

PRELIMINARY ENGINEERING REPORT NORTH CREEK SEWER DISTRICT

FOR
THE TOWN OF JOHNSBURG

Warren County
New York



Project Number: 15-028

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1 EXECUTIVE SUMMARY

The Town of Johnsburg, located in northern Warren County, is seeking to form a new sewer district to serve the Hamlet of North Creek. The study area is a mix of densely developed residential/commercial areas, lower density residential areas, satellite commercial areas, and planned residential developments. Most of the proposed study area is served by the existing municipal water system. Wastewater in the study area is currently treated by individual septic systems of various treatment type, construction, age, and performance. Due to small lot sizes and other constraints, many new replacement septic systems would not be able to meet current design standards. Since the age and treatment ability of the individual systems are unknown, there is also potential for environmental impact from failure of existing systems. North Creek is designated a hamlet, and as such is intended to accommodate denser development with minimal impact to natural resources. To appropriately accommodate dense development, the Town should have a wastewater treatment facility adequate to protect water quality.

Based upon an analysis of the existing conditions, response from Town Officials, and discussions with the Town of Johnsburg Sewer Committee, a single-phase plan with a wastewater treatment facility is presented for the implementation of a comprehensive sewer district. This option was selected based on monetary and non-monetary factors and the potential for grant/loan opportunities and anticipated sewer fees. Several alternatives were evaluated for the implementation of the collection and treatment system. Treatment options included a community subsurface disposal system, advanced fixed-film treatment units, a Sequencing Batch Reactor (SBR) system, and a force main connection to Gore Mountain. The advanced fixed-film process has been selected as the recommended alternative. The treatment system would be fed by a sanitary collection system with gravity collection and pump stations with force mains.

The proposed collection system would consist of 8-inch gravity sewer mains, residential connections, and force mains. The collection system would consist of approximately 4,850 linear feet of gravity sewer main located along Main Street, Ski Bowl Road, and Railroad Place with approximately sixty-six (66) lateral connections. The collection system would also include approximately 4,835 linear feet of force main and a pump station.

As of writing of this report, the estimated construction cost for collection, treatment, and discharge is \$7,630,880. The estimated O&M costs total \$60,000 per year. For this report, the most conservative approach was used to ensure adequate funding can be secured.

2 PROJECT PLANNING

The Town of Johnsburg, located in northern Warren County, is seeking to form a new sewer district to serve the Hamlet of North Creek. The study area is a mix of densely developed residential/commercial areas, lower density residential areas, satellite commercial areas, and planned residential developments. Most of the proposed study area is served by the existing municipal water system. Wastewater in the study area is currently treated by individual septic systems of various treatment type, construction, age, and performance. Due to small lot sizes and other constraints, many new replacement septic systems would not be able to meet current design standards. Since the age and treatment ability of the individual systems are unknown, there is also potential for environmental impact from failure of existing systems. North Creek is designated a hamlet, and as such is intended to accommodate denser development with minimal impact to natural resources. To appropriately accommodate dense development, the Town should have a wastewater treatment facility adequate to protect water quality.

2.1 Location

The Hamlet of North Creek is in the northeastern portion of the Town of Johnsburg, in Warren County, New York. The Hamlet is located between the Hudson River to the east and NY Route 28 to the west. The location is shown in Appendix A, Figure A-1. The Hamlet is in the southern Adirondack Park, northwest of the Lake George area. The Hamlet supports season long tourism, with winter activities centered around neighboring Gore Mountain Ski area. There are also many other outdoor activities that bring visitors to the Hamlet year-round, including fishing, hiking, mountain biking, rafting, and new activities involving the former Saratoga and North Creek Railroad tracks.

2.2 Environmental Resources Present

2.2.1 Topography

The Hamlet area contains mixed topography, with a general slope from west to east from NYS Route 28 to the Hudson River. Along the river there is a rapid grade transition to meet the water surface. The Hamlet contains some minor grade changes due to historic development and local topography. The most significant grade change is around the North Creek, which splits the Hamlet area. The topography of the site will require segmentation of the collection system and in-depth analysis to maximize the use of a gravity collection systems. It is likely that pumping of wastewater will be required as topography will not allow for draining to one area. The area topography is presented in Appendix A, Figure A-2.

2.2.2 Geology

The area is in the Adirondack Park where bedrock and sand/gravel deposits dominate the local geology. In general, mountainous areas and areas with steeper slopes have shallow depths to bedrock. Alternatively, flatter areas and areas adjacent to existing rivers have sand or gravel

deposits overlaying the bedrock formations. These sands and gravels are highly permeable and can have a significant depth to bedrock. A majority of the Hamlet is located over sand and gravel deposits; however, there are isolated areas of exposed bedrock or large subsurface boulders. Based upon observed geology, the wastewater system design will not be significantly impacted by the subsurface geology; however, areas of ledge may impact the final wastewater system location.

2.2.3 Hydrology

The area has significant underground water resources. Groundwater generally flows from surrounding mountain areas to the Hudson River through extensive sand and gravel deposits. Drinking water for the Hamlet and several residences outside of the Hamlet is provided by wells located in these deposits. The local hydrology is critically important for water supply and should not be impacted by the proposed wastewater treatment system. Of special note are the existing water supply wells for the North Creek Water District as indicated in Appendix A, Figure A-2.

2.2.4 Wetlands

Wetland information was taken from the United States Fish and Wildlife Service, New York State Department of Environmental Conservation, and Adirondack Park Agency. Several dispersed wetlands are present in the Hamlet area, with most of the wetlands adjacent to the North Creek and/or the Hudson River. Most of the wetlands are Freshwater Forested/Shrub wetlands. The location of the wetlands is not anticipated to have a major impact on the design of the wastewater district or wastewater treatment area as few wetlands are located within the Hamlet area. Wetland maps are presented in Appendix A in Figures A-3A and A-3B.

2.2.5 Floodplains

The Federal Emergency Management Administration (FEMA), Flood Insurance Rate Maps for the Town of Johnsbury shows the extent of the Hudson River and North Creek 100-year floodplains. The mapping indicates the 100-year floodplains are generally located adjacent to the Hudson River and North Creek, with minimal intrusion into the Hamlet area. The floodplains do limit the location of a wastewater disposal system to areas elevated above the nearby waterbodies. A map of the 100-year floodplains in the Hamlet area is shown in Appendix A, Figure A-4.

2.2.6 Soils

Soils in the Hamlet area are varied; however, the area is primarily composed of sandy soils with occasional areas of exposed ledge. The Town of Johnsbury owns and operates a parcel of land used as a highway garage and sandpit for the Hamlet area. Based upon observations at this site, soil mapping, and general topography of the area it is likely that most of the area is comprised of highly permeable sands. These highly permeable soils serve as a water source for the municipal water system for the Hamlet as discussed in section 1.2.3. A soils map of the Hamlet area is shown in Appendix A, Figure A-5.

2.2.7 DEC Water Quality Classification

The DEC water quality classification is shown in Appendix A, Figure A-6. The Hamlet area is located adjacent to the intersection of the Hudson River and the North Creek. The Hudson River is classified as C(T) for the section adjacent to the Hamlet area, and the North Creek is classified as a C(T) stream. These classifications require specific limits on the quantity and quality of wastewater discharged to nearby waterbodies if surface discharge is required. Based upon these conditions the wastewater treatment system should avoid surface discharge unless the discharge can be located to avoid impacts to the receiving waterbody.

2.2.8 Natural Communities

A map showing the presence of natural communities is presented in Appendix A, Figure A-7. The project area does not have any areas of significant natural communities; however, a portion of the project area is located within the boundary areas surrounding significant natural communities. The existing natural communities located adjacent to the Hudson River and other environmental areas may limit the possible wastewater system locations.

2.2.9 Historic Resources

The Hamlet area has several historically significant buildings and locations. A map of the historically significant components is shown in Appendix A, Figure A-8. Historic resources will not impact the type of wastewater system selected, although they may limit the final location. Should locations be identified for wastewater system, historical surveys should be performed during the environmental review to determine presence or absence of historic sites. A list of historic resources in the Hamlet area is summarized in Table 2-1. It is not anticipated that historic buildings will limit the location of wastewater treatment facilities, or the type of treatment used; however, the internal wastewater piping of historic buildings will impact the design of the collection system.

Table 2-1 - List of Historic Resources in Hamlet Area

USN	Name	Status
11306.00001	North Creek Railroad Station Complex - Railroad Pl	Listed
11306.00005	Owens House Gallery & Museum Store - 313 Main Street at Railroad Place	Undetermined
11306.00009	Motel - 1-story/14 tourist units - 264 Main St	Not Eligible
11306.00009	2-story commercial building - 272 Main St	Not Eligible
11306.00009	3-story commercial building - 274 Main St	Not Eligible
11306.00009	1-story commercial building - 302 Main St	Not Eligible
11306.0001	2-story/side-gabled residence - 41 NY 28 N	Not Eligible
11306.0001	Town of Johnsburg Library - 219 Main St	Not Eligible
11306.0001	Waddell house, frame residence - 52 NY 28N	Eligible
11306.0001	house - 1 Circle Ave	Eligible
11306.0001	house - 2 Circle Ave	Eligible
11306.0001	Owens House Gallery & Museum Shop - 312 Main St	Undetermined
11306.00011	St James Catholic Church - 239 Main Street	Undetermined

11306.00011	United Methodist Church - Main Street	Undetermined
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2.2.10 Tax Maps

A map of the tax parcels in the Hamlet area is shown in Appendix A, Figure A-9. The Hamlet area is primarily composed of small lots for single-family residences. Several of the existing parcels do not meet the separation distance requirements for new wastewater disposal systems. The small lot sizes would make the use of several decentralized wastewater treatment systems to serve the Hamlet area difficult. A centralized wastewater system would be best suited for treatment of the Hamlet area.

2.2.11 Existing Zoning

A map of the existing zoning is presented in Appendix A, Figure A-10. The Hamlet area is primarily zoned for business uses, residential uses, and public facilities. The project area spans several zoning districts in the Hamlet area. No zoning regulations were found to impact the location or treatment system type of a wastewater treatment system for the hamlet area.

2.2.12 Proposed Zoning

No proposed modifications to the existing zoning maps are known at the time of this report.

2.2.13 APA Land Use Classification

The Adirondack Park Agency designates most of the project area as Hamlet. Adjacent to the project area is a portion of Low-Intensity use areas. To simplify permitting requirements, the proposed wastewater treatment system should be in an area zoned as Hamlet or in other zoning areas with less stringent controls. A map of the APA designated lands uses is presented in Appendix A, Figure A-11.

2.2.14 Regional Plans

The regional plans prepared by Warren County identify the Hamlet as an area of concentrated growth for the region. The Town of Johnsburg is part of the First Wilderness Heritage Corridor, a scenic corridor based around the Saratoga to North Creek Railway (currently not running) and the upper Hudson River. The plans for the corridor called for the development of North Creek into a centralized tourism area as it is the end of the rail line. Regional plans indicate that the lack of a centralized wastewater system has been a limiting factor to development in the Hamlet. The centralized wastewater treatment system should not be sited in a tourism sensitive area, additionally the treatment system selected should not create conditions (odors, increased traffic, visual impacts, etc.) that will impact tourism.

2.3 Population Trends

2.3.1 Population Data

North Creek is defined as an un-incorporated Hamlet within the Town of Johnsbury. The Hamlet is primarily residential and has several small to moderately sized businesses and restaurants but does not have any major industrial centers. The Hamlet area is currently served by a municipal water system.

As of the 2010 Census, there are 616 permanent residents living in the Hamlet. The permanent population is supplemented by seasonal visitors, who participate in both winter and summer recreation. Preliminary 2020 Census data indicates a population of 698 permanent residents which is an increase of 13.31% from 2010. The population is supplemented by seasonal visitors but the growth to seasonal tourism is difficult to document and predict; however, it is reasonable to assume that population will increase in the area over time. Investment by the Town, private individuals and the State of New York has increased tourism in the area over the past ten years. Additional investment is anticipated in the future, and the development of a centralized wastewater system is likely to increase investment in the area by removing barriers to development.

2.3.2 Concentrated Growth Areas

Redevelopment in the Hamlet area has increased with several new businesses supplementing existing local businesses. Major institutions in the Hamlet area include the Johnsbury School, Town Hall, a supermarket, hotels, shopping areas, a laundry, and restaurants. It is anticipated that this growth will continue within the Hamlet area.

In addition to the Hamlet area there are two other areas of anticipated growth: Gore Mountain Ski Resort and the existing Front Street Development. Gore Mountain Ski Resort, owned and operated by the Olympic Regional Development Authority (ORDA), is primarily a day-use ski center during its six-month snow ski season. During that season, the mountain experiences its highest wastewater flows. ORDA is actively promoting increased shoulder-season events at Gore Mountain. The Front Street Development provides slope-side residential facilities and anticipates a full-service complex in the future. Please see Appendix A, Figure A-12 for a map of the areas of concentrated growth.

2.4 Community Engagement

Initial funding to evaluate a proposed wastewater system was provided through a grant from the NYS Department of State through the First Wilderness Heritage Corridor. As part of the grant funding public meetings were held to discuss the planned area. Prior to the public meetings a Wastewater Advisory committee was developed. The committee was selected by the Town of Johnsbury and includes members of the business and residential communities and local government. The committee has provided guidance on the sewer district boundaries, siting of the treatment facilities, and potential areas of interest from the community. Following the preparation of the Map, Plan and Report a public meeting was held to present and review a draft of the plan at a public town meeting. All comments were recorded and, when appropriate, comments were used to prepare the final report. The final Map, Plan and Report shall be presented and adopted by the Town Board.

2.5 Sewer District Delineation

The proposed sewer district in the Town of Johnsbury for the Hamlet of North Creek is shown in the map included as Figure A-3 in Appendix A. No sewer district had been established for the area previously. The proposed sewer district was delineated based upon guidance from the Sewer Committee, local topography, and potential need for wastewater service. The sewer district includes the Hamlet area, the Ski Bowl, Front Street Development, and commercial/residential areas near the Route 28/Ski Bowl Road intersection. The proposed North Creek Sewer District will include properties along Main Street from Ski Bowl Road to the Town Hall. Appendix C includes information about the properties included in the district. C-1 is a table of the properties in the district and C-2 is the Metes and Bounds legal description of the district.

3 EXISTING FACILITIES

The area is primarily served by existing individual on-site wastewater treatment and disposal systems. Most systems are simple septic tanks connected to an absorption bed or seepage pit. In addition to these individual systems there are two wastewater treatment facilities in the area. One serves the Gore Mountain Ski Resort and the second serves a portion of the existing Front Street Development.

3.1 Location

The location of the two existing wastewater treatment systems at Gore Mountain Ski Resort and Front Street Development is shown on Figure A-13 in Appendix A

3.2 History

To date no major wastewater systems have been proposed or constructed to serve the Hamlet area. A history of the existing wastewater systems serving the concentrated growth areas adjacent to the Hamlet area is included in the following section.

3.3 Condition of the Existing Facilities

3.3.1 Gore Mountain

The wastewater treatment system for Gore Mountain Ski Facility was upgraded in 1991. The existing plant consists of two treatment processes, a Sequencing Batch Reactor (SBR) system for the summer months, and an Orbital Treatment System for the winter months when flows are higher. In addition to the two biological processes, the plant has an effluent polishing filter and a sludge holding and digestion tank. The facility discharges under SPDES Permit No. 0034339. The plant has a maximum permit flow of 65,000 GPD. At the time of this report there were no major known violations, and the plant is reported to be performing well.

3.3.2 Front Street Development

The wastewater treatment system for Front Street Development was commissioned in 2011. Further development at the site is planned for a mixed residential and recreational area adjacent to the North Creek Ski Bowl. Wastewater treatment is provided by a fixed-film Orenco advanced treatment system. The facility has a permitted capacity of 12,000 GPD and operates under the SPDES permit No. NY0265870.

3.4 Individual Wastewater Systems

Most of the existing residences and businesses located in the Hamlet area are served by individual wastewater systems that consist of septic tanks and leach fields. These systems are assumed to be in varying levels of compliance. Several systems are located on lots where compliance with

required separation distances is not possible and the physical and operational integrity is unknown. The main concern with these existing systems is the potential impact on water quality in the area.

3.5 Financial Status of the Existing Facilities

The existing wastewater system at Gore is financed by the Olympic Regional Development Authority (ORDA). The Front Street Development wastewater treatment facilities are owned by Mountain Sewer Company. Individual wastewater systems are owned and operated by residential users. Financial data for the two centralized systems is not available.

4 NEED FOR PROJECT

Although the Hamlet area and other locations have been developed without a centralized system, current standards for wastewater design have limited development in the Hamlet. Small lot sizes have precluded several lots from changing or expanding due to limited wastewater treatment capacity. The development of a centralized wastewater system will help facilitate growth in the area. North Creek is designated as a hamlet and is intended to accommodate denser development with minimal impact to natural resources. To appropriately accommodate dense development, the Town should have a wastewater treatment facility adequate to protect water quality. Investment into the community has been limited due to the inability to handle increased wastewater flows.

In addition to reducing barriers for future investment in the community, the establishment of a centralized wastewater system would help residents with sub-standard wastewater systems and reduce the potential for an impact to the water quality in the area.

4.1 Health, Sanitation, and Security

At the time of this report there are no documented health issues related to existing wastewater systems. However, several facilities discharge wastewater to septic tanks and disposal fields that were designed under previous design standards. Several of these systems do not meet the existing requirements for setback distances, septic tank sizing, and/or application rates. These systems have the potential to discharge untreated wastewater to the environment where health related issues may occur. There have also been circumstances where existing businesses have been denied expansion because there isn't enough land to install a new wastewater system.

4.2 Aging Infrastructure

The individual wastewater systems serving the Hamlet area are of various ages and conditions. As stated previously, most of the existing parcels do not have sufficient space for conventional wastewater treatment and disposal systems that are compliant with current design standards. It is likely that several of the existing individual wastewater systems will require replacement within the next five to ten years. Replacement costs for failing systems are anticipated to be significant for the property owners. In addition, effluent from systems that may be failing can enter the groundwater and ultimately negatively impact the local water supply or the Hudson River.

4.3 Reasonable Growth

The development of a centralized wastewater system will help facilitate growth in the area. Existing businesses would have the potential for expansion and new businesses could open. Currently, there is development planned at the Ski Bowl which will be aided by the development of a wastewater system.

5 DESIGN CRITERIA

5.1 Flow Data and Wastewater Characteristics

Based upon the size of the proposed sewer district flows can be determined for the design of a wastewater treatment system. The proposed district includes 24 residential properties and the downtown commercial district. This information is shown on the proposed district included as Appendix A – Figure A-3. It is also shown on the Warren County GIS Map of the proposed district included as Appendix A-7. For the following section the design flows shall be considered Permit Flows (Maximum flow averaged over a 30-day period).

Based on a review of a previously completed feasibility study and current conditions in the Hamlet, the design flow for the proposed sewer district would be approximately 61,000 gallons per day (GPD). This includes a mix of residential, commercial, and municipal properties. This includes a mix of residential and commercial properties.

Table 5-1- Proposed Flows

Flow Condition	Estimated Flow (GPD)
Average Day (ADF)	51,000
Permit Flow, Max Monthly (MMF)	61,000
Peak Daily Flow (PDF)	100,000
Peak Hourly Flow (PHF)	200,000

For the design of a wastewater treatment system typical contaminant characteristics are required. Values for BOD, TSS, Ammonia and Phosphorus loading are included in Table 5-2 below.

Table 5-2 Typical Wastewater Characteristics

Parameter	Typical Value
Five-Day Biochemical Oxygen Demand (BOD ₅)	250 mg/L
Total Suspended Solids (TSS)	250 mg/L
Ammonia (NH ₃)	45 mg/L
Total Phosphorus (TP)	8 mg/L

5.2 Location Selection Criteria

No centralized wastewater system serves the Hamlet area; therefore, an appropriate location must be selected. The following selection criteria were reviewed by the Sewer Committee and used to determine the potential location for a wastewater treatment facility. Please note that the locations of the existing wastewater treatment facilities for Gore Mountain Ski Facility and Front Street Development were also evaluated.

5.2.1 Proximity to Sewer District

The primary selection criteria were the proximity of the location of the wastewater treatment facility to the proposed sewer district and areas of concentrated growth. Priority was given to parcels located within or adjacent to the proposed sewer district. Secondary priority was given to locating the wastewater system in relation to the areas of concentrated development. Locating a wastewater treatment system close to these areas will reduce the cost of a wastewater collection system.

5.2.2 Topography

Location selection was also based upon local topography. To reduce the costs of a collection system, the proposed wastewater system should be in an area where wastewater generated from the proposed sewer district will drain by gravity. In lieu of draining by gravity, the sewer district should be served by a minimal number of pumping stations to convey wastewater to a treatment area. Lower topography areas generally located near the North Creek and Hudson Rivers were given priority as they would be better suited to gravity drainage.

5.2.3 Property Ownership

Parcels currently owned by the Town of Johnsbury, or Warren County were given a higher ranking as no land purchase would be required.

5.2.4 Adequate Space

Locations were evaluated to determine if the selected site contained sufficient space for the wastewater systems considered. For planning purposes, a size of two acres was used to evaluate if a location had sufficient space for a full buildout of a conventional wastewater system along with all associated equipment. Space was evaluated based upon the presence of flat areas and lack of limits to construction.

5.2.5 Access for Construction and Maintenance

Parcels with easy access to a major roadway were given priority. Any proposed wastewater treatment system will require significant construction and road access will reduce land development costs. For the location evaluation, priority was given to major State and County Routes that can handle large construction vehicles. Locations adjacent to residential developments were discouraged as the construction would negatively impact residents.

5.2.6 Construction Issues

Constructability evaluations were based upon desktop analysis of existing conditions and limited site inspections. Barriers to construction included the presence of shallow bedrock, wetlands,

significant natural communities, historic resources, and location relative to floodplains. Priority was given to areas without major construction issues.

5.2.7 Regulatory Issues

Parcels with limited barriers to development due to regulatory controls should be given priority. Regulatory barriers can include permitting required to modify zoning requirements, obtaining approval from State of New York regulatory agencies, and approval of the Adirondack Park Agency.

5.2.8 Scenic and Tourism Impacts

The selected location should not have an impact to the scenic resources of the area or negatively impact seasonal tourism. Locations with barriers to visibility or minimal impact on both scenic and tourism resources were preferred over other locations.

5.3 Location Options

Based upon these criteria five locations were identified in a preliminary analysis. A summary of the locations evaluated is included below.

Town Highway Parcel (Tax Map 66.-1-14) – This parcel is owned by the Town of Johnsbury and is currently used as a highway maintenance facility and sand excavation area. This location is adjacent to the main sewer district and centrally located between the two areas of concentrated development. The site is currently used as a highway facility; however, there is sufficient space for development without impacting the highway garage. Sufficient access to the site is provided from Route 28. The site is currently disturbed and is not anticipated to have major construction issues. The site is currently used for municipal services; however, the area is designated as a park and the Town of Johnsbury has additional plans for the development of the area. The site is adjacent to three water supply wells serving the North Creek Water District. This location would need have additional measures to prevent the wells from being impacted. In addition to environmental measures, the location borders the Ski Bowl and recreational facilities; therefore, additional visual screening and significant permitting would be required.

Town Hall Parcel (Tax Map 66.-10-2-41) – This parcel is owned by the Town of Johnsbury and is currently utilized for the Town Hall and parking area. This location is in the main sewer district and centrally located between the two areas of concentrated development. This area is located down gradient of most areas of the district. Adequate access to the site is provided from Route 28. The site is currently disturbed and preliminary evaluations indicate the site has enough space for a wastewater treatment facility and there appear to be no major barriers to construction. The North Creek and a small tributary stream border the property, but no impacts to the environment are anticipated for this location.

Parcel Adjacent to Train Station (Tax Map 66.5-1-1) – This parcel is located at the northern end of the proposed sewer district and is adjacent to the Front Street Development concentrated growth area. Based upon local topography it is likely that part of the sewer district can drain to the area by

gravity; however, some pumping may be required to bring the hydraulic profile to grade. The property is not owned by the Town of Johnsbury; therefore, the location would have to be purchased from the current owner. Preliminary evaluations indicate the site has enough space for a wastewater treatment facility and there appear to be no major barriers to construction. Vehicle access to the site can be provided from Main Street and Ski Bowl Road. The site is located within the APA designated Hamlet area and is listed as commercially zoned, indicating there may be some minor permitting issues with the site. The Hudson River and a small tributary stream border the property, although, no impacts to the environment are anticipated for this location. The Saratoga and North Creek Railway's northern station and the Copperfield Inn neighbor the property; visual barriers will be required to mitigate potential visual impacts to nearby properties.

Location along Peaceful Valley Road (Various Parcel Locations) – Several areas adjacent to Peaceful Valley Road were also evaluated. These sites are distant from the sewer district; however, their location is centrally located between the Gore Mountain concentrated growth area and sewer district. These placements may reduce barriers to creating a centralized wastewater system serving both Gore Mountain and the sewer district. These locations are at an elevation higher than most of the sewer district, requiring pump stations and force mains. Several suitable locations are available, and ownership ranges from private, to properties owned by the State of New York through ORDA and the Gore Mountain Ski Facility. An agreement between the Town and ORDA would be required to utilize one of these locations. Existing forested areas and little flat areas will require site development including clearing of trees and grading for construction. The sites are on the Gore Mountain Ski Facility lands and are designated for intensive use by the APA; therefore, the construction of a wastewater treatment system should be permissible. Adequate space is present to construct a new facility and provide screening from the road to limit visual impact.

Location near Landfill (Tax Map 66.-1-14) – The Town currently owns a large parcel (currently used as a transfer station and recreational paths) adjacent to the existing Ski Bowl. The location is southwest, and upslope of the Town Highway Parcel previously presented and is slightly more distant from the proposed sewer district. Due to the relatively high elevation of this location, pumping will be required to convey wastewater to the treatment location. The site has limited space, and there are indications of exposed ledge at the site. A preliminary analysis should be conducted to determine sub-surface conditions at the site and potential for major barriers to construction. The land is currently used for municipal work and should not require major permitting changes to allow for the construction of a wastewater system. The site is located adjacent to the Ski Bowl recreational paths, the ski trails, and upslope of the Grunblatt Memorial Beach; therefore, additional analysis will be required to evaluate the impacts to scenic and recreational resources. The site is also a Town-designated Park.

Based upon the observed locations the ***Town Hall Parcel*** was selected as the recommended location for the new wastewater treatment facilities. This location was preferred as the site is located downslope from most areas of the district, has adequate space and presents limited barriers to development at the site and is owned by the Town.

6 ALTERNATIVES ANALYSIS

The following section outlines the options evaluated for the wastewater design. Four treatment options were selected for evaluation and are listed below. Due to the various configurations available, only treatment options are considered in this section, the collection system is discussed in Section 8.1. Each of the viable options was evaluated based on the following criteria: environmental impacts, land requirements, potential construction problems, sustainability concerns, and cost. **Costs associated with collection and pump stations are discussed in Section 8.1.**

6.1 No-Action Alternative

The no-action alternative was initially reviewed but deemed unviable since it doesn't address any of the issues described in Section 4. No action would allow all issues that limit investment in the community to continue and may cause future health related issues due to future septic system failures.

6.2 Option 1 – Conventional Sub-Surface Treatment and Disposal System

Option 1 would involve the construction of a traditional sub-surface treatment and disposal system. Wastewater would be collected and pumped to one central location where treatment would be provided by a single large septic tank and several absorption beds. Treated wastewater would be discharged to the soil. The following sections outline an analysis of this option. A process diagram of Option 1 is included in Figure A-14 in Appendix A.

6.2.1 Process Sizing

Three items would require sizing for this option: the septic tank, pumping station, and absorption area. Sizing for these systems is performed in accordance with the guidance from the New York State Department of Environmental Conservation (NYSDEC) Design Standards for Intermediate Sized Wastewater Treatment Systems.

Septic tank size was determined based upon DEC design guidance for the requirement of holding tank volume equal to the daily average flow rate. The septic tank was sized to have a capacity of 90,000 gallons. A wastewater pumping station located adjacent to the septic tank would be sized to hold one-third of the daily flow, or approximately 30,000 gallons. For a pump station of this size, two pumps need to be present for redundancy.

The absorption field for this option would be sized based on soil conditions and applicable loading rates as stated in the design guidance. The soil conditions at the selected location (and most other alternative locations) are listed as very permeable. Due to the size of the system and the need for treatment of additional parameters in the wastewater (nitrogen compounds and phosphorus) a lower percolation rate is desired. Assuming soil amendments are required to achieve a percolation rate of 6-7 minutes per inch, the soil can treat 1.0 gallons per square foot per day. For absorption beds the application rate is reduced by 25 percent to accommodate the limited reaeration capacity, resulting in an application rate of 0.75 gallons per square foot per day. With a wastewater loading

of 90,000 gallons per day the required disposal area is 120,000 square feet. This total disposal area would be served by absorption beds 15 feet in width and 200 feet in length. Each absorption bed would provide 3,000 square feet of treatment area; with a total of 40 absorption beds required to treat the design flow. A 100 percent reserve area would also be required pursuant to regulations.

6.2.2 Environmental Impacts

The proposed treatment system for Option 1 is anticipated to have minimal impact to the environment. The centralized treatment system with a lower application rate will provide enhanced treatment compared to the treatment currently provided by the existing systems at each property. In addition to the enhanced treatment, the proposed system will have more stringent monitoring and maintenance requirements compared to the existing systems. This enhanced monitoring will result in detection of potential contamination issues, whereas the current systems lack monitoring requirements. Due to the size of the proposed system, groundwater monitoring will be required. This treatment option will also have a minimal increase in impervious area, resulting in negligible stormwater runoff. Electrical demand for this option would be the lowest of all proposed alternatives as pumping from the septic tank would be the only source of demand.

6.2.3 Land Requirements

This option would require the most area of any option evaluated, mostly for the absorption beds. Based upon preliminary sizing using 15 feet x 200 feet absorption beds with a 5-foot spacing between beds the overall area for this option would require approximately 4.8 acres. This area would require regular mowing to prevent trees from setting roots into the absorption beds; the area could be used as a recreation field or open space. As stated previously, a 100 percent reserve area would also be required.

6.2.4 Construction Problems

This option would require construction activities typical of a conventional sub-surface wastewater disposal system; however, the scope of construction would be much larger than a conventional wastewater system. A cast-in-place concrete tank would likely be most economical for the required size; consequently, the proposed septic tank would require excavation and significant concrete work. The construction of the absorption beds would be relatively simple and could be accomplished with construction equipment typically owned by municipalities. The large number of materials required for construction would require substantial material stockpiling and transportation as part of the construction process.

6.2.5 Sustainability Concerns

The modification to the site with this option would be minimal. The use of the existing site would be minimally impacted and allow for continued use of the area. This option would have the lowest electrical demand of any option.

6.2.6 Cost Estimates

A cost estimation for the proposed project is presented in Table 6-1 below. This preliminary cost estimation breaks down the various cost categories by general work. Due to the large areas of absorption beds required, a significant portion of the cost for this option would come from the construction of absorption beds. This cost could be reduced with in-kind services provided by the Town (construction and materials provided or procured by the Town of Johnsbury). A 25 percent contingency has been added for preliminary cost estimations.

The concrete construction will be a significant cost for the septic tank and pump station budget items. This estimated amount is based on cast-in-place construction as precast construction is typically much higher for the sizes involved. Additional components for the septic tank and pump station (pumps, controls, and electrical work) would be relatively minor. A 25 percent contingency is added for preliminary design.

In addition to the septic tank and pump station, additional site work would be required. Yard piping connecting all the components, soil restoration, plantings, and an access road to allow for periodic pumping out the septic tank would be required.

Professional services anticipated for this project would involve advanced permitting, a hydrogeological study to ensure no contamination of nearby river, typical engineering design, bond counsel, various legal expenses, grant procurement and administration, and construction inspection/documentation. The total anticipated capital cost for this option is \$2,489,707 and is shown in Table 6-1 below.

Operational and maintenance costs for this option were also evaluated to determine the ongoing costs. Operations costs are shown in Table 6-2 below and broken down by general category. Costs were estimated based on operational experience with similar sized municipal projects. Total annual O&M costs are estimated at \$55,000.

The cost of the collection system construction is **not included in this cost estimate**. Costs assume funding and loan requirements including (but not limited to) State Prevailing Wage, Buy American Requirements, and Davis Bacon Requirements. Other conditions may apply from funding/grant/loan agencies which could increase construction costs.

Table 6-1-- Option 1 Capital Cost Estimation

Project: <u>North Creek Map Plan and Report</u>		
Description: <u>Option 1 - In-ground System</u>		
Date: <u>7/1/2021</u>		
A	Absorption Beds	
1	Excavation and Storage	\$65,520
2	Soil Amendments	\$87,360
3	Crushed Stone	\$187,590
4	Piping	\$105,495
5	Filter Fabric	\$63,700
6	Soil Restoration	\$96,720
6a	Groundwater Monitoring Wells	\$84,500

7	Subtotal	\$690,885
8	Contingency (25 percent)	\$172,721
9	Absorption Beds Total	\$863,606
B	Septic Tank / Pump Station	
10	Concrete and Excavation	\$327,600
11	Pumps	\$31,200
12	Controls	\$23,400
13	Electrical	\$15,600
14	Misc. Components	\$15,600
15	Subtotal	\$413,400
16	Contingency (25 percent)	\$103,350
17	Septic Tank / Pump Station Total	\$516,750
C	Misc. Field Work	
18	Yard Piping	\$117,000
19	Plantings	\$78,000
20	Access Road	\$15,600
21	Subtotal	\$210,600
22	Contingency (25 percent)	\$52,650
23	Misc. Field Work Total	\$263,250
24	Construction Grand Total	\$1,643,606
D	Professional Services	
25	Permitting	\$49,920
26	Hydrogeological Study	\$49,920
27	Engineering	\$234,000
28	Legal	\$98,800
29	Bond Counsel	\$73,320
30	Construction Inspection	\$93,600
31	Professional Services Total	\$599,560
32	Project Contingency (15 percent)	\$246,541
33	Total Project Cost	\$2,489,707

Table 6-2-- Option 1 O&M Cost Estimation

Project:		<u>North Creek Map Plan and Report</u>
Description:		<u>Option 1 - In-ground System</u>
Date:		<u>7/1/2021</u>
A		
1	Site Upkeep (Mowing, snow removal, etc.)	\$5,000
2	Solids Hauling	\$17,500
3	Staffing	\$12,000
4	Electric	\$5,000
5	Pump Maintenance and Replacement	\$5,000
6	Contractual Services	\$5,500
7	Water Quality Testing	\$5,000
8	Total	\$55,000

6.2.7 Advantages/Disadvantages

This option would likely have the lowest construction costs, most simplified construction, and lowest operational costs of any options listed. In addition, the construction would have minimal impacts on the site and allow for additional uses of the location. This option would also not require a certified operator, reducing operation costs.

Disadvantages include that this option would be a centralized septic system that would have little flexibility to handle industrial flows or significant changes to flow characteristics. In addition, the wastewater flow is the maximum flow recommended for an underground wastewater disposal system. Based upon the proposed flow, additional treatment for compliance with groundwater standards would likely be required. Compliance with nitrogen groundwater standards would likely be difficult with a traditional subsoil disposal system. The area required for this system is also a disadvantage. The Town currently does not own property to locate a traditional subsoil disposal system of this size and the cost to purchase and adequately sized piece of property is too high to make it feasible. The combination of these factors is ultimately why Option 1 was not chosen and was determined to not be a viable option.

6.3 Option 2 – In-Ground Advanced System

This option would involve the construction of a new wastewater treatment and disposal system that would include an advanced in-ground fixed film treatment system. This option would provide treatment like Option 1; however, the system would have a smaller size and be able to provide additional treatment flexibility. For the Map, Plan, and Report ORENCO treatment systems were evaluated and used for process sizing and cost estimations, however; the Town is not required to use ORENCO, and any advanced fixed film process could be selected during final design. Figure A-15 in Appendix A has a process diagram for Option 2.

6.3.1 Process Sizing

Advanced Treatment Systems typically require vendor basis of design to provide a product warranty. This basis of design can be estimated from design documents, with final process sizing provided by the vendor.

The overall process consists of a primary settling tank, anoxic mixing basin, fabric media treatment units, recirculation pumping chamber and discharge pumping chamber.

Preliminary design information available from ORENCO provides typical loading rates to the fabric media treatment units in terms of pounds of BOD per day or gallons per day. Preliminary sizing information is presented by ORENCO in Appendix B. For this design a surface discharge is assumed, and no disposal field is required.

6.3.2 Environmental Impacts

The proposed treatment system for Option 2 is anticipated to have minimal impact to the environment. The treatment system proposed will increase wastewater treatment and discharge treated effluent to surface waters. The system would be able to provide enhanced treatment compared to the treatment currently provided by the existing systems at each property. In addition to the enhanced treatment, the proposed system will have more stringent monitoring and maintenance requirements compared to the existing systems. This enhanced monitoring will result in detection of potential contamination issues, whereas the current systems lack monitoring requirements. The proposed system can be modified to include treatment of additional parameters including nitrogen and phosphorus.

This treatment option will have a moderate increase in impervious area, resulting in stormwater runoff that can be treated by surface stormwater features. Electrical demand for this option would be moderate when compared to other options due to recirculation of the wastewater and pumping from the tanks to the location of discharge.

6.3.3 Land Requirements

This option would require significantly less area than Option 1. Based upon preliminary sizing provided by ORENCO with typical surface features the overall area required for this option would be approximately 1.6 acres. This area would require fencing and screening to prevent trespassing on site.

6.3.4 Construction Problems

This option would require site construction typical of an advanced sub-surface wastewater disposal system, although the scope of construction would be much larger. Prefabricated treatment system components could be delivered and installed on-site. The installation of the process tanks would require the use of heavy equipment to lift and place components. Following placement of the process components, construction would be relatively simple and could be accomplished with typical construction equipment.

6.3.5 Sustainability Concerns

The modification to the site with this option would be moderate. Additional proprietary treatment units could be added to the proposed site, if necessary. These units require additional recirculation to meet treatment goals, therefore additional electrical use would be required. As a result of construction, stormwater control features would be required. Although this option would use more electricity and generate more stormwater runoff than Option 1, the treatment flexibility with this setup is anticipated to result in better treatment of effluent.

6.3.6 Cost Estimates

A cost estimation for the proposed project is presented in Table 6-3. This preliminary cost estimation breaks down the various cost categories by general work. The advanced treatment units provided by ORENCO would be the largest cost item for the project.

The concrete construction would be the most significant cost for the septic tank and pump station component. This estimated amount is based upon cast-in-place construction, as precast construction is typically higher for the sizes involved. Additional components for the septic tank and pump station (Pumps, Controls, and electrical work) would be relatively minor. A 15-percent contingency is added for preliminary design. In addition to the septic tank and pump station, additional site work would be required. Yard piping connecting all the components, soil restoration, plantings, and an access road for pumping out the septic tank would be required. In addition to these items a new control building would be required to house controls, aeration equipment and other components.

Professional services anticipated for this project would involve advanced permitting, typical engineering design, ORENCO Engineering costs, bond counsel, various legal expenses, grant procurement and administration, and construction inspection/documentation. The total anticipated cost for this option is \$4,214,000. For this report, the most conservative approach was used to ensure adequate funding can be secured.

Operational and maintenance costs for this option were also evaluated to determine the ongoing costs. Operations costs are shown in Table 6-4 and broken down by general category. Costs were estimated based on operation experience with similar sized municipal projects. Total annual O&M costs are estimated at \$60,000.

The cost of the collection system construction **is not included in this cost estimate**. Costs assume funding and loan requirements including (but not limited to) State Prevailing Wage, Buy American Requirements, and Davis Bacon Requirements. Other conditions may apply from funding/grant/loan agencies which could increase construction costs.

Table 6-3-- Option 2 Capital Cost Estimation

Project:		<u>North Creek Map Plan and Report</u>
Description:		<u>Option 2 - Advanced Fixed Film System</u>
Date:		<u>7/1/2021</u>
	Treatment System Components	
1	ORENCO AX Max Treatment Units	\$1,320,000
2	Septic Tanks	\$450,000
3	EQ/Anoxic Tanks	\$415,000
4	Recirculation/Pumping Systems	\$85,000
5	Alkalinity Feed System	\$42,500
6	Controls/Electrical	\$175,000
7	Backup Generator w/ATS	\$125,000
8	UV Disinfection System	\$100,000

9	Outfall Structure	\$20,000
10	8" Outfall Pipe	\$12,500
11	Control Building/Electrical/HVAC	\$250,000
12	Yard Piping	\$85,000
13	Post Aeration/Conveyance to Discharge	\$55,000
14	Ventilation & Heating for AX Units	\$45,000
15	Subtotal	\$3,180,000
16	Mobilization/Demobilization	\$159,000
17	Contingency (15 Percent)	\$477,000
18	Engineering/Construction Oversight	\$318,500
19	Bonding/Permitting/Legal/Grant Admin	\$80,000
20	Engineering/Construction Inspection	\$347,040
21	Legal/Permitting/Bonding/Grant Admin	\$80,000
22	Total Project Cost	\$4,214,000

Table 6-4-- Option 2 O&M Cost Estimation

Project: <u>North Creek Map Plan and Report</u>		
Description: <u>Option 2 - Advanced System</u>		
Date: <u>7/1/2021</u>		
	Operation & Maintenance	
1	Site Upkeep (Mowing, snow removal, etc.)	\$5,000
2	Solids Hauling	\$15,000
3	Staffing	\$10,000
4	Electric	\$9,500
5	Equip Maintenance and Replacement	\$4,000
6	Contractual Services	\$11,500
7	Water Quality Testing	\$5,000
8	Total	\$60,000

6.3.7 Advantages/Disadvantages

This option would likely have construction costs that are higher than Option 1. Due to additional site features and the proposed treatment system, the visual impact from this option would be increased compared to Option 1. The resulting construction would require the area dedicated for treatment to be isolated from the remainder of the Scenic Byway, likely by vegetated features. This option would also require a certified operator, increasing operational costs.

Advantages of this system include a more robust centralized treatment system that would have the flexibility to handle changes in wastewater flow concentration without the need for a traditional wastewater system and provide enhanced treatment to protect surface and ground waters. This option requires less land than Option 1 and would fit on property already owned by the Town.

6.4 Option 3 – Conventional SBR System

This option would involve the construction of a traditional sequencing batch reactor (SBR) system. The SBR is a modified activated sludge process for wastewater treatment. In this system, wastewater is added to a tank, mixed with bacteria by aeration, allowed to settle by gravity, and decanted to final disinfection and discharge. The advantage of an SBR process is that equalization, aeration, and clarification can all be achieved in a single tank. Although a single tank is required for treatment, at least two SBR units are required. SBR systems are well suited to low flow conditions and can provide nutrient removal (phosphorus and nitrogen) in addition to BOD treatment. The process diagram for Option 3 is included as Figure A-16 in Appendix A.

6.4.1 Process Sizing

The SBR process requires sizing of the headworks screening and grit removal equipment along with determining the required SBR tank volume based upon hydraulic loading and organic loading. Screening equipment does not take up a large area, therefore the flow to be treated will not have a major impact on the building size but will impact the proposed cost. The incoming wastewater characteristics used for system design are outlined in Section 5 – Design Criteria. Preliminary sizing calculations were used to determine that two tanks with a size of 30' by 30' and a depth of 12' would be required. The tanks would be served by an aeration system providing approximately 60 cubic feet per minute of aeration to meet biological oxygen requirements.

6.4.2 Environmental Impacts

The SBR system is a standard method for treating wastewater, and the operational parameters are well understood. This option would allow for a large degree of flexibility in wastewater treatment and allow for treatment of additional components such as nitrogen and phosphorus compounds with modifications to the aeration and non-aerated mixing cycles. Discharge would likely be to a surface water, therefore a review of the discharge location and the impact to the receiving stream would be required.

The SBR process would require containment over the tank to prevent the spread of odors, provide visual screening, and minimize noise from operations. A simple building could be constructed over the SBR tank. This building would also provide an insulated area protected from the elements during winter operations.

6.4.3 Land Requirements

This option would require buildings for the screening, SBR treatment process and any sludge holding or treatment. This would also require some site modifications to allow for access by trucks and maintenance equipment. A total site area of approximately 1.3 acres is anticipated for this option.

6.4.4 Construction Problems

This option would involve traditional building and concrete construction. Although the tanks would be a large construction item, it is not likely that there would be major construction issues using contractors in the area. The construction activities may require an extensive period to complete; depending upon the seasonal tourism activities, the construction may be visible from the roadway.

6.4.5 Sustainability Concerns

SBR treatment would include the construction of new impervious surfaces that would require the construction of stormwater treatment measures. SBR treatment uses aeration blowers to provide oxygen to the process. These aeration blowers would require some electrical usage. The system would provide high quality effluent that could be discharged to surface waters including North Creek or the Hudson River.

6.4.6 Cost Estimates

A cost estimation for the proposed project is presented in Table 6-5. This preliminary cost estimation breaks down the various cost categories by general work. General categories for work include the headworks, SBR system, site work, and additional typical construction components (Sludge Handling, Electrical, SCADA, and HVAC).

The proposed headworks building would require components to provide preliminary treatment of wastewater to prevent clogging of downstream components. Costs for the headworks building would be primarily equipment for screening, new concrete work, and the construction of a building to house the equipment. Some of these costs could be covered with in-kind services or materials to reduce costs. Costs associated with the SBR process would be greater than 50 percent of the proposed construction costs. Costs associated with the SBR process would include the construction of new concrete foundation and tanks, building construction, process equipment, pumps, blowers, and other miscellaneous components. Additional site construction would be required for construction access and maintenance, provide screening from adjacent properties, addition of stormwater control, and additional site improvements.

Professional services anticipated for this project would involve typical permitting, advanced engineering design, bond counsel, various legal expenses, grant procurement and administration, and construction inspection/documentation. The total anticipated cost for this option is \$4,584,375.

Operation and maintenance costs for this option were also evaluated to determine the ongoing costs. Operations costs are shown in Table 6-6 and broken down by general category. Costs were estimated based on operational experience with similar sized municipal projects, and other similar sized municipal systems in the region. Total annual O&M costs are estimated at \$122,000.

The cost of the collection system construction **is not included in this cost estimate.**

Table 6-5-- Option 3 Cost Estimation

Project: <u>North Creek Map Plan and Report</u>		
Description: <u>Option 3 - Conventional SBR</u>		
Date: <u>7/1/2021</u>		
A	Headworks	
1	Equipment	\$187,500
2	Concrete	\$93,750
3	Building	\$150,000
4	Subtotal	\$431,250
5	Contingency (25 percent)	\$107,813
6	Headworks Total	\$539,063
B	SBR Treatment System	
7	Concrete and Excavation	\$815,500
8	Piping/Diffusers/valves	\$218,750
9	Equipment (including UV)	\$500,000
10	Building	\$450,000
11	Blowers	\$87,500
12	Subtotal	\$2,068,750
13	Contingency (25 percent)	\$517,188
14	SBR Treatment System Total	\$2,585,938
C	Misc. Field Work	
15	Yard Piping (including Outfall)	\$131,250
16	Plantings	\$50,000
17	Access Roads and Paving	\$62,250
18	Subtotal	\$237,500
19	Contingency (25 percent)	\$59,375
20	Misc Field Work Total	\$296,875
21	Sludge Storage and Equip. Total	\$156,250
22	Electrical Total	\$187,500
23	SCADA Controls Total	\$156,250
24	HVAC Total	\$100,000
25	Construction Grand Total	\$4,021,875
D	Professional Services	
26	Permitting	\$62,500
27	Engineering	\$318,750
28	Legal	\$112,500
29	Bond Counsel	\$50,000
30	Construction Inspection	\$150,000
31	Professional Services Total	\$693,750
33	Total Project Cost	\$4,584,375

Table 6-6-- Option 3 O&M Cost Estimation

Project: <u>North Creek Map Plan and Report</u>		
Description: <u>Option 3 - Conventional SBR</u>		
Date: <u>7/1/2021</u>		
A		
1	Site Upkeep (Mowing, snow removal, etc.)	\$5,000
2	Headworks Electric	\$3,000
3	Headworks Maintenance	\$1,500
4	SBR Electric	\$15,000
5	SBR Maintenance	\$3,500
6	SBR Chemicals	\$5,000
7	Laboratory Electric	\$500
8	Laboratory Heat	\$1,250
9	Laboratory Equipment	\$1,500
10	Telecom	\$1,000
11	Sludge Hauling	\$12,000
12	Sludge Electric	\$1,500
13	Contractual Services	\$6,000
14	Water Quality Testing	\$5,000
15	Staff	\$60,000
16	Total	\$122,000

6.4.7 Advantages/Disadvantages

The advantages of this option would include the ability of a conventional wastewater treatment process to handle the flow from the proposed sewer district. The SBR process would also be better able to deal with the variable flow rates and wastewater concentrations that would be generated by the sewer district than Option #1 or #2.

This option would require a significant investment in infrastructure, with new screening and grinding facilities, concrete tanks, building for treatment area, laboratory, sludge holding and disposal facilities, and a full-time certified operator to maintain the facility. These investments would require additional maintenance over the long-term to ensure compliance with wastewater regulations.

6.5 Option 4 – Force Main to Gore Mountain

This option would involve an agreement with Gore Mountain Ski Facility to convey wastewater from the proposed sewer district to the Gore Mountain Wastewater Treatment Facility (GMWWTF) for treatment. This option would involve the construction of a series of pump stations to convey wastewater along the existing access road to the facility and upgrading the facility at Gore to treat the increased wastewater flow. A process diagram for option 4 is shown in Figure A-17 in Appendix A.

6.5.1 Process Sizing

The process sizing for this option would be relatively minor, with sizing of pump stations and force main lines required. Based upon preliminary evaluations three pump stations would be required to meet the pressure and flow requirements.

In addition to the sizing of the force main, additional improvements to the Gore Mountain Wastewater Treatment Facility would be required. Due to the many upgrade options available to meet treatment requirements associated with increased flow, a specific treatment process cannot be identified at this time; however, based upon organic and hydraulic loading, cost estimations can be made.

6.5.2 Environmental Impacts

This option would likely involve construction of a force main along an existing disturbed area or roadway to minimize construction impacts. Due to the construction issues caused by shallow depth to bedrock in the area, appropriate access to the construction site would be required. Construction along the Gore access road would be the most suitable location as the access road provides easy access for construction vehicles. If construction occurs along the existing access road the disturbances caused by construction would be minor. Any required blasting would occur within the existing right-of-way for the (ROW) road, minimizing impacts to environmentally sensitive areas.

If construction were to be located outside of the existing access road, significant disturbances to the existing natural areas would be required to provide access for construction vehicles. Blasting through bedrock would be required in areas along the existing ski trails and in forested areas. These activities would significantly impact the surrounding environmental areas.

In addition to the environmental impacts caused by the force main construction, the existing wastewater facility would likely need to be expanded to discharge increased amounts of treated wastewater. The existing plant discharges wastewater to an adjacent intermittent stream with strict effluent limitations. Increased flow of wastewater to the intermittent stream may result in impacts to the stream. Additional treatment may be required to meet new effluent discharge requirements.

6.5.3 Land Requirements

This option would have the lowest land requirements of any of the options listed. The new force main would be located within an existing ROW to allow for long-term maintenance. New pumps stations would be required with this option; however, they could be located to minimize land investments.

6.5.4 Construction Problems

This option would involve the construction a new force main along an access road that would require significant construction. Potential construction issues include excavation in bedrock/ledge and locating the proposed trench to minimize impacts to environmentally sensitive areas. The force

main would have to be protected from freezing and require deep burial of any pipe. In addition to the methods of construction, the construction phasing should be planned in a way to prevent impacts to the seasonal tourism industry.

6.5.5 Sustainability Concerns

This option would require significant energy consumption due to pumping the wastewater to an elevated location. Additionally, the construction of a pressurized force main would result in a high-pressure line that has potential for breakage from shock loadings. Although this option would have the smallest land use of any option, the maintenance and energy requirements would be the greatest of any option.

6.5.6 Cost Estimates

A cost estimate for the proposed option is presented in Table 6-7. This preliminary cost estimate breaks down the various costs by general categories including the booster stations, force mains, and upgrades to the Gore Mountain Wastewater Treatment Facility.

Three booster stations would be required to convey wastewater from the selected location for treatment to the Gore Mountain Facility. These booster stations would require buildings to house and protect the required pumps, piping, and additional force main components. Due to the need for continuous pumping, each booster station would have a backup generation for emergency operations.

Most of the construction costs associated with this option would come from the installation of new pipeline along the existing access road. Due to the variable conditions and advanced construction techniques required, the installation costs for new ledge and non-ledge force main will be higher than typical construction.

In addition to the proposed booster stations and force main, upgrades to the Gore Mountain Wastewater Treatment Facility will be required with this option. The existing facility has a maximum permitted flow of 65,000 GPD. Assuming additional flow of 90,000 GPD, the wastewater facility will require upgrades to the existing process components to handle the increased flows. A preliminary evaluation of the existing facility indicates that upgrades to the headworks facility, the biological system, and the tertiary filtration would be necessary per DEC requirements.

Professional services anticipated for this project would involve advanced permitting, advanced engineering design, bond counsel, various legal expenses, grant procurement and administration, and construction inspection/documentation. The total anticipated capital cost for this option is \$6,232,500. Please note this treatment option would include treatment of new sewer district flows and the existing permitted flow at Gore Mountain.

Operational and maintenance costs for this option were also evaluated to determine the ongoing costs. Operations costs are shown in Table 6-8 below and broken down by general category. Costs were estimated based on operational experience with similar sized municipal projects, and other

similar sized municipal systems in the region. Total annual O&M costs are estimated at \$172,500. Please note this O&M cost would include treatment of flows and the existing permitted flow at Gore Mountain.

Estimated costs assume funding and loan requirements including (but not limited to) State Prevailing Wage, Buy American Requirements, and Davis Bacon Requirements. Other conditions may apply from funding/grant/loan agencies which could increase construction cost.

Table 6-7-- Option 4 Capital Cost Estimation

Project: <u>North Creek Map Plan and Report</u>		
Description: <u>Option 4 - Force Main to Gore</u>		
Date: <u>7/1/2021</u>		
A	Booster Stations	
1	Pumps and Installation	\$450,000
2	Electric Work	\$144,000
3	Piping and Valves	\$48,000
4	Site Work	\$108,000
6	Subtotal	\$750,000
7	Contingency (25 percent)	\$187,500
8	Booster Stations Total	\$937,500
B	Force Main	
9	Non-Ledge Force Main	\$360,000
10	Ledge Force Main	\$720,000
11	Directional Boring	\$300,000
12	Subtotal	\$1,380,000
13	Contingency (25 percent)	\$345,000
14	Force Main Total	\$1,725,000
C	Gore WWTP Upgrade	
16	Upgrade to Headworks	\$450,000
17	Upgrade to Biological Treatment	\$1,224,000
18	Upgrade to Tertiary Treatment	\$462,000
19	Subtotal	\$2,136,000
20	Contingency (25 percent)	\$534,000
21	Gore WWTP Upgrade Total	\$2,670,000
22	Controls	\$150,000
323	Construction Grand Total	\$5,482,500
D	Professional Services	
24	Permitting	\$90,000
25	Engineering	\$300,000
26	Legal	\$60,000
27	Bond Counsel	\$60,000
28	Construction Inspection	\$240,000
29	Professional Services Total	\$750,000
31	Total Project Cost	\$6,232,500

Table 6-8-- Option 4 O&M Cost Estimation

Project: <u>North Creek Map Plan and Report</u>		
Description: <u>Option 4 – Force Main to Gore</u>		
Date: <u>7/1/2021</u>		
A		
1	Headworks / Pump Station Electric	\$8,000
2	Headworks Maintenance	\$1,000
3	Biological Treatment Electric	\$20,000
4	Biological Treatment Maintenance	\$5,000
5	Biological Treatment Chemicals	\$7,000
6	Laboratory Electric	\$500
7	Laboratory Heat	\$2,500
8	Laboratory Equipment	\$2,000
9	Telecom	\$1,000
10	Sludge Hauling	\$12,000
11	Sludge Electric	\$2,500
12	Tertiary Filters	\$3,000
13	Reaeration System	\$5,000
14	Contractual Services	\$8,000
15	Water Quality Testing	\$5,000
16	Staff	\$90,000
17	Total	\$172,500

6.5.7 Advantages/Disadvantages

This option would have the advantage of utilizing an existing wastewater treatment system, which may increase the potential for obtaining grant funding. In addition, the existing facility has operational staff with a history of successful wastewater plant operations.

Disadvantages for this option include the extensive construction requirements, construction costs, extensive permitting requirements, and placing more wastewater processing in an environmentally sensitive area adjacent to a major tourism center.

7 SELECTION OF A TREATMENT ALTERNATIVE

7.1 Life Cycle Cost Analysis

The following section determines the lifecycle cost of each option. All cost estimates are converted to present day dollars and assumes a 38-year planning period and a 1.5% interest rate to be more conservative. The analysis was also evaluated using a -0.3% interest rate per OMB Circular A-94 requirements, but the selected alternative remained the same.

Table 7-1 – Present Worth Analysis

Item	Capital Cost (PW)	interest %	Total # of replacements [[38/# of years] - 1]	Present Value	O&M (Annual)	O&M (Present Value)	Total Present Value
Options							
Option 1 - In Ground System	\$2,489,707.00	1.50%	1	\$2,452,913.30	\$55,000.00	\$1,553,042.01	\$4,005,955.31
Option 2 - Advanced Fixed Film System	\$4,214,000.00	1.50%	1	\$4,151,724.14	\$60,000.00	\$1,694,227.64	\$5,845,951.78
Option 3 - Conventional SBR	\$4,584,375.00	1.50%	1	\$4,516,625.62	\$122,000.00	\$3,444,929.54	\$7,961,555.16
Option 4 - Force Main to Gore Mtn.	\$6,232,500.00	1.50%	1	\$6,140,394.09	\$172,500.00	\$4,870,904.48	\$11,011,298.57

7.2 Non-Monetary Considerations

Significant differences exist between the options that cannot be quantified in monetary terms. The primary differences between the options presented are the methods of meeting permit limits and types of additional equipment. Non-monetary components considered important when evaluating the alternatives are:

- Impact to Tourism/Environment
- Ease of Operation/Operator Training
- Treatment Performance
- Mechanical Reliability
- Ease of Construction
- Ease of Expansion
- Future Treatment Standards
- Permitting Process

7.2.1 Impact to Tourism/Environment

With Option 1, the site will not be significantly changed as most equipment will be located below ground, reducing visual impact. In addition to visual impact, operational traffic, and discharge of odors are anticipated to be minimal. Treated wastewater will be discharged to groundwater adjacent to the North Creek and may require further analysis to ensure no impact to downstream locations.

Option 2 would have minimal visual impacts and could be screened by vegetation. A security fence would likely be required to protect treatment equipment. Odors and operational traffic would be minimal, like Option 1. Treated wastewater would be discharged to the adjacent surface water. Due to treatment provided by the system and the large distance between the treatment system and downstream uses no impacts to recreational resources are anticipated.

Option 3 would have significant visual impacts and would require screening by vegetation. Due to the size of the building, additional architectural features may be required to meet permitting requirements. A security fence would likely be required to protect treatment equipment. Odors would be minimized by on-site treatment systems; however, operational traffic may be increased compared to Options 1 and 2. Wastewater would be treated to a higher standard than other treatment options and discharged to the adjacent surface water. Due to treatment provided by the system no impacts to recreational resources are anticipated.

Option 4 would require modifications at an existing wastewater facility. Typically, this is the least disruptive scenario; however, the location is near the Gore Mountain lodges and would require significant effort to minimize visual impacts. Odors would be contained by proposed equipment. Operational traffic may be problematic, and the wastewater facility is located past the base lodge, disrupting normal operations of the ski center.

7.2.2 Ease of Operation/Operator Training

Option 1 – The below ground system would have the lowest operational requirements and would not require significant training. However, if the system receives an unusual wastewater loading, it may cause operational issues that would be difficult to rectify.

Option 2 – The advanced treatment system would require additional operations oversight and training compared to Option 1. It is anticipated that a Town staff member would be required to perform operational duties daily, and a certified wastewater operator would be required for SPDES reporting.

Option 3 – The size and complexity of this treatment option would require one full time certified operator hired by the Town. The system would require a high amount of initial training; however, long term operation is anticipated to be minimal. Several communities in the region utilize similar treatment systems and report simplified operation compared to other treatment technologies.

Option 4 – Operations and maintenance would be like Option 3, with an increase in staffing due to the increased flow. This option would not require significant operator training as the facility has been in operation for over a decade and the existing operators are familiar with the facility.

7.2.3 Treatment System Performance & Flexibility

Option 1 - Would meet the technical requirements for system performance; however, the limited control and reliance on sub-surface treatment would significantly limit the performance of the system. Since the flow would be higher than 30,000 gallons per day to groundwater discharge, monitoring wells would be required to ensure compliance with groundwater standards. In other

municipal locations, compliance with groundwater Nitrogen standards has been variable with sub-surface systems.

Option 2 - The advanced treatment system would provide more operational control of wastewater treatment and would likely have increased treatment performance. Treatment performance may be impacted by variable flow loadings (summer vs. winter), temperature, and other conditions. It is anticipated that this option would be suitable for meeting stream discharge requirements.

Option 3 - The treatment system of this option would have the greatest flexibility and would be suitable for variable treatment requirements. Impacts due to seasonal loading, toxic shock, and temperature variations are anticipated to be minimal. It is anticipated that this option would be suitable for meeting stream discharge requirements.

Option 4 - The treatment system of this option would have the greatest flexibility and would be suitable for variable treatment requirements. Impacts due to seasonal loading, toxic shock, and temperature variations are anticipated to be minimal. The existing facility discharges to an intermittent stream with significant discharge restrictions; therefore, more restrictive discharge limits may apply if an alternative discharge cannot be identified.

7.2.4 Mechanical Reliability

Option 1 – This option is the simplest in terms of mechanical components. Pumps and distribution piping are anticipated to be reliable. In the event of a major incident at the site, repairs could be completed by existing Town staff.

Option 2 – The proposed advanced treatment system would have more components and pumping equipment compared to option 1; however, the system is anticipated to have minimal issues. Repairs to the system would likely be performed by staff approved by the advanced treatment unit provider to ensure warranty.

Option 3 – The treatment system and components would be reliable, and with proper routine maintenance should have minimal issues. Most maintenance can be performed by the operational staff.

Option 4 – The treatment system and components would be reliable, and with proper routine maintenance should have minimal issues. Most maintenance can be performed by the operational staff.

7.2.5 Ease of Construction

Option 1 – This option would be relatively simple to construct and would have minimal issues at the site.

Option 2 – Construction of the septic tank and pumping station would be like Option 1, and the installation of Orenco systems would be simplified compared to Option 3 and 4. Heavy equipment would likely be required to place prefabricated units.

Option 3 – This option would have moderate construction issues. The site would be accessible for construction equipment, it would be anticipated to have minimal impacts to the surrounding properties. Due to the prevalence of sands in the construction area and assumed high groundwater table, sheeting may be required for concrete work.

Option 4 – Construction for this option would be difficult as the site is located at the Gore Mountain Ski facility. This would limit construction duration, and require work be performed to standards as to not impact the existing facility. There are also significant outcroppings of bedrock along the potential route of the force main, which could potentially require blasting during construction.

7.2.6 Ease of Future Expansion

Option 1 – This option would preserve the proposed septic tank and pump station for use with any potential future expansion. The absorption beds and associated site work would not be compatible with any future expansion.

Option 2 – This option would preserve the proposed septic tank and pump station for use with a possible future expansion. This option would be most compatible with an expansion of the proposed ORENCO system, as existing components could be retained and used as part of the treatment process. Additional ORENCO units could be added if the district is expanded.

Option 3 – This option would be most suitable for future expansion, as the equipment could be reused with a larger SBR system, or the existing concrete tanks repurposed for another treatment option.

Option 4 – This option would restrict future expansion to a further upgrade of the Wastewater Treatment Plant at Gore.

7.2.7 Future Treatment Standards

Option 1 – This option would have minimal flexibility to meet future water treatment standards. Additional process equipment could be added to improve performance prior to discharge; however, limited space would be available for modifications.

Option 2 – This option would have more flexibility to meet future water treatment standards. Additional tankage and process equipment would likely be required.

Option 3 – The proposed treatment process for this option would have significant flexibility to meet future treatment standards and would not require modifications to meet anticipated treatment standards.

Option 4 – The proposed treatment process for this option would have significant flexibility to meet future treatment standards and would not require modifications to meet anticipated treatment standards.

7.2.8 *Permitting Process*

Option 1 – This option may encounter significant permitting issues. The large size of the sub-surface treatment system would require DEC approval. Based upon previous project experience and existing regulations, this system is treating flows higher than what is typically permitted. Additional permitting and consultation with DEC would be required prior to approval.

Option 2 – The advanced treatment systems used in this option have been permitted in other projects. No major permitting issues related to the DEC are anticipated; however, performance data or testing may be required to show compliance with standards at the proposed flow rates. APA review may require additional screening and mitigation of visual impacts.

Option 3 – The permitting process through DEC would be typical of a wastewater project with this option. The APA permitting process will likely be more extensive with this option as visual impacts would be greater compared to other options.

Option 4 – The permitting process for this option would likely be extensive as the project would be located on the lands of the Gore Mountain Ski Facility.

7.3 **Selected Alternative**

Based on the evaluation of monetary factors and non-monetary factors, **Option 2 - Advanced In-Ground System** is recommended.

8 RECOMMENDED TREATMENT AND COLLECTION SYSTEM

8.1 Wastewater Treatment and Collection System Overview

8.1.1 Wastewater Treatment

The proposed wastewater treatment system would utilize the Advanced In-Ground Treatment system discussed in Section 6.3 and include a new collection system and connections to residential units. The overall process consists of a primary settling tank, anoxic mixing basin, fabric media treatment units, recirculation pumping chamber, and discharge pumping chamber. A schematic layout of the advanced in-ground treatment system is shown in Appendix A, Figure A-15. Preliminary sizing information by ORENCO is presented in Appendix B. The new wastewater treatment facility is expected to have a permitted maximum capacity of 61,000 gallons per day. It should be noted that once the SPDES permit parameters are received from the NYSDEC, the treatment system may be changed to ensure compliance with the SPDES limits. The new treatment tanks and units will be located on the current Town Hall property, near the existing lower parking area. The effluent from the treatment system is expected to be discharged to the North Creek which is adjacent to the wastewater treatment facility site. Figure A-19 is the Preliminary Site Plan which shows the layout of the wastewater treatment equipment and infrastructure on the selected site near the Town Hall.

8.1.2 Collection System Type

For the establishment of a new sewer district there are two primary types of collection systems possible, gravity collection and pressure sewer system. Both types provide advantages and disadvantages when implemented.

A gravity collection system would involve the installation of new gravity sewer mains and service laterals. For each building in the sewer district a new gravity service line would connect between the existing building and new sewer mains. Wastewater would flow by gravity from homes, through the new service laterals to sewer mains located adjacent to, or underneath the existing roadway. The sewer mains would be located to take advantage of the existing topography to optimize gravity collection. The sewer mains would ultimately discharge to a pump station, located at a low point within the district. The pump stations would utilize pumps sized to handle the flow and transfer wastewater from an area to the central wastewater treatment facility location. Advantages of gravity collection include simpler operation, minimal mechanical components to maintain, reduced energy use with gravity flow, and a low instance of blockage or failure. Disadvantages of gravity collection include reliance on existing topography for proper operation, and larger line size compared to pressure systems.

In a pressure system, new pump stations, pressure service laterals, and new pressure force mains would be constructed. For a building in the sewer district, wastewater would flow by gravity to a septic tank/ pump station or pump station only. Due to site restrictions within the Hamlet area, septic tanks and pump stations would be located on the building owner's property. From the pump

station, the water would be sent to a common force main and discharged to a common pump station and sent to the central wastewater treatment area. Advantages of pressure systems include the ability to transfer wastewater regardless of topography, more control over wastewater flow, and potential for simpler construction. Disadvantages include high energy use, increased chance of pump/mechanical failure, and the need for agreements on ownership, maintenance, and easements for the operation of the septic tank/pump stations.

Based upon a preliminary evaluation of the existing conditions, experience of neighboring communities, and public feedback, a combination of gravity and pressure collection system was selected for design and estimation of the costs associated with implementing the recommended alternative. Actual conditions encountered during further site evaluations, design phases, or construction may change conditions and/costs. If changes are encountered, re-evaluation of the collection system may be required.

8.1.3 Collection System Layout

The proposed collection system would consist of 8-inch gravity sewer mains, residential connections, and force mains. The collection system would consist of approximately 4,850 linear feet of gravity sewer main located along Main Street, Ski Bowl Road, and Railroad Place with approximately sixty-six (66) lateral connections. The collection system would also include approximately 4,835 linear feet of force main and a pump station. The wastewater from the proposed ORDA Ski Bowl Lodge would discharge (from the ORDA supplied grinder pump station) approximately 2,000 linear feet to a grinder pump station located near the nursing home. The flow from the nursing home and ORDA will discharge through approximately 1,120 feet of force main across Route 28 and into the gravity collection on Ski Bowl Road. Portions of the gravity collection system would discharge to one pump station, located at a low point within the system, which would pump through approximately 1,715 linear feet of force main. Figure A-18 illustrates the layout of the system including gravity mains, force mains and pump stations.

8.1.4 Collection System Cost Estimate

There is no centralized wastewater system that currently serves the Hamlet area; therefore, an entire sanitary collection and conveyance system is required. The costs associated with a collection system for the proposed sewer district are shown below in Table 8-1:

Table 8-1 – Collection System Costs

Project: <u>North Creek Map Plan and Report</u>	
Description: <u>Collection System Cost Estimate</u>	
Date: <u>3/17/2022</u>	
	Collection System Construction
1	Gravity Sewer Pipe (8") \$848,750.00
2	Sewer Manhole incl Air Releases \$357,000.00
3	Sewer Laterals \$396,000.00
4	Pumping Stations w/ Backup Power \$200,000.00
5	Grinder Station -Nursing Home/ORDA \$125,000.00
6	2" HDPE Force Main from ORDA \$170,000.00
7	2.5" Force Main from Nursing Home \$100,800.00
8	3" Force Main -PS#1 to Gravity Main \$222,950.00
9	Collection System Subtotal \$2,420,500.00
10	Mobilization/Demobilization \$121,025.00
11	Maintenance & Protection of Traffic \$145,230.00
12	Contingency \$363,075.00
13	Permitting, Bonding, Grant Administration \$100,000
14	Easements/Legal Fees \$25,000
15	Engineering & Construction Oversight \$242,050.00
16	Total Estimated Collection Cost \$3,416,880.00

8.2 Total Project Cost Estimate

Collection System Total Estimated Project Cost:	\$3,416,880.00
In-Ground Advanced Fixed-Film Treatment Cost:	\$4,214,000.00
Total Estimated Project Capital Cost:	\$7,630,880.00

8.3 Estimated Annual Operations Budget

Estimated Annual Operation and Maintenance Cost:	\$60,000
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A complete cost breakdown of the collection system and treatment facility components along with non-construction costs is included in Table 8-2.

Table 8-2 – Total Project Cost Estimate

Collection System Costs				
Item	Unit Cost	Units	Qty	Total Estimated Cost
Gravity Sewer Pipe (8-inch)	\$ 175.00	LF	4850	\$ 848,750.00
Sewer Manholes including Air Releases	\$ 8,500.00	EA	42	\$ 357,000.00
Sewer Laterals	\$ 6,000.00	EA	66	\$ 396,000.00
Pumping Stations w/ Backup Power	\$ 200,000.00	EA	1	\$ 200,000.00
Grinder Station for Nursing Home/ORDA	\$ 125,000.00	EA	1	\$ 125,000.00
2" HDPE Force Main from ORDA	\$ 85.00	LF	2000	\$ 170,000.00
2.5" HDPE Force Main from Nursing Home	\$ 90.00	LF	1120	\$ 100,800.00
3" HDPE Force Main from PS #1 to Gravity	\$ 130.00	LF	1715	\$ 222,950.00
Collection System Estimated Total				\$ 2,420,500.00
Mobilization/Demobilization				\$ 121,025.00
Maint/Protection of Traffic/Erosion Sediment Control				\$ 145,230.00
Contingency				\$ 363,075.00
Engineering and Construction Oversight				\$ 242,050.00
Easements/Legal Fees				\$ 25,000.00
Bonding, Permitting, and Grant Administration				\$ 100,000.00
Total Estimated Cost				\$ 3,416,880.00
*Need survey and borings to determine accurate topography and subsurface conditions.				
Treatment System - Located at Town Hall Property				
Item	Unit Cost	Units	Qty	Total Estimated Cost
Septic Tanks	\$ 150,000.00	EA	3	\$ 450,000.00
EQ/Anoxic Tanks	\$ 125,000.00	EA	3	\$ 415,000.00
AX Max Units	\$ 110,000.00	EA	12	\$ 1,320,000.00
Recirculation and Pumping Systems	\$ 85,000.00	EA	1	\$ 85,000.00
Alkalinity Feed System	\$ 42,500.00	EA	1	\$ 42,500.00
Yard Piping	\$ 85,000.00	LS	1	\$ 85,000.00
Control Building/Electrical/HVAC	\$ 250,000.00	LS	1	\$ 250,000.00
Ventilation and Heating System for AX Units	\$ 45,000.00	LS	1	\$ 45,000.00
UV Disinfection System	\$ 50,000.00	EA	2	\$ 100,000.00
Post Aeration/Conveyance to Discharge	\$ 55,000.00	LS	1	\$ 55,000.00
8" Outfall Pipe	\$ 125.00	LF	100	\$ 12,500.00
Allowance for Outfall Structure	\$ 20,000.00	LS	1	\$ 20,000.00
Electrical/Controls	\$ 175,000.00	LS	1	\$ 175,000.00
Backup Generator w/ ATS	\$ 125,000.00	LS	1	\$ 125,000.00
Treatment Estimated Total				\$ 3,180,000.00
Mobilization/Demobilization				\$ 159,000.00
Contingency				\$ 477,000.00
Engineering and Construction Oversight				\$ 318,000.00
Bonding, Permitting, and Grant Administration				\$ 80,000.00
Total Estimated Cost				\$ 4,214,000.00
Estimated Annual O&M Cost				\$ 60,000.00
*Borings required to accurately determine subsurface conditions				
Collection System Total	\$ 3,416,880.00			
Wastewater Treatment Plant Total	\$ 4,214,000.00			
Total Estimated Project Capital Cost	\$ 7,630,880.00			

8.4 Calculated User Fees

Table 8-3 shows potential user fees as determined by different levels of grant and loan funding. User fees would be based on Equivalent Dwelling Units or EDUs. An equivalent dwelling unit is assumed to be a 3-bedroom house at 170 gallons per day (GPD). Apartments are assumed to be 2 bedrooms. Vacant lots are assumed to be 1/3 EDU.

Table 8-3 – Estimated User Fees

Estimated Flow from Tables	51,000	GPD
Flow per EDU	170	GPD/EDU
Estimated Number of Active EDUs	298.3	
Vacant Lot EDUs	12.9	39 vacant lots
Total Number of EDUs	311.2	
Estimated Annual O&M Cost	\$ 60,000.00	
Annual O&M Cost per EDU	\$ 192.83	

Funding	Estimate
GRANTS: \$750,000 NBRC + \$1,600,000 ESD + \$1,498,000 USDA	
1.5% - Amount to Finance	\$ 3,783,000.00
Cost/EDU (1.5%) - Debt Load	\$ 422.07
Cost/EDU (1.5%) - Debt Load + O&M	\$ 614.90

8.4.1 Hook-Up Cost

The estimated cost for connecting to the Sewer District is \$6,000 and will be covered by the district as part of the formation, construction, and original hook-up. Future connection fees are estimated to be in \$2,000 to \$8,000 range. The Town does not intend to own, operate, and maintain the laterals. Once the construction of the project is completed, the property owner will own, operate, and maintain the laterals. The cost for each lateral assumes laterals up to the buildings. This does not include re-plumbing of existing sewer (in-house) and does not include work to bring any existing plumbing to code, if needed. This also does not include decommissioning existing septic systems. For installation, temporary easements will likely be required. These details will be determined during final design as this is still preliminary.

8.4.2 Typical Property

The typical property in the district is a single-family residential property which represents the assessed value of the mode of the benefited properties situated in the district that will be required to finance the cost of the proposed improvements. The typical property is a one family residence

having an assessed value of \$3,000 at an equalization rate of 1.9% and will be assigned one EDU. The estimated first year cost per property is based on debt service plus operation and maintenance cost. Thus, the projected first year total cost for a typical property is \$614.90. Appendix D-1 has the complete cost breakdown for the project and Appendix D-2 provides a table of Short-Lived Assets.

8.5 Project Schedule

The following table outlines a potential timeline for implementation of the Recommended Alternative.

Table 8-4 – Project Schedule

Task	Month - Year
Present Map Plan and Report	June 2022
Establishment of Sewer District	July 2022 - August 2022
Final Order Adopted for Sewer District	August 2022
Secure Grants / Loans	July 2021 to December 2022
Prepare Engineer Plans/Technical Report	September 2022 – May 2023
NYSDEC Permit Approval	Feb. 2023 – September 2023
Town Board Approval	October 2023
Bid Phase	Nov. 2023 – December 2023
Contract Award	January 2024
Construction	March 2024 – December 2025

8.6 Lead Agency / Project Partners

For the implementation of the recommended alternative the following parties have been identified as having a potential role in implementation.

Table 8-5 – Project Team / Stakeholders

Organization	Role
Town of Johnsbury Town Board	Lead Agency, Approve Resolutions
Town of Johnsbury Sewer Committee	Advisory Committee
North Creek Business Alliance	Public Outreach
Lake Champlain-Lake George Regional Planning Board	Grant/Loan Assistance and Administration
Project Attorney	Legal Assistance, Bond Counsel
Project Engineer	Engineering Plans, Construction Documents

8.7 Potential Funding Sources

The following section details potential grant and loan sources for the implementation of the recommended alternative.

8.7.1 Grant Funding

- Empire State Development Grant Funds – This program funds regional programs related to retaining or creating jobs. Specialty infrastructure projects can be funded through this program. This program can provide funds up to 20% of the total project cost.
- Community Development Block Grants – This program seeks to fund community development projects. This program is focused on infrastructure development. This program could be used to fund the project with funds up to \$1,000,000. Two main considerations for this funding source are: (1) determining if the Hamlet will meet the economic requirements, and (2) determining if the pre-application and timeframe requirements can be met.
- New York Main Streets Program – This program seeks to fund projects enhancing the main street areas in the state. This program has three components, and funding would most likely fall under the NYMS Downtown Stabilization Program. This program offers up to \$500,000 for programs that help stabilize downtown areas.
- Department of State – Local Waterfront Revitalization Program – This program seeks to fund projects along coasts or existing waterways that have an existing Local Waterfront Revitalization Plan (LWRP). The Town of Johnsbury has received funding under the Local Waterfront Revitalization Program, therefore the program may fund costs. This program is a 50% match grant, no limit on the funding amount is known.
- New York State DEC – Water Quality Improvement Project Program – This funding is aimed at projects that will improve the water quality. Funds for this program can be used for construction of new/improved infrastructure. The project would likely be considered “General Wastewater Improvement” and would be applicable for 40% of project costs.
- New York WIIA: – Clean Water Grant – This funding is aimed at projects that will improve wastewater infrastructure in the State of New York. Funds for this program can be used for construction of new/improved infrastructure. The program can fund up to 25% of eligible costs.
-

8.7.2 Low-Cost Loans

- USDA Rural Development – This program provides funding for clean and reliable drinking water systems, sanitary sewage disposal, sanitary solid waste disposal, and storm water drainage to households and businesses in eligible rural areas. Financing typically consists of long-term, low-interest loans. If funds are available, a grant may be combined with a loan, if necessary, to keep user costs reasonable.

- Clean Water State Revolving Fund – This program is administered by the Environmental Facilities Corporation and New York State Department of Environmental Conservation, to provide long-term, low interest or zero interest loans.

8.8 Permit Requirements

The following section outlines the minimum permits required for the project. Additional permits and/or permit approvals may be required.

- NYS DEC – State Pollution Discharge Elimination System (SPDES) Permit
- NYS DEC – Stormwater Construction Permit
- NYS DOT – Utility Work Permit
- Adirondack Park Agency – Major Project
- Warren County Public Works
- Town of Johnsbury – Building Permit
- Town of Johnsbury – Site Plan Approval

8.9 Regulatory Approvals

The Johnsbury Town Board has completed the environmental review under New York State Environmental Quality Review Act (SEQRA) and the National Environmental Policy Act (NEPA) for the proposed sewer district. The SEQR review includes a determination of the project area for state or federally regulated wetlands, potential impacts to endangered species or habitats, and potential impacts to historic or archeologically significant sites. The Town of Johnsbury, acting as lead agency through the coordinated review process, determined the project to be a Type I action on December 23, 2019. The Town issued a negative declaration on July 20, 2021, and a notification of the negative declaration was published in the NYS Environmental Notice Bulletin on July 28, 2021, as required. The New York State Office of Parks, Recreation and Historic Preservation issued a letter finding that no properties, including archaeological and/or historic resources, listed in or eligible for the New York State and National Registers of Historic Places will be impacted by this project. An environmental review in accordance with Section 106 of the National Historic Preservation Act and the associated Environmental Report was submitted in November 2021.

The plans for the proposed collection system and wastewater treatment plant will need approval from New York State Department of Environmental Conservation (NYSDEC).

Generally, the proposed sewer pipes will be in the New York State Department of Transportation

(NYSDOT) right-of-way. NYSDOT approval will be needed for installing the pipes. Sewer lines located on private property will require temporary easements/licenses from those property owners to allow the construction of the sewer lateral. Once construction is completed, the property owners will own the lateral and be responsible for maintenance and repair.

9 CONCLUSIONS AND RECOMMENDATIONS

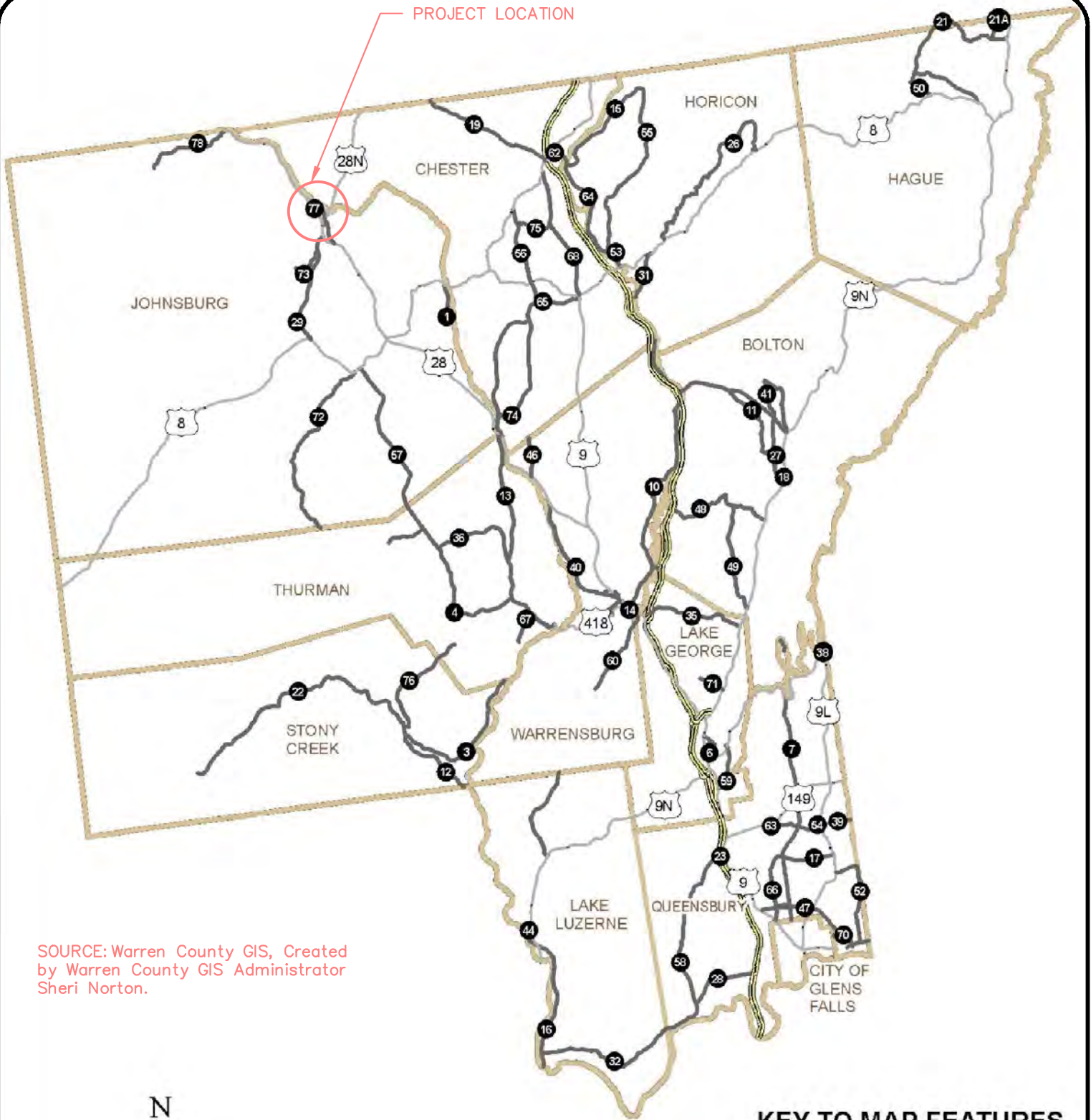
Results from this PER indicate that the construction of a new advanced in-ground wastewater treatment and conveyance system (Option 2) is the most cost-effective solution to provide the Hamlet of North Creek with a centralized wastewater system to encourage development. Currently, the ORENCO wastewater treatment system is used as the basis for design, but any advanced fixed-film process can be selected during final design and bidding. It should be noted that once the SPDES permit parameters are received from the NYSDEC, the treatment system may be changed to ensure compliance with the SPDES limits. The proposed project would include the construction of an advanced in-ground wastewater treatment system and a combination of gravity and pressure collection system.

The estimated probable project cost for these improvements is \$7,630,880. User costs to fund these improvements are expected to be approximately \$614.90 per EDU.

APPENDIX A

(A-1 through A-19)

PROJECT LOCATION



SOURCE: Warren County GIS, Created by Warren County GIS Administrator Sheri Norton.



0 2.5 5 10 Miles

KEY TO MAP FEATURES

- MUNICIPAL BOUNDARIES
- County
- State
- Federal

MAP, PLAN, & REPORT
LOCATION MAP

TOWN OF JOHNSBURG
219 MAIN STREET

A-1

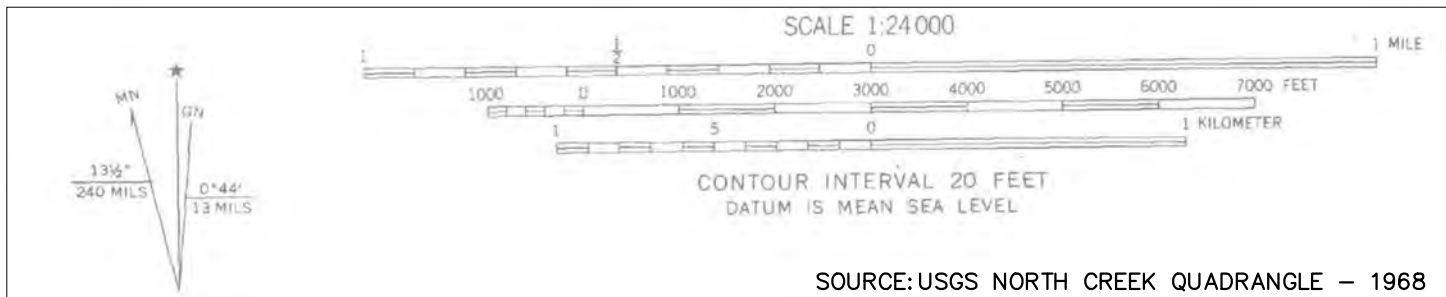
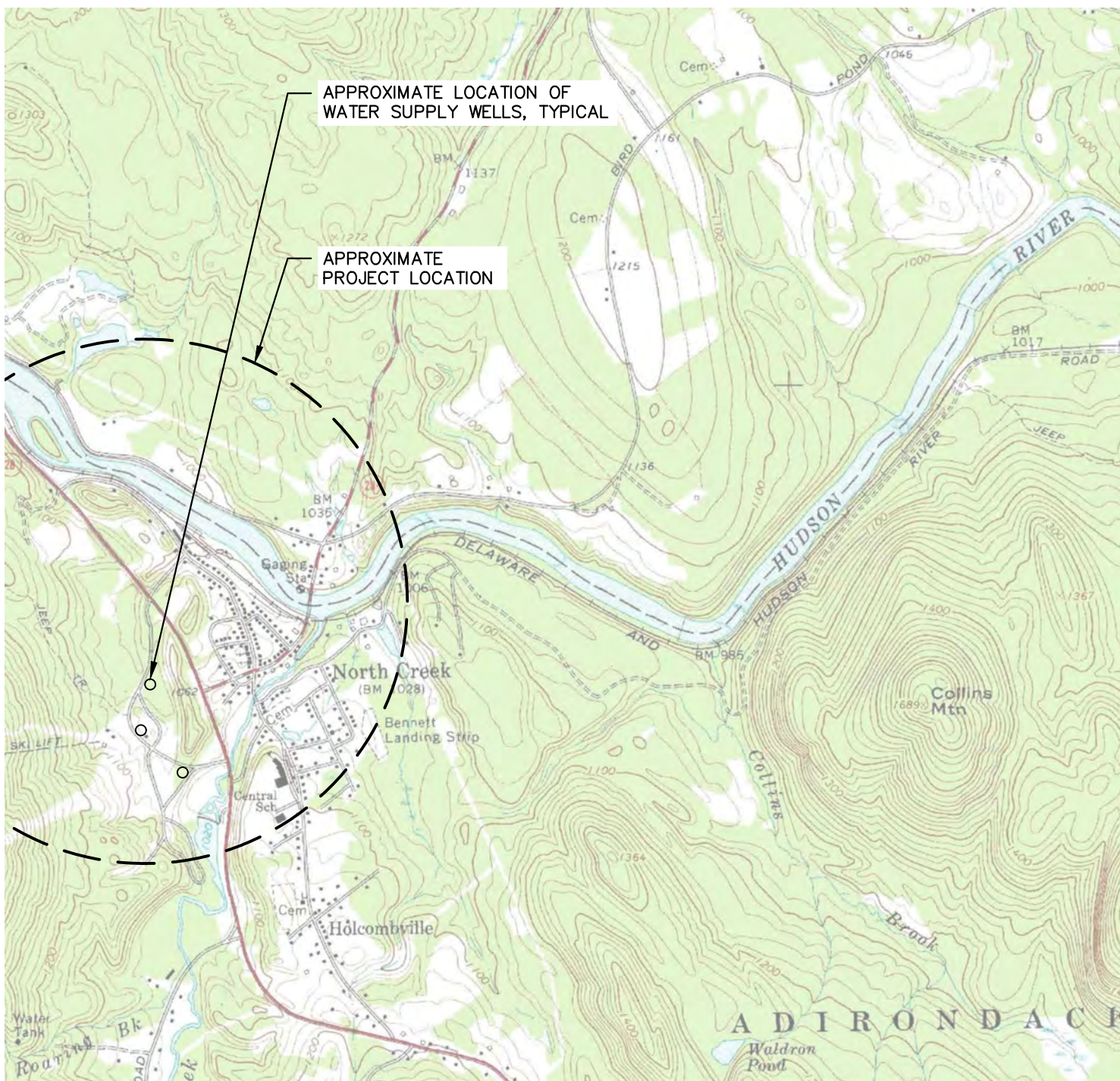


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NEW YORK

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SOURCE: USGS NORTH CREEK QUADRANGLE — 1968

MAP, PLAN & REPORT
TOPO MAP

TOWN OF JOHNSBURG
219 MAIN STREET

A-2

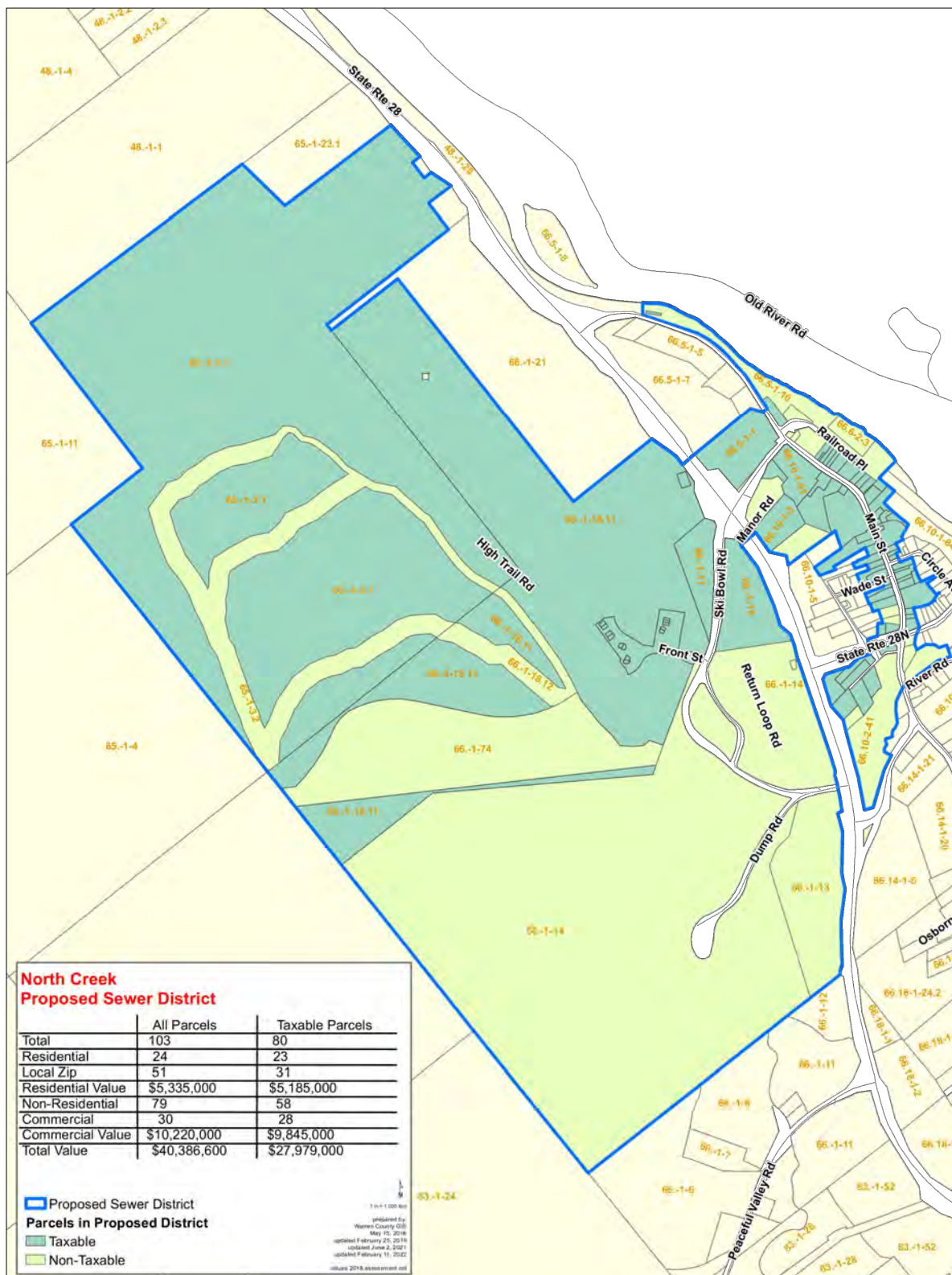
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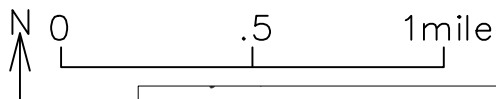










MAP, PLAN & REPORT
PROPOSED SEWER DISTRICT

TOWN OF JOHNSBURG
219 MAIN STREET

A-3





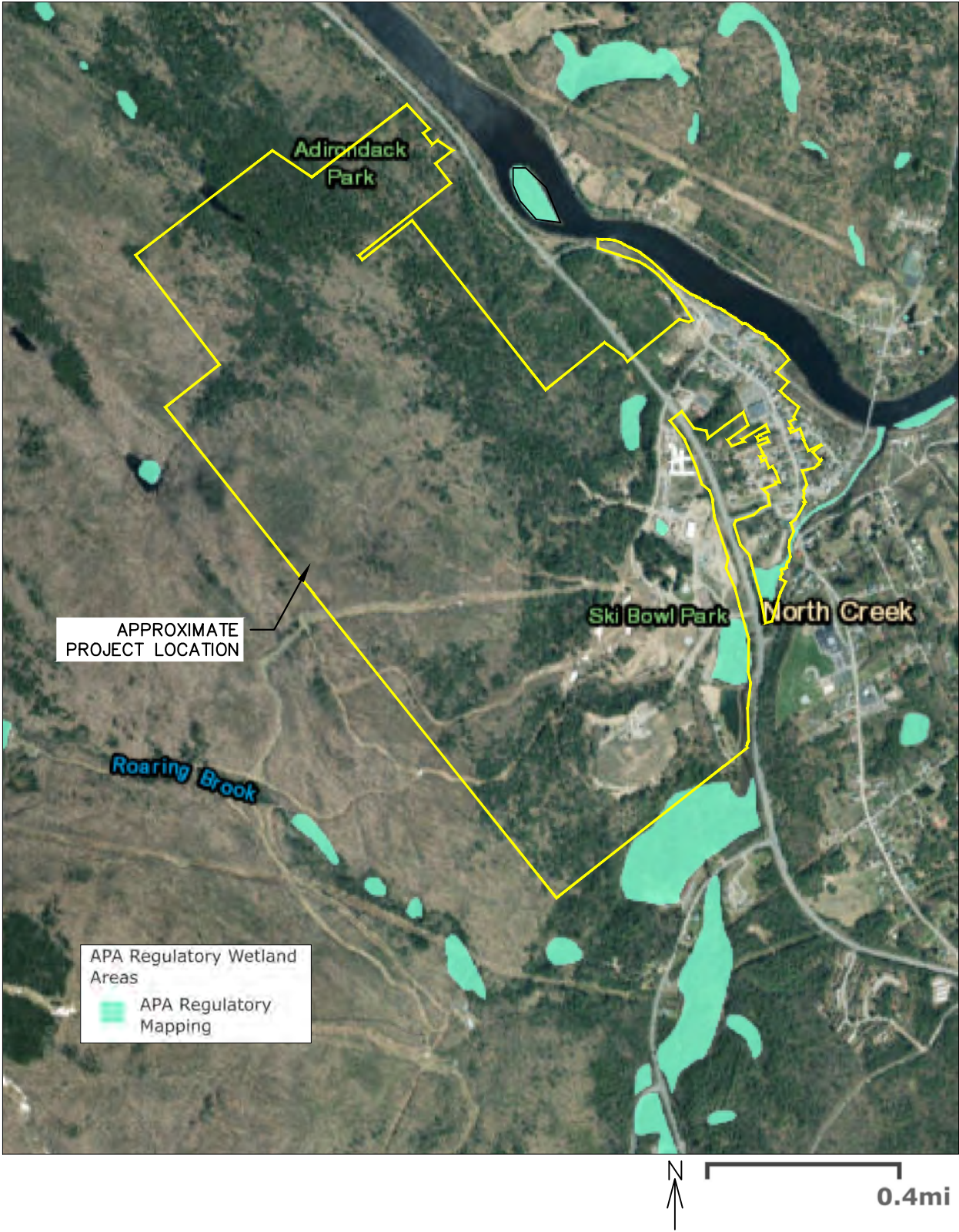
Wetlands		
	Estuarine and Marine Deepwater	 Freshwater Emergent Wetland
	Estuarine and Marine Wetland	 Freshwater Forested/Shrub Wetland
		 Freshwater Pond
		 Lake
		 Other
		 Riverine

MAP, PLAN & REPORT
FEDERAL WETLANDS MAP

TOWN OF JOHNSBURG
219 MAIN STREET

A-3A





MAP, PLAN & REPORT
APA WETLANDS MAP

TOWN OF JOHNSBURG
219 MAIN STREET

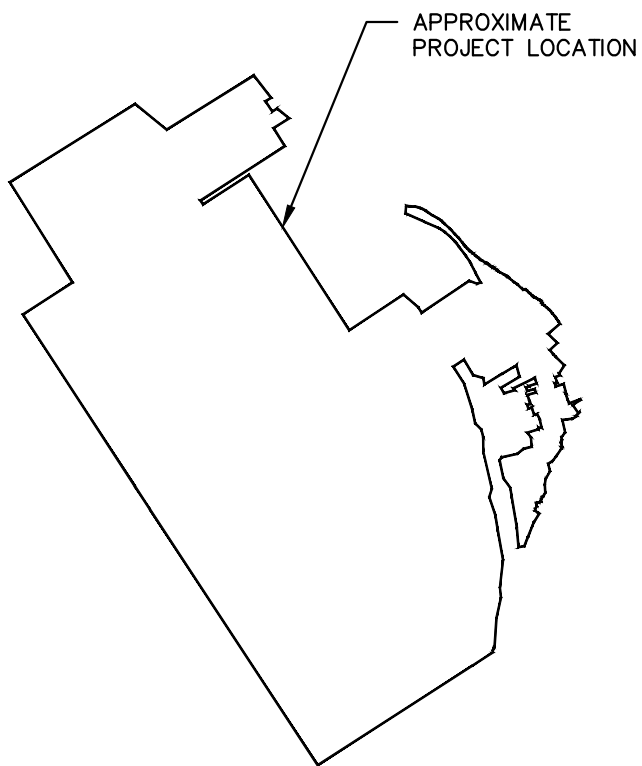
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SOURCE: FEMA FIRM MAP, TOWN
OF JOHNSBURG, NEW YORK,
WARREN COUNTY (PANEL: 360875
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MAP, PLAN & REPORT
FEMA FLOOD MAP

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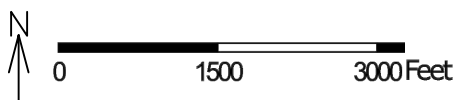
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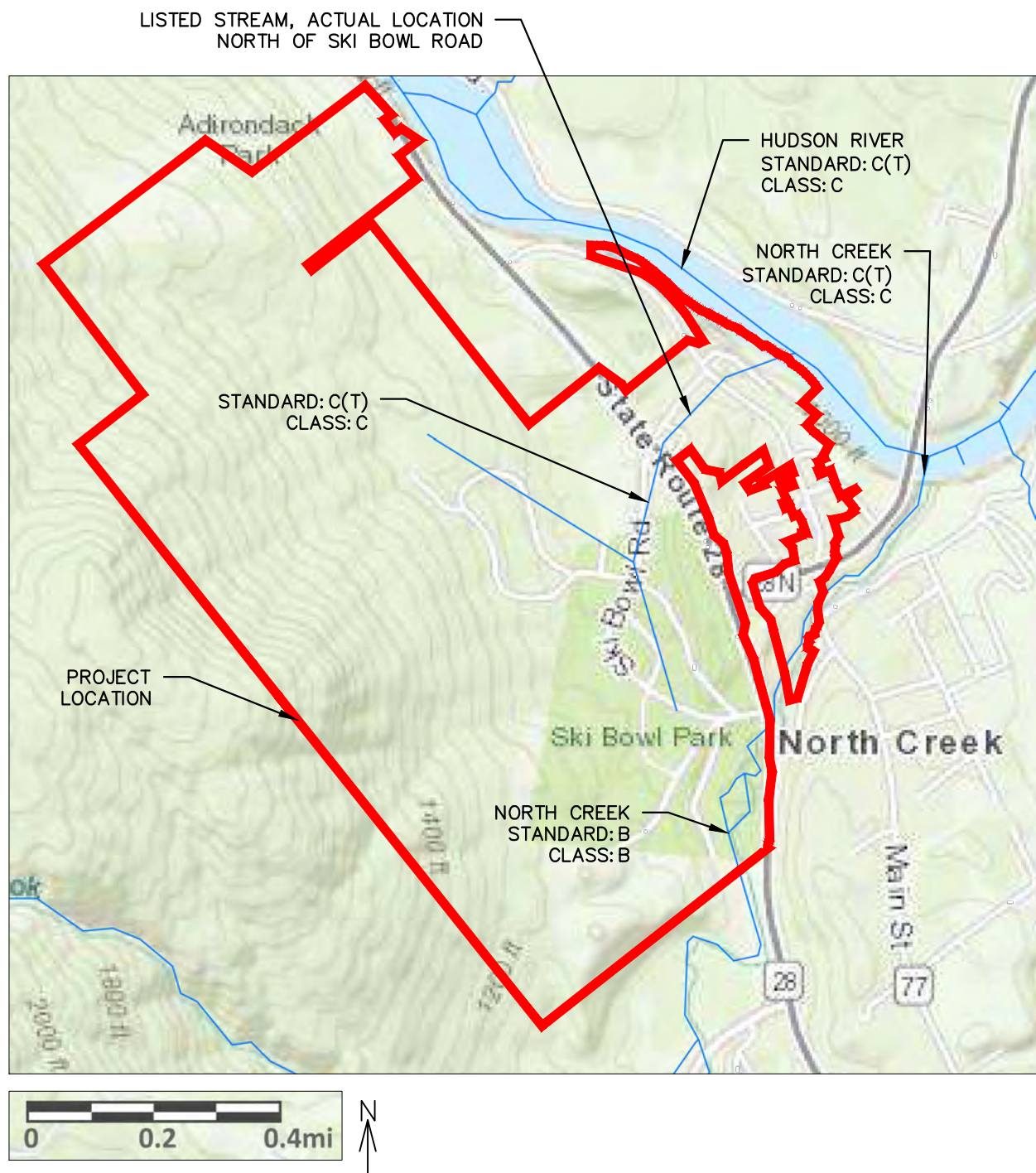
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SOURCE: NRCS SOIL SURVEY (ACCESSED JULY, 2021)



SOURCE: NYS DEC ENVIRONMENTAL MAPPER (ACCESSED JULY, 2021)

MAP, PLAN & REPORT
WATERBODY CLASSIFICATION

TOWN OF JOHNSBURG
219 MAIN STREET

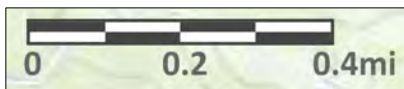
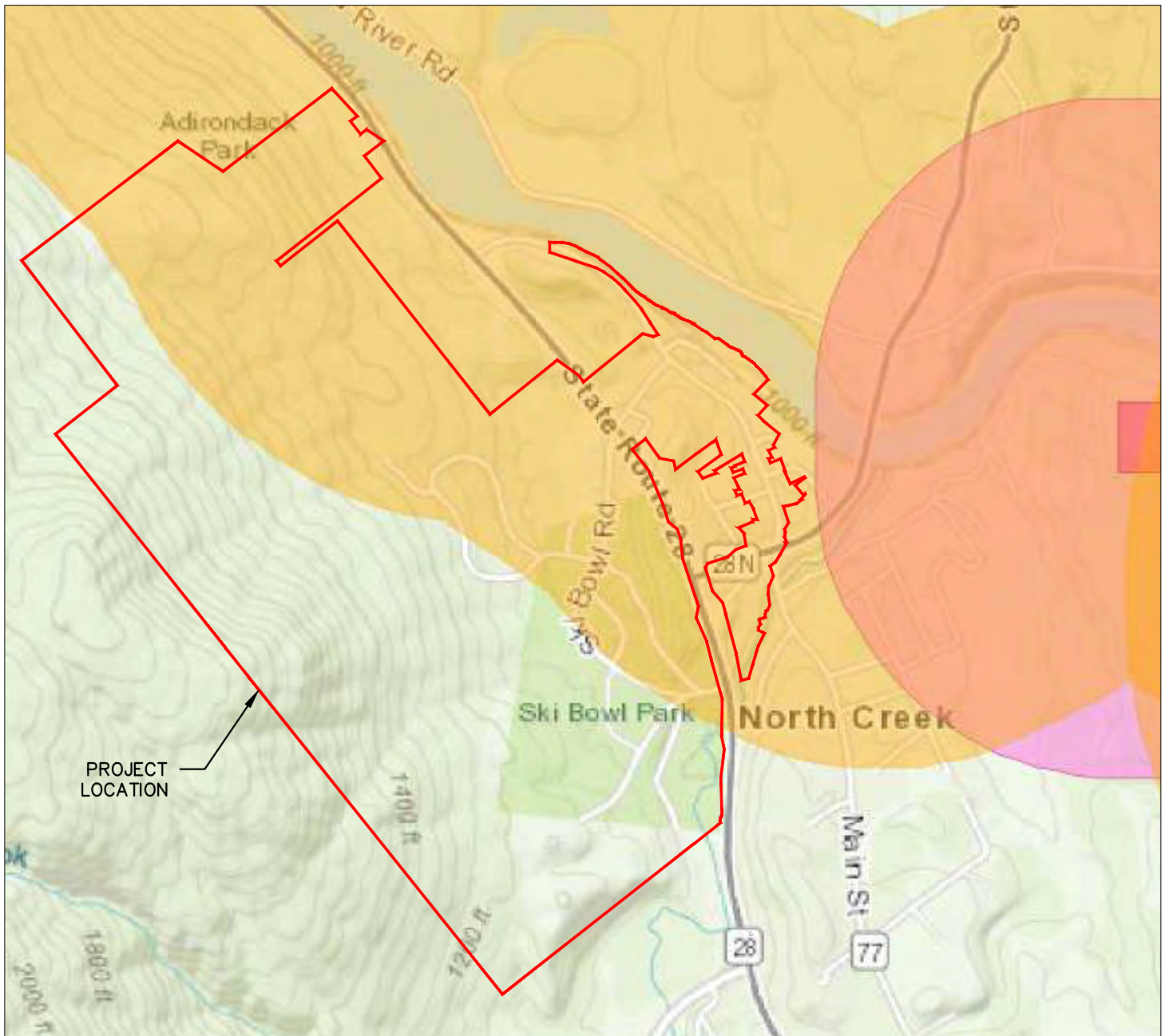
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- Significant Natural Communities
- Natural Communities Near This Location
- Rare Plants or Animals

SOURCE: NYS DEC ENVIRONMENTAL MAPPER (ACCESSED JULY, 2021)

MAP, PLAN & REPORT
NATURAL COMMUNITIES

TOWN OF JOHNSBURG
219 MAIN STREET

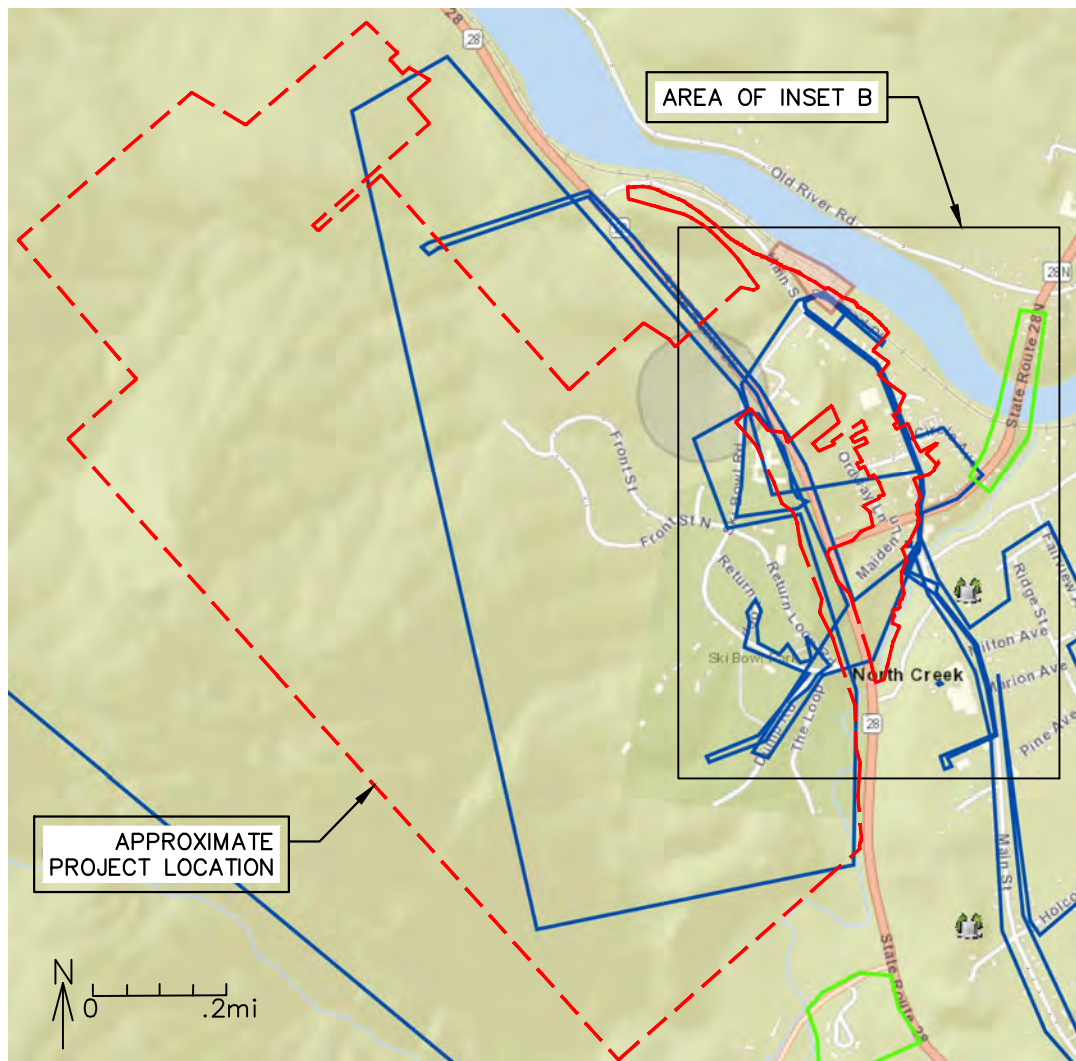
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USN Building Points (View)

- Eligible
- Listed
- Not Eligible
- Undetermined

National Register Building Sites (View)



USN Building Districts (View)



Survey Archaeology Areas (View)



Consultation Projects (View)



Archeologically Sensitive Areas



INSET B: SHPO NOTED
STRUCTURES WITHIN
PROJECT LOCATION
BOUNDARY



0 600ft

SOURCE: NYS SHPO CRIS MAPPING SYSTEM
(ACCESSED JULY, 2021)

MAP, PLAN & REPORT
SHPO CRIS MAP

TOWN OF JOHNSBURG
219 MAIN STREET

A-8

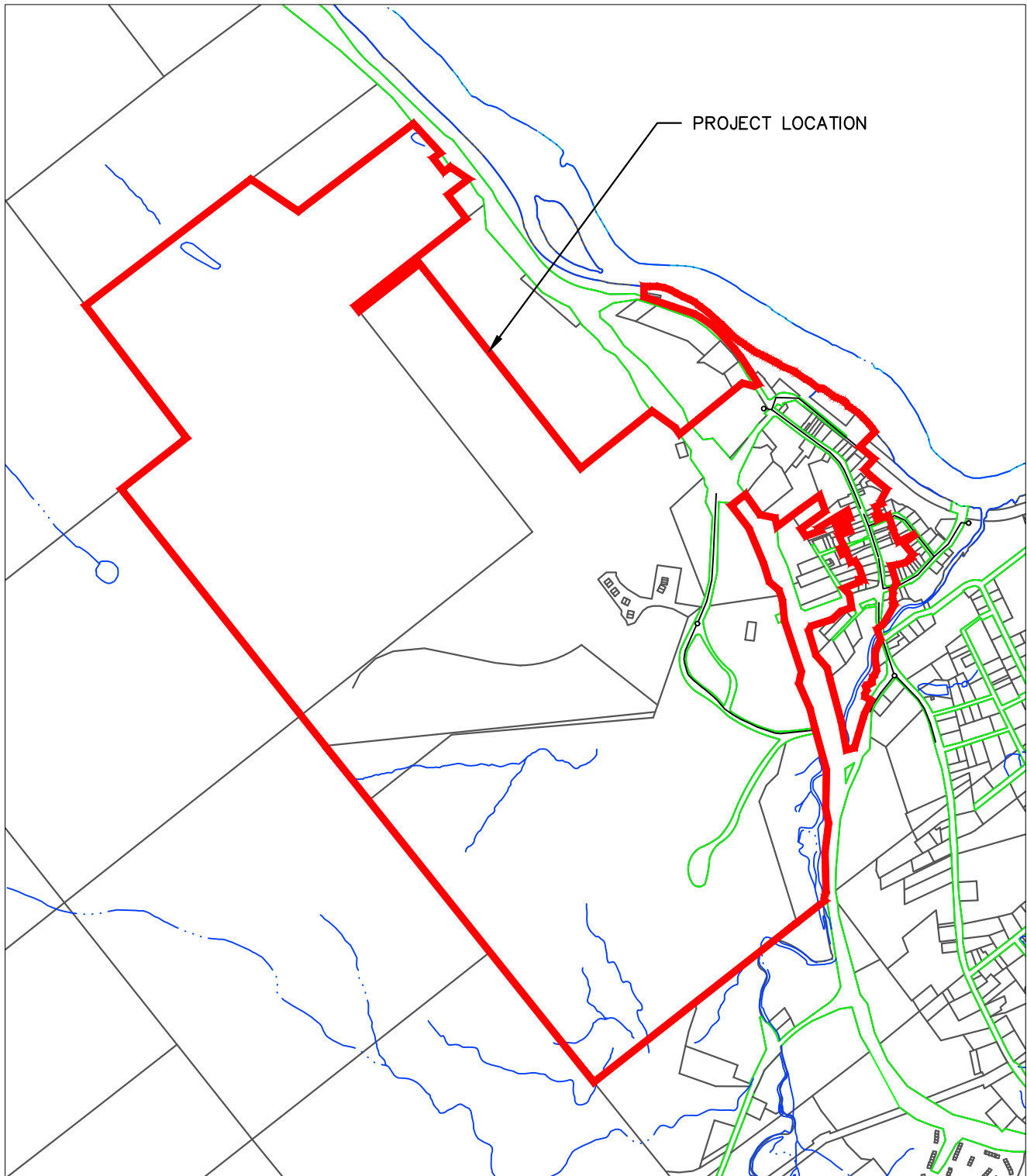


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MAP, PLAN & REPORT
TAX PARCEL MAP

TOWN OF JOHNSBURG
219 MAIN STREET

A-9

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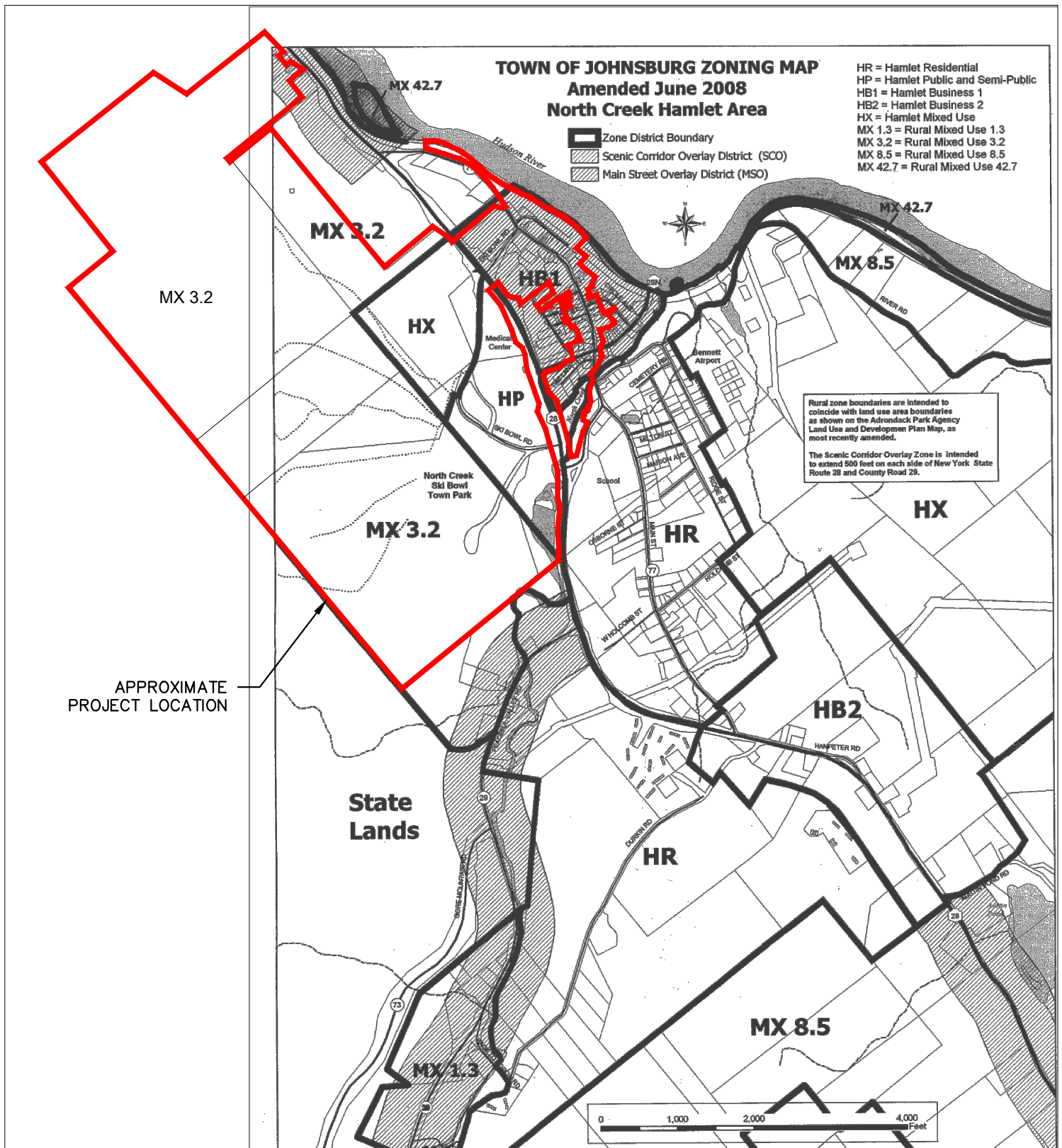
**TOWN OF JOHNSBURG ZONING MAP
Amended June 2008
North Creek Hamlet Area**

HR = Hamlet Residential
HP = Hamlet Public and Semi-Public
HB1 = Hamlet Business 1
HB2 = Hamlet Business 2
HX = Hamlet Mixed Use
MX 1.3 = Rural Mixed Use 1.3
MX 3.2 = Rural Mixed Use 3.2
MX 8.5 = Rural Mixed Use 8.5
MX 42.7 = Rural Mixed Use 42.7

Zone District Boundary
Scenic Corridor Overlay District (SCO)
Main Street Overlay District (MSO)

Rural zone boundaries are intended to coincide with land use area boundaries as shown on the Adirondack Park Agency Land Use and Development Plan Map, as most recently amended.

The Scenic Corridor Overlay Zone is intended to extend 500 feet on each side of New York State Route 28 and County Road 29.



SOURCE: TOWN OF JOHNSBURG ZONING MAP

**MAP, PLAN & REPORT
ZONING MAP**

**TOWN OF JOHNSBURG
219 MAIN STREET**

A-10

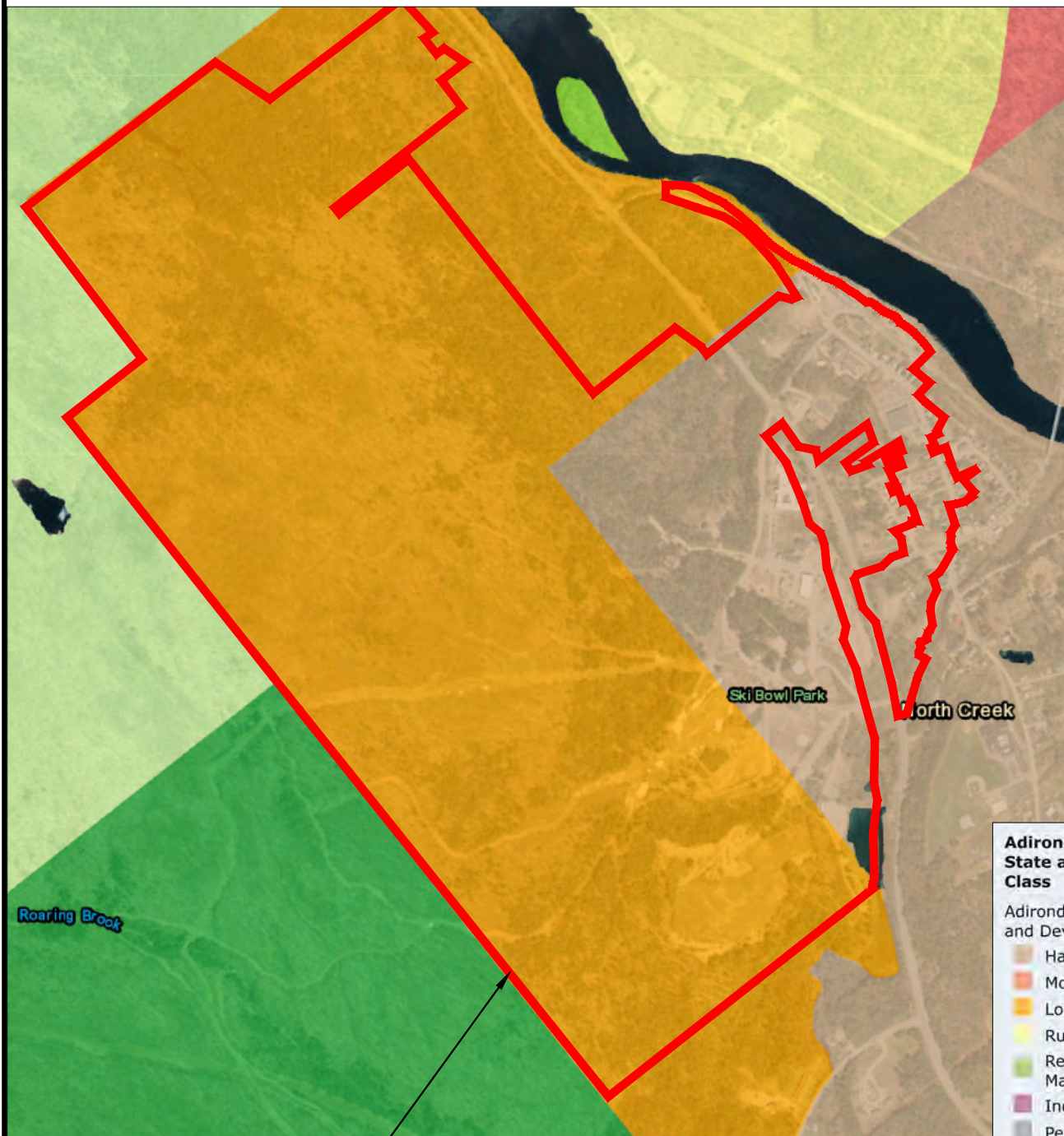
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APPROXIMATE
PROJECT LOCATION

Adirondack Park 2018 State and Private Land Class

Adirondack Park Land Use
and Development Plan

- Hamlet
- Moderate Intensity
- Low Intensity
- Rural Use
- Resource Management
- Industrial Use
- Pending Pvt Land

State Land Map

- Wilderness
- Canoe Area
- Primitive Area
- Wild Forest
- Intensive Use
- Historic
- State Administrative
- Pending Classification

SOURCE: APA LAND USE MAP (ACCESSED JULY, 2021)

MAP, PLAN & REPORT
APA ZONING MAP

TOWN OF JOHNSBURG
219 MAIN STREET

A-11

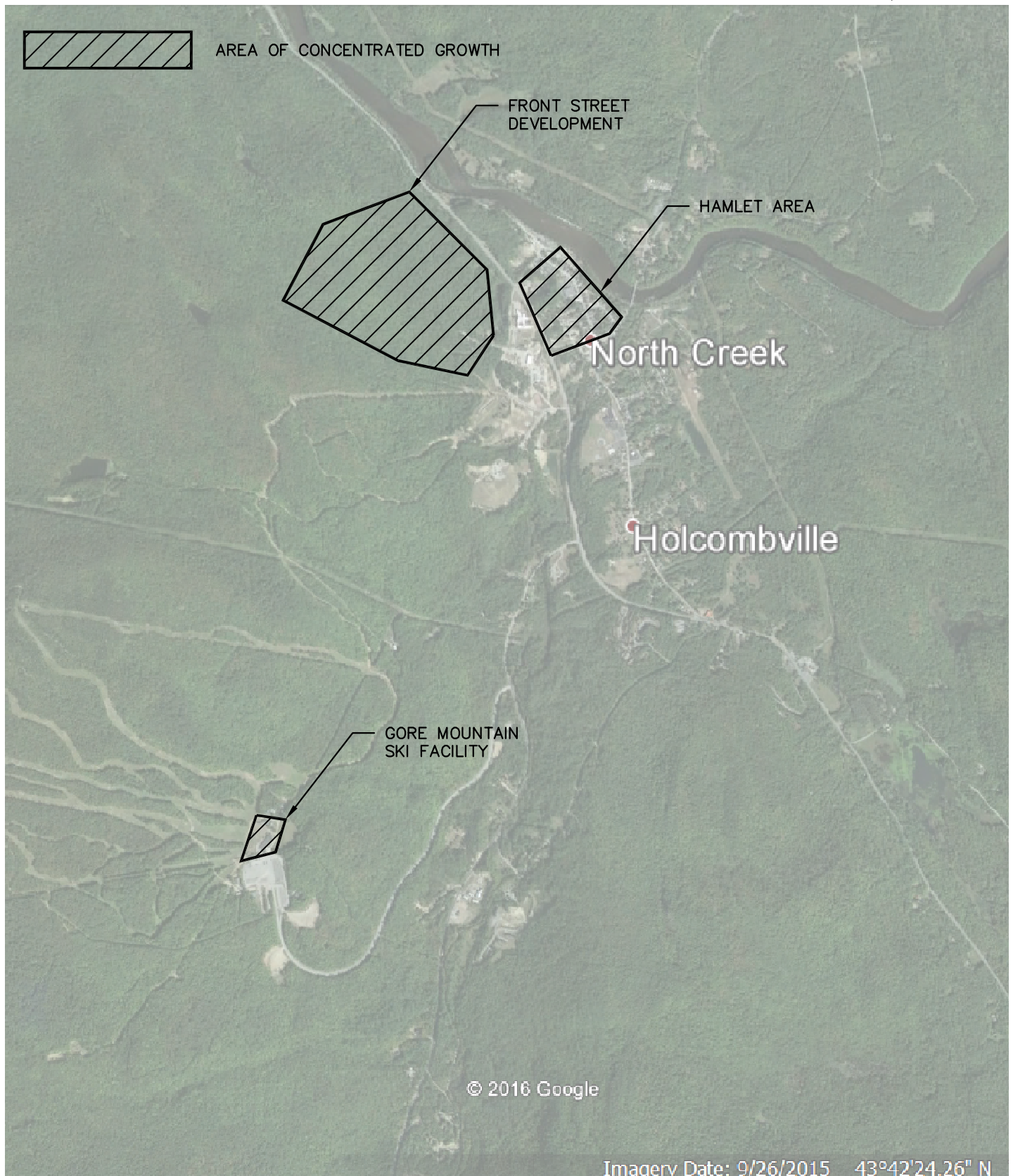
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MAP, PLAN & REPORT
GROWTH AREAS

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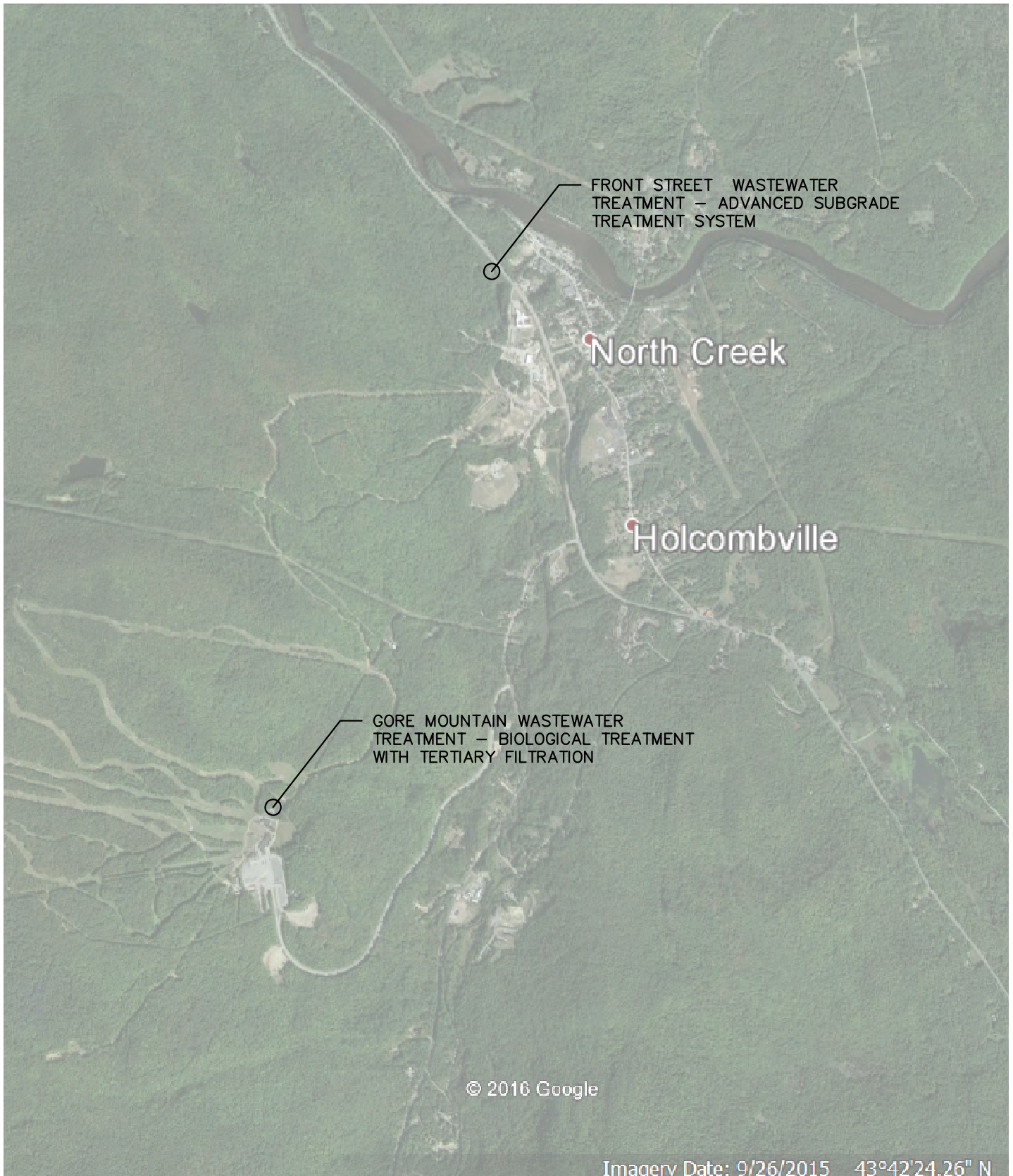
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MAP, PLAN & REPORT
EXISTING WASTEWATER

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219 MAIN STREET

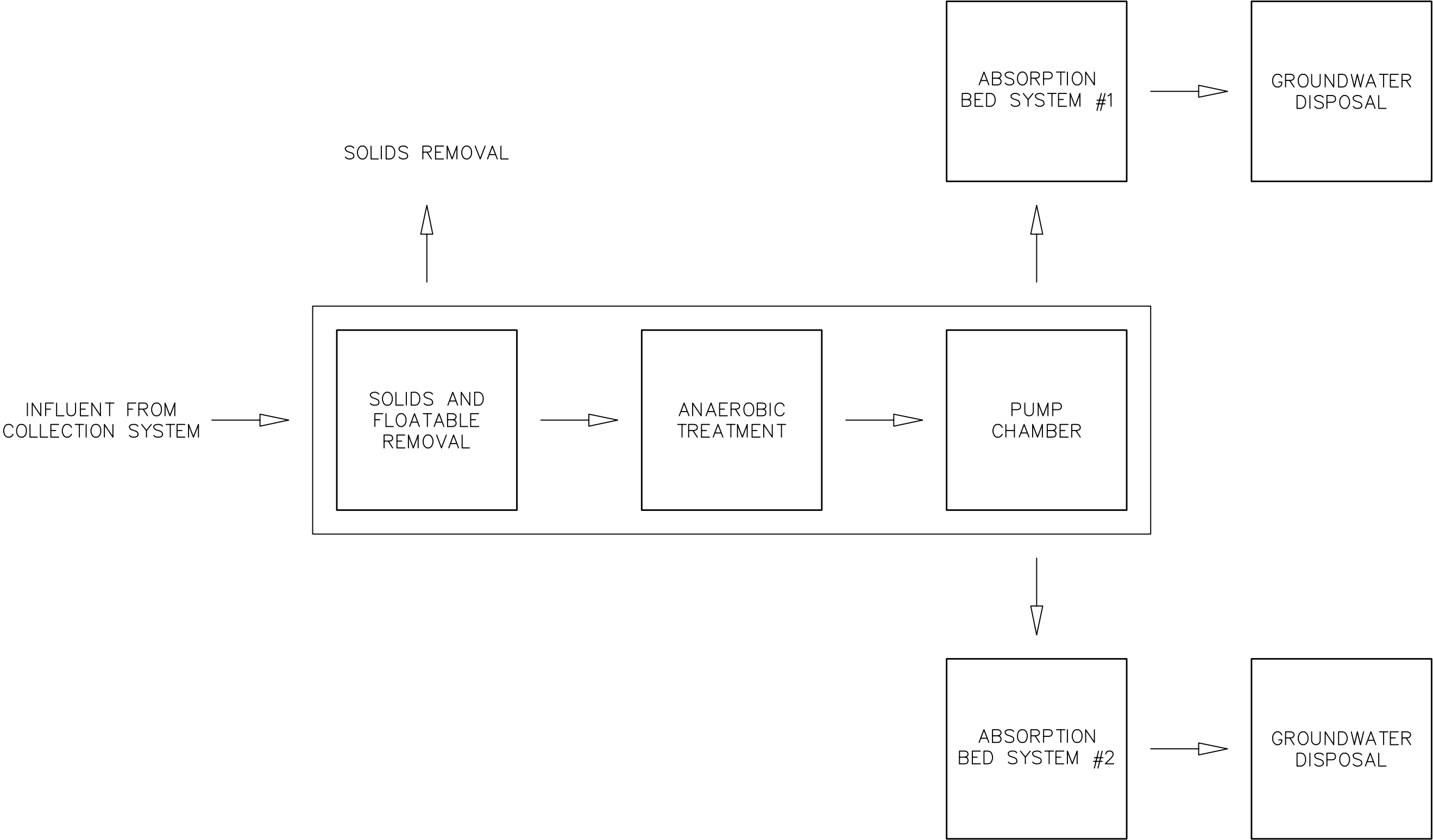
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MAP, PLAN, AND REPORT
OPTION 1
PROCESS SCHEMATIC

TOWN OF JOHNSBURG
219 MAIN STREET
JOHNSBURG WARREN COUNTY NEW YORK

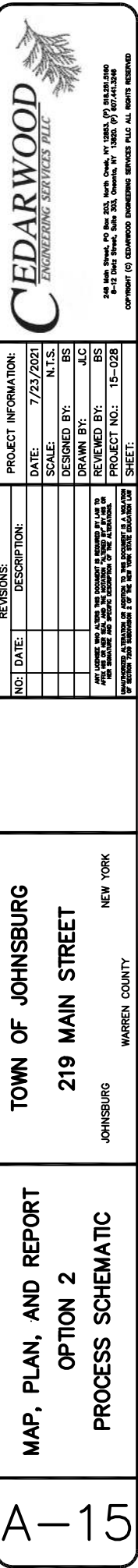
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SCALE:	N.T.S.
DESIGNED BY:	BS
DRAWN BY:	JLC
REVIEWED BY:	BS
PROJECT NO.:	15-028
SHEET:	

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INFLUENT FROM
COLLECTION SYSTEM

SCREENING

GRINDER

FLOW
MEASUREMENT

FLOW
SPLITTING

SBR TANK
#1

SBR TANK
#2

FLOW
MEASUREMENT

SURFACE
WATER
DISCHARGE

TANK 1
AERATION
BLOWERS

TANK 2
AERATION
BLOWERS

AEROBIC
SLUDGE
DIGESTION

TRUCKING
DISPOSAL

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PROJECT NO.:	15-028
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219 MAIN STREET	
JOHNSBURG	WARREN COUNTY

MAP, PLAN, AND REPORT
OPTION 3
PROCESS SCHEMATIC

INFLUENT FROM
COLLECTION SYSTEM

SCREENING

GRINDER

FLOW
MEASUREMENT

BOOSTER
STATION 1

BOOSTER
STATION 2

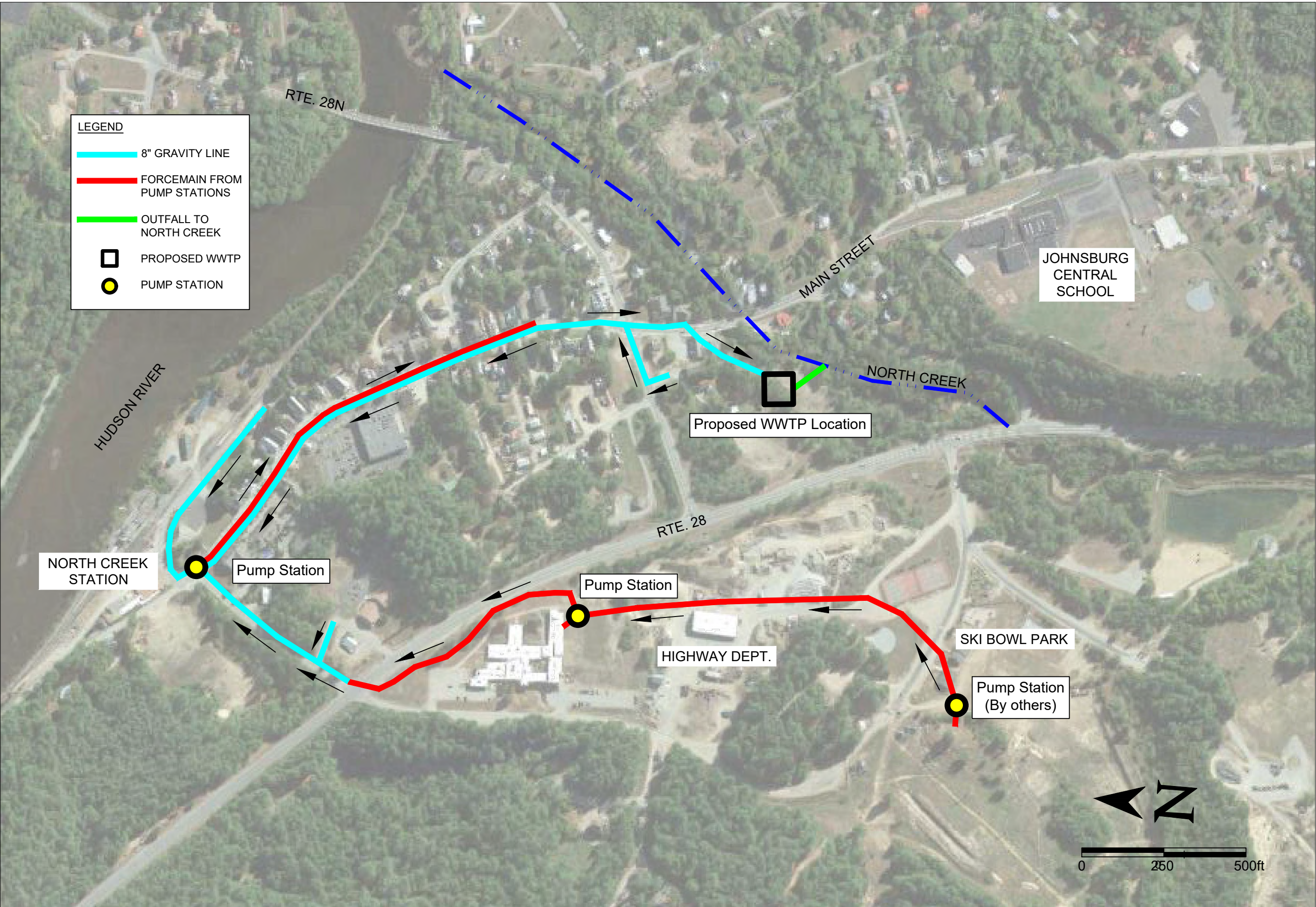
BOOSTER
STATION 3

FLOW
MEASUREMENT

UPGRADED GORE
MOUNTAIN
WASTEWATER
PLANT

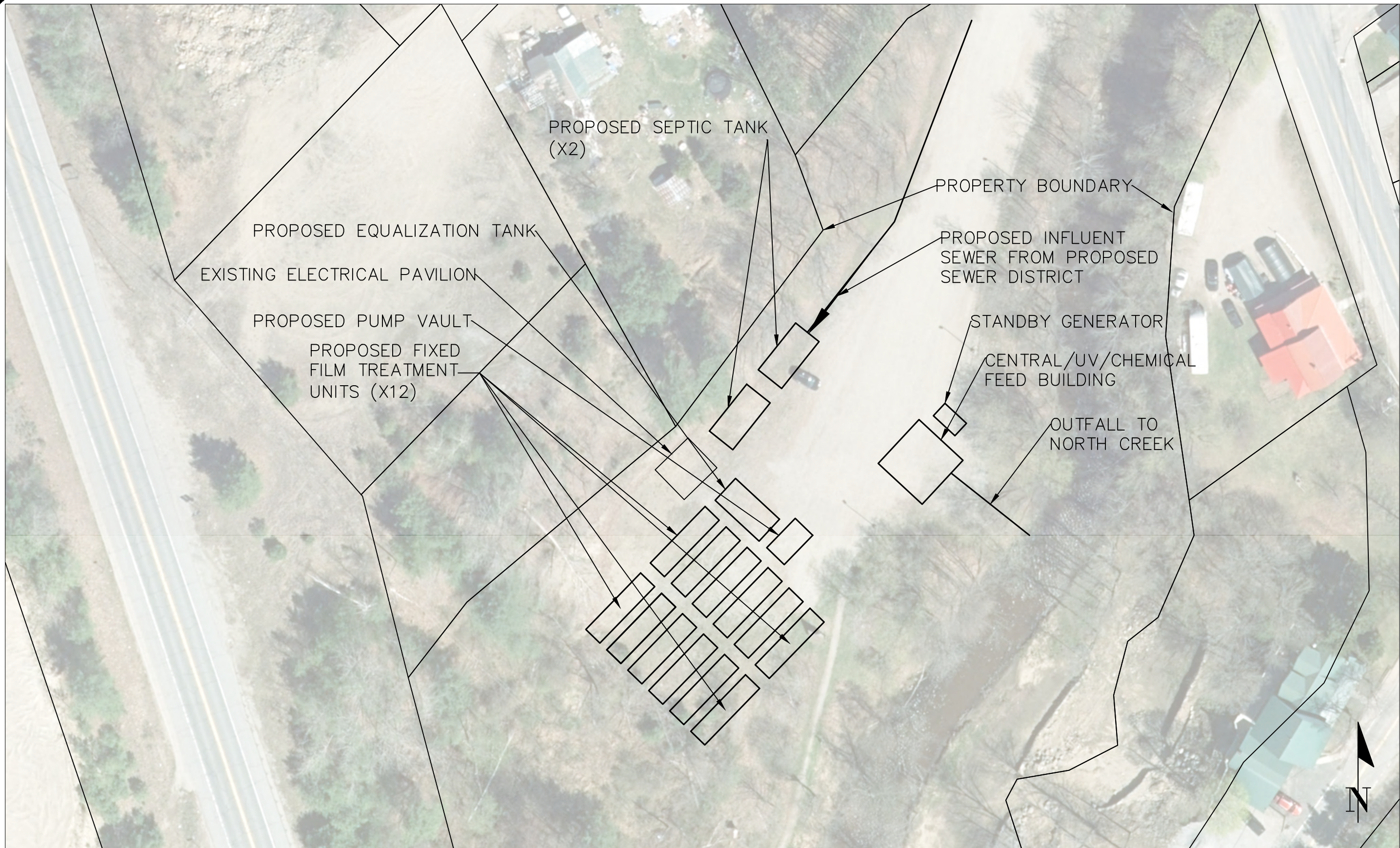
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PROJECT NO.:	15-028
SHEET:	

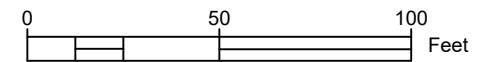


LEGEND

- 8" GRAVITY LINE
- FORCEMAIN FROM PUMP STATIONS
- OUTFALL TO NORTH CREEK
- PROPOSED WWTP
- PUMP STATION



NORTH CREEK PROPOSED WWTP LAYOUT
SCALE: 1:50



APPENDIX B

Preliminary Evaluation of an **Orenco[®] AdvanTex[®] Treatment Facility**



Project Name
Hamlet of North Creek
Warren County, NY

Prepared for
Brian Suozzo, P.E.
Cedarwood Engineering Services, PLLC

Prepared by
Garry-Lee Espinosa
Orenco Systems, Inc.

Date
December 3, 2019



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SECTION 1: COST SUMMARY

This report presents the results of a feasibility study for the construction and long-term operation of a wastewater treatment system improvements for the Hamelt of North Creek, NY. All parcels in the study area are served by individual septic systems (with some advanced treatment systems) for treatment and disposal of wastewater. The on-site systems are obsolete and non-compliant with current regulatory standards.

Approximate construction costs, operation and maintenance costs, and life-cycle cost for an AdvanTex recirculating packed bed treatment system are included in this report.

Capital Costs

	Option 1		Option 2
	60,000gpd	15,000gpd	75,000gpd
STEP System	-	-	\$54,879
Primary Treatment Tanks	\$598,075	\$239,251	\$980,243
AdvanTex Treatment	\$1,701,474	\$513,444	\$1,886,476
Total	\$2,299,550	\$752,695	\$2,921,599

Operation & Maintenance Costs

Annual O&M Cost	\$21,612	\$5,839	\$10,606
-----------------	----------	---------	----------

Options 1: 60,000gpd System Includes the following components:

- Two (2) 40,000gl Fiberglass Primary Tanks with access risers and lids
- One (1) 40,000gl Fiberglass Flow EQ/Pre-Anoxic Tank with:
 - Two (2) duplex pumping systems and equipment
 - Access risers and lids
 - Pumping system controlled by WWTP control panel
- Stage One AX-Max Treatment System (2,300sqft of textile) with:
 - Six (6) AX-Max300-42, each 300sqft
 - Two (2) AX-Max250, each 250sqft, (houses recirculation pumps, discharge pumps and fan assemblies)
- Stage Two AX-Max Treatment System (900sqft of textile) with:
 - Two (2) AX-Max250-35, each 250sqft

- Two (2) AX-Max200, each 200sqft, (houses recirculation pumps, discharge pumps and fan assemblies)
- Alkalinity Feed System
- Flow Meter
- Telemetry control panel
- O&M Manual, start up, shipping costs, and installation costs

Options 1: 15,000gpd System Includes the following components:

- Two (2) 15,000gl Fiberglass Primary Tanks with access risers and lids
- One (1) 15,000gl Fiberglass Flow EQ/Pre-Anoxic Tank with:
 - One (1) duplex pumping systems and equipment
 - Access risers and lids
 - Pumping system controlled by WWTP control panel
- Stage One AX-Max Treatment System (575sqft of textile) with:
 - One (1) AX-Max300-42, 300sqft
 - One (1) AX-Max275, 275sqft, (houses recirculation pumps, discharge pumps and fan assemblies)
- Stage Two AX-Max Treatment System (275sqft of textile) with:
 - One (1) AX-Max275-35 (houses recirculation pumps, discharge pumps and fan assemblies)
- Alkalinity Feed System
- Flow Meter
- Telemetry control panel
- O&M Manual, start up, shipping costs, and installation costs

Options 2: 75,000gpd System Includes the following components:

- Seven (7) 1,000gl Concrete STEP tanks each with pump and controls (on-lot)
- Three (3) 50,000gl Fiberglass Primary Tanks with access risers and lids
- One (1) 50,000gl Fiberglass Flow EQ/Pre-Anoxic Tank with:
 - Two (2) duplex pumping systems and equipment
 - Access risers and lids
 - Pumping system controlled by WWTP control panel

- Stage One AX-Max Treatment System (2,950sqft of textile) with:
 - Nine (9) AX-Max300-42, each 300sqft
 - One (1) AX-Max200, 200sqft, (houses recirculation pumps, discharge pumps and fan assemblies)
- Stage Two AX-Max Treatment System (1,150sqft of textile) with:
 - Three (3) AX-Max300-42, each 300sqft
 - One (1) AX-Max250, 250sqft, (houses recirculation pumps, discharge pumps and fan assemblies)
- Alkalinity Feed System
- Flow Meter
- Telemetry control panel
- O&M Manual, start up, shipping costs, and installation costs

Does Not Include:

- Gravity collection or forcemain costs
- Anti-buoyancy flanges - add \$36,000 per unit
- Control building to house controls and chemical feed
- UV disinfection treatment

SECTION 2: DESIGN SUMMARY

The facility addressed in this proposal includes a primary treatment (STEP), effluent sewer, and advanced secondary treatment for a new residential subdivision. Projected wastewater flow rates and organic loading were provided and based upon projected usage for the existing facility.

Wastewater Flow Rates

Hydraulic Design Parameters

	Option 1		Option 2
	60,000 gal/day	15,000 gal/day	75,000 gal/day
Design Average Day Flow			

Wastewater Strengths

Predicted wastewater strengths for the service area are outlined in the tables below. For TKN, TN, and NH₃-N restrictive permit limits, the primary treated effluent should have a minimum temperature of 15°C, with pH ranging from 7.2 to 8, and a residual alkalinity of greater than 100 mg/L maintained throughout the process. This will typically require an alkalinity feed system.

Constituent Loading Assumptions - Option 1, 60,000gpd	DADF, gpd	Concentration (mg/L)	Primary Treated Load (lbs/day)
Biochemical Oxygen Demand (BOD ₅), mg/L:	60,000	150	75.0
Total Suspended Solids (TSS), mg/L:	60,000	40	20.0
Ammonia (NH ₃ -N), mg/L:	60,000	40	20.0

Constituent Loading Assumptions - Option 1, 15,000gpd	DADF, gpd	Concentration (mg/L)	Primary Treated Load (lbs/day)
Biochemical Oxygen Demand (BOD ₅), mg/L:	15,000	150	18.7
Total Suspended Solids (TSS), mg/L:	15,000	40	5.0
Ammonia (NH ₃ -N), mg/L:	15,000	40	5.0

Constituent Loading Assumptions - Option 2, 75,000gpd	DADF, gpd	Concentration (mg/L)	Primary Treated Load (lbs/day)
Biochemical Oxygen Demand (BOD ₅), mg/L:	75,000	150	93.8
Total Suspended Solids (TSS), mg/L:	75,000	40	25.0
Ammonia (NH ₃ -N), mg/L:	75,000	40	25.0

Permit Limitations

The following table provides the discharge limitations as provided by Cedarwood Engineering Services, PLLC.

Limitations	Concentration mg/L
Biochemical Oxygen Demand (BOD ₅)	10
Total Suspended Solids (TSS)	5

Ammonia (NH ₃ -N), mg/L: (Summer)	1.2
Ammonia (NH ₃ -N), mg/L: (Winter)	2.2
Settable Solids (SS), mg/L:	0.1

SECTION 3: TECHNOLOGY DESCRIPTION & SIZING

Septic Tank Effluent Pumping (STEP)

STEP Interceptor Tanks are designed to collect wastewater; segregate settleable and floatable solids (sludge and scum); accumulate, consolidate and store solids; digest organic matter; and discharge primary-treated effluent. Passive, energy-free primary tank- age provides the most cost-efficient method of primary treatment available for nonindustrial sewage; BOD removal of >50% and TSS removal of > 90% (when using an effluent filter) are typically accomplished with passive primary treatment.

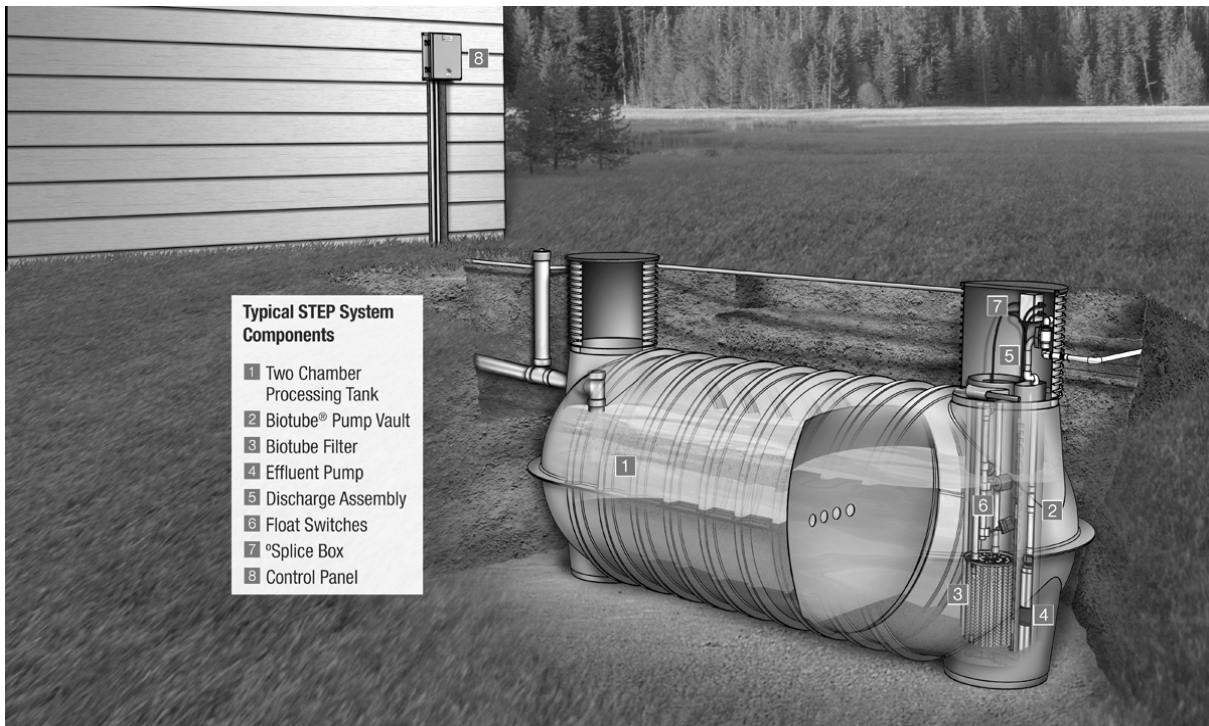


Figure 1. Typical STEP system components.

Forcemain (Effluent Sewer)

Effluent leaving the STEP tank is conveyed to the treatment plant using small diameter (typically 2 – 4” PVC or HDPE) forcemains. Only the filtered liquid is discharged by pump to shallow, small-diameter collection lines that follow the contour of the land. Solids remain in the underground tank, for passive, natural treatment.



Figure 2. Orenco STEP System and AdvanTex Treatment Facility

Primary Treatment Stage

The primary treatment stage is designed to collect wastewater; segregate settleable and floatable solids (sludge and scum); accumulate, consolidate and store solids; digest organic matter; and discharge primary-treated effluent. Passive, energy-free primary tankage provides the most cost-efficient method of primary treatment available for nonindustrial sewage; BOD removal of >50% and TSS removal of > 90% (when using an effluent filter) are typically accomplished with passive primary treatment.

The primary treatment stage can be configured in several ways, including single- or multiple-compartment tanks, single tanks with meandering baffles (partitions), or multiple tanks in series. Some systems may utilize solids separation devices. Primary treatment includes effluent screening, and effluent may be discharged to the secondary treatment stage via gravity or pump.

Flow Equalization/Pre-Anoxic Tank

This process consists of recirculating a portion of the recirc-blend (or filtrate) from the AdvanTex secondary treatment system to an anoxic zone within the initial primary solids settling/collection chamber or, preferably, in a separate pre-anoxic tank. A pre-anoxic treatment stage tends to balance and lower concentrations by blending primary treated effluent with AX filtrate. It also provides an environment for denitrifying a portion of the nitrified filtrate.

The use of a pre-anoxic stage benefits all applications and is essential for those applications with high-strength waste (organic or nitrogen concentrations) and restrictive permit limits, as well as applications in which higher-quality effluent and enhanced overall removal performance are desired.

Flow equalization (**EQ**) provides stability by leveling out peaks in flow and allowing consistent loading of the treatment system. EQ is strongly recommended for systems with variable flow patterns and restrictive discharge limits. EQ is especially important for systems that have highly variable flow patterns due to usage (e.g., resorts and churches) or collection method (e.g., conventional gravity collection).

The EQ stage consists of a tank or tanks fitted with a timed-dose-controlled pumping system. It follows the primary tank and pre-anoxic tank (if used) and is typically located before pre-aeration/clarification tankage (if used) or a recirculation-blend chamber.

AdvanTex Treatment – Stage One

After pre-anoxic treatment, effluent is transported to the recirculation-blend tank or chamber, where it is blended with AdvanTex filtrate. The blended wastewater is distributed over the AdvanTex textile media and percolates down through the media, where it is filtered, cleaned, and nitrified by the naturally occurring microorganisms populating the media. After treatment, a portion of the filtrate is returned to the recirculation-blend chamber while a portion is transported to the next treatment stage or to dispersal. Note that a portion of the recirc-blend (or filtrate) is often returned directly to the pre-anoxic treatment stage.



Figure 3. Typical AX-Max Treatment Facility (Christiansburg, OH)

AdvanTex Treatment – Stage Two

After stage one treatment, effluent is transported to the stage two of an AdvanTex treatment system, which operates like stage one, except smaller. Because the BOD levels are low exiting stage one, nitrifiers populating stage two thrive in the low carbon environment providing additional reduction in ammonia.

SECTION 4: SCOPE AND MATERIAL COST BREAKDOWN

STEP System (On-Lot) and Forcemain Components (Option 2 Only)

1,000 gal STEP System Estimate (Per Unit)

Interceptor Tank, 1,000 gal	\$1,750
Access Equipment (2 ft & 4ft Burial Depth)	\$473
STEP Pumping Equipment	\$1,703
Control Panel (Telemetry & Non-Telemetry)	\$617
Installation Estimate (% of Materials)	\$2,726
Shipping Estimate (10% of materials)	\$545
Total (Per Unit)	\$7,840

Subtotal (7 total) **\$54,879**

Primary Treatment Tanks (Option 1)

Primary Treatment (WWTP)	60,000gpd	15,000gpd	75,000gpd
(2) 40,000gl / (2) 15,000gl / (3) 50,000gl Fiberglass	\$220,000	\$82,500	\$412,500
Access Equipment	\$8,109	\$8,109	\$12,163
Biotube Effluent Filter	\$1,500	\$750	\$2,251
Subtotal	\$229,609	\$91,359	\$426,914

Flow EQ/Pre-Anoxic Tank (WWTP)

40,000gl / 15,000gl / 50,000gl Fiberglass	\$110,000	\$41,250	\$137,500
Access Equipment	\$4,054	\$4,054	\$4,054
Biotube Effluent Filter	\$8,146	\$4,073	\$8,146
Subtotal	\$122,200	\$49,377	\$149,700

Primary & Flow EQ/Pre-Anoxic Tank Shipping

10% of material	\$35,181	\$14,074	\$57,661
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Construction Estimate

Labor and Misc. Equipment (60% of Materials)	\$211,085	\$84,442	\$345,968
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Materials Total	\$351,809	\$140,736	\$576,614
Construction Total	\$211,085	\$84,442	\$345,968
Shipping	\$35,181	\$14,074	\$57,661
Total	\$598,075	\$239,251	\$980,243

AdvanTex® Treatment

Stage One AdvanTex Equipment	60,000gpd	15,000gpd	75,000gpd
AX-Max Treatment (2,300sqft / 575sqft / 2,950sqft)	\$719,191	\$181,814	\$803,595
AX-MAX Pumping Equipment	\$40,040	\$20,020	\$45,500
RNE Pump	\$2,536	\$2,536	\$6,915
Discharge Pumping Equipment	\$12,430	\$5,269	\$11,300
Ventilation Assemblies	\$10,868	\$2,717	\$14,820
Float Assembly(s)	\$622	\$622	\$565
Piping, fittings, glue	\$2,400	\$900	\$3,000
Subtotal	\$788,086	\$213,877	\$885,695

Stage Two AdvanTex Equipment			
AX-Max Treatment (900sqft / 275sqft / 1,150sqft)	\$307,835	\$92,169	\$326,905
AX-MAX Pumping Equipment	\$20,020	\$6,215	\$18,200
Discharge Pumping Equipment	\$12,430	\$5,269	\$11,300
Ventilation Assemblies	\$5,434	\$2,717	\$7,410
Float Assembly(s)	\$677	\$677	\$615
Piping, fittings, glue	\$300	\$150	\$450
Subtotal	\$346,696	\$107,197	\$364,880

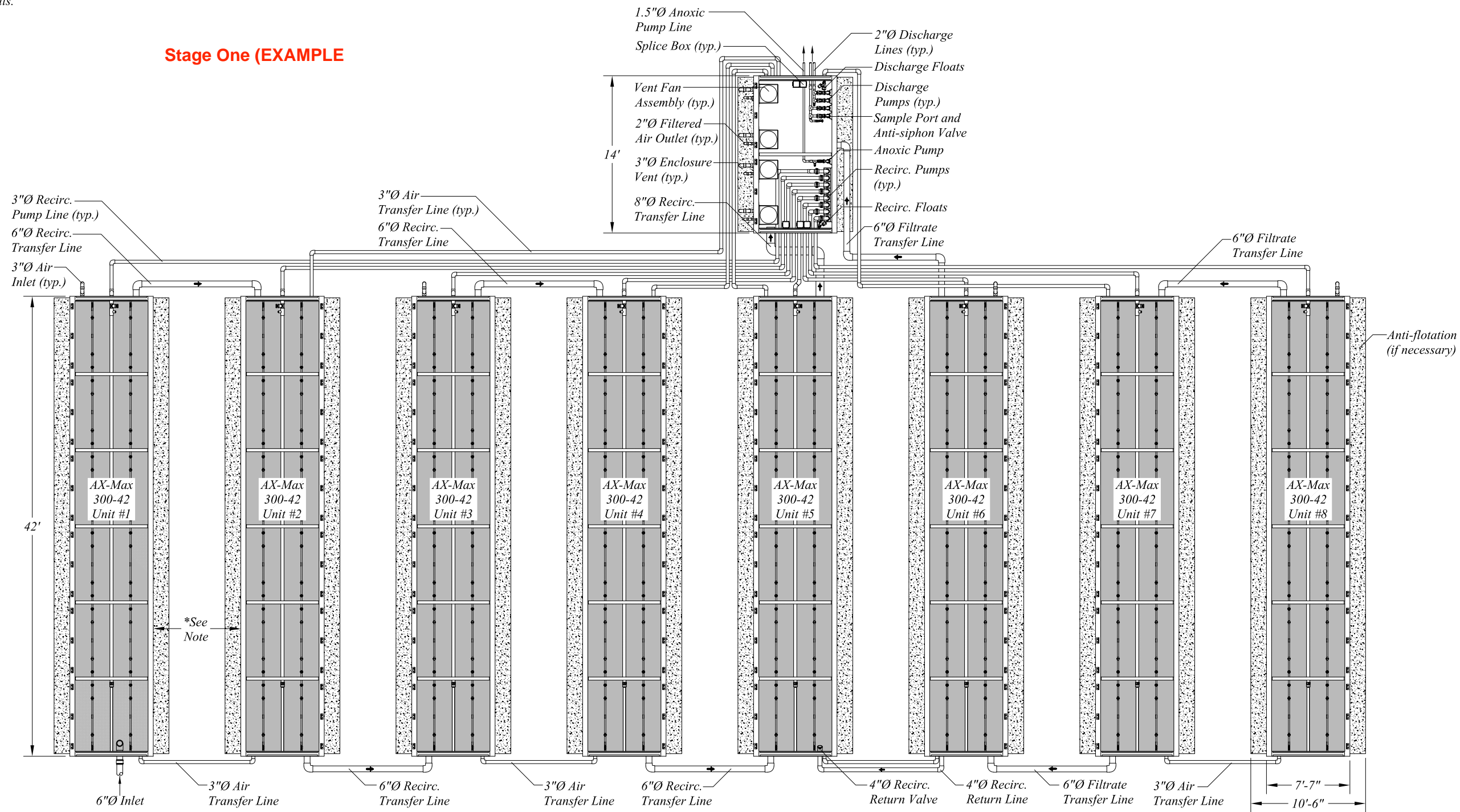
Ancillary Equipment			
Telemetry Control Panel w/ cell modem	\$23,350	\$14,250	\$28,200
Alkalinity Equipment	\$27,537	\$13,705	\$37,902
Instrumentation / Flow Meter	\$7,975	\$7,975	\$7,250
Subtotal	\$58,862	\$35,930	\$73,352

Shipping, Commissioning, and Operator Training			
Commissioning & Operator Training	\$5,000	\$5,000	\$5,000
O&M Manual	\$1,500	\$1,500	\$1,500
Shipping	\$143,237	\$42,840	\$158,871
Subtotal	\$149,737	\$49,340	\$165,371

Construction Estimate			
Labor and Misc. Equipment (% of Materials)	\$358,093	\$107,101	\$397,178
Subtotal	\$358,093	\$107,101	\$397,178

	60,000gpd	15,000gpd	75,000gpd
Materials Total	\$1,193,644	\$357,003	\$1,323,927
Construction Total	\$358,093	\$107,101	\$397,178
Shipping, Commissioning, and Operator Training	\$149,737	\$49,340	\$165,371
Total	\$1,701,474	\$513,444	\$1,886,476

Note: Spacing between AX-Max units is dependent on desired bury depth.
Consult Orenco Engineering for details.



Customer Approval
Signature: _____ Date: _____
Customer Name: _____
By this signature, Customer indicates that they have reviewed this Proposed System Configuration Drawing and found that it meets all of the designer's functional requirements and/or specifications.



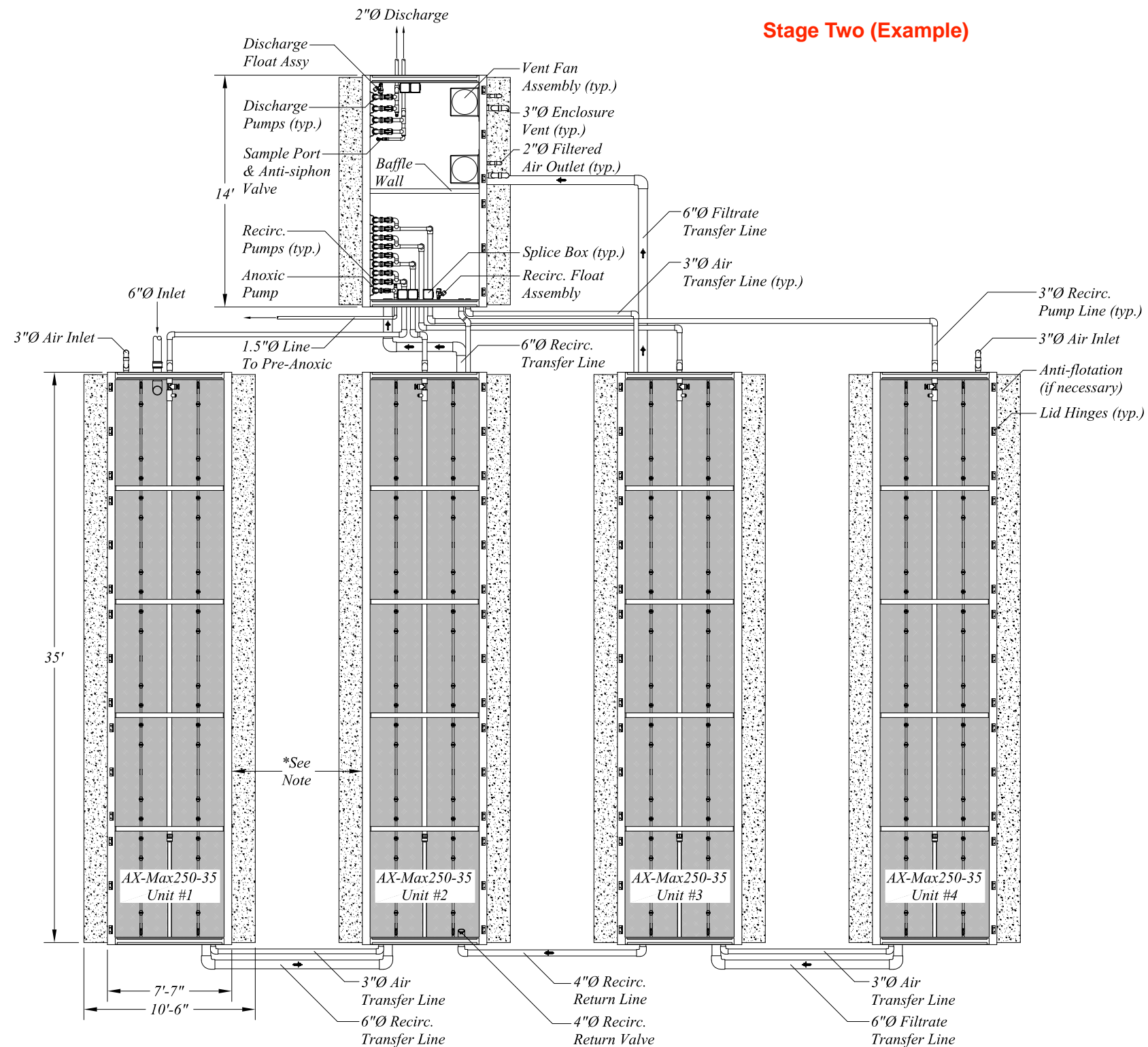
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Portions or all of this Proposed System Configuration Drawing, as appropriate, may be reproduced and integrated into the site-specific layout and configuration of a system by its designer.

Disclaimer: This Proposed System Configuration Drawing is provided solely as a design aid and illustrates one possible configuration of a system that would comply with Orenco's design criteria for the requirements and/or specifications that have been communicated to Orenco (based on third-party standards testing protocols and performance reports, as applicable). Design decisions, including the actual layout and configuration of the system and its viability for the project, are at the sole discretion of the systems's designer.

**AdvanTex AX-Max2400
Pump Discharge
Plan View**

Drawn By:	BAS	Scale:	1" = 10'-0"
Reviewed By:	SH	Sheet:	1 OF 10
File Name:	AX-MAX2400-I.DWG	Rev:	2.0
		Date:	11/02/2017

Note: Spacing between AX-Max units is dependent on desired bury depth. Consult Orenco Engineering for details.



Customer Approval
Signature: _____ Date: _____
Customer Name: _____
By this signature, Customer indicates that they have reviewed this Proposed System Configuration Drawing and found that it meets all of the designer's functional requirements and/or specifications.



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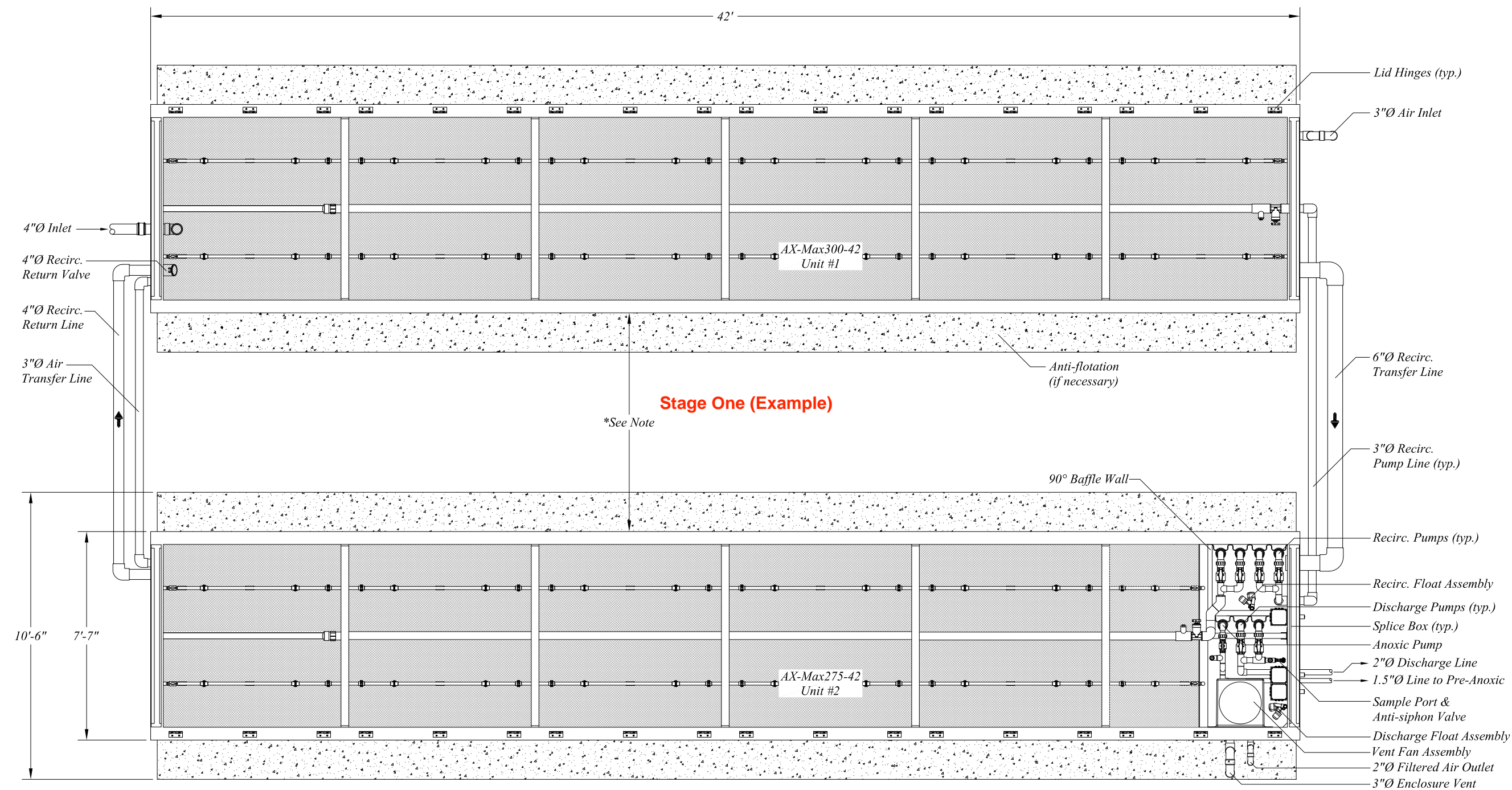
Disclaimer: This Proposed System Configuration Drawing is provided solely as a design aid and illustrates one possible configuration of a system that would comply with Orenco's design criteria for the requirements and/or specifications that have been communicated to Orenco (based on third-party standards testing protocols and performance reports, as applicable). Design decisions, including the actual layout and configuration of the system and its viability for the project, are at the sole discretion of the systems' designer.

**AdvanTex AX-Max1000
Pump Discharge**

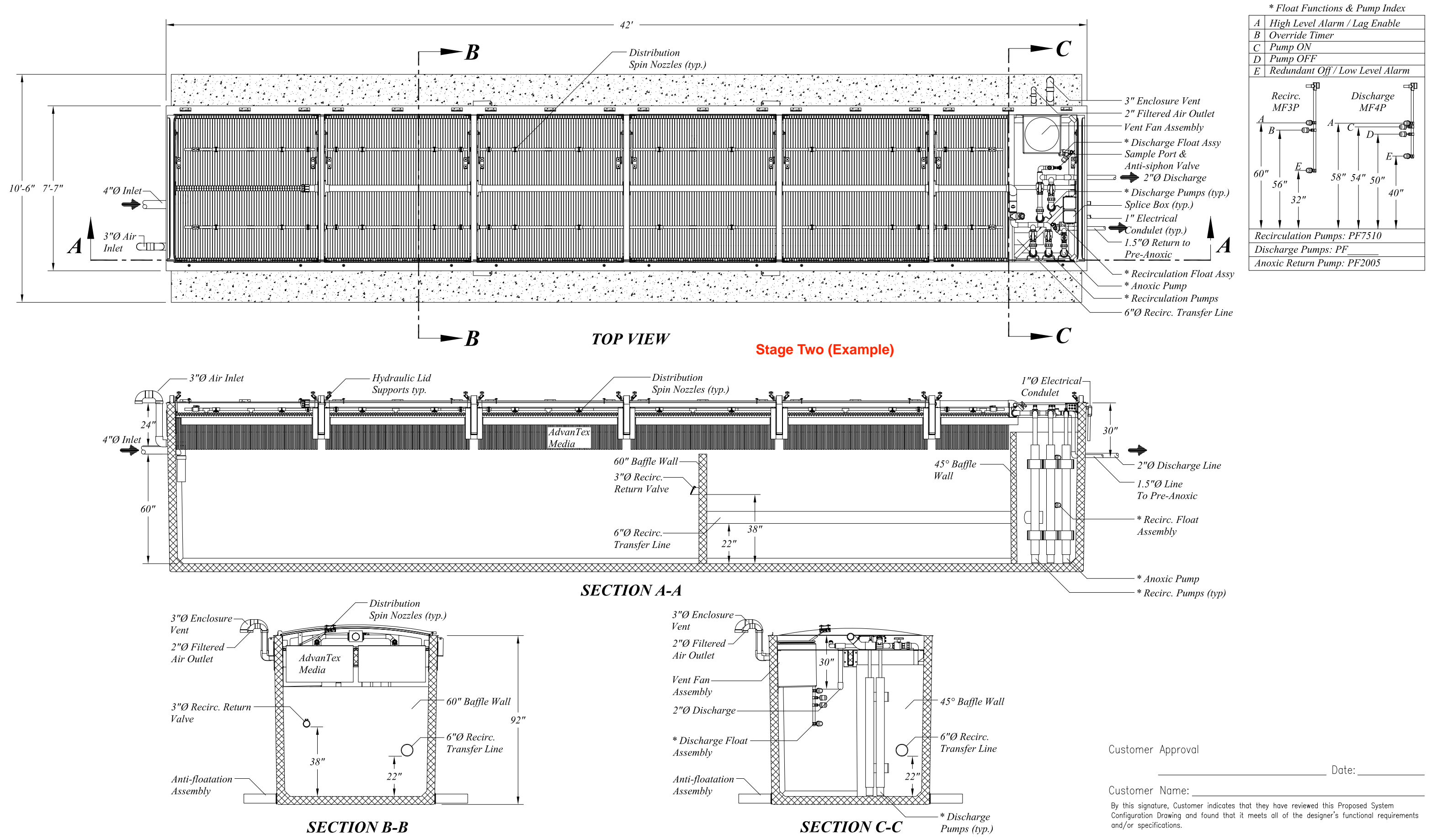
Plan View

Drawn By:	BAS	Scale:	1" = 8'-0"
Reviewed By:	SH	Sheet:	1 OF 6
File Name:	AX-Max1000-1.DWG	Rev:	2.0
		Date:	12/20/2017

Note: Spacing between AX-Max units is dependent on desired bury depth. Consult Orenco Engineering for details.



Customer Approval
Signature: _____ Date: _____
Customer Name: _____
By this signature, Customer indicates that they have reviewed this Proposed System Configuration Drawing and found that it meets all of the designer's functional requirements and/or specifications.



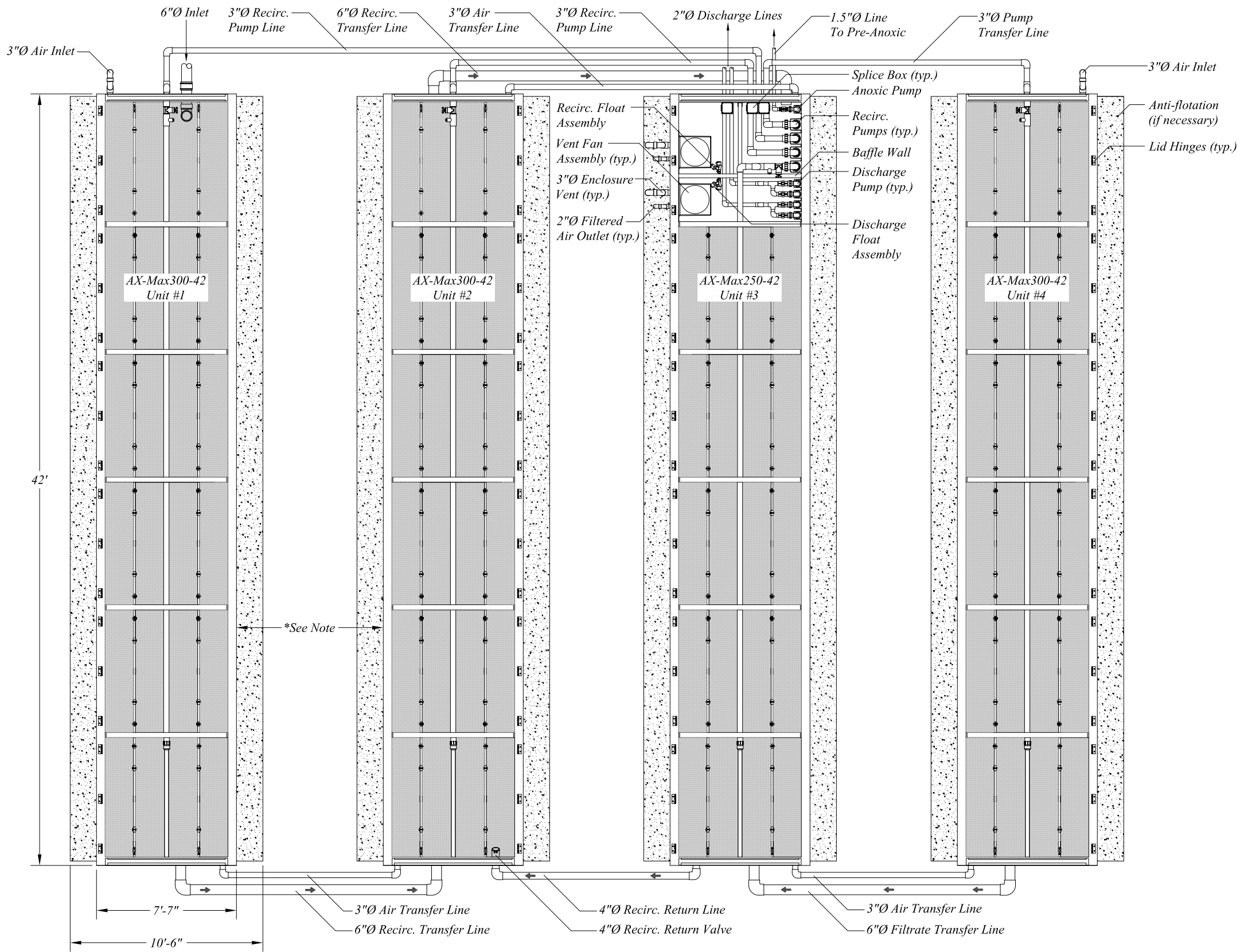
Customer Approval _____ Date: _____

Customer Name: _____

By this signature, Customer indicates that they have reviewed this Proposed System Configuration Drawing and found that it meets all of the designer's functional requirements and/or specifications.

Note: Spacing between AX-Max units is dependent on desired bury depth. Consult Orenco Engineering for details.

Stage Two (Example)



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APPROVED:

DATE APPROVED:

UNAUTHORIZED CHANGES & USES

Orenco has prepared these drawings for use by the design engineer. Orenco will not be responsible or liable for unauthorized changes to or uses of these drawings. All changes to these drawings must be made in writing and must be approved by the design engineer.

PRODUCT CONFIGURATION DRAWINGS



Orenco Systems® Incorporated
Changing the Way the World Does Wastewater®

Drawn By: DSM

Drawn For:

Project: AdvanTex AX-MAX 1150
Pump Discharge

Title: Plan View

Scale: 1" = 6'-0"

Sheet: 1 OF 5

Rev: 1.0

Date: 10/13/14

APPENDIX C

C-1

List of Sewer District Properties

C-1 List of North Creek Sewer District Properties

Tax Map Number	Property Address	Owner	EDUs
66.10-1-42	267 MAIN ST	Mastrantoni, Robert	3.95
66.10-1-68	268 MAIN ST	Smith, Michael J	5.27
66.10-1-69.1	264 MAIN ST	Alpine Lodge	14.07
66.10-1-66	272 MAIN ST	Choptank Mills Assoc, Inc	11.62
66.10-1-67	3 BAROUDI LN	Baroudi, Philip	2.00
66.10-1-65	274 MAIN ST	Bowers, Michael	1.48
66.10-1-43	273 MAIN ST	North Creek Center LLC	5.18
66.10-1-64	276 MAIN ST	Greenan, Michael	1.55
66.10-1-63	280 MAIN ST	Tanny, Keith A	0.99
66.10-1-46	287 MAIN ST	Eager, Jeffrey A	1.00
66.10-1-13	243 MAIN ST	Methodist Church - NC	0.29
66.10-1-14	247 MAIN ST	Methodist Church - NC	1.00
66.10-1-16	251 MAIN ST	M&R Prestigious Properties:LLC	1.55
66.10-2-15	248 MAIN ST	Nauen, Daniel	2.00
66.10-2-17	244 MAIN ST	CRE JV Mixed Fifteen, NY 3 Branch Holdings	0.64
66.10-2-14	250 MAIN ST	Georgia, Elizabeth	1.00
66.10-1-34	255 MAIN ST	Premier Properties of the, North Country	5.65
66.10-1-49.1	295 MAIN ST	Equity Trust Co - Custodian	4.16
66.46-1-4	140 FRONT ST	Greenwich Land Dev:LLC	1.00
66.46-1-5	138 FRONT ST	Frontstreet Realty One:LLC	1.00
66.46-1-2	30 FRONT ST	Dougherty, Catherine M	1.00
66.10-2-19	238 MAIN ST	Lender, Raymond E	1.00
66.46-1-3	28 FRONT ST	Crik Capital Partners:LLC	1.00
66.10-2-12	254 MAIN ST	Freebern, Andrew	0.85
66.10-1-35	257 MAIN ST	Ferillo, Martin	1.00
66.10-2-13	252 MAIN ST	Feiden, John J	1.48
66.10-1-36	259 MAIN ST	Smith, Richard	1.00
66.10-2-11	256 MAIN ST	Adirondack Supply	0.35
66.10-1-72	260 MAIN ST	Williams, Sarah B	3.44
66.10-1-37	261 MAIN ST	Konis, Geoffery	2.00
66.10-1-39	263 MAIN ST	Citizens Telecom UCI	0.29
66.-1-16	126 SKI BOWL RD	112 Ski Bowl Rd, LLC	35.29
66.10-1-41	33 ORDWAY LN	Hewitt, Harris	1.00
66.10-2-41	219 MAIN ST	Town Of Johnsburg	0.71
66.-1-14	88 SKI BOWL RD	Town Of Johnsburg	49.76
66.10-2-33	227 MAIN ST	11 Clinton Street Inc	3.00
66.10-2-32	228 MAIN ST	Town of Johnsburg	3.76
66.10-1-10	235 MAIN ST	Broderick, William	0.92
66.10-2-40	7 MAIDEN LN	Rountry, Robert	1.00
66.10-1-61	282 MAIN ST	Waite Realty, INC	5.27
66.10-1-2	3584 ST RT 28	Town Of Johnsburg	13.67
66.10-1-60	284 MAIN ST	Klippel, Lucretia J	0.49
66.10-1-51	307 MAIN ST	Copperfield Inn Resorts,LLC	53.55
66.10-1-59	288 MAIN ST	PMG Managment	5.18
66.10-1-1	158 SKI BOWL RD	Kernell, John	2.00

66.10-1-57	292 MAIN ST	Arnheiter, Laurie A	2.54
66.10-1-56	296 MAIN ST	Hinckley, Christine	9.18
66.6-2-8	302 MAIN ST	Mc Graw, Timothy	3.76
66.10-1-54	298 MAIN ST	Szymaniak, Kamil	1.00
66.10-1-53	300 MAIN ST	Trimmers	3.29
66.6-2-7	304 MAIN ST	Neary, William T	2.00
66.6-2-5	312 MAIN ST	North Creek Railway Depot	0.09
66.6-2-6	MAIN ST	County of Warren &	0.09
66.10-2-39	13 MAIDEN LN	Todd, Evan J	2.00
66.10-2-20	35 RT 28N	Coyne & Sons Gen Construction	5.65
66.10-1-11	237 MAIN ST	St James Catholic Church	1.41
66.10-2-18	240 MAIN ST	Hudson Quinn Holdings LLC	1.00
66.10-1-12	239 MAIN ST	St James Catholic Church	1.00
66.46-1-10	3 MILL LN	Ski Bowl Holdings One LLC	1.00
66.46-1-11	5 MILL LN	Mc Nutt, Janis M	1.00
66.6-2-2	5 RAILROAD PL	North Creek Railway Depot	0.29
66.6-2-1	320 MAIN ST	320 Main, LLC	0.65
66.5-1-10	33 RAILROAD PL	County Of Warren	0.09
66.10-1-3	3576 ST RT 28	North Creek Apt Ltd.	8.47
66.10-1-4	ST RT 28	Town of Johnsburg	0.33
66.5-1-9	MAIN ST	Barton Mines Company	0.33
66.-1-18.12	79 SKI BOWL RD	Town of Johnsburg	0.33
66.46-1-12	7 MILL LN	Front Street Mountain Dev:LLC	0.33
66.46-1-14	11 MILL LN	Front Street Mountain Dev:LLC	0.33
66.46-1-13	9 MILL LN	Front Street Mountain Dev:LLC	0.33
66.46-1-8	FRONT ST	Front Street Mountain Dev LLC	0.33
66.46-1-9	FRONT ST	Front Street Mountain Dev LLC	0.33
66.46-1-7	FRONT ST	Front Street Mountain Dev LLC	0.33
66.46-1-6	FRONT ST	Front Street Mountain Dev LLC	0.33
66.-1-18.2	ST RT 28	Front Street Mountain Dev CO.	0.33
66.10-2-38.2	MAIDEN LN	320 Main, LLC	0.33
66.6-2-4	MAIN ST	North Creek Railway Depot	0.33
66.10-1-55	MAIN ST	Hinckley, Christine	0.33
66.10-1-49.2	295 MAIN ST	North Creek Center LLC	0.33
66.5-1-2	SKI BOWL RD	Town Of Johnsburg	0.33
65.-1-3.1	ST RT 28	Front Street Mountain Dev Co	0.33
66.-1-75	ST RT 28	Town of Johnsburg	0.33
66.-1-18.11	79 SKI BOWL RD	Front Street Mountain Dev Co	0.33
66.10-1-9	RT 28N	Broderick, William D	0.33
66.-1-20.1	ST RT 28	Town of Johnsburg, NC Water Distr	0.33
66.5-1-1	317 MAIN ST	Monter, Elliot	0.33
66.10-2-37	MAIDEN LN	320 Main, LLC	0.33

65.-1-3.2	ST RT 28	Town of Johnsburg	0.33
66.10-2-31	RT 28N	Town of Johnsburg	0.33
66.10-2-35	MAIDEN LN	Guarino, Patrick J	0.33
66.10-2-36	MAIDEN LN	Guarino, Patrick J	0.33
66.10-1-70	MAIN ST	Nessle, Robert W	0.33
66.10-1-71	MAIN ST	Nessle, Robert W	0.33
66.10-2-16	MAIN ST	Georgia, Elizabeth	0.33
66.10-1-15	MAIN ST	Methodist Church - NC	0.33
66.46-1-1	SKI BOWL RD	Front Street Mountain Dev LLC	0.33
66.10-1-69.2	BAROUDI LN	Mulvey, Rebecca P	0.33
66.-1-17	ST RT 28	Frontstreet Mtr. Dvpt, LLC	0.33
66.10-2-38.1	ST RT 28	North Creek Park Dist.	0.33
66.10-1-62	MAIN ST	GHW Irrevocable Trust	0.33
66.6-2-3	21 RR PLACE	Town of Johnsburg	0.33
66.-1-74	SKI BOWL RD	Town of Johnsburg	0.00
66.-1-13	ST RT 28	Town Of Johnsburg	0.00

311.16

C-2

Metes and Bounds

DARRAH LAND SURVEYING, PLLC
59 Lake Avenue, Lake Luzerne, N.Y. 12846
(518) 798-4692
(518) 654-9416

Schedule A

All that certain parcel of land, being situate in the Town of Johnsburg, County of Warren and State of New York more particularly described as follows:

Beginning at a point at the intersection of the easterly bounds of Route 28 with the northerly bounds of Peaceful Valley Road, County Road 29, and the southwesterly bounds of lands of the Town of Johnsburg; thence in a northerly direction along the easterly bounds of Route 28 to a point in the southerly bounds of lands of the North Creek Park District per Book 200 of Deeds at Page 290; thence continuing in a northerly direction along the said easterly bounds of Route 28, and along the westerly bounds of the North Creek Park District, and the westerly bounds of lands now or formerly of 320 Main LLC, per Book 5556 of Deeds at page 63 to a point at the intersection of Routes 28 and 28N; thence in a easterly direction along the southerly bounds of Route 28N, and being the northerly bounds of 320 Main LLC, and the northerly bounds of lands now or formerly of Frank P. Guarino and Patrick J. Guarino per Book 812 of Deeds at page 116 to a point in the westerly bounds of Ordway Lane; thence in a northeasterly direction across Route 28N, to a point in the southwesterly corner of lands now or formerly of William D. Broderick per Book 1259 of Deeds at page 288; thence continuing in a northeasterly direction along the lands of Broderick 102.7 feet more or less to a point; thence in a southeasterly direction along the northerly bounds of Broderick 41.69 feet more or less to a point; thence in a northerly direction along the westerly bounds of lands now or formerly of St. James Catholic Church per Book 61 of Deeds at page 437, to a point in the southerly bounds of lands now or formerly of Come By Chance, LLC per Book 5747 of Deeds at page 1; thence along the lands now or formerly of Come By Chance, LLC, the following six (6) courses and distances: 1) continuing in a northerly direction 10.04 feet more or less to a point; 2) westerly 46.75 feet more or less to a point; 3) northerly 70 feet more or less to a point; 4) westerly 20.67 feet more or less to a point; 5) northerly 90.75 feet more or less to a point; and 6) easterly 167.53 feet more or less to a point in the westerly bounds of lands now or formerly of M & R Prestigious Properties, LLC; per Book 4025 of Deeds at page 288; thence in a northerly direction along the said westerly bounds of M & R Prestigious Properties, LLC, 51.09 feet more or less to a point in the southerly bounds of Wade Street; thence in a northwesterly direction across Wade Street to a point in the southerly bounds of lands now or formerly of Premier Properties of the North Country, LTD per Book 1334 of Deeds at page 83; thence in a westerly direction along the said southerly bounds of lands now or formerly of

DARRAH LAND SURVEYING, PLLC
59 Lake Avenue, Lake Luzerne, N.Y. 12846
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Premier Properties of the North Country, LTD, and the southerly bounds of lands or formerly of Martin Ferrillo and Radana Dooley per Book 5555 of Deeds at page 239, to the southwesterly corner thereof; thence in a northerly direction along the westerly bounds of Ferrillo and Dooley, 88.83 feet more or less to a point; thence in a easterly direction along the northerly bounds of Ferrillo and Dooley, to the westerly bounds of lands now or formerly of Richard and Lisa Smith per Book 1376 of Deeds at page 7; thence in a northerly direction along the said westerly bounds of Smith to a point in the southerly bounds of lands now or formerly of Geoffery S. Konis per Book 1248 of Deeds at page 180; thence in a westerly direction along the said southerly bounds of Konis to a point at the southwesterly corner thereof; thence in a northerly direction along the said westerly bounds of Konis to a point in northerly bounds thereof; thence in a easterly direction along the said northerly bounds of Konis to a point in the westerly bounds of lands now or formerly of Citizens Telecommunications Company of New York, Inc. per Book 921 of Deeds at page 212; thence in a northerly direction along the said westerly bounds of Citizens, 75.04 feet more or less to a point in the southerly bounds of lands now or formerly of Sybil H. Utterback and Harris Hewitt per Book 3047 of Deeds at page 256; thence along the bounds of Utterback and Hewitt the following five (5) courses and distances: 1) in a southwesterly direction, 303.3 feet more or less to a point; 2) southerly 32 feet more or less to a point; 3) easterly 166 feet more or less to a point; 4) northerly 89 feet more or less to a point; and 5) northeasterly 276.28 feet, more or less to a point at the southwesterly corner of lands now or formerly of Village Square Associates per Book 3667 of Deeds at page 261; thence along Village Square Associates the following two (2) courses and distances: 1) in a northerly direction 150 feet more or less to a point; and 2) in a westerly direction 31.39 feet more or less to a point in the southerly bounds of lands now formerly of North Creek Center, LLC per Book 5186 of Deeds at page 282; thence along North Creek Center, LLC the following two (2) courses and distances: 1) in a northwesterly direction 233.21 feet more or less to a point; and 2) northerly 145.16 feet more or less to a point in the southwesterly bounds of Copperfield Inn Resorts, LLC per Book 3688 of Deeds at page 251; thence along the westerly bounds of said Copperfield Inn Resorts, LLC the following two (2) courses and distances: 1) continuing northerly 54.84 feet more or less to a point; and 2) northwesterly 100.00 feet more or less to a point in the southeasterly corner of lands now or formerly of the Town of Johnsbury per Book 218 of Deeds at page 270; thence in a southwesterly direction along the southerly bounds of the Town of Johnsbury to the easterly bounds of Route 28; thence continuing southwesterly across Route 28 to the lands now or formerly of 112 Ski Bowl Road, LLC per Book 5703 of Deeds at page 71; thence in a southeasterly direction along the westerly bounds of Route 28, 955 feet more or less to a point

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in the northerly bounds of lands or formerly of the Town of Johnsburg ; thence continuing southeasterly along the said westerly bounds of Route 28, 1235 feet more or less to point in the northerly bounds of Ski Bowl Road; thence continuing across said Ski Bowl Road to a point in the southerly bounds thereof; thence continuing southeasterly along the said westerly bounds of Route 28, 1550 feet more or less to a point; thence in a southwesterly direction along the southerly bounds of land of the Town of Johnsburg, per Book 4782 of Deeds at page 234, 2612 feet more or less to a point in the easterly bounds of the State on New York; thence in a northwesterly direction along the said easterly bounds of New York State, 3215 feet more or less to a point at the southeasterly corner of lands now or formerly of Front Street Mountain Development, LLC per Book 1442 of Deeds at page 206; thence continuing northwesterly along the easterly bounds of New York State, 610 feet more or less to a point at the southwesterly corner of lands now or formerly of the Town of Johnsburg per Book 4350 of Deeds at page 290; thence continuing northwesterly along the easterly bounds of New York State 200 feet more or less to a point at the southwesterly corner Front Street Mountain Development, LLC; thence continuing northwesterly along the easterly bounds of New York State, 160 feet more or less to a point at the southwesterly corner of lands now or formerly of the Town of Johnsburg; thence continuing northwesterly along the easterly bounds of New York State 130 feet more or less to a point at the southwesterly corner Front Street Mountain Development, LLC per Book 1492 of Deeds at page 43; thence continuing northwesterly along the easterly bounds of New York State 2440 feet more or less to a point in the easterly bounds of New York State; thence in a northeasterly direction along the easterly bounds of New York State, 742 feet more or less to a point; thence in a westerly direction along the northerly bounds of New York State 1505 feet more or less to a point; thence in a northeasterly direction along the southeasterly bounds of New York State 2164.04 feet more or less to the southwesterly bounds of lands now or formerly of Robert D. Monroe, Jr. per Book 5063 of Deeds at page 71; thence in a southwesterly direction along the southerly bounds of Monroe, 477.62 feet more or less to a point; thence in a northeasterly direction along the southeasterly bounds of Monroe 1107.46 feet more or less to a point in the southerly bounds of Route 28; thence in a southeasterly direction along the southerly bounds of Route 28, 355 feet more or less to a point westerly bounds of lands now or formerly of Mark E. Price per Book 1134 of Deeds at page 129; thence in a southerly direction along Price, 80 feet more or less to a point; thence in a southeasterly direction along Price, 157 feet more or less to a point; thence in a northerly direction still along Price, 80 feet more or less to a point in the southerly bounds of Route 28; thence in a southeasterly direction along the southerly bounds of Route 28, 200 feet more or less to the northwesterly corner of lands now or formerly of Rebcca Mulvey per

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Book 898 of Deeds at page 272; thence in a southerly direction along the westerly bounds of Mulvey 240 feet more or less to a point; thence in a southeasterly direction 240 feet more or less to a point in the westerly bounds of lands now or formerly of NCNY Properties, LLC per Book 4008 of Deeds at page 35; thence in a southwesterly direction along said lands of NCNY Properties, LLC 1250 feet more or less to a point; thence in a southeasterly direction at right angles to the previous course 60 feet more or less to a point; thence in a northeasterly direction along the northwesterly bounds of Front Street Mountain Development, LLC 690 feet more or less to a point; thence in a southeasterly direction along the northeasterly bounds of Front Street Mountain Development, LLC 2330 feet more or less to a point; thence in a northeasterly direction to the southwesterly bounds of Route 28; thence in a southeasterly direction along Route 28, 325 feet more or less, to a point; thence in a northeasterly direction crossing Route 28, 128 feet more or less to a point at the intersection of the northeasterly bounds of said Route 28 with the southwesterly corner of lands now or formerly of Elliot Monter per Book 1044 of Deeds at page 269; thence continuing in northeasterly direction along the northwesterly bounds of Monter, 604.4 feet more or less to a point; thence in an easterly direction along the northerly bounds of lands of Monter 98.52 feet more or less to a point in the southwesterly bounds of Main Street; thence crossing Main Street to a point in the northeasterly bounds thereof; thence in a northwesterly direction along the said northerly bounds of Main Street, and the southwesterly bounds of lands now or formerly of 320 Main, LLC per Book 5083 of Deeds at page 292 to a point being the northwesterly corner of 320 Main, LLC; thence continuing along the northerly bounds of Main Street, and being the southerly bounds of lands now or formerly of the County of Warren per Book 1010 of Deeds at page 142, 1255 feet more or less to a point; thence in a northerly direction along the said lands of the County of Warren to a point in the southerly shore of the Hudson River; thence in a southeasterly direction as it winds and turns, along the said southerly shore of the Hudson River, 1853 feet more or less to a point in the westerly bounds of lands now or formerly of the Town of Johnsburg per Book 4191 of Deeds at page 14; thence continuing southeasterly along the shore of the Hudson River and the northerly bounds of the Town of Johnsburg, 370 feet more or less to a point in the westerly bounds of the County of Warren; thence continuing along the shore of the Hudson River, being the northerly bounds of the County of Warren, 240 feet more or less to a point in the westerly bounds of other lands of the County of Warren; thence in a southwesterly direction to the northerly bounds of lands now or formerly of Melinda L. Waddell per Book 5309 of Deeds at page 77; thence in a southeasterly direction along the said northerly bounds of Waddell, and the northerly bounds of lands now or formerly of John Cavan and Michael Greenan per Book 4124 of Deeds at page 1, 175.22 feet more or less to a point; thence in a southerly

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direction along the easterly bounds of lands of Cavan and Greenan 130 feet more or less to a point; thence in a southeasterly direction along the northerly bounds of Cavan and Greenan, the northerly bounds of lands now or formerly of the Phillip Baroudi Trust per Book 846 of Deeds at page 232, and the northerly bounds of lands now or formerly of Rebecca P. Mulvey per Book 1354 of Deeds at page 175, 268.7 feet more or less to a point; thence southerly along the easterly bounds of Mulvey, and the easterly bounds of lands now or formerly of Alpine Lodge, LLC per Book 1441 of Deeds at page 116, 117.9 feet more or less to a point; thence southeasterly along Alpine Lodge, LLC 30 feet more or less to a point at the intersection of the northwesterly bounds of lands now or formerly of John P. McAlonen Jr. per Book 3427 of Deeds at page 68, and the northeasterly bounds of lands now or formerly of Adirondack Supply, LLC, per Book 1492 of Deeds at page 292 thence in a westerly direction along the northerly bounds of Adirondack Supply, LLC, 67.5 feet to a point; thence in a southerly direction along the westerly bounds of lands of Adirondack Supply, LLC, 74.28 feet to a point; thence in a westerly and southerly direction along lands now or formerly of the Nessel Family Trust, per Book 6337 of Deeds at page 186, to the northerly bounds of Circle Avenue; thence in a southeasterly direction crossing said Circle Avenue, to the northwesterly corner of lands now or formerly of the Mac Clarence's, per Book 1485 of Deeds at page 224; thence in a southerly direction along the westerly bounds of said lands of Mac Clarence, the westerly bounds of lands now or formerly of Paul and Sharon Ryan, per Book 3208 of Deeds at page 116; and the westerly bounds of lands now or formerly of Matthew Thomas, per Book 5909 of Deeds at page 187, to the northerly bounds of lands now or formerly of Community Bank, National Association, per Book 6388 of Deeds at page 311; thence in a easterly direction along the division line between Thomas, on the North, and Community Bank, National Association on the South, 148.15 feet to a point in the westerly bounds of Circle Avenue; thence in a southerly direction along Circle Avenue 10.18 feet, to a point in the northerly bounds of lands now or formerly of Grau Geist, LLC, per Book 5941 of Deeds at page 90; thence in a westerly direction along the said northerly bounds of lands now or formerly of Grau Geist, LLC, to the northwesterly bounds of lands now or formerly of Pratt Trucking and Excavating, LLC, per Book 6443 of Deeds at page 44; thence southerly and easterly along said lands of Pratt Trucking and Excavating, LLC, to the northerly bounds of lands now or formerly of Christine M. Carew, per Book 1206 of Deeds at page 144; thence in a westerly direction along the southerly bounds of the Community Bank, National Association, and the northerly bounds of the following six (6) adjoiner's: 1) said lands of Carew; 2) lands now or formerly of Leona A. Clark, per Book 915 of Deeds at page 125; 3) lands now or formerly of John C. McArdle, Trust, per Book 5873 of Deeds at page

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248; 4) lands now or formerly of Hudson River Trailer Park, LLC, per Book 5888 of Deeds at page 12; 5) lands now or formerly of Lorraine K. Morehouse, per

Book 825 of Deeds at page 65; and 6) lands now or formerly of Stephanie A. Leonard, per Book 3314 of deeds at page 234, thence in a southerly direction, running along the westerly bounds of said Leonard, to the northerly bounds of Bridge Street, New York State Route 28N; thence in a southwesterly direction across Bridge Street, State Route 28N, to the northeast boundary of lands now or formerly of the Town of Johnsburg, per Book 5243 of Deeds at page 104; thence in a southerly direction along the easterly bounds of the Town of Johnsburg to the northeasterly bounds of other lands now or formerly of the Town of Johnsburg, per Book 1290 of Deeds at page 248; thence in a southerly direction along the easterly bounds of said Town of Johnsburg to a point in the easterly bounds of Main Street, County Road 77; thence crossing Main Street, County Road 77 to the intersection of the westerly bounds of Main Street, County Road 77 with the northeasterly bounds of lands now or formerly of Leopaul and Margaret West per Book 529 of Deeds at page 84; thence in a southerly direction, along the westerly bounds of said West, along Mill Creek 254 feet more or less, as it winds and turns to a point in the northwesterly bounds of lands now or formerly of John McAloner, per Book 5480 of Deeds at page 303; thence in a southeasterly direction along the westerly bounds of said McAloner, 370 feet more or less along Mill Creek as it winds and turns to the northerly bounds of Peaceful Valley Road, County Road 29; thence in a southwesterly direction along the said northerly bounds of Peaceful Valley Road, County Road 29, 548 feet more or less, to the point of beginning.

APPENDIX D

APPENDIX D-1

Appendix D-1

North Creek Sewer District Construction Items Estimate for Collection and Treatment

Estimate Prepared 05/4/2022

Pipe Lengths	Length (ft)	# MHs
Gravity Collection		
8-inch gravity to PS #1	1715	10
8-inch gravity to WWTP	1350	14
8-inch gravity to PS #1	900	5
8-inch gravity to PS #1	885	8
Total Length	4850	37

Force Mains	Length (ft)
Nursing Home FM to Gravity Line	1120
ORDA PS to Nursing Home PS	2000
FM from PS #1 to Gravity Line	1715
Total Length	4835

Collection System Costs				
Item	Unit Cost	Units	Qty	Total Estimated Cost
Gravity Sewer Pipe (8-inch)	\$ 175.00	LF	4850	\$ 848,750.00
Sewer Manholes including Air Releases	\$ 8,500.00	EA	42	\$ 357,000.00
Sewer Laterals	\$ 6,000.00	EA	66	\$ 396,000.00
Pumping Stations w/ Backup Power	\$ 200,000.00	EA	1	\$ 200,000.00
Grinder Station for Nursing Home/ORDA	\$ 125,000.00	EA	1	\$ 125,000.00
2" HDPE Force Main from ORDA	\$ 85.00	LF	2000	\$ 170,000.00
2.5" HDPE Force Main from Nursing Home	\$ 90.00	LF	1120	\$ 100,800.00
3" HDPE Force Main from PS #1 to Gravity	\$ 130.00	LF	1715	\$ 222,950.00
Collection System Estimated Total				\$ 2,420,500.00
Mobilization/Demobilization				\$ 121,025.00
Maint/Protection of Traffic/Erosion Sediment Control				\$ 145,230.00
Contingency				\$ 363,075.00
Engineering and Construction Oversight				\$ 242,050.00
Easements/Legal Fees				\$ 25,000.00
Bonding, Permitting, and Grant Administration				\$ 100,000.00
Total Estimated Cost				\$ 3,416,880.00

*Need survey and borings to determine accurate topography and subsurface conditions.

Treatment System - Located at Town Hall Property				
Item	Unit Cost	Units	Qty	Total Estimated Cost
Septic Tanks	\$ 150,000.00	EA	3	\$ 450,000.00
EQ/Anoxic Tanks	\$ 125,000.00	EA	3	\$ 415,000.00
AX Max Units	\$ 110,000.00	EA	12	\$ 1,320,000.00
Recirculation and Pumping Systems	\$ 85,000.00	EA	1	\$ 85,000.00
Alkalinity Feed System	\$ 42,500.00	EA	1	\$ 42,500.00
Yard Piping	\$ 85,000.00	LS	1	\$ 85,000.00
Control Building/Electrical/HVAC	\$ 250,000.00	LS	1	\$ 250,000.00
Ventilation and Heating System for AX Units	\$ 45,000.00	LS	1	\$ 45,000.00
UV Disinfection System	\$ 50,000.00	EA	2	\$ 100,000.00
Post Aeration/Conveyance to Discharge	\$ 55,000.00	LS	1	\$ 55,000.00
8" Outfall Pipe	\$ 125.00	LF	100	\$ 12,500.00
Allowance for Outfall Structure	\$ 20,000.00	LS	1	\$ 20,000.00
Electrical/Controls	\$ 175,000.00	LS	1	\$ 175,000.00
Backup Generator w/ ATS	\$ 125,000.00	LS	1	\$ 125,000.00
Treatment Estimated Total				\$ 3,180,000.00
Mobilization/Demobilization				\$ 159,000.00
Contingency				\$ 477,000.00
Engineering and Construction Oversight				\$ 318,000.00
Bonding, Permitting, and Grant Administration				\$ 80,000.00
Total Estimated Cost				\$ 4,214,000.00
Estimated Annual O&M Cost				\$ 60,000.00

*Borings required to accurately determine subsurface conditions

Collection System Total	\$ 3,416,880.00
Wastewater Treatment Plant Total	\$ 4,214,000.00
Total Estimated Project Capital Cost	\$ 7,630,880.00

Estimated Flow from Tables	51,000	GPD
Flow per EDU	170	GPD/EDU
Estimated Number of Active EDUs	298.3	
Vacant Lot EDUs	12.9	39 vacant lots
Total Number of EDUs	311.2	
Estimated Annual O&M Cost	\$ 60,000.00	
Annual O&M Cost per EDU	\$ 192.83	

APPENDIX D-2

Appendix D-2 - List of Short-Lived Asset Infrastructure

Wastewater Utilities	Service Life (years)	Quantity	Approximate Anticipated Unit Cost (USD)	Approximate Anticipated Total Cost (USD)
Treatment Related				
Pump	5 to 10	6	\$3,000.00	\$18,000.00
Pump Controls	7.5 to 10	6	\$2,500.00	\$15,000.00
Chemical feed pumps	5	4	\$1,200.00	\$4,800.00
UV lamps	1	2	\$1,000.00	\$2,000.00
Filter media, distribution nozzles, etc.	10 or more	12	\$2,000.00	\$24,000.00
Level Sensors	5 to 10	10	\$200.00	\$2,000.00
Pressure Transducers	5 to 10	4	\$1,200.00	\$4,800.00
Back-up Power Generator	10 or more	1	\$45,000.00	\$45,000.00
Chemical Leak Detection Equipment	10 or more	1	\$1,000.00	\$1,000.00
Flow Meters	5 to 10	5	\$2,000.00	\$10,000.00
SCADA Systems	10 or more	1	\$20,000.00	\$20,000.00
Collection System Related				
Pump	5 to 10	4	\$4,000.00	\$16,000.00
Pump Controls	7.5 to 10	2	\$2,500.00	\$5,000.00
Trash racks/bar screens	15 or more	2	\$4,000.00	\$8,000.00
Vaults, lids, and access hatches	20 or more	4	\$2,000.00	\$8,000.00
Security devices and fencing	15 or more	2	\$5,000.00	\$10,000.00
Alarms & Telemetry	10	2	\$1,000.00	\$2,000.00
Back-up Power Generator	10 or more	2	\$25,000.00	\$50,000.00
Level Sensors	5 to 10	8	\$200.00	\$1,600.00
Pressure Transducers	5 to 10	2	\$1,200.00	\$2,400.00