3.14 Utilities – Wastewater

This section describes the existing wastewater treatment and conveyance system on the project site and the proposed system that will treat additional wastewater from the Silo Ridge Resort Community. Any mitigation measures needed to address potential wastewater impacts from the proposed development are also discussed.

3.14.1 Existing Conditions

The 670±-acre project site currently consists of the 170±-acre Silo Ridge Country Club, which includes an 18-hole golf course and clubhouse with a restaurant, banquet facilities, pro shop, and offices. The remaining area of the site is undeveloped except for a 2.2-acre residential parcel. The existing sanitary system on the project site is a septic system with subsurface disposal via leach field. The system operates under New York State Pollution Discharge Elimination System (SPDES) permit number NY0234966, with a permitted flow rate of 12,600 gallons per day (gpd) and a permit expiration date of 2025. Because the water source for the clubhouse is a private well that is not metered, the exact flow rate to the septic system is unknown. However, the system is functioning adequately and has been sufficient to serve the needs of the existing golf course and associated facilities.

3.14.2 Potential Impacts

Projected Wastewater Flow

The proposed Silo Ridge Resort Community includes the development of up to 369 residential units including townhomes and single-family homes, a resort hotel, a spa and fitness center, restaurants, and a small retail store. The existing golf course and country club will be retained and upgraded. A new onsite wastewater collection and treatment system will be designed and constructed to accommodate flows from the proposed development.

Table 3.14-1, "Projected Wastewater Flow," is an estimate of wastewater that will be produced by all components of the proposed project. The Dutchess County Department of Health (DCDOH) will review these flow assumptions and is expected to issue a Flow Confirmation Letter concurring with the methodology used to calculate the anticipated flow rates; as of yet, the letter has not been received. The final wastewater flows will be determined in the Wastewater Facility Plan. The flows take into account allowable reductions due to the use of low-flow plumbing fixtures. As indicated in Table 3.14-1, the project at full build-out will generate approximately 219,000± gallons per day (gpd) of wastewater, with a potential peak flow of approximately 788,470± gpd.

Table 3.14-1 Projected Wastewater Flows

Land Use	Unit	Unit Qty	Generation Rate [1] (gpd/unit)	Flow Reduction Credit [2]	Avg Daily Flow with Credit [3] (gpd)	Peak Hour Head-Count [4]
Phase I						
Maintenance Facilities	Ea.	1	400	0%	400	2
Golf Clubhouse						
Banquet Hall	Person	375	20	10%	6,750	188
Restaurant	Seats	100	35	10%	3,150	50
Retail/Office	SF	2,000	0.1	20%	160	25
Golfers [8]	Ea.	160	3	20%	384	80
				Phase I Total Flow:	**10,844**	
Phase II						
Condominiums	3-BR home	76	400	20%	24,320	228
Phase 1 Hotel Rooms [5]						
A - Studio / One Bath	1-BR apt.	8	120	20%	768	8
B - One BR / One Bath	1-BR apt.	40	150	20%	4,800	40
C - Two BR / Two Bath	2-BR apt.	30	300	20%	7,200	60
D - Three BR / Two Bath	3-BR apt.	30	400	20%	9,600	90
Phase 1 Hotel General						
Banquet Hall	Person	200	20	10%	3,600	100
Conference Areas	Seats	200	10	20%	1,600	100
Restaurant [6]	Seats	125	35	10%	3,938	63
Spa [7]	SF	15,000	0.4	10%	5,400	25
Retail store & shop	SF	2,000	0.1	20%	160	25
Swimming Pool	Swimmer	333	10	0%	3,330	50
WWTP	Workers	2	25	20%	40	2
Infiltration & Inflow [9]	Total	0.5	1,600	0%	800	0
				Phase II Total Flow:	**65,556**	
Phase III						
Condominiums	3-BR home	252	400	20%	80,640	756
Single Family	4-BR home	41	475	20%	15,580	164
Phase 2/3 Hotel Rooms						
A - Studio / One Bath	1-BR apt.	30	120	20%	2,880	30
B - One BR / One Bath	1-BR apt.	48	150	20%	5,760	48
C - Two BR / Two Bath	2-BR apt.	74	300	20%	17,760	148
D - Three BR / Two Bath	3-BR apt.	60	400	20%	19,200	180
Infiltration & Inflow [9]	Total	0.5	1,600	0%	800	0
				Phase III Total Flow:	**142,620**	
				PROJECT TOTAL AT FULL BUILD-OUT (gpd):	**219,020**	2,461
				Ten States Peaking Factor (for 2,300 population):	3.6	
				Peak Hourly Flow (gpd):	788,470	
				Peak Hourly Flow (gpm):	548	

[1] Wastewater rates from NYSDEC Design Standards for Wastewater Treatment Works 1988 unless noted.
[2] NYSDEC allows for up to 20% reduction in flows to account for use of low flow plumbing fixtures.
[3] Average Daily Flow assumes full occupancy of all residences and commercial facilities.
[4] Peak Hour Headcount is used to select peak hourly wastewater multiplier from Ten States Standards. Headcounts for public facilties have been reduced by 50% assuming that 1/2 the patrons are under "Residences" or "Hotel".
[5] Hotel rooms and residences assume 1 person per bed for purposes of calculating peak hourly flow.
[6] Retail, restaurant, and other commercial numbers include emplyee contribution unless otherwise noted.
[7] Spa wastewater generation is estimated at 4X the wastewater generation of conventional retail space.
[8] A maximum of 160 golfers assumed per day, based on 4 golfers every 15 minutes for 10 hours. Flow rate of 3 gpd/golfer based on 1988 NYSDEC standards for airport passengers.
[9] An estimated 15,000 LF of sewer line is anticipated, with 5,000 LF (1 mile) of that as 8" gravity pipe. Ten States Standards allows max 200 gal / in dia / mile / day for push-on SDR35 PVC piping. (200 x 8 in. x 1 mile = 1600 gpd)

The total average daily flow is the *design flow* for the proposed wastewater system when fully constructed. Generally, the NYSDEC protocol used to calculate wastewater flows is fairly conservative, and a system designed to meet this demand is conservatively sized. At times, actual flow rates will be substantially less than the design flow due to construction phasing, variations in midweek versus weekend occupancy, and seasonal occupancy patterns. Consequently, the wastewater system will be designed to efficiently handle the lowest anticipated flow rates caused by these fluctuations. Full build-out flow rates are not expected to drop below 15% of the final design rate shown in Table 3.14-1. Therefore, the system will be designed to accommodate this minimum flow. The system will also be able to handle periodic high flow days that exceed the average daily flow, while maintaining effluent quality that does not violate SPDES permit requirements.

Wastewater Collection System

The proposed sanitary system will consist of a gravity collection and conveyance system supplemented by low pressure sewers and a wastewater treatment plant (WWTP), as shown on SP5 in “Engineering Drawings,” including collection pipe layout, pump station locations, treatment plant location, and the direction of flow. Each of the system components is described in detail below.

Because of their reliability and relatively low cost, gravity sewers have been selected in areas of the site where practical. Low pressure sewers have been selected in areas where widely varying topography makes gravity sewers impractical. All low pressure sections of the system will ultimately empty into a gravity section or into a pump station. Because of site topography, wastewater from most of the site will be pumped via force main to a final length of gravity pipe that will terminate at the WWTP.

The Wastewater Master Plan utilizes color to indicate the different components of this system. The four segments of low pressure sewer are indicated in green on the plan. Each served building or house in the low pressure sewer areas of the collection network will be equipped with a grinder pump station that will convey wastewater to a low pressure collection trunk. Each of the four segments of low pressure sewer discharges to the gravity system at some point.

The gravity system is indicated in yellow on the Wastewater Master Plan. Portions of the gravity system flow to either of two pump stations (indicated in red) or directly to the onsite WWTP. The two pump stations discharge to the same force main, which itself discharges to that portion of the gravity system flowing directly to the WWTP. The sanitary sewer force main is indicated in purple.

Treated water from the onsite WWTP is discharged through a force main, which is routed in a southerly direction to a point of outfall at an unnamed stream south of

Bridge #1. This stream flows in a southerly direction to wetland areas and then to two unnamed ponds. In addition to helping sustain tributary onsite wetlands, this treated water supplements the water from the second pond (i.e. Irrigation Pond), which is utilized for golf course irrigation. The treated water force main is indicated in blue on the Wastewater Master Plan.

Wastewater Treatment

To treat wastewater from Silo Ridge, a new, privately owned and operated WWTP will be constructed on the property. As shown on the "Overall Wastewater Master Plan" (see SP5 in "Engineering Drawings"), the WWTP is proposed to be located in the northeastern corner of the property (south of Route 44). Figure 2, "Wastewater Treatment Plant Site Layout," in Appendix 9.8 shows a smaller scale site layout of the WWTP area, which also includes the proposed water treatment plant for the Silo Ridge project (discussed in Section 3.13).

It should be noted that, as described in Section 3.5, "Cultural Resources," a historic archaeological site was identified in the vicinity of the proposed location for the WWTP. The archaeological consultant for the project recommended either avoidance of the area or additional investigations in the proposed location. Based on this information, the Applicant is now proposing to locate the proposed WWTP on the opposite side of US Route 44, which would avoid impacts to Temporary Site 3662-02 and eliminate the need for a Phase II investigation. A Phase I cultural resources survey of the new WWTP location is currently being conducted. Preliminary results of the survey indicate that there are no significant cultural resources in this location. This new location has also been included in evaluation of the Traditional Neighborhood Alternative and is discussed in detail in Section 5.0. The location is shown on Sheet SP4-A, "Overall Wastewater Master Plan" for the Traditional Neighborhood Alternative, included at the end of this DEIS.

The preferred plan is to build and operate the proposed WWTP as a privately-owned facility. Under this plan, the Town of Amenia would consent to the formation of a private Sewage Works Transportation Corporation that would enable the plant and the collection system to be built and operated outside the control of a public sewer district. The Transportation Corporation would own and operate the wastewater infrastructure, and would generate operating revenue by collecting sewer fees from the residents of the development and from the commercial properties such as the golf course (clubhouse) and hotel. This private construction and ownership plan is essential to the success of the Silo Ridge development, given that the Town of Amenia currently has no sewer district into which Silo Ridge could be incorporated. However, the Town is evaluating the feasibility of forming a sewer district and may have an interest in either sending its wastewater to the Silo Ridge WWTP, or in assuming ownership and operational responsibility of the WWTP once the district is operational. Consequently, the WWTP will be designed to accommodate the Silo

Ridge project, but with future expansion potential to take additional wastewater from the Town. Discussions with the Town indicate that all foreseeable expansions would approximately double the capacity of the WWTP to nearly 400,000 gpd over several years. The Town would be responsible for this future expansion. The flow rate of 219,000 gpd identified above represents what is required to service only the Silo Ridge development.

The WWTP would consist of advanced biological treatment, gravity settling of solids, advanced filtration to remove residual solids, and disinfection prior to surface water discharge. The proposed WWTP outfall location is an unclassified onsite intermittent stream that drains to onsite Class C irrigation ponds. These ponds then overflow off-site to Amenia/Cascade Brook, a Class C(t) Stream which is ultimately is tributary to Wassaic Creek and the Housatonic River. The plant will include a comprehensive odor control strategy, including full enclosure in a dedicated building, appropriate ventilation, and aeration of various process tanks to prevent septic conditions.

The preferred option for treatment technology is a sequencing batch reactor (SBR) with tertiary filtration, while the likely alternate to the preferred SBR option is a membrane bioreactor (MBR). Both technologies use the same biological process to treat wastewater, and differ primarily in their final filtration method. Final selection of the treatment technology will be confirmed in later design phases of the project and subject to DCDOH and NYSDEC approval. There is no substantive difference in site or environmental impact between the SBR and MBR technologies. Details of the two treatment technologies are provided below.

Sequencing Batch Reactor

A sequencing batch reactor (SBR) was selected over other practical alternatives because of its technical feasibility, its ability to meet anticipated effluent quality requirements, and its ability to treat a wide range of wastewater flow rates that will occur due to weekly and seasonal occupancy. This includes its ability to withstand months of low-flow operation and then ramp up at the start of peak season with minimal acclimation time. A conceptual SBR design has been used to develop the WWTP building size and site layout shown in the Wastewater Master Plan. However, a membrane bioreactor (MBR) is considered a reasonable backup alternative in the event that the SBR option becomes less desirable for technical or financial reasons later in the design process. Preliminary evaluations have shown that switching to an MBR as the preferred alternative could be done within the proposed building footprint, and would not change the WWTP site layout or impacts in any substantial way that would affect the impacts associated with the treatment.

The SBR is a suspended growth technology that combines all steps of the activated sludge process into a single tank that treats wastewater in discrete batches.

Screened wastewater flows into the SBR tank, where it is equalized for flow, treated, clarified, and discharged. A typical SBR system consists of two pairs of alternating reactor tanks, so that while one is receiving aeration, the other is settling.

Because SBR is a batch process with adjustable treatment duration, this technology is ideal for situations with variable wastewater loadings and flows, such as a seasonal golf resort community like the proposed project. An SBR plant is designed so that high flows can be treated by shorter cycle times, and low flows can be treated with longer cycle times. Although an SBR system contains pairs of treatment tanks (as opposed to a single aeration tank), the system can be built within a very compact footprint due to the elimination of a separate equalization tank and clarifier tank.

One perceived disadvantage of an SBR system is the mechanical and control complexity needed to adjust treatment cycle times in response to influent flow rate. However, advances in the simplicity and reliability of programmable controls and instrumentation essentially nullify this argument. An SBR system is a reliable technology which is extremely flexible and adaptable to changing flow conditions. This is particularly valuable for a project where large flow fluctuations are anticipated with daily and seasonal variations in occupancy. As a result, this technology is considered the optimal choice for the Silo Ridge project.

<u>Membrane Bio-Reactor</u>

An MBR is a suspended growth, activated sludge technology that is able to eliminate the gravity clarifier by using submerged filtration membranes to extract clarified effluent from the mixed wastewater. The membranes have pore sizes in the nano- to micro-filtration range (approximately 1 nanometer), and are capable of leaving nearly all suspended solids and bacteria behind in the aeration tank, yielding a very high quality effluent.

In addition to better clarification and high effluent quality, advantages of MBR systems include a high-mixed liquor suspended solids (MLSS) content in the aeration tank. Conventional activated sludge plants operate at a low MLSS (approximately 3,000 mg/l) because to operate higher would send more solids to the clarifier, compromising effluent quality. Because the MBR membranes can easily remove solids better than a gravity clarifier, MBR systems can operate at a much higher MLSS (>10,000 mg/l), allowing the same level of treatment to be attained in a smaller tank volume. Also contributing to a small MBR plant footprint is the elimination of a clarifier.

MBR systems have significant advantages in situations where the required effluent quality justifies using a membrane filter. However, in situations where membrane filtration is not required, the capital and operating cost associated with membranes can cause an MBR to be less cost competitive. Because membrane filtration is not anticipated to be required for the Silo Ridge project, MBR technology is not considered the most appropriate technology. It is, however, considered a reasonable alternative in the event that the SBR option becomes less desirable for technical or financial reasons later in the design process.

Wastewater Quality

The required wastewater effluent quality is determined by three primary criteria and is summarized in Table 3.14-2 below:

- SPDES Limits: The values in this column of the table constitute only preliminary guidance from DEC, not final permit values. The goal of these limits is to maintain the quality of the receiving streams. Final values are calculated by NYSDEC from a waste assimilative capacity (WAC) analysis based on receiving stream characteristics and anticipated effluent flow rates. Preliminary effluent limits communicated by NYSDEC for this project are included as Appendix B: NYSDEC Preliminary Effluent Limits of the wastewater report (see Appendix 9.8 of the DEIS).

- Reuse Limits: NYSDEC, in conference with NYSDOH, will issue guidance for the safe reuse of effluent as irrigation water. Based on previous projects in New York State seeking to reuse effluent for irrigation, these standards tend to focus on reuse practices, not effluent quality. The exception to this is effluent disinfection efficiency, as measured by fecal coliform concentrations. Reuse guidelines recommended by NYSDOH to NYSDEC for a similar project are included as Appendix C: NYSDOH Effluent Reuse Guidelines of the wastewater report (see Appendix 9.8 of the DEIS).

- Operational Considerations: Unlike the first two criteria in this list, these considerations are voluntary. The property sponsor has a vested interest in maintaining high water quality in the irrigation ponds to prevent eutrophication, odor, and other aesthetic problems. Ponds tend to have less mixing and/or dilution than the streams or larger lakes that are typical outfall locations. Ponds therefore are more prone to serve as a concentration point for effluent constituents that enter it, even at low levels.

The "Design Target" column of Table 3.14-2 lists the effluent quality that the WWTP will be designed to meet in order to satisfy the more stringent of the two values dictated by the SPDES limit and Reuse limit. With treatment of wastewater effluent to the indicated levels, the water quality of streams, ponds, and aquifers will be protected; therefore, no adverse effects on water quality will occur.

Table 3.14-2 Preliminary Discharge Standards

Parameter	Raw Influent	NYSDEC SPDES Limit	NYSDOH Reuse Limit	Design Target	Standards Met by Recommendation
Biochemical Oxygen Demand (BOD_5) – mg/L	220	5	N/A	5	Intermittent Stream Standards
Total Suspended Solids (TSS) – mg/L	220	10	N/A	10	Intermittent Stream Standards
Settleable Solids – ml/L	10	0.1	N/A	0.1	Intermittent Stream Standards
Dissolved Oxygen – mg/L	0	7.0	N/A	7.0	Intermittent Stream Standards or Class C_t/C_{ts} standards
pH	6-9	6.5-8.5	N/A	6.5-8.5	Intermittent Stream Standards
Ammonia (winter/summer) – mg/L	25	2.2/1.5	N/A	2.2/1.5	Intermittent Stream Standards
Phosphorus (total) – mg/L	8	0.5	N/A	0.5	Lake/Pond Discharge (limits range from 0.5-1.0 mg/L for flows >50,000 gpd)
Fecal Coliform count (30-day geometric mean)	10^8	N/A	200	200	DOH recommendation. DEC Class A discharge (200)
Fecal Coliform count (7-day geometric mean)	10^8	N/A	200	200	DOH recommendation. DEC Class A discharge (200)

Use of Constructed Wetlands for Wastewater Treatment

One of the alternatives for wastewater treatment that was evaluated for the proposed project was the use of constructed wetlands. Constructed wetlands use aquatic plants in shallow ponds or channels to treat wastewater by natural microbial, biological, physical, and chemical processes. Although they can be a cost-saving alternative in some applications, the US EPA cautions that the small number of existing constructed wetlands results in limited data availability regarding the design, costs, and operations of wetland treatment systems. In general, the EPA considers regions with inexpensive land available and limited availability of experienced WWTP operators as most suitable for a constructed wetland treatment system. Both of these conditions are negated by the rising cost of land in Dutchess County, the limited land at the Silo Ridge property, and the general availability of skilled, licensed wastewater operators in the New York / Connecticut area.

Average design parameters published by the EPA indicate that approximately one square foot of wetland area is required for treatment of one gallon of low to medium strength wastewater per day. This parameter is based on empirical data primarily obtained from existing wetland treatment systems located in Louisiana, Mississippi, and other southern states. Additionally, in cold weather climates, a greater wetland treatment area would be required, due to reduced wetland performance during colder periods. As a "rule-of-thumb" for constructed wetlands in cold climates, an increase in the wetland treatment area by 25% is desirable. Additionally, the total area required, including berms, diversion areas, channels, equipment access, etc. would be 1.5 times the treatment area.

Constructed wetlands are not considered a preferred alternative for the Silo Ridge project for the following reasons:

- *Technically Impractical*: Effluent quality requirements for the Silo Ridge project are likely higher than a wetland can produce without additional treatment. This is driven by the project sponsor's desire to reuse effluent for irrigation, and the stringent Intermittent Stream Standards that the project may require. At a minimum, constructed wetlands would have to be followed by post-aeration to increase dissolved oxygen level, and by disinfection. Depending on the quality of wetland effluent, addition filtration and ammonia removal may also be required. Adding these engineered processes reduces the appeal of using wetlands as a wastewater treatment option, and makes a conventional WWTP a more practical choice. Additional mechanical complexity is introduced if the wetlands are distributed across the site, thereby requiring a large piping network and additional pump stations.

- *Land Use Requirements*: Using the EPA methodology described above, the minimum land required for constructed wetlands at Silo Ridge (excluding emergency reconstruction area to address bed failure) is:

  (180,000 gpd) x (1 ft^2 area / gpd) x 1.25 x 1.5 = 337,500 ft^2

- This translates to approximately 8 acres of land for a constructed wetland to serve the entire Silo Ridge project. If the wetland were to serve only a portion of the project, its size would decrease proportional to flow. This amount of land is unavailable on the Silo Ridge property for wastewater treatment purposes. Additional land area complications arise because the varying site topography would require extensive grading, terracing, or retaining walls. Attempting to distribute the wetlands across the site in multiple smaller footprints would somewhat diminish this impact. However, the fencing likely required to limit access to untreated wastewater could create a significant visual impact across the property.

- *Extended Startup Period*: Establishing a constructed wetland may require more than one growing season, and is affected by the season in which planting occurs, the density of the plantings, the type of plants, the type of wetland, and weather conditions. During early phases of plant growth, exposure to wastewater is not recommended. It may take several growing seasons for the wetland to reach an optimal vegetative density.

- *Approval Process*: The duration of the approval process may be extended by the unique nature of the process. As of 2005, there are no approved constructed wetlands operating in Dutchess County. In the mid-Hudson region, there is currently one operating constructed wetland located in the Town of Lloyd, Ulster County serving a single manufacturing facility. The wetland receives and treats a volume of wastewater less than 1/3 of its design capacity on weekdays, and usually receives no flow on weekends or holidays. Its performance therefore cannot be accurately gauged against its design.

3.14.3 Proposed Mitigation Measures

Surface Water Quality

The wastewater treatment technology for this project will be selected to meet all effluent quality requirements as required by NYSDEC. The anticipated effluent quality values listed in Table 3.14-2 can be readily achieved by the preferred alternative. When met, these stringent standards will help preserve the water quality of the intermittent stream where the outfall is proposed, the downstream Class C irrigation ponds, Amenia/Cascade Brook (Class Ct), and downstream water bodies. Onsite public health will be protected by disinfection of the effluent, and by the fact that the effluent will be diluted in the Irrigation Pond before reuse. The collection system will not have a significant adverse impact on surface water quality and mitigation is not required.

Groundwater Quality

There will be no direct discharge of treated wastewater effluent to groundwater, and it is anticipated that the wastewater system for the project will not have a significant adverse impact on groundwater. In fact, removing the existing leach field from service may produce a marginal improvement in local groundwater quality. The reuse of treated WWTP effluent for golf course irrigation, combined with captured storm water, will eliminate the need to use potable water for irrigation. Since the Silo Ridge project will utilize onsite wells for potable water, this will further reduce impact on the underlying aquifer. It should be noted that the Irrigation Pond is already a spring-fed water body, and some groundwater is therefore used for irrigation in that manner. This usage has a negligible impact on groundwater, however, since unused spring water would continue to flow into the pond and overflow off-site to Amenia Brook in the absence of irrigation demand. The sanitary sewer collection system will be leak-tight, and will not have a significant adverse impact on groundwater quality. No mitigation is necessary.

Air Quality

Implementation of the proposed wastewater strategy will not result in the discharge of any priority air pollutants, and will have no significant negative impact on air quality. The only potential source of air pollutants will be the WWTP emergency backup generator. However, this generator will operate infrequently and will not have a significant adverse impact on air quality. Odors from the wastewater treatment process are discussed below.

Visual Aesthetics

The preferred WWTP alternative will be contained entirely within a building that has been designed to be of similar scale and dimensions as the multi-family condominium buildings proposed for the project. The WWTP will be located uphill from Amenia Brook, with a layout that follows the hillside to minimize building height and visibility. This will allow the project architect to blend the WWTP building into the surrounding area, minimizing its visual impact. The low pressure sewer pump stations will be entirely subsurface, with only an at-grade access hatch for each. The community pump stations will be either entirely below-grade with an access hatch, or will consist of a small above-grade structure containing pumps and controls. Each of the community pump stations also will be equipped with an enclosed emergency generator with appropriate muffling, and will have sufficient landscaping, fencing, or architectural features to allow them to have a negligible visual impact.

Land Use

As shown by the Wastewater Treatment Plant Site Layout (see Figure 2 in Appendix 9.8), the proposed WWTP option has been designed to occupy a minimal amount of land area, with the building in which all processes reside occupying approximately 9,000 feet. Furthermore, enclosing it in a building with appropriate ventilation and odor control eases the need for a nuisance buffer around the plant, allowing greater land use flexibility in the surrounding area. Pavement has been kept to a minimum, with enough paved area only to provide truck access and maneuvering for deliveries and solids hauling, and a small number of parking spaces for WWTP operators.

Cultural Resources

As noted above, cultural resources were identified in the vicinity of the proposed WWTP location and avoidance of this area is recommended. If avoidance cannot be accomplished, additional investigation and potential subsequent mitigation would be required. The Applicant is currently pursuing a location across US Route 44 for the WWTP to avoid any impacts to this cultural site.

Odor

Odor issues will be mitigated by proper operation of aerated processes and by enclosing the entire treatment process inside a building. The main treatment process tanks will be aerated and mixed to maintain oxygen levels and prevent septic conditions that lead to the generation of most offensive odors. The enclosure of the tanks within the building also will allow additional odor control and ventilation options in the future if the need arises. Within the building, the influent channel and the head works will be located in a dedicated room to allow for special ventilation and odor control as needed. Initially, odor control measures for the head works room will consist of properly enclosing all processes. The ventilation system of the head works room will be sufficiently segregated so that a dedicated odor control system could potentially be added at a future time if necessary. Odor control technology options include activated carbon or a scrubber. All other portions of the WWTP process are expected to yield negligible odors and will be subjected simply to standard ventilation and climate control in the building.

Any future equipment used for odor control would be located within the building. All ventilation will conform to Ten States, NFPA, and any other applicable standards. This includes the enclosed room containing the primary screen, which triggers specific ventilation, access, and gas monitoring requirements per Ten States Standards section 61.13.

All pump stations within the site-wide collection system will utilize standard odor control measures, including proper ventilation, and timed pump-down of large pump stations so their contents do not reside in them for extended periods during times of low sewer flow and turn septic. During detailed sewer design, the option of odor control chemicals will be evaluated in addition to the above measures. Additional measures are not necessary.

Noise

All excessively noisy equipment such as large pumps, blowers, compressors, and generators, will be housed inside buildings, vaults, or noise-reducing enclosures to mitigate impacts at neighboring residences and properties. The aeration blowers for the treatment tanks will be the loudest equipment, and will be located either in a dedicated sound-proofed room within the WWTP building, or within individual noise enclosures within the building. All pumps associated with the treatment process will be submersible pumps, and therefore will be submerged in water and relatively quiet when operating. Piping will be designed to minimize noise associated with high velocity pipe flow in the building. The emergency generator for the WWTP will operate only sporadically and will not create a significant noise impact. The collection system pump stations will be subsurface and produce no discernible noise.

Current Town of Amenia Code §121-20G(2) restricts noise that is audible beyond property boundaries. Current code is even stricter if the lot lies within 200 feet of a residential district, and provides a list of acceptable thresholds for a variety of noise types. The Proposed (draft) Code would simplify the noise ordinance to limit all noise to 60 decibels at the property line. Exceptions are made for construction activities and for emergency activities, such as the emergency generator. The WWTP will be designed so that when it starts operation, it will meet all governing noise ordinances.

Separation Distances to Nearby Properties

NYSDEC guidelines recommend a 500-foot separation distance between wastewater aeration tanks and public roadways, places of significant public use, or residential structures. This recommended distance is intended primarily to minimize the WWTP impacts of noise and odor on surrounding properties. Both the preferred alternative (SBR) and the likely backup alternative (MBR) contain aeration tanks that would trigger these separation requirements. However, this minimum 500-foot separation assumes a conventional WWTP with outdoor tanks, and can be substantially reduced by implementing "engineering measures" such as enclosing the process tanks, implementing appropriate ventilation and odor control measures, and housing all loud equipment in soundproofed enclosures. As described above, the Silo Ridge WWTP will incorporate such measures, allowing it to be less than 500 feet from other structures while not having a significant adverse impact. Figure 3.14-1 illustrates properties within 500 feet of the proposed WWTP location. Distances to the properties that lie within 500 feet of the proposed WWTP are listed in Appendix 9.8, "Wastewater Report."

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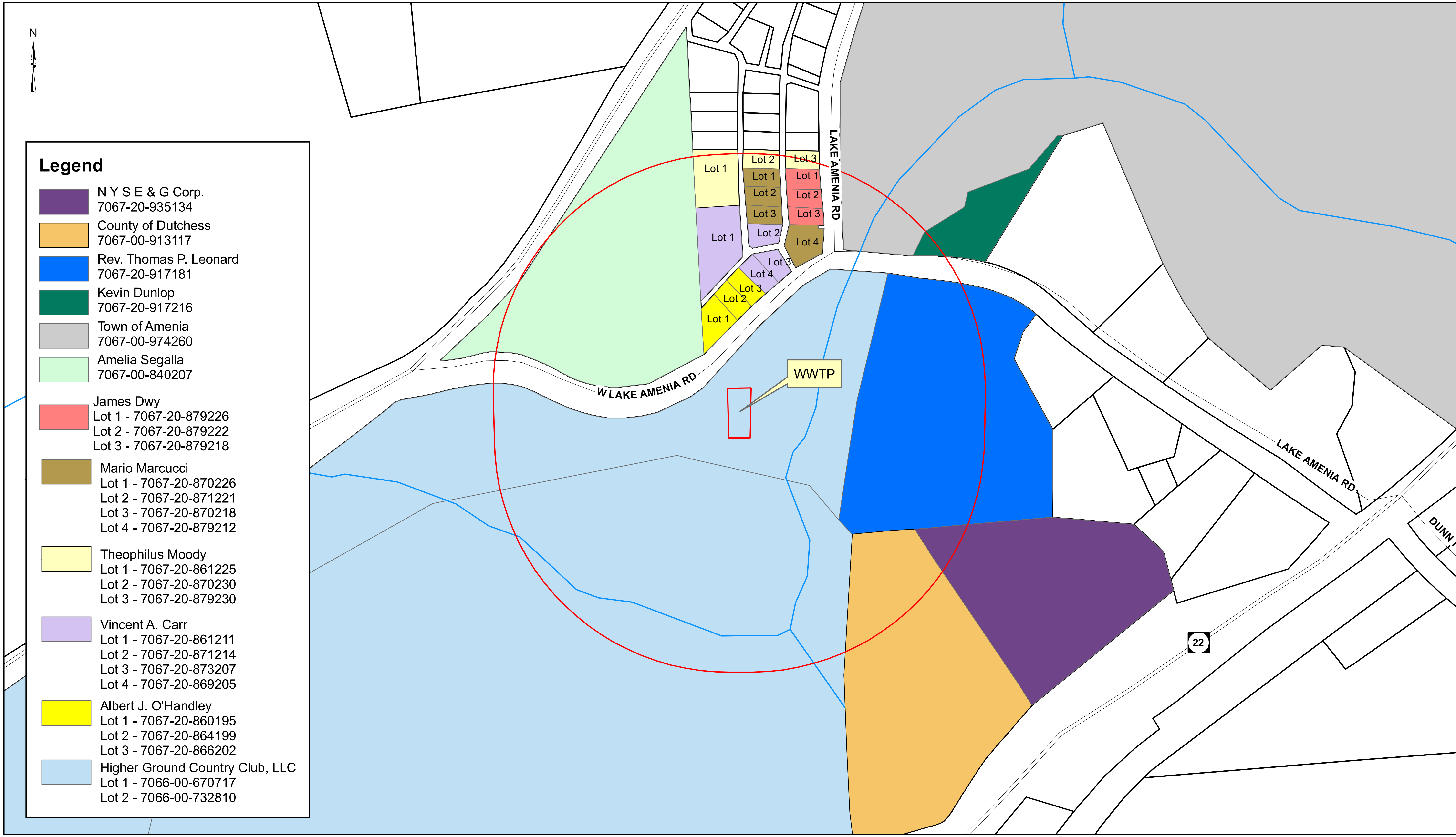

THE Chazen COMPANIES

Silo Ridge Resort Community

Parcel Data within 500-ft of WWTP (Proposed Action)

Town of Amenia, Dutchess County, New York

1 inch equals 200 feet

Fig. 3.14-1

Source: Dutchess County Real Property

Drawn by: SEP