

### 3.12 Utilities - Wastewater

#### 3.12.1 Existing Wastewater Conditions and Project Proposals

##### ***WASTEWATER TREATMENT AND DISPOSAL***

Wastewater treatment and disposal can be achieved through a central sewer system or through individual septic systems. The preferred choice is central sewer because it proves to be a cleaner and safer alternative. Unlike septic systems, central sewers convey sewage to a wastewater treatment plant for treatment prior to disposal. The treatment plant regularly monitors the quality of the treated wastewater, or effluent, prior to disposal to ensure that it meets the state permitted requirements. The sludge produced as a result of the treatment process is transferred to a solids handling facility for further treatment. On the other hand, septic systems rely upon the decomposition of sewage in sealed tanks as treatment. Liquid waste is then discharged in a nearby seepage pit or drain field. Wastewater treatment plants discharge a higher quality effluent when compared to septic systems. Failing septic systems regularly occur due to old age, improper maintenance, improper design and improper installation. Once septic systems fail, untreated sewage seeps into the nearby waters, which may impose serious health risks.

All wastewater generated by Legacy Ridge is proposed to be conveyed to an upgrade and expansion of the existing Valley Forge Wastewater Treatment Plant (WWTP) for treatment. The option of installing an additional, on-site wastewater treatment plant was contemplated, but consolidating treatment to a single location proved to be a better alternative considering the reduction in operational and maintenance costs and the number of point discharges. Access to the WWTP is located off Washington Avenue in Highland Mills, Orange County, New York (See Figure 106, Valley Forge WWTP Upgrade). The Town of Woodbury owns the WWTP. The WWTP currently treats domestic wastewater from the existing Valley Forge residential development. The facility has a State Pollution Discharge Elimination System (SPDES) permit No. NY-0020478, which allows for a discharge to 56,000 gallons per day (GPD) to an unnamed tributary of Woodbury Creek. A copy of the permit is provided in the WWTP Engineering Report (See Appendix 9.7, Section 3.1 and 3.2). Based on recent discharge monitoring reports, the WWTP receives an average of 24,000 to 16,000 gallons per day of wastewater (See Appendix 9.7, Section 5.1).

The WWTP currently implements extended aeration activated sludge (EAAS) process to treat wastewater. Treated effluent discharges into an unnamed tributary of Woodbury Creek. The tributary is classified as a Class C intermittent stream and is specified as Water Index #LH89-7-4-1. Current effluent discharge limitations are noted in the existing permit (See Appendix 9.7).

The proposed R-2A zoning, Legacy Ridge will generate an average of approximately 140,000 GPD of wastewater. Wastewater flow calculations are provided in the WWTP Engineering Report and are based upon criteria specified in the New York State Department of Environmental Conservation's Design Standard for Wastewater Treatment Works, 1988. The Project Sponsor would propose a WWTP rebuilding designed at 225,000 GPD in order to handle the projected combined average daily flow.<sup>88</sup> A WWTP upgrade to a membrane bioreactor system is proposed and is further described in Section 13.2.2.

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<sup>88</sup> It is proposed that the plant will be rebuilt to a state-of-the-art facility to handle the current permitted flow of 56,000 gpd plus the anticipated flow generated from the Legacy Ridge site of 140,000 gpd. The plant will be designed 15% beyond the design flow to improve the plant's reliability and serve future connections.

***SANITARY SEWER COLLECTION SYSTEM***

There are no existing sanitary sewers on the Legacy Ridge site or within the path of off-site sewer main construction. The Legacy Ridge wastewater collection system will be of entirely new construction.

All wastewater generated by the Legacy Ridge development will be conveyed to the WWTP through a proposed 8-inch force main. The force main will travel south along County Road CR-9 and enter the Valley Forge development at Hamilton Avenue. The existing sanitary sewer collection system will discharge directly into a grit chamber at the WWTP and will not affect existing sewers. Any change in discharge into the un-named creek currently used by the Valley Forge WWTP will be subject to NYSDEC State Pollutant Discharge Elimination System (SPDES) permit requirements.

**Figure 106 - Valley Forge WWTP Upgrade**

### 3.12.2 Potential Wastewater Impacts

#### **WASTEWATER TREATMENT AND DISPOSAL**

The 56,000 GPD Valley Forge WWTP will be completely rebuilt to a state-of-the-art facility designed to treat a design flow of 225,000 GPD, which was determined based on existing permit requirements, proposed flows from the Legacy Ridge development, and 15% additional capacity to improve the plant's reliability and to serve future connections, if so desired by the Town. Please refer to Figure 107 for a map of the proposed modifications to the Valley Forge Sewer District. The proposed Valley Forge WWTP rebuilding will consist of changing the existing plant with membrane biological reactor (MBR) treatment. Details of the MBR process can be found in Appendix 9.7. The membrane system eliminates some existing processes, such as clarification, chlorination and sand bed filtration. Existing tankage and equipment that is in good condition will be utilized in the proposed rebuilding. Existing equipment is being reused as a matter of convenience to facilitate the installation of a new system; for example, the influent grit chamber and sewer provide the only logical gravity pathway into the site and will be continued to be used but the existing concrete structures will be rehabilitated to increase their useful life. Refer to Figure 108 for a process flow diagram and Figure 109 for the proposed MBR system upgrade

The MBR system implements tertiary treatment, providing an overall improvement in wastewater effluent quality. The improvement in effluent quality will also meet more stringent effluent limitations, if imposed by the New York Department of Environmental Conservation (NYDEC). Receiving waters should not be adversely impacted by the plant rebuilding. The MBR system also provides pathogen removal prior to disinfection to reduce disinfection costs. The following table describes typical effluent characteristics of the proposed MBR system.

| <b>Table 42 - Typical MBR Effluent Characteristics</b>      |                               |
|---|-------------------------------|
| <b>CONSTITUENT</b>  | <b>Effluent Concentration</b> |
| Carbonaceous Biochemical Oxygen Demand (CBOD <sub>5</sub> ) | < 5 mg/l                      |
| Ammonia (NH <sub>3</sub> )                                  | < 2mg/l                       |
| Total Settable Solids (TSS)                                 | < 10 mg/l                     |
| pH  | 6.0– 9.0                      |

Recent discharge monitoring reports for the Valley Forge WWTP (as included in Appendix 9.7) indicate an average daily flow ranging between 24,000-16,000 gpd. The actual flow is less than half the design flow; therefore, one train can be removed from service and retrofitted with the MBR system while continuing operation and treatment. A temporary holding tank can be placed on-site in order to provide additional storage. The MBR system upgrade is a very constructible and manageable option.

As stated previously, the construction of the MBR system upgrade should not have any impact on the existing plant operation. The new treatment plant will provide the following additional improvements or safeguards:

- New Operations Building – The existing operations building is in poor condition and requires complete replacement. A new operations building will be constructed to replace the existing building. The new operations building will be aesthetic facility constructed of masonry block walls with a gable roof. The building will include a lavatory and more space to provide a safer environment for equipment maintenance.
- Landscaping – The site will be landscaped to provide screening for the treatment plant and to offer an aesthetically pleasing view.
- Odor Control – Odors are not expected to arise from the WWTP rebuilding. Space will be provided in the operations building for an odor control system, for future installation. The cost of any future odor control system will be the responsibility of the sewer district.
- Sound Attenuation – The proposed equipment (blowers, louvers, etc.) will be provided with sound attenuation, as required, minimizing noise pollution.
- Removal of Existing Tankage – Many of the tanks included in the original construction will be removed and properly demolished. This will create better access to the treatment plant components.
- UV Disinfection – The existing chlorine disinfection unit will be replaced with an ultraviolet disinfection unit that is to be housed in the operations building. This will eliminate the handling of chlorine, providing a safer alternative.

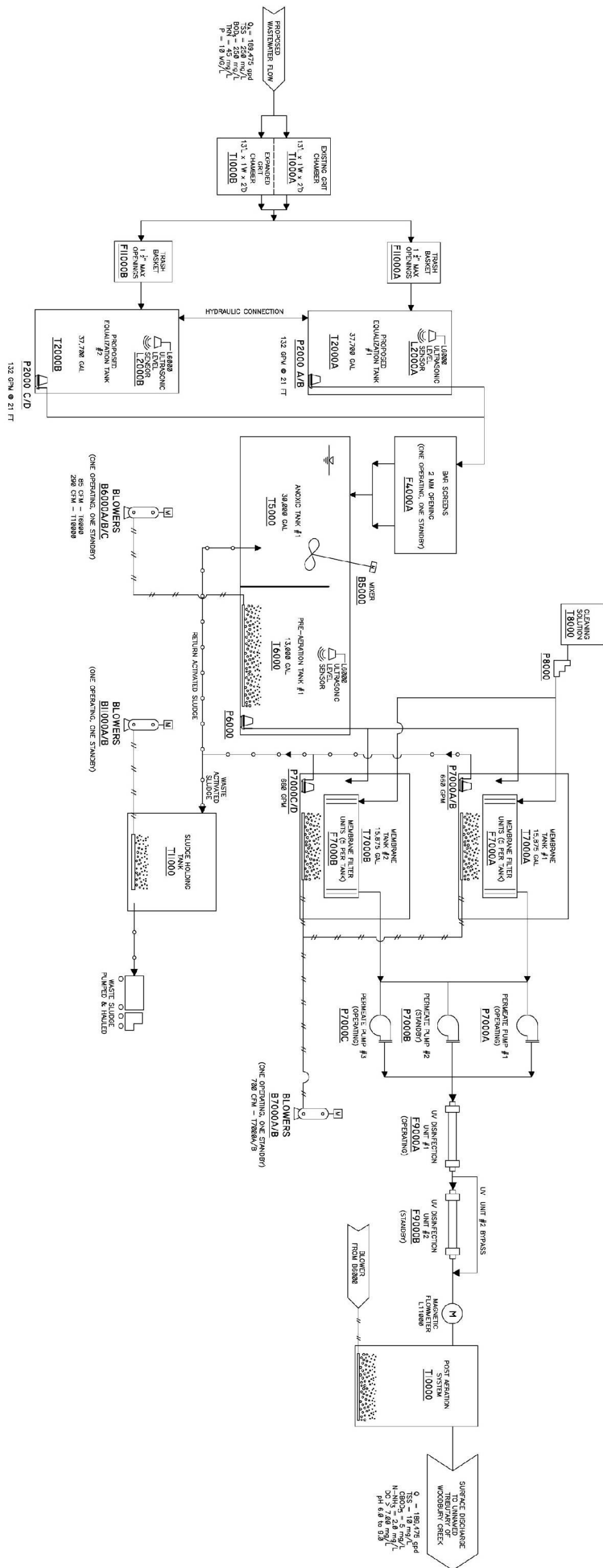
Kubota® membranes as manufactured by Enviroquip are proposed. These membranes require cleaning every six months, on average. Cleaning is performed in-situ within the tanks, avoiding the need for membrane removal, interruption in operation and tank draining. The membrane does not require a backwash tank or backwash pumps, eliminating the need for additional pumps and instrumentation.

### ***SANITARY SEWER COLLECTION SYSTEM***

Under the preferred alternative, a new sanitary sewer collection system will be installed to convey wastewater to the Valley Forge WWTP. The proposed collection system will consist of a gravity collection system and a series of pump stations and force mains. All of the Legacy Ridge wastewater will exit the southeastern corner of the site at NY County Road 9 (a.k.a. Smith Clove Road). Once the force main exits the site, it will travel within the CR-9 right-of-way until it enters the Valley Forge community at Hamilton Avenue. The main will then travel within the roadways of Valley Forge until it discharges directly into the new WWTP grit chamber.

Construction of the Legacy Ridge sanitary sewer collection system will have no impact on existing sewer collection systems. Appropriate traffic control measures will be taken along CR-9 during construction of the proposed sewer mains. The proposed off-site sewer mains will cross the unnamed tributary of Woodbury Creek where necessary. Stream crossings will be either bridged or directional drilled, depending on the better alternative for construction. In either case, there would be no impacts to the Woodbury Creek, as the piping would either go above or below the Creek.

**Figure 107 - Proposed Sewer District**







### ***R-2A CLUSTER vs. R-2 CONVENTIONAL ZONING vs. R-3 CONVENTIONAL ZONING***

The Legacy Ridge site is currently zoned as R-3A Conventional. A request to rezone Legacy Ridge as R-2A Conservation Cluster has been presented. Rezoning Legacy Ridge as R-2A Conventional was also contemplated. Under R-3A zoning, the development would result in 155 lots. Under R-2A Conventional, the development would result in 233 lots. Assuming the homes in each scenario would be four-bedroom units, approximately 74,000 gpd of wastewater would be generated by 155 homes (R-3A) and 111,000 gpd would be generated of 233 homes (R-2A). This is less than the 140,000 gpd of wastewater that will be generated by the proposed 287 homes in Legacy Ridge under R-2A Cluster.

However, the costs of providing the necessary upgrade to the Valley Forge WWTP are fixed, and have been estimated to be as high as \$1,100,000. It is doubtful that the smaller project could justify the additional expense of the WWTP complete rebuilding. The Project Sponsor would more likely consider on-site treatment or individual septic systems for the project site (see a discussion of these alternatives below).

If the preferred action is approved, and the alternative of rebuilding the Valley Forge plant is selected, the Town has a number of alternatives under Town Law Article 12, 12 A, and 12C, to rebuild the proposed sewer plant, and would determine the appropriate procedures based upon the plant actually selected for improvement. If the alternative selected is that the developer would construct a new plant onsite, the Developer would undertake the cost of constructing the plant, and the Town would act under Article 12 to establish a sewer District and approve the plans. The ownership and operation would be turned over to the Town. Thereafter, the district would operate in the same manner as other Town Districts, or ultimately become part of a consolidated district. If the alternative selected is the improvement of an existing plant, the Town and the Developer would enter into a contract to assure Developer funding of the appropriate level of improvements. The Town would act under Article 12 or 12 A to expand or consolidate any existing district, or to establish a new district. If an expansion of a County District, together with any appropriate improvement of a County treatment plant, is selected as the appropriate option, then similar contracts would be negotiated with the County, and the expansion and improvements would take place under Article 5-A of the County Law (Sec. 250 and following).

### ***Alternate Treatment Options***

The preferred plan includes the complete rebuilding of the Valley Forge WWTP to a state-of-the-art facility and development of a new collection system. However, the Project Sponsor has evaluated 2 options should this not be viable.

#### *Option 1: Construction of a new WWTP for on-site Discharge*

The Project Sponsor has investigated the possibility of constructing a new WWTP for on-site treatment and discharge of sewage. It is assumed that the technology for this plant will be identical to the preferred plan (MBR technology), and therefore the discharge impacts will be identical, except that the treated wastewater would be discharged into an onsite stream.

The cost of construction would be the responsibility of the Project Sponsor, and maintenance and operation would still be borne solely by the residents benefiting from the plant. With 155 homes (under the R-3A alternative) or 233 homes (under

the R-2A alternative) the plant would be less economical than if 287 homes were connected to the plant. However, if the plant were to be located on-site, the cost of the transmission line along CR-9 to the Valley Forge WWTP would no longer be incurred. Further cost reduction is noted in on-site wastewater treatment by excluding existing flows, which requires 56,000 gpd in plant design. Therefore, an on-site treatment plant could be economically viable. For this option, the methods of forming the appropriate Town Sewer district are the same as those set forth above.

By not upgrading the Valley Forge system and plant, however, the Valley Forge residents would be responsible for any necessary upgrades to that system, which have been estimated as high as \$1,100,000. Under this scenario, the approximately 134 homes which discharge into this system would be responsible for the upgrade, at a cost of approximately \$8,200 per home.

#### *Option 2: Construction of On-site Septics*

Under the reduced-count development option of remaining at the R-3A density, the alternative of centrally collected and treated wastewater would become too expensive for the Project Sponsor. Under this option, the Project Sponsor would propose individual septic systems which would be designed to Orange County Health Department standards.

By not upgrading the Valley Forge system and plant, however, the Valley Forge residents would be responsible for any necessary upgrades to that system, which have been estimated as high as \$1,100,000. Under this scenario, the approximately 134 homes which discharge into this system would be responsible for the upgrade, at a cost of approximately \$8,200 per home.

By not providing central collection and treatment of the waste, individual septic systems will infiltrate wastewater into the groundwater system. Further, there is no process for monitoring and ensuring the viability of septic systems after construction, and long term, septic systems typically fail to operate as efficiently. Failed septic systems have the potential to significantly impact groundwater quality.

Septic systems also result in the need to clear significantly more land (See Figure 113, Typical Sewer and Water Lots) resulting in the loss of more than 44 acres of existing vegetation (a 23.8% increase) and habitat site-wide.

### **3.12.3 Wastewater Mitigation Measures**

The following are proposed to offset the potential impacts of the preferred plan:

- Rebuilding and dedication to the Town of the Valley Forge treatment system as required;
- Central treatment for sewage from Legacy Ridge development.

To ensure the sanitary collection and treatment system is developed to high industry standards, the following will be implemented:

- The off-site and on-site improvements, including but not limited to pump stations, treatment plant, force mains and gravity lines and appurtenances, will be designed in accordance with state and local regulations and specifications, including the Town Engineer and the Town Water and Sewer Superintendent.
- Improvements to the Valley Forge WWTP will be designed in accordance with the *Recommended Standards for Wastewater Facilities* © 2004 (a.k.a. Ten States Standards) and local requirements.
- The Project Sponsor will map and discuss the proposed modifications to the wastewater district.

During construction of the system, the following mitigation measures will be implemented:

- Frequent inspection of wastewater system construction will ensure proper installation.
- An appropriate traffic control plan will be provided and executed prior to the commencement of off-site construction.

Upon Operation of the System, the following mitigation will be implemented:

- Daily monitoring of inflow, treatment parameters and effluent discharge to ensure conformance with permit standards.
- All operations and maintenance costs will be funded solely by those parcels within the sewer district which will include the Legacy Ridge parcel.

A survey is currently being completed to establish the right-of-way along a portion of Smith Clove Road. The concept for the force main is to locate the piping within county right-of-way, where necessary, without having to reconstruct the county road. A more precise location of the force main will be established upon completion of the survey. The force main may connect to the Valley Forge plant via two options. One option is extending the force main along Hamilton Avenue and Washington Drive to the plant site. This will likely cause some degree of road reconstruction. The second option is to connect the force main to the first manhole on Hamilton Ave and directing the proposed Legacy Ridge wastewater through the existing collection system. Portions of the existing system that will receive the proposed flows have been evaluated and it has been determined that approximately 1000 L.F. of existing sewer piping will have to be expanded to accommodate the proposed flow. Pipe expansion will likely be completed through a process referred as the pipe insertion method, which will not require road restoration.

The proposed plan in upgrading the wastewater plant is described in detail in the HDR|LMS Engineer's Report for the Valley Forge Wastewater Treatment Plant Upgrade. The suggestion of replacing the entire sewer piping from Hamilton Avenue to the plant will be considered.

In an effort to provide screening of the facility, supplemental vegetation plantings will be included as a mitigation measure to reduce the visual impacts of the Valley Forge rebuilding. Low branched deciduous and coniferous trees shall be used for screening. Tree species subject to disease or insect damage (eastern hemlock) or favored as a food item by white-tailed deer (white cedar, azaleas and yews) will be avoided in the planting plans.

Tree species that will be considered for the screening are as follows:

Norway Spruce  
White Fir

Austrian Pine  
Douglas Fir

Eastern White Pine  
White Spruce

The final plant species list will be determined based on the size and commercial availability of each species and completed by a Landscape Architect. The plants will be watered as needed during the first growing season and any plants that appear to be weakened or dead will be replaced during the first two growing seasons.