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Town of Georgia Sewer Feasibility Assessments for the Historic Village and the Town Center

Draft Report

Stone Project Number 041514-W

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EXECUTIVE SUMMARY

The Town of Georgia, Vermont hired the consultant team of Stone Environmental Inc. (Stone) and Forcier Aldrich & Associates Inc. (FA&A) to conduct a wastewater feasibility study for the Historic Village and Town Center areas. These two areas of existing development were identified in the Georgia Village Plan as places where further appropriate development could be encouraged in support of the Town's overall vision. The study area includes 164 properties, most of which are developed with either single-family residences or seasonal camps. Property sizes range from 0.2 acre to over 150 acres.

Georgia's natural features pose both opportunities for and limits to the construction and successful operation of decentralized wastewater disposal systems. For example, the soils that underlie the study areas may pose significant limitations for onsite systems, including areas of shallow groundwater and shallow bedrock. Most properties in both study areas are served by individual onsite water supplies, consisting of shallow springs or drilled wells. In order to protect the drinking water, no onsite systems can be constructed within a protective buffer zone surrounding each well or spring.

The Historic Village and Town Center properties are served by individual or clustered onsite sewage disposal systems. Information on the existing sewage disposal systems was gathered from town office files, state Regional Office files, property owner survey questionnaires, interviews, and area site visits.

A needs analysis was conducted for both study areas to determine whether each individual property could support a conventional onsite system under the current State rules. This assessment combined spatial information, such as topography and soils information, with local information like parcel boundaries, building footprint areas, locations of water supplies, and building uses, to determine what constraints each property might contain for onsite wastewater treatment and disposal. The needs assessment results were confirmed by reviewing other sources of information collected during the study. This review resulted in an overall recommendation for each property of either maintaining and upgrading a system onsite, or connecting to an offsite solution.

Of the 164 parcels in the two study areas, 125 parcels can support an onsite wastewater disposal system. These parcels met all the environmental setbacks required by the state as well as depth to groundwater and bedrock criteria. The analysis estimated that seven parcels in the Historic Village and 32 parcels in the Town Center could not support an onsite wastewater disposal system. Limited available area was the greatest constraint on limited parcels in the Historic Village area, while shallow groundwater was the greatest constraint on parcels in the Town Center area.

1. INTRODUCTION

The Town of Georgia, Vermont has chosen to conduct a water supply and wastewater feasibility study for the Historic Village and Town Center areas, located in the southeastern portion of the Town (Figure 1).

The objectives of the study are to:

- Determine whether each parcel can support an onsite wastewater system;
- Identify areas where construction of new onsite or offsite systems are needed;
- Identify potential cluster system sites;
- Develop and analyze engineering system alternatives;
- Prepare preliminary conceptual plans and cost estimates;
- Develop preliminary funding and user fees;
- Make recommendations on structural or management options; and
- Provide education and outreach to the residents and local officials on current and potential future conditions.

Stone Environmental Inc. (Stone) and Forcier Aldrich & Associates Inc. (FA&A) were hired to conduct this study. This Final Report provides information on each of the objectives above.

1.1. Education and Outreach

Education and outreach efforts are important in this study for several reasons. Many owners with onsite water supply and sewage disposal systems are not taught about what type of system they might have, and what they may need to know about how to properly use and maintain it. Beyond that, they may not understand that since older properties were developed, scientists, engineers, and regulators have learned more about how these systems function and about how, if installed in the wrong conditions or under the wrong design specifications, they can impact groundwater and surface water quality.

An initial public meeting was held on the basics of how systems work, how to maintain them, and how they can impact the environment and water supply wells. A handout describing this study and some basic information was developed and distributed at the meeting. A property owner survey questionnaire was developed and distributed to the study area property owners. The results of the survey are summarized in Table 1. The response rate for the surveys was 25% or about 38 out of 154 surveys mailed. Besides collecting important information on sewage disposal systems and water supplies, we asked whether property owners had any questions or concerns about their property's wastewater needs. Fifty percent of the respondents said their existing system or soils on their property were constraining the owners' plans for growth. A majority of the respondents (64%) said that they would support community wastewater and water supply systems that allow increases in land use density.

Another approach to outreach and education includes a wastewater advisory committee. The committee includes members of the Selectboard, Planning Commission, and the Town Planner. The committee met four times during the course of the project to provide more detailed discussions on the study scope, results, and recommended plan.

2. STUDY AREA DESCRIPTION

The study area includes parcels within the Historic Village and Town Center Planning Areas identified in the report "Georgia Village Plan—A Vision for the Future" published in April 2003. Georgia is located in Franklin County in the northwest portion of the state. Figure 1 shows the Town and the study areas in their wider geographical context. Table 2 includes a list of properties within the study area including parcel identification numbers, street addresses, owner names, property uses, and approximate parcel sizes.

2.1. Community Profile

The Town of Georgia is located between Milton and St. Albans in northwest Vermont. The Town is bordered by St. Albans Town to the north, Fairfield to the northeast, Fairfax to the east, Milton to the south, and Lake Champlain to the west. The Historic Village has primarily residential and small commercial properties, while the Town Center has a broader mix of land uses, including some large commercial and industrial properties.

The Town of Georgia's population has grown from 3,753 in 1990 to 4,375 in 2000 (US Census). There was an approximately 17% increase in Georgia's population in this ten year period. While Georgia's rate of population growth may be slowing somewhat, it appears that the Town's population will continue to grow into the future. The current population is an all-time high for the Town.

The two study areas include a total of 164 parcels (118 in the Town Center and 46 in the Historic Village). The Town Center area contains 46 single-family residences, 38 commercial or industrial properties, four Town-owned properties including the library and Hope Cemetery, an apartment building, and six vacant parcels. A significant number of properties in this area (20) had no land use identified in the Grand List. The Historic Village contains 31 single-family residences, nine Town-owned properties including the Town offices and the school, and a few commercial properties or apartment buildings. Property sizes range from less than 0.2 acre to over 150 acres in both study areas.

2.2. Natural Resources

Natural features can pose both opportunities for and limits to the construction and successful operation of decentralized wastewater disposal systems. These features, such as topography, surface waters, and soils, are described below with particular attention to their impact on the potential for onsite wastewater disposal in the Town Center and Historic Village. Figure 2 identifies environmental sensitivities within the study area.

2.2.1. Topography

The topography of the study area consists mostly of flat to gently rolling terrain with steep-sided valleys near streams, particularly east of Route 7 in the Town

Center (Figure 1). Generally, elevations range from around 300 feet above mean sea level (AMSL) in the southern part of the Town Center to 557 feet AMSL on an unnamed hill located just southeast of the Historic Village.

2.2.2. Surface Water

The study areas are situated at the intersection of three watersheds, all of which ultimately drain to the Northeast Arm of Lake Champlain. All of the Historic Village lies within the Mill River watershed. The Mill River drains the largest watershed area in the Town, passing mostly through productive agricultural areas before it discharges to Lake Champlain near the northeast corner of the town (Figure 1).

The Town Center is located at the boundary between two watersheds. The divide between the two watersheds roughly follows Route 7 south of I-89. North of I-89, the watershed divide runs north-northwest away from Route 7. The area east of the divide is in the Lamoille River watershed, and a series of small streams flow south to join Arrowhead Mountain Lake. The area west of the divide contains a series of small streams that flow west towards Stone Bridge Brook and, ultimately, to Lake Champlain.

2.2.3. Soils

There is a range of soil types in the study areas. Soils vary based on geologic material, slope, hydrology, human disturbance, and other factors. The best generalized source of soils data for this area is the Soil Survey Report of Franklin County prepared by the Natural Resource Conservation Service (NRCS). The NRCS data was derived by mapping the landscape with spot field checks to arrive at an approximate level of resolution of 3 acres, with acknowledged inclusions of other soils. This report describes the soil series, or groups of soils with common properties, found in the study area.

For the purposes of this assessment, we are primarily concerned with the properties of the soils that determine suitability for the siting of onsite septic systems: depth to seasonal high groundwater, depth to bedrock, soil permeability, and slope. Figures 3 and 4 show the soils in the study areas and vicinity. Soil characteristics for the two study areas are summarized in Table 3.

Based on the NRCS soils information, it appears that little of the land in the Historic Village area is suitable for a conventional in-ground disposal system. The predominant soils in the Historic Village are Georgia stony loams, Massena stony and extremely stony loams, and Scantic silt loams. These soils all have shallow groundwater tables, ranging from 1 foot or less for Scantic silt loams to a maximum of 3 feet for Georgia stony loams. Most of this area would require either mound systems or mounds with curtain drains due to the high groundwater table. There are a few pockets of soils that are suitable for conventional systems located southwest of the Georgia Plains Road / Route 7 intersection, and also just south and east of the study area.

In the Town Center area, most of the land west of Route 7 and north of I-89 is not suitable for a conventional in-ground wastewater disposal system. The predominant soils in the Town Center are Eldridge, Enosburg, and Wareham loamy fine sands; Georgia and Massena stony loams; and Scantic silt loams. These soils all have shallow groundwater tables, ranging from 6 inches or less for Wareham loamy fine sands to a maximum of 3 feet for Georgia stony loams. Most of this area would require either mound systems or mounds with curtain drains due to the high groundwater table. The area south of I-89 and east of Route 7 contains predominantly Missisquoi loamy sands and Windsor loamy fine sands. These well-drained soils are suitable for conventional subsurface disposal systems.

2.3. Water Supplies

Onsite wells can limit onsite wastewater capacity because of the required protective setbacks between water supply wells and wastewater disposal systems. It is likely that most properties in the study areas are served by individual onsite water supplies, consisting of shallow springs, or drilled wells. Water supply information from file reviews and from property owner surveys is summarized on Table 4. In the Historic Village, at least eight properties are served by drilled wells, while a shallow (dug) well serves one property. In the Town Center, there is a wider mix of water supply types. Eighteen properties are served by individual drilled wells, one is served by a shallow well; a small community water system with a drilled well serves at least eight properties; and three properties are connected to a municipal water supply.

The water supply information currently available does not account for a significant portion of the developed properties within the study area. Water supply information was not available for 37 of the developed properties in the Historic Village, or for 82 properties in the Town Center.

2.4. Zoning Districts

The only zoning district in the Historic Village area is Residential-Medium Density (AR-2). The purpose of this district is to allow residential development at a higher density than in rural areas, and to allow small-scale commercial uses that reflect the historic village patterns. However, the minimum lot size and setback requirements in this district will not necessarily allow the same type and density of development that historically occurred in the Village.

The Town Center area contains several different zoning districts. The area west of Route 7 and along Route 104A is zoned primarily Business-High Density (B-1). This district is intended to accommodate high-density commercial uses that are appropriate for a locally designated growth center. The remaining portions of the Town Center area are classified either as Industrial (I-1) or Commercial-Light Industrial (I-2).

3. HISTORIC AND CURRENT WASTEWATER TREATMENT

The Historic Village and the Town Center are both served predominantly by onsite sewage disposal systems. The Historic Village largely contains individual disposal systems, while the Town Center contains properties served by individual systems and larger disposal systems that serve groups of developed properties. There is a wastewater treatment plant in the Town Center area that serves the Wyeth manufacturing facility located on Industrial Park Road. Information on the existing individual and cluster sewage disposal systems was gathered from town office files, state Regional Office files, the property owner survey questionnaires, and area site visits.

This section includes some general information on onsite sewage disposal systems, how they function and need to be maintained, and some information on newer components, including advanced treatment systems, which can improve wastewater treatment where soils contain limitations. Information gathered from permit files and other sources, as well as the information collected from the surveys, is also discussed.

3.1. Onsite System Components and Maintenance

Onsite septic systems, when properly sited, installed, and maintained, can be a long-term effective means of wastewater treatment and disposal. However, septic systems can negatively impact surface waters and groundwater when they malfunction or when they are placed too close to the groundwater table or have other soils constraints.

The traditional onsite septic system in the study area (and around Vermont) includes a 1,000 gallon concrete septic tank, a concrete distribution box, and a leach bed or leach trenches. The septic tank settles out the solids and provides some treatment; the distribution box splits the flows evenly between pipes or trenches, and the leach bed or trenches (made out of stone or alternative materials with perforated pipe covered with filter fabric) along with the unsaturated soils below the system provide the final distribution and treatment.

The survey responses also indicated that approximately 11% of the respondents had drywells, which typically follow septic tanks and consist of concrete cylinders with open bottoms and holes in the sides, surrounded by stone, which holds the wastewater until it disperses into the ground. Two concerns with drywells are that they typically contain a small volume and can be undersized for their intended uses, and that they are usually quite deep in the soil profile, sometimes close to 10 feet. For drywells to comply with current regulations, the soil conditions must be suitable at a depth of four feet below the system. These conditions are rather unusual on many Vermont sites.

Pump stations can be added after the septic tank if the disposal field is higher in elevation than the building outlet, or for mounds and advanced treatment systems. Pressurizing the disposal field also allows for improved distribution of the effluent, making more efficient use of the entire field.

Effluent filters can now be added to the outlets of septic tanks. These filters screen solids from the effluent when it leaves the tank. If the tank is full of solids, the filters will plug and the system will slow or back up before solids leave the tank and enter the disposal field. The filters need to be hosed off usually once a year.

Advanced pre-treatment components can be added after the septic tank to improve wastewater treatment prior to disposal. This can allow for smaller leach fields (up to ½ the area of traditional leach fields), which can be important on small lots. Pre-treatment may also eliminate the need for a mound system, since reductions in the vertical separations to limiting soils are gained when using pre-treatment units. Pre-treatment components may also allow for increased capacity of onsite systems, which maximizes the soil resources, or may allow for the use of sites not previously approved under the Rules.

Since August 2002, the Vermont Environmental Protection Rules (Rules) have contained a process (and incentives) to use these technologies where site conditions are difficult. Since the revised Rules were implemented, several different technologies have been approved by DEC and are available for designers to consider. A designer should think about the availability of component parts, local service providers, and ongoing operation and maintenance costs when considering or recommending any particular component.

Operation and maintenance of conventional septic systems is quite simple. Operation or use of the system can be greatly enhanced by the use of water conservation devices and developing appropriate habits, such as only doing one load of laundry a day and eliminating in-sink garbage disposals.

Maintenance on conventional systems consists of having someone check the levels in the septic tank and pumping it out when necessary. For the homeowner, this usually means calling the septic tank pumper and always paying for a pumpout, whether it is really necessary or not; homeowners can avoid this unnecessary expense by checking the tank themselves. Depending on the use of the system, it may need to be pumped every year to every seven years. The condition of the tank, particularly its baffles and access, should also be inspected. If there are multiple tanks or pump station tanks, these should be inspected regularly and pumped when necessary. Any electrical parts should be inspected yearly.

Maintenance of tanks is a lot easier when access to the tank is not a problem, as when the tank is buried under a couple of feet of soil. If the top of the tank is deeper than 12 inches below the surface, access risers should be installed on the tank. In the past the risers were constructed of thick heavy concrete, but lightweight plastic and fiberglass materials for risers are now available, although child safety must be considered.

Another maintenance item is to check **distribution boxes** and make sure all of the outlet pipes are level. If this box is not level (which can easily happen in Vermont's freezing climate), one portion of the disposal field may be overloaded while other parts go unused. There are plastic devices available that can easily be installed to make the outlet pipes level.

The disposal field itself should be checked for seepage or surfacing of effluent, or for water loving plant growth. If there is untreated wastewater surfacing or discharging into a ditch or surface waters, there is a real public health hazard that should be addressed immediately with the help of the town's Sewage Officer. Although not typical in Vermont, some disposal fields (leach fields) include monitoring pipes so that the stone in the disposal field can be checked for ponding. Some ponding of treated wastewater in the field can be acceptable, but if the system has a thick clogged mat or is being hydraulically overused the wastewater system may surface or back up.

3.2. Local and State Permit Programs & File Reviews

There is limited information in Town and State Department of Environmental Conservation (DEC) permit files for properties in the Historic Village, mainly due to the age of most structures. More permit information is available for properties in the Town Center area, where there are more commercial buildings and most construction is relatively recent. Stone conducted a review of the files in the Town Office and at the District 6 Regional Office in Essex Junction. A summary of the available permit information is shown in Table 4.

3.2.1. Town Permits

The Town of Georgia records State (DEC) permits in their paper files, and issues local wastewater permits based on the State's permits as issued. The Town's wastewater-related permits have not been filed consistently over time. The level of effort necessary to collect and organize wastewater permit information from several disparate sets of paper files was considered to be outside the scope of this preliminary study. Since the Town permits essentially duplicate information available in the State permits, the Town's permit files were not reviewed further for the study areas. However, several site plans were collected from the Town's subdivision permitting files in order to understand the locations of systems in the larger commercial/industrial developments.

3.2.2. State Permits

Stone reviewed the DEC permit files in the Essex Junction Regional Office for permits for public buildings (almost any occupied building except a single family residence) and for subdivisions that are less than 10 acres in size (since 1969). A total of 14 permits were found for six parcels in the Historic Village study area. Three of these permits were for the replacement of failed septic systems, and at least one of these failures resulted in a "best-fix" solution. The rest of the permits were either for subdivisions or new construction.

A total of 90 permits were found for at least 46 parcels in the Town Center study area. A few of the permits could not be identified with a specific parcel number, generally because the original parcel the permit was issued for had been subdivided and no longer existed. Most of these permits were for subdivisions, new construction, or changes of use without increases in wastewater flows. Seven of the permits were for the replacement of failed systems. Three of the permits for replacement of failed systems were issued for the same property (the Georgia Mobil station on Route 7), indicating that the property may be in a "best fix" situation.

3.3. Property Owner Survey

The main goal of the property owner survey was to obtain information regarding existing water supplies and septic systems. The survey was mailed to property owners in both study areas in October 2004. Of the 150 surveys sent, responses were received from 38 owners (25%). The survey responses were entered into a database by the staff of the Northwest Regional Planning Commission for analysis and reporting. Table 1 contains a summary of the responses.

The data collected from the individual surveys were very useful during the assessment process. The survey provided additional information about ages and types of septic systems, when septic tanks were last pumped, and repairs or plans on file. Information about types and locations of water supplies and indications of water quality were also collected.

Most of the respondents rely on individual onsite systems (90%), while the rest are connected to a shared community system. Approximately 21% of the respondents' onsite systems were constructed prior to 1982, when the first major technical design standards for Vermont were published. Seventy-seven percent of the properties contained leach fields, none of the respondents' systems had drywells. Six mound systems were identified in the study area. Over 20% of the septic tanks were two or more feet below grade, which means they are difficult to access unless they have access risers on the tanks, and it means that the leach fields may be deeper in order for gravity flow to reach the field. A few respondents (9%) reported evidence of system failure, such as sewage smalls or sink holes near the septic tank or leachfield. Most property owners (77%) said they did not have a copy of any sketches, plans, or permits on their system.

Three questions were directed towards maintenance of their septic tanks and system repairs. Over 60% of the respondents indicated they pumped their tanks every 1 to 5 years. Eleven percent indicated they pumped their tank since 1995, with another 55% pumping since 2000. Almost 40% of the respondents indicated upgrades or repairs to their systems within the last ten years.

Seventy-three percent of the respondents rely on individual drilled wells, 21% on shared or community drilled wells, and 6% rely on a shallow well or spring or on an unknown water source. More than half of the respondents indicated always having good quality (56%), but a significant number (31%) indicated seasonal fluctuations in water quality and 13% indicated that they always had poor quality. Seasonal fluctuations in water quality may be due to connections to very shallow or surface groundwater sources.

4. NEEDS ASSESSMENT

The needs assessment portion of this study includes a data-driven Geographic Information System (GIS) analysis that combines spatial information, such as USGS topography and NRCS soils information, with local information such as parcel boundaries, building footprint areas, and building uses, to determine what, if any, constraints a property may contain for onsite wastewater treatment and disposal. The results of the GIS analysis are indicated on Figures 5 and 6 by colors summarizing the key constraint(s), if any, for each property.

The results of that analysis were confirmed by including all other sources of information collected and described in Section 3. This review resulted in an overall recommendation for each property of either maintaining and upgrading a system onsite, or connecting to an offsite solution. The results of this assessment are summarized on Table 5 and on Figures 5 and 6.

Following is a detailed description of the needs analysis and a summary of the recommended solutions for the Historic Village and the Town Center.

4.1. Data-Driven GIS Needs Analysis

The Needs Analysis was performed to identify parcels that may not be suitable for onsite septic systems. There are two main components to the needs analysis: an "available area" analysis and a "required area" analysis, each of which is described below.

The objective of the available area analysis was to identify which developed parcels would be constrained by inadequate lot size if required to install an upgrade to an onsite system. There are many factors that result in areas of a parcel being unavailable for construction of an onsite system. For example, state and local regulations require that certain "setbacks" or distances from natural or artificial features be maintained in order to protect those resources. One such setback is a required separation of 50 feet from surface waters and wetlands. It is because of setback regulations that the total area available on a parcel is significantly reduced when determining which areas are suitable for onsite systems. A second and equally important part of determining if a parcel has enough suitable land area to support an onsite system is the analysis of the soil conditions on the parcel to determine the area required to treat the wastewater flows from the parcel. Both the determination of available area and that of required area for onsite systems for each developed parcel were addressed by the study team. The last step identified those properties with soil conditions where the seasonal high groundwater table was 24 inches or less or where the depth to bedrock was less than 24 inches. Both of these conditions impact the type of onsite system that may be built.

The following assumptions and criteria were used to conduct the needs analysis.

4.1.1. Available Area Analysis

The first step in the assessment of suitable areas was to determine the available area on each developed parcel. This process involved both analyses of GIS data to identify areas unsuitable for onsite system development, as well as complex database operations to identify parcel features that might further limit onsite system development. The table below lists each of the setbacks of features examined in the available area analysis. Each of these features will be briefly discussed.

Area Analysis Criteria

Feature	Required Setback (ft)
Lakes, ponds, and impoundments (wetlands)	50
River, streams	50
Top of embankment, or slope greater than 30%	25
Bedrock Escarpments	25
Property line	25
Private wells-spring, dug well	150
Private wells-drilled well	100

Source: Vermont Environmental Protection Rules, Wastewater System and Potable Water Supply Rules, 2004.

1. Lakes, Ponds, and Impoundments (Wetlands): All lakes and ponds contained in the GIS Hydrography dataset were spatially buffered with the indicated setback distance using GIS. All wetlands contained in the GIS Hydrography dataset were also spatially buffered with the indicated setback distance using GIS.
2. Rivers, Streams: All streams contained in the GIS Streams dataset were spatially buffered with the indicated setback distance using GIS.
3. Top of Embankment, or Slope greater than 30%: Areas with slopes of greater than 30% were identified from the GIS Digital Elevations dataset. These areas were spatially buffered with the indicated setback distance using GIS.
4. Bedrock Escarpments: Bedrock Escarpments were obtained from the Franklin County soils dataset. Escarpments were spatially buffered with the indicated setback distance using GIS.
5. Property Lines: Property lines were obtained from the Georgia GIS parcel dataset. Property lines were spatially buffered with the indicated setback distance using GIS.
6. Private Water Supplies: Spatial well locations were obtained from the State Water Supply GIS dataset. Each water supply point was spatially buffered with the indicated setback distance using GIS. For parcels where spatial well data were unavailable, information acquired from the property owner survey and from permits was used to identify the type of water supply. For those properties with a private water supply indicated, a well buffer equal to half the setback

distance was subtracted from the parcel. The 50% reduction in the well setback is equivalent to assuming that a portion of the area resulting from a standard setback would overlap adjacent parcels and other buffer areas on a small lot. It is likely that this method underestimates the well shield areas required by the Environmental Protection Rules for the protection of drinking water supplies. Drilled wells require protection of an area within 200 feet upslope from the well in addition to the 100-foot radius, while shallow wells require protection of an area within 500 feet upslope of the 150-foot radius. For properties without water supply information, no water supply buffer was assumed to exist on the property. This assumption will result in some properties with private wells appearing to have more area available for an onsite system than is actually the case.

7. Building Footprints: Building square footages were gathered from the Georgia Tax Assessor files for many properties in the study areas. Building footprints were calculated using building square footages and property descriptions. For example, if a building square footage was 2500 sq. ft. and the property description was a 2-story cape, then the building square footage was divided in half to find the footprint. Where building square footages were not available for developed properties, an average value was calculated by averaging all available building footprints with the same property description. The building footprints were not buffered using GIS, but their areas were included in the analysis as areas unavailable for onsite systems.
8. Available Area Calculation: The total available area for a parcel was determined by subtracting an assumed building footprint area from the area of the parcel outside the required setback buffers as calculated by the GIS analysis. In addition, private well buffer areas were subtracted for those parcels whose private wells were not located in the GIS assessment. This calculation is shown in the following equation:

Area Available = Parcel Area – Required Setback Buffers – Building Footprint – Private Well Buffer

4.1.2. Required Area Analysis

The required area for construction of an onsite system was determined from two primary pieces of information:

- Soil properties (percolation rates and long-term acceptance rates) for each parcel
- Design parameters for each onsite system.

Assumptions made regarding the determination of each of the inputs to the required area calculation are described below.

4.1.2.1. *Soil Properties*

Percolation rates and long-term acceptance rates (LTAR) were calculated for each soil type within the study area. Average percolation rates were assigned using the soil textures from the NRCS soils data and the average rates listed in the Vermont Indirect Discharge Rules. Where more than one soil existed on a parcel, the soil's weighted area was calculated, and then the average percolation rates and LTARs were averaged across the parcel. The required area was determined for each parcel based on the average LTAR and percolation rate.

4.1.2.2. *Onsite System Design Assumptions*

Each onsite system was assumed to be a standard trench leach field design. The standard Vermont Wastewater System and Potable Water Supply Rules long-term application rate (LTAR) effluent loading rates were used in the sizing of the leach field. A standard three-foot wide trench with a four-foot separation between trenches was used as the typical layout. This resulted in a range of required areas for leach fields depending on the assumed percolation rate (soils with higher percolation rates require larger leach fields). It was assumed that if a leach field could be successfully sited on the property that adequate area for other system components, such as septic tanks and distribution boxes, was also available.

4.1.3. *Area Analysis Assessment*

The available area for an onsite system was compared to the required area for each parcel. Parcels were identified as area limited if the available area was less than the required area. Parcels were identified as being unconstrained by area when the available area was greater than the required area.

4.1.4. *Seasonal High Groundwater Analysis*

An additional GIS analysis was conducted for parcels with potential groundwater limitations. Soils with groundwater depths of less than 24 inches require a raised system such as a mound, or a system using alternative technology to increase treatment before disposal, and indicate a constraint to a typical subsurface system. A parcel was identified as having a groundwater limitation if the area of the parcel with a groundwater depth of greater than 24 inches was smaller than the available area required for a conventional onsite system. This analysis may overestimate site limitations regarding depth to groundwater, as it does not account for filtrate systems, alternative systems, or desktop hydrogeologic analyses that may be used under the EPRs.

4.1.5. *Depth to Bedrock Analysis*

Depth to bedrock was assessed to identify parcels with potential bedrock limitations. Parcels with shallow bedrock, of less than 24 inches, would require additional fill to allow an onsite system to function properly. A parcel was identified as having a bedrock limitation if the area of the parcel with a depth to bedrock of greater than 24 inches was smaller than the available area required for a conventional onsite system.

4.2. GIS Analysis Results

The results of the three analyses are represented on Figures 5 and 6 and are summarized on Table 5 in the section titled Environmental Assessment Results. The factors affecting the analysis results are included in the table. Of the 46 parcels in the Historic Village study area, there were 39 parcels that can support an onsite wastewater disposal system (Figure 5). These parcels met all the environmental setbacks required by the state listed in the Area Analysis Criteria table in Section 4.1.1 as well as the depth to groundwater and bedrock criteria described in Sections 4.1.4 and 4.1.5. There were seven parcels that the GIS analysis estimated could not support an onsite wastewater disposal system. Six of these parcels were constrained by only environmental setbacks and one parcel was constrained only by shallow bedrock. The parcels with limitations are generally small parcels that are scattered along Route 7 throughout the village.

Of the 118 parcels in the Town Center study area, there were 86 parcels that can support an onsite wastewater disposal system (Figure 6). These parcels met all the environmental setbacks required by the state listed in the Area Analysis Criteria table in Section 4.1.1 as well as the depth to groundwater and bedrock criteria described in Sections 4.1.4 and 4.1.5. There were 32 parcels that the GIS analysis estimated could not support an onsite wastewater disposal system. Of these parcels, two were constrained by only environmental setbacks, 24 parcels were constrained only by shallow groundwater, five parcels were constrained by setbacks and by shallow groundwater, and one parcel was constrained only by shallow bedrock. Shallow groundwater was the factor that impacted the most parcels in this area, followed by limited available area. The 32 parcels with limitations vary widely in size and are scattered throughout the study area, with the exception of a cluster of limited parcels at the intersection of Routes 7 and 104A.

4.3. Lot-by-Lot Review and Proposed Recommended Solutions

Once the results of the GIS analyses were produced, a lot-by-lot review was conducted. This review included using all of the additional information known about the properties, confirming the results of the GIS analyses, and developing recommended solutions for each parcel. Onsite solutions are recommended for most properties that did not have any constraints identified in the GIS analyses. However, there were some properties where indications from permits, surveys and site visits led us to make recommendations for offsite solutions where no constraints are shown on the figures.

This is a planning level study and no onsite inspections or soils testing were conducted. If more detailed results are desired, additional onsite evaluations will be necessary.

5. HISTORIC VILLAGE

5.1. Build-out Analysis

The document entitled "Georgia Village Plan, A Vision for the Future", dated April 2003 was initially used to evaluate the future water demands and projected wastewater flows. Under Option #2, the planning information provided in this document was based on a full build-out analysis which can take 50 to 100 years to implement. The residential and commercial units projected at full build-out are summarized in Table 6. This build-out analysis includes both existing and future development for the residential and commercial uses.

5.2. Water Supply

5.2.1. Projected Water Demands

For the purposes of this feasibility study, a planning duration of twenty (20) years is typically used. The build-out analysis includes both existing and future development, so the existing water demands were estimated based on the needs assessment. A total of 46 properties were identified in this study area and include a mix of residential, commercial, and institutional uses. The Georgia Elementary and Middle School is the single largest user with an estimated average daily water demand of 10,200 gpd. For all of the existing properties, the average daily water demand was estimated at 18,400 gpd.

The population projection for Georgia of 2% annually was used to project the water demands to 2025. The Vermont Water Supply Rules Design Criteria were used to project the future average day water demands for each use category. The residential use category was assumed to be a mix of multiple and single family dwellings with an average of two (2) bedrooms and two (2) people per bedroom. A detailed breakdown was not available for the commercial uses, so an allowance of 450 gpd per acre was assumed. Once more specific information is available on the uses, the demands can be adjusted accordingly. The 2025 projected average day water demands for the Historic Village are 33,000 gpd as summarized in Table 7.

5.2.2. Evaluation of Alternatives

5.2.2.1. Individual Wells and Other Supplies

The existing 46 properties have on-site water supply. These water supplies typically consist of individual wells, dug (shallow) wells, springs, and other types of supplies. The well logs for this area were obtained from the State Water Supply Division and were reviewed to determine the approximate depth and yields of the existing wells. The depths varied from 100' to 400' and several wells indicated high yields of 50 to 150 gpm. No test data was available on the water quality to determine if treatment would be required.

Advantages

- Several wells in this area have good yields which can indicate that adequate water supply can be obtained on individual properties.
- The installation and operation and maintenance costs are the responsibility of each individual property owner.
- Use of individual on-site wells requires significantly less infrastructure by eliminating storage tanks, distribution piping, and other appurtenances.

Disadvantages

- The use of on-site wells and minimum isolation distances can limit the options for subsurface wastewater disposal on smaller properties.
- No fire protection is provided by individual on-site water supplies.
- Overall operation and maintenance of the supplies is not provided to ensure periodic water quality testing and routine maintenance is being performed.

Estimated Costs

Drilling an individual well for a residential use typically runs $5,000 to $10,000 depending on the depth and the needed water demands. The annual operation and maintenance costs for operating the well will be the responsibility of each property owner.

5.2.2.2. Community Wells – Public water Supply

The majority of the existing 46 properties have on-site water supply and these water supplies could be abandoned. A public water supply would provide domestic and fire flows to serve the Historic Village. This public water system would consist of a drilled well or wells, storage reservoir, distribution piping, fire hydrants, and water services. A preliminary layout for this alternative is provided on Figure 7.

The well logs for this area were obtained from the State Water Supply Division and were reviewed to determine the approximate depth and yields of the existing wells. The depths varied from 100' to 400' and several wells indicated high yields of 50 to

150 gpm. A new well or wells would be required to produce approximately 50 gpm to comply with the 2025 projected water demands. No test data was available on the water quality to determine if treatment would be required.

A new storage reservoir would be required to provide both domestic and fire flows. The reservoir would be constructed at an elevation which maintains a minimum pressure of 35 psi throughout the distribution system. A needed fire flow demand up to 2,500 gpm would be required, so a storage volume of approximately 350,000 gallons would provide storage for both domestic and fire flow demands.

Distribution piping located in the public right-of-way will transport the water from the well and/or reservoir to the users. The piping would be a minimum 8" diameter and include fire hydrants at the needed spacing. Individual water services are provided to the edge of right-of-way and water meters provided in each building.

Advantages

- Use of a public water system provides greater flexibility in implementing on-site wastewater disposal alternatives.
- Fire protection is provided throughout the distribution system.
- Overall operation and maintenance of the system is provided to ensure periodic water quality testing and routine maintenance is being performed.

Disadvantages

- Several wells in this area have good yields which can indicate that adequate water supply can be obtained on individual properties, reducing the need for a public water system to meet future demands.
- Extensive infrastructure is required for the new well, storage reservoir, distribution piping, and water services.
- Land purchase is required for the well and storage reservoir.
- The costs to the individual property owners will increase significantly to fund the capital costs and to operate and maintain the system.

Estimated Costs

An overall estimated construction cost can not be developed for this alternative unless further study is performed to identify specific sites for the well and storage reservoir, and a preliminary layout of the distribution system is prepared. Average water rates for a Vermont municipality range from $350 to $400 annually, and include the operation and maintenance and debt retirement.

5.2.2.3. Municipal Interconnection with City of St. Albans

The City of St. Albans operates a water treatment plant located on Route 104 in North Fairfax at the St. Albans Reservoir. Water could be purchased from the City and a new transmission main constructed to transport the treated water to the Historic Village area. A preliminary layout for this alternative is provided on Figure 8. The new transmission main would extend west on Route 104 to Conger Road, continue south on Oakland Station Road to Carpenter Hill Road and continue to Route 7. The total length needed for this transmission main is approximately 5 miles.

The transmission main transports the water to a new storage reservoir to provide both domestic and fire flows. The reservoir would be constructed at an elevation which maintains a minimum pressure of 35 psi throughout the distribution system. A needed fire flow demand up to 2,500 gpm would be required, so a storage volume of approximately 350,000 gallons would provide storage for both domestic and fire flow demands.

Distribution piping located in the public right-of-way will transport the water from the transmission main and reservoir to the users. The piping would be a minimum 8" diameter and include fire hydrants at the needed spacing. Individual water services are provided to the edge of right-of-way and water meters provided in each building.

Advantages

- Use of a public water system provides greater flexibility in implementing on-site wastewater disposal alternatives.
- Fire protection is provided throughout the distribution system.
- Overall operation and maintenance of the system is provided to ensure periodic water quality testing and routine maintenance is being performed.
- Drilling and land purchase for a new water supply is not required.
- The water is purchased as needed, typically reducing the annual operation and maintenance costs.
- The City of St. Albans is the closest point to the Historic Village for a municipal water connection.

Disadvantages

- Several wells in this area have good yields which indicate that adequate water supply can be obtained on individual properties, reducing the need for a public water system to meet future demands.

- Extensive infrastructure is required for the new transmission main, storage reservoir, distribution piping, and water services.
- Land purchase is required for the storage reservoir.
- The costs to the individual property owners will increase significantly to fund the capital costs, and to operate and maintain the system.

Estimated Costs

An overall estimated construction cost can not be developed for this alternative unless further study is performed to identify specific sites for the storage reservoir. To implement this alternative, payment of a connection fee to the City of St. Albans will be required. Water will be purchased as needed, so the annual operation and maintenance costs will include buying the water, operating and maintaining the distribution system, and debt retirement.

5.2.2.4. Municipal Interconnection With Champlain Water District

Champlain Water District currently supplies water to the Town of Milton distribution system. Water could be purchased from the Champlain Water District and a new transmission main constructed to transport the treated water to the Historic Village area. A preliminary layout for this alternative is shown on Figure 8. The new transmission main would begin at Lake Road in Milton, extend north on Route 7, cross Interstate 89, and continue north on Route 7 to the Historic Village. The total length required for this transmission main is approximately 6 miles.

The transmission main transports the water to a new storage reservoir to provide both domestic and fire flows. The reservoir would be constructed at an elevation which maintains a minimum pressure of 35 psi throughout the distribution system. A needed fire flow demand up to 2,500 gpm would be required, so a storage volume of approximately 350,000 gallons would provide storage for both domestic and fire flow demands.

Distribution piping located in the public right-of-way will transport the water from the transmission main and reservoir to the users. The piping would be a minimum 8" diameter and include fire hydrants at the needed spacing. Individual water services are provided to the edge of right-of-way and water meters provided in each building.

Advantages

- Use of a public water system provides greater flexibility in implementing on-site wastewater disposal alternatives.
- Fire protection is provided throughout the distribution system.
- Overall operation and maintenance of the system is provided to ensure periodic water quality testing and routine maintenance is being performed.
- Drilling and land purchase for a new water supply is not required.
- The water is purchased as needed, typically reducing the annual operation and maintenance costs.

Disadvantages

- Several wells in this area have good yields which indicate that adequate water supply can be obtained on individual properties, reducing the need for a public water system to meet future demands.
- Extensive infrastructure is required for the new transmission main, storage reservoir, distribution piping, and water services.
- Land purchase is required for the storage reservoir.
- The costs to the individual property owners will increase significantly to fund the capital costs, and to operate and maintain the system.
- The end of the existing waterline in the Town of Milton is farther away from the Historic Village than the City of St. Albans for a municipal water connection.

Estimated Costs

An overall estimated construction cost can not be developed for this alternative unless further study is performed to evaluate the waterline extension. A hydraulic analysis needs to be performed to determine if any distribution system upgrades are required in Milton and addition of booster pumping is required.

To implement this alternative, payment of a connection fee to the Town of Milton may be required. Water will purchased as needed, so the annual operation and maintenance costs will include buying the water, operating and maintaining the distribution system, and debt retirement. Typical water rates for municipalities connected to the CWD supply are $150 to $200 annually.

5.3. Wastewater Disposal

5.3.1. Projected Wastewater Flows

For the purposes of this feasibility study, a planning duration of twenty (20) years is typically used. The build-out analysis includes both existing and future development, so the existing wastewater flows were estimated based on the needs assessment. A total of 46 properties were identified in this study area and include a mix of residential, commercial, and institutional uses. The Georgia Elementary and Middle School is the single largest user with an estimated wastewater flow of 10,200 gpd. For all of the existing properties, the wastewater flow was estimated at 18,400 gpd.

The population projection for Georgia of 2% annually was used to project the wastewater flows to 2025. The Vermont Environmental Protection Rules (EPR's) were used to project the future wastewater flows for each use category. The residential use category was assumed to be a single family residential unit at 245 gpd per unit. A detailed breakdown was not available for the commercial uses, so an allowance of 450 gpd per acre was assumed. Once more specific information is available on the commercial uses, the flows can be adjusted accordingly. The 2025 projected wastewater flows for the Historic Village are 31,000 gpd as summarized in Table 8.

5.3.2. Evaluation of Alternatives

5.3.2.1. Individual On-Site

The existing 46 properties have on-site wastewater systems. The needs assessment indicated that 37 of the properties are recommended for an on-site solution and 9 properties are recommended for an off-site solution based on the environmental assessment results. The majority of the properties identified for an off-site approach are small lots restricted by area.

For this approach, the on-site subsurface systems would continue to be used. The existing developed properties would utilize a conventional subsurface, mound system, or best fix depending on the soil suitability.

Georgia Elementary and Middle School has the largest existing subsurface wastewater system in the Historic Village. The system is operated under an Indirect Discharge Permit (ID-9-0094-1A) for two separate subsurface disposal systems. System B has a permitted design capacity of 6,000 gpd and serves Building B. System C has permitted design capacity of 11,250 gpd and serves Building C. The type and size of the wastewater disposal system for Building C is unknown since the system was designed and constructed prior to the implementation of the Indirect Discharge Rules. In July 2004 a failure of System C occurred, so effluent from Building C can now be diverted to System B while school is in session.

For new development, the type of disposal system will be determined by the projected wastewater flows and other environmental constraints. Depending on the soil suitability, the use may be restricted for specific properties if only an on-site approach is available.

Advantages

- The installation and operation and maintenance costs are the responsibility of each individual property owner.
- Use of individual on-site systems requires less infrastructure by eliminating pumping systems, low pressure sewers, and disposal areas.

Disadvantages

- The majority of the soils in the Historic Village are not suitable for a conventional subsurface system. Mound systems are required for most of the properties.
- Depending on the soil suitability, the use may be restricted for specific properties if only an on-site approach is available.
- The use of individual on-site wastewater disposal can be limited if a public water supply is not provided.
- No options are available for off-site disposal.
- Overall operation and maintenance of the systems is not provided to ensure routine maintenance is being performed.

Estimated Costs

For a residential use, a typical on-site system can range from $7,500 to $38,000 depending on the soil suitability and other site constraints. The annual operation and maintenance costs for operating the system will be the responsibility of each property owner.

5.3.2.2. Individual On-Site and Off-Site Community Cluster Systems

The existing 46 properties have on-site wastewater systems. The needs assessment indicated that 37 of the properties are recommended for an on-site solution and 9 properties are recommended for an off-site solution based on the environmental assessment results. The majority of the properties identified for an off-site approach are small lots restricted by area.

For this approach, the on-site subsurface systems would continue to be used to the extent possible. The existing developed properties would utilize a conventional subsurface, mound system, or best fix depending on the soil suitability.

For existing properties and new development which require off-site disposal, community cluster systems would be provided. Suitable soils for conventional subsurface were identified at three (3) accessible locations in the vicinity of the Historic Village. The first site is located north of the Georgia schools, the second site is located south of Plains Road, and the third site is located south along Route 7. The locations of each potential disposal area are shown on Figure 9.

Disposal area #1 is partially located on the school property and at least four (4) other properties. The soils at this location are identified as Copake Fine Sandy Loam (CpB). A stream dissects the area of suitable soils, limiting the space available for a subsurface disposal system. This site would likely be preserved for the school and properties located at the north end of the Historic Village.

Disposal area #2 is located south of Plains Road on two (2) properties. The soils at this location are identified as St. Albans Slaty Loam (SaB) and Windsor Loamy Fine Sand (WsB). A stream outlets from the southwest corner of this area. This site could serve the area west of Route 7 and Plains Road.

Disposal area #3 is located south along Route 7 just outside the Historic Village. The soils at this location are identified as St. Albans Slaty Loam (SaC). Route 7 bisects this location and some of the properties are currently developed. The slopes in this area are noted to range from 8 to 15 percent making it more difficult to site a subsurface disposal area.

Advantages

- Use of individual on-site systems in requires less infrastructure by eliminating pumping systems, low pressure sewers, and disposal areas.
- Options are available for off-site disposal.
- A management program could be developed to provide routine maintenance for both the on-site and off-site subsurface disposal systems.

Disadvantages

- The majority of the soils in the Town Center are not suitable for a conventional subsurface system. Mound systems are required for most of the properties.

Estimated Costs

For a residential use, a typical on-site system can range from $7,500 to $38,000 depending on the soil suitability and other site constraints.

An overall estimated construction cost can not be developed for this alternative until the properties served by each potential off-site disposal area are identified and a conceptual layout for a collection system and disposal area is prepared.

The operation and maintenance costs for each individual on-site system can be the responsibility of each landowner or the Town could develop a management structure to take overall responsibility for the operation and maintenance of all on-site and off-site subsurface disposal systems.

5.3.2.3. Municipal Connection

Wyeth Nutritionals currently operates a permitted wastewater treatment facility located in the Georgia Industrial Park. Additional information and detail is provided for this approach under the wastewater alternatives for the Town Center. If the Town has the ability to utilize this facility, the Historic Village could be interconnected with a Town Center municipal sewer collection system. A preliminary layout of this alternative is shown on Figure 10.

A sewer system located in the public right-of-way will collect and transport the wastewater to a major pumping station located at a low point in the Historic Village. All of the wastewater would be pumped in a new force main which would extend south along Route 7, cross Interstate 89 and discharge to a Town Center sewer collection system. The sewer system piping in the Historic Village would be a minimum 8" diameter and include manholes for access and maintenance. Individual sewer services are provided to the edge of right-of-way for each property.

Advantages

- Use of a municipal wastewater system provides greater flexibility in utilizing and protecting individual on-site water supplies.
- Overall operation and maintenance of the system is provided to ensure routine maintenance is being performed.
- Land purchase for off-site community disposal systems is not required.
- Excess sewer capacity would be available for future development of the properties and not limited by the soils suitability.

- The Georgia Middle and Elementary School could be connected, eliminating the problematic subsurface disposal system.
- The force main extension from the Historic Village to the Town Center can be used to limit sewer connections and future development along the Route 7 corridor.

Disadvantages

- Extensive infrastructure is required for the new sewer collection system, pumping station, and force main.
- The costs to the individual property owners will increase significantly to fund the capital costs, and to operate and maintain the system.

Estimated Costs

Further study must be performed to evaluate the preliminary collection system layout and force main extension to the Town Center to develop an overall estimated construction cost. In addition, there will be other costs associated with the purchase of treatment capacity and upgrade at the Wyeth Nutritionals treatment facility.

Average sewer rates for a Vermont municipality range from $350 to $400 annually, and include operation and maintenance and debt retirement.

6. TOWN CENTER

6.1. Build-out Analysis

The document entitled "Georgia Village Plan, A Vision for the Future", dated April 2003, was initially used to evaluate the future water demands and projected wastewater flows. Under Option #2, the planning information provided in this document was based on a full build-out analysis which can take 50 to 100 years to implement. The residential and commercial units projected at full build-out are summarized in Table 9. This build-out analysis includes both existing and future development for the residential and commercial uses.

6.2. Water Supply

6.2.1. Projected Water Demands

For the purposes of this feasibility study, a planning duration of twenty (20) years is typically used. The build-out analysis includes both existing and future development, so the existing water demands were estimated based on the needs assessment. A total of 118 properties were identified in this study area and include a mix of residential, commercial, and institutional uses. For all of the existing properties, the average daily water demand was estimated at 18,300 gpd.

The population projection for Georgia of 2% annually was used to project the water demands to 2025. The Vermont Water Supply Rules Design Criteria were used to project the future average day water demands for each use category. The residential use category was assumed to be a mix of multiple and single family dwellings with an average of two (2) bedrooms and two (2) people per bedroom. A detailed breakdown was not available for the commercial uses, so an allowance of 450 gpd per acre was assumed. Once more specific information is available on the commercial uses, the demands can be adjusted accordingly. The 2025 projected average day water demands for the Town Center are 163,000 gpd as summarized in Table 10.

6.2.2. Evaluation of Alternatives

6.2.2.1. Individual Wells and Other Supplies

The majority of the existing 118 properties have on-site water supply. These water supplies typically consist of individual wells, dug (shallow) wells, springs, and other types of supplies. The well logs for this area were obtained from the State Water Supply Division and were reviewed to determine the approximate depth and yields of the existing wells. The depths varied from 100' to 500' and several wells indicated high yields of 40 to 100 gpm. No test data was available on the water quality to determine if treatment would be required.

Advantages

- Several wells in this area have good yields which indicate that adequate water supply can be obtained on individual properties.
- The installation and operation and maintenance costs are the responsibility of each individual property owner.
- Use of individual on-site wells requires significantly less infrastructure by eliminating storage tanks, distribution piping, and other appurtenances.

Disadvantages

- The use of on-site wells and minimum isolation distances can limit the options for subsurface wastewater disposal on smaller properties.
- No fire protection is provided by individual on-site water supplies.
- Overall operation and maintenance of the supplies is not provided to ensure periodic water quality testing and routine maintenance is being performed.

Estimated Costs

Drilling an individual well for a residential use typically runs $5,000 to $10,000 depending on the depth and the needed water demands. The annual operation and maintenance costs for operating the well will be the responsibility of each property owner.

6.2.2.2. Community Wells – Public Water Supply

The majority of the existing 118 properties have on-site water supply and these water supplies could be abandoned. A public water supply would provide domestic and fire flows to serve the Town Center. This public water system would consist of a drilled well or wells, storage reservoir, distribution piping, fire hydrants, and water services. A preliminary layout for this alternative is provided on Figure 11.

The well logs for this area were obtained from the State Water Supply Division and were reviewed to determine the approximate depth and yields of the existing wells. The depths varied from 100' to 500' and several wells indicated high yields of 40 to 100 gpm. A new well or wells would be required to produce approximately 250 gpm to comply with the 2025 projected water demands. No test data was available on the water quality to determine if treatment would be required.

A new storage reservoir would be required to provide both domestic and fire flows. The reservoir would be constructed at an elevation which maintains a minimum pressure of 35 psi throughout the distribution system. A needed fire flow demand up to 2,500 gpm would be required, so a storage volume of approximately 450,000 gallons would provide storage for both domestic and fire flow demands.

Distribution piping located in the public right-of-way will transport the water from the well and/or reservoir to the users. The piping would be a minimum 8" diameter and include fire hydrants at the needed spacing. Individual water services are provided to the edge of right-of-way and water meters provided in each building.

Advantages

- Use of a public water system provides greater flexibility in implementing on-site wastewater disposal alternatives.
- Fire protection is provided throughout the distribution system.
- Overall operation and maintenance of the system is provided to ensure periodic water quality testing and routine maintenance is being performed.

Disadvantages

- Several wells in this area have good yields which can indicate that adequate water supply can be obtained on individual properties reducing the need for a public water system to meet future demands.
- Extensive infrastructure is required for the new well, storage reservoir, distribution piping, and water services.
- Land purchase is required for the well and storage reservoir.
- The costs to the individual property owners will increase significantly to fund the capital costs and to operate and maintain the system.

Estimated Costs

An overall estimated construction cost can not be developed for this alternative unless further study is performed to identify specific sites for the wells and storage reservoir, and a preliminary layout of the distribution system is performed. Average water rates for a Vermont municipality range from $350 to $400 annually, and include the operation and maintenance and debt retirement.

6.2.2.3. South Georgia Fire District #1

The South Georgia Fire District No. 1 provides water supply to the area along Route 7 north of the Milton Town line and south of Interstate 89 as shown on Figure 11. Existing wells produce a combined yield of approximately 84 gpm and 55,000 gallons of storage is provided. The distribution system serves approximately 160 existing users with future plans to expand to 190 users. The average daily demands are 33,600 gpd and limited capacity is available for expansion. A distribution system consisting of small size pipelines provides only domestic water supply.

Advantages

- Use of a public water system provides greater flexibility in implementing on-site wastewater disposal alternatives.
- Overall operation and maintenance of the system is provided to ensure periodic water quality testing and routine maintenance is being performed.

Disadvantages

- No fire protection is provided by this public water system.
- Additional source capacity is not available for future expansion.
- The distribution system consists of small sized pipelines of various pipe materials.
- The storage reservoir has limited capacity to meet the current and future needs.

Estimated Costs

An overall estimated construction cost can not be developed for this alternative since this existing water system has limited capacity available for expansion and would be unable to provide the future needs of the Town Center.

6.2.2.4. Municipal Interconnection with City of St. Albans

The City of St. Albans operates a water treatment plant located on Route 104 in North Fairfax at the St. Albans Reservoir. Water could be purchased from the City and a new transmission main constructed to transport the treated water to the Town Center area. A preliminary layout for this alternative is provided on Figure 12. The new transmission main would extend west on Route 104 to Conger Road, continue south on Oakland Station Road to Route 7, cross Interstate 89, and extend south to the Town Center area. The total length required for this transmission main is approximately 6 miles.

The transmission main transports the water to a new storage reservoir to provide both domestic and fire flows. The reservoir would be constructed at an elevation which maintains a minimum pressure of 35 psi throughout the distribution system. A needed fire flow demand up to 2,500 gpm would be required, so a storage volume of approximately 450,000 gallons would provide storage for both domestic and fire flow demands.

Distribution piping located in the public right-of-way will transport the water from the transmission main and reservoir to the users. The piping would be a minimum 8" diameter and include fire hydrants at the needed spacing. Individual water services are provided to the edge of right-of-way and water meters provided in each building.

Advantages

- Use of a public water system provides greater flexibility in implementing on-site wastewater disposal alternatives.
- Fire protection is provided throughout the distribution system.
- Overall operation and maintenance of the system is provided to ensure periodic water quality testing and routine maintenance is being performed.
- Drilling and land purchase for a new water supply is not required.
- The water usage is metered and is purchased as needed, typically reducing the annual operation and maintenance costs.

Disadvantages

- Several wells in this area have good yields which can indicate that adequate water supply can be obtained on individual properties, reducing the need for a public water system to meet future demands.
- Extensive infrastructure is required for the new transmission main, storage reservoir, distribution piping, and water services.
- Land purchase is required for the storage reservoir.
- The costs to the individual property owners will increase significantly to fund the capital costs, and to operate and maintain the system.
- The City of St. Albans supply is farther from the Town Center than the Milton distribution system and CWD supply for a municipal water connection.

Estimated Costs

An overall estimated construction cost can not be developed for this alternative unless further study is performed to identify specific sites for the storage reservoir. To implement this alternative, payment of a connection fee to the City of St. Albans will be required. Water will purchased as needed, so the annual operation and maintenance costs will include buying the water, and operating and maintaining the distribution system, and debt retirement.

6.2.2.5. *Municipal Interconnection with Champlain Water District*

Description

Champlain Water District currently provides water to the Town of Milton and other member communities. Water could be purchased from the Champlain Water District and a new transmission main constructed to transport the treated water to the Town Center area. A preliminary layout for this alternative is shown on Figure 12. The new transmission main would begin at Lake Road in Milton and extend north on Route 7 to the Town Center. The total length of this transmission main is approximately 3 miles

The transmission main transports the water to a new storage reservoir to provide both domestic and fire flows. The reservoir would be constructed at an elevation which maintains a minimum pressure of 35 psi throughout the distribution system. A needed fire flow demand up to 2,500 gpm would be required, so a storage volume of approximately 450,000 gallons would provide storage for both domestic and fire flow demands.

Distribution piping located in the public right-of-way will transport the water from the well and/or reservoir to the users. The piping would be a minimum 8" diameter and include fire hydrants at the needed spacing. Individual water services are provided to the edge of right-of-way and water meters provided in each building.

Advantages

- Use of a public water system provides greater flexibility in implementing on-site wastewater disposal alternatives.
- Fire protection is provided throughout the distribution system.
- Overall operation and maintenance of the system is provided to ensure periodic water quality testing and routine maintenance is being performed.
- Drilling and land purchase for a new water supply is not required.

- The water usage is metered and is purchased as needed, typically reducing the annual operation and maintenance costs.
- The end of the existing waterline in the Town of Milton is closer to the Town Center for a municipal connection.

Disadvantages

- Several wells in this area have good yields which can indicate that adequate water supply can be obtained on individual properties, reducing the need for a public water system to meet future demands.
- Extensive infrastructure is required for the new transmission main, storage reservoir, distribution piping, and water services.
- Land purchase is required for the storage reservoir.
- The costs to the individual property owners will increase significantly to fund the capital costs, and to operate and maintain the system.
- Upgrades may be required to the Town of Milton distribution system.

Estimated Costs

An overall estimated construction cost can not be developed for this alternative unless further study is performed to evaluate the waterline extension. A hydraulic analysis needs to be performed to determine if any distribution system upgrades are required in Milton and addition of booster pumping is required.

To implement this alternative, payment of a connection fee to the Town of Milton may be required. Water will purchased as needed, so the annual operation and maintenance costs will include buying the water, operating and maintaining the distribution system, and debt retirement. Average water rates for municipalities connected to the CWD supply are $150 and $200 annually.

6.3. Wastewater Disposal

6.3.1. Projected Wastewater Flows

For the purposes of this feasibility study, a planning duration of twenty (20) years is typically used. The build-out analysis includes both existing and future development, so the existing wastewater flows were estimated based on the needs assessment. A total of 118 properties were identified in this study area and include a mix of residential, commercial, and institutional uses. For all of the existing properties, the wastewater flow was estimated at 18,300 gpd.

The population projection for Georgia of 2% annually was used to project the wastewater flows to 2025. The Vermont Environmental Protection Rules (EPR's) were used to project the future wastewater flows for each use category. The residential use category was assumed to be a single family residential unit at 245 gpd per unit. A detailed breakdown was not available for the commercial uses, so an allowance of 450 gpd per acre was assumed. Once more specific information is available on the commercial uses, the flows can be adjusted accordingly. The 2025 projected wastewater flows for the Town Center are 138,000 gpd as summarized in Table 11.

6.3.2. Evaluation of Alternatives

6.3.2.1. Individual On-Site

Description

The existing 118 properties which are developed have on-site wastewater systems. The needs assessment indicated that 80 of the properties are recommended for an on-site solution and 38 properties are recommended for an off-site solution based on the environmental assessment results. The majority of the properties identified for an off-site approach are restricted by depth to groundwater.

For this approach, the on-site subsurface systems would continue to be used. The existing developed properties would utilize a conventional subsurface, mound system, or best fix depending on the soil suitability.

For new development, the type of disposal system will be determined by the projected wastewater flows and other environmental constraints. Depending on the soil suitability, the use may be restricted for specific properties if only an on-site approach is available.

Advantages

- The installation and operation and maintenance costs are the responsibility of each individual property owner.
- Use of individual on-site systems requires less infrastructure by eliminating pumping systems, low pressure sewers, and disposal areas.

Disadvantages

- The majority of the soils in the Town Center are not suitable for a conventional subsurface system. Mound systems are required for most of the properties.
- Depending on the soil suitability, the use may be restricted for specific properties if only an on-site approach is available.
- The use of individual on-site wastewater disposal can be limited if a public water supply is not provided.
- No options are available for off-site disposal.
- Overall operation and maintenance of the systems is not provided to ensure routine maintenance is being performed.

Estimated Costs

For a residential use, a typical on-site system can range from $7,500 to $38,000 depending on the soil suitability and other site constraints. The annual operation and maintenance costs for operating the system will be the responsibility of each property owner.

6.3.2.2. Individual On-Site and Off-Site Community Cluster Systems

The existing properties which are developed have on-site wastewater systems. The needs assessment indicated that 80 of the properties are recommended for an on-site solution and 38 properties are recommended for an off-site solution based on the environmental assessment results. The majority of the properties identified for an off-site approach are small lots restricted by area.

For this approach, the on-site subsurface systems would continue to be used to the extent possible. The existing developed properties would utilize a conventional subsurface, mound system, or best fix depending on the soil suitability.

For existing properties and new development which require off-site disposal, community cluster systems would be provided. Suitable soils for conventional subsurface were identified at multiple locations in the proximity of the Town Center as shown on Figure 13. The soils at these locations are identified as Windsor Loamy Fine Sands (Ws) with typical slopes of 0 to 8 percent.

Advantages

- Use of individual on-site systems requires less infrastructure by eliminating pumping systems, low pressure sewers, and disposal areas.

- Options are available for off-site disposal.
- A management program could be developed to provide routine maintenance for both the on-site and off-site subsurface disposal systems.

Disadvantages

- The majority of the soils in the Town Center are not suitable for a conventional subsurface system. Mound systems are required for most of the properties.

Estimated Costs

For a residential use, a typical on-site system can range from $7,500 to $38,000 depending on the soil suitability and other site constraints.

An overall estimated construction cost can not be developed for this alternative until the properties served by each potential off-site disposal area are identified and a conceptual layout for a collection system and disposal area is prepared.

The operation and maintenance costs for each individual on-site system can be the responsibility of each landowner or the Town could develop a management structure to take overall responsibility for the operation and maintenance of all on-site and off-site subsurface disposal systems.

6.3.2.3. Wyeth Nutritional Wastewater Treatment Facility

Description

Wyeth Nutritionals currently operates a wastewater treatment facility located in the Georgia Industrial Park and this facility is operated under Discharge Permit #3-1209, effective July 1, 2002. Prior to late 1999, this facility received process wastewater from the Wyeth facility and the Vermont Whey Company. Since the closing of Vermont Whey, the flows and loadings have decreased significantly. The wastewater treatment process has been modified as a result of the decreased loadings.

The overall treatment process consists of a two stage activated sludge treatment system followed by clarification, chemical precipitation for phosphorus removal, and filtration prior to discharge. The aerated lagoon system and one of the two aeration tanks have been taken off-line and abandoned. The Wyeth waste stream is pumped to a 35,000 gallon equalization tank, flows by gravity to a 1,000,000 gallon aeration tank, and continues to a secondary clarifier. Aluminum sulfate is injected into the secondary clarifier effluent for phosphorus removal in the precipitation clarifier. The clarifier effluent is then pumped through three (3) continuous upflow sand filters operating in parallel prior to discharge to Arrowhead Lake.

The effluent limitations are based on the discharge of treated whey processing wastewater. Flow is limited to a monthly average of 0.425 mgd and a maximum day of 0.460 mgd. A summary of the flows from January 2003 though May 2004 is provided in Table 12. The monthly average flow is 0.100 mgd and a maximum day flow of 0.278 mgd was recorded.

Up to 325,000 gpd of permitted flow capacity is potentially available. Since the facility only receives treated whey processing wastewater, use of the facility for treatment of domestic wastewater would need to be addressed with the State as a change in the permit conditions. Evaluation of the treatment process would need to be performed to identify any upgrades required to handle the increase flow and loadings to ensure compliance with the permitted effluent limitations.

A sewer collection system would be constructed to serve the Town Center area. Existing on-site subsurface systems would be abandoned in areas which do not have suitable soils. Mainline sewers located in the public right-of-way will collect and transport the wastewater to a main pump station which discharges the flow in a sewer forcemain to the existing wastewater treatment facility. A preliminary layout for this alternative is shown on Figure 14.

Advantages

- Use of a municipal wastewater system provides greater flexibility in utilizing and protecting individual on-site water supplies.
- Overall operation and maintenance of the system is provided to ensure routine maintenance is being performed.
- Land purchase for off-site community disposal systems is not required.
- Sewer capacity would be available for future development in areas of greater density and is not limited by the soil suitability.
- Existing properties with disposal systems in areas of unsuitable soils can be connected to the new collection system.
- Excess flow capacity is available at the Wyeth treatment facility which allows use of an existing permitted Discharge.

- If additional capacity is available and the infrastructure is in-place, municipal sewer service could be extended to the Historic Village in the future.

Disadvantages

- Extensive infrastructure is required for the new sewer collection system, pumping stations, and force main.
- Upgrades may be required to the Wyeth treatment facility to accommodate the additional flow and loadings.
- The costs to the individual property owners will increase significantly to fund the capital costs, and to operate and maintain the system.
- Significant areas of suitable soils for on-site and off-site subsurface disposal are located in the vicinity.

Estimated Costs

An overall estimated construction cost can not be developed for this alternative unless further study is performed to evaluate the preliminary collection system layout.

7. NEXT STEPS

7.1. Historic Village

7.1.1. Water Supply

- Continue to utilize the on-site individual water supplies.
- Further investigation for a public water supply is a low priority since the existing properties will continue to be served by individual on-site wells.

7.1.2. Wastewater Disposal

- The wastewater disposal approach will need to be a combination of individual on-site and off-site community cluster systems. The off-site locations identified with suitable soils for conventional subsurface disposal should be further investigated to determine the site capacities and potential for future wastewater disposal.

7.2. Town Center

7.2.1. Water Supply

- The municipal connection with the Town of Milton and Champlain Water District should be studied. A preliminary engineering study needs to be prepared and could be funded through a municipal planning grant. A detailed hydraulic analysis need to be performed to: identify any upgrades required to the Town of Milton distribution system, determine if booster pumping is required, verify the transmission main size, and select a potential storage reservoir site. Once a detailed layout of the required infrastructure is completed, the estimated construction costs and a total project cost can be developed.

7.2.2. Wastewater Disposal

- The Town should initiate discussions with the new owner of the Wyeth Nutritionals to develop an agreement to purchase uncommitted treatment capacity. If the negotiations proceed successfully, an engineering evaluation of the existing treatment facility needs to be performed to identify the required upgrades and costs associated with utilizing the existing facility and modifying the Discharge Permit. This engineering evaluation could be funded through a municipal planning grant.
- If the use of Wyeth Nutritionals treatment facility is not available as an option, then the wastewater disposal approach will need to be a combination of individual on-site and off-site community cluster systems.

The off-site locations identified with suitable soils for conventional subsurface disposal should be further investigated to determine the site capacities and potential for future wastewater disposal.

8. PROJECT FINANCING

At the feasibility level phase, existing municipal water and wastewater funding programs are identified for the Historic Village and Town Center growth areas. Actual pursuit of grants and loans do not occur until near the end of the preliminary engineering phase, the next step in the Town of Georgia's planning process. Different funding sources may be utilized for each separate growth center to address the future infrastructure needs.

Project financing is a dynamic and evolving process. Municipalities work with State and Federal Officials in an effort to acquire the maximum amount of grants. Georgia, during the next project phase, will begin working with the appropriate State and Federal Officials to acquire the maximum possible grants.

8.1. Water Supply

8.1.1. Funding Sources

There are several common sources of grant and loan funding for municipal projects. More detailed evaluation of the applicability of these sources will be made in the next planning phase, preliminary engineering. The State of Vermont (DEC) and USDA Rural Development (RD) have programs that can provide grants and loans on eligible municipal water projects, providing the various funding program requirements are satisfied.

A summary of the most common water funding sources area:

VT Department of Environmental Conservation: DWSRF (State Revolving Fund) Loans – Water Supply Division

The State Water Supply Division (WSD) offers several different types of funding sources on similar projects for planning, design, and construction. Depending on eligibility and ability to pay, the State offers low interest loans through the Drinking Water State Revolving Loan Fund (DWSRF) with interest rates ranging from –3% to +3% and with terms ranging from 20 to 30 years. The State of VT Median Household Income (MHI) based on the 2000 census is $40,368 and is $45,409 adjusted for inflation since 2000. Based on the Town of Georgia's MHI, the best funding option available from the State is a DWSRF loan at an interest rate of +3%. The term of 20 or 30 years will be dependent on the total project cost and impact on the water rates.

U.S. Department of Agriculture, Rural Development (USDA-RD) Loans and Grants:

Awards may be made on qualifying municipal water projects to municipalities under 10,000 in population. Loan and grant amounts are based upon the municipality's medium household income from the 2000 census and the estimated equivalent user cost for the chosen water project. The RD loan % value is re-evaluated every quarter and is subject to change on a quarterly basis. The Town of Georgia's 2000 census medium household income is $54,156, which is above RD's intermediate rate. Being above the intermediate rate, the water project does not qualify for RD grant funding. However, an income survey of households in the area will provide additional and more specific information regarding incomes in the service area. The project still may qualify for an RD loan.

8.2. Wastewater Disposal

8.2.1. Funding Sources

There are several common sources of grant and loan funding for municipal projects. More detailed evaluation of the applicability of these sources will be made in the next planning phase, preliminary engineering. However, the Town has already begun involving the Vermont Department of Environmental Conservation (DEC), Facilities Engineering Division in the Town of Georgia project. Mr. Robisky is currently working with Town's consultant team. The DEC and USDA Rural Development (RD) have programs that can provide grants and loans on eligible municipal wastewater projects, providing the various funding program requirements are satisfied. All grant and loan recipients must be a municipal entity and nearly all past projects receiving grant and loan funding have served a municipal growth center.

A summary of the most common wastewater funding sources are:

1. VT Department of Environmental Conservation: SRF (State Revolving Fund) Loans - Pollution Control (24 V.S.A. Chapter 120)

Awards can be made to municipalities on pollution control related work for planning, design or construction. The Town of Georgia has received a "planning advance" loan for funding the wastewater portion of this project. The planning advance does not have to be repaid to the State if the project is not constructed. However, should the project continue into the next phase, it is likely the source of planning funds will be the SRF program. Planning loans are interest-free but construction loans carry a 2% administration fee. The construction loans are repaid in equal annual payments over a term of up to 20 years. Loan repayments are returned to the revolving fund for subsequent use as new loans. This funding source is the Clean Water Act, State/EPA Revolving Loan Fund – or CWSRF. Loans are used to help finance the local share of the project. A local bond vote typically secures the loan funding.

2. VT Department of Environmental Conservation: 35% Grant - Dry Weather Pollution Abatement (10 V.S.A. Chapter 1625)

Awards may be made to municipalities for the planning and construction of facilities which purpose is the abatement of dry-weather pollution. This may include interceptor and collection sewers, pump stations, sewage treatment facilities, outfall sewers, and subsurface disposal treatment and disposal systems. This grant is normally not implemented unless there is tandem State or Federal grant/loan funding for the project. This grant requires the identification of points of pollution to document these sources of pollution to the surface waters of the State. A State Facilities Engineering Division engineer will inspect the potential points of pollution to determine eligibility for State funding.

3. U.S. Department of Agriculture, Rural Development (USDA-RD) Loans and Grants:

Awards may be made on qualifying municipal wastewater projects to municipalities under 10,000 in population. Loan and grant amounts are based upon the municipality's medium household income from the 2000 census and the estimated equivalent user cost for the chosen wastewater project. The RD loan % value is re-evaluated every quarter and is subject to change on a quarterly basis. The Town of Georgia's 2000 census medium household income is $54,156, which is above RD's intermediate rate. Being above the intermediate rate, the wastewater project does not qualify for RD grants funding. However, an income survey of households in the area will provide additional and more specific information regarding incomes in the service area. The project still may qualify for an RD loan.

4. VT Department of Housing and Community Affairs, Community Development Block Grant Program (Vermont Community Development Program - VCDP):

Awards are based on a very competitive process. Wastewater projects which meet VCDP benefit requirements, (51% of persons benefiting must be low to moderate (low-mod) income eligible), can apply for the implementation grant.

Implementation grants range from $50,000 to a maximum of $750,000. A special multi-year grant option can go as high as $1,000,000. VDCP, on a very limited basis, also provides a two-phase grant up to $1,500,000.

5. The U.S. Environmental Protection Agency (EPA), State and Tribal Assistance Grant (STAG):

Each year municipalities work with Vermont's U.S. Senators in an effort to get their wastewater projects into the U.S. Capital Budget for STAG grants. In a typical year, one traditional and one non-traditional STAG grant may be awarded in Vermont. For the Historic Village, the on-site wastewater disposal project would be considered a non-traditional project. For the Town Center, a new collection system and treatment facility would be considered a traditional project. The grants are based on need, and each project must receive the support of the DEC for the U.S. Senators to consider a project for a STAG grant.

8.3. Estimated Costs

8.3.1. Introduction

For selected water and wastewater disposal alternatives discussed in Section 6.0, an opinion of probable cost was prepared. Accurately estimating costs at the level of a feasibility study is difficult due to the limited information available.

Total project cost summaries were not prepared under this feasibility study, but need to be prepared during the next phase of planning. The total project cost typically includes the construction cost, engineering, hydrogeological, permitting, legal, fiscal, administrative, and land costs. If a 10% construction contingency is included, the total project cost is 30 to 40% more than the estimated construction cost.

8.3.2. Historic Village

Water Supply

Several alternatives were evaluated for the water supply, but it is anticipated that this area will continue to utilize the on-site individual wells. Further investigation for a public water supply is a low priority so an opinion of probable cost was not developed for a new water supply.

8.3.3. Wastewater Disposal

A combination of individual on-site and off-site community cluster systems will be the approach for providing the future wastewater disposal needs of the Historic Village service area.

Costs for a typical residential on-site disposal system can range from $7,500 to $38,000 depending on the soil suitability and other site constraints for a residential use. Depending on the management structure implemented by the Town, the annual operation and maintenance costs for the on-site systems may continue to be the responsibility of the landowner.

Three (3) potential areas of suitable soils for disposal were identified as shown on Figure 9 for off-site community cluster systems. For the Disposal Area #2, a preliminary layout for a low pressure sewer system serving the west side of Route 7 was prepared. An estimated cost for the sewer system and wastewater disposal area was developed and a detailed breakdown is provided on Table 13. The opinion of probable cost for this approach is $835,000 based on the following assumptions:

- An ENR cost index of 7298 for February 2005.
- Septic tank effluent pump (STEP) systems are provided for 20 units and include abandonment of existing septic tanks.
- Low pressure sewer services are provided from the STEP system to the right-of-way.
- The wastewater disposal area is based on a system sized for approximately 4,900 gpd.
- Other project costs are not included for engineering and permitting, construction contingency, land purchase, etc.

8.3.4. Town Center

Water Supply

The approach for connection to a municipal system was evaluated further using Champlain Water District since the Milton distribution system is located closest to the Town Center. As shown on Figure 12, a new transmission main would extend north along Route 7 to a new storage reservoir located north of Interstate 89. An estimated cost was prepared for a new meter vault, transmission main, storage reservoir and appurtenances, and a detailed breakdown is provided on Table 14. The opinion of probable cost for this approach is $2,825,000 based on the following assumptions:

- An ENR cost index of 7298 for February 2005.
- A hydraulic analysis has not been performed to verify the size of the transmission main and to determine if booster pumping is required. A cost is not included for the addition of booster pumping.

- Water services for approximately 100 connections are provided within the right-of-way.
- Costs are not included for any upgrades required to the Town of Milton distribution system.
- No subsurface investigation has been performed to verify ledge removal quantities.
- Estimated costs for the storage reservoir are based on a 500,000 gallon above ground steel tank.
- Other project costs are not included for engineering and permitting, construction contingency, land purchase, etc.

Wastewater Disposal

Use of the existing wastewater treatment facility at the Wyeth Nutritional was evaluated further to develop estimated costs. As shown on Figure 14, a new collection system would be constructed to serve the Town Center. Gravity sewers with manholes would collect and transport the wastewater to a main pump station located at the southwest corner of the service area. All of the wastewater will be pumped from this location directly to the Wyeth treatment facility by sewer forcemain. An estimated cost was prepared for the sewer collection system, pump station, and force main, and a detailed breakdown is provided on Table 15. The opinion of probable cost for this approach is $2,525,000 based on the following assumptions:

- An ENR cost index of 7298 for February 2005.
- Sewer services for approximately 100 connections are provided within the right-of-way.
- The costs only include one (1) pump station. Addition of other pump stations will be the responsibility of the individual landowners.
- No subsurface investigation has been performed to verify ledge removal quantities.
- Other project costs are not included for engineering and permitting, construction contingency, land purchase, etc.

Additional costs will be incurred by the Town to purchase treatment and disposal capacity and construct any required upgrades at the Wyeth Nutritional wastewater facility. The wastewater flow projections indicate that the Town will require up to 119,700 gpd of treatment capacity for the Town Center. Depending on the age and condition of the existing facilities, the purchase costs for treatment could range from $3 to $5 per gallon, or $360,000 to $600,000. This purchase cost will be negotiated directly with the facility owner. Purchase of this treatment capacity could be performed annually as the capacity is needed and funded through a sewer connection fee.

In addition, upgrades of the facility may be required to modify the existing Discharge Permit to provide treatment of the domestic wastewater. For the needed capacity, the upgrades could cost an additional $10 to $15 per gallon of capacity. The estimated construction cost for the treatment facility upgrades could range from $1,200,000 to $1,800,000.

8.4. Next Steps

8.4.1. Historic Village

Water Supply

- Continue to utilize the on-site individual water supplies.
- Further investigation for a public water supply is a low priority since the existing properties will continue to be served by individual on-site wells.

Wastewater Disposal

- The wastewater disposal approach will need to be a combination of individual on-site and off-site community cluster systems. The off-site locations identified with suitable soils for conventional subsurface disposal should be further investigated to determine the site capacities and potential for future wastewater disposal.

8.4.2. Town Center

Water Supply

- The municipal connection with the Town of Milton and Champlain Water District should be studied. A preliminary engineering study needs to be prepared and could be funded through a municipal planning grant. A detailed hydraulic analysis need to be performed to: identify any upgrades required to the Town of Milton distribution system, determine if booster pumping is required, verify the transmission main size, and select a potential storage reservoir site. Once a detailed layout of the required infrastructure is completed, the estimated construction costs and a total project cost can be developed.

Wastewater Disposal

- The Town should initiate discussions with the new owner of the Wyeth Nutritionals to develop an agreement to purchase uncommitted treatment capacity. If the negotiations proceed successfully, an engineering evaluation of the existing treatment facility needs to be performed to identify the required upgrades and costs associated with utilizing the existing facility and modifying the Discharge Permit. This engineering evaluation could be funded through a municipal planning grant.

- If the use of Wyeth Nutritionals treatment facility is not available as an option, then the wastewater disposal approach will need to be a combination of individual on-site and off-site community cluster systems. The off-site locations identified with suitable soils for conventional subsurface disposal should be further investigated to determine the site capacities and potential for future wastewater disposal.

9. PROJECT SCHEDULE

In Vermont the typical municipal wastewater project can have up to four (4) distinctive phases, each proceeding phase leading into the next. These four phases are:

1. Feasibility Study
2. STEP I, Preliminary Engineering
   a. STEP I is usually followed by the project's bond vote.
3. STEP II, Preparation of the Final Designs.
   a. Permits are obtained.
   b. Land and rights-of-way are acquired.
4. STEP III, Construction
   a. Bid phase
   b. Construction Phase
   c. 1st Year Warranty Phase

This schedule assumes the Town of Georgia decides to move forward with the project into STEP I and conduct the preliminary engineering in 2005. The follow-on bond vote could then occur at the March 2006 Town Meeting. Following a positive bond vote, the project would proceed into the hydrogeological and aquatic biota special studies in 2006 required on the municipal disposal sites greater than 6,500 gpd. Once State approval was obtained of the wastewater disposal sites, the STEP II final designs and permitting could occur in 2007. If the project proceeded quickly, construction might occur in 2008. Otherwise, the Town is looking at a 2009 construction period. Assuming construction completion in 2010, then the one-year warranty period would be completed in 2011. Operations of the new wastewater system would start in 2009. Although this schedule appears to be drawn out, it reasonably reflects the typical sequence of events in a Vermont wastewater project.