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WATER RESOURCE ENGINEERS

TOWN OF HIGHGATE, VERMONT

Highgate Airport Infrastructure Feasibility Study

May 2020

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1. PROJECT PLANNING

1.1 Introduction

The purpose of the Highgate Airport Infrastructure Study (HAIS) is to evaluate the feasibility of extending water and sewer infrastructure to the Franklin County Airport and nearby properties. The area around the Highgate Airport has been identified through town planning as a desirable site for commercial and industrial development going back to the early 1970's.

1.2 Location

The Town of Highgate is located in Franklin County, in northwestern Vermont, and abuts the Towns of Swanton, Sheldon, and Highgate as well as Lake Champlain and the Canadian province of Quebec. The HAIS study area is located in the southwestern quadrant of town, with the airport itself located just under one mile east from Interstate I-89 and the Village of Swanton. A location map showing the overall location of the study area is included in **Figure 1.**

1.3 Study Area

The study area was divided into two phases. Study area phases are shown in **Figure 2,** and are described below:

1. Phase I extends from near I-89, along Vermont Route 78 to the south end of Airport Road, then north along Airport Road to include the Franklin County Airport and surrounding properties.
2. Phase II extends from the south end of Airport Road, east along Vermont Route 78 for approximately ¾ of a mile.

In addition to the area around the Franklin County Airport, Highgate includes two other population centers. Highgate Center is the historical village district of Highgate and is located approximately two miles past the study area along Route 78. Highgate Springs is located approximately one mile north of the study area. The infrastructure needs of these two areas were not evaluated as part of this study.

1.4 Property Uses

The approximately 64 parcels in the study area include residential, commercial, and light industrial activities. Approximately nine (9) parcels are currently undeveloped. A subdivision is proposed by Jim Harrison within the study area east of the airport (and would include a land swap with the airport) that would add approximately 280,000 square feet of commercial and light-industrial space on seven parcels. Most parcels within the study area are too small, already fully developed, or present too many physical or environmental constraints to offer significant additional development potential, though future in-fill development or expansion is possible. Four parcels, totaling approximately 160 acres could be the site of significant future development.

The Franklin County State Airport consists of a single parcel, where tenants own buildings but lease the land. Property uses within the airport include:

- Several small aviation-related business, including aircraft service and repair, using three properties;
- Additional commercial and light industrial uses similar to those outside the airport, totaling four properties
- Aircraft storage in simple, uninsulated hangers, using the remaining 45 properties.

A significant airport improvements project is proposed that will include extension of the runway and taxiways as well as the addition of three hangers, with 15 more hangers to be added during later development phases.

Existing property usage within of the study area, including tenant properties on the airport parcel, is summarized in Charts 1.1 and 1.2, below. A majority of the property use in the Phase I service area is for aircraft storage.

Chart 1.1
Existing Property Use – Phase I (Number of grand list properties)

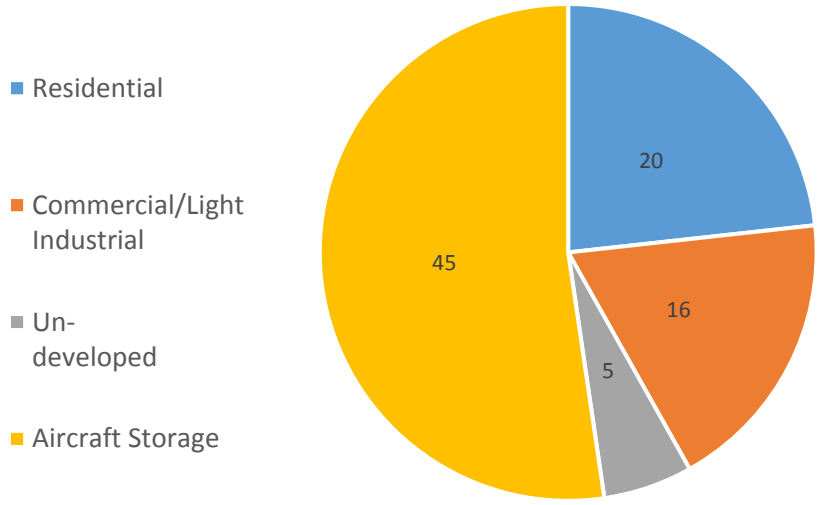
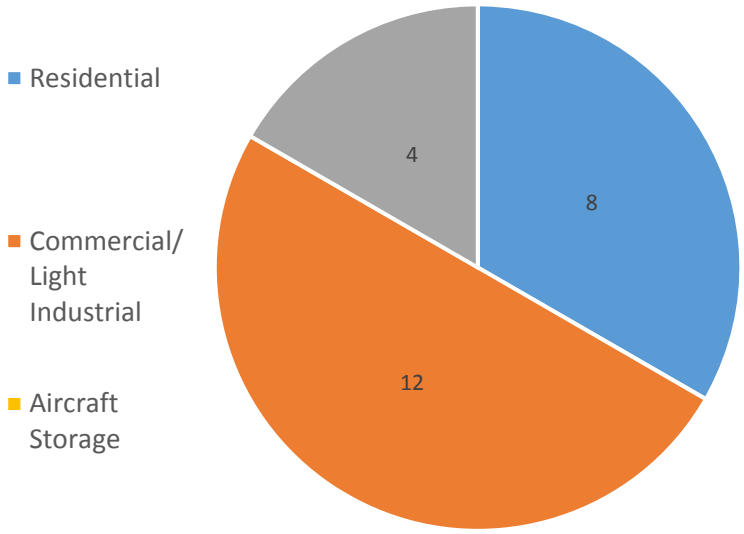


Chart 1.2
Existing Property Use – Phase II (Number of grand list properties)



1.5 Existing Infrastructure

The study area does not currently provide any municipal water or wastewater infrastructure. The Village of Swanton owns municipal water and sewer infrastructure that extends to near the study area boundary. The location of this existing infrastructure is shown in **Figure 2**. The nearest municipal water and wastewater infrastructure to the study area is on the Missisquoi Valley Union High School (MVU) property. The nearest municipal water or wastewater infrastructure installed within a Town or State highway right-of-way is on Route 78, between I-89 and the entrance drive to MVU.

A map showing the Vermont Department of Environmental Conservation's On-Site Soil Sewage Disposal Rating and the location of private water supplies is included in **Figure 3.** Soils in the study area are generally favorable for on-site wastewater disposal. Well yields in the study area range from 0 to over 30 gallons per minute, with the majority of wells yielding 3 to 5 gallons per minute.

1.6 Environmental Resources Present

Maps showing significant environmental resources is included in **Figures 4, 5 and 6**. Environmental resources believed to be present in or near the study area are summarized below.

- Wetlands: Large areas of VSWI-mapped wetlands are located to the southwest and northeast of the airport. Additional smaller areas of VSWI-mapped wetlands are located at the eastern extent of Phase II. Based on wetland evaluations identified in the Franklin County State Airport (FSO)

Environmental Assessment, the larger wetland areas in proximity to the Airport are Class II wetlands.

- Rare, Threatened, or Endangered Species: The airport property includes a number of rare, threatened or endangered species. The Franklin County State Airport (FSO) Environmental Assessment identifies five rare, threatened, or endangered bird species and one threatened bat species that are known to exist near the airport.
- Significant Natural Communities: Three significant natural communities are located west and northeast of the Airport, just outside of the study area.
- Prime Agricultural Soils: Most of the site is underlain by mapped prime agricultural soils of statewide importance. However, significant portions of the study area have been disturbed by airport construction, sand and gravel extraction, road construction, or commercial/residential development or have been heavily subdivided, thereby limiting the study area's agricultural value.

No deer wintering areas, river corridors, floodways or flood hazard areas are known to exist within or adjacent to the project area.

As part of the grant funds received by the Town, an Archeological Resource Assessment (ARA) was completed by the University of Vermont Consulting Archeology Program. The only mapped archeological sites identified in the project area are located in the northern vicinity of the airport area and outside of the area of likely infrastructure construction. However, the ARA notes that most of the project area could still be considered archeologically sensitive and recommends a Phase I site identification survey.

2. NEEDS ASSESSMENT

As part of this study, a survey questionnaire was sent via mail to property owners in the study area. Additionally, the survey was sent to airport tenants who rent portions of the airport property. The study asked property owners and tenants detailed questions about their existing water supplies and wastewater disposal systems as well as their interest in connecting to municipal water and sewer infrastructure. The survey questionnaire is included in **Appendix B**.

A total of 144 surveys were mailed, of which 41 were sent to property owners and 103 were sent to airport tenants. Of the 144 surveys mailed out, a total of 24 responses were received, for an overall response rate of 16%, though some responses were incomplete. It is believed that the low response rate and large number of incomplete surveys is largely due to the inclusion of airport hangar tenants, many of whom use their properties solely for storage purposes, and/or do not have permanent ownership interest in the property and are therefore less likely to be interested in water or wastewater infrastructure. Chart 2.1 and 2.2 show the distribution of surveys sent and received by ownership interest and property use, respectively.

Chart 2.1
Surveys Sent

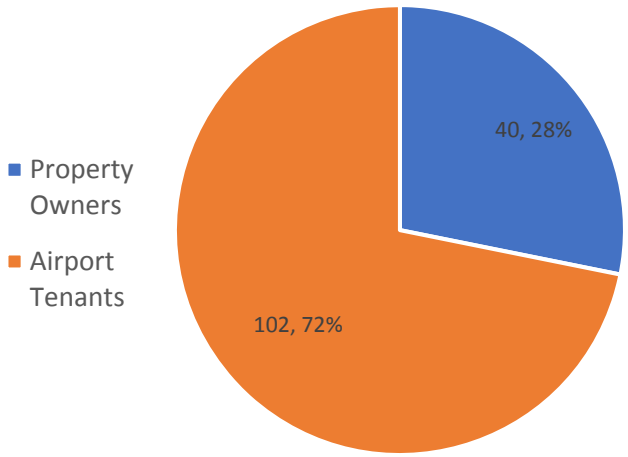
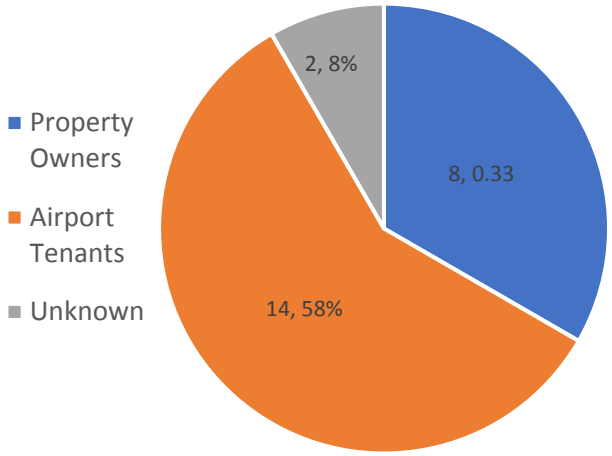


Chart 2.2
Surveys Received



2.1 Wastewater Needs

Charts 2.3 and 2.4 summarize the ages and conditions of respondent's wastewater disposal systems. The majority of respondents did not answer this question (and are presumably airport leaseholders who do not have wastewater disposal systems). Of the remaining respondents, the majority of disposal systems date to the 1970's and 1980's. The data suggests that the majority of the disposal systems in the study area will not approach the end of their expected 50-year lifespans for another 10 to 20 years. No disposal systems in the study area were reported to have experienced failures.

Chart 2.3
Age of Existing Septic System (year constructed)

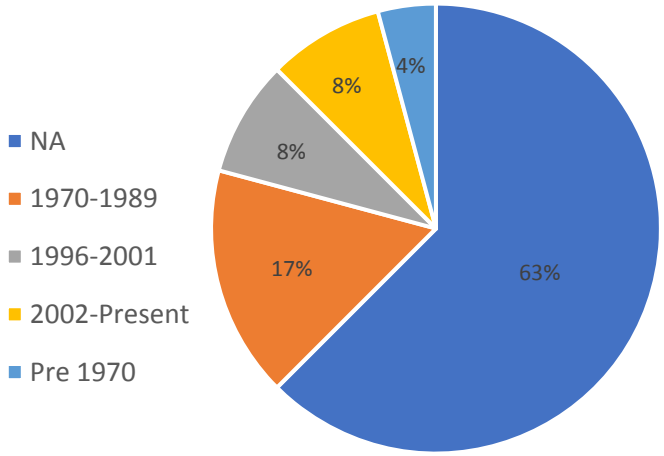
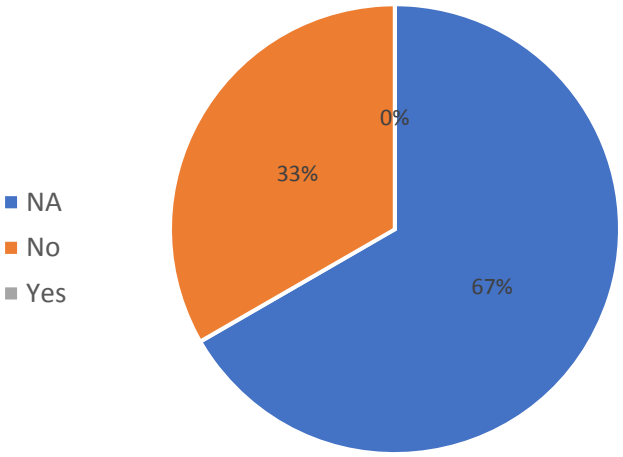


Chart 2.4
Wastewater Disposal System Failure



Given the generally good condition of the wastewater disposal systems in the area and favorable soils, on-site disposal systems are currently capable of meeting the study area's wastewater disposal needs based on current uses. Municipal wastewater infrastructure will help reduce technical impediments for future development. Specific problem areas include the airport parcel and properties that have been previously used for sand and gravel extraction, since extensive cut and fill activities limit the soil's usability for wastewater disposal. Additionally, heavily developed commercial and industrial properties may not have space for either replacement wastewater disposal systems or new wastewater disposal systems necessary for expansion or in-fill development.

2.2 Water Supply Needs

Charts 2.5 and 2.6 summarize the type and condition of respondent's water supplies. Approximately half of respondent's did not answer these questions (and are presumably airport leaseholders and do not have water supplies). Of the remaining respondents, the vast majority use individual drilled wells and approximately 19% reported having issues with their water supplies, such as poor quality or unreliable yields.

Chart 2.5
Water Supply Type

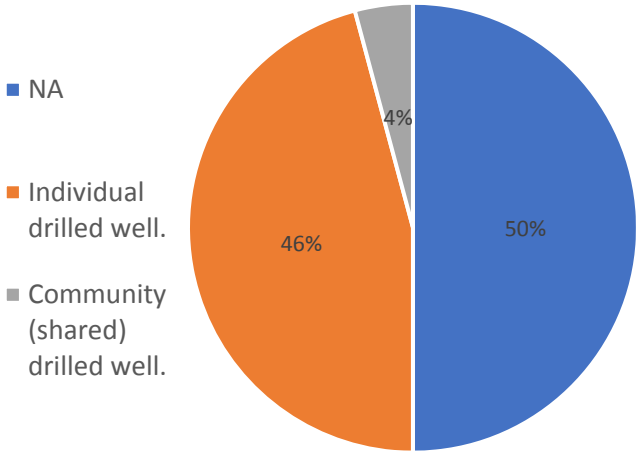
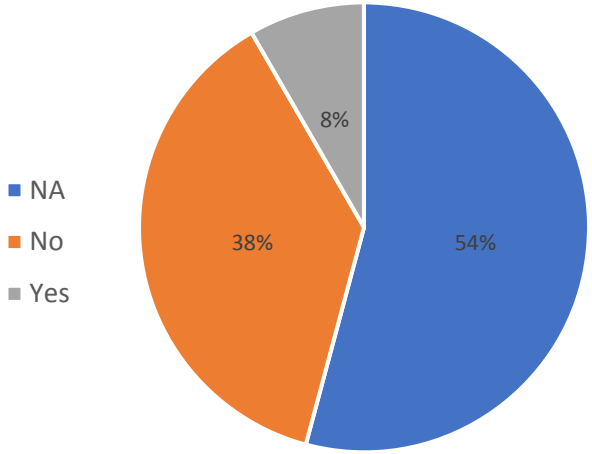


Chart 2.6
Water Supply Failures or Problems



A significant portion of survey responses reported issues with their on-site water supplies. Additionally, the typical 3 to 5 gallon per minute well yield in the area is marginally adequate for most single-family residential users but inadequate for most commercial or industrial users. Installing additional on-site water supplies may interfere with the isolation zones of existing on-site disposal systems, especially for expansion or in-fill development on currently developed sites.

2.3 User Interest

Charts 2.7 and 2.8 summarize user interest in and willingness to pay for municipal water and wastewater service. Slightly less than half of respondents indicated that they were not interested in municipal water or wastewater service, approximately one quarter of respondents indicated that they were, and the remainder did not respond. On average, respondents indicated they would be willing to pay approximately $500 per year for municipal water and sewer service. While the survey allowed respondents to rank their interest in either municipal water supply infrastructure or municipal sewer infrastructure, respondents did not indicate a strong preference for one relative to the other, though several comments qualitatively indicated a greater needs related to water supply infrastructure.

Chart 2.7
Interest in Municipal Water/Wastewater

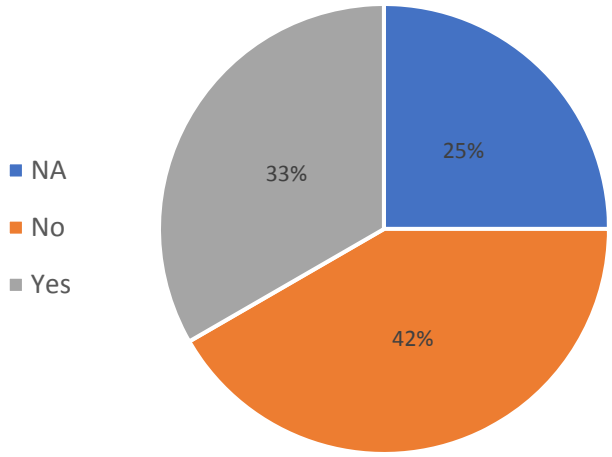
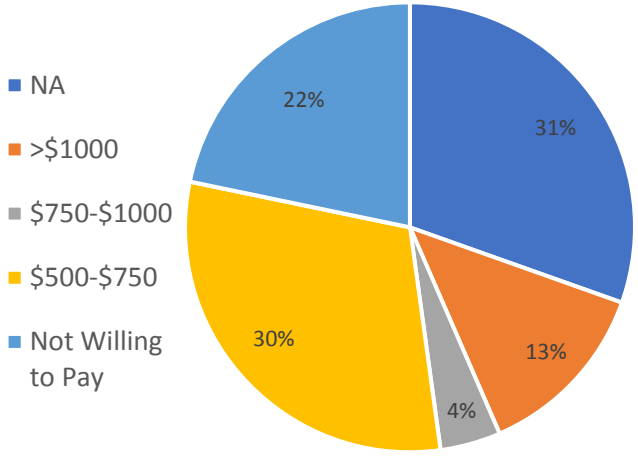


Chart 2.8
Willingness to Pay for Municipal Water & Sewer (per year)



2.4 Other Comments

The survey also included space on which respondents could provide additional written information about their property and wastewater needs. These comments were reviewed and are summarized below.

- Most concerns were related to deficient on-site water supplies, with several respondents describing poor water quality from their wells.
- Most airport tenants use their hangers solely for aircraft storage and have little interest in or use for water or sewer service. Additionally, many of these buildings are uninsulated.
- Two respondents expressed interest in municipal water and wastewater infrastructure for reasons of improved property value and future development.

3. PRELIMINARY DESIGN CRITERIA

3.1 Service Area

Proposed service areas are shown in **Figure 7.**

The recommended service area for Phase I includes the core of the airport, where several commercial and light industrial users are located, as well as the area to the east of the airport, which includes developable land and is the site of a proposed subdivision by Jim Harrison.

Properties on Route 78 west of Airport Road may be included in the service area depending on the route and type of interconnection to Swanton's water and sewer infrastructure. This area is denoted as Phase IA.

The recommended service area for Phase II includes the area along Route 78, east of Airport Road, to include Raven Drive. This area includes several commercial and residential users as well as some land that could be the site of future subdivision or infill development.

Parcels not adjacent to Route 78, Airport Road, or Raven Drive are not currently recommended for inclusion in the service area because they are primarily undeveloped or consist of residential properties whose needs can readily be met using on-site water and wastewater infrastructure. It would be relatively easy to expand the service area to include these properties in the future as the on-site water and wastewater infrastructure ages or when private landowners elect to extend water and wastewater infrastructure to their properties.

3.2 Design Flows

Estimated user connections and design flows for the Phase I, IA and II service areas for the initial year (2020) and design year (2040) are shown in **Appendix C**. Design flows and user connections are summarized in Table 3.1 and 3.2.

Design flows are also expressed in equivalent units (EU). One EU is generally taken to be the design flow for a two-bedroom single-family residential unit. By describing design flows in a common unit, economic and financial comparisons can be made between different users, alternatives and systems even when the design flows for individual users vary widely. This method is also used by some funding programs to evaluate the financial condition of systems and assign subsidies or grants.

Table 3.1
Estimated Design Flows – Initial Year

Phase	Water User Connections	Water Design Flow (gpd)	Water Equivalent Units (EU)	Wastewater User Connections	Wastewater Design Flow (gpd)	Wastewater Equivalent Units (EU)
I	9	840	4	9	2,740	4
IA	8	2,250	10.7	0	0	0
II	7	2,200	10.5	7	5,500	10.5

Table 3.2
Estimated Design Flows – Design Year

	Water User Connections	Water Design Flow (gpd)	Water Equivalent Units (EU)	Wastewater User Connections	Wastewater Design Flow (gpd)	Wastewater Equivalent Units (EU)
I	18	14,240	67.8	16	16,140	67.8
IA	15	3,150	15	0	0	0
II	16	6,300	30	16	9,300	28.7

Table 3.1 and 3.2 Notes:
1. Wastewater design flows include an infiltration allowance of 1,900 gpd for Phase I, 0 gpd for Phase IA, and 3,300 for Phase II.
2. Equivalent Users (EU) calculated by dividing design flows in Table 3.1 by 210 gallons per day. Infiltration is deducted in the Equivalent Unit (EU) calculation since it will be a system-wide expense and not directly billable to individual users.

Wastewater design flows are based on Chapter 1, Section 1-808 of the Environmental Protection Rules and assume connection to a municipal system with a capacity of over 50,000 gallons per day. Water design flows are based on Chapter 21, Appendix A Part 2 of the Environmental Protection Rules.

Several assumptions were made in determining design flows. The assumptions made for the Phase I service area include:

1. Commercial and aviation-related property owners in the airport (other than hanger owners) reported greater water and wastewater needs, so it was assumed that all commercial- and aviation-related properties (other than hangers) would be connect to municipal water and wastewater infrastructure during the initial year.
2. The proposed subdivision to the east of the airport would be connected to municipal water and wastewater infrastructure during the initial year.
3. Properties used for aircraft storage have minimal water or wastewater needs and would not be connected in the initial or design year, with the exception of two hangers that currently have on-site water and wastewater systems.
4. Due to the limited additional developable area within the Phase I service area, no additional development would occur prior to the design year.

Assumptions made for the Phase IA and Phase II service areas include:

1. Approximately 30% of survey respondents indicated interest in or need for municipal water or wastewater infrastructure; therefore, it was assumed that approximately 1/3 of properties in the Phase IA or Phase II service areas would connect in the initial year. These would primarily be commercial or light industrial properties
2. Some additional development would occur prior to the design year, and some additional existing residential properties would connect prior to the design year as existing on-site water and wastewater disposal systems fail.
3. Properties in the Phase IA service area would only connect to proposed water main infrastructure and would be unable to connect to a proposed sewer force main.

3.3 Fire Flows

The Town of Highgate has requested that fire hydrants be provided in the service area. For the small wood construction and moderately-sized steel construction in the proposed service area, a minimum fire flow of 500 gallons per minute is required. . The extension of the distribution system into higher-elevation areas around the airport should be designed so that available fire flows elsewhere within the Village of Swanton's distribution system are not significantly impacted.

Fire hydrants in developed areas should typically be spaced 300 to 600 feet apart, depending on building density and construction, though they can be spaced more widely in rural areas. For this project, hydrant spacing should be approximately 600 feet within the airport area and approximately 1,000 feet elsewhere along Route 78 and Airport Road.

3.4 Village of Swanton - Existing Water Capacity

The Village of Swanton's water system includes a surface water treatment facility, distribution system, and 1.5-million-gallon storage tank, with a permitted Maximum Day Demand (MDD) of 1.0 million gallons per day (gpd). Based on data provided by the Village of Swanton for January 2018 through December 2018, current average day demand is approximately 351,000 gpd, with an observed MDD of 505,000 gpd. Existing capacity and demand for the Village of Swanton's water system are summarized in Table 3.1.

Table 3.1
Swanton Village Water Capacity

	Authorized	Current Usage	Available Capacity
Maximum Day Demand (MDD)	1,000,000 gpd	505,000 gpd	295,000 gpd[1]

Notes:
1. Available capacity is based on 80% of authorized MDD.

The total water supply design flow for all proposed phases of the project in the design year is approximately 24,000 gpd (ADD) which is just a small fraction of the available capacity.

Preliminary hydraulic modeling of portions of the Village of Swanton's distribution system were conducted to determine the feasibility of providing water service, including fire flows, to the Highgate Airport area. This included performing a hydrant flow test near the MVU access drive and Rt. 78 on October 31, 2019. Summarized output from the preliminary hydraulic model is included in **Appendix D**.

Based on the hydraulic modeling, 8-inch diameter pipe will have adequate capacity to provide domestic and fire flows to the proposed service area, but a booster pumping station will be necessary to provide adequate domestic and fire flows to the proposed service area as well as allow extension of the service area to the elevation of the airport without negatively impacting available fire flows in the existing Village distribution system. Construction of a storage tank in the new airport pressure zone is infeasible due to the lack of sufficiently elevated terrain nearby and the prohibitive cost of constructing and maintaining an elevated storage tank. Therefore, the booster pump station would include variable-speed pumps and pressure tanks, with a standby generator providing continuous operation during power outages.

3.5 Village of Swanton - Existing Wastewater Capacity

The Village of Swanton operates a municipal wastewater treatment facility (WWTF) with a permitted annual average daily flow of 0.9 million gallons per day (mgd). Based on data provided by the Village of Swanton for January 2017 through June 2019, current average daily flow is 0.538 mgd. Existing capacity and flows for the Village of Swanton's WWTF are summarized in Table 3.2.

Table 3.2
Swanton Village Wastewater Capacity

	Authorized	Current Usage	Available Capacity[1].
Permitted Annual Average Daily Flow (AADF)	0.9 mgd	0.538 mgd (60%)	0.182 mgd

Notes:
1. Available capacity is based on 80% of permitted AADF.

The available wastewater capacity of the Village of Swanton's WWTF far exceeds the expected design-year flow of 0.025 mgd. However, the Village of Swanton' wastewater collection system reportedly has a hydraulic limitation on First Street, which is downstream of both potential connection points. The severity of this limitation is unknown, but it may require correction before additional users are connected.

3.6 Village of Swanton – Water & Sewer Rates

The Village of Swanton has separate rates for customers within and outside of the Village boundaries. Rates are composed of a fixed monthly customer charge plus a variable rate based on metered usage. The Village of Swanton's water and sewer rates are including in **Appendix E.**

3.7 Other Design Criteria

Several additional design criteria were used to develop and evaluate alternatives.

1. Portions of the airport on and around runways and within runway protection zones, or portions of the airport that may be included in those zones in the future were presumed to be unavailable for construction of water or sewer infrastructure, except for installation of service connections for buildings in the immediate vicinity.
2. For cost estimating purposes, it was assumed that service connections will be installed to the edge of the right-of-way. One sewer and one water service connection will be provided for each existing developed property in the service area, except for buildings used solely for aircraft storage. Stubs will be provided for future connection by publicly- or privately-constructed infrastructure.
3. Utilities crossing Route 78 will likely require installation in sleeves installed using trenchless methods such as jacking or horizontal boring.

4. EVALUATION OF ALTERNATIVES - WASTEWATER

4.1 Wastewater Alternatives

Four alternative methods of providing sewer service to the proposed service areas were developed. Alternatives considered include three alternatives based on municipal wastewater infrastructure (Wastewater Alternatives No. 1 through 3) and one no action alternative (Wastewater Alternative No. 4) based on continued use of on-site wastewater disposal systems.

Alternative No. 1 – Phase I Pump Station & Force Main Interconnection

Under this alternative, a new pump station ("Airport Pump Station") would be constructed on the airport property. A gravity sewer collection system (consisting of both Town-owned and privately-owned infrastructure) would serve surrounding properties, including the proposed subdivision to the east. The force main would run from the pump station south out Airport Road to Route 78, then west on Route 78 to connect to Swanton's sewer collection system near I-89. No gravity sewer infrastructure would be constructed on Route 78, so no users in that area (Phase IA) would be able to connect. A conceptual map of this alternative is included in **Figure 8**.

Alternative No. 2 – Phase I Gravity Sewer Interconnection

Under this alternative, gravity sewer running cross-country from the airport west to a connection with Swanton's collection system near the Missisquoi Valley Union High School (MVU). A gravity sewer collection system, identical to Alternative No. 1 would be constructed to serve surrounding properties, including the subdivision to the east. No sewer infrastructure would be constructed along Route 78, so no potential customers there would be able to connect. A conceptual map of this alternative is included in **Figure 9**.

Alternative No. 3 – Phase II Expansion

Under this alternative, a gravity sewer collection system would be constructed in the Phase II service area, as well a pump station to the east to serve the northernmost portion of the service area. The Phase II gravity sewer collection system and pump station would be connected to the Phase I gravity sewer collection system. This Alternative assumes that one of the Phase I alternatives has previously been or is concurrently being constructed. A conceptual map of this alternative is included in **Figure 10**.

Alternative No. 4 – On-Site Wastewater Disposal Systems

Under this alternative, properties would continue to use on-site wastewater disposal systems, maintaining and/or reconstructing them as necessary.

4.2 Non-Monetary Evaluation

These alternatives are evaluated qualitatively in **Appendix F**.

Alternative No. 2 requires access to restricted portions of the airport where the proposed gravity sewer crosses under runways and taxiways. Alternatively, the gravity sewer could be installed around the restricted portions of the airport, but this would be on private property and require a longer, flatter run of gravity sewer installed at depths of approximately 20 feet, making this option very costly and difficult to implement if it is feasible at all. Therefore, both variants of this alternative are considered infeasible and are not carried forward for further analysis.

Alternative No. 3 substantially increases the capital cost of the project, requires an additional pump station, as well as additional capacity in the Phase I pump station. Additionally, the Phase II service area is already developed, so expansion of wastewater infrastructure into this area would be less likely to have a significant economic development benefit.

4.3 Estimated Construction and Operation & Maintenance Costs

Estimated construction costs for each remaining alternative are included in **Appendix G**. Estimated Operation and Maintenance (O&M) costs for each remaining alternative are included in **Appendix H**. These costs are summarized below in Table 4.2.

Table 4.2
Wastewater
Estimated Construction and O&M Costs

	Construction Cost[1.]	Annual O&M Cost
Alternative No. 1	$1,186,000	$17,500
Alternative No. 3	$1,219,000	$17,800

Notes:
1. ENR 11326 = December 2019

4.4 Evaluation of Alternatives

Construction of Alternative No. 3 (Phase II expansion) has significantly higher unit costs than Alternative No. 1, though both alternatives carry substantial unit costs. Therefore, it is recommended that expansion of sewer infrastructure into the Phase II area not be pursued at this time.

Alternative No. 1 is the lowest-cost, most feasible alternative and is the recommended alternative, though it may not be economically feasible without a larger user base to carry the fixed costs associated with construction and installation of the pump station, gravity sewer, and force main infrastructure.

5. EVALUATION OF ALTERNATIVES - WATER

5.1 Water Supply Alternatives

Four alternative methods of providing water service to the proposed service areas were developed. Alternatives considered include three alternatives based on municipal water infrastructure (Water Alternatives No. 1 through 3) and one no action alternative (Water Alternative No. 4) based on continued use of on-site individual wells.

Water Alternative No. 1 – Phase I Interconnection via Route 78

Under this alternative, a new 8" water main would be constructed along Route 78 to Airport Road, then south along Airport Road into the airport property. A booster pumping station that provides domestic and fire flow would be constructed somewhere along this alignment. Potential users along Route 78 could connect to the new water main. A conceptual map of this alternative is included in **Figure 8**.

Water Alternative No. 2 – Phase I Interconnection via MVU

Under this alternative, a new 8" water main would run east from Missisquoi Valley Union High School (MVU) across private property and the airport property. A booster pumping station that provides domestic and fire flow would be constructed somewhere along this alignment, most likely near MVU. No water supply infrastructure would be constructed along Route 78, so no potential customers there would be able to connect. A conceptual map of this alternative is included in **Figure 9**.

Water Alternative No. 3 – Phase II Expansion

Under this alternative, 8" water main would be constructed in the Phase II service area, along Route 78 and Raven Drive. The Phase II water main would be connected to the Phase I water main where convenient. This Alternative assumes that one of the Phase I alternatives has previously been or is concurrently being constructed. A conceptual map of this alternative is included in **Figure 10**.

Water Alternative No. 4 – On-Site Water Supplies

Under this alternative, properties would continue to use on-site water supplies, maintaining and/or replacing them as necessary.

5.2 Non-Monetary Evaluation

These alternatives are evaluated qualitatively in **Appendix F**.

All of the proposed alternatives are feasible, but Alternative No. 2 will require crossing both wetlands and private land, and will bypass potential users on Route 78. This alternative would share some common costs with Wastewater Alternative No. 2, which was determined to be infeasible in Section 4. Therefore, this alternative is not recommended.

Alternative No. 3 would increase the capital cost of the project, but would allow access to additional users. Alternative No. 3 would not require construction of an additional booster pumping station, since the Phase II service area would be part of the same pressure zone as Phase I. However, the Phase II service area is already developed, so expansion of water supply infrastructure into this area would be less likely to have a significant economic development benefit.

Alternative No. 4 does not improve water quality or provide fire flows, so it does not meet the design requirements of the project.

5.3 Estimated Construction Costs

Estimated construction costs for each remaining alternative are included in **Appendix G**. Estimated Operation and Maintenance (O&M) costs for each remaining alternative included in **Appendix H**. These costs are summarized below in Table 5.2.

Table 5.2
Water
Estimated Construction and O&M Costs

	Construction Cost[1.]	Annual O&M Cost
Alternative No. 1	$1,054,000	$19,700
Alternative No. 3	$498,000	$7,000

Notes:
1. ENR 11326 = December 2019

5.4 Evaluation of Alternatives

Construction of Alternative No. 3 (Phase II expansion) has a slightly higher unit cost than Alternative No. 1. Therefore, it is recommended that expansion of water supply infrastructure into the Phase II area not be pursued at this time, though it should be noted Alternative No. 3 is competitive with Alternative No. 1 and may be a viable future project, especially if greater water supply needs develop in the Phase II service area.

Alternative No. 1 is the lowest-cost, most feasible alternative and is the recommended alternative.

6. PROPOSED PROJECT

6.1 Project Phasing

To better disperse costs over time, make better use of available funding sources, reduce financial risks associated with the project, and establish a user base before making additional investments, it may be necessary to finance and construct water and wastewater infrastructure in separate phases, with the water supply infrastructure phase constructed first, and the sewer infrastructure constructed a few years later. Having a municipal water extension has been identified as the higher priority utility, however, the Town Selectboard and other interested parties are in favor of constructing both utility improvements at the same time. Having this infrastructure in place will be greatly enhance the economic development potential in this area.

6.2 Water Project

A preliminary map of the proposed water project is included in **Figure 11**.

The proposed water project includes construction of water supply infrastructure (previously identified as Alternative No. 1) to serve the Phase I and IA service areas. The water infrastructure will be connected to and served by the Village of Swanton's municipal water distribution system. The recommended project includes:

1. Approximately 7,200' of new 8" PVC water main starting at the MVU entrance and extending east along Rt. 78 and north along Airport Road to serve the Phase I service area.
2. Water services and stubs installed to the edge of the right-of-way for future expansion or privately-financed infrastructure extensions.
3. Booster pump station with variable-speed pumps and pressure tanks. The booster pumps will be sized to provide both domestic and fire flows, which may require staged pumps. A standby generator will be required to serve the pumps during power outages.
4. Valves, hydrants, and other appurtenances.

Where water services cross Vermont Route 78, sleeving and/or trenchless installation methods may be required.

Serving the airport area using an elevated water storage tank would require a structure at least 100 feet tall. This is prohibitively expensive at this time, but could be a viable way of providing highly reliable fire flows to the airport area, possibly be funded via Federal Aviation Administration programs.

6.3 Sewer Project

A preliminary map of the proposed sewer project is included in **Figure 11**.

The proposed sewer project includes construction of sewer infrastructure (previously identified as Alternative No. 1) to serve the Phase I service area. The sewer infrastructure will be connected to and served by the Village of Swanton's municipal sewer system. The recommended project includes:

1. Approximately 2,200' of new 8" PVC gravity sewer and manholes to serve the Phase I service area on Airport Road.
2. Sewer stubs installed to the edge of the right of way for service connections or for connection of future expansions or privately financed infrastructure extension.
3. Duplex submersible sewer pump station with a precast concrete wet well. Because the pump station will be sized for the design-year flows, excess volume will be available in the initial year to serve as emergency storage, so no standby generator is proposed. A valve pit, typical for duplex pump stations, will be provided. Provisions for odor control will also be included.
4. 9,600' of 4" PVC or HDPE force main running south on Airport Road and west on Rt. 78 to Frontage Road with cleanout manholes.

6.4 Estimated Costs

Estimated total project costs are included in **Appendix I** and are summarized in Table 6.1 below. Total project costs are based on the estimated construction costs presented in Tables 4.2 and 5.2, but also include; engineering allowances, and administrative, as well as a 15% construction contingency.

Table 6.1
Estimated Total Project Costs

Proposed Project	Estimated Construction Cost[1.]	Estimated Total Project Cost
Water Project	$1,095,000	$1,600,000
Sewer Project	$1,238,000	$1,810,000
Total	$2,333,000	$3,410,000

Notes:
1. All costs based on ENR 11823 = March 2021

6.5 Projected Operation & Maintenance Costs

Operation and maintenance (O&M) of the proposed water and/or sewer infrastructure could be accomplished two ways.

O&M Alternative No. 1

The proposed infrastructure could be operated and maintained as part of the Village of Swanton's system, with individual users each paying the established non-village customer charges to cover the Village of Swanton's costs. Additional customer charges would be imposed on users by the Town of Highgate to cover the project's debt service.

O&M Alternative No. 2

The proposed infrastructure could be operated and maintained independently by the Town of Highgate (possibly using a contract operator), with individual users paying user fees to the Town of Highgate to cover operation and maintenance costs, debt service, water purchased from, and wastewater treatment fees to the Town of Highgate.

Under O&M Alternative No. 1, water and sewer fee payments to the Village of Swanton would take the place of O&M costs, and are summarized in Tables 6.2A and 6.2B. These are initial estimates only and will need to be updated as discussions with Swanton continue and the number and types of customers to be connected is better defined.

Table 6.2A
Estimated Water Fee Payments – Initial Year

	Quantity	Fee	Total Charges
Customer Fixed Rate – Residential	7 customers	$46.31/customer/month	$3,890
Customer Fixed Rate – Commercial	10 customers	$92.63/customer/month	$11,116
Customer Fixed Rate – Industrial	0 customers	$185.26/customer/month	$0
Variable Rate	3,090 gpd	$5.11/1000 gal	$5,763
		Total	$20,769
		Average Annual Fee per EU	$1,411

Table 6.2B
Estimated Sewer Fee Payments – Initial Year

	Quantity	Fee	Total Charges
Customer Fixed Rate – Residential	0 customers	$34.04/customer/month	$-
Customer Fixed Rate – Commercial	9 customers	$68.07/customer/month	$11,116
Customer Fixed Rate – Industrial	0 customers	$136.14/customer/month	$-
Variable Rate	840 gpd	$4.10/1000 gal	$1,257
		Total	$8,609
		Average Annual Fee per EU	$2,152

Table 6.2A and 6.2B Notes:
1. Based on Village of Swanton's sewer rates effective March 1, 2018 for users outside of Swanton Village

O&M costs under Alternative No. 2 are summarized in **Appendix H**, Total O&M Cost – Water and Sewer Alternatives No. 1.

O&M Costs for each alternative are summarized below in Tables 6.3A and 6.3B.

Table 6.3A
Estimated O&M Costs – Proposed Water Project

Alternative	Initial Year O&M Cost
O&M Alternative No. 1	$20,769
O&M Alternative No. 2	$19,700

Table 6.3B
Estimated O&M Costs – Proposed Sewer Project

	Initial Year O&M Cost
O&M Alternative No. 1	$8,609
O&M Alternative No. 2	$17,500

Both alternatives have similar costs, with Alternative No. 1 having a lower annual cost.

Qualitatively, O&M Alternative No. 1 is preferable, since the Village of Swanton already has the necessary certified personnel and administrative support in place, which would be duplicated if the Town of Highgate undertook operation of the proposed infrastructure. This would presumably be the most beneficial option for the Village of Swanton, since it maximizes their revenue and creates a financial return on their excess capacity, without substantially increasing their operating costs.

6.6 Permitting Requirements

Drinking Water and Groundwater Protection Division

Because the project involves construction of a booster pump station and installation of more than 500 linear feet of new water main, a Permit-to-Construct issued by the State of Vermont Drinking Water and Groundwater Protection Division will be necessary.

State Highway Right-of-Way Work/Access

A State Highway Right-of-Way Work/Access Permit (1111 Permit) issued by the Vermont Agency of Transportation will be necessary for the infrastructure constructed within the Route 78 right-of-way.

Act 250

An Act 250 jurisdictional determination from the State of Vermont will be required for this project. With the extension of municipal water and sewer to this new service area, it is likely that an Act 250 permit will be required.

Archeological Investigation

Most federal funding sources require an archeological investigation be completed as part of the National Environmental Protection Act (NEPA) environmental review process. As part of the grant for this study, an Archeological Resource Assessment (ARA) was completed, which is a preliminary process used determine whether additional archeological work is necessary. The ARA completed as part of this study notes that most of the proposed infrastructure improvements will take place in archeologically sensitive areas, and recommends that a Phase I site identification survey be completed.

Wetlands

A wetlands permit issued by the State of Vermont is required where disturbance will occur within 50 feet of a class II wetland. For projects designed such that disturbance remains inside an existing roadway fill prism through wetland crossings, a wetlands permit generally is not required. A jurisdictional determination should be requested from the State of Vermont's district wetlands ecologist.

6.7 Potential Funding Sources

Several potential funding options are discussed below. It is expected that funding for the project will be derived from a combination of funding sources.

State of Vermont Clean Water / Drinking Water State Revolving Fund Loan

For the sewer, the Clean Water Revolving Loan Fund (CWSRF) offers loans at a 20 or 30 year term and 2% administrative fee, and 50% loan subsidies on engineering costs up to $100,000 per year. The Drinking Water State Revolving Fund (DWSRF) offers loans with up to a 30-year loan term and 0% to 3% interest rates. The DWSRF and CWSRF programs are not well-suited to funding infrastructure extensions unless there is a documented drinking water health issues or pollution abatement concerns. DWSRF and CWSRF Priority List applications were submitted by the Town in January 2020 and this project is on the Project Priority List for both water and sewer but an eligibility determination will be required before these funding sources can be pursued.

USDA Rural Development

The USDA/ Rural Development Program provides grant and loan funding for water and wastewater infrastructure projects in rural areas. Loan terms of up to 40 years and interest rates of 1.75% to 3% can be combined with additional grant funding, depending on the economic conditions in the area. As of 2019, the Town of Highgate is eligible for up to 45% grant funding through this program. While USDA Rural Development and State of Vermont SRF programs share many similarities, USDA Rural Development funding is generally more suitable for infrastructure extensions. Funding applications for this program can be submitted anytime but are due in December of each year and a positive bond vote is required before a funding offer can be issued.

Northern Border Regional Commission Economic Infrastructure Development Grants

The Northern Border Regional Commission (NRBC) offers grants of up to $1,000,000 for eligible infrastructure projects. This federally-funded program requires matching funds of up to 50%. Matching funds can be obtained through other funding programs but must include a minimum 20% non-federal match. Funding applications for this program are generally accepted in May of each year but the deadline has been extended to June 1 this year.

US Department of Commerce Economic Development Administration Grant

The US Department of Commerce provide grants through the Economic Development Administration (EDA) in amounts from $100,000 to $3,000,000. To qualify, the project must demonstrate alignment with EDA's investment priorities, which include construction of water and sewer infrastructure to support economic development and investment in Qualified Opportunity Zones such as Franklin County. Funding applications are accepted on an ongoing basis until that grant cycle's funds are depleted, with funding cycles typically beginning in the fall of each year.

State of Vermont Community Development Program

The State of Vermont's Vermont Community Development Program (VCDP) offers grants of $5,000 to $500,000 for economic or community development projects (including infrastructure projects), with a particular focus on projects that benefit low-income residents or support housing or critical services. Applications for these grants are accepted multiple times per year. These grants are relatively competitive and the proposed project may not be well suited to this program unless the benefit to low-income residents, housing or critical services can be documented. Typically this grant must be supported by a firm commitment from a new business or tenant where new jobs are documented.

Vermont Municipal Bond Bank

The Vermont Municipal Bond Bank (VMBB) provides loans to municipalities for a wide range of purposes, including infrastructure projects that may not be eligible for other funding programs described above. While loan terms are generally more favorable than could be obtained from commercial lenders, loan forgiveness is not available and loan terms and interest rates are not as favorable as other funding programs described above. Typical loan term is 20 years and the interest rate is based on the current market rate. Therefore, it is not recommended that VMBB funding be pursued unless funding available from the other State and Federal programs described above is inadequate.

6.8 Project Funding Alternatives

Two funding alternatives for the proposed water and sewer projects are described below, evaluated in **Appendix J**, and summarized Table 6.3.

Funding Alternative No. 1

Under Funding Alternative No. 1, approximately 50% of project costs would be funded by the Economic Development Authority grant. A Northern Borders Regional Commission grant at half the maximum allowable level of $1,000,000 would also be used. Both of these are federal grants, so a Vermont Municipal Bond Bank loan covering the remaining 25% of project costs would be used to satisfy Northern Border's 20% non-federal matching requirement.

Funding Alternative No. 2

Under Funding Alternative No. 1, approximately 50% of project costs would be funded by an Economic Development Authority grant. Because no Northern Borders grants would be used, there would be no non-federal 20% match requirement, allowing the remaining project cost to be funded via a USDA Rural Development Program loan with a subsidy of up to 45%.

Table 6.3
Funding Alternatives Comparison – Proposed Water & Sewer Project

Funding Alternative No. 1		Funding Alternative No. 2	
Funding Source	**Estimated Funding**	**Funding Source**	**Estimated Funding**
Economic Development Authority Grant	$2,200,000	Economic Development Authority Grant	$0
Northern Borders Regional Commission Grant (up to 25% of total project costs; requires 20% non-federal match; $1,000,000 limit)	$500,000	Northern Borders Regional Commission Grant (up to 25% of total project costs; requires 20% non-federal match; $1,000,000 limit)	$500,000
Local Share	$200,000	Local Share	$200,000
VMBB Loan 20-year Loan Term @ 2.5% $32,715 Annual Payment	$510,000	USDA Rural Development Loan 30-year Loan Term @ 1.875% Interest; $1,626,000 40% Grant $1,084,000 $71,096 Annual Payment	$2,710,000
Total Estimated Funding	$3,410,000		$3,410,000

Funding Alternative No. 1 requires less debt support and is the recommended funding alternative that the Town of Highgate should pursue. Under this funding alternative, it is assumed that this project is not eligible for the State revolving loan funds and the local share could be contributed by a private developer(s). The estimated debt service under this funding alternative is $32,715 for the combined water and sewer projects.

The total estimated annual cost of the project is summarized in Tables 6.4, below.

Table 6.4
Estimated Annual Project Costs – Water & Sewer

Expense	Cost
Water Fees to Village of Swanton (from Table 6.2A)	$20,769
Sewer Fees to Village of Swanton (From Table 6.3B)	$8,609
Debt Service (From Table 6.3)	$32,715
Total Annual Cost	**$62,093**

6.9 Projected User Rates

Under the funding alternative evaluated above, approximately $32,715 in debt service will be necessary each year. Two potential revenue sources to support this debt are described below.

Town of Highgate General Fund / Property Taxes

A portion of the project's debt service could be paid using Town-wide property taxes. Assuming a grand-list value of $94,000,000, a town-wide assessment of $0.001 per hundred dollars of assessed value would be sufficient to cover approximately $1,000 in annual debt service. This equates to an approximately $2 increase in annual property taxes on a $200,000 property.

User Fees

For most water and sewer infrastructure projects a substantial portion of the project's debt service and operation and maintenance costs are paid via user fees. Since it is assumed that operation and maintenance costs would be covered as part of the Village of Swanton's user fees, additional user fees would be needed to cover debt service.

To maintain affordability, annual user fees should generally not exceed approximately $1,000 each for sewer and water service for a two-bedroom single-family residence if possible. For comparison, a single residential user paying the Village of Swanton's non-village fixed and variable rates could expect to pay $926 and $722 per EU per year for water and sewer service, respectively. A user of the proposed water and sewer infrastructure would have to pay some additional amount to cover debt service associated with the project, discussed below.

It is assumed that support for the VMBB loan could be funded through a combination of these revenue sources. For example, if a user fee of $1,200 per EU for water and $1,400 per EU for sewer were set, estimated user revenues in the initial year would be $23,240, out of the expected annual cost of $62,093. If the remaining approximately $38,853 were funded via the Town of Highgate's general fund, the estimated tax impact would be approximately $0.0413 per hundred dollars of assessed property value, or approximately $82 on a $200,000 property. The required general fund support would likely decrease over time as the user base increases and is able to assume a greater share of costs.

6.10 Project Schedule

A preliminary schedule for implementing the proposed water and sewer projects is shown in Table 6.6, below.

Table 6.6
Project Schedule – Proposed Water and Sewer Projects

	2020				2021				2022				2023			
	Q1	Q2	Q3	Q4	Q1	Q2	Q3	Q4	Q1	Q2	Q3	Q4	Q1	Q2	Q3	Q4
Finalize Feasibility Study	X															
Submit Funding Applications																
Preliminary Engineering																
Bond Vote (November)				X												
Final Design and Permitting																
Bidding							X									
Construction																
End of 1-Year Warranty Period														X		

6.11 Community Engagement

Regular working group meetings were held during the preparation of this study. Meetings typically took place monthly, and included representatives from the Town of Highgate, Village of Swanton, State of Vermont, interested property owners, airport users, and regional economic development organizations.

A final draft of this study was reviewed with the Town of Highgate Selectboard and Swanton Village Trustees at a publicly warned meeting on March 5th, 2020. A copy of the presentation is included in **Appendix K.**

To acquire debt financing for this project, a Town-wide bond vote will have to be held and passed. Prior to holding a bond vote, at least one public informational meeting is typically held.

7. CONCLUSIONS & RECOMMENDATIONS

7.1 Conclusions

Installation of water and sewer infrastructure to the proposed service areas is technically feasible, but will be challenging to implement economically. Key challenges are the limited existing user base in the initial years over which to distribute costs, as well as significant non-village water and sewer fees that will need to be paid to the Village of Swanton, and will likely compose over 50% of the annual costs of the proposed water and sewer project.

7.2 Recommended Next Steps

Should the Town of Highgate decide to move forward with the proposed project, the following steps are recommended:

1. The Town of Highgate should discuss the project with the funding programs described above and begin pursuing available funding sources. Key topics of discussion should be the eligibility of the project for funding and key project development goals necessary to acquire funding.
2. The Town of Highgate should coordinate with the Village of Swanton on water and sewer rates and developing a Memorandum of Understanding (MOU) on an operation & maintenance agreement.

Pending favorable outcomes from these steps, the Town of Highgate will need to begin preparation of funding applications, prepare bond documents, hold public informational meetings, and pass a Town-wide bond vote in order to secure loan funding.

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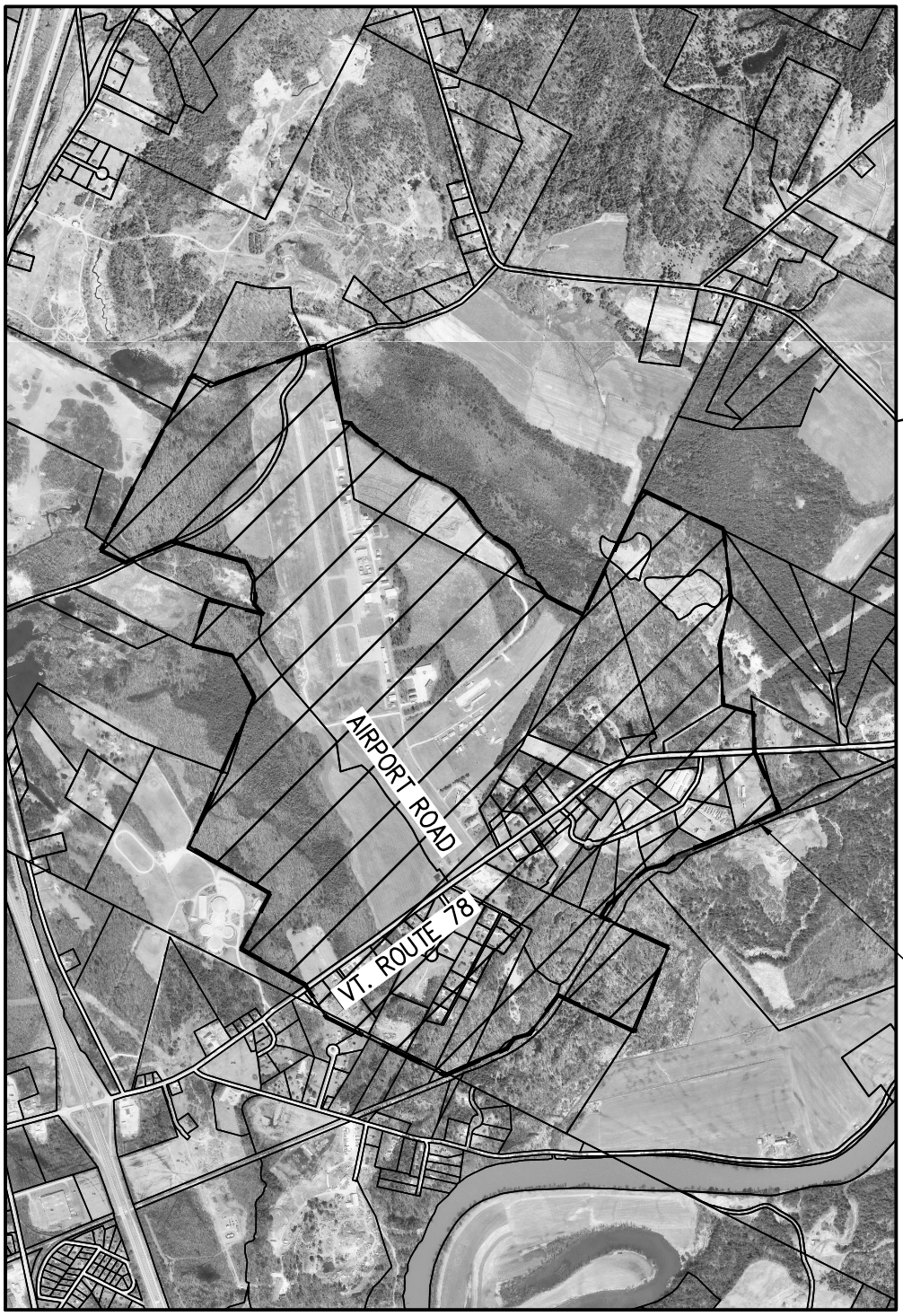
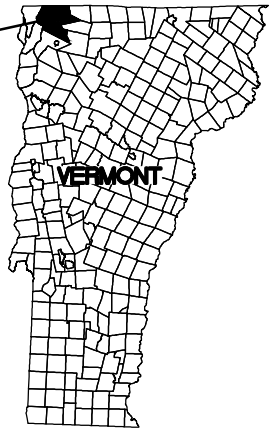
APPENDIX A - Figures





LOCATION OF STUDY AREA

N

LOCATION MAP

SCALE: 1"=1200'

Aldrich + Elliott
WATER RESOURCE ENGINEERS

6 Market Place, Suite 2
Essex Jct., VT 05452

P: 802.879.7733
AEengineers.com

PROJECT LOCATION MAP

HIGHGATE
AIRPORT INFRASTRUCTURE FEASIBILITY STUDY

TOWN OF HIGHGATE
HIGHGATE VERMONT

DESIGNED	MG
DRAWN	JEB
CHECKED (PM)	MJM
CHECKED (PE)	WAE
SCALE	AS NOTED
DATE	MAY, 2020
PROJECT NO.	18063
FIGURE NO.	1

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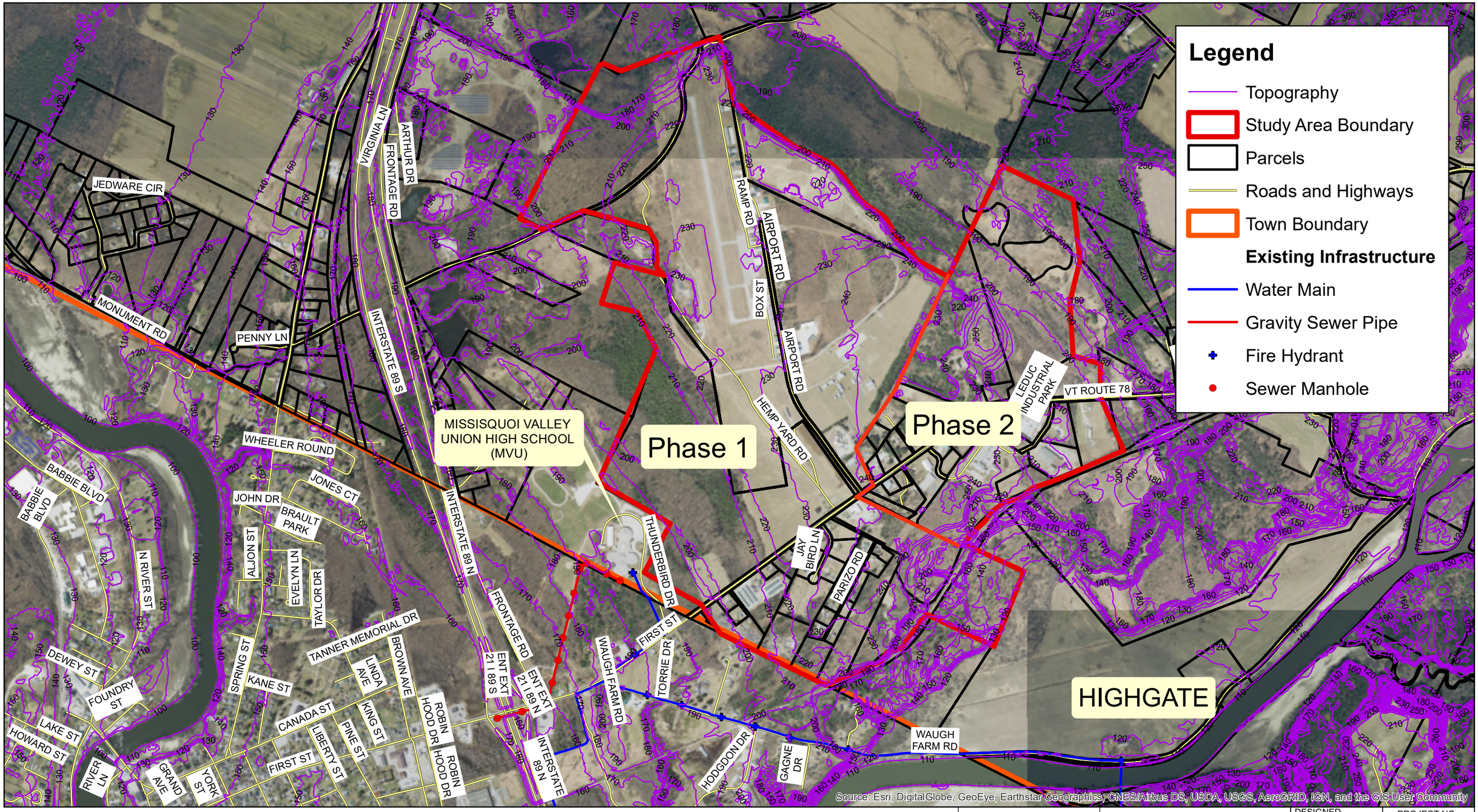

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1" = 1200'

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STUDY AREA AND EXISTING INFRASTRUCTURE

HIGHGATE AIRPORT INFRASTRUCTURE FEASIBILITY STUDY

TOWN OF HIGHGATE

HIGHGATE VT

DESIGNED	WAE
DRAWN	MG
CHECKED (PM)	WAE
CHECKED (PE)	WAE
SCALE	AS NOTED
DATE	MAY 2020

PROJECT NO. 18063

FIGURE NO. 2

Legend

- Study Area Boundary
- Class I - Well Suited
- Class II - Moderately Suited
- Class III - Marginally Suited
- Class IV - Not Suited
- Class V - Not Rated
- Water Supply (100-Foot Buffer)
- Water Supply

Source: Esri, DigitalGlobe, GeoEye, Earthstar Geographics, CNES/Airbus DS, USDA, USGS, AeroGRID, IGN, and the GIS User Community

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1" = 1000'

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ON-SITE SOIL SEWAGE DISPOSAL RATING AND WATER SUPPLIES

HIGHGATE AIRPORT INFRASTRUCTURE FEASIBILITY STUDY

TOWN OF HIGHGATE

HIGHGATE VT

DESIGNED	WAE
DRAWN	MG
CHECKED (PM)	WAE
CHECKED (PE)	WAE
SCALE	AS NOTED
DATE	MAY 2020

PROJECT NO. 18063

FIGURE NO. 3

Legend

- Study Area Boundary
- Streams
- Mapped VSWI Wetlands
- Surface Water

Source: Esri, DigitalGlobe, GeoEye, Earthstar Geographics, CNES/Airbus DS, USDA, USGS, AeroGRID, IGN, and the GIS User Community

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1" = 1000'

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WATER RESOURCES	DESIGNED WAE	PROJECT NO. 18063
	DRAWN MG	
HIGHGATE AIRPORT INFRASTRUCTURE FEASIBILITY STUDY	CHECKED (PM) WAE	FIGURE NO. 4
	CHECKED (PE) WAE	
TOWN OF HIGHGATE	SCALE AS NOTED	
HIGHGATE VT	DATE MAY 2020	

Legend

- Study Area Boundary
- Deer Wintering Areas
- Rare Threatened and Endangered Species

Source: Esri, DigitalGlobe, GeoEye, Earthstar Geographics, CNES/Airbus DS, USDA, USGS, AeroGRID, IGN, and the GIS User Community

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1" = 1000'

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DEER WINTERING AREAS AND RARE THREATENED AND ENDANGERED SPECIES

HIGHGATE AIRPORT INFRASTRUCTURE FEASIBILITY STUDY

TOWN OF HIGHGATE

HIGHGATE VT

DESIGNED	WAE
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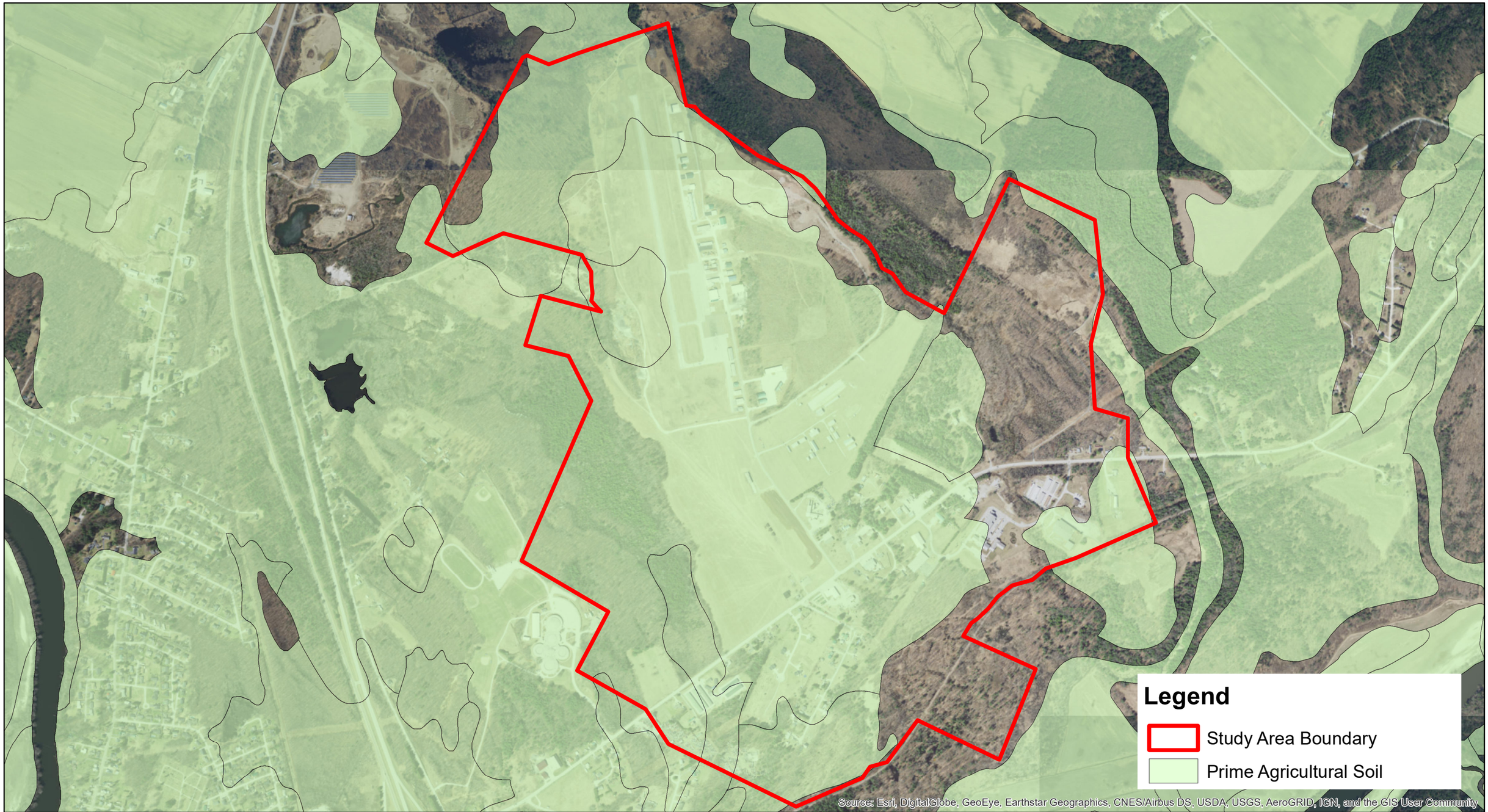
CHECKED (PE)	WAE
SCALE	AS NOTED
DATE	MAY 2020

PROJECT NO. 18063

FIGURE NO. 5



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1" = 1000'

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PRIME AGRICULTURAL SOILS

HIGHGATE AIRPORT
INFRASTRUCTURE
FEASIBILITY STUDY

TOWN OF HIGHGATE
HIGHGATE VT

DESIGNED WAE
DRAWN MG
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SCALE AS NOTED
DATE MAY 2020

PROJECT NO. 18063

FIGURE NO. 6

Legend

- Parcels
- Town Boundary
- Phase I Service Area
- Phase IA Service Area
- Phase II Service Area

Source: Esri, DigitalGlobe, GeoEye, Earthstar Geographics, CNES/Airbus DS, USDA, USGS, AeroGRID, IGN, and the GIS User Community

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1" = 1000'

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PROPOSED SERVICE AREAS

HIGHGATE AIRPORT
INFRASTRUCTURE
FEASIBILITY STUDY

TOWN OF HIGHGATE

HIGHGATE VT

DESIGNED	WAE
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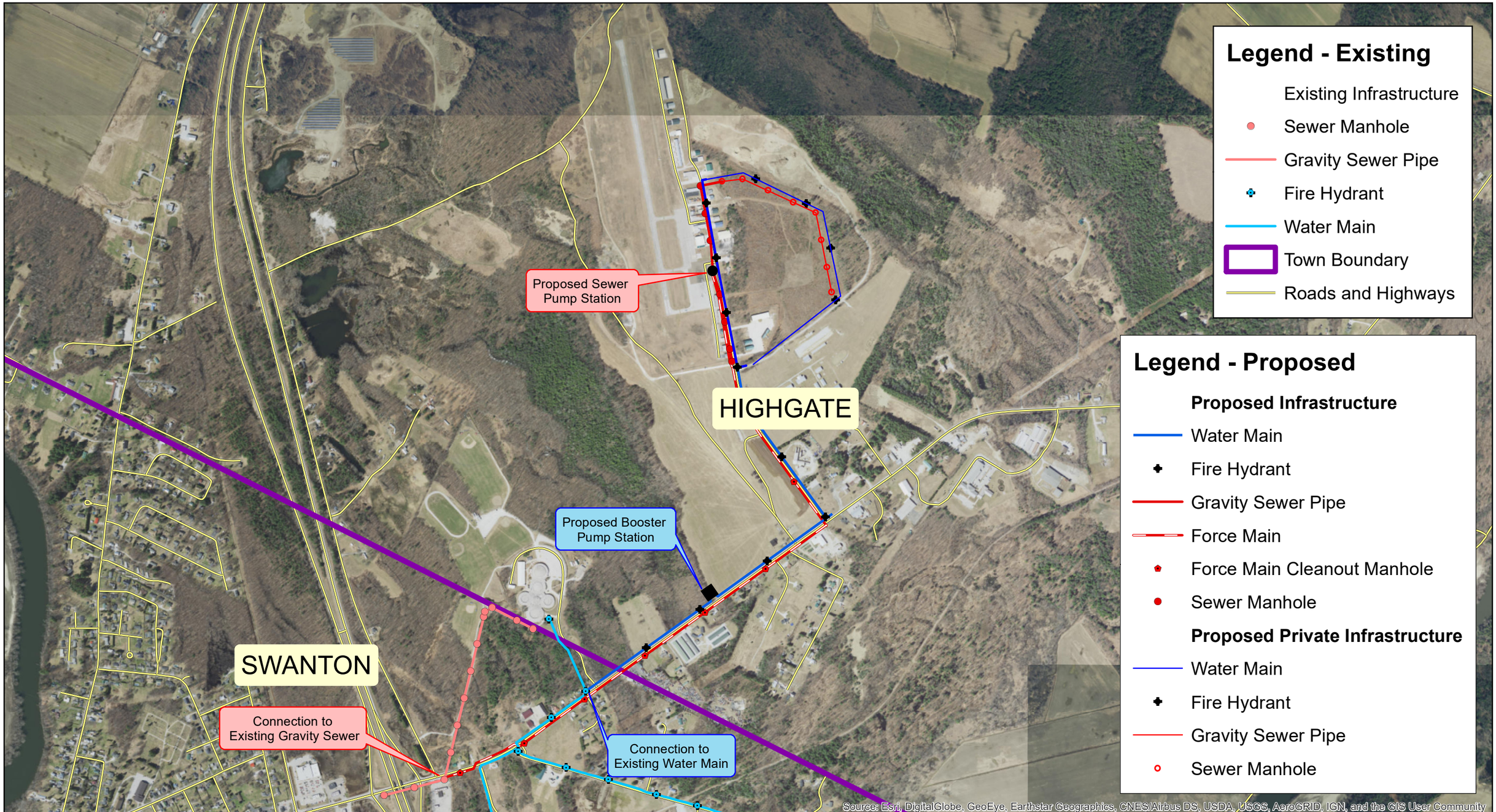
SCALE	AS NOTED
DATE	MAY 2020

PROJECT NO. 18063

FIGURE NO. 7



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1" = 1200'

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ALTERNATIVE NO. 1

HIGHGATE AIRPORT INFRASTRUCTURE FEASIBILITY STUDY

TOWN OF HIGHGATE

HIGHGATE VT

DESIGNED	WAE
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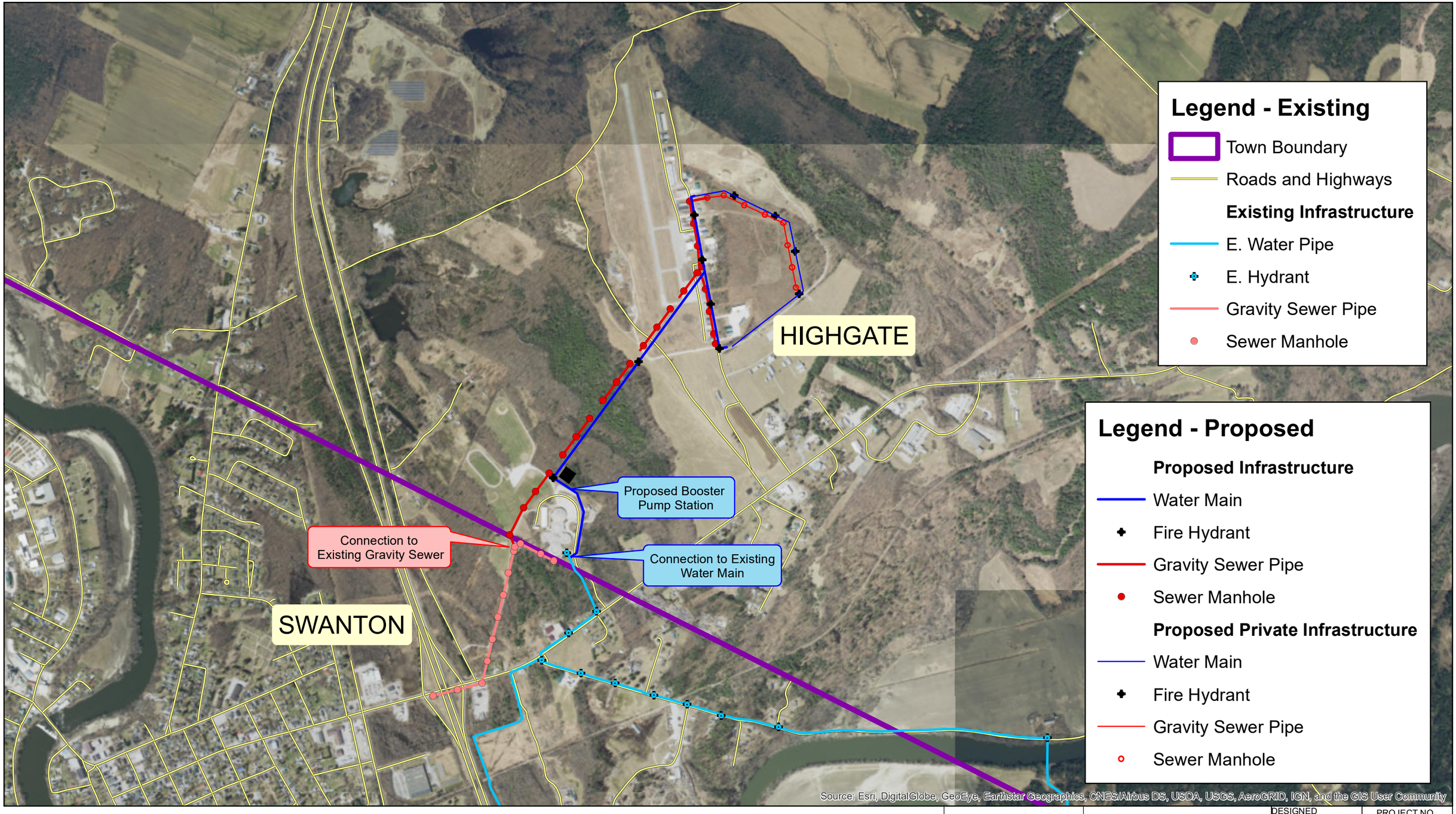
SCALE	AS NOTED
DATE	MAY 2020

PROJECT NO. 18063

FIGURE NO. 8



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1" = 1200'

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ALTERNATIVE NO. 2

HIGHGATE AIRPORT INFRASTRUCTURE FEASIBILITY STUDY

TOWN OF HIGHGATE

HIGHGATE VT

DESIGNED	WAE
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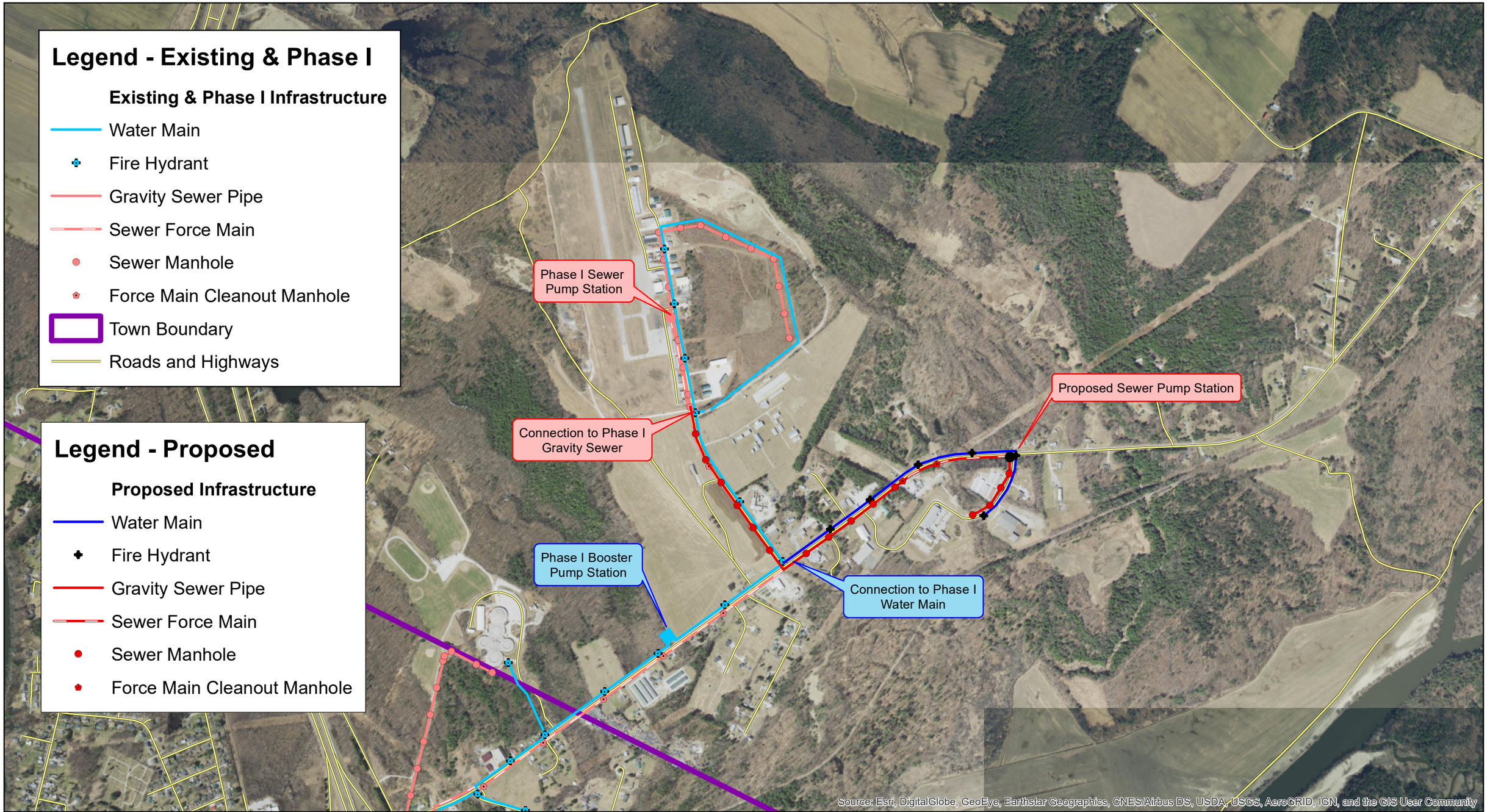
SCALE	AS NOTED
DATE	MAY 2020

PROJECT NO. 18063

FIGURE NO. 9



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1" = 1200'

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WATER RESOURCE ENGINEERS

ALTERNATIVE NO. 3

HIGHGATE AIRPORT
INFRASTRUCTURE
FEASIBILITY STUDY

TOWN OF HIGHGATE

HIGHGATE VT

DESIGNED	WAE
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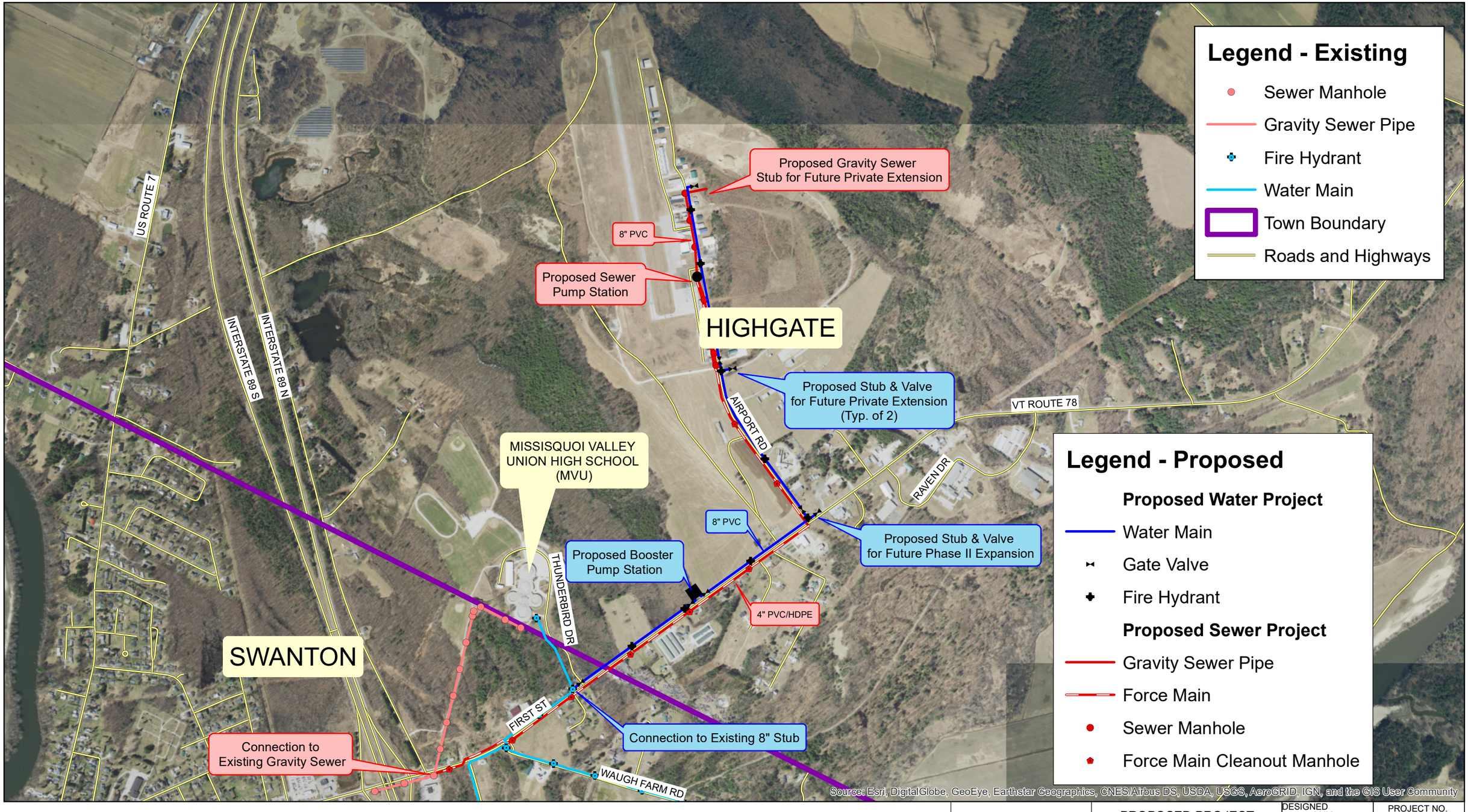
CHECKED (PM)	WAE
CHECKED (PE)	WAE
SCALE	AS NOTED
DATE	MAY 2020

PROJECT NO. 18063

FIGURE NO. 10



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1" = 1200'

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PROPOSED PROJECT

HIGHGATE AIRPORT INFRASTRUCTURE FEASIBILITY STUDY

TOWN OF HIGHGATE

HIGHGATE VT

DESIGNED	MJM
DRAWN	MG
CHECKED (PM)	WAE
CHECKED (PE)	WAE
SCALE	AS NOTED
DATE	MAY 2020

PROJECT NO. 18063

FIGURE NO. 11

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APPENDIX B – Property Owner Survey

Town
Of
Highgate

PO Box 189
2996 Vermont Route 78
Highgate, VT 05459

Phone: 802-868-4697
Fax: 802-868-3064

www.highgatevt.org

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hbvalenta@highgatevt.org

Shelley Laroche
Town Treasurer &
Delinquent Tax Collector
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Wendi Dusablon
Town Clerk
RB, Planning & Selectboard Clerk
Ext. 201
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Samantha Derosia
Zoning Administrator
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Extension 209

Aimee & Peter
Listers Office & 911 Coord.
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areynolds@highgatevt.org

Public Works Dept.
Philip 'Butch' Brosseau
ublicworks@highgatevt.org
Ext. 207

Sharon Bousquet
Bruce Butler
Randy Connelly
Richard Flint
Joshua LaRocque

August 15, 2019

Re: Town of Highgate
Airport Infrastructure Expansion
Property Owner Surveys

To Whom It May Concern,

The Town of Highgate received an Economic Development Infrastructure Planning Grant from the Agency of Commerce and Community Development. The purpose of this grant is to conduct a feasibility study to determine the economic development potential of extending existing water/sewer infrastructure along Vermont Route 78 to support existing and new business development at a proposed Industrial Commerce Park in Highgate located on Airport Road.

An approximate service area has been identified, so this water/sewer extension could also have the ability to serve existing properties located along the new water/sewer infrastructure routes. A property owner survey is being sent to the landowners of each property located within this potential service area.

These property owner surveys are being distributed so that the Town can better understand the current and future water and wastewater needs for this service area.

Your response is very important, so please return this survey in the self- addressed stamped envelope to Aldrich + Elliott, the Town's engineering consultant for this project. All completed surveys need to be returned by August 30, 2019.

If you have any questions on the survey, please contact Wayne Elliott as follows:

Telephone No.: (802) 879-7733 X103
Email Address: welliott@aeengineers.com

Thank-you for your time in completing the survey.

Town of Highgate

Sharon Bousquet
Highgate Selectboard Chair

PROPERTY OWNER SURVEY

This survey is for the Town to better understand the current water and wastewater needs for the potential Airport Infrastructure Expansion.

Specific information by address will be confidential and will not be shared with the Town or State. The information will not be used to pursue any type of enforcement action relating to non-complying or failed systems.

All information gathered will be used for study purposes only. The information will be compiled by Aldrich + Elliott, PC and summarized by area; not by specific address.

Property Owner(s) Name: _____ Phone: (Day) _____

Mailing Address: _____ Phone (Evening): _____

_____

Location (Street No. and Name): _____

Size of Lot: _____ square feet or _____ acres (please approximate if not sure)

*** Please sketch** your building location, driveway, septic tank, leachfield, and well on the last page.

Property Description: _____ Residential _____ Number of Bedrooms

_____ Commercial _____ Type of Use

I. YOUR EXISTING WASTEWATER TREATMENT AND DISPOSAL SYSTEM

1. When was your septic system built?

   _____ Before 1970 _____ 1990-1995 _____ 2002-Present

   _____ 1970-1989 _____ 1996-2001 _____ Don't know

2. Please indicate the components of your septic system by checking 1 or more below (refer to the attached definitions page):

	Wastewater Disposal System	Dosing Pump Station
_____ Cesspool		
_____ Septic Tank	_____ Dry Well (Seepage Pit)	_____ Yes
_____ Concrete	_____ Absorption Trench	_____ No
_____ Metal	_____ Absorption Bed	If Yes, Is there a panel with
_____ Plastic	_____ At-Grade	an alarm light or horn?
_____ Fiberglass	_____ Mound	_____ Yes
_____ Other	_____ Other	_____ No

Advanced or Innovative/Alternative Treatment System

_____ Yes _____ No If Yes, please describe below under other (i.e. Manufacturer, type)

_____ Other: _____

_____

3. How often is the septic tank pumped?
   - Do you know if your septic tank has ever been pumped? _____ Yes _____ No
   - Approximately every _____ years.
   - Year that septic tank was last pumped: _____

4. How deep below the ground surface is your septic tank?
   _____ 0-1 foot _____ Greater than 3 feet Is there an accessible cover at grade?
   _____ 1-3 feet _____ Don't know _____ Yes _____ No

5. Has your wastewater disposal system (leachfield, drywell, etc.) experienced any of the following conditions? _____ Yes _____ No (If yes, please fill out below.)

   _____ Surfacing sewage
   _____ Seasonally?
   _____ Overflow pipe to a ditch
   _____ Sink holes near septic tank or leachfield
   _____ Sewage smell at or near leachfield
   _____ Ground surface is always wet

6. Do you have space available for a replacement area if your wastewater disposal system fails?
   _____ Yes _____ No

7. Do you have any design plans of your septic system?

	Yes		No

8. Have you made any upgrades or repairs to your septic system within the last 10 years?
   _____ Yes _____ No (If yes, please describe below.):

   _____

   _____

II. YOUR EXISTING WATER SUPPLY SYSTEM

1. Do you know where your water supply is located?
   _____ On my property _____ On property other than mine

2. Which type of water system do you have?

   _____
   _____ Individual drilled well
   _____ Individual dug well/well point/spring
   _____ Community (shared) drilled well
   _____ Community (shared) dug well/spring
   _____ Don't know

3. Which statement best describes the quality of the water from your source (i.e., in regard to clearness, color, taste, odor, and hardness):
   _____ Always good quality _____ Poor quality seasonally _____ Always poor quality
   _____ Generally good quality, but water quality declines on a seasonal basis

4. Have you ever run out of water?
   _____ Yearly _____ Every few years _____ Never

5. Do you have any contamination issues with your source? _____ Yes _____ No
   _____ Radium _____ Petroleum _____ Other If other, type: _____
   _____ Bacteriological _____
   _____ Sulfur Odor _____

III. COMMENTS

1. Do you have any comments/questions about the water or wastewater needs for this service area?

   _____

   _____

   _____

2. What specific needs do you feel that your property or building as a whole has for water and/or wastewater?

   _____

   _____

   _____

3. Please comment on your interest, willingness or concerns for a municipal water and/or wastewater project.

   _____

   _____

4. What uses in the future would you have for your property if you had more water and/or wastewater capacity? (i.e. No change, add a bedroom, subdivide, add an apartment, change use to commercial (type?)

   _____

   _____

5. Do you have an interest in industrial and/or commercial development with adequate/affordable/accessible water and wastewater?

   Yes____ No ___

6. If yes, on a scale of 1 through 5 (with 5 being the highest and 1 being the lowest), rate your interest.

Commercial		Industrial	
	1. □		1. □
	2. □		2. □
	3. □		3. □
	4. □		4. □
	5. □		5. □

7. If yes, rate your interest (on a scale of 1 through 5) in making available “demonstration” or “spec. space”?

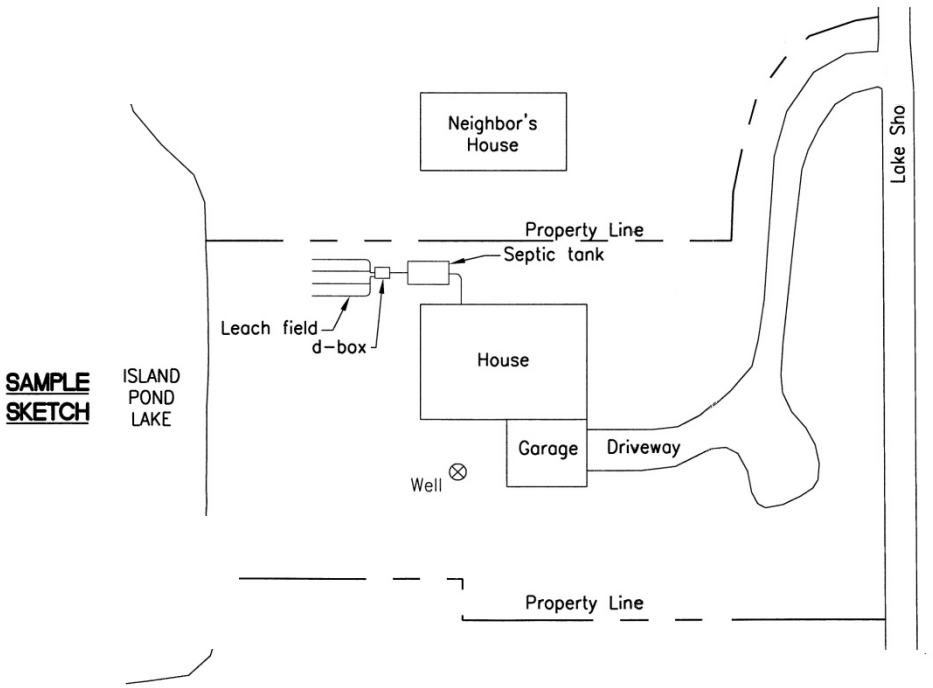
   1. □
   2. □
   3. □
   4. □
   5. □

8. How much would you be willing to pay per year for municipal water and wastewater?

	$500 - $750		$750 - $1,000		>$1,000

SKETCH OF PROPERTY

Please provide a sketch of your parcel with the location of your house, driveway, nearest road, septic tank, leachfield, property line, well/spring, brook or ponds.



Aldrich + Elliott
WATER RESOURCE ENGINEERS

APPENDIX C – Estimated Design Flows

Highgate Airport Infrastructure Study
Design Flow Estimates
12/18/2019
A+E Project #18063

Wastewater Design Flows

	VTEPR DESIGN FLOW		Phase I								Phase IA								Phase II							
			INITIAL YEAR - 2020				DESIGN YEAR - 2040				INITIAL YEAR - 2020				DESIGN YEAR - 2040				INITIAL YEAR - 2020				DESIGN YEAR - 2040			
PROPERTY USE	**RULE**	**DESIGN FLOW PER PROPERTY**	**TOTAL NUMBER OF PROPERTIES**	**% OF PROPERTIES CONNECTED**	**ESTIMATED NUMBER OF USER CONNECTIONS**	**ESTIMATED DESIGN FLOW (GAL/DAY)**	**TOTAL NUMBER OF PROPERTIES**	**% OF PROPERTIES CONNECTED**	**ESTIMATED NUMBER OF USER CONNECTIONS**	**ESTIMATED DESIGN FLOW (GAL/DAY)**	**TOTAL NUMBER OF PROPERTIES**	**% OF PROPERTIES CONNECTED**	**ESTIMATED NUMBER OF USER CONNECTIONS**	**ESTIMATED DESIGN FLOW (GAL/DAY)**	**TOTAL NUMBER OF PROPERTIES**	**% OF PROPERTIES CONNECTED**	**ESTIMATED NUMBER OF USER CONNECTIONS**	**ESTIMATED DESIGN FLOW (GAL/DAY)**	**TOTAL NUMBER OF PROPERTIES**	**% OF PROPERTIES CONNECTED**	**ESTIMATED NUMBER OF USER CONNECTIONS**	**ESTIMATED DESIGN FLOW (GAL/DAY)**	**TOTAL NUMBER OF PROPERTIES**	**% OF PROPERTIES CONNECTED**	**ESTIMATED NUMBER OF USER CONNECTIONS**	**ESTIMATED DESIGN FLOW (GAL/DAY)**
Residential																										
Single-Family Homes	210 gal/day	210	0	0%	0	0	0	0%	0	0	20	0%	0	0	23	0%	0	0	10	0%	0	0	12	25%	3	630
Subtotal, Residential					0	0			0	0			0	0			0	0			0	0			3	630
Commercial																										
Warehousing, Distribution, Service, or Retail	15 gpd/employee 10 employees/property	150	3	100%	3	450	5	100%	5	750	3	0%	0	0	4	0%	0	0	10	60%	6	900	13	75%	10	1500
Subtotal, Commercial					3	450			5	750			0	0			0	0			6	900			10	1500
Industrial																										
Light Industry, Machinery, Metal, or Rubber/Plastic Fabrication	15 gpd/employee 20 employees/property 1000 gal/day process allowance	1300	0	100%	0	0	3	100%	3	3900									2	50%	1	1300	4	75%	3	3900
Food or Beverage Production	15 gpd/employee 20 employees/property 2000 gal/day process allowance	2300	0	100%	0	0	4	100%	4	9200																
Subtotal, Industrial					0	0			7	13100			0	0			0	0			1	1300			3	3900
Aviation																										
FBO	15 gpd/employee 5 employees/property	75	1	100%	1	75	1	100%	1	75	0	0%	0	0	1	0%	0	0								
Aircraft Service	15 gpd/employee 5 employees/property	75	3	100%	3	225	3	100%	3	225	0	0%	0	0	3	0%	0	0								
Aircraft Storage	15 gpd/user 3 users/day	45	45	4%	2	90	60	3%	2	90	0	0%	0	0	45	0%	0	0								
Subtotal, Aviation					6	390			6	390			0	0			0	0			0	0			0	0
Total User Flow					**9**	**840**			**18**	**14240**			**0**	**0**			**0**	**0**			**7**	**2200**			**16**	**6030**
Non-User Flow																										
Infiltration Allowance	300 gal/day/inch diameter/mile of pipe					1900				1900												3300				3300
Total Design Flow						**2740**				**16140**				**0**				**0**				**5500**				**9330**

Highgate Airport Infrastructure Study
Design Flow Estimates
12/18/2019
A+E Project #18063

Water Supply Design Flows

	VTEPR DESIGN FLOW		Phase I								Phase IA								Phase II							
			INITIAL YEAR - 2020				DESIGN YEAR - 2040				INITIAL YEAR - 2020				DESIGN YEAR - 2040				INITIAL YEAR - 2020				DESIGN YEAR - 2040			
PROPERTY USE	**RULE**	**DESIGN FLOW PER PROPERTY**	**TOTAL NUMBER OF PROPERTIES**	**% OF PROPERTIES CONNECTED**	**ESTIMATED NUMBER OF USER CONNECTIONS**	**ESTIMATED DESIGN FLOW (GAL/DAY)**	**TOTAL NUMBER OF PROPERTIES**	**% OF PROPERTIES CONNECTED**	**ESTIMATED NUMBER OF USER CONNECTIONS**	**ESTIMATED DESIGN FLOW (GAL/DAY)**	**TOTAL NUMBER OF PROPERTIES**	**% OF PROPERTIES CONNECTED**	**ESTIMATED NUMBER OF USER CONNECTIONS**	**ESTIMATED DESIGN FLOW (GAL/DAY)**	**TOTAL NUMBER OF PROPERTIES**	**% OF PROPERTIES CONNECTED**	**ESTIMATED NUMBER OF USER CONNECTIONS**	**ESTIMATED DESIGN FLOW (GAL/DAY)**	**TOTAL NUMBER OF PROPERTIES**	**% OF PROPERTIES CONNECTED**	**ESTIMATED NUMBER OF USER CONNECTIONS**	**ESTIMATED DESIGN FLOW (GAL/DAY)**	**TOTAL NUMBER OF PROPERTIES**	**% OF PROPERTIES CONNECTED**	**ESTIMATED NUMBER OF USER CONNECTIONS**	**ESTIMATED DESIGN FLOW (GAL/DAY)**
Residential																										
Single-Family Homes	150 gal/day/bedroom Assume 2 bedrooms/property	300	0	0%	0	0	0	0%	0	0	20	33%	7	2100	23	33%	8	2400	10	0%	0	0	12	25%	3	900
Subtotal, Residential					0	0			0	0			7	2100			8	2400			0	0			3	900
Commercial																										
Warehousing, Distribution, Service, or Retail	15 gpd/employee 10 employees/property	150	3	100%	3	450	5	100%	5	750	3	33%	1	150	4	75%	3	450	10	60%	6	900	13	75%	10	1500
Subtotal, Commercial					3	450			5	750			1	150			3	450			6	900			10	1500
Industrial																										
Light Industry, Machinery, Metal, or Rubber/Plastic Fabrication	15 gpd/employee 20 employees/property 1000 gal/day process allowance	1300	0	100%	0	0	3	100%	3	3900									2	50%	1	1300	4	75%	3	3900
Food or Beverage Production	15 gpd/employee 20 employees/property 2000 gal/day process allowance	2300	0	100%	0	0	4	100%	4	9200																
Subtotal, Industrial					0	0			7	13100			0	0			0	0			1	1300			3	3900
Aviation																										
FBO	15 gpd/employee 5 employees/property	75	1	100%	1	75	1	100%	1	75	0	0%	0	0	1	75%	1	75								
Aircraft Service	15 gpd/employee 5 employees/property	75	3	100%	3	225	3	100%	3	225	0	0%	0	0	3	100%	3	225								
Aircraft Storage	15 gpd/user 3 users/day	45	45	4%	2	90	60	3%	2	90	0	0%	0	0	45	0%	0	0								
Subtotal, Aviation					6	390			6	390			0	0			4	300			0	0			0	0
Total					**9**	**840**			**18**	**14240**			**8**	**2250**			**15**	**3150**			**7**	**2200**			**16**	**6300**

Aldrich + Elliott
WATER RESOURCE ENGINEERS

APPENDIX D – Hydraulic Model Results

Town of Highgate
Highgate Airport Infrastructure Study - Preliminary Hydraulic Model
Hydraulic Model Basis of Design
A+E Project #18063
12/24/2019

Summary

Water System:	Swanton Village Water
WSID:	5132
ADD (Permitted):	500,000 gpd
MDD (Permitted):	1,000,000 gpd
ADD (2018 Water Production):	252,500 gpd
MVU High School	5,040 gpd
Village (J-119)	247,460 gpd
MDD (Design)	505,000 gpd
Airport	49,560 gpd
MVU High School	10,080 gpd
Village (J-119)	940,360 gpd
Elevation Assigned From:	VCGI contour data

Other Notes:
Village distribution system merged into single node (J-119) - elevation of J-119 was assumed to be highest point in Village Distribution System

Calibration Parameters

Topology:	Existing
Physical:	Calibrated
Tank Level:	High - 312.75 ft MSL
Old Transmission Main:	Active
Demand:	ADD (2018)
WTP Production:	1200 gpm
Model Configuration:	Steady State

Base Scenario

Topology:	Proposed - Alternative No. 1
Physical:	Calibrated
Tank Level:	Low - 290.00 ft MSL
Old Transmission Main:	Inactive
Demand:	MDD (Design)
WTP Production:	Off
Model Configuration:	Steady State

Fire Flow Scenario

Topology:	Proposed - Alternative No. 1
Physical:	Calibrated
Tank Level:	Low - 290.00 ft MSL
Old Transmission Main:	Inactive
Demand:	MDD (Design) + Fire Flow
WTP Production:	Off
Model Configuration:	Fire Flow
Fire Flow Criteria:	
Min. Fire Flow - Village:	2000 gpm
Min. Fire Flow - Airport:	500 gpm
Minimum Pressure - Village:	20 psi
Minimum Pressure - Airport:	20 psi

Town of Highgate
Highgate Airport Infrastructure Study
Hydraulic Model Results - Base Scenario
A+E Project #18063
12/24/2019

Label	Elevation (ft)	Zone	Hydraulic Grade (ft)	Demand (gpm)	Pressure (psi)
H3-2	189.72	Village	308.07	0	51.2
H3-3	189.71	Village	308.3	0	51.3
H3-4	190.25	Village	308.49	0	51.2
H3-5	194.39	Village	308.72	0	49.5
H3-6	202.91	Village	308.91	0	45.9
H3-7	210.85	Village	309.11	0	42.5
H3-8	161.09	Village	309.43	0	64.2
H3-9	119	Village	310.92	0	83
H3-15	196.02	Village	308.04	0	48.5
H3-13	191.11	Village	308.05	0	50.6
H3-14	194.39	Village	308.05	0	49.2
ProposedHydrants-1	226.48	Airport	325.89	0	43
ProposedHydrants-2	230	Airport	325.89	0	41.5
ProposedHydrants-3	229.3	Airport	325.89	0	41.8
ProposedHydrants-4	231.04	Airport	325.9	0	41
ProposedHydrants-5	234	Airport	325.93	0	39.8
ProposedHydrants-6	196	Airport	326	0	56.2
ProposedPrivateHydrants-1	228.79	Airport	325.89	0	42
ProposedPrivateHydrants-2	227.21	Airport	325.9	0	42.7
ProposedPrivateHydrants-3	231.65	Airport	325.9	0	40.8
ProposedPrivateHydrants-4	244.62	Airport	325.9	0	35.2
BPS_Control_Node	196	Airport	326	0	56.2
J-7	293	N/A	311.82	0	8.1
J-5	293	N/A	311.82	0	8.1
J-120	196	Village	308	0	48.5
J-119	154.41	Village	307.16	653	66.1
J-117	226.29	Airport	325.89	35	43.1
J-115	228.63	Village	325.89	0	42.1
J-104	196.24	Village	308.04	7	48.4
J-102	196.17	Village	308.04	0	48.4
J-87	194.3	Village	308.05	0	49.2
J-11	189.99	Village	308.05	0	51.1
J-3	154.41	Village	307.17	0	66.1
J-2	130.59	Village	311.01	0	78.1
J-1	119	Village	310.93	0	83

Town of Highgate
Highgate Airport Infrastructure Study
Hydraulic Model Results - Fire Flow Scenario
A+E Project #18063
12/24/2019

Label	Zone	Satisfies Fire Flow Constraints?	Fire Flow (Needed) (gpm)	Fire Flow (Available) (gpm)	Flow (Total Needed) (gpm)	Flow (Total Available) (gpm)	Pressure (Residual Lower Limit) (psi)	Pressure (Calculated Residual) (psi)	Pressure (Zone Lower Limit) (psi)	Pressure (Calculated Zone Lower Limit) (psi)	Junction w/ Minimum Pressure (Zone)
H3-2	Village	Yes	500	2000	500	2000	20	32	20	28.4	H3-7
H3-3	Village	Yes	500	2000	500	2000	20	33.2	20	28.4	H3-7
H3-4	Village	Yes	500	2000	500	2000	20	34	20	28.4	H3-7
H3-5	Village	Yes	500	2000	500	2000	20	33.4	20	28.4	H3-7
H3-6	Village	Yes	500	2000	500	2000	20	30.7	20	28.4	H3-7
H3-7	Village	Yes	500	2000	500	2000	20	28.4	20	31.7	H3-6
H3-8	Village	Yes	500	2000	500	2000	20	51.6	20	29.9	H3-7
H3-9	Village	Yes	500	2000	500	2000	20	77.8	20	35.2	ProposedPrivateHydrants-4
H3-15	Village	Yes	500	1314	500	1314	20	20.1	20	20	J-104
H3-13	Village	Yes	500	2000	500	2000	20	28.2	20	26	J-104
H3-14	Village	Yes	500	2000	500	2000	20	23.9	20	23.1	J-104
ProposedHydrants-1	Airport	Yes	500	698	500	698	20	26.6	20	20	ProposedPrivateHydrants-4
ProposedHydrants-2	Airport	Yes	500	696	500	696	20	24.9	20	20	ProposedPrivateHydrants-4
ProposedHydrants-3	Airport	Yes	500	700	500	700	20	25.7	20	20	ProposedPrivateHydrants-4
ProposedHydrants-4	Airport	Yes	500	703	500	703	20	25.9	20	20	ProposedPrivateHydrants-4
ProposedHydrants-5	Airport	Yes	500	731	500	731	20	24.7	20	20.1	ProposedPrivateHydrants-4
ProposedHydrants-6	Airport	Yes	500	820	500	820	20	41.1	20	20	ProposedPrivateHydrants-4
ProposedPrivateHydrants-1	Airport	Yes	500	693	500	693	20	25.6	20	20	ProposedPrivateHydrants-4
ProposedPrivateHydrants-2	Airport	Yes	500	690	500	690	20	26.5	20	20	ProposedPrivateHydrants-4
ProposedPrivateHydrants-3	Airport	Yes	500	688	500	688	20	25	20	20	ProposedPrivateHydrants-4
ProposedPrivateHydrants-4	Airport	Yes	500	686	500	686	20	20	20	25.9	ProposedPrivateHydrants-3
J-119	Village	Yes	2000	2577	2653	3230	20	30.7	20	20	J-104

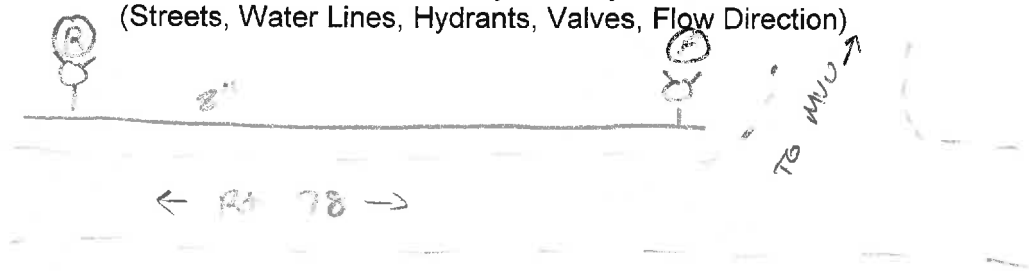
Aldrich + Elliott, PC
Water Resource Engineers

Aldrich + Elliott
WATER RESOURCE ENGINEERS

HYDRANT FLOW TEST REPORT

Project Name:	Swanton - Highgate	Project No.:	18063
Location:	MJU Access Road	Date:	10/31/2019
Inspector:	MJM	Time:	3:50
		Weather:	55°, Lgt Rain

Diagram of Physical Layout
(Streets, Water Lines, Hydrants, Valves, Flow Direction)



FIELD DATA:

Flowing Hydrant (A) (F)			Residual Hydrant (B) (R)		
Hydrant No.:			Hydrant No.:		
Size Nozzle:	2-½"		Static Pressure:	56	psi
Pilot Reading:		psi	Residual Pressure:	Droped to 46, stabilized at 52	psi
Flow Rate:	1060	gpm			

PROJECTED FLOWS:

$$Q_R = Q_F \times \frac{h_R^{0.54}}{h_F^{0.54}}$$

Q_R	Flow at residual pressure of 20 psi (gpm)
Q_F	Hydrant A flow rate (gpm)
h_R	Static at Hydrant B - 20 psi (psi)
h_F	Static at Hydrant B - Residual at Hydrant B (psi)

Projected Flow (Q_R) at 20 psi Residual: gpm

Notes: (Note any conditions affecting test, i.e. pumps operating/tanks on-line/off-line)

Backwash cycle just finished

Aldrich + Elliott
WATER RESOURCE ENGINEERS

APPENDIX E – Village of Swanton Water & Sewer Rates

Swanton Village Public Works

Water Treatment

Water & Sewer Rates Effective March 1st, 2018

Residential Village

Water – $23.16 customer charge plus $2.56 per 1,000 gallons
Sewer – $34.04 customer charge plus $4.10 per 1,000 gallons
Water connection cost – $750
Sewer connection cost – $750

Residential Town

Water – $46.31 customer charge plus $5.11 per 1,000 gallons
Sewer – $34.04 customer charge plus $4.10 per 1,000 gallons
Water connection cost – $1500
Sewer connection cost – $1500

Commercial Village

Water – $46.31 customer charge plus $2.56 per 1,000 gallons
Sewer – $68.07 customer charge plus $4.10 per 1,000 gallons
Water connection cost – $2000
Sewer connection cost – $2000

Commercial Town

Water – $92.63 customer charge plus $5.11 per 1,000 gallons
Sewer – $68.07 customer charge plus $4.10 per 1,000 gallons
Water connection cost – $2000
Sewer connection cost – $2000

Industrial Village

Water – $92.63 customer charge plus $2.56 per 1,000 gallons
Sewer – $136.14 customer charge plus $4.10 per 1,000 gallons

Industrial Town

Water – $185.26 customer charge plus $5.11 per 1,000 gallons
Sewer – $136.14 customer charge plus $4.10 per 1,000 gallons

Aldrich + Elliott
WATER RESOURCE ENGINEERS

APPENDIX F – Non-Monetary Evaluation Matrix

Highgate Airport Infrastructure Study
Non-Monetary Evaluation - Wastewater Alternatives
1/2/2020
A+E Project #18063

	Wastewater Alternative No. 1 Phase I Pump Station & Force Main Interconnection	**Wastewater Alternative No. 2 Phase I Gravity Sewer Interconnection**	**Wastewater Alternative No. 3 Phase II Expansion**	**Wastewater Alternative No. 4 On-Site Wastewater Disposal Systems**
Constructability	Straightforward construction.	Requires construction either under runways or at significant depths. Careful design of gravity sewer will be necessary due to marginal available slope. Shares common costs with Water Alternative No. 2	Straightforward construction. Significantly larger in scope than other alternatives.	Individual users are responsible for permitting and construction of new or replacement on-site wastewater systems. Site conditions for on-site wastewater disposal systems in the proposed service areas are generally favorable for low-impact domestic wastewater disposal.
Land Requirements	Most construction would occur in public right-of-ways.	New gravity sewer interconnection will require easements on privately-owned land.	Most construction would occur in public right-of-ways.	Construction of on-site disposal systems is difficult on small or heavily developed parcels.
Environmental Considerations	Construction is primarily limited to areas already impacted by road and airport construction.	New gravity sewer interconnection will pass through wetlands and areas that may be more archeologically significant.	Construction is primarily limited to areas already impacted by road construction and land development.	
Operation & Maintenance	Pump stations require periodic maintenance for cleaning, removal of debris, and replacement of equipment. New infrastructure is readily accessible for maintenance.	No municipal pump station would be necessary. Because the gravity sewer interconnection crosses areas used for aircraft operation and is located well away from roads, access for maintenance will be limited.	Would require additional pump station require periodic maintenance for cleaning, removal of debris, and replacement of equipment. New infrastructure is readily accessible for maintenance.	Individual users are responsible for operation and maintenance of on-site wastewater disposal systems. There are very few reported issues with the existing on-site wastewater disposal systems in the proposed service areas.
User Access & Expandability	No access to additional users along Route 78.	No access to additional users along Route 78.	Access to additional users in Phase II service area. Low user interest or needs in this area.	Site conditions may limit on-site wastewater disposal capacity, especially for in-fill residential or concentrated commercial/industrial development, or facilities with high-strength wastewater.

Highgate Airport Infrastructure Study
Non-Monetary Evaluation - Water Alternatives
1/2/2020
A+E Project #18063

	Water Alternative No. 1 **Phase I Interconnection via Route 78**	**Water Alternative No. 2** **Phase I Interconnection via MVU**	**Water Alternative No. 3** **Phase II Expansion**	**Water Alternative No. 4** **On-Site Water Supplies**
Constructability	Straightforward construction.	Special construction techniques and/or phasing may be necessary under and around runways. Shares common costs with Wastewater Alternative No. 2	Straightforward construction. Significantly larger in scope than other alternatives.	Individual users are responsible for permitting and construction of new or replacement on-site water supplies. Poor-quality groundwater is reported to exist in the area.
Land Requirements	Most construction would occur in public right-of-ways.	New gravity sewer interconnection will require easements on privately-owned land.	Most construction would occur in public right-of-ways.	Minimal land requirements, but isolation distances to existing on-site wastewater disposal systems may be inadequate.
Environmental Considerations	Construction is primarily limited to areas already impacted by road and airport construction.	New water main will pass through wetlands and areas that may be more archeologically significant.	Construction is primarily limited to areas already impacted by road construction and land development.	
Operation & Maintenance	Booster pump stations require periodic maintenance. New infrastructure is readily accessible for maintenance.	Booster pump stations require periodic maintenance. Because the proposed water main crosses areas used for aircraft operation and is located well away from roads, access for maintenance will be limited.	New infrastructure is readily accessible for maintenance. Would be served by booster pump station from Alternative No. 1 or 2; Additional booster pump station would not be required.	Individual users are responsible for operation and maintenance of on-site water supplies.
User Access & Expandability	Straightforward connection of users along Route 78.	No access to additional users along Route 78.	Access to additional users in Phase II service area.	Limited well yields and inadequate isolation distances to on-site wastewater disposal systems may limit in-fill development.
Fire Flows	Yes	Yes	Yes	No

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APPENDIX G – Estimated Construction Costs

Highgate Area Infrastructure Study
Estimated Construction Cost - Wastewater Alternative No. 1
5/6/2020
A+E Project #18063

	Description of Item	Quantity	Unit	Unit Price	Cost ENR 11326	Cost ENR 11823	Cost ENR 12522
A - Sewer							
A- 1	8" PVC Gravity Sewer	2,200	L.F.	$ 80	$ 176,000	$ 183,723	$ 194,585
A- 2	4" PVC Sewer Service Stub	250	L.F.	$ 60	$ 15,000	$ 15,658	$ 16,584
A- 3	4" PVC Sewer Force Main	9,600	L.F.	$ 60	$ 576,000	$ 601,276	$ 636,824
A- 4	4" PVC Sewer Force Main in 12" Sleeve	130	L.F.	$ 200	$ 26,000	$ 27,141	$ 28,746
B - Sewer Appurtenances							
B- 1	48" Dia. Sewer Manhole	7	EA.	$ 4,000	$ 28,000	$ 29,229	$ 30,957
B- 2	Force Main Cleanout Manhole	8	EA.	$ 3,000	$ 24,000	$ 25,053	$ 26,534
B- 3	8" x 4" Service Wye	10	EA.	$ 120	$ 1,200	$ 1,253	$ 1,327
B- 4	7000-gal Duplex Submersible Pump Station	1	EA.	$ 155,000	$ 155,000	$ 161,802	$ 171,368
B- 5	Connection to Existing Sewer Manhole	1	EA.	$ 2,000	$ 2,000	$ 2,088	$ 2,211
C - Earthwork							
C- 1	Rock Excavation	50	C.Y.	$ 150	$ 7,500	$ 7,829	$ 8,292
C- 2	Boulder Excavation	50	C.Y.	$ 75	$ 3,750	$ 3,915	$ 4,146
C- 3	Misc. Extra. Below Grade Excavation	50	C.Y.	$ 40	$ 2,000	$ 2,088	$ 2,211
C- 4	Exc. & Replace Unsuitable Material	50	C.Y.	$ 50	$ 2,500	$ 2,610	$ 2,764
D - Roadwork and Appurtenances							
D- 1	Bituminous Pavement Repair - Roads	50	S.Y.	$ 75	$ 3,750	$ 3,915	$ 4,146
D- 2	Bituminous Pavement Repair - Drives	140	S.Y.	$ 60	$ 8,400	$ 8,769	$ 9,287
D- 3	Road Shoulder Repair	200	L.F.	$ 20	$ 4,000	$ 4,176	$ 4,422
D- 4	Gravel Road and Driveway Repair	200	L.F.	$ 25	$ 5,000	$ 5,219	$ 5,528
E - Incidental Work							
E- 1	Calcium Chloride	5	TON	$ 650	$ 3,250	$ 3,393	$ 3,593
E- 2	Rigid Trench Insulation	50	L.F.	$ 15	$ 750	$ 783	$ 829
E- 3	Silt Fence	100	L.F.	$ 3	$ 300	$ 313	$ 332
E- 4	Inlet Protection	4	EA.	$ 175	$ 700	$ 731	$ 774
E- 5	Uniformed Traffic Officers	80	HRS.	$ 85	$ 6,800	$ 7,098	$ 7,518
F -Lump Sum							
F- 1	Prep of Site and Misc Work (10%)	1	L.S.	$ 105,190	$ 105,190	$ 109,806	$ 116,298
F- 2	VTrans Inspection Allowance	1	L.S.	$ 5,000	$ 5,000	$ 5,219	$ 5,528
F- 3	Bonds (2%)	1	L.S.	$ 23,142	$ 23,142	$ 24,157	$ 25,586
				TOTALS	$ 1,185,232	$ 1,237,241	$ 1,310,390
				USE	**$ 1,186,000**	**$ 1,238,000**	**$ 1,311,000**

Notes:

1. ENR 11326 = December 2019
2. ENR 11823 = March 2021
3. ENR 12522 = March 2023

Highgate Area Infrastructure Study
Estimated Construction Cost - Wastewater Alternative No. 3
5/6/2020
A+E Project #18063

	Description of Item	Total Quantity	Unit	Unit Price	Cost ENR 11326	Cost ENR 11823	Cost ENR 12522
A - Sewer							
A- 1	8" PVC Gravity Sewer	7,200	L.F.	$ 80	$ 576,000	$ 601,276	$ 636,824
A- 2	4" PVC Sewer Service Stub	1,000	L.F.	$ 60	$ 60,000	$ 62,633	$ 66,336
A- 3	4" PVC or HDPE Sewer Force Main	1,400	L.F.	$ 60	$ 84,000	$ 87,686	$ 92,870
B - Sewer Appurtenances							
B- 1	48" Dia. Sewer Manhole	17	EA.	$ 4,000	$ 68,000	$ 70,984	$ 75,181
B- 2	Force Main Clearnout Manhole	2	EA.	$ 2,000	$ 4,000	$ 4,176	$ 4,422
B- 3	8" x 4" Service Wye	10	EA.	$ 120	$ 1,200	$ 1,253	$ 1,327
B- 4	5000-gal Duplex Submersible Pump Station	1	EA.	$ 155,000	$ 155,000	$ 161,802	$ 171,368
B- 5	Additional capacity in Phase I pump station	1	EA.	$ 50,000	$ 50,000	$ 52,194	$ 55,280
B- 6	Connection to Existing Sewer Manhole	1	EA.	$ 2,000	$ 2,000	$ 2,088	$ 2,211
C - Earthwork							
C- 1	Rock Excavation	50	C.Y.	$ 150	$ 7,500	$ 7,829	$ 8,292
C- 2	Boulder Excavation	50	C.Y.	$ 75	$ 3,750	$ 3,915	$ 4,146
C- 3	Misc. Extra. Below Grade Excavation	50	C.Y.	$ 40	$ 2,000	$ 2,088	$ 2,211
C- 4	Exc. & Replace Unsuitable Material	50	C.Y.	$ 50	$ 2,500	$ 2,610	$ 2,764
D - Roadwork and Appurtenances							
D- 1	Bituminous Pavement Repair - Roads	80	S.Y.	$ 75	$ 6,000	$ 6,263	$ 6,634
D- 2	Bituminous Pavement Repair - Drives	200	S.Y.	$ 60	$ 12,000	$ 12,527	$ 13,267
D- 3	Road Shoulder Repair	1,000	L.F.	$ 20	$ 20,000	$ 20,878	$ 22,112
D- 4	Gravel Road and Driveway Repair	100	L.F.	$ 25	$ 2,500	$ 2,610	$ 2,764
E - Incidental Work							
E- 1	Class B Concrete	10	C.Y.	$ 600	$ 6,000	$ 6,263	$ 6,634
E- 2	Calcium Chloride	5	TON	$ 650	$ 3,250	$ 3,393	$ 3,593
E- 3	Rigid Trench Insulation	50	L.F.	$ 15	$ 750	$ 783	$ 829
E- 4	Silt Fence	600	L.F.	$ 3	$ 1,800	$ 1,879	$ 1,990
E- 5	Inlet Protection	4	EA.	$ 175	$ 700	$ 731	$ 774
E- 6	Stone-Lined Drainage Swale	50	L.F.	$ 120	$ 6,000	$ 6,263	$ 6,634
E- 7	Uniformed Traffic Officers	80	HRS.	$ 85	$ 6,800	$ 7,098	$ 7,518
F -Lump Sum							
F- 1	Prep of Site and Misc Work (10%)	1	L.S.	$ 107,495	$ 107,495	$ 112,212	$ 118,846
F- 2	VTrans Inspection Allowance	1	L.S.	$ 5,000	$ 5,000	$ 5,219	$ 5,528
F- 3	Bonds (2%)	1	L.S.	$ 23,785	$ 23,785	$ 24,829	$ 26,297
				TOTALS	$ 1,218,030	$ 1,271,479	$ 1,346,651
				USE	**$ 1,219,000**	**$ 1,272,000**	**$ 1,347,000**

Notes:

1. ENR 11326 = December 2019
2. ENR 11823 = March 2021
3. ENR 12522 = March 2023

Highgate Area Infrastructure Study
Estimated Construction Cost - Water Alternative No. 1
5/6/2020
A+E Project #18063

	Description of Item	Total Quantity	Unit	Unit Price	Cost ENR 11386	Cost ENR 11823	Cost ENR 12522
A - Sewer							
A- 1	8" C900 PVC Water Main	7,200	L.F.	$ 70	$ 504,000	$ 523,344	$ 554,285
A- 2	8" C900 PVC Water Main in 16" Sleeve	50	L.F.	$ 200	$ 10,000	$ 10,384	$ 10,998
B - Sewer Appurtenances							
B- 1	Fire Hydrant Branch Connections	8	EA.	$ 4,500	$ 36,000	$ 37,382	$ 39,592
B- 2	3/4" or 1" Corporation Stop	22	EA.	$ 200	$ 4,400	$ 4,569	$ 4,839
B- 3	3/4" or 1" Curb Stop	22	EA.	$ 200	$ 4,400	$ 4,569	$ 4,839
B- 4	3/4" or 1" CTS PE Water Service	300	L.F.	$ 50	$ 15,000	$ 15,576	$ 16,497
B- 5	3/4" or 1" CTS PE Water Service in 1-1/2" Sleeve	250	L.F.	$ 80	$ 20,000	$ 20,768	$ 21,995
B- 6	8" Gate Valve	8	EA.	$ 2,500	$ 20,000	$ 20,768	$ 21,995
B- 7	Booster Pump Station	1	EA.	$ 240,000	$ 240,000	$ 249,211	$ 263,945
B- 8	Air Release Manhole	1	EA.	$ 10,000	$ 10,000	$ 10,384	$ 10,998
C - Earthwork							
C- 1	Rock Excavation	50	C.Y.	$ 150	$ 7,500	$ 7,788	$ 8,248
C- 2	Boulder Excavation Water Main	50	C.Y.	$ 75	$ 3,750	$ 3,894	$ 4,124
C- 3	Misc. Extra. Below Grade Excavation	50	C.Y.	$ 40	$ 2,000	$ 2,077	$ 2,200
C- 4	Exc. & Replace Unsuitable Material	50	C.Y.	$ 50	$ 2,500	$ 2,596	$ 2,749
D - Roadwork and Appurtenances							
D- 1	Bituminous Pavement Repair - Roads	130	S.Y.	$ 75	$ 9,750	$ 10,124	$ 10,723
D- 2	Bituminous Pavement Repair - Drives	140	S.Y.	$ 60	$ 8,400	$ 8,722	$ 9,238
D- 3	Road Shoulder Repair	100	L.F.	$ 20	$ 2,000	$ 2,077	$ 2,200
D- 4	Gravel Road and Driveway Repair	100	L.F.	$ 25	$ 2,500	$ 2,596	$ 2,749
E - Incidental Work							
E- 1	Class B Concrete	30	C.Y.	$ 600	$ 18,000	$ 18,691	$ 19,796
E- 2	Calcium Chloride	5	TON	$ 650	$ 3,250	$ 3,375	$ 3,574
E- 3	Rigid Trench Insulation	50	L.F.	$ 15	$ 750	$ 779	$ 825
E- 4	Silt Fence	1,000	L.F.	$ 3	$ 3,000	$ 3,115	$ 3,299
E- 5	Inlet Protection	4	EA.	$ 175	$ 700	$ 727	$ 770
E- 6	Uniformed Traffic Officers	80	HRS.	$ 85	$ 6,800	$ 7,061	$ 7,478
F -Lump Sum							
F- 1	Prep of Site and Misc Work (10%)	1	L.S.	$ 93,470	$ 93,470	$ 97,057	$ 102,796
F- 2	VTrans Inspection Allowance	1	L.S.	$ 5,000	$ 5,000	$ 5,192	$ 5,499
F- 3	Bonds (2%)	1	L.S.	$ 20,663	$ 20,663	$ 21,456	$ 22,725
				TOTALS	$ 1,053,833	$ 1,094,280	$ 1,158,976
				USE	**$ 1,054,000**	**$ 1,095,000**	**$ 1,159,000**

Notes:

1. ENR 11326 = December 2019
2. ENR 11823 = March 2021
3. ENR 12522 = March 2023

Highgate Area Infrastructure Study
Estimated Construction Cost - Water Alternative No. 3
5/6/2020
A+E Project #18063

	Description of Item	Total Quantity	Unit	Unit Price	Cost ENR 11386	Cost ENR 11823	Cost ENR 12522
A - Sewer							
A- 1	8" C900 PVC Water Main	4,200	L.F.	$ 70	$ 294,000	$ 305,284	$ 323,333
A- 2	8" C900 PVC Water Main in 16" Sleeve	60	L.F.	$ 200	$ 12,000	$ 12,461	$ 13,197
B - Sewer Appurtenances							
B- 1	Fire Hydrant Branch Connections	8	EA.	$ 4,500	$ 36,000	$ 37,382	$ 39,592
B- 2	3/4" or 1" Corporation Stop	10	EA.	$ 200	$ 2,000	$ 2,077	$ 2,200
B- 3	3/4" or 1" Curb Stop	10	EA.	$ 200	$ 2,000	$ 2,077	$ 2,200
B- 4	3/4" or 1" CTS PE Water Service	150	L.F.	$ 50	$ 7,500	$ 7,788	$ 8,248
B- 5	3/4" or 1" CTS PE Water Service in 1-1/2" Sleeve	125	L.F.	$ 80	$ 10,000	$ 10,384	$ 10,998
B- 6	8" Gate Valve	5	EA.	$ 2,500	$ 12,500	$ 12,980	$ 13,747
C - Earthwork							
C- 1	Rock Excavation	50	C.Y.	$ 150	$ 7,500	$ 7,788	$ 8,248
C- 2	Boulder Excavation Water Main	50	C.Y.	$ 75	$ 3,750	$ 3,894	$ 4,124
C- 3	Misc. Extra. Below Grade Excavation	50	C.Y.	$ 40	$ 2,000	$ 2,077	$ 2,200
C- 4	Exc. & Replace Unsuitable Material	50	C.Y.	$ 50	$ 2,500	$ 2,596	$ 2,749
D - Roadwork and Appurtenances							
D- 1	Bituminous Pavement Repair - Roads	70	S.Y.	$ 75	$ 5,250	$ 5,451	$ 5,774
D- 2	Bituminous Pavement Repair - Drives	80	S.Y.	$ 60	$ 4,800	$ 4,984	$ 5,279
D- 3	Road Shoulder Repair	100	L.F.	$ 20	$ 2,000	$ 2,077	$ 2,200
D- 4	Gravel Road and Driveway Repair	100	L.F.	$ 25	$ 2,500	$ 2,596	$ 2,749
E - Incidental Work							
E- 1	Class B Concrete	30	C.Y.	$ 600	$ 18,000	$ 18,691	$ 19,796
E- 2	Calcium Chloride	5	TON	$ 650	$ 3,250	$ 3,375	$ 3,574
E- 3	Rigid Trench Insulation	50	L.F.	$ 15	$ 750	$ 779	$ 825
E- 4	Silt Fence	1,000	L.F.	$ 3	$ 3,000	$ 3,115	$ 3,299
E- 5	Inlet Protection	4	EA.	$ 175	$ 700	$ 727	$ 770
E- 6	Uniformed Traffic Officers	80	HRS.	$ 85	$ 6,800	$ 7,061	$ 7,478
F -Lump Sum							
F- 1	Prep of Site and Misc Work (10%)	1	L.S.	$ 43,880.00	$ 43,880	$ 45,564	$ 48,258
F- 2	VTrans Inspection Allowance	1	L.S.	$ 5,000.00	$ 5,000	$ 5,192	$ 5,499
F- 3	Bonds (2%)	1	L.S.	$ 9,753.60	$ 9,754	$ 10,128	$ 10,727
				TOTALS	$ 497,434	$ 516,525	$ 547,063
				USE	**$ 498,000**	**$ 517,000**	**$ 548,000**

Notes:

1. ENR 11326 = December 2019
2. ENR 11823 = March 2021
3. ENR 12522 = March 2023

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APPENDIX H – Estimated O&M Costs

Highgate Airport Infrastructure Study
Operation & Maintenance Costs - Wastewater
1/2/2020
A+E Project #18063

	Wastewater Alternative No. 1	Wastewater Alternative No. 3
Wastewater Treatment (1)		
Fixed Rate	$ 900	$ -
Variable Rate	$ 4,200	$ 8,300
Other Costs		
Electricity	1100	1900
Equipment Service/Replacement	3000	2500
Pump Station Cleaning	2000	1500
Jetting/Flushing	2300	2100
Miscellaneous Operator Labor	2500	1000
Administrative & Overhead	1500	500
Total O&M Cost	**$ 17,500**	**$ 17,800**

Notes:

1. Based on Village of Swanton's non-village charges of $68/month industrial fixed rate and $4.10/1,000 gallons
2. Based on Swanton Village Electric Department's Commercial B rate, with assumed peak demand not to exceed 30 kW
3. Assumes 20-year effective lifespan for mechanical/electrical equipment
4. All values are for the initial year

Highgate Airport Infrastructure Study
Operation & Maintenance Costs - Water
1/2/2020
A+E Project #18063

	Water Alternative No. 1	Water Alternative No. 3
Water Purchase (1)		
Fixed Rate	$ 1,200	$ -
Variable Rate	$ 5,800	$ 4,200
Operator Labor		
Sampling	$ 600	$ -
Flushing	$ 1,000	$ 500
Miscellaneous	$ 2,500	$ 1,000
Other Costs		
Electricity (2)	$ 1,600	$ 200
Propane	$ 1,000	$ 100
Equipment Service/Replacement (3)	$ 4,000	$ 500
Laboratory Testing	$ 500	$ -
Administrative & Overhead	$ 1,500	$ 500
Total O&M Cost	**$ 19,700**	**$ 7,000**

Notes:

1. Based on Village of Swanton's non-village charges of $92.63/month industrial fixed rate and $5.11 per 1,000 gal
2. Based on Swanton Village Electric Department's Commercial B rate, with assumed peak demand not to exceed 30 kW
3. Assumes 20-year effective lifespan for mechanical/electrical equipment
4. All values are for the initial year

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APPENDIX I – Estimated Total Project Cost

Town of Highgate
Highgate Airport Infrastructure Feasibility Study
Total Project Cost Estimate - Proposed Sewer Project
May 6, 2020

Item Description	Sewer Project	Water Project	Combined Project
CONSTRUCTION			
Construction Cost (1)	$ 1,238,000	$ 1,095,000	$2,333,000
CONSTRUCTION SUBTOTAL	$ 1,238,000	$ 1,095,000	$2,333,000
CONSTRUCTION CONTINGENCY			
Construction Contingency (15%)	$ 185,700	$ 164,250	$349,950
CONSTRUCTION CONTINGENCY SUBTOTAL	$ 185,700	$ 164,300	$350,000
ENGINEERING (2)			
Step I - Preliminary Engineering Report	$ 50,000	$ 40,000	$90,000
Step II - Final Design	$ 90,000	$ 80,000	$170,000
Step III - Construction Phase Services	$ 170,000	$ 150,000	$320,000
ENGINEERING SUBTOTAL	$ 310,000	$ 270,000	$580,000
OTHER COSTS			
Administrative	$ 25,000	$ 22,000	$47,000
Legal	$ 25,000	$ 22,000	$47,000
Archeology (3)	$ 15,000	$ 15,000	$30,000
Short-Term Interest	$ 10,000	$ 10,000	$20,000
OTHER SUBTOTAL	$ 75,000	$ 69,000	$144,000
ESTIMATED TOTAL PROJECT COST	**$ 1,808,700**	**$ 1,598,300**	**$3,407,000**
BOND AMOUNT	**$ 1,810,000**	**$ 1,600,000**	**$3,410,000**

Notes:

1. Construction cost based on ENR 11823 = March 2021.
2. Engineering fees based on the current State curve allowance.
3. Estimated costs for Phase I archeological survey only.

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APPENDIX J – Funding Analysis – Proposed Water & Sewer Project

Highgate Airport Infrastructure Study
Funding Analysis - Proposed Water & Sewer Project
5/6/2020
A+E Project #18063

	Funding Alternative No. 1	Funding Alternative No. 2
Capital Costs		
Total Project Cost	$ 3,410,000	$ 3,410,000
Project Funding		
NBRC Grant	$ 500,000	$ 500,000
EDA Grant	$ 2,200,000	
Local Share	$ 200,000	$ 200,000
Debt Financing	$ 510,000	$ 2,710,000
Total Project Funding	**$ 3,410,000**	**$ 3,410,000**
Debt Support		
Program	VMBB	USDA RD
Loan Amount	$ 510,000	$ 2,710,000
Forgiveness	0%	40%
Term (years)	20	30
Interest Rate	2.50%	1.875%
Annual Debt Service	**$ 32,715**	**$ 71,359**

Notes:

1. Northern Borders Regional Grant has a per-project maximum of $1,000,000.

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APPENDIX K – Study Presentation

Town of Highgate

Highgate Airport Infrastructure Feasibility Study

Public Meeting

February 6, 2020

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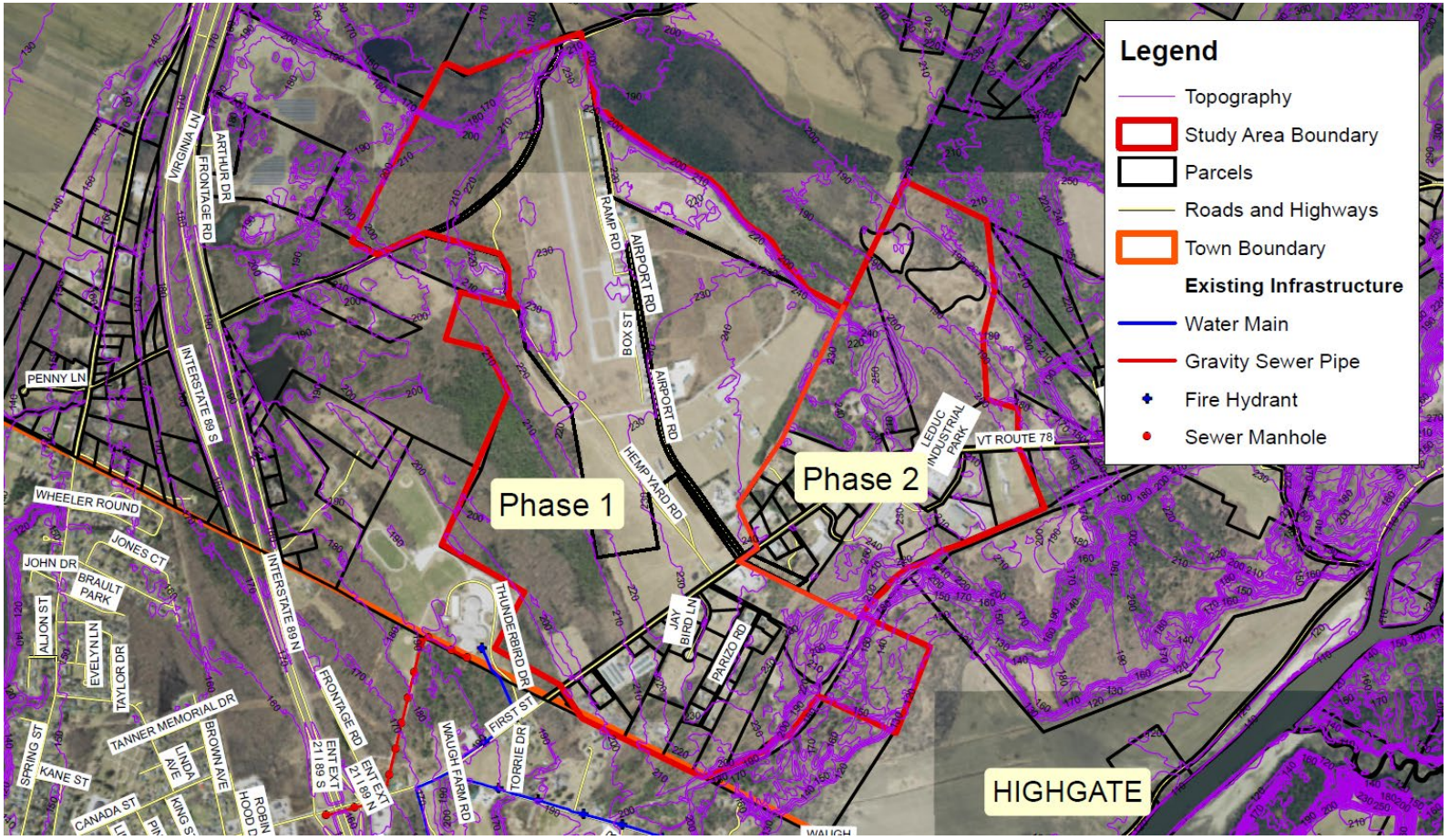
Study Area



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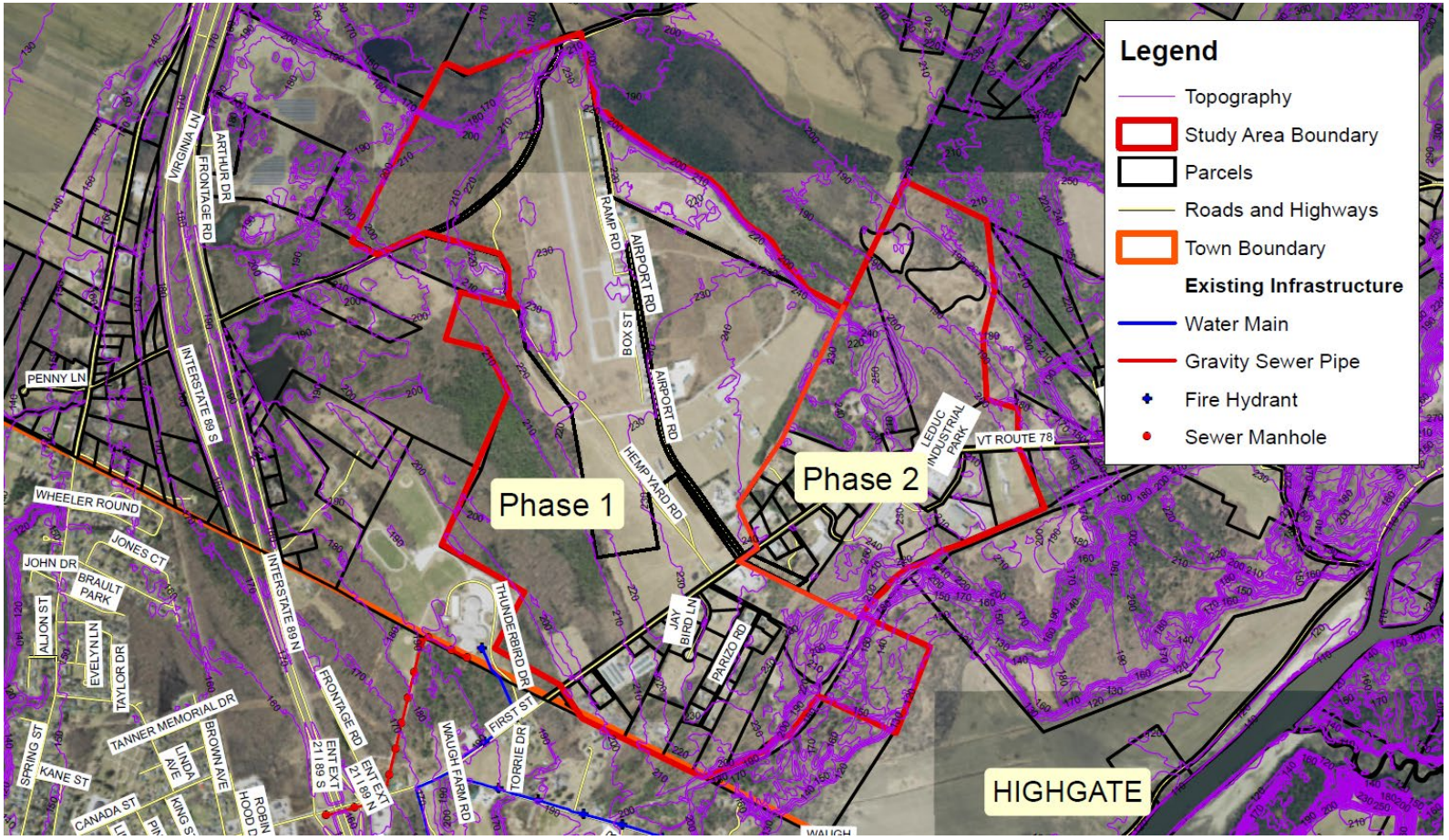
Introduction

- Purpose
  - Evaluate feasibility of extending municipal water and sewer infrastructure to the Franklin County Airport and nearby properties.
  - Identified as a desirable development area through Town planning since the 1970's.

- Feasibility Study Process
  - Existing Infrastructure
  - Water & Wastewater Needs Assessment
    - Property Owner Survey
  - Preliminary Design Criteria
    - Service Area
    - Preliminary Design Flows
    - Regulatory & Feasibility Requirements
  - Develop & Evaluate Alternatives
  - Proposed Project
    - Water
    - Sewer
  - Estimated Costs
  - Available Funding

Existing Infrastructure



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Property Uses

- Existing Property Uses
  - Residential, Aviation, Commercial – Low to moderate water/wastewater needs
- Future Development
  - Industrial, Food & Beverage Processing, Other – High water/wastewater needs
- Fire Protection
  - Not currently available

Property Owner Survey

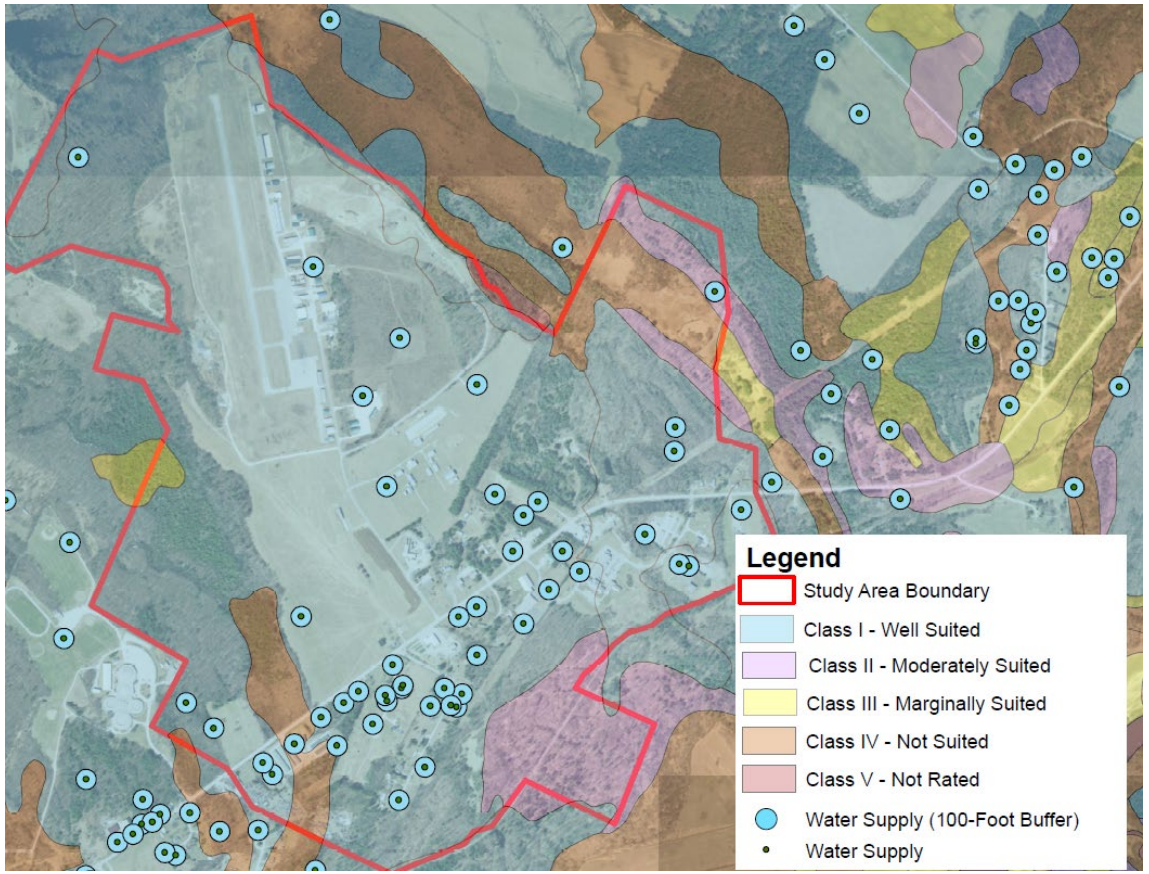
- 144 Surveys Sent – 24 Responses
  - General condition of existing on-site water & wastewater disposal systems
  - User interest in municipal water & sewer
  - Willingness to pay for municipal water & sewer

- No reported issues with on-site wastewater disposal systems
- Some reported issues with on-site water supplies (20%)
- Some interest in municipal water & sewer (33%)
- Willing to pay $500 per year (average respondent)

- Respondents indicated greater needs for water than for wastewater

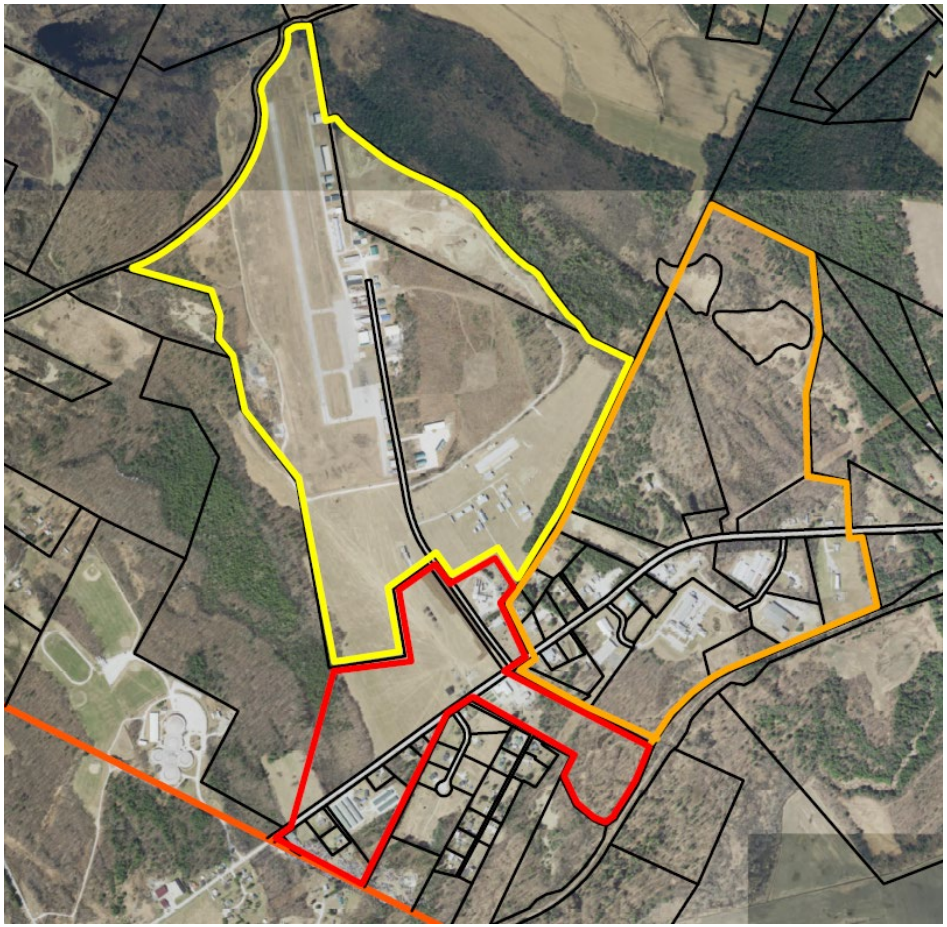
Water & Wastewater Needs Assessment

- On-Site Water Supplies
  - 3-5 gallons per minute
  - Typical Residential Household = 5 gallons per minute
- On-Site Wastewater Disposal Systems
  - Soils are fair to good
  - Small lot sizes limit infill or redevelopment
  - Inadequate for high-flow or high-strength users



Proposed Service Area

- Phase I – Water & Sewer
- Phase IA – Water Only
- Phase II – Future Expansion



Preliminary Design Flows

- Initial Year – Used to evaluate costs – Assumes very limited development
- Design Year – Used to design infrastructure – 20 years out

Estimated Design Flows – Initial Year

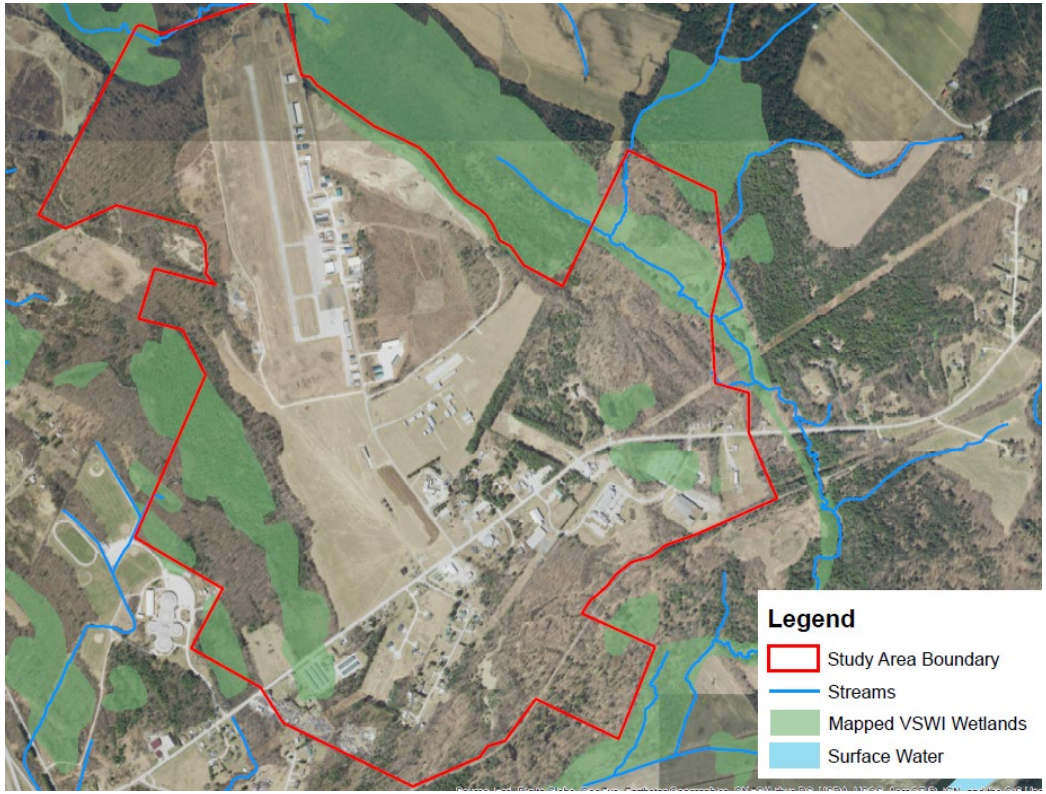
Phase	Water User Connections	Water Design Flow (gal. per day)	Water Equivalent Units (EU)	Wastewater User Connections	Wastewater Design Flow (gal. per day)	Wastewater Equivalent Units (EU)
I	9	840	4	9	2,740	4
IA	8	2,250	10.7	0	0	0
II	7	2,200	10.5	7	5,500	10.5

Estimated Design Flows – Design Year

Phase	Water User Connections	Water Design Flow (gal. per day)	Water Equivalent Units (EU)	Wastewater User Connections	Wastewater Design Flow (gal. per day)	Wastewater Equivalent Units (EU)
I	18	14,240	67.8	16	16,140	67.8
IA	15	3,150	15	0	0	0
II	16	6,300	30	16	9,300	28.7

Regulatory & Feasibility Criteria

- Wetlands
- Historical Resources
- Airport Operations
- Land Acquisition
- Swanton Water & Wastewater Capacity



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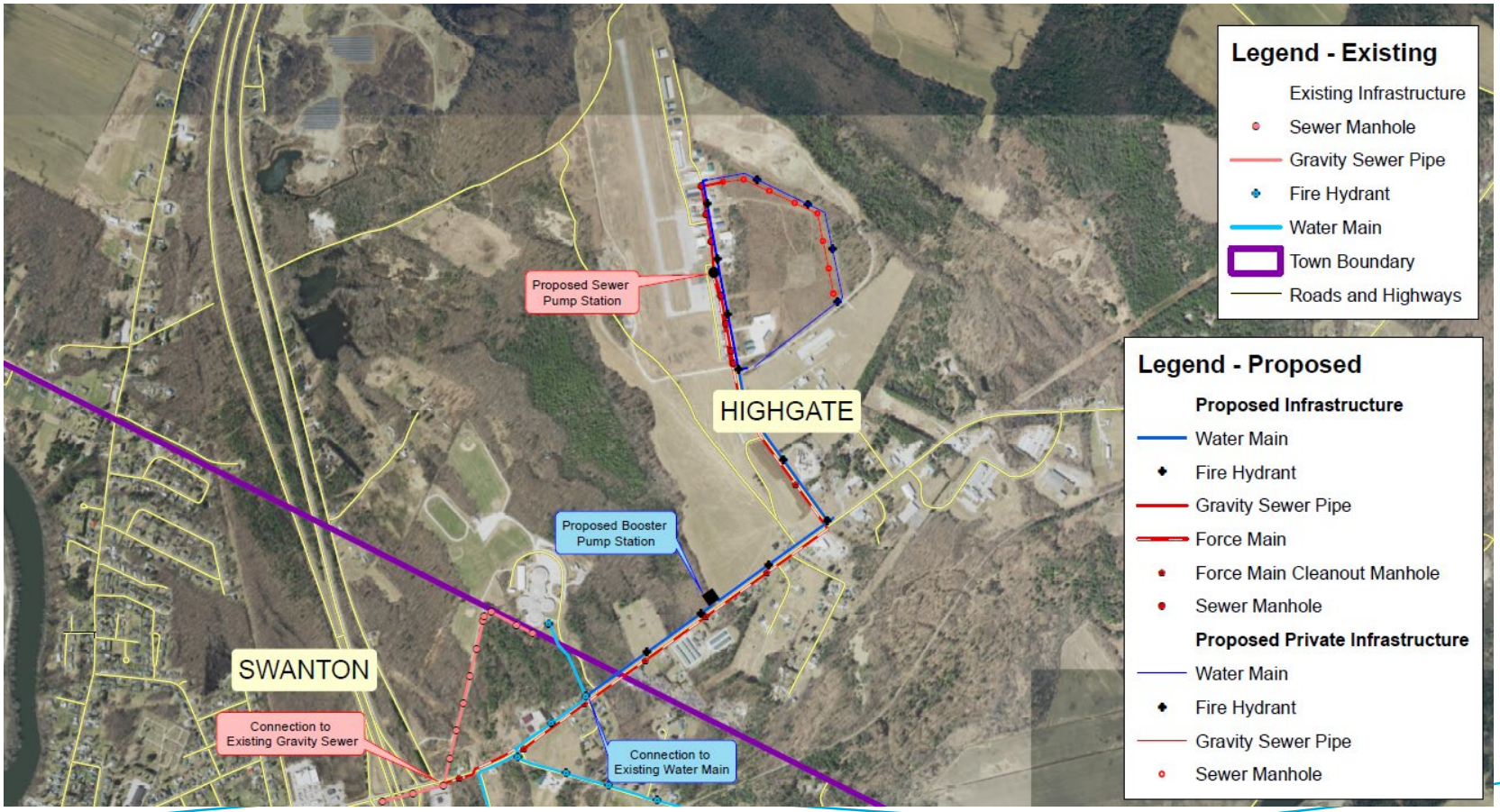
Alternative No. 1



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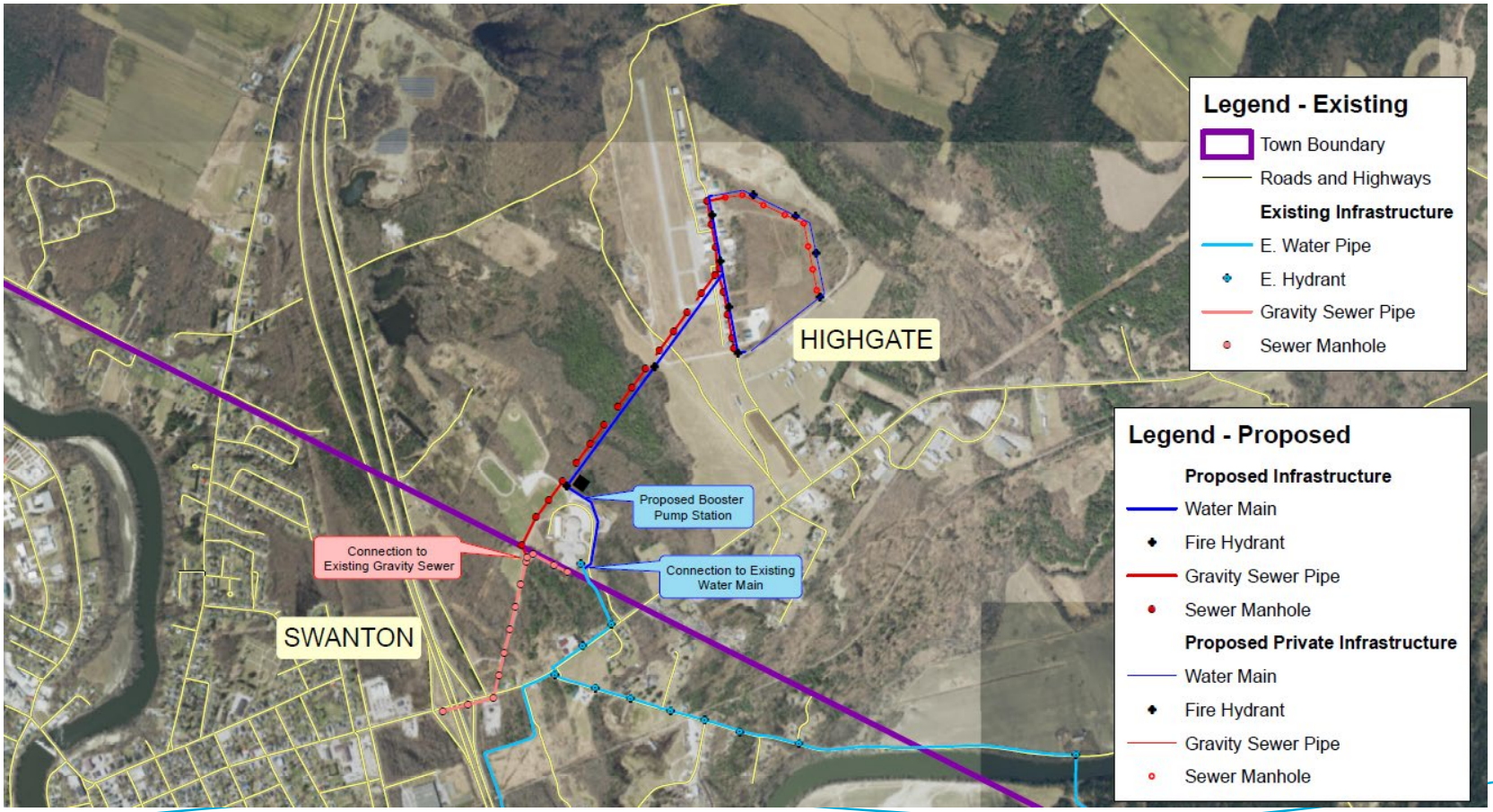
Alternative No. 2



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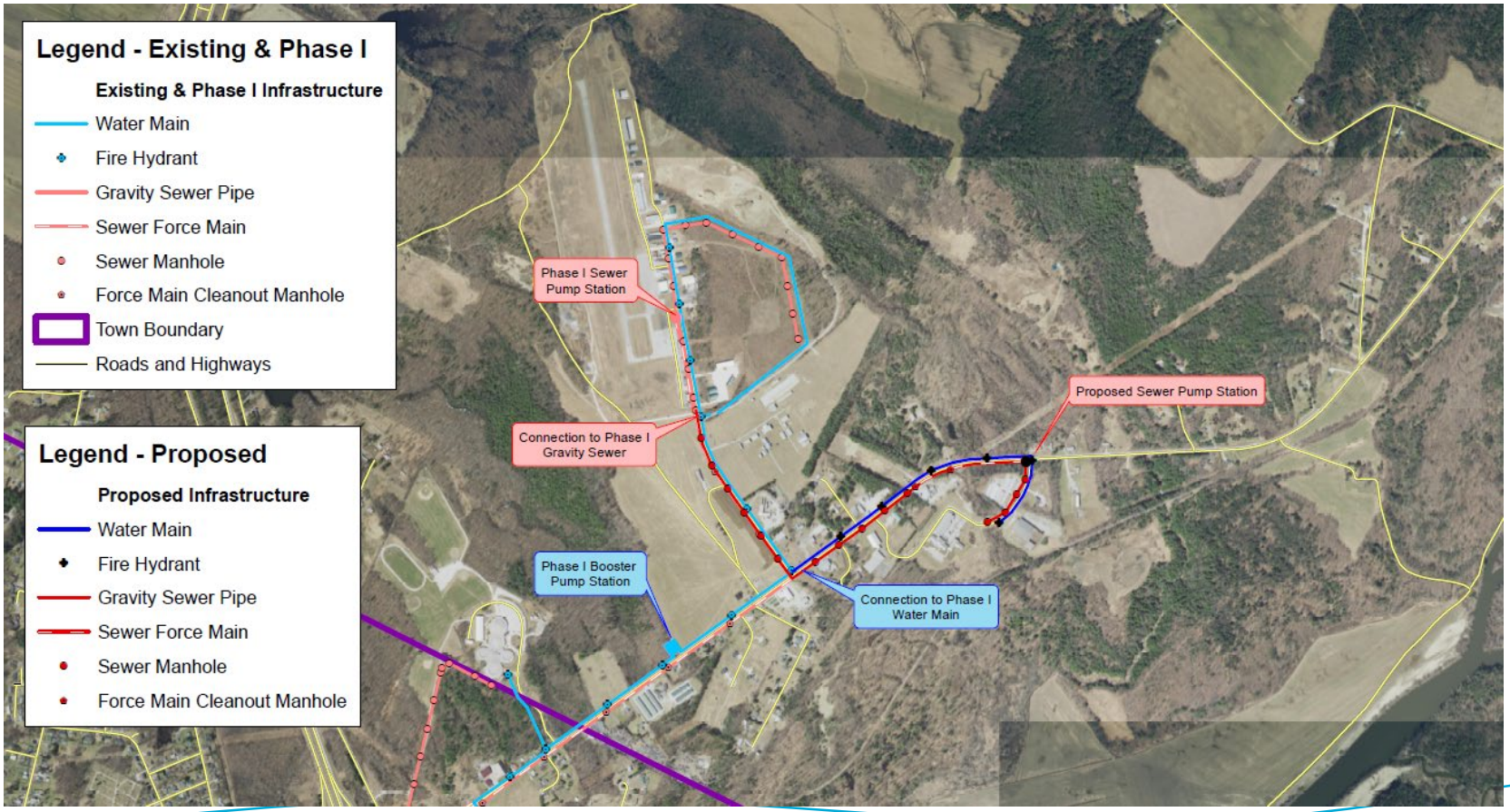
Alternative No. 3



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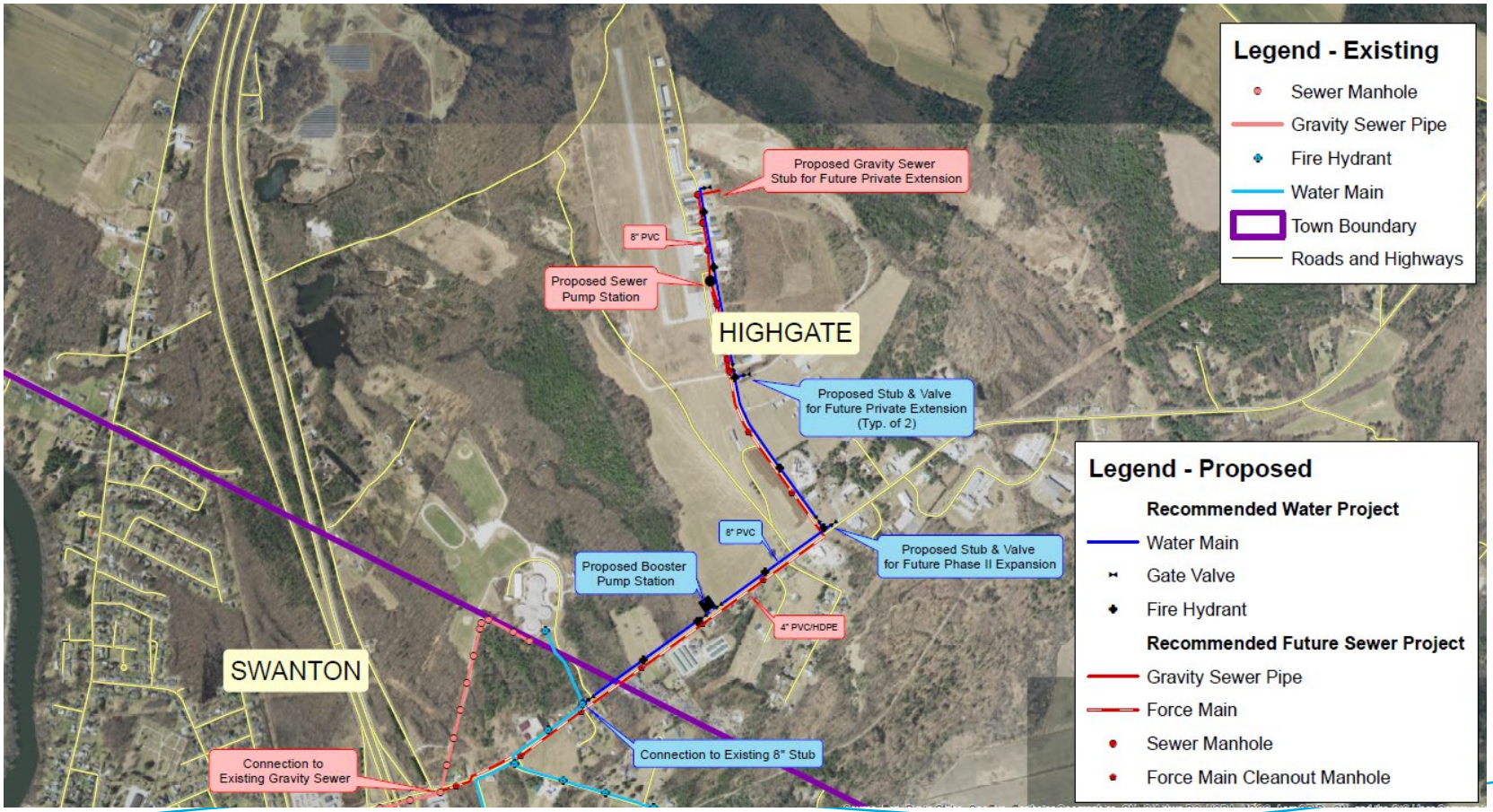
Alternatives Evaluation

- Interconnection Route to Village of Swanton
  - Follow developed right-of-ways
  - Avoid potentially difficult environmental permitting issues
  - Avoid runways or airport operations

- Phase II Service Area
  - Significantly increases cost
  - Area is already developed

Proposed Project



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Estimated Project Costs

Water

Estimated Construction Cost	$1,095,000
Estimated Total project Cost	$1,590,000

Sewer

Estimated Construction Cost	$1,590,000
Estimated Total project Cost	$1,810,000

Notes:

- Water construction costs projected to March 2021.
- Sewer construction costs projected to March 2023.
- Estimated total project costs include engineering, legal, and administrative costs, short-term interest, and 15% construction contingency.

Funding Options & Revenue Sources

- State of Vermont DWSRF/CWSRF
- USDA Rural Development
- Northern Borders Regional Commission
- Economic Development Administration

Proposed Water Project			
Funding Alternative No. 1		**Funding Alternative No. 2**	
Funding Source	**Estimated Funding**	**Funding Source**	**Estimated Funding**
Economic Development Authority Grant (assumed 50% of total project costs)	$795,000	Economic Development Authority Grant (assumed 50% of total project costs)	$795,000
Northern Borders Regional Commission Grant (25% of total project costs; requires 20% non-federal match; $500,000 limit)	$397,500		
DWSRF Loan 30-year Loan Term @ 3% Interest; 0% Loan Forgiveness $20,280 Annual Payment	$397,500	USDA Rural Development Loan 40-year Loan Term @ 2.25% Interest; 45% Grant $16,693 Annual Payment	$795,000
Total Estimated Funding	$1,590,000		$1,590,000

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Operation & Maintenance

- Certified Operators
- Maintenance
- Water Purchases and Wastewater Treatment Fees

<u>O&M Alternative No. 1</u>

- New infrastructure operated as part of Swanton's system
- Each user pays Swanton's customary fee schedule, plus additional charges to cover Town of Highgate's debt service

<u>O&M Alternative No. 2</u>

- Town of Highgate operates infrastructure independently
- Town of Highgate purchases water from Swanton and pays for wastewater treatment

Anticipated User Costs

Swanton User Fees and/or Water Purchases + O&M Costs

+ Debt Service

- Assuming:
  - Funding as outlined previously
  - No general fund support
  - Village of Swanton's Town-User rates
- Typical residential household would pay $1,750 per year for water service alone
- Less than $1,000 per year is recommended.

Next Steps

- Sequencing
  - Water now and sewer later
  - Water and sewer now
- Funding Applications
  - State CWSRF & DWSRF Priority List Applications
  - Northern Borders Regional Commission
  - Economic Development Administration
  - Other
- Village of Swanton
  - Water & Sewer fees
  - Operations & Maintenance
- Town-wide Bond Vote
  - Public Information/Outreach
  - Highgate General Fund Support

QUESTIONS?