Public Works Department
PO Box 730
Stowe, VT 05672
802-253-8770

MEMORANDUM

TO: **Charles Safford, Town Manager**
CC: **Selectboard**
FROM: **Harry Shepard, PE, Public Works Director/Town Engineer**
DATE: **November 21, 2024**
SUBJECT: **Stowe Water and Sewer Capacity Evaluation**

As requested, this Memorandum is intended to answer the question asked by the Selectboard/Water and Sewer Commissions and an increasing number of interested Board/Commissions, Developers, and members of the Public; "What is the Capacity of Stowe's Water and Sewer systems? This effort has included significant data accumulation and analysis, review and analysis of related permits, consultation with our Engineering consultant and VTDEC regulators, and consideration of the physical size, location and operating conditions of various water and sewer system components.

First, I would like to define "Capacity" and clarify the focus of this review. Sub-Chapter 21-2 of the Vermont Water Supply Rules define Capacity to mean "*that a public water system has the technical, financial, and management capabilities to consistently comply with current performance standards, including the requirements of this rule and the Safe Drinking Water Act, 42 U.S.C Section 300f as amended."* The requirements for "technical (sometime referred to as operational), financial and management capabilities" are common tenets for defining Utility capacities. This effort is focused solely on the Town's technical capacities.

Second, it will be helpful to understand the capacity considerations to follow by having a general understanding of the historical development and extent of the Town's water and sewer systems. These are as follows:

Sewer: The original Stowe sewer system consisted of a wastewater treatment plant (WWTP), designed for 0.165 million gallons per day (MGD), with a service area and collection system that included the former Stowe Village and Lower Village and the Lower Village Sewer Pump Station (LVPS), constructed in the late 1970's. Some elements of this original collection system are remnants of clay tile sewers associated with abandoned common leaching systems or direct point source discharges to the North and West Branch's and the Little River. In the mid-1990s, the WWTP's capacity was increased to 0.225 MGD by the construction of the headworks building and sludge storage bunker.

In the late 1990's-early 2000's, major expansions of the sewer service area and collection system with two additional pump stations - Weeks Hill and Mansfield Base were developed. The WWTP was expanded to increase its permitted capacity to 1.0 MGD and upgraded to increase the quality of the effluent discharge and residuals to produce a Class A biosolid. In the mid 2000's, in response to odor control issues, foul air improvements were implemented. In 2018, in response to continued odor challenges, the use of the residuals processing system (ATAD) used to produce Class A biosolid was suspended and odor issues subsided. Exhibit A attached is a plan that depicts key elements of the Stowe Sewer System.

Water: Stowe's water system was established by the former Village in 1904. The original system served the core of the Village and was supplied by various spring sources proximate to the original reservoir on Sunset Hill. These sources proved inadequate during dry weather periods and in 1934, the Village purchased a 10 Acre parcel of land with more dependable spring water sources on Edson Hill (Robinson Springs) and installed a 6" cast iron transmission pipe from the source to the Sunset Hill reservoir. For 65 years, this source dependably served the Village without treatment or pumping. This source remains one of the Town's two water supplies. Upgrades for minimal treatment (pH adjustment and disinfection) have occurred and the supply is permitted for 213 gallons per minute (GPM). The 6" cast iron transmission pipe (now distribution), which is 90 years old, also remains in service along the upper portions of Edson Hill Road.

In the late 1990's and early 2000's, concurrent with the major expansions of the sewer system and intent to similarly expand the water system, an additional source of supply was required. Finding and developing this source of supply was a major challenge for the Town during this period and our second source, our Village Green facility, was secured, permitted, and developed. The Village Green facility lays above a classic "confined aquifer" (water bearing soil layer below a fine grained (low permeability) soil overburden that provides some level of protection of the underlying water quality from surface influences). This source has a known physical yield capacity estimated to be over 1000 GPM. This raw water source is high in Iron and Manganese. This facility is currently permitted for 413 GPM with a treatment plant that includes filtration for iron and manganese, and disinfection. The plant was designed for and constructed to be expanded for additional future capacity, with provisions for an additional filter train. A redundant well, installed in 2015, was installed, and developed, but not permitted, to increase the facilities supply capacity to 1000 GPM+/-. The water distribution system and service area were updated and expanded and now includes 28+/- miles of distribution piping with 9 water storage tanks and 11 booster pump stations serving 15 pressure zones, each with their own capacity characteristics. Some of these distribution elements were former private water systems now supplied by and incorporated into the Town's distribution system. Exhibit B attached depicts key elements of the Stowe Water System.

Third, for discussions of capacity below, our sewer system will be subdivided into our WWTP, and Collection System and our water system will be subdivided into our Sources/Treatment and Distribution System. These are as follows:

Sewer-WWTP: Stowe is fortunate to have a relatively modern WWTP operating under VTDEC Discharge Permit No 3-1232, with a hydraulic capacity of 1.0 MGD Average Daily Flow. Our Average Daily Flow in 2023 was 0.368 MGD but as a resort community, we have a large seasonal variation in flows, typically ranging from 0.3-0.5 MGD+/- Our Peak Daily Flow, typically associated with high water-wet weather events, was approximately 0.8 MGD. This occurred during the July 2024 flood event. The influent contribution from a typical residence varies from 150 to 165 GPD. Hydraulically, our WWTP has adequate capacity for the foreseeable future.

Our WWTP also has organic discharge limitations associated with our Discharge Permit. Exhibit C attached is a copy of a portion of our discharge monitoring report submitted monthly to VTDEC. This lists the various constituents monitored and reported for both concentrations and mass loading. Each represents a capacity consideration. As a resort community, most of our influent is domestic in nature, although some of our restaurants and breweries/cider makers produce a higher strength influent wastewater. As part of the commissioned efforts by our Engineering consultants associated with the 20-year review of our WWTP performance required by our Discharge Permit, each of these constituents were analyzed and affirmed to be well within the WWTP's original design criteria and we remain compliant current Discharge Permit limitations. Organically, our WWTP also has adequate capacity for the foreseeable future.

Sewer Collection System: In general, the collection system installed with the major expansions constructed in the early 2000's, including the Weeks Hill and Mansfield Pump Stations, are both hydraulically adequate and in good operating condition. In general, this portion of our system (above Weeks Hill Road) are deemed to have adequate capacity for the foreseeable future. One capacity limitation which is permit related is for properties along the Mountain Road in the Upper Mountain Road (UMR) zoning district (from Strom Farm Road to the base of Harlow Hill, except at the Edson Hill Road intersection). Our Act 250 permit for the WWTP and collection system expansion prohibits the allocation of sewer flows greater than the uses that existed on March 16, 2001. This was intended to limit development along this corridor and has often resulted in capacity limitations for these properties.

The original collection system (below Weeks Hill Road) is generally hydraulically adequate and in fair operating condition, but exceptions exist, most significantly, the Lower Village Sewer Pump Station (LVPS). This critical collection system element is 45 years old and antiquated. It performs admirably and within its design capacity of 396,000 GPD during normal dry weather flow conditions, but significantly exceeds its design capacity during high water-wet weather events. During the recent July 2024 event, it pumped an estimated 847,000 GPD. When these more frequent events occur, both lead and lag pumps operate simultaneously for extended continuous run times periods. This is indicative of capacity limitations. Either pump failure during these periods would likely result in a direct discharge of untreated sewage and a permit violation. The Town has completed the Preliminary Engineering design for the proposed replacement of the LVPS. In general, this will consist of a new Dry-Pit type facility abutting and south of the existing facility. Additional property acquisition will be required. We are also currently studying the adequacy of the existing sewer force main from the LVPS to the Headworks building, which includes a river crossing and upgrades are likely. We are currently targeting 2027-2028 for construction dependent on permits and funding. The current Estimated Total Cost is $3-4M. Until this upgrade is implemented, I would classify our sewer capacity in this portion of our service area (Village and Lower Village) as capacity limited. Modest growth over the next few years can be accommodated but risks of pump failure during these more frequent wet weather events will remain high until upgrades are implemented.

Another capacity limitation in the original collection system is where remnants of original clay tile sewer pipe remain. These are antiquated and can be in poor condition. We typically address these by replacement, either by the Town or Developers looking to connect as a capacity concern. A recent example was the replacement of the common clay tile sewer behind the buildings on the north side of Main St. This was undertaken in phases by both the Town and Developers because of this localized capacity concern.

A final capacity limitation with the sewer collection system that should be noted is that significant portions of the sewer service area do not include any abutting existing collection system. Exhibit A includes a repeated notation, "Limits of Gravity Collection System" These are the ends of our existing collection system, usually limited from extension by existing grade conditions. In these situations, extensions of the collection system will require new sewer pump stations to have "Capacity to Serve".

Water-Sources/Treatment: A general description of our two sources of supply, treatment and permitted yields was previously described. Edson Hill is a high elevation source with better water quality requiring less treatment. It was also formally a naturally occurring artesian spring discharging approximately 180-200 GPM to the surface 24/7/365. During the efforts to expand the system in the early 2000's, extensive geo-hydraulic assessment to evaluate the potential for more water from this source was undertaken to no avail. It is a steady 190GPM+/- source, 24/7/365, but not more. The source protection area is relatively small and undeveloped except for a couple of large lot residences. Much of the Town's 10 Acre parcel is immediately upgradient of these wells in that Source Protection Area. We monitor the drawdown level in this well and have documented acceptable seasonal variation while maintaining an average withdrawal 186 GPM, +/-5 GPM, 24 hour/day. Operationally, we know that attempts to operate the well pumps at less than 24 hours/day or at withdrawal rates above 195 GPM create numerous operational challenges including loss of suction in the adjacent Edson Hill Manor hydro-pneumatic pump station and vacuum conditions that have damaged and altered the function downstream elements, including 2 pressure sustaining valves. This well is best operated 24/7/365 as we do.

Village Green has a high yield capacity "confined" aquifer but requires more treatment. It is also located in the Mountain Road Village zoning district, a growth center with commercial and residential uses and a golf course within its source protection area. This area is also experiencing other development growth pressures. It also has relatively low but detectible levels of PFAS, which calls into question the effectiveness of the confining layer above the underlying aquifer.

Operationally, we try to use as much water from Edson Hill as possible because of the reduced treatment requirements. We are fortunate to have a distribution system that allows this. We can provide water to all pressure zones except one (Stowe Club) from either source. Our Stowe Club pressure zone can only be supplied from Village Green. During peak demand periods in the winter season, most of Edson Hill water is used above Edson Hill Road, supplemented as required for demand by water from Village Green. During other seasons when the demand above Edson Hill Road is significantly less, more Edson Hill water flows by gravity toward the Village and is mixed with Village Green water to meet the demands of our pressure zones below Edson Hill Road. Although not officially blending, this does provide reduced levels of PFAS in most of our pressure zones.

Exhibit D attached is a graphic depicting a Water System Demand & Capacity Analysis. It depicts key information regarding our demand trends from 2010-2023 and existing permitted supply considerations. As a resort community, we also experienced higher seasonal demands and it also includes an estimate of our "Maximum Occupancy Average Day Demand", which is another demand criteria in the Water Supply Rules. The horizontal lines depict individual capacities for both sources using our permitted yields for both 12 and 24 hours per day. It also includes how we operate Edson Hill at a slightly reduced yield of 186 GPM +/-, 24 hours per day and combinations for both sources. The Average Day Demand (ADD) is the total amount of water used by a system for one year divided by 365. The Maximum Day Demand (MDD) is the largest volume of water delivered to the system in a single day. In general, 12-hour withdrawals are used for capacity considerations associated with the ADD and 24-hour withdrawals are used for MDD.

Our ADD, which has been trending positive approximately +7% per year, started to exceed our combined 12-hour withdrawals in 2022 however, our ADD is still well below the combination of the 12-hour withdrawal from Village Green and our operational 24- hour withdrawal from Edson Hill. This also satisfies our current estimated Maximum Occupancy ADD. Section 2.2.1 of the Water Supply Rules require that if your ADD exceeds your 12-hour permitted withdrawals, "*the water system immediately apply for additional source capacity*". This is one of the reasons why we proposed, and the Water Commission approved an FY23 Water Capital project to commence the Engineering design, testing and permitting to increase the permitted yield and treatment capacity of our Village Green facility. This effort has been suspended because of detectible PFAS in our Village Green supply. However, our efforts to achieve additional source capacity have not been suspended and if necessary, capacity expansion at our Village Green facility incorporating PFAS treatment may become necessary. A Preliminary Engineering Study to do so has been completed. VTDEC has affirmed in writing that for the purposes of source capacity considerations, the Water Supply Rule requirements for the MDD will control.

Our current MDD is 708,680 gallons which is 79% of our Max Day Capacity and 87% of our 90% Max Day Capacity, which is the threshold when the Water Supply Rule requires planning for additional sources, which we already have begun. Exhibit D includes approximations of existing reserve source capacity using the MDD requirements. At 90% of MDD, we estimate that we have capacity for an additional 700-1400 bedrooms. At 100% MDD, we have capacity for an estimated 1400 – 2800 bedrooms. The lower range is based upon allocation flows. The higher range is based upon estimates of actual flows, which are generally less than 1/2 of the allocation flows. Our existing sources have the capacity for modest growth.

Water-Distribution System: Because of our mountainous terrain and large service area (for a VT municipal system), our distribution system is complex. During peak demand periods in the winter season, water from Village Green is pumped 5 times and flows through 3 water storage tanks to reach our most remote customers.

Our Engineering consultant who specializes in VT Water and Wastewater commented that Stowe has the most complicated distributions system in Vermont. As noted previously, each pressure zone has its own unique capacity characteristic. Key elements related to capacity in the distribution systems include the following:

- Volume of Stored Water: At a minimum, water storage tanks must hold at least the ADD and if Fire Protection System are to be served, the ADD + 60,000 gallons minimum for Fire demand.
- If fire protection systems are served, the minimum size of the distribution piping must be 8" minimum.
- Elevation of Stored Water: This establishes the service pressures in each pressure zone. For our distribution system, which is generally linear and relatively simple hydraulically, we do not have the "Capacity to Serve" minimum service pressures required by the Water Supply Rules above elevations 100'+/- below the stored water elevations.

Exhibit E attached is a Water and Sewer Capacity Map. It depicts relevant general capacity information for our water and wastewater facilities, sewer service area and sub-areas to each of our sewer pump stations, water pump stations, storage tanks and pressure zones, approximate maximum service elevation for each pressure zone, and connected parcels with water and/or sewer service.

The column titled "Reserve ADD Capacity" under the Drinking Water Pressure Zone Capacity provides an estimate of additional capacity in each pressure zone. Sunset is our largest pressure zone with a 729,000-gallon storage tank and approximately 451,000 GPD of Reserve ADD capacity. The Springer-Miller project is in this pressure zone, and we have "Capacity to Serve". Excluding our hydro-pneumatic pressure zones, which serve a few higher elevation residences (and are capacity limited), our AIG pressure zone which serves the Toll House area is our most limited pressure zone with only 5000 GPD ADD reserve capacity. We have "Capacity to Serve" small projects such as adding bedrooms to existing buildings, like a few recent applications in the Mt. Mansfield Townhome Condominiums, but for any larger development proposal, we would not. This distribution system also has 6" maximum pipe so we would not have "Capacity to Serve" any project proposed in this pressure zone that required Fire Protection systems. The recent golf course development in the Stowe Club pressure zone would have Allocation Flows that exceed the Reserve ADD in that pressure zone. This is one of the reasons why I advised the developer that I would not recommend approval of Allocations to the Water and Sewer Commission for this project, because we would not have the "Capacity to Serve". We do not have a sewer collection proximate to Shaw's supermarket and this is one of the locations where a sewer pump station would be required to extend the existing collection system further north to provide service. Again, we currently do not have "Capacity to Serve".

The above is intended to provide recent examples of "Capacity to Serve" determinations that we regularly make before presenting Allocation recommendations to the Water and Sewer Commissions. In some instances, upgrades and/or expansions are negotiated with the developers to remedy Capacity to Serve concerns. Spruce Peak Realty constructed more water storage in our Spruce pressure zone. Percy's proposed extension of our water distribution system to serve their new subdivision off of Cape Cod Road. These are recent examples of developer sponsored upgrades to provide us with the Capacity to Serve. Shaw's supermarket decided against constructing a municipal sewer pump station and that project was not recommended for allocation because we lacked the Capacity to Serve.

I hope this adequately answers the question "What is Stowe Water and Sewer System Capacity? The answer is not simple, but neither is our systems. In general, we have capacity, but this is limited, and each project needs to be reviewed and considered as we currently do on a case-by-case basis as described herein. Given the growth that has occurred in the Town over the last 15 years, it will be prudent for the Town to advance the efforts for securing additional source capacity for the water system and replacement of the LVPS for the sewer system to have adequate capacity for the foreseeable future, These are both projects that Public Works is actively working to advance.

Limit of Gravity Collection System

Mansfield Sewer Pump Station

Limit of Gravity Collection System

Limit of Gravity Collection System

Weeks Hill Sewer Pump Station

Limit of Gravity Collection System

Limit of Gravity Collection System

Weeks Hill/Lower Village Pump Stations Service Area Boundary

Waste Water Treatment Facility

Lower Village Sewer Pump Station

Limit of Gravity Collection System

Limit of Gravity Collection System

TOWN OF Stowe

Sewer Collection System

Sewer Service Area
Sewer Lines (Green = Town Owned)
Sewer Manholes (Orange = Private)
UMR Zoning District
Connected Parcels
Sewer Customers

Nov. 21, 2024

0 750 1,500 2,250 3,000 3,750 4,500 5,250 6,000 6,750 7,500 ft

EXHIBIT A

Water Distribution Map

Updated Nov. 21, 2024

0 0.5 1 1.5 2 mi

0 1,000 2,000 3,000 4,000 5,000 6,000 7,000 8,000 9,000 10,000 ft

EXHIBIT B

Spruce Storage Tank
Vol: 184,783 gal
Elev: 1890 ft

Mansfield Water
Pump Station
353 GPM

AIG Storage Tank
Vol: 85,500 gal
Elev: 1559 ft

Toll House Storage
Tank & Pump Station
Vol: 150,960 gal
Elev: 1305 ft
365 GPM

Notch Brook
Hydro-Pneumatic
Pump Station

Notch Brook Storage Tank
Vol: 32,800 gal
Elev: 1455 ft

Notch Brook Booster
Pump Station
34 GPM

Notch Brook
Pump Station
442 GPM

Edson Hill Well
185 GPM

Edson Hill Treatment Facility &
Hydro-Pneumatic Pump Station

Sanborn Rd Preasure
Sustaining Valve

Edson Hill Storage Tank &
Preasure Sustaining Valve
Vol: 252,070 gal
Elev: 1144 ft

Houston Farm
Pump Station

Trapp's Storage Tank
Vol: 150,960 gal
Elev: 1507 ft

Trapp's Pump Station
134 GPM

Stowe Club Storage Tank
Vol: 128,163 gal
Elev: 1227 ft

Stowe Club
Hydro-Pneumatic
Pump Station

Alpine Meadows Preasure
Reducing Valve

Village Green Water
Treatment Facility & Well
413 GPM Production
500 GPM to Sunset
134 GPM to Stowe Club

Lower Village Water
Pump Station
118 GPM

Area able to be served off
Sunset Preasure Zone
with existing mains.

Sunset Storage Tank
Vol: 728,952 gal
Elev: 929 ft

Lower Village Storage Tank &
Hydro-Pneumatic Pump Station
Vol: 43,603 gal
Elev: 1008 ft

Legend

Water Service Elevations
(100ft below tank)

- Sunset
- Lower Village Atmospheric
- Lower Village Hydro-Pneumatic
- Stowe Club Atmospheric
- Stowe Club Hydro-Pneumatic
- Trapps
- Edson Atmospheric
- Edson PSV
- Sanborn Road PSV
- Edson Hill Manor
- Toll House
- Notchbrook Atmosperic
- Notchbrook Hydro-Pneumatic
- AIG
- Spruce

Customers by Water Preasure Zone

- Sunset
- Lower Village
- Lower Village Hydro-Pneumatic
- Stowe Club
- Stowe Club Hydro-Pneumatic
- Alpine Meadows PRV
- Trapps
- Edson Hill
- Edson PSV
- Sanborn Rd PSV
- Edson Hill Manor Hydro-Pneumatic
- Toll House
- Notchbrook
- Notchbrook Hydro-Pneumatic
- AIG
- Spruce

EXHIBIT C

VERMONT WASTEWATER PERMIT PROGRAM

Permittee: Town of Stowe - Permit # 3-1232

Month: Jul-24

PERMIT MONITORING INFORMATION
FOUR BASIN SBR FACILITY

DATE	INFLUENT BOD mg/L 1	INFLUENT TSS mg/L 2	EFFLUENT BOD mg/L 3	EFFLUENT BOD lbs 4	EFFLUENT TSS mg/L 5	EFFLUENT TSS lbs 6	EFFLUENT TKN mg/L 7	EFFLUENT TKN lbs 8	EFFLUENT UOD lbs 9	EFFLUENT Total Phosphorus mg/L 10	EFFLUENT Total Phosphorus lbs 11	EFFLUENT Total Ammonia mg/L 12	EFFLUENT Total Ammonia lbs 13	EFFLUENT Total Nitrogen mg/L 14	EFFLUENT Total Nitrogen lbs 15	EFFLUENT NOx mg/L 16	EFFLUENT NOx lbs 17	EFFLUENT Total Copper mg/L 18	EFFLUENT Total Copper lbs 19	EFFLUENT E-Coli #/100 ml 20	EFFLUENT Settleable Solids ml/L 21	EFFLUENT pH su 22	EFFLUENT Turbidity ntu 23	EFFLUENT UV Intensity % 24	EFFLUENT Total Daily Flow mgd 25
1																				0.0	7.05	0.15	100	0.400
2																				0.0	7.14	0.12	100	0.415
3	190	222	1.30	3.77	1.00	2.90	0.60	1.74	13.4	0.18	0.52	0.10	0.29	3.80	11.03	3.20	9.29	0.003	0.007	1	0.0	7.15	0.12	100	0.348
4																					0.0	7.04	0.14	100	0.426
5																					0.0	7.01	0.14	100	0.378
6																					0.0	6.96	0.16	100	0.491
7																					0.0	6.94	0.16	100	0.397
8																					0.0	7.07	0.17	100	0.313
9																					0.0	7.06	0.13	100	0.335
10																					0.0	7.06	0.13	100	0.421
11	130	180	1.30	8.68	1.00	6.68	0.80	5.34	36.8	0.24	1.60	0.22	1.47	3.90	26.05	3.10	20.71	0.003	0.019	1	0.0	7.11	0.23	100	0.801
12																					0.0	7.04	0.13	100	0.542
13																					0.0	6.90	0.11	100	0.558
14																					0.0	7.01	0.12	100	0.427
15																					0.0	7.02	0.12	100	0.462
16																					0.0	7.05	0.12	100	0.395
17																					0.0	7.02	0.12	100	0.452
18	220	172	1.20	4.41	1.00	3.68	0.70	2.57	18.1	0.17	0.63	0.10	0.37	3.70	13.61	3.00	11.03	0.002	0.008	1	0.0	7.01	0.13	100	0.441
19																					0.0	7.03	0.12	100	0.398
20																					0.0	7.02	0.13	100	0.419
21																					0.0	7.00	0.12	100	0.350
22																					0.0	7.09	0.15	100	0.350
23																					0.0	7.14	0.16	100	0.369
24																					0.0	7.13	0.14	100	0.370
25	210	206	5.30	16.13	1.00	3.04	0.70	2.13	32.8	0.24	0.73	0.50	1.52	4.10	12.48	3.40	10.35	0.003	0.009	1	0.0	7.05	0.16	100	0.365
26																					0.0	7.01	0.17	100	0.383
27																					0.0	7.04	0.13	100	0.378
28																					0.0	7.04	0.14	100	0.370
29																					0.0	7.18	0.12	100	0.369
30																					0.0	7.04	0.14	100	0.333
31																					0.0	7.02	0.13	100	
Total	750	780	9.10	33.00	4.00	16.30	2.80	11.79	101.1	0.83	3.48	0.92	3.65	15.50	63.17	12.70	51.38	0.010	0.042	4			4.30	3100	12.456
Ave.	188	195	2.28	8.25	1.00	4.08	0.70	2.95	25.3	0.21	0.87	0.23	0.91	3.88	15.79	3.18	12.85	0.003	0.011	1			0.14	100	0.415
Max.	220	222	5.30	16.13	1.00	6.68	0.80	5.34	36.8	0.24	1.60	0.50	1.52	4.10	26.05	3.40	20.71	0.003	0.019	1		7.18	0.23	100	0.801
Min.	130	172	1.20	3.77	1.00	2.90	0.60	1.74	13.4	0.17	0.52	0.10	0.29	3.70	11.03	3.00	9.29	0.002	0.007	1		6.90	0.11	100	0.313
Average % Removal			98.8%		99.5%																				

UOD lbs = (Effluent BOD lbs x 1.43) + (Effluent TKN lbs x 4.57)

Effluent Primary Flow Device Is A 90 Degree V-notch Weir

Effluent Flow Checks

Date 26	Head feet 27	Actual Flow mgd 28	Chart Flow mgd 29	(Actual - Chart) / Actual x 100 = % error 28
7/3/2024	0.563	0.384	0.379	1.4 % error
7/10/2024	0.708	0.682	0.662	2.9 % error
7/17/2024	0.396	0.159	0.164	-2.8 % error
7/24/2024	0.458	0.229	0.237	-3.3 % error
				% error

Factory Calibration Date: By:

Comments And Explanations Of Any Violations:
(Reference all attachments here)

Prepared By: Bryan Longe

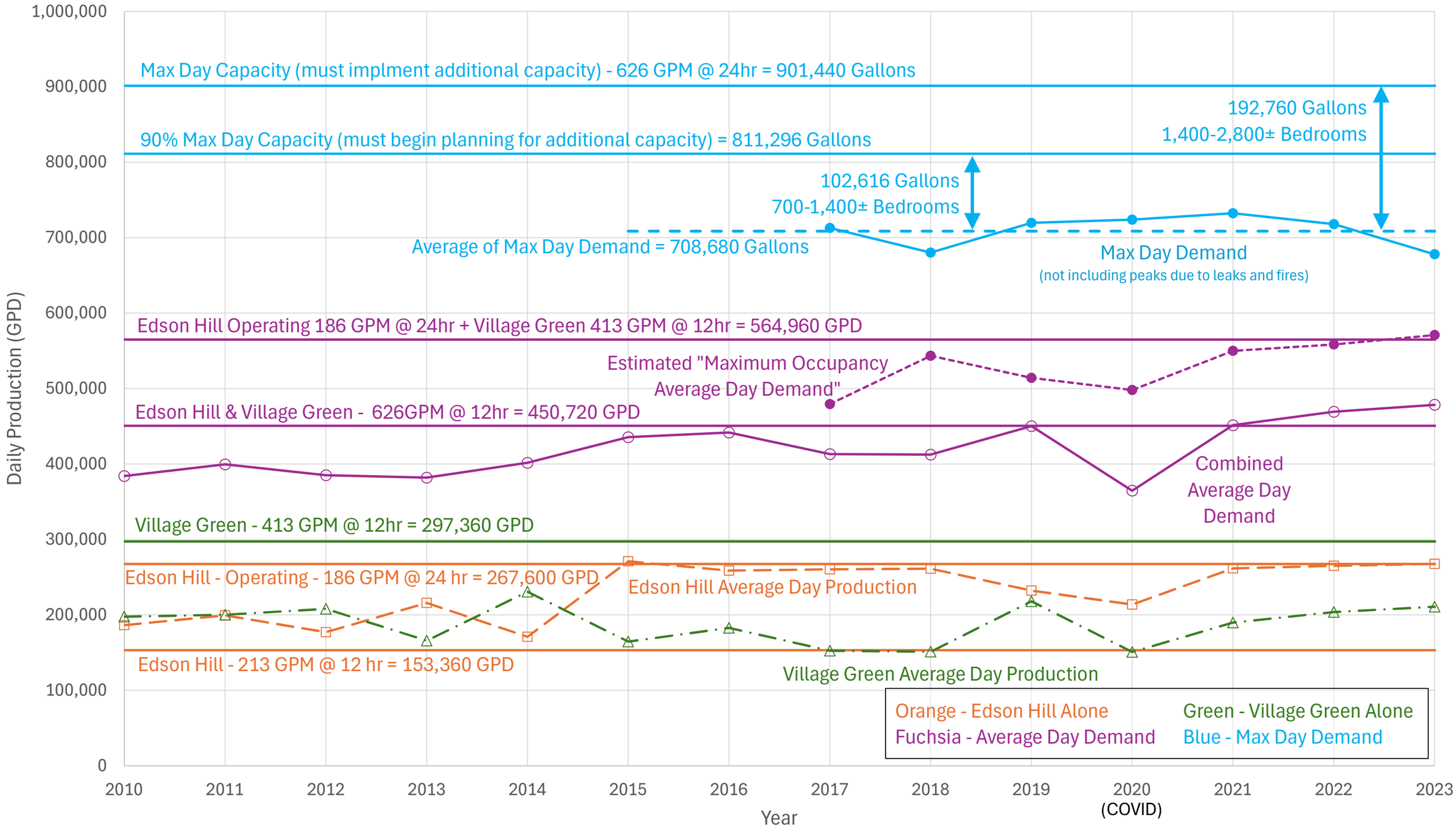
I certify under penalty of law that I have personally examined and am familiar with the information submitted herein. Based on my inquiry of those individuals immediately responsible for obtaining the information, I believe the submitted information is true, accurate and complete. I am aware that there are significant penalities for submitting false information, including the possibility of fine and imprisonment.

Approved By: Harry Shepard

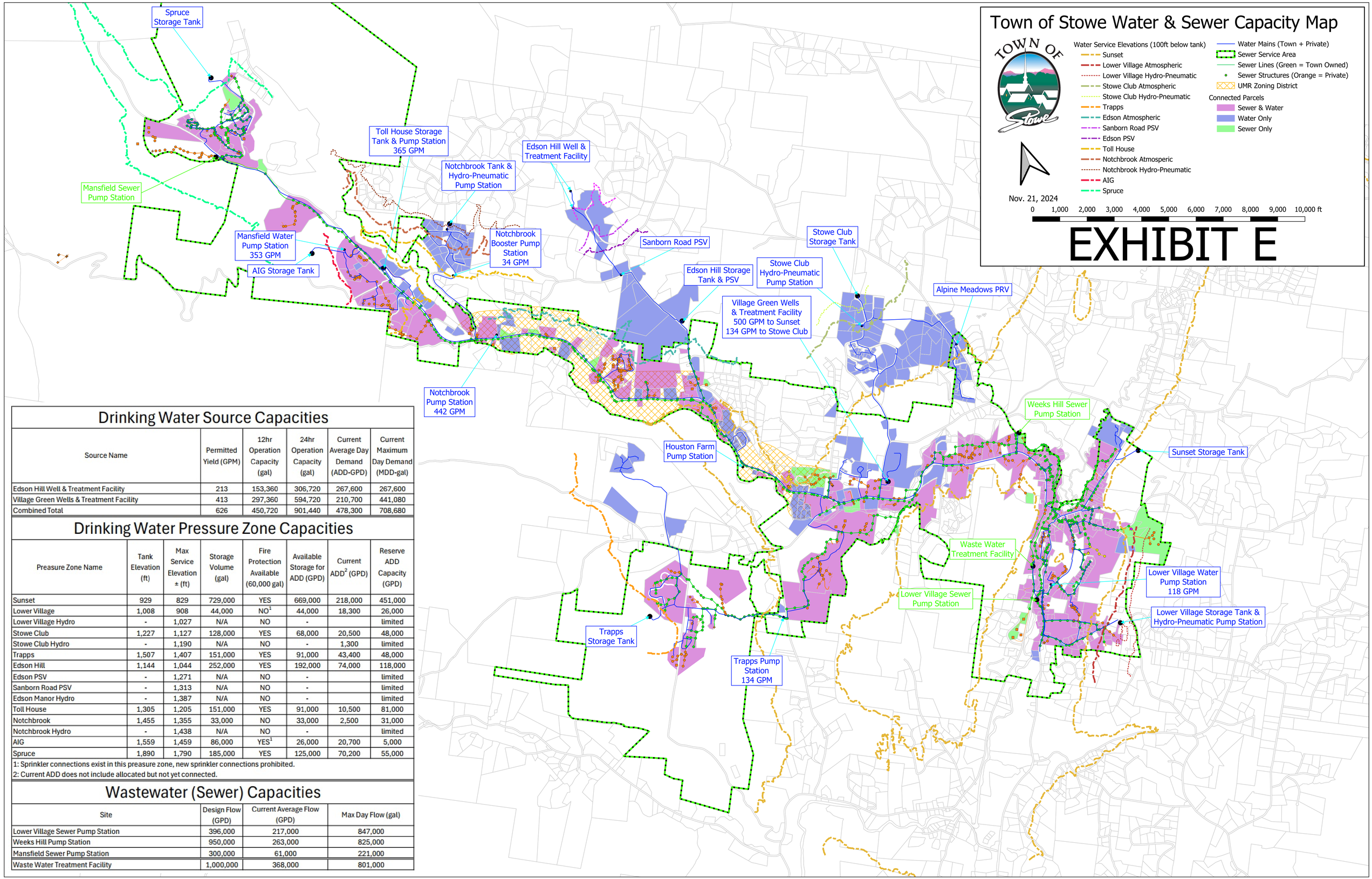
One Copy To The State With original Signature, Permittee To Keep One Copy On File

WR-43-3 Computer Form Revised 10092009

Stowe Water Department - Demand & Capacity Analysis - EXHIBIT D



Town of Stowe Water & Sewer Capacity Map



Water Service Elevations (100ft below tank)
- Sunset
- Lower Village Atmospheric
- Lower Village Hydro-Pneumatic
- Stowe Club Atmospheric
- Stowe Club Hydro-Pneumatic
- Trapps
- Edson Atmospheric
- Sanborn Road PSV
- Edson PSV
- Toll House
- Notchbrook Atmosperic
- Notchbrook Hydro-Pneumatic
- AIG
- Spruce

- Water Mains (Town + Private)
- Sewer Service Area
- Sewer Lines (Green = Town Owned)
- Sewer Structures (Orange = Private)
- UMR Zoning District

Connected Parcels
- Sewer & Water
- Water Only
- Sewer Only

Nov. 21, 2024

0 1,000 2,000 3,000 4,000 5,000 6,000 7,000 8,000 9,000 10,000 ft

EXHIBIT E

Drinking Water Source Capacities

Source Name	Permitted Yield (GPM)	12hr Operation Capacity (gal)	24hr Operation Capacity (gal)	Current Average Day Demand (ADD-GPD)	Current Maximum Day Demand (MDD-gal)
Edson Hill Well & Treatment Facility	213	153,360	306,720	267,600	267,600
Village Green Wells & Treatment Facility	413	297,360	594,720	210,700	441,080
Combined Total	626	450,720	901,440	478,300	708,680

Drinking Water Pressure Zone Capacities

Preasure Zone Name	Tank Elevation (ft)	Max Service Elevation ± (ft)	Storage Volume (gal)	Fire Protection Available (60,000 gal)	Available Storage for ADD (GPD)	Current ADD[2] (GPD)	Reserve ADD Capacity (GPD)
Sunset	929	829	729,000	YES	669,000	218,000	451,000
Lower Village	1,008	908	44,000	NO[1]	44,000	18,300	26,000
Lower Village Hydro	-	1,027	N/A	NO	-		limited
Stowe Club	1,227	1,127	128,000	YES	68,000	20,500	48,000
Stowe Club Hydro	-	1,190	N/A	NO	-	1,300	limited
Trapps	1,507	1,407	151,000	YES	91,000	43,400	48,000
Edson Hill	1,144	1,044	252,000	YES	192,000	74,000	118,000
Edson PSV	-	1,271	N/A	NO	-		limited
Sanborn Road PSV	-	1,313	N/A	NO	-		limited
Edson Manor Hydro	-	1,387	N/A	NO	-		limited
Toll House	1,305	1,205	151,000	YES	91,000	10,500	81,000
Notchbrook	1,455	1,355	33,000	NO	33,000	2,500	31,000
Notchbrook Hydro	-	1,438	N/A	NO	-		limited
AIG	1,559	1,459	86,000	YES[1]	26,000	20,700	5,000
Spruce	1,890	1,790	185,000	YES	125,000	70,200	55,000

1: Sprinkler connections exist in this preasure zone, new sprinkler connections prohibited.
2: Current ADD does not include allocated but not yet connected.

Wastewater (Sewer) Capacities

Site	Design Flow (GPD)	Current Average Flow (GPD)	Max Day Flow (gal)
Lower Village Sewer Pump Station	396,000	217,000	847,000
Weeks Hill Pump Station	950,000	263,000	825,000
Mansfield Sewer Pump Station	300,000	61,000	221,000
Waste Water Treatment Facility	1,000,000	368,000	801,000