Town of East Greenbush

Rensselaer County, New York

Hampton Manor Water District Feasibility Study

Delaware Engineering, D.P.C.

28 Madison Avenue Extension
Albany, New York 12203

December 1, 2017

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1.0 Summary

Drinking water quality, the effects of aging infrastructure, and the potential for consolidation of services are among the topics most frequently cited in current public policy discussions. Witness to this is the recently adopted New York State Budget which includes funding initiatives to be spread over a period of five years, including funds to address sources of drinking water contamination, unregulated contaminants, intermunicipal water and sewer systems and aging infrastructure.

The Town of East Greenbush owns, operates and maintains a water source and distribution system serving the Hampton Manor Water District. This Feasibility Study has been prepared to examine the current Hampton Manor water treatment, storage and distribution system and evaluate alternatives to aging infrastructure and water quality aesthetics.

Importantly, the Town of East Greenbush has several opportunities to address present and future water needs within the Town, with standalone water supply systems or through purchase of water from neighboring municipalities. As a result, a number of different options exist that would achieve the goals of the Town of East Greenbush with respect to providing environmentally sound, economically advantageous water service. The conclusions of this evaluation are principally as follows:

1. The aesthetics of the water drawn from the Hampton Manor wells are poor. Based on sampling results of the Hampton Manor wells, a new filtration system is required to reduce poor taste, odor and color problems that are frequently experienced by water users. Rehabilitating or constructing a new water storage tank is also required to maintain Hampton Manor as a separate water supply system. As a standalone system, property owners in Hampton Manor would take on the burden of paying debt service and operating and maintaining the new treatment systems as well as the new water tank(s) for at least 30 years, and there would be no economy of scale as is the case for property owners in the General Water District.

2. Connection to the General Water District would alleviate taste, odor and color problems that are frequently experienced within Hampton Manor. The existing water tanks in Hampton Manor would be decommissioned; therefore replacement and maintenance of tanks would be eliminated. While Hampton Manor property owners would be responsible for funding debt service for the interconnection to the General Water District, in the future, the property owners in Hampton Manor would benefit from the economy of scale that property owners in the General Water District realize.

3. The installation of water meters on each occupied property could be conducted under either a standalone or consolidated system scenario. In either case, a meter amortization approach to the installation and maintenance of the meters is recommended. Incorporating the costs of water meters in long term borrowing (likely 30 years) is not recommended because the useful life of a water meter is approximately 10 years, at which time the meter will need to be replaced, and the users would continue paying debt service on meters that are no longer in use while also have to fund the cost of replacement meters.

4. Blending of source water is complex due to the widely varied water chemistry between Hampton Manor and Troy water. Blending incompatible source waters can result in aesthetic and operational issues, and for these reasons, this is not a recommended approach.

2.0 Planning Area

The Town of East Greenbush is located in Rensselaer County, New York, just miles southeast of the City of Albany. The Town's population is estimated at 16,500 persons while the Hampton Manor Census Designated Place (CDP) has 2,400 persons (2010 Census). A Location Map is included as Figure 1.

Hampton Manor is a Hamlet located in the western portion of the Town of East Greenbush. The US Census Bureau has adopted an official boundary for the CDP, although it is clear that because of concentrated development, the Hampton Manor Water District (Figure 2) extends past the CDP bounds.

The Town also owns and operates a General Water District which serves the majority of Town residents as well as some areas located immediately outside of the Town. The General Water District obtains water through an Intermunicipal Agreement with the City of Troy.

2.1 Hampton Manor Water Treatment and Distribution System

The Hampton Manor Water District boundary falls between Columbia Turnpike (Route 20 and 9) to the west, follows the CDP boundary along the south, runs northeast along Eastern Avenue, and includes all connecting roads along Hampton Avenue. Over 650 parcels are included in the Hampton Manor Water District (the "District"). Appendix A contains a Map Book of the entire Hampton Manor water system.

Overview of System:

- No. of Customers: 655+
- Number of EDUs: 811
- No. of Active Groundwater Wells: 2
- Average Daily Demand: 109,000 GPD
- Pipe Length: 7.7 miles
- No. of Water Valves: >120
- No. of Fire Hydrants: Approx. 45
- Elevation Difference between High (360) & Low Points (180): 180 feet
- System Pressure Varies from 40 PSI to 65 PSI

The Hampton Manor Water District is primarily made up of residential users (92%). Approximately 3.4% of the District is comprised of two-family homes, 2.5% are businesses and the rest are multi-unit apartments and buildings. The District also supplies water to an 18 unit mobile home park on Columbia Turnpike. Figure 3 shows a map with water customers by property class with and without meters.

The Hampton Manor water system serves approximately 650 customers with a population of 2,240 people. These customers result in 811 equivalent dwelling units (EDUs). An EDU represents the average single family home. Average daily water demand is 109,000 gallons per day (gpd) with peak daily demands of 205,000 gpd. The system is generally unmetered. The approximately 3% of accounts that are metered pay per gallon for water usage based on type of unit (i.e. residential, apartment building or business). The flat rate for a single-family residence is $95 every six months or $190 per year.

Water is supplied from two groundwater wells located on Hampton Avenue and Pinehurst Avenue. Well A consists of a bedrock drilled well, 110 feet in depth with a 12-inch casing and a capacity of 600 gallons per minute (gpm) but yielding 100 gpm. Well B consists of a bedrock drilled well, 100 feet in depth with a 6-inch casing and a capacity of 250 gpm but yielding 90 gpm. Yield, or well pumping rate, is limited by the horsepower of the well pump. This defines how fast the pump can deliver water. It is a sustainable rate of water flow that a well can draw continuously over an extended period. Capacity of the well is how much water is available at any one point in time.

Well A is used as the primary well and Well B is used as a backup. Treatment consists of chlorination for disinfection and ortho-polyphosphate for corrosion control and as a sequestering agent. Water from both of the wells is disinfected with sodium hypochlorite prior to distribution to protect against contamination from harmful bacteria and other organisms.

The distribution system has two pressure zones with separate 60,000-gallon storage tank, 140,000-gallon storage tank and booster pumps, located on Hudson Avenue on the eastern side of the District. The two water tanks are required to provide pressure for proper system operation. An evaluation completed recently for each of the tanks identified the need to replace the existing 60,000-gallon tank and the need to rehabilitate the 140,000-gallon tank in the near future to maintain proper operation of the water distribution system. See Appendix B for copies of the tank evaluations.

It has been reported by water users that the treated water from the Hampton Manor wells is hard and contains iron. Color is also noted as an issue. While these concerns are not public health priorities, the aesthetics of the water have a significant impact on quality of life. In similar water systems in the region, iron present in the groundwater reacts with the chlorine used for disinfectant, creating an oxidation reduction reaction, resulting in poor taste and color.

Recent water sampling and tests (Appendix C) revealed that the source water for Hampton Manor does not contain Perfluorooctanoic acid (PFOA), which is a relief to the Town and its residents. PFOA is a known carcinogen affecting some groundwater users in the region. As part of this Feasibility Study, routine water quality parameters were tested for at each of the wells prior to disinfection. The results are summarized below.

Table 1. October 2017 Hampton Manor Wells Water Quality Data

Water Quality Parameter	Secondary Maximum Contaminant Level (SMCL)		Well A	Well B
Alkalinity (as CaCO3)	100	mg/L	240	210
pH	6.5-8.5		7.4	7.5
TDS	500	mg/L	615	530
Turbidity		NTU	5.8	2.2
Color	15	CPU	5	<5
Conductivity		umhos/cm	1,080	925
Calcium		mg/L	115	118
Chloride	250	mg/L	159	125
Magnesium		mg/L	28	27.5
Iron (T)	0.3	mg/L	0.441	0.276
Manganese	0.05	mg/L	0.164	0.171
Nitrite (as-N)	1 (MCL)	mg/L	ND	ND
Odor	3	TON	ND	ND
Sodium	20*	mg/L	48.3	28
Sulfate (SO4)	250	mg/L	59.2	54
Fluoride	2	mg/L	ND	ND
Silicon		mg/L	8.31	8.59

*There is no MCL or SMCL for Sodium

National Primary Drinking Water Regulations (NPDWR) have been set by the US Environmental Protection Agency (EPA). NPDWRs are mandatory water quality standards for drinking water. Maximum Contaminant Level (MCL) is defined as the highest level of contaminant that is allowed in drinking water. These were established by the EPA to protect the public against consumption of drinking water contaminants that present health risks. In addition, National Secondary Drinking Water Regulations (NSDWR) were also established by the EPA. These Secondary Maximum Contaminant Levels (SMCL) are established guidelines to assist public water systems in managing the aesthetics of drinking water such as odor, taste and color. SMCLs do not present health risks and are not federally enforceable. Please note that the water samples do not exceed any Primary MCLs.

Water quality testing reveals that more than one constituent in Hampton Manor water may be contributing to the color, odor and aesthetic issues reported by many water users. The results of the water quality testing performed in October 2017 are discussed below:

- Alkalinity is a measure of the water's ability to neutralize acids. Alkalinity higher than 100 mg/l impacts taste and corrosivity although it is not considered a health hazard. Alkalinity at both wells measures over 200 mg/l.

- Total dissolved solids (TDS) can cause water hardness, deposits and can give water a salty taste. High TDS concentrations can also lead to discoloration of water as well as discoloration of fixtures and appliances. TDS were detected at both wells.

- Conductivity is a determinant of TDS concentration. The higher the TDS, the more ions will be present in the water and the higher the conductive reading will be.

- High levels of iron in water can cause the water to turn a rust color. The water may also have a metallic taste and stain fixtures and appliances a rust color. Iron levels in Well A exceed the SMCL while iron levels in Well B are below but very close to the SMCL.

- Manganese can discolor water black or brown. The water may also have a metallic taste and stain fixtures and appliances a black or brown color. Manganese levels in both wells are well above the SMCL.

- All water supplies will contain some sodium. While there is no MCL or SMCL for sodium, the US EPA recommends that a level of 20 mg/l not be exceeded for those persons on a sodium restricted diet. Sodium levels in both wells exceed 20 mg/l.

2.2 General Water District

The East Greenbush General Water District provides water to approximately 11,200 residential and commercial customers within the Town. The average daily demand for the General Water system is 3,303,000 gallons. The total water purchased in 2016 from the City of Troy was over 1 billion gallons. The average annual charge for water in 2016 was $3.70 per 1,000 gallons for metered residential customers. This equates to about $158 per year based on typical Hampton Manor water usage. Customers are billed every 3 months. Unmetered residential customers pay a flat rate of $432 per year.

The General Water District purchases its water from the City of Troy (the “City”). The City draws its water from the Tomhannock Reservoir, located to the northeast portion of the City. Water flows from the Tomhannock Reservoir to the Troy water treatment plant. The water purchased by East Greenbush

is pumped through the Cross Street Pump Station. A 36-inch water main along Route 4 through North Greenbush carries water to two, 5 million gallon storage tanks at the top of Grandview Drive which distributes water throughout the General Water District. The supply system is jointly owned with the City of Rensselaer.

3.0 Alternatives

3.1 Alternative 1 – Current System Upgrade

Upgrades to the current system include treatment improvements at the wells and storage tank improvements. Treatment will be provided by sand filters which are able to filter out the metal constituents, such as iron and manganese, listed in Table 1. Storage options include rehab of the existing tanks or elimination of the existing tanks in favor of a single tank. There are added operation and maintenance costs associated with this alternative. These costs are discussed below.

3.1.1 Additional Treatment at the Well Site

The Hampton Manor wells are located off of Hampton Avenue and Pinehurst Avenue just north of Hampton Manor Lake. This parcel is owned and operated by the Town of East Greenbush and is also the location of the David Onderdonk Jr. Memorial Park. This area of the District is primarily residential in nature. A Well Location Map is included as Figure 4.

Water samples were taken at both wells to test for typical water constituents (Appendix C). Raw water from the Hampton Manor wells is hard and contains iron and manganese. Color is also an issue. While these concerns are not public health priorities, the aesthetics of the water can have a significant impact on quality of life as described above in Section 2.1. Surrounding towns in Rensselaer County also experience these characteristics in groundwater sources.

In order to treat the constituents found in the Hampton Manor water wells, two sand filters would be installed at the well site. Two new lower powered pumps would be needed along with a small building to house the new equipment which would be constructed on-site near the wells. Preliminary construction costs, including all material, labor, engineering and permitting costs for this alternative is shown below in Table 2.

Table 2. New Sand Filter Costs

Item	Cost
Engineering (including design, coordination and oversight)	$10,000.00
Permitting	$5,000.00
2 Sand Filters	$35,000.00
2 New Pumps	$50,000.00
Controls/SCADA	$50,000.00
Filter Building to House Sand Filters, Pumps and Controls	$15,000.00
Construction & Installation	$150,000.00
TOTAL =	**$315,000.00**

Treating water for iron, manganese and aesthetics can be costly in terms of operation and maintenance. Automated sand filters could save on manual labor costs but will increase the project costs slightly over un-automated filters. Electricity cost savings would be realized for this alternative because the new pumps used for the filters would be much smaller (15 horsepower) than the current well pumps (60 horsepower). Electricity costs would decrease to about $250 per month for the Town if this option is chosen. Added operation and maintenance costs for this alternative total $24,000. This added cost is accounted for in the Rate Analysis below.

Approximately 10% of the flow will be lost to filter backwash. The WWTP must be able to accept iron and manganese backwash from the filters and an added flow of approximately 10,000 gpd. This may add to the operation and maintenance costs and could have an impact on the feasibility of this option.

3.1.2 Rehabilitate Existing Water Storage Tanks

System pressure is supplied by two water storage tanks; a 60,000-gallon storage tank and a 140,000-gallon storage tank, located on Hudson Avenue on the eastern side of the District. A Water Tank Location Map is included as Figure 5.

An evaluation completed for each of the tanks in 2016 identified the need to replace the existing 60,000-gallon tank and the need to rehabilitate the 140,000-gallon tank in the near future to maintain proper operation of the water distribution system. This option is not recommended as costs can be significant and the positive aspects of a project such as this do not outweigh those of constructing a new water storage tank. The evaluation reports point out that the costs for replacement and rehabilitation should be evaluated based on the condition of the 60,000-gallon tank. Costs for a new tank are very similar to the costs to rehabilitate the two existing tanks. Preliminary construction costs, including all material, labor, engineering and permitting costs for rehabilitation of the two existing Hampton Manor water tanks are described in Table 3 below.

Table 3. Existing Tank Rehabilitation Costs

Item	Cost
Engineering (including design, coordination and oversight)	$5,000.00
140,000 Gallon Tank Rehabilitation Materials	$210,000.00
60,000 Gallon Tank Rehabilitation Materials	$90,000.00
Construction & Installation	$300,000.00
TOTAL =	**$605,000.00**

3.1.3 New Water Tank

This alternative explores the decommissioning and removal of the two existing water tanks and the construction of one new water tank for Hampton Manor. The two current storage tanks that provide pressure for proper system operation have been found to be in need of replacement or considerable rehabilitation. A new tank would be constructed on the same site as the older tanks. A new storage tank at this site is an affordable and viable option for providing storage and delivery of water to the District. As can be seen in Table 3 above, costs for a brand new tank are very similar to those of rehabilitation of the two older tanks. Construction of a new tank would also increase the service life of the tank.

Preliminary construction costs, including all material, labor, engineering and permitting costs for this alternative are described in Table 4 below.

Table 4. New Water Storage Tank Costs

Item	Cost
Engineering (including design, coordination and oversight)	$10,000.00
New 200,000 Gallon Aquastore Tank	$270,000.00
Decommissioning & Removal of Tanks (unless extensive lead abatement is required)	$80,000.00
Construction & Installation	$350,000.00
TOTAL =	**$710,000.00**

3.2 Alternative 2 – Connection to the General Water District as Sole Water Supply

The consolidation option is attractive because it is possible to eliminate the water tanks in Hampton Manor as pressure will be provided by the two five-million gallon concrete water storage tanks and Cross Street Pump Station that serve the remainder of the Town of East Greenbush, as well as the City of Rensselaer. Having conducted the design engineering and construction of the two large tanks and pump station some years ago, Delaware Engineering is well aware of their condition, operation, and function.

The wells and water storage tanks serving Hampton Manor would be decommissioned under this option. The valve at the intersection of Hudson Avenue and Eastern Avenue will be opened in order to allow water to flow from the General Water District to the Hampton Manor Water District. A 6-inch master meter would be installed at this location. The meter size is determined by the size of the water line. A location map of the connection point is included as Figure 6.

Because of the topography of the General Water District, pressure control reduction will be required to control the system pressures and ensure proper operations. Pressure control is achieved through the installation of a pressure reducing valve (PRV) within the water system. These types of valves are used to obtain a regulated and constant pressure throughout the system. PRVs are completely automatic and will not need to be monitored continually. Detailed design drawings would need to be completed in order to pinpoint the exact location of the PRV within the Hampton Manor system. A PRV is typically installed directly on the waterline and in a vault underground. The Hampton Manor system already has several PRVs in operation. The installation of pressure control will have no impact on the General Water District. Costs for installation of the PRV are included in the table below.

Preliminary construction costs, including all material, labor, engineering and permitting costs for this alternative are shown in Table 5 below. Note that the costs presented herein are to decommission and to remove the existing water storage tanks. Decommissioning (also referred to as stabilization) of the water tanks includes draining the water and disconnecting them from the water system.

Table 5. General Water District Connection Costs

Item	Cost
Engineering (including design, coordination and oversight)	$15,000.00
Permitting	$10,000.00
6" Master Meter to be installed at interconnection point	$22,000.00
Decommissioning of Wells & Decommissioning/Removal of Tanks (cost assumes minimal lead abatement)	$80,000.00
Pressure Control (Pressure Reducing Valve Equipment)	$75,000.00
Construction and Installation	$177,000.00
TOTAL =	**$379,000.00**

3.3 Alternative 3 – Connection to General Water District to Blend Existing Sources

Blending of source water is complex due to the widely varied water chemistry between Hampton Manor and Troy water. Blending incompatible source waters can result in aesthetic and operational issues, and for these reasons, this is not a recommended approach.

4.0 Meters

Alternative 3 includes costs for a master meter, to be located at the connection site of the two Districts, as opposed to installation of individual meters for each customer. It is recommended that a 4 year metering plan be put in place by the Town of East Greenbush. Approximately 630 customers in the District are unmetered and it has been assumed for purposes of this Study that about a quarter of those customers will require meter pits. Meters pits allow a meter to be installed on the property when an inside location is not viable. The metering plan would include replacement of approximately 158 meters per year over a 4 year period. The cost for these meters would be included in the biannual billing statements for all customers in the District. Costs for meter installation are detailed below in Table 6.

Table 6. Annual Meter Installation Plan

	Cost	Units	Total
Meter	$495.00	119	$58,905.00
Meter & Meter Pit	$1,067.00	39	$41,613.00
		Total Cost per Year =	**$100,518.00**

With 630 customers, the approximate annual cost of the meters to each customer is $160 under the four year installation plan. If desirable due to user cost impact, it possible to accelerate the installation of meters to three years or extend it to five years by changing the percent of meters installed each year (three years is 33% per year; five years is 20% per year); however, if a different timetable is desired, note that a plan of less than three years and greater than five years has been proven to be impractical.

Bonding of meters, or including meters in the total project cost, is not recommended as the average life of a meter is 10 years and the life of the project loan will be 30 years. The Town will eventually be paying interest on meters that are in need of repair or replacement if they are to be included in bonding costs.

Meters could also be installed on a one year time frame, although this method is not recommended for several reasons. While it is not challenging to purchase and warehouse 630 meters, it would be challenging to use existing staff to install 630 meters in a year. Moreover, the large number of meters that require installation of a pit to accommodate the meter will be time consuming for staff and require dedication of equipment for this purpose. Existing staff is likely already fully employed with other tasks in the water system, and the workload is generally strained to accommodate meter installs. In addition to the commitment of staff and equipment, installing all of the meters at one time will result in the need to replace all of the meters at once in approximately ten years, which is the useful life of a water meter. This will burden the users and operators with high costs and time commitments in the future every ten years. And, if the cost of meters is included in long term borrowing which generally has a 30 year term, after the tenth year of the financing, rate payers will be paying for meters that are no longer in service and will have to fund meter replacements nevertheless. For these reasons, installing the meters on a three to four year schedule with funds generated by user payments is highly recommended.

With 630 customers, the approximate annual cost of the meters to each customer is $763 under the one year installation plan. While this would be a one-time payment, it is a significantly higher cost than the $160 for the four year annual meter installation payment plan and may be burdensome for some homeowners. There are presently no grant programs specifically for the cost of water meters.

Table 7. One-Year Meter Installation Plan

	Cost	Units	Total
Meter	$495.00	630	$311,850.00
Meter & Meter Pit	$1,067.00	158	$168,586.00
		Total Cost =	**$480,436.00**

5.0 Water Line Replacement

The Town Water Department works on water line replacement each year to ensure reliability of the water distribution system to its users. Under any scenario or alternative described above, water line maintenance, repair and replacement is going to be required. Because these costs will be the same regardless of whether the system remains as a standalone or consolidates, water line costs are not included in the rate analysis below. A map of the water lines to be replaced is included as Figure 7.

The cost estimate below includes the following:

- Connections to existing water mains
- New 6” Ductile Iron Pipe (DIP) or 6” C-900 PVC Pressure Pipe with Restrained Ductile Iron fittings included
- New 6” Ductile Iron Gate Valves and Valves Boxes
- New Fire Hydrants with 6” Ductile Iron Gate Valves (Guard valves)
- New 1” copper pipe or HDPE pipe water services for each property (includes corporation stop, pipe, curb stop with curb box and connection to existing water services)
- Support and protection of existing utilities during construction (i.e. gas pipes, electric poles and conduits, sanitary and storm sewer piping)
- Pressure testing of new watermains

- Chlorination of new watermains
- Bacteria testing of new watermains
- Abandonment of existing watermains (left in place and capped or plugged)
- Restoration of lawns
- Restoration of pavement
- As-Built drawings

Table 8. Water Line Replacement Costs

	Quantity	Unit	Rate	Total Cost
Tampa Ave. Water Main Replacement	1,000	LF	$220.00	$220,000.00
Hudson Ave. Water Main Replacement	700	LF	$220.00	$154,000.00
Washington Ave. Water Main Replacement	800	LF	$220.00	$176,000.00
Madison Ave. Water Main Replacement	1,000	LF	$220.00	$220,000.00
Spring Ave. Water Main Replacement	300	LF	$220.00	$66,000.00
			TOTAL CONSTRUCTION COSTS =	**$836,000.00**

6.0 Hampton Manor Water System Hydraulic Modeling

A hydraulic analysis of the Hampton Manor water system was performed based on original hard copy maps of the water system and topographic data. Water department personnel were helpful in providing additional system data as well as information on their system operating procedures. The analysis relied on modeling using EPANET.

The purpose of this exercise is to analyze the performance capabilities of the system and to define the requirements necessary to meet system design standards for pressure and flow based on the alternatives described herein. Wells, pipes, pumps, water tanks and reservoirs can be sized and positioned using pressure and flow data resulting from the hydraulic modeling scenarios. Pressures should generally not exceed 100 PSI within the system. Hydraulic modeling helps to prevent this.

The EPANET model was built by first simulating the current water distribution system based on known data and tank operations. The model consists of approximately 132 nodes which allow for the calculation of water pressure at a given point (primarily at street intersections and storage tanks). Each node was assigned an elevation based on topographic data. The model contains approximately 147 links (or pipes) which connect the nodes and equipment. Each link is assigned a pipe diameter, pipe length and roughness coefficient for calculation of friction loss through the pipe. The model was calibrated using known pressures measured at hydrants throughout the system. Some assumptions were incorporated into the model including well and pump input parameters.

Multiple modeling scenarios were created to evaluate system pressures under the different alternatives presented in this report (See Appendix D). Modeling scenarios include: 1) the existing system under static water pressure conditions and 2) connection to the General Water District at Eastern Avenue between Hudson Avenue and Washington Avenue (includes decommissioning of the source water wells and water storage tanks).

7.0 Water User Rates

The ultimate judge of the financial viability of the proposed alternatives is the amount charged to users, as it takes into account both the operational costs of the system as well as debt repayment of the construction itself.

Three figures are available for comparisons of proposed user rates. The New York State Environmental Facilities Corporation's Intended Use Plan contains a formula which equates the target water service charge (TSC) for a given population based on the median house income (MHI) of the area. Based on the MHI for Hampton Manor CDP (approximately $60,000, as determined by the Census Department), the target water charge is around $1,000 per year. The USDA Rural Utility Service uses an affordability metric of 1.5% of MHI for annual water or sewer charges. In this case, under the USDA program, $900 is considered an affordable cost for water service in Hampton Manor. It is also instructive to note that according to the New York State Comptroller's office, the average cost of water to a single family home in NYS in 2017 is $966.

Most customers in the Hampton Manor Water District are not metered and pay a flat rate each billing cycle. Non-metered users are billed based on 6-month usage periods. The majority of accounts in the system are single family residential. Those accounts pay a flat rate of $190 per year. Non-metered businesses pay a flat rate of $114 per year. It is noted that these rates are adequate to provide for the purchase of water that is of poor aesthetic quality.

The majority of metered accounts are businesses or large water users, such as the Red Mill Elementary School. Metered accounts are billed every six months. The minimum charge for metered accounts is $104 per year, for usage up to 21,000 gallons. The rate for water used over the minimum is $2.93 per 1,000 gallons. The average metered user pays $156 per year for water in the Hampton Manor Water District.

In order to determine the potential impact of these options on user rates, a Water Rate Analysis (Table 8) has been prepared. The results of the analysis as well as recommendations and next steps towards resolving water treatment issues in the Town of East Greenbush are presented herein.

The first step in the creation of the rate model was review of existing information regarding the Hampton Manor water system including users, rates, debt and operating/maintenance budgets and similar information.

The following data was collected and reviewed:

- Existing O&M Budget
- Existing Debt
- Existing User base: EDUs & Gallons Water Treated
- New project cost (capital + soft cost) for each Alternative
- Expected debt terms for new project costs

Table 9. Water Rate Analysis

	Alternative 1 Sand Filters & New Tank	Alternative 1 Sand Filters & Rehab Tanks	Alternative 2 GW Connection
Project Cost	$1,025,000	$920,000	$379,000
Interest Rate	4.00%	4.00%	4.00%
Finance Term (Years)	30	30	30
Annual Debt from Alt.	$59,276	$53,204	$21,918
Hampton Manor EDUs	811	811	811
Debt per EDU[1]	$73	$66	$27
Current Operating Costs	$130,000	$130,000	NA
Added Operating Costs	$24,000	$24,000	$0
Total O&M	$154,000	$154,000	$0
Cost of Water	$0	$0	$160[2]
Annual Cost per EDU	$263	$255	$187

1 - There are 811 EDUs in the Hampton Manor Water District

2 - Based on rate of $40 per quarter ($160 per year), similar to the metered residential charges in General Water ($158 per year)

Given that the current cost for discolored, odorous water in Hampton Manor is $190/EDU, any option explored is a reasonable solution from a cost perspective.

8.0 Planning Considerations

Potential grant and low-interest financing could be explored, some of the most common funding sources are:

- NYS Clean Water State Revolving Fund
- Empire State Development Corporation
- NYS Clean Water/Clean Air Bond Act
- NYS Senate and Assembly Funding
- U.S. Department of Agriculture Rural Development

In addition to a determination of funding, the following is a summary of steps, in approximate chronological order, necessary to bring the proposed alternative into operation:

- Water district planning/extension/consolidation and community involvement
- Map Plan and Report
- Site studies to address wetlands, archeology, and other environmental considerations, if needed
- Conduct SEQR review
- Establish municipal water district/extension/consolidation as per Town Law Art. 12/12A or 12C
- Obtain Comptroller approval (if required)
- Seek and secure project financing
- Design and approvals from the DOH
- Miscellaneous local and other permits (DOT, County, etc.)
- Bid and award construction contracts
- Construction
- Facility start-up

Considering the scope of the project, completion would require an estimated 24 months from the time work begins on planning, design, and permits until the systems would be consolidated and operational. If grants or reduced interest funding are not available the best course of action may be to fund the work with conventional municipal bonds.

9.0 Conclusion

In conclusion, the recommended alternative is consolidation. Consolidation with the General Water District will allow the decommissioning of the wells and water tanks in Hampton Manor. Usage is relatively low throughout the District and will result in lower added yearly user costs as compared to the other project alternatives. This option also allows for Hampton Manor residents to obtain good quality drinking water with a small financial contribution.