

January 29, 2016

Board of Water and Sewer Commissioners
Groveland Water and Sewer Department
183 Main Street
Groveland, MA 01834

RE: Water Rate Study

Dear Board:

This report is in accordance with our water rate study contract dated September 7, 2015. The Groveland Water and Sewer Department (GWSD) recently updated its capital improvement plan (CIP) in coordination with MassDEP's Drinking Water Infrastructure Needs Survey and Assessment. The updated CIP recommends significant improvements to all aspects of the water system over the next ten years. Environmental Partners Group (EPG) has prepared this letter report to review the current water rates and fees and determine adjustments required to execute the capital improvements.

Background

The GWSD provides municipal water service to customers in Groveland, MA with a water distribution system consisting of approximately 36.5 miles of water piping, delivering water for potable use to about 1950 customers, and providing water for fire protection. Domestic service connections range in size from 1-inch to 2-inch. Operation of the water distribution system is the responsibility of Mr. Tom Cusick, the Department Superintendent who reports to the Board of Water and Sewer Commissioners. The Board of Water and Sewer Commissioners has the authority to set water rates and fees.

Existing Rates and Fees

The current rate structure was last updated in July 2012 and utilizes a three tier increasing block rate as shown on Table 1.

Table 1 – Groveland Existing Water Rates

Description	Amount
Minimum Quarterly Charge up to 1200 CF	\$50.58
1200 – 3000 CF	\$4.61 / 100 CF
Over 3000 CF (Residential)	\$8.63 / 100 CF
Over 3000 CF (Commercial/School)	\$6.98 / 100 CF

Other public water suppliers in the Groveland area were surveyed for comparison. The GWSD rates are relatively low compared to other similar size water systems that were surveyed in the area and significantly lower than the average. A cost comparison based on varied consumption volumes is shown in Table 2.

Table 2 – Local Water Rate Comparison

Usage (cf)	Groveland	Average	Amesbury	Merrimac	Georgetown	North Andover	Topsfield
1,200	\$50.58	\$73.66	\$97.20	\$71.81	\$87.40	\$45.60	\$89.82
2,000	\$87.46	\$114.64	\$162.00	\$119.68	\$124.20	\$76.00	\$138.70
3,000	\$133.56	\$171.82	\$243.00	\$179.52	\$171.35	\$131.50	\$204.89
4,000	\$219.86	\$238.42	\$324.00	\$239.36	\$234.60	\$187.00	\$292.70
10,000	\$737.66	\$709.40	\$810.00	\$598.40	\$865.50	\$520.00	\$853.70

The following data has been reviewed as part of preparation of this report:

- Current water rate structure
- Current and historical water revenue
- Current and forecasted system demand
- Current and historical billing and accounting records
- Current debt
- Current retained earnings balance
- Planned capital improvements
- Current and forecasted operations and maintenance costs

Using the available data, EPG reviewed and evaluated the immediate and future revenue requirements of the GWSD with the intent of maintaining a positive accounting balance. Guidelines from the AWWA Manual of Water Supply Practices - Principals of Water Rates, Fees, & Charges were utilized where applicable. System variables and financial assumptions used in the water rate calculations are found in Table 3.

Table 3 – Analysis Variables & Assumptions

Description	Amount
Existing Accounts	1954
Estimated Annual Growth Rate	0.5%
Inflation	3.0%
Annual Benefit Cost Increase	10%
Existing Fund Balance (as of June 30, 2015)	\$119,529

Water System Revenue

Water Consumption

Revenue for the GWSD is primarily obtained from water consumption. Over the last 3 fiscal years, water rates have generated between 90% and 95% of the total revenue. Of the remaining 5%-10%, approximately half is generated by system development fees with the remainder from miscellaneous services fees performed by Water Department personnel.

The GWSD bills water consumption on a quarterly basis and has a minimum charge and increasing block rate system. A minimum charge of \$50.58 per quarter (\$202.32 annual) is charged to each customer and includes the first 1,200 cubic feet (cf) of water consumption. Any volume of consumption above 1,200 cf and up to 3,000 cf per quarter is charged at a rate of \$4.61 per 100 cf (HCF). Consumption in excess of 3,000 cf per quarter is charged at a rate of \$8.63 per HCF for residential services and \$6.98 per HCF for commercial services and schools. Additionally, customers are afforded a 10% discount on any water consumption bill that is paid within 30 days. For FY15, the GWSD generated approximately \$810,000 in water consumption revenue and discounted approximately \$55,000 for a net revenue of \$755,000. Reduction in water consumption revenue due to the discount policy has been consistent over the past 3 years at approximately 6.5%.

System Development Fee

Revenue from connection fees is generated by charging new customers a fee for connecting to the distribution system. The fee is based on the size of the metered connection. The intent of this fee is for each new customer to pay for the portion of the capital costs that have already been spent to develop the existing water system. The current connection fee excluding the cost of the meter is \$2,575 for a 1" connection. This fee is based on the demand that the connection will place on the water system. Development within the limits of the water system over the past several years has been relatively low, with an average of 8 new connections per year. The rate of new connections is estimated to remain at this rate over the next 10 years. New connection fees in FY15 generated \$26,000 in revenue.

Table 4 on the following page lists the projected water usage and generated revenue over the next ten years if the existing water rate structure and fee schedule was maintained. This table assumes the following:

- New services are added at average rate of 8 services per year.
- Water consumption increases by approximately 0.5% per year
- Unaccounted for Water remains at 10% of total gallons pumped.
- Actual usage revenue will be 90% of calculated revenue (discounts, late/delinquent payment)
- All new service connections will be 1-inch.

These assumptions equal an annual system growth of approximately 0.5%. This also means that the GWSD revenue, based on a per unit volume billed basis, would be approximately \$0.65 to \$0.70 per 100 gallons billed.

**Table 4 - Existing Revenue
Water Rate Study
Groveland, MA**

	2016	2017	2018	2019	2020	2021	2022	2023	2024	2025
Rates and Fees										
Minimum Charge (1200 cf)	\$50.58	\$50.58	\$50.58	\$50.58	\$50.58	\$50.58	\$50.58	\$50.58	\$50.58	\$50.58
Block Rate 1 (<1,200 cf)	\$4.22	\$4.22	\$4.22	\$4.22	\$4.22	\$4.22	\$4.22	\$4.22	\$4.22	\$4.22
Block Rate 2 (1,200 - 3,000 cf)	\$4.61	\$4.61	\$4.61	\$4.61	\$4.61	\$4.61	\$4.61	\$4.61	\$4.61	\$4.61
Block Rate 3 (> 3000 cf) - Res	\$8.63	\$8.63	\$8.63	\$8.63	\$8.63	\$8.63	\$8.63	\$8.63	\$8.63	\$8.63
Block Rate 3 (> 3000 cf) - Com	\$6.98	\$6.98	\$6.98	\$6.98	\$6.98	\$6.98	\$6.98	\$6.98	\$6.98	\$6.98
System Development Fee	\$2,575	\$2,575	\$2,575	\$2,575	\$2,575	\$2,575	\$2,575	\$2,575	\$2,575	\$2,575
Annual Quantities										
Total Accounts	1962	1970	1978	1986	1994	2002	2010	2018	2026	2034
Total Minimum Charge Accounts	628	631	634	636	639	641	644	646	649	651
Minimum Charge Volume (cf)	1,555,096	1,562,560	1,570,061	1,577,597	1,585,169	1,592,778	1,600,423	1,608,105	1,615,824	1,623,580
Billed Volume - Block 1	6,231,664	6,261,576	6,291,631	6,321,831	6,352,176	6,382,666	6,413,303	6,444,087	6,475,019	6,506,099
Billed Volume - Block 2	4,907,012	4,930,566	4,954,233	4,978,013	5,001,907	5,025,916	5,050,041	5,074,281	5,098,638	5,123,111
Billed Volume - Block 3 (Res)	2,625,131	2,637,731	2,650,392	2,663,114	2,675,897	2,688,742	2,701,647	2,714,615	2,727,646	2,740,738
Billed Volume - Block 3 (Com)	796,080	799,901	803,741	807,599	811,475	815,370	819,284	823,217	827,168	831,139
Total Billed Volume (cf)	16,114,982	16,192,334	16,270,058	16,348,154	16,426,625	16,505,473	16,584,699	16,664,306	16,744,294	16,824,667
Total Pumped Volume (cf)	17,905,536	17,991,483	18,077,842	18,164,615	18,251,805	18,339,414	18,427,443	18,515,895	18,604,771	18,694,074
Percent of Pumped Water Billed	90.0%	90.0%	90.0%	90.0%	90.0%	90.0%	90.0%	90.0%	90.0%	90.0%
New Accounts	8	8	8	8	8	8	8	8	8	8
Revenue										
Minimum Charge Revenue	\$127,057	\$127,664	\$128,271	\$128,676	\$129,282	\$129,687	\$130,294	\$130,699	\$131,306	\$131,710
Block 1 Revenue	\$262,665	\$263,925	\$265,192	\$266,465	\$267,744	\$269,029	\$270,321	\$271,618	\$272,922	\$274,232
Block 2 Revenue	\$226,213	\$227,299	\$228,390	\$229,486	\$230,588	\$231,695	\$232,807	\$233,924	\$235,047	\$236,175
Block 3R Revenue	\$226,549	\$227,636	\$228,729	\$229,827	\$230,930	\$232,038	\$233,152	\$234,271	\$235,396	\$236,526
Block 3C Revenue	\$55,566	\$55,833	\$56,101	\$56,370	\$56,641	\$56,913	\$57,186	\$57,461	\$57,736	\$58,013
Actual Revenue (-10%)	-\$89,805	-\$90,236	-\$90,668	-\$91,082	-\$91,519	-\$91,936	-\$92,376	-\$92,797	-\$93,241	-\$93,666
Usage Revenue Subtotal	\$808,245	\$812,122	\$816,015	\$819,742	\$823,667	\$827,426	\$831,384	\$835,176	\$839,166	\$842,991
Connection Fee Revenue	\$20,600	\$20,600	\$20,600	\$20,600	\$20,600	\$20,600	\$20,600	\$20,600	\$20,600	\$20,600
Connection Fees Revenue Subtotal	\$20,600	\$20,600	\$20,600	\$20,600	\$20,600	\$20,600	\$20,600	\$20,600	\$20,600	\$20,600
Miscellaneous Fees Revenue	\$31,000	\$31,930	\$32,888	\$33,875	\$34,891	\$35,937	\$37,016	\$38,126	\$39,270	\$40,448
Total Annual Revenue	\$859,845	\$864,652	\$869,503	\$874,216	\$879,158	\$883,964	\$889,000	\$893,902	\$899,036	\$904,039

Water Department Expenses

Capital Improvements

A Capital Improvement Plan (CIP) outlines the planned capital improvement projects required in order to maintain reliable municipal water services for the water customers and is intended to address the future needs of the community. The GWSD updated their capital improvement plan in August 2015. This report lists a multitude of improvement projects that were recommended over a planning period of ten years. These projects include replacement or rehabilitation of the Perry Hill Water Storage Tank, replacement of the Well No. 1 Pump Station, test well investigations, improvements to Wells No. 3 and No. 4 and approximately 4 miles of water main replacements. For the purposes of this study, we have included a CIP that includes replacement of the Perry Hill tank (\$2.3M), a test well program to explore the development of a new groundwater source (\$75k), replacement of the Well No. 1 PS (\$1M), improvements to Wells No. 3 and No. 4 (\$350k) and replacement of approximately 1 mile of water main (\$1.5M) as the planned capital improvements over the next ten years. Our cost opinions are based on an Engineering News Record (ENR) Construction Cost Index of 10,037 (July 2015). The cost index can be used to update the project cost opinions in the future. We assumed that all projects with the exception of the test well investigation will be fully bonded over twenty years. We have also included replacement of the Department's backhoe in 2022 and utility vehicles in 2018 and 2024.

Debt Service

The GWSD has existing debt due to previous capital improvement projects, including the construction of the Town Forest Water Storage Tank and the Booster Pump Station. The existing scheduled bond payments extend beyond the ten year study period included in this analysis. Only the payments for bonds that are projected to occur between the years 2016 and 2025 are included in the cost model tables. The debt service costs for years 2016 through 2025 include all of the projects listed and will create a total debt amount of approximately \$3.75M during that period.

Operation and Maintenance

Annual Operations and Maintenance (O&M) cost estimates are based on our review of past expenditures for the years 2013 to 2015 and projected expenditures for the study period. O&M costs for the GWSD are divided into the following categories:

- Salaries and Wages
- Benefits
- Expenses (Electricity, Chemicals, Equipment, Consulting, Tools, etc.)

Total expenses, including Capital Improvements, Debt Service, and O&M costs will be approximately \$790k in 2016, increasing to \$1.5M in 2025. It was assumed that the Department will add an additional part time employee in 2020. Expenses are summarized in Table 5.

Table 5 - Water System Expenses
Water Rate Study
Groveland, MA

	2016	2017	2018	2019	2020	2021	2022	2023	2024	2025
Operations & Maintenance										
Salaries & Wages	\$230,000	\$236,900	\$244,007	\$251,327	\$303,867	\$312,983	\$322,373	\$332,044	\$342,005	\$352,265
Benefits	\$104,000	\$114,400	\$125,840	\$138,424	\$151,934	\$167,127	\$183,840	\$202,224	\$222,446	\$244,690
Expenses	\$250,000	\$257,500	\$265,225	\$273,182	\$281,377	\$289,819	\$298,513	\$307,468	\$316,693	\$326,193
O&M Expenses Subtotal	\$584,000	\$608,800	\$635,072	\$662,933	\$737,178	\$769,928	\$804,725	\$841,736	\$881,143	\$923,149
Debt Service										
Existing Debt Service	\$172,000	\$169,700	\$167,400	\$165,100	\$161,650	\$173,200	\$169,300	\$135,400	\$132,400	\$139,400
Lower Main Street Water Main		\$85,500	\$83,475	\$81,450	\$79,425	\$77,400	\$75,375	\$73,350	\$71,325	\$69,300
Gardner Street Water Main		\$57,000	\$55,650	\$54,300	\$52,950	\$51,600	\$50,250	\$48,900	\$47,550	\$46,200
Wells No. 3/4 Improvements								\$33,250	\$32,463	\$31,675
Perry Hill Tank Replacement					\$195,500	\$191,475	\$187,450	\$183,425	\$179,400	\$175,375
Well No. 1 Pump Station								\$95,000	\$92,750	\$90,500
Debt Service Subtotal	\$172,000	\$312,200	\$306,525	\$300,850	\$489,525	\$493,675	\$482,375	\$569,325	\$555,888	\$552,450
Capital Expenditures										
New Truck			\$54,636						\$65,239	
New Backhoe							\$122,987			
Test Well Investigation		\$26,523	\$27,318	\$28,138						
Capital Improvements Subtotal	\$0	\$26,523	\$81,955	\$28,138	\$0	\$0	\$122,987	\$0	\$65,239	\$0
Total Annual Expenses	\$756,000	\$947,523	\$1,023,552	\$991,921	\$1,226,703	\$1,263,603	\$1,410,088	\$1,411,061	\$1,502,270	\$1,475,599

Evaluation of Rates and Fees

Retained Earnings Balance

The existing account balances, revenue generated and expenses were evaluated to determine the overall account balance at the end of each year in the study period. This information is tabulated in Table 6 as well as shown graphically in Figure 1 for the years 2016 through 2025. With the existing water rates and proposed CIP, an operating deficit will occur in FY17 with account reserves depleted by the end of 2019. The operating deficit increases dramatically beyond FY17 and is primarily due to increased capital improvement debt service.

We recommend that the GWSD set a goal of maintaining a retained earnings account balance of at least 50% of the operating budget, currently approximately \$400K. The following sections examine modifications to the rates, fees, and other revenue sources that will be needed for Groveland to proceed with the CIP.

Water Rate Structure

There are several different ways to structure a water rate system. The flat fee approach charges all customers the same amount, regardless of how much water is used. This approach is typically used when water metering is not performed. This is not a preferred method as water usage varies among customers, and customers don't pay based on their own consumption. Another method is to charge a flat rate based on customers metered volume. A third structure includes block rates which are used to define usage blocks and adjust the water rate accordingly. Declining blocks charge less per unit of water with increased usage. This method encourages water usage and is not allowed in Massachusetts. Increasing blocks charge more per unit of water as more water is used encouraging water conservation as well as increased revenue from large water users. Additional variations on rate structure include distinguishing between different user classes or varying rates seasonally.

The GWSD existing rate structure includes a minimum charge of \$50.58 per quarter that includes water usage of up to 1,200 cubic feet and a three step increasing block rate. Residential rates are higher than commercial rates for the highest block (over 3,000 cf). This existing structure appears adequate for a water system of the Groveland's size and customer base.

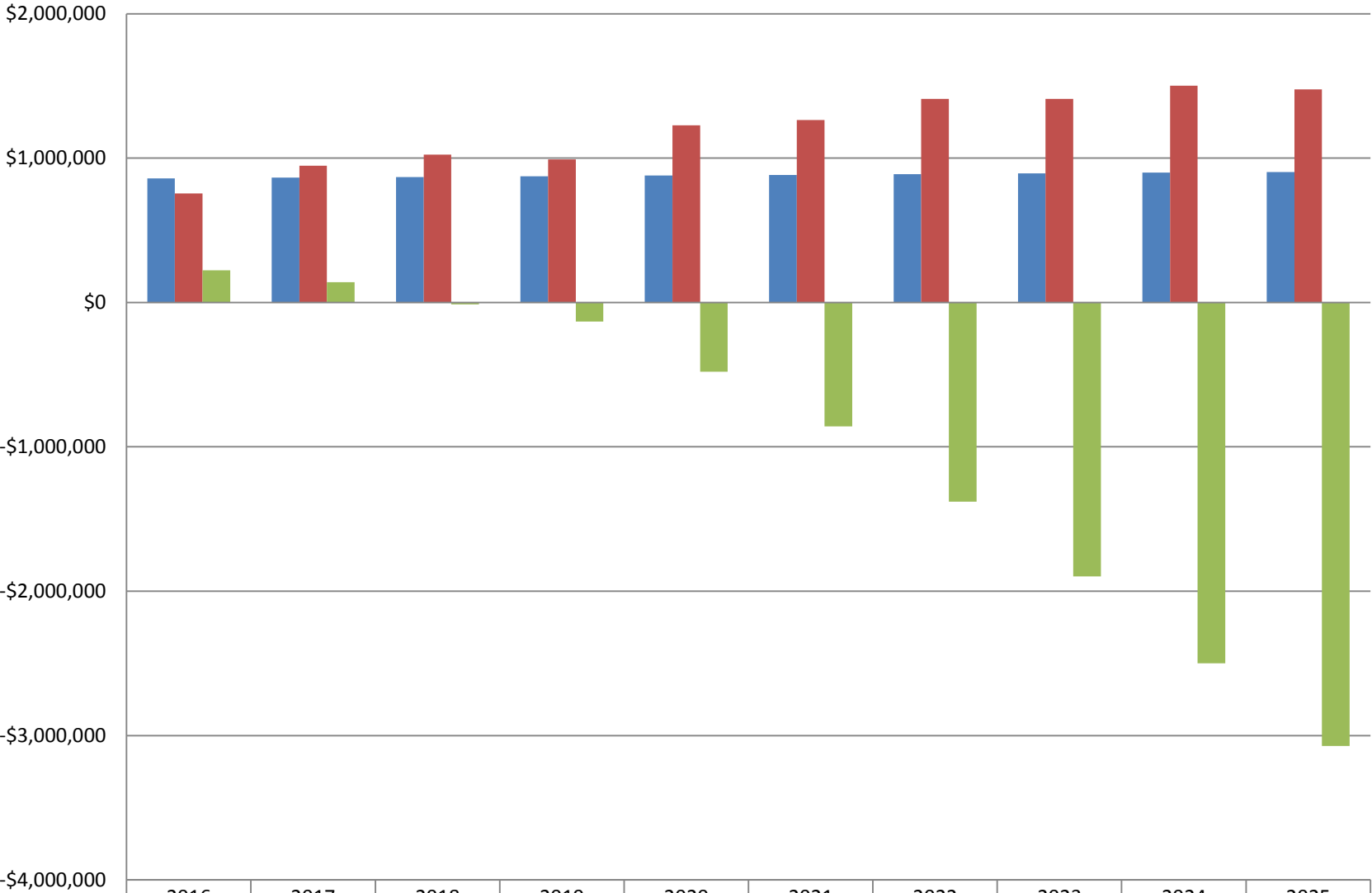
Water Consumption Billing

The block rates and minimum charge were most recently updated in July 2012. We recommend that the Water Department maintain their current increasing block rate structure and increase their billing rates in conjunction with the three major capital improvement projects planned over the next 10 years. Recommended increases are 15% and 6% for FY17 and FY18 to fund the Main Street Water Main replacement; 25% in 2020 in conjunction with the Perry Hill tank replacement; and 15% in FY23 for replacement of the Well No. 1 Pump Station. Increases after FY18 should be reevaluated after the scopes of the tank replacement and PS replacement projects have been clearly defined.

Table 6 - Existing Account Balance
Water Rate Study
Groveland, MA

	2016	2017	2018	2019	2020	2021	2022	2023	2024	2025
Operating Beginning Balance	\$119,529	\$223,374	\$140,503	-\$13,545	-\$131,250	-\$478,795	-\$858,434	-\$1,379,522	-\$1,896,681	-\$2,499,914
Total Revenue	\$859,845	\$864,652	\$869,503	\$874,216	\$879,158	\$883,964	\$889,000	\$893,902	\$899,036	\$904,039
O&M	\$584,000	\$608,800	\$635,072	\$662,933	\$737,178	\$769,928	\$804,725	\$841,736	\$881,143	\$923,149
Debt Service	\$172,000	\$312,200	\$306,525	\$300,850	\$489,525	\$493,675	\$482,375	\$569,325	\$555,888	\$552,450
Capital Improvements	\$0	\$26,523	\$81,955	\$28,138	\$0	\$0	\$122,987	\$0	\$65,239	\$0
Total Expenses	\$756,000	\$947,523	\$1,023,552	\$991,921	\$1,226,703	\$1,263,603	\$1,410,088	\$1,411,061	\$1,502,270	\$1,475,599
Year End Operating Balance	\$223,374	\$140,503	-\$13,545	-\$131,250	-\$478,795	-\$858,434	-\$1,379,522	-\$1,896,681	-\$2,499,914	-\$3,071,474

Figure 1 - Account Summary with Existing Rates - DRAFT



	2016	2017	2018	2019	2020	2021	2022	2023	2024	2025
Total Revenue	\$859,845	\$864,652	\$869,503	\$874,216	\$879,158	\$883,964	\$889,000	\$893,902	\$899,036	\$904,039
Total Expenses	\$756,000	\$947,523	\$1,023,552	\$991,921	\$1,226,703	\$1,263,603	\$1,410,088	\$1,411,061	\$1,502,270	\$1,475,599
Operating Balance	\$223,374	\$140,503	-\$13,545	-\$131,250	-\$478,795	-\$858,434	-\$1,379,522	-\$1,896,681	-\$2,499,914	-\$3,071,474

System Development Fees

System development charges are considered purchasing a piece of the system capacity. Significant capital costs have already been incurred to develop the GWSD system to its existing capacity. A new customer pays their portion of the capital cost via the connection fee. The Equity Method connection fee calculation was used to calculate the connection fees based on the GWSD assets listed in Table 7. The Equity Method assigns a cost to the new connection related to average equity attributable to existing customers. System equity is determined by evaluating system assets, accumulated depreciation, system liabilities, sources of equity and system capacity.

Table 7 – Water Department Assets

Description	Amount
Water Mains ¹	\$4.93M
Corrosion Control Facility ²	\$165k
Booster Station ²	\$160k
Land	\$736k
Equipment & Vehicles	\$75k
Town Forest Tank ³	\$1.92M
Total	\$8.66M

1. Based on 50 Year useful life @ \$150/ft (2015 Dollars)
2. Based on 20 Year useful life
3. Based on 75 Year useful life

The capacity of the water distribution system is determined to be the number of equivalent 1-inch domestic (non-fire protection) services in the water system. Therefore, all different size water service connections in the water system are converted to an equivalent number of 1-inch services. In 2015, there were 2,316 equivalent services. The average net equity investment per equivalent 1-inch connection is calculated by dividing the total assets by the number of services. Using this method, the 1-inch connection fee is calculated to be \$3,700. The GWSD existing connection fee for a 1-inch service is \$2,575. Based on our evaluation, the system development fees should be increased as soon as practicable to correspond with current system equity. Additionally, the connection fee should be adjusted to correspond with the major CIP projects as they are implemented.

Fire Protection Services Revenue

The GWSD does not currently generate any revenue from fire protection services. The cost of fire protection services is common throughout New England and based on the costs incurred to build and maintain a fire protection system which requires fire storage, large distribution piping and service in the form of both hydrants and building fire connections. The construction, maintenance and operation of these system components add to the overall system costs, yet do

not necessarily benefit only water rate payers in the Town. For example, if a school, town office, or other municipal building should burn, the entire town could pay higher taxes for rebuilding.

Typically, water suppliers target a certain percentage of gross revenue to be generated by fire protection revenue through annual fees assessed per hydrant and per fire connection service. The AWWA Manual of Principles of Water Rates Fees and Charges references the Maine Water Utility Association Committee on Fire Protection establishment of fire protection service costs. They have estimated that fire protection services should range from 6% to 30% of the gross revenue. The percentage varies based on the ratio of system capacity required for domestic use vs. system capacity required for fire protection.

Recommendations

Proposed Increases

In order to finance the planned capital improvements for this study period and to provide an adequate account balance, water rates and fees need to be increased. The minimum and block usage rates are recommended to be increased immediately (FY17) by 15% and then again by 6% for FY16. Rates should then remain until the Perry Hill water storage tank replacement and Well No. 1 PS replacement projects are implemented. In coordination with the tank project, each billing rate block and the minimum charge should be increased by 25%. In coordination with the Well No.1 PS project, each billing rate block and the minimum charge should be increased by 15%. This will allow the Department to maintain a retained earnings balance of approximately 50% of the operating budget. Table 8 lists the existing water rates and proposed rate increase planned for FY17. Table 9 shows how various quarterly bills would increase by this new rate structure based on the amount of water consumed.

Table 8 – Existing and Proposed Water Rates

Description	Existing Rates	FY 17 Proposed Rates
Minimum Quarterly Charge up to 1200 CF	\$50.58	\$58.17
1200 – 3000 CF	\$4.61 / 100 CF	\$5.30 / 100 CF
Over 3000 CF (Residential)	\$8.63 / 100 CF	\$9.92 / 100 CF
Over 3000 CF (Commercial/School)	\$6.98 / 100 CF	\$8.03 / 100 CF

Table 9 – Example Quarterly Water Bill Amounts (Residential)

Usage (cf)	Existing Rates	Proposed Rates	Quarterly Increase	Annual Increase
1,200	\$50.58	\$58.17	\$7.59	\$30.36
2,000	\$87.46	\$100.57	\$13.11	\$52.44
3,000	\$133.56	\$153.57	\$20.01	\$80.04
4,000	\$219.86	\$252.77	\$32.91	\$131.64
10,000	\$737.66	\$847.97	\$110.31	\$441.24

In addition to increased consumption billing rates, we also recommend that domestic connection fees be increased. We recommend increasing 1-inch connection charges based on the equity method calculated in Section 4. The 1-inch connection charge should be increased to \$3,700 plus the meter cost. All other size connections should be increased in proportion to the current meter ratios. These increases will allow the GWSD to maintain a positive revenue trend and complete all planned capital improvement projects over the ten year study period.

Table 11 shows the projected revenue with the proposed billing rate and fee increases. Figure 2 and Table 12 show the account balance information based on the new fees. With the recommended increases, these available funds will allow the District to pursue all planned capital improvements.

Summary

We recommend increasing the existing water rates and new connection fees in response to future increases in operational expenses and planned capital improvement projects. The rate structure should be reviewed a minimum of every three years, in order to verify that the fees are generating enough revenue to meet the operating requirements of the Department and to complete the substantial amount of planned infrastructure improvements.

Table 10 – Local Water Rate Comparison with Proposed 15% Increase

Usage (cf)	Groveland	Average	Amesbury	Merrimac	Georgetown	North Andover	Topsfield
1,200	58.17	\$73.66	\$97.20	\$71.81	\$87.40	\$45.60	\$89.82
2,000	100.57	\$114.64	\$162.00	\$119.68	\$124.20	\$76.00	\$138.70
3,000	153.57	\$171.82	\$243.00	\$179.52	\$171.35	\$131.50	\$204.89
4,000	252.77	\$238.42	\$324.00	\$239.36	\$234.60	\$187.00	\$292.70
10,000	847.97	\$709.40	\$810.00	\$598.40	\$865.50	\$520.00	\$853.70

Based on the survey of adjacent communities, Groveland customers have lower water costs than most Towns in the area. Even with the proposed rate increase, the cost of water for Groveland customers will remain relatively low for most residential users.

We appreciate the opportunity to prepare this rate study. Please feel free to contact me at (617) 657-0281 or rja@envpatners.com with any questions or concerns.

Very truly yours,
Environmental Partners Group, Inc.


Ryan J. Allgrove, P.E.
Project Manager

cc: Tom Cusick, Superintendent

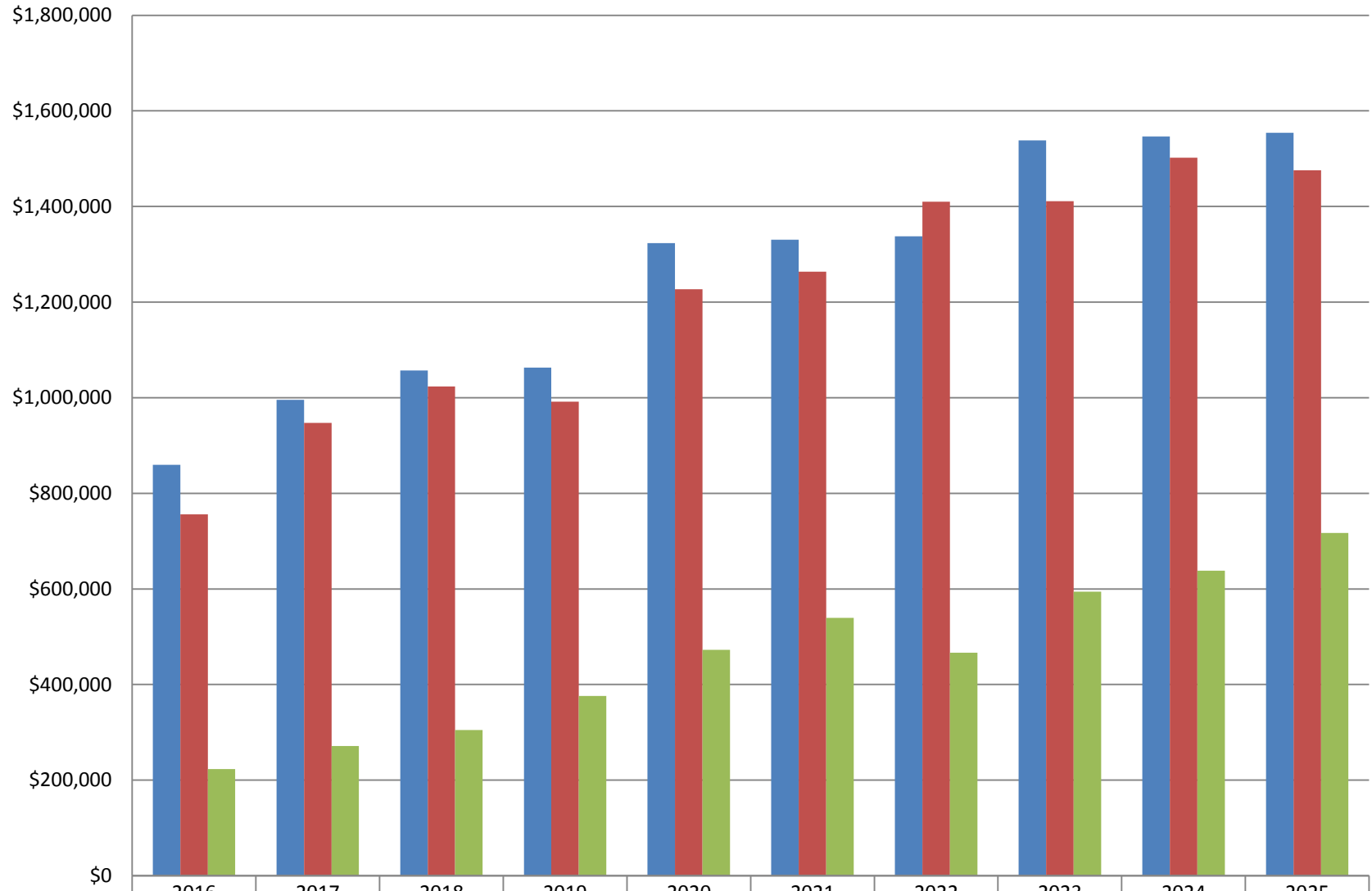
Table 11 - Proposed Revenue
Water Rate Study
Groveland, MA

	2016	2017	2018	2019	2020	2021	2022	2023	2024	2025
Rates and Fees										
Minimum Charge (1200 cf)	\$50.58	\$58.17	\$61.66	\$61.66	\$77.07	\$77.07	\$77.07	\$88.63	\$88.63	\$88.63
Block Rate 1 (<1,200 cf)	\$4.22	\$4.85	\$5.14	\$5.14	\$6.42	\$6.42	\$6.42	\$7.39	\$7.39	\$7.39
Block Rate 2 (1,200 - 3,000 cf)	\$4.61	\$5.30	\$5.62	\$5.62	\$7.02	\$7.02	\$7.02	\$8.08	\$8.08	\$8.08
Block Rate 3 (> 3000 cf) - Res	\$8.63	\$9.92	\$10.52	\$10.52	\$13.15	\$13.15	\$13.15	\$15.12	\$15.12	\$15.12
Block Rate 3 (> 3000 cf) - Com	\$6.98	\$8.03	\$8.51	\$8.51	\$10.64	\$10.64	\$10.64	\$12.23	\$12.23	\$12.23
System Development Fee	\$2,575	\$3,700	\$3,700	\$3,700	\$4,200	\$4,200	\$4,200	\$4,600	\$4,600	\$4,600
Annual Quantities										
Total Accounts	1962	1970	1978	1986	1994	2002	2010	2018	2026	2034
Total Minimum Charge Accounts	628	631	634	636	639	641	644	646	649	651
Minimum Charge Volume (cf)	1,555,096	1,562,560	1,570,061	1,577,597	1,585,169	1,592,778	1,600,423	1,608,105	1,615,824	1,623,580
Billed Volume - Block 1	6,231,664	6,261,576	6,291,631	6,321,831	6,352,176	6,382,666	6,413,303	6,444,087	6,475,019	6,506,099
Billed Volume - Block 2	4,907,012	4,930,566	4,954,233	4,978,013	5,001,907	5,025,916	5,050,041	5,074,281	5,098,638	5,123,111
Billed Volume - Block 3 (Res)	2,625,131	2,637,731	2,650,392	2,663,114	2,675,897	2,688,742	2,701,647	2,714,615	2,727,646	2,740,738
Billed Volume - Block 3 (Com)	796,080	799,901	803,741	807,599	811,475	815,370	819,284	823,217	827,168	831,139
Total Billed Volume (cf)	16,114,982	16,192,334	16,270,058	16,348,154	16,426,625	16,505,473	16,584,699	16,664,306	16,744,294	16,824,667
Total Pumped Volume (cf)	17,905,536	17,991,483	18,077,842	18,164,615	18,251,805	18,339,414	18,427,443	18,515,895	18,604,771	18,694,074
Percent of Pumped Water Billed	90.0%	90.0%	90.0%	90.0%	90.0%	90.0%	90.0%	90.0%	90.0%	90.0%
New Accounts	8	8	8	8	8	8	8	8	8	8
Revenue										
Minimum Charge Revenue	\$127,057	\$146,814	\$156,362	\$156,855	\$196,994	\$197,611	\$198,536	\$229,025	\$230,089	\$230,798
Block 1 Revenue	\$262,665	\$303,514	\$323,269	\$324,821	\$407,975	\$409,934	\$411,901	\$475,960	\$478,245	\$480,540
Block 2 Revenue	\$226,213	\$261,394	\$278,408	\$279,744	\$351,358	\$353,045	\$354,739	\$409,909	\$411,876	\$413,853
Block 3R Revenue	\$226,549	\$261,782	\$278,820	\$280,159	\$351,879	\$353,569	\$355,266	\$410,517	\$412,487	\$414,467
Block 3C Revenue	\$55,566	\$64,208	\$68,387	\$68,716	\$86,307	\$86,721	\$87,137	\$100,689	\$101,172	\$101,658
Actual Revenue (-10%)	-\$89,805	-\$103,771	-\$110,525	-\$111,029	-\$139,451	-\$140,088	-\$140,758	-\$162,610	-\$163,387	-\$164,132
Usage Revenue Subtotal	\$808,245	\$933,940	\$994,722	\$999,265	\$1,255,063	\$1,260,791	\$1,266,821	\$1,463,489	\$1,470,482	\$1,477,184
Connection Fee Revenue	\$20,600	\$29,600	\$29,600	\$29,600	\$33,600	\$33,600	\$33,600	\$36,800	\$36,800	\$36,800
Connection Fees Revenue Subtotal	\$20,600	\$29,600	\$29,600	\$29,600	\$33,600	\$33,600	\$33,600	\$36,800	\$36,800	\$36,800
Miscellaneous Fees Revenue	\$31,000	\$31,930	\$32,888	\$33,875	\$34,891	\$35,937	\$37,016	\$38,126	\$39,270	\$40,448
Total Annual Revenue	\$859,845	\$995,470	\$1,057,210	\$1,062,740	\$1,323,553	\$1,330,328	\$1,337,437	\$1,538,415	\$1,546,552	\$1,554,432

Table 12 - Proposed Account Balance
Water Rate Study
Groveland, MA

	2016	2017	2018	2019	2020	2021	2022	2023	2024	2025
Operating Beginning Balance	\$119,529	\$223,374	\$271,322	\$304,980	\$375,799	\$472,650	\$539,375	\$466,724	\$594,079	\$638,361
Total Revenue	\$859,845	\$995,470	\$1,057,210	\$1,062,740	\$1,323,553	\$1,330,328	\$1,337,437	\$1,538,415	\$1,546,552	\$1,554,432
O&M	\$584,000	\$608,800	\$635,072	\$662,933	\$737,178	\$769,928	\$804,725	\$841,736	\$881,143	\$923,149
Debt Service	\$172,000	\$312,200	\$306,525	\$300,850	\$489,525	\$493,675	\$482,375	\$569,325	\$555,888	\$552,450
Capital Improvements	\$0	\$26,523	\$81,955	\$28,138	\$0	\$0	\$122,987	\$0	\$65,239	\$0
Total Expenses	\$756,000	\$947,523	\$1,023,552	\$991,921	\$1,226,703	\$1,263,603	\$1,410,088	\$1,411,061	\$1,502,270	\$1,475,599
Retained Earnings Balance	\$223,374	\$271,322	\$304,980	\$375,799	\$472,650	\$539,375	\$466,724	\$594,079	\$638,361	\$717,194

Figure 2 - Account Summary with Proposed Rates



Total Revenue	\$859,845	\$995,470	\$1,057,210	\$1,062,740	\$1,323,553	\$1,330,328	\$1,337,437	\$1,538,415	\$1,546,552	\$1,554,432
Total Expenses	\$756,000	\$947,523	\$1,023,552	\$991,921	\$1,226,703	\$1,263,603	\$1,410,088	\$1,411,061	\$1,502,270	\$1,475,599
Operating Balance	\$223,374	\$271,322	\$304,980	\$375,799	\$472,650	\$539,375	\$466,724	\$594,079	\$638,361	\$717,194