

**Kingston Water Department
Five-Year Capital Plan
DRAFT 12/10/14**



2015 to 2019



Only Tap Water SM Delivers

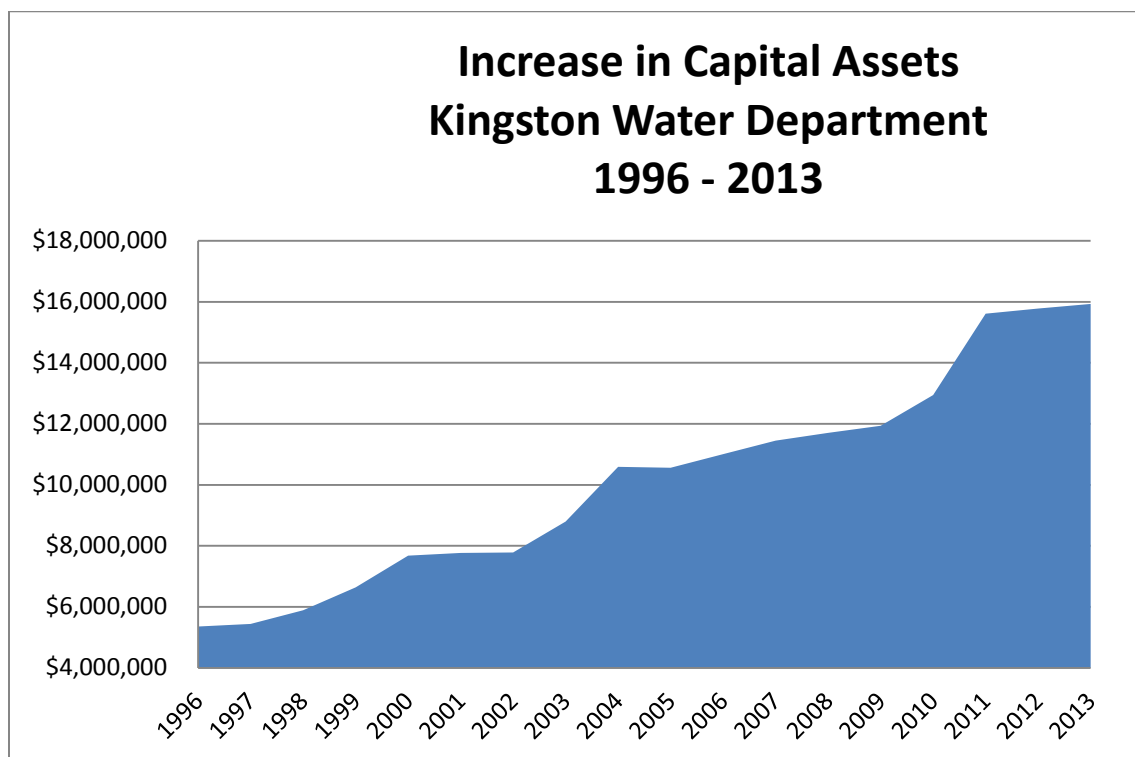
- *Public Health Protection***
- *Fire Protection***
- *Support for the Economy***
- *The Overall Quality of Life We Enjoy***

Capital Plan Goals and Objectives

The mission of the Kingston Water Department is to provide its customers with drinking water of the highest quality. In addition, the Department must supply flows adequate for fire suppression and sustain water service capacity at levels sufficient to provide for current and future needs of the residents of the City of Kingston. The capital plan of the Kingston Water Department must provide the assets needed to accomplish these goals. Capital plan items should result in either improvement in operational effectiveness and efficiencies; improve service delivery, or water quality.

Since its establishment in 1895, the Board of Water Commissioners has consistently made improvements and repairs to create the system that the City of Kingston enjoys today. As depicted in Figure 1, between 1996 and 2013, the most recent year for which an independent audit was completed for the Department, the Board has increased the assets of the KWD three-fold.

Figure 1: Increase in Capital Assets 1996 through 2013



The current CIP identifies \$17,746,129 in improvements. Additionally some \$6,090,797 in improvement projects were accomplished during the previous CIP and more than \$4,300,000 will be carried over to the succeeding plan (Table 3). Many of the current improvements are associated with regulatory compliance with the balance related to infrastructure repair and replacement.

Criteria for Capital Projects and Purchases

While all projects are important to the Department, resource limitations dictate that some mechanism to prioritize items should be established. Therefore, capital projects are evaluated according to the following criteria and prioritized consistent with the ranking system found in Table 1:

Table 1: Project Criteria

Criteria	Rank
The project is legally mandated	8
The project improves public health or safety	7
The project results in significant cost savings or operational efficiencies	6
The project contributes directly to achievement of strategic goals	5
The project is linked to other projects and improves the results of those initiatives	4
The project cost matches available resources and fulfills at least one other criteria	3
The project improves customer service	2
The project supports economic development	1

The ranking system is a guide in scheduling projects for implementation. The final decision for project authorization rests with the Board of Water Commissioners

Previous Capital Project Evaluation

During the past 5 years, the KWD has completed more than \$6,000,000 in capital projects. While many of those initiatives are multi-year projects that will carry over to this Capital Improvement Plan, several key projects were completed. These include:

- **Painting the exterior of the Florence Street tank (Rank 12):** This was completed in 2014 at a cost of approximately **\$500,000** and was funded through a bond.
- **Time and Attendance Management System (Rank 15):** A biometric/computerized time clock system was installed at a cost of **\$9,950**. Of that total, \$8,455 was obtained through a grant from NYS Archives.
- **Phase 2B Plant Improvements (Rank 18):** While the Phase 1 & 2 Improvements to the Treatment Plant dealt with repairs and renovations to the treatment system. The Phase 2B project deals with essential repairs to the building envelope. It addressed repairs to the roof and clerestory as well as heating, electrical, and security repairs. The cost was about **\$500,000** and was funded through a DWSRF bond.
- **LT2 Compliance Binnewater UV Treatment Plant (Rank 20):** Changes in EPA regulations mandated that all treated water reservoirs be covered, taken out of service, or treat the effluent from the reservoir for 4-log removal of viruses and protozoan cysts by April 2009. After examining all of the alternatives, a UV Treatment Facility was constructed at KWD's 12 million gallon Binnewater Reservoir. The cost was nearly **\$3,000,000** and the project was bonded through the DWSRF.
- **Mink Hollow Intake (Rank 24):** The Mink Hollow Intake is the KWD's main source of supply. Significant flood events in 2010 seriously compromised its integrity and an engineering assessment determined that it required immediate replacement. The cost was just over

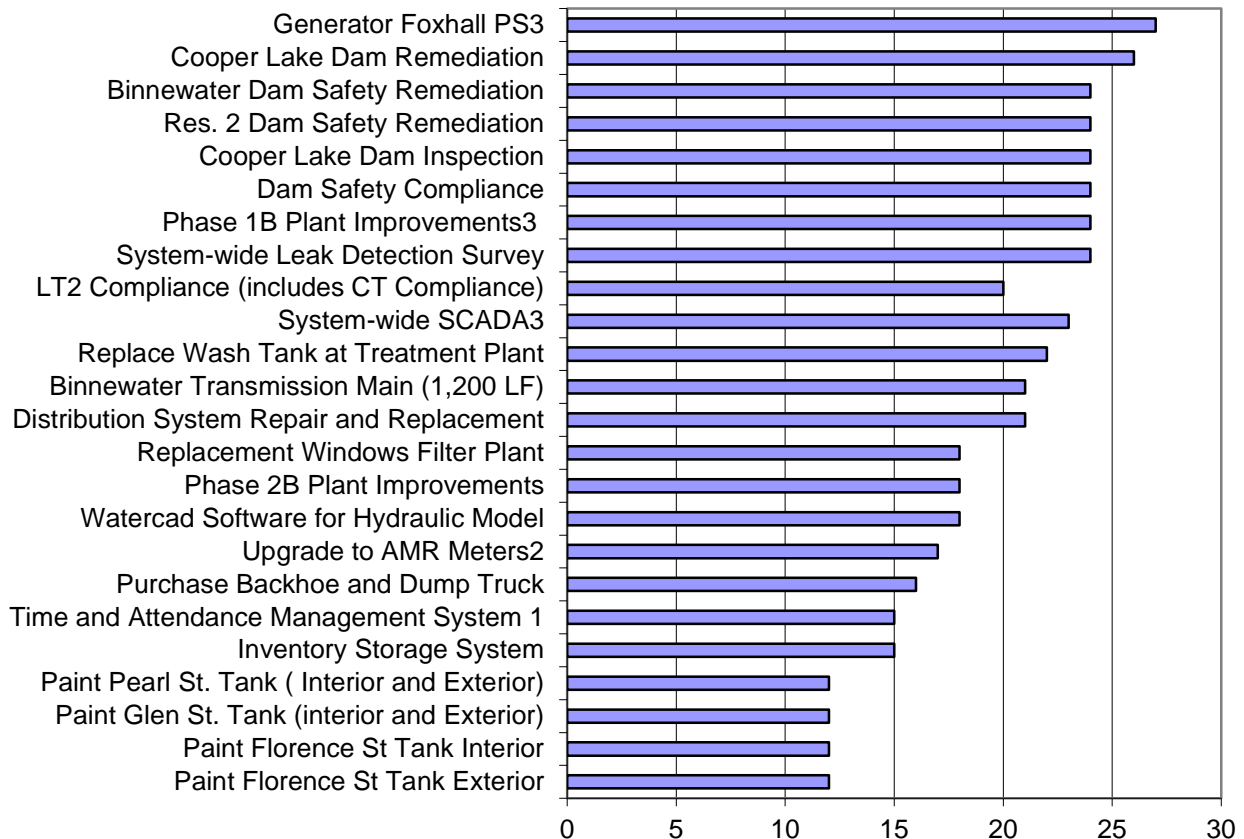
\$1,000,000, with approximately \$750,000 coming from a DWSRF loan and the balance coming from operations since any construction associated with the dam could not be funded from the drinking water revolving loan fund.

- Trench Drain for Secondary Containment at the PTF (Rank 20):** The Pre-Treatment Facility (PTF) was designed and built in 1993 for the purpose of adding coagulant upstream of our filters so that filtration could be more efficient and the KWD could meet the requirements of the SDWA. It was constructed without any secondary containment in the transfer area, even though this was a NYS DEC requirement when the facility went online. The NYSDEC made its first inspection of the facility in 2011, some 18 years after the facility was operational. They issued a notice of violation due to the absence of the trench drain. The project was completed by KWD personnel in the fall of 2011 at a cost of **\$35,600** and was funded from operations.

Project Description and Ranking for Current CIP

The relative ranking for all of the projects included in the 2015 to 2019 Capital Improvement Plan can be seen in Figure 2:

Figure 2: Project Ranking



Install Generator at Foxhall Pump Station:

Rank 27: (7+6+5+4+3+2)

The Foxhall Pump Station is the only such facility that does not have auxiliary power. While the high pressure system that is served by this station is mostly residential, its most critical customer is the

Benedictine Hospital. Although the hospital has emergency plans in place to provide potable water to its patients, it is important to be able to provide that facility with an uninterrupted supply of water for fire suppression. Fortunately, the KWD was successful in its application to the Storm Mitigation Loan Program (SMLP) and a generator for this facility was included in our application for \$2,700,000 in funding (75% zero interest loan and 25% grant). **Cost: \$68,900**

Cooper Lake Dam Remediation:

Rank 26: (8+7+5+4+2)

Following the 2009 Dam Safety Regulations by the NYSDEC, the KWD was required to conduct an Engineering Analysis (EA) of its Cooper Lake Dam and West Dike. This was required of all Class C dams in NYS. As a result of the findings in the EA, the KWD is required to bring the dam into compliance with current dam safety regulations. Schnabel Engineering was chosen as the project engineer and is designing the improvements. Based on the timetable submitted to the NYSDEC, construction is expected to be complete by the close of 2016. **Cost: \$6,500,000**

Dam Safety Compliance:

Rank 24: (8+7+5+4)

Binnewater Dam Remediation:

Rank 24: (8+7+5+4)

Res. 2 Dam Compliance:

Rank 24: (8+7+5+4)

As per the 2009 Dam Safety Regulations promulgated by the NYSDEC, the KWD is required to conduct EA's on all of its Class B dams. This includes the dams at Binnewater Reservoir and Reservoir #2. This work must be completed by August 2015 to be in regulatory compliance. Following the EA, remediation work at both facilities will most likely be required. However, the extent of that work cannot be known until the Assessments are completed. **Cost: \$2,100,000**

Phase 1B Plant Improvements:

Rank 24: (7+6+5+4+2)

This project calls for the installation of an air scour system for each filter as well as the incorporation of dual media in all filters. The balance of this work will include the installation of a new underdrain system in the front 8 filters. This is a continuation of 2 previous projects at the Plant. Phase 1B will improve the efficiency of the filtration process and increase run times, reducing backwash water usage. It was included in the SMLP application and flood mitigation measured will be included in the work.

Cost: \$1,827,929

System-Wide Leak Detection Survey:

Rank 24: (7+6+5+4+2)

Non-revenue water that is attributable to leaks is a waste of both water and revenue. In addition, being able to pro-actively pin-point the location of a leak minimizes outages and loss of service and improves safety. **Cost: \$12,000**

Install a System-wide SCADA System:

Rank 23: (7+6+5+3+2)

SCADA systems (Supervisory Control and Data Acquisition Systems) allow for the remote monitoring and control of water system components. The KWD has two disparate systems at each of the Treatment Facilities. However, they are not integrated and the balance of the system lacks any remote monitoring or control capability. This is especially important in the Distribution System since our monitoring capability is limited to alarm sensors and personnel have to be onsite to make any control changes. This project was included in the SMLP and will improve our efficiency, level of service, and safety. **Cost: \$780,000**

Replace Wash Tank at the Filter Plant:

Rank 22: (7+6+5+5)

An inspection has identified some structural problems with the current 50,000 gallon tank and the recommendation from our engineering consultant is to replace it with a 100,000 tank. The tank is

essential for the safe and efficient operation of the Plant since it enables the filters to be backwashed without creating hydraulic transients that could damage the system. This project will be coordinated with the Phase 1B Improvements. **Cost: \$1,510,800**

Binnewater Transmission Main: **Rank 21: (7+6+5+2+1)**
There is a short section of unlined cast iron transmission main that supplies water from the Plant to the Binnewater Reservoir that is in a tuberculated condition and, under certain extreme conditions, will not allow the KWD to maintain the hydraulic grade line (HGL) for normal operations. This main was installed in 1927 and cannot be taken out of service. The installation of a redundant main would enhance our ability to provide uninterrupted service to the City of Kingston, mitigate the likelihood of a widespread service interruption if this section of main were to fail, and improve security. **Cost: \$1,000,000**

Distribution Repair and Replacement: **Rank 21: (7+6+5+2+1)**
The majority of the Department's distribution system was installed prior to WWII. While significant improvements have been made, including the addition of large diameter mains in some areas and cement lining projects, investment in this aging infrastructure needs to be made to maintain the level of service and reliability. Projects include some water main replacement, gate valve installation along our transmission mains, and replacement of our pressure regulating valves throughout the system. **Cost: \$5,108,738**

Replacement Windows at Filter Plant: **Rank 18: (7+6+5)**
During the Phase 2B Plant Improvements, many of the issues with the Plant's building envelope were addressed. However, the windows were not able to be included in that work due to staffing constraints. Many of the windows are original to the structure and for energy conservation and safety reasons need to be replaced. To improve security, glass break analyzers should be added when the new windows are installed. **Cost: \$250,000**

Watercad Software for Hydraulic Model: **Rank 18: (6+5+4+2+1)**
Several years ago, CDMSmith created a hydraulic model of the distribution system. Since we lack the software to run the model, it resides on their computers and we must engage them to run scenarios and calibrate it. With the purchase of the software, we could bring the model in-house and utilize it to evaluate project impacts. It would also become a tool to enhance our operations and improve water quality. **Cost: \$40,000**

Upgrade to AMR Meters: **Rank 17 (6+5+4+2)**
It currently takes one full time employee to read all 7900+/- meter quarterly. If the entire system were converted to a radio-read automatic meter reading (AMR) system, that could be reduced to a total of a couple of days each quarter. While not eliminating a position, a system-wide conversion to the AMR technology would enable the KWD to re-position that individual to be utilized in other areas of our operations where resources are currently limited. It would also allow for monthly billing for some or all of our customer classes. The total cost of the conversion is about \$800,000 and we have been funding the program from the operations budget with the allocation of about \$50,000 each year. **Cost: \$471,000**

Purchase Backhoe and Dump Truck: **Rank 16: (7+2+4+3)**
To maintain the system, it is essential to have a reliable Backhoe and Dump Truck. The later was replaced during the previous Capital Plan and replacement of the Backhoe, which was in better

condition, was deferred. The Backhoe is at the end of its useful life and must be replaced. **Cost: \$130,000**

Inventory Storage System:

Rank 15: (6+4+3+2)

During the 2000 renovation of the Office and Shop, existing storage space was converted to work space. Since then, storage of equipment has been scattered among several facilities. This makes inventory control difficult and decreases response times during an emergency. The old boiler room is still used as storage. However, we cannot take full advantage of its vertical space without the installation of a rack storage system. Such a system could allow for better inventory control and promote efficiencies. **Cost: \$25,000**

Paint Pearl Street Tank Interior and Exterior:

Rank 12: (7+5+2)

Re-coat both exterior and interior of tank as recommended in most recent inspection report. Add safety ladder system. **Cost: \$900,000**

Paint Glen Street Tank Interior and Exterior:

Rank 12: (7+5+2)

Re-coat both exterior and interior of tank as recommended in most recent inspection report. **Cost: \$900,000**

Paint Exterior of Florence Street Tank:

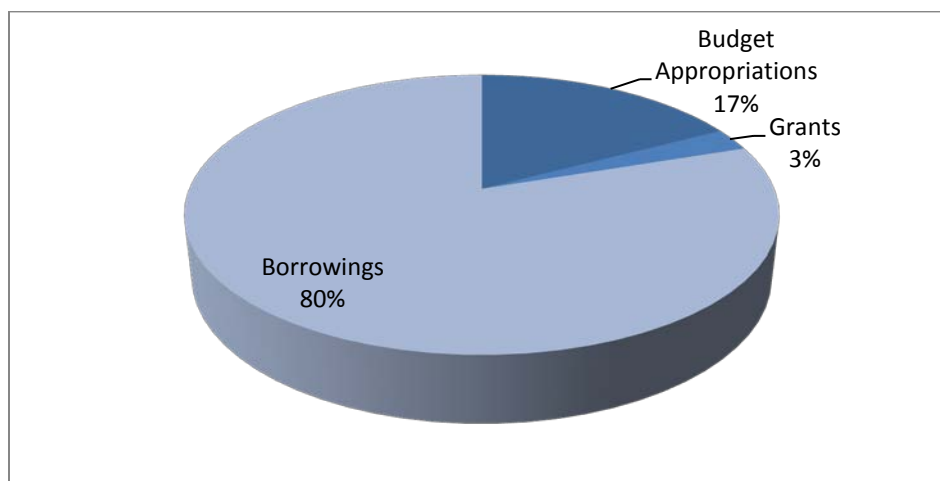
Rank 12: (7+5+2)

The exterior of this tank was painted in 2014. As per the most recent report, the exterior should be repainted. **Cost: \$500,000**

Funding of the Current CIP and Implications for Potential Rate Increases

As shown in Figure 3, 97% of the funding for the CIP is proposed to come directly from operations (17%) or debt (80%). Consequently, the anticipated impact on the Department's budget will be significant.

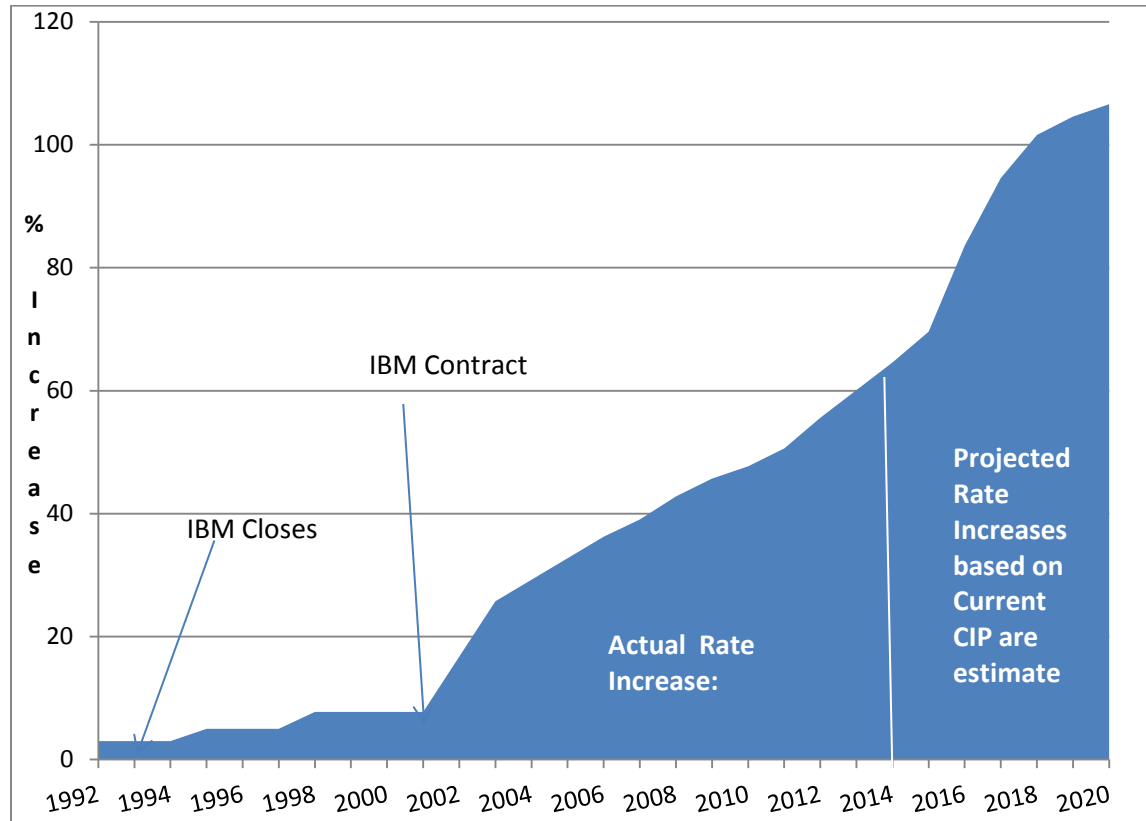
Figure 3: Capital Plan Funding Sources



The specific timing of these projects will certainly have an impact on the magnitude of future rate increases as will the term of the loans and the interest rate. Assuming that the term is 20 years and

interest rates and water sales remain relatively stable, borrowing each \$1,000,000 will incur an annual payment of debt and interest of about \$80,000. Assuming that there are no significant increases in operational costs (cost of labor, energy, materials and supplies, or contractual items) that would cause an increase in water rates, the debt service associated with this CIP will likely cause a rate increase that approaches 42% over the life of the plan (Figure 4). This is a 99% increase in rates since 2001 when the IBM contract expired.

Figure 4: Cumulative Rate Increases 1992 - 2020 (2015 - 2020 are projections based on CIP debt)



The impact of bonding is generally felt in the succeeding year. Therefore the specific increases are projected to be as follows:

Table 2: Projected Rate Increases for CIP

Year	Projected Rate
2015	5%
2016	14%
2017	11%
2018	7%
2019	3%
2020	2%

Again, these are only estimates based on projected borrowing for the capital improvements outlined in this plan and are predicated on the stated assumptions, including stable water sales. While declining water sales is a national trend, water sales within the City of Kingston have declined significantly in the past few years and have only been stabilized by increased sales to the Town of Ulster (Figure 5). In addition to other cost increases that could impact rates, a continuation in the downward trend in sales within the City or a significant change in the relationship between the KWD and the Town could also have an impact on these projections.

Figure 5: Trend in Water Sales

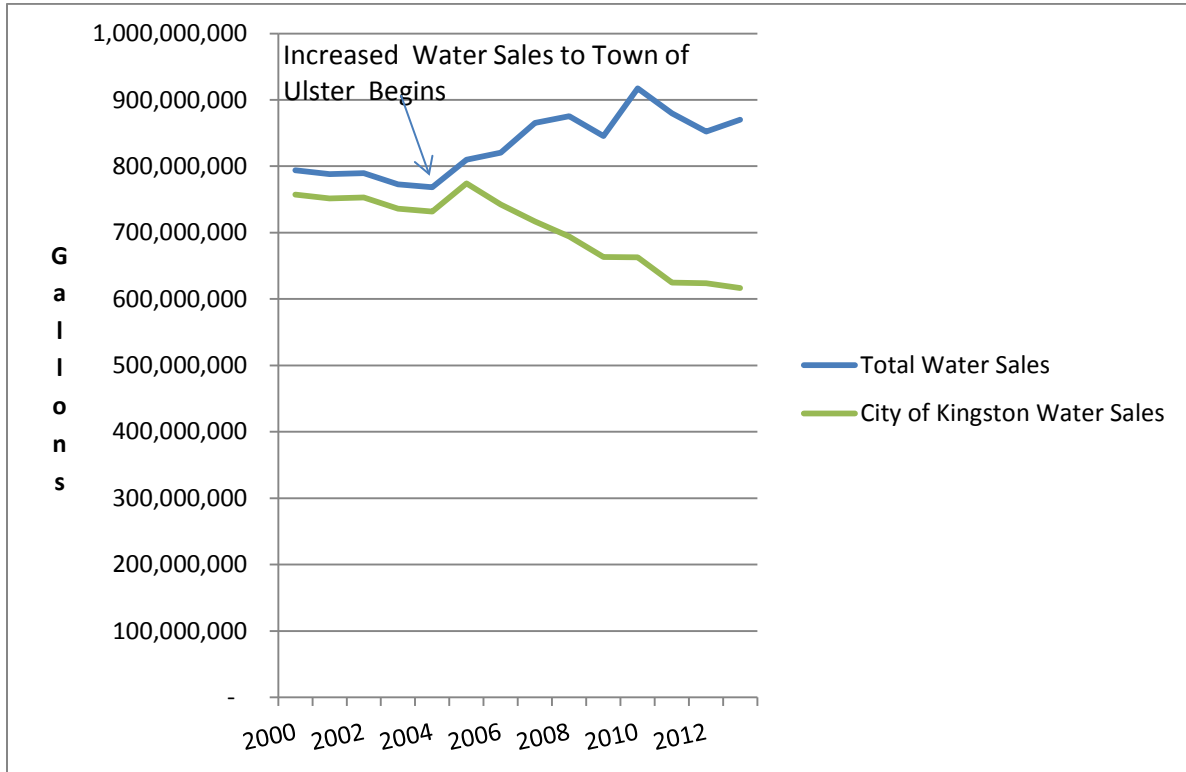


Table 3: Capital Improvement Plan 2015 to 2019

Description	Rank	Total Cost	Prior 5 Years	2015	2016	2,017	\$ 2,018	2019	Balance
Paint Florence St Tank Exterior	12	\$ 500,000	\$ 500,000	\$ -	\$ -	-	\$ -	\$ -	\$ -
Paint Florence St Tank Interior	12	\$ 500,000	\$ -	\$ -	\$ -	-	\$ -	\$ 500,000	\$ -
Paint Glen St. Tank (interior and Exterior)	12	\$ 900,000	\$ -	\$ -	\$ 900,000	-	\$ -	\$ -	\$ -
Paint Pearl St. Tank (Interior and Exterior)	12	\$ 900,000	\$ -	\$ -	-	900,000	\$ -	\$ -	\$ -
Inventory Storage System	15	\$ 25,000	\$ -	\$ -	\$ 25,000	-	\$ -	\$ -	\$ -
Time and Attendance Management System ¹	15	\$ 9,950	\$ 9,950	\$ -	\$ -	-	\$ -	\$ -	\$ -
Purchase Backhoe and Dump Truck	16	\$ 226,763	\$ 96,763	\$ 130,000	\$ -	-	\$ -	\$ -	\$ -
Upgrade to AMR Meters ²	17	\$ 780,000	\$ 309,000	\$ 20,000	\$ 50,000	50,000	\$ 50,000	\$ 50,000	\$ 251,000
Watercad Software for Hydraulic Model	18	\$ 40,000	\$ -	\$ -	\$ -	-	\$ 40,000	\$ -	\$ -
Phase 2B Plant Improvements	18	\$ 506,695	\$ 506,695	\$ -	\$ -	-	\$ -	\$ -	\$ -
Replacement Windows Filter Plant	18	\$ 250,000	\$ -	\$ -	\$ -	-	\$ -	\$ 250,000	\$ -
LT2 Compliance (includes CT Compliance)	20	\$ 2,725,417	\$ 2,725,417	\$ -	\$ -	-	\$ -	\$ -	\$ -
Distribution System Repair and Replacement	21	\$ 5,450,000	\$ 341,262	\$ 100,600	\$ 250,000	250,000	\$ 250,000	\$ 250,000	\$ 4,008,138
Binnewater Transmission Main (1,200 LF)	21	\$ 1,000,000	\$ -	\$ -	\$ -	1,000,000	\$ -	\$ -	\$ -
Replace Wash Tank at Treatment Plant	22	\$ 1,510,800	\$ -	\$ 1,510,800	\$ -	-	\$ -	\$ -	\$ -
System-wide SCADA ³	23	\$ 780,000	\$ -	\$ 780,000	\$ -	-	\$ -	\$ -	\$ -
System-wide Leak Detection Survey	24	\$ 12,000	\$ -	\$ 12,000	\$ -	-	\$ -	\$ -	\$ -
Phase 1B Plant Improvements ³	24	\$ 1,870,050	\$ 42,121	\$ 1,827,929	\$ -	-	\$ -	\$ -	\$ -
Dam Safety Compliance	24	\$ 386,695	\$ 286,695	\$ 100,000	\$ -	-	\$ -	\$ -	\$ -
Cooper Lake Dam Inspection	24	\$ 179,100	\$ 179,100	\$ -	\$ -	-	\$ -	\$ -	\$ -
Res. 2 Dam Safety Remediation	24	\$ 1,000,000	\$ -	\$ -	\$ -	1,000,000	\$ -	\$ -	\$ -
Binnewater Dam Safety Remediation	24	\$ 1,000,000	\$ -	\$ -	\$ -	-	\$ 1,000,000	\$ -	\$ -
Mink Hollow Intake ⁴	24	\$ 1,007,994	\$ 1,007,994	\$ -	\$ -	-	\$ -	\$ -	\$ -
Pretreatment Facility Trench Drain	24	\$ 35,600	\$ 35,600	\$ -	\$ -	-	\$ -	\$ -	\$ -
Cooper Lake Dam Remediation	26	\$ 6,500,000	\$ 50,200	\$ 2,350,000	\$ 4,099,800	-	\$ -	\$ -	\$ -
Generator Foxhall PS ³	27	\$ 68,900	\$ -	\$ 68,900	\$ -	-	\$ -	\$ -	\$ -
		\$ 28,164,964	\$ 6,090,797	\$ 6,900,229	\$ 5,324,800	3,200,000	\$ 1,340,000	\$ 1,050,000	\$ 4,259,138
Funding									
Budget Appropriations		\$ 1,695,000	\$ 4,024,949	\$ 20,000	\$ -	-	\$ 97,200	\$ -	
Reserve Funds		\$ -		\$ -	\$ -				
Grants		\$ 751,159	\$ 51,159	\$ 700,000	\$ -	-	\$ -	\$ -	
Borrowings		\$ 25,718,805	\$ 2,014,689	\$ 192,000	\$ 900,000	3,200,000	\$ 1,242,800	\$ 1,050,000	
Total		\$ 28,164,964	\$ 6,090,797	\$ 912,000	\$ 900,000	3,200,000	\$ 1,340,000	\$ 1,050,000	
Notes:									
1: \$8,455 from NYS SARA Grant, balance from operations			3: Funding through Storm Mitigation Loan Program = 75% zero interest loan and 25% grant						
2: \$42,704 from NYS SARA Grant, balance from operations			4: \$750,000 from DWSRF Loan, balance operations						