



CHARLESTON WATER SYSTEM

2006

CAPITAL IMPROVEMENTS PROGRAM



APRIL 22, 2010

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I. Introduction and Executive Summary

The Charleston Water System's 2006 Capital Improvements Program (hereinafter "CIP") consisted of short-term master plan improvements and expansions to water and wastewater infrastructure for the years 2006 through 2009. The CIP was developed by the staff of the Commissioners based upon long-term master planning undertaken by the staff and consulting engineers. The three-year CIP was adopted by the Commissioners in 2006. The CIP was designed not only to accommodate projected growth within the service area, but from an asset management perspective, included substantial funds for rehabilitation and replacement of aging infrastructure. It further included projects to help meet increasingly stringent environmental regulations and legislation.

The construction schedule for the various improvements included in the CIP was determined on the basis of relative need and importance of each such improvement, the time required for planning and design work and the extent to which modifications can be effected on existing facilities. The CIP was financed out of proceeds of the Series 2006A Bonds, the Series 2006B Bonds, and anticipated Bond offerings in subsequent years, as well as from current and future revenues and funds of Charleston Water System.

A. Water System

The CIP addressed the current needs of both the Hanahan Water Treatment Plant and the water distribution system for the years of 2006 through 2009, and includes projects associated with growth, regulatory changes and infrastructure replacement and rehabilitation. Proposed improvements to the water system included a filter building, two elevated water storage tanks, a chemical storage facility, an electrical distribution improvements that include centralized stand-by power generation equipment, a booster pumping facility, new and replacement water mains to meet growth and fire flow demands in retail and wholesale service areas, and engineering studies to identify treatment technologies for future plant expansion and continued compliance with drinking water regulations. The Charleston Water System must continue to make improvements to the Hanahan Water Treatment Plant and to the water distribution system to ensure available capacity to meet water demands associated with growth and fire protection, as well as to comply with increasing regulatory requirements and to replace aging infrastructure.

Proceeds of the Series 2006A Bonds and the Series 2006B Bonds in the total approximate amount of \$26,900,000 is being used to finance water treatment plant improvements included in the CIP. The projects at the Hanahan Water Treatment Plant include installation of a 24 million gallon per day filter building, a 1.5 million gallon elevated storage tank for filter backwash, a chemical storage facility, miscellaneous piping to improve hydraulics, electrical distribution improvements that include centralized stand-by power generation equipment, and process pilot testing for projects in future phases of the capital improvements program. A comprehensive 20-year master plan was prepared by engineering consultants in conjunction with Commission engineers. The master plan addresses adequacy of existing water supply and treatment facilities to meet projected

future demands associated with growth through 2030 and proposed treatment goals of anticipated drinking water quality regulations. The master plan evaluates process alternatives and incorporates recommended improvements into a phased construction program.

Proceeds of the Series 2006A Bonds and the Series 2006B Bonds in the total approximate amount of \$47,100,000 is being used to finance water distribution system improvements included in the CIP. The projects include installation of 111,000 feet of water transmission mains ranging in size from 48-inch to 12-inch, a 1.5 million gallon elevated storage tank and booster pump station, and replacement or rehabilitation of aging water mains. A comprehensive 20-year master plan of the water distribution system was prepared by engineering consultants in conjunction with Commission engineers. The master plan addresses both rehabilitation of the existing distribution system infrastructure and improvements to meet projected water demands and fire flow requirements associated with future growth through 2030. Extensive hydraulic computer modeling of the water distribution system was performed to identify infrastructure needs and develop a phased construction program.

B. Wastewater System

The CIP addressed the current needs of both the Plum Island Wastewater Treatment Plant and the wastewater collection system for the years of 2006 through 2009, and includes projects associated with regulatory compliance, growth and infrastructure replacement and rehabilitation. Proposed improvements to the wastewater system include a blower building, replacement of influent screens, electrical distribution improvements that include centralized stand-by power generation equipment, influent pump station improvements, a regional pumping facility, inflow and infiltration reduction, rehabilitation of pump stations, a sewer tunnel extension, new and replacement sewer mains to meet growth demands in the service area. The Charleston Water System must continue to make improvements to the Plum Island Wastewater Treatment Plant and to the wastewater collection system, including the deep tunnel interceptors, to ensure available capacity to handle projected wastewater flow and to replace aging infrastructure.

Proceeds of the Series 2006A Bonds and the Series 2006B Bonds in the total approximate amount of \$14,550,000 is being used to finance wastewater treatment plant improvements included in the CIP. The projects at the Plum Island Wastewater Treatment Plant include installation of a blower building, replacement of aeration basin diffusers, replacement of influent screens, electrical distribution improvements that include centralized stand-by power generation equipment, and influent pump station improvements. A comprehensive 20-year master plan was prepared by engineering consultants in conjunction with Commission engineers. The master plan addresses adequacy of existing treatment facilities to meet projected future flows associated with growth through 2030 and proposed treatment goals of future discharge regulations. The master plan evaluates process alternatives and incorporates recommended improvements into a phased construction program.

Proceeds of the Series 2006A Bonds and the Series 2006B Bonds in the total approximate amount of \$66,910,000 is being used to finance wastewater collection system improvements included in the CIP. The projects include 18,000 feet of deep tunnel interceptor sewer to Daniel Island, 21,000 feet of gravity sewer mains ranging in size from 36-inch to 8-inch, 33,000 feet sewer force mains ranging in size from 20-inch to 12-inch, a 10 million gallon per day pumping station, infiltration and inflow reduction, and upgrades or rehabilitation of aging pump stations, force mains and gravity mains. A comprehensive 20-year master plan of the wastewater collection system was prepared by engineering consultants in conjunction with Commission engineers. The master plan addresses both rehabilitation and replacement of the existing collection system infrastructure and improvements to meet projected wastewater flows associated with future growth through 2030. Extensive hydraulic modeling of the wastewater collection system was performed to identify infrastructure needs and develop a phased construction program.

II. Project Descriptions

Water Treatment Plant

1. Clarification Pilot Testing:

Project involved pilot-scale testing of the Hanahan Water Treatment Plant's (HWTP) raw water sources (Bushy Park, Edisto River, and a mixed blend) to identify alternative clarification technologies. Initial bench-scale testing was conducted to establish pilot-scale operating conditions. Two dissolved air flotation (DAF) units and one inclined lamella plate settler unit were tested each with a granular media pilot filter column. Both summer and winter testing was conducted. Evaluation of the testing was summarized in a final report along with a recommendation of the appropriate technology to utilize for future clarification process improvements at the HWTP.

Project Status: Complete

Expenditures: \$655,200

2. Phase 1 Filtration and Chemical Storage Improvements:

Project includes the installation of four (4) new granular media filters, 400 linear feet of 84-inch spiral welded filtered water pipe, and new bulk chemical tank farm at the HWTP. Construction of the new filters will replace the retired 1947 Booker Filter Building with 24 million gallon per day (MGD) of additional filtration capacity at the Stoney Filter Building to provide a total filtration capacity of 116 MGD. Installation of the 84-inch filtered water pipe will remove hydraulic restrictions that currently exist and will allow the plant to operate more efficiently. The new tank farm will improve the level of safety of handling and storing the HWTP's liquid chemicals for treatment as well as provide for future bulk storage tanks to meet the requirements for a projected future HWTP flow of up to 140 MGD.

Project Status: Construction 80% Complete

Anticipated Expenditures: \$22,409,764

3. Phase 1 Electrical System Improvements:

Project included electrical improvements at the HWTP to provide for a consolidated primary electrical feed as well as a consolidated standby power generation facility. The initial phase of providing the HWTP's infrastructure with a dual (or loop) feed was installed. The project also included installation of the initial phase (1 of 4) of converting existing 2400-volt service to 4160-volt service. The project increased the electrical reliability at the HWTP as well as consolidated emergency backup power generation, and began the systematic process of replacing the less reliable 2400-volt service which has grounding safety issues.

Project Status: Complete

Expenditures: \$8,264,360

4. Diesel Fuel Distribution Improvements:

Project included the installation of five (5) new generator day tanks and associated automatic valves to replace obsolete equipment, a new flow meter and automatic valve at the diesel bulk tank farm, and SCADA equipment and programming to control and

monitor the HWTP's diesel fuel distribution network. The project was conducted to take proactive measures to help mitigate potential diesel fuel spill incidents that could occur as a result of supplying fuel to the HWTP's consolidated power generation facility and other standby generators. The installed measures minimize the time that the fuel piping is exposed to the full volume and head in the bulk storage tanks to only the periods necessary to recharge the day tanks located with the diesel engines.

Project Status: Complete

Expenditures: \$131,206

5. Backwash Water Elevated Storage Tank:

Project includes installation of a 1.5 million gallon elevated storage tank for backwash water to serve the filter buildings at the HWTP, and removal of two existing elevated water tanks; the 200,000 gallon backwash tank at HWTP, and the 500,000 gallon tank at the Charleston Municipal Golf Course. In the event of an unforeseen power outage, the elevated tank will also provide interim emergency storage to help sustain system pressures and water flow until standby power generators can be engaged to restore HWTP pumping capacity.

Project Status: 99% Complete

Expenditures: \$5,859,622

Water Distribution System

6. Peninsula Trunk Main Improvements Phase 1A-HWTP to Lincoln Avenue:

Project included installation of approximately 16,000 linear feet of 48-inch diameter water main from the Hanahan Water Treatment Plant to Sumner Avenue and approximately 4,600 linear feet of 36-inch diameter water main from Sumner Avenue to the 30-inch Cooper River crossing at I-526. Project improved system reliability, transmission efficiency and fire protection to West Ashley, James Island, Johns Island and the Daniel Island/Cainhoy Peninsula.

Project Status: Complete

Expenditures: \$18,391,557

7. 30-inch Grimball Road Water Transmission Main Improvements:

Project included installation of approximately 8,700 linear feet of 30-inch diameter water main along Grimball Road from west of Folly Road to the Stono River providing a third wholesale water delivery point to St. Johns Water Company.

Project Status: Complete

Expenditures: \$3,688,346

8. MUSC Area Water Main Improvements:

Project included installation of approximately 1,500 linear feet of 12-inch diameter water main on Courtenay Drive and approximately 500 linear feet of 12-inch diameter water main on Doughty Street. Project replaced aging water mains in the area of the Medical University complex, improving water flow, boosting system pressure and providing increased fire protection.

Project Status: Complete

Expenditures: \$921,213

9. Murray Drive Water Main Relocation:

Project will relocate approximately 660 linear feet of 24-inch diameter water main, 240 linear feet of 20-inch diameter water main, 670 linear feet of 8-inch diameter water main, and 530 linear feet of 6-inch diameter water main. Relocations will remove utility conflicts for the SCDOT project to realign Murray Boulevard for intersection improvements at the junction of Hanahan Road, Railroad Avenue and Highland Park Road in Hanahan. Project funding will be completely reimbursed to CWS by the SCDOT through a utility agreement.

Project Status: Bidding

Anticipated Expenditures: \$0

10. Remount Road Water Main Relocations:

Project included relocation of existing water mains within SCDOT right-of-way in conflict with the widening of I-26 and interchange improvements at Remount Road and Aviation Avenue. Included in the project was the installation of approximately 660 linear feet of 12-inch diameter horizontal directional drilled HDPE water main, 1680 linear feet of 12-inch diameter water main, 26 linear feet of 8-inch diameter water main, and 958 linear feet of 6-inch diameter water main.

Project Status: Complete

Expenditures: \$949,435

11. ASR Feasibility Study:

Project consists of evaluating feasibility for utilizing Aquifer Storage Recovery (ASR) at three proposed sites in the Charleston Water System (CWS) service area. The three sites considered for ASR are the Ravenel area, Cainhoj area, and the Northwest Water Storage Tank site off of US Highway 78 near Ladson. A feasibility study was prepared that included a hydrogeological investigation of the Charleston area, development of ASR criteria, and regulatory review. Subsequently, an ASR conceptual design report was prepared that provided alternatives and recommendations for future implementation of ASR. Key objectives of the study were to meet the needs of CWS with regard for improved water quality, emergency and fire flow water supplies, and seasonal water storage. ASR implementation was also compared to proposed projects from the master plans to determine if ASR is a more cost-effective option.

Project Status: 95% Complete

Anticipated Expenditures: \$208,800

12. Lower King Street Water Main Improvements:

In conjunction with the City of Charleston's Lower King Street Streetscape Project, this project included installation of approximately 1,930 linear feet of 4-inch thru 12-inch ductile iron water main and associated fire hydrants, valves, and water and fire services. The Lower King Street project, that portion between Princess Street and Broad Street, provided for the replacement of a corroded 1880's 10-inch water main improving system reliability and fire protection in this area of the City.

Project Status: Complete

Expenditures: \$835,008

13. America Street Water Main Replacement:

Project includes installation of approximately 100 linear feet of 12-inch, 5,000 linear feet of 8-inch and 200 linear feet of 6-inch ductile iron water main for the purpose of replacing aging infrastructure. Project goals are to increase system reliability, increase fire protection and reduce operation and maintenance costs.

Project Status: 95% Complete

Anticipated Expenditures: \$1,687,000

14. Pitt Street Water Main Replacement:

Project included installation of approximately 3,150 linear feet of 8-inch diameter ductile iron water main for the purpose of replacing a corroded 1880's vintage main. The project provided increased system reliability, increased fire protection and reduced operation and maintenance costs.

Project Status: Complete

Expenditures: \$1,030,470

15. Bees Ferry Road Water Storage Tank Facility:

Project will consist of one 5.0 million gallon ground storage tank and a booster pump station. Provisions will be made for the installation of an additional 5.0 million gallon ground storage tank in the future pursuant to master plan recommendations. Project goals are to meet the projected water demands and fire protection needs of customers in the West Ashley, Hollywood and Ravenel areas; as well as the water demands of wholesale customers on Johns Island. Funding for construction phase services will be requested in the next CIP bond issue.

Project Status: Preliminary Design Phase

Anticipated Design Expenditures: \$1,002,111

16. Church, Tradd, Queen & Legare Streets Water Main Replacement:

Project will include installation of approximately 3,800 linear feet of 8-inch and 2,500 linear feet of 6-inch diameter water main to replace corroded 1880's vintage water mains. Project goals are to increase system reliability, increase fire protection and reduce operation and maintenance costs.

Project Status: Design Phase

Anticipated Expenditures: \$2,900,000

17. Croghan Greenway Water Main Relocation:

Project included installation of approximately 1,400 linear feet of 20-inch diameter HDPE water main. Project replaced two existing unrestrained aerial crossings with failing pipe supports in order to improve system reliability in the Byrnes Downs and South Windermere areas.

Project Status: Complete

Expenditures: \$578,995

18. I-26 and Hwy 78 Interchange Water Main Relocation:

Project included relocation of an existing water main within SCDOT right-of-way in conflict with the US Highway 78 widening and interchange improvements. Included in the project was the installation of approximately 950 linear feet of 30-inch diameter HDPE water main and 950 linear feet of 24-inch diameter ductile iron water main. \$400,000 of the project cost was reimbursed to CWS by SCDOT through a utility agreement.

Project Status: Complete

Expenditures: \$751,806

19. James Island Bridge Water Main Relocation:

Project included relocation of an existing water main within SCDOT right-of-way in conflict with the James Island Creek Bridge widening project. Included in the project was the installation of approximately 400 linear feet of 14-inch diameter HDPE water main along Hwy 171 under James Island Creek.

Project Status: Complete

Expenditures: \$226,035

20. Lower Folly Road Water Main Improvements Phase 1:

Project includes installation of approximately 850 linear feet of 16-inch diameter HDPE water main and 2,000 linear feet of 12-inch diameter ductile iron water main along Folly Road from Battery Island Drive to Sol Legare Road. Once all phases are completed, the project will provide additional water capacity to Folly Beach and increase system reliability by eliminating a single point of failure.

Project Status: 95% complete

Anticipated Expenditures: \$757,990

21. Rantowles Creek Water Main Replacement:

Project included relocation an existing water main within SCDOT right-of-way in conflict with the Rantowles Creek Bridge widening project. Included in the project was the installation of approximately 1,500 linear feet of 20-inch diameter HDPE water main along US Hwy 17 crossing under Rantowles Creek.

Project Status: Complete

Expenditures: \$824,217

22. Stono River Water Main Replacement:

Project included installation of approximately 3,500 linear feet of 30-inch diameter HDPE water main and 1,500 linear feet of 24-inch diameter ductile iron pipe under the Stono River along Maybank Highway. Project replaced an aging and damaged water main serving Johns Island.

Project Status: Complete

Expenditures: \$5,925,893

23. Wappoo Road Water Main Replacement:

Project includes installation of approximately 3,700 linear feet of 8-inch diameter water main. Project will replace an aging water main along Wappoo Road from Garden Road

to Nemours Road, improving system reliability, fire protection and reducing maintenance costs.

Project Status: Beginning Construction

Anticipated Expenditures: \$590,232

24. Riverland Terrace Elevated Water Storage Tank:

Pending system test results following activation of the new elevated storage tank at HWTP, this project may proceed or be postponed until demand dictates its construction. If implemented, the project would include a new 1.5 million gallon elevated storage tank at the Charleston Municipal Golf Course and distribution piping improvements. Once constructed, this tank would provide additional equalization and emergency storage for the James Island, Johns Island, and Folly Beach areas.

Project Status: On Hold

Anticipated Expenditures: \$6,744,400

25. West Ashley / James Island Booster Station:

Project will include a pumping station off of Leinbach Street in West Ashley to boost distribution system pressure to the Riverland Terrace Elevated Storage Tank and to all retail and wholesale customers downstream of the booster pump station (West Ashley, James Island, Sullivan's Island, Isle of Palms, and Johns Island).

Project Status: Design

Anticipated Expenditures: \$8,201,200

26. Palmetto Commerce Parkway Water Main Extension:

Project will include installation of approximately 7,200 linear feet of 24-inch diameter, 10,645 linear feet of 16-inch diameter, and 2,700 linear feet of 12-inch diameter water main to serve the Palmetto Commerce Park, an area of high growth potential identified in the Water Distribution Master Plan.

Project Status: Design

Anticipated Expenditures: \$2,600,000

27. Future Drive Water Main Extension:

Project will include installation of approximately 8,000 linear feet of 24-inch diameter water main to serve an area of high growth potential identified in the Water Distribution Master Plan, and allow the existing 5 million gallon Northwest Water Storage Tank to better serve the Palmetto Commerce Park area.

Project Status: Design

Anticipated Expenditures: \$1,400,000

28. Hollywood/Ravenel Water Main Extension Phase 1:

Project included installation of approximately 15,500 linear feet of 16-inch diameter water main along Old Jacksonboro Road from US Highway 17 to Highway 165. The project improved water service and fire protection in Ravenel and provided the first leg of water main to loop the distribution system between Ravenel and Hollywood. In addition, this main will help to provide future water service to an area of high growth potential identified in the Water Distribution Master Plan.

Project Status: Complete

Expenditures: \$1,658,500

29. Hollywood/Ravenel Water Main Extension Phase 2:

Project will include installation of approximately 8,000 linear feet of 16-inch diameter and 6,500 linear feet of 12-inch diameter water main along US Highway 17, Old Jacksonboro Road, and New Road to provide the second leg of water main to loop the distribution system between Ravenel and Hollywood. In addition, this main will help to provide future water service an area of high growth identified in our Water Distribution Master Plan.

Project Status: Design

Anticipated Expenditures: \$1,399,035

30. Hollywood/Ravenel Booster Station Improvements:

Project included upgrades to an existing booster station to help meet the current and future water demands for its service area. Major assets installed in the project included a new 40 horsepower (HP) motor, variable frequency drives, a new flow meter, and an auxiliary power transfer switch.

Project Status: Complete

Expenditures: \$144,248

31. Hollywood / Ravenel Elevated Storage Tank Site:

The Water Distribution System Master Plan calls for a 1 million gallon elevated water storage tank in this part of the CWS service area to meet long range peak water demands and fire protection needs. Discussions are ongoing with Mead Westvaco regarding a tank site in the proposed East Edisto Business Park southwest of Ravenel. Initially the site may also be used for aquifer storage and recovery (ASR) discussed elsewhere in this report. Funding for design and construction phase services for the tank will be requested in a future CIP bond issue when water demand needs dictate.

Project Status: Planning Phase

Anticipated Land Expenditures: \$100,000

32. Bee Street Water Main Relocation:

Project includes relocation of an existing water main within SCDOT right-of-way in conflict with planned roadway improvements. Included in the project is the relocation of approximately 1,200 linear feet of 12-inch diameter water main.

Project Status: Beginning Construction

Anticipated Expenditures: \$475,475

33. I-26 Rest Area Water Main Extension:

Project included installation of approximately 1,700 linear feet of 8-inch diameter water main to improve water service for the I-26 east bound rest area near College Park Road. The old water main was installed through a drainage structure and prone to flood water damage.

Project Status: Complete

Expenditures: \$163,040

34. Stark Industrial Park Water Main Replacement:

Project will include installation of approximately 10,000 linear feet of 8-inch diameter water main to replace corroded 1940's era water mains for the purpose of increasing system reliability, fire protection and reducing operation and maintenance costs.

Project Status: Design

Anticipated Expenditures: \$1,094,690

35. Union Heights Water Main Rehabilitation Phase 1:

Project included installation of approximately 5,300 linear feet of 8-inch diameter and 6-inch diameter water main to replace corroded 1940's era cast and galvanized water mains for the purpose of increasing system reliability, fire protection and reducing operation and maintenance costs.

Project Status: Complete

Expenditures: \$715,908

36. Windermere Area Water Main Relocations:

Project included installation of approximately 1,600 linear feet of 6-inch diameter water main to replace a corroded 1950's era water main with a history of frequent breaks for the purpose of increasing system reliability, fire protection and reducing operation and maintenance costs.

Project Status: Complete

Expenditures: \$290,411

37. Byrnes Downs Water Main Relocations:

Project included relocation of water distribution system components to accommodate new storm drainage structures.

Project Status: Complete

Expenditures: \$213,225

38. Daniel Island Parcel F Phase 1:

Project included installation of trunk water distribution system components to conform with the requirements of the Daniel Island Development Agreement.

Project Status: Complete

Expenditures: \$147,235

39. Daniel Island Parcels Y and Z:

Project included installation of trunk water distribution system components to conform with the requirements of the Daniel Island Development Agreement.

Project Status: Complete

Expenditures: \$117,051

40. Daniel Island Water Main Extensions:

Included in the CIP to fund trunk water main projects pursuant to the Daniel Island Development Agreement. Funds are drawn as needed to comply with the terms of the agreement.

Project Status: Ongoing

Anticipated Expenditures: \$190,700

41. Cainhoy Water Main Extensions

Included in the CIP to fund trunk water main projects pursuant to the Primus, Harper, and Lawson-Johnson Development Agreements. Funds are drawn as needed to comply with the terms of the agreement.

Project Status: Ongoing

Anticipated Expenditures: \$1,500,000

Wastewater Treatment Plant

42. Phase 1 Electrical System and Blower Improvements:

Project includes the construction of a new blower building and associated air supply piping at the Plum Island Wastewater Treatment Plant (PIWWTP) as well as an upgrade to its electrical distribution system. The new blower building includes four (4) new single stage blowers, standby generator, 480V switchgear, and all necessary piping, valves, meters, and appurtenances. New air supply piping was installed to serve the plant's nine aeration basins and fine bubble aeration system. The PIWWTP's automation (SCADA) system was also updated for controlling dissolved oxygen concentration in the treatment process. The PIWWTP's electrical system was also upgraded by converting the existing 2300V distribution system to an SCE&G 23.9KV overhead power distribution system and eliminating the onsite electrical substation. Existing 2300V transformers on the PIWWTP site were replaced with 480V transformers. These electrical improvements will allow for better distribution of power, enhance system reliability, and provide a higher level of safety for the plant maintenance staff.

Project Status: 99% Complete

Anticipated Expenditures: \$15,171,116

43. Aeration Basin Diffuser Improvements:

Project consists of the installation of new membrane fine bubble diffusers in nine aeration basins at the PIWWTP. The installation includes the replacement of existing ceramic disc diffusers with 8,018 new membrane diffusers as well as associated PVC grid piping, stainless steel drop pipes and supports, purge systems, and other related items. The new membrane diffusers will provide greater aeration efficiency and provide a power cost savings for the PIWWTP's blower system.

Project Status: Beginning Construction

Anticipated Expenditures: \$596,600

44. Harbor Tunnel Pump Station Pump and Controls:

Project includes the installation of two new 280 HP submersible sewage pumps and control panels for the PIWWTP's Harbor Tunnel Pump Station (HTPS). The HTPS is a high-lift pump station that conveys raw wastewater received from Peninsular Charleston, Daniel Island, and the Cainhoy area to the Plant headworks for screening. The additional pump installations are replacements for pumps that failed catastrophically.

Project Status: Construction/Installation

Anticipated Expenditures: \$695,400

45. Preliminary Treatment Facilities Design:

Project includes engineering services for updating the PIWWTP Master Plan and preparation of a Basis of Design Report for the second phase of capital improvements at the Plant. The master plan update will include revising the growth and wastewater flow projections for the CWS service area, updating regulatory requirements to reflect final NPDES discharge permit limits, and reviewing and revising all Plant unit processes with regard to capital improvements necessary to achieve a treatment capacity of up to 54 MGD (135 MGD peak flow). The Basis of Design Report will outline preliminary designs for a new pretreatment facility (plant headworks), tunnel flushing storage tank, and new primary clarification tanks. The new facilities are being planned and coordinated in conjunction with the new West Ashley Sewer Tunnel and Pump Station Project so that design and construction interfaces are adequately addressed to help ensure uninterrupted operations at the PIWWTP. Funding for construction phase services will be requested in a future CIP bond issue.

Project Status: 50% Complete

Anticipated Preliminary Design Expenditures: \$580,800

46. West Ashley Pump Station Pump 4 and Controls:

Project includes the installation of a new 335 HP dry-pit submersible sewage pump, variable frequency drive, and associated valves and piping for the PIWWTP's West Ashley Pump Station (WAPS). The WAPS is a high-lift pump station that conveys raw wastewater received from the West Ashley area of Charleston, as well as from Johns Island, Hollywood and Ravenel, to the plant's headworks for screening. Currently three pumps are installed at the WAPS. Under normal operating conditions, only two pumps are utilized to maintain flow, however, during extreme peak wet-weather flow events the third pump is required. In order to maintain pumping operations during these peak weather events and have an installed standby pump available for redundancy, a fourth pump is being added. In addition to the pump installation, extensive preparatory work was performed inside the wetwell to remove accumulated debris that could restrict flow and potentially enter the pumps causing damage or failure. The project will provide greater reliability for this critical pump station.

Project Status: Beginning Construction/Installation

Anticipated Expenditures: \$613,836

47. Daniel Island Wastewater Treatment Plant Odor Control System:

Project included the installation of a 75-foot diameter fiberglass dome, 20-inch suction piping, and 8,000 cfm blower with associated impregnated carbon filter units to scrub wastewater odors from an existing 690,000 gallon flow equalization tank at the Daniel Island Wastewater Treatment Plant (DIWWTP). Also included was the fabrication of stainless steel enclosures for two (2) rotary drum influent screens. The odor control system was installed due to nearby resident complaints of odors from the Plant. Prior to construction of the project, a plant-wide odor study was conducted that identified the equalization tank and influent screens as those processes that primarily contributed to the cause of odors.

Project Status: Complete

Expenditures: \$1,066,221

48. Daniel island WWTP Outfall Improvements:

Project involves the relocation of the existing DIWWTP outfall to a point closer to the plant along the same receiving stream. The current outfall is being abandoned and the property on which it resides is being reverted to its previous owner.

Project Status: Construction

Anticipated Expenditures: \$79,500

Wastewater Collection System

49. Cain's Crossing Pump Station Upgrade:

Project involved increasing design capacity of a Developer's wastewater pump station to meet future flow projections identified in CWS's Thomas Island & Cainhoy Wastewater Master Plan. Project funded the incremental difference to upsize the pump station beyond the requirements of the Developer.

Project Status: Complete

Expenditures: \$170,169

50. Shellring Collection System Improvements:

Project involved increasing design capacity and depth of a Developer's wastewater collection system and pump station to meet future flow projections identified in CWS's Thomas Island & Cainhoy Wastewater Master Plan. Project funded the incremental difference to upsize the pump station and deepen the sewer main beyond the requirements of the Developer to allow for extension of the system.

Project Status: Complete

Expenditures: \$186,440

51. Governor's Cay Pump Station:

Project involves increasing design capacity of a Developer's wastewater pump station to meet future flow projections identified in CWS's Thomas Island & Cainhoy Wastewater Master Plan. Project will fund the incremental difference to upsize the pump station beyond the requirements of the Developer.

Project Status: Design (Development Project On-Hold)

Anticipated Expenditures: \$250,000

52. Pump Station 84 Upgrade and New Force Main:

Project included the construction of an upgrade to CWS's Pump Station 84 on Daniel Island as well as the installation of a new 20-inch diameter sewer force main from the pump station to the DIWWTP. The upgrade improved the pumping capacity of the station from approximately 1,000 gallons per minute (gpm) to 3,600 gpm to meet increasing sewer flows from Daniel Island as well as from the Cainhoy area. The upgrade was designed to meet the future sewer flow from Daniel Island at build-out. The

20-inch force main was installed to replace the existing 12-inch force main from this pump station and convey the build-out wastewater flow to the DIWWTP.

Project Status: Complete

Expenditures: \$3,380,640

53. Lower King Street Wastewater Improvements:

In conjunction with the City of Charleston's Lower King Street Streetscape Project, this project included the trenchless rehabilitation of 2,464 linear feet of 8-inch sewer pipe by the cured-in-place-pipe methods (CIPP) as well as the rehabilitation of approximately 85 6-inch sewer service laterals. The project also included the video inspection and cleaning of all sewer pipe and laterals, sewer cleanout replacement, and manhole frame and cover replacement along with cementitious manhole rehabilitation. The Lower King Street Project included that portion of the CWS sewer system between Princess Street and Broad Street.

Project Status: Complete

Expenditures: \$835,008

54. Croghan Greenway Sewer Relocation:

Project consisted of installing approximately 1,000 linear feet of 20-inch diameter HDPE sewer force main. Project replaced an existing unrestrained aerial crossing with failing pipe supports in order to improve system reliability in the area.

Project Status: Complete

Expenditures: \$333,654

55. Croghan Shaft Area Collection System Improvements Study:

Project included the study of the wastewater collection system at the Croghan Shaft. The Croghan Shaft is located in a highly developed area just off of Albemarle Road near Porter-Gaud, and customer perception is being negatively impacted by persistent sanitary sewer overflows. The study determined the problem to be a hydraulic restriction in the existing West Ashley Sewer Tunnel. Problems discovered are being addressed within the Phase 5 - West Ashley Sewer Tunnel Replacement Project.

Project Status: Complete

Expenditures: \$25,000

56. Pump Station Rehabilitation Phase 1:

Project consists of the replacement/rehabilitation of five (5) wastewater pump stations and the repainting of above ground piping associated with twelve (12) others. Based on design information, flow monitoring results, and field observations by CWS staff, a priority list of pump stations needing specific improvements was developed. Many of the pump stations on the list are old and nearing the end of their service life, such as the stations included in this project. Rehabilitation of these stations will provide increased reliable capacity for the affected areas, as well as reduced operation and maintenance costs.

Project Status: Construction

Anticipated Expenditures: \$1,273,500

57. Pump Station Rehabilitation Phase 2:

Project consists of the replacement/rehabilitation of nine (9) wastewater pump stations. The subject pump stations were identified from a priority listing established from design information, flow monitoring results, and field observations by Charleston Water System staff. Many of the pump stations on the list are older and nearing the end of their anticipated useful life, such as the stations included in this project. Rehabilitation of these stations will provide increased reliability and capacity for the affected areas, as well as reduced operation and maintenance costs.

Project Status: Design

Anticipated Expenditures: \$1,925,000

58. Pump Station RT-6 Upgrade:

Project will consist of the replacement of an aging, limited capacity pump station with a new station that has greater depth and capacity to provide service to a larger area in the Bees Ferry Road corridor. These improvements are based on recommendations from the Wastewater Collection System Master Plan.

Project Status: Design

Anticipated Expenditures: \$810,000

59. Red Top Regional Pump Station and Wastewater Interceptor Phase 1:

The Red Top area, generally bound by US Highway 17, CSX Railroad, Rantowles Creek, and the Glen McConnell Expressway, is a portion of the collection system that has significant growth potential. This area is presently served by a series of small aging pump stations that deliver wastewater to the 36-inch Church Creek gravity sewer line. Based on future flow projections, the capacity of the Church Creek Interceptor will be inadequate to handle the future flows for this area. The Red Top Project will provide for a new sewer interceptor system for the Red Top area independent of the Church Creek System. This new sewer system infrastructure will allow diversion of significant future flows (including the Grande Oaks Development) from the existing Church Creek Interceptor, and create the opportunity for elimination of several small pump stations. Design of project currently indicates the need for a new 8 MGD pump station, approximately 10,000 linear feet of gravity mains ranging in size from 18-inch up to 36-inch diameter, approximately 5,000 linear feet of 16-inch diameter force main along Bees Ferry Road, and approximately 30,000 linear feet of 24-inch force main along US Highway 17 and the West Ashley Greenway. Due to the complexities of the project and the need to offer some flexibility of construction methods, it is being planned as a design-build project.

Project Status: Design

Anticipated Expenditures: \$23,000,000

60. Thomas Island Regional Pump Station and Interceptor:

Project involves the design of a regional interceptor/collection system to carry wastewater flow from the Thomas Island and the Cainhoy areas to the DIWWTP. Currently the wastewater flow from this region is carried through the collection system located on Daniel Island to the DIWWTP. Based on future flow projections, the present capacity of the Daniel Island interceptor system will be inadequate to handle the future

wastewater flows from Thomas Island and Cainhoy areas, thus that wastewater flow must be rerouted. This project design will address the wastewater infrastructure needs to route the Thomas Island and Cainhoy flow directly to the DIWWTP thereby freeing up capacity within the Daniel Island collection system to adequately handle its build-out. The project design is currently indicating the need for the installation of a pump station with approximately 15,000 linear feet of 24-inch wastewater force main, and various size gravity mains on Thomas Island. Present activity involves only preliminary design and easement acquisitions. Funding for the design and construction phase services will be requested in a future CIP bond issue as demand dictates.

Project Status: Design

Anticipated Preliminary Design Expenditures: \$606,000

61. Village Tract Pump Station Upgrade:

Project included the installation of larger pumps within an existing wastewater pump station in order to meet increased capacity needs of the area.

Project Status: Complete

Expenditures: \$99,885

62. Wastewater Pump Station Inventory:

Project involved collection of data on all of the 185 CWS wastewater pump stations. Information obtained included physical parameters of stations, performance of pumps at time of inspection and photographic logging. Information is being used for design purposes and as an evaluation tool in categorizing pumps stations needing future rehabilitation.

Project Status: Complete

Expenditures: \$139,628

63. Johns Island Wastewater - Sailfish and Maybank Gravity Sewer Extension:

Project will include installation of approximately 6,200 linear feet of 10-inch diameter gravity sewer in easements to serve an area of high growth potential along the Maybank Highway corridor on Johns Island.

Project Status: Bidding

Anticipated Expenditures: \$1,525,000

64. Johns Island Wastewater Interceptor Phase 1:

Project will include installation of a 4.5 MG pump station, approximately 5,100 linear feet of 16-inch diameter gravity sewer, and 6,700 liner feet of 16-inch diameter force main in easements to serve an area of high growth between Maybank Highway and the Johns Island Airport.

Project Status: Design (Development Project On Hold)

Anticipated Expenditures: \$5,745,000

65. Pump Station XX and YY Rehabilitation:

Project will include rehabilitation of two (2) aging sewer pump stations and replace approximately 3,500 linear feet of deteriorated 6-inch and 8-inch diameter sewer force mains in the Moreland area. Rehabilitation and replacement of this sewer infrastructure

will provide increased reliability for the affected areas, as well as reduced operation and maintenance costs.

Project Status: Design

Anticipated Expenditures: \$2,200,000

66. Collection System Rehabilitation Phase 1 - PS 56:

Project will replace approximately 1,800 linear feet of deteriorated 8-inch diameter sewer force main with a history of frequent breaks. The project includes installation of a new 10-inch diameter force main and replacement of the piping at an existing pump station along Harborview Road near the Charleston Country Club. Rehabilitation and replacement of this sewer infrastructure will provide increased reliability for the affected areas, as well as reduced operation and maintenance costs.

Project Status: Construction

Anticipated Expenditures: \$428,500

67. Collection System Rehabilitation Phase 1 - PS C and CC:

Project included installation of approximately 2,400 linear feet of 8-inch diameter and 400 linear feet of 12-inch diameter force mains replacing deteriorated mains with histories of frequent breaks. Replacement of this sewer infrastructure will provide increased reliability for the affected areas, as well as reduced operation and maintenance costs.

Project Status: Complete

Expenditures: \$615,000

68. Collection System Rehabilitation Phase 1 - PS S and WW:

Project will include installation of approximately 1,800 linear feet of 10-inch diameter force main for PS WW and 1,600 linear feet of 10-inch diameter force main for PS S replacing the existing deteriorated force mains with histories of frequent breaks. Replacement of this sewer infrastructure will provide increased reliability for the affected areas, as well as reduced operation and maintenance costs.

Project Status: Design

Anticipated Expenditures: \$685,900

69. Headquarters Island Force Main Replacement:

Project included installation of approximately 600 linear feet of 8-inch diameter force main to bypass a portion of an existing force main that was exposed by erosion in a salt water creek near Headquarters Island. This project eliminated a potential point of pollution.

Project Status: Complete

Expenditures: \$152,785

70. Beresford Commercial Tracts Wastewater Main Extension:

The project will include installation of gravity sewer mains to serve commercial parcels fronting Clements Ferry Road between Jack Primus Road and Charleston Regional Business Center in conformance with the Harper Development Agreement.

Project Status: Design

Anticipated Expenditures: \$481,000**71. Infiltration and Inflow (I/I) Removal**

The Charleston Water System (CWS) Wastewater Collection Department recently performed a sewer system evaluation study (SSES) to identify critical repair needs for main lines, manholes and service laterals in sub-basins with the highest normalized I/I flows and/or hydraulic capacity problems. In 2006, the West Ashley service area was chosen as the primary focus area due to several compelling factors, including the average age of the system (35 years old), a history of emergency repairs (75% of all service failures), and the number of wet weather SSO's per year (five). Additionally, flow modeling performed on the system as part of the CWS 2006 Master Plan revealed that the tunnel for the West Ashley service area only had the carrying capacity to accommodate a 6 Month/24 Hour Design Storm. On the average, a 78.9% reduction in I/I was achieved to reduce average wet weather flows by 492.7 million gallons per year (MGY) or an average of 1.35 MGD. Since many of the line and manhole deficiencies repaired were below the groundwater table, a reduction in dry weather base flow of 1.49 MGD (25.8% reduction) or 543.9 MGY was also realized. Despite a 88% increase in the number of accounts over the past ten years, the WWTP Average Daily Flow (ADF) over the 2007/2008 period (i.e., 20 MGD) was brought below the WWTP ADF recorded in 1998 (22 MGD) indicating an extremely favorable return on investment for such projects. Consequently, the typical annual funding for ongoing I/I removal work is approximately \$1,150,000.

Project Status: Ongoing

Expenditures: \$4,500,000

72. Phase 3 - Cooper Tunnel Replacement

The CIP included supplemental funding for completion of the Cooper Tunnel Project in the amount of \$8,000,000. The Cooper Tunnel Project replaced the original sewer tunnel constructed in the early 1970's, which was failing, and consisted of approximately 18,000 linear feet of 48-inch diameter deep tunnel piping and seven drop shafts.

Project Status: Complete

2006 Bond Expenditures: \$8,000,000

Total Expenditures: \$52,175,000

73. Phase 4 – Daniel Island Extension Tunnel

The Daniel Island Extension Tunnel was constructed to supplement sanitary sewer service for Daniel Island and the Cainhoy Peninsula. The Daniel Island WWTP can not be expanded to accommodate the projected built-out sewer flows from this region due to regulatory limits on the permitted discharge. The Daniel Island Tunnel, consisting of 18,000 linear feet of 54-inch diameter deep tunnel piping and two drop shafts, will transport sanitary sewer to the Peninsular City tunnel system and on to the Plum Island Plant for treatment.

Project Status: Complete

Expenditures: \$32,000,000

74. Phase 5 - West Ashley Sewer Tunnel Replacement:

Project currently includes engineering design services for a replacement deep sewer tunnel to serve the West Ashley service area of Charleston as well as provide for a new deep high-lift pump station at the Plum Island WWTP. Approximately 8,000 linear feet of 54-inch new sewer tunnel that stretches from the Croghan Shaft, beneath the Porter-Gaud High School property, and onto the Plum Island WWTP is planned. The new pump station will have a capacity of 75 MGD and will be interconnected via tunnels to the existing West Ashley Pump Station currently in service at the plant. The existing West Ashley Sewer Tunnel is being replaced due to severe hydraulic restrictions in the existing 30-inch pipe and progressing deterioration of the pipe. The proposed tunnel will be designed to meet future wastewater flows from the West Ashley service area of at least 60 MGD. The addition of a new 75 MGD high-lift pump station will allow the plant to achieve a future treatment capacity of 54 MGD (135 MGD peak flow). Funding for construction phase services will be requested in the next CIP bond issue.

Project Status: 5% Design Complete

Anticipated Design Phase Expenditures: \$4,354,300

75. Byrnes Downs Sewer Main Relocations

Project included relocation of gravity sewer mains to accommodate new storm drainage structures.

Project Status: Complete

Expenditures: \$166,030

76. Daniel Island Parcel F Phase 1

Project included installation of trunk sewer collection system components to conform with the requirements of the Daniel Island Development Agreement.

Project Status: Complete

Expenditures: \$106,896

77. Daniel Island Wastewater Main Extensions

Included in the CIP to fund trunk sanitary sewer projects pursuant to the Daniel Island Development Agreement. Funds are drawn as needed to comply with the terms of the agreement.

Project Status: Ongoing

Anticipated Expenditures: \$748,850

78. Cainhoy Wastewater Main Extensions

Included in the CIP to fund trunk sanitary sewer projects pursuant to the Primus, Harper, and Lawson-Johnson Development Agreements. Funds are drawn as needed to comply with the terms of the agreement.

Project Status: Ongoing

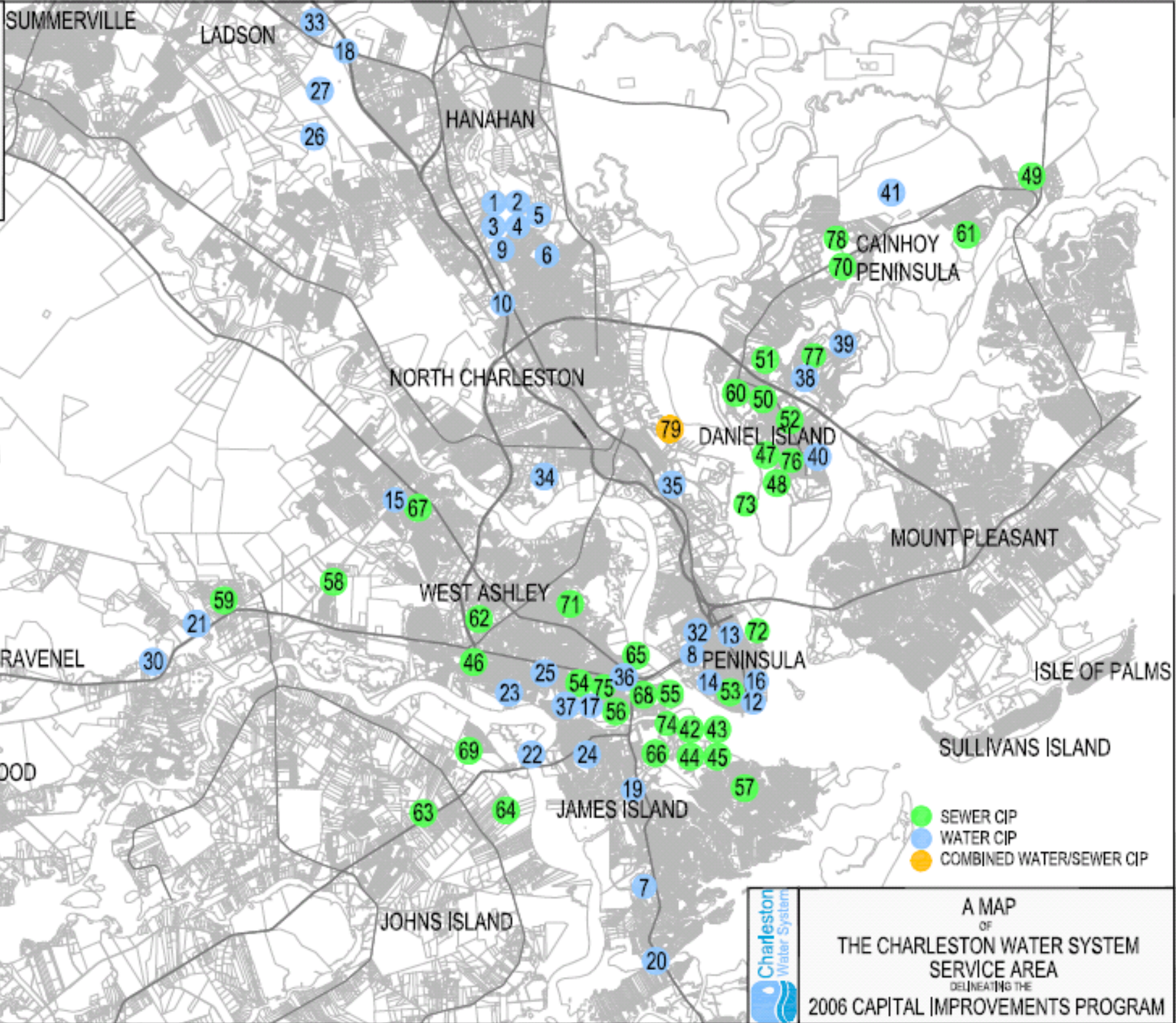
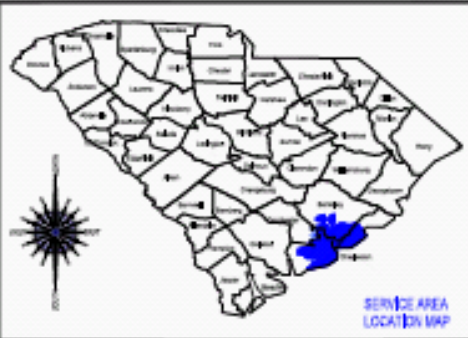
Anticipated Expenditures: \$1,640,285

Common Utility**79. Hobson Street Inventory Building Roof Replacement:**

The project includes installation of new thermoplastic roofing including selective structural framing repairs and installation, metal roof deck installation, rough carpentry, roof insulation for the CWS Inventory Warehouse at the Hobson Street Operations Center. According to a study prepared by a structural engineering firm, the existing roof system was structurally unsound and beyond repair. Funding for the project is distributed 60/40 to the water and wastewater utility capital budgets, respectively.

Project Status: Construction

Anticipated Expenditures: \$700,000



III. Financial Information

**CHARLESTON WATER SYSTEM
MAJOR CAPITAL IMPROVEMENT PROGRAM
2006 BOND ANALYSIS**

	WATER BOND	SEWER BOND	TOTAL
ALLOCATED FOR PROJECTS	106,164,378	116,534,164	222,698,542
2006 BOND PROCEEDS:	72,463,599	83,674,359	156,137,958
INTEREST EARNINGS ON 2006 BOND	7,469,558	7,891,796	15,361,353
TOTAL PROCEEDS AND INTEREST	\$ 79,933,157	\$ 91,566,155	\$ 171,499,311
TOTAL COSTS TO DATE	79,670,918	71,108,624	150,779,543
2006 BOND FUNDS REMAINING	\$ 262,239	\$ 20,457,530	\$ 20,719,769
CASH SUPPLEMENT ALLOCATED FOR PROJECTS	\$ 26,231,221	\$ 24,968,009	\$ 51,199,231

IV. Conclusion

The Charleston Water system greatly appreciates the support of City Council and the Mayor for the 2006 Capital Improvements Program and the bond issue to fund those much needed projects. We at Charleston Water System take our mission of protecting the environment and public health very seriously. It is our fervent goal to help improve the quality of life in Charleston and the surrounding communities by providing reliable and efficient clean water services that help to support the local economy, smart growth, public health and life safety through fire protection.

Each of the projects included in the 2006 CIP have or will, in some manner, help Charleston Water System to better serve our community. With a few exceptions, these projects are complete or nearing completion, but the challenge of addressing the next phase of capital improvements awaits. System improvements for growth and capacity demands, fire protection, compliance with new environmental regulations, and aging infrastructure replacement needs require constant funding to ensure our water and wastewater systems work reliably. Continued implementation of the recommended critical infrastructure improvements identified in the treatment, distribution system and collection system master plans is essential to sustaining long-term quality water and wastewater services for all of the citizens and communities served by Charleston Water System. We look forward to your continued support in this important and vital public services endeavor.