10.0 Recommended Plan

10.1 Overview and Conclusions

This section describes the conclusions and recommendations for the Phase 2 Control Plan for the Wellington Avenue CSO Facility. The recommended plan is based on the results of the alternatives analysis presented in Section 7, the cost estimates presented in Section 8, and the affordability analysis presented in Section 9.

10.1.1 Model Development

A hydrologic and hydraulic model was developed for the tributary collection system to the Wellington Avenue CSO Facility. The model included the Thames Street Interceptor, the Long Wharf Pump Station, and the Washington Street CSO Facility. Flow metering performed in 2005, 2007, and 2008 was utilized to calibrate the model for existing dry weather and wet weather conditions. The modeling analysis included evaluation of rainfall data from 1948 to 2008 collected at the T.F. Green Airport in Providence, RI to select a typical year to be used to evaluate CSO controls. Based on the analysis of the rainfall data, the year 1996 was selected as the typical year.

The calibrated model was utilized to establish the existing conditions flows in the Wellington Avenue CSO Facility catchment area for the typical year 1996; the impact of the enhanced sewer separation work completed by the City as of December 2008 on the frequency and volume of CSOs at the Wellington Avenue CSO Facility; and to evaluate the effectiveness of CSO control alternatives to eliminate CSOs for all the storms in the typical year up to the largest storm during the typical year, the “design storm” at the Wellington Avenue CSO Facility. In addition, the CSO control alternatives were evaluated for their impacts to the Long Wharf Pump Station, the Washington Street CSO Facility, and the Water Pollution Control Plant (WPCP).

The model was also utilized to evaluate the impacts of flows from the Wave Avenue Pump Station in Middletown on CSO frequency and volume at the Wellington Avenue CSO Facility and the Washington Street CSO Facilities. System optimization, consisting of evaluation of the impacts of eliminating existing flow regulating weirs at three locations on the Thames Street Interceptor, was also examined using the model.

10.1.2 CSO Control Alternatives

Phase 2 included preliminary evaluation and screening of CSO controls. Based on the screening analysis, the following CSO control alternatives were selected to be evaluated for their ability to eliminate CSOs for the largest storm in the typical year 1996, the “design storm”:

- Centralized Storage;
- Decentralized Storage;
- Conveyance of flow via pumping and force main from the Wellington Avenue CSO Facility directly to the Long Wharf Pump Station with treatment at the WPCP;

- Conveyance of flow via pumping and force main from the Wellington Avenue CSO Facility directly to the WPCP; and

- Sewer Separation.

The CSO control alternatives were also evaluated with respect to impacts to the Washington Street CSO Facility and the WPCP.

10.1.3 Conclusions

The following are the conclusions from the Phase 2 hydrologic and hydraulic modeling and alternatives analysis:

1. As noted in Section 7, the modeling analysis indicated that the system is not only impacted by direct inflow sources, but is also impacted significantly, due to pipeline defects such as holes, cracked and broken pipes, misaligned and open joints, by tidal flows, specifically in the Thames Street Interceptor and the Wellington Avenue Sewer; and also by rainfall induced infiltration combined with high groundwater elevations in the Wellington Avenue tributary catchment area. During Phase 1 Part 2, it was surmised that the increased wet weather flows were more impacted by inflow sources and that infiltration sources were of lesser impact. The modeling results in Phase 2 have indicated that rainfall induced infiltration is a more significant component of the total wet weather flow than previously envisioned.

2. The model was used for the typical year 1996 to simulate flows under existing conditions, before implementation of the recent enhanced sewer separation (prior to 2007), for the typical year 1996 to determine if the model reasonably generated data close to the recorded CSO volume and number of events in a typical year at the Wellington Avenue CSO Facility. As noted in Section 4.7.3, the model simulation predicted 14 overflows at the Wellington Avenue CSO Facility totaling approximately 22.8 million gallons. These results correlated well with analysis of the CSO overflows at the Wellington Avenue CSO Facility from 2002 through 2008, which resulted in an annual average number of overflows of 17 per year and an annual volume of approximately 22 million gallons.

3. The City's Enhanced Sewer Separation Program has been ongoing from 2007 through 2008 in the Wellington Avenue CSO Facility tributary area. The existing conditions' calibrated model was modified to account for the reductions in flow to the system for catch basins, sump pumps, and roof leaders that have been recently disconnected. The Existing Conditions 2008 Baseline Model was developed to simulate flows for the typical year 1996 to determine the estimated reduction in annual CSO volume and annual number of events in a typical year due to the recent sewer separation work that has been completed in the Wellington Avenue CSO Facility tributary catchment area. Based on the model simulations of the typical year 1996, the sewer separation work completed as of December 2008 in the Wellington Avenue CSO Facility Tributary catchment area estimates a 12% reduction in annual CSO volume, a 20% reduction of CSO events, and a 7% reduction in the largest CSO event volume. It should be noted that the preliminary estimated volume of infiltration and inflow used in the Phase 1 Part 2 Report was approximately four million gallons based on the removal of connected catch basins, roof drains, and sump pumps. This preliminary estimate was based on the use of the Rational

Method formula, which only uses a single rainfall event with a high peak rainfall intensity of 1inch/hour for the calculation. As noted above, using the Baseline Conditions 2008 Model developed in this phase of the project, the estimated removal of infiltration and inflow is reduced from 4 to 2.8 million gallons based on simulation of all the rainfall events in a typical year.

4. Simulation of the centralized storage alternative yielded a volume requirement of 6.4 million gallons required to capture the CSO volume generated by the largest storm in the typical year of 1996. Potential storage locations evaluated included the ball field/park area adjacent to the Wellington Avenue CSO Facility and/or Spencer Park on Wellington Avenue. The impacts to the Washington Street CSO Facility and the WPCP were also evaluated with the model. It was determined that the rate of pumpback of the tank could increase the frequency and volume of overflows at Washington Street due to the elevated hydraulic grade line that occurs in the system for the largest storms in the typical year for several days after the storm event. Therefore, the storage tank post-event pumpback rate is a critical design parameter, and for centralized storage must be equal to approximately 0.5 to 1 mgd to minimize impacts to Washington Street for these larger storms. Model simulations of centralized storage resulted in increased flows to the WPCP. The model predicted that flows at the WPCP would exceed the permitted allowable monthly average daily flow of 10.7 mgd during three months in the typical year, however the monthly daily maximum flow limit of 19.7 was not exceeded.

5. Simulation of the decentralized storage alternative yielded a volume requirement of approximately 9 million gallons required to capture the CSO volume generated by the largest storm in the typical year of 1996. Sixteen preliminary storage sites were evaluated and screened. Potential final storage locations evaluated with the model included the ball field/park area adjacent to the Wellington Avenue CSO Facility, Spencer Park on Wellington Avenue, Morton Park and Narragansett Avenue. The impacts to the Washington Street CSO Facility and the WPCP were evaluated with the model. The impacts of the pumpback rate for decentralized storage were similar to the centralized storage option. It was determined that the rate of pumpback of the tank could increase the frequency and volume of overflows at Washington Street due to the elevated hydraulic grade line that occurs in the system for the largest storms in the typical year for several days after the storm event, and by reducing this parameter, the impacts to Washington Street could be eliminated. Model simulations of decentralized storage also resulted in increased flows to the WPCP. The model predicted that flows at the WPCP would exceed the allowable monthly average daily flow during three months in the typical year, however, the monthly maximum flow limit was not exceeded.

6. Simulation of the alternative of conveying flow directly from the Wellington Avenue CSO Facility to the Long Wharf Pump Station via either an overland force main or a sub-aqueous force main below Newport Harbor and conveying the flow via the existing 36-inch force main to the WPCP for treatment was evaluated. Evaluation of this alternative resulted in several significant impacts to existing facilities, including the need for construction of a new pump station at Long Wharf; and to the WPCP, including headwork's modifications/flow equalization, upgrades to primary treatment, and new disinfection and effluent pumping facilities. In addition, due to the increase in flow, construction of a new outfall would be required. This alternative increased the volume and frequency of CSOs at Washington Street. Model simulations of this alternative resulted in increased flows to the WPCP. The model predicted that flows at the WPCP

would exceed the allowable monthly average daily flow during two months in the typical year, and would exceed the maximum daily flow three times during the year. In addition, this alternative would require approval from the Rhode Island Department of Environmental Management (RIDEM) to modify the current RIPDES permit to allow primary treatment and disinfection of wet weather bypasses, as well as for an increase in the WPCP's discharge capacity.

7. Simulation of the alternative of conveying flow directly from the Wellington Avenue CSO Facility to the WPCP via either an overland force main or a sub-aqueous force main below Newport Harbor was evaluated. The required upgrades and new facilities at the WPCP were the same as those for the Long Wharf alternative. This alternative also increased the volume and frequency of CSOs at Washington Street. Model simulations of this alternative resulted in increased flows to the WPCP. The model predicted that flows at the WPCP would exceed the allowable monthly average daily flow during two months in the typical year, and would exceed the maximum daily flow three times during the year. As noted above, this alternative would also require approval from RIDEM to modify the current RIPDES permit to allow primary treatment and disinfection of wet weather bypasses, as well as for an increase in the WPCP's discharge capacity.

8. Sewer separation has been an ongoing CSO control alternative performed by the City since the 1970s.More recently, the City's enhanced sewer separation projects have included disconnection of roof leaders, catch basins, and sump pumps that were identified as connected to the sanitary sewer system by field investigation work performed as part of Phase 1 Part 1, Phase 1 Part 2, and Phase 1 Part 3. However, based on the flow metering performed in 2005 and 2007 and the subsequent model calibration, the Wellington Avenue CSO Facility tributary catchment area still exhibits significant quantities of rainfall dependent infiltration and inflow. Completion of sewer separation in the Wellington Avenue CSO Facility tributary area would consist of further field investigations to identify additional public and private sources of infiltration and inflow; disconnection of additional connected catch basins, roof leaders and sump pumps; and rehabilitation and replacement of sewer laterals and sewer mains in the existing collection system. Model simulations of this alternative were performed to assess the impacts of reducing the rainfall dependent infiltration and inflow for three scenarios: 30%, 50%, and 80%. Each of these scenarios resulted in a reduction of CSO frequency and volume at the Washington Street CSO Facility and at the WPCP. The 80% reduction scenario was determined as the level required to eliminate CSO's at the Wellington Avenue CSO Facility for the typical year 1996. Achieving this level of infiltration and inflow reduction would require replacement and rehabilitation of virtually the entire existing Wellington Avenue collection system.

9. Impacts of flows from the Wave Avenue Pump Station in Middletown were evaluated with the model. As presented in Section 7.7, it was determined that high wet weather flows from the Wave Avenue Pump Station increase the frequency and volume of CSOs at both the Wellington Avenue CSO Facility and the Washington Street CSO Facility, with the more significant impact on the Washington Street CSO Facility.

10 The CSO control alternatives were evaluated with respect to eliminating CSO's at the Wellington Avenue CSO Facility for the typical year; the impacts to CSO frequency and volume at the Washington Street CSO Facility; total flows to the WPCP and with regard to the siting, environmental, institutional, permitting issues. The alternative that

eliminates CSOs during the typical year, reduces impacts to the Washington Street CSO Facility and the WPCP, as well as with the least potential siting (i.e., construction impacts), environmental, institutional, and permitting issues was determined to be a combination of aggressive continued sewer separation combined with a reduced volume of centralized storage.

11. Each of the CSO control alternatives were evaluated with respect to cost. Table 10.1 summarizes the costs for the CSO control alternatives. The costs include capital costs, design and construction engineering costs, and the present worth of the operation and maintenance costs.

TABLE 10.1
CSO CONTROL ALTERNATIVES COST ESTIMATES

CSO Control Alternative	Estimated Present Worth Cost ($, Millions)
Centralized Storage	$60.4
Decentralized Storage	$105.8
Conveyance to Long Wharf- Marine Route	$78.3
Conveyance to Long Wharf- Overland Route	$66.4
Conveyance to WPCP - Marine Route	$115.0
Conveyance to WPCP - Overland Route	$84.3
Sewer Separation: Full Replacement	$166.5
Sewer Separation and Storage	$61.7

Based on the estimated costs presented in Table 10.1, the most cost effective to achieve the objective of eliminating all CSOs up to the largest storm in the typical year was the alternative of combining sewer separation and storage. Although its cost is slightly higher than the cost of centralized storage, the overall reduction in annual flows to the Long Wharf Pump Station and the WPCP will result in greater long term operation and maintenance cost savings.

12. Implementation of the Sewer Separation and Storage alternative for the Wellington Avenue area will place a financial and economic burden on the City of Newport, as well as the other entities that utilize the City's wastewater and CSO system. Based upon the USEPA's guidance and definitions of burden, the economic and financial burden on Newport residents utilizing the system will be high. Although the combination alternative of sewer separation and storage is recommended because it is environmentally effective and one of the most cost-effective, each CSO alternative was also reviewed per the EPA Guidance. In accordance with this Guidance, each alternative evaluated would put a "High Burden" on the residents.

10.2 Recommended CSO Control Plan

During the development of the Phase 2 plan, progress meetings with RIDEM and the Environmental Protection Agency indicated that, from a regulatory approval perspective, complete sewer separation should be pursued by the City as the primary method of CSO control, and that other CSO controls, such as storage, may be considered if complete sewer separation could not be achieved, either technically or from a financial affordability standpoint. The following Phase 2 recommendations are based on this requirement and constitute the first steps to meeting this objective.

The recommended plan for CSO control to eliminate CSOs for the largest storm in the typical year for the Wellington Avenue CSO Facility is sewer separation combined with storage, if sewer separation alone cannot meet the objective. The recommended initial phase of separation to achieve this objective is based on a target of removing 30% of the rainfall dependent infiltration and inflow and is as follows:

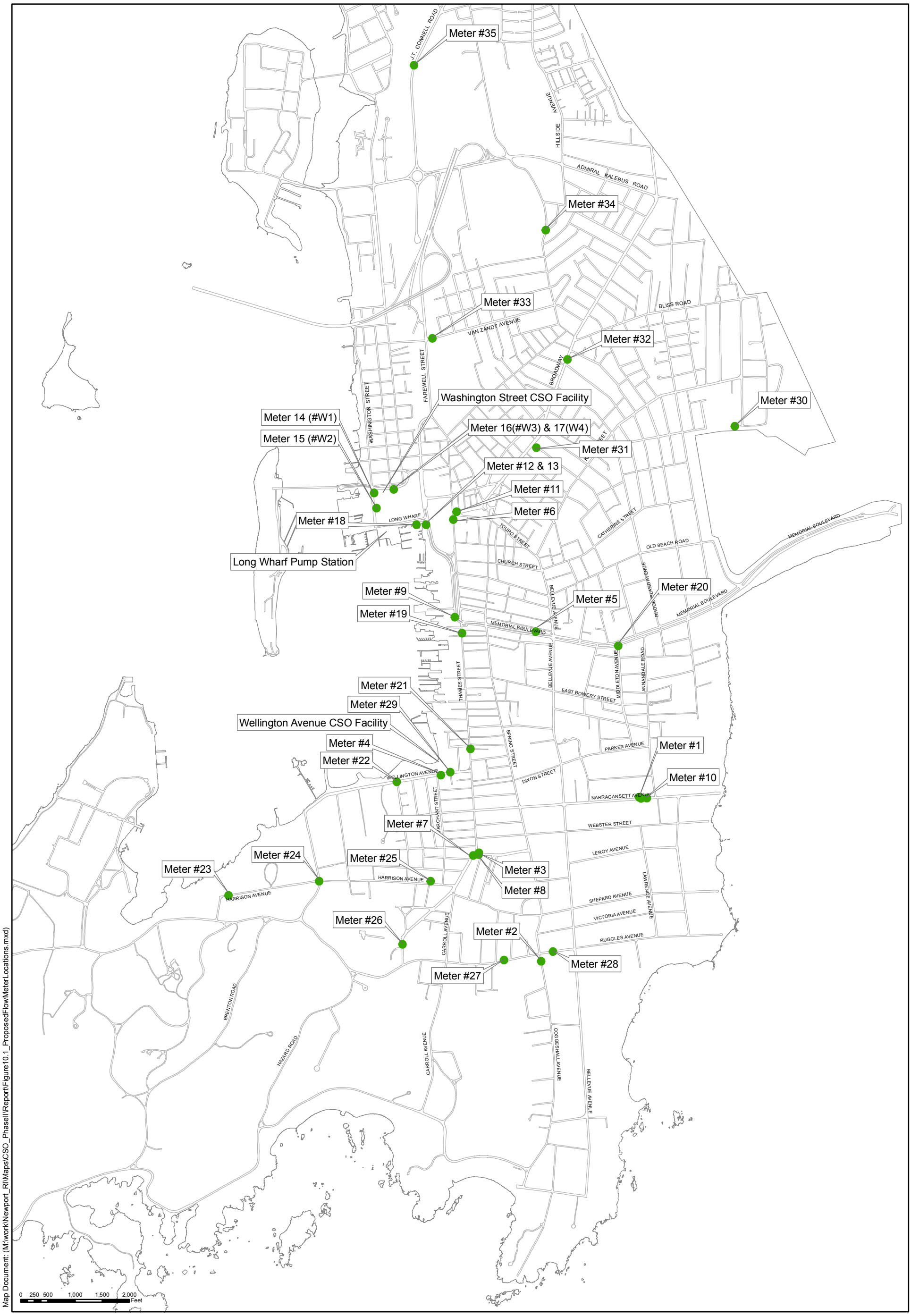
1. A flow metering program conducted for one year, including installation of groundwater gauges at each meter location; and tide gauging intended to identify locations within each of the tributary catchments in the Wellington Avenue CSO Facility catchment area, including the private sewer catchment area, and select locations in the Washington Street catchment area to provide boundary conditions, with excessive infiltration and inflow. The plan includes installation of 35 meters for a 12-month period in order to capture all seasonal flow, rainfall, and groundwater elevation fluctuations. In addition salinity testing within the Thames Street Interceptor and Wellington Avenue Sewer is recommended to evaluate the influence of tidal flows. Figure 10.1 presents the proposed meter locations.

2. Based on the results of the flow metering program, further expanded sewer system evaluation survey (SSES) field investigation are recommended for those areas identified by the flow metering with excessive infiltration and inflow. The field activities have been estimated based the initial objective to remove 30% of the rainfall dependent infiltration and inflow and will include the following: These quantities represent the balance of the quantities that were not field investigated in Phase 1 Part 2 and Phase 1 Part 3 and includes field investigations in the private sewer catchment areas.

    - 72,000 feet of Smoke Testing;
    - 113,000 feet of closed circuit television inspection;
    - 1,200 building inspections;
    - Dye flooding (30 locations); and
    - Dye testing (1,200 tests);

    Private sources of infiltration and inflow, such as sewer laterals with running flow, sump pumps, roof drains, area drains, etc. will be identified and scheduled for elimination based on the City's ongoing program for removal of these sources. Public sources, such as additional connected catch basins, that are identified will be disconnected from the sanitary system and connected to existing or new storm drains.

    Based on the results of the SSES, the locations within the tributary catchments requiring sewer system rehabilitation and replacement will be identified. The following estimated quantities are based on the objective to remove 30% of the rainfall dependent infiltration and inflow. The quantities were developed based on the assumption that 70% of the sanitary sewers that are investigated will require some form of rehabilitation, with 25% requiring joint testing and sealing, 30% requiring rehabilitation, and 15% requiring sewer replacement. It was further assumed that 50% of the manholes that are inspected will require some rehabilitation. The quantities of new storm drain, catch basin disconnections, and service connection repairs were assumed.



Map Document: (M:\work\Newport_RI\Maps\CSO_PhaseII\Report\Figure10.1_ProposedFlowMeterLocations.mxd)

Figure 10.1
Proposed Flow Meter Locations
Phase 2 CSO Control Plan

- Meter Locations

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W E
S

AECOM

Drawn By:	
Date:	February 2009
Approved:	
Scale:	1:20,000

- 28,000 linear feet of joint testing and sealing;
- 28,000 linear feet of cured-in-place pipelining or sliplining;
- Lining of the Thames Street Interceptor (approximately 6,200 feet)
- 16,000 linear feet of sewer replacement;
- 2,500 linear feet of sewer replacement on Wellington Avenue
- 25,000 linear feet of new storm drain
- 20 catch basin disconnections;
- 8- service connections; and
- 225 manholes for rehabilitation.

The first recommended projects under the sewer rehabilitation and replacement program are rehabilitation of the Thames Street Interceptor and replacement of the Wellington Avenue Sewer from the intersection of Thames Street to Halidon Street. During the flow metering and tide gauging conducted during Phase 1 Part 2 and Phase 2, these locations were identified as being directly impacted by tidal inflow.

3. Upon completion of this phase of sewer separation, post-construction monitoring of the frequency and volume of CSO at the Wellington Avenue CSO Facility for a one-year period is recommended. In addition, a post-construction flow monitoring plan should be developed to determine if the infiltration and inflow in areas identified has been eliminated.

4. Based on the results of the post-construction monitoring, it is recommended that the City incorporate the results of the sewer separation into the model to establish the post-construction baseline conditions. At that time, the size of storage required to eliminate CSOs up to the largest storm in the typical year can be determined. As noted in Section 7, based on removal of 30% of the rainfall dependent infiltration and inflow, the model predicted a storage requirement of approximately 2 million gallons. The model can be used to confirm this estimate, and adjust the volume accordingly based on the then existing conditions.

5. The costs for the initial phase of sewer separation and storage are presented in Table 10.2.

TABLE 10.2
RECOMMENDED PLAN COSTS

	Estimated Cost
THAMES STREET INTERCEPTOR REHABILITATION	**$4,500,000**
WELLINGTON AVENUE SEWER REPLACEMENT	**$1,800,000**
FLOW METERING	$947,000
Engineering and Contingency	$331,450
Flow Metering Estimated Cost	$1,278,450
SEWER SYSTEM EVALUATION SURVEY	
Smoke Testing of Sanitary Sewers	$43,200
Closed Circuit Television (CCTV) Inspection of Sanitary Sewers	$226,000
Manhole Inspections	$45,000
Building Inspections	$120,000
Dye Flood of Sewers or adjacent drains	$15,000
Dye Testing of Buildings	$84,000
Sub Total for SSES Field Work	$533,200
Engineering and Contingency	$250,000
SSES Estimated Cost	$783,200
Total Flow Metering and SSES	$2,061,650
ESTIMATED COST FLOW METERING AND SSES (ROUNDED)	**$2,100,000**
SEWER SEPARATION – REHABILITATION/REPLACEMENT	
Joint Testing and Sealing	$700,000
Cured-In-Place or Slip Lining of Sewer Pipe	$2,380,000
Full Replacement of Sewer Pipe	$6,400,000
Catch Basin Disconnection From Sanitary Sewer	$1,200,000
New Storm Drains	$6,250,000
Replace Service Connections	$350,000
Manhole Rehabilitation	$337,500
Rehabilitation/Replacement Sub-Total	$17,617,500

TABLE 10.2 (CONTINUED)

		Estimated Cost
Recreational Improvements		$0
Mobilization, Bonds, & Insurance		$792,788
Contractor OH & Profit		$2,554,538
Construction Contingency		$4,316,288
	Construction Subtotal	$25,281,113
Engineering and Construction Administration		$4,404,375
Permitting		$1,500,000
	Engineering Subtotal	$5,904,375
	Total Sewer Separation	$31,185,488
ESTIMATED COST SEWER SEPARATION (ROUNDED)		**$31,200,000**
STORAGE TANK		**Estimated Cost**
Storage Tank		$8,000,000
Modifications to Existing Facility/Collection System		1,692,750
Recreational Improvements		$920,811
Mobilization, Bonds, & Insurance		$436,174
Contractor Overhead & Profit		$1,602,212
Construction Contingency		$3,099,727
	Construction Subtotal	$15,751,673
Engineering and Construction Administration		$3,859,160
Permitting		$1,500,000
	Engineering Subtotal	$5,359,160
Land Acquisition		$708,825
	Total (Storage Tank)	$21,819,656
ESTIMATED COST STORAGE TANK (ROUNDED)		**$21,900,000**
		$200,000
ESTIMATED PRESENT WORTH COST		**$61,700,000**

6. The City has been working with RIDEM to optimize flow to the Water Pollution Control Plant. The Flow Optimization Study submitted to RIDEM in 2007 indicated that an increase in the allowable average monthly flow from 10.7 to 15.7 could be accomplished without an impact on the discharge water quality. It is recommended that the City continue to work with RIDEM to allow an increase to 15.7 mgd on a "trial basis" for one year to determine not only the impacts at the WPCP but also on the frequency and volume of overflows at the Wellington Avenue CSO Facility and the Washington Street CSO Facility. During the trial period, no other improvements would be made to the WPCP in order to limit the variables influencing the results. Also, during the trail period, the average monthly flow would be increased incrementally in order to confirm that no adverse impacts resulting from the flow increases are experienced.

7. It is recommended that the City perform flow metering to provide the required data to initiate an infiltration and inflow investigation in the Washington Street tributary catchment area similar to the program that was performed in Phase 1 Part 2 for the Wellington Avenue CSO Facility. This metering should be performed at the same time as the metering proposed in the Wellington Avenue area. The infiltration and inflow study can then be used to prioritize catchments for detailed sewer system evaluation field investigations. The limited model in the Washington Street area should also be expanded to include the entire Washington Street system and the remainder of the City.

   The estimated cost for the flow metering (assumed one year duration); an order of magnitude cost for the sewer system evaluation survey using the costs for similar work performed in the Wellington area as the basis; and the estimated cost to expand the model to include the Washington Street area and the remainder of the City are presented in Table ES.5.

TABLE 10.3
PRELIMINARY COST ESTIMATES FOR RECOMMENDATIONS FOR WASHINGTON STREET CSO AREA

Recommendation	Estimated Cost
Flow Metering	$200,000
Sewer System Evaluation Survey	$800,000
Model Expansion	$200,000
Total	$1,200,000

Table 10.4 summarizes the costs of the recommended sewer separation and storage program for Wellington Avenue and the recommendations for Washington Street.

TABLE 10.4
COST SUMMARY OF RECOMMENDED PLAN

Recommendation	Estimated Cost
Recommended Plan – Wellington Avenue	$61,700,000
Washington Street Recommendations	$1,200,000
Total	**$62,900,000**

10.3 Implementation Schedule

Figure 10.2 presents the implementation schedule for the recommended plan. The schedule was developed with consideration toward the required sequencing of recommended activities. The requirement for collection of one year of flow data is to account for the seasonal variation of rainfall and to provide adequate time to capture a variety of storm events and conditions during the year. The flow metering results must then be analyzed to identify the specific areas throughout the Wellington Avenue catchment area for detailed sewer system evaluation survey (SSES) activities. SSES work must be completed and the data then analyzed to determine the location and extent of the required sewer separation work, (i.e., sanitary sewer rehabilitation and replacement and new storm drainage systems). Areas on public property will require preparation of design plans, permitting, and construction. Removal of sources identified on private property will require a notification and follow-up process similar to the program performed by the City in Phase 1.

Upon completion of the initial phase of sewer separation construction, post-construction monitoring of the frequency and volume of overflows will be required to determine the impacts of the sewer separation work performed. At that time, the model can be used to determine if additional sewer separation work is required and/or to refine the required volume of storage.

While the overall CSO control program for the Wellington Avenue area is scheduled to extend for the next 13.5 years, it is possible as a result of the work performed on Phases A-C, which is scheduled to take 7.5 years, that sufficient extraneous flow can be removed from the system to meet the objectives of the Control Plan. If this can be confirmed by the post-construction monitoring, then the design, permitting and construction of a storage facility will not be needed. It is also conceivable that significant sources of extraneous flows (RDII and tidal infiltration) are identified early in the SSES process so as to shorten the estimated implementation schedule even further; however, this cannot be predicted at this time.

10.4 Monitoring Plan

The City has an existing monitoring program for the Wellington Avenue and Washington Street CSO Facilities. The frequency and total volume of CSO has been collected since 1998. In addition, the City conducts a Harbor Monitoring Program which includes the collection of water quality samples in Newport Harbor at 10 sites selected by the RIDEM on a weekly basis. The samples are each tested for water temperature, pH, Biochemical Oxygen Demand (BOD) Total Suspended Solids (TSS), fecal coliform, Enterococci, TKN, and salinity. In addition the program includes water quality monitoring during two CSO events per year. For the CSO monitoring water quality samples are collected at two of the sampling sites representative of the effects of the Washington and Wellington CSO outfalls before, during, and after the event. The samples are monitored for the same parameters as the weekly sampling program except Total Nitrogen replaces TKN. The monitoring results are submitted to the Rhode Island Department of Environmental Management (RIDEM). The City's monitoring program will continue during and after the implementation of the recommended plan. The data that is collected will be compared to the existing conditions data to evaluate the effectiveness of the CSO controls.

In addition, it is recommended the City consult with RIDEM and EPA to develop a water quality monitoring and modeling plan to be utilized to demonstrate the effectiveness of the implementation of the recommendations presented above, and to address RIDEM and EPA's long term objective of meeting water quality standards.

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FIGURE 10.2
WELLINGTON AVENUE CSO FACILITY TRIBUTARY SEWER
CITY OF NEWPORT, RI

Phase 2 Control Plan for Combined Sewer Overflows Project Implementation Schedule for the Wellinton Avenue Area

Phase	Task Name	Year 1	Year 2	Year 3	Year 4	Year 5	Year 6	Year 7	Year 8	Year 9	Year 10	Year 11	Year 12	Year 13	Year 14
	Notice To Proceed Received from City of Newport														
A-1	Flow Metering for Wellington Avenue and Washington Street CSO Facility Tributary Areas														
A-1	Expand Model to Washington Street Tributary Area														
A-1	Water Quality Monitoring														
A-1	Preliminary Design and Permitting - Thames St. Interceptor Rehab.														
A-1	Preliminary Design and Permitting - Wellington Ave. Sewer Replacement														
A-2	I/I Study - Wellington Avenue Tributary Area														
A-2	Water Quality Modeling														
A-2	Final Design (including City and RIDEM Review and Bidding) - Thames St. Interceptor Rehab.														
A-2	Final Design (including City and RIDEM Review and Bidding) - Wellington Ave. Sewer Replacement														
A-3	SSES Field Work - Remaining Catchment Areas withing the Wellington Avenue Tributary Area														
A-3	Construction - Thames St. Interceptor Rehab.														
A-3	Construction - Wellington Ave. Sewer Replacement														
B-1	Disconnection of Private Connections (Sump Pumps, Rain Leaders, Yard Drains)														
B-1	Replace Service Lines - Wellington Avenue Tributary Area														
B-1	Preliminary Design and Permitting - Disconnection of Public Connections														
B-1	Preliminary Design - SSES Identified Sewer Rehab.														
B-2	Final Design - Disconnections of Public Connections														
B-2	Final Design - SSES Identified Sewer Rehab. (including City and RIDEM Review and Bidding)														
B-3	Construction - Disconnection of Public Connections														
B-3	Construction - SSES Identified Sewer Rehab.														
C-1	Preliminary Design and Permitting - New Storm Drain														
C-2	Final Design - New Storm Drain (including City and RIDEM Review and Bidding)														
C-3	Construction - New Storm Drain														
D-1	Post Monitoring of Rehabilitation Work														
E-1	Preliminary Design and Permitting - Storage Tank														
E-2	Final Design - Storage Tank														
E-3	Construction - Storage Tank														
F	Post Monitoring of Storage Tank														

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