

3.0 Recent System Improvements and CSO Management

3.1 Enhanced Sewer Separation

In spite of the sewer separation work that has been done to date, the system still exhibits an increase in flows during storm events due to both infiltration and inflow (I/I) of a magnitude that would indicate that there are portions of the Wellington Avenue area that are not fully separated. Enhanced sewer separation involves activities to identify and eliminate these sources. The previously completed Phase 1 Part 1, Phase 1 Part 2, and Phase 1 Part 3 projects have included the following:

- Field investigations to identify sources of infiltration and inflow. In Phase 1 Part 1, of the seven drainage catchment areas, Priority Catchments 1, 3, 4 and 7 were identified for detailed infiltration and inflow field investigations that were later performed in the Phase 1 Part 2 of work and were described in Sections 2 through 8 of the Phase 1 Part 2 Report.
- Additional flow metering and field investigations were performed to isolate inflow and infiltration flows in Catchment Area 6 due to inconclusive results obtained in the Phase 1 Part 1 flow metering. Results of the SSES were presented in the Amendment to the Phase 1 Part 2 CSO Control Plan, Sewer System Evaluation Study for Catchment Area 6.
- Disconnection of catch basins identified as connected to the sewer system in previous reports to the City of Newport presented in the Phase 1 Part 1 CSO Control Plan Report page 2-12, with the exception of one of the two Morton Park catch basins. The remaining Morton Park basin is scheduled to be disconnected in 2009.
- Disconnection of catch basins identified in Phase 1 Part 2. The status of these disconnections is presented in Table 3.1.
- Sewer system rehabilitation to repair pipes and manholes to reduce impacts of infiltration.
- Disconnection and relocation of inflow sources such as sump pumps, area drains and roof drains from the sewer system. As part of Phase 1 Part 2, buildings with roof drains, area drains and sump pumps were identified in the Priority Catchments and follow-up work in Catchment Area 6 and were notified by letter from the City that these sources are required to be disconnected from the building's sanitary sewer in accordance with the City's Ordinance Section 13.08.030(R).
- Evaluation of the existing storm drain system in areas where roof drains and catch basins were identified as connected to the sanitary sewer and development of separation plans for these sources to redirect flows to the storm drain system.

Hydraulic modeling and analysis, included in Phase 2, was utilized to evaluate to what extent this alternative reduces or eliminates CSOs from the Wellington Avenue CSO Facility.

3.1.1 Roof Leader Disconnection Program

As part of the Phase 1 Part 2 project, the City of Newport performed Sewer System Evaluation Surveys in Priority Catchment Areas 1, 3, and 4 which identified roof leaders connected to the sanitary sewer system using smoke testing, building inspections, and dye testing. The contribution of flow from roofs was based on the area of the roof and the number of roof leaders that were confirmed to be connected. For example, if there was a connected roof leader at each

corner of the roof, the entire roof area was included in the calculation for contributing area, if there were only two roof leaders connected, then half of the roof was included in the calculation, and so forth. The Rational Equation, $Q = ciA$, was used to determine peak discharge into the sanitary sewer system, and inflow estimates were based on a storm with a minimum intensity of 1.00 inch per hour, or approximately the peak intensity of a 1-year, 6-hour storm event.

Smoke and dye testing in the Priority Catchment Areas 1, 3, and 4 tributary to the Wellington Avenue CSO Facility identified 166 locations with roof and/or yard drains that were connected to the sanitary sewer system. The City initiated disconnection of these drains, to be completed by property owners, by writing letters to the owners in November of 2006. Subsequent follow up demand letters resulted in the disconnection of 162 sites as of December, 2008.

The estimated reduction in flow to the City sanitary sewer collection system as determined in the Phase 1 Part 2 CSO Control Plan for all 166 sites is 2,200,000 gallons per day (gpd). Further investigation in Catchment Area 6 led to 88 sites being identified by smoke and dye testing. The City initiated disconnection of these drains, again to be completed by property owners, by writing letters to the owners in September, 2007. Subsequent follow up demand letters resulted in the disconnection of 78 sites as of December, 2008. The estimated reduction in flow to the City's sanitary sewer collection system as determined in the Amendment to the Phase 1 Part 2 CSO Control Plan for all 88 sites is 1,482,000 gpd.

3.1.2 Sump Pump Disconnection Program

House to house inspections, as part of the Sewer System Evaluation Survey, were used to identify sump pumps connected to the sanitary sewer system. The estimated inflow reductions in the Priority Catchment Areas 1, 3, and 4 tributary to the Wellington Avenue CSO Facility and Catchment Area 6 are based on a flow rate of 1.0 gallon per minute (gpm) from each sump pump. In the Priority Catchment Areas 1, 3, and 4 tributary to the Wellington Avenue CSO Facility, 192 sump pumps connected to the sanitary sewer system were identified. The City initiated the disconnection of these sump pumps, to be completed by property owners, by writing letters to the owners in December, 2006. Subsequent follow up demand letters resulted in the reported disconnection of 167 pumps as of December, 2008. The estimated reduction in flow to the City sanitary sewer collection system as determined in the Phase 1 Part 2 CSO Control Plan for all 192 sites is 276,500 gpd. Further investigation in Catchment Area 6 led to identification of an additional 105 sump pumps at 98 sites during house to house inspections. Again, The City initiated the disconnection of these sump pumps, to be completed by property owners, by writing letters to the owners in October, 2007. Subsequent follow up demand letters resulted in the reported disconnection of 79 sites as of December, 2008. The estimated reduction in flow to the City sanitary sewer collection system as determined in the Amendment to the Phase 1 Part 2 CSO Control Plan for all 98 sites is 162,000 gpd.

3.1.3 Catch Basin Separation Projects

As a further part of the Sewer System Evaluation Survey within the Priority Catchment Areas in Phase 1 Part 2, catch basins connected to the sanitary sewer were identified in Priority Catchment Areas 1, 3, and 4. Smoke testing of public sewers identified 28 locations with potential cross-connections and catch basins connected to the sanitary sewer. Table 3.1 indicates the current status of each location. In addition to the catch basins identified in the Phase 1 Part 2 SSES, catch basins identified as connected to the City's sewer in previous reports to the City were or are currently being addressed. Table 3.2 indicates the current status of each location.

The estimated reduction in flow to the sanitary sewer collection system was determined to be 2,000,000 gpd by the Rational Equation, $Q = ciA$. Inflow estimates are based on a storm with a minimum intensity of 1.00 inch per hour. This intensity is approximately the peak intensity of a 1-year, 6-hour storm event. For connected catch basins, the contributing drainage area to the catch basin was estimated in the field and the runoff coefficient calculated based on the land use (% impervious and % pervious) of the contributing area.

The SSES conducted in Catchment Area 6 identified additional direct and indirect connections to the sanitary sewer and presented in Tables 3.3 and 3.4, respectively.

The reduction of inflow from these catch basins to the sanitary sewer collection system as determined in the Catchment Area 6 SSES was estimated to be 568,317 gpd. Inflow reductions were calculated as described in the preceding paragraph.

**TABLE 3.1
PHASE 1 PART 2 - PUBLIC SMOKE TESTING STATUS**

| | Location | Type | Status |
|----|--|------------------|---|
| 1 | 27/29 Chapel Street | Catch Basin | Construction Contract #08-001 Complete |
| 2 | Edgar Court/Memorial Boulevard | Catch Basin | Construction Contract #08-001 Complete |
| 3 | Bellevue Avenue /Memorial Boulevard | Catch Basin | Construction Contract #08-001 Complete |
| 4 | Parker Avenue | Catch Basin | Construction Contract #08-001 Complete |
| 5 | Middleton Avenue /Parker Avenue | Catch Basin | Construction Contract #08-001 Complete |
| 6 | Memorial Boulevard /Red Cross Avenue | Catch Basin | Construction Contract #08-001 Complete |
| 7 | Clay Street/ Ward Avenue | Catch Basin | Earth Tech Ops disconnected Fall 07 |
| 8 | Carey Street | Catch Basin | Construction Contract #08-001 Complete |
| 9 | Houston Avenue /Wellington Avenue | Catch Basin | Construction Contract #08-001 Complete |
| 10 | Marchant Street /Atlantic Street | Catch Basin | Construction Contract #08-001 Complete |
| 11 | Middleton Avenue /Parker Avenue | Cross Connection | Construction Contract #08-001 Complete |
| 12 | 35 Annandale Road. | Drain Manhole | Construction Contract #08-001 Complete |
| 13 | Narragansett Avenue /Ochre Point Avenue | Cross Connection | Earth Tech Ops disconnected Fall 07 |
| 14 | 19 McCormick Rd. | clean out | Private property/Owner contacted Complete Fall 07 |
| 15 | Ruggles Avenue /Carroll Avenue | Abandoned line | Earth Tech Ops disconnected Fall 07 |
| 16 | Columbus Avenue/Wellington Avenue | Unknown | No structure/possible line crack. To be addressed in High Priority sewer rehab design |
| 17 | Harbor View Avenue /Columbus Avenue | Unknown | No structure/possible line crack. To be addressed in High Priority sewer rehab design |
| 18 | Harbor View Avenue /Columbus Avenue | Unknown | No structure/possible line crack. To be addressed in High Priority sewer rehab design |
| 19 | Annandale Road/Dresser Street | Catch Basin | Construction Contract #08-001 Complete |
| 20 | Marchant Street /Connection Street | Catch Basin | Construction Contract #08-001 Complete |
| 21 | 5 Harrison Lane | Catch Basin | Construction Contract #08-001 Complete |

TABLE 3.1
PHASE 1 PART 2 - PUBLIC SMOKE TESTING STATUS (Continued)

| | Location | Type | Status |
|----|-------------------------------------|-------------|---|
| 22 | 23 Halidon Avenue | Catch Basin | Construction Contract #08-001 Complete |
| 23 | Halidon House | Catch Basin | Confirmed not connected to sanitary sewer. No further work required |
| 24 | Halidon Avenue /Wellington Avenue | Catch Basin | Confirmed not connected to sanitary sewer. No further work required |
| 25 | Rose Hill Cottages/Roseneath Avenue | Catch Basin | Crack in MH109.29.1. To be Addressed in Manhole Rehab contract #09-011 |
| 26 | Carey Elementary School | Catch Basin | Construction Contract #08-001 Complete |
| 27 | Morton Park North | Catch Basin | Earth Tech Ops disconnected Fall 07 |
| 28 | Morton Park South | Catch Basin | Design to be completed under contract #09-010. Construction scheduled FY 2010 |

Note: Construction Contract 08-001 was awarded in the Fall of 2007. The contract was completed including final paving on July 1, 2008.

**TABLE 3.2
PREVIOUSLY IDENTIFIED
DIRECT PUBLIC CONNECTIONS TO THE SANITARY SEWER**

| | Location | Type | Status |
|---|-------------------------------|----------------|--|
| 1 | Cherry Street | Catch Basin | Earth Tech Ops disconnected Fall 07 |
| 2 | Willow Street | Catch Basin | Design to be completed under contract #09-010. Construction scheduled FY 2010 |
| 3 | Gladding Court | Catch Basin | Earth Tech Ops disconnected Fall 07 |
| 4 | Broadway at Friendship Street | Catch Basin | Design to be completed under contract #09-010. Construction scheduled FY 2010 |
| 5 | Harrison Lane | Catch Basin | Construction Contract #08-001 Completed Spring 08 |
| 6 | Newport Hospital | Catch Basin | Earth Tech Ops disconnected Fall 07 |
| 7 | Findley Place | Catch Basin | Construction Contract #08-001 Completed Spring 08 |
| | Long Wharf | Catch Basin | Construction Contract #08-001 Completed Fall 07 |
| | Morton Park | 2 Catch Basins | Earth Tech Ops disconnected CB 1 Fall 07 2 nd Catch Basin disconnection to be designed under Contract #09-010. Construction scheduled for FY 2010. |
| 8 | Gidley Street | Catch Basin | Catch Basin not connected to the City Sewer. No further work required. |

**TABLE 3.3
PUBLIC SMOKE TESTING STATUS
CATCHMENT AREA 6
DIRECT PUBLIC CONNECTIONS TO THE SANITARY SEWER**

| | Location | Type | Status |
|---|--------------------------------------|-------------|---|
| 1 | 15 West Street | Catch Basin | Design to be completed under contract #09-010. Construction scheduled FY 2010 |
| 2 | Bellevue Avenue and Catherine Street | Catch Basin | Design to be completed under contract #09-010. Construction scheduled FY 2010 |
| 3 | 25 Webster Avenue | Catch Basin | Design to be completed under contract #09-010. Construction scheduled FY 2010 |
| 4 | 32 Webster Avenue | Catch Basin | Design to be completed under contract #09-010. Construction scheduled FY 2010 |
| 5 | Perry Street and Spring Street | Catch Basin | Design to be completed under contract #09-010. Construction scheduled FY 2010 |
| 6 | 26 Perry Street | Catch Basin | Design to be completed under contract #09-010. Construction scheduled FY 2010 |
| 7 | Opposite 26 Perry Street | Catch Basin | Design to be completed under contract #09-010. Construction scheduled FY 2010 |
| 8 | 104 Spring Street | Catch Basin | Design to be completed under contract #09-010. Construction scheduled FY 2010 |
| 9 | Freebody Park | Catch Basin | Design to be completed under contract #09-010. Construction scheduled FY 2010 |

**TABLE 3.4
PUBLIC SMOKE TESTING STATUS CATCHMENT AREA 6
INDIRECT PUBLIC STRUCTURES POTENTIALLY CONNECTED
TO THE SANITARY SEWER**

| Location | Type | Status |
|------------------------------------|---------------|---|
| 1 Pelham Street and Come Street | Catch Basin | Investigation to be completed under contract # 09-010. See Note |
| 2 Pelham Street and Corne Street | Catch Basin | Investigation to be completed under contract # 09-010. See Note |
| 3 14 Pelham Street | Catch Basin | Investigation to be completed under contract # 09-010. See Note |
| 4 William Street and King Street | Catch Basin | Investigation to be completed under contract # 09-010. See Note |
| 5 William Street and King Street | Catch Basin | Investigation to be completed under contract # 09-010. See Note |
| 6 William Street and King Street | Drain Manhole | Investigation to be completed under contract # 09-010. See Note |
| 7 William Street and Thomas Street | Catch Basin | Investigation to be completed under contract # 09-010. See Note |
| 8 26 William Street | Catch Basin | Investigation to be completed under contract # 09-010. See Note |
| 9 35 William Street | Catch Basin | Investigation to be completed under contract # 09-010. See Note |
| 10 360 Gidley Street | Drain Manhole | Investigation to be completed under contract # 09-010. See Note |
| 11 Bowery Street and King Street | Drain Manhole | Investigation to be completed under contract # 09-010. See Note |

Note: Contract # 09-010 includes disconnection of the catch basins identified in Table 3.3 and investigations of indirect connections identified in Table 3.4.

3.1.4 High Flow Management at the WPCP

In 2007, AECOM evaluated flows and water quality data between 2004 and 2007 through the WPCP and made recommendations to optimize flows through the WPCP. The objectives were to safeguard treatment of flows at the WPCP and to reduce overall CSOs by maximizing flows through the plant. Discussions between the City and RIDEM are ongoing.

3.2 Current Best Management Practices

Best management practices currently performed by the City of Newport are discussed in Section 5.2.2, “Nine Minimum Controls in Newport”.