CITY OF PORTLAND
COMBINED SEWER OVERFLOW PROGRAM

ANNUAL CSO PROGRESS REPORT TO DEQ

FISCAL YEAR 2007-2008

As Required by the Amended Stipulated Final Order
(ASFO WQ-NWR-91-75)

CITY OF PORTLAND
BUREAU OF ENVIRONMENTAL SERVICES

JUNE 30, 2008

Annual CSO Progress Report to DEQ for FY 2007-2008

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I. Summary

Portland's Combined Sewer Overflow (CSO) Program has completed the 17th year of implementing the full array of projects to control all CSO discharges by December 2011. As of June 2008, the City estimates it has reduced the annual CSO volume from 6.0 billion gallons to 2.07 billion gallons per year (65.5% reduction).

At this time, the City is in full construction of the East Side CSO Tunnel System. The City has completed over 9,000 feet of tunneling from the mining shaft at OMSI. The City has completed several segments of the consolidation conduits that will bring CSO to the four drop shafts to the north: Alder, Steele Bridge, River Street, and Port Center. All activities are being directed to meet the final ASFO requirements to control the remaining 19 CSO outfalls by December 2011.

During the past fiscal year (2007-08), BES invested $120 million into the CSO Program. For next fiscal year, BES expects to invest $140 million.

This Annual CSO Progress Report, required under the Amended Stipulated and Final Order (ASFO), presents the activities completed during fiscal year that ends June 30. The highlights and note-worthy accomplishments from fiscal year 2007-2008 include:

- **East Side CSO Tunnel**: The tunnel boring machine (TBM) completed 8,668 feet of the 20,230 foot north tunnel drive from the Opera Shaft to the Port Center Way Shaft.
- **Tunnel Shafts**: Shaft excavation to tunnel depth was completed for the Alder, Steel, and River Street Shafts. Shaft excavation was initiated at the Port Center, Taggart and McLoughlin Shaft sites.
- **Consolidation Pipelines and Diversion Structures:** Completed several shafts and micro-tunnel drives required to bring CSO to the major tunnel shafts.
- Completed over 10 **Sustainable Stormwater Program** projects that remove and infiltrate stormwater runoff from streets, parking lots, and roofs in the combined system
- Completed and submitted on December 1, 2007 a proposed method for demonstrating compliance for the West Side CSO system for the "one-in-three" summer and "4-per-year" winter season requirement for eliminating or controlling CSO discharges.
- Due to the lack of storms and only 2 CSO events over the 12-month period of December 2006-2007, BES recommended that the Demonstrating Compliance report required under the ASFO for the 16 Willamette River CSO outfalls be post-poned until December 2009 after more storms have occurred and a more robust demonstration of compliance can be made.

The City of Portland has completed each of the 27 milestones required in the ASFO (see last page of Appendix A for full list) that have come due through June 30, 2008. One outstanding item (which is not a requirement) is a new Update to the CSO Facilities Plan Report. This report will be incorporated into the September 2010 Updated Facilities Plan required by the ASFO to describe how the City will continue to improve CSO control after December 2011.

Portland's CSO Program is on schedule and moving aggressively through the next and final phase of controlling the Willamette River CSO outfalls. The significant activities we expect to complete next fiscal year ending June 30, 2009 include:

- Nearly complete the long tunneling drive north to the Port Center Shaft from the OMSI/Opera mining shaft towards the north.
- Complete all nine micro-tunnel drives for the consolidation pipelines that bring CSO to the shafts.
- Complete the Swan Island CSO Pump Station Phase 2 electrical and mechanical design.
- Complete design and advertise for bid on the Portsmouth Force Main
- Complete design and advertise for bid on the Balch Consolidation Conduit (BCC)

II. Introduction

Requirement for Annual Progress Report

This annual report to the Oregon Department of Environmental Quality (DEQ) is required under the Amended Stipulation and Final Order (ASFO) No. WQ-NWR-91-75 signed with the City of Portland (City) on August 11, 1994. During the period that the ASFO is in effect, the City is required to submit each year by September 1st an annual progress report summarizing the City's efforts to eliminate CSO discharges. The report is to contain information on CSO control activities performed during the past fiscal year and identify the CSO Program work planned for the current fiscal year. This report covers the CSO Program activities performed under the Capital Improvement Program (CIP) as well as the planning, operations, and maintenance activities performed by the Bureau of Environmental Services (BES) operating programs for the combined sewer and CSO systems during the past fiscal year.

Portland's Capital Improvement Program (CIP)

The City of Portland's Bureau of Environmental Services manages the planning, and implementation (pre-design, design, construction, & startup) of all capital projects. The CIP is divided into specific functional categories which include: CSO, Maintenance and Reliability, Sewage Treatment Systems, Surface Water Management, and Systems Development. The number of capital improvement projects, listed by program area, is shown in Table 1 below.

Table 1: Projects in Current Capital Improvement Program

Category	Projects Listed at End of FY 07-08	Projects Open During FY 07-08
Combined Sewer Overflow	339	55
Maintenance and Reliability	558	80
Sewage Treatment Systems	438	49
Surface Water Management	201	43
Systems Development	278	42
Total	**1814**	**269**

At the end of fiscal year 2007-08, there were 1814 individual projects listed in the CIP and 269 projects open during the year. For the CSO Program, there were 340 CSO projects listed in the CIP (see Appendix A for the CSO Capital Improvement Program Implementation Schedule). The 339 CSO projects represent the CSO Management Plan, as it currently exists within the City of Portland in terms of CIP activities. This report focuses primarily on the accomplishments of those projects. It should be noted, however, that there are projects in other CIP categories that have or will have a positive impact on water quality and the control and/or handling of CSO such as basement flooding control projects and improvements at Columbia Boulevard Wastewater Treatment Plant (CBWTP). These projects are not extensively covered in this report but represent other work BES performs that results in improved control of CSO discharges

III. CSO Program Background

In 1991, when the Stipulation and Final Order (SFO) was issued by DEQ, approximately 60% of Portland's population was served by the combined sewer system. When a storm event occurred in the City that exceeded 0.10 inches in a few hours, stormwater runoff into the combined system would cause overflows to both the Columbia Slough and the Willamette River through up to 55 individual outfalls. Model simulations showed that the 1990 combined sewer system would discharge approximately 6.0 billion gallons of CSO to the Columbia Slough and Willamette River for an average year.

Since 1991, the City has implemented stormwater reduction facilities across the city (these are referred to as the “Cornerstone Projects”), improved interceptor system performance, and completed large CSO conveyance, storage and treatment facilities in the Columbia Slough system. These activities have resulted in CSO discharges being reduced by more than half

citywide. In the Columbia Slough, CSO events have been eliminated for storms less than 5-year winter or 10-year summer return frequency.

With the completion of the Westside CSO system and supporting projects in 2006 and the on-going work for the Expanded Downspout Disconnection Program, CSO discharge volumes to the Willamette River have been reduced (as of June 30, 2008) from 4.8 billion gallons per year (1990 estimate) to about 2.07 billion gallons per year, based on average annual rainfall. This represents an annual system-wide reduction of more than 65% since 1990.

The Amended Stipulated Final Order (ASFO) contains a firm schedule such that CSO controls must be implemented within a 20-year period from 1991 through 2011. The City has met or exceeded each of the regulatory requirements for CSO control identified in the ASFO. The ASFO contains the following major milestones for controlling the CSO outfalls:

- By December 1, 2000, the City must eliminate all CSO discharges to the Columbia Slough for storms equal to or less than the 5-year winter storm and 10-year summer intensities. [Milestone completed.]
- By December 1, 2001, the City must eliminate CSO discharges at 7 Willamette River outfalls for storms less than or equal to a 3-year summer storm and limit winter overflows to four or less per winter on average. [Milestone completed.]
- By December 1, 2006, the City must eliminate CSO discharges at 16 additional Willamette River CSO outfalls for storms less than or equal to a 3-year summer storm and limit winter overflows four or less per winter on average. [Milestone completed.]
- By December 1, 2011, the City must eliminate CSO discharges at all remaining Willamette River outfalls for storms less than or equal to a 3-year summer storm and limit winter overflows to less than four per winter on average. [Design completed and construction underway.]

The ASFO has a number of intermediate milestones, including submission of this annual CSO progress report to DEQ by September 1 of each year that the ASFO is in effect.

IV. Past Fiscal Year Activities

The CSO abatement activities performed during the period beginning July 1, 2007 and ending June 30, 2008 are categorized in five subsections:

- ASFO Milestones Achieved
- Program Planning Accomplished
- CSO Control Projects Planned, Designed, and/or Constructed
- CSO Operation and Maintenance Activities
- Public Involvement Activities

A. ASFO Milestones Achieved

This past fiscal year contained three ASFO milestones for completing Portland's 20-year CSO program. In total, there are 38 milestones beginning with the first CSO Progress Report required in 1995 all the way through the final report in 2012 that will demonstrate the completed system's compliance with the ASFO performance criteria. The FY 06-07 milestones were #27, #28 and #29.

In fiscal year 2008, BES addressed three ASFO milestones:

- Milestone #27 – Submit Annual CSO Progress Report - ASFO Section 12.a (11): "By no later than September 1 of each year that this Amended Order is in effect, the City shall submit to the Department and to the Commission for review an annual progress report on efforts to eliminate untreated CSO discharges, subject to the storm return frequencies specified in Paragraph 12.a. of this Amended Order."

- Milestone #28 – Demonstrate Compliance with ASFO for newly Controlled Outfalls within 12 Months of Controlling Outfalls - ASFO Section 12.d: "Requiring Respondent to demonstrate that each untreated CSO discharge has been eliminated, subject to the storm return frequencies specified in Paragraph 12.a. of this Amended Order, by a means approved by the Department, within twelve months of the scheduled date when compliance is required in this Amended Order. (Nothing in this paragraph shall prevent the Department from enforcing this Amended Order during the twelve month demonstration period.)"

  On December 1, 2007, the City submitted a report on the only two overflows that occurred during the winter 2006/2007. Given that there were so few large storm events, the City recommended an amended Demonstration of Compliance report be submitted to DEQ by December 1, 2009 that would cover a longer period of compliance and likely more events that would show conclusively that the completed controls for the 16 outfalls comply with the ASFO performance criteria.

In addition, the City had already fully initiated construction of the mining shaft at the OMSI/Opera site in early spring 2006, and has completed 10,000 feet of tunneling for the East Side system as well as the drop shafts and their consolidation conduits to deliver flow to the East Side CSO Tunnel. The ASFO requires the City to start this construction by May 2008 under the 29th Milestones specified in the ASFO:

- Milestone #29 – Begin construction of system required to control all CSO outfalls by December 1, 2011. ASFO Section 12.a (9): "By no later than May 1, 2008, the Respondent shall begin construction required to comply with Section 12.a.(10)"

B. Accomplishments in Program Planning

The CSO Program continues to execute planning projects for facilities and activities that will cost-effectively reduce CSO and assure that the Program meets our regulatory obligations. Planning activities performed during Fiscal Year 06-07 include the following:

Portland's Facilities/System Planning

The Asset Systems Management Division in the Engineering Services Group, which is responsible for Facilities Planning, initiated in 2005 the update to the Combined, Sanitary, Stormwater, and Treatment Systems Plans. With assistance from CH2M HILL for management and expertise support, and Brown & Caldwell for CMOM support, BES is completing this 3-year effort to produce a detailed Public Facilities Plan that is integrated with the Portland Watershed Plan and incorporates asset management techniques. At the time of this report, the Combined System Plan is approximately 85% complete and the Sanitary System Plan is 70% complete. The Stormwater System Plan, focused on the separated (non-combined) areas, will begin in 2009.

CBWTP Facilities Plan Update

The City is developing a comprehensive update to the Columbia Boulevard Wastewater Treatment Plant (CBWTP) facilities plan. This effort examines the liquid and solids processing necessary to meet NPDES requirements and managed expected loadings in 2011, 2015 and 2020. This effort will be completed in calendar year 2008.

C. Accomplishments in Predesign, Design and Construction

As noted in Section II, 55 of the 339 projects in the City's CIP directly related to the CSO Program were open and active during the fiscal year. To be "active" a project must have been in at least one of the following project phases:

- Predesign
- Design
- Advertise/Bid
- Construction
- Startup / Close Out

Appendix A provides a graphical status check for all of the 339 CSO projects. The major active projects are described in narrative summaries below. The small number of active projects reflects the maturity of the CSO Program as it nears the end of the program.

Downspout Disconnection FY 07/08

During FY 07-08, the City continued the Downspout Disconnection Program in the East Willamette and Columbia Slough Watersheds. The Program was active in areas recommended

by the 1994 CSO Facilities Plan (where sumps are installed) while also increasing focus on neighboring combined sewer areas outside of the original 1994 CSO Plan area.

Downspouts were disconnected at 1,150 homes. Of these homes, 595 were located in the original Cornerstone Project area defined in the 1994 CSO Plan and 555 were in the new Program area. This activity is estimated to remove about 29 million additional gallons of stormwater per year from the combined sewer system. Additionally, 93 homeowners (56 from sumped areas) signed up to disconnect downspouts but the work was not completed before the end of the fiscal year. Also, many homes were surveyed and found to have roof area already disconnected from the combined sewer, which contributes to overall stormwater reduction.

Since the beginning of the Downspout Disconnection Program through June 30, 2008, the Program has disconnected downspouts at over 24,485[1] homes removing about 550 million gallons of stormwater per year from the combined sewer system. Of these homes, 15,496 are located in the original Cornerstone area while the remaining are in the new or Expanded Downspout Disconnection Program area. In addition, more than 33,000 surveyed homes have been found to have one or more downspouts already disconnected, resulting in a total of over 58,000 homes with one or more downspouts disconnected from the combined sewer system. This has removed an estimated 1.2 billion gallons of stormwater from the system annually.

Sustainable Stormwater Management Program (SSMP)

BES has organized several parallel efforts to implement green solutions and stormwater inflow controls into a single integrated program titled the Sustainable Stormwater Management Program (SSMP). There are three primary program areas:

(1) Pilot / Field Projects

(2) Policy and Technical Assistance

(3) Education and Outreach related to sustainable stormwater strategies.

Staff has also developed a monitoring program to document how much the different projects contribute to CSO reduction goals.

The Sustainable Stormwater Program includes three CIP projects described in previous CSO annual reports: the Eastside Inflow Controls Predesign Project (completed spring 2007); and the Holladay, Stark, and Sullivan Inflow Controls Project. The program also includes the Innovative Wet Weather Program, which began implementation in FY05 and is funded by the City's operating budgeted and EPA grant funds.

Innovative Wet Weather Program (IWWP)

The IWWP is funded through an EPA grant for innovative projects that demonstrate sustainable, low-impact stormwater management solutions. Funds have been earmarked for projects in three categories: Water-quality Friendly Streets & Parking Lots,

1. Database modifications resulted in adjustment to cumulative totals from previous years.

Downspout Disconnections, Bioswales and Ecoroofs. One IWWP stormwater project, Rejuvenation Stormwater Planters, was completed in the CSO area during FY 07-08. The Rejuvenation Stormwater Project manages 7000 square feet of roof area.

Holladay, Stark, and Sullivan Inflow Controls Projects

In 2002 BES completed an engineering predesign analysis to address capacity problems in the combined sewer serving the Holladay, Stark, and Sullivan basins. The predesign recommended a number of local stormwater management projects to protect residents from sewer backups. In 2003 BES completed the first project, diverting runoff from 0.8 acres of paved surface into a landscape infiltration basin near Glencoe School. The project protects residents on SE 52nd from sewer backups and preserves capacity in the East Side CSO Tunnel.

In September 2007, BES completed a similar project to protect residents on SE Pine Street from sewer backups. The project manages runoff from more than two acres of asphalt and roofs at Tabor Middle School, diverting it to a group of infiltration planters and drywells. The project also includes a vegetated stormwater curb extension and a sump to manage runoff from the street.

Sustainable Stormwater Management Program (SSMP) Projects

- Three green street curb extensions were installed at SE 12th & Clay managing 11,000 square feet of street runoff while providing a safer pedestrian crossing of 12th Ave.
- Installed three new green streets in partnership with the Office of Transportation to combine stormwater management with traffic and pedestrian safety improvements. Locations are SE Belmont & 55th, SE Belmont & 42nd, and NW Everett & 16th. A combined 0.5 acres of street runoff are managed.
- Installed a rain garden at N Albina & Prescott in partnership with the Portland Development Commission. The project converted a concrete open space into a 600 square foot rain garden that manages runoff from approximately 7,500 square feet of street.
- Installed two new green streets in areas with potential basement sewer backup risk - NE 23rd & Irving and NE 7th & Fargo. 23rd & Irving is a behind the curb facility in the 9 foot wide planting strip that manages 3,400 square feet of street runoff. The 7th & Fargo project extended an existing corner extension to manage 3,200 square feet of street runoff, and was initiated as part of our Community Request Program.

Willamette River CSO Program Projects

The Willamette River CSO Program has been designed to control the original 42 CSO outfalls that previously discharged to the Willamette River. The first two phases of this program have been completed with seven outfalls controlled in 2001 and 16 outfalls controlled in 2006. The remaining 19 outfalls will be controlled by the East Side CSO Tunnel as well as smaller projects outside the alignment of the tunnel.

Balch Consolidation Conduit

The Balch Consolidation Conduit (BCC) will capture CSO discharges previously going to the northwest Outfall 17 and convey the flow to the West Side CSO tunnel via the Nicolai drop shaft structure. The project was originally part of the West Side tunnel project scope of work and included approximately 5500 feet of 54-inch micro tunneled pipeline. As a result of the City identifying additional CSO flows in the Balch Basin, the project was pulled from the tunnel project scope of work and placed into a separate project.

Through a new predesign effort completed during this last fiscal year, the pipeline size and initial route was reevaluated. The pipeline size was increased to 84-inches in diameter and will be a micro-tunnel similar to the Southwest Parallel Interceptor. The upstream end of the BCC will be in the heart of the Balch CSO basin near the intersection of NW 29th Avenue and NW 29th Avenue. This location allows the BCC to also provide local basement flooding relief as well as collect all CSO from the basin. The new alignment will require the BCC to be 7,000 feet in length.

The BCC project moved from predesign to design in January 2008 with an expected design completion date in January 2009. Some design challenges include excessively soft soils, high ground water conditions and contaminated media in the basin. The project will start construction in June 2009 with construction completion scheduled for November of 2010.

Towards the end of the FY07, the project team completed a Value Engineering (VE) process that confirmed the recommended alignment proposed by design team with some modifications. Also coming from the VE was identification of schedule concerns and need to make progress on the NW Neighborhood (NWN) Basin Relief elements necessary to meet ASFO in December 2011. As of early 2008, the NWN elements were rolled into the BCC design responsibilities along with the decision to change the project to an alternative contracting method similar to the WSCSO/ESCSO contracting method given the schedule challenges and risk/complexity of the project. Adding NWN and greater level of detail with 30% design completed, the project cost estimate has increased to approximately $43 million.

CBWWTF Wet Weather Headworks (Wet Weather Screenhouse)

BES submitted final design package (plans and specifications) for DEQ review and to meet December 1, 2007 submittal deadline. The Wet Weather Headworks will be part of the work to be completed on the CBWTP–CBWWTF site for the 2011 deadline. Construction is scheduled to begin in FY 2009.

East Side Willamette CSO Program

East Side CSO Tunnel Project

The purpose of the East Side CSO (ESCSO) Tunnel is to control CSO discharges at 13 outfalls to the Willamette River by 2011. (Previously there were 14 outfalls, but Outfall 31 was sealed off during a local maintenance project.) The tunnel will be 29,530 linear feet (5.6 miles) long, 22 feet in diameter, and 85 to 165 feet deep. Once construction is completed in 2011, the project will allow discharge from only four of the 13 outfalls during large storm events. The four active outfalls will meet or exceed the ASFO performance standard for controlling CSO to the 3-year summer storm and the 4-per-winter storm.

The contractor, Kiewit/Bilfinger Berger JV (KBB), continued work in all areas of the project this reporting year. Below is a list of the major work accomplished for the reporting period ending June 30, 2008.

Tunnel: The tunnel boring machine (TBM) completed 8,668 feet of the 20,230 foot north tunnel drive from the Opera Shaft to the Port Center Way Shaft. The tunnel reached the Alder Shaft in December 2007 and the Steel Bridge Shaft in May 2008. The concrete tunnel segment liner pre-cast plant continued casting tunnel segments and has completed casting of 50% of the tunnel segments for the project.

Tunnel Shafts: The temporary support system for the remaining three major tunnel drop shafts was completed. Shaft excavation to tunnel depth was completed for the Alder, Steel, and River Street Shafts. Shaft excavation was initiated at the Port Center, Taggart and McLoughlin Shaft sites. Construction of the final structural concrete lining began at the Alder and Steel Bridge Shafts.

Consolidation Pipelines and Diversion Structures:

- Outfall 28 (Insley): Began construction of the temporary support of excavation for the diversion structure.
- Outfall 30 (Taggart): No work this period.
- Outfalls 33, 34, and 35 (Alder): The installation of cut and cover pipelines along SE 2nd and SE 3rd Avenues for consolidation of the Alder Basin flows was completed. No additional activity will occur until startup activities in 2011.
- Outfall 36 (Alder): The excavation and installation of temporary support for the diversion structure began.
- Outfalls 37 (Stark) and 38 (Oak): Completed the excavation and temporary support for the Manhole 37-1 shaft (located in SE 3rd Avenue and connects to the Alder Shaft). Completed the excavation, temporary support, and buildout of the Outfall 37 drop structure and Manhole 38-1 (connects Oak outfall 38 to the consolidation conduit in SE 3rd Ave.) The consolidation conduit micro-tunnel drive from the Manhole 37-1 shaft to the Manhole 38-1 shaft was completed.

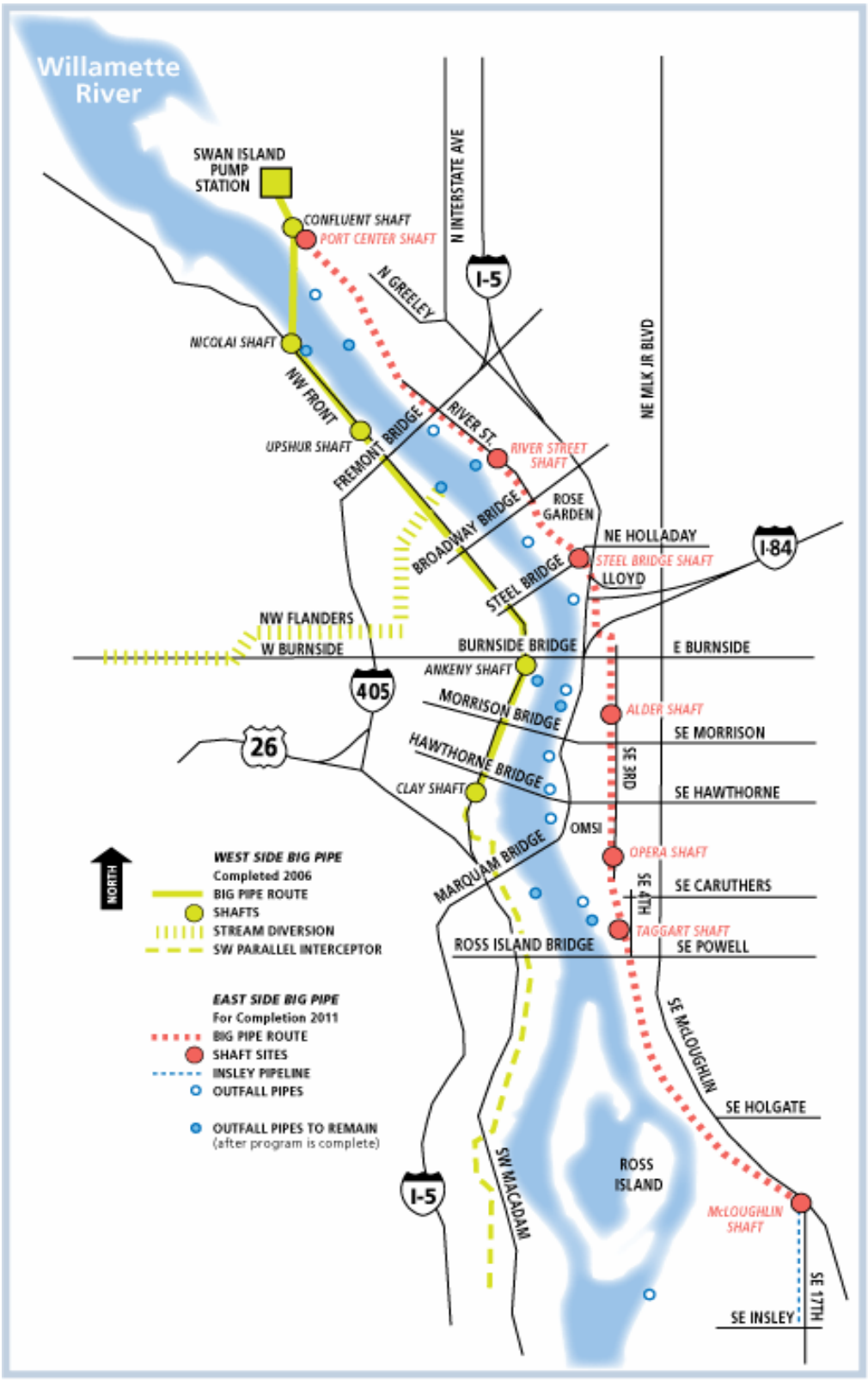
- Outfall 40: The micro-tunnel drive between the Steel Bridge Shaft and Outfall 40 was completed. Completed the excavation and temporary support for the Manhole 40-1 near the connection to the Sullivan Outfall, and installed the bottom section of the structure. Completion of the manhole and the conduit to connect the manhole to the outfall will be completed prior to start up.
- Outfall 41: Construction of the drop shaft structure was completed.
- Outfall 43: No work this period.
- Outfall 44A: The plan for this outfall was originally to separate the basin and divert flow to the interceptor system. This plan was re-analyzed and the design of a new diversion pipeline and associated structure was completed.
- Outfall 46: Temporary support of excavation was completed for the diversion structure and Manhole 46-1 near the Port Center Way Shaft. Initial concrete work began on the diversion structure. The 3,000 foot micro-tunnel drive was completed between Manhole 46-1 and the diversion structure. The micro tunnel drive between Manhole 46-1 and the Port Center Shaft was completed.

Swan Island CSO Pump Station

Located on Swan Island at the downstream end of the tunnel is a 220 Million Gallon per Day (MGD) dry-pit submersible pump station that transfers flow from the tunnel through a new force main system to the existing interceptors - Peninsular Tunnel and Portsmouth Tunnel. The pump station is designed to accommodate low-flow dry-weather conditions as well as peak wet weather flows up to the design capacity. The pump station design includes surge control equipment and other site improvements.

The structural components of the pump station are all complete including the surface structures, dual-power stations, and Operations & Maintenance Building. The first phase of the pump station – a 100 MGD system – is completed and in full operation. Startup testing was completed in the fall of 2006 for the multiple modes and conditions expected.

The Phase II portion of the pump station will consist of providing another 120 MGD of pumping. These pumps will typically discharge to the Portsmouth Forcemain and will become the primary wet weather pumping system. During fiscal year 2007-08, the project team selected the design consultant for the Phase 2 mechanical and electrical work.



Map of Willamette CSO Tunnel System Route and Drop Shafts

Portsmouth Force Main

The Portsmouth Force Main will connect the Swan Island Pump Station to the Portsmouth Tunnel interceptor and direct CSO to the CBWTP for treatment. The force main system will carry up to 120 MGD of CSO flow and will be complete in 2011.

The final design scope of work includes a single 66-inch force main from the Swan Island CSO Pump Station to the Portsmouth Tunnel. For narrative purposes, the force main alignment has been broken into two distinct segments:

- Segment 1: Swan Island:
  - 2,900 feet of 84-inch micro-tunnel construction
  - 6,977 feet of 66-inch open cut construction
- Segment 2: Bluff
  - 160 feet of 66-inch open-cut construction
  - 5,959 feet of 11-foot diameter deep tunnel

The force main alignment is shown on aerial maps, which are available upon DEQ request.

During fiscal year 2007-08, the project team completed:

- 90 % Design documents
- Received letter from DEQ accepting the design approach for the project.

Sellwood / Lents Projects

The Sellwood and Lents outfalls (OF26 and OF27) are south of the furthest reach of the East Side CSO Tunnel and will not directly benefit from that Big Pipe Project. Therefore, local solutions have been and will be implemented in the Sellwood and Lents basins to control CSO to the required ASFO level. There are three projects remaining to control CSO in this area by December 2011:

Sellwood Reliever

This project will provide a new reliever sewer in the center of Sellwood basin and is one of the projects required to eliminate CSOs to the Sellwood portion of Outfall #27 in accordance with the ASFO. This project was originally defined in the Sellwood Cornerstone Project.

The scope of work includes constructing a new 24"-36" diameter combined sewer pipeline along 11th Ave and Umatilla Street and eliminating two diversion structures.

As of June 2007, the design was complete and bid documents were prepared for advertisement. Construction began in November 2007 and is on schedule to be completed by September 30, 2008. Two in-system diversions have been removed; one located at SE 11th & SE Nehalem St., and a second located at SE 15th & SE Tenino St.. These diversions

previously directed wet weather flows to the Umatilla Pump station which relieves to the Willamette River via Outfall 27

Sellwood Interceptor

This project involves re-aligning and upgrading (upsizing) the existing Sellwood gravity interceptor sewer, which collects and conveys combined sewage from the Sellwood basin to the Umatilla Pump Station.

The interceptor runs along a north-south orientation beginning north of the Umatilla Pump Station approximately 500' to manhole SE-199 and stretches to the south approximately 1400' to manhole SE-193. It parallels the Oregon Pacific Railroad along the east bank of the Willamette.

The current interceptor is in fair to poor condition. During storm events, it overflows to the river via Outfall #27 and #26. The interceptor's present location poses a significant access problem for maintenance crews due to limited access along the railroad and steep slopes to the west. The new location therefore requires re-alignment of the railroad.

Related projects include the Lents Trunk Outfall #27 Control System and the Bureau of Parks and Recreation "Springwater Missing Gap" Project.

As of June 2007, the project team was revising the workplan to incorporate the railroad re-alignment in the scope of work. Geotechnical engineering work was completed the following month using on-call contractors. Railroad re-alignment work was completed in May 2008.

Construction of the interceptor is scheduled to commence in May 2009 and be substantially complete by April 2010. When complete, six (6) existing CSO diversions (one to Outfall #26, and five to Outfall #27) will be eliminated from the interceptor system. One interim CSO diversion structure will be constructed at Umatilla Street to relieve the interceptor until the Sellwood / Lents CSO Pump Station is complete. Once completed, the interceptor and Umatilla pump station will relieve to the Sellwood / Lents CSO Pump Station which will store and pump CSO for storms exceeding the ASFO criteria.

Sellwood / Lents Trunk Outfall #27 Control System

BES engineering staff developed a cost-effective and innovative way to control CSO discharges to Outfall 27 in the Sellwood area by converting the old 71” tall by 56”wide Lents Trunk into an inline storage and pumping system. This project will replace more expensive wet weather upgrades at Umatilla and Harney pump stations and the construction of a large inline storage facility in the Lents basin. The project includes lining the 4,400 feet of the trunk line, installing a CSO pump station and control gate, and installing flap-gate valve for high-river conditions.

At the end of the fiscal year, the two parts of the project (pump station and trunk lining) were in progressing through the predesign stages and reaching about 10% design. A full walk-thru inspection of the trunk was scheduled for July 2008. Predesign is expected to be completed in the early fall 2008.

Columbia Slough CSO Program

Since the completion of the Columbia Slough CSO facilities, the primary work performed on the facilities has consisted of operation, maintenance and monitoring. The large Columbia Slough Consolidation Conduit (CSCC) and the related pumping and conveyance system have performed well. Other than the December 28, 2005 accidental overflow previously reported to DEQ, there has not been an overflow from the CSCC system since it began operation in October 2000.

D. CSO Operation and Maintenance Activities Completed

During the year the City continued implementation of operation and maintenance practices that reduce the impact of CSOs and stormwater on the receiving streams. These activities capture and remove pollutants, floatables and debris from the stormwater before it is discharged to the receiving streams from the CSO outfalls. The following information provides the magnitude of the **citywide** effort. Actual measurements and recorded data were not available for this report, so the following information represents estimates based on previous levels of activity:

- Sewer Cleaning: 167 miles
- Sewer CCTV Inspection 158 miles
- Catch Basin / Inlet Cleaning: 17,180 units
- Drainage Sump/Sedimentation Manhole Cleaning: 2,231 units
- Street Sweeping (City-wide):
  - Residential Streets: 17,900 Curb miles
  - Arterial Streets: 21,736 Curb miles
  - Downtown Core: 8,680 Curb miles

Diversion Structure Inspections and Modifications

The Diversion Structure Inspection Program is designed such that each active diversion structure that can overflow to a receiving water body (approximately 100) is inspected once a week. Diversions that overflow to a downstream facility (approximately 50) and do not pose a risk of direct discharge to the receiving water body are inspected once every two months. Overall, the City performed approximately 5,000 diversion inspections last fiscal year.

E. Public Involvement, Education and Outreach Activities:

The focus of the CSO public involvement, education and outreach in FY 2007-2008 was on construction of East Side CSO projects. The goals listed below are met through the public information and involvement activities:

Goal 1: Inform and involve businesses and residents

Goal 2: Maintain good working relationships and two-way communication with the businesses and residents along the project alignment

Goal 3: Respond to individual citizen or business concerns quickly

Goal 4: Meet project milestones and deadlines

Goal 5: Help project stay on time and within budget

Outreach activities for the East Side Big Pipe Project provide the latest project information to the public, and include working with businesses along the tunnel and pipeline routes to minimize construction disruptions. Outreach provides businesses, residents, and business and neighborhood groups with project information and opportunities to give input on project decisions, including construction mitigation measures and traffic plans. These activities are tailored to the needs of area communities and are designed to reduce construction impacts. Door-to-door site visits were an invaluable tool to develop the long-term relationships needed for this project. In addition to involving impacted communities in CSO project decisions, the bureau is committed to educating the public about environmental issues.

Environmental Services has implemented a public involvement plan for the East Side CSO projects. The projects include:

- The East Side CSO Tunnel (East Side Big Pipe)
- SE 3rd Avenue utility relocations, sewer and construction of outfall structures
- SE 2nd Avenue railroad track removal, sewer construction and construction of outfall structures
- SE 18th Avenue utility relocations, sewer and construction of outfall structures
- SE 20th utility relocations and road resurfacing; construction of five of seven tunnel shafts
- The Portsmouth Force Main

Community Benefit Opportunity Program

This program was created to add amenities to neighborhoods affected by CSO construction. East Side CSO construction affects 11 neighborhoods between SE 17th and McLoughlin and the Columbia Boulevard Wastewater Treatment Plant. Community groups and citizens in those areas nominated 38 projects by the deadline of February 4, 2007. A citizen advisory committee reviewed the proposals, and worked with Environmental Services to recommend 21 projects for funding, for a total of $1.77 million. The remaining budget of almost $230,000 was set aside for projects that may arise throughout the life of the East Side CSO Projects. The projects awarded funding include bank restoration along the Willamette River, street tree planting, sustainable stormwater management facilities, trail access, and community gardens.

CSO Notification

Environmental Services' River Alert system notifies the public of CSO discharges.

The BES Spill Prevention/Citizen Response Section is on call to respond to a CSO discharge to the Columbia Slough by posting portable Extreme Rain Event signs. They will post the warning signs at potentially impacted recreational access points along the Columbia Slough between NE 13th Avenue and Kelley Point Park. There have been no combined sewer overflows to the Columbia Slough since Environmental Services developed this warning system.

The River Alert system also includes ten folding signs installed at public access points to the Willamette River. A contractor travels the river by boat and opens the warning signs each time there is a CSO between May 15 and October 15. Forty-eight hours after each CSO event ends, the contractor closes the warning signs. The contractor is required to supply BES with written verification that the signs were opened or closed and a report of the times the work was completed. In the rainy season between October 15 and May 15, the signs remain open with the message in view for boaters and other river users.

Willamette River
CSO warning sign

Columbia Slough
extreme rain event warning sign

The Columbia Slough extreme rain event warning signs display the phone number of the Spill Prevention/Citizen Response Section. Staff monitors the line 24 hours a day. The Willamette River warning signs display the phone number of the River Alert Hotline, a 24-hour recorded message the public can call to learn if a CSO advisory is in effect and to hear a message about the CSO program.

The River Alert program notifies the media by fax and email every time there is an overflow to the Willamette River between May 15 and October 15. The Oregonian newspaper publishes an overflow icon on the top of the weather page when overflows occur. In addition, Internet users can visit the Environmental Services website at www.portlandonline.com/bes/overflow to learn if a CSO advisory is in effect. Internet users can also subscribe to automatic email notification each time Environmental Services issues a CSO advisory.

Clean River Projects Construction Signs

Environmental Services requires contractors to post signage at any sewer system-related construction site to inform the public that the construction is a sewer project designed to keep rivers and streams clean. In addition, BES posted large banners at West Side and East Side CSO project construction sites.

Construction sign

CSO Interpretive Signs

Environmental Services interpretive signs are posted at CSO construction sites and along the Eastbank Esplanade. The signs have updated information about CSO tunnel construction.

2006 interpretive sign

Media Relations

Environmental Services uses media advisories, news releases, traffic advisories, and media events to publicize CSO projects. Environmental Services also briefs reporters individually. The city provides timely, accurate responses to all media requests and keeps files of all newsprint and broadcast media coverage. In fiscal year 2007-2008, Environmental Services issued 18 media releases regarding combined sewer overflow projects; 13 were CSO advisories during the summer notification period, and five were traffic advisories related to CSO construction or stories about the CSO construction program.

Media Events

Environmental Services two CSO media events in the last year to draw attention to significant milestones in the CSO Program.

October 24, 2007 – Environmental Services staff report to the Portland City Council on East Side Big Pipe construction progress. The briefing was broadcast on the community and government access channel of Portland Community Media Television.

December 10, 2007 – BES hosts a tour of the East Side Big Project for stakeholders, reporters and invited guests.

Internet

Environmental Services provides current information about the city's CSO programs at its CSO website, www.cleanriverworks.com. The site is dedicated entirely to CSO construction projects, schedules, and impacts. The bureau's main website is at www.portlandonline.com/bes.

V. Planned Efforts for Current Fiscal Year

Fiscal Year 2008-2009 activities to reduce CSO continue the implementation of the 20-year program to plan, design, construct, and operate Portland's CSO control system. The activities this fiscal year can be briefly summarized as follows:

- Continue tunneling north to the Port Center Shaft. Given the rate of progress achieved during the past year, it is possible that the tunnel will reach the Port Center Shaft in the summer of 2009.
- Continue completing the construction of shafts for the East Side Willamette CSO Tunnel System. Shafts cannot be fully completed until the tunnel has passed through the shafts, and then the final stages of the shaft can be constructed.
- Update the CSO System Operating Plan as the City continues operating, maintaining and monitoring the West Side Willamette and the Columbia Slough CSO Systems to assure compliance with the ASFO and the NPDES Permit
- Continue implementation of stormwater inflow reduction projects in the form of the Expanded Downspout Disconnection Program and the Sustainable Stormwater Management Program.

The current work is divided into the same five subsections used for the previous year's efforts.

A. ASFO Milestones to be Achieved

In fiscal year 2009, BES will address one ASFO milestones:

- Submit Annual CSO Progress Report - ASFO Section 12.a (11): "By no later than September 1 of each year that this Amended Order is in effect, the City shall submit to the Department and to the Commission for review an annual progress report on efforts to eliminate untreated CSO discharges, subject to the storm return frequencies specified in Paragraph 12.a. of this Amended Order."

B. Program Planning to be Accomplished

CSO program-level planning will continue during the current fiscal year as the City develops two planning documents for CSO system:

- CSO System Operating – Update for 2008-09
- East Side CSO System Startup Project Components

In addition, the new Systems Planning effort will continue the process of examining the capacity and rehabilitation needs in the combined and sanitary systems. The end result will be a public facilities plan with recommended projects to address basement backups, SSOs and potential structural condition problems. BES expects to complete the combined and sanitary system plans in calendar year 2009.

C. CSO Projects to be Predesigned, Designed and/or Constructed

The CSO control projects that will be in the predesign, design and/or construction phases during the current fiscal year include:

- During FY 08-09, the **Expanded Downspout Disconnection Program** will continue to disconnect downspouts at homes as well as small multifamily properties in the East Willamette watershed served by the combined sewer.
- **Innovative Wet Weather Program**: At least two projects are planned for completion by the end of Summer 2009. One green street project on NW 35th in an industrial area, and one ecoroof project still in development.
- **Holladay, Stark, and Sullivan Inflow Controls Project**: BES will select final alternatives and initiate design phase activities for five additional projects in FY08-09.
- **Sustainable Stormwater Management Program**: Four green streets from the Community Request Program are planned along four projects involving pedestrian safety improvements combined with stormwater management funded by the 1% for Green Program.
- **Balch Consolidation Conduit (BCC):** The BCC project will move from predesign to design in January 2008 with a design completion date of January 2009.
- **East Side CSO Tunnel Project**
    - **Tunnel**: The TBM will continue to drive north towards the Port Center Way Shaft. Based on a current TBM production rates, the TBM should arrive at the Port Center Shaft in the summer of 2009. The manufacture of pre-cast tunnel segments will continue.
    - **Tunnel Shafts**: Excavate the remaining three (Port Center, Taggart and McLoughlin) shafts to tunnel level. Installation of the final structural concrete will continue at the Alder and Steel Bridge Shafts and will begin at the River Street Shaft.
    - **Consolidation Pipelines and Diversion Structures:** All nine micro-tunnel drives on are expected to be completed. Work will continue at the diversion structures under construction. Initial excavation and temporary support will begin at Outfall 30.
- **Swan Island CSO Pump Station:** The Phase 2 electrical and mechanical design will be completed and the project will be advertised for bid in Spring 2009.
- **Portsmouth Force Main:** Final design documents will be complete and the project will be advertised for bid. Construction is expected to begin on both Segment 1 and Segment 2 contracts in early 2009.

D. CSO Operation and Maintenance Activities Planned

During the current fiscal year the City will continue the implementation of operation and maintenance practices that reduce the impact of CSOs on receiving streams. This Citywide effort is expected to complete the following estimated project work:

- Sewer Cleaning: 160 miles
- Catch Basin/inlet Cleaning: 5,000 catch basin/inlets
- Drainage Sump Cleaning: 2,500 sumps/sedimentation manholes
- Street Sweeping:
  - Residential Streets: 17,000 Curb miles
  - Arterial Streets: 17,000 Curb miles
  - Downtown Core: 8,500 Curb miles
- Diversion Structure Inspections: Perform weekly inspections on all active diversion structures that directly overflow to the receiving stream and do not have automatic monitors/alarms; perform routine inspections on all other active diversions on a bi-monthly (once per two months) basis or as needed for maintenance and proper performance

E. FY 08-09 Public Involvement Activities Planned:

Environmental Services will continue to educate and identify opportunities for Portland residents, businesses and neighborhood groups to participate in CSO and watersheds enhancement projects. The bureau will work closely with Neighborhood Coalition offices and associations to raise awareness of the CSO program, gain active public input on project decisions, and involve more citizens, businesses and neighborhood groups in watershed protection and restoration efforts. Activities in the coming year include:

- Working with citizen committees and work groups to address issues regarding CSO project designs and construction plans. This will include continued community involvement and outreach for the Portsmouth Force Main design now underway.
- Continuing support of the Businesses for Clean Rivers Advisory Committee
- Continuing to conduct site visits to areas within the East Side CSO Tunnel alignment and the Portsmouth Force Main Project
- Continuing to give presentations to organized community groups and trade groups
- Providing opportunities for face-to-face discussions, such as open houses. This will include two open houses scheduled for November 2008 regarding the Portsmouth Force Main Project.
- Developing informational materials that explain CSO projects, timelines, construction mitigation plans and opportunities to enhance impacted communities
- Providing public involvement support for Willamette Stormwater Inflow Control Projects to encourage and assist commercial and industrial property owners in the combined area to remove stormwater from the combined system by creating on-site stormwater

infiltration facilities that use more natural systems like swales, wetlands and native vegetation to detain and treat stormwater

- Providing educational CSO classroom presentations and assembly programs, and developing a new CSO classroom activity that focuses on the history of sewers and implementation of CSO solutions in Portland
- Providing information to the public about the CSO program through special displays in high traffic areas such as OMSI and businesses affected by construction. The CSO Exhibit at OMSI will be upgraded to reflect new projects and to include the East Side CSO Tunnel Projects.
- Providing presentations and guided "tours to the fence" of project sites
- Continuing the CSO River Alert public notification program
- Distributing citywide newsletters and quarterly water/sewer utility bill inserts that inform citizens about the CSO program and projects, watershed restoration activities and how citizens help protect Portland watersheds
- Developing a speaker's bureau/watershed workshop to highlight City of Portland water quality issues and projects, such as the CSO Program to improve the Willamette River.

VI. Conclusions

This past fiscal year, the City continued its focus on implementing the East Side CSO Program's work of tunneling from the OMSI/Opera mining shaft and constructing consolidation piping and drop shafts. Due to these efforts, the capital expenditure for the CSO Program was about $120 million this past fiscal year, and is expected to be $140 in the next fiscal year. These costs are in addition to the approximate $820 million in capital costs already expended over the past years for the Westside, Cornerstone Projects and the Columbia Slough CSO systems.

The Bureau is now beginning to plan for the projects that will need to occur after 2011 in order to maintain and increase the level of CSO control beyond the minimum requirements stated in the ASFO. The ASFO requires the City to submit an updated Facilities Plan in September 2010 to identify how the CSO system will continue to provide better-than-ASFO required levels of CSO control. These future, post-2011 projects are expected to be almost entirely "sustainable stormwater management" facilities designed to infiltrate and treat additional stormwater off of difficult impervious surfaces while providing vegetation and green spaces for habitat and public amenities. To prepare for this post-2011 effort, BES is implementing many pilot and grant projects via the Sustainable Stormwater Program to develop a full base of experience and proven performance that will serve the Bureau in achieving the post-2011 goals for continued stormwater reduction and increased CSO control.

APPENDIX A

CITY OF PORTLAND - BES

CSO Capital Improvement Program Implementation Schedule

(Appendix A contains 37 pages including this title page)