CITY OF PORTLAND
COMBINED SEWER OVERFLOW PROGRAM

ANNUAL CSO PROGRESS REPORT TO DEQ

FISCAL YEAR 2006-2007

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

CITY OF PORTLAND
BUREAU OF ENVIRONMENTAL SERVICES

JUNE 30, 2007

Annual CSO Progress Report to DEQ for FY 2006-2007

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I. Summary

Portland's Combined Sewer Overflow (CSO) Program has completed the 16th and most challenging year of implementing the full array of projects to control all CSO discharges by December 2011. Having already completed all CSO projects for the Columbia Slough system, the Program focus has completely shifted to the Willamette River System. Portland successfully completed the Startup & Testing of the West Side CSO Tunnel related facilities, including the Swan Island CSO Pump Station. By completing this new CSO storage and treatment system along with stream separation and local sewer improvement projects, Portland controlled 16 more CSO outfalls, meeting a critical ASFO requirement.

At this time, the City is in full construction of the East Side CSO Tunnel and has completed the primary mining shaft at OMSI. All activities are being directed to meeting the final set of ASFO requirements for controlling the last 19 CSO outfalls by December 2011.

During the past fiscal year (2006-07), BES invested $125 million into the CSO Program. For next fiscal year, BES expects to invest $145 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 2006-2007 include:

- Completed the construction, startup and testing of the West Side CSO Tunnel / Swan Island Pump Station system, including the Peninsular Forcemain. These facilities, along with system improvements and the SW Parallel Interceptor provide control of 16 additional CSO outfalls on the Willamette River.
- Completed construction of the Tanner Phase III and Phase IV projects to remove clean stream and stormwater from the West Side CSO system and discharge it to the stormwater-only Tanner Outfall.
- Submitted the engineering documents (plans and specifications) for the projects necessary to control the final 19 Willamette River CSO outfalls by December 2011.
- Completed constructing the OMSI/Opera Mining Shaft for the East Side CSO Tunnel and initiated work on the Alder and Steel Bridge Shafts.
- Completed and submitted on March 1, 2006 a proposed method for demonstrating compliance for the West Side CSO system for the winter season requirement of eliminating CSO discharges for all storms smaller than a 4-per-winter recurrence frequency.
- Completed and submitted on July 6, 2006 (just after the fiscal year) an updated report demonstrating compliance for the Columbia Slough CSO system.

The City of Portland has completed each of the 25 milestones required in the ASFO (see last page of Appendix A for full list) that have come due through June 30, 2006. One outstanding item (which is not a requirement) is a new Update to the CSO Facilities Plan Report. This

updated report is currently being developed and will be submitted during this new fiscal year (FY2007-08).

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, 2008 include:

- Initiate the East Side 25-foot-diameter tunneling machine (named "Rosie") and begin tunneling from the OMSI/Opera mining shaft towards the north. The first shaft to be reached will be the Alder Shaft.
- Submit a new update to the CSO Facilities Plan
- Submit a proposed method for demonstrating compliance for the 3-year summer storm level of control for the Willamette River CSO outfalls.
- Initiate the predesign of a new inline storage & pumping project on the Lents Trunk-Outfall to control Outfall #27 in the Sellwood area.

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 06-07	Projects Open During FY 06-07
Combined Sewer Overflow	340	5
Maintenance and Reliability	520	69
Sewage Treatment Systems	416	22
Surface Water Management	179	29
Systems Development	263	18
Total	**1,804**	**143**

At the end of fiscal year 2006-07, there were 1,804 individual projects listed in the CIP and 143 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 340 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.

This year's CIP shows a shift in that fewer CSO Projects are being opened (5 this year) compared to other category areas of the CIP, such as Maintenance & Reliability (increased from 15 last year to 69 this year.) This reflects the dovetailing off of new CSO projects as we approach the 2011 deadline while also starting to plan and design projects to serve other capital needs once the CSO controls are completed.

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, CSO discharge volumes to the Willamette River were reduced (as of June 30, 2007) from 4.8 billion gallons per year (1990 estimate) to 2.1 billion gallons per year, based on average annual rainfall. This represents an annual system-wide reduction of 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, 2006 and ending June 30, 2007 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 four 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 #23 through #26. These milestones and their relevant ASFO sections are as follows:

Milestone #23 – Annual CSO Progress Report for FY04-05 as per 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 #24 – Eliminate Untreated Discharges from 16 Willamette Outfalls as per ASFO Section 12.a (7): " By no later than December 1, 2006, the respondent shall eliminate untreated CSO discharges, subject to the storm return frequencies specified An Paragraph 12.a. of this Amended Order, at 16 of the remaining CSO discharge points, consistent with the facilities plan approved by the Commission;"

Milestone #25 – Submit Engineering Documents for Controlling Remaining Willamette Outfalls as per ASFO Section 12.a (8): By no later than December 1, 2006, the Respondent shall submit engineering plans and specifications for construction work required to comply with Section 12.a.(10);

Although it is just an option, Portland considers the opportunity to update the CSO Facilities Plan to also be an important milestone:

Milestone #26 – Submit Engineering Documents for Controlling Remaining Willamette Outfalls as per ASFO Section 21: The Respondent may submit to the Department no later than December 1, 2001, and December 1, 2006, or at other appropriate times during the implementation of the facilities plan, an updated facilities plan report evaluating the effectiveness of CSO control technologies, including, if appropriate, recommendations for reevaluation of activities necessary to accomplish the requirements of this Order if new information or technology has become available. DEQ shall approve or disapprove the recommendations within six months of receipt of the updated facilities plan.

In addition, the City has already fully initiated construction of the mining shaft at the OMSI/Opera site, as well as the important 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 develop and execute planning projects for facilities and activities that will cost-effectively control 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, BES is leading 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 70% complete and the Sanitary System Plan is 30% complete. The Stormwater System Plan, focused on the separated (non-combined) areas, will begin in 2008.

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, 5 of the 340 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 340 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 06/07

During FY 06-07, 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, 2007, 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 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 that have disconnected one or more downspouts from the combined sewer system removing 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 included in previous CSO annual reports: the Eastside Inflow Controls Predesign Project; 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 at sites in the CSO area. Funds have been earmarked for projects in three categories: Water-quality Friendly Streets & Parking Lots, Downspout Disconnections, Bioswales and Ecoroofs. Five projects, managing over 13.5 acres of drainage area, were completed in FY07-06.

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

Holladay, Stark, and Sullivan Inflow Controls Projects

In 2002 BES completed the engineering predesign to address capacity problems in the combined sewer serving the Holladay, Stark, and Sullivan basins. The predesign recommended a number of inflow control projects. In 2003 BES completed the first inflow control 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.

In September 2007, BES will complete a similar project to protect residents on SE Pine Street from sewer backups. The project will manage runoff from more than two acres of asphalt and roofs at Tabor Middle School, diverting it to a group of stormwater planters and drywells. The project also includes two elements in the public right-of-way: a vegetated stormwater curb extension and a sump.

Sustainable Stormwater Management Program (SSMP) Projects

- Green Street in North Portland was installed to address residential sewer back up problems in areas identified at high risk. An existing planting strip was excavated, two cuts made in the curb, and the facility was planted with vegetation appropriate for stormwater facilities.
- A new Green Street design was installed at the corner of 21st and Tibbets. It combined the technologies of both a stormwater curb extension and street stormwater planters. The design provides for safe pedestrian crossing and accommodates access to parked vehicles.
- Assisted with implementation of a stormwater planter to pilot small commercial property retrofits. The property is located on SE Division Street. All stormwater runoff is managed from this 5000 square foot lot.
- Piloted two water quality filter boxes located in the furnishing zone on either side of SW Capitol Hwy. Each unit receives street runoff, which filters through soil media, and is collected by a perforated pipe underdrain that flows to the storm sewer. Units are manufactured by Filterra and are being evaluated for future use elsewhere. North unit is shallow (2.5' deep) to match storm sewer depth; south unit is standard (3.5' deep).
- An Ecoroof was placed on the Portland Building to manage stormwater, reduce peak runoff volume, and provide multiple other benefits such as improving air quality and reducing air temperatures, reducing building energy consumption, and providing wildlife habitat.
- SSMP provided funding to a grant program administered through the Office of Sustainable Development - the Green Investment Fund. Two projects were completed in FY 06-07 that integrated sustainable stormwater management into site designs.

Tanner Creek Stream Diversion

The Tanner Creek Stream Diversion project completed construction of the main separation conduits and completing design of the remaining segments. This stream separation project is divided into 5 phases. The last remaining two phases (Phase 3 and 4) were completed late 2006.

- Tanner Creek Phase 1 (from 17th & Johnson to 11th & Lovejoy): ***Completed***
- Tanner Creek Phase 2 (from 18th & Jefferson/Light Rail to 17th & Johnson): ***Completed***
- Tanner Creek Phase 3 (Sylvan/Canyon to Light Rail): Completed design for both stormwater/stream quantity and quality facilities along Highway 26 and under the Jefferson Ramp/Tunnel. Construction began in the spring and is currently underway as seen by the late-night lane closures and activities along the side of on Highway 26. ***Completed***
- Tanner Creek Phase 4 (North side of Washington Park along Burnside): Re-design was completed and construction initiated to direct the northside of Washington Park and surrounding stormwater areas into the new Tanner Creek stream pipe. ***Completed***
- Tanner Creek Phase 5 (From 11th & Lovejoy to the CSO Drop Shaft location at Upshur): ***Completed.***

West Side Willamette CSO Program Projects

This major system was completed this past year, including final construction, testing and startup. The Westside Willamette CSO Project that control most of the outfalls along the west side of the Willamette River include:

SW Parallel Interceptor (SWPI)

This critical CSO control facility for the Southwest Portland CSO area also provides needed sanitary capacity for the current and future development along the river. All three segments were constructed in previous years and this past year the system was placed into full operation. The Southwest Parallel Interceptor controls CSO discharges from OF#01 (California) through OF#07 (Sheridan) and delivers its flows to the SW Clay Street Shaft.

West Side CSO Tunnel, Shafts, Pump Station and Pipelines

The Westside tunnel system collects and transports CSO from existing combined sewer outfalls that discharge to the Willamette River. The tunnel is approximately 18,000-feet long extending from the waterfront area near SW Clay Street, proceeding north and paralleling the Willamette River to an area between NW Nicolai Street and NW 26th Street, then crossing underneath the Willamette River to the confluent structure and the Swan Island CSO Pump Station. The tunnel includes various shafts along the alignment with depths ranging between 100 to 150 feet. Specific shafts include:

- Swan Island Pump station shaft (135 feet diameter approximate)

- Confluent shaft for the West and future East CSO tunnels (45-ft diameter approximate)
- Four drop shafts along the alignment (outside diameter)
    - Clay Street (47-feet in diameter)
    - Ankeny (39-feet in diameter)
    - Upshur (39-feet in diameter)
    - Nicolai (60- feet in diameter)

CSO Tunnel and Shafts

All tunneling and drop shafts for the West Side system are completed and in full operation. Odor control facilities at the Clay Street shaft have been installed and are in operation as well.

Swan Island 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 late last fall for the multiple modes and conditions expected.

Peninsular Force Main

The Peninsular force main system is a dual force main consisting of a 30-inch and 48-inch pipelines up to 1,400 feet in length each that connects the new Swan Island pump station to the existing Peninsular Tunnel interceptor. This force main system is used for pumping dry weather flow as well wet weather flows up to 100 MGD.

The two force mains have been installed and connected. Testing of the forcemains as part of the overall Swan Island Pump Station testing was completed in the fall of 2006.

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:
    - 2,600 feet of 84-inch micro-tunnel construction
    - 7,315 feet of 66-inch open cut construction
- Segment 2: Bluff
    - 200 feet of 66-inch open-cut construction
    - 5,975 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 2006-07, the project team completed:

- Preliminary Design
- Value Engineering
- Submitted 30% Design Documents to DEQ as part of December 1, 2006 requirement

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 currently underway, 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 decision on a preferred alignment is scheduled for September 2007. The alignment alternatives are each approximately 7000 feet in length with six access shafts ranging from 35 feet to 85 feet deep. 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 BCC project will move from predesign to design in January 2008 with a design completion date of 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.

Influent Pump Station (IPS) Capacity Improvements

BES engineers made revisions to the IPS automation and supervisory control system software in order to optimize storage and treatment of wet weather flows and to manage peak flows. The revisions were based on actual wet weather conditions experienced during the fall of 2007 and this past winter.

CBWWTF Wet Weather Headworks (Wet Weather Screenhouse)

BES submitted final design package (plans and specifications) for DEQ review and to meet December 1, 2006 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 overflows at 14 outfalls to the Willamette River by 2011. The tunnel will be 29,530 linear feet (5.6 miles) long, 22 feet in diameter, and 85 to 165 feet deep. As the project has developed, the number of outfalls controlled by the tunnel was reduced to 13. The eliminated OF 31 is to be controlled re-routing flows to the existing interceptor system. OF 44A was previously being controlled by separating the upstream basin, but this was not found to be economically feasible. Flows from OF 44A will now be collected near the River and conveyed to the ESCSO Tunnel.

The Design Project was completed in February 2006 and the Final Contract documents issued. The final project design will allow discharge from only 4 of the 14 outfalls during large storm events after the tunnel is completed in 2011. These 4 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 (Joint Venture team of Kiewit-Bilfinger-Berge, KBB) was issued Notice to Proceed in March 2006. Work to date has primarily been in the preparation for and construction of 2 of the 7 tunnel shafts. The main mining site near OMSI / Opera is located at SE Caruthers Street and SE Water Avenue and is currently operational. The initial start up tunnel of approximately 230 linear feet is in place. The 25-foot diameter tunnel boring machine (TBM) was delivered to the site in the spring, and the TBM trailing and support equipment is currently being lowered and installed in the tunnel. Production mining will commence September 4, 2007. Most of the TBM operation will then be supported by infrastructure located underground.

Construction of the temporary support of excavation slurry walls was completed for 3 of the 6 large drop shafts. These shafts were the Alder Shaft, Steel Bridge Shaft, and River Street Shaft. Alder Shaft has been excavated to depth, Steel Bridge Shaft has been partially excavated, and River Street Shaft excavation has yet to begin.

Six diversion structures for collecting, and/or conveying flows from the existing outfalls and routing them eventually to the tunnel are underway and support of excavations is nearly complete. These structures include diversion points for OF37, OF 38, OF40, OF41, and OF46. Work has also begun on the open cut conveyance pipeline collecting the Alder Basin outfalls - OF33, OF34, OF35, and OF36.

One 84-inch diameter micro-tunnel run from OF 41 to Steel Bridge Shaft is also substantially complete. This pipe was approximately 140 linear feet.

Tunnel segments are also under full production, with approximately 15% complete.

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 four 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 medium (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 is expected to begin in fiscal year 2007-08.

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 extends north of the Umatilla Pump Station approx. 500' to manhole SE-199 and to the south approx. 1400' to manhole SE-193 and parallels the Oregon Pacific Railroad along the east bank of the Willamette.

The interceptor is in fair to poor condition and currently 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 also requires re-alignment of the railroad.

Related projects include the Lents Trunk Outfall 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 scope of work. Geotechnical engineering work was scheduled for the following month using on-call contractors.

Lents 1 & 2 Downstream Controls

This project consists of modifying the large existing diversion structures SE183 and SE183A on the Lents Trunk with adjustable (stop-log) weirs and improving the underflow capacity where cost-effectively possible. This project will provide two benefits. First, the new adjustable weirs at the above diversion structures will provide ability to divert greater flow to the SE Reliever Interceptor and the SE Interceptor thus eliminating excessive flows to Harney PS and Outfall #27 in accordance with ASFO goals. Second, during low-flow condition, the weirs will provide ability to divert the required additional 5-cfs flow to the East Side CSO tunnel for self-cleaning flow-velocity.

Project is at 30% design. The slide gate restricting flow at SE183A has been fully opened, allowing all flow up to about 100-cfs to enter the SE Relieving Interceptor.

Lents Trunk Outfall Control System – New Project

BES engineering staff have developed a cost-effective and innovative way to control CSO discharges to Outfall 27 and Outfall 26 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 will include lining the 4,400 feet of the trunk line, installing a small pump station and control gate, and installing flap-gate valve for high-river conditions. The project will be advertised for predesign and design services in August/September 2007.

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

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: 7,941 units
- Drainage Sump/Sedimentation Manhole Cleaning: 678 units
- Street Sweeping: 7.566 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 West Side Big Pipe Project startup was implemented during the fall 2006. Since that time, the focus of the CSO construction program has shifted from the west side of the Willamette River to the east side. CSO public involvement activities have changed to meet the needs of individual 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, 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 is implementing 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 Pre-Design Phase of the Portsmouth Force Main

Community Benefit Opportunity Program

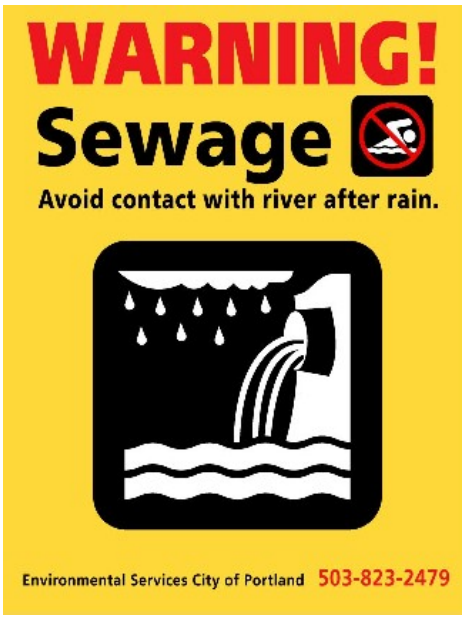
This program provides affected neighborhoods with an opportunity to nominate community-based projects to be funded within the East Side CSO Tunnel budget. Applications were received and are in the process of being ranked by a Citizen Advisory Committee. Within the next reporting period, the projects will be selected and some will begin implementation.

CSO Notification

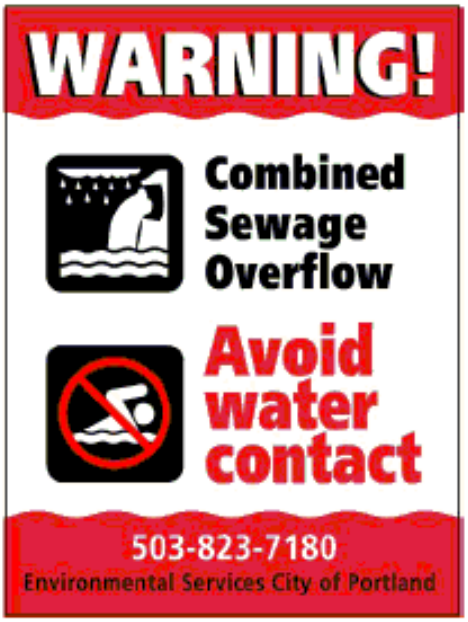
Environmental Services' River Alert system notifies the public of CSO discharges.

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



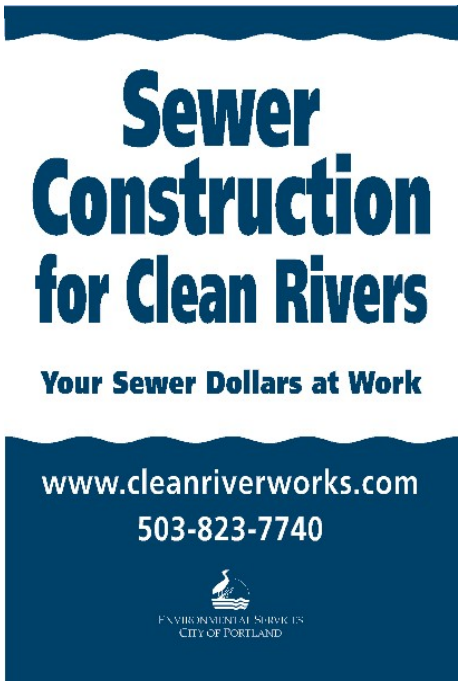
Columbia Slough
extreme rain event warning sign

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 home page at www.portlandonline.com/bes 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

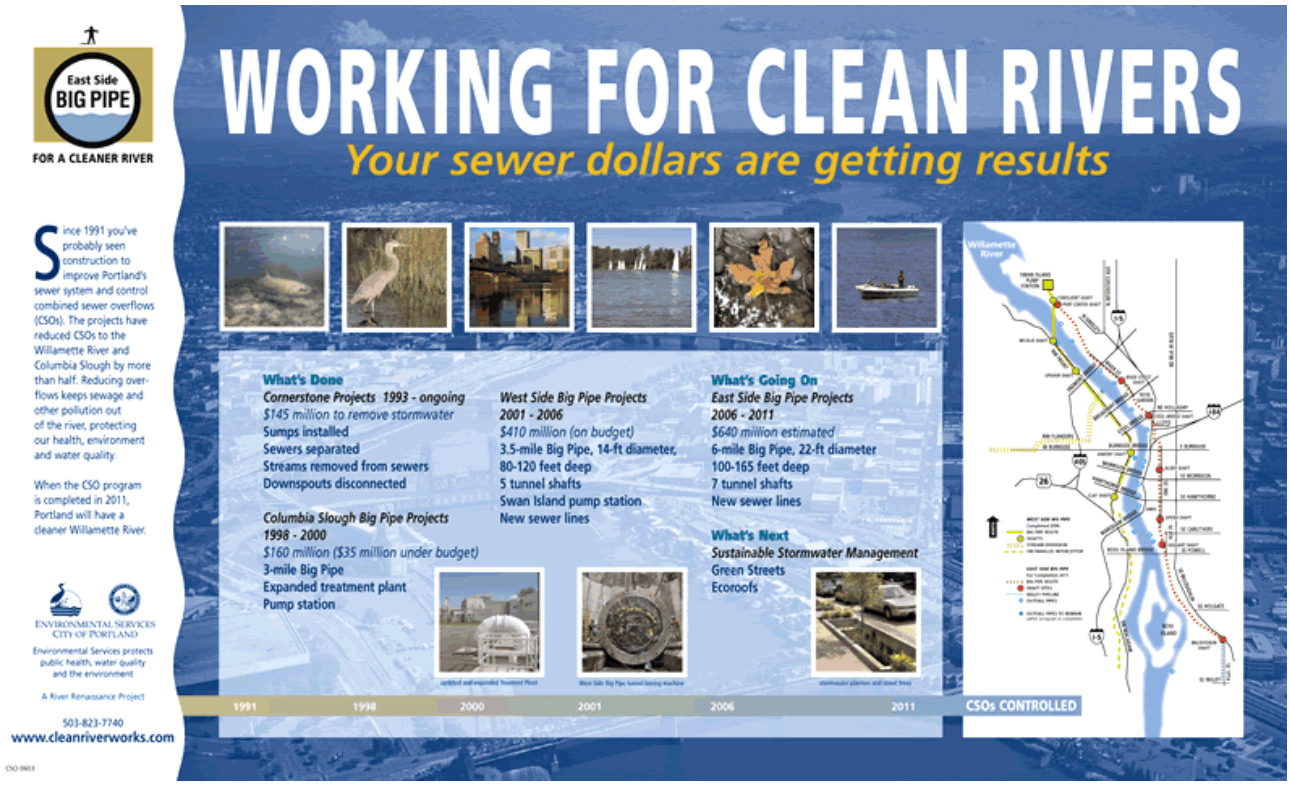
Environmental Services requires contractors to post signage at any sewer system-related construction site to inform the public that the construction is a sewer project designed to keep rivers and streams clean. In addition, BES posted large banners at West Side and East Side CSO project construction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



Construction sign

CSO Interpretive Signs

Environmental Services developed new interpretive signs in the last year and posted them 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 2006-2007, Environmental Services issued 30 media releases regarding combined sewer overflow projects; ten were CSO advisories during the summer notification period, 10 were traffic advisories related to CSO construction, and ten were stories about the CSO construction program.

Media Events

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

- September 14, 2006 - Staff and contractors on the West Side Big Pipe project celebrated successful project completion and startup.
- October 12, 2006 - City officials announce the opening of a Swan Island Pump Station trail funded by the West Side Community Benefit Opportunity (CBO) Program and announce that money is available for the East Side CBO Program.

- December 8, 2006 – Reporters and photographers invited to watch installation of the East Side Big Pipe muck conveyor over the Eastside Esplanade Trail.
- March 23, 2007 – Christening ceremony is held for the East Side Big Pipe tunnel boring machine.

In addition to media events and media coverage, Environmental Services also made a public presentation to the Portland City Council in May 2006 to update the Council on the CSO abatement program. The briefing was covered by Portland media and broadcast on the community and government access channel of Portland Community Media Television.

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 2007-2008 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 construction of shafts for the East Side Willamette CSO Tunnel System; receive delivery of Tunnel Boring Machine.
- Continue 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 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 2008, BES will address three 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."

- 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.)"
- Submit Updated CSO Facilities Plan - ASFO Section 21: "The Respondent may submit to the Department no later than December 1, 2001, and December 1, 2006, or at other appropriate times during the implementation of the facilities plan, an updated facilities plan report evaluating the effectiveness of CSO control technologies, including, if appropriate, recommendations for reevaluation of activities necessary to accomplish the requirements of this Order if new information or technology has become available. DEQ shall approve or disapprove the recommendations within six months of receipt of the updated facilities plan."

  Because this Updated CSO Facilities Plan is optional and can be submitted at "other appropriate times", BES expects to submit an updated facilities plan during this year.

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 2007-08
- 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 2008.

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 07-08, the **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:** Seven of the grant projects should be completed by the end of Summer 2007. One project includes the implementation of a series of stormwater planters and curb extensions ("green streets") along SE Clay Street to create a "green" corridor to the Willamette River.
- **Holladay, Stark, and Sullivan Inflow Controls Project:** BES will perform design and initiation construction on two to three of the remaining projects during FY07-08.
- **CBWTP Primary Clarifier Expansion:** Continue construction of new primary treatment facilities.
- **Portsmouth Forcemain Project:** The Design Phase, started in February 2007, will continue to July 2008.
- **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 Willamette CSO System** construction will continue throughout this fiscal year and are expected to continue through September 2011. The primary efforts through 2008 will be the construction of the temporary support of excavation slurry wall shafts of the three remaining tunnel drop shafts, Taggart Shaft, McLoughlin Shaft, and Port Center Way Shaft. The excavation of the shafts will continue through 2009 with build out of the shafts continuing in stages through 2010.

  These shafts will provide the location for primary maintenance and repair work needed on the TBM as it travels along the alignment. The TBM will be fully operational and expecting to progress at approximately 40 lf/day on average. The TBM is expected to reach Alder Shaft in October 2007 and the Steel Bridge in July 2008 and River Street Shaft in December 2008. This is approximately 12,000 lf.

  Seven of the nine 84-inch diameter micro-tunnel pipe runs will be completed or underway by July 2008. The associated diversion structures will also be constructed or finished.

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: 700 sumps/sedimentation manholes
- Street Sweeping: 9,600 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. 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 city will expand efforts to increase citizen participation in project decisions, raise awareness about watershed issues and encourage citizens to become stewards of Portland's watersheds. 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
- Continuing to give presentations to organized community groups and trade groups
- Providing opportunities for face-to-face discussions, such as open houses
- 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
- 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, 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 completed one of its most complex and largest efforts to complete the West Side CSO Program for controlling 16 outfalls on the Willamette River. The final startup and testing of the system in the fall of 2006 showed ways to improve both the CSO operations and the collection system operations.

At the same time, the City shifted focus onto the East Side CSO Program and prepared to begin tunneling from the OMSI/Opera mining shaft. The tunneling towards the Confluence Structure on Swan Island will commence late in the summer of 2007. Due to these efforts, the capital expenditure for the CSO Program was about $125 million this past fiscal year, and is expected to be $145 this next fiscal year. These costs are in addition to the approximate $700 million in capital costs already expended over the past years for the Westside, Cornerstone Projects and the Columbia Slough CSO systems.

With the completion of the CSO Sizing & Predesign Projects, the Bureau's focus is being extended 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. These future, post-2011 projects are almost entirely "sustainable stormwater management" projects that are 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 to develop a full base of experience and proven projects that will serve the Bureau in achieving the post-2011 goals for continued stormwater reduction and increased CSO control.

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APPENDIX A

CITY OF PORTLAND - BES

CSO Capital Improvement Program Implementation Schedule

(Appendix A contains 37 pages including this title page)