State of Oregon
Department of Environmental Quality Memorandum

Date: October 8, 2010

To: Environmental Quality Commission

From: Dick Pedersen, Director

Subject: Agenda item L, Action item: Amendments to the stipulation and final order addressing the city of Astoria's combined sewer overflows
October 20-22, 2010, EQC meeting

Purpose of item

Under the terms of the Jan. 13, 1993, Stipulation and Final Order WQMW-NWR-92-247 signed by the city of Astoria and the Oregon Environmental Quality Commission, the parties may by mutual agreement amend the order. Astoria has proposed amendments to the order. This item will propose the amendments for commission consideration.

DEQ recommendation and EQC motion

DEQ recommends that the commission:

1. Authorize the EQC chair and DEQ director to execute the Amended Stipulation and Final Order No. WQMW-NWR-92-247.

2. Direct DEQ to assure that the waste discharge permit developed by DEQ pursuant to the selected alternative of the Combined Sewer Overflow Facility Plan has limitations that meet water quality standards and clear, unambiguous, easily measured limitations and restrictions for the wastewater treatment facility and combined sewer overflow discharge points.

Why this is important

DEQ works with local communities and businesses around Oregon to minimize impacts to water quality from nonpoint sources in many ways. For Astoria, with a population of about 10,000, to assume the debt level and sewer surcharge rates it has and achieve additional control improvements, represents to DEQ a firm commitment by the city to protect the water quality of Oregon.

DEQ believes that the proposed amended order clearly reflects the public policy goal of eliminating the discharge of raw sewage to public waters so as to minimize the threat to public health and safety. DEQ also believes that the proposed amended order establishes the required reductions in combined sewer overflow discharge volumes at levels which are most cost effective given the characteristics of the city's combined sewer system and currently available reduction measures, but which will also improve the protection afforded the contact recreation beneficial use on the subject water bodies. DEQ agrees that the proposed amended order establishes a

policy basis and identifies specific required actions by the city beyond those identified in the facility plan for possible future further reductions in discharges.

At this time, Oregon DEQ supports and recommends the level of control proposed in Astoria's Combined Sewer Overflow Facility Plan and an Amended Stipulation and Final Order.

Background

Stipulation and Final Order requirements

The order in its present form requires the city, on a specified schedule, to undertake the necessary planning and implementation of corrective measures to significantly reduce the discharge of untreated sanitary sewage to Alderbrook Lagoon, Young's Bay and the Columbia River from the city's combined sanitary sewage-storm runoff sewer system. These discharges are called combined sewage overflows

The order establishes stringent requirements for overflow reduction. In the summer months, May 22 through October 14, all discharges that violate applicable water quality standards must be eliminated except those resulting from violent storms with a ten-year return frequency or larger. In winter, October 15 through May 21, all discharges that violate applicable water quality standards must be eliminated except those resulting from storms with a five-year return frequency or larger. As such, the order requires a reduction of 99.6 percent of the overflow discharges that have historically occurred.

At the time the order was developed, DEQ and Astoria understood that there was insufficient information to allow a complete characterization of the combined sewer system and the overflow discharges. The information available at the time was insufficient to determine the facilities and costs needed to meet the level of reduction required by the order. In recognition of the limited information then available, the order required Astoria to prepare a Combined Sewage Overflow Facility Plan that included a characterization of the overflows and also identified the types and cost of facilities needed to meet the required level of reduction. Furthermore, the order contained a provision that allowed it to be reexamined and amended with respect to alternative levels of reduction based on new information and understanding that might be developed during the facility planning process.

Combined Sewage Overflow Facility Plan proposed alternatives

In September 1998, in accordance with the order, Astoria finalized a facility plan that included information on facilities that would meet the reduction requirements contained within the order. The plan also included various scenarios for alternative reduction levels and described the needed facilities and costs. The range of options was summarized as follows:

- Sewer separation: 67 percent modeled annual volume reduction at a projected 1998 cost of approximately $490,000. This would not meet the order's requirement.
- Existing system optimization: 70 percent modeled annual volume reduction at a projected 1998 cost of approximately $3,100,000. This would not meet the order's requirement.
- Storage enhancements and inflow controls: 85 percent modeled annual volume reduction at a projected 1998 cost of approximately $10,200,000. This would not meet the order's requirement.
- Capture and treat: Three strategies in different combinations - 99 percent modeled annual volume reduction at a projected 1998 cost from approximately $18,300,000 to $32,800,000. This would meet the order's requirements.
- Sewer separation: 99 percent modeled annual volume reduction at a projected 1998 cost of $36,250,000. This would meet the order's requirements.

Recommended plan
The facility plan recommended an approach that combined the most effective control methods of each outfall proposed in the alternatives considering discharge location and cost effectiveness. The recommended action items were:

1. Stormwater separation in undeveloped forested areas.
2. Partial street stormwater separation and new stormwater conveyance pipes.
3. Flow slipping of stormwater, slowing down waters entrance into the system.
4. Diversion structure modification and system optimization.
5. Inline storage facilities to store and release stormwater over an extended period.
6. Storage tank construction at outfalls to store and re-introduction of the stored water to the system when capacity is available.

The control methods of the recommended plan would:

- Meet the current required level of control for Young's Bay and Alderbrook Lagoon outfalls.
- Require a maximum of six-in-one-year overflow events on Columbia River outfalls in the winter months and,
- Require controls to contain storms up to two-year return frequency during the summer months

Total capture of overflow volume was estimated to be 96 percent at a1998 cost of approximately $22 million.

The proposed recommended plan was accepted by the city and proposed to DEQ staff. Public meetings were held October 3, 2001. There were no comments from the public at that time.

The City Council recommended approval of the amended order May 8, 2002. At the time, DEQ was reluctant to propose an amendment to the commission because Astoria had shown little progress on limiting overflows. Subsequently, the city has committed considerable resources and made great strides to reduce overflows.

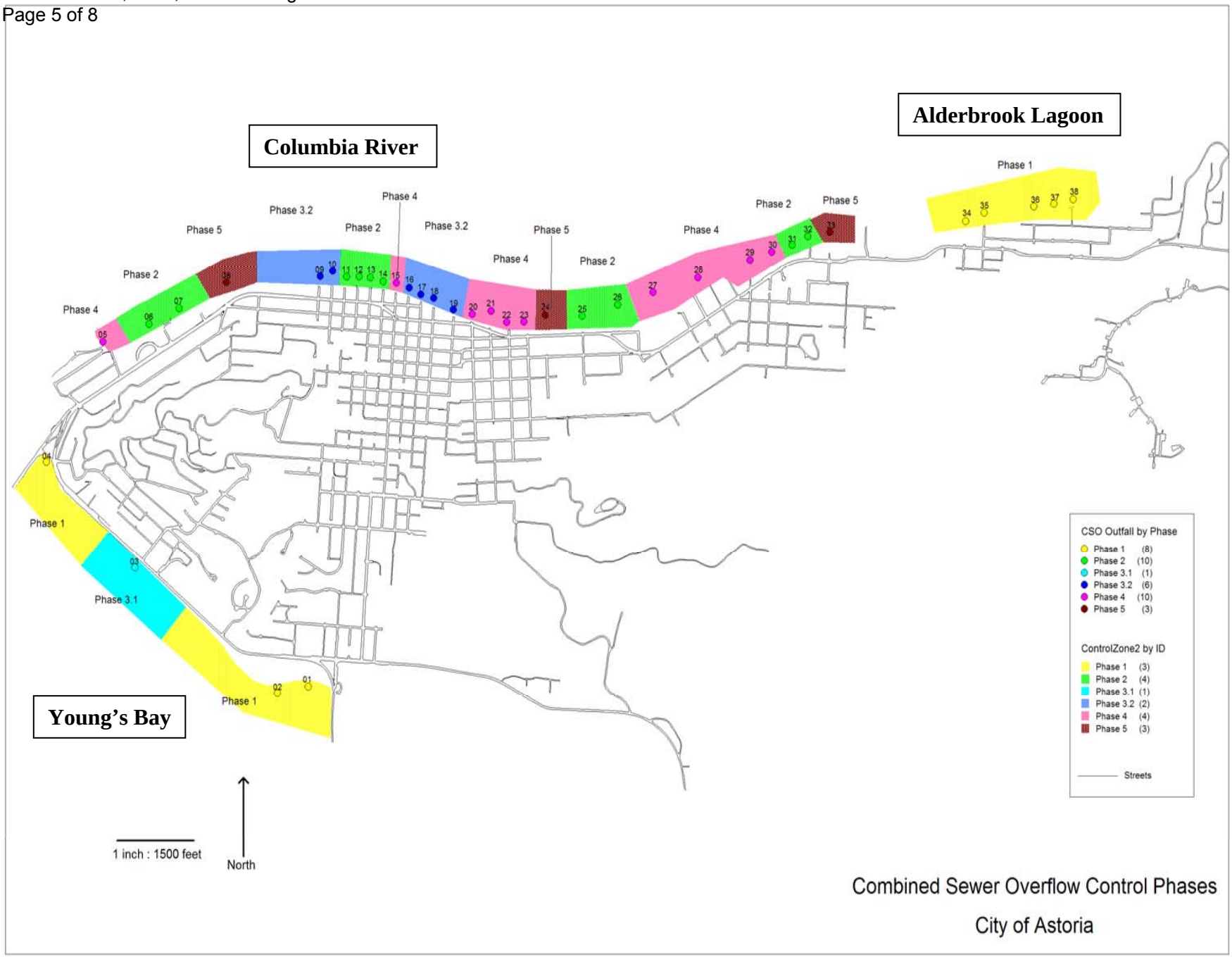
In 2009, DEQ and Astoria discussed amending the order and discussions were held with DEQ water quality staff to re-start the amendment process. In 2005 and 2010, the city reviewed and revised its facility plan, as part of the order. Once again, the original proposed recommended plan was accepted by the city and proposed to DEQ staff. A public meeting was held June 17, 2010. There were no comments from the public at that time.

Project work to date

In August 2010, DEQ presented an information item to the commission describing the geography and topography of Astoria. DEQ also provided a summary of the work Astoria since 2002 to control the combined sewer overflow discharges from its 38 outfalls along Young's Bay, the Columbia River and Alderbrook Lagoon.

The map on the following page, taken from the 2010 CSO Facility Plan Update, displays the outfalls locations and designations, as well as the phase in which they will be addressed.

As the result of its efforts, Astoria has reached 99 percent control level for the outfalls to Young's Bay and Alderbrook Lagoons, and a 35 percent reduction of overflows to the Columbia River. This represents the removal of an estimated 349.9 million gallons of combined sewer overflow per year out of an estimated 419.6 gallons, an overall 83 percent reduction. To date, Astoria has spent $17 million with another $22 million planned totaling about $39 million, for the proposed total of 96 percent level of control in an amended order. The original order required a 99 percent level of control, which would cost the city an additional $10-15 million more, for a total of around $50 million in project costs, to achieve three percent additional reduction.


Columbia River
Alderbrook Lagoon
Young's Bay
Phase 1
Phase 2
Phase 3.1
Phase 3.2
Phase 4
Phase 5
CSO Outfall by Phase
Phase 1 (8)
Phase 2 (10)
Phase 3.1 (1)
Phase 3.2 (6)
Phase 4 (10)
Phase 5 (3)
ControlZone2 by ID
Phase 1 (3)
Phase 2 (4)
Phase 3.1 (1)
Phase 3.2 (2)
Phase 4 (4)
Phase 5 (3)
Streets
1 inch : 1500 feet
North
Combined Sewer Overflow Control Phases
City of Astoria

Key issues

Proposed modifications and rationale

The most important proposed substantive change to the order would be to allow the required level of control for discharges to the Columbia River to be less stringent. The current order requires elimination of combined sewer overflows up to the ten-year return summer and the five-year return winter storms. It is estimated the original order would reduce 99 percent of flow volume. The proposed amendments would allow up to six wintertime and once-in-two-year summer overflow events to the Columbia River. Based upon more than forty years of rainfall data, the improvements proposed by the amendment would reduce overflow volume approximately 96 percent.

The rationale for the proposed change is the additional cost of achieving 99 percent reduction in volume as compared to 96 percent is disproportionately large. As part of the facility plan process, Astoria developed cost curves that indicate the costs of achieving compliance beyond a 93 percent control level climb sharply. The 2010 CSO Facility Plan Update indicated that the cost rises sharply after 80 percent volume reduction. Water quality improvements for the additional three percent between 96 and 99 percent control may not be measurable.

In recognition of the possible increased sensitivity, higher uses and practicality of controlling their overflows, the higher levels of control for Young's Bay and Alderwood Lagoon in the current order would remain in effect. Currently, Astoria has virtually eliminated overflows to the two water bodies under their overflow plan already with completion of the Denver Street Storage Project, and the city separates storm and groundwater flow from sanitary sewer flow when practicable. A large percentage of combined sewer overflow water volume has been eliminated by separating sanitary sewer from a single combined sewer collection area due to year-round stream flow in the sewer.

Compliance with EPA's guidance

The proposed amendment is in accordance to the EPA's "Presumption Approach" where water quality standards are presumed to be met unless monitoring shows otherwise. The presumption approach allows for no more than an average of six overflows per year, treatment of 85 percent of collected combined sewer flow volume or the equivalent of 85 percent removal of combined sewer overflow total suspended solids and biological oxygen demand loads. The approach also requires water quality monitoring is to ensure the presumption of meeting water quality standards by the enacted level of control is correct.

The amended order would allow up to six overflow events per year and capture and treatment an estimated 96 percent of combined sewerage collected. Water quality monitoring is in place to assess the current effectiveness of the control practices. A long-term, post construction

monitoring plan will be developed to show compliance with the water quality standards.

As the plan progresses, priorities will continue to be reassessed. Weir heights at outfall manholes have been adjusted to maximize capture according to storm intensity and capacity in the combined sewage overflow system and wastewater treatment plant. For example, the Denver Street Storage Project has been accelerated due to information gathered since the overall containment project began.

The proposed amended order provides the basis for further reductions in the coming decades beyond those specifically now required. It provides a target area to implement further reduction measures that will be revealed as the new infrastructure performs its tasks.

Previous commission actions: City of Portland Amended Stipulation and Final Order

Portland and Astoria originally had identical design requirements. In 1993, Portland pursued an amended order in its plan to control overflows. The commission approved of the amendment to Portland's order, recognizing the commitment to overflow reduction by the city, the limits to the ability of its populace to fund it, and the practicality of the expense the overflow capture rates put forth in the original order. Portland has since spent considerable sums of money and achieved great improvements in the control of overflows, with an anticipated 96.6 percent control level that may be met as soon as December 2011.

The Portland amended order contains similar design requirements to those being proposed by Astoria. The Portland system is allowed four-per-winter events; Astoria is requesting to be allowed six. The Portland system eliminated overflows up to a three-year return storm; Astoria is requesting to control up to a two-year return summer storm. Overall, Astoria would control 96 percent of the overflow volume to Portland's 94 percent even though Astoria has larger and more prolonged storm events and a smaller collection system. In addition, Portland discharges its large overflow volume to the Willamette River, where Astoria discharges its smaller volume to a much larger water body, the Columbia River.

Commission authority

Paragraph 10 of the order provides for the amendment by mutual agreement of the parties, subject to "notice and opportunity for public comment."

Attachments

A. Draft Amended Stipulation and Final Order
B. Original Stipulation and Final Order
C. September 2002 CSO Facility Plan, with 2005 and 2010 Updates
D. Astoria June 2010 Annual Nine Minimum Controls report

Available upon request

1. Astoria CSO program documents: Draft CSO Facility Plan, August 1998, 2005 CSO Facility Plan Update, 2010 CSO Facility Plan Update and supporting documents

Approved:

Section: _____

Division: _____

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