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KING COUNTY WASTEWATER TREATMENT DIVISION  
BARTON AND MURRAY COMBINED SEWER OVERFLOW CONTROL FACILITIES PLAN  

September 2011
# Barton and Murray Combined Sewer Overflow Control Facilities Plan

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ALTERNATIVE EVALUATION SUMMARY
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<th>Category</th>
<th>Sample Scenario</th>
<th>Sample Questions</th>
<th>Notes</th>
</tr>
</thead>
<tbody>
<tr>
<td>LAND USE AND NEIGHBORHOOD</td>
<td>1. City of Seattle Comprehensive Plan</td>
<td>Will the location of the site conflict with Seattle's land use and zoning planning policies?</td>
<td>Yes</td>
<td>Partially consistent</td>
</tr>
<tr>
<td></td>
<td>2. Seattle Municipal Code</td>
<td>Will the location of the site conflict with the Seattle Municipal Code (SMC)?</td>
<td>Yes</td>
<td>Partially consistent</td>
</tr>
<tr>
<td></td>
<td>3. Shoreline Master Plan</td>
<td>Will the location of the site conflict with the Shoreline Master Plan?</td>
<td>Yes</td>
<td>Located in an existing zone, generally consistent with SMC</td>
</tr>
<tr>
<td></td>
<td>4. Permitting Complexity</td>
<td>Will the location of the site require permits or permits be required in a timely manner?</td>
<td>Yes</td>
<td>SEPA and local permits required with public notice, Shoreline and ECA reviews required</td>
</tr>
<tr>
<td>ENVIRONMENT</td>
<td>1. Cultural Resources</td>
<td>Will construction of the alternative impact archaeological resources?</td>
<td>Yes</td>
<td>Project site area does not contain any known archaeological sites.</td>
</tr>
<tr>
<td></td>
<td>2. Historic Properties</td>
<td>Will construction of the alternative impact historic properties?</td>
<td>Yes</td>
<td>Historic properties are located in or near the project site area.</td>
</tr>
<tr>
<td></td>
<td>3. Risk and Wildlife</td>
<td>Will construction of or operation of the alternative impact fish and wildlife or their habitat?</td>
<td>Yes</td>
<td>Construction and/or operation of the alternative is likely to adversely affect fish and wildlife and/or their habitat.</td>
</tr>
<tr>
<td></td>
<td>4. Soils and Sediments</td>
<td>Will construction of the alternative impact soils and sediments?</td>
<td>Yes</td>
<td>The project site area is not known to contain contaminated soils. However, based on site characteristics, there is potential for construction and/or operation to adversely affect soils and sediments.</td>
</tr>
<tr>
<td></td>
<td>5. Water</td>
<td>Will construction of the alternative impact water quality?</td>
<td>Yes</td>
<td>The project site area is not known to contain any toxic substances. However, based on site characteristics, there is potential for construction and/or operation to adversely affect water quality.</td>
</tr>
<tr>
<td></td>
<td>6. Traffic and Noise</td>
<td>Will traffic and noise impacts be potentially significant due to project location?</td>
<td>Yes</td>
<td>Property ownership requires coordination with City of Seattle for access. Construction and operation is entirely within county right of way.</td>
</tr>
<tr>
<td></td>
<td>7. Water Quality</td>
<td>Will the treatment system result in the discharge of untreated stormwater to a surface waterbody?</td>
<td>Yes</td>
<td>There are more than two locations included in flow control. The alternative includes modifications to existing infrastructure and complex mechanisms for ensuring compliance with water quality standards.</td>
</tr>
<tr>
<td>TECHNICAL</td>
<td>1. Technical Complexity</td>
<td>Will the location of the site require complex flow measurement, algorithms, or PLC programming and infrastructure to direct flow to the alternative storage or treatment facility?</td>
<td>Yes</td>
<td>There is one site included in the alternative. All controls and infrastructure are located within the site or on adjacent existing rights of way.</td>
</tr>
<tr>
<td></td>
<td>2. Compatibility with Existing WW System</td>
<td>Do the standards of other agencies affect the design and execution of the facility?</td>
<td>Yes</td>
<td>King County standard practices and any applicable standards. Construction and operation is entirely within county right of way.</td>
</tr>
</tbody>
</table>
EVALUATION CRITERIA

1. Project Costs
   1. Are the Project Costs predictable and quantifiable in terms of design, permitting and mitigation costs?
   2. Are the Project Costs predictable and quantifiable in terms of construction costs?

2. Complying/Adapting Management
   1. Can the alternative install and manage without vertical structural changes? Is there a technical or organizational requirement to keep the existing vertical structural organization intact?
   2. Can the alternative comply with any changes to current state regulations?

3. Design/Construction/Implementation
   1. Does the alternative have similar or comparable design steps? Are there additional design steps or phases? Are there any structural changes to the facility that will occur during construction?
   2. Can the alternative be implemented without significant delays or disruptions?
   3. Can the alternative be built within the budgeted time frame?

4. Staffing
   1. Does the facility require operator attention during startup? The facility requires operator attention during startup. The facility can generally be operated without operator attendance. The facility requires operator attention during startup. The facility can generally be operated without operator attendance. The facility requires operator attention during startup. The facility can generally be operated without operator attention. The facility requires operator attention during startup. The facility can generally be operated without operator attention.
   2. Does the facility require operator attention during routine maintenance?
   3. Does the facility require operator attention during emergency events?

5. Safety
   1. Does the alternative have higher risk than other alternatives in terms of potential change orders, failure to meet permits that could result in cost increases?
   2. Are there any specific safety issues associated with the alternative that would be a concern to operations?

6. Impact on downstream processes
   1. What is the level of normal maintenance? How many mechanical/instrumentation components are required?
   2. Are the control systems routinely used for similar facilities and similar applications?

7. Technology
   1. What are the Project Costs predictable and quantifiable in terms of design, permitting and mitigation costs?
   2. Are the Project Costs predictable and quantifiable in terms of construction costs?

8. Reliability
   1. How complex is the system (number and type of components)? How complex are the startup procedures and controls? Are redundant control systems provided? Is dedicated backup power available?
   2. Are the Project Costs predictable and quantifiable in terms of design, permitting and mitigation costs?

9. Training
   1. How complex is the system (number and type of components)? How complex are the startup procedures and controls? Are redundant control systems provided? Is dedicated backup power available?
   2. Are the Project Costs predictable and quantifiable in terms of design, permitting and mitigation costs?

10. Cost Effectiveness
    1. Are the Project Costs predictable and quantifiable in terms of design, permitting and mitigation costs?
    2. Are the Project Costs predictable and quantifiable in terms of construction costs?

11. Schedule
    1. Are the Project Costs predictable and quantifiable in terms of design, permitting and mitigation costs?
    2. Are the Project Costs predictable and quantifiable in terms of construction costs?

12. Technology
    1. How complex is the system (number and type of components)? How complex are the startup procedures and controls? Are redundant control systems provided? Is dedicated backup power available?
    2. Are the Project Costs predictable and quantifiable in terms of design, permitting and mitigation costs?
Operational Costs

1. Compared to other alternatives, are operational costs predictable and can be scheduled? Yes, operational costs are predictable and can be scheduled.

2. Compared to other alternatives, are operational costs for training, energy, staffing, and external agency costs low? Yes, operational costs for training, energy, staffing, and external agency costs are low.

3. Are additional data privacy concerns for maintenance? No, there are no additional data privacy concerns for maintenance.

9. Maintenance Costs

1. Does the alternative require more or less maintenance resources than other alternatives? The alternative requires less maintenance resources than other alternatives.

2. Are maintenance requirements for the alternative easy to perform or burdensome with regard to frequency and/or volume? Maintenance requirements for the alternative are easy to perform with regard to frequency and volume.

3. Will maintenance cost increase with capacity? No, maintenance cost will not increase with capacity.

10. Environmental Costs

1. What does the cost of land and land development compared with other alternatives? The cost of land and land development is lower compared with other alternatives.

2. What costs required by external agencies other stakeholders for design, construction, or operation? Yes, the alternative requires additional design elements to meet the county's vision of itself.

3. Will there be costs associated with increased operation and maintenance, e.g., what are the costs to maintain successful operation of elements under external control? The alternative has several components such as "green" technology, public benefits or other elements attractive to grants.

11. Grant Opportunities

1. What grants are available that could make this project more attractive to funding?

2. What is the alternative's benefit to external fundraising efforts? The alternative has several components such as "green" technology, public benefits or other elements attractive to grants.

COMPARATIVE SUMMARY

2021.11.18

1. Condition

Facility changes or impedes surrounding land and marine use, and equipment may be necessary to maintain the facility, but noise/light/work services may be necessary to maintain the facility, but noise/light/work services will be provided to the facility.

3. Potential Community Impacts

1. Is use compatible with community vision of itself at this stage, before specific conversations with potentially affected parties can occur? Yes, the alternative is consistent with the community's vision of itself.

2. What are the benefits of CMMP activities on the surrounding community? The alternative has potential to provide local environmental benefits, including attraction to wildlife, conservation of open space, and enhancement of the local community's quality of life.

2021.11.19

1. Construction Impacts

Project located in heavy use roadway, park or beach area, resulting in area closure or significant use impact, with duration an entire dry weather season or longer.

4. How will truck traffic affect area? Limited amount of hauling required for materials/equipment; roadways will be required for equipment/materials storage or other activities.

Project located in area with no public access, few neighbors, little commuter traffic.

3. Replacement of existing improvements required.

Project requires high volume, long term truck traffic on constricted roadways that cannot be carried out on a restricted schedule or route.

Project located in heavy use roadway, park or beach area, resulting in area closure or significant use impact, with duration an entire dry weather season or longer.

Project located on site with no public access, or public access can be maintained during construction, and project is short duration or constructed outside main user season.

Project located in heavy use roadway, park or beach area, resulting in area closure or significant use impact, with duration an entire dry weather season or longer.

Project located on site with no public access, or public access can be maintained during construction, and project is short duration or constructed outside main user season.

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Summary of Discussion

**Attendance**

<table>
<thead>
<tr>
<th>King County</th>
<th>Consultant</th>
<th>SPU</th>
</tr>
</thead>
<tbody>
<tr>
<td>Betsy Cooper</td>
<td>John Phillips</td>
<td>Ellen Blair</td>
</tr>
<tr>
<td>Hien Dung</td>
<td>Kevin Schock</td>
<td>Jennifer Corrigan</td>
</tr>
<tr>
<td>Pam Erstad</td>
<td>Linda Sullivan</td>
<td>Kevin Dour</td>
</tr>
<tr>
<td>Sue Hildreth</td>
<td>Bob Swarner</td>
<td>Karl Hadler</td>
</tr>
<tr>
<td>Ron Kohler</td>
<td>Martha Tuttle</td>
<td>Jeff Lykken</td>
</tr>
<tr>
<td>Kathy Mathena</td>
<td>Jim Weber</td>
<td>Brian Matson</td>
</tr>
<tr>
<td>Tiffany McClaskey</td>
<td>Mary Wohleb</td>
<td>Allen de Steiguer</td>
</tr>
<tr>
<td>Sue Meyer</td>
<td>Monica Van der</td>
<td>Lloyd Skinner</td>
</tr>
<tr>
<td>Shahrazad Namini</td>
<td>Vieren</td>
<td>Bob Skinner</td>
</tr>
<tr>
<td>Chris Okuda</td>
<td>Karl Zimmer</td>
<td></td>
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<tr>
<td>Ukwenga Oleru</td>
<td></td>
<td>Sahba Mohandessi</td>
</tr>
</tbody>
</table>

**Purpose of this Summary:**

This document provides a summary of the workshop process and captures the discussion themes that supported recommendations for CSO control project alternative means to be forwarded for review by internal management and further development by the project team.

**Workshop Process**

Team members used a collaborative approach to screen alternative means for CSO control using a range of factors. The work was accomplished through a series of meetings on Dec. 9, 2009 and Dec. 10, 2009 and is part of the team evaluation process to identify three CSO control alternative means for further evaluation. Documenting the workshop process is a critical piece of the project.

**Workshop Goals and Objectives:**

1. Recommend three alternative means for CSO control for the Barton Basin to present to the public for input and to develop in more detail, with the remaining alternatives to be tabled at this time.
2. Where possible, recommend a set of alternative means that represents the range of complexity and constraints in the basin.
3. Discuss and document the reasons and rationale for recommendations.
December 9, 2009 Workshop – “Straw Poll”

Materials Available for Workshop
1. Final revised Barton Basin Alternatives summary sheets (1 for each alternative)
2. Final revised table of selection factors ratings and descriptions of Low, Moderate, and High impact
3. Final revised Alternative Rating Sheets for Barton Basin (summary & expanded to include description of ratings)
4. Summary of major changes to Barton, Murray, and South Magnolia Basin Alternatives and overall selection factors
5. Inventory of Available Property and Property Profiles

Workshop Approach/Agenda
A “Straw Poll” was conducted to generate discussion and help inform the team’s recommendations.

An enlarged wall chart of the screening factors and draft ratings for all alternatives for the Barton basin was posted on the wall. King County staff used dot stickers to indicate the alternatives they thought should be recommended for further evaluation and those they thought should not be recommended. Most importantly, staff also wrote their thoughts on the wall charts as to why certain alternatives should or should not be recommended as well as any questions they might have.

Workshop Outcome
The straw poll provided staff with an initial, visual survey of how their colleagues viewed the alternatives, and provided valuable insight into the reasons for their views. This initial survey and the written thoughts were used to start an in-depth discussion of the alternatives at the Dec. 10, 2009 workshop.

December 10, 2010 – Initial Barton Alternatives Narrowing

Materials Available for Workshop
1. Preliminary planning level cost information for comparison purposes for Barton Basin
2. Initial Straw Poll Results

Workshop Approach/Agenda
1. Review of Initial Straw Poll Results for Barton (Jeff Lykken, Tetra Tech)

2. Initial Barton Alternatives Narrowing - Discussion (facilitated by Bob Wheeler, Triangle Associates)
   - Identify alternatives that clearly do not merit further consideration at this time
   - Identify alternatives that clearly merit further consideration at this time
   - Discussion of remaining alternatives to reduce the recommended number to three
   - Discussion of basis for recommendations on all alternatives
3. Presentation of Preliminary Planning Level Cost Information for Comparison Purposes
   (Kevin Dour, Tetra Tech)
   - Methodology for determining costs
   - Review of methodology for creating comparative cost ratings
   - Discussion of whether cost information changes any of the three alternatives currently identified for further evaluation

4. Team Agreement on 3 Alternative Means for CSO control for Further Development
   (facilitated by Bob Wheeler, Triangle Associates)
   - Survey of team for confidence in recommended alternatives
   - Final thoughts on recommendations

Workshop Outcome
King County staff recommended the following alternative means for CSO control to be considered for further development:

- Rectangular or Pipe Storage in Bottom of Basin. The Basin Lead will evaluate whether a rectangular storage tank or a storage pipe is the best configuration for this alternative (elements of Alternatives 1A and 1C). The project team decided to combine elements of these two alternatives going forward because they are very similar, and the team wished to maintain the flexibility to optimize the storage facility configuration during more detailed evaluation.
- Pipe Storage in Upper Fauntleroy Way (Alternative 1E)
- Rectangular Storage in Vicinity of Fauntleroy School (Alternative 1F)

The engineering basin leads, Jeff Lykken and Kevin Dour, for the Barton Basin supported these choices.

Follow-up with WTD Management and January 19, 2010 Briefing with WTD Director
King County staff recommended Rectangular or Pipe Storage in Bottom of Basin (elements of Alternatives 1A and 1C) for further development largely because the facility would be located where most flows could be captured. King County staff subsequently presented challenges for this alternative related to the environmental, community, and land use and permitting selection factors to WTD management. Specific concerns such as disruptions to ferry traffic and/or service were presented to the WTD Director Christie True in a briefing on January 19, 2010. The Director determined that the other two “gray” alternatives recommended for further development in the Barton basin did not involve the same level of challenges posed by Rectangular or Pipe Storage in Bottom of Basin, and directed the project team to discontinue further evaluation of that alternative.

Summary of Workshop Process Discussion for Barton Basin

Considerations for all CSO Project Basins

- O&M staff objected to considering a circular storage tank. A rectangular storage tank is preferable from an O&M perspective. An offline storage pipe is less desirable but workable from an O&M perspective.
King County Puget Sound Beach CSO Control Projects

Alternative Screening Workshop for Barton Basin

- O&M staff emphasized that even as constraints to the alternatives emerge, it will be important to keep O&M access out of the ROW. O&M staff explained that O&M activities will be restricted in certain ways in the absence of safe, protected access outside of the ROW.

Considerations for Barton Basin

- Alternative 1E could be difficult to implement because of identified archeological resources, but the engineering design must be further refined to better understand the potential impacts to archeological resources.
- One way to think about the Green Stormwater Infrastructure alternative, which is proceeding for the Barton basin on a separate track, is as a tool for reducing the risk associated with meeting the CSO control requirement with a “gray” alternative.
- Although a range of costs is shown for land acquisition and permitting costs, the permitting costs could very likely be at the high end. The range shown is not meant to suggest that the cost might be somewhere in the middle.
- The range of costs for land acquisition is based on a low and a high estimate of the number of properties needed. Only assessed values were used for private property cost estimating; no additional costs for acquisition were included.
- The cost estimate for Alternative 4A does not consider the potential cost to treat stormwater.
- The cost estimates discussed were preliminary planning level cost estimates for comparison purposes.

Considerations for Barton Basin CSO Control Alternatives

<table>
<thead>
<tr>
<th>Alternative 1A: Rectangular Storage, Bottom of Basin/Alternative and 1C: Pipe Storage, Bottom of Basin (Recommended for further development)</th>
</tr>
</thead>
</table>

Alternative 1A and Alternative 1C are both storage alternatives using different types of storage facilities and were deemed similar enough to be put forth for further evaluation as a single alternative.

Design Engineering

- All of the peak flow is captured using passive technology. This is the least technically complex method for CSO control.
- Considering both rectangular and pipe storage will allow the design team more flexibility in optimizing the storage configuration.

Cost

- Alternative 1A is moderate cost and Alternative 1C is low cost relative to all potential Barton CSO control alternatives.
- Potential for cost estimate to change based on permitting and property acquisition costs

Land Use/Permitting
King County owns property adjacent to the Barton Pump Station that might be useful for siting or constructing this alternative.

Shoreline use permit may be needed.

Property acquisition may be necessary.

Environmental

- Moderate likelihood that archaeological resources are present, which could delay the project schedule.
- Permit conditions could require marine access to avoid environmental impacts, though there still might be permit conditions related to water access.

Community Impact

- Construction could disrupt traffic on an arterial, Fauntleroy Way SW, and Fauntleroy ferry traffic. This would require extensive coordination with WSDOT.
- Some community members have indicated they do not want changes to King County’s property adjacent to the Barton Pump Station or disruptions to Cove Park.
- Some community members have expressed concern about impacts to Cove Park, and informed the county that grant funding was invested in the park.
- Members of the Fauntleroy community have expressed concern about facilities and land use that are not compatible with their vision of their neighborhood area.

O&M

- Cleaning a rectangular tank is easier, occurs less frequently and requires less staff time than cleaning a circular tank (Alternative 1B).

Alternative 1B: Circular Storage, Bottom of Basin (Not recommended for further development)

Additional considerations are captured in Alternative 1A and 1C.

Design Engineering

- Circular storage at the bottom of the basin may provide some construction related benefits but provides no additional operational benefits compared to rectangular or pipe storage at the bottom of the basin.

Cost

No discussion. Comments related to cost were captured in the evaluation document.

Land Use/Permitting

No discussion. Comments related to land use/permitting were captured in the evaluation document.

Environmental

No discussion. Comments related to environmental issues were captured in the evaluation document.
Community Impact
No discussion. Comments related to community impacts were captured in the evaluation document.

O&M
• Circular storage requires more frequent maintenance and more staff time than rectangular or pipe storage.

Alternative 1D: Right of Way Pipe Storage, Bottom of Basin (Not recommended for further development)

Design Engineering
• Provides no additional technical or operational benefits compared to Alternative 1C.

Cost
No discussion. Comments related to cost were captured in the evaluation document.

Land Use/Permitting
• No property acquisition needed.

Environmental
• Moderate likelihood that archaeological resources are present, which could delay the project schedule.

Community Impact
• Construction would disrupt traffic on an arterial, Fauntleroy Way SW, and Fauntleroy ferry traffic. This would require extensive coordination with WSDOT.

O&M
• Access for O&M staff poses traffic control and safety issues. Fauntleroy Way SW is a busy arterial. Accessibility would be limited and require traffic control if entry were within the paved road.

Alternative 1E: Pipe Storage, Upper Fauntleroy Way SW (Recommended for further development)

Design Engineering
• About half of basin peak flow is captured using passive technology. Moderate level of technical complexity and operational management compared to other CSO control approaches.

Cost
• Lower cost relative to other Barton CSO control alternatives.
• Lower potential for project costs to change relative to other Barton CSO control alternatives.

Land Use/Permitting
• No property acquisition needed for storage pipe installation (may need easements for electrical and odor control facilities).

Environmental
• Project is located in area with known archeological resources. Further refinement of alternative needed to evaluate issues related to archeological resources. Evaluation of archeological resources elements could result in schedule delay and/or denial of permit.

Community Impact
• Construction will disrupt traffic on a non-arterial street.
• Access to residences will be limited during construction along approximately 200 ft of street Right of Way.

O&M
• Telemetry and instrumentation will be necessary to predict and capture adequate flows to meet the CSO control requirement. Telemetry and flow control adds technical complexity to flow management.

Alternative 1F: Rectangular Storage in the Vicinity of Fauntleroy School (Recommended for further development)

Design Engineering
No discussion. Comments related to design engineering were captured in the evaluation document.

Cost
• Low cost relative to other Barton CSO control alternatives.
• Low risk of cost estimate changing dramatically.

Land Use/Permitting
No discussion. Comments related to land use/permitting were captured in the evaluation document.

Environmental
• Minimal potential for environmental impacts or permitting difficulties.

Community Impact
• Avoids traffic impacts to Fauntleroy Way SW arterial and Fauntleroy ferry traffic.
• Minimal if any disruption to street Right of Way.
• Potential willing property seller. Best opportunity for positive community partnership.
Community members have indicated they do not want changes to King County’s property adjacent to the Barton Pump Station or disruptions to Cove Park. This alternative avoids use of residential property or the park.

**O&M**
- Approximately half of basin flow can be captured at this point in the basin. Telemetry and instrumentation will be necessary to predict and capture adequate flows to meet the CSO control requirement. Telemetry and flow control is more difficult for meeting the CSO control requirement compared to passively capturing all of basin flow at the bottom of the basin.

---

**Alternative 1G: Rectangular Storage, Basin 416 (Not recommended for further development)**

**Design Engineering**
- Since facility is located high in the basin less than half of the basin flow is captured. It may be necessary to add size to storage facility to guarantee capture of adequate volumes to achieve control requirements.

**Cost**
- Moderate cost relative to other Barton CSO control alternatives.

**Land Use/Permitting**
- Construction might be required in Lowman Beach Park. The Seattle Dept. of Parks and Recreation has a policy that opposes the use of parks for certain types of utilities. This could impact the project schedule.

**Environmental**
No discussion. Comments related to environmental issues were captured in the evaluation document.

**Community Impact**
- Construction and above ground facilities would be disruptive to park users.
- Construction could impact approximately 800 ft of street Right of Way; impacted streets are not arterial.

**O&M**
- Technically complex compared to other storage alternatives. Telemetry and instrumentation will be necessary to predict and capture adequate flows to meet the CSO control requirement. More management of peak flows required relative to other storage alternatives.

---

**Alternative 3A: End of Pipe Treatment, Bottom of Basin (Not recommended for further development)**
Design Engineering
- All of the peak flow is captured using passive technology. This is the least technically complex method for CSO control.

Cost
- High cost relative to other Barton CSO control alternatives.

Land Use/Permitting
- Treatment facility in shoreline is currently prohibited.
- Permitting effluent discharge to Puget Sound could delay the project schedule.

Environmental
No discussion. Comments related to environmental issues were captured in the evaluation document.

Community Impact
- Community members may object to treatment facility in residential neighborhood.

O&M
- O&M more complicated and time-consuming for staff than storage.

Alternative 4A: Peak Flow Reduction, Basin 416 (Recommended for further development)

Design Engineering
- Directing additional stormwater to Municipal Separate Storm Sewer System (MS4) system would require adequate capacity to prevent potential flood impacts to Longfellow Creek.
- Project schedule could be considerably delayed because of need to coordinate with City of Seattle and work required on hundreds of private properties.

Cost
- The project and life cycle costs could increase beyond the estimated costs if stormwater treatment is required.
- High cost relative to other Barton CSO control alternatives even before considering the possibility that stormwater may require treatment.

Land Use/Permitting
- Project schedule could be impacted due to issues related to permitting, coordination with Seattle, and community opposition.

Environmental
No discussion. Comments related to environmental issues were captured in the evaluation document.

Community Impact
King County Puget Sound Beach CSO Control Projects
Alternative Screening Workshop for Barton Basin

- More information is needed to evaluate alternative with option to disconnect roofs only and either add conveyance or coordinate with SPU’s RainWise program for onsite stormwater management.
- In the present configuration, stormwater pipe construction would impact several blocks of non-arterial streets.

O&M

- Defining roles and responsibilities for stormwater management systems creates is necessary to clarify requirements for O&M staff.
### Barton Basin Alternatives

#### Category / Criteria

<table>
<thead>
<tr>
<th>LAND USE AND PERMITTING</th>
<th>LAND USE AND PERMITTING</th>
</tr>
</thead>
</table>

1. City of Seattle Comprehensive Plan
1. City of Seattle Comprehensive Plan


3. Shoreline Master Program Compatibility
3. Shoreline Master Program Compatibility

4. Permitting Complexity
4. Permitting Complexity

5. Property Acquisition Complexity
5. Property Acquisition Complexity

<table>
<thead>
<tr>
<th>1E: Pipe Storage, Upper Fauntleroy Way SW</th>
<th>1F: Rectangular Storage Near Fauntleroy School</th>
<th>Green Stormwater Infrastructure (GSI) Alternative</th>
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</thead>
</table>

#### Impact Rating

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<tr>
<th>LAND USE AND PERMITTING</th>
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</table>

1. Section 6.5 of the Seattle Comprehensive Plan (Utilities Element of the Planning Policies, U16) states that the City should work cooperatively with King County to identify and expeditiously address combined sewer overflows for which the County maintains responsibility. In addition, no residential property acquisition will be necessary under this alternative.

2. Utilities would be buried underground in the ROW which would only temporarily disrupt public access. Zoning: N/A (Located in ROW).

3. N/A - Not within Shoreline District.

4. Only local permits required from SDOT (no federal or state permits required). Traffic impacts for local residents. Provisions for temporary and emergency access required. Exceptional tree permit may be required from DPD if tree removal is necessary. Above grade structures will be below height limits prescribed in SMC. Will not require marine access.

5. N/A - Not within Shoreline District.

6. Abnormal ground O&G and electrical will be below height limits prescribed in SMC. Lot coverage will be consistent with zoning. Will not require marine access.

7. ROW permits required. Affected roadway have moderate traffic volume in residential and neighborhood commercial land uses. Will require careful traffic planning to maintain access. Work hours may be restricted.

8. Fauntleroy Community Association (property owner) may be amenable to locating facility on property. 

9. No property acquisition required. SDOT will consider the project street beautification. Will need to go through the street improvement process. Since no pipes or structures are within right-of-way street use fees are minimal.

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**November 2010**

**Final Evaluation**

**CAROLLO ENGINEERS/STRATTS**

**PAGE 1 of 4**

**PRELIMINARY DRAFT - FOR DISCUSSION PURPOSES ONLY**
**BARTON BASIN ALTERNATIVES**

<table>
<thead>
<tr>
<th>CATEGORY / CRITERIA</th>
<th>1E: PIPE STORAGE, UPPER FAUNTLEROY WAY SW</th>
<th>1F: RECTANGULAR STORAGE NEAR FAUNTLEROY SCHOOL</th>
<th>GREEN STORMWATER INFRASTRUCTURE (GSI) ALTERNATIVE</th>
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<tr>
<td>ENVIRONMENT</td>
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<tr>
<td>ENVIRONMENT</td>
<td>DESCRIPTION</td>
<td>DESCRIPTION</td>
<td>DESCRIPTION</td>
</tr>
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</table>

1. **Cultural Resources**

- **ENVIRONMENT:** 1. Cultural Resources
  - Based on site characteristics, project area has high probability of containing archaeological resources.
  - Significant archaeological resources found adjacent to project area. Executive Order 8835 process would cause delay of up to six months or more and could result in denial of project. No historic resources in project area. Excavation likely to extend into native soils.
  - No known archaeological sites. Based on site characteristics, project area may have moderate probability of containing archaeological resources. Fauntleroy School has been nominated as a Seattle Landmark. Not projectile found on site. Fauntleroy Community prepared application but have not submitted it yet for National Landmark. Excavation likely to extend into native soils.

2. **Fish and Wildlife**

- **ENVIRONMENT:** 2. Fish and Wildlife
  - No impacts anticipated. Fauntleroy Creek is located to the south of the project area. It is approximately 100 feet south of the intersection of Director and Upper Fauntleroy Way which will have construction activity. Fauntleroy Creek is used by Coho and Cutthroat for spawning and rearing. Construction most likely would require removal of Douglas Fir and Pacific Madrone along west edge of Upper Fauntleroy Way which may meet the definition of exceptional tree according to SMC.
  - No impacts anticipated. Fauntleroy Creek is approximately 100 feet south of the south edge of the school parking lot which may have construction activity. Fauntleroy Creek is used by Coho and Cutthroat for juvenile rearing.
  - Construction of this alternative would not affect fish and wildlife, or their habitat. This alternative would create new habitat.

3. **Wetlands, Streams, and Shoreline**

- **ENVIRONMENT:** 3. Wetlands, Streams, and Shoreline
  - No wetlands, streams, or shoreline within project area. Fauntleroy Creek is approximately 100 feet to the north of Director Street and Upper Fauntleroy Way. No impacts anticipated.
  - No wetlands or shoreline within project area. Fauntleroy Creek located south of project area. No impacts to creek or creek buffer anticipated.
  - No wetlands, streams or shoreline in project area. Check on potential for groundwater daylighting.

4. **Soils and Sediments**

- **ENVIRONMENT:** 4. Soils and Sediments
  - No known contaminated sites. Project area is not within liquefaction zone. No steep slopes and/or potential or known landslide areas.
  - No known contaminated sites in project area. Project area is not within liquefaction zone. No steep slopes and/or potential or known landslide areas.
  - No known contaminated sites in project area. No steep slopes and/or potential or known landslide areas.

5. **Water Quality**

- **ENVIRONMENT:** 5. Water Quality
  - No new untreated discharges to surface waters.
  - No new untreated discharges to surface waters.
  - No new untreated discharges to surface waters.

**TECHNICAL**

1. **Technical Complexity**

- **ENVIRONMENT:** 1. Technical Complexity
  - Mid-Basin alternative requires careful management of flows to ensure bottom of basin flow quantities do not exceed Barton PS capacity. Alternative requires complex diversion structure to divert flows to storage.
  - Mid-Basin alternative requires careful management of flows to ensure bottom of basin flow quantities do not exceed Barton PS capacity. Alternative requires complex diversion structure to divert flows to storage.
  - No significant construction issues or risks beyond typical landscape construction in right-of-way. Temporary traffic or access issues. Temporary offsite parking for Community Center may need to be provided.

2. **Compatibility with Existing WW system**

- **ENVIRONMENT:** 2. Compatibility with Existing WW system
  - May prolong peak event to existing system because stored flows will be fed back into the system after peak event passes. More pounds of BOD, TSS will be routed through treatment facilities.
  - May prolong peak event to existing system because stored flows will be fed back into the system after peak event passes. More pounds of BOD, TSS will be routed through treatment facilities.
  - Will not affect the operation of the existing treatment system.

3. **Flexibility/Adaptive Management**

- **ENVIRONMENT:** 3. Flexibility/Adaptive Management
  - May be able to lengthen pipe to the north and expand capacity northward past Henderson Street. It would be difficult to reconfigure drain chamber and expand facility within tight right-of-way.
  - Area available within parking lot of Fauntleroy School to expand tank or construct auxiliary tank.
  - Additional separation could be undertaken if initial efforts do not provide control.

4. **Constructability/Implementation Schedule**

- **ENVIRONMENT:** 4. Constructability/Implementation Schedule
  - There may be construction difficulties with groundwater, archeological conditions, and excavation. Difficult construction conditions within street right-of-way (R/W) issues associated with residential access during construction. Limited area available for staging and material laydown.
  - No significant construction issues or risks beyond typical structure excavation and construction. Access for nursery needs to be maintained. Temporary offsite parking for Community Center may need to be provided.
  - No significant construction issues or risks beyond typical landscape construction in right-of-way. Temporary traffic or access issues.
### Barton Basin Alternatives

<table>
<thead>
<tr>
<th>CATEGORY / CRITERIA</th>
<th>IMPACT</th>
<th>DESCRIPTION</th>
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<th>DESCRIPTION</th>
<th>IMPACT</th>
<th>DESCRIPTION</th>
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<tbody>
<tr>
<td><strong>1:</strong> Staffing</td>
<td>2</td>
<td>Facility can be automatically started and...</td>
<td>3</td>
<td>Facility is passive and does not require...</td>
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</tr>
<tr>
<td>2. Training</td>
<td></td>
<td></td>
<td>3</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>3. Reliability</td>
<td>2</td>
<td>System may require telemetry/controls to...</td>
<td>3</td>
<td>System is not complex. Gravity stormwater...</td>
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<td>4. Maintenance</td>
<td>2</td>
<td>Automatic flushing gates should provide...</td>
<td>3</td>
<td>Maintenance complexity is less than for...</td>
<td></td>
<td></td>
</tr>
<tr>
<td>5. Safety</td>
<td>2</td>
<td>Street access required. Traffic control...</td>
<td>3</td>
<td>Maintenance of rain gardens will require...</td>
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#### COST EFFECTIVENESS

<table>
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<tr>
<th>CATEGORY / CRITERIA</th>
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<tr>
<td>1. Project Capital Costs</td>
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<td>2. Life Cycle Costs</td>
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<td></td>
</tr>
<tr>
<td>3. Cost Variability/Risk</td>
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<tr>
<td>CATEGORY / CRITERIA</td>
<td>CATEGORY / CRITERIA</td>
<td>1E: PIPE STORAGE, UPPER FAUNTLEROY WAY SW</td>
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<tr>
<td></td>
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<td>IMPACT RATING</td>
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<tr>
<td>1. Location</td>
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<tr>
<td>2. Potential Community Impacts</td>
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<tr>
<td>3. Construction Impacts</td>
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Summary of Discussion

Attendance

<table>
<thead>
<tr>
<th>King County</th>
<th>Consultant</th>
<th>SPU</th>
</tr>
</thead>
<tbody>
<tr>
<td>Betsy Cooper</td>
<td>John Phillips</td>
<td>Ellen Blair</td>
</tr>
<tr>
<td>Hien Dung</td>
<td>Kevin Schock</td>
<td>Jennifer Corrigan</td>
</tr>
<tr>
<td>Pam Erstad</td>
<td>Linda Sullivan</td>
<td>Kevin Dour</td>
</tr>
<tr>
<td>Ron Kohler</td>
<td>Bob Swarner</td>
<td>Jeff Lykken</td>
</tr>
<tr>
<td>Tiffany McClaskey</td>
<td>Martha Tuttle</td>
<td>Brian Matson</td>
</tr>
<tr>
<td>Sue Meyer</td>
<td>Jim Weber</td>
<td>Allen de Steiguer</td>
</tr>
<tr>
<td>Shahrzad Namini</td>
<td>Mary Wohleb</td>
<td>Lloyd Skinner</td>
</tr>
<tr>
<td>Chris Okuda</td>
<td>Monica Van der Vieren</td>
<td>Bob Wheeler</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Sahba Mohandessi</td>
</tr>
</tbody>
</table>

Purpose of this Summary:
This document provides a summary of the workshop process and captures the discussion themes that supported recommendations for CSO control project alternatives to be forwarded for review by internal management and further development by the project team.

Workshop Process
Team members used a collaborative approach to screen alternative means for CSO control using a range of factors. The work was accomplished through a series of meetings on Dec. 9, 2009; Dec. 16, 2009 and Jan. 27, 2010 and is part of the team evaluation process to identify three CSO control alternatives for further evaluation. Documenting the workshop process is a critical piece of the project.

Workshop Goals and Objectives:
1. Recommend three alternative means for CSO control for the Murray Basin to present the public for input and to develop in more detail, with the remaining alternatives to be tabled at this time.
2. Where possible, recommend a set of alternative means that represents the range of complexity and constraints in the basin.
3. Discuss and document the reasons and rationale for recommendations.

December 9, 2009 Workshop – “Straw Poll”

Materials Available for Workshop
1. Final revised Murray Basin Alternatives summary sheets (1 for each alternative)
2. Final revised table of selection factors ratings and descriptions of Low, Moderate, and High impact
3. Final revised Alternative Rating Sheets for Murray Basin (summary & expanded to include description of ratings)
4. Summary of major changes to Barton, Murray, and South Magnolia Basin Alternatives and overall selection factors
5. Inventory of Available Property and Property Profiles

Workshop Approach/Agoenda
A “Straw Poll” was conducted to generate discussion and help inform the team’s recommendations.

An enlarged chart of the screening factors and draft ratings for all alternatives for the Murray basin was posted on the wall. King County staff used dot stickers to indicate the alternatives they thought should be recommended for further evaluation and those they thought should not be recommended. Most importantly, staff also wrote their thoughts on the wall charts as to why certain alternatives should or should not be recommended as well as any questions they might have.

Workshop Outcome
The straw poll provided staff with an initial, visual survey of how their colleagues viewed the alternatives, and provided valuable insight into the reasons for their views. This initial survey and the written thoughts were used to start an in-depth discussion of the alternatives at the Dec. 16, 2009 workshop.

December 16, 2010 – Initial Murray Alternatives Narrowing

Materials Available for Workshop
1. Preliminary planning level cost information for comparison purposes for Murray Basin
2. Initial Straw Poll Results

Workshop Approach/Agenda
1. Review of Initial Straw Poll Results for Murray (Jeff Lykken, Tetra Tech)

2. Initial Murray Alternatives Narrowing - Discussion (facilitated by Bob Wheeler, Triangle Associates)
   • Identify alternatives that clearly do not merit further consideration at this time
   • Identify alternatives that clearly merit further consideration at this time
   • Discussion of remaining alternatives to reduce the recommended number to three
   • Discussion of basis for recommendations on all alternatives

3. Presentation of Preliminary Planning Level Cost Information for Comparison Purposes
   (Kevin Dour, Tetra Tech)
   • Methodology for determining costs
   • Review of methodology for creating comparative cost ratings
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- Discussion of whether cost information changes any of the three alternatives currently identified for further evaluation

4. Team Agreement on 3 Alternative means for CSO control for Further Development
   (facilitated by Bob Wheeler, Triangle Associates)
   - Survey of team for confidence in recommended alternatives
   - Final thoughts on recommendations

Workshop Outcome
King County staff recommended the following alternative means for CSO control to be considered for further development:
- Rectangular Storage, Bottom of Basin (Alternative 1A)
- Distributed Storage Beach Drive & Murray Ave (Alternative 1C)
- Bottom of Basin - Combined Pipe/Rectangular Storage (Alternative 1F)
- Peak Flow Reduction Combined w/Storage (Alternative 5A).

Staff requested additional evaluation of Alternative 5A to determine whether peak flow reduction could be accomplished by roof drain disconnection from the sewer system rather than a combination of residential disconnection and redirection of street flows. Eliminating street flows avoids the potential need for stormwater treatment infrastructure to address water quality requirements. Staff proposed that Alternative 5A be evaluated in parallel if peak flow reduction from rooftops could be used to eliminate the pipe storage in Murray Ave that is part of Alternative 1C.

The engineering basin leads, Jeff Lykken and Kevin Dour, for the Murray Basin supported these choices.

January 27, 2010 - Follow up Meeting

Meeting Approach/Agenda
Alternative 5A was subjected to additional investigation and the results were presented at the January 27, 2010 project team meeting. The project team had considered impervious area disconnection (installation of storm sewers) and green stormwater infrastructure (rain gardens; bioswales) in the Murray basin. Hydraulic modeling indicated that there is not enough connected impervious area available throughout the entire basin to eliminate the need for “gray” infrastructure (storage or treatment). Analysis showed that the required storage volume could be reduced by 15-20% if large areas of connected street runoff and roof runoff were disconnected from the CSO system.

Meeting Outcome
King County staff recommended that Alternative 5A not be further developed at this time since it involves considerably higher costs and does not substantially reduce the challenges of constructing the remaining necessary storage at the bottom of the basin.

Staff recommended that the following alternative means for CSO control be considered for further development:
Summary of Workshop Process Discussion for Murray Basin

Considerations for all CSO Project Basins
- Several issues related to Operations/Maintenance activities were raised:
  - The costs and availability of water to flush storage facilities should be considered during the next phase as alternatives are refined.
  - Using a weir to passively capture flow is simpler than using telemetry and other controls to capture flows, but weirs still require careful design to insure that height is correct for projected flows. Also, Operations staff has to monitor for sedimentation and may need to manage issues.
  - A CSO treatment facility is much more complex operationally than storage.
  - Life cycle costs have not been calculated yet, but O&M costs will be small compared to capital costs for the alternatives.

Considerations for Murray Basin
- An emergency generator and odor control upgrade project is planned for the Murray Pump Station. Further work on this project was deferred until the CSO alternatives in the Murray basin were narrowed to see if there would be opportunities to combine the projects; thereby reducing neighborhood impacts. Combining the upgrade and CSO control projects may reduce community impacts, permitting requirements, and costs. As the CSO control alternatives are narrowed and refined, WTD management will determine if the emergency generator and odor control upgrade project can be combined with the CSO control project.
- The King County Puget Sound Beach CSO Control Projects project manager will review past discussions with Seattle City Light regarding power line extension to provide electricity to facilities.

Considerations for Murray Basin CSO Control Alternatives

Alternative 1A: Rectangular Storage, Bottom of Basin (Recommended for further development)

Design Engineering
- All of the peak flow is captured using passive technology. This is the least technically complex method for CSO control.
- This alternative can be combined with the required emergency generator and odor control project at Murray pump station.
- Some amount of storage or pumping capacity will need to be added at the Murray pump station because of increased flows from the upgraded Barton pump station. This alternative features a single facility that can control CSOs and manage the additional flows from Barton without adding additional pumping capacity at Murray.
Cost

- Low planning level cost relative to other Murray CSO control alternatives.
- Off-street construction limits avoids permitting costs associated with street right-of-way construction.

Land Use/Permitting

- Sufficient space to accommodate staging and construction.
- May require property acquisition.
- Construction might be required in Lowman Beach Park. The Seattle Dept. of Parks and Recreation has a policy that opposes the use of parks for certain types of utilities. This could impact the project schedule.
- Work is located within shoreline zone. A Plan Shoreline Permit from the City of Seattle may be needed, in which case a formal alternatives analysis would be required. This could extend the project schedule.

Environmental

No discussion. Environmental comments were captured in the evaluation document for the Murray basin CSO control alternatives.

Community Impact

- Off-street construction limits traffic impacts in residential area with limited access.
- Construction would cause temporary reduction in recreational use of Lowman Beach Park.
- Small above-ground facilities may cause limited but permanent reduction in accessible park area.
- Some community members have expressed strong opposition to additional utility work in Lowman Beach Park.
- May require property acquisition.

O&M

- O&M access already exists in the park.

Alternative 1B: Circular Storage, Murray Ave & Lincoln Park Way (Not recommended for further development)

Design Engineering

- About half of basin peak flow is captured using passive technology (with peak flow pump station, 100% of peak would be captured and directed to circular storage tank). Moderate level of technical complexity and operational management compared to other CSO control approaches.
- Soft ground associated with stream flows may be difficult to construct on.
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Cost
- Off-street construction avoids permitting costs associated with street right-of-way construction.

Land Use/Permitting
- Could potentially use City of Seattle-owned property.
- If greenbelt is not used, requires purchase of residential properties.

Environmental
- Potential facility location is designated a critical area (environmental) and permitting could extend the project schedule or make the project infeasible.
- The site has steep slopes which might make it difficult to permit the project.

Community Impact
- Requires peak flow pump station at bottom of basin in addition to the storage facility to pump additional flows from Barton.
- Potential facility location is identified as a greenbelt in a neighborhood plan. Community members may oppose any construction there.
- Off-street construction limits traffic impacts in residential area with limited access.

O&M
- Circular storage requires more frequent maintenance and more staff time than rectangular or pipe storage.

Alternative 1C: Distributed Storage Beach Drive & Murray Ave (Recommended for further development)

Design Engineering
- All of the peak flow is captured using passive technology.
- Two storage facilities are considered technically more complex than a single, bottom of the basin storage facility.
- This alternative can be combined with the planned emergency generator and odor control project at Murray pump station.
- Some amount of storage or pumping capacity will be required at the Murray pump station to accommodate increased flows from the upgraded Barton pump station. This alternative can control peak flows within the Murray basin while accommodating increased flows from Barton without adding additional pumping capacity at Murray.

Cost
- Potential for relocation of utilities in ROW could result in additional construction costs.

Land Use/Permitting
- Project is mostly located within right-of-way. Would not require use of Lowman Beach Park or purchase of residential properties.
Environmental
- Minimal environmental impacts.

Community Impact
- Project is mostly located within right-of-way. Would not require use of Lowman Beach Park or purchase of residential properties.
- Relocation of sanitary sewer, water and other underground utilities will be required along Beach Drive and Murray Ave SW. This may result in utility disruptions during construction.
- Construction would be very disruptive to street right-of-way for Beach Drive and Murray Ave. However, construction impacts are not static in a single area because of open cut & cover construction.

O&M
- Telemetry and instrumentation will be necessary to predict and capture projected flows. Flow management by telemetry for multiple facilities is more complex compared to passively capturing all of basin flow at one location at the bottom of the basin.
- Access for O&M staff poses traffic control and safety issues. Accessibility would be limited and require traffic control if entry were within the paved road. Site access structures off the roadway could increase project complexity.

Alternative 1D: Bottom of Basin – Tunneling (Not recommended for further development)

Design Engineering
- All of the peak flow is captured using passive technology. This is the least technically complex means to meet the CSO control requirement.
- No on-the-ground geotechnical investigations have been done to confirm that the material is suitable for tunneling. Investigation may show that tunneling is not feasible in this location.
- Tunneling is a more complex construction method than cut-and-cover.
- This alternative can be combined with the planned emergency generator and odor control project at Murray pump station.

Cost
No discussion. Comments related to cost were captured in evaluation document.

Land Use/Permitting
- Any easement requirements for boring under private property were not considered in the selection factors.

Environmental
No discussion. Environmental comments were captured in evaluation document.
Community Impact
- Tunneling portals would require large areas in a compact, residential neighborhood.
- Construction would completely block Beach Drive near Lowman Beach Park, which is the only access route to residences south of the park.
- Avoids construction in most of Lowman Beach Park. Construction would likely occur in a portion of the park, in the vicinity of the existing Murray pump station.
- Relocation of sanitary sewer, water and other underground utilities would be required along Beach Drive. This may result in utility disruptions.

O&M
No discussion. Comments related to O&M were captured in the evaluation document.

Alternative 1E: Upper Basin Storage (Not recommended for further development)

Design Engineering
- This alternative can be combined with the planned emergency generator and odor control project at Murray pump station.

Cost
- High cost compared to other Murray CSO control alternatives.

Land Use/Permitting
- Construction might be required in Lowman Beach Park. The Seattle Dept. of Parks and Recreation has a policy that opposes the use of parks for certain types of utilities. This could impact the project schedule.
- Work is located within shoreline zone. A Plan Shoreline Permit from the City of Seattle may be needed, in which case a formal alternatives analysis would be required. This could extend the project schedule.

Environmental
No discussion. Environmental comments were captured in evaluation document.

Community Impact
- 32 mgd pump station would be needed at the bottom of basin.
- Temporary and permanent impacts to multiple areas in the Murray basin. Construction impacts and a permanent facility at the bottom of the basin, construction impacts and a permanent facility in the upper basin, and construction impacts to 2550 lineal feet of street right-of-way.
- Community has historically opposed additional utility location in Lowman Beach Park.
- Relocation of sanitary sewer, water and other underground utilities may be required along Beach Drive. This may result in utility disruptions.
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O&M
- Telemetry and instrumentation will be necessary to monitor and control storage volume in upper basin. Flows would be diverted passively by gravity to peak flow pump station at bottom of basin.

**Alternative 1F: Bottom of Basin - Combined Pipe/Rectangular Storage (Recommended for further development)**

**Design Engineering**
- All of the peak flow is captured using passive technology.
- Although this alternative involves multiple facilities, they are located proximal to each other and management is less complicated than distributed storage.
- This alternative can be combined with the planned emergency generator and odor control project at Murray pump station.

**Cost**
- Low cost relative to other Murray CSO control alternatives.

**Land Use/Permitting**
- Avoids construction in Lowman Beach Park and in the shoreline zone.
- Requires purchase of residential properties.

**Environmental**
No discussion. Comments related to environmental issues were captured in the evaluation document.

**Community Impact**
- Construction would be located in Beach Drive right-of-way resulting in traffic disruptions over a long period of time.
- Relocation of sanitary sewer, water and other underground utilities may be required along Beach Drive. This may result in utility disruptions.
- Requires purchase of residential properties.

**O&M**
- Multiple facilities will require more maintenance and are not as easy to manage as a single facility.

**Alternative 2A: Convey & Treat at Alki (Not recommended for further development)**

**Design Engineering**
- The capacity of the Alki CSO treatment facility and outfall would need to be evaluated and likely upgraded for discharging additional flows to Puget Sound.
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- Would require upgrades to the existing 63rd Street pump station and the Alki treatment facility to handle the additional flows.
- This alternative can be combined with the planned emergency generator and odor control project at Murray pump station.

Cost
- High cost compared to other Murray CSO control alternatives.

Land Use/Permitting
- Work is located within shoreline zone. A Plan Shoreline Permit from the City of Seattle may be needed, in which case a formal alternatives analysis would be required. This could extend the project schedule.
- Construction might be required in Lowman Beach Park. The Seattle Dept. of Parks and Recreation has a policy that opposes the use of parks for certain types of utilities. This could impact the project schedule.

Environmental
- The capacity of the Alki CSO treatment facility and outfall would need to be evaluated and likely upgraded for discharging additional flows to Puget Sound.
- Permitting effluent discharge to Puget Sound could delay the project schedule.

Community Impact
- Construction would be disruptive for residents, park users, and commuters:
  - Construction of 13,500 lineal feet of force main in Beach Drive.
  - Would require upgrades to the existing 63rd Street pump station and the Alki treatment facility to handle the additional flows.
  - Would require construction of a 28.5 mgd peak flow pump station at the bottom of the basin, possibly in Lowman Beach Park.
- If Lowman Beach Park is not used, it would be necessary to purchase residential properties to site the peak flow pump station.
- Community has historically opposed additional utility location in Lowman Beach Park.

O&M
No discussion. Comments related to O&M were captured in the evaluation document.

Alternative 3A - End of Pipe Treatment, Bottom of Basin (Not recommended for further development)

Design Engineering
- Technically complex.
- This alternative can be combined with the planned emergency generator and odor control project at Murray pump station.
- This alternative can control CSOs and manage the additional flows from Barton Pump Station without adding additional pumping capacity at Murray.
Cost
• High cost relative to all other Murray CSO control alternatives.

Land Use/Permitting
• Treatment facility in shoreline is currently prohibited by code.
• Construction might be required in Lowman Beach Park. The Seattle Dept. of Parks and Recreation has a policy that opposes the use of parks for certain types of utilities. This could impact the project schedule.
• If Lowman Beach Park is not used, it would be necessary to purchase residential properties to site the storage facility.

Environmental
• Permitting effluent discharge to Puget Sound could delay the project schedule.

Community Impact
• Community members may object to treatment facility in residential neighborhood.
• Community has historically opposed additional utility location in Lowman Beach Park
• If Lowman Beach Park is not used, it would be necessary to purchase residential properties to site the storage facility.

O&M
• O&M more complicated and time-consuming for staff than storage.

Alternative 5A: Peak Flow Reduction Combined w/Storage (Not recommended for further development)

Design Engineering
• Storage volume required for CSO control will be reduced with effective rooftop disconnection. Flows to West Point Treatment Plant will also be reduced.
• Although more stormwater flows to the Combined Sewer System from streets than from roof drains, there may be enough acreage of connected roof drains to considerably reduce the amount of storage required in the basin.
• While it may take some time to achieve enough roof drain disconnects, the disconnect efforts can begin as soon as the Facility Plan is complete.
• May be challenging to identify sufficient stormwater sources that can be disconnected from the system to reliably reduce the storage volume to meet CSO control requirements.
• Some amount of storage or pumping capacity will need to be added at the Murray pump station because of increased flows from the upgraded Barton pump station. The Beach Drive storage facility can control CSOs and manage the additional flows from Barton Pump Station without adding additional pumping capacity at Murray.
• The Beach Drive storage facility can be combined with the planned emergency generator and odor control project at Murray pump station.
Cost
• If only areas with existing stormwater systems are targeted to meet the project goal, permitting and construction costs might be lower than initially anticipated because no new stormwater pipes will be needed.

Land Use/Permitting
• The King County CSO Program is interested in roof drain disconnects as a way to control CSOs. Other agencies have had success with roof drain disconnects. The City of Seattle has an operational roof drain disconnect program and they have offered to partner and cost-share with King County to encourage people to redirect their roof drains to the stormwater system in partially separated basins.
• Department of Ecology and EPA have indicated interest in “source control” as a way to control CSOs.
• The storage facility would not require use of Lowman Beach Park or acquisition of residential properties.

Environmental
• If only roof drain disconnection is needed to meet the project goal, and not street disconnection, Department of Ecology does not require additional treatment of stormwater.

Community Impact
• Many community members have expressed interest in an option other than a traditional “gray” facility.
• Project schedule could be considerably delayed because of need to coordinate with City of Seattle and work required on hundreds of private properties.
• Construction of storage facility would be very disruptive to street right-of-way for Beach Drive.
• Relocation of sanitary sewer, water and other underground utilities would be required along Beach Drive. This may result in utility disruptions.

O&M
• Access for O&M staff poses traffic control and safety issues. Accessibility would be limited and require traffic control if entry were within the paved road. Site access structures off the roadway could increase project complexity.
### MURRAY BASIN ALTERNATIVES

<table>
<thead>
<tr>
<th>CATEGORY / CRITERIA</th>
<th>1A: RECTANGULAR STORAGE, BOTTOM OF BAY</th>
<th>1F: BOTTOM OF BAY - BEACH DRIVE RECTANGULAR STORAGE</th>
<th>CAG 2A: STORAGE IN LINCOLN PARK LOWER PARKING LOT</th>
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<tbody>
<tr>
<td>IMPACT RATING</td>
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</tr>
<tr>
<td>LAND USE AND PERMITTING</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>1. City of Seattle Comprehensive Plan</td>
<td>1</td>
<td>Section 6.5 of the Seattle Comprehensive Plan (Utilities Element of the Planning Policies, U16) states that the City should work cooperatively with King County to identify and expeditiously address combined sewer overflows. The alternatives analysis includes plans to reduce the number of combined sewer overflows. The construction of a tank within Seattle Parks is strongly discouraged.</td>
<td>2</td>
</tr>
<tr>
<td>2. Seattle Municipal Code (SMC/Zoning Code)</td>
<td>2</td>
<td>Zoning in Single Family Residential. Lowman Beach Park in potential placement area will require review for consistency with Parks policies. May require condition use permit for utility service use.</td>
<td>2</td>
</tr>
<tr>
<td>3. Shoreline Master Program Compatibility</td>
<td>2</td>
<td>Zoning in Single Family Residential. Lowman Beach Park in potential placement area will require review for consistency with Parks policies. May require condition use permit for utility service use.</td>
<td>2</td>
</tr>
<tr>
<td>4. Permitting Complexity</td>
<td>1 (changed from 2)</td>
<td>This alternative will require a Shoreline Permit. The parking lot may be required if the pipe portion of the tank is not located below grade. This may require multiple reviews from the City of Seattle DPD, Parks and Stormwater. The location of the property may affect height and view requirements. The traffic volume is likely to be substantial. The permit review is complex.</td>
<td>2</td>
</tr>
<tr>
<td>5. Property Acquisition Complexity</td>
<td>1</td>
<td>Assumes location on park property. If located on private property, zoning would change from Z1 to Z2. Neighborhood has expressed concerns. This is waterfront real estate, which will be expensive to replace. The project could be feasible. Initiative 42 requires input and review from Seattle City Council to ensure park property is used for public purposes.</td>
<td>2</td>
</tr>
</tbody>
</table>
**Barton, Murray, Magnolia and North Beach CSO Projects**

**Alternatives Analysis**

**MURRAY BASIN ALTERNATIVES**

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<tr>
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<td>DESCRIPTION</td>
</tr>
<tr>
<td>ENVIRONMENT</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>1. Cultural Resources</td>
<td>2</td>
<td>No archaeological or historic resources identified in the project area. Based on site characteristics, the project area has a high probability of containing archaeological resources.</td>
<td>2</td>
</tr>
<tr>
<td>2. Fish and Wildlife</td>
<td>2 unchanged from 3</td>
<td>It is assumed that Pelly Creek is not a fish-bearing stream. Construction and operation of this alternative would move a minimum of 1000 cubic yards of sediment, which may affect fish and wildlife, rangeland, and riparian habitat. If marine access was required, rating would change from 2 to 1.</td>
<td>2</td>
</tr>
<tr>
<td>3. Wetlands, Streams, and Shoreline</td>
<td>2</td>
<td>It is assumed that Pelly Creek, which is piped through the project area along the northern edge of Lowman Beach Park, would likely have to be moved to construct this alternative. The project area is located within the shoreline district. Construction on the beach is not anticipated. It is assumed that marine access would not be required. If marine access was required, construction would impact Puget Sound seafloor and rating would change from 2 to 1. No wetlands in the project area.</td>
<td>2</td>
</tr>
<tr>
<td>4. Soils and Sediments</td>
<td>3</td>
<td>No known contaminated sites. Project area is within liquefaction zone. No steep slopes and/or potential or known landslide areas.</td>
<td>2</td>
</tr>
<tr>
<td>5. Water Quality</td>
<td>3</td>
<td>No new untreated discharges to surface waters.</td>
<td>3</td>
</tr>
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### MURRAY BASIN ALTERNATIVES

#### 1A: RECTANGULAR STORAGE, BOTTOM OF BASIN

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<thead>
<tr>
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</thead>
<tbody>
<tr>
<td>2</td>
<td>At bottom of basin and will passively capture peak flow using a weir in a diversion structure. Most reliable and will not require telemetry to divert flow. No storage.</td>
</tr>
</tbody>
</table>

#### 1F: BOTTOM OF BASIN - BEACH DRIVE RECTANGULAR STORAGE

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<thead>
<tr>
<th>IMPACT RATING</th>
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</table>
| 2             | <At bottom of basin and will passively capture peak flow using a weir in a diversion structure. Most reliable and will not require telemetry to divert flow.>

#### CAG 2A: STORAGE IN LINCOLN PARK LOWER PARKING LOT

<table>
<thead>
<tr>
<th>IMPACT RATING</th>
<th>DESCRIPTION</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Storage at two locations: bottom of basin (0.1MG) and up-basin. Storage volume at bottom of basin uses passive gravity overflow and is highly reliable. Storage in Lincoln Park will use a more complex diversion structure relying on telemetry and possibly predictive algorithms. Telemetry signal and audible alarm will be maintained during a peak flow event. There will be continuous need for site management at the diversion structure because force main flows will be released and downstream flows will be gravity.</td>
</tr>
</tbody>
</table>

#### CATEGORY / CRITERIA

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</thead>
<tbody>
<tr>
<td>Technical Complexity</td>
<td>1</td>
<td>3</td>
<td>1</td>
</tr>
<tr>
<td>Compatibility with Existing WW system</td>
<td>2</td>
<td>2</td>
<td>2</td>
</tr>
<tr>
<td>Flexibility/Adaptive Management</td>
<td>2</td>
<td>2</td>
<td>2</td>
</tr>
<tr>
<td>Constructability/Implementation Schedule</td>
<td>2</td>
<td>2</td>
<td>2</td>
</tr>
</tbody>
</table>

#### IMPACT RATING

1. **Technical Complexity**
   - **Description**: At bottom of basin and will passively capture peak flow using a weir in a diversion structure. Most reliable and will not require telemetry to divert flow. No storage.
   - **Rating**: 2

2. **Compatibility with Existing WW system**
   - **Description**: May prolong peak event to existing system because stored flows will be fed back into the system after peak event passes. More pounds of BOD, TSS will be routed through treatment facilities.
   - **Rating**: 2

3. **Flexibility/Adaptive Management**
   - **Description**: Limited space available for expansion or construction of auxiliary tanks. Property is limited at the bottom of the basin and ability to expand in the future could be problematic.<br>Storage may be used as a temporary wet well during remodeling/construction at existing Murray Pump Station.
   - **Rating**: 1

4. **Constructability/Implementation Schedule**
   - **Description**: There may be construction difficulties with groundwater and excavation. Due to construction staging and truck traffic, it is expected there will be some access impacts to residential properties south of Lowman Beach parking.<br>Security fencing and site security will be required to keep people out of the area during park closure.<br>May need to maintain pedestrian access between Beach Drive and Lincoln Park to the south.
   - **Rating**: 2
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<tr>
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<tbody>
<tr>
<td>O&amp;M</td>
<td>1. Staffing</td>
<td>Facility can be automatically started (gravity overflow) and run autonomously under design conditions. Minimal staffing required for operation and shut down. Some staffing/supervision may be needed for cleaning. Facility should not impact downstream facilities.</td>
<td>3</td>
<td>Facility can be automatically started (gravity overflow) and run autonomously under design conditions. Minimal staffing required for operation and shut down. Some staffing/supervision may be needed for cleaning. Facility should not impact downstream facilities.</td>
<td>2</td>
</tr>
<tr>
<td></td>
<td>2. Training</td>
<td>Staff familiar with storage facilities and technology - North Creek. Similar control approaches to other facilities within the system can be specified for consistency.</td>
<td>3</td>
<td>Staff familiar with storage facilities and technology - North Creek &amp; Henderson. Similar control approaches to other facilities within the system can be specified for consistency.</td>
<td>2</td>
</tr>
<tr>
<td></td>
<td>3. Reliability</td>
<td>System is not complex. Gravity diversion over a weir. Power not critical for ability to store peak flows. Storage is a proven technology for controlling peak flow events.</td>
<td>3</td>
<td>System is not complex. Gravity diversion over a weir. Storage is a proven technology for controlling peak flow events.</td>
<td>3</td>
</tr>
<tr>
<td></td>
<td>4. Maintenance</td>
<td>Alternative requires less maintenance than other alternatives. Automatic flushing gates should provide most, if not all, the cleaning needed. Minimal telemetry/controls to maintain typical level sensing and pump system controls. Assumes no entry.</td>
<td>2</td>
<td>Alternative requires less maintenance than other alternatives. Automatic flushing gates should provide most, if not all, the cleaning needed. Minimal telemetry/controls to maintain typical level sensing and pump system controls. Assumes no entry.</td>
<td>2</td>
</tr>
<tr>
<td></td>
<td>5. Safety</td>
<td>No street access required. No traffic control procedures required. No street use/closure permit required.</td>
<td>3</td>
<td>No street access required. No traffic control procedures required. No street use/closure permit required.</td>
<td>1</td>
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</table>

**COST EFFECTIVENESS**

1. Project Capital Costs | 3 | 3 | 3 | 3
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<tr>
<td>2. Life Cycle Costs</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>3. Cost: Variability/Risk</td>
<td>3</td>
<td>3</td>
<td>3</td>
</tr>
<tr>
<td>COMMUNITY IMPACT</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>1. Location</td>
<td>Access hatches and penetrations such as vents may cause reduction in park use. The design must try to minimize impacts to existing land use.</td>
<td>Existing parcels will no longer be for residential use. Balcony grade facility with limited abovegrade structures provides potential for future public access. Will not impact surrounding land use.</td>
<td>In Lincoln Park lower parking lot, area will continue to be used as a parking lot after construction. AT bottom of basin in Murray (0.1 MG) will likely be located in the street and not at end of street. Existing uses, however, access hatches and penetrations in lower lot (0.2 MG) will likely be located in the street and not in the street. Bottom of basin in Murray will not affect existing use. Some facilities require limited access (e.g. electrical and odor controls) for routine maintenance. Periodic access to tank hatches etc., may be needed for longer interval maintenance (such as inspections). The design must try to minimize impacts to existing land use.</td>
</tr>
<tr>
<td>2. Potential Community Impacts</td>
<td>Facility will result in a some loss of park use (recreational use and view) which goes against the community’s stated vision of itself.</td>
<td>The community has expressed the loss (or displacement) of rental property in the neighborhood goes against the community’s vision of itself.</td>
<td>A below grade storage facility located in the lower parking lot at Lincoln Park (1.25 MG) and at the bottom of the basin in Murray (0.1 MG) would not affect the community’s vision of itself. Staff could check facility during scheduled intervals. Planned maintenance could be scheduled and performed during non-peak uses of the park.</td>
</tr>
<tr>
<td>3. Construction Impacts</td>
<td>&lt;Estimated construction duration is 24-36 months&gt;. Park users and adjacent residents will be affected by construction traffic and noise. Some aspects of construction can be reduced through design and construction controls.</td>
<td>&lt;Estimated construction duration is 24-36 months&gt;. Park users and adjacent residents will be affected by construction traffic and noise. Some aspects of construction can be reduced through design and construction controls.</td>
<td>&lt;Estimated construction duration is 24-36 months&gt;. Lincoln &amp; Lowman Beach Parks users and adjacent residents will be affected by construction traffic and noise. Some aspects of construction can be reduced through design and construction controls. Construction will result in loss of recreational use, water view, and access to the park during construction. Existing trees in park may need to be removed in order to provide room for construction material storage. Extensive truck hailing will occur for excavation and materials within residential streets to main arterial/Audubon Way. &gt;</td>
</tr>
<tr>
<td></td>
<td>&lt;Estimated construction duration is 24-36 months&gt;. Lincoln &amp; Lowman Beach Parks users and adjacent residents will be affected by construction traffic and noise. Some aspects of construction can be reduced through design and construction controls. Construction will result in loss of recreational use, water view, and access to the park during construction. Extensive truck hailing will occur for excavation and materials within residential streets to main arterial/Audubon Way. &gt;</td>
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November 2010
Final Evaluation
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<tr>
<td><strong>LAND USE AND PERMITTING</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>1. City of Seattle Comprehensive Plan</td>
<td>1</td>
<td>Section 6.5 of the Seattle Comprehensive Plan (Utilities Element of the Planning Policies, U16) states that the City should work cooperatively with King County to identify and expeditiously address combined sewer overflows. Elsewhere in the Comp Plan (Land Use Element, Section 2.1, LU 61 &amp; 62), uses in Single Family Residential neighborhoods should affirm and encourage residential use by one household as the principal use or should only encourage uses that are permitted outright. Location may require review for consistency with City parks policies. If the storage facility is not located in the park, the rating would be improved.</td>
<td>2</td>
</tr>
<tr>
<td>2. Seattle Municipal Code (SMC/Zoning Code)</td>
<td>2</td>
<td>Zoning is Single Family Residential. Lowman Beach Park in potential placement area will require review for consistency with Parks policies.</td>
<td>2</td>
</tr>
<tr>
<td>3. Shoreline Master Program Compatibility</td>
<td>1</td>
<td>Storage is most likely considered a &quot;Utility Service Use&quot;. A Utility Service Use is allowed outright within the Shoreline District only if it can be demonstrated that it requires a shoreline location, although water-related uses (pump stations will likely be considered a water-related use) are preferred next in line to water-dependent uses within the Shoreline District. Because this option involves acquisition of Single Family Residential (SFR) properties, it is uncertain if this option will be considered compatible with existing land uses in the area.</td>
<td>3</td>
</tr>
<tr>
<td>4. Permitting Complexity</td>
<td>2</td>
<td>This alternative will require a Shoreline Permit. Potential for marine access will add federal and state permits in addition to local permits. This could add up to a year or more to the schedule. Affected roadways have low traffic volume in residential neighborhood with restricted access to residences south of Lowman Beach Park. Will require careful traffic planning to maintain access. Work hours likely to be restricted. Permit review likely to be more complex.</td>
<td>2</td>
</tr>
<tr>
<td>5. Property Acquisition Complexity</td>
<td>1</td>
<td>Assumes location on park property. If located on private property the rating would change to from 1 to 2. Neighborhood has expressed concerns, waterfront real estate. Acquisition possible for private property.</td>
<td>2</td>
</tr>
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</table>
## MURRAY BASIN ALTERNATIVES

### 1A: RECTANGULAR STORAGE, BOTTOM OF BASIN

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<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>1. Cultural Resources</td>
<td>2</td>
<td>No archaeological or historic resources identified in the project area. Based on site characteristics, the project area has a high probability of containing archaeological resources.</td>
<td>2</td>
<td>No archaeological or historic resources identified in the project area. Based on site characteristics, the project area has a high probability of containing archaeological resources.</td>
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<td>No archaeological or historic resources identified in the project area. Based on site characteristics, the project area has a high probability of containing archaeological resources.</td>
</tr>
<tr>
<td>2. Fish and Wildlife</td>
<td>3</td>
<td>It is assumed that Pelly Creek is not a fish-bearing stream. Construction and operation of this alternative would not affect fish and wildlife, or their habitat.</td>
<td>2</td>
<td>It is assumed that Pelly Creek is not a fish-bearing stream. Construction would require clearing of forested area, which may affect fish and wildlife. If marine access was required, rating would change from 3 to 1.</td>
<td>3</td>
<td>Construction and operation of this alternative would not affect fish and wildlife or their habitat.</td>
</tr>
<tr>
<td>3. Wetlands, Streams, and Shoreline</td>
<td>2</td>
<td>It is assumed that Pelly Creek, which is piped through the project area along the northern edge of Lowman Beach Park, would likely have to be moved to construct this alternative. It is assumed that marine access would not be required. If marine access was required, construction would impact Puget Sound shoreline and rating would change from 2 to 1. No wetlands in the project area.</td>
<td>1</td>
<td>Pelly Creek flows through the project area and would be impacted by construction activities. The project area may contain wetlands that would be impacted by construction activities. This alternative would not impact shoreline areas.</td>
<td>2</td>
<td>It is assumed that Pelly Creek, which is piped through the project area, would likely have to be moved to construct this alternative. This alternative would not impact wetlands or shoreline areas.</td>
</tr>
<tr>
<td>4. Soils and Sediments</td>
<td>3</td>
<td>No known contaminated sites. Project area is within liquefaction zone. No steep slopes and/or potential or known landslide areas.</td>
<td>1</td>
<td>No known contaminated sites. Eastern part of project area has steep slopes and is identified as a potential landslide area. Project area is not within liquefaction zone and contains no known landslide areas.</td>
<td>3</td>
<td>No known contaminated sites. Project area is not within liquefaction zone and contains no steep slopes and/or potential or known landslide areas. Murray Avenue SW is adjacent to steep slopes.</td>
</tr>
<tr>
<td>5. Water Quality</td>
<td>3</td>
<td>No new untreated discharges to surface waters.</td>
<td>3</td>
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<tr>
<td>TECHNICAL</td>
<td>IMPACT RATING</td>
<td>DESCRIPTION</td>
<td>IMPACT RATING</td>
</tr>
<tr>
<td>1. Technical Complexity</td>
<td>3</td>
<td>At bottom of basin and will capture peak flow using a weir in a diversion structure. Most reliable and will not require telemetry to divert flows.</td>
<td>2</td>
</tr>
<tr>
<td>2. Compatibility with Existing WW system</td>
<td>2</td>
<td>May prolong peak event to existing system because stored flows will be fed back into the system after peak event passes. More pounds of BOD, TSS will be routed through treatment facilities.</td>
<td>2</td>
</tr>
<tr>
<td>3. Flexibility/Adaptive Management</td>
<td>2</td>
<td>Limited space available for expansion or construction of auxiliary tank. Property is limited at the bottom of the basin and ability to expand in the future could be problematic.</td>
<td>2</td>
</tr>
<tr>
<td>4. Constructability/Implementation Schedule</td>
<td>2</td>
<td>There may be construction difficulties with groundwater and excavation. Limited construction access and issues associated with ferry traffic.</td>
<td>2</td>
</tr>
<tr>
<td>CATEGORY / CRITERIA</td>
<td>IMPACT RATING</td>
<td>DESCRIPTION</td>
<td>IMPACT RATING</td>
</tr>
<tr>
<td>---------------------</td>
<td>---------------</td>
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<td>---------------</td>
</tr>
<tr>
<td><strong>O&amp;M</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>1. Staffing</td>
<td>3</td>
<td>Facility can be automatically started (gravity overflow) and run autonomously under design conditions. Minimal staffing required for operation and shut down. Some staffing/supervision may be needed for cleaning. Facility should not impact downstream facilities.</td>
<td>2</td>
</tr>
<tr>
<td>2. Training</td>
<td>3</td>
<td>Staff familiar with storage facilities and technology - North Creek. Similar control approaches to other facilities within the system can be specified for consistency.</td>
<td>3</td>
</tr>
<tr>
<td>3. Reliability</td>
<td>3</td>
<td>System is not complex. Gravity diversion over a weir. Storage is a proven technology for controlling peak flow events.</td>
<td>2</td>
</tr>
<tr>
<td>4. Maintenance</td>
<td>3</td>
<td>Alternative requires less maintenance than other alternatives. Automatic flushing gates should provide most, if not all, the cleaning needed. Minimal telemetry/controls to maintain (typical level sensing and pump system controls). Assumes no entry.</td>
<td>2</td>
</tr>
<tr>
<td>5. Safety</td>
<td>3</td>
<td>No street access required. No traffic control procedures required.</td>
<td>3</td>
</tr>
<tr>
<td>CATEGORY / CRITERIA</td>
<td>ALTERNATIVE 1A: RECTANGULAR STORAGE, BOTTOM OF BASIN</td>
<td>ALTERNATIVE 1B: CIRCULAR STORAGE, MURRAY AVE &amp; LINCOLN PARK</td>
<td>ALTERNATIVE 1C: DIST. STORAGE BEACH DRIVE &amp; MURRAY AVE</td>
</tr>
<tr>
<td>---------------------</td>
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<td>------------------------------------------------------</td>
<td>--------------------------------------------------</td>
</tr>
<tr>
<td>COST EFFECTIVENESS</td>
<td><img src="image1" alt="Impact Rating" /> Relative cost = 1.0</td>
<td><img src="image2" alt="Impact Rating" /> Relative cost = 1.2</td>
<td><img src="image3" alt="Impact Rating" /> Relative cost = 1.7</td>
</tr>
<tr>
<td>1. Project Capital Costs</td>
<td><img src="image4" alt="Impact Rating" /> Relative cost = 1.0</td>
<td><img src="image5" alt="Impact Rating" /> Relative cost = 1.2</td>
<td><img src="image6" alt="Impact Rating" /> Relative cost = 1.7</td>
</tr>
<tr>
<td>2. Life Cycle Costs</td>
<td><img src="image7" alt="Impact Rating" /> Relative cost = 1.0</td>
<td><img src="image8" alt="Impact Rating" /> Relative cost = 1.2</td>
<td><img src="image9" alt="Impact Rating" /> Relative cost = 1.7</td>
</tr>
<tr>
<td>3. Cost Variability/Risk</td>
<td><img src="image10" alt="Impact Rating" /> Relative cost = 1.0</td>
<td><img src="image11" alt="Impact Rating" /> Relative cost = 1.2</td>
<td><img src="image12" alt="Impact Rating" /> Relative cost = 1.7</td>
</tr>
<tr>
<td>Note: Project Capital Costs for Murray Alternatives range from a low $13M to a high of $70M</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>COMMUNITY IMPACT</td>
<td><img src="image13" alt="Impact Rating" /> Relative cost = 1.0</td>
<td><img src="image14" alt="Impact Rating" /> Relative cost = 1.2</td>
<td><img src="image15" alt="Impact Rating" /> Relative cost = 1.7</td>
</tr>
<tr>
<td>1. Location</td>
<td><img src="image16" alt="Impact Rating" /> Relative cost = 1.0</td>
<td><img src="image17" alt="Impact Rating" /> Relative cost = 1.2</td>
<td><img src="image18" alt="Impact Rating" /> Relative cost = 1.7</td>
</tr>
<tr>
<td>2. Potential Community Impacts</td>
<td><img src="image19" alt="Impact Rating" /> Relative cost = 1.0</td>
<td><img src="image20" alt="Impact Rating" /> Relative cost = 1.2</td>
<td><img src="image21" alt="Impact Rating" /> Relative cost = 1.7</td>
</tr>
<tr>
<td>3. Construction Impacts</td>
<td><img src="image22" alt="Impact Rating" /> Relative cost = 1.0</td>
<td><img src="image23" alt="Impact Rating" /> Relative cost = 1.2</td>
<td><img src="image24" alt="Impact Rating" /> Relative cost = 1.7</td>
</tr>
</tbody>
</table>

Small, above ground facilities and vents may cause limited reduction in land use. Design must consider surrounding land use. If the facility is built across the street from the park, it should be rated a 2. If it is built in Lowman Park it should be rated a 1.

Design can help small aboveground facilities fit into community vision that is consistent with current surrounding uses. If built across the street from the park it should be rated a 3, if built in the park, a 2.

Construction traffic and hauling will use residential arterials. Wooded area provides visual buffer from nearby residences. Some aspects of construction can be reduced through design and construction controls. If constructed in across from the park, it should be rated a 2. If built in Lowman park, it should be a 1.
### Land Use and Permitting

<table>
<thead>
<tr>
<th>CATEGORY / CRITERIA</th>
<th>ALTERNATIVE 1D: BOTTOM OF BASIN - TUNNELING</th>
<th>1E: UPPER BASIN STORAGE</th>
<th>1F: BOTTOM OF BASIN - COMBINED PIPE/RECTANGULAR STORAGE</th>
</tr>
</thead>
<tbody>
<tr>
<td>IMPACT RATING</td>
<td>DESCRIPTION</td>
<td>IMPACT RATING</td>
<td>DESCRIPTION</td>
</tr>
<tr>
<td><strong>LAND USE AND PERMITTING</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>1. City of Seattle Comprehensive Plan</td>
<td>Section 6.5 of the Seattle Comprehensive Plan (Utilities Element of the Planning Policies, U16) states that the City should work cooperatively with King County to identify and expeditiously address combined sewer overflows.</td>
<td>1</td>
<td>Section 6.5 of the Seattle Comprehensive Plan (Utilities Element of the Planning Policies, U16) states that the City should work cooperatively with King County to identify and expeditiously address combined sewer overflows.</td>
</tr>
<tr>
<td>2. Seattle Municipal Code (BMC/Zoning Code)</td>
<td>Utilities would be buried underground in the ROW which would only temporarily disrupt public access. Zoning: N/A (Located in ROW).</td>
<td>2</td>
<td>Storage is compatible with existing land use within ROW, but may not be fully consistent with Seattle Parks policies for ancillary structures if located in Lowman Beach Park.</td>
</tr>
<tr>
<td>3. Shoreline Master Program Compatibility</td>
<td>Utilities would be buried underground in the ROW which would only temporarily disrupt public access. Parts of alternative may be in the Shoreline Zone.</td>
<td>3</td>
<td>Storage is compatible with existing land use within ROW, but may not be consistent with Seattle Parks policies for ancillary structures if located in Lowman Beach Park. Pump stations is a &quot;Utility Service Use&quot; within the Shoreline District only if it can be demonstrated that it requires a shoreline location, although water-related uses (pump stations will likely be considered a water-related use) are preferred next in line to water-dependent uses within the Shoreline District.</td>
</tr>
<tr>
<td>4. Permitting Complexity</td>
<td>This alternative may require a Shoreline Permit for portions of the alternative within 200-ft of the shoreline. Only local permits required from SDOT (no federal or state permits required). Traffic impacts for local residents. Provision for temporary and emergency access required. SDOT Street Use permit fees could be extremely high because of size of facilities (pipe storage) and number of structures located within ROW (Costs accounted for in Cost Effectiveness Category).</td>
<td>2</td>
<td>This alternative will require a Shoreline Permit. Potential for marine access will add federal and state permits in addition to local permits. This could add up to a year or more to the schedule. Affected roadways have moderate traffic volumes in residential neighborhood with restricted access to residences south of Lowman Beach Park. Will require careful traffic planning to maintain access. Work hours likely to be restricted. Permit review likely to be complex.</td>
</tr>
<tr>
<td>5. Property Acquisition Complexity</td>
<td>SDOT street, may require additional property for tunnel portal and ancillary facilities (odor control, electrical, generator, etc.). Acquisition is possible.</td>
<td>1</td>
<td>Property acquisition difficult if tank located on Seattle Public School Property and pump station located in park. Rating would change from 1 to 2 if tank and pump station are located on private property.</td>
</tr>
</tbody>
</table>

#### Notes
- Section 6.5 of the Seattle Comprehensive Plan (Utilities Element of the Planning Policies, U16) states that the City should work cooperatively with King County to identify and expeditiously address combined sewer overflows. Elsewhere in the Comp Plan (Land Use Element, Section 2.1, LU 61 & 62), uses in Single Family Residential neighborhoods should affirm and encourage residential use by one household as the principal use or should only encourage uses that are permitted outright. Storage is compatible with existing land use within ROW, but may not be fully consistent with Seattle Parks policies for ancillary structures if located in Lowman Beach Park. Provisions for temporary and emergency facilities (odor control, electrical, generator, etc.) could be required. Acquisition is difficult if the storage facility is not located in the park, the rating would be improved.
- Utilities would be buried underground in the ROW which would only temporarily disrupt public access. Zoning: N/A (Located in ROW). Zoning is Single Family Residential. Lowman Beach Park in potential placement area will require review for consistency with Parks policies Dependent upon final location of pump station. Storage is compatible with existing land use within ROW, but may not be consistent with Seattle Parks policies for ancillary structures if located in Lowman Beach Park. Pump stations is a "Utility Service Use" within the Shoreline District only if it can be demonstrated that it requires a shoreline location, although water-related uses (pump stations will likely be considered a water-related use) are preferred next in line to water-dependent uses within the Shoreline District. Storage is most likely considered a "Utility Service Use". A Utility Service Use is allowed outright within the Shoreline District if it can be demonstrated that it requires a shoreline location, although water-related uses (pump stations will likely be considered a water-related use) are preferred next in line to water-dependent uses within the Shoreline District. This alternative may require a Shoreline Permit for portions of the alternative within 200-ft of the shoreline. Only local permits required from SDOT (no federal or state permits required). Traffic impacts for local residents. Provision for temporary and emergency access required. SDOT Street Use permit fees could be extremely high because of size of facilities (pipe storage) and number of structures located within ROW (Costs accounted for in Cost Effectiveness Category). This alternative will require a Shoreline Permit. Potential for marine access will add federal and state permits in addition to local permits. This could add up to a year or more to the schedule. Affected roadways have moderate traffic volumes in residential neighborhood with restricted access to residences south of Lowman Beach Park. Will require careful traffic planning to maintain access. Work hours likely to be restricted. Permit review likely to be complex. Property acquisition difficult if tank located on Seattle Public School Property and pump station located in park. Rating would change from 1 to 2 if tank and pump station are located on private property. Single family residential properties must be acquired for rectangular tank. For pipe storage, SDOT (Residential Street) may require additional property for ancillary facilities (odor control, electrical, generator, etc.).
## MURRAY BASIN ALTERNATIVES

### 1. Cultural Resources
- **Alternative 1D:** Bottom of Basin - Tunneling: 2
  - No archaeological or historic resources identified in the project area. Based on site characteristics, the project area has a high probability of containing archaeological resources.
- **1E:** Upper Basin Storage: 2
  - No archaeological resources identified in the project area. Based on site characteristics, the project area in which the pump station would be located has a high potential for containing archaeological resources. The majority of the rest of the basin has a low probability of containing archaeological resources. Historic properties in the upper basin include the Gatewood School (4320 SW Myrtle St.) and the Kenney Presbyterian Home for the Retired (7125 Fauntleroy Way).
- **1F:** Bottom of Basin - Combined Pipe/Rectangular Storage: 2
  - No archaeological or historic resources identified in the project area. Based on site characteristics, the project area has a high probability of containing archaeological resources.

### 2. Fish and Wildlife
- **Alternative 1D:** Bottom of Basin - Tunneling: 3
  - Construction and operation of this alternative would not affect fish and wildlife or their habitat.
- **1E:** Upper Basin Storage: 3
  - Construction and operation of this alternative would not affect fish and wildlife or their habitat (assuming no clearing of forested areas was required). If marine access was required, rating would change from 3 to 1.
- **1F:** Bottom of Basin - Combined Pipe/Rectangular Storage: 2
  - Construction would require clearing of forested area, which may affect fish and wildlife.

### 3. Wetlands, Streams, and Shoreline
- **Alternative 1D:** Bottom of Basin - Tunneling: 2
  - It is assumed that Pelly Creek, which is piped through the project area, would likely have to be moved to construct this alternative. This alternative would not impact wetlands or shoreline areas.
- **1E:** Upper Basin Storage: 3
  - Pelly Creek is piped through the project area along the northern edge of Lowman Beach Park. This rating assumes that construction would not impact the creek or any wetlands or shoreline area within the basin.
- **1F:** Bottom of Basin - Combined Pipe/Rectangular Storage: 2
  - It is assumed that Pelly Creek, which is piped through the project area, would likely have to be moved to construct this alternative. This alternative would not impact wetlands or shoreline areas.

### 4. Soils and Sediments
- **Alternative 1D:** Bottom of Basin - Tunneling: 3
  - No known contaminated sites. Project area is not within liquefaction zone and contains no steep slopes and/or potential or known landslide areas.
- **1E:** Upper Basin Storage: 2
  - No known contaminated sites. Project area on west side of Beach Dr. SW is within liquefaction zone. No steep slopes and/or potential or known landslide areas on west side of Beach Dr. SW. Project area on the east side of Beach Dr. SW is not in liquefaction zone, but is adjacent to steep slopes and potential landslide area. Impacts on soils and sediments for storage in upper basin depends on location.
- **1F:** Bottom of Basin - Combined Pipe/Rectangular Storage: 2
  - No known contaminated sites. Project area on west side of Beach Dr. SW is within liquefaction zone. No steep slopes and/or potential or known landslide areas on west side of Beach Dr. SW. Project area on the east side of Beach Dr. SW is not in liquefaction zone, but is adjacent to steep slopes and potential landslide area.

### 5. Water Quality
- **Alternative 1D:** Bottom of Basin - Tunneling: 3
  - No new untreated discharges to surface waters.
- **1E:** Upper Basin Storage: 3
  - No new untreated discharges to surface waters.
- **1F:** Bottom of Basin - Combined Pipe/Rectangular Storage: 3
  - No new untreated discharges to surface waters.
<table>
<thead>
<tr>
<th>CATEGORY / CRITERIA</th>
<th>ALTERNATIVE 1D: BOTTOM OF BASIN - TUNNELING</th>
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</thead>
<tbody>
<tr>
<td></td>
<td>IMPACT RATING</td>
<td>DESCRIPTION</td>
<td>IMPACT RATING</td>
</tr>
<tr>
<td>TECHNICAL</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>1. Technical Complexity</td>
<td>3</td>
<td>At bottom of basin and will capture peak flow using a weir in a diversion structure. Most reliable and will not require telemetry to divert flows.</td>
<td>2</td>
</tr>
<tr>
<td>2. Compatibility with Existing WW system</td>
<td>2</td>
<td>May prolong peak event to existing system because stored flows will be fed back into the system after peak event passes. More pounds of BOD, TSS will be routed through treatment facilities.</td>
<td>2</td>
</tr>
<tr>
<td>3. Flexibility/Adaptive Management</td>
<td>2</td>
<td>Ability to expand in the R/W is limited because of space and ground surface restrictions. Ability to lengthen pipe limited because of steep excavation depths north and south of the placement area.</td>
<td>3</td>
</tr>
<tr>
<td>4. Constructability/Implementation Schedule</td>
<td>1</td>
<td>There may be construction difficulties with groundwater and excavation. Difficult construction conditions within street R/W; issues associated with ferry traffic.</td>
<td>2</td>
</tr>
</tbody>
</table>
**MURRAY BASIN ALTERNATIVES**

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<thead>
<tr>
<th>CATEGORY / CRITERIA</th>
<th>ALTERNATIVE 1D: BOTTOM OF BASIN - TUNNELING</th>
<th>IMPACT RATING</th>
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<th>DESCRIPTION</th>
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<th>DESCRIPTION</th>
</tr>
</thead>
<tbody>
<tr>
<td>O&amp;M</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>1. Staffing</td>
<td>3</td>
<td>Facility can be automatically started (gravity overflow and run autonomously under design conditions. Minimal staffing required for operation and shut down. Some staffing/supervision may needed for cleaning. Facility should not impact downstream facilities.</td>
<td>2</td>
<td>Facility can be automatically started and run autonomously under design conditions. However, facility will be started using monitoring and telemetry. This may require operator response to ensure proper startup and operation of the facility. Some staffing/supervision may needed for cleaning. Facility should not impact downstream facilities.</td>
<td>3</td>
<td>Facility can be automatically started and run autonomously under design conditions. However, facility will be started using monitoring and telemetry. This may require operator response to ensure proper startup and operation of the facility. Some staffing/supervision may needed for cleaning. Facility should not impact downstream facilities.</td>
<td></td>
</tr>
<tr>
<td>2. Training</td>
<td>3</td>
<td>Staff familiar with storage facilities and technology - Henderson &amp; Mercer Street Tunnel. Similar control approaches to other facilities within the system can be specified for consistency.</td>
<td>3</td>
<td>Staff familiar with storage &amp; pumping facilities and technology - Henderson &amp; Mercer Street Tunnel. Similar control approaches to other facilities within the system can be specified for consistency.</td>
<td>3</td>
<td>Staff familiar with storage facilities and technology - North Creek &amp; Henderson. Similar control approaches to other facilities within the system can be specified for consistency.</td>
<td></td>
</tr>
<tr>
<td>3. Reliability</td>
<td>3</td>
<td>System is not complex. Gravity diversion over a weir. Storage is a proven technology for controlling peak flow events.</td>
<td>2</td>
<td>System requires telemetry/controls to effectively operate pump station and manage the storage of peak flows. Power is critical for operation of pump station, telemetry &amp; monitoring equipment and ability to store peak flows. Storage is a proven technology for controlling peak flow events.</td>
<td>3</td>
<td>System is not complex. Gravity diversion over a weir. Power not critical for ability to store peak flows. Storage is a proven technology for controlling peak flow events. Telemetry and controls may be required to effectively manage storage volumes between rectangular tank and storage pipe.</td>
<td></td>
</tr>
<tr>
<td>4. Maintenance</td>
<td>2</td>
<td>Alternative requires less maintenance than other alternatives. Automatic flushing gates should provide most, if not all, the cleaning needed. Minimal telemetry/controls to maintain (typical level sensing and pump system controls). Assumes no entry.</td>
<td>2</td>
<td>Automatic flushing gates should provide most, if not all, the cleaning needed. More complex telemetry/controls than bottom of the basin alternatives (pump station monitors, possible flow meters, level sensing and pump system controls). Assumes no entry.</td>
<td>3</td>
<td>Alternative requires less maintenance than other alternatives. Automatic flushing gates should provide most, if not all, the cleaning needed. Minimal telemetry/controls to maintain (typical level sensing and pump system controls). Assumes no entry.</td>
<td></td>
</tr>
<tr>
<td>5. Safety</td>
<td>1</td>
<td>Street access required. Traffic control procedures required. Street use/closure permit required. Heavily travelled roadway. Rating would change from from 1 to 2 if maintenance access can be moved outside of the travelled right-of-way.</td>
<td>3</td>
<td>No street access required. No traffic control procedures required. No street use/closure permit required.</td>
<td>1</td>
<td>Street access required. Traffic control procedures required. Street use/closure permit required. Heavily travelled roadway.</td>
<td></td>
</tr>
</tbody>
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<tr>
<td><strong>COST EFFECTIVENESS</strong></td>
<td><strong>IMPACT RATING</strong></td>
<td><strong>DESCRIPTION</strong></td>
<td><strong>IMPACT RATING</strong></td>
</tr>
<tr>
<td>1. Project Capital Costs</td>
<td>2</td>
<td>Relative cost = 1.7</td>
<td>1</td>
</tr>
<tr>
<td>2. Life Cycle Costs</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>3. Cost Variability/Risk</td>
<td>3</td>
<td>Variability Ratio = 1.1</td>
<td>3</td>
</tr>
</tbody>
</table>

Note: Project Capital Costs for Murray Alternatives range from a low $13M to a high of $70M

<table>
<thead>
<tr>
<th><strong>COMMUNITY IMPACT</strong></th>
<th><strong>DESCRIPTION</strong></th>
<th><strong>IMPACT RATING</strong></th>
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<th><strong>IMPACT RATING</strong></th>
<th><strong>DESCRIPTION</strong></th>
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</thead>
<tbody>
<tr>
<td>1. Location</td>
<td>Location of abovegrade structures will likely require residential property acquisition that may not be residential uses in future. Rating may depend on future uses of property.</td>
<td>1</td>
<td>Aboveground structure for large pump station in park, two pump stations in same location will impede land use in park. Below grade tank does not impose similar limitations on land use.</td>
<td>1</td>
<td>Below grade facility with limited abovegrade structures provides potential for future public access.</td>
</tr>
<tr>
<td>2. Potential Community Impacts</td>
<td>Infrequent, planned access by O&amp;M staff reduces periodic impacts. Design considerations for abovegrade structures can reduce adverse impacts on community vision.</td>
<td>3</td>
<td>Pump station and tanks on separate sites will require additional maintenance attention. Design can reduce visual impacts. This would be a permanent change in how the land is used in this area and should be rated a 1.</td>
<td>1</td>
<td>Limited O&amp;M frequency. Site use not likely to change community vision.</td>
</tr>
<tr>
<td>3. Construction Impacts</td>
<td>Large portal construction on Beach Dr. will require property acquisition and have impacts on traffic and emergency vehicle access. Long duration, high volume hauling would use narrow residential street adjacent to park.</td>
<td>1</td>
<td>Due to construction duration, multiple sites, temporary closure of park, and pipeline alignment along residential arterials for extended period, impacts will be significant.</td>
<td>1</td>
<td>Off street area available for construction staging. Construction can be sequenced to reduce impacts on traffic and neighborhood.</td>
</tr>
</tbody>
</table>
**MURRAY BASIN ALTERNATIVES**

<table>
<thead>
<tr>
<th>CATEGORY / CRITERIA</th>
<th>ALTERNATIVE 2A: CONVEY &amp; TREAT AT ALKI</th>
<th>ALTERNATIVE 3A - END OF PIPE TREATMENT, BOTTOM OF BASIN</th>
<th>ALTERNATIVE 5A: PEAK FLOW REDUCTION COMBINED W/STORAGE</th>
</tr>
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<tr>
<td></td>
<td>IMPACT RATING</td>
<td>DESCRIPTION</td>
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<td><strong>LAND USE AND PERMITTING</strong></td>
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<td></td>
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<tr>
<td>1. City of Seattle Comprehensive Plan</td>
<td>1</td>
<td>Section 6.5 of the Seattle Comprehensive Plan (Utilities Element of the Planning Policies, U16) states that the City should work cooperatively with King County to identify and expeditiously address combined sewer overflows. Elsewhere in the Comp Plan (Land Use Element, Section 2.1, LU 61 &amp; 62), uses in Single Family Residential neighborhoods should affirm and encourage residential use by one household as the principal use or should only encourage uses that are permitted outright. Alternative may not be fully consistent with Seattle Parks policies if peaking pump station is located in Lowman Beach Park. If the storage facility is not located in the park, the rating would be improved. The large size of facility located within the Park and proximity to shoreline would most likely be contrary to Land Use policies LU 58, 61, &amp; 62.</td>
<td>1</td>
</tr>
<tr>
<td>2. Seattle Municipal Code (SMC/Zoning Code)</td>
<td>2</td>
<td>Zoning is Single Family Residential. Lowman Beach Park in potential placement area will require review for consistency with Parks policies. Dependent upon final location of pump station.</td>
<td>1</td>
</tr>
<tr>
<td>3. Shoreline Master Program Compatibility</td>
<td>1</td>
<td>Pump station is a &quot;Utility Service Use&quot;. A Utility Service Use is allowed outright within the Shoreline District if it can be demonstrated that it requires a shoreline location. Because this option involves acquisition of Single Family Residential properties, it is uncertain if this option will be considered compatible with existing land uses in the area. New treatment plants are not allowed in Shoreline District.</td>
<td>1</td>
</tr>
<tr>
<td>4. Permitting Complexity</td>
<td>1</td>
<td>This alternative will require a Shoreline Permit. Potential for marine access will add federal and state permits in addition to local permits. This could add up to a year or more to the schedule. Affected roadways have high traffic volumes on a residential arterial with restricted access to residences. Will require careful traffic planning to maintain access. Work hours likely to be restricted. Permit review likely to be complex.</td>
<td>1</td>
</tr>
<tr>
<td>5. Property Acquisition Complexity</td>
<td>1</td>
<td>Location on park property for Murray pump station would be difficult. Rating would change from 1 to 2 if pump station located on private property.</td>
<td>1</td>
</tr>
</tbody>
</table>
# Barton, Murray, Magnolia and North Beach CSO Projects
## Alternatives Analysis
### Murray Basin Alternatives

<table>
<thead>
<tr>
<th></th>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>1. Cultural Resources</strong></td>
<td><img src="Impact" alt="Impact Rating: 2" /></td>
<td><img src="Impact" alt="Impact Rating: 2" /></td>
<td><img src="Impact" alt="Impact Rating: 2" /></td>
</tr>
<tr>
<td>Description</td>
<td>No archaeological or historic resources identified in the project area. Based on site characteristics, the project area in which the pump station would be located has a high probability of containing archaeological resources.</td>
<td>No archaeological or historic resources identified in the project area. Based on site characteristics, the project area has a high probability of containing archaeological resources.</td>
<td>No archaeological or historic resources identified in the pipe storage part of the project area. Based on site characteristics, this part of the project area has a high probability of containing archaeological resources. Disconnections in upper basin not expected to impact archaeological or historic resources.</td>
</tr>
<tr>
<td><strong>2. Fish and Wildlife</strong></td>
<td><img src="Impact" alt="Impact Rating: 3" /></td>
<td><img src="Impact" alt="Impact Rating: 3" /></td>
<td><img src="Impact" alt="Impact Rating: 2" /></td>
</tr>
<tr>
<td>Description</td>
<td>Construction and operation of this alternative would not affect fish and wildlife, or their habitat. If marine access was required, rating would change from 3 to 1.</td>
<td>It is assumed that Pelly Creek is not a fish-bearing stream. Construction and operation of this alternative would not affect fish and wildlife, or their habitat. If marine access was required, rating would change from 3 to 1.</td>
<td>Construction of this alternative would not affect fish and wildlife, or their habitat. Operation could have adverse effects on fish and wildlife if treatment was not required for stormwater discharges.</td>
</tr>
<tr>
<td><strong>3. Wetlands, Streams, and Shoreline</strong></td>
<td><img src="Impact" alt="Impact Rating: 3" /></td>
<td><img src="Impact" alt="Impact Rating: 2" /></td>
<td><img src="Impact" alt="Impact Rating: 2" /></td>
</tr>
<tr>
<td>Description</td>
<td>Pelly Creek is piped through the project area along the northern edge of Lowman Beach Park. This rating assumes that construction would not impact the creek or any wetlands or shoreline area within the basin.</td>
<td>It is assumed that Pelly Creek, which is piped through the project area along the northern edge of Lowman Beach Park, would likely have to be moved, and would be impacted by construction of this alternative. It is assumed that marine access would not be required. If marine access was required, construction would impact Puget Sound shoreline and rating would change from 2 to 1. No wetlands in the project area.</td>
<td>Pelly Creek, which is piped through the project area along the northern edge of Lowman Beach Park, would be impacted by construction of this alternative. This alternative would not impact wetlands.</td>
</tr>
<tr>
<td><strong>4. Soils and Sediments</strong></td>
<td><img src="Impact" alt="Impact Rating: 3" /></td>
<td><img src="Impact" alt="Impact Rating: 3" /></td>
<td><img src="Impact" alt="Impact Rating: 2" /></td>
</tr>
<tr>
<td>Description</td>
<td>No known contaminated sites. Project area is within liquefaction zone. No steep slopes and/or potential or known landslide areas.</td>
<td>No known contaminated sites. Project area is within liquefaction zone. No steep slopes and/or potential or known landslide areas.</td>
<td>No known contaminated sites in the Beach Drive SW project area. This project area is not within liquefaction zone and contains no steep slopes and/or potential or known landslide areas. Soil and sediment impacts in upper basin depend on location of disconnections and stormwater system construction. Operation could impact sediment quality if treatment was not required for stormwater discharges.</td>
</tr>
<tr>
<td><strong>5. Water Quality</strong></td>
<td><img src="Impact" alt="Impact Rating: 3" /></td>
<td><img src="Impact" alt="Impact Rating: 3" /></td>
<td><img src="Impact" alt="Impact Rating: 1" /></td>
</tr>
<tr>
<td>Description</td>
<td>No new untreated discharges to surface waters.</td>
<td>No new untreated discharges to surface waters.</td>
<td>It is assumed that stormwater treatment would not be required. If stormwater treatment was required, rating would change from 1 to 3.</td>
</tr>
</tbody>
</table>
### MURRAY BASIN ALTERNATIVES

<table>
<thead>
<tr>
<th>CATEGORY / CRITERIA</th>
<th>ALTERNATIVE 2A: CONVEY &amp; TREAT AT ALKI</th>
<th>ALTERNATIVE 3A - END OF PIPE TREATMENT, BOTTOM OF BASIN</th>
<th>ALTERNATIVE 5A: PEAK FLOW REDUCTION COMBINED W/STORAGE</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>IMPACT RATING</td>
<td>DESCRIPTION</td>
<td>IMPACT RATING</td>
</tr>
<tr>
<td><strong>TECHNICAL</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>1. Technical Complexity</td>
<td>2</td>
<td>Bottom of Basin alternative, peak flows diverted by weir to peak flow pump station. But will require some telemetry and management of an intermittently used pump station. Considered more reliable since diversion is at bottom of the basin.</td>
<td>1</td>
</tr>
<tr>
<td>2. Compatibility with Existing WW system</td>
<td>1</td>
<td>Will send the peak flow to existing downstream system as event occurs. May cause capacity issues at treatment plant. More pounds of BOD, TSS will be routed through treatment facilities.</td>
<td>3</td>
</tr>
<tr>
<td>3. Flexibility/Adaptive Management</td>
<td>2</td>
<td>Limited space available for expansion of peak flow pump station. Property is limited at the bottom of the basin and ability to expand in the future could be problematic.</td>
<td>2</td>
</tr>
<tr>
<td>4. Constructability/Implementation Schedule</td>
<td>2</td>
<td>No significant construction issues or risks beyond typical structure excavation and construction. Possible traffic and access issues regarding temporary construction conditions associated with Roxhill Playground.</td>
<td>2</td>
</tr>
</tbody>
</table>
**Murray Basin Alternatives**

<table>
<thead>
<tr>
<th>Category / Criteria</th>
<th>Alternative 2A: Convey &amp; Treat at Alki</th>
<th>Alternative 3A - End of Pipe Treatment, Bottom of Basin</th>
<th>Alternative 5A: Peak Flow Reduction Combined w/Storage</th>
</tr>
</thead>
<tbody>
<tr>
<td>O&amp;M</td>
<td>Facility can be automatically started and run autonomously under design conditions. However, facility will be started using monitoring and telemetry. This may require operator response to ensure proper startup and operation of the facility. Some staffing/supervision may be needed for cleaning. Facility should not impact downstream facilities.</td>
<td>Facility can be automatically started but will require operator response to ensure proper startup and operation. Staffing/supervision may be needed for cleaning. Facility should not impact downstream facilities.</td>
<td>Routine staffing for stormwater system/treatment system maintenance.</td>
</tr>
<tr>
<td>1. Staffing</td>
<td>2</td>
<td>1</td>
<td>3</td>
</tr>
<tr>
<td>2. Training</td>
<td>3</td>
<td>1</td>
<td>3</td>
</tr>
<tr>
<td>3. Reliability</td>
<td>2</td>
<td>2</td>
<td>3</td>
</tr>
<tr>
<td>4. Maintenance</td>
<td>2</td>
<td>1</td>
<td>3</td>
</tr>
<tr>
<td>5. Safety</td>
<td>3</td>
<td>3</td>
<td>2</td>
</tr>
</tbody>
</table>

**Description:**
- **1. Staffing:** Staff familiar with pumping systems and technology. Requires power, telemetry, and maintenance for reliable operation and function of the system.
- **2. Training:** Requires operation of a pump station to convey peak flows. System will have standard reliability and redundancy measures incorporated into the design. Requires power, telemetry, and maintenance for reliable operation and function of the system.
- **3. Reliability:** Alternative requires less maintenance than most other alternatives. More complex telemetry/controls than bottom of the basin alternatives (pump station monitors, possible flow meters, level sensing and pump system controls).
- **4. Maintenance:** No street access required. No traffic control procedures required. No street use/closure permit required.
- **5. Safety:** System requires telemetry/controls to effectively store peak flows. Power is critical for operation of treatment facility, telemetry & monitoring equipment. Treatment technology is proven.
- **Description:** System not complex. Gravity stormwater and treatment system. Peak flow reduction, when effectively implemented, is a proven technology for controlling peak flow events.

**Description:** Minimal maintenance compared to other alternatives. Typical stormwater piping and treatment system maintenance.

**Description:** No street access required. No traffic control procedures required. No street use/closure permit required.

**Description:** Maintenance of storm sewers will require manhole access in streets.
### Barton, Murray, Magnolia and North Beach CSO Projects
### Alternatives Analysis

#### MURRAY BASIN ALTERNATIVES

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<tr>
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</thead>
<tbody>
<tr>
<td></td>
<td>IMPACT RATING</td>
<td>DESCRIPTION</td>
<td>IMPACT RATING</td>
</tr>
<tr>
<td>COST EFFECTIVENESS</td>
<td>1. Project Capital Costs</td>
<td>1 Relative cost = 3.9</td>
<td>1 Relative cost = 5.3</td>
</tr>
<tr>
<td></td>
<td>2. Life Cycle Costs</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>3. Cost Variability/Risk</td>
<td>2 Variability Ratio = 1.8</td>
<td>3 Variability Ratio = 1.1</td>
</tr>
</tbody>
</table>

Note: Project Capital Costs for Murray Alternatives range from a low $13M to a high of $70M.

#### COMMUNITY IMPACT

<table>
<thead>
<tr>
<th>CATEGORY / CRITERIA</th>
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<tr>
<td></td>
<td>IMPACT RATING</td>
<td>DESCRIPTION</td>
<td>IMPACT RATING</td>
</tr>
<tr>
<td></td>
<td>1. Location</td>
<td>1 Large pump station in park will reduce size of park.</td>
<td>1 Changes land use.</td>
</tr>
<tr>
<td></td>
<td>2. Potential Community Impacts</td>
<td>1 Long term duration of construction on Beach Dr. will impede traffic, access, and emergency vehicle access.</td>
<td>1 Significant O&amp;M activities and storage of chemicals. Incompatible with land use.</td>
</tr>
<tr>
<td></td>
<td>3. Construction Impacts</td>
<td>1 Construction duration, access limitations, and traffic disruption as well as utilities relocations will adversely impact up to 400 residences, commuter traffic, emergency vehicle access. Construction controls used to reduce impacts will be difficult to implement.</td>
<td>2 Duration of construction, moderate hauling required with periodic deliveries of large equipment during construction. Temporary closure of park for construction staging.</td>
</tr>
<tr>
<td>CATEGORY / CRITERIA</td>
<td>1A: RECTANGULAR STORAGE, BOTTOM OF BASIN</td>
<td>ALTERNATIVE 1B: CIRCULAR STORAGE, BOTTOM OF BASIN</td>
<td>ALTERNATIVE 1C: PIPE STORAGE, BOTTOM OF BASIN</td>
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<td>-------------------------------------------------</td>
<td>----------------------------------------</td>
</tr>
<tr>
<td><strong>LAND USE AND</strong></td>
<td><strong>IMPACT RATING</strong></td>
<td><strong>DESCRIPTION</strong></td>
<td><strong>IMPACT RATING</strong></td>
</tr>
<tr>
<td>1. City of Seattle Comprehensive Plan</td>
<td>2</td>
<td>Section 6.5 of the Seattle Comprehensive Plan (Utilities Element of the Planning Policies, U16) states that the City should work cooperatively with King County to identify and expediously address combined sewer overflows. Elsewhere in the Comp Plan (Land Use Element, Section 2.1, LU 61 &amp; 62), uses in Single Family Residential neighborhoods should affirm and encourage residential use by one household as the principal use or should only encourage uses that are permitted outright. Location may require review for consistency with City parks polices.</td>
<td>2</td>
</tr>
<tr>
<td>2. Seattle Municipal Code (SMC/Zoning Code)</td>
<td>2</td>
<td>Located on or adjacent to existing pump station. Although zoning is Single Family Residential, pump stations, storage tanks, etc are most likely considered water-related uses. Barton St. End park in potential placement area may require review for consistency with Parks polices.</td>
<td>2</td>
</tr>
<tr>
<td>3. Shoreline Master Program Compatibility</td>
<td>2</td>
<td>Because this option involves acquisition of Single Family Residential properties, it is uncertain if this option will be considered compatible with existing land uses in the area. Storage is most likely considered a “Utility Service Use”. A Utility Service Use is allowed outright within the Shoreline District only if it can be demonstrated that it requires a shoreline location, although water-related uses (pump stations will likely be considered a water-related use) are preferred next in line to water-dependent uses within the Shoreline District.</td>
<td>2</td>
</tr>
<tr>
<td>4. Permitting Complexity</td>
<td>2</td>
<td>This alternative will require a Shoreline Permit. Potential for marine access will add federal and state permits in addition to local permits. This could add up to a year or more to the schedule. Affected roadways have high traffic volume in residential and neighborhood commercial land uses with regional transportation use. Will require careful traffic planning to maintain access. Work hours likely to be restricted. Permit review likely to be most complex. The large size of facility and associated construction impacts (temporary) may be considered a &quot;high impact&quot; use by the City.</td>
<td>2</td>
</tr>
<tr>
<td>5. Property Acquisition Complexity</td>
<td>2</td>
<td>Single family residential, neighborhood has expressed concerns, waterfront real estate. Acquisition is possible</td>
<td>2</td>
</tr>
<tr>
<td>CATEGORY / CRITERIA</td>
<td>ALTERNATIVE 1A: RECTANGULAR STORAGE, BOTTOM OF BASIN</td>
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</tr>
<tr>
<td>---------------------</td>
<td>------------------------------------------------</td>
<td>------------------------------------------------</td>
<td>------------------------------------------------</td>
</tr>
<tr>
<td>ENVIRONMENT</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>1. Cultural Resources</td>
<td>Rating 2: No known archaeological sites. Based on site characteristics, project area has high probability of containing archaeological resources. Ethnographic site located south of ferry dock. Residential properties next to ferry dock are on Seattle Historic Inventory.</td>
<td>Rating 2: No known archaeological sites. Based on site characteristics, project area has high probability of containing archaeological resources. Ethnographic site located south of ferry dock. Residential properties next to ferry dock are on Seattle Historic Inventory.</td>
<td>Rating 2: No known archaeological sites. Based on site characteristics, project area has high probability of containing archaeological resources. Ethnographic site located south of ferry dock. Residential properties next to ferry dock are on Seattle Historic Inventory.</td>
</tr>
<tr>
<td>2. Fish and Wildlife</td>
<td>Rating 1: Assuming marine access is required, construction would likely have adverse effects on fish and wildlife and/or their habitat in Puget Sound. Fauntleroy Creek, which is used by coho salmon, crosses through project area south of ferry dock.</td>
<td>Rating 1: Assuming marine access is required, construction would likely have adverse effects on fish and wildlife and/or their habitat in Puget Sound. Fauntleroy Creek, which is used by coho salmon, crosses through project area south of ferry dock.</td>
<td>Rating 1: Assuming marine access is required, construction would likely have adverse effects on fish and wildlife and/or their habitat in Puget Sound. Fauntleroy Creek, which is used by coho salmon, crosses through project area south of ferry dock.</td>
</tr>
<tr>
<td>3. Wetlands, Streams, and Shoreline</td>
<td>Rating 1: Assuming marine access is required, construction would impact Puget Sound shoreline. Fauntleroy Creek crosses through project area south of ferry dock.</td>
<td>Rating 1: Assuming marine access is required, construction would impact Puget Sound shoreline. Fauntleroy Creek crosses through project area south of ferry dock.</td>
<td>Rating 1: Assuming marine access is required, construction would impact Puget Sound shoreline. Fauntleroy Creek crosses through project area south of ferry dock.</td>
</tr>
<tr>
<td>4. Soils and Sediments</td>
<td>Rating 2: No known contaminated sites in project area. Project area is within liquefaction zone. Steep slopes located in project area on south side of ferry terminal. No potential or known landslide areas in project area.</td>
<td>Rating 2: No known contaminated sites in project area. Project area is within liquefaction zone. Steep slopes located in project area on south side of ferry terminal. No potential or known landslide areas in project area.</td>
<td>Rating 2: No known contaminated sites in project area. Project area is within liquefaction zone. Steep slopes located in project area on south side of ferry terminal. No potential or known landslide areas in project area.</td>
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<td>---------------------</td>
<td>----------------------------------------</td>
<td>----------------------------------------</td>
<td>----------------------------------------</td>
</tr>
<tr>
<td><strong>TECHNICAL</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>1. Technical Complexity</td>
<td>3 At bottom of basin and will capture peak flow using a weir in a diversion structure. Most reliable and will not require telemetry to divert flows.</td>
<td>3 At bottom of basin and will capture peak flow using a weir in a diversion structure. Most reliable and will not require telemetry to divert flows.</td>
<td>3 At bottom of basin and will capture peak flow using a weir in a diversion structure. Most reliable and will not require telemetry to divert flows.</td>
</tr>
<tr>
<td>2. Compatibility with Existing WW system</td>
<td>2 May prolong peak event to existing system because stored flows will be fed back into the system after peak event passes. More pounds of BOD, TSS will be routed through treatment facilities.</td>
<td>2 May prolong peak event to existing system because stored flows will be fed back into the system after peak event passes. More pounds of BOD, TSS will be routed through treatment facilities.</td>
<td>2 May prolong peak event to existing system because stored flows will be fed back into the system after peak event passes. More pounds of BOD, TSS will be routed through treatment facilities.</td>
</tr>
<tr>
<td>3. Flexibility/Adaptive Management</td>
<td>2 Limited space available for expansion or construction of auxiliary tank. Property is limited at the bottom of the basin and ability to expand in the future could be problematic.</td>
<td>2 Limited space available for expansion or construction of auxiliary tank. Property is limited at the bottom of the basin and ability to expand in the future could be problematic.</td>
<td>2 Limited space available for expansion or construction of auxiliary tank. Property is limited at the bottom of the basin and ability to expand in the future could be problematic.</td>
</tr>
<tr>
<td>4. Constructability/Implementation Schedule</td>
<td>2 There may be construction difficulties with groundwater and excavation. Limited construction access and issues associated with ferry traffic.</td>
<td>2 There may be construction difficulties with groundwater and excavation. Limited construction access and issues associated with ferry traffic.</td>
<td>2 There may be construction difficulties with groundwater and excavation. Limited construction access and issues associated with ferry traffic.</td>
</tr>
<tr>
<td><strong>O&amp;M</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>1. Staffing</td>
<td>3 Facility can be automatically started (gravity overflow) and run autonomously under design conditions. Minimal staffing required for operation and shut down. Some staffing/supervision may be needed for cleaning. Facility should not impact downstream facilities.</td>
<td>3 Facility can be automatically started (gravity overflow) and run autonomously under design conditions. Minimal staffing required for operation and shut down. Some staffing/supervision may be needed for cleaning. Facility should not impact downstream facilities.</td>
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</tr>
<tr>
<td>2. Training</td>
<td>3 Staff familiar with storage facilities and technology - North Creek. Similar control approaches to other facilities within the system can be specified for consistency.</td>
<td>2 Staff familiar with storage facilities within the system. There are no other circular storage tanks in the KC system.</td>
<td>3 Staff familiar with storage facilities and technology - Henderson &amp; Mercer Street Tunnel. Similar control approaches to other facilities within the system can be specified for consistency.</td>
</tr>
<tr>
<td>3. Reliability</td>
<td>3 System is not complex. Gravity diversion over a weir. Power not critical for ability to store peak flows. Storage is a proven technology for controlling peak flow events.</td>
<td>3 System is not complex. Gravity diversion over a weir. Power not critical for ability to store peak flows. Storage is a proven technology for controlling peak flow events.</td>
<td>3 System is not complex. Gravity diversion over a weir. Power not critical for ability to store peak flows. Storage is a proven technology for controlling peak flow events.</td>
</tr>
<tr>
<td>4. Maintenance</td>
<td>3 Alternative requires less maintenance than other alternatives. Automatic flushing gates should provide most, if not all, the cleaning needed. Minimal telemetry/controls to maintain (typical level sensing and pump system controls). Assumes no entry.</td>
<td>3 Alternative requires less maintenance than other alternatives. Automatic flushing gates should provide most, if not all, the cleaning needed. Minimal telemetry/controls to maintain (typical level sensing and pump system controls). Assumes no entry.</td>
<td>3 Alternative requires less maintenance than other alternatives. Automatic flushing gates should provide most, if not all, the cleaning needed. Minimal telemetry/controls to maintain (typical level sensing and pump system controls). Assumes no entry.</td>
</tr>
<tr>
<td>5. Safety</td>
<td>3 No street access required. No traffic control procedures required. No street use/closure permit required.</td>
<td>3 No street access required. No traffic control procedures required. No street use/closure permit required.</td>
<td>3 No street access required. No traffic control procedures required. No street use/closure permit required.</td>
</tr>
</tbody>
</table>
### Barton Basin Alternatives

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<thead>
<tr>
<th>CATEGORY / CRITERIA</th>
<th>1A: RECTANGULAR STORAGE, BOTTOM OF BASIN</th>
<th>ALTERNATIVE 1B: CIRCULAR STORAGE, BOTTOM OF BASIN</th>
<th>ALTERNATIVE 1C: PIPE STORAGE, BOTTOM OF BASIN</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>IMPACT RATING</td>
<td>DESCRIPTION</td>
<td>IMPACT RATING</td>
</tr>
<tr>
<td>COST EFFECTIVENESS</td>
<td>1. Project Capital Costs</td>
<td>2 Relative cost = 1.8</td>
<td>2 Relative cost = 1.8</td>
</tr>
<tr>
<td></td>
<td>2. Life Cycle Costs</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>3. Cost Variability/Risk</td>
<td>2 Variability Ratio = 1.5</td>
<td>2 Variability Ratio = 1.5</td>
</tr>
<tr>
<td>COMMUNITY IMPACT</td>
<td>1. Location</td>
<td>2 Small, above ground facilities and vents may cause limited reduction in land use. Design must consider surrounding land use.</td>
<td>2 Small, above ground facilities and vents may cause limited reduction in land use. Design must consider surrounding land use.</td>
</tr>
<tr>
<td></td>
<td>2. Potential Community Impacts</td>
<td>2 Community has expressed concern about facility changing character and nature of the neighborhood. However, facilities can be design such that any small aboveground facilities can fit into community vision that is consistent with current surrounding uses. Back to back construction at the site (first the Pump Station upgrade and then a CSO facility) will cause more intense construction fatigue for the nearby neighbors.</td>
<td>2 Community has expressed concern about facility changing character and nature of the neighborhood. However, facilities can be design such that any small aboveground facilities can fit into community vision that is consistent with current surrounding uses. Back to back construction at the site (first the Pump Station and then a CSO facility) will cause more intense construction fatigue for the nearby neighbors.</td>
</tr>
<tr>
<td></td>
<td>3. Construction Impacts</td>
<td>1 Neighbors are close and will be affected by construction traffic and noise. Ferry riders will be affected by construction traffic. State Patrol will need to direct traffic during Ferry hours. Neighbors accessing Cove Park will be affected.</td>
<td>1 Neighbors are close and will be affected by construction traffic and noise. Ferry riders will be affected by construction traffic. State Patrol will need to direct traffic during Ferry operating hours. Impact to Ferry System. Neighbors accessing Cove Park will be affected.</td>
</tr>
<tr>
<td>CATEGORY / CRITERIA</td>
<td>ALTERNATIVE 1D: RW PIPE STORAGE, BOTTOM OF BASIN</td>
<td>1E: PIPE STORAGE, UPPER FAUNTLEROY WAY SW</td>
<td>1F: RECTANGULAR STORAGE NEAR FAUNTLEROY SCHOOL</td>
</tr>
<tr>
<td>---------------------</td>
<td>-------------------------------------------------</td>
<td>---------------------------------</td>
<td>---------------------------------</td>
</tr>
<tr>
<td>LAND USE AND PERMITTING</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>1. City of Seattle Comprehensive Plan</td>
<td>3</td>
<td>Section 6.5 of the Seattle Comprehensive Plan (Utilities Element of the Planning Policies, U16) states that the City should work cooperatively with King County to identify and expeditiously address combined sewer overflows for which the County maintains responsibility. In addition, no residential property acquisition will be necessary under this alternative.</td>
<td>3</td>
</tr>
<tr>
<td>2. Seattle Municipal Code (SMC/Zoning Code)</td>
<td>3</td>
<td>Utilities would be buried underground in the ROW which would only temporarily disrupt public access. Zoning: N/A (Located in ROW).</td>
<td>3</td>
</tr>
<tr>
<td>3. Shoreline Master Program Compatibility</td>
<td>3</td>
<td>Utilities would be buried underground in the ROW.</td>
<td>3</td>
</tr>
<tr>
<td>4. Permitting Complexity</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>5. Property Acquisition Complexity</td>
<td>2</td>
<td>SDOT (Fauntleroy Way major arterial), may require additional property for ancillary facilities (odor control, electrical, generator, etc.). Acquisition is possible.</td>
<td>2</td>
</tr>
</tbody>
</table>
### Barton Basin Alternatives

#### Category / Criteria

<table>
<thead>
<tr>
<th>Environment</th>
<th>Alternative 1D: R/W Pipe Storage, Bottom of Basin</th>
<th>Alternative 1E: Pipe Storage, Upper Fauntleroy Way SW</th>
<th>Alternative 1F: Rectangular Storage Near Fauntleroy School</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>1. Cultural Resources</strong></td>
<td>Based on site characteristics, project area has high probability of containing archaeological resources. Significant archaeological resources found in project area north of ferry dock. No historic resources in project area.</td>
<td>Based on site characteristics, project area has high probability of containing archaeological resources. Significant archaeological resources found adjacent to project area. Executive Order 0505 process would cause delay of up to a year or more and could result in denial of project. No historic resources in project area.</td>
<td>No known archaeological sites. Based on site characteristics, project area has medium probability of containing archaeological resources. Fauntleroy School has been nominated as a Seattle Landmark.</td>
</tr>
<tr>
<td><strong>2. Fish and Wildlife</strong></td>
<td>Fauntleroy Creek, which is used by coho salmon, crosses project area in pipe south of ferry dock.</td>
<td>No impacts anticipated.</td>
<td>No impacts anticipated.</td>
</tr>
<tr>
<td><strong>3. Wetlands, Streams, and Shoreline</strong></td>
<td>Fauntleroy Creek crosses project area in pipe south of ferry dock. No wetlands or shoreline in project area.</td>
<td>No wetlands, streams, or shoreline within project area.</td>
<td>No wetlands or shoreline within project area. Fauntleroy Creek located south of project area. No impacts to creek or creek buffer anticipated.</td>
</tr>
<tr>
<td><strong>4. Soils and Sediments</strong></td>
<td>No known contaminated sites in project area. Project area is within liquefaction zone. No steep slopes and/or potential or known landslide areas.</td>
<td>No known contaminated sites. Project area is not within liquefaction zone. No steep slopes and/or potential or known landslide areas.</td>
<td>No known contaminated sites in project area. Project area is not within liquefaction zone. No steep slopes and/or potential or known landslide areas.</td>
</tr>
<tr>
<td><strong>5. Water Quality</strong></td>
<td>No new untreated discharges to surface waters.</td>
<td>No new untreated discharges to surface waters.</td>
<td>No new untreated discharges to surface waters.</td>
</tr>
<tr>
<td>CATEGORY / CRITERIA</td>
<td>ALTERNATIVE 1D: R/W PIPE STORAGE, BOTTOM OF BASIN</td>
<td>1E: PIPE STORAGE, UPPER FAUNTLEROY WAY SW</td>
<td>1F: RECTANGULAR STORAGE NEAR FAUNTLEROY SCHOOL</td>
</tr>
<tr>
<td>-----------------------------------------</td>
<td>-------------------------------------------------</td>
<td>------------------------------------------</td>
<td>-----------------------------------------------</td>
</tr>
<tr>
<td>TECHNICAL</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>1. Technical Complexity</td>
<td>IMPACT RATING</td>
<td>DESCRIPTION</td>
<td>IMPACT RATING</td>
</tr>
<tr>
<td></td>
<td>3</td>
<td>At bottom of basin and will capture peak flow using a weir in a diversion structure. Most reliable and will not require telemetry to divert flows.</td>
<td>2</td>
</tr>
<tr>
<td>2. Compatibility with Existing WW system</td>
<td>2</td>
<td>May prolong peak event to existing system because stored flows will be fed back into the system after peak event passes. More pounds of BOD, TSS will be routed through treatment facilities.</td>
<td>2</td>
</tr>
<tr>
<td>3. Flexibility/Adaptive Management</td>
<td>2</td>
<td>Ability to expand in the R/W is limited because of space and ground surface restrictions. Ability to lengthen pipe limited because of steep excavation depths north and south of the placement area.</td>
<td>3</td>
</tr>
<tr>
<td>4. Constructability/Implementation Schedule</td>
<td>1</td>
<td>There may be construction difficulties with groundwater and excavation. Difficult construction conditions within street R/W; issues associated with ferry traffic.</td>
<td>2</td>
</tr>
<tr>
<td>O&amp;M</td>
<td>1. Staffing: Facility can be automatically started (gravity overflow) and run autonomously under design conditions. Minimal staffing required for operation and shut down. Some staffing/supervision may be needed for cleaning. Facility should not impact downstream facilities.</td>
<td>2. Staffing: Facility can be automatically started and run autonomously under design conditions. However, facility will be started using monitoring and telemetry. This may require operator response to ensure proper startup and operation of the facility. Some staffing/supervision may be needed for cleaning. Facility approaches to other facilities within the system can be specified for consistency.</td>
<td>2. Staffing: Facility can be automatically started and run autonomously under design conditions. However, facility will be started using monitoring and telemetry. This may require operator response to ensure proper startup and operation of the facility. Some staffing/supervision may be needed for cleaning. Facility approaches to other facilities within the system can be specified for consistency.</td>
</tr>
<tr>
<td></td>
<td>3</td>
<td>Staff familiar with storage facilities and technology - Henderson &amp; Mercer Street Tunnel. Similar control approaches to other facilities within the system can be specified for consistency.</td>
<td>3</td>
</tr>
<tr>
<td></td>
<td>3</td>
<td>System is not complex. Gravity diversion over a weir. Power not critical for ability to store peak flows. Storage is a proven technology for controlling peak flow events.</td>
<td>2</td>
</tr>
<tr>
<td></td>
<td>3</td>
<td>Alternative requires less maintenance than other alternatives. Automatic flushing gates should provide most, if not all, the cleaning needed. Minimal telemetry/controls to maintain (typical level sensing and pump system controls). Assumes no entry.</td>
<td>2</td>
</tr>
<tr>
<td></td>
<td>3</td>
<td>Street access required. Traffic control procedures required. Street use/closure permit required. Heavily travelled roadway.</td>
<td>2</td>
</tr>
</tbody>
</table>

12/27/2010

PRELIMINARY DRAFT - FOR DISCUSSION PURPOSES ONLY
### Barton Basin Alternatives

<table>
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<tr>
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</thead>
<tbody>
<tr>
<td>COST EFFECTIVENESS</td>
<td>IMPACT RATING</td>
<td>DESCRIPTION</td>
<td>IMPACT RATING</td>
</tr>
<tr>
<td>1. Project Capital Costs</td>
<td>3</td>
<td>Relative cost = 1.2</td>
<td>3</td>
</tr>
<tr>
<td>2. Life Cycle Costs</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>3. Cost Variability/Risk</td>
<td>3</td>
<td>Variability Ratio = 1.2</td>
<td>3</td>
</tr>
</tbody>
</table>

**Note:** Project Capital Costs for Barton Alternatives range from a low $2.4M to a high of $38.5M

### Community Impact

<table>
<thead>
<tr>
<th>CATEGORY / CRITERIA</th>
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</tr>
</thead>
<tbody>
<tr>
<td>1. Location</td>
<td>3 Facility does not impede land use.</td>
<td>3 Facility does not impede land use.</td>
<td>2 Small, above ground facilities and vents may cause limited reduction in land use. Design must consider surrounding land use.</td>
</tr>
<tr>
<td>2. Potential Community Impacts</td>
<td>3 Does not change community vision of itself as facilities in street.</td>
<td>3 Does not change community vision of itself as facilities in street.</td>
<td>2 Design can help small aboveground facilities fit into community vision that is consistent with current surrounding uses.</td>
</tr>
<tr>
<td>3. Construction Impacts</td>
<td>1 Construction duration, access limitations, and traffic disruption will be significant to ferry traffic as well as utilities relocations, nearby residences, emergency vehicle access. Construction controls used to reduce impacts will be difficult to implement.</td>
<td>1 Construction duration, access limitations, and traffic disruption as well as utilities relocations will adversely impact up to 7 residences, emergency vehicle access. Construction controls used to reduce impacts will be difficult to implement.</td>
<td>2 Construction traffic and hauling will use residential arterials. Wooded area provides visual buffer from nearby residences. Some aspects of construction can be reduced through design and construction controls.</td>
</tr>
<tr>
<td>CATEGORY / CRITERIA</td>
<td>ALTERNATIVE 1G: RECTANGULAR STORAGE, BASIN 416</td>
<td>ALTERNATIVE 3A - END OF PIPE TREATMENT, BOTTOM OF BASIN</td>
<td>ALTERNATIVE 4A: PEAK FLOW REDUCTION, BASIN 416</td>
</tr>
<tr>
<td>---------------------</td>
<td>-------------------------------------------------</td>
<td>-------------------------------------------------</td>
<td>-------------------------------------------------</td>
</tr>
<tr>
<td><strong>LAND USE AND PERMITTING</strong></td>
<td><strong>IMPACT RATING</strong></td>
<td><strong>DESCRIPTION</strong></td>
<td><strong>IMPACT RATING</strong></td>
</tr>
<tr>
<td>1. City of Seattle Comprehensive Plan</td>
<td>2</td>
<td>Storage is compatible with existing land use within ROW, but may not be fully consistent with Seattle Parks policies if tank is located within Roxhill Playground. According to the Seattle Department of Parks and Recreation Non-Park Uses of Park Lands - Policy endorsed by City Council Resolution #29475 (October 1996), it is the policy of the Department to eliminate and prevent unauthorized non-park uses.</td>
<td>1</td>
</tr>
<tr>
<td>2. Seattle Municipal Code (SMC/Zoning Code)</td>
<td>2</td>
<td>Zoning is Single Family Residential, but pipe will be located within ROW, except for small storage tank and ancillary facilities on public/private property. If located on Parks property, will need to demonstrate consistency with Dept. policies.</td>
<td>1</td>
</tr>
<tr>
<td>3. Shoreline Master Program Compatibility</td>
<td>3</td>
<td>N/A - Not within Shoreline District.</td>
<td></td>
</tr>
<tr>
<td>4. Permitting Complexity</td>
<td>2</td>
<td>No federal or state nexus. Local permits, SDOT Street Use, Seattle Parks approval may be necessary. Affected roadways have moderate traffic volume in residential and neighborhood commercial land uses. Will require careful traffic planning to maintain access. Work hours may be restricted. Permit review likely to be more complex.</td>
<td>1</td>
</tr>
<tr>
<td>5. Property Acquisition Complexity</td>
<td>1</td>
<td>Assumes tank would be located in Roxhill Playground. Difficult acquisition because it is an active public property. Rating would change from 1 to 2 if tank located on private property.</td>
<td>2</td>
</tr>
</tbody>
</table>
### Barton, Murray, Magnolia and North Beach CSO Projects

#### Alternatives Analysis

**BARTON BASIN ALTERNATIVES**

<table>
<thead>
<tr>
<th>CATEGORY / CRITERIA</th>
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<th>ALTERNATIVE 3A - END OF PIPE TREATMENT, BOTTOM OF BASIN</th>
<th>ALTERNATIVE 4A: PEAK FLOW REDUCTION, BASIN 416</th>
</tr>
</thead>
<tbody>
<tr>
<td>ENVIRONMENT</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>1. Cultural Resources</td>
<td>3 - No known cultural resources in portion of project area located within Barton Basin. Based on project site characteristics, project site located within Barton Basin has low probability of containing archaeological resources. Need to check area east of Barton Basin in vicinity of Roxhill Playground.</td>
<td>2 - No known archaeological sites. Based on site characteristics, project area has high probability of containing archaeological resources. Ethnographic site located south of ferry dock. Residential properties next to ferry dock are on Seattle Historic Inventory.</td>
<td>3 - No known archaeological sites. No known cultural resources in project area. Based on site characteristics, project area has low probability of containing archaeological resources. Disconnections in upper basin not expected to impact archaeological or historic resources.</td>
</tr>
<tr>
<td>2. Fish and Wildlife</td>
<td>2 - Roxhill Playground identified on Priority Habitat and Species (PHS) map.</td>
<td>1 - Assuming marine access is required, construction would likely have adverse effects on fish and wildlife and/or their habitat in Puget Sound. Fauntleroy Creek, which is used by coho salmon, crosses through project area south of ferry dock.</td>
<td>2 - Construction of this alternative would not affect fish and wildlife, or their habitat. Operation could have adverse effects on fish and wildlife if treatment was not required for stormwater discharges.</td>
</tr>
<tr>
<td>3. Wetlands, Streams, and Shoreline</td>
<td>3 - No wetlands, streams, or shoreline within project area.</td>
<td>1 - Assuming marine access is required, construction would impact Puget Sound shoreline. Fauntleroy Creek crosses through project area south of ferry dock. No wetlands in project area.</td>
<td>3 - No wetlands, streams or shoreline in project area.</td>
</tr>
<tr>
<td>4. Soils and Sediments</td>
<td>2 - No known contaminated sites in project area (contaminated sites located at south end of Roxhill Playground). No steep slopes or potential or known landslide areas in project area. Liquidation zone in Roxhill Playground.</td>
<td>2 - No known contaminated sites in project area. Project area is within liquefaction zone. Steep slopes located in project area on south side of ferry terminal. No potential or known landslide areas in project area.</td>
<td>2 - No known contaminated sites in project area. Project area is not within liquefaction zone. No steep slopes and/or potential or known landslide areas. Operation could impact sediment quality if treatment was not required for stormwater discharges.</td>
</tr>
<tr>
<td>5. Water Quality</td>
<td>3 - No new untreated discharges to surface waters.</td>
<td>3 - No new untreated discharges to surface waters.</td>
<td>1 - It is assumed that stormwater treatment would not be required. If stormwater treatment was required, rating would change from 1 to 3.</td>
</tr>
</tbody>
</table>
### Technical Complexity
1. Furthest away from CSO overflow. Will involve complex telemetry and possibly predictive algorithms.

### Compatibility with Existing WW system
2. May prolong peak event to existing system because stored flows will be fed back into the system after peak event passes. More pounds of BOD, TSS will be routed through treatment facilities.

### Flexibility/Adaptive Management
3. Area available within Roxhill Playground to expand tank or construct auxiliary tank.

### Constructability/Implementation Schedule
2. No significant construction issues or risks beyond typical structure excavation and construction. Possible traffic and access issues regarding temporary construction conditions associated with Roxhill Playground.

### Staffing
1. Facility can be automatically started and run autonomously under design conditions. However, facility will be started using monitoring and telemetry. This may require operator response to ensure proper startup and operation of the facility. Some staffing/supervision may be needed for cleaning. Facility can be automatically started and run autonomously under design conditions. However, facility will be started using monitoring and telemetry. This may require operator response to ensure proper startup and operation of the facility. Some staffing/supervision may be needed for cleaning. Facility can be automatically started and run autonomously under design conditions. However, facility will be started using monitoring and telemetry. This may require operator response to ensure proper startup and operation of the facility. Some staffing/supervision may be needed for cleaning. Facility can be automatically started and run autonomously under design conditions. However, facility will be started using monitoring and telemetry. This may require operator response to ensure proper startup and operation of the facility. Some staffing/supervision may be needed for cleaning. Facility can be automatically started but will require operator response to ensure proper startup and operation. Staffing/supervision may be needed for cleaning. Facility should not impact downstream facilities.

### Training
2. Staff familiar with storage facilities and technology - North Creek. Similar control approaches to other facilities within the system can be specified for consistency.

### Reliability
2. System requires telemetry/controls to effectively store peak flows. Power is critical for operation of the basin and ability to expand in the future could be problematic.

### Reliability
2. System requires telemetry/controls to effectively store peak flows. Power is critical for operation of treatment facility, telemetry & monitoring equipment. Treatment technology is proven.

### Reliability
2. System requires telemetry/controls to effectively store peak flows. Power is critical for operation of treatment facility, telemetry & monitoring equipment. Treatment technology is proven.

### Maintenance
2. Minimal maintenance compared to other alternatives. Typical stormwater piping and treatment system maintenance.

### Maintenance
2. Minimal maintenance compared to other alternatives. Typical stormwater piping and treatment system maintenance.

### Safety
3. No street access required. No traffic control procedures required. No street use/closure permit required.

### Safety
3. No street access required. No traffic control procedures required. No street use/closure permit required.

### Safety
3. No street access required. No traffic control procedures required. No street use/closure permit required.

### Safety
2. Maintenance of storm sewers will require manhole access in streets.

### Impact Analysis

<table>
<thead>
<tr>
<th>CATEGORY / CRITERIA</th>
<th>ALTERNATIVE 1G: RECTANGULAR STORAGE, BASIN 416</th>
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</tr>
</thead>
<tbody>
<tr>
<td>IMPACT RATING</td>
<td>DESCRIPTION</td>
<td>IMPACT RATING</td>
<td>DESCRIPTION</td>
</tr>
<tr>
<td>TECHNICAL</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>1. Technical Complexity</td>
<td>1</td>
<td>Furthest away from CSO overflow. Will involve complex telemetry and possibly predictive algorithms.</td>
<td>1</td>
</tr>
<tr>
<td>2. Compatibility with Existing WW system</td>
<td>2</td>
<td>May prolong peak event to existing system because stored flows will be fed back into the system after peak event passes. More pounds of BOD, TSS will be routed through treatment facilities.</td>
<td>3</td>
</tr>
<tr>
<td>3. Flexibility/Adaptive Management</td>
<td>3</td>
<td>Area available within Roxhill Playground to expand tank or construct auxiliary tank.</td>
<td>2</td>
</tr>
<tr>
<td>4. Constructability/Implementation Schedule</td>
<td>2</td>
<td>No significant construction issues or risks beyond typical structure excavation and construction. Possible traffic and access issues regarding temporary construction conditions associated with Roxhill Playground.</td>
<td>2</td>
</tr>
<tr>
<td>O&amp;M</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>1. Staffing</td>
<td>2</td>
<td>Facility can be automatically started and run autonomously under design conditions. However, facility will be started using monitoring and telemetry. This may require operator response to ensure proper startup and operation of the facility. Some staffing/supervision may be needed for cleaning. Facility can be automatically started and run autonomously under design conditions. However, facility will be started using monitoring and telemetry. This may require operator response to ensure proper startup and operation of the facility. Some staffing/supervision may be needed for cleaning. Facility can be automatically started and run autonomously under design conditions. However, facility will be started using monitoring and telemetry. This may require operator response to ensure proper startup and operation of the facility. Some staffing/supervision may be needed for cleaning. Facility can be automatically started but will require operator response to ensure proper startup and operation. Staffing/supervision may be needed for cleaning. Facility should not impact downstream facilities.</td>
<td>1</td>
</tr>
<tr>
<td>2. Training</td>
<td>3</td>
<td>Staff familiar with storage facilities and technology - North Creek. Similar control approaches to other facilities within the system can be specified for consistency.</td>
<td>1</td>
</tr>
<tr>
<td>3. Reliability</td>
<td>2</td>
<td>System requires telemetry/controls to effectively store peak flows. Power is critical for operation of telemetry &amp; monitoring equipment and ability to store peak flows. Storage is a proven technology for controlling peak flow events.</td>
<td>2</td>
</tr>
<tr>
<td>4. Maintenance</td>
<td>2</td>
<td>Alternative requires less maintenance than most other alternatives. Automatic flushing gates should provide most, if not all, the cleaning needed. More complex telemetry/controls than bottom of the basin alternatives (pump station monitors, possible flow meters, level sensing and pump system controls). Assumes no entry.</td>
<td>1</td>
</tr>
<tr>
<td>5. Safety</td>
<td>3</td>
<td>No street access required. No traffic control procedures required. No street use/closure permit required.</td>
<td>3</td>
</tr>
</tbody>
</table>

**Impact Rating:**
1. High
2. Medium
3. Low

**Description:**
- **IMPACT:**
- **RATING:**
- **DESCRIPTION**
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<td>DESCRIPTION</td>
<td>IMPACT RATING</td>
</tr>
<tr>
<td>COST EFFECTIVENESS</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>1. Project Capital Costs</td>
<td>2</td>
<td>Relative cost = 1.9</td>
<td>1</td>
</tr>
<tr>
<td>2. Life Cycle Costs</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>3. Cost Variability/Risk</td>
<td>2</td>
<td>Variability Ratio = 1.6</td>
<td>3</td>
</tr>
<tr>
<td>Note: Project Capital Costs for Barton Alternatives range from a low $2.4M to a high of $38.5M</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

COMMUNITY IMPACT

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<tr>
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<tr>
<td></td>
<td>IMPACT RATING</td>
<td>DESCRIPTION</td>
<td>IMPACT RATING</td>
</tr>
<tr>
<td>1. Location</td>
<td>2</td>
<td>Small, above ground facilities and vents may cause limited reduction in land use. Design must consider surrounding land use.</td>
<td>1</td>
</tr>
<tr>
<td>2. Potential Community Impacts</td>
<td>2</td>
<td>Design can help small aboveground facilities fit into community vision that is consistent with current surrounding uses.</td>
<td>1</td>
</tr>
<tr>
<td>3. Construction Impacts</td>
<td>1</td>
<td>Due to construction duration, multiple sites, temporary closure of playground, and pipeline alignment along residential arterials, impacts will be significant.</td>
<td>1</td>
</tr>
<tr>
<td>------------------------------</td>
<td>-------------------</td>
<td>-----------------------------------------------</td>
<td>-----------------------------------------------</td>
</tr>
<tr>
<td>What are the significant challenges associated with this alternative?</td>
<td>Community Impact</td>
<td>1. Impacts to ferry traffic and Fauntleroy traffic during construction. 2. Concurrent construction impacts to the Fauntleroy community for 5-7 years from multiple construction projects (Barton PS upgrade; CAG 2, and Barton CSO project). 3. Odor concerns in parking lot/trapped air/pressure to gravity. 4. Parking disruption for O&amp;M activities 5. ADA access 6. May need additional odor control by Lowman Park. 7. Parking reduction and traffic detours will impact large organized events, in addition to typical park users, at this regional park.</td>
<td>1. Long-term impact associated with siting numerous CSO facilities throughout the neighborhood. The proposed sites require siting in 2 parks. 2. New stakeholders that will need to be engaged. 3. High traffic impacts in multiple locations.</td>
</tr>
<tr>
<td></td>
<td>Technical</td>
<td>1. Very difficult to construct due to limited site space and distant access from streets for construction crews and equipment. 2. Requires complex control scheme for flow diversion. Reliable flow control is uncertain because King County does not have experience or familiarity with this type of flow control. 3. Results in two storage structures for Murray Basin. Reduces the storage size at Murray, but does not eliminate the need for 1. Requires complex control scheme for flow diversion. Reliable flow control is uncertain because King County does not have experience or familiarity with this type of flow control. 2. Results in two storage structures for Murray Basin. Reduces the storage size at Murray, but does not eliminate the need for storage and all associated site impacts. 3. KC still has to build a facility for odor control and generator by Lowman. 4. Construction – concurrent or sequential both present.</td>
<td>1. Requires complex control scheme for flow diversion. Reliable flow control is uncertain because King County does not have experience or familiarity with this type of flow control. 2. Results in two storage structures for Murray Basin. Reduces the storage size at Murray, but does not eliminate the need for storage and all associated site impacts. 3. KC still has to build a facility for odor control and generator by Lowman. 4. Multiple diversion and storage points throughout the upper portion of collection increases system complexity, thereby decreasing the certainty of reliable flow control. 2. Upper basin storage requires larger storage facilities when compared to bottom-of-basin storage in order to increase the certainty of flow control. 3. Does not eliminate the need for bottom-of-basin storage. 4. Construction – concurrent or sequential both present.</td>
</tr>
</tbody>
</table>
| Environmental  | 1. Possible tree removal.  
2. Restoration area/volunteer grants for restoration.  
3. Historic status of pool. | 1. Possible impact to trees.  
2. Vegetated areas around park disrupted. | 1. 2 parks involved.  
2. Traffic, noise, disruption throughout community.  
3. High potential for encountering soil contamination (dry cleaner) | 1. Loss of old trees.  
2. Conservancy zone. | 1. The site contains wetlands and an associated stream. The feasibility of obtaining environmental approvals for this alternative is highly uncertain.  
2. Lengthy council review (minimum 12 months). |
| --- | --- | --- | --- | --- | --- |
| O&M | 1. Serious concerns over complexity of routing flows out of Barton PS force mains and into storage facility located between two pump stations.  
2. KC has no previous experience with motorized valves and predictive ability to use these valves.  
3. Access to tank – pedestrian hazards on path. | 1. Not first choice due to complexity factor (but solvable).  
2. Risk of reliability needs quantifying.  
3. Safety for access in parking lot | 1. Multiple facilities for O&M staff to maintain increases staffing requirements and reduces overall system reliability. | 1. Complex operations.  
2. Reliability concerns.  
3. Multiple facilities required for stable control. | |
| Land Use/Permitting | 1. The park is in CR zoning and building this prohibited and will require code amendment or rezoning.  
2. Would have to demonstrate no other feasible alternative. | 1. Lengthy, uncertain process associated with allowing use of existing park property for CSD facility. However, siting majority of facilities within existing parking area may mitigate this issue.  
2. Differentiator being under parking lot as opposed to traditional park use. | 1. Lengthy, uncertain process associated with property acquisition at multiple sites. This includes parks again.  
2. Parks locations will require council approval. | 1. The park is in CR zoning and building this prohibited and will require code amendment or rezoning.  
2. Would have to demonstrate no other feasible alternative.  
2. Private property acquisition potentially required for new pump station.  
3. Storage tank | 1. Requires acquisition of up to six privately owned properties.  
2. Facility extends into ROW. |
| Why should this alternative move forward? | Not recommended for further evaluation. | The impacts to the community are well documented. Limiting facilities to within existing parking areas may reduce the impact on parks, making this alternative more feasible from a land use perspective. | Not recommended for further evaluation. | The impacts to the community are well documented. However, this alternative is a very cost-effective, reliable alternative for CSO control. | Not recommended for further evaluation. | Although there are technical challenges, the planning team is confident that these can be reasonably dealt with during design. This alternative is a cost-effective, reliable alternative for CSO control. |
Appendix C

PUBLIC INVOLVEMENT DOCUMENTATION
KING COUNTY WASTEWATER TREATMENT DIVISION
COMBINED SEWER OVERFLOW (CSO) BEACH PROJECTS
BARTON BASIN

PUBLIC INVOLVEMENT AND OUTREACH

The goal of public involvement and outreach was to inform interested citizens about the Combined Sewer Overflow Beach project in the Barton basin and to provide opportunities for meaningful involvement in the CSO control planning process.

The public process objectives were to:
- Provide timely and clear information to stakeholders and the public about the purpose of the project and their opportunities to participate.
- Conduct a clear, systematic, and objective process for identifying and evaluating alternatives for CSO control and associated wastewater infrastructure (pump station, pipeline, etc.), and selecting preferred alternative(s) and site(s).
- Obtain input from stakeholders and the public on the alternatives and criteria before preferred alternative(s) and site(s) are selected by King County.

AGENCY STAKEHOLDER ENGAGEMENT PROCESS

To facilitate stakeholder input, a workshop for local and state agency staff and tribal entities was held on May 7, 2009 to advise the development of the CSO control alternatives and their evaluation criteria. This workshop covered the four basins associated with the CSO Beaches project: North Beach, South Magnolia, Murray, and Barton. Agencies and Tribes were sent a letter of invitation and a reminder email. A meeting summary was sent to all attendees.

The workshop participants reviewed the CSO program, the range of approaches the County considered to address CSOs in the four basins, and its public outreach approach. Participants provided input on the approaches, existing conditions, current and future projects, plans and opportunities for coordination and methods for public outreach. The project team used this input to guide development of the range of alternatives that would be considered as well as to modify the existing public involvement plan where appropriate.

A technical memo was sent in the winter of 2010 to agency stakeholders as the alternatives were narrowed from nine to three. The memo explained how the short list of alternatives was determined and solicited written comments to inform the identification of an alternative for environmental review. Agencies were also notified via email of all public meetings. Stakeholders will receive a letter explaining how their input was used to inform the process, as well as provide information about the upcoming SEPA process.

Elected officials (King County Executive, Councilmember Jan Drago and Joe McDermott, Seattle City Councilmember Rasmussen), agencies (Department of Ecology, Seattle Public Utilities and Seattle Public Utilities and Neighborhoods Committee, Suquamish, Muckelshoot and Tulalip Tribes) and regional committees (Metropolitan Water Pollution Abatement Advisory Committee and Regional Water Quality Committee) were briefed at key milestones for each basin.
PUBLIC MEETINGS AND BRIEFINGS

King County hosted public meetings, community group meetings and briefings between 2007 and 2010 to provide information about the development of CSO control alternatives and to facilitate active public participation in the planning process. In advance of the public meetings, postcards or newsletters were mailed to property owners in the basin area, people who had joined the mailing list, and representatives of community organizations who had expressed interest in the planning process. Email notifications were sent to the County’s contact lists and community organizations with listservs for additional distribution. Notices of public meetings were available on the project and King County website and were provided to local and regional media through news releases.

Public Meetings:

- June 27, 2007: A joint public meeting was held for the Barton and Murray communities to explain the CSO Beach project and discuss the alternative means for controlling CSO’s.
- October 8, 2009: A public open house was held to provide an overview of the CSO control problem in the Barton basin, explain approaches identified to control CSOs, provide information on how to stay up to date on progress, and solicit input.
- March 18, 2010: A public meeting was held to present the three preferred CSO control alternatives and solicit public input.
- August 5, 2010: A technical information session was held to provide additional information about the Green Stormwater Infrastructure alternative to residents in sub basin 416, east of 35th Ave SW.
- November 1, 2010: A public meeting was held to present a community-generated alternative proposing a CSO facility sited in Lincoln Park on Fauntleroy Way in the Barton basin, and to solicit feedback on this alternative.

Community Group Meetings and Briefings:

- 2007 – 2008: Several community briefings were given at the request of the Fauntleroy Community Association during regularly scheduled board meetings.
- November 10, 2009: The Fauntleroy Community Association board held a meeting to discuss concurrent projects including the Barton Pump Station upgrade, the proposed CSO control project, and beach sand replacement in Fauntleroy Cove.
- During 2010, King County public involvement staff attended several Fauntleroy Community Association Board meetings to discuss the CSO Beach Project and the schedule for selecting alternatives.

Public input from all meetings and briefings was used to identify an alternative for further review. Almost all of the respondents recognized the need to address the CSO problem in Barton. Most respondents were opposed to siting the facility along Upper Fauntleroy Way S.W. across from the ferry terminal due to traffic disruptions. Respondents were divided on storage at the old Fauntleroy school site and green stormwater infrastructure (GSI) in the upper basin, with a variety of concerns about both methods of CSO control. While many respondents were enthusiastic about GSI, some were concerned about potential drainage, landslide and stability issues.

Barton basin residents and the Fauntleroy community voiced opposition to the storage under the south parking lot in Lincoln Park based on concerns over the potential for 5-7 years of multiple
construction projects in the immediate vicinity with impacts to ferry staging, traffic, and Lincoln Park access and parking.

PUBLIC INFORMATION

Project Website
In 2009 a project website, www.kingcounty.gov/CSObeachprojects, was established to make information on the development of the CSO control approaches available to the public. A link to the project website was made available on the Wastewater Treatment Division’s homepage and provided to the public in meeting notices, press releases, newsletters, emails and at meetings.

Notice of all public meetings and stakeholder workshops were posted on the website. After public meetings, written summaries, presentations, and handouts were made available on the website. Interested parties were able to sign up for the project mailing list and were provided a phone and email contact for King County staff.

Technical information was made available on the website as a separate link (http://www.kingcounty.gov/environment/wtd/Construction/Seattle/BeachCSO/Library/TechInfo.aspx) to allow interested citizens opportunities to better understand the decision process. Individuals could request CD copies of the technical information as needed.

Project Mailings
A newsletter was mailed to basin residents in fall 2009 with information about the upcoming decision process for CSO control projects and options for community involvement and participation. The newsletter included a mail-in form to sign up for email updates and/or hard copies of web materials. A second newsletter was sent in spring 2010 to announce the three selected alternatives for CSO control and provide information about a public meeting to discuss the alternatives. Newsletters were also provided as a PDF by email and mailed to local and state agencies and tribes. A technical information session flier was sent in July 2010 to residents within the upper basin that would be affected by the green stormwater infrastructure solution. In October 2010, a flier was sent to residents in the Fauntleroy neighborhood to announce the November 1, 2010 public meeting. Sandwich boards were also placed throughout Lincoln Park and the surrounding neighborhood to ensure maximum attendance at the November meeting.

COMMENT TRACKING AND RESPONSE PROCESS

Members of the public submitted feedback or input in a variety of ways. Stakeholders and members of the public were invited to ask questions and provide comments at all of the stakeholder workshops and public meetings. The consultant team and representatives of King County responded to comments and questions during those meetings. A summary of public comment and response from each meeting was posted in the meeting summary available on the project website, and a ‘frequently asked questions’ page was included on the website.

King County community relations planning staff received the comments that were submitted via the website, an online survey, email and phone. The comments were saved by County staff for their records. Some comments were intended to inform the CSO control decision process and did not require a response. For questions and comments that did require a response, King County staff responded via email or phone. The West Seattle blog, http://westseattleblog.com/, a
media resource used extensively by the Barton and Murray communities, provided extensive coverage of options, discussions, decisions and process.

Public input from all meetings, briefings, and comments was used to identify an alternative for further review. Based on the strong level of public input during the decision-making process, specific requests from stakeholders, and King County’s commitment to public involvement, the County is planning continued public outreach throughout the design and construction phases. An updated public involvement plan will be developed for design and construction to keep the community and stakeholders engaged and informed, and to respond to concerns during design, environmental review, and construction.
The goal of public involvement and outreach was to inform interested citizens about the Combined Sewer Overflow Beach project in the Murray basin and to provide opportunities for meaningful involvement in the CSO control planning process.

The public process objectives were to:
• Provide timely and clear information to stakeholders and the public about the purpose of the project and their opportunities to participate.
• Conduct a clear, systematic, and objective process for identifying and evaluating alternatives for CSO control and associated wastewater infrastructure (pump station, pipeline, etc.), and selecting preferred alternative(s) and site(s).
• Obtain input from stakeholders and the public on the alternatives and criteria before preferred alternative(s) and site(s) are selected by King County.

AGENCY STAKEHOLDER ENGAGEMENT PROCESS

To facilitate stakeholder input, a workshop for local and state agency staff and tribal entities was held on May 7, 2009 to advise the development of the CSO control alternatives and their evaluation criteria. This workshop covered the four basins associated with the CSO Beaches project: North Beach, South Magnolia, Murray, and Barton. Agencies and Tribes were sent a letter of invitation and a reminder email. A meeting summary was sent to all attendees.

The workshop participants reviewed the CSO program, the range of approaches the County considered to address CSOs in the four basins, and its public outreach approach. Participants provided input on the approaches, existing conditions, current and future projects, plans and opportunities for coordination and methods for public outreach. The project team used this input to guide development of the range of alternatives that would be considered as well as to modify the existing public involvement plan where appropriate.

A technical memo was sent in the winter of 2010 to agency stakeholders as the alternatives were narrowed from nine to three. The memo explained how the short list of alternatives was determined and solicited written comments to inform the identification of an alternative for environmental review. Agencies were also notified via email of all public meetings. Stakeholders will receive a letter explaining how their input was used to inform the process, as well as provide information about the upcoming SEPA process.

Elected officials (King County Executive, Councilmember Jan Drago and Joe McDermott, Seattle City Councilmember, Rasmussen), agencies (Department of Ecology, Seattle Public Utilities and Seattle Public Utilities and Neighborhoods Committee, Suquamish, Muckleshoot and Tulalip Tribes) and regional committees (Metropolitan Water Pollution Abatement Advisory Committee and Regional Water Quality Committee) were briefed at key milestones for each basin.
PUBLIC MEETINGS AND BRIEFINGS

King County hosted public meetings, community group meetings and briefings between 2007 and 2010 to provide information about the development of CSO control alternatives and to facilitate active public participation in the planning process. In advance of the public meetings, postcards or newsletters were mailed to property owners in the basin area, people who had joined the mailing list, and representatives of community organizations who had expressed interest in the planning process. Email notifications were sent to the County’s contact lists and community organizations with listservs for additional distribution. Notices of public meetings were available on the project and King County website and were provided to local and regional media through press releases.

Due to significant concern in the Murray basin, King County convened a community advisory group (CAG) to better understand and explore options for CSO control in the Murray basin. This group consisted of twelve residents, four alternates, and several ex officio members.

Public Meetings

- June 27, 2007: A community briefing was held for the West Seattle community to inform citizens of the CSO control project.
- October 7, 2009: A public open house was held to provide residents with broad background on the CSO control problem in the Murray basin, explain approaches identified to control CSOs, provide information on how to stay up to date on progress, and solicit input.
- March 29, 2010: A public meeting was held to present the three preferred CSO control alternatives and solicit public input.
- June 19, 2010: A technical information session was held to respond to citizens’ requests for technical information and information about the process to identify and screen CSO control alternatives.
- November 1, 2010: A public meeting was held to present a Murray CAG-generated alternative proposing a CSO facility sited in Lincoln Park on Fauntleroy Way in the Barton basin, and to solicit feedback on this alternative.

Community Group Meetings and Briefings

- Between 2007 and 2009, County staff attended two Fauntleroy Community Association board meetings to keep neighbors informed and updated on the project.
- October 21, 2009: The Morgan Community Association hosted a community meeting to discuss CSO control approaches and the public participation process.
- April 21, 2010: The Morgan Junction Community Association hosted a presentation on CSO control alternatives.
- June – September, 2010: Eight meetings of the Murray CAG were held to debate and discuss CSO control alternatives.

Public input from all meetings and briefings was used to identify an alternative for further review. While most community members recognized the need to deal with CSO control problems in the Murray basin, few members supported the three alternatives presented by the County. Neighbors of Lowman Beach Park submitted a statement with more than 700 signatures opposed to siting an underground storage facility in Lowman beach Park. Community members considered Lowman Beach Park a treasured space, but they were also against using private
property for a storage site. The in-street control option was also opposed due to possible lengthy street closures and traffic disruptions. The Murray Community Advisory Committee (CAG) was established in response to community objection to the Lowman Beach Park alternative. The Murray CAG issued a report in October recommending storage in Lincoln Park, triggering strong opposition from the Barton/Fauntleroy Community.

PUBLIC INFORMATION

Project website
In 2009 a project website, www.kingcounty.gov/CSObeachprojects, was established to make information on the development of the CSO control approaches available to the public. A link to the project website was made available on the Wastewater Treatment Division’s homepage and provided to the public in meeting notices, press releases, newsletters, emails and at meetings.

Notice of all public meetings and stakeholder workshops were posted on the website. After public meetings, written summaries, presentations, and handouts were made available on the website. Interested parties were able to sign up for the project mailing list and were provided a phone and email contact for King County staff.

Technical information was made available on the website as a separate link (http://www.kingcounty.gov/environment/wtd/Construction/Seattle/BeachCSO/Library/TechInfo.aspx) to allow interested citizens opportunities to better understand the decision process. Individuals could request CD copies of the technical information as needed.

Project mailings
A newsletter was mailed to about 5,000 basin residents in fall 2009 with information about the upcoming decision process for CSO control projects and options for community involvement and participation. The newsletter included a mail-in form to sign up for email updates and/or hard copies of web materials. A second newsletter was sent in spring 2010 to announce the three selected alternatives for CSO control and provide information about a public meeting to discuss the alternatives. Newsletters were also provided as a PDF by email and mailed to local and state agencies and tribes. A technical information session flier was sent in July 2010 to residents within the upper basin that would be affected by the green stormwater infrastructure solution. In October 2010, a flier was sent to residents in the Fauntleroy neighborhood to announce the November 1, 2010 public meeting. Sandwich boards were also placed throughout Lincoln Park to ensure maximum attendance at the meeting.

In addition to targeted mailings, news releases were sent at key milestones to local and regional media, including blogs, and to city and state agencies for distribution.

COMMENT TRACKING AND RESPONSE PROCESS

Members of the public submitted feedback or input in a variety of ways. Stakeholders and members of the public were invited to ask questions and provide comments at all of the stakeholder workshops and public meetings. The consultant team and representatives of King County responded to comments and questions during those meetings. A summary of public comment and response from each meeting was posted in the meeting summary available on the project website, and a ‘frequently asked questions’ page was included on the website.
King County community relations planning staff received the comments that were submitted via the website, an online survey, email and phone. The comments were saved by County staff for their records. Some comments were intended to inform the CSO control decision process and did not require a response. For questions and comments that did require a response, King County staff responded via email or phone. The West Seattle blog, http://westseattleblog.com/, a media resource used extensively by the Barton and Murray communities, provided extensive coverage of options, discussions, decisions and process.

Public input from all meetings, briefings, and comments was used to identify an alternative for further review. Based on the strong level of public input during the decision-making process, specific requests from stakeholders, and King County’s commitment to public involvement, the County is planning continued public outreach throughout the design and construction phases. An updated public involvement plan will be developed for design and construction to keep the community and stakeholders engaged and informed, and to respond to concerns during design, environmental review, and construction.
Murray Basin Combined Sewer Overflow Project
Community Advisory Group

12 October 2010

Pam Elardo
Interim Director
King County
Department of Natural Resources
Wastewater Treatment Division
201 South Jackson Street
Seattle, WA 98104

Subject: Murray Basin CAG
Final Report and Recommendations

Dear Pam:

The Murray Basin Community Advisory Group is pleased to provide the attached
Final Report and Recommendations as a product of our four month collaboration
with King County Water Treatment Division staff and its consultants in an effort to
partner with King County in identifying the best alternative for CSO solutions in
the Murray Basin.

As noted, there are a number of obvious take-aways that emerged and which
informed the process for developing the set of recommendations in this report. It
has become evident that the CSO problem does not have a single, obvious,
exquisitely simple, technically pure and universally equitable solution.
Consistently the CAG endeavored to find outcomes that adhere to its Guiding
Principles for equitable, efficient, functional, operationally viable, cost effective,
environmentally sound and comprehensive solutions. The CAG also committed
to developing solutions whose outcomes embrace and respond to the six criteria
established by KCWTD.

While this report represents the specific recommendations of the CAG, we
believe it is the result of an intense and cooperative effort of the CAG, KCWTD
and its consultant team taking on the significant challenges associated with the
CSO program with the clear intent to find the optimal solution for a healthy and
vibrant Puget Sound.

The CAG thanks KCWTD and its consultants for their participation and
cooperation in providing information and testing alternatives in response to our
requests. This report and its recommendations would not have been possible
without their analysis.

Our recommendations are presented in three categories: 1) recommendations for
specific CSO alternatives; 2) recommendations for components or approaches
that should be applied to all alternatives; and 3) recommendations for the
alternative selection and design process going forward as it relates to community
involvement. It is with respect to the last category that we would like to
emphasize our recommendation that the County Continue to formally engage
with the CAG throughout the design, development and implementation
phases of the CSO project
This recommendation strongly encourages the County and KCWTD to continue to meet with the CAG throughout the next phases of the project in order to avoid a repeat of the disconnect that was evident at the onset of the project; to maintain continuity and progress in the process; to capitalize on the considerable work that has been accomplished as KCWTD moves forward in detailed development of the selected alternative; and to engage with the larger community in expanding understanding, seeking approval, and generally communicating the results.

We recommend the County immediately expand the CAG process to include equitable representation from the Fauntleroy community in a combined CAG to develop, review and evaluate the next phases of development of the CSO alternative.

The CAG believes it would be an unfortunate repeat of a missed opportunity to wait until an alternative has been selected and design work fully developed before re-engaging with the CAG.

Again, we thank KCWTD for the opportunity to participate in this process, and very much look forward to continuing to partner with you during the next crucial stages of this important endeavor.

Sincerely,

The Murray Basin Community Advisory Group

Bill Beyers
John Comick
Katherine Dee
Patrick Gordon
Scott Gunderson
Chris Jansen
Vlad Oustimovich (Abstaining)
Charles Redmond
Donna Sandstrom
Don Stark
Dr. Ron Sterling
CAG Member Signatures:

Bill Beyers
John Comick
Katherine Dee
Patrick Gordon
Scott Gunderson
Chris Jansen
Vlad Oustimovich
Charles Redmond
Donna Sandstrom
Don Stark
Dr. Ron Sterling
Cheryl Eastberg
Linda Sullivan
Tracy Tackett
Seattle Parks Department - Ex-Officio
KCWTD – Ex-Officio
Seattle Public Utilities – Ex-Officio

Alternates Include:

Cindy Barker  Morgan Community Association – Alternate
Sharon Best     Neighbor – Alternate
Jim Coombes   Neighbor – Alternate
Linda Cox      Neighbor – Alternate

KCWTD Staff and Consultants Include:

Martha Tuttle    KCWTD
Shahrzad Namini  KCWTD
Jeff Lykken      Tetra Tech

Facilitation Consultants

Penny Mabie     Envirolissues
Amy Meyer       Envirolissues
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Appendix
Executive Summary

On 9 June 2010 King County Wastewater Treatment Division (KCWTD) convened the first Murray Basin Citizens Advisory Group meeting to provide a forum for dialog and information sharing, and to consult with members of the community on the siting of new facilities to reduce combined sewer overflow (CSO) episodes into Puget Sound. CAG members were asked to participate in the process to represent themselves and their broader communities in helping KCWTD make a stronger connection with the community; to provide meaningful input in solving the CSO problem, and help identify the best reasonable and technically feasible alternatives that would address community concerns and County requirements.

The CAG was formed by the County in response to strong community reaction and opposition to the three short-listed alternatives for CSO facility locations, and to address community concerns that it had not been involved in the development, evaluation, and selection of those alternatives. It is important to note the overwhelming support from the community relative to restoring and protecting the health of Puget Sound, and to making significant strides to reduce runoff during peak flow events as mandated by the State of Washington.

The most vigorous community opposition was directed at the proposed locations in Lowman Beach Park, on private residential property adjacent to the park, and in a deep cut-and-cover tunnel along 900’ of Beach Drive SW. The community contended that locating CSO facilities in Lowman Beach Park would eliminate the very amenities that make the park so special to the greater community. It also contended that replacing residential uses with utility facilities would forever change the scale and character that defines the neighborhood; and that major street and utility construction activities needed to be considered in the context of the area’s geology, and access and safety for the community.

The CAG consists of eleven members who represent residents in both the Murray and Barton Basins; representatives from the Fauntleroy Community Association, the Murray Community Association and environmental organizations; ex-officio members from KCWTD, Seattle Department of Parks and Recreation and Seattle Public Utilities. The CAG was supported by a project team from KCWTD and its consultants, and meetings were facilitated by EnvirolIssues. All meetings were conducted in a public forum where the greater community was invited to observe and provide comment.

Community and KCWTD Goals

The existing combined sewer and storm water systems in the Barton and Murray Basins can no longer control the flow during heavy rain, or peak events. This results in combined sewer overflows into Puget Sound on an average of five times per year. The goal of the CSO program is to limit further water quality degradation in Puget Sound by holding combined flow during peak events, and metering that combined flow back into the treatment system at a rate that can be accommodated in accordance with agency and regulatory requirements.

From the onset the CAG has stated its strong support for and commitment to the responsible stewardship and protection of Puget Sound, including overall support...
for the objectives of the KCWTD CSO program. The community is also committed to the stewardship and protection of the character, scale and integrity of parks, open spaces and natural features, and its residential neighborhoods through solutions that are equitable among the greater communities; that are integrated and comprehensive from an overall point of view; that are effective, adaptable and sustainable over time; that are operationally viable and cost effective; and that engage the entire community in an endeavor to raise the awareness of our environmental responsibilities.

**Guiding Principles**

In an attempt to establish an agreed-upon framework for assessing CSO alternatives and to formalize a set of beliefs and convictions that could be articulated and discussed throughout the process, the CAG developed a set of Guiding Principles as outlined below and further detailed in the body of this report. These Guiding Principles were incorporated with KCWTD’s six evaluation criteria in order to establish a blended scoring mechanism with which to identify preferred alternatives.

1. **Share responsibilities for reduction and elimination of CSO events within each neighborhood, community, basin and municipality that contributes to the problem.**

2. **Prioritize locations and sites for CSO facilities in consideration for the preservation and protection of unique scale, character, natural features and vegetation of parks, neighborhoods and communities; and seek solutions that preclude or minimize the increased footprint of such facilities.**

3. **Embrace environmental stewardship with solutions that incorporate the highest aspirations for environmental sustainability, enhanced air and water quality, noise reduction, and which serve to enhance marine habitat and migration.**

4. **Analyze costs on a Total-Cost-of-Ownership (TCO) basis that considers a balance between short-term project costs and long-term operational costs.**

5. **Minimize short-term construction impacts on individual properties, neighborhoods and communities to the fullest degree practical.**

6. **Minimize long-term physical and operational impacts with solutions that avoid inappropriate structures, operational noise and odors, and other permanent conditions that will negatively impact the scale, use, character and value of adjacent properties and spaces.**

7. **Strive for long-term, comprehensive and adaptable solutions that exemplify durability, simplicity, expandability and ease of maintenance over a fifty year period.**
8. Incorporate and leverage community values and assets with solutions that protect neighborhood and community character and that leverage the opportunity to enhance community assets through improved streets, sidewalks and open spaces.

9. Implement comprehensive solutions that follow a bold vision, are adaptable over time, and are fully coordinated with other regulatory bodies (State, County and City) to avoid conflicts and overlaps and to maximize the value for the effort and expenditure.

10. Incorporate best practices that seek all opportunities to utilize newest technologies and proven approaches in order to provide the County, City and Community with outcomes that achieve their collective goals.

11. Avoid unintended consequences through a process of constant review of alternatives for compliance with Guiding Principles, as well as for their effectiveness and appropriateness.

Process

Commencing in June 2010, the CAG met approximately nine times with KCWTD, participated in two workshops, and met on numerous other occasions to develop, refine and evaluate alternative CSO solutions. These meetings progressed through a series of information-gathering sessions, system approaches and technical discussions, and alternative development and evaluation reviews. A number of meetings focused on various regulatory issues with the participation of City of Seattle and State of Washington representatives.

Throughout the process, the CAG has asked many probing questions and raised a number of topics that emerged from the community. While there remain a number of these questions that warrant further explanation and/or exploration, KCWTD has endeavored to address them within the context of the CAG meetings, and to the degree the very conceptual level of design and development of the alternatives would allow.

Going forward, the continued interaction between KCWTD and the CAG will be essential in fulfilling the agreed-upon goals as the CSO project progresses through design and implementation.

During the four months since formation of the CAG, considerable work has been accomplished in discussing, understanding, refining and evaluating seventeen alternative CSO solutions – nine originally proposed by KCWTD, and eight proposed by the CAG. Full descriptions of these alternatives are provided in the body of this report.

In developing its own CSO alternatives, and in evaluating those developed by KCWTD, the CAG has anticipated that key features of any alternative that appeared to have merit might be incorporated into other alternatives. This in fact occurred throughout the process as the seventeen alternatives were narrowed to
nine, while key features of dropped alternatives were retained as add-ons to those remaining.

Following many weeks of discussions, reviews and refinements of the original seventeen alternatives, including a series of thorough evaluations utilizing the Guiding Principles and KCWTD evaluation criteria, the list of alternatives was eventually narrowed to seven and then to five for a final review and recommendation. Those final five include the following in order of their relative CAG preference:

CAG2a Below-Grade Storage at Lincoln Park, South Parking Lot
   Project Total Cost: $24,138,000 Relative Cost Factor: 1.0

KC1B Rectangular and/or Pipe Storage in Vicinity of Murray Avenue SW and Lincoln Park Way SW (triangle site)
   Project Total Cost: $33,493,000 Relative Cost Factor: 1.4

CAG2 Below-Grade Storage at Lincoln Park, North of Colman Pool
   Project Total Cost: $29,367,000 Relative Cost Factor: 1.2

CAG8 Distributed Upper Basin Storage for Murray Peak Flows
   Project Total Cost: $34,823,000 Relative Cost Factor: 1.4

KCIF Combined Pipe and Rectangular Storage at Bottom of Murray Basin
   Project Total Cost: $30,110,000 Relative Cost Factor: 1.2

Murray Basin Citizens Advisory Group Recommendations

At the conclusion of the last scheduled CAG meeting on 28 September 2010, there were a number of obvious take-aways that emerged and which have informed the process for developing the set of recommendations in this report. It has become evident that the CSO problem does not have a single, obvious, exquisitely simple, technically pure and universally equitable solution. Consistently the CAG has endeavored to find outcomes that adhere to its Guiding Principles for equitable, efficient, functional, operationally viable, cost effective, environmentally sound and comprehensive solutions. Finally, the CAG has also committed to developing solutions whose outcomes embrace and respond to the six criteria established by KCWTD.

While this report represents the specific recommendations of the community members of the CAG, we believe it is the result of an intense and cooperative effort of the CAG, KCWTD and its consultant team taking on the significant challenges associated with the CSO program with the clear intent to find the optimal solution for a healthy and vibrant Puget Sound.

The CAG thanks KCWTD and its consultants for their participation and cooperation in providing information and testing alternatives in response to our requests. This report and its recommendations would not have been possible without their analysis.
Recommendations for Specific Alternatives

1. **Advance CAG2a as the preferred alternative as modified at the 28 September 2010 CAG Meeting**
   This recommendation includes the proviso to explore options to further reduce the impacts on the community, parks and the parking lot. They include:
   a. Explore all options to avoid the need for a new pump station in Lincoln Park. In the event one is needed, it should be located in a manner that does not impact natural features or is located outside of shoreline areas.
   b. Locate 0.1mg storage facility in bottom of Murray Basin outside of Lowman Beach Park – in Murray Avenue SW or Beach Drive SW right-of-way.
   c. In the design of the below-grade storage structure in parking area, include options for below-grade odor and electrical control structures, improved pedestrian and vehicle access provisions, and increased safety measures for pedestrian and vehicular access.
   d. Engage both the Lowman and Fauntleroy communities in vetting and further developing this alternative and approaching the community and the City of Seattle to evaluate options and mitigation for use of this specific park parcel.

2. **Explore KC1B (along with portions of KC1F) as back-up alternatives as modified at the 28 September 2010 CAG meeting**
   This recommendation recognizes that a back-up alternative should be maintained pending confirmation of technical feasibility of CAG2a. It includes the proviso that a number of modifications should be incorporated into the alternative as currently drawn to further reduce the impacts on community, open spaces, wetlands and parks. They include:
   a. Increase storage at Fauntleroy School to 0.5mg in order to reduce the total storage requirement in Murray Basin to approximately 0.85MG.
   b. Explore option to provide some additional upper basin storage (as shown in CAG8 Alternative) to further reduce required storage capacity in bottom of basin.
   c. Locate the new 10mgd peak flow pump station out of Lowman Beach Park (potentially in Murray Avenue SW or Beach Drive SW rights-of-way) and explore options to incorporate and retire current Murray Pump Station. This option would result in new, state-of-the-art pump station similar to 53rd Street Station.
   d. Explore options to incorporate potential sites shown in KC1F and/or utilize Murray Avenue SW right-of-way to eliminate need to encroach on wetlands, steep slopes or private property for storage structures.
   d. Locate new storage and control structures below grade to allow above-grade landscape features to mitigate loss of natural features.
Recommendations to be Applied to All Alternatives

3. Increase storage capacity in Fauntleroy School (Barton Basin) to 0.5mg
   This recommendation recognizes the beneficial impacts on total storage requirements in the bottom of basin alternatives recommended above, and provides for additional options for locating storage structures to accommodate them. Further, it acknowledges and supports the Guiding Principles in seeking solutions that are quantitatively and qualitatively shared within the communities served.

4. Apply Green Stormwater Infrastructure mechanisms/methodologies in both Barton and Murray Basins
   This recommendation would serve to reduce peak flows and improve the reliability of any storage solution, as well as provide capacities for unknown future climatic and weather conditions. Further, it could be a mechanism to educate and encourage community involvement and awareness of the need for sustainable practices.

5. Identify and incorporate opportunities to reduce the footprint of CSO facilities by locating them in rights-of-way and other public property in lieu of natural open spaces within parks and communities, or on private property.
   This recommendation would create opportunities to maintain and/or restore natural amenities within the communities, and provide readily accessible locations for maintenance and operations of facilities that might otherwise not accommodate storage capacities necessary to accept peak flows [possibly creating opportunity to retire Murray Pump Station in Lowman Beach Park].

6. Retain options to store portions of peak flows in Upper Murray Basin in conjunction with other storage solutions.
   Through combination with other bottom of basin storage options, this would provide potential for reduction of storage requirements and/or provide additional capacity and reliability to system. A number of these opportunities are identified in CAG8 alternative

Recommendations to be applied to the Process going forward

7. Adopt and incorporate the CAG Guiding Principles into the KCWTD CSO Program and County Process.
   This recommendation acknowledges the considerable effort on the part of the community to provide a thoughtful and comprehensive set of guidelines that incorporates the goals, aspirations and commitments of the community to the environmental stewardship of Puget Sound, the protection of the scale, character and natural features of the community, and the protection of private properties while addressing the CSO projects with full consideration of the County’s requirements. In much the same manner that the CAG acknowledges KCWTD’s criteria, incorporation of the CAG Guiding Principles by KCWTD as it moves forward would ratify the relationship that has been forged through this process. Through this
recommendation, the CAG incorporates its Guiding Principles as part of the recommendations of this report.

8. **Continue to formally engage with the CAG throughout the design, development and implementation phases of the CSO project**

   This recommendation strongly encourages the County and KCWTD to continue to meet with the CAG throughout the next phases of the project in order to avoid a repeat of the disconnect that was evident at the onset of the project; to maintain continuity and progress in the process; to capitalize on the considerable work that has been accomplished as KCWTD moves forward in detailed development of the selected alternative; and to engage with the larger community in expanding understanding, seeking approval, and generally communicating the results.

   **The CAG recommends the County immediately expand the CAG process to include equitable representation from the Fauntleroy community in a combined CAG to develop, review and evaluate the next phases of development of the CSO alternative.**

   **The CAG believes it would be an unfortunate repeat of a missed opportunity to wait until an alternative has been selected and design work fully developed before re-engaging with the CAG.**
1.0 History / Context

Prior to the formation of the Murray Citizens Advisor Committee (CAG) in June 2010, King County Wastewater Treatment Division (KCWTD) had commenced work on addressing the uncontrolled combined sewer overflows into Puget Sound. While this initial work was not part of the scope or charter for the CAG, the following summary is provided to set the context from the community’s perspective for the events and circumstances that eventually led to its formation and the considerable effort that was undertaken by the CAG and KCWTD in working towards a successful outcome and solutions for controlling combined sewer overflow (CSO) events.

In 2003 KCWTD began design work on upgrading the Murray Pump Station located in Lowman Beach Park, with studies to add odor control and emergency generator equipment to the existing facilities. Between 2005 and 2007 several Lowman Beach neighbors and community members from the Morgan Community Association, working with KCWTD, were able to negotiate a planned re-location of those facilities to a proposed below-grade location under the sidewalk in the Beach Drive SW right-of-way, outside of the boundaries of Lowman Beach Park. In 2007, prior to the commencement of final design, the project was put on hold when the County redirected its focus towards the CSO Control Program, and specifically on the Beach Projects of North Beach, Magnolia, Murray Basin and Barton Basin.

In the period between 2007 and 2009, the County began to study alternative approaches to addressing the CSO in these locations considering (1) storage, (2) on-site treatment, (3) conveyance and treatment, and (4) peak flow reduction. During this same period, they conducted public open houses throughout the four communities to discuss the compliance requirements and schedules, to explain various methodologies for addressing them, and to seek public input. Prior to the 29 March 2010 Open House at the Southwest Community Center, and the subsequent community meeting held on 21 April 2010 at the Kenney Home, hosted by the Morgan Community Association (MoCA), no specific alternative solutions or locations for the Murray Basin were presented to the community.

At the 29 March 2010 public open house hosted by the County, KCWTD and its consultants reviewed the underlying CSO compliance requirements and the four alternative approaches to addressing them, and revealed for the first time three short-listed CSO alternatives, subsequently identified as:

- **KC1A**
  1 Million gallon below-grade storage facility with above grade odor control and emergency generator structures located in Lowman Beach Park.

- **KC1C**
  1 million gallon storage facility located in approximately 900ft of large diameter pipe below Beach Drive SW, and approximately 350ft of large diameter pipe below Murray Ave. SW, with above grade odor control and emergency generator structures in Lowman Beach Park.
KC1F
1 million gallon storage facility located partially in 500lf of large diameter pipe below Beach Drive SW, and partially in tank storage with above-grade odor control and emergency generator structures located on currently privately-owned properties east of Lowman Beach Park.

The project schedule presented at the March meeting identified a process that anticipated the selection of the preferred solution in early summer of 2010, with a report back to the public in summer/fall of 2010 (subsequent to the selection), followed by further development of the design and preparation of SEPA documents through the remainder of 2010. The community was informed it could provide further comment during the environmental review process.

During this public meeting and the subsequent presentation at MoCA, the community reaction was remarkably consistent in two regards: (1) in supporting the underlying intent to aggressively, effectively and sustainably embrace the need to control overflows into Puget Sound and protect this vital resource and its habitat; (2) and in opposing the three proposed alternatives and the manner in which the public outreach, and the process in which engineering, design, and facility siting were being conducted.

It is important to note the overwhelming support from the community relative to restoring and protecting the health of Puget Sound, and to making significant strides to significantly reduce runoff during peak flow events as mandated by the State of Washington. The only concerns expressed in this regard were focused on making sure that the measures that were being considered would be adequate for both current and future weather and climate patterns, and that the County not underestimate the passion and willingness of the community to explore sustainable practices and green solutions.

It is also important to note the community concern that was directed at the process for public outreach and involvement. In contrast to the expressed support for the overall intent of the project, there was very strong reaction to the limited public notification and the extent of alternative development and review that had occurred without public review and input; the narrowing of alternatives to the three presented without disclosure or discussion of the other alternatives; the lack of information relative to the evaluation criteria or the scoring that was done to arrive at the three alternatives, or the underlying data that would support the engineering and design approach; and the very limited timeframe that was given for public review of the three alternatives prior to KCWTD’s selection of the preferred direction.

The most vigorous community opposition was clearly directed at the three short-listed alternatives, and specifically the permanent impacts of KC1A on Lowman Bach Park; the significant duration, scope and disruption of KC1C on Beach Drive SW and Murray Ave. SW; and the scale, land-use and character impacts of KC1F on Lowman Beach Park and the residential community through the use of private property, as well as the extensive disruption on Beach Drive SW.
With the subsequent determination by KCWTD that the cut-and-cover tunnel in alternative KC1C was not technically feasible, the following highlights a number of the issues that emerged as key components of the criticism of and opposition to KC1A and KC1F and which formed the genesis of numerous letters, emails and petitions opposing the remaining alternatives.

Lowman Beach Park is an intimate 1.35 acre City of Seattle park located along the shoreline of Puget Sound, immediately north of and forming the northern pedestrian gateway to Lincoln Park for many West Seattle and City-wide residents, thousands of whom use it to pass through on their walks to and from Lincoln Park. There are two century-old Sycamore trees on the site, along with a driftwood-ridden beach that is home to an ever-changing array of make shift forts, a major put-in location for kayakers, windsurfers, kite-flyers, hearty waders, and young explorers. It is a gathering point for the annual Christmas Ship bonfire, numerous weddings, family picnics, and everything one would want to occur on an intimate and natural shoreline.

The community contended that the County’s proposal for locating CSO facilities in Lowman Beach Park would eliminate the very amenities that make this park so special, including:

- Removal of non-replaceable and century-old sycamore trees that provide shelter and character to the park and that, along with the beach access are the primary defining features of Lowman Beach Park.
- Disruption and reconfiguration of the approach to the beach that establishes visual continuity between land and water and provides ready access to the water’s edge.
- Re-configuration of sloping topography that defines a number of intimate zones within the park and provides a natural and varied flow from the higher street elevations to the shore.
- Addition of access facilities (hatches, pads, drives, vents) as well as above-grade odor control and emergency generator structures that would further reduce the remaining natural zones within the park and permanently tip the balance of the character from recreational to utility.
- Potential disruption of the shoreline habitat at least through the construction period, and likely beyond, due to the close proximity to the shoreline of the proposed structures and the need to address geologic, topographic and aquatic conditions.
- Loss of use of the park for an extended period of time during construction, as well as impacts on current recreational uses once facilities are in place and operating (physical impediments, noise, odor, perception).
- The unlikely ability to identify replacement or satisfactory mitigation options in accordance with city ordinances protecting City of Seattle Parks.
The Community also contended that the County’s proposal for CSO facilities immediately east of Lowman Beach Park on private residential property would also have significant negative impacts on the community including:

- A significant change in use, scale and character through the loss of approximately sixteen residential units and the construction of CSO facilities (storage structure, odor control and emergency generator structures, security and access provisions, etc.).
- Questionable ability to sufficiently address steep slope conditions for Lincoln Park Way and residential properties through retaining structures and other geotechnical measures.
- Concerns for the visual impacts of retaining structures and CSO facilities on Lowman Beach Park and the neighborhood.

The Community requested a temporary moratorium on the proposed project schedule and articulated an initial set of principles that it asked be considered in the development of new alternatives. They included the following:

- No further development of non-recreational use of Lowman Beach Park that would change or destroy the existing character and amenities of the park, including existing trees and vegetation, topography, beach access, views of the shoreline, etc. Consider mitigation and or removal of current utility facilities within the park.
- No avoidable and extended disruption of neighborhood streets during construction of CSO facilities that would impact properties and property values, and that do not conform to City of Seattle Street Use conditions (loss of access and services to/from residential homes and neighborhoods.
- No avoidable taking or change of use of private property through eminent domain or other mechanisms, that would result in loss of residential use and character of the neighborhood.
- Incorporation of comprehensive, adaptable and environmentally sustainable practices and methodologies in the design and development of comprehensive CSO facility solutions
- Creation of a community-wide, multi-basin Stakeholders/Advisory Committee to participate with the County in all phases of the development, design and implementation of alternative CSO facility solutions
2.0 Murray Basin Community Advisory Group (CAG)

In response to community requests the County convened the Murray Basin Community Advisory Group (CAG) in June 2010 to provide a forum for dialog and information sharing, and to consult with representatives of the community on the siting of new facilities to reduce combined sewer overflow episodes into Puget Sound. Members of the CAG were asked to participate in a process where they would represent themselves and their broader community members in a process to help KCWTD make a stronger connection with the community; to provide meaningful input and help the County solve the serious problem of combined sewer overflows; help the County reach reasonable and technically feasible alternative CSO solutions that address community concerns and County requirements; and provide advice and input on current and potentially new alternative CSO solutions.

The CAG consists of 11 members who represent residents in both the Murray and Barton Basins; representatives from the Fauntleroy Community Association, Morgan Community Association, and environmental protection organizations; one ex-officio representative from KCWTD, and ex-officio members from Seattle Parks Department, Seattle Public Utilities. Participation in CAG meetings and workshops also included 3 alternate CAG members, project team members from King County Wastewater Treatment Division, and its consultants. Meetings were facilitated by members of Envirolssues. All meetings and deliberations were conducted in a public forum, and members of the community were invited to observe and provide input at each meeting.

The mission of the CAG is to:

- Provide a forum for dialog and information sharing between KCWTD and the community.
- Consider the Murray Basin CSO problem in the context of the broader city and county wastewater system, including the Barton Basin.
- Consult with representatives of the community, including the Fauntleroy community, on a community-acceptable alternative or suite of alternatives to reduce Combined Sewer Overflow episodes.
- Help King County make a stronger connection with the community, and help King County provide information to the community so community members can provide meaningful input in order to help the County solve the serious problems of combined sewer overflows.
- Provide advice, as community representatives, on guiding principles to be considered in potential solutions and ways to address community concerns.
- Partner with King County to find the best alternative for CSO solutions in the Murray basin within the timeframe dictated by the County’s regulatory requirements.
- Develop a Report to KCWTD at the conclusion of the scheduled CAG meetings that represents its consensus findings and recommendations, and provides a dissenting point of view if consensus is not reached.
CAG members include:

Bill Beyers       Neighbor
John Comick       Neighbor
Katherine Dee     Neighbor
Patrick Gordon    Neighbor
Scott Gunderson   Neighbor
Chris Jansen      Neighbor
Vlad Oustimovich  Fauntleroy Community Association
Charles Redmond   Morgan Community Association
Donna Sandstrom   Neighbor
Don Stark         Neighbor
Dr. Ron Sterling  Neighbor
Cheryl Eastberg   Seattle Parks Department - Ex-Officio
Linda Sullivan    KCWTD – Ex-Officio
Tracy Tackett     Seattle Public Utilities – Ex-Officio

Alternates Include:

Cindy Barker      Morgan Community Association – Alternate
Sharon Best       Neighbor – Alternate
Jim Coombes      Neighbor – Alternate
Linda Cox        Neighbor – Alternate

KCWTD Staff and Consultants Include:

Martha Tuttle     KCWTD
Shahrzad Namini   KCWTD
Jeff Lykken       Tetra Tech

Facilitation Consultants

Penny Mabie       EnvirolIssues
Amy Meyer         EnvirolIssues
3.0 Community and KCWTD Goals

The goal of the CSO program is to limit further water quality degradation in Puget Sound by holding stormwater runoff during a peak flow event and metering the stormwater back into the treatment system at a rate that can be accommodated in accordance with agency and regulatory requirements.

There are currently an average of five discharges into Puget Sound each year at the Murray Pump Station resulting from the combined flows from the Barton (approximately 45%) and Murray Basins (approximately 55%). The State of Washington, through the Department of Ecology under WAC 173-245-090 and Discharge Permit WA 002918 have mandated that the County undertake a program to reduce these discharges into Puget Sound to an average of one overflow event per year by the year 2030. The County, in turn has committed to a sequenced program to meet those requirements, beginning with the Beaches Project which includes the Barton and Murray Basins, and anticipates that solutions will be developed and under construction in 2013. KCWTD has indicated that this schedule requires the identification of a preferred alternative by December 2010.

From the onset of its interactions with the KCWTD, the Community has stated its strong support for and commitment to the responsible stewardship and protection of Puget Sound, including overall support for the objectives of KCWTD CSO project. The Community is also committed to the stewardship and protection of the character, scale and integrity of its surroundings including the protection of parks, open spaces and natural features, maintenance of streets and services throughout the community, and protection of the use, scale and character of private property. Central to the community group is the strongly felt commitment to the preservation, protection and restoration of Lowman Beach Park. These concerns accrue to a large community of users of Lowman Beach Park as evidenced by the number of signers to the informal petition that was circulated immediately following the 29 March 2010 meeting.

They also integrate a crucial concept, as noted in Guiding Principle #1, that the solution for Murray Basin be integrated within a comprehensive view of the CSO problem for Barton Basin, establishing a basis for an equitable solution that attempts to solve the problem in relative proportion to the origin of the problem – solidifying the overall community commitment for responsible stewardship of Puget Sound.

Throughout the process, the CAG has endeavored to establish a set of Guiding Principles that will help find mutually acceptable solutions for the CSO projects that are equitable, effective, functional, operationally viable, cost/value-based, environmentally responsible and comprehensive.
4.0 Guiding Principles

In an attempt to establish an agreed-upon framework for assessing CSO alternatives and to formalize a set of beliefs and convictions that had been articulated and discussed throughout the process, the CAG worked to develop a set of Guiding Principles. Their foundation and purpose is intended to:

- Express a set of framework principles that capture the values and an agreed-upon planning intent that can be applied to the project regardless of a particular alternative solution
- Avoid language that is directed solely at a specific solution to either advance or eliminate it in the evaluation process
- Capture the intent of the Guiding Principle concept, but eliminate references to specific measures, solutions, locations, etc. in order that the principle can be applied across the series of alternatives
- Be utilized to establish a framework for defining and weighting evaluation criteria to be utilized in the review and evaluation of County and Community alternatives.

[Guiding Principles by definition are not evaluation criteria. Rather, they articulate a set of agreed-upon values that are utilized in the development of alternative solutions. Evaluation criteria will be developed and weighted in a manner that incorporates the values expressed in the Guiding Principles].

The Murray CAG statement of Guiding Principles

1. Share Responsibilities For Solutions
   The responsibility for reduction/elimination of CSO overflows into Puget Sound resides with each neighborhood, community, basin and municipality that contributes to the problem. The burden and impacts of the solution should be shared both quantitatively and qualitatively within the respective basins in relative proportion to their contribution to the problem, in order that there are no “downstream” impacts. (In other words, don’t push the problem on to the next basin downstream).

2. Prioritize Siting and Locations for CSO “Facilities”
   In compliance with the intent of the current City of Seattle Comprehensive Plan and Land-Use Policies and Ordinances, considerations to preserve and protect the unique scale, character, natural features and vegetation of parks, neighborhoods and communities should be in the forefront in the development, prioritization and selection for siting CSO facilities.

   In addition, the siting of CSO facilities should be strategically prioritized in order to preclude or minimize the increased “footprint” of such facilities on land not currently used for “utility” purposes; and every effort should be explored to utilize existing public rights-of-way, public surplus property, and under-utilized public property in lieu of natural open space in parks and private property obtained either through acquisition or eminent domain.
3. **Embrace Environmental Stewardship**
   Solutions for CSO overflows should incorporate the highest aspirations for environmental stewardship and serve as models for environmental sustainability through improvements that enhance water and air quality, reduce noise, enhance marine habitat and migration, pursue both land-side and water-side practices that minimize the negative environmental footprint of all elements of potential solutions, and broaden community awareness of the need and methodologies for controlling runoff.

   In addition, consideration should be given to employ solutions and materials that do no further harm to the environment and make quantifiable, effective and long-term improvements, both as an end goal for the project and as a guide for design methodology and implementation.

4. **Analyze Costs on a Total Cost of Ownership (TCO) Basis**
   Evaluate solutions for CSO facilities on the basis of a Total Cost of Ownership analysis that considers a balance between short-term project costs and long term operational costs.

   Short-term project costs should incorporate acquisition, mitigation and initial construction costs, as well as a comprehensive listing of all “soft” costs for consulting, environmental reviews, permitting, financing and other agency considerations. Long-term costs should consider maintenance, labor, replacement and other operating costs within a fifty year time frame.

5. **Minimize Short-Term Construction Impacts**
   Solutions for CSO facilities should be implemented in a manner that minimizes impacts on and disruptions to individual properties, neighborhoods and communities in terms of use of streets and sidewalks, noise, avoidable disturbances, and property values.

   Construction should be accomplished within applicable street-use and other permitting regulations that address access, safety, security, monitoring and allowable time periods for work.

6. **Minimize Long-Term Operational Impacts**
   Solutions for CSO facilities should minimize or avoid unsightly and inappropriate visual structures, operational noise and odors, disruptive access facilities, and other permanent conditions that will negatively impact the scale, use, character and value of adjacent properties or spaces.

7. **Strive For Long-Term, Comprehensive and Adaptable Solutions**
   Solutions for CSO facilities should exemplify durability, simplicity, expandability, adaptability and ease of maintenance over a fifty year lifetime (minimum), and provide initial capacity within a reasonable margin of error and cost to accommodate future unpredictable climatic changes and weather patterns.
8. **Incorporate and Leverage Community Values and Assets**
Solutions for CSO facilities should be designed and constructed in a manner that acknowledges and protects a neighborhood and community character, its unique places and spaces, its scale, land-uses, and the amenities that define and support its identity and values. When possible, solutions should enhance these neighborhood and community assets through improving streets, sidewalks, community facility and open spaces.

9. **Implement Comprehensive Solutions**
Solutions for CSO facilities should follow a bold vision and be adaptable over time. They should be planned and implemented in a fully coordinated effort between and among regulatory bodies (State, County and City), agencies and departments and the community in a manner that anticipates and incorporates planned and anticipated projects in order to avoid conflicts, unnecessary overlaps and re-work, and to leverage the opportunity to maximize the value achieved for the effort.

10. **Incorporate Best Practices**
Solutions for CSO facilities should be planned in a manner that seeks out all opportunities to incorporate newest technologies and proven best practices and approaches to provide the County, City and Community with outcomes that achieve their collective goals and aspirations for addressing CSO overflows.

11. **Avoid Unintended Consequences**
Every effort should be taken during the planning and selection process to review each alternative for compliance with these Guiding Principles and to assess them not only for effectiveness, appropriateness and compliance, but also to evaluate potential unintended consequences on an incremental basis throughout the project. Proposed solutions should be evaluated by neutral (non-advocate) parties to ensure there are no negative consequences to the environment or the Community.

### 5.0 Evaluation Criteria
It is important to note that in developing a process for review and evaluation of the proposed CSO alternatives, the CAG incorporated their Guiding Principles into KCWTD’s original six criteria in order to establish a blended scoring mechanism with which to identify the preferred alternative(s), and to ultimately achieve a recommended outcome that addressed both the County’s and the community’s aspirations. This approach and methodology was applied by the CAG throughout the process in developing alternatives, modifying them and ultimately evaluating them. Categories for evaluation include the following:
Criteria 1: Land Use/Permitting (KCWTD) and CAG Guiding Principle 2
Combines KCWTD criteria for assessing compliance with City of Seattle Comprehensive Plan, Municipal Code, Parks Ordinances, permit complexity and property acquisition with CAG Guiding Principle #2 to prioritize siting options to preserve and protect natural features, character and scale of communities.

Criteria 2: Environment (KCWTD) and CAG Guiding Principle #3 & #11
Environmental
Combines KCWTD criteria for assessing the impacts on cultural resources, fish and wildlife, wetlands and shoreline, soils and sediments, water quality with CAG Guiding Principles #3 and #11 to pursue alternatives that are models for sustainability, and that enhance water and air quality, provide effective, comprehensive and appropriate solutions.

Criteria 3: Technical (KCWTD) and CAG Guiding Principle #7, #9 & #10
Comprehensive and Adaptable Solutions
Combines KCWTD criteria for assessing complexity, compatibility, flexibility and constructability with CAG Guiding Principles #7, #9 and #10 to pursue solutions that are comprehensive, adaptable, employ best practices and are coordinated among various regulatory agencies.

Criteria 4: Operations/Maintenance (KCWTD) and CAG Guiding Principle #6, #7 & #10 Long-Term Efficiencies
Combines KCWTD criteria for assessing staffing requirements, reliability, maintenance and safety with CAG Guiding Principles #6, #7 and #10 to pursue solutions that consider and address durability, simplicity and expandability/adaptability over time.

Criteria 5: Community Impact (KCWTD) and CAG Guiding Principle #1, #2, #6 & #8 Preserve Character, Scale and Values of Community
Combines KCWTD criteria for evaluating the short and long term impacts on the community with CAG Guiding Principles #1, #2, #6 and #8 to pursue solutions that are equitable and share responsibilities among communities, that embrace community values, and that sufficiently address and mitigate impacts.

Criteria 6: Cost/Value (KCWTD) with CAG Guiding Principle #4, #7, #9 & #10 to Evaluate Solutions on a Total Cost of Ownership Basis
Combines KCWTD criteria for assessing relative project, relative life-cycle, relative variability/risk, and acquisition and mitigation costs with CAG Guiding Principles #4, #7, #9 and #10 to pursue solutions that maximize life-cycle costs, and that are comprehensive and leverage synergies with other anticipated projects.
6.0 Process

Commencing in June 2010, the CAG has met approximately 9 times with KCWTD, participated in an additional 2 workshops, and has met on numerous occasions to develop, refine and evaluate alternative solutions. The purpose of this report is to describe how and why the community advisory group (CAG) was formed, outline the various subjects that were discussed, explain the review of KCWTD and the development of the CAG alternatives, describe how the CAG and KCWTD evaluated and modified the various alternatives, and ultimately how the CAG reached its recommendations for the preferred alternatives to incorporate the Guiding Principles and to limit the number of Murray Basin CSO overflows into Puget Sound to one per year.

Meetings progressed through a series of organizational and information-gathering sessions, system approaches and technical discussions, and to alternative development and evaluation reviews. A number of meetings focused on various regulatory issues with City of Seattle and State of Washington representatives providing information relative to statutory and regulatory requirements impacting the CSO projects. Additionally, the County conducted two workshops to focus on technical requirements for the Murray and Barton Basin CSO projects; one on 19 June 2010, and another on 9 September 2010.

Throughout the process, the CAG asked many probing questions and raised a number of topics that emerged from the community during the process in the form of written and verbal requests for information. As noted by Christie True, Director KCWTD, at the introductory meeting, the hope of the County was to provide satisfactory information and participate in a process whose outcome would be to agree on an alternative that both solves the regulatory requirements and meets the community’s objectives. Within that process, she indicated the County’s commitment to working with the CAG to re-look at previous alternatives, explore new alternatives, and consider the problem in the context of both the Murray and Barton Basins. Community questions and topics included the following:

- Questions relating to the schedule for the Beaches CSO projects in the context of the 2030 deadline.
- Questions regarding the underlying data for establishing the quantity of flow, the frequency of events, and the projections for future flows that were used to establish CSO solutions.
- Questions relating to the quantities and impacts of the combined flows from Barton Basin on the proposed CSO solutions in the Murray Basin – especially as 45% of the combined flows being accommodated in Murray flow directly from Barton during an event.
- Questions relating to the alternatives that were not presented to the community, or that did not emerge from the County’s review process, and the process, weighted criteria and evaluations that were used to establish the shortlist.
Questions relating to geographic information systems (GIS) data information in the basins and the degree to which they were used to study upper basin alternative solutions.

Questions relating to the alternative solutions that are being studied in Barton Basin, especially as they might inform or impact the solutions in Murray Basin.

Questions relating to Green Stormwater solutions (GSI) and whether and to what extent they were being studied in either of the basins, or to what degree they might reduce the storage requirements were they to be incorporated.

Questions relating to the involvement of the City of Seattle Park Department and Public Utilities in the development and review of the CSO alternatives, especially as they relate to the use of Lowman Beach Park; whether they contemplate a comprehensive look at solutions that could address both regulatory bodies; and whether the solutions anticipate and are coordinated with future projects.

While there remain a number of these questions that warrant further explanation and or exploration, KCWTD has endeavored to address them within the context of the CAG meetings, and to the degree the very conceptual level of design and development would allow. Going forward the continued interaction between KCWTD and the CAG will be essential in fulfilling the agreed-upon goals as the project is developed further through design and implementation. How and in which format that interaction might occur is addressed in the CAG recommendations.

The following is an outline that summarizes the major topics that were addressed during the scheduled CAG meetings.

**Meeting #1, 9 June 2010:**
- Introductions and organizational issues for the CAG
- Context, ground rules, review of project goals
- Outline and agenda for 19 June 2010 Technical Session
- Review of community questions/topics for discussion at future meetings

**Technical Workshop, 19 June 2010:**
- Update on KCWTD process in response to community input
- Introduction of Community Advisory Group
- Discussion of community input/advisory role
- Explanation of CSO approaches
- Description of Barton and Murray Basin combined flows and system requirements
- Description of KCWTD CSO alternatives
- Discussion of GSI approaches (general and specific)
- Discussion regarding factors in comparing alternatives
- Question/Answers
- Field trip to Murray and 53rd Avenue Pump Stations

**Meeting #2, 24 June 2010:**
- Report out on 19 June Technical Session
- Overview of KCWTD CSO program
- Overview of Barton and Murray Basin requirements
- Sewer 101

**Meeting #3, 8 July 2010:**
- Review of Seattle Public Utilities CSO program
- Discussion of 9 Barton Basin and 9 Murray Basin KCWTD alternatives specifically relating to technical constraints
- Introductory discussion of CAG alternatives
- Review of work plan for future meetings

**Meeting #4, 3 August 2010:**
- Review of Seattle Parks Department policies on use of Lowman Beach Park, Kevin Stoops
- Green Stormwater alternative approaches
- Begin development of CAG Guiding Principles
- Discussion of CAG alternatives, and feedback from KCWTD
- Review CAG information requests
- Review of Open Issues log

**Meeting #5, 19 August 2010:**
- Information follow-up from Mtg. #4 re: distributed storage requirements, GSI stormwater management, etc
- Brainstorming for development of CAG Guiding Principles, draft values, reach general consensus
- Review of County criteria for evaluating alternatives
- Identify gaps and disconnects between KCWTD criteria and CAG Guiding Principles
- Outline next steps

**Meeting #6, 30 August 2010:**
- Discussion of KCWTD and CAG alternatives
- Discussion to refine and clarify assumptions and key factors in alternatives
- Initial review of 18 alternatives in context of Guiding Principles and evaluation criteria in order to commence process of narrowing alternatives
Technical Workshop, 9 September 2010:
- Review of initial CAG evaluation process and summaries for KCWTD and CAG alternatives
- Review of Technical Features of all KCWTD and CAG alternatives with intent to refine them for further review and evaluation
- Discussion of technical refinements for next CAG review

Meeting #7, 15 September 2010:
- Review of refinements to 18 KCWTD and CAG alternatives
- Review and discussion of preliminary evaluations
- CAG and KCWTD “scoring” exercise to narrow the number of alternatives

Meeting #8, 27 September 2010
- Review and discuss short-listed alternatives
- Discussion regarding KCWTD suggested refinements to alternatives
- Initial discussion regarding draft CAG recommendations
- Discussion of options and process for continued CAG participation in development, design and implementation of CSO alternative

Meeting #9, 28 September 2010
- Refine list of potential CSO alternative recommendations
- Develop consensus on draft recommendations
- Confirm next steps regarding the CAG Report to the County, and continued CAG participation

[Meeting agendas, materials and meeting notes for the CAG meetings are posted on the KCWTD Beach Projects website noted below].

During the four months since formation of the CAG, considerable work has been accomplished in discussing, understanding, refining, and evaluating seventeen alternative CSO solutions; nine originally proposed by KCWTD, and eight proposed by the CAG. The charter of the CAG, in working with KCWTD, was to develop a set of alternatives and review the KCWTD alternatives with the intent that key features of any alternative might be incorporated into another. Key features for consideration in the development of the CAG alternatives were aimed at adherence to the principle of equity and the joint consideration of both Barton and Murray Basins – since 45% of the combined peak flow being captured in Murray comes directly from Barton; protection of Lowman Beach Park; protection of the private residential properties; incorporation of green infrastructure measures to reduce storage requirements; exploration of distributed storage facilities in the upper basins; and avoidance of massive construction impacts along major access streets. The following outline summary of those alternatives provides a high level description of the locations, key features and approaches for the Murray basin CSO facilities. Full descriptions of the alternative concepts are provided on the King County Water Treatment Division website for the CSO projects at:
7.0 Alternative CSO Approaches Considered by the CAG:

**KC1A:** Rectangular Storage at Bottom of Basin, located in Lowman Beach Park  
Key features include approximately 1 million gallon below-grade storage, odor control and electrical control structures, as well as a new diversion structure. [This alternative requires a City of Seattle Ordinance for location in Lowman Beach Park].

**KC1B:** Storage at Bottom of Basin, located in site bounded by intersection of Lincoln Park Way W. and Murray Ave. SW  
Key features include 1 million gallon storage, odor control and electrical structures, new below-grade diversion structure and pump station.

**KC1C:** Distributed Storage along Beach Drive SW and Murray Avenue SW  
Large diameter (12") pipe below 900 feet of Beach Drive SW, and 350 feet of Murray Ave. SW., new odor control and electrical control structures at Murray Ave. SW and Lowman Beach Park, as well as and new diversion structures at each location.

**KC1D:** Pipe Storage at Bottom of Basin, located along 1250 feet of Beach Drive SW  
Key features include large diameter (12") pipe located below Beach Drive SW, 50 foot diameter tunnel portals at each end, odor control and electrical control structures at Lowman Beach Park, new diversion structure at Murray Pump Station.

**KC1E** Upper Basin Storage  
New below-grade storage structure, odor control and electrical control structures located in Gatewood School Playground; new 42" force main (pipe) along Lincoln Park Way SW and SW Myrtle St; new 28.5 mgd peak flow pump station, odor control and electrical control structures at Lowman Beach Park, new diversion structure at Murray Pump Station.

**KC1F** Combined Pipe and Rectangular Storage at Bottom of Basin, located on private property and Beach Drive SW, adjacent to Lowman Beach Park  
Key features include 1 million gallon storage, partially below Beach Drive SW, and partially on private property across from Lowman Beach Park; odor control and electrical control structures adjacent to storage structure, new diversion structure at Murray Pump Station.

**KC2A** Convey and Treat at Alki  
Key features include new conveyance from Barton and Murray Basins to Alki Treatment Facility; significant expansion and upgrades to Alki Facility.
KC3A  **End of Pipe Treatment at Bottom of Basin**
Key features include new Actiflo Treatment Facility located in Lowman Beach Park; new diversion and access structures in Lowman Beach Park. **[This alternative requires a City of Seattle ordinance for location in Lowman Beach Park].**

KC5A  **Peak Flow Reduction Combined with Storage in Bottom of Basin**
Key features include open cut large diameter (12”) pipe storage under Beach Drive SW; new odor control and electrical control structures in Lowman Beach Park; new diversion structure at Murray Pump Station; implementation of GSI in upper Murray Basin to reduce storage requirements.

CAG1  **Storage in Mid-Basin in Lincoln Park, North Parking Lot**
Key features include 1.25 million gallon storage below-grade in north parking lot in Lincoln Park; expansion of Barton Pump Station capacity; expansion of Murray Pump Station capacity; new 30: force main connecting Barton Pump Station and Murray Pump Station with the storage facility. **[This alternative requires a City of Seattle Ordinance for location in Lincoln Park].**

CAG2  **Storage in Bottom of Basin in Lincoln Park, North of Colman Pool**
Key features include 1.25 million gallon storage below-grade in upland area north of Colman Pool; new odor control and electrical control structures; expansion of Murray Pump station capacity; new force main connecting Barton and Murray Pump Stations. **[This alternative requires a City of Seattle Ordinance for location in Lincoln Park].**

CAG3  **Combine GSI with Additional Storage in Barton to reduce storage requirements in Murray**
Key features include incorporation of green stormwater infrastructure in Barton Basin; new storage facility near bottom of Barton Basin (likely near Fauntleroy School parking); reduced storage at bottom of Murray Basin (approximately .6 MG in lieu of 1MG); incorporate with other Murray alternatives.

CAG4  **Separate all Sewer and Stormwater Flows in Both Basins**
Key features include disconnection of 1,200 homes and 230 non-residential properties from combined sewers in Murray Basin; remove approximately sufficient acres of impervious area runoff in Barton Basin to eliminate need for storage; provide MS4 treatment in both basins to treat storm runoff as required.

CAG5  **Upper Basin Storage in Gatewood Elementary Playground**
Key features include new 1.25 million gallon storage facility in Gatewood Elementary playground; new 36” force main from Barton Pump Station to Gatewood Elementary; expansion and upgrades to Barton and Murray Pump Stations; new 20” force main from Murray Pump Station to Gatewood Elementary; also assumes GSI and .22MG storage in Barton Basin.
Following a number of discussions and reviews relative to the merits and challenges of each of the alternatives, members of the CAG commenced to evaluate the alternatives noted above in terms of compliance with the CAG’s Guiding Principles and the County’s six categories of evaluation criteria. Several CAG members embarked on independent evaluation approaches and methodologies, and in conjunction with KCWTD recommended that a number of alternatives could be eliminated due to factors of technical feasibility (including a number of the KCWTD alternatives), cost, voluntary participation/implementation, regulatory acceptance and other considerations.

In this process two members of the CAG independently developed scoring matrices that were used by the CAG to evaluate the merits and challenges of each of the seventeen alternatives. The criteria noted above were utilized for these evaluations; even though the methodologies for scoring differed between them the outcomes were very similar. After review among CAG members, the scores were averaged, and results were used to help identify alternatives that could be recommended for elimination from further consideration.

[These evaluation matrices are provided in the Appendix of this report]

Following the initial evaluation by the CAG in an attempt to identify components of the alternatives that appeared to have merit or warrant further investigation, the CAG made a number of recommendations to blend certain key features of alternatives. These evaluations and ensuing recommendations were further explored in the Technical Workshop convened by KCWTD on 9 September 2010. The outcome of that workshop included a series of modified alternatives that were reviewed, discussed and evaluated at the 15 September 2010 CAG meeting, and recommended for further consideration. Those alternatives included the following:

**CAG6 Barton Pump Station Pumps Directly to Alki**
Key features include 0.1 MG storage in Lowman Beach Park (bottom of basin); new 36” force main from Murray Pump Station to 63rd St. Pump Station; expansion and upgrades to Barton Pump Station (requires expanded footprint).

**CAG7 GSI in Murray Basin to Reduce Storage Requirements**
Key features include implementation of basin-wide commercial and residential GSI (Residential Rainwise) for 15% reduction in storage volume; installation of rain gardens to remove up to 10 acres of impervious area in Murray; 0.85 MG storage at bottom of basin.

**CAG8 Upper Basin Storage (Distributed) in Murray to significantly Reduce Storage Requirements at Bottom of Basin**
Key features include storage facilities located in four locations in upper basin; additional storage at bottom of basin (to be determined); control systems to monitor and distribute flows before and after events.
Modified Approaches (Narrowed from 15 September 2010 CAG Meeting)

**CAG2 Install Below-Grade Storage in Lincoln Park**
Key features as modified include four optional locations for below-grade storage [north of Colman Pool; below north parking lot; below south parking lot; deep tunnel storage at foot of Lincoln Bluff]: 0.1MG storage at bottom of Murray Basin; potential to retire Murray Pump Station and relocate to triangle site. [This alternative requires a City of Seattle Ordinance for location in Lincoln Park].

**CAG8 Install Distributed Storage at 4 Locations in Upper Murray Basin**
Key features remain as described in previous CAG8 [This option remains on the list pending further review and discussion relative to the complexity of the piping and flow control system, and an analysis of the beneficial impacts on the bottom of basin storage requirements].

**CAG9 Combination of CAG3, CAG7, and KC1B**
Key features assume implementation of a number of mechanisms and methodologies in combination including: green infrastructure and additional storage in Barton Basin; Green stormwater infrastructure in Murray Basin for additional CSO control/reliability; Storage at bottom of Murray Basin in triangle site at Lincoln Park Way SW and Murray Ave. SW.

**KC1B Bottom of Basin Storage at Triangle Site (Lincoln Park Way SW and Murray Ave. SW)**
Key Features include 1MG storage structure; new odor control and electrical control structure [Alternative locations include use of Murray Ave SW right-of-way to reduce or eliminate the need for acquisition and use of private property].

**KC1F Bottom of Basin Storage on Private Property and Below Portions of Beach Drive SW (East from Lowman Beach Park)**
Key features include total of 1 below-grade storage; new odor control and electrical control structures; retaining structures to address steep slope below Lincoln Park Way SW and private residential properties above extension of Murray Ave SW [This alternative requires acquisition of some or all residential properties along Beach Drive SW immediately across from Lowman Beach park].

[A copy of City of Seattle Ordinance # 118477 adopting Initiative 42, as well as the Seattle Department of Parks and Recreation Policy, endorsed by the Seattle City Council Resolution #29475 is included in the Appendix of this report].
Following the 15 September 2010 CAG meeting, KCWTD and its consultants continued to refine aspects of each of the remaining alternatives, and explore options and/or revisions that would enhance performance, address engineering requirements, or adjust to specific site constraints or opportunities. In the intervening two weeks between the 15 September and 27 September 2010 meetings, these refinements were developed to a conceptual level sufficient to generate relative land acquisition, construction and operational cost assumptions, and provide additional information for use by the CAG in its review and recommendations. It was noted a number of times by KCWTD that both the engineering and cost data was conceptual and would require further development and confirmation throughout the design and development process that would follow the selection of a preferred alternative.

Working up to the last minute, KCWTD provided this refined information at the 27 September 2010 CAG meeting (a meeting prior to which invitations were circulated in the community encouraging attendance and inviting public comment). Those refined alternatives are described as follows:

**CSO Alternative Refinements for 27 September 2010 CAG Meeting:**

[See appendix for conceptual diagrams of the following alternatives, along with preliminary planning-level comparative cost data prepared by KCWTD. Note: costs used in following descriptions are potential total cost numbers from KCWTD data]

**CAG2 Below-Grade Storage at Lincoln Park, Colman Pool**

<table>
<thead>
<tr>
<th>Project Total Cost: $29,367,000</th>
<th>Relative Cost Factor: 1.2</th>
</tr>
</thead>
</table>

This alternative remains much as presented at the 15 September 2010 meeting with the following key features:

1. 1.25MG below-grade storage structure in triangle area north of Colman Pool.
2. Motorized-valve diversion structure connecting to two existing 24” force mains located below beach path.
3. 0.1mg below-grade storage at bottom of Murray Basin in a specific location to be determined.
4. Use of the existing (post upgrades) Barton Pump Station.
5. 0.22mg below-grade storage at Fauntleroy School and/or GSI in upper Barton Basin.

**CAG2a Below-Grade Storage at Lincoln Park South Parking Lot**

<table>
<thead>
<tr>
<th>Project Total Cost: $24,138,000</th>
<th>Relative Cost Factor: 1.0</th>
</tr>
</thead>
</table>

This alternative was newly developed in the intervening time between the 15 September and the 27 September 23 2010 meetings. Key features include:

1. 1.25mg storage tank below-grade in south parking lot at Lincoln Park.
2. Below-Grade odor, electrical control structure near storage structure.
3. New 24” dual force mains connecting the storage structure to the existing force mains located below beach path.
4. Motorized-valve diversion structure connecting two existing 24” force mains (note: may require pump station TBD).
5. 0.1mg below-grade storage at bottom of Barton Basin in location to be determined.
6. Use of existing (post upgrades) Barton Pump Station.
7. 0.22 below-grade storage at Fauntleroy School and/or GSI in upper Barton Basin.

**CAG2b  Below-Grade Storage Tunnel in Lincoln Park**

*Project Total Cost: $47,486,000: Relative Cost Factor: 2.0  
[Total Project Cost assumes $1,000,000 park mitigation costs]*

This alternative was newly developed in the intervening time between the 15 September and 27 September 2010 meetings. Key features include:
1. 1.44mg, 10’ diameter storage tunnel between existing 24“ force mains below beach path, and launching pit located in south parking lot of Lincoln Park.
2. Below-grade odor, electrical control structure near storage tunnel
3. Motorized-valve diversion structure at connection of tunnel and existing force mains.
0.1mg below-grade storage at bottom of Murray Basin in location to be determined.
4. Use of existing (post upgrades) Barton Pump Station.
5. 0.22mg below-grade storage structure in Fauntleroy School and/or GSI in upper Barton Basin.

**CAG8  Distributed Upper Basin Storage for Murray Peak Flows**

*Project Total Cost: $34,823,000: Relative Cost Factor: 1.4  
[Total Project Costs assumes $4,000,000 land acquisition costs]*

This alternative was modified somewhat from previous alternative and includes the following key features:
1. Four distributed storage structures in specific locations to be further determined (approximately 0.5mg total capacity) and new connecting pipeline.
2. 0.5mg below-grade storage structure in bottom of Murray Basin in location to be confirmed, but most likely KC1B triangle site.
3. Use of existing (post upgrades) Barton Pump Station.
4. Use of existing Murray Pump Station.
5. Use of existing force mains between Barton, Murray and Alki.

**CAG9  Combined GSI, Pumping and Storage Improvements**

*Project Total Cost: $37,720,000: Relative Cost Factor: 1.6  
[Total Project Costs assumes $2,000,000 land acquisition costs]*

This alternative was modified to establish specific storage requirements in bottom of Murray Basin. Key features include:
1. Implementation of Residential Rainwise and other GSI improvements to test effectiveness and provide future implementation data (costs not included in this alternative).
2. 0.5mg below-grade storage in Fauntleroy School.
3. Use of existing (post upgrades) Barton Pump Station.
4. 0.86mg storage at Murray Ave. & Lincoln Park Way SW (triangle site and below Murray Ave SW right of way).
5. New 10mgd below-grade peak flow pump station in bottom of Murray Basin in location to be determined.

**KC1B Rectangular and Pipe Storage in Vicinity of Murray Avenue SW & Lincoln Park Way SW**

Project Total Cost: $33,493,000; Relative Cost Factor: 1.4  
[Total Project Costs assumes $2,000,000 land acquisition costs]

This alternative was modified to establish specific location, capacity and configuration alternatives. Key features include:

1. New 0.6 and 0.4 below-grade storage structure and pipe storage in vicinity of Murray Ave. SW and Lincoln Park Way SW, along with associated steep slope retaining structures.  
   [Note: There are a number of specific siting and configuration alternatives that will require further study in order to determine construction, capacity, and cost impacts, including the potential for the use of existing right-of-way or acquisition of private property].
2. New 10mgd below-grade peak flow pump station in bottom of Murray Basin in location to be determined.
3. Miscellaneous odor, electrical and emergency control structures in proximity to storage structures, specific locations to be determined.

[Note: Total storage requirements in bottom of Murray Basin would be reduced by increased storage capacity in Barton Basin similar to CAG9].

**KC1F Combined Pipe and Rectangular Storage at Bottom of Murray Basin**

Project Total Cost: $30,110,000; Relative Cost Factor: 1.2  
[Total Project Costs assumes $3,000,000 land acquisition costs]

This alternative has not been developed beyond the preliminary draft level presented at the initial CAG meetings. Key features include:

1. 0.6-1.0mg storage structure on current private properties and 0.0-0.4mg pipe storage below Beach Drive SW.  
   [Note: There are a number of specific siting and configuration alternatives that will require further study in order to determine constructability, capacity, and cost impacts, including the potential for the use of existing right-of-way and/or the acquisition of private property].
2. Odor, electrical control structures in proximity to storage structures in specific locations to be determined.
At the conclusion of the review of the alternatives noted above, and after further discussion concerning the relative merits and challenges associated with each of them, the CAG recommended dropping CAG2B and CAG9 from further consideration as discrete alternatives; CAG2B because of the considerable marginal increase in total project costs, and potential operational challenges associated with the maintenance of the storage tunnel; and CAG9 because once the distinguishing features of green stormwater infrastructure were incorporated into KC1B, they were essentially the same alternative.

The CAG then met again the following evening of 28 September 2010, the last scheduled meeting for the Murray Basin Citizens Advisory Group prior to its report to the County.

During this meeting the CAG reviewed the remaining five alternatives in order to clarify any remaining questions of KCWTD, review the merits and challenges of each alternative, to establish a ranked preference in terms of priorities if possible, and to establish a basis for final recommendations. The following is a consolidated listing of the merits and challenges discussed by the CAG at both meetings:

8.0 Final Review and Evaluation of CSO Alternatives in Order of Relative CAG Preference (using initial up/down voting)

CAG2a Below-Grade Storage at Lincoln Park, South Parking Lot

General Observations (merits)

- This alternative appears to hold the most promise, is the most cost effective and among the more technically straight-forward solutions (assuming a pump station is not required to divert flow up to the storage location).
- This alternative utilizes the existing Barton Pump Station (post upgrades) and does not require a new pump station at Lowman Beach Park.
- This alternative solves the storage problem for both Barton and Murray Basins in a central location that does not require acquisition of private property, poses the least environmental risk, and provides the opportunity for an improved parking condition at the completion of the construction.
- This alternative provides an easily accessible location for construction and maintenance of the facilities.
General Observations (challenges)

- This alternative is within Lincoln Park and requires resolution of City Ordinance 118477 (park mitigation may be offset by location in and restoration of parking lot).
- This alternative has not been fully vetted within the Fauntleroy community.
- This alternative is within highly used parking lot and would require alternative pedestrian access to beach and play areas during construction.
- This alternative poses challenges relative to traffic, access and disruption during construction period.

Further Considerations

- Further technical development and engineering is required to confirm adequacy of motorized valve controls. If a pump station is required, costs and location for it would have to be confirmed.
- A location outside of Lowman Beach Park for a 0.1mg storage structure will have to be determined.
- With its location in the existing parking lot, this alternative has the potential to create an improved end condition relative to car and pedestrian access, safety and capacity with careful planning.

KC1B Rectangular and/or Pipe Storage I Vicinity of Murray Avenue SW and Lincoln Park Way SW (triangle site)

General Observations (merits)

- With some reconsideration and relocation of storage structure configurations, this alternative may not require acquisition of private properties or intrusion into wetland areas on the site (See Further Considerations below).
- Total storage requirements on this site can be reduced with incorporation of upper basin storage.
- This alternative, in conjunction with considerations for use of Murray Avenue SW right-of-way may provide opportunities for the most discrete storage location.

General Observations (challenges)

- This alternative is located adjacent to/within a wetland area that contains steep slopes, remnants of Pelley Creek, and needs for mitigation, geotechnical considerations, and multi-agency permitting.
- This alternative requires a new 10mgd pump station in the bottom of the basin, in a location to be determined (currently shown in Lowman Beach Park).
- This alternative is in the upper-mid range of costs and complexity of the remaining alternatives.
Further Considerations

- Further exploration of available storage structure locations within public right-of-way in Murray Avenue SW and Lincoln Park Way SW could move storage away from wetland areas, and eliminate need for private property acquisition.
- Locations for 10mgd pump station outside of Lowman Beach Park are required (potentially under Beach Drive SW right-of-way or in Murray Avenue SW right-of-way).
- Some upper basin storage (Murray Avenue SW and Holly as example) could significantly reduce size of storage requirement in triangle site.
- Bury storage structures and associated control structures in a manner that would allow landscape features to mitigate loss of current natural features.

CAG2 Below-Grade Storage at Lincoln Park, North of Colman Pool

General Observations (merits)

- This alternative is the second-most cost effective (including an assumed $8M park mitigation assessment) and technically straightforward solution.
- This alternative utilizes the existing Barton Pump Station (post upgrades) and does not require a new pump station at Lowman Beach Park.
- This alternative solves the storage problem for both Barton and Murray Basins in a central location and does not require the use of private properties.

General Observations (challenges)

- This alternative is located in a visible, highly utilized and sensitive shoreline location that will require resolution of City of Seattle Ordinance 118477 as well as other regulatory requirements.
- Likelihood of opposition and challenge in the review and regulatory process is very high (same issues as KC1A).
- This alternative would impose significant impacts on use of Lincoln Park shoreline during construction period. Access to the site would be via heavily used pedestrian paths to and from Colman Pool and along the beach.

Further Considerations

- The very high marks this alternative receives for technical simplicity and cost effectiveness are offset by the very negative marks it receives for environmental and park impacts.
CAG8 Distributed Upper Basin Storage for Murray Peak Flows

General Observations (merits)

- This alternative provides an opportunity to leverage community assets, enhance existing locations (Gatewood Playground as an example), and/or mitigate environmental issues in specific locations.
- Incorporation of this alternative can be utilized to significantly reduce the storage requirements at the bottom of the basin, and potentially improve viability of other proposed alternative.
- Storage at bottom of basin reduced to 0.5mg in location to be determined.

General Observations (challenges)

- This alternative is the highest cost of the remaining alternatives.
- This alternative involves construction and maintenance of facilities on multiple locations throughout the upper basin.
- This alternative involves a number of private properties and may result in increased opposition/challenges.
- KCWTD has expressed concerns for technical complexity and viability.

Further Considerations

- This alternative, or portions of it, can provide additional capacity and reliability when used in conjunction with other bottom of the basin storage alternatives, and should be considered as a worthwhile add-on.
- Cost is a concern for this alternative, but it can provide benefits noted above in an incremental basis as conditions change and need arises.

KC1F Combined Pipe and Rectangular Storage at Bottom of Murray Basin

General Observations (merits)

- This alternative is among the more technically straight-forward solutions and in the low-mid range for cost.
- If upper basin storage solutions are added to this alternative, it is possible the storage and control structures could be located with the use of little or no private properties.
- Utilizes existing Beach Drive SW right-of-way for portion of storage requirements.
- This alternative could be combined with KC1B storage locations to reduce need for private properties.
General Observations (challenges)

- As shown this alternative requires the acquisition of private residential properties, raising concerns for:
  Change in character, use and scale of residential neighborhood;
  potential need for eminent domain to acquire property;
  loss of affordable rental housing on site;
- This alternative as currently shown requires potentially significant geotechnical review and engineering to address steep slopes on east and south boundaries of site
- Use of Beach Drive SW right-of-way during construction impacts the only access to the ‘dead-end’ community to the south.

Further Considerations

- This alternative should be considered in conjunction with KC1B in order to raise probability of locating facilities within public rights-of-way and eliminating need for private property or wetland impacts.
- If the above modifications can be made to address private property, housing and character concerns, every effort should be explored to replace the existing Murray Pump Station outside of Lowman Beach Park with new, current technologies.

9.0 Murray Basin Community Advisory Group Recommendations

At the conclusion of the last CAG meeting on 28 September 2010 there were a number of obvious take-aways that emerged and which have informed the process for developing the set of recommendations noted herein. Throughout the process it has become evident that the need to address the combined sewer overflow problem that exists within the Murray and Barton Basins, while crucial for the continued health of Puget Sound, does not have a single obvious, exquisitely simple, technically pure and universally equitable solution. From the onset of the engagement of the CAG and its interactions with KCWTD in challenging and understanding the underlying data, in examining standard and best practices approaches to addressing CSO’s, in developing and reviewing alternative solutions, in modifying those solutions to capture the merits and resolve the challenges apparent in each, and in undertaking the significant challenges of evaluating those alternatives given their early and conceptual level of development, the CAG has endeavored to find outcomes that adhere to its Guiding Principles for equitable, efficient, functional, operationally viable, cost effective, environmentally sound and comprehensive solutions. Importantly, the CAG has committed to finding outcomes that embrace and respond to the six categories of criteria established by KCWTD for land-use, environmental, technical, operational, community and cost considerations. While this report represents the specific recommendations of the community members of the CAG, we believe that it is the result of an intense and cooperative effort of the CAG, KCWTD and its consultant team taking on the significant challenges with the intent to find the optimal solutions focused on fostering conditions for a healthy and vibrant Puget Sound for the region’s inhabitants, including those who live within its waters. Commitment to that end by all participants in this process has never been at question.
The CAG thanks KCWTD and its consultants for their participation and cooperation in providing information and testing alternatives in response to our requests. This report and its recommendations would not have been possible without their analysis.

The CAG has formatted its recommendations in three categories; those that apply to specific alternatives; those that generally apply to any alternative; and those that apply to the process going forward through design, implementation and operations phases.

**Recommendations for Specific Alternative(s)**

1. **Advance CAG2a as the preferred alternative as modified for the 27 September 2010 CAG meeting.**
   This recommendation includes the proviso to explore options to further reduce the impacts on the community, parks and the parking lot. They include:
   a. Explore all options to avoid the need for a new pump station in Lincoln Park. In the event one is needed, it should be located in a manner that does not impact natural features or is located outside of shoreline areas.
   b. Locate 0.1mg storage facility in bottom of Murray Basin outside of Lowman Beach Park – in Murray Avenue SW or Beach Drive SW right-of-way.
   c. In the design of the below-grade storage structure in parking area, include options for below-grade odor and electrical control structures, improved pedestrian and vehicle access provisions, and increased safety measures for pedestrian and vehicular access.
   d. Engage both the Lowman and Fauntleroy communities in vetting and further developing this alternative and approaching the community and the City of Seattle to evaluate options and mitigation for use of this specific park parcel.

2. **Explore KC1B (along with portions of KC1F) as back-up alternatives as modified in CAG reviews during 27 September 2010 meeting.**
   This recommendation recognizes that a back-up alternative should be maintained pending confirmation of technical feasibility of CAG2a. It includes the proviso that a number of modifications should be incorporated into the alternative as currently drawn to further reduce the impacts on community, open spaces, wetlands and parks. They include:
   a. Increase storage at Fauntleroy School to 0.5mg in order to reduce the total storage requirement in Murray Basin to approximately 0.85MG.
   b. Explore option to provide some additional upper basin storage (as shown in CAG8 Alternative) to further reduce required storage capacity in bottom of basin.
c. Locate the new 10mgd peak flow pump station out of Lowman Beach Park (potentially in Murray Avenue SW or Beach Drive SW rights-of-way) and explore options to incorporate and retire current Murray Pump Station. This option would result in new, state-of-the-art pump station similar to 53rd Street Station.
c. Explore options to incorporate potential sites shown in KC1F and/or utilize Murray Avenue SW right-of-way to eliminate need to encroach on wetlands, steep slopes or private property for storage structures
d. Locate new storage and control structures below grade to allow above-grade landscape features to mitigate loss of natural features

General Recommendations to be Applied to Alternatives During their Design, Development and Implementation

3. Increase storage capacity in Fauntleroy School (Barton Basin) to 0.5mg
   This recommendation recognizes the beneficial impacts on total storage requirements in the bottom of basin alternatives recommended above, and provides for additional options for locating storage structures to accommodate them. Further, it acknowledges and supports the Guiding Principles in seeking solutions that are quantitatively and qualitatively shared within the communities served.

4. Apply Green Stormwater Infrastructure mechanisms/methodologies in both Barton and Murray Basins. This would serve both to reduce peak flows and improve the reliability of any storage solution, as well as provide capacities for unknown future climatic and weather conditions. Further, it could be a mechanism to educate and encourage community involvement and awareness of the need for sustainable practices.

5. Identify opportunities to reduce footprint of CSO facilities by locating them in rights-of-way and public property in lieu of natural open spaces within parks and communities or on private property. This would create opportunities to maintain and/or restore natural amenities within the communities, and provide readily accessible locations for maintenance and operations of facilities that might otherwise not accommodate storage capacities necessary to accept peak flows [possibly creating opportunity to retire Murray Pump Station in Lowman Beach Park].

6. Retain options to store portions of peak flow in upper Murray Basin. Through combination with other bottom of basin storage options, this would provide potential for reduction of storage requirements and/or provide additional capacity and reliability to system. A number of these opportunities are identified in CAG8 alternative.
Recommendations to be Applied to Process Going Forward

7. **Adopt and incorporate CAG Guiding Principles into process.**
   This recommendation acknowledges the considerable effort on the part of the community to provide a thoughtful and comprehensive set of guidelines that incorporates the goals, aspirations and commitments of the community to the environmental stewardship of Puget Sound, the protection of the scale, character and natural features of the community, and the protection of private properties while addressing the CSO projects with full consideration of the County’s requirements. In much the same manner that the CAG acknowledges KCWTD’s criteria, incorporation of the CAG Guiding Principles by KCWTD as it moves forward would ratify the relationship that has been forged through this process. **Through this recommendation, the CAG incorporates its Guiding Principles as part of the recommendations of this report.**

8. **Continue to formally engage with the CAG throughout the design and development phases of the CSO project**
   This recommendation strongly encourages the County and KCWTD to continue to meet with the CAG throughout the next phases of the project in order to avoid a repeat of the disconnect that was evident at the onset of the project; to maintain continuity and progress in the process; to capitalize on the considerable work that has been accomplished as KCWTD moves forward in detailed development of the selected alternative; and to engage with the larger community in expanding understanding, seeking approval, and generally communicating the results.

   **The CAG recommends the County immediately expand the CAG process to include equitable representation from the Fauntleroy community in a combined CAG to develop, review and evaluate the next phases of development of the CSO alternative.**

   **The CAG believes it would be an unfortunate repeat of a missed opportunity to wait until an alternative has been selected and design work fully developed before re-engaging with the CAG.**
CAG Member Signatures:

Bill Beyers
John Comick
Katherine Dee
Patrick Gordon
Scott Gunderson
Chris Jansen
Vlad Oustimovich *(Abstaining)*
Charles Redmond
Donna Sandstrom
Don Stark
Dr. Ron Sterling
Cheryl Eastberg  Seattle Parks Department - Ex-Officio
Linda Sullivan   KCWTD – Ex-Officio
Tracy Tackett  Seattle Public Utilities – Ex-Officio

Alternates Include:

Cindy Barker  Morgan Community Association – Alternate
Sharon Best     Neighbor – Alternate
Jim Coombes    Neighbor – Alternate
Linda Cox       Neighbor – Alternate

KCWTD Staff and Consultants Include:

Martha Tuttle   KCWTD
Shahrzad Namini  KCWTD
Jeff Lykken     Tetra Tech

Facilitation Consultants

Penny Mabie     Envirolissues
Amy Meyer       Envirolissues
Appendix (Materials available upon request)

a) CAG Evaluation Matrices – Initial 17 Alternatives
b) CAG Evaluation Matrix – Nine short-listed Alternatives
c) KCWTD Diagrams Five Final Alternatives
d) CAG Evaluation Matrix – Five Final Alternatives
e) City of Seattle Ordinance #118477
f) City of Seattle, Department of Parks and Recreation Policy on Non-Park Uses of Park Lands
0.5 MG of Storage at Bottom of Basin to Control All Other Subbasins

Implement Basinwide On-Site (Rainwise) for Up to an Additional 31 Acres of Impervious Disconnection

Green Stormwater Infrastructure in Subbasin 416 Remove Up to 26 Acres of Impervious Area

0.6 MG of Storage at Murray P.S.

Pumping Capacity at Barton P.S. Held at 22 mgd

Peak Flow Along Director Street Controlled by GSI

Barton Basin Boundary
Barton Sub-Basin Boundary
Steep Slopes > 1 acre
300' Buffer of Steep Slopes > 1 Acre
Parcels Connected to CSS Outside Buffer
Parcels Connected to CSS
ROW Connected to the CSS

COMMUNITY-SUGGESTED ALTERNATIVE 3
COMBINE GSI WITH ADDITIONAL STORAGE IN BARTON
Puget Sound

Murray Basin: Install Approximately 7,000' of 12" Storm Sewers to Remove Up to 10 Acres of Impervious Area

Disconnect a Minimum of 1,200 Homes and 230 Non-Residential Properties from the Combined Sewer System

Barton Basin: Install Approximately 13,800' of 12" Storm Sewers to Remove Up to 26 Acres of Impervious Area

Disconnect a Minimum of 1,550 Homes and 80 Non-Residential Properties from the Combined Sewer System

Puget Sound

COMMUNITY-SUGGESTED ALTERNATIVE 4
SEPARATE ALL SEWER AND STORMWATER FLOWS
 Existing Murray Force Main and Gravity Pipeline to Alki

New 36" Barton Pump Station Force Main to 63rd Street Pump Station 13,500 Feet

0.10-MG of Storage at Murray Pump Station Site 20' x 45' x 15'D

Existing Murray Pump Station

Connect Existing 24" Force Main to New Force Main

Existing Dual 24" Force Mains

Upgrade Existing Barton R.S. for Pressure Peak Flow Rate = 33 mgd

0.22-MG Storage Tank at Fauntleroy School

Green Stormwater Infrastructure

Upgrade Existing Barton R.S. for Pressure Peak Flow Rate = 33 mgd

COMMUNITY-SUGGESTED ALTERNATIVE 6

BARTON PUMP STATION PUMPS DIRECTLY TO ALKI

CSD Facilities Planning

BARTON AND MURRAY

COMBINED SEWER OVERFLOW CONTROL FACILITIES PLAN
Implement Basinwide On-Site Commercial and Residential (Rainwise) for Up to an Additional 15% Reduction in Storage Volume at Bottom of Basin Reduced from 1.0 MG to 0.85 MG with Rain Gardens Alone. Further Reduction to 0.71 MG by Adding Commercial and Residential Rainwise.

Install Rain Gardens to Remove Up to 10 Acres of Impervious Area.

Storage Volume at Bottom of Basin Reduced from 1.0 MG to 0.85 MG with Rain Gardens Alone. Further Reduction to 0.71 MG by Adding Commercial and Residential Rainwise.
Implement Residential Rainwise and Other GSI Improvements to Test Effectiveness and Provide Additional Removal of Impervious Area (cost not included)

- 0.86-MG Storage at Murray Avenue & Lincoln Park Way
- 0.5-MG Storage Tank at Fauntleroy School
- 10-mgd Peak-Flow Pump Station
- Existing Dual 24" Force Mains
- Existing Barton P.S. Limited to 26 mgd
# Puget Sound Beach Combined Sewer Overflow (CSO) Control Projects

**Public Meeting for Barton Basin**  
March 18, 2010, 6:00 PM – 8:30 PM  
Southwest Community Center  
2801 SW Thistle St, Seattle, WA 98126

## Agenda

**Meeting Purpose:** This meeting is intended to –  
- Present three alternative means for CSO control in the Barton basin  
- Present how these alternatives were developed  
- Explain why the three alternatives are being considered for further evaluation  
- Hear from the community about the alternatives

<table>
<thead>
<tr>
<th>Time</th>
<th>Activity</th>
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<tbody>
<tr>
<td>6:15 pm</td>
<td>Welcome &amp; Introduction to Project Team</td>
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<tr>
<td>6:20 pm</td>
<td>PowerPoint Presentation</td>
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<tr>
<td></td>
<td>• CSO Control Program Overview</td>
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<td>• CSO Beaches Projects Objectives</td>
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<td>• CSO Control Approaches</td>
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<td>• Barton Basin Requirements</td>
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<td>• Barton Basin Alternatives</td>
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<td>• Next Steps</td>
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<td>7:00 PM</td>
<td>Questions, Responses and Input</td>
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<td><em>A summary of tonight’s meeting will be available on the project website (<a href="http://www.kingcounty.gov/csobeachprojects">www.kingcounty.gov/csobeachprojects</a>) or you can sign up to receive a copy by mail.</em></td>
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<td>8:00 PM</td>
<td>View Displays</td>
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<td>8:30 PM</td>
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Alternative Formats Available  
206-684-1280 or 711 TTY Relay
Puget Sound Beach Combined Sewer Overflow (CSO) Control Projects

Barton Basin

Public Meeting Summary
March 18, 2010, 6:00-8:30 pm
Southwest Community Center, 2801 SW Thistle St, Seattle, WA 98126

Overview

On March 18, 2010, the King County Wastewater Treatment Division (WTD) hosted a public meeting for the Puget Sound Beach Combined Sewer Overflow (CSO) Control Projects in the Barton basin. Approximately eighteen people attended the meeting.

Meeting Purpose

The meeting was intended to –

• Present three alternative means for CSO control in the Barton basin
• Present how these alternatives were developed
• Explain why the three alternatives are being considered for further evaluation
• Hear from the community about the alternatives

Public Meeting Approach

Shahrzad Namini, King County project manager, started the meeting and introduced the team. Jeff Lykken, the lead engineer for the Barton basin, and Bob Wheeler, the meeting facilitator, gave a PowerPoint presentation that included the following topics:

• CSO Control Program Overview
• CSO Beaches Projects Objectives
• CSO Control Approaches
• Barton Basin Requirements
• Barton Basin Alternatives
• Next Steps

Following the presentation, there was a period for meeting attendees to ask questions of the project team and to provide input on the alternative means of CSO control. Afterwards, meeting attendees were encouraged to view informational posters that were set up at the back of the meeting room and talk with members of the project team. Flip charts were available to record questions and input.

Meeting attendees were informed of and encouraged to use a variety of methods for submitting questions and input, which include the following:
Because of the project schedule, meeting attendees were encouraged to provide input by mid-April, 2010. Input received by then will provide the best opportunity to inform the evaluation of the three alternatives. Input is always welcome and will be used throughout the facility planning process.

**List of Informational Posters**
- Basin Map showing City System/County System & Combined System/Separated System
- Map of each alternative with basin inset (3 boards)
- Map of all three alternatives
- “What is a Combined Sewer Overflow?”
- CSO Control approaches overview
- Factors used for alternatives evaluation
- Decision Process graphic

**List of Handouts Available**
- Information Packet
  - Meeting agenda
  - Public Information Document
  - Diagram of decision process
- Feedback forms
- Dept of Ecology CSO fact sheet
- EPA press release
- Ratepayer report
- RainWise brochure (Seattle Public Utilities)
Summary of Questions and Input

Questions and input from the public are summarized below.

There were multiple questions and remarks on the following topics.

Underground Storage Pipe in Upper Fauntleroy Way
- This alternative would impact a highly valued community green space by: removing the vegetation such as the prized roses, potentially damaging trees, obstructing the viewpoints with above grade facilities; and potentially causing odor problems.
- What are the heights and locations of above grade facilities? (Response: Odor control and electrical facilities are usually in the range of 8- to 10-feet high. This may vary depending on the facility.)
- How big would the construction footprint be? (Response: The pipeline would be approximately 270 feet long. The construction width would be approximately 16- to 18-feet with shoring.)
- Could there be a risk of liquefaction in this area during earthquakes? (Response: Geotechnical evaluation is being conducted to assess this type of risk. In earthquake prone areas like ours, planning and design incorporates seismic considerations.)
- Consider putting pipe storage in 45th Ave SW instead of Upper Fauntleroy Way. The street is wider and moves the work away from the community green space and viewpoint on Upper Fauntleroy Way. (Response: The design engineers will investigate that option, and we will report back to the community.)

Green Stormwater Infrastructure
- This area has had landslides in the past; will increasing groundwater make landslide problems worse? Could a big storm send enough stormwater down to the clay layer on the hill and shear the hill? (Response: As part of refining the three alternatives, the project team is investigating local conditions and assessing soil types and infiltration rates.)
- How will the cost of the green stormwater infrastructure alternative be estimated? (Response: This alternative is currently being further refined and a cost estimate will be developed. The project team is communicating with jurisdictions that have carried out similar projects to inform our estimating process.)
- It will be important to know how the roadside rain gardens would be operated and maintained. The roadside rain garden “bump-outs,” or curb bulbs, seem like a benefit to calming traffic. How have neighbors of bump-outs felt about them? (Response: Some Portland residents have said that traffic calming is a benefit of roadside rain gardens.)
- What happens to pollutants in the stormwater? (Response: The largest benefit of green stormwater infrastructure is the ability for the system to remove pollutants from stormwater. In the case of Barton, water will be retained and infiltrated, natural processes within the rain gardens break down most of the pollutants or the pollutants are used by the vegetation in the rain garden.)
- Could green stormwater infrastructure be dispersed in the Barton basin rather than concentrated in a single subbasin to distribute parking and groundwater impacts?
Puget Sound Beach Combined Sewer Overflow (CSO) Control Projects  
Barton Basin Public Meeting Summary

(Response: King County looked at dispersing the green stormwater infrastructure throughout the basin. Because a large portion of the basin is partially separated, there was not enough flow centralized in one area to adequately reduce CSOs. This area produced the best result for CSO reduction.)

- Will reducing stormwater in the sewer system result in odors or operational problems because the system won’t flush well? (Response: No, this will not be a problem because the system will operate as it does during average dry weather flows.)

Underground Storage at Former Fauntleroy School

- This looks like it could be a good alternative.
- Has King County communicated with the property owner? Is there potential for cooperation? (Response: Yes, King County is in communication with the property owner.)

Additional questions and input included the following:

- Are there examples of similar storage facilities that citizens could visit? (Response: King County has constructed similar storage facilities, but it is difficult to see storage facilities since they are located mostly underground. Photos and information about the North Creek Storage Facility and Hidden Lake inline pipe storage are available on the King County Wastewater Treatment Division website. The project constructed to control CSOs in the Barton basin may not be identical to these facilities.)

- How is public input used? (Response: 
  o Public input is used to develop and refine alternatives. A good example is a community member’s idea about putting pipe storage on 45th Ave NW. The project team looks for input from the community to help shape/refine the alternatives using basin-specific issues and knowledge, and to make sure good ideas have not been overlooked.
  o Public input is also used to develop and refine the various factors that are used to evaluate alternatives. A good example is the input received from the community on the history and background of the park on Upper Fauntleroy Way. Information about community green space and vegetation will help to inform analysis of environmental and community factors, and design/engineering considerations. Public input on all of these factors is important to King County to help develop a well-rounded approach to identifying the proposed alternative for further environmental review. Some input relates more to design and construction; feedback related to these phases will be carried forward to those project phases.)
Puget Sound Beach Combined Sewer Overflow (CSO) Control Projects
Barton Basin Public Meeting Summary

Attendance

Puget Sound Beach CSO Control Project Team

King County Wastewater Treatment Division
Shahrzad Namini, Project Manager; Norm Alberg, Manager of Project Management Unit; John Phillips, CSO Control Program; Mary Wohleb, Assistant Project Manager; Hien Dung, Real Estate Services; Martha Tuttle, Community Relations; Monica Van Der Vieren, Community Relations; Sue Meyer, Environmental Planning; Meredith Redmon, Environmental Planning

Carollo Engineers
Brian Matson, consultant team project manager;

Tetra Tech
Jeff Lykken, Barton and Murray basins lead engineer; Kevin Dour, Barton and Murray basins project engineer

Triangle Associates, Inc.
Bob Wheeler, facilitator; Ellen Blair, community relations support

Seattle Public Utilities

Sahba Mohandessi
Puget Sound Beach Combined Sewer Overflow (CSO) Control Projects

Technical Information Sharing for Barton Basin
August 5, 2010
The Hall at Fauntleroy
9131 California Ave SW
Seattle, WA 98136
6 p.m. - 8 p.m.

Agenda

Meeting Purpose: This meeting is intended to –
• Respond to citizens’ request for technical information and information about Green Stormwater Infrastructure (GSI) to control combined sewer overflows.
• Hear and discuss input from the community for King County to consider
• Explain next steps for the Barton Basin CSO Control project

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<thead>
<tr>
<th>Time</th>
<th>Agenda Item</th>
<th>Discussion Lead</th>
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<tbody>
<tr>
<td>6:00-6:15 pm</td>
<td>Welcome &amp; Review Meeting Format organized around community questions and comments</td>
<td>Bob Wheeler, Triangle Associates</td>
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<td>6:15-6:30 pm</td>
<td>Project Background &amp; Decision-Making Process</td>
<td>Linda Sullivan, WTD</td>
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<td></td>
<td>• Updates to King County’s process in response to community concerns</td>
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<td>• What is a CSO?</td>
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<td>6:30-7:00 pm</td>
<td>Understanding Your Basin</td>
<td>Jeff Lykken, Tetra Tech</td>
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<td>• How wastewater flows in Barton basin</td>
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<td>• Existing infrastructure</td>
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<td>• Alternatives considered for the Barton Basin</td>
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<td>• Factors for comparing alternatives</td>
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<td>7:00-7:30 pm</td>
<td>Green Infrastructure</td>
<td>Peg Staeheli, SvR Design; John Phillips, WTD</td>
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<tr>
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<td>• What is GSI?</td>
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<td>• How is GSI being evaluated for CSO control?</td>
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<td>• What would GSI look like in this neighborhood, if this option is selected?</td>
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<tr>
<td>7:30-8:00 pm</td>
<td>Questions, comments and next steps</td>
<td>Bob Wheeler, Triangle Associates</td>
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Overview

On August 5, 2010, the King County Wastewater Treatment Division (WTD) hosted a public meeting to respond to citizens’ request for technical information and information about Green Stormwater Infrastructure (GSI) to control combined sewer overflows. The meeting was also intended to hear and discuss input from the community for King County to consider and to explain next steps for the Barton Basin CSO Control project.

Forty members of the public attended the meeting. Attendees were invited via e-mail, mailings, press release and door to door fliers in the neighborhood under consideration.

Presentations

Through presentations from the project team, meeting attendees learned about the nature of the CSO problem and the project decision-making process. There was an overview of the three alternatives being considered for CSO control in the Barton basin, with a detailed discussion of the GSI alternative. The GSI alternative focuses largely on constructing raingardens; a planted depression that allows rainwater runoff from impervious areas, like streets and driveways, the opportunity to be absorbed. Locations for such raingardens in the street are usually in planting strips between the road and the sidewalk and sometimes at “curb bulbs” at road intersections. The project team acknowledged input received from the community at previous public meetings and via e-mail, phone calls, mail and the internet.
Summary of Questions and Input

Questions and input from the meeting attendees are summarized below. This includes nine comment forms that were turned in at the meeting.

GSI Alternative in upper basin
Meeting attendees who expressed support for the GSI alternative, gave reasons including neighborhood aesthetics, water quality benefits, and a desire to shift away from “gray” infrastructure. Some attendees opposed the GSI alternative, with concerns about the potential for flooding and landslides, cost-effectiveness and aesthetics. A few attendees supported building both GSI and a storage facility.

GSI Design
The project team emphasized that designing GSI for CSO control is different than designing for stormwater control or water quality objectives. There are more stringent capacity requirements to meet CSO control objectives.

WTD staff clarified that in subbasin 416, the area of upper Barton basin where GSI is being considered, there is only a combined sewer system. There is no separate stormwater sewer. In response to a question, the GSI consultant clarified that existing street curb drains leading to the combined sewer system would likely remain in place. Stormwater would flow to roadside raingardens. Water that exceeds the capacity of the raingardens (in large storms) would be directed to the curb drains and on to the combined sewer system, to avoid overflows from the swales.

It was suggested that making bike-friendly streets part of the GSI alternative would benefit the neighborhood and discussed how pedestrian crossings would be designed into the parking strip swales.

A meeting attendee asked how driveways between raingardens would be addressed. The GSI consultant said that it would depend on the location of inlets; curb cuts might be built on either side of the driveway to allow water to pass from one raingarden to the next via the street or the water might be piped under the driveway.

In response to a question, the GSI consultant explained that it would likely not be necessary to put raingardens in every planting strip in subbasin 416. Further analysis would identify the exact location of the roadside raingardens. A meeting attendee expressed concern that a checkerboard pattern of roadside raingardens throughout the neighborhood might not be aesthetically pleasing. This comment would be considered during design of the GSI alternative. The GSI consultant said the goal would be to create a pleasing visual rhythm for the neighborhood.

A community member suggested focusing the GSI work at two school sites in the area. WTD staff said that the school sites are being considered as part of the project, but the sites’ impervious area totals only about five acres out of a total of 26 needed to control CSOs in the basin.
In response to a question, WTD staff said that a financial incentive to encourage property owners in subbasin 416 to participate in the City of Seattle RainWise program is being considered, but not currently underway. WTD staff said they would observe how successful the city’s current program in the Ballard neighborhood is. This project focuses on placing raingardens in the existing street right of way to control stormwater that enters the combined sewer system from the street.

Existing drainage issues
Some meeting attendees expressed concern that existing problems such as landslides and water in basements would be worsened by the GSI alternative. A meeting attendee noted that some houses are downhill from the parking strip where roadside raingardens might be located.

WTD staff said that they work with the City of Seattle’s surface water management staff to identify existing problems and avoid making them worse. Project team members said there are guidelines that govern the placement of raingardens to avoid creating problems. Factors such as soil type and the direction of water flow would be considered in the design. The project team would locate raingardens at least 300 feet away from steep slopes and 500 feet from known landslide areas. Geotechnical engineers have reviewed the area and made recommendations for areas not to place raingardens.

The GSI consultant noted that basement leaks in West Seattle are sometimes related to the groundwater level, and may be less directly related to surface water. Areas where homes have low basements have been eliminated from consideration for raingardens as part of the initial feasibility studies.

Meeting attendees expressed concern about the potential to exacerbate flooding along Longfellow Creek. Project team members explained that the GSI alternative would increase creek flows during dry periods but not affect the flow of stormwater to the creek during wet weather, since excess water would continue to be piped away from Longfellow Creek to the Barton pump station. GSI would improve creek conditions during low flow conditions, which is an issue for Longfellow Creek. There was also concern expressed about the potential for increased erosion along local creeks which is related to stormwater flows from areas outside the project area.

Raingarden maintenance
There was discussion about who would be responsible for maintaining roadside raingardens. Project team members explained that WTD would be responsible for maintenance to keep the raingardens functioning properly for CSO control. Some property owners may prefer to do more frequent maintenance themselves, depending on preferred aesthetics.

In response to the question the GSI consultant noted the maintenance is not highly skilled but more similar to normal yard maintenance.

In response to a question, WTD staff explained that the cost of maintaining the roadside raingardens would come from regional WTD rates, just like operation and maintenance of other WTD facilities. Local property owners would not pay extra for maintenance.
Public process
Meeting attendees wondered how neighborhood concerns and individual property owners’ concerns would be addressed if the GSI alternative moves forward. Project team members said that there would be additional public meetings during design and there would be a formal environmental review process. WTD staff said that they would meet one-on-one with anyone who was interested. Block level meetings with property owners were suggested and would also be used to define the location and design of GSI within each block.

A meeting attendee asked about recourse if any private property sustains damage as a result of raingardens. While the design team would be tasked with ensuring that the GSI alternative does not damage private property, King County has an established process for responding to property damage claims.

Underground storage alternatives: Storage pipe under Upper Fauntleroy Way SW & Storage tank under parking lot at the former Fauntleroy School site.
A meeting attendee asked if one of the storage alternatives has a construction or operational benefit over another. The project engineer explained that a storage tank provides some amount of operational flexibility compared to a storage pipe, but that the difference is relatively unimportant compared to the other factors being considered, such as community and environmental impact.

In response to a question, the project engineer said the project team had considered tunneling rather than excavating to construct the storage pipe alternative under Upper Fauntleroy Way SW. Tunneling is not considered feasible because of the need to dig sizeable pits to tunnel and concerns with soil suitability for tunneling.

There was some support expressed for building the storage tank at the former Fauntleroy School site. Any opposition to that alternative mainly came from those who support the GSI alternative instead.

Cost
There was discussion about the relative cost of the three alternatives and how the CSO control project would be funded. Construction of the GSI alternative would cost somewhat more than either storage alternative, but the GSI alternative retains more water and reduces flow to the combined sewer system and the difference in maintenance costs and lifecycle costs, while still being evaluated, make GSI more comparable and cost-effective.

WTD staff said that the cost of the Puget Sound Beach CSO Control projects is already funded in WTD’s capital improvement program and will be paid for by regional wastewater rates.
Staff Attendance

The following project team members attended the technical information session:

King County Wastewater Treatment Division
Linda Sullivan, Capital Projects Managing Supervisor; Shahrzad Namini, Project Manager; John Phillips, CSO Control Program; Erika Peterson, Community Relations; Martha Tuttle, Community Relations

Seattle Public Utilities
Susan Stoltzfus, CSO Program

Carollo Engineers
Brian Matson, consultant team project manager

Tetra Tech
Jeff Lykken, Barton Basin Lead; Kevin Dour, Barton project engineer

SvR Design Company
Peg Staeheli, landscape architect; Greg Giraldo, civil engineer

Triangle Associates
Bob Wheeler, facilitator; Ellen Blair, community relations support
### Puget Sound Beach Combined Sewer Overflow (CSO) Control Projects

**Special Public Meeting: NEW Community Generated Proposal for CSO facility in Lincoln Park**  
November 1, 2010, 6:30-8:30 PM  
The Hall at Fauntleroy  
9131 California Ave S.W., Seattle WA

**Agenda**

**Meeting Purpose:** This meeting is intended to –
- Raise awareness that Lincoln Park’s south parking lot has been recommended as a potential location for a CSO facility
- Provide information on this recommendation
- Let the community know how to give input that will help inform the county’s decision

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<tr>
<th>Time</th>
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<tr>
<td>6:30 p.m.</td>
<td>Welcome</td>
<td>Bob Wheeler, Facilitator</td>
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<td>CSO Beach Project Overview</td>
<td>Linda Sullivan, King County</td>
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<td>Presentation of the Murray Community Advisory Group (CAG)’s Lincoln Park recommendation for CSO control</td>
<td>Patrick Gordon and Penny Mabie, Murray CAG</td>
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<td>Decision process and next steps</td>
<td>Linda Sullivan, King County</td>
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| 7:15 p.m.| Questions, Comments and Input  
* A summary of tonight’s meeting will be available on the project website ([www.kingcounty.gov/csobeachprojects](http://www.kingcounty.gov/csobeachprojects)) within one month | Bob Wheeler, Facilitator |
| 8:30 p.m.| Adjourn                                                                |                           |
Puget Sound Beach Combined Sewer Overflow (CSO) Control Projects

Special Public Meeting: NEW Community Generated Proposal for CSO facility in Lincoln Park

Public Meeting Summary
November 1, 2010 6:30-8:30 pm
The Hall at Fauntleroy, 9131 California Ave S.W., Seattle 98136

Overview

On November 1, 2010, the King County Wastewater Treatment Division (WTD) hosted a public meeting for the Puget Sound Beach Combined Sewer Overflow (CSO) Control Projects in the Barton basin. The meeting was intended to raise awareness that Lincoln Park’s south parking lot has been proposed as a potential location for a CSO facility, provide information on this alternative, and let the community know how to give input that will help inform the county’s decision.

One hundred and five members of the public attended the meeting.

Presentations

Through presentations from the project team and the Murray Community Advisory Group (CAG), meeting participants learned about the wastewater conveyance system and CSO control problem in West Seattle, received a detailed explanation of the community-generated Lincoln Park CSO control alternative, and learned about the decision process, next steps and how communities can provide input on the proposal. The presentation and other meeting materials can be found at www.kingcounty.gov/csobeachprojects.

After the presentation, attendees had the opportunity to comment on the proposal and ask questions. Attendees also had the opportunity to view informational posters that were set up around the meeting room and talk with members of the project team. Flip charts were available to record questions and input.

Meeting attendees were informed of and encouraged to use a variety of methods for submitting questions and input, which include the following:

- Web: www.kingcounty.gov/csobeachprojects
- E-mail: Martha.tuttle@kingcounty.gov
- Phone: 206-263-7301
- Feedback forms (available at the public meeting)
Meeting attendees were encouraged to ask questions, express concerns, and provide input. King County staff indicated that input is always welcome and will be used throughout the decision process.

Summary of Questions and Input
Questions, feedback, and discussion from the meeting attendees are summarized below.

GENERAL CSO

Compliance with codes
One participant questioned the county’s timeline and need for Department of Ecology compliance. The Department of Ecology and the Federal Government can impose fines as well as enforce mandates with consent decrees. WTD staff shared that between 2010 and 2030 there will be 15 more King County CSO control projects that will be implemented throughout the County.

Understanding system-wide flows
Several community members wanted to better understand how system-wide wastewater and stormwater flow in West Seattle, and whether other basins influence Barton and Murray. The lead engineer explained that the Barton basin is the headwaters of the system that flows northward to Murray and on to the 63rd Ave pump station as it makes its way toward the West Point Treatment Plant. Flows to the east of the Murray basin travel to the Longfellow Creek area within the City of Seattle’s combined sewer system.

One participant asked if WTD could add a pipeline that would bypass flows from Murray and send them further north, eliminating the need for Murray storage. The County team evaluated this option but it was not carried forward because it did not adequately meet the established evaluation factors.

Personal responsibility
One participant questioned the impact of each resident reducing flow to the system by a certain percentage as a solution for CSOs. This could make a minor reduction in the amount of storage that is required, but would not come close to eliminating the need for a significant project in the basin.

RELATIONSHIP BETWEEN BARTON AND MURRAY BASINS

Storage tank locations
Several meeting attendees asked whether the storage tank in Lincoln Park would eliminate the need for a project in the Murray basin. WTD staff explained that the Lincoln Park storage option would still require a smaller tank at the bottom of the Murray basin in the Lowman Beach Park area. Barton basin will still need a CSO control project, using one of the three alternatives presented in March (storage in Upper Fauntleroy Way, Green Stormwater Infrastructure in the upper basin, storage at Fauntleroy School).
Two meeting attendees expressed concern about using private property across from Lowman Beach Park because it includes family homes.

One meeting participant suggested placing the tank under the ferry dock at Fauntleroy terminal.

A meeting attendee suggested that each basin should take an equal share of the burden; Barton and Murray should each store 500,000 gallons of peak flows during large storm events.

**Green Stormwater Infrastructure (GSI)**

One community member wanted to know about GSI possibilities in both basins. The lead engineer answered that GSI was considered for both basins but was found to be feasible in the Barton basin due to several factors, including having substantial areas where street runoff is connected to the sanitary sewer system and relatively large areas with flat terrain and less concern about groundwater causing slope instability. The Murray CAG recommended GSI in both basins if possible, but they recognized that GSI in Murray cannot be the sole solution because there is not enough connected area and because of steep unstable slopes.

**Comparing Lincoln Park and Lowman Beach Park**

Community members asked Murray CAG members why Lowman Beach Park was less preferable than Lincoln Park. From the CAG perspective, Lowman Beach Park is a small park that slopes to the water and has very old (100+ years) Sycamore trees. The concern is that these special features make it irreplaceable; this project would forever change the character of Lowman Beach Park. By comparison, Lincoln Park would temporarily lose its parking lot and paved path, both of which are not natural and could be replaced to the same or better condition. If a large project is put in Lowman Beach Park, Murray will be storing a large quantity of flow from the Barton basin.

One meeting participant asked about comparative costs for doing two projects to address Murray flows – one at Lincoln Park and one at Lowman Beach Park – compared with a single project at Lowman Beach Park. The lead engineer explained that the cost would be greater to build in two areas but at this early point in the process, the estimated cost differential does not appear great (~$3-4 million for a ~$25 million project).

**Life cycle assessment**

A meeting attendee asked how life cycle costs were determined and suggested that they include capital costs as well as operations and maintenance. Life cycle costs would be considered as part of the evaluation of the alternatives and refined during design.

**Concerns about the public process and basin equity**

Several people expressed their concern about a lack of transparency with the process. Meeting attendees felt that the Murray Basin community had an extensive public process without representation from the Barton community. A member of the Fauntleroy Community Association did attend the CAG meetings but reported himself not to be a voting member.

Some community members requested the formation of a Community Advisory Group for the Barton basin. People felt that the Lincoln Park alternative was a last minute proposal and not
fully considered. Several community members expressed the belief that if Lincoln Park was a recently discovered possibility there must be other possible CSO control solutions as yet untapped.

The group discussed different ideas about equity. Neighbors of Lincoln Park described the impacts of other urban infrastructure projects – including other wastewater facilities and regional transportation investments in their area.

Several members of the CAG shared their feelings that the Lincoln Park alternative would spread the burden more equitably across the basins, would cause short-term pain but no lasting harm and asked the Barton community to read the CAG report (www.kingcounty.gov/CSOBeachProjects). CAG members were concerned that this proposal was being interpreted as Barton versus Murray or Fauntleroy Community Association (FCA) versus Murray Community Association (MOCA). The CAG looked at numerous solutions, all of which they felt had more flaws than the Lincoln Park solution.

WTD staff emphasized that King County has tried to be transparent throughout the process and engage all affected communities – all meeting materials are posted on the website along with meeting summaries to make the process as inclusive as possible. Additionally, it was stated that the Lincoln Park alternative is a relatively new approach proposed by the CAG and this meeting was organized to bring Barton basin community members into the discussion before any decisions are made.

LINCOLN PARK PROPOSAL: TECHNICAL DETAILS

Technical Details
In response to a question, the lead engineer explained that the Barton pump station upgrade would have enough pressure for flows to be pumped uphill to a storage tank under the south parking lot. There may be motorized valves at the bottom of the hill which would be turned on when flows exceed capacity, or flows may be routinely pumped uphill but only stored under Lincoln Park’s south parking lot during an event which exceeds the pump station’s capacity.

There would not be a new outfall needed and the existing outfalls at Barton and Murray would remain intact (as for other alternatives being considered). Whichever CSO control mechanism is chosen, CSOs must be controlled to no more than one event per year on average per Department of Ecology requirements.

Excavation and shoring
Property owners adjacent to Lincoln Park asked whether geotechnical studies had been completed to show that surrounding homes would be stable during excavation and construction. This would be an important consideration if the proposal moves forward.

One community member expressed concern that the Fauntleroy area is subject to liquefaction during an earthquake.

Concerns about the project footprint
Puget Sound Beach Combined Sewer Overflow (CSO) Control Projects
Barton Basin Public Meeting Summary

One participant questioned whether project elements would be above or below grade. WTD staff explained that project elements would be located underground for this proposal with the possible exception of small components such as vents.

A meeting attendee expressed concern that the tank footprint would be larger than the actual parking lot and would impact Lincoln Park’s natural resources.

Location of proposed facilities within Lincoln Park
One meeting attendee shared her concern that the large maple tree near the parking, which is used for weddings and other major milestones, would be impacted.

One participant requested that the WTD explore the use of the grassy area near the parking lot as an alternate storage tank site.

Odor and electrical concerns
One participant shared her strong reservations about the odor and electrical facilities associated with the storage tank. Odor control, electrical outages and noise were raised as particular concerns.

LINCOLN PARK PROPOSAL: CONSTRUCTION CONCERNS

Numerous meeting attendees expressed overall concern about construction during the project and shared that the Lincoln Park area has the worst traffic and parking (along with the best park) in West Seattle. According to many attendees, this is a highly challenging location to site a major construction project.

Traffic
A representative from the Fauntleroy Community Association made a presentation expressing strong opposition to the proposal, emphasizing the impact on traffic in the neighborhood. According to the representative, every neighborhood street is lined with houses, there are no sidewalks, and there is currently too much fast-moving traffic in the neighborhood. Without the Lincoln Park parking lot’s 75 spaces, park users would park in the neighborhood and more drivers would use side streets, greatly impacting an already impacted community.

Ferry traffic was raised as a large concern by the community. According to one community member, a resident counted more than 2,700 cars during a four-hour period on a summer day (during morning and evening commute times). She expressed concern that if even half of the ferry traffic were to choose an alternative route through the neighborhood, it would overwhelm the side streets.

Meeting attendees wanted to know whether WTD had developed traffic and detour plans during construction for the Lincoln Park alternative and if so how they compared to plans for the possible Lowman Beach Park site. Traffic issues are considered as part of the decision-making process for choosing a preferred alternative; but specific traffic control plans have not been developed for either of the alternatives.
**Concurrent projects**
Meeting attendees wanted to better understand the relationship between the Barton pump station upgrade and the Lincoln Park CSO project. The existing Barton pump station has pumps that can convey 26 mgd (million gallons per day). The upgrade will allow for a conveyance capacity of 33 mgd. The Barton pump station is a separate project from CSO control projects. However, the cost to upgrade the capacity is relatively small within the context of the larger project and will allow greater flexibility.

Community members were concerned about the number of concurrent projects in the neighborhood. The Barton pump station project will begin in 2012 and last approximately 2.5 years. King County METRO will be constructing Rapid Ride bus stations at the ferry terminal around the same time period. If Fauntleroy School is chosen as the Barton CSO control option, the project will begin in 2013 and last approximately 2 years. If the Lincoln Park alternative is chosen, it will mean another significant project in the neighborhood at the same time as the above listed projects.

**Parking**
Concern about loss of parking was widespread. In addition to regular park use, the parking lot is used for teenage swim team members who arrive at dawn to practice. A member of the Murray CAG shared his hope that this project would result in increased parking for Lincoln Park users over the long term.

Meeting participants expressed their desire to have the parking lot returned to its original condition.

**Access**
Several meeting attendees expressed concern that ADA access be maintained through the park during construction. The construction plan will ensure that access is maintained.

A meeting participant asked whether the County had considered installing a large-diameter storage pipeline in Lincoln Park along the beach rather constructing a storage tank under the parking lot. This alternative was not considered as it was thought to be much more impactful to park facilities.

Meeting attendees noted that the access road to Colman Pool and the lower beach area is crucial for park operations and maintenance.

**Safety**
Several meeting participants shared their concern about safety in the Lincoln Park area during construction. Many small children use the park, as well as numerous pedestrians and bicyclists.

**Closing**
The project team thanked the participating citizens for their robust input. Citizen input is very important to informing the decision process, and is always welcome.
Attendance

Puget Sound Beach CSO Control Project Team

King County Wastewater Treatment Division
Norm Alberg, Project Planning and Delivery Section Manager; Shahrzad Namini, Project Manager; Linda Sullivan, Capital Projects Managing Supervisor; Mary Wohleb, Assistant Project Manager; Erika Peterson, Community Relations

Carollo Engineers
Brian Matson, consultant team project manager

Tetra Tech
Jeff Lykken, basin lead engineer; Kevin Dour, engineer

Triangle Associates, Inc.
Bob Wheeler, facilitator; Kristine Cramer, community relations support
Puget Sound Beach Combined Sewer Overflow (CSO) Control Projects

Public Meeting for Murray Basin
March 29, 2010, 6:00 PM – 8:30 PM
Southwest Community Center
2801 SW Thistle St, Seattle, WA 98126

Agenda

Meeting Purpose: This meeting is intended to –
• Present three alternative means for CSO control in the Murray basin
• Present how these alternatives were developed
• Explain why the three alternatives are being considered for further evaluation
• Hear from the community about the alternatives

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<th>Time</th>
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<tr>
<td>6:15 pm</td>
<td>Welcome &amp; Introduction to Project Team</td>
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| 6:20 pm| PowerPoint Presentation
        | • CSO Control Program Overview
        | • CSO Beaches Projects Objectives
        | • CSO Control Approaches
        | • Murray Basin Requirements
        | • Murray Basin Alternatives
        | • Next Steps                                                             |
| 7:00 PM| Questions, Responses and Input
        | *A summary of tonight’s meeting will be available on the project website* |
        | *(www.kingcounty.gov/csobeachprojects)* or you can sign up to receive a copy by mail.* |
| 8:00 PM| View Displays                                                            |
| 8:30 PM| Adjourn                                                                  |
Puget Sound Beach Combined Sewer Overflow (CSO) Control Projects

Murray Basin

Public Meeting Summary
March 29, 2010, 6:00-8:30 pm
Southwest Community Center, 2801 SW Thistle St, Seattle, WA 98126

Overview

On March 29, 2010, the King County Wastewater Treatment Division (WTD) hosted a public meeting for the Puget Sound Beach Combined Sewer Overflow (CSO) Control Projects in the Murray basin. Approximately 19 members of the public attended the meeting.

Meeting Purpose

The meeting was intended to –
- Present three alternative means for CSO control in the Murray basin
- Present how these alternatives were developed
- Explain why the three alternatives are being considered for further evaluation
- Hear from the community about the alternatives

Public Meeting Approach

Shahrzad Namini, King County project manager, started the meeting and introduced the team. John Phillips, King County CSO Program; Jeff Lykken, the lead engineer for the Murray basin; Kevin Dour, the project engineer for the Murray basin; and Bob Wheeler, the meeting facilitator, gave a PowerPoint presentation that included the following topics:
- CSO Control Program Overview
- CSO Beaches Projects Objectives
- CSO Control Approaches
- Murray Basin Requirements
- Murray Basin Alternatives
- Next Steps

Following the presentation, there was a period for meeting attendees to ask questions of the project team and to provide input on the alternative means of CSO control. Afterwards, meeting attendees were encouraged to view informational posters that were set up around the meeting room and talk with members of the project team. Flip charts were available to record questions and input.
Meeting attendees were informed of and encouraged to use a variety of methods for submitting questions and input, which include the following:

- Web: www.kingcounty.gov/csobeachprojects
- E-mail: CSOBeachProjects@kingcounty.gov
- Phone: 206-263-7301
- Feedback forms (available at the public meeting)

Because of the project schedule, meeting attendees were encouraged to provide input by mid-April, 2010. Input received by then will provide the best opportunity to inform the evaluation of the three alternatives. Input is always welcome and will be used throughout the facility planning process.

**List of Informational Posters**

- Basin Map showing City System/County System & Combined System/Separated System
- Map of each alternative with basin inset (3 boards)
- Map of all three alternatives
- “What is a Combined Sewer Overflow?”
- CSO Control approaches overview
- Factors used for alternatives evaluation
- Decision Process graphic

**List of Handouts Available**

- Information Packet
  - Meeting agenda
  - Diagram of decision process
  - Map of basin
  - Feedback form
- Public Information Document
- Dept. of Ecology CSO fact sheet
- Ratepayer report
- “Don’t Flush Trouble” flier
- RainWise brochure (City of Seattle)
- “Natural Drainage Systems” (City of Seattle)
Summary of Questions and Input

Questions and input from the public are summarized below.

There were multiple questions and remarks on the following topics.

**Impacts to Lowman Beach Park**
- What facilities would be above grade and what would be below grade in the park?
- Would the two old trees be removed? Those trees are more than 100 years old and cannot be replaced.
- Lowman Beach Park is not an appropriate place for this work; the park is too important.
- Many people walk and ride their bikes through this area. There are many truck trips in and out to service the pump station, which creates a hazard. There shouldn’t be more utility work here.
- Could the above grade facilities moved so as not to impact the tennis court? Could you put a tennis court on top of the storage tank?
- The community worked extensively on plans for the electrical generator project for the Murray Pump Station and recommended a below grade facility. Why is the electrical generator now shown in a different location and above grade?

**Response:** The specifics of where facilities will be located, whether they will be located above or below grade, and how the construction site would be restored will be determined with public input during the design phase for the proposed alternative. The current drawings show one possible configuration with the storage tank below grade and the odor control and electrical facilities above grade. The storage tank would require an access point on top.

Because flows in the Murray basin converge only right before reaching Murray Pump Station, the CSO control project will need to be located somewhere near the pump station.

About three years ago the community urged WTD to consider locating the electrical generator facilities underground in the street right-of-way. WTD did preliminary analysis and found that it was not possible to meet codes and access for safety at that location. There have been no additional discussions about the electrical generator project until now.

The specifics of where the electrical generator will be located will be worked out during the design phase. The current drawings show one possible configuration.

**Response (Seattle Dept. of Parks and Recreation representative):** The Dept. of Parks and Recreation has policies about locating utilities in public parks. The department is in communication with WTD about this project.
Influence of flows from Barton Pump Station
- How much of the flow at Murray Pump Station comes from the Barton Pump Station?
- There is a similar CSO control project proceeding in the Barton basin. WTD has not selected a CSO control alternative for the Barton basin yet. Will what is selected in the Barton basin impact what is needed in the Murray basin?
- Will WTD do everything possible in the Barton basin to minimize the storage needs in the Murray basin?

Response: Approximately half of the flow at Murray Pump Station is pumped from the Barton Pump Station.

WTD is upgrading the Barton Pump Station to a capacity of 33 million gallons per day (MGD). The capacity of the force main between the Barton and Murray pump stations is 33 MGD. If Barton Pump Station were not upgraded, storage for CSO control in the Murray basin might be reduced from 1 million gallons to 750 thousand gallons. It would mean increased storage in the Barton basin.

Demand management/green stormwater infrastructure
- How much could the storage volume be reduced by using demand management methods in the Murray basin?
- Bioswales are being used in South Lake Union to reduce the flow of stormwater into storm sewers. Why can’t something similar be done here?
- Building storage seems like an outdated approach to controlling CSOs.
- What is the definition of a “steep” slope? Is SW Othello St. too steep for demand management?
- Stormwater should be kept separate and flows in combined sewers should be reduced. Are King County and the City of Seattle working to reduce flows and minimize CSO control solutions? Is increased CSO infrastructure needed because of predicted larger future storm events?

Response: The project team found that there is not enough opportunity for stormwater disconnection in Murray basin to substantially reduce the size or cost of storage. The Murray basin is partially separated, meaning that some impervious surface is already connected to a separated storm system. There is impervious surface connected to the combined sewer system in areas scattered throughout the basin, but there is no large, contiguous area that could be disconnected. Disconnection cannot be pursued on steep slopes or in areas with existing drainage problems. Much of the potential disconnection in the basin is on private property rather than public right-of-way, which makes it less feasible.

Controlling CSOs in a combined sewer is different than slowing the flow of stormwater to storm sewers. Green stormwater infrastructure has been used very successfully to control stormwater in storm systems, but that does not necessarily mean it can reliably control CSOs to the regulatory limit.
Puget Sound Beach Combined Sewer Overflow (CSO) Control Projects  
Murray Basin Public Meeting Summary

SW Othello St. is considered a steep slope, which is defined as a 33% or greater slope by the City of Seattle.

The City of Seattle has improved its stormwater codes, which should gradually reduce the flow of stormwater into the system, which will reduce CSOs. It should not be necessary to overbuild CSO control solutions now because we hope to rely on them less in the future.

Response (Seattle Public Utilities representative): The City of Seattle is working to control its CSOs to the same level that is required of King County. To serve the entire city, we aim to meet current regulation as opposed to overbuilding to meet an unknown future need.

“Beach Drive area combined pipe and tank storage” alternative
• Would you need to buy the private properties where storage is shown or could you put storage underneath the buildings on those properties?
• Removing people’s homes would be a major impact.
• How much would it cost to acquire the private properties? Who is responsible for relocating tenants?

Response: Storage could not be constructed underneath the existing buildings. If this were to become the proposed alternative, King County would work with the owners and tenants of the properties and go through an established property acquisition process. The process includes a fair market determination for the property cost and potential relocation benefits. The property owners have been notified that this is one of the alternatives under consideration.

Environmental considerations
• Are rectangular tanks more subject to failure than round pipes in earthquakes?
• Doesn’t King County have a disaster mitigation plan that states critical infrastructure should no longer be built in tsunami zones or liquefaction zones?

Response: All storage will be constructed to International Building Code (IBC) standards and King County standards for seismic safety.

Decision process
• The cost estimates for each alternative include only engineering estimates of construction costs; they don’t include property acquisition, permits, street use or other costs. Will these alternatives be evaluated before true costs are known?
• Why does the draft facility plan for this project have to be done by December 2010?

Response: Planning level cost estimates are developed for the design elements (what would be constructed) at a very high level in order to compare alternatives. Detailed cost estimating will happen at the final design phase for the selected project.
Completing the draft facility plan by December 2010 is a milestone established in the permit granted by the Dept. of Ecology for the West Point wastewater treatment plant.

**Public input**
- Will all of the elected officials and City of Seattle agencies who have been briefed about the alternatives be briefed again about the public input that is being provided?
- What happens to our public input?
- The City of Seattle is forming a CSO Sounding Board. Does WTD have a Sounding Board?
- There was a subcommittee of the Morgan Community Association that worked with WTD on the previous planning work for the generator project. We should have been consulted about this project.
- This was an excellent presentation. Will it be posted on the website?

**Response:** Public input will be summarized and posted on the project website. The PowerPoint presentation will also be posted on the project website.

Public input is used to develop and refine alternatives. The project team looks for input from the community to help shape/refine the alternatives using basin-specific issues and knowledge, and to make sure good ideas have not been overlooked.

Public input is also used to develop and refine the various factors that are used to evaluate alternatives. For example, information about community priorities regarding parks and natural areas will help to inform analysis of environmental and community factors. Public input on all of the factors is important to King County to help develop a well-rounded approach to identifying the proposed alternative for further environmental review.

Some input relates more to design and construction; feedback related to these phases will be carried forward to those project phases.

The City of Seattle is creating its own CSO control plan now. King County had a citizen Sounding Board in the 1990s when it was creating a CSO control plan. However, WTD staff work closely with Seattle Public Utilities staff, and we will be interested to hear any input from their Sounding Board that might affect King County’s projects.

**Response (Seattle Dept. of Parks and Recreation representative):** I will brief parks department management about the input provided at this month’s public meetings and we will have follow-up meetings with WTD.

Additional questions and input from the public included the following:

- What will this project achieve in the big picture of Puget Sound health and public health? Is it really necessary? **(Response:** CSO control is required under the federal Clean Water Act and by the state Department of Ecology. There are five million
gallons of combined sewer overflows annually at the Murray CSO on average. King County’s CSOs total 900 million gallons annually on average. The Puget Sound Partnership Action Agenda identifies toxics in stormwater as the top priority for cleaning up Puget Sound. King County and the City of Seattle are the biggest contributors of stormwater to Puget Sound. Controlling CSOs in the Murray basin is part of a larger effort to clean up Puget Sound.)

- The distributed pipe storage in Beach Dr SW and Murray Ave SW alternative would come close to the Pelly Place Natural Area. That should be added to the list of challenges for this alternative.

- Couldn’t you put storage on the beach? (Response: There are multiple challenges to building storage on the beach. Environmental regulations make it very difficult to get permits for a project on the beach. Construction would be difficult on the beach, and community impacts would likely be high.

- WTD should put storage under Lincoln Park to control CSOs for both the Barton basin and the Murray basin. It makes more sense to do one large project that can be “oversized” to handle any future problems than to do “band-aid” solutions in multiple urban areas. This could happen with political will. (Response: The project team looked at the potential for a storage tunnel under Lincoln Park. Preliminary geotechnical analysis showed that the geology of the area would make it very difficult to successfully bore a tunnel. Tunneling under Lincoln Park would entail major construction at either end of the tunnel, at Barton Pump Station and Murray Pump Station, so it would not reduce construction impacts at Murray Pump Station. Preliminary cost estimates were very high.)

- Where on the map is the ordinary high water mark or the seawall at Lowman Beach Park? (Response: We would need to look up the ordinary high water mark. We can point out the approximate location of the seawall.)

- What does the City of Seattle say about the potential for ripping up some streets? (Response: WTD is in communication with Seattle Department of Transportation. They have concerns about potential traffic impacts that would have to be addressed.)

### Attendance

**Puget Sound Beach CSO Control Project Team**

*King County Wastewater Treatment Division*

Shahrzad Namini, Project Manager; Linda Sullivan, Capital Projects Managing Supervisor; John Phillips, CSO Control Program; Mary Wohleb, Assistant Project Manager; Bill Wilbert, Environmental Programs Managing Supervisor; Hien Dung, Real Estate Services; Sue Meyer, Environmental Planning; Martha Tuttle, Community Relations; Monica Van der Vrien, Community Relations

*Carollo Engineers*

Brian Matson, consultant team project manager
Tetra Tech
Jeff Lykken, Barton and Murray basins lead engineer; Kevin Dour, Barton and Murray basins project engineer

Triangle Associates, Inc.
Bob Wheeler, facilitator; Ellen Blair, community relations support

Seattle Public Utilities

Sahba Mohandessi
Puget Sound Beach Combined Sewer Overflow (CSO) Control Projects

Technical Information Sharing for Murray Basin
June 19, 2010, 9:30 AM – 4:30 PM
Gatewood Elementary School
4320 SW Myrtle St, Seattle, WA

Light refreshments will be provided
Optional Field Trip to Murray and 53rd Ave Pump Stations at 3:00 PM

Agenda

Meeting Purpose: This meeting is intended to –
- Respond to citizens’ request for technical information and information about the process to identify and screen CSO control alternatives
- Hear and discuss input from the community for King County to consider
- Explain next steps for the Murray Basin CSO Control project

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<tr>
<th>Time</th>
<th>Agenda Item</th>
<th>Discussion Lead</th>
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<tr>
<td>9:30 – 9:40 am</td>
<td>Sign-in</td>
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<tr>
<td>9:40 – 9:50 am</td>
<td>Welcome &amp; Review Meeting Format organized around community questions and comments</td>
<td>Bob Wheeler, Triangle Associates</td>
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<td>9:50 - 10:15 am</td>
<td>Project Background &amp; Decision-Making Process</td>
<td>Linda Sullivan, WTD</td>
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<td>Updates to King County’s process in response to community concerns</td>
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<td>Introduce stakeholder committee</td>
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<td>How will the community influence the decision?</td>
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<td>10:15 – 11:30 am</td>
<td>Understanding Your Basin</td>
<td>Jeff Lykken, Tetra Tech</td>
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<td>How wastewater flows in Murray basin</td>
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<td>Volume requiring control to prevent overflows</td>
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<td>How does the system at Barton basin relate to the system at Murray?</td>
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<td>11:30 – 12</td>
<td>Lunch</td>
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<td>12-1:30</td>
<td>Developing and Evaluating CSO Alternatives</td>
<td>Jeff Lykken, Tetra Tech; Peg Staeheli SvR Design; John Phillips, WTD</td>
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<td>• Options considered for the Murray Basin</td>
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<td>• Factors for comparing alternatives</td>
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<td>1:30-1:45</td>
<td>Break</td>
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<td>1:45 – 2:45 pm</td>
<td>Q&amp;A</td>
<td>Project team</td>
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<td>2:45 – 3:00 pm</td>
<td>Next Steps</td>
<td>Bob Wheeler, Triangle Associates &amp; Linda Sullivan, WTD</td>
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<td>3:00 – 4:30 pm</td>
<td>Bus field trip to view Murray and 53rd Ave Pump Stations</td>
<td>Other experts</td>
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<td>3-3:30 p.m. Or stay at the meeting room and talk to project team members with expertise in variety of disciplines</td>
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Puget Sound Beach Combined Sewer Overflow (CSO) Control Projects

Murray Basin

Technical Information Session
Summary of Discussion
June 19, 2010, 9:30-4:30 pm (field trip at 3:00 pm)
Gatewood Elementary School, 4320 SW Myrtle St., Seattle, WA

Overview

On June 19, 2010, the King County Wastewater Treatment Division (WTD) hosted a public meeting to share technical information about the combined sewer overflow (CSO) control project in the Murray basin. The meeting was organized in response to citizen requests for additional technical information about how the wastewater system works in the Murray basin and how WTD developed and evaluated CSO control alternatives for the basin.

A tour of the Murray Pump Station and the 53rd Ave Pump Station was offered at 3 pm.

Approximately 36 members of the public attended the meeting, including several members of the newly formed Citizen Advisory Group (CAG) for the Murray basin.

Presentations

Through presentations from the project team, meeting participants learned about the nature of the CSO problem and the project decision-making process. There were detailed discussions of flow requirements in the Murray Basin, with hydrographs demonstrating various scenarios. A detailed discussion of Green Stormwater Infrastructure followed and the nine alternatives that were considered for the Murray Basin were reviewed.

Summary of Questions and Input

Questions and input from the meeting attendees are summarized below.

CSO legal requirements
The group discussed improvements WTD is making to water quality sampling procedures after receiving fines from the Department of Ecology relating to CSO treatment plants.

In response to a question, the team clarified that the Puget Sound Beaches CSOs are priorities because they are located near waterfront recreation areas.

Relationship of Barton basin system, Murray basin system, and downstream system
WTD staff confirmed that the schedule for proposing a CSO control alternative for the Barton basin had been extended to correspond with the extended schedule for Murray basin.

July 2010
The group discussed a planned Barton Pump Station upgrade project that will increase the capacity to send flow to the Murray Pump Station. WTD staff said that the Barton Pump Station is being upgraded for several reasons, including adding a back-up generator and odor control and replacing mechanical equipment. The additional cost to the project to increase pumping capacity is about $300,000. WTD management decided it was worthwhile to invest this comparatively small marginal cost while the opportunity exists. This will provide flexibility in the system in the long-term and provide flexibility in controlling CSOs in the Barton basin. WTD staff said that flow data had shown that building storage or other upgrades in the Murray basin was inescapable regardless of whether pumping capacity of the Barton Pump Station is increased. WTD staff said that the Barton Pump Station, like most pump stations, typically pumps at less than capacity.

An attendee asked if it was possible to “balance” the amount of storage in the Barton and Murray basins so that storage would fit into street right-of-way in both basins.

Acknowledging community concerns that flows from the Barton basin affect the Murray basin, staff reminded the group that the Barton and Murray basins are both upstream in a regional system, and both basins send flow through neighborhoods that are downstream, all the way to West Point Treatment Plant. They noted that there is pressure to keep sewer rates low, and WTD must consider using its facilities in the most efficient manner.

In response to a question, WTD staff said that the areas of the Barton basin that have separated systems will not be added into the combined system. An attendee asked how much capacity exists in the wastewater system downstream of the Murray Pump Station. WTD staff said that the capacity at the SW Alaska St. overflow point constrains capacity to 1-2 MGD above the capacity of the Murray Pump Station.

**Stormwater separation**
Meeting attendees commented that removing stormwater from the wastewater system would reduce the flows that WTD’s wastewater system has to handle. While stormwater contributes to most of the flow during CSO events, separating stormwater often requires building a dedicated stormwater system, which is very expensive. A separate storm system might need to include treatment facilities which would create additional costs and impacts.

Meeting attendees said there were locations in the Murray basin where surface water was suspected to reconnect with the combined sewer system. Basin residents were encouraged to tell WTD staff of the locations where they suspected this was happening. WTD staff said that in general the way the stormwater and sewer systems interact is understood, but the community may know details about specific connections that WTD does not have on record.

In response to a question, WTD staff confirmed that the stormwater system is the City of Seattle’s responsibility.
Green stormwater infrastructure
Much discussion centered on where green stormwater infrastructure (GSI) techniques can be applied, what techniques are available, and how well GSI is understood. Attendees also questioned why there is no GSI alternative in the Murray basin that focuses on street right-of-way like there is in the Barton basin.

Understanding of GSI
WTD staff and consultants emphasized that a great deal of research is still ongoing about where and how to implement GSI. Attendees asked about the use of GSI in the High Point development and its effectiveness. The GSI consultant for the Barton and Murray CSO projects, who also worked on the High Point project, noted that research and understanding of GSI techniques has improved even in the few years since the High Point development was built.

In response to a question, WTD staff said that the City of Seattle has not adopted a program to replace concrete panels in the street with porous concrete because the standards and specifications are evolving rapidly as research progresses.

WTD staff and consultants explained that most GSI projects that have been built to date were designed to reduce or slow stormwater into stormwater systems, not to control CSOs. They said that designing GSI to control CSOs is much different, and that there must be a high degree of certainty that the CSO regulation will be met for the Department of Ecology and EPA to approve the project.

Where GSI can be applied
WTD staff and consultants explained that the requirements for using GSI to control CSOs include the following: 1) the existence of a combined system, 2) relatively flat topography, and 3) space to implement green features such as rain gardens. They pointed out that it is easier to implement GSI in Portland because they have better soils for infiltration.

GSI Alternatives in Barton and Murray
The team described a GSI alternative in the Barton basin, which would include rain gardens built in the public right-of-way. Street run-off in the potential project area is currently connected to the combined sewer system. Under this option, any GSI on private property would be voluntary and would improve the control of CSOs. WTD staff clarified that implementing GSI in Barton could reduce the flow to the Murray basin and through the regional system.

WTD staff said that the Murray basin differs from the Barton basin because it lacks a large area where stormwater in the public street right-of-way is connected to the wastewater system. In the Murray basin, most of the stormwater enters the combined sewers from private property rather than from street run-off. A GSI alternative would require work on private property to reduce the amount of storage needed in the Murray basin. Preliminary results of a recent study showed that GSI on private property in the Murray Basin may be able to reduce storage needs in the Murray basin, but it cannot eliminate storage.

GSI options for private property include cisterns with typical volume of 1600 gallons, and rain gardens. The City of Seattle does not currently have an incentive program to install rain gardens
in the Murray basin, although if WTD proposes GSI to help control CSOs in the Murray basin, an incentive program would probably be needed to achieve enough voluntary participation.

Analysis and Data
Meeting attendees discussed how the impact of GSI on the combined sewer system was evaluated. A technical memo summarizing the process and the results is available on the project website.

The group discussed the complexity of managing the combined sewer system, noting the variability of rainfall over Seattle and what happens when the ground becomes saturated. By releasing excess water into the environment, CSOs prevent back-ups into homes and businesses and protect treatment facilities. The West Point treatment facility has an active management process to handle flows and prevent overflows.

Techniques
The effectiveness of permeable pavement was discussed. In response to a question, the GSI consultant said that drilling holes in regular pavement does not make “permeable” pavement. The soil under regular pavement is compacted to be very dense and resist water.

Existing Murray Pump Station
A meeting attendee encouraged WTD to establish an emergency preparedness plan for the Murray Pump Station, including plans for keeping a back-up generator running during an emergency. Overflows at the Murray Pump Station occur about once every three years due to power outages.

WTD staff explained that the planned upgrade to the Murray Pump Station, which may be combined with the Murray CSO project if possible, is intended to upgrade the station, including a back-up generator and odor control, but the pumping capacity would not be increased because of downstream limitations.

Sizing of CSO control alternatives
Meeting attendees asked WTD to make available the calculations that led to the sizing of the CSO control alternatives.

Other CSO control alternatives that WTD considered
The potential to increase the capacity of the Murray Pump Station and downstream system to get flows out of basin was also discussed. WTD staff said that alternative would involve a lengthy new pipeline and upgrading the Alki CSO treatment plant to handle additional flows.

The group clarified:

- Portals for the tunneling alternative would be required during construction only. The structures on either end of the storage tunnel would be underground.
- If flows were pumped to a higher elevation in the basin for storage, gravity could be used to release flows back to the bottom of the basin.
- On-site treatment alternative would have to be above ground. WTD is no longer considering that alternative at this time.
A storage facility at the bottom of the basin can be placed underground. If a facility were to be built underground at the Lowman Beach Park, WTD would work with the community on design, construction, and how the park would be restored.

Potential additional CSO control alternatives
Participants asked about other alternatives, such as building a shorter pipe under the street near the park and adding length to another storage pipe uphill, or using one of the private properties shown in Alternative 1F. A suggestion was made for pumping straight from Barton Pump Station to Gatewood Elementary via a new pipeline, rather than pumping to the Murray Pump Station, and putting a storage facility at the school to control CSOs.

A meeting attendee asked if the force mains in Lincoln Park could be used for storage, since they have excess capacity above what Barton Pump Station will be able to pump. WTD staff replied that it would not be possible to use the force mains for storage because a pressure pipe and storage are not compatible components of a system.

Staff Attendance
The following project team members attended the technical information session:

King County Wastewater Treatment Division
Linda J. Sullivan, Capital Projects Managing Supervisor; Shahrzad Namini, Project Manager for Puget Sound Beach CSO Control Projects; Chris Okuda, Project Management; John Phillips, CSO Control Program; Erika Peterson, Community Relations; Martha Tuttle, Community Relations; Elizabeth Elliott, Community Relations

Carollo Engineers
Brian Matson, consultant team project manager

Tetra Tech
Jeff Lykken, Murray Basin Lead; Kevin Dour, Murray project engineer

Triangle Associates
Bob Wheeler, facilitator; Ellen Blair, community relations support

EnviroIssues
Penny Mabie, CAG facilitator
**Puget Sound Beach Combined Sewer Overflow (CSO) Control Projects**

**Special Public Meeting: NEW Community Generated Proposal for CSO facility in Lincoln Park**
November 1, 2010, 6:30-8:30 PM  
The Hall at Fauntleroy  
9131 California Ave S.W., Seattle WA

**Agenda**

**Meeting Purpose:** This meeting is intended to –  
- Raise awareness that Lincoln Park’s south parking lot has been recommended as a potential location for a CSO facility  
- Provide information on this recommendation  
- Let the community know how to give input that will help inform the county’s decision

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<tr>
<th>Time</th>
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<th>Presenter/Notes</th>
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<tr>
<td>6:30 p.m.</td>
<td>Welcome</td>
<td>Bob Wheeler, Facilitator</td>
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<td>CSO Beach Project Overview</td>
<td>Linda Sullivan, King County</td>
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<td>Presentation of the Murray Community Advisory Group (CAG)'s Lincoln</td>
<td>Patrick Gordon and Penny Mabie, Murray CAG</td>
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<td>Park recommendation for CSO control</td>
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<td>Decision process and next steps</td>
<td>Linda Sullivan, King County</td>
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<td>7:15 p.m.</td>
<td>Questions, Comments and Input</td>
<td>Bob Wheeler, Facilitator</td>
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<td><strong>A summary of tonight’s meeting will be available on the project</strong></td>
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<td><strong>website (<a href="http://www.kingcounty.gov/csobeachprojects">www.kingcounty.gov/csobeachprojects</a>) within one month</strong></td>
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Puget Sound Beach Combined Sewer Overflow (CSO) Control Projects

Special Public Meeting:
NEW Community Generated Proposal for CSO facility in Lincoln Park

Public Meeting Summary
November 1, 2010 6:30-8:30 pm
The Hall at Fauntleroy, 9131 California Ave S.W., Seattle 98136

Overview
On November 1, 2010, the King County Wastewater Treatment Division (WTD) hosted a public meeting for the Puget Sound Beach Combined Sewer Overflow (CSO) Control Projects in the Barton basin. The meeting was intended to raise awareness that Lincoln Park’s south parking lot has been proposed as a potential location for a CSO facility, provide information on this alternative, and let the community know how to give input that will help inform the county’s decision.

One hundred and five members of the public attended the meeting.

Presentations
Through presentations from the project team and the Murray Community Advisory Group (CAG), meeting participants learned about the wastewater conveyance system and CSO control problem in West Seattle, received a detailed explanation of the community-generated Lincoln Park CSO control alternative, and learned about the decision process, next steps and how communities can provide input on the proposal. The presentation and other meeting materials can be found at www.kingcounty.gov/csobeachprojects.

After the presentation, attendees had the opportunity to comment on the proposal and ask questions. Attendees also had the opportunity to view informational posters that were set up around the meeting room and talk with members of the project team. Flip charts were available to record questions and input.

Meeting attendees were informed of and encouraged to use a variety of methods for submitting questions and input, which include the following:
- Web: www.kingcounty.gov/csobeachprojects
- E-mail: Martha.tuttle@kingcounty.gov
- Phone: 206-263-7301
- Feedback forms (available at the public meeting)
Meeting attendees were encouraged to ask questions, express concerns, and provide input. King County staff indicated that input is always welcome and will be used throughout the decision process.

**Summary of Questions and Input**
Questions, feedback, and discussion from the meeting attendees are summarized below.

**GENERAL CSO**

**Compliance with codes**
One participant questioned the county’s timeline and need for Department of Ecology compliance. The Department of Ecology and the Federal Government can impose fines as well as enforce mandates with consent decrees. WTD staff shared that between 2010 and 2030 there will be 15 more King County CSO control projects that will be implemented throughout the County.

**Understanding system-wide flows**
Several community members wanted to better understand how system-wide wastewater and stormwater flow in West Seattle, and whether other basins influence Barton and Murray. The lead engineer explained that the Barton basin is the headwaters of the system that flows northward to Murray and on to the 63rd Ave pump station as it makes its way toward the West Point Treatment Plant. Flows to the east of the Murray basin travel to the Longfellow Creek area within the City of Seattle’s combined sewer system.

One participant asked if WTD could add a pipeline that would bypass flows from Murray and send them further north, eliminating the need for Murray storage. The County team evaluated this option but it was not carried forward because it did not adequately meet the established evaluation factors.

**Personal responsibility**
One participant questioned the impact of each resident reducing flow to the system by a certain percentage as a solution for CSOs. This could make a minor reduction in the amount of storage that is required, but would not come close to eliminating the need for a significant project in the basin.

**RELATIONSHIP BETWEEN BARTON AND MURRAY BASINS**

**Storage tank locations**
Several meeting attendees asked whether the storage tank in Lincoln Park would eliminate the need for a project in the Murray basin. WTD staff explained that the Lincoln Park storage option would still require a smaller tank at the bottom of the Murray basin in the Lowman Beach Park area. Barton basin will still need a CSO control project, using one of the three alternatives presented in March (storage in Upper Fauntleroy Way, Green Stormwater Infrastructure in the upper basin, storage at Fauntleroy School).
Two meeting attendees expressed concern about using private property across from Lowman Beach Park because it includes family homes.

One meeting participant suggested placing the tank under the ferry dock at Fauntleroy terminal.

A meeting attendee suggested that each basin should take an equal share of the burden; Barton and Murray should each store 500,000 gallons of peak flows during large storm events.

**Green Stormwater Infrastructure (GSI)**

One community member wanted to know about GSI possibilities in both basins. The lead engineer answered that GSI was considered for both basins but was found to be feasible in the Barton basin due to several factors, including having substantial areas where street runoff is connected to the sanitary sewer system and relatively large areas with flat terrain and less concern about groundwater causing slope instability. The Murray CAG recommended GSI in both basins if possible, but they recognized that GSI in Murray cannot be the sole solution because there is not enough connected area and because of steep unstable slopes.

**Comparing Lincoln Park and Lowman Beach Park**

Community members asked Murray CAG members why Lowman Beach Park was less preferable than Lincoln Park. From the CAG perspective, Lowman Beach Park is a small park that slopes to the water and has very old (100+ years) Sycamore trees. The concern is that these special features make it irreplaceable; this project would forever change the character of Lowman Beach Park. By comparison, Lincoln Park would temporarily lose its parking lot and paved path, both of which are not natural and could be replaced to the same or better condition. If a large project is put in Lowman Beach Park, Murray will be storing a large quantity of flow from the Barton basin.

One meeting participant asked about comparative costs for doing two projects to address Murray flows – one at Lincoln Park and one at Lowman Beach Park – compared with a single project at Lowman Beach Park. The lead engineer explained that the cost would be greater to build in two areas but at this early point in the process, the estimated cost differential does not appear great (~$3-4 million for a ~$25 million project).

**Life cycle assessment**

A meeting attendee asked how life cycle costs were determined and suggested that they include capital costs as well as operations and maintenance. Life cycle costs would be considered as part of the evaluation of the alternatives and refined during design.

**Concerns about the public process and basin equity**

Several people expressed their concern about a lack of transparency with the process. Meeting attendees felt that the Murray Basin community had an extensive public process without representation from the Barton community. A member of the Fauntleroy Community Association did attend the CAG meetings but reported himself not to be a voting member.

Some community members requested the formation of a Community Advisory Group for the Barton basin. People felt that the Lincoln Park alternative was a last minute proposal and not
fully considered. Several community members expressed the belief that if Lincoln Park was a recently discovered possibility there must be other possible CSO control solutions as yet untapped.

The group discussed different ideas about equity. Neighbors of Lincoln Park described the impacts of other urban infrastructure projects – including other wastewater facilities and regional transportation investments in their area.

Several members of the CAG shared their feelings that the Lincoln Park alternative would spread the burden more equitably across the basins, would cause short-term pain but no lasting harm and asked the Barton community to read the CAG report (www.kingcounty.gov/CSOBeachProjects). CAG members were concerned that this proposal was being interpreted as Barton versus Murray or Fauntleroy Community Association (FCA) versus Murray Community Association (MOCA). The CAG looked at numerous solutions, all of which they felt had more flaws than the Lincoln Park solution.

WTD staff emphasized that King County has tried to be transparent throughout the process and engage all affected communities – all meeting materials are posted on the website along with meeting summaries to make the process as inclusive as possible. Additionally, it was stated that the Lincoln Park alternative is a relatively new approach proposed by the CAG and this meeting was organized to bring Barton basin community members into the discussion before any decisions are made.

**LINCOLN PARK PROPOSAL: TECHNICAL DETAILS**

**Technical Details**

In response to a question, the lead engineer explained that the Barton pump station upgrade would have enough pressure for flows to be pumped uphill to a storage tank under the south parking lot. There may be motorized valves at the bottom of the hill which would be turned on when flows exceed capacity, or flows may be routinely pumped uphill but only stored under Lincoln Park’s south parking lot during an event which exceeds the pump station’s capacity.

There would not be a new outfall needed and the existing outfalls at Barton and Murray would remain intact (as for other alternatives being considered). Whichever CSO control mechanism is chosen, CSOs must be controlled to no more than one event per year on average per Department of Ecology requirements.

**Excavation and shoring**

Property owners adjacent to Lincoln Park asked whether geotechnical studies had been completed to show that surrounding homes would be stable during excavation and construction. This would be an important consideration if the proposal moves forward.

One community member expressed concern that the Fauntleroy area is subject to liquefaction during an earthquake.

**Concerns about the project footprint**
One participant questioned whether project elements would be above or below grade. WTD staff explained that project elements would be located underground for this proposal with the possible exception of small components such as vents.

A meeting attendee expressed concern that the tank footprint would be larger than the actual parking lot and would impact Lincoln Park’s natural resources.

**Location of proposed facilities within Lincoln Park**

One meeting attendee shared her concern that the large maple tree near the parking, which is used for weddings and other major milestones, would be impacted.

One participant requested that the WTD explore the use of the grassy area near the parking lot as an alternate storage tank site.

**Odor and electrical concerns**

One participant shared her strong reservations about the odor and electrical facilities associated with the storage tank. Odor control, electrical outages and noise were raised as particular concerns.

**LINCOLN PARK PROPOSAL: CONSTRUCTION CONCERNS**

Numerous meeting attendees expressed overall concern about construction during the project and shared that the Lincoln Park area has the worst traffic and parking (along with the best park) in West Seattle. According to many attendees, this is a highly challenging location to site a major construction project.

**Traffic**

A representative from the Fauntleroy Community Association made a presentation expressing strong opposition to the proposal, emphasizing the impact on traffic in the neighborhood. According to the representative, every neighborhood street is lined with houses, there are no sidewalks, and there is currently too much fast-moving traffic in the neighborhood. Without the Lincoln Park parking lot’s 75 spaces, park users would park in the neighborhood and more drivers would use side streets, greatly impacting an already impacted community.

Ferry traffic was raised as a large concern by the community. According to one community member, a resident counted more than 2,700 cars during a four-hour period on a summer day (during morning and evening commute times). She expressed concern that if even half of the ferry traffic were to choose an alternative route through the neighborhood, it would overwhelm the side streets.

Meeting attendees wanted to know whether WTD had developed traffic and detour plans during construction for the Lincoln Park alternative and if so how they compared to plans for the possible Lowman Beach Park site. Traffic issues are considered as part of the decision-making process for choosing a preferred alternative; but specific traffic control plans have not been developed for either of the alternatives.
Concurrent projects
Meeting attendees wanted to better understand the relationship between the Barton pump station upgrade and the Lincoln Park CSO project. The existing Barton pump station has pumps that can convey 26 mgd (million gallons per day). The upgrade will allow for a conveyance capacity of 33 mgd. The Barton pump station is a separate project from CSO control projects. However, the cost to upgrade the capacity is relatively small within the context of the larger project and will allow greater flexibility.

Community members were concerned about the number of concurrent projects in the neighborhood. The Barton pump station project will begin in 2012 and last approximately 2.5 years. King County METRO will be constructing Rapid Ride bus stations at the ferry terminal around the same time period. If Fauntleroy School is chosen as the Barton CSO control option, the project will begin in 2013 and last approximately 2 years. If the Lincoln Park alternative is chosen, it will mean another significant project in the neighborhood at the same time as the above listed projects.

Parking
Concern about loss of parking was widespread. In addition to regular park use, the parking lot is used for teenage swim team members who arrive at dawn to practice. A member of the Murray CAG shared his hope that this project would result in increased parking for Lincoln Park users over the long term.

Meeting participants expressed their desire to have the parking lot returned to its original condition.

Access
Several meeting attendees expressed concern that ADA access be maintained through the park during construction. The construction plan will ensure that access is maintained.

A meeting participant asked whether the County had considered installing a large-diameter storage pipeline in Lincoln Park along the beach rather constructing a storage tank under the parking lot. This alternative was not considered as it was thought to be much more impactful to park facilities.

Meeting attendees noted that the access road to Colman Pool and the lower beach area is crucial for park operations and maintenance.

Safety
Several meeting participants shared their concern about safety in the Lincoln Park area during construction. Many small children use the park, as well as numerous pedestrians and bicyclists.

Closing
The project team thanked the participating citizens for their robust input. Citizen input is very important to informing the decision process, and is always welcome.
Attendance

Puget Sound Beach CSO Control Project Team

*King County Wastewater Treatment Division*
Norm Alberg, Project Planning and Delivery Section Manager; Shahrzad Namini, Project Manager; Linda Sullivan, Capital Projects Managing Supervisor; Mary Wohleb, Assistant Project Manager; Erika Peterson, Community Relations

*Carollo Engineers*
Brian Matson, consultant team project manager

*Tetra Tech*
Jeff Lykken, basin lead engineer; Kevin Dour, engineer

*Triangle Associates, Inc.*
Bob Wheeler, facilitator; Kristine Cramer, community relations support
Appendix D

STATE ENVIRONMENTAL POLICY ACT (SEPA)
DOCUMENTATION
Affidavit of Publication

STATE OF WASHINGTON
Counties of King and Snohomish

The undersigned, on oath states that he/she is an authorized representative of The Seattle Times Company, publisher of The Seattle Times of general circulation published daily in King and Snohomish Counties, State of Washington. The Seattle Times has been approved as a legal newspaper by orders of the Superior Court of King and Snohomish Counties.

The notice, in the exact form annexed, was published in the regular and entire issue of said paper or papers and distributed to its subscribers during all of the said period.

<table>
<thead>
<tr>
<th>Newspaper</th>
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<td>The Seattle Times</td>
<td>05/12/11, 05/19/11</td>
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Marilyn Peredo       Signature       Marilyn Peredo

Said oath oath was administered and sworn to before me on May 19, 2011.

Christina C. McKenna  Notary Public in and for the State of Washington, commission at Seattle
Notice is hereby given that on May 12, 2011, the King County Wastewater Treatment Division (WTD) issued a State Environmental Policy Act (SEPA) Determination of Non-significance (DNS) for the Barton Combined Sewer Overflow (CSO) Control Project. The project involves installing a system of bioretention/biofiltration facilities ("bioswales") in West Seattle's Sunnie Heights and Westwood neighborhoods. The purpose of the project is to reduce CSOs from the Barton basin. Comments will be accepted on this project until 5 p.m. on May 31, 2011. Send comments to Wesley Sprague, Supervisor, Community Services and Environmental Planning, King County Wastewater Treatment Division, 201 S. Jackson Street, MS: KSC-NR-0005; Seattle, WA 98104-3855. The Director of King County Department of Natural Resources and Parks, consistent with King County Public Rule 7.4-1, Section 6.2.14, and RCW 43.21C.240, has determined that the environmental impacts identified in the SEPA environmental checklist for the Barton CSO Control Project will be adequately addressed by the development regulations and other applicable requirements of the City of Seattle and by all other applicable state and federal regulations referred to in the environmental checklist for the Barton CSO Control Project. Therefore, no administrative appeal of issuance of the DNS will be allowed for the Barton CSO Control Project. The rule may be viewed at http://www.kingcounty.gov/operations/policies/rules/utilities/put741pr.aspx. For a copy of the SEPA DNS and environmental checklist, King County Public Rule PUT-7.4-1, or more information contact Sue Meyer, Water Quality Planner, at 206-684-1171 or sue.meyer@kingcounty.gov.
AFFIDAVIT OF PUBLICATION

STATE OF WASHINGTON  )
COUNTY OF KING      ) ss.

Idella E. Gabler, being first duly sworn on oath, deposes and says: That she is the Principal Clerk of the West Seattle Herald, White Center News, Ballard News Tribune, Highline Times, Des Moines News, and Federal Way News weekly Newspapers, which is now and at all times herein mentioned, has been published and printed in the office maintained at the place of publication at Seattle, King County, Washington; That by order of the Superior Court of the state of Washington, In and for King County, said newspaper is now, and at all times mentioned herein, has been approved as a legal newspaper for the publication of any advertisement, notice, summons, report, proceedings, or other official document required by law to be published; That said newspaper is published regularly, at least once a week, in the English language, as a newspaper of general circulation in the Seattle area, King County, Washington, and at the time of application for approval by the aforementioned Superior Court, was published at least six months prior to the date of said application.

That the annexed is a true copy of a KING COUNTY WASTEWATER TREATMENT DIVISION NOTICE OF DETERMINATION OF NONSIGNIFICANCE, as it was published in regular issues of said newspaper each week for a period of TWO consecutive week(s), commencing on the 13th day of May 2011, and ending on the 20th day of May 2011, inclusive; and that said newspaper was regularly distributed to its subscribers, as a newspaper of general circulation during all of said period.

That the full amount of the fee charged for the foregoing publication is the sum of $153.00

______________________________
Idella E. Gabler

Subscribed and sworn to before me this 20th day of May, 2011.

______________________________
D. M. Smith
NOTARY PUBLIC, in and for the state of Washington
My commission expires: 11/22/2014

D.M. SMITH
Notary Public
State of Washington
My Commission Expires
November 22, 2014
DETERMINATION OF NONSIGNIFICANCE

TITLE OF PROPOSAL: Barton Combined Sewer Overflow Control Project

DESCRIPTION OF PROPOSAL: To meet the combined sewer overflow (CSO) control standard of the National Pollutant Discharge Elimination System permit for the West Point Treatment Plant, the King County Wastewater Treatment Division proposes to install a system of bioretention/bioinfiltration facilities ("bioswales") in West Seattle’s Sunrise Heights and Westwood neighborhoods. The bioswales, which would be installed in existing planting strips or new curb bulbs along the street over 32-64 half blocks, would prevent and delay stormwater from entering the combined sewer system from the street right-of-way. Construction of the proposed bioswales would begin in the second half of 2013 and take approximately two years to complete.

LOCATION OF PROPOSAL, INCLUDING STREET ADDRESS, IF ANY: The project site would include public street rights-of-way in an approximately 200-acre residentially developed area in West Seattle’s Sunrise Heights and Westwood neighborhoods. The exact locations of bioswales in this area would be determined during design. The site is bound to the west by 34th Avenue SW, to the north by SW Othello Street, to the east by 29th Avenue SW, and to the south by SW Barton Street. It is located in King County, Washington, in Sections 25 and 36, Township 24N, Range 3E.

SEPA Responsible Official: Pam Elardo, P.E.
Position/Title: Director, King County Wastewater Treatment Division
Address: 201 South Jackson Street, MS KSC-NR-0501
Seattle, WA 98104-3855
Date: 5/5/11
Signature: 

Proponent and Lead Agency: King County Department of Natural Resources and Parks
Wastewater Treatment Division
Contact Person: Sue Meyer, Water Quality Planner
King County Wastewater Treatment Division
201 South Jackson Street, MS KSC-NR-0501
Seattle, WA 98104
phone: 206-684-1171; e-mail: sue.meyer@kingcounty.gov

Issue Date: May 12, 2011

The State Environmental Policy Act (SEPA) lead agency for this proposal has determined that it does not have a probable significant adverse impact on the environment. An environmental impact statement is not required under RCW 43.21C.030(2)(c). This decision was made after review of a completed environmental checklist and other information on file with the lead agency. This information is available to the public on request.

☒ This Determination of Nonsignificance (DNS) is issued under WAC 197-11-340 (2); the lead agency will not act on this proposal for 17 days from the issue date. Comments must be submitted by May 31, 2011. Submit comments to Wesley Sprague, Supervisor, Community Services and Environmental Planning, King County Wastewater Treatment Division, 201 South Jackson Street, MS KSC-NR-0505, Seattle, WA 98104-3855.

☒ The Director of King County Department of Natural Resources and Parks, consistent with King County Public Rule 7-4-1, Section 6.2.14 and RCW 43.21C.240, has determined that the environmental impacts identified in the SEPA environmental checklist for the Barton CSO Control Project will be adequately addressed by the development regulations and other applicable requirements of the City of Seattle and by all other applicable state and federal regulations referred to in the environmental checklist for the Barton CSO Control Project. Therefore, no additional administrative appeal of issuance of the DNS will be allowed for the Barton CSO Control Project. The rule may be viewed at http://www.kingcounty.gov/operations/policies/rules/utilities/put741pr.aspx, or contact Sue Meyer, Water Quality Planner, at 206-684-1171 or sue.meyer@kingcounty.gov to obtain a copy of the rule.

[Statutory authority: RCW 43.21C.110. 84-05-020 (Order DE 83-39), §197-11-970, filed 2/10/84, effective 4/4/84.]
Environmental Checklist

for the

Barton Combined Sewer Overflow Control Project

April 27, 2011

Prepared in compliance with the State Environmental Policy Act (SEPA) (RCW 43.21C), the SEPA Rules (WAC 197-11), and Chapter 20.44 King County Code, implementing SEPA in King County procedures.

This information is available in accessible formats upon request at 206-684-1280 (voice) or 711 (TTY).
ENVIRONMENTAL CHECKLIST

A. BACKGROUND

1. Name of proposed project, if applicable:
   Barton Combined Sewer Overflow Control Project

2. Name of applicant:
   King County Wastewater Treatment Division (WTD), Department of Natural
   Resources and Parks (DNRP)

3. Address and phone number of applicant and contact person:
   King County Wastewater Treatment Division
   201 South Jackson Street, MS: KSC-NR-0505
   Seattle, WA 98104-3855
   CONTACT:
   Sue Meyer, Water Quality Planner, telephone: 206-684-1171,
   email: sue.meyer@kingcounty.gov

4. Date checklist prepared:
   April 27, 2011

5. Agency requesting checklist:
   King County Wastewater Treatment Division, Department of Natural Resources and
   Parks

6. Proposed timing or schedule (including phasing, if applicable):
   Construction of the Barton CSO Control Project is expected to begin in the second
   half of 2013 and take approximately two years to complete.

7. Do you have any plans for future additions, expansions, or further activity
   related to or connected with this proposal? If yes, explain.
   King County plans to begin construction of the Barton Pump Station Upgrade Project
   in 2012. It will take approximately three years to complete. This project includes the
   installation of new raw sewage pumps that will increase the capacity of the pump
   station from 26 million gallons per day (MGD) to 33 MGD.

8. List any environmental information you know about that has been prepared, or
   will be prepared, directly related to this proposal.
   Archaeological and Historical Resources in the Barton Sub-Basin, Seattle, Washington, Cascadia Archaeology, October 26, 2009
   Preliminary Geologic/Geotechnical Evaluation of Barton Alternatives, Seattle, Washington, Shannon & Wilson, Inc., March 26, 2010
Barton CSO Control Project Biological Assessment—Letter of “No Effect”, ESA Adolfson, March 30, 2011

Environmental Conditions Technical Memorandum, Barton Basin, Puget Sound CSO Project, E00022E06, ESA Adolfson, April 23, 2010

Earth Technical Memorandum, Barton and Murray Combined Sewer Overflow Control Projects, ESA Adolfson, April 8, 2011

Environmental Justice Technical Memorandum, Barton and Murray Combined Sewer Overflow Control Projects, ESA Adolfson, April 8, 2011

Noise Technical Memorandum, Barton and Murray Combined Sewer Overflow Control Projects, ESA Adolfson, April 8, 2011

Recreation Technical Memorandum, Barton and Murray Combined Sewer Overflow Control Projects, ESA Adolfson, April 8, 2011

Traffic Technical Memorandum, Barton and Murray Combined Sewer Overflow Control Projects, ESA Adolfson, April 8, 2011

Draft Barton and Murray Combined Sewer Overflow Control Facilities Plan, Tetra Tech, Inc., and Carollo Engineers, February 2011. This report will be finalized and submitted to Ecology for approval by July 2011.

A Washington State Water Pollution Control Revolving Fund State Environmental Review Process Environmental Issues Checklist will be prepared for the proposed project.

Additional environmental information that will be prepared for the proposed project includes reports summarizing the findings of a cultural resources survey, groundwater monitoring, and subsurface geotechnical investigations that have been or will be performed in the project area.

9. **Do you know whether applications are pending for governmental approvals of other proposals directly affecting the property covered by your proposal? If yes, explain.**

None known

10. **List any government approvals or permits that will be needed for your proposal, if known.**

City of Seattle Department of Transportation
- Street Use Permit
- Street Improvement Permit

Washington State Department of Ecology
- National Pollution Discharge Elimination System (NPDES) Construction Stormwater General Permit
- State Environmental Review Process

11. **Give brief, complete description of your proposal, including the proposed uses and the size of the project and site. There are several questions later in this**
checklist that ask you to describe certain aspects of your proposal. You do not need to repeat those answers on this page. (Lead agencies may modify this form to include additional specific information on project description).

The King County Wastewater Treatment Division’s (WTD’s) Barton Pump Station receives flows of combined sanitary sewage and stormwater collected in the Barton wastewater basin located in West Seattle on Puget Sound. The approximately 1,100-acre basin drains to the Barton Pump Station next to the Fauntleroy Ferry Terminal. Dry weather flows pumped from the Barton Pump Station are conveyed to the West Point Treatment Plant in the City of Seattle’s Magnolia neighborhood for treatment, disinfection and discharge to Puget Sound. Under peak flow conditions, some of the flows pumped from the Barton Pump Station receive primary treatment at the Alki Wet Weather Treatment Facility which then discharges them to Puget Sound.

The Barton Pump Station has the capacity to convey a peak flow rate of 26 MGD. The capacity of the pump station will increase to 33 MGD as part of the Barton Pump Station Upgrade Project (see Section A.7). When heavy rains cause flows in the basin to exceed the capacity of the conveyance system, a combination of stormwater and diluted sewage is discharged to Puget Sound through an outfall located near the pump station. Between the years 2000 and 2007, there was an average of four such combined sewer overflows (CSOs) annually in the Barton basin. The average annual total CSO volume in the basin was 4.3 million gallons.

King County’s NPDES permit for the West Point Treatment Plant requires that the County implement controls to reduce CSOs in the Barton basin to an average of no more than one per year on a long-term average. To meet the CSO control standard, King County proposes to construct the Barton CSO Control Project.

The proposed project would consist of the installation of a system of bioretention/bioinfiltration facilities (“bioswales”) in West Seattle’s Sunrise Heights and Westwood neighborhoods. The bioswales would be installed in existing planting strips or new curb bulbs along the street over 32-64 half blocks (a half block is defined as half of a residential block, from the alley to the right-of-way). Curb bulbs, which would be created by extending bioswales into the street for a short distance, would be used to increase the bioswales’ infiltration and storage capacity. The exact size, location and number of bioswales required would be determined during design.

The bioswales would prevent and delay stormwater from entering the combined sewer system from the street right-of-way. Surface drainage that is currently routed to the combined sewer would be intercepted by the bioswales, where some of the runoff would infiltrate and some would be stored. This would reduce the volume and peak flow that enters the combined system and is conveyed to the downstream Barton Pump Station, thereby reducing CSOs from the basin.

12. Location of the proposal. Give sufficient information for a person to understand the precise location of your proposed project, including a street address, if any, and section, township, and range, if known. If a proposal would occur over a range of area, provide the range or boundaries of the site(s). Provide a legal description, site plan, vicinity map, and topographic map, if reasonably available. While you should submit any plans required by the agency, you are not required to duplicate maps or detailed plans submitted with any permit applications related to this checklist.
The project site includes public street rights-of-way in an approximately 200-acre residentially developed area in West Seattle’s Sunrise Heights and Westwood neighborhoods. The exact locations of bioswales in this area would be determined during design. The site is bound to the west by 34th Avenue SW, to the north by SW Othello Street, to the east by 29th Avenue SW, and to the south by SW Barton Street (see Vicinity Map). It is located in King County, Washington, in Sections 25 and 36, Township 24N, Range 3E.

Offsite staging areas would be identified by the construction contractor.

B. ENVIRONMENTAL ELEMENTS

1. Earth

a. General description of the site (circle one): Flat, rolling, hilly, steep slopes, mountainous, other __________.

The street rights-of-way where bioswales would be located are generally flat.

b. What is the steepest slope on the site? (approximate percent slope)?

Bioswales would not be installed in locations with a slope greater than five percent.

c. What general types of soils are found on the site? (for example, clay, sand, gravel, peat, muck)? If you know the classification of agricultural soils, specify them and note any prime farmland.

Based on a review of existing literature, the soils at the project site generally consist of very dense Vashon till overlain by a relatively thin layer of loose to medium dense recessional outwash or weathered topsoil zones. This relatively thin layer is typically between zero and two feet thick; however, locally, it may be 5-10 feet thick and may have as much as 25 feet of fill material placed over it. In the southeastern corner of the project site (near SW Barton Street and 29th Avenue SW), post-glacial depression deposits consist of a mixture of soft peat and loose to medium dense silt and sand.

d. Are there surface indications or history of unstable soils in the immediate vicinity? If so, describe.

According to City of Seattle environmentally critical areas maps, the project site contains one known landslide area near 34th Avenue SW and SW Henderson Street, steep slopes on the east side of 30th Avenue SW between SW Holden Street and SW Kenyon Street, and steep slopes on the east side of 29th between SW Cloverdale Street and SW Trenton Street. No bioswales would be installed near these areas.

e. Describe the purpose, type, and approximate quantities of any filling or grading proposed. Indicate source of fill.

The planting strips between existing curbs and sidewalks along 32-64 half blocks would be excavated and graded to create bioswales. In some areas, curb bulbs would be created to provide space for larger bioswales. The curb bulbs would be created by moving the curb out into the parking area of the roadway.
for a short distance. The bioswales would be approximately 10-15 feet wide and approximately 6-10 inches deep.

Excavation and fill volumes for the proposed project would depend on the number of half blocks over which bioswales were installed. Construction of the bioswales would require excavation of approximately 270-400 cubic yards (CY) of soil per half block area. The total excavation volume for the proposed project would be between approximately 13,000 CY and 17,000 CY. Excavated soils not used as backfill would be legally disposed of off-site at a location determined by the contractor. A total of approximately 9,000-11,000 CY of landscape bioretention soils would be brought to the site and used to supplement native soils.

f. Could erosion occur as a result of clearing, construction, or use? If so, generally describe.

Yes. Construction activities such as site grading and excavation, materials handling, and stockpiling could cause erosion on a short-term basis. Short-term erosion could also result from the exposure of stockpiled spoils and fill. However, the potential for erosion would be low because excavation depths would be shallow, open excavation areas would be limited, and erosion control measures would be implemented (see Section B.1.h).

Operation of the completed project would not result in any erosion.

g. About what percent of the site will be covered with impervious surfaces after project construction (for example, asphalt or buildings)?

Approximately 50 percent of the existing rights-of-way in the project area are covered with impervious surfaces. After the project is completed, there may be a reduction in the total impervious area by up to five percent due to the addition of curb bulbs at the end of the blocks. There would be no net increase in impervious surfaces on the project site as a result of this project.

h. Proposed measures to reduce or control erosion, or other impacts to the earth, if any:

Project construction activities would utilize construction-related best management practices (BMPs) such as temporary erosion and sediment control measures to minimize the potential for erosion and sedimentation. Typical BMPs that could be used include covering bare soil and stockpiles, using appropriate means to minimize tracking of sediment onto public roadways by construction vehicles, and restoring disturbed areas by replanting as soon as practical. Temporary erosion and sediment control measures would be identified in the project plans and specifications and would be implemented as required by the City of Seattle.

If curb bulbs were created for new bioswales, then the project could reduce the total amount of impervious surface in the project area by up to five percent.

2. Air

a. What types of emissions to the air would result from the proposal (i.e., dust, automobile emissions, odors, industrial wood smoke) during construction
and when the project is completed? If any, generally describe and give approximate quantities if known.

The primary source of air emissions would include fossil fuel combustion by-products from construction equipment and trucks used to haul material to and from the project site, and dust from the excavation activity.

A King County Greenhouse Gas Emissions Worksheet is attached.

b. Are there any off-site sources of emissions or odor that may affect your proposal? If so, generally describe.

No

c. Proposed measures to reduce or control emissions or other impacts to air, if any:

During construction, BMPs would be implemented to control dust. Types of BMPs that would be used include street sweeping, watering exposed soil surfaces, and covering soil stockpiles to help minimize the amount of fugitive dust and particulate pollution to the surrounding areas.

3. Water

a. Surface:

1) Is there any surface water body on or in the immediate vicinity of the site (including year-round and seasonal streams, saltwater, lakes, ponds, or wetlands)? If yes, describe type and provide names. If appropriate, state what stream or river it flows into.

No

2) Will the project require any work over, in, or adjacent to (within 200 feet) the described waters? If yes, please describe and attach available plans.

No

3) Estimate the amount of fill and dredge material that would be placed in or removed from surface water or wetlands and indicate the area of the site that would be affected. Indicate the source of fill material.

None

4) Will the proposal require surface water withdrawals or diversions? Give general description, purpose, and approximate quantities if known.

No

5) Does the proposal lie within a 100-year floodplain? If so, note location on the site plan.
No

6) **Does the proposal involve any discharges of waste materials to surface waters? If so, describe the type of waste and anticipated volume of discharge.**

No

b. **Ground:**

1) **Will ground water be withdrawn, or will water be discharged to groundwater? Give general description, purpose, and approximate quantities if known.**

Some of the runoff routed to the proposed bioswales would infiltrate and reach groundwater.

2) **Describe waste material that will be discharged into the ground from septic tanks or other sources, if any (for example: Domestic sewage; industrial, containing the following chemicals...; agricultural; etc.). Describe the general size of the system, the number of such systems, the number of houses to be served (if applicable), or the number of animals or humans the system(s) are expected to serve.**

Plants and bioretention soils in the bioswales would filter out pollutants in runoff that is routed to the bioswales.

c. **Water Runoff (including storm water):**

1) **Describe source of runoff (including storm water) and method of collection and disposal, if any (include quantities, if known). Where will this water flow? Will this water flow into other waters? If so, describe.**

The source of runoff during construction would be stormwater. During construction, this stormwater would continue to enter the combined sewer system and be conveyed to the West Point Treatment Plant for treatment, disinfection, and discharge to Puget Sound.

Following construction of the proposed project, stormwater that is currently directed along the curb and gutter system and into the combined sewer would be re-directed to the new bioswales through curb cuts. Some runoff would infiltrate into the ground through the bottom of the bioswales. When the rate of runoff that was being routed to a bioswale exceeded the infiltration capacity of the facility, the water would begin ponding within the bioswale. Once the ponding depth exceeded 10 inches, runoff would begin to overflow into a catch basin connected to the combined sewer system. Runoff beyond the capacity of the bioswales that entered the combined sewer system would be conveyed to the West Point Treatment Plant or Alki Wet Weather Treatment Facility for treatment, disinfection, and discharge to Puget Sound.

As is currently the case, if, during or immediately after a wet weather event, storm water and sanitary sewage flows exceeded the capacity of the
combined sewer system in the Barton basin, excess flows would be discharged to Puget Sound untreated through an existing outfall located next to the Barton Pump Station. The purpose of the proposed project is to reduce the frequency and volume of such discharges. The project is being designed to reduce CSOs in the Barton basin to an average of no more than one per year on a long-term average.

2) Could waste materials enter ground or surface waters? If so, generally describe.

Construction-related materials could enter ground or surface waters due to accidental spills, mechanical failures, or if construction activities are performed outside specified conditions.

See Section B.1.h and B.3.d for measures to minimize the potential for these impacts.

d. Proposed measures to reduce or control surface, ground and runoff impacts, if any:

Erosion and sedimentation control BMPs would be used during construction to reduce and control stormwater runoff impacts. Examples of typical BMPs that would be used during construction are presented in Section B.1.h.

Additional construction BMPs that could be implemented to prevent the introduction of contaminants into surface water or groundwater during construction include:

- maintaining spill containment and clean up materials in areas where equipment fueling is conducted;
- storing fuels and other potential contaminants away from excavation sites and surface waters in secured containment areas;
- conducting regular inspections, maintenance and repairs on fuel hoses, hydraulically operated equipment, lubrication equipment, and chemical/petroleum storage containers; and
- establishing a communication protocol for the unlikely event of a spill.

Because of variation in the distribution of permeable and relatively impermeable soils in the project area, increased groundwater levels due to infiltration at bioswales could result in changes to moisture levels in residential yards, basements, and crawl spaces on nearby properties. To reduce the risk of increased moisture levels in these areas, sites noted as having poor soils and/or poor drainage patterns would be considered infeasible locations for bioswales. Further, all bioswales would be located so that the basements of structures on adjacent properties would be outside of the zone of influence of water infiltrating through the bioswales.

The project itself is a measure to reduce surface water impacts. The purpose of the proposed project is to reduce the number of CSOs that are discharged to Puget Sound from the Barton basin. Additionally, plants and bioretention soils
in the bioswales would filter out pollutants in runoff that is routed to the bioswales.

4. Plants

   a. Check or circle types of vegetation found on the site:

   - XX deciduous tree
   - XX evergreen tree
   - XX shrubs
   - XX grass
   - pasture
   - XX crop or grain: home gardens in planting strips
   - _____ wet soil plants
   - _____ water plants:
   - _____ other types of vegetation

   Vegetation in the street rights-of-way where bioswales would be located consists primarily of grass.

   b. What kind and amount of vegetation will be removed or altered?

   Most of the existing vegetation in the bioswale locations would be removed. Some mature trees and shrubs would be left in place.

   c. List threatened or endangered species known to be on or near the site.

   None known

   d. Proposed landscaping, use of native plants, or other measures to preserve or enhance vegetation on the site, if any:

   The bioswales would be planted with native, drought tolerant herbaceous plants, shrubs, trees, and groundcovers. The bioswales would be designed by a landscape architect and plants would be selected by a horticulturalist.

   Temporary irrigation systems would be used during summer months for two years following construction to reduce plant mortality. Mulch would be replaced approximately once every three years or when necessary.

   Existing mature trees and shrubs located in the proposed bioswale locations would be left in place, if practicable. Residents would be encouraged to salvage other plants from planting strips prior to construction and relocate them.

5. Animals

   a. Circle any birds and animals which have been observed on or near the site or are known to be on or near the site:

   birds: hawk, heron, eagle, **songbirds**, other:

   mammals: deer, bear, elk, beaver, other: **domestic cats and dogs, squirrels, rodents**
fish: bass, salmon, trout, herring, shellfish, other:

b. List any threatened or endangered species known to be on or near the site.

The following species are listed under the federal Endangered Species Act (ESA) and may occur in the vicinity of the site.

<table>
<thead>
<tr>
<th>Common Name</th>
<th>Scientific Name</th>
<th>ESA Status</th>
<th>Jurisdiction</th>
</tr>
</thead>
<tbody>
<tr>
<td>Puget Sound ESU Chinook Salmon</td>
<td>Oncorhynchus tshawytscha</td>
<td>T</td>
<td>NMFS</td>
</tr>
<tr>
<td>Puget Sound DPS Steelhead</td>
<td>Oncorhynchus mykiss</td>
<td>T</td>
<td>NMFS</td>
</tr>
<tr>
<td>Coastal-Puget DPS Bull Trout</td>
<td>Salvelinus confluentus</td>
<td>T</td>
<td>USFWS</td>
</tr>
<tr>
<td>Marbled Murrelet</td>
<td>Brachyramphus marmoratus</td>
<td>T</td>
<td>USFWS</td>
</tr>
</tbody>
</table>

ESU = Evolutionarily Significant Unit  
DPS = Distinct Population Segment  
T = Threatened  
NMFS = National Marine Fisheries Service  
USFWS = United States Fish and Wildlife Service

The proposed project is not expected to affect any of these species. No in-water work is proposed as part of the project.

c.  Is the site part of a migration route? If so, explain.

The entire Puget Sound area is part of the Pacific flyway migration route.

d. Proposed measures to preserve or enhance wildlife, if any:

Erosion and sedimentation control measures (see Section B.1.h) and measures to prevent the introduction of contaminants into surface water or groundwater (see Section B.3.d) would be implemented during construction.

The project itself is a measure to minimize potential impacts on wildlife. Construction of the proposed project would reduce the volume of untreated sanitary sewage and stormwater that is discharged to Puget Sound from the Barton basin, thereby reducing the potential for related adverse effects on aquatic life.

6. Energy and Natural Resources

a. What kinds of energy (electric, natural gas, oil, woodstove, solar) will be used to meet the completed project's energy needs? Describe whether it will be used for heating, manufacturing, etc.

Temporary project energy needs would be limited to those required to operate construction equipment. Construction equipment would use fossil fuels.

The completed project would require infrequent use of fossil fuels for vehicles traveling to the site for maintenance.

b. Would your project affect the potential use of solar energy by adjacent properties? If so, generally describe.
c. What kind of energy conservation features are included in the plans of this proposal? List other proposed measures to reduce or control energy impacts, if any:

None

7. Environmental Health

a. Are there any environmental health hazards, including exposure to toxic chemicals, risk of fire and explosion, spill, or hazardous waste, that could occur as a result of this proposal? If so, describe.

Potential exposure to construction-related materials such as fuel and hydraulic fluid could occur as the result of accidental spills, mechanical failures, or if the construction activities deviate from the project construction specifications or permit conditions.

1) Describe special emergency services that might be required.

None

2) Proposed measures to reduce or control environmental health hazards, if any:

Section B.3.d discusses typical BMPs that could be implemented to prevent spills of contaminants and minimize exposure to environmental health hazards in the event of a spill.

The project itself is a measure to reduce environmental health hazards. Installation of the proposed bioswales would reduce the risk of CSOs, which can present a public health hazard.

b. Noise

1) What types of noise exist in the area which may affect your project (for example: traffic, equipment, operation, other)?

Noise in the project area would not affect the proposed project.

2) What types and levels of noise would be created by or associated with the project on a short-term or a long-term basis (for example: traffic, construction, operation, other)? Indicate what hours noise would come from the site.

Construction of the proposed project would create a new, temporary source of noise in the project area that would be audible to nearby residences, churches and schools. Construction-related noise would include engine and mechanical and scraping noises associated with the use of heavy equipment such as dump trucks, excavators, jackhammers, and graders. These types of equipment typically generate noise in the range of
80-90 dBA at a distance of 50 feet. Hauling activities to and from the project site would contribute to traffic noise.

Construction activity would take place during daytime hours. It is anticipated that nighttime construction activity would not be required.

Operation of the proposed project would not generate noise.

3) Proposed measures to reduce or control noise impacts, if any:

During construction, all activities would be performed consistent with the City of Seattle’s Noise Control Ordinance. All impacts from noise generated by construction would be short-term and temporary in nature and would not constitute a substantial effect on the surrounding land uses. Construction BMPs would be used to minimize construction noise. Examples of BMPs that could be used include shutting off equipment when not in use, using effective vehicle mufflers, creating a 24-hour construction hotline to promptly respond to questions and complaints, and notifying residences in advance of project construction scheduling and phasing.

8. Land and Shoreline Use

a. What is the current use of the site and adjacent properties?

The project would take place in the public right-of-way, which includes paved roadways and vegetated planting strips between existing curbs and sidewalks. Adjacent properties are generally single family residences.

b. Has the site been used for agriculture? If so, describe.

No

c. Describe any structures on the site.

The proposed bioswale locations currently contain subsurface storm drain inlets and catch basins, light posts, water meters, hydrants, and sidewalks. Structures adjacent to the bioswale locations include single-family houses and potentially two schools located in the project area.

d. Will any structures be demolished? If so, what?

Subsurface storm drain facilities, light posts, water meters, and hydrants could be moved, if necessary, to construct the proposed project.

e. What is the current zoning classification of the site?

The proposed bioswales would be located in public right-of-way. The zoning classification of the project area is Single-Family Residential (SF 5000, SF 7200).

f. What is the current comprehensive plan designation of the site?
The current comprehensive plan designation of the project area is Single-Family Residential.

g. If applicable, what is the current shoreline master program designation of the site?

Not applicable

h. Has any part of the site been classified as an "environmentally sensitive" area? If so, specify.

According to City of Seattle environmentally critical areas maps, the project site contains one known landslide area near 34th Avenue SW and SW Henderson Street, steep slopes on the east side of 30th Avenue SW between SW Holden Street and SW Kenyon Street, and steep slopes on the east side of 29th between SW Cloverdale Street and SW Trenton Street. The project is not expected to impact these areas.

i. Approximately how many people would reside or work in the completed project?

None

j. Approximately how many people would the completed project displace?

None

k. Proposed measures to avoid or reduce displacement impacts, if any:

None proposed

l. Proposed measures to ensure the proposal is compatible with existing and projected land uses and plans, if any:

The proposed project would not change existing land uses or preclude projected land uses.

Compliance with the City of Seattle’s permitting requirements would help ensure that the proposal is compatible with existing and projected land uses.

9. Housing

a. Approximately how many units would be provided, if any? Indicate whether high, middle, or low-income housing.

None

b. Approximately how many units, if any, would be eliminated? Indicate whether high, middle, or low-income housing.

None

c. Proposed measures to reduce or control housing impacts, if any:
None needed

10. Aesthetics
   a. What is the tallest height of any proposed structure(s), not including antennae; what is the principal exterior building material(s) proposed?

      No new structures are proposed.

   b. What views in the immediate vicinity would be altered or blocked?

      The proposed project would not alter or block any views.

   c. Proposed measures to reduce or control aesthetic impacts, if any:

      The proposed bioswales would be designed by a landscape architect. They would enhance the appearance of the right-of-way by creating a green-belt effect.

11. Light and Glare
   a. What type of light or glare will the proposal produce? What time of day would it mainly occur?

      Temporary lighting may be used at the beginning and end of work days when daylight hours are short. No nighttime construction is anticipated.

      The completed project would not produce any light or glare.

   b. Could light and glare from the finished project be a safety hazard or interfere with views?

      No

   c. What existing off-site sources of light or glare may affect your proposal?

      None

   d. Proposed measures to reduce or control light and glare impacts, if any:

      None

12. Recreation
   a. What designated and informal recreational opportunities are in the immediate vicinity?

      There are no parks or public open spaces in the project area. However, several parks and community centers are located nearby. E.C. Hughes Playground, a 6.3-acre park with a playground, wading pool, and sport fields, is located one block east of the project area between SW Holden and SW Kenyon Streets. The Southwest Community Center and Pool is located two blocks east of the project area on SW Thistle Street. Roxhill Park, a 13-acre park with a playground, sports fields, and picnic facilities, is located one block southeast of the project...
area on SW Roxbury Street. An outdoor play area associated with Westside School is located in the project area on 34th Avenue SW between SW Holden and SW Kenyon Streets.

Informal recreational opportunities in the project area include walking, jogging and bike riding on streets and sidewalks.

b. Would the proposed project displace any existing recreational uses? If so, describe.

The proposed project would not permanently displace any recreational uses.

During construction, informal recreational use of streets and sidewalks would be temporarily displaced because some sidewalks and street lanes would be temporarily closed (see Section B.14.g).

c. Proposed measures to reduce or control impacts on recreation, including recreation opportunities to be provided by the project or applicant, if any:

King County would provide advance notification of construction activities, including sidewalk and street lane closures, to nearby residents. Advance notification would include posting signage at the site and written notification. The notification would include the name and phone number of the King County staff to be contacted regarding questions or concerns about construction activity.

13. Historic and Cultural Preservation

a. Are there any places or objects listed on, or proposed for, national, state or local preservation registers known to be on or next to the site? If so, generally describe.

A preliminary assessment of archaeological and historical resources in the Barton basin was completed for the proposed project in October 2009. The assessment identified the Gatewood Substation, which is located near the intersection of 35th Avenue SW and SW Holden Street. The Gatewood Substation is listed on the Seattle Historic Inventory. The proposed project is not expected to impact this building.

b. Generally describe any landmarks or evidence of historic, archaeological, scientific or cultural importance known to be on or next to the site.

The preliminary archaeological and historical resources assessment completed for the proposed project in October 2009 identified the entire project site as having a low probability for archaeological resources.

c. Proposed measures to reduce or control impacts, if any:

The proposed project would comply with the requirements of the National Historic Preservation Act. This would include the completion of a cultural resources survey at the project site. If artifacts were uncovered during excavation, work would be stopped pending notification of and response from appropriate agencies.

14. Transportation
a. **Identify public streets and highways serving the site, and describe proposed access to the existing street system. Show on site plans, if any.**

The proposed project would take place within the rights-of-way of public streets in the project area. These streets provide access to and connect with the major arterials of 35th Avenue SW or Delridge Way SW.

b. **Is site currently served by public transit? If not, what is the approximate distance to the nearest transit stop?**

Yes. The project area is served by King County Metro Transit bus route 22 along SW Thistle Street and route 21 along 35th Avenue SW.

c. **How many parking spaces would the completed project have? How many would the project eliminate?**

During construction, on-street parking may be temporarily restricted to one side of the street and certain zones within a block may have no parking. As a result, residents and visitors may have to park one to two blocks from their destination. The temporary loss of on-street parking spaces would be experienced on the block or blocks under active construction at any given time and last for approximately six weeks.

The completed project would not create any parking spaces. The completed project may result in the permanent elimination of up to two parking spaces per block in locations where curb bulbs are created.

d. **Will the proposal require any new roads or streets, or improvements to existing roads or streets, not including driveways? If so, generally describe (indicate whether public or private).**

Most of the proposed bioswales would be located in planting strips between existing curbs and sidewalks. In locations were curb bulbs were created, new approximately 25-foot-long sections of curb would be constructed in the adjacent public street to expand the width of the planting strip by approximately five feet. This would reduce the width of the travelled right-of-way.

e. **Will the project use (or occur in the immediate vicinity of) water, rail, or air transportation? If so, generally describe.**

No

f. **How many vehicular trips per day would be generated by the completed project? If known, indicate when peak volumes would occur.**

The number of truck trips required for construction of the proposed project would depend on the number of half blocks on which bioswales were installed. Between approximately 2,700 and 5,300 one-way truck trips would be required over the entire project area. It is anticipated that the peak number of one-way truck trips during construction in a half block area would be approximately 20 per day.
Routine inspection and maintenance of the completed project is not expected to impact traffic in the area. It would generate between approximately four and eight one-way truck trips per month for each half block area.

g. Proposed measures to reduce or control transportation impacts, if any:

Temporary localized traffic impacts would occur in the project area during construction of the proposed project. The bioswales would be constructed on a block-by-block basis and progress through the project area. It is estimated that a one- to two-block area would be under construction at any one time and that construction in that area would last for approximately six weeks. It is not anticipated that any streets would be closed during construction, but traffic may be temporarily restricted to one lane and sections of sidewalk would be closed. Construction could result in temporary and minimal access restrictions to individual residences.

Construction of the proposed project would require a street use right-of-way permit from the City of Seattle. Permit conditions would require a traffic control plan to be submitted and approved prior to commencing construction activities. The plan’s goal would be to provide safe work areas and to minimize congestion. The plan would include the locations of traffic control devices and signage. It would include measures to address residential access, emergency vehicle access, road closures and detours, temporary bus route changes, and pedestrian safety. Potential measures that could be implemented include: protective barriers, fences, flaggers, foot and/or vehicle bridges, and steel plating.

King County would provide advance notification of construction activity to all residents adjacent to the construction area. The notification would include the name and phone number of the individual at King County to be contacted regarding questions or concerns about construction activity.

15. Public Services

a. Would the project result in an increased need for public services (for example: fire protection, police protection, health care, schools, other)? If so, generally describe.

No

b. Proposed measures to reduce or control direct impacts on public services, if any:

The contractor would be required to maintain access to residences by fire, emergency medical technician, and police vehicles and personnel at all times during construction.

16. Utilities

a. Circle the utilities currently available at the site: electricity, natural gas, water, refuse service, telephone, sanitary sewer, septic system, other.
b. Describe the utilities that are proposed for the project, the utility providing the service, and the general construction activities on the site or in the immediate vicinity which might be needed.

The completed project would use water provided by the City of Seattle to irrigate plants during summer months for the first two years.

Utilities located in planting strips where bioswales would be located would most likely need to be relocated to construct the proposed project. This could cause temporary, short-term disruption of some utility service to some residences.

C. SIGNATURE

The above answers are true and complete to the best of my knowledge. I understand that the lead agency is relying on them to make its decision.

Signature: Wesley Sprague
Date Submitted: 5/3/11
Location Feasibility Diagram

Layout of Rain Garden Cells on a Typical Block

Typical Cross-Sections

Typical Planting Strip

Before Rain Garden Installation

After
### King County Greenhouse Gas Emissions Worksheet—Barton CSO Control Project

#### Section I: Buildings

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<tr>
<th>Type (Residential) or Principal Activity (Commercial)</th>
<th># Units</th>
<th>Square Feet (in thousands of square feet)</th>
<th>Embodied</th>
<th>Energy</th>
<th>Transportation</th>
<th>Lifespan Emissions (MTCO2e)</th>
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#### Section II: Pavement

| Pavement                                             | 1.00    |                                          |          |        |        | 50                          |

**Total Project Emissions:** 50

**Note:** The proposed project consists of the installation of rain gardens in existing planting strips and new curb bulbs in public right-of-way.
No comments were received on the State Environmental Policy Act Determination of Nonsignificance that was issued for the Barton Combined Sewer Overflow Control Project on May 12, 2011.
Re: Advertiser Account #66257505
Ad #: 796616900

Affidavit of Publication

4123067 / 1

STATE OF WASHINGTON
Counties of King and Snohomish

The undersigned, on oath states that he/she is an authorized representative of The Seattle Times Company, publisher of The Seattle Times of general circulation published daily in King and Snohomish Counties, State of Washington. The Seattle Times has been approved as a legal newspaper by orders of the Superior Court of King and Snohomish Counties.

The notice, in the exact form annexed, was published in the regular and entire issue of said paper or papers and distributed to its subscribers during all of the said period.

<table>
<thead>
<tr>
<th>Newspaper</th>
<th>Publication Date</th>
</tr>
</thead>
<tbody>
<tr>
<td>The Seattle Times</td>
<td>04/28/11, 05/05/11</td>
</tr>
</tbody>
</table>

Subscribed and sworn to before me on May 6, 2011

Marilyn Peredo

Maureen E. Duggan

Maureen E. Duggan

Notary Public in and for the State of Washington, residing at Seattle
NOTICE OF ISSUANCE - DETERMINATION OF NONSIGNIFICANCE.

Notice is hereby given that on April 28, 2011, the King County Wastewater Treatment Division (WTD) issued a State Environmental Policy Act (SEPA) Determination of Nonsignificance (DNS) for the Murray Combined Sewer Overflow (CSO) Control Project. The project involves constructing a wastewater storage tank and ancillary equipment facility on private properties that would be acquired by King County. The properties are located across Beach Drive SW from Lowman Beach Park in West Seattle.

The project would also include construction of an underground diversion structure next to WTD's existing Murray Pump Station in Lowman Beach Park. The purpose of the project is to reduce CSOs from the Murray basin.

Comments will be accepted on this project until 5 p.m. on May 16, 2011. Send comments to Wesley Sprague, Supervisor, Community Services and Environmental Planning, King County Wastewater Treatment Division; 201 S. Jackson St., MS: KSC-NR-0505, Seattle, WA 98104-3855. The Director of King County Department of Natural Resources and Parks, consistent with King County Public Rule 7-4-1, Section 6.2.14, and RCW 43.21C.240, has determined that the environmental impacts identified in the SEPA environmental checklist for the Murray CSO Control Project will be adequately addressed by the development regulations and other applicable requirements of the City of Seattle and by all other applicable state and federal regulations referred to in the environmental checklist for the Murray CSO Control Project. Therefore, no administrative appeal of issuance of the DNS will be allowed for the Murray CSO Control Project. The rule may be viewed at http://www.kingcounty.gov/operations/policies/rules/utilities/pub741pr.aspx. For a copy of the SEPA DNS and environmental checklist, King County Public Rule PUT-7-4-1, or more information contact Sue Meyer, Water Quality Planner, at 206-684-1171 or sue.meyer@kingcounty.gov.
AFFIDAVIT OF PUBLICATION

STATE OF WASHINGTON
COUNTY OF KING

Idella E. Gabler, being first duly sworn on oath, deposes and says: That she is the Principal Clerk of the West Seattle Herald, White Center News, Ballard News Tribune, Highline Times, Des Moines News, and Federal Way News weekly Newspapers, which is now and at all times herein mentioned, has been published and printed in the office maintained at the place of publication at Seattle, King County, Washington; That by order of the Superior Court of the state of Washington, In and for King County, said newspaper is now, and at all times mentioned herein, has been approved as a legal newspaper for the publication of any advertisement, notice, summons, report, proceedings, or other official document required by law to be published; That said newspaper is published regularly, at least once a week, in the English language, as a newspaper of general circulation in the Seattle area, King County, Washington, and at the time of application for approval by the aforementioned Superior Court, was published at least six months prior to the date of said application.

That the annexed is a true copy of a NOTICE OF ISSUANCE DETERMINATION OF NONSIGNIFICANCE, as it was published in regular issues of said newspaper each week for a period of ONE consecutive week(s), commencing on the 6th day of May 2011, and ending on the 6th day of May 2011, inclusive; and that said newspaper was regularly distributed to its subscribers, as a newspaper of general circulation during all of said period.

That the full amount of the fee charged for the foregoing publication is the sum of $ 85.00

Idella E. Gabler

Subscribed and sworn to before me this 6th day of May, 2011.

D. M. Smith
Notary Public
State of Washington
My Commission Expires November 22, 2014
AFFIDAVIT OF PUBLICATION
STATE OF WASHINGTON  )
COUNTY OF KING  ) ss.

Idella E. Gabler, being first duly sworn on oath, deposes
and says: That she is the Principal Clerk of the West Seattle
Herald, White Center News, Ballard News Tribune, Highline
Times, Des Moines News, and Federal Way News weekly
Newspapers, which is now and at all times herein mentioned, has
been published and printed in the office maintained at the place of
publication at Seattle, King County, Washington; That by order of
the Superior Court of the state of Washington, In and for King
County, said newspaper is now, and at all times mentioned herein,
has been approved as a legal newspaper for the publication of any
advertisement, notice, summons, report, proceedings, or other
official document required by law to be published; That said
newspaper is published regularly, at least once a week, in the
English language, as a newspaper of general circulation in the
Seattle area, King County, Washington, and at the time of
application for approval by the aforementioned Superior Court, was
published at least six months prior to the date of said application.

That the annexed is a true copy of a KING COUNTY
WASTEWATER TREATMENT NOTICE OF ISSUANCE, as it
was published in regular issues of said newspaper each week for a
period of ONE consecutive week(s), commencing on the 29th day of
April 2011, and ending on the 30th day of April 2011, inclusive; and
that said newspaper was regularly distributed to its subscribers, as a
newspaper of general circulation during all of said period.

That the full amount of the fee charged for the foregoing
publication is the sum of $ 85.00

Idella E. Gabler

Subscribed and sworn to before me this 29th day of April, 2011.

D. M. Smith
NOTARY PUBLIC, in and for the state of Washington
My commission expires: 11/22/2014
DETERMINATION OF NONSIGNIFICANCE

TITLE OF PROPOSAL: Murray Combined Sewer Overflow Control Project

DESCRIPTION OF PROPOSAL: To meet the combined sewer overflow (CSO) control standard of the National Pollutant Discharge Elimination System permit for the West Point Treatment Plant, the King County Wastewater Treatment Division proposes to construct a wastewater storage tank and ancillary equipment facility on private property that would be acquired by King County and an underground diversion structure next to King County’s existing Murray Pump Station in Lowman Beach Park. Property acquisition and site demolition would take place between late 2011 and mid-2012. Construction of the proposed CSO control facilities would begin in the first half of 2013 and take approximately two and one-half years to complete.

LOCATION OF PROPOSAL, INCLUDING STREET ADDRESS, IF ANY: The project site would include the six parcels and adjacent public right-of-way across Beach Drive SW from Lowman Beach Park (the storage tank site), the southeastern corner of Lowman Beach Park, and the adjacent portion of Beach Drive SW. The street address of the Murray Pump Station in Lowman Beach Park is 7015 Beach Drive SW. It is located in the City of Seattle, which is in King County, Washington. The project site is located in Section 26, Township 24N, Range 3E.

SEPA Responsible Official: Pam Elardo, P.E.

Position/Title: Director, King County Wastewater Treatment Division

Address: 201 South Jackson Street, MS KSC-NR-0501
Seattle, WA 98104-3855

Date: 4/26/11

Proponent and Lead Agency: King County Department of Natural Resources and Parks
Wastewater Treatment Division

Contact Person: Sue Meyer, Water Quality Planner
King County Wastewater Treatment Division
201 South Jackson Street, MS KSC-NR-0505
Seattle, WA 98104
phone: 206-684-1171; e-mail: sue.meyer@kingcounty.gov

Issue Date: April 28, 2011

The State Environmental Policy Act (SEPA) lead agency for this proposal has determined that it does not have a probable significant adverse impact on the environment. An environmental impact statement is not required under RCW 43.21C.030(2)(c). This decision was made after review of a completed environmental checklist and other information on file with the lead agency. This information is available to the public on request.

This Determination of Nonsignificance (DNS) is issued under WAC 197-11-340 (2); the lead agency will not act on this proposal for 17 days from the issue date. Comments must be submitted by May 16, 2011. Submit comments to Wesley Sprague, Supervisor, Community Services and Environmental Planning, King County Wastewater Treatment Division, 201 South Jackson Street, MS KSC-NR-0505, Seattle, WA 98104-3855.

The Director of King County Department of Natural Resources and Parks, consistent with King County Public Rule 7-4-1, Section 6.2.14 and RCW 43.21C.240, has determined that the environmental impacts identified in the SEPA environmental checklist for the Murray CSO Control Project will be adequately addressed by the development regulations and other applicable requirements of the City of Seattle and by all other applicable state and federal regulations referred to in the environmental checklist for the Murray CSO Control Project. Therefore, no administrative appeal of issuance of the DNS will be allowed for the Murray CSO Control Project. The rule may be viewed at http://www.kingcounty.gov/operations/policies/rules/utilities/put741pr.aspx, or contact Sue Meyer, Water Quality Planner, at 206-684-1171 or sue.meyer@kingcounty.gov to obtain a copy of the rule.

[Statutory authority: RCW 43.21C.110. 84-05-020 (Order DE 83-39), §197-11-970, filed 2/10/84, effective 4/4/84.]
Environmental Checklist

for the

Murray Combined Sewer Overflow Control Project

April 13, 2011

Prepared in compliance with the State Environmental Policy Act (SEPA) (RCW 43.21C), the SEPA Rules (WAC 197-11), and Chapter 20.44 King County Code, implementing SEPA in King County procedures.

This information is available in accessible formats upon request at 206-684-1280 (voice) or 711 (TTY).
ENVIRONMENTAL CHECKLIST

A. BACKGROUND

1. Name of proposed project, if applicable:
   Murray Combined Sewer Overflow Control Project

2. Name of applicant:
   King County Wastewater Treatment Division (WTD), Department of Natural Resources and Parks (DNRP)

3. Address and phone number of applicant and contact person:
   King County Wastewater Treatment Division
   201 South Jackson Street, MS: KSC-NR-0505
   Seattle, WA 98104-3855
   CONTACT:
   Sue Meyer, Water Quality Planner, telephone: 206-684-1171, email: sue.meyer@kingcounty.gov

4. Date checklist prepared:
   April 13, 2011

5. Agency requesting checklist:
   King County Wastewater Treatment Division, Department of Natural Resources and Parks

6. Proposed timing or schedule (including phasing, if applicable):
   The proposed project would be completed in two phases.

   The first phase would include King County acquisition of the private properties on which the proposed combined sewer overflow (CSO) control facility would be constructed; clearing of the site, which would include demolition of six existing residential buildings; and stabilization of the site. It is expected that the private properties located on the proposed CSO storage tank site would be acquired by King County and the residents would be relocated between late 2011 and mid-2012. After the sites were vacated, the buildings would be demolished and the site stabilized in preparation for construction. The buildings may be boarded up prior to demolition.

   During the time that the proposed storage tank site was temporarily vacated (the time between demolition and construction), the County would implement measures to ensure that the site is safe. The County would also make temporary aesthetic improvements to the site. These would be discussed with the community during design.

   The second phase would include construction of the proposed CSO control facilities, as described in Section A.11. This work is expected to begin in the first half of 2013 and take approximately two and one-half years to complete.
7. **Do you have any plans for future additions, expansions, or further activity related to or connected with this proposal? If yes, explain.**

The existing underground Murray Pump Station structure and equipment would continue to be maintained and upgraded as necessary, but there are no plans for future expansion of the pump station’s footprint. Key components of the previously planned Murray Pump Station Upgrade Project, including the installation of a new odor control system and standby power generator, would no longer be required after the proposed project is completed. The odor control equipment and standby power generator in the proposed ancillary equipment facility would function for the Murray Pump Station as well as the CSO storage facility.

8. **List any environmental information you know about that has been prepared, or will be prepared, directly related to this proposal.**

Phase I Environmental Site Assessment—Murray Avenue Pump Station, 7015 Beach Drive SW, Seattle, WA, Herrera Environmental Consultants, Inc., March 4, 2004

Archaeological and Historical Resources in the Murray Sub-Basin, Seattle, Washington, Cascadia Archaeology, October 26, 2009


Environmental Conditions Technical Memorandum, Murray Basin, Puget Sound CSO Project, E00022E06, ESA Adolfson, April 23, 2010


Draft Barton and Murray Combined Sewer Overflow Control Facilities Plan, Tetra Tech, Inc, and Carollo Engineers, February 2011. This report will be finalized and submitted to Ecology for approval by July 2011.

Murray CSO Control Project Biological Assessment, ESA Adolfson, March 2011

Murray CSO Control Project Biological Assessment—Letter of “No Effect”, ESA Adolfson, March 31, 2011

Earth Technical Memorandum, Barton and Murray Combined Sewer Overflow Control Projects, ESA Adolfson, April 8, 2011

Environmental Justice Technical Memorandum, Barton and Murray Combined Sewer Overflow Control Projects, ESA Adolfson, April 8, 2011

Noise Technical Memorandum, Barton and Murray Combined Sewer Overflow Control Projects, ESA Adolfson, April 8, 2011

Recreation Technical Memorandum, Barton and Murray Combined Sewer Overflow Control Projects, ESA Adolfson, April 8, 2011

Traffic Technical Memorandum, Barton and Murray Combined Sewer Overflow Control Projects, ESA Adolfson, April 8, 2011
Additional environmental information that will be prepared for the proposed project includes reports summarizing the findings of a cultural resources survey, subsurface geotechnical investigations, and a Phase II Environmental Site Assessment that have been or will be performed in the project area.

9. **Do you know whether applications are pending for governmental approvals of other proposals directly affecting the property covered by your proposal? If yes, explain.**

   None known

10. **List any government approvals or permits that will be needed for your proposal, if known.**

    Government approvals or permits that may be needed for the proposed Murray CSO Control Project include:

    **City of Seattle**

    *Department of Planning and Development:*
    - Master Use Permit (includes Shoreline Substantial Development Permit)
    - Noise Variance Permit

    *Department of Transportation:*
    - Street Use: Major Utility Permit or Street Improvement Permit
    - Street Use Permit

    *Parks and Recreation:*
    - Revocable Use Permit

    **King County**
    - Industrial Waste Permit

    **Puget Sound Clean Air Agency**
    - Air Quality Permit

    **Washington State Department of Ecology**
    - National Pollutant Discharge Elimination System (NPDES) Construction Stormwater General Permit
    - Underground Storage Tank Notification
    - State Environmental Review Process

11. **Give brief, complete description of your proposal, including the proposed uses and the size of the project and site. There are several questions later in this checklist that ask you to describe certain aspects of your proposal. You do not need to repeat those answers on this page. (Lead agencies may modify this form to include additional specific information on project description).**
King County’s Murray Pump Station receives flows of combined sanitary sewage and stormwater from two sources: flows collected in the Murray wastewater basin and flows received from the upstream Barton Pump Station. Both of these sources are located in West Seattle on Puget Sound. The approximately 1,000-acre Murray basin drains to the Murray Pump Station located in Lowman Beach Park. Dry weather flows pumped from the Murray Pump Station are conveyed to the West Point Treatment Plant in the City of Seattle’s Magnolia neighborhood for treatment, disinfection and discharge to Puget Sound. Under peak flow conditions, some of the flow pumped from the Murray Pump Station receives primary treatment at the Alki Wet Weather Treatment Facility and is then discharged to Puget Sound.

The Murray Pump Station has the capacity to convey a peak flow rate of 31.5 million gallons per day (MGD). When heavy rains cause flows in the basin to exceed the capacity of the pump station, a combination of stormwater and diluted sewage is discharged to Puget Sound through an outfall located near the pump station. Between the years of 2000 and 2007, there was an average of five such CSOs annually in the Murray basin. The average annual total combined sewer overflow volume for the basin was 5.2 million gallons. King County’s current National Pollutant Discharge Elimination System (NPDES) permit for the West Point Treatment Plant requires that the County implement controls to reduce CSOs in the Murray basin to an average of no more than one per year on a long-term average.

To meet the CSO control standard, King County proposes to construct the Murray CSO Control Project. The proposed project would involve the construction of a new approximately one-million-gallon storage tank, diversion structure, and ancillary equipment facility (see attached Site Layout Plan). Prior to constructing the storage tank, King County would acquire the six private properties on which it would be located and demolish all existing structures on the properties. The site would then be stabilized in preparation for construction of the storage tank. The properties, which are located across Beach Drive SW from Lowman Beach Park, are currently in private ownership and contain one single-family and five multi-family residential buildings. Adjacent public right-of-way to the west (Beach Drive SW) and south of the proposed tank site would be used for construction staging.

The underground diversion structure would be constructed next to WTD’s existing underground Murray Pump Station in Lowman Beach Park and would direct wet weather flows exceeding the capacity of the pump station to the storage tank through a new 48-inch-diameter influent pipeline. The underground tank would be located across Beach Drive SW from the pump station. It would consist of five approximately 15-foot-wide, 20-foot-high cells ranging in length from 60 to 180 feet. A retaining wall would be constructed along the eastern edge of the tank site to stabilize and protect the existing hillside. The tank would store up to approximately one million gallons of peak flow until system capacity was available. Stored flow would then be pumped back into the local combined sewer system or the diversion structure through a new approximately 12- to 18-inch-diameter effluent pipeline and eventually discharged to the Murray Pump Station wet well.

An above grade approximately 4,900-square-foot one-story (about 15 feet) tall ancillary equipment facility would be constructed on top of the storage tank site to serve the CSO control facility. It would house electrical control panels and motor control centers, an odor control system and standby power generator that would serve both the storage tank and the Murray Pump Station, an approximately 2,000-gallon diesel fuel storage tank for the generator, a ventilation system, and a utility water system.
In addition to achieving the CSO control standard for the Murray basin, the proposed project would reduce the likelihood of wastewater overflows to Puget Sound during power outages at the Murray Pump Station and CSO storage facility, reduce releases of odorous air from the pump station, and improve air quality inside of the pump station. This is because the proposed new standby power generator and odor control facility would function for the Murray Pump Station as well as the CSO storage facility.

12. Location of the proposal. Give sufficient information for a person to understand the precise location of your proposed project, including a street address, if any, and section, township, and range, if known. If a proposal would occur over a range of area, provide the range or boundaries of the site(s). Provide a legal description, site plan, vicinity map, and topographic map, if reasonably available. While you should submit any plans required by the agency, you are not required to duplicate maps or detailed plans submitted with any permit applications related to this checklist.

The project site would include the six parcels and adjacent public right-of-way across Beach Drive SW from Lowman Beach Park (the “storage tank site”), the southeastern corner of Lowman Beach Park, and the adjacent portion of Beach Drive SW. The street address of the Murray Pump Station in Lowman Beach Park is 7015 Beach Drive SW. It is located in the City of Seattle, which is in King County, Washington (see attached Vicinity Map). The project site is located in Section 26, Township 24N, Range 3E.

Offsite staging areas would be identified by the construction contractor.

B. ENVIRONMENTAL ELEMENTS

1. Earth

   a. **General description of the site (circle one):** Flat, rolling, hilly, steep slopes, mountainous, other: gentle slopes

      The ground in Lowman Beach Park and Beach Drive SW rises gently to the east and north, respectively. The footprint of the proposed storage tank site contains gentle slopes, but is bordered by very steep slopes to the northeast, east, and southeast. To construct the storage tank, excavation would be required near the toes of these steep slopes.

   b. **What is the steepest slope on the site? (approximate percent slope)?**

      The slopes bordering the storage tank site exceed 40 percent.

   c. **What general types of soils are found on the site? (for example, clay, sand, gravel, peat, muck)?** If you know the classification of agricultural soils, specify them and note any prime farmland.

      Based on a review of existing literature, the soils at the project site generally consist of an approximately 7- to 12-foot-deep layer of sand and gravel fill that overlies approximately 10-30 feet of very loose to medium dense alluvium (sands and gravels). The alluvium contains organic materials in its matrices, and soft peat layers that were deposited after the disappearance of the last glacial ice.
These soils are underlain at depths of 21-40 feet by medium dense to very dense recessional outwash consisting of sand and gravel.

d. **Are there surface indications or history of unstable soils in the immediate vicinity? If so, describe.**

City of Seattle environmentally critical areas maps identify known landslide areas in the vicinity of the project site and potential landslide areas on the properties adjacent to and southeast of the storage tank site. Additionally, Lowman Beach Park is identified by the City of Seattle as a liquefaction prone area.

e. **Describe the purpose, type, and approximate quantities of any filling or grading proposed. Indicate source of fill.**

During demolition of the six buildings on the storage tank site, approximately 100 cubic yards (CY) of soil and 800 CY of building materials (e.g., concrete, wood) would be exported from the site. Up to approximately 50 CY of soil would be imported as fill and placed in voids left by the removal of heating oil tanks and building foundations, if the foundations were removed. Building foundations may be temporarily left in place to stabilize the site until construction of the storage tank begins. Part of the site may be graded and temporary erosion control and stabilization best management practices (BMPs) may be implemented (e.g., seeding or hay bales) until construction activities begin.

Before the storage tank was constructed, an approximately 230-foot-long and 12-foot-tall retaining wall would be installed to protect the existing hillside along the northeast, east, and south edges of the storage tank site.

During construction of the storage tank, diversion structure, and influent and effluent pipelines, a total of approximately 14,000 CY of soil would be excavated, as described below. Excavation in Lowman Beach Park would account for approximately 1,000 CY of the total excavation volume.

The proposed storage tank would be constructed on the other side of Beach Drive SW from Lowman Beach Park. The facility would be a buried five-cell tank, with each cell measuring approximately 15 feet wide and ranging in length from 60 to 180 feet. Excavation for the tank would extend to a depth of approximately 40 feet below ground surface.

The proposed underground diversion structure would be constructed in Lowman Beach Park next to the existing underground Murray Pump Station. Excavation to construct the approximately 700-square-foot, 17-foot-tall underground structure would extend to a depth of approximately 20-25 feet below ground surface.

The influent pipeline would be installed between the diversion structure and the storage tank. It would be approximately 48 inches in diameter and approximately 180 feet long. The trench excavated to install the influent pipeline would be approximately 18 to 20 feet deep and approximately 12-15 feet wide. The effluent pipeline would be installed between the storage tank and either an existing manhole located in Beach Drive SW or the diversion structure. It would be approximately 12-18 inches in diameter and approximately 50-180 feet long.
feet long, depending on where it terminated. The trench excavated to install the effluent pipeline would be approximately six to 10 feet deep and approximately two to three feet wide. Ducts and conduit that would need to extend from the ancillary equipment facility or storage tank to the Murray Pump Station would likely be placed in one or both of the trenches excavated to install the pipelines.

The excavations required to construct the facilities described above would require some type of shoring. Shoring is the process of bracing excavation walls in order to prevent their collapse. The use of shoring systems provides safety for workers in excavations and facilitates the excavation process.

The type of shoring used for construction of the proposed storage tank and diversion structure would depend on soil and groundwater conditions at the sites. Piles would likely be sunk to depths between approximately 50 and 80 feet to support the storage tank excavation and to depths between approximately 30 and 55 feet to support the diversion structure excavation.

The influent pipeline excavation would likely be shored with stacked trench boxes where it is shallow. Soldier piles used to shore the deeper part of the excavation could extend to a depth of up to 30-40 feet.

Construction of the proposed storage tank may require the installation of uplift piles or anchors to control potential uplifting of the tank. Uplift piles, deep foundation elements, or ground improvement may be required to limit the potential for liquefaction-induced settlement of the tank.

Approximately 4,000 CY of fill would be required to backfill the excavations described above. Most of this fill would be placed on top of the new underground facilities. If the native materials were suitable, excavation spoils would be stockpiled and used for backfill. Excavated soils not used as backfill would be legally disposed of off-site at a location determined by the contractor. If the excavated soils were not of the appropriate quality for backfill, other material would be brought to the site and used as backfill. The source of imported material would be determined by the contractor and meet all pertinent project and legal requirements.

f. Could erosion occur as a result of clearing, construction, or use? If so, generally describe.

Yes, construction activities such as site grading, excavation, filling, materials handling, and stockpiling could cause erosion on a short-term basis. Short-term erosion could also result from the exposure of stockpiled spoils and fill. Erosion control measures would be implemented to minimize potential erosion (see Section B.1.h., below).

Excavation for the storage tank could destabilize adjacent uphill soils and increase the likelihood of them slumping or sliding. The measures described in Section B.1.h would be implemented to prevent these types of impacts from occurring.

Operation of the completed project would not result in any erosion.

g. About what percent of the site will be covered with impervious surfaces after project construction (for example, asphalt or buildings)?
Approximately 50 percent of the proposed storage tank site is currently covered with impervious surface. The existing impervious surface includes the residential buildings that would be demolished as part of the proposed project. After the project is completed, approximately 35 percent of the storage tank site would be covered with impervious surface. Impervious surfaces would include the new ancillary equipment facility, access hatches, lift slabs, and driving surfaces. Surface water runoff from the storage tank site would be collected, detained and treated through new bioretention facilities on the site.

The impervious surface area in Lowman Beach Park would increase by approximately 32-64 square feet (SF) as a result of one or two new access hatches that would be installed on top of the proposed new diversion structure.

The portion of Beach Drive SW right-of-way that lies within the project area currently consists of 100 percent impervious surface. This would not change as a result of the proposed project.

h. Proposed measures to reduce or control erosion, or other impacts to the earth, if any:

Project construction and demolition activities would use construction-related BMPs such as temporary erosion and sediment control measures to minimize the potential for erosion and sedimentation. Typical BMPs that could be used include installing silt fences, covering bare soil and stockpiles, and regularly inspecting and repairing erosion and sediment control measures. Additional BMPs and other measures could include using appropriate means to minimize tracking of sediment onto public roadways by construction vehicles and restoring disturbed areas by replanting or repaving as soon as practical after construction is completed. Temporary erosion and sediment control measures would be identified in the project plans and construction specifications and would be implemented as required by the City of Seattle.

Following demolition of the buildings on the storage tank site, measures would be taken to minimize erosion and sedimentation in the period before construction of the CSO storage tank begins. Voids would be backfilled and the site would be graded to direct runoff to existing catch basins. Additional measures could include the use of quarry spalls, filter fabric fencing, sediment traps at catch basins, and crushed rock surfaces.

During construction, measures would be taken to ensure that surrounding structures were not damaged as a result of vibration or settlement. These measures would be specified in project plans and construction specifications and could include monitoring for vibration and/or settlement at the project site and/or nearby residences. Additionally, piles would likely be installed in pre-drilled holes in order to minimize vibrations and settlement.

King County would conduct subsurface geotechnical investigations during design. Soil and groundwater information collected during these investigations would be used to design a shoring system(s) and dewatering plan that minimize the potential for vibration and settlement that could impact nearby structures.
Groundwater reinjection could be done to limit potential groundwater drawdown-induced settlement (Section B.3.b.1 describes potential excavation dewatering activities).

Prior to constructing the storage tank, measures would be implemented to stabilize adjacent uphill soils and prevent them from slumping or sliding. These measures would include the installation of a shoring system for the storage tank excavation and construction of a permanent retaining wall along the northeast, east, and south edges of the proposed storage tank site in order to protect the existing hillside.

2. Air

a. **What types of emissions to the air would result from the proposal (i.e., dust, automobile emissions, odors, industrial wood smoke) during construction and when the project is completed?** If any, generally describe and give approximate quantities if known.

During demolition and construction, air emissions would include fossil fuel combustion by-products from construction equipment and trucks used to haul material to and from the project site, and dust from the demolition, excavation and grading activity. Air emissions from engines could increase during certain activities, such as queuing trucks for loading and offloading of materials, or during heavy excavation.

After the project is completed, diesel engine emissions would be emitted through a new exhaust stack at the site of the ancillary equipment facility during maintenance and operation of the standby power generator. It is anticipated that the generator would be operated for maintenance purposes once a month for approximately one hour. It is anticipated that the generator would be operated during emergency circumstances one or two times per year for a maximum of 24 hours.

After the project is constructed, it is not anticipated that sewage odors would be noticeable outside of the proposed facility under normal operating conditions. Odors associated with operation and maintenance of the facility would be minimized and mitigated through several design features (see Section B.2.c).

A King County Greenhouse Gas Emissions Worksheet is attached.

b. **Are there any off-site sources of emissions or odor that may affect your proposal?** If so, generally describe.

No.

c. **Proposed measures to reduce or control emissions or other impacts to air, if any:**

During demolition and construction, BMPs would be implemented to control dust. Types of BMPs that would be used include street sweeping, watering exposed soil surfaces, and covering soil stockpiles to help minimize the amount of fugitive dust and particulate pollution to the surrounding areas.
Long-term impacts from odors associated with operation of the proposed project would be minimized and mitigated through several design features. Odor generation in the proposed diversion structure would be minimized by designing the structure to limit turbulence and keeping the hatches to the structure closed. Odors generated in the proposed storage tank would be minimized through use of the flushing system that would be installed to clean settled solids from the tank after each storage event.

Any odors generated within the tank from stored wastewater or solids not removed from the wash-down system would be mitigated through operation of the odor control facility housed in the ancillary equipment facility. The odor control facility would also reduce releases of odorous air from the Murray Pump Station and improve air quality inside of the pump station. The odor control system would consist primarily of a carbon adsorption scrubber vessel, mist eliminator, and fan. Gas concentrations at the odor control facility would be actively monitored to determine the functional performance of the facility and create an accurate schedule for replacement of the carbon filter media.

The project itself is a measure to reduce odor emissions to the air from the Murray Pump Station.

The standby power generator at the proposed facility would use a diesel engine designed to minimize the discharge of gaseous pollutants to the atmosphere. The engine would meet a minimum of Environmental Protection Agency Non-road Tier One diesel engine emissions requirements.

3. Water

a. Surface:

1) Is there any surface water body on or in the immediate vicinity of the site (including year-round and seasonal streams, saltwater, lakes, ponds, or wetlands)? If yes, describe type and provide names. If appropriate, state what stream or river it flows into.

The project site is located next to Puget Sound.

Pelly Creek enters a pipe in the wooded area located across Lincoln Park Way SW from the proposed storage tank site. The pipe crosses under Lincoln Park Way SW; crosses the northern tip of the proposed storage tank site; and then crosses under Beach Drive SW and the northern edge of Lowman Beach Park before discharging to Puget Sound. Pelly Creek appears to be a Type 4 or Type 5 water, as defined by Seattle Municipal Code, due to its small size and relatively low habitat value. It is not known at this point whether the creek flows perennially or intermittently, which would determine its classification as a Type 4 or Type 5 water, respectively.

2) Will the project require any work over, in, or adjacent to (within 200 feet) the described waters? If yes, please describe and attach available plans.

Excavation in Lowman Beach Park for the new diversion structure and 48-inch-diameter influent pipeline would occur approximately 180 feet from
the Puget Sound shoreline. Construction staging in Lowman Beach Park would occur approximately 125-150 feet from the Puget Sound shoreline. None of these activities would affect Puget Sound.

Construction of the proposed storage tank would occur next to the piped section of Pelly Creek that crosses the northern tip of the tank site. Construction is not anticipated to impact the piped creek.

3) Estimate the amount of fill and dredge material that would be placed in or removed from surface water or wetlands and indicate the area of the site that would be affected. Indicate the source of fill material.

None

4) Will the proposal require surface water withdrawals or diversions? Give general description, purpose, and approximate quantities if known.

Following construction of the proposed project, stormwater runoff on the storage tank site would be directed to new bioretention facilities on the site for treatment prior to discharge to the storm drain system.

The completed project would reduce the volume of untreated stormwater and sanitary sewage that is discharged to Puget Sound. During wet weather events where the capacity of the Murray Pump Station was exceeded, sanitary sewage and stormwater would be diverted to the storage tank and then pumped back to the local sewer system when capacity was available. These flows would be conveyed to the West Point Treatment Plant for treatment prior to being discharged to Puget Sound. Additionally, the proposed standby power generator would provide back-up power to the Murray Pump Station and CSO storage facility during power outages, thereby reducing the likelihood of wastewater overflows to Puget Sound.

5) Does the proposal lie within a 100-year floodplain? If so, note location on the site plan.

No

6) Does the proposal involve any discharges of waste materials to surface waters? If so, describe the type of waste and anticipated volume of discharge.

No. As described above in Section B.3.a.4, the proposed project would reduce the discharge of untreated sanitary sewage and stormwater to Puget Sound.

b. Ground:

1) Will ground water be withdrawn, or will water be discharged to groundwater? Give general description, purpose, and approximate quantities if known.
The depth to groundwater at the project site is not currently known, but it is assumed that groundwater would be encountered during excavation for the proposed storage tank, diversion structure, and pipelines that would connect those two facilities. Some form of dewatering would be required for approximately 10-12 months to keep the excavations free of water.

The amount of dewatering required would depend, in part, on the type(s) of shoring system used for the excavations and selection of shoring methods would be determined, in part, by groundwater conditions. If a permeable shoring system was used, dewatering volumes could reach 2,000 gallons per minute (GPM). Some of this water may be reinjected into the ground to limit potential groundwater drawdown-induced settlement. If a relatively impermeable shoring system was used, dewatering volumes would be closer to approximately 100 GPM.

Dewatering water would be discharged to the King County sewer system or directly to Puget Sound through the existing stormwater drainage system. Some dewatering water could also be reinjected into the ground. Discharge of dewatering water to the sewer system would require a King County Industrial Waste Discharge Permit. Any dewatering water discharged directly to Puget Sound would have to meet Washington State Water Quality Standards.

2) Describe waste material that will be discharged into the ground from septic tanks or other sources, if any (for example: Domestic sewage; industrial, containing the following chemicals...; agricultural; etc.). Describe the general size of the system, the number of such systems, the number of houses to be served (if applicable), or the number of animals or humans the system(s) are expected to serve.

None

c. Water Runoff (including storm water):

1) Describe source of runoff (including storm water) and method of collection and disposal, if any (include quantities, if known). Where will this water flow? Will this water flow into other waters? If so, describe.

The source of runoff during and after construction would be rainfall. Runoff on the site currently infiltrates pervious areas in Lowman Beach Park or the storage tank site or enters a storm drainage system that either discharges to Puget Sound or flows into the sewer system. Runoff control measures during and after construction would comply with the City of Seattle’s stormwater management requirements.

After the proposed project is completed, stormwater on the storage tank site would flow into new bioretention facilities on the site. The soils and plantings in the bioretention facilities would settle, absorb, and filter the stormwater runoff prior to infiltration. Runoff from the construction area in Beach Drive SW would enter the existing storm drainage system and runoff in Lowman Beach Park would either infiltrate into the park’s grassy or landscaped areas or enter the existing storm drainage system.
If, during or immediately after a wet weather event, storm water and sanitary sewage exceeded the capacity of the combined sewer system, it would be discharged to Puget Sound untreated through an outfall located next to the Murray Pump Station. The purpose of the proposed project is to reduce the frequency and volume of such discharges. The project is being designed to reduce CSOs in the Murray basin to an average of no more than one per year on a long-term average.

2) **Could waste materials enter ground or surface waters? If so, generally describe.**

During demolition of the buildings on the storage tank site, waste materials such as heating oil, if encountered, could enter ground or surface waters if precautions were not taken to identify and prevent the release of such materials (see Sections B.7.a and B.7.a.2).

Construction-related materials could enter ground or surface waters due to accidental spills, mechanical failures, or if construction activities are performed outside specified conditions.

Following completion of the project, diesel fuel could enter ground or surface waters if accidentally spilled during filling of the approximately 2,000-gallon storage tank. It is anticipated that the storage tank would be filled one or two times per year.

See Section B.1.h and B.3.d for measures to minimize the potential for these impacts.

d. **Proposed measures to reduce or control surface, ground and runoff impacts, if any:**

Measures that would be taken to prevent waste materials such as heating oil from entering ground or surface waters during demolition and excavation activities are described in Section B.7.a.2.

Erosion and sedimentation control BMPs would be used during demolition and construction to reduce and control stormwater runoff impacts. Examples of typical BMPs that would be used are presented in Section B.1.h.

Additional BMPs that could be implemented to prevent the introduction of contaminants into surface water or groundwater during demolition and construction include:

- maintaining spill containment and clean up materials in areas where equipment fueling is conducted;
- refueling construction equipment and vehicles away from surface waters whenever practicable;
- containing equipment and vehicle wash water associated with construction and keeping it from draining into surface waters;
- storing fuels and other potential contaminants away from excavation sites and surface waters in secured containment areas;
• conducting regular inspections, maintenance and repairs on fuel hoses, hydraulically operated equipment, lubrication equipment, and chemical/petroleum storage containers; and
• establishing a communication protocol for the unlikely event of a spill.

If dewatering water were discharged to the King County sewer system, reinjected, or discharged directly to Puget Sound, it would be monitored to ensure that it met applicable standards. If necessary to meet those standards, measures would be taken to improve the water’s quality before it was discharged. Discharges of dewatering water directly to Puget Sound would be routed through a settling tank, if necessary, to reduce turbidity.

Measures would be taken to minimize the potential for fuel spills associated with the standby power generator’s diesel fuel storage tank. These measures could include installation of a double-walled tank, automatic shut-off valves, a leak detection system, or a concrete spill containment berm. In addition, appropriate BMPs would be implemented to minimize the risk of fuel spills. These could include installation of a fuel level indicator, signage to discourage overfilling, and staff training.

The proposed project would include implementation of green stormwater infrastructure BMPs. These BMPs would include, but not be limited to, the creation of bioretention facilities for stormwater control and treatment on the storage tank site.

The project itself is a measure to reduce surface water impacts. The purpose of the proposed project is to reduce the number of CSOs that are discharged to Puget Sound from the Murray basin. Additionally, the proposed project would reduce the likelihood of wastewater overflows to Puget Sound by providing back-up power to the Murray Pump Station and CSO storage facility during power outages.

4. Plants
   a. Check or circle types of vegetation found on the site:

   XX deciduous tree
   XX evergreen tree
   XX shrubs
   XX grass
   ______ pasture
   ______ crop or grain
   ______ wet soil plants
   ______ water plants:
   ______ other types of vegetation

   Three large trees in Lowman Beach Park (two London planes and one Douglas fir) appear to meet the definition of “exceptional tree” in the City of Seattle Department of Planning and Development (DPD) Director’s Rule 16-2008 (DR 16-2008) due to their size and species. The proposed storage tank site may also contain a flowering cherry, several big leaf maples, and several Douglas firs that would be considered exceptional trees. Per DR 16-2008, an exceptional tree has
significant value due to its size, species, condition, age, or other factors. Measures would be taken to protect these trees during construction to the maximum extent practicable (see Section B.4.d).

b. **What kind and amount of vegetation will be removed or altered?**

All vegetation on the six parcels that would be acquired on the storage tank site would be removed. Some trees, shrubs and grass in the public right-of-way on the south end of the storage tank site would also be removed. If necessary to construct the proposed project, this could include trees on the storage tank site that meet the definition of exceptional tree in DR 16-2008.

Up to approximately 14,000 SF of grass and landscaping could be removed or disturbed in the southeastern part of Lowman Beach Park by construction of the diversion structure and influent pipeline and limited staging that would occur in that corner of the park. The area and duration of staging in Lowman Beach Park would be limited, to the extent practicable, to what is required to construct the project.

The exceptional trees in Lowman Beach Park would not be removed or altered. Measures such as those described in Section B.4.d would be implemented to protect the trees.

c. **List threatened or endangered species known to be on or near the site.**

None known

d. **Proposed landscaping, use of native plants, or other measures to preserve or enhance vegetation on the site, if any:**

The proposed storage tank site would be landscaped with drought-tolerant or native plantings, or both. Landscaping on the site would include bioretention facilities to control and treat stormwater.

Vegetation removed or disturbed during construction in Lowman Beach Park would be restored except for approximately 32-64 SF of existing grass that would be replaced with one or two at-grade metal hatches on top of the diversion structure. Landscaped areas that were removed or disturbed would be replanted with drought-tolerant or native plantings, or both.

Landscaping on the proposed storage tank site would be consistent with City of Seattle standards and King County would consider input from the community when developing the landscaping plan. Temporary irrigation systems would be used for one or two years following construction to reduce plant mortality.

Impacts to exceptional trees on the project site, including their removal, would be avoided to the maximum extent practicable. Exceptional tree removal, if necessary, and exceptional tree protection measures would be performed consistent with City of Seattle tree protection regulations. Measures that could be implemented during construction to protect exceptional trees located on or adjacent to the project site include demarcating the critical root zones (CRZs) of trees to be protected with high visibility fencing, excluding CRZs from the construction staging areas, and restricting heavy equipment from travelling through the CRZs.
5. **Animals**

   a. **Circle any birds and animals which have been observed on or near the site or are known to be on or near the site:**

      birds: hawk, heron, eagle, songbirds, other: seagulls
      mammals: deer, bear, elk, beaver, other: domestic dogs and cats, rodents
      fish: bass, salmon, trout, herring, shellfish, other:

   b. **List any threatened or endangered species known to be on or near the site.**

      The following species are listed under the federal Endangered Species Act (ESA) and could be near the site.

<table>
<thead>
<tr>
<th>Common Name</th>
<th>Scientific Name</th>
<th>ESA Status</th>
<th>Jurisdiction</th>
</tr>
</thead>
<tbody>
<tr>
<td>Puget Sound ESU Chinook Salmon</td>
<td>Oncorhynchus tshawytscha</td>
<td>T</td>
<td>NMFS</td>
</tr>
<tr>
<td>Puget Sound DPS Steelhead</td>
<td>Oncorhynchus mykiss</td>
<td>T</td>
<td>NMFS</td>
</tr>
<tr>
<td>Coastal-Puget DPS Bull Trout</td>
<td>Salvelinus confluentus</td>
<td>T</td>
<td>USFWS</td>
</tr>
<tr>
<td>Canary Rockfish</td>
<td>Sebastes pinniger</td>
<td>T</td>
<td>NMFS</td>
</tr>
<tr>
<td>Yelloweye Rockfish</td>
<td>Sebastes ruberrimus</td>
<td>T</td>
<td>NMFS</td>
</tr>
<tr>
<td>Boccaccio Rockfish</td>
<td>Sebastes paucispinis</td>
<td>E</td>
<td>NMFS</td>
</tr>
<tr>
<td>Southern DPS North American Green Sturgeon</td>
<td>Thaleichthys pacificus</td>
<td>T</td>
<td>NMFS</td>
</tr>
<tr>
<td>Steller Sea Lion</td>
<td>Eumetopias jubatus</td>
<td>T</td>
<td>NMFS</td>
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<tr>
<td>Humpback Whale</td>
<td>Megaptera novaeangliae</td>
<td>E</td>
<td>NMFS</td>
</tr>
<tr>
<td>Southern Resident Killer Whale</td>
<td>Orcinus orca</td>
<td>E</td>
<td>NMFS</td>
</tr>
<tr>
<td>Marbled Murrelet</td>
<td>Brachyramphus marmoratus</td>
<td>T</td>
<td>USFWS</td>
</tr>
</tbody>
</table>

ESU = Evolutionarily Significant Unit  
DPS = Distinct Population Segment  
T = Threatened  
E = Endangered  
NMFS = National Marine Fisheries Service  
USFWS = United States Fish and Wildlife Service

The proposed project is not expected to adversely affect any of these species. No in-water work is proposed as part of the project.

Noise generated by the proposed project could cause some behavioral disturbances to marbled murrelets if they were foraging in marine nearshore waters during construction. However, it is not expected that the proposed project would result in adverse effects to marbled murrelets for the following reasons:

- there have been no documented sightings of marbled murrelets in the project area,
- the project area contains no suitable nesting habitat for marbled murrelets,
- marbled murrelets would not be exposed to noise above identified injury/mortality thresholds,
- no in-water work would be required,
- marbled murrelets, if present, would likely avoid the project area or fly away during construction activities,
- suitable foraging habitat is plentiful in the adjacent waters of Puget Sound outside of the terrestrial zone of effect,
- construction activity that could result in noise disturbance (vibratory pile driving) may not be required,
- an impact pile driver would not be used, and
- the proposed project would not affect prey species for marbled murrelets.

c. **Is the site part of a migration route? If so, explain.**

The entire Puget Sound area is part of the Pacific flyway migration route.

d. **Proposed measures to preserve or enhance wildlife, if any:**

Erosion and sedimentation control measures (see Section B.1.h) and measures to prevent the introduction of contaminants into surface water or groundwater (see Section B.3.d) would be implemented during construction.

An impact hammer would not be used to install piles. This would minimize the potential for noise disturbance to marbled murrelets.

The project itself is a measure to minimize potential impacts on wildlife. Construction of the proposed project would reduce the volume of untreated sanitary sewage and stormwater that is discharged to Puget Sound from the Murray basin, thereby reducing the potential for related adverse affects on aquatic life.

6. **Energy and Natural Resources**

a. **What kinds of energy (electric, natural gas, oil, woodstove, solar) will be used to meet the completed project's energy needs? Describe whether it will be used for heating, manufacturing, etc.**

Temporary project energy needs would be limited to those required to operate construction equipment. Construction equipment would use fossil fuels.

In the completed project, electricity would be used for lighting and to operate equipment in the storage tank and ancillary equipment facility. This would include the effluent pumps and flushing system equipment, the odor control system, the instrumentation and control system, and the ventilation system. The standby power generator would be powered by diesel fuel.

b. **Would your project affect the potential use of solar energy by adjacent properties? If so, generally describe.**

No

c. **What kind of energy conservation features are included in the plans of this proposal? List other proposed measures to reduce or control energy impacts, if any:**

The proposed lighting systems would be energy efficient.
7. **Environmental Health**

   a. **Are there any environmental health hazards, including exposure to toxic chemicals, risk of fire and explosion, spill, or hazardous waste, that could occur as a result of this proposal? If so, describe.**

   A Phase I Environmental Site Assessment completed for the Murray Pump Station site in 2004 identified several recognized environmental conditions (RECs) on the proposed CSO storage tank site, including a historic gas station and four residences with heating oil tanks. An additional three residences with heating oil tanks were identified near the project site. No releases from these RECs have been documented, but because of their presence it is possible that hazardous material related to the RECs could be encountered during demolition and/or construction activities.

   The buildings that would be demolished on the storage tank site could contain materials such as lead paint or asbestos that could present health hazards.

   Potential exposure to construction-related materials such as fuel and hydraulic fluid could occur as the result of accidental spills, mechanical failures, or if the construction activities deviate from the project construction specifications or permit conditions.

   Diesel fuel could be spilled when the approximately 2,000-gallon storage tank is filled.

   1) **Describe special emergency services that might be required.**

      None

   2) **Proposed measures to reduce or control environmental health hazards, if any:**

      A Phase II Environmental Site Assessment would be conducted for the proposed project site. It would include testing for hazardous materials at the site. Based on the findings, measures that should be implemented during demolition and construction to minimize exposure to hazardous material, properly dispose of hazardous material, and comply with all pertinent regulatory requirements would be proposed. These measures would be included in the proposed project’s construction specifications.

      Section B.3.d discusses typical BMPs that could be implemented to prevent spills of contaminants and minimize exposure to environmental health hazards in the event of a spill.

      The buildings to be demolished would be inspected for the presence of materials that could present health hazards, such as lead paint and asbestos, prior to demolition. If such materials were present, they would be properly handled and disposed of when the building is demolished or before the building is demolished. For example, a contractor certified to remove and properly dispose of lead paint could be used for demolition of the buildings.
The project itself is a measure to reduce environmental health hazards. Installation of the CSO storage facilities, including the standby power generator that would provide back-up power to the Murray Pump Station and CSO storage facility during power outages, would reduce the risk of wastewater overflows to Puget Sound.

b. Noise

1) **What types of noise exist in the area which may affect your project (for example: traffic, equipment, operation, other)?**

Noise in the project area would not affect the proposed project.

2) **What types and levels of noise would be created by or associated with the project on a short-term or a long-term basis (for example: traffic, construction, operation, other)? Indicate what hours noise would come from the site.**

Construction of the proposed project would create a new, temporary source of noise in the project area that would be audible to nearby residences and Lowman Beach Park. Demolition and construction-related noise would include engine and mechanical and scraping noises associated with the use of heavy equipment such as dump trucks, excavators, cranes, concrete mixers, graders and flatbed trucks. These types of equipment typically generate noise in the range of 80-90 dBA at a distance of 50 feet. Hauling activities to and from the project site would contribute to traffic noise.

Noise levels associated with the installation of shoring systems and uplift piles, if required, would depend on the type of shoring and uplift piles used and the method of installation. This would be determined by the contractor. Vibratory pile driving equipment typically generates noise measuring approximately 95-101 dBA at a distance of 50 feet. Drilling would generate less noise. It is anticipated that it would take several months to install shoring for the proposed excavations, assuming that two rigs were used.

Noise would also be generated during construction by pumps used to dewater excavations. The pumps would generate noise levels measuring less than 70 dBA at a distance of 25 feet. Exact noise levels would depend on the dewatering method used, which would be determined by the contractor, and the amount of dewatering required. The dewatering pumps would likely be powered by a generator that would create noise levels measuring up to 60 dBA at a distance of 23 feet.

Construction activity would take place during daytime hours. It is anticipated that nighttime construction activity would not be required. Dewatering pumps would run 24 hours per day and it is anticipated that dewatering pumping would occur for approximately 10-12 months.

Following construction, noise would be generated by equipment such as the standby power generator and the effluent pumps for very limited durations when maintenance occurred and during the estimated one to five
times each year that this equipment is expected to operate. Operation of the odor control unit would also generate noise.

3) **Proposed measures to reduce or control noise impacts, if any:**

All demolition and construction activities would be performed consistent with the City of Seattle’s Noise Control Ordinance. All impacts from noise generated by demolition and construction would be short-term and temporary in nature and would not constitute a substantial effect on the surrounding land uses. Construction BMPs would be used to minimize demolition and construction noise. Examples of BMPs that could be used include:

- using effective vehicle mufflers, engine intake silencers, and engine enclosures, and shutting off equipment when not in use;
- locating activities away from sensitive receptors when possible;
- using portable noise barriers placed around stationary equipment;
- encouraging equipment drivers to avoid backing up as much as possible to reduce the use of back-up alarms;
- using broadband back-up alarms to eliminate impacts of single-frequency high-pitched alarms;
- notifying residents and businesses near the project area of upcoming noisy demolition and construction activities; and
- creating a 24-hour construction hotline to promptly respond to questions and complaints.

Additionally, King County would notify adjacent residences in advance of project demolition and construction scheduling and phasing.

An impact hammer would not be used to install piles.

New equipment that generates noise would be enclosed in buildings, thereby minimizing noise impacts resulting from operation of the proposed project.

8. **Land and Shoreline Use**

a. **What is the current use of the site and adjacent properties?**

The proposed project site is located in a multi- and single-family residential waterfront area of West Seattle. The proposed storage tank and ancillary equipment facility site currently contains single- and multi-family residences. The six parcels that comprise the site would be acquired by King County as part of the proposed project. The site is bordered to the northeast by Lincoln Park Way SW, beyond which is the lower portion of the Pelly Creek ravine. The tank site is bordered to the southeast by single- and multi-family housing and to the west by Beach Drive SW and Lowman Beach Park. Lowman Beach Park is a 4.1-acre park that contains lawn/open space, a tennis court, and a tidal beach area. King County’s Murray Pump Station is located below ground in the southeast corner of the park. The park is bordered to the north and south by single family residences and to the west by Puget Sound.

b. **Has the site been used for agriculture? If so, describe.**
c. **Describe any structures on the site.**

The proposed storage tank site contains single- and multi-family residential structures. The following are the approximate types of buildings found on the six parcels:

- two three-unit buildings,
- one five-unit building,
- two two-unit buildings, and
- one one-unit building.

King County’s existing approximately 2,140-square-foot Murray Pump Station is located below ground in the southeast corner of Lowman Beach Park.

d. **Will any structures be demolished? If so, what?**

All of the structures on the proposed storage tank site (identified above in Section B.8.c) would be demolished. It is expected that this would occur sometime between late 2012 and the start of construction of the proposed CSO storage facility in the first half of 2013. It is expected that it would take approximately 6-8 weeks to prepare the structures for demolition (e.g., remove hazardous and recyclable materials), demolish the structures, remove debris, and stabilize and secure the site.

e. **What is the current zoning classification of the site?**

The current zoning classification of Lowman Beach Park is Single Family Residential (SF 5000). The six parcels on which the storage tank would be built are zoned Lowrise 1.

f. **What is the current comprehensive plan designation of the site?**

The current comprehensive plan designations of Lowman Beach Park and the proposed storage tank site are “City-Owned Open Space” and “Multi-Family Residential,” respectively.

g. **If applicable, what is the current shoreline master program designation of the site?**

Lowman Beach Park is designated as “Conservancy Recreation” under Seattle’s Shoreline Master Program.

h. **Has any part of the site been classified as an "environmentally sensitive" area? If so, specify.**

City of Seattle environmentally critical area (ECA) maps identify Lowman Beach Park as a liquefaction prone area. The northern approximately one-third of the proposed storage tank site is identified as riparian corridor because Pelly Creek is piped near this area.

City of Seattle maps identify several ECAs adjacent to the proposed project site. These include steep slopes on parcels adjacent to the proposed storage tank site,
riparian corridor along the northern section of Lowman Beach Park (related to the piped section of Pelly Creek), and shoreline habitat area in the western half of Lowman Beach Park.

i. **Approximately how many people would reside or work in the completed project?**

No people would reside in the completed project. It is estimated that the completed project would be visited by King County staff on a weekly basis for normal operation and maintenance purposes.

j. **Approximately how many people would the completed project displace?**

The proposed project would permanently displace all people residing in the buildings located on the six parcels that comprise the proposed storage tank site. These buildings would need to be demolished in order to construct the proposed project and it is expected that residents would vacate the buildings sometime between late 2011 and mid-2012. The project would permanently displace 15-30 people.

k. **Proposed measures to avoid or reduce displacement impacts, if any:**

Residents and property owners displaced by the proposed project would receive relocation assistance from King County, if eligible for relocation benefits, in accordance with the provisions of King County WTD’s adopted WTD Resident Relocation Program.

King County would acquire all necessary properties at fair market value and provide relocation assistance to qualified property owners and qualified tenants. The County would follow the Uniform Relocation Assistance and Real Property Acquisition Policies Act (49 Code of Federal Regulations Part 24) and the Washington State law covering property acquisition (Chapter 8.26 Revised Code of Washington, Title 468-100 Washington Administrative Code) to provide consistent treatment, to minimize hardship of persons displaced as a direct result of the proposed project, and to seek cooperative settlements of property acquisitions and relocation claims.

l. **Proposed measures to ensure the proposal is compatible with existing and projected land uses and plans, if any:**

Landscaping, architectural treatment, odor and noise control equipment, and compliance with the City of Seattle’s permitting requirements would help ensure that the proposal is compatible with existing and projected land uses.

9. **Housing**

a. **Approximately how many units would be provided, if any? Indicate whether high, middle, or low-income housing.**

None

b. **Approximately how many units, if any, would be eliminated? Indicate whether high, middle, or low-income housing.**
The proposed project would permanently eliminate approximately 16 units. The residential displacements would include the following parcels (unit sizes and configurations are approximations):

- 7004 Beach Drive SW (APN 198120-0080): 2,570-square-foot apartment building with three residential units,
- 7010 Beach Drive SW (APN 198120-0070): 4,842-square-foot apartment building with five residential units,
- 7018 Beach Drive SW (APN 198120-0060): 1,660-square-foot duplex with two residential units,
- 7024 Beach Drive SW (APN 198120-0055): 3,830-square-foot building with three residential units,
- 7030 Beach Drive SW (APN 198120-0032): 1,130-square-foot duplex with two residential units, and
- 7034 Beach Drive SW (APN 198120-0035): 1,090-square-foot single-family residence (one residential unit).

The income levels of these units have not yet been determined. However, based on 2000 United States Census data obtained for the project area (the area located within an approximately 0.5-mile radius of the proposed project site), the project area has a lower percentage of low-income individuals than the City of Seattle as a whole (5 percent and 12 percent, respectively). The median income of the project area is $64,126, which is higher than the median income of the City as a whole ($50,866).

None of the buildings are considered low-income housing, as defined by the Seattle Housing Authority.

c. Proposed measures to reduce or control housing impacts, if any:

See Section B.8.k.

10. Aesthetics

a. What is the tallest height of any proposed structure(s), not including antennae; what is the principal exterior building material(s) proposed?

The footprint of the proposed ancillary equipment facility would be approximately 4,900 SF. The height of the building would be approximately 15 feet (one story). Exhaust stacks for the odor control system and standby power generator would extend above the roofline. The facility’s principal exterior building material would be determined during the final design phase.

b. What views in the immediate vicinity would be altered or blocked?

The visual quality of the immediate project area would be temporarily altered for up to three years—from the time of demolition through the end of construction. After the properties on the storage tank site are acquired by King County and the tenants are relocated, the buildings would likely be boarded up until they were demolished. The site may also be fenced for safety and security reasons during that time. Temporary visual impacts during demolition and construction would include the presence of construction equipment, work crews, dust/exhaust, materials, signage, temporary fencing, staging areas in the construction zone, and traffic congestion along haul routes. An approximately
50-foot-tall crane would be located on the proposed storage tank site during demolition and for most of the approximately two and one-half-year construction period.

The appearance of the proposed storage tank site would be permanently altered. The existing buildings on the site would be replaced with the buried storage tank and above grade ancillary equipment facility. The site would also contain a large retaining wall on the adjacent hillside, security fencing, bioretention facilities, and additional landscaping that would be designed to screen the new structures to the maximum extent practicable. The ground surface on top of the storage tank would need to be able to support heavy equipment, and one or two access hatches would be located on top of each of the five storage tank cells.

Because the storage tank site is bordered on all sides except for the west side by steep slopes, the completed project would not block any views.

c. Proposed measures to reduce or control aesthetic impacts, if any:

The ancillary equipment facility would be designed to minimize the visual impact of the building and the large retaining wall that would be constructed to support the hillside behind it. Design considerations would include where the facility is placed on the site and how it is configured. Placing the facility next to the hillside could reduce its visual presence and screen part of the retaining wall. King County would consider input from the community on exterior materials, architectural elements, and landscaping of the ancillary equipment facility to ensure that it is consistent with the residential waterfront setting. The design would include plantings around the exterior of the facility which would provide partial screening of the facility. Bioretention facilities would also be installed on the site.

The design process for the ancillary equipment facility would follow City of Seattle policies and guidelines for incorporating aesthetic considerations into design.

The removal of exceptional trees, as defined by the City of Seattle DPD Director’s Rule 16-2008, would be avoided to the maximum extent practicable.

Any area in Lowman Beach Park where grass and landscaping were removed to construct the proposed project would be replanted, except for an approximately 32- to 64-square-foot area over the diversion structure where one or two access hatches would be installed. Any other surface improvements impacted by construction would also be restored.

11. Light and Glare

a. What type of light or glare will the proposal produce? What time of day would it mainly occur?

Temporary lighting may be used at the beginning and end of work days when daylight hours are short. No nighttime construction is anticipated.

The proposed ancillary equipment facility would include exterior security lighting that would be used during nighttime hours.
b. **Could light and glare from the finished project be a safety hazard or interfere with views?**  

The ancillary equipment facility’s exterior security lighting would be noticeable from surrounding properties that currently have views of the site.

c. **What existing off-site sources of light or glare may affect your proposal?**  

None

d. **Proposed measures to reduce or control light and glare impacts, if any:**  

Full cutoff, low-intensity light fixtures would be used for the ancillary equipment facility’s exterior security lighting. The light fixtures would be configured so that light is not cast beyond the edge of the storage facility site to minimize light that would be noticeable from surrounding properties.

The use of highly reflective building materials and/or finishes in the design of the ancillary equipment facility exterior would be restricted.

12. **Recreation**

a. **What designated and informal recreational opportunities are in the immediate vicinity?**  

The proposed project would take place in and adjacent to Lowman Beach Park, a 4.1-acre waterfront park located on the west side of Beach Drive SW, north of Lincoln Park. It includes lawn/open space, a tennis court, a swing set, and a tidal beach area on Puget Sound. The park provides views of the Olympic Mountains, Alki Point, and Williams Point.

Several parks are located near the project area. Lincoln Park, which is Seattle’s second largest park at 133 acres, is located on Puget Sound approximately 0.25 mile south of the project site. Solstice Park, a 7-acre park on the east side of Fauntleroy Way SW, is approximately 0.25 mile from the project site. It contains tennis courts and a community p-patch garden. Pelly Place Natural Area, which is located less than 0.25 mile to the northeast of the project site contains one acre of green space.

b. **Would the proposed project displace any existing recreational uses? If so, describe.**  

Yes. The proposed project would involve construction in and next to Lowman Beach Park. Recreational users of the park would be impacted by temporary visual and noise impacts associated with demolition and construction activity, as well as temporary closure of part of the park. The southeast section of the park, including a portion of the existing lawn area, would be disturbed for excavation and construction of the diversion structure and influent pipeline. This portion of the park would also be used as a staging area for a limited time during construction. The area and duration of staging in the park would be limited, to the maximum extent practicable, to what is required to construct the project. Staging in the park would not impact the exceptional trees in the park, the tennis court, or the beach. The actual duration of closure, and extent of park use by the contractor, would be determined during final design.
The approximately 25 on-street parking spaces in front of the park along Beach Drive SW would be unavailable for use during most of the construction period. During construction, park users could use on-street parking spaces located just north of the project area on Beach Drive SW and 48th Avenue SW. During construction, park users would be able to access the beach and use part of the open space.

Operation of the proposed facility would not displace any recreational uses.

c. Proposed measures to reduce or control impacts on recreation, including recreation opportunities to be provided by the project or applicant, if any:

The contractor would be required to maintain safe pedestrian access to the section of Lowman Beach Park that remained open during construction, to the maximum extent practicable. Measures to ensure pedestrian safety could include the use of signage regarding park access routes and the use of temporary fencing or ecology blocks to designate safe walkways through or near the construction area.

Construction BMPs would be implemented to minimize construction noise (see Section B.7.b.3).

King County would provide advance notification of demolition and construction activities to all residents adjacent to the project site. Advance notification would include posting signage at the site and written notification. The notification would include the name and phone number of the King County staff to be contacted regarding questions or concerns about construction activity.

13. Historic and Cultural Preservation

a. Are there any places or objects listed on, or proposed for, national, state or local preservation registers known to be on or next to the site? If so, generally describe.

A preliminary assessment of archaeological and historical resources in the Murray basin was completed for the proposed project in October 2009. The assessment identified two buildings in the vicinity of the project site that are on the Seattle Historic Inventory. These buildings are the Kenney Presbyterian Home for the Retired, which is located approximately 0.1-mile east of the site on Fauntleroy Way SW, and the Gatewood School, which is located approximately 0.2-mile east of the project site on SW Myrtle Street. The proposed project is not expected to impact these structures.

b. Generally describe any landmarks or evidence of historic, archaeological, scientific or cultural importance known to be on or next to the site.

Lowman Beach Park is located within an area classified as an “Archaeological Buffer Overlay District” by the City of Seattle because it is located within the United States Government Meander Line and its 200-foot buffer. The meander line provides an indication of where the saltwater shoreline existed prior to recent fill or alteration. The area within 200 feet of the meander line has a high potential to contain archaeological resources such as Native American and early European settlements.
The preliminary archaeological and historical resources assessment completed for the proposed project in October 2009 identified the entire project site as having a high probability for archaeological resources.

c. **Proposed measures to reduce or control impacts, if any:**

   The proposed project would comply with the requirements of the National Historic Preservation Act. This would include the completion of a cultural resources survey at the project site. If artifacts were uncovered during excavation, work would be stopped pending notification of and response from appropriate agencies.

14. **Transportation**

   a. **Identify public streets and highways serving the site, and describe proposed access to the existing street system. Show on site plans, if any.**

      The project site includes the section of Beach Drive SW located between Lowman Beach Park and the proposed tank site located across Beach Drive SW from the park. The project site is accessed via Fauntleroy Way SW, Lincoln Park Way SW, and Beach Drive SW. The paved access road along the southern boundary of Lowman Beach Park is also used to access the project site.

   b. **Is site currently served by public transit? If not, what is the approximate distance to the nearest transit stop?**

      Yes. The project site is served by King County Metro Transit bus route 54 along Fauntleroy Way SW and by routes 37 and 53 along Beach Drive SW.

   c. **How many parking spaces would the completed project have? How many would the project eliminate?**

      The completed project would not create any parking spaces. It may result in the net permanent loss of up to two parking spaces on the east side of Beach Drive SW in front of the storage tank site. This would be associated with a driveway entrance to the proposed site.

      Street parking along Beach Drive SW would be unavailable or restricted for approximately 12-18 months of the two and one-half year construction period. This would affect approximately 25 on-street parking spaces. Parking on the east side of Beach Drive SW could also be temporarily unavailable during the time that demolition is taking place on the storage tank site. Several parking spots on the south side of Lincoln Park Way SW adjacent to the storage tank site could be intermittently and temporarily unavailable during demolition and/or construction so that trucks could load and unload material from a conveyor belt that extended from the street to the storage tank site. On-street parking is available just north of the project site on Beach Drive SW and 48th Avenue SW.

      Although parking spaces on Beach Drive SW and possibly Lincoln Park Way SW would be temporarily unavailable while demolition and construction activities were occurring, the demand for parking on Beach Drive SW could also be reduced during this time as a result of the residential buildings on the storage tank site being vacated.
d. **Will the proposal require any new roads or streets, or improvements to existing roads or streets, not including driveways? If so, generally describe (indicate whether public or private).**

A new temporary lane of travel may be created on the west side of Beach Drive SW for use during the 12-18 months that the eastern lane of Beach Drive SW would be closed to traffic (see Section B.14.g).

A permanent new access road would likely be created in the right-of-way on the south end of the storage tank site to provide access to the tank and ancillary equipment facility.

Following construction, the right-of-way in the project area would be repaved as necessary to meet current City of Seattle Department of Transportation pavement and street restoration requirements. New sidewalks and curb cuts would comply with requirements of the Street Improvement Permit that would be obtained for the project.

e. **Will the project use (or occur in the immediate vicinity of) water, rail, or air transportation? If so, generally describe.**

No

f. **How many vehicular trips per day would be generated by the completed project? If known, indicate when peak volumes would occur.**

Demolition of the residential buildings on the storage tank site would require approximately 160 one-way truck trips to haul away demolition debris and approximately 20 one-way truck trips to bring in material needed to fill in voids and stabilize the site. Additional vehicular trips associated with construction workers would also occur.

During construction of the proposed storage tank and associated facilities, excavation hauling and delivery of concrete would require up to approximately 3,400 one-way truck trips. Most of these truck trips would occur during a six-month period. Additional vehicular trips associated with construction workers and delivery of other materials would also occur. During the six-month period, the project could generate up to 50 one-way truck trips per day. The number of truck trips would depend on contractor planning and construction sequencing.

Operation and maintenance of the completed project is not expected to impact traffic in the area.

g. **Proposed measures to reduce or control transportation impacts, if any:**

Temporary localized traffic impacts are anticipated for approximately 12-18 months of the two and one-half year construction period. Temporary traffic impacts in the project area would include street closures, traffic and parking restrictions, and restricted access to residences and Lowman Beach Park. These impacts and measures that could be implemented to reduce or control them are described generally in the following paragraphs.
The eastern lane of Beach Drive SW adjacent to the storage tank site would be required for use by construction equipment during construction. There are no alternate routes to properties south of the project site along Beach Drive SW. The contractor would be required to provide safe vehicular and pedestrian access to these properties during construction, although access could be limited at times. Access could be provided by creating a new temporary lane of travel on the west side of Beach Drive SW and/or by placing steel plates over open excavations.

The southern lane of Lincoln Park Way SW adjacent to the storage tank site could also be closed intermittently and temporarily during construction so that trucks could load and unload material from a conveyer belt that extended from Lincoln Park Way SW to the storage tank site.

Intermittent and temporary closure of the paved access road along the southern boundary of Lowman Beach Park may occur during construction of the diversion structure and influent pipeline. The contractor would be required to provide safe vehicular and pedestrian access to properties along the road during construction, although access could be limited at times.

A portion of Beach Drive SW public right-of-way would be excavated to install the influent and effluent pipelines, and utilities required for the proposed project.

If necessary, contractor parking in and near the project area would be limited in order to ensure adequate on-street parking for residents and visitors. Contractors could be required to park off-site and carpool or shuttle to the project area.

The proposed project would require several street use permits from the City of Seattle Department of Transportation. Permit conditions would require a traffic control plan and pedestrian control plan to be submitted and approved prior to the start of construction. The plan would identify traffic and parking restrictions and the locations of traffic control devices and signage. It would include detailed measures to address residential access, emergency vehicle access, road closures and detours, and pedestrian safety. Potential measures that could be implemented include the use of protective barriers, fences, flaggers, foot and/or vehicle bridges, specified hours of residential vehicular access during active construction, provisions for emergency access, and steel plating.

King County would provide advance notification of construction activity to all residents adjacent to the construction area and to residents that use Beach Drive SW to access homes located to the south of Lowman Beach Park. Advance notification would include posting signage at the site as well as written notification of impacted residences. The notification would include the name and phone number of the King County staff person to be contacted regarding questions or concerns about construction activity.

15. Public Services

a. Would the project result in an increased need for public services (for example: fire protection, police protection, health care, schools, other)? If so, generally describe.

No
b. Proposed measures to reduce or control direct impacts on public services, if any:

The contractor would be required to maintain access to residences by fire, emergency medical technician (EMT), and police vehicles and personnel at all times during construction.

16. Utilities

a. Circle the utilities currently available at the site: electricity, natural gas, water, refuse service, telephone, sanitary sewer, septic system, other.

b. Describe the utilities that are proposed for the project, the utility providing the service, and the general construction activities on the site or in the immediate vicinity which might be needed.

The completed project would use water and electricity provided by the City of Seattle.

Some of the utilities in Beach Drive SW right-of-way may need to be temporarily or permanently relocated to construct the proposed project. This could cause temporary, short-term disruption of some utility service to some residences.

C. SIGNATURE

The above answers are true and complete to the best of my knowledge. I understand that the lead agency is relying on them to make its decision.

Signature: ____________________________

Date Submitted: 4/13/11
## King County Greenhouse Gas Emissions Worksheet—Murray CSO Control Project

### Section I: Buildings

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### Section II: Pavement

| Pavement                                            | 60.00   |                                           |          |        |                | 3000                       |

**Total Project Emissions:** 6959

Note: The proposed project consists of a new approximately 10,500-square-foot buried storage tank, an approximately 700-square-foot diversion structure, and an approximately 4,900-square-foot ancillary equipment facility. It also includes restoration of the existing street and sidewalks adjacent to the proposed storage tank site.
May 16, 2011

Mr. Wesley Sprague, Supervisor
Community Services and Environmental Planning
King County Wastewater Treatment Division

RE: DETERMINATION OF NONSIGNIFICANCE COMMENTS
MURRAY COMBINED SEWER OVERFLOW CONTROL PROJECT

Dear Mr. Sprague

Thank you for the opportunity to review the April 28, 2011 Determination of Nonsignificance (DNS) and the April 13, 2011 Environmental Checklist for the Murray CSO Control Project, as well as ESA Adolfson Technical Memorandums forwarded to me by Water Quality Planner Sue Meyer.

RECOMMENDED CHANGES AND CLARIFICATIONS
Please accept the following comments on the Environmental Checklist, which include recommended changes to the Checklist (in underline form) and recommended clarifications to the Checklist.

A.12 – The construction contractor who establishes offsite staging areas can inadvertently expand the impact of this project on the community without advanced notification or citizen review. In light of this, please revise this section of the checklist to state that “Offsite staging areas would be identified by the construction contractor following a list of potential staging areas prepared in conjunction with community review.”

B.4 Plants
d. Drought tolerant planting - Lowman Beach contains open grass areas in addition to trees and shrubs. Grass is not considered to be drought tolerant. The Checklist should be revised to reflect how those landscape areas in Lowman Beach Park with removed or disturbed vegetation will be replanted to restore the existing park use, especially the open grass concept - even if the replacement is not drought tolerant.

B.7 Environmental Health
b. Noise - The subject property is located at the bottom of a large “bowl” area, surrounded by blocks of residential uses to the north, east, and south, with Puget Sound to the west. Due to this topographic condition, noise generated at the site, including vibration impacts and noise generated by pavement removal and placement of piles, can be expected to travel ‘up’ the bowl and impact a wider residential area than identified in the ESA Adolfson Technical Memorandums. Mitigation measures outlined in April 8, 2011 memorandum note that “adjacent residences would be notified of project construction scheduling and phasing as part of the projects public outreach.” In light of the ‘bowl’ condition, the following additional mitigation shall be added to the Checklist:
1) The notification area for any construction activity that involves impact equipment and others that create impulse noise shall be expanded beyond “adjacent” to include notification of properties within 1,000 feet around the entire project area.

2) Public notification of any construction activity that involves impact equipment and others that create impulse noise shall include the start time and the finish time of said activity, as well as an active and valid 24/7 contact name and phone number.

B.10 Aesthetics
b. Views Altered - Revise the Checklist to state that depending on their height and finish, exhaust stacks may alter the views of those properties immediately to the east of the project site following construction.

B.14 Transportation
a. SW Beach Drive - The Checklist should be revised to state that 25-plus properties obtain access off of SW Beach Drive south of the project site, and this portion of SW Beach Drive dead-ends at Lincoln Park. There is no opportunity for any sort of a detour route for access to these properties, except over water. Given these constraints, vehicular access will need to be continually maintained for these properties for the entire duration of the construction.

g. Contractor parking – Revise the Checklist to state that Contractor parking in and near the project areas shall be limited to ensure adequate on-street parking for residents and park visitors. Contractors will be required to park off-site and shuttle to the project area.

Thank you for incorporating these comments into the Checklist. I can be reached at 206-940-2255 (m) if you have any questions.

Sincerely,

[Signature]

Deb Barker
6043 48th Avenue SW
Seattle, WA 98136
July 5, 2011

Deb Barker
6043 48th Avenue SW
Seattle, WA 98136

Response to Comments on the Murray Combined Sewer Overflow Control Project

Dear Ms. Barker:

Thank you for your comments on the Murray Combined Sewer Overflow (CSO) Control Project State Environmental Policy Act Determination of Nonsignificance. Following are responses to the specific concerns expressed in your letter.

Staging. Impacts associated with off-site staging areas identified by the construction contractor will be minimized by King County’s requirement that its contractors comply with applicable regulations when they are operating staging areas as part of King County projects. Contractors will also be required to obtain the necessary permits for the operation of off-site staging areas and comply with permit conditions.

Vegetation. Grass removed or disturbed during construction in Lowman Beach Park will be restored to maintain the existing park use, with the exception of approximately 32 to 64 square feet of existing grass that will be replaced with one or two access hatches that will be placed on top of the proposed new diversion structure. Other landscaped areas in the park that are removed or disturbed will be replanted as required by the City of Seattle Parks Department. Landscaping on the storage tank site will contain drought tolerant or native plantings or both.

Noise. Properties that will be impacted by construction activity that involves impact equipment or other intense noise generating equipment will be notified in advance of this activity. Notification will include the expected start time and finish time of the activity, as well as an active and valid phone number for a person that can be contacted at all times.

Views. As currently proposed, exhaust stacks for the odor control system and standby power generator will extend approximately three feet above the roofline of the approximately 15-foot-tall ancillary equipment facility. They will be located below the residences located to the east of the ancillary equipment facility and will be designed to minimize their aesthetic impacts.
exhaust stacks may be noticeable from the residences and therefore alter views, but they will not block views.

Residential Access. King County appreciates your concern regarding the ability of residents located on SW Beach Drive south of Lowman Beach Park to access their homes during construction. Measures will be taken during construction to minimize impacts to residential access. As described in the State Environmental Policy Act (SEPA) environmental checklist, construction contract specifications will require the contractor to provide safe vehicular and pedestrian access to residences during construction, although access could be limited at times. Per City of Seattle requirements, the contractor will be required to maintain access to residences for emergency vehicles and personnel (example, fire, police, and medical) at all times during construction. In addition to project design and construction sequencing, measures taken to meet this requirement could include having materials and equipment on-site to create immediate access for emergency vehicles, such as steel plates to cover excavations.

King County will provide advance notification of construction activities to residents near the construction area, including times when vehicular access to homes will be limited. King County understands that restricted vehicular access to homes is very inconvenient and will make every effort to minimize these impacts and clearly communicate about times when these impacts cannot be avoided.

Parking. King County appreciates your concern about the maintenance of adequate parking near the project site for residents and park users during construction. The County will require its construction contractor to minimize impacts on parking during construction to the extent practicable. Some potential means of doing this are described in the environmental checklist.

If you have SEPA-related questions about the Murray CSO Control Project, please contact Sue Meyer, Water Quality Planner, at 206-684-1171 or sue.meyer@kingcounty.gov. For other questions about the project, please contact the project manager, Erica Jacobs, at 206-684-1138.

Sincerely,

[Signature]

Wesley Sprague
Supervisor

cc: Erica Jacobs, Project Manager, King County Wastewater Treatment Division (WTD)
Shahrzad Namini, Project Manager, WTD
Sue Meyer, Water Quality Planner, WTD
Mr. Wesley Sprague  
Supervisor, Community Services and Environmental Planning  
King County Wastewater Treatment Division  
201 South Jackson Street  
MS KSC-NR-0505  
Seattle, WA 98104-3855

Dear Mr. Sprague:

Please consider this letter to be a comment for the record regarding the decision of no significant environmental impacts (DNS) for the proposed Murray CSO project.

We find the decision process for the alternative selected for the Murray CSO project to be flawed, and (1) urge the King County Waste Treatment Division (KCWTD) to withdraw the DNS related to this proposed facility, (2) to revisit the planning framework for the Murray CSO project, and (3) to select another alternative for the Murray CSO project. We will articulate our reasons for this argument in this letter. Mr. Beyers was a member of the Murray Community Advisory Group (CAG), has followed this proposed project in some detail, and has examined the Draft Facilities Plan posted on KCWTD's website in February 2011 regarding this proposed project. In undertaking these revisions to the planning for this project, KCWTD is urged to begin immediately a public involvement process, something that has been suspended since KCWTD announced its proposal for this project in December 2010. See comments below on the CAG process.

SEPA. Let us address the issues just identified, and to do so within the framework of the Washington State Environmental Policy Act (SEPA), which states *inter alia* that KCWTD division is required to “study, develop, and describe appropriate alternatives to recommended courses of action in any proposal which involves unresolved conflicts concerning alternative uses of available resources” RCW 43.21C.020(3)(e). In this case the question is whether there are unresolved conflicts regarding the use of alternative resources. The DNS does not discuss this issue at all, and the Draft Facilities Plan (DFP) does not rule out the feasibility of either alternative considered in the “final screening analysis,” and fails to adequately consider several alternatives included in the “coarse screening analysis contained in the Draft Facilities Plan. The unresolved conflict here is whether private property must be taken to achieve this environmental action. The DNS does not address this question, the Draft Facilities Plan leaves this question on the table (as it does not rule out the feasibility of the other two alternatives), and we argue that the DFP was flawed in its treatment of alternatives proposed by the CAG. KCWTD has a duty under RCW to demonstrate that it has
resolved the conflict between taking private land, and using public land for this project, and it has not resolved this conflict in its DFP or in the DNS.

Given these procedural mistakes, the DNS should be withdrawn, and KCWTD should move to open its analytical process, with full citizen involvement, so that mandated CSO treatment standards can be met. The CAG recommended two alternatives using public property. KCWTD staff and their consultants were closely involved with the CAG process, and neither alternative proposed by the CAG was argued by KCWTD or their consultants to be fatally flawed and urged for removal from the set of alternatives when we submitted our report in 2010. It would seem as though KCWTD staff and their consultants would have indicated their concerns with CAG alternatives in good faith, lest members of this group, like Mr. Beyers, would feel betrayed by the KCWTD decision announced in December 2010 to site this facility on private land without adequately resolving the question of whether it was necessary under SEPA to take this land.

In the period since KCWTD posted on its website the Draft Proposed Facilities Plan, and neighbors have had a chance to review these documents, it has become clear to us that KCWTD made a mistake in selecting the proposed alternative. Thousands of signatures have been submitted on petitions gathered by neighbors opposing the selected alternative. The people living in these residences do not want their homes to be taken.

CAG process The CAG developed a set of Guiding Principles, together with KCWTD (including Linda Sullivan, Christie True, and others from the City of Seattle), and these were vetted carefully with full public involvement. Fundamental in these Guiding Principles were the notions of (a) equity within both the Murray and Barton Basins in development of CSO projects, (b) protection of open space within parks, (c) protection of the character, scale, use, and property values of private property and neighborhoods, (d) minimizing long term impacts on open space, the community and private property, (e) incorporation of sustainable best practices, (f) solutions in the upper basins to reduce the impact of solutions in the bottom of the basins. The CAG recommendations were based on these principles.

DFP Details The foundation for the DNS is the DFP. We would like to offer these comments on the DFP. The Coarse Screening Matrix for alternative 1B in the DFP is flawed. The pumping station needed to handle Barton flows could be sited in the undeveloped Murray right of way on the east side of Beach Dr. SW, rather than in Lowman Beach Park. The pipeline to the “triangle” site could go under Lincoln Park Way north to the “triangle site.” The comments on O&M are not explained in public documents that we are aware of. Regarding land-use/permitting – if the pump station were located as suggested above—then private property would not need to be taken, nor would the “lengthy, uncertain process associated with allowing use of existing park property for new pump station if sited in the park” be an issue. The CAG offered alternative 1B after careful consideration, and KCWTD treatment in the DFP of this alternative is cursory, biased, and flawed. This alternative (1) is feasible, (2) avoids the SEPA issue of taking private property when it is not needed to achieve a mandated
environmental objective, (3) is cost effective, and (4) has environmental challenges similar to and not more complex than the selected alternative.

Regarding alternative 1F coarse screening matrix information, the text fails to make reference to a new diversion structure proposed for a location in Lowman Beach Park and related piping, the need for permits from the City of Seattle for this structure, and City policies to not locate projects of this type in public parks. The narrative for this section also fails to note that the taking of private property must be “necessary,” implying that there are not options for the use of public property to achieve the same goals. Clearly, alternative 1B avoids this obstacle, as the storage facility, related pumping station, odor control, and emergency generation facilities could be located on land currently publicly owned. The community impact section fails to note that taking these private properties will reduce overall private property valuation by millions of dollars, which will raise property taxes for other taxpayers who will now have to make up for the loss of these property taxes. **The need for City of Seattle involvement for zoning changes and consideration of policies to save moderate rate housing is not highlighted.** The description of the odor control and emergency generator facilities for this alternative are described in the Draft Facilities Plan as above grade, while CAG members were assured by KCWTD’s Linda Sullivan at a June 19, 2010 workshop that these facilities would be underground in any chosen alternative. (If alternative 1F were pursued, these facilities could be located underground in the Murray Ave. right of way.

**Summary Comments** We strongly support KCWTD programs to reduce CSO spills. The present proposal is problematic, flawed, and must be revised. We are very upset that the County Executive, who took a strong interest in early citizen concerns about KCWTD proposals to demolish Lowman Beach Park has not weighed in with concern about a proposal to demolish 16 affordable rental properties in a neighborhood where literally 50’ north of the selected location there is a parcel of already publically owned land that can accomplish the same environmental goals without these damaging impacts.

Sincerely,

William B. & Margaret L. Beyers

Cc: County Executive Dow Constantine
    King County Councilman Joe McDermott
    Seattle City Councilman Tom Rasmussen
July 5, 2011

William B. and Margaret L. Beyers
7159 Beach Drive SW
Seattle, WA 98136

Response to Comments on the Murray Combined Sewer Overflow Control Project

Dear Mr. and Ms. Beyers:

Thank you for your comments on the Murray Combined Sewer Overflow (CSO) Control Project State Environmental Policy Act (SEPA) Determination of Nonsignificance (DNS). Following are responses to the specific concerns expressed in your letters dated May 9, 2011 and May 15, 2011.

The County acknowledges that the language in the petition as a comment from the four signatories of the letter, but not as an official comment from each of the signatories to the petition. This letter includes responses to the comments.

Chapter 43.21C.030 of the Revised Code of Washington, referenced in your comment letter, contains general SEPA guidelines for state agencies and local governments. The SEPA rules contained in Chapter 197-11 of the Washington Administrative Code (WAC) establish requirements for compliance with SEPA. WAC 197-11-055 and 197-11-060 allow government agencies to identify a proposal to accomplish a goal and then conduct environmental review of that proposal. The SEPA rules state that environmental review is appropriate when the principal features of a proposal can be reasonably identified and that agencies must make certain that the proposal which is the subject of environmental review is properly defined.

As allowed in the SEPA rules, King County identified a proposal to control CSOs in the Murray basin. The proposal is to construct a wastewater storage tank and ancillary equipment facility on private property that would be acquired by King County and an underground diversion structure next to King County’s existing Murray Pump Station in Lowman Beach Park. Based on the environmental checklist prepared for the proposed project, King County determined that the proposal is not likely to have a probable significant adverse environmental impact and issued a DNS. King County reconsidered the DNS based on comments received during the DNS comment period and has decided to retain the DNS, unchanged, as final. Because the County’s proposal is not likely to have a significant adverse environmental impact, an Environmental

CREATING RESOURCES FROM WASTEWATER
Impact Statement is not required (WAC 197-11-330). No administrative appeal of the DNS was offered because the Director of the King County Department of Natural Resources and Parks, consistent with King County Public Rule 7-4-1 determined that the environmental impacts identified in the environmental checklist will be adequately addressed by the development regulations and other applicable requirements of the City of Seattle and by other applicable state and federal regulations referred to in the environmental checklist.

In your comment letter, you provided comments on the February 2011 Draft Barton and Murray Combined Sewer Overflow Control Facilities Plan ("Facilities Plan") and identified the Draft Facilities Plan as the foundation for the DNS. The Draft Facilities Plan was developed to meet Washington requirements for wastewater engineering reports (WAC 173-240-060), facility plan requirements defined in Washington’s August 2008 Criteria for Sewage Works Design ("The Orange Book" Section C3), and Code of Federal Regulations Title 40 Part 35. It summarizes preliminary engineering that has been completed by King County for improvements to control CSOs from the Murray basin. It also describes the need for the Murray CSO Control Project and the processes King County used to identify and evaluate alternative means of CSO control in order to define a proposal on which environmental review would be conducted in accordance with SEPA. The Draft Facilities Plan is not the foundation for the SEPA DNS. The SEPA environmental checklist that supported the DNS analyzed the environmental impacts and identified potential mitigation measures associated with King County’s proposal to construct a wastewater storage tank and ancillary equipment facility on private property that would be acquired by King County and an underground diversion structure in Lowman Beach Park in order to control CSOs in the Murray basin.

In your comment letter, you requested that King County provide an opportunity for extensive public involvement in the development of a proposal that satisfies project goals and minimizes impact on the community. The County obtained public input during the time that it was identifying and evaluating alternative means of controlling CSOs in the Murray basin by hosting numerous public meetings, community group meetings and briefings where it provided information about the development of alternative means of CSO control and facilitated active public participation in the project planning process. King County also established the Murray Community Advisory Group in response to the community’s opposition to a proposal that would involve major construction in Lowman Beach Park. Project information was made available to the public by the County via a project website and project mailings. Input obtained during this extensive public outreach and involvement effort was considered by the County when it decided on its proposal for controlling CSOs in the Murray basin.

None of the possible alternative means of CSO control was optimal for all evaluation criteria the County considered. Constructing a storage tank in Lincoln Park’s lower parking lot or in the triangular piece of property located on the northeast side of Lincoln Park Way ("the triangle") were not put forward as the County’s proposal because these approaches posed significant operational and reliability issues, and would have likely required more substantial construction in Lowman Beach Park than the County’s current proposal. If a storage tank were constructed in Lincoln Park, an approximately 0.1-million-gallon storage tank and an odor control and standby
generator facility would still be required near the existing Murray Pump Station in Lowman Beach Park. If a storage tank were constructed in the triangle, a peak-flow pump station near the Murray Pump Station would be required and private property might need to be acquired to provide access to the storage facility.

The community’s strong opposition to major construction in Lowman Beach Park helped King County to define its proposal. This proposal provides a single, reliable facility with fewer construction impacts to neighborhoods and parks than other possible means of CSO control that were considered. King County believes that its proposal offers the best balance between the community’s interests, the overall needs of the regional wastewater conveyance system, and the County’s obligation to comply with CSO control requirements in its current West Point Treatment Plant National Pollution Discharge Elimination System permit.

King County will continue to work with the community during the design and construction phases of the proposed project. An updated public involvement plan will be developed to keep the community and stakeholders engaged and informed, and to respond to community concerns during project design and construction.

In your letters, you raised the topic of City of Seattle involvement in the proposed project. Representatives from Seattle Public Utilities (SPU) and Seattle Parks and Recreation (Seattle Parks) have been and will continue to be involved in the Murray CSO Control Project. An SPU representative was a member of the King County project team that identified and evaluated alternative means of CSO control in the Murray basin and representatives from both SPU and Seattle Parks have attended community meetings on the project at King County’s invitation. King County will continue to work closely with the City on this project during project design and the City will become involved in the activities described in your letter (zoning, park use, etc.) once King County begins applying for project permits.

The petition attached to your May 9, 2011 comment letter expressed concern about environmental and community impacts associated with King County’s proposal. While it is true that the project will result in temporary construction impacts such as the odor, noise, traffic, recreation, and aesthetic impacts described in the environmental checklist, King County will take steps during design and construction to avoid or minimize these impacts. Examples of such avoidance and minimization measures are described in the environmental checklist.

The acquisition of private property for the project will result in the displacement of the people residing in the buildings located on the proposed storage tank site and the demolition of the residential buildings. As stated previously, King County’s proposal responds to the community’s very strongly expressed desire to minimize construction in Lowman Beach Park. Residential displacement impacts will be mitigated as described in the environmental checklist.

The petition also provided comments on costs associated with King County’s proposal. While SEPA does not address the cost of a proposal, cost is an important part of King County’s decision process.
William B. and Margaret L. Beyers  
July 5, 2011  
Page 4

In response to the petition’s question regarding the necessity for CSO control in the Murray basin, King County’s current National Pollutant Discharge Elimination System permit for the West Point Treatment Plant requires that the County implement controls to reduce CSOs in the Murray basin to an average of no more than one per year on a long-term average.

If you have SEPA-related questions about the Murray CSO Control Project, please contact Sue Meyer, Water Quality Planner, at 206-684-1171 or sue.meyer@kingcounty.gov. For other questions about the project, please contact the project manager, Erica Jacobs, at 206-684-1138.

Sincerely,

Wesley Sprague  
Supervisor

cc: Erica Jacobs, Project Manager, King County Wastewater Treatment Division (WTD)  
Shahrzad Namini, Project Manager, (WTD)  
Sue Meyer, Water Quality Planner, (WTD)
Wesley Sprague  
Supervisor - Community Services and Environmental Planning  
King County Wastewater Treatment Division  
201 South Jackson Street  
MS KSC-NR-0505  
Seattle, WA 98104-3855  

May 9, 2011  

Ref: Murray Combined Sewer Overflow Control Project DNS  

Dear Wesley,  

To say that we the community are disappointed with how the county has handled the Murray Combined Sewer Overflow Control Project would be an understatement.  

We believe that the DNS and related documents fail to meet the SEPA requirement to “study, develop and describe appropriate alternatives to recommended courses of action in any proposal which involves unresolved conflicts concerning alternative uses of available resource.” (RCW 43.21C.030(3)(e)). We argue that there is an unresolved conflict over use of available resources, as in the course screening evaluation included in the February 2011 Draft Facilities Plan, where documentation was inadequate to rule out recommended CAG alternatives, KC1F and CAG2A. King County Waste Treatment Division (KCWTD) has not demonstrated in the DNS and related documents that there is a resolution of the conflict between condemning private property and making use of underutilized public property for a public project.  

Options included in the KCWTD course and final screening included two options that did not require taking large amounts of private property—KC1A and CAG 2A. Both of these utilize public park lands, but KC1A would dramatically impact irreplaceable public resources, and was basis for the community outcry that precipitated creation of the CAG. We agree that this option should not be considered further. CAG alternative 2A would use a public parking lot in a park, but does not contain irreplaceable assets, and was not only considered a viable solution by the CAG, but also by KCWTD consultants during the CAG process.  

The CAG alternatives were carefully reviewed by KCWTD staff during this process, as well as their consultants. The fatal-flaws that led to rejection of both of the CAG alternatives were not made evident to CAG members during their deliberations, nor explained a month later when KCWTD selected another alternative. The Draft Facilities Plan does not adequately explain these decisions.  

There has been no public meeting to discuss or explain these decisions, yet this SEPA DNS has been issued, without an opportunity for appeal, and there is no announced plan for public involvement.  

To the best of our current knowledge the City of Seattle has not been involved in terms of zoning and land use changes, demolition of moderate rate housing, or use of Lowman Beach Park for increased footprint of utilities, etc.  

The community and the CAG have adamantly and consistently opposed the alternative KCWTD selected since it was first made “public”.  

If King County’s alternative 1B was substituted for KCWTD’s recommended alternative 1F, its selection should not significantly alter KCWTD’s schedule for completing this project, as articulated in King County document code PUT-7-4-1 (PR).  

Finally, please find the attached 3544 signatures of community members opposing this alternative.
We request KCWTD's re-engagement with the community, this time in genuine collaboration to avoid the inevitable challenges and opposition.

We argue that there is a significant environmental impact associated with this proposed project, and that the declaration of DNS was the wrong action by KCWTD. We urge KCWTD to proceed with a full SEPA EIS for this proposed project, so that there will be an opportunity for extensive public involvement with the evaluation of alternatives and the development of a project approach which satisfies project goals and minimizes impact on the community.

Bill Beyers  
7024 Beach Drive SW, Seattle, WA 98136  
CAG Member

Patrick Gordon  
7119 Beach Drive SW, Seattle, WA 98136  
CAG Member

Jim Coombes  
7031 Beach Drive SW, Seattle, WA 98136  
CAG Member

Michael Harkin  
7024 Beach Drive SW, Seattle, WA 98136  
Family Homestead affected by project
SAVE THE LOWMAN BEACH NEIGHBORHOOD

PETITION
To: Dow Constantine, Joe McDermott, Christie True, Pam Elard

In March of 2009, after some prodding, King County Wastewater Treatment Division (KCWD) held a presentation to a group of concerned citizens to explain a proposal to build a 1,000,000 gallon combined sewage overflow (CSO) holding tank in or near Lowman Beach Park. Their choice (of three) was to build the tank in Lowman Beach Park. The reaction was outrage.

After a petition was circulated and submitted with over 400 signatures, the county formed a Community Action Group (CAG) which spent hundreds if not thousands of hours analyzing the original 3 and 14 more alternatives, selecting a preferred solution and an alternate. KCWTD selected neither but chose the only one of the original three remaining; using eminent domain to condemn 6 properties and 16 reasonably priced dwelling units; even though the CAGs second choice (1-B “triangle”) was several million dollars cheaper, only 200 feet away and currently vacant.

ENVIRONMENTAL
The environmental impacts of this alternative are numerous and severe.
- Long term destruction of the neighborhood and replacement with an industrial zone.
- Will increase odor, noise, sinkholes, disruption and unsightliness.
- Construction impacts of noise, dirt, disruption, unsightliness and danger would go on for 2 to 4 years.
- Is the concept even necessary or is it yet another bureaucratic mandate forcing something on us we don’t need or want.
- At minimum, the project needs to go through the complete Environmental Impact process.

COMMUNITY
Selection of the eminent domain alternative will:
- Destroy 16 reasonably priced living units when a cheaper, vacant and very viable alternative exists 200 feet away.
- Completely changes the character of the neighborhood from residential to industrial.

The larger size of the facility is because KCWMD is sending 45% of Barton basin’s overflow to Lowman; thereby, increasing the community destruction at Lowman.

COSTS
Current sewer rates are extremely high (over double the water rates ((117%)) in the area)
The cost of the eminent domain alternative (using the county’s own estimates) is far more expensive than the 1B “triangle” option recommended by the Community Action Group.

Where is the common sense? KCWTD plans to spend $10,000 per gallon to keep a small amount of sewage out of the sound.

SUMMARY
If we are forced to accept and pay for anything it should not destroy the community. It should not be the option KCWTD choose but the alternate site the CAG selected.

Environmentally, the KCWTD alternative is very damaging and we demand a full EIS.
If we are forced to accept and pay for this monstrosity, then the result must be community friendly.
July 5, 2011

Patrick Gordon
7119 Beach Drive SW
Seattle, WA 98136

Response to Comments on the Murray Combined Sewer Overflow Control Project

Dear Mr. Gordon:

Thank you for your recent comment letter and petition on the Murray Combined Sewer Overflow (CSO) Control Project State Environmental Policy Act (SEPA) Determination of Nonsignificance (DNS). Following are responses to the specific concerns expressed in your letter.

The County acknowledges the language in the petition as a comment from the four signatories of the letter, but not as an official comment from each of the signatories to the petition. This letter includes responses to the comments.

Chapter 43.21C.030 of the Revised Code of Washington, referenced in your comment letter, contains general SEPA guidelines for state agencies and local governments. The SEPA rules contained in Chapter 197-11 of the Washington Administrative Code (WAC) establish requirements for compliance with SEPA. WAC 197-11-055 and 197-11-060 allow government agencies to identify a proposal to accomplish a goal and then conduct environmental review of that proposal. The SEPA rules state that environmental review is appropriate when the principal features of a proposal can be reasonably identified and that agencies must make certain that the proposal that is the subject of environmental review is properly defined.

As allowed in the SEPA rules, King County identified a proposal to control CSOs in the Murray basin. The proposal is to construct a wastewater storage tank and ancillary equipment facility on private property that would be acquired by King County and an underground diversion structure next to King County’s existing Murray Pump Station in Lowman Beach Park. Based on the environmental checklist prepared for the proposed project, King County determined that the proposal is not likely to have a probable significant adverse environmental impact and issued a DNS. King County reconsidered the DNS based on comments received during the DNS comment period and has decided to retain the DNS, unchanged, as final. Because the County’s proposal is not likely to have a significant adverse environmental impact, an Environmental
Impact Statement is not required (WAC 197-11-330). No administrative appeal of the DNS was offered because the Director of the King County Department of Natural Resources and Parks, consistent with King County Public Rule 7-4-1 determined that the environmental impacts identified in the environmental checklist will be adequately addressed by the development regulations and other applicable requirements of the City of Seattle and by other applicable state and federal regulations referred to in the environmental checklist.

In your comment letter, you requested that King County provide an opportunity for extensive public involvement in the development of a proposal that satisfies project goals and minimizes impact on the community. The County obtained public input during the time that it was identifying and evaluating alternative means of controlling CSOs in the Murray basin by hosting numerous public meetings, community group meetings and briefings where it provided information about the development of alternative means of CSO control and facilitated active public participation in the project planning process. King County also established the Murray Community Advisory Group in response to the community’s opposition to a proposal that would involve major construction in Lowman Beach Park. Project information was made available to the public by the County via a project website and project mailings. Input obtained during this extensive public outreach and involvement effort was considered by the County when it decided on its proposal for controlling CSOs in the Murray basin.

None of the possible alternative means of CSO control was optimal for all evaluation criteria the County considered. Constructing a storage tank in Lincoln Park’s lower parking lot or in the triangular piece of property located on the northeast side of Lincoln Park Way (“the triangle”) were put forward as King County’s proposal because these approaches posed significant operational and reliability issues, and would have likely required more substantial construction in Lowman Beach Park than the County’s current proposal. If a storage tank were constructed in Lincoln Park, an approximately 0.1-million-gallon storage tank and an odor control and standby generator facility would still be required near the existing Murray Pump Station in Lowman Beach Park. If a storage tank were constructed in the triangle, a peak-flow pump station near the Murray Pump Station would be required and private property might need to be acquired to provide access to the storage facility.

The community’s strong opposition to major construction in Lowman Beach Park helped King County define its proposal. This proposal provides a single, reliable facility with fewer construction impacts to neighborhoods and parks than other possible means of CSO control that were considered. King County believes that its proposal offers the best balance between the community’s interests, the overall needs of the regional wastewater conveyance system, and the County’s obligation to comply with CSO control requirements in its current West Point Treatment Plant National Pollution Discharge Elimination System permit.

King County will continue to work with the community during the design and construction phases of the proposed project. An updated public involvement plan will be developed to keep the community and stakeholders engaged and informed, and to respond to community concerns during project design and construction. The proposed facilities will be designed so that their
visual impacts are minimized and they blend in with the surrounding neighborhood to the extent possible. When designing the ancillary equipment facility that will be located on the storage tank site, the County will consider input from the community on exterior materials, architectural elements, fencing, and landscaping to ensure that it is consistent with the residential waterfront setting. The design process for the ancillary equipment facility will follow City of Seattle (City) policies and guidelines for incorporating aesthetic considerations into design.

In your letter, you raised the topic of City of Seattle involvement in the proposed project. Representatives from Seattle Public Utilities (SPU) and Seattle Parks and Recreation (Seattle Parks) have been and will continue to be involved in the Murray CSO Control Project. An SPU representative was a member of the King County project team that identified and evaluated alternative means of CSO control in the Murray basin and representatives from both SPU and Seattle Parks have attended community meetings on the project at King County’s invitation. King County will continue to work closely with the City on this project during project design and the City will become involved in the activities described in your letter (zoning, park use, etc.) once King County begins applying for project permits.

The petition attached to your comment letter expressed concern about environmental and community impacts associated with King County’s proposal. While it is true that the project will result in temporary construction impacts such as the odor, noise, traffic, recreation, and aesthetic impacts described in the environmental checklist, King County will take steps during design and construction to avoid or minimize these impacts. Examples of such avoidance and minimization measures are described in the environmental checklist.

The acquisition of private property for the project will result in the displacement of the people residing in the buildings located on the proposed storage tank site and the demolition of the residential buildings. As stated previously, King County’s proposal responds to the community’s very strongly expressed desire to minimize construction in Lowman Beach Park. Residential displacement impacts will be mitigated as described in the environmental checklist.

In response to the petition’s question regarding the necessity for CSO control in the Murray basin, King County’s current National Pollutant Discharge Elimination System permit for the West Point Treatment Plant requires that the County implement controls to reduce CSOs in the Murray basin to an average of no more than one per year on a long-term average.
If you have SEPA-related questions about the Murray CSO Control Project, please contact Sue Meyer, Water Quality Planner, at 206-684-1171 or sue.meyer@kingcounty.gov. For other questions about the project, please contact the project manager, Erica Jacobs, at 206-684-1138.

Sincerely,

Wesley Sprague
Supervisor

cc: Erica Jacobs, Project Manager, King County Wastewater Treatment Division (WTD)
    Shahrzad Namini, Project Manager, WTD
    Sue Meyer, Water Quality Planner, WTD
July 5, 2011

Jim Coombes
7031 Beach Drive SW
Seattle, WA 98136

Response to Comments on the Murray Combined Sewer Overflow Control Project

Dear Mr. Coombes:

Thank you for your recent comment letter and petition on the Murray Combined Sewer Overflow (CSO) Control Project State Environmental Policy Act (SEPA) Determination of Nonsignificance (DNS). Following are responses to the specific concerns expressed in your letter.

The County acknowledges the language in the petition as a comment from the four signatories of the letter, but not as an official comment from each of the signatories to the petition. This letter includes responses to the comments.

Chapter 43.21C.030 of the Revised Code of Washington, referenced in your comment letter, contains general SEPA guidelines for state agencies and local governments. The SEPA rules contained in Chapter 197-11 of the Washington Administrative Code (WAC) establish requirements for compliance with SEPA. WAC 197-11-055 and 197-11-060 allow government agencies to identify a proposal to accomplish a goal and then conduct environmental review of that proposal. The SEPA rules state that environmental review is appropriate when the principal features of a proposal can be reasonably identified and that agencies must make certain that the proposal that is the subject of environmental review is properly defined.

As allowed in the SEPA rules, King County identified a proposal to control CSOs in the Murray basin. The proposal is to construct a wastewater storage tank and ancillary equipment facility on private property that would be acquired by King County and an underground diversion structure next to King County’s existing Murray Pump Station in Lowman Beach Park. Based on the environmental checklist prepared for the proposed project, King County determined that the proposal is not likely to have a probable significant adverse environmental impact and issued a DNS. King County reconsidered the DNS based on comments received during the DNS comment period and has decided to retain the DNS, unchanged, as final. Because the County’s proposal is not likely to have a significant adverse environmental impact, an Environmental
Impact Statement is not required (WAC 197-11-330). No administrative appeal of the DNS was offered because the Director of the King County Department of Natural Resources and Parks, consistent with King County Public Rule 7-4-1 determined that the environmental impacts identified in the environmental checklist will be adequately addressed by the development regulations and other applicable requirements of the City of Seattle and by other applicable state and federal regulations referred to in the environmental checklist.

In your comment letter, you requested that King County provide an opportunity for extensive public involvement in the development of a proposal that satisfies project goals and minimizes impact on the community. The County obtained public input during the time that it was identifying and evaluating alternative means of controlling CSOs in the Murray basin by hosting numerous public meetings, community group meetings and briefings where it provided information about the development of alternative means of CSO control and facilitated active public participation in the project planning process. King County also established the Murray Community Advisory Group in response to the community’s opposition to a proposal that would involve major construction in Lowman Beach Park. Project information was made available to the public by the County via a project website and project mailings. Input obtained during this extensive public outreach and involvement effort was considered by the County when it decided on its proposal for controlling CSOs in the Murray basin.

None of the possible alternative means of CSO control was optimal for all evaluation criteria the County considered. Constructing a storage tank in Lincoln Park’s lower parking lot or in the triangular piece of property located on the northeast side of Lincoln Park Way (“the triangle”) were put forward as King County’s proposal because these approaches posed significant operational and reliability issues, and would have likely required more substantial construction in Lowman Beach Park than the County’s current proposal. If a storage tank were constructed in Lincoln Park, an approximately 0.1-million-gallon storage tank and an odor control and standby generator facility would still be required near the existing Murray Pump Station in Lowman Beach Park. If a storage tank were constructed in the triangle, a peak-flow pump station near the Murray Pump Station would be required and private property might need to be acquired to provide access to the storage facility.

The community’s strong opposition to major construction in Lowman Beach Park helped King County define its proposal. This proposal provides a single, reliable facility with fewer construction impacts to neighborhoods and parks than other possible means of CSO control that were considered. King County believes that its proposal offers the best balance between the community’s interests, the overall needs of the regional wastewater conveyance system, and the County’s obligation to comply with CSO control requirements in its current West Point Treatment Plant National Pollution Discharge Elimination System permit.

King County will continue to work with the community during the design and construction phases of the proposed project. An updated public involvement plan will be developed to keep the community and stakeholders engaged and informed, and to respond to community concerns during project design and construction. The proposed facilities will be designed so that their
visual impacts are minimized and they blend in with the surrounding neighborhood to the extent possible. When designing the ancillary equipment facility that will be located on the storage tank site, the County will consider input from the community on exterior materials, architectural elements, fencing, and landscaping to ensure that it is consistent with the residential waterfront setting. The design process for the ancillary equipment facility will follow City of Seattle (City) policies and guidelines for incorporating aesthetic considerations into design.

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If you have SEPA-related questions about the Murray CSO Control Project, please contact Sue Meyer, Water Quality Planner, at 206-684-1171 or sue.meyer@kingcounty.gov. For other questions about the project, please contact the project manager, Erica Jacobs, at 206-684-1138.

Sincerely,

Wesley Sprague
Supervisor

cc: Erica Jacobs, Project Manager, King County Wastewater Treatment Division (WTD)
    Shahrzad Namini, Project Manager, WTD
    Sue Meyer, Water Quality Planner, WTD
July 5, 2011

Michael Harkin
7024 Beach Drive SW
Seattle, WA 98136

Response to Comments on the Murray Combined Sewer Overflow Control Project

Dear Mr. Harkin:

Thank you for your recent comment letter and petition on the Murray Combined Sewer Overflow (CSO) Control Project State Environmental Policy Act (SEPA) Determination of Nonsignificance (DNS). Following are responses to the specific concerns expressed in your letter.

The County acknowledges the language in the petition as a comment from the four signatories of the letter, but not as an official comment from each of the signatories to the petition. This letter includes responses to the comments.

Chapter 43.21C.030 of the Revised Code of Washington, referenced in your comment letter, contains general SEPA guidelines for state agencies and local governments. The SEPA rules contained in Chapter 197-11 of the Washington Administrative Code (WAC) establish requirements for compliance with SEPA. WAC 197-11-055 and 197-11-060 allow government agencies to identify a proposal to accomplish a goal and then conduct environmental review of that proposal. The SEPA rules state that environmental review is appropriate when the principal features of a proposal can be reasonably identified and that agencies must make certain that the proposal that is the subject of environmental review is properly defined.

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Impact Statement is not required (WAC 197-11-330). No administrative appeal of the DNS was offered because the Director of the King County Department of Natural Resources and Parks, consistent with King County Public Rule 7-4-1 determined that the environmental impacts identified in the environmental checklist will be adequately addressed by the development regulations and other applicable requirements of the City of Seattle and by other applicable state and federal regulations referred to in the environmental checklist.

In your comment letter, you requested that King County provide an opportunity for extensive public involvement in the development of a proposal that satisfies project goals and minimizes impact on the community. The County obtained public input during the time that it was identifying and evaluating alternative means of controlling CSOs in the Murray basin by hosting numerous public meetings, community group meetings and briefings where it provided information about the development of alternative means of CSO control and facilitated active public participation in the project planning process. King County also established the Murray Community Advisory Group in response to the community’s opposition to a proposal that would involve major construction in Lowman Beach Park. Project information was made available to the public by the County via a project website and project mailings. Input obtained during this extensive public outreach and involvement effort was considered by the County when it decided on its proposal for controlling CSOs in the Murray basin.

None of the possible alternative means of CSO control was optimal for all evaluation criteria the County considered. Constructing a storage tank in Lincoln Park’s lower parking lot or in the triangular piece of property located on the northeast side of Lincoln Park Way (“the triangle”) were put forward as King County’s proposal because these approaches posed significant operational and reliability issues, and would have likely required more substantial construction in Lowman Beach Park than the County’s current proposal. If a storage tank were constructed in Lincoln Park, an approximately 0.1-million-gallon storage tank and an odor control and standby generator facility would still be required near the existing Murray Pump Station in Lowman Beach Park. If a storage tank were constructed in the triangle, a peak-flow pump station near the Murray Pump Station would be required and private property might need to be acquired to provide access to the storage facility.

The community’s strong opposition to major construction in Lowman Beach Park helped King County define its proposal. This proposal provides a single, reliable facility with fewer construction impacts to neighborhoods and parks than other possible means of CSO control that were considered. King County believes that its proposal offers the best balance between the community’s interests, the overall needs of the regional wastewater conveyance system, and the County’s obligation to comply with CSO control requirements in its current West Point Treatment Plant National Pollution Discharge Elimination System permit.

King County will continue to work with the community during the design and construction phases of the proposed project. An updated public involvement plan will be developed to keep the community and stakeholders engaged and informed, and to respond to community concerns during project design and construction. The proposed facilities will be designed so that their
visual impacts are minimized and they blend in with the surrounding neighborhood to the extent possible. When designing the ancillary equipment facility that will be located on the storage tank site, the County will consider input from the community on exterior materials, architectural elements, fencing, and landscaping to ensure that it is consistent with the residential waterfront setting. The design process for the ancillary equipment facility will follow City of Seattle (City) policies and guidelines for incorporating aesthetic considerations into design.

In your letter, you raised the topic of City of Seattle involvement in the proposed project. Representatives from Seattle Public Utilities (SPU) and Seattle Parks and Recreation (Seattle Parks) have been and will continue to be involved in the Murray CSO Control Project. An SPU representative was a member of the King County project team that identified and evaluated alternative means of CSO control in the Murray basin and representatives from both SPU and Seattle Parks have attended community meetings on the project at King County’s invitation. King County will continue to work closely with the City on this project during project design and the City will become involved in the activities described in your letter (zoning, park use, etc.) once King County begins applying for project permits.

The petition attached to your comment letter expressed concern about environmental and community impacts associated with King County’s proposal. While it is true that the project will result in temporary construction impacts such as the odor, noise, traffic, recreation, and aesthetic impacts described in the environmental checklist, King County will take steps during design and construction to avoid or minimize these impacts. Examples of such avoidance and minimization measures are described in the environmental checklist.

The acquisition of private property for the project will result in the displacement of the people residing in the buildings located on the proposed storage tank site and the demolition of the residential buildings. As stated previously, King County’s proposal responds to the community’s very strongly expressed desire to minimize construction in Lowman Beach Park. Residential displacement impacts will be mitigated as described in the environmental checklist.

In response to the petition’s question regarding the necessity for CSO control in the Murray basin, King County’s current National Pollutant Discharge Elimination System permit for the West Point Treatment Plant requires that the County implement controls to reduce CSOs in the Murray basin to an average of no more than one per year on a long-term average.
If you have SEPA-related questions about the Murray CSO Control Project, please contact Sue Meyer, Water Quality Planner, at 206-684-1171 or sue.meyer@kingcounty.gov. For other questions about the project, please contact the project manager, Erica Jacobs, at 206-684-1138.

Sincerely,

[Signature]

Wesley Sprague
Supervisor

cc: Erica Jacobs, Project Manager, King County Wastewater Treatment Division (WTD)
Shahrzad Namini, Project Manager, WTD
Sue Meyer, Water Quality Planner, WTD
May 10, 2011

To:

Wesley Sprague
Community Services and Environmental Planning
King County Wastewater Treatment Division
201 South Jackson Streets, MS KSC-NR-0505
Seattle, WA 98104-3855

Mr. Sprague.

Thank you for your letter regarding the Murray Combined Sewer Overflow Control Project. We have concerns with the existing proposal.

We are opposed to the plan to remove family homes for the planned Murray Combined Sewer Overflow Control Project. To destroy these homes is wrong, and goes against what King County voters and taxpayers have said for years, that is, we want to live more urbanly and to use more public transit. As proposed, the Murray Combined Sewer Overflow Control Project would destroy family homes just paces from a Metro bus route. The high quality of life and uniqueness of this West Seattle neighborhood would be degraded by a fenced compound adjacent to the Lowman Beach Park.

There are two viable alternatives that accomplish the goals of the CSO project that don’t destroy homes. We personally prefer the South Lincoln Park parking lot site. The Murray Avenue “triangle” site would not destroy family homes. We consider long term negatives to the neighborhood things like unaesthetic (industrial) above ground structures and ‘Cyclone’ fencing. Such project features need to be aesthetidy compatible with a family neighborhood.

Thank you,

Keith Neal & Cheryle Bohl

[Signatures]

6735 Beach Drive SW
Seattle WA 98136.

CC.

Pam Elardo, P.E.
King County Wastewater Treatment Division

Sue Mayer,
King County Wastewater Treatment Division
July 5, 2011

Keith Neal and Cheryle Bohl
6735 Beach Drive SW
Seattle, WA 98136

Response to Comments on the Murray Combined Sewer Overflow Control Project

Dear Mr. Neal and Ms. Bohl:

Thank you for your comments on the Murray Combined Sewer Overflow (CSO) Control Project State Environmental Policy Act Determination of Nonsignificance. Following are responses to the specific concerns expressed in your letter.

In your letter you expressed concerns about King County’s proposal to construct a CSO storage tank on private property located across Beach Drive SW from Lowman Beach Park and, specifically, the proposal’s associated housing and aesthetic impacts.

None of the possible means of CSO control considered by the County were optimal for all evaluation criteria the County used. Community Advisory Group (CAG) Alternative 2A (storage at Lincoln Park lower parking lot) and Alternative 1B-b (storage in the vicinity of Murray Avenue and Lincoln Park Way—“the Murray Avenue triangle site”) were not put forward as King County’s proposal because they posed significant operational and reliability issues, and would have likely required more substantial construction in Lowman Beach Park than the County’s current proposal. CAG Alternative 2A would have required construction of an approximately 0.1-million-gallon storage tank and an odor control and standby generator facility near the existing Murray Pump Station in Lowman Beach Park. Alternative 1B-b would have required the construction of a peak-flow pump station near the Murray Pump Station. It is also likely that this alternative would have required the acquisition of private property.

The community’s strong opposition to major construction in Lowman Beach Park helped King County to define its proposal. This proposal provides a single, reliable facility with fewer construction impacts to neighborhoods and parks than other possible means of CSO control that were considered. King County believes that its proposal offers the best balance between the community’s interests, the overall needs of the regional wastewater conveyance system, and the County’s obligation to comply with CSO control requirements in its current West Point Treatment Plant National Pollution Discharge Elimination System permit.
As described in the SEPA environmental checklist, King County will mitigate the housing and residential displacement impacts associated with its proposed project by acquiring the properties necessary to construct the project at fair market value and providing relocation assistance to qualified property owners and qualified tenants.

The proposed facilities will be designed so that their visual impacts are minimized and they blend in with the surrounding neighborhood to the extent possible. When designing the ancillary equipment facility that will be located on the storage tank site, the County will consider input from the community on exterior materials, architectural elements, fencing, and landscaping to ensure that it is consistent with the residential waterfront setting. The design process for the ancillary equipment facility will follow City of Seattle policies and guidelines for incorporating aesthetic considerations into design.

If you have SEPA-related questions about the Murray CSO Control Project, please contact Sue Meyer, Water Quality Planner, at 206-684-1171 or sue.meyer@kingcounty.gov. For other questions about the project, please contact the project manager, Erica Jacobs, at 206-684-1138.

Sincerely,

[Signature]
Wesley Sprague
Supervisor

cc: Erica Jacobs, Project Manager, King County Wastewater Treatment Division (WTD)
    Shahrzad Namini, Project Manager, WTD
    Sue Meyer, Water Quality Planner, WTD
Wesley Sprague, Supervisor
Community Services and Environmental Planning
King County Wastewater Treatment Division (KCWTD)
201 South Jackson Street, MS: KSC-NR-0505
Seattle, WA 98104-3055

Re: SEPA Determination of Nonsignificance for Murray CSO project

Dear Mr. Sprague,

I am shocked that KCWTD issued a SEPA Determination of Nonsignificance (DNS) and is not planning on conducting an Environmental Impact Statement for the Murray Basin CSO project. I am writing to request that the DNS ruling be overturned and the EIS prepared.

I was an Alternate on the Citizen Advisory Group (CAG) for the Murray Basin CSO project. I am also writing against the plan to use the property across the street from Lowman Beach Park for the Murray CSO project because it means that eminent domain of private property will be required. This is unnecessary as there are two other alternatives available for use. The EIS would provide further documentation as to which site would be best for the community.

The CAG recommendation, CAG #2 – The Triangle, which KCWTD ignored, should be thoroughly studied. The other alternative (CAG #2A) is excellent, too, and would easily work as it involves using the space underneath the south parking lot of Lincoln Park.

I feel like KCWTD misrepresented their intent with all the CAG meetings as they are proceeding with the solution they wanted in the first place. In my opinion, either Alternative CAG2 or CAG2a would be best for the long term for the following reasons:

- CAG 2a was the most cost effective as developed by King County’s staff own numbers.
- Either preserves both Lincoln Park and Lowman Beach Park with their public waterfront and neither would have adverse construction staging impacts on the parks.
- CAG #2 and CAG#2a will work for several technical reasons. This was not true for most of the alternatives.
- The CAG developed Guiding Principles from which to judge the alternatives, and CAG2a best meets the guiding principles of all alternatives.
- Any of the alternatives for a project this size will create short term impacts. Choosing an alternative based on fewest short term impacts doesn’t make sense. With CAG2a there are no long term impacts to shorelines, parks, wet lands, private property, or tax revenues.
- Taking of private property for this project puts the total burden on a few families for the needs of the entire community. This is totally unfair when there are other alternatives available. These private residences provide housing for 16 families.

A complete Environmental Impact Statement must be prepared to examine the detrimental effects of KCWTD plan to locate this CSO across from Lowman Beach Park and underground in the south end of Lowman Beach Park. Existing CSO and KCWTD facilities in Lowman Beach Park should be removed as a part of this new CSO facility.

Sincerely,

Linda Ann Cox

cc: Email: Dow.Constantine@METROKC.GOV

6523 California Ave SW, #228, Seattle, WA 98136
(206) 938-4848 e-mail: Cox.LindaAnn@comcast.net
July 5, 2011

Linda Ann Cox
6523 California Avenue SW, #228
Seattle, WA 98136

Response to Comments on the Murray Combined Sewer Overflow Control Project

Dear Ms. Cox:

Thank you for your comments on the Murray Combined Sewer Overflow (CSO) Control Project State Environmental Policy Act (SEPA) Determination of Nonsignificance (DNS). Following are responses to the comments presented in your letter.

The SEPA rules contained in WAC 197-11-055 and 197-11-060 allow government agencies to identify a proposal to accomplish a goal and then conduct environmental review of that proposal. The SEPA rules state that environmental review is appropriate when the principal features of a proposal can be reasonably identified and that agencies must make certain that the proposal that is the subject of environmental review is properly defined.

As allowed in the SEPA rules, King County identified a proposal to control CSOs in the Murray basin. The proposal is to construct a wastewater storage tank and ancillary equipment facility on private property that would be acquired by King County and an underground diversion structure next to King County’s existing Murray Pump Station in Lowman Beach Park. Based on the environmental checklist prepared for the proposed project, King County determined that the proposal is not likely to have a probable significant adverse environmental impact and issued a DNS. King County reconsidered the DNS based on comments received during the DNS comment period and has decided to retain the DNS, unchanged, as final. Because the County’s proposal is not likely to have a significant adverse environmental impact, an Environmental Impact Statement is not required (WAC 197-11-330).

The County obtained public input during the time that it was identifying and evaluating alternative means of controlling CSOs in the Murray basin by hosting numerous public meetings, community group meetings and briefings where it provided information about the development of alternative means of CSO control and facilitated active public participation in the project planning process. King County also established the Murray Community Advisory Group in response to the community’s opposition to a proposal that would involve major construction in
Lowman Beach Park. The public input obtained through these efforts helped King County define its proposal for controlling CSOs in the Murray basin.

None of the possible alternative means of CSO control was optimal for all evaluation criteria the County considered. Constructing a storage tank in Lincoln Park’s lower parking lot or in the triangular piece of property located on the northeast side of Lincoln Park Way (“the triangle”) were not put forward as the County’s proposal because these approaches posed significant operational and reliability issues, and would have likely required more substantial construction in Lowman Beach Park than the County’s current proposal. If a storage tank were constructed in Lincoln Park, an approximately 0.1-million-gallon storage tank and an odor control and standby generator facility would still be required near the existing Murray Pump Station in Lowman Beach Park. If a storage tank were constructed in the triangle, a peak-flow pump station near the Murray Pump Station would be required and private property might need to be acquired to provide access to the storage facility.

King County’s proposal provides a single, reliable facility with fewer construction impacts to neighborhoods and parks than other possible means of CSO control that were considered. King County believes that its proposal offers the best balance between the community’s interests, the overall needs of the regional wastewater conveyance system, and the County’s obligation to comply with CSO control requirements in its current West Point Treatment Plant National Pollution Discharge Elimination System permit.

In your comment letter, you stated that the existing King County wastewater facilities in Lowman Beach Park should be removed as part of the proposed project. The existing facilities in the park are essential facilities that would be impracticable to move.

If you have SEPA-related questions about the Murray CSO Control Project, please contact Sue Meyer, Water Quality Planner, at 206-684-1171 or sue.meyer@kingcounty.gov. For other questions about the project, please contact the project manager, Erica Jacobs, at 206-684-1138.

Sincerely,

Wesley Sprague
Supervisor

cc: Erica Jacobs, Project Manager, King County Wastewater Treatment Division (WTD)
    Shahrazad Namini, Project Manager, WTD
    Sue Meyer, Senior Environmental Planner, WTD
Mr. Wesley Sprague  
Community Services and Environmental Planning  
KCWTD  
201 S Jackson St. MS KSC-N O 505  
Seattle, Wa. 98104-3855

Loman Beach CSO Project  
May 11, 2011

Dear Sir,

A modicum of common sense and an eye on spending taxpayer dollars wisely is the obvious approach to the Murray CSO Project; not the displacement of existing housing, relocating the residents, and the dismissal of an environmental impact study. Only 100 feet away there is a natural “triangle” topographic feature that would allow a holding tank and attendant structures that would satisfy the CSO criteria.

The “triangle” recommended as a CAG alternative never seems to have been seriously considered by “head in the sand” engineers who apparently missed this alternative in the early planning stages. It is an obvious solution creating the least disruption in construction of this scope. Moving the project to the “triangle” would remove the temptation to use Loman Park as a staging area. The “triangle” site is already owned by the City of Seattle, so no need to invoke eminent domain and would have far less impact on the neighborhood and has Murray Avenue as a staging area. We continue to be concerned about Loman Park; regardless of which site, it would not be appropriate to turn Loman Park into a staging area. The “triangle” is a viable alternative. The 3500 signatures collected in opposition to the KCWTD alternative should send a clear message.

We are in full agreement with the May 4, 2011 flyer prepared by neighbors involved with CAG who have been diligently working on the CSO issue.

Thank you for your attention in reviewing this issue with an eye on the wise spending of taxpayer dollars.

Sincerely,

Dan and Sharon Smith  
7131 Beach Drive SW  
Seattle, Wa. 98136
July 5, 2011

Dan and Sharon Smith
7131 Beach Drive SW
Seattle, WA 98136

Response to Comments on the Murray Combined Sewer Overflow Control Project

Dear Mr. and Ms. Smith:

Thank you for your comments on the Murray Combined Sewer Overflow (CSO) Control Project State Environmental Policy Act Determination of Nonsignificance. Following are responses to the concerns expressed in your letter.

King County did not propose the construction of a storage tank on the triangular piece of property on the northeast side of Lincoln Park Way to achieve CSO control in the Murray basin for several reasons. This option would have required construction of a peak flow pump station in Lowman Beach Park, would have been more complex to operate, and offered less reliability than other means of CSO control that were considered. Additionally, it would have likely required the acquisition of private property; the construction, operation and maintenance of two storage facilities; and construction in an environmentally sensitive area.

None of the alternative means of CSO control identified was optimal for all evaluation criteria the County considered. The community’s strong opposition to major construction in Lowman Beach Park helped King County to define its proposal. This proposal provides a single, reliable facility with fewer construction impacts to neighborhoods and parks than other possible means that were considered. King County believes that the proposal offers the best balance between the community’s interests, the overall needs of the regional wastewater conveyance system, and the County’s obligation to comply with CSO control requirements in its current West Point Treatment Plant National Pollution Discharge Elimination System permit.

In your letter, you expressed concern about the use of Lowman Beach Park for staging. The area and duration of staging in Lowman Beach Park will be limited to what is needed to construct the facilities to be located in the park and the contractor will be required to maintain safe pedestrian access to the section of Lowman Beach Park that will remain open during construction, to the maximum extent practicable.
If you have SEPA-related questions about the Murray CSO Control Project, please contact Sue Meyer, Water Quality Planner, at 206-684-1171 or sue.meyer@kingcounty.gov. For other questions about the project, please contact the project manager, Erica Jacobs, at 206-684-1138.

Sincerely,

Wesley Sprague
Supervisor

cc: Erica Jacobs, Project Manager, King County Wastewater Treatment Division (WTD)
    Shahrzad Namini, Project Manager, WTD
    Sue Meyer, Senior Environmental Planner, WTD
Sue

1. I live at 7034 Beach DR SW across from where the first CSO project was going to be at Lowman Beach Park. All of the people who live on this block signed the petition that we did not want it here, destroying the park and the neighborhood.

Thank you for not putting it in the Park.

I have to wonder what you are thinking??

I would guess you don't care, now you want to kick us out of our houses, the people that told you the first time we did not want it here at the park.

I feel like you are doing what ever you want and you just do not care about what it happens to this neighborhood, Looks like you are going to make the block a construction park regardless.

I want you to know that I DO NOT WANT IT ON THIS BLOCK FIND ANOTHER LOCATION...

Paul Vera

7034 Beach DR SW

Seattle WA 98136

206-762-2044 Home

[Signature]
Wesley Sprague and Project Manager

In addition to sending an email to Sue Meyer, she suggested I send a letter with my comments to you.

Like I wrote in my email to Sue, I would like to ask to please look for another location for the holding tank other than Lowman Beach and the block across from it. I realize that something needs to be done and I am glad you are looking for some kind of a plan.

I also know you are going to take down the house by the ferry dock at the South end of Lincoln park for a pump station, and you are working on plans to put the holding tank across from Lowman beach park tearing all of the houses down.

This is a rare block that looks out over the park at the water and the house by the ferry dock is also special beach front property.

I find it hard to believe tearing down beach front properties and displacing people from there homes and future homes my friends want to retire in for your project is the best you are coming up with. I am sure you have walked down here and you know what a rare find houses like these are across from the park and water.

I know you have a better mind for this project then tearing a neighborhood down for a construction zone.

Please look for another location, I don’t want to move from this awesome view or the neighborhood. The neighborhood has been like family to me and many people down here. It’s a close-knit and special, rare community that is not found in your average city dwellings. I will be very sad to leave.

Paul Vera
7034 Beach DR SW
Seattle WA 98136
206-762-2044 home

[Signature]
July 5, 2011

Paul Vera
7034 Beach Drive SW
Seattle, WA 98136

Response to Comments on the Murray Combined Sewer Overflow Control Project

Dear Mr. Vera:

Thank you for your comments on the Murray Combined Sewer Overflow (CSO) Control Project State Environmental Policy Act (SEPA) Determination of Nonsignificance.

In your letter you expressed concern about King County’s proposal to construct a CSO storage tank across Beach Drive SW from Lowman Beach Park and the proposal’s associated housing and residential displacement impacts. You also expressed appreciation that King County did not propose construction of a CSO storage tank in Lowman Beach Park.

King County identified numerous means of controlling CSOs in the Murray basin. Most of the means of CSO control considered were located at the bottom of the basin near the existing Murray Pump Station in Lowman Beach Park because that is where enough peak flow can be captured to achieve CSO control. None of the possible means of CSO control considered were optimal for all evaluation criteria the County used. The community’s strong opposition to major construction in the park helped King County to define its proposal. This proposal provides a single, reliable facility with fewer construction impacts to neighborhoods and parks than other possible means of CSO control that were considered. King County believes the proposal offers the best balance between the community’s interests, the overall needs of the regional wastewater conveyance system, and the County’s obligation to comply with CSO control requirements in its current West Point Treatment Plant National Pollution Discharge Elimination System permit.

As described in the SEPA environmental checklist, King County will mitigate the housing and residential displacement impacts associated with its proposed project by acquiring the properties necessary to construct the project at fair market value and providing relocation assistance to qualified property owners and qualified tenants.

Finally, in your letter you stated that King County is going to take down a house on the south end of Lincoln Park to construct a pump station. This is incorrect. King County is planning to
upgrade its existing Barton Pump Station, which is located next to the Fauntleroy Ferry Terminal, but the project will not involve the demolition of any residential buildings.

If you have SEPA-related questions about the Murray CSO Control Project, please contact Sue Meyer, Water Quality Planner, at 206-684-1171 or sue.meyer@kingcounty.gov. For other questions about the project, please contact the project manager, Erica Jacobs, at 206-684-1138.

Sincerely,

[Signature]

Wesley Sprague
Supervisor

cc: Erica Jacobs, Project Manager, King County Wastewater Treatment Division (WTD)
    Shahrzad Namini, Project Manager, WTD
    Sue Meyer, Senior Environmental Planner, WTD
May 11, 2011

Wesley Sprague  
Community Services and Environmental Planning  
King County Wastewater Treatment Division  
201 South Jackson Street, MS: KSC-NR-0505  
Seattle, WA 98104-3855

Sent via e-mail: Wesley.sprague@kingcounty.gov

Re: Murray Combined Sewer Overflow Control Project – Determination of Nonsignificance

Seattle Parks & Recreation (Parks) appreciates the opportunity to provide comments on the Murray Combined Sewer Overflow Control Project – Determination of Nonsignificance (DNS). Upon completion of the project, impacts to Lowman Beach Park will be minimal. Parks concerns are the potential impacts associated with the construction of the project. As indicated in the Checklist, access to the park could be constrained and parking adjacent to the park will be unavailable to park visitors during construction. Additionally, existing irrigation lines in the park could be disturbed during construction and portions of the park will be disturbed during the installation of the underground diversion structure and associated influent pipe. The following are more specific comments and concerns related to the project.

- All areas of the park that are disturbed during the construction of the CSO project must be returned to their previously undisturbed condition; i.e. grass replanted and established, any other landscape materials replaced and replanted, paved areas repaved and irrigation lines reconnected to serve the disturbed areas.
- There may be irrigation lines in the area of the surrounding the proposed construction/staging within the park. King County must work with Parks to ensure that the irrigation system in the remaining areas of the park not impacted by the construction continue to function throughout the duration of the project. Once construction is complete, the complete irrigation system must be reconnected.
- Parks understands the need for construction access within the park associated with the diversion structure and influent pipe. However, no construction access and/or general staging will be allowed within Lowman Beach Park beyond that which is necessary to accomplish the proposed construction within the park.
- Any work within Lowman Beach Park will require a Right-of-entry permit from Parks.
- Access to the remainder of the park not impacted by the construction, including the tennis court and beach, must be maintained throughout the duration of the project.
Temporary recreational environmental impacts to visitors and recreational users of Lowman Beach Park are potentially adverse and significant. Mitigation for project impacts during construction such as maintaining access, limiting staging within the park and returning disturbed areas to better than the pre-construction state is warranted. Parks looks forward to working cooperatively with King County throughout the project to ensure the project is successful and that impacts on the park and park visitors are minimized and/or mitigated. Thank you for your consideration of these comments as you move forward on the project. If you have any questions regarding these comments, please contact me at 206.684.7048 or david.graves@seattle.gov.

Regards,

David Graves, AICP
Senior Planner
Planning & Development Division
Seattle Parks & Recreation
July 5, 2011

David Graves
Senior Planner
Planning & Development Division
Seattle Parks & Recreation
800 Maynard Avenue South, 3rd Floor
Seattle, WA 98134-1336

Response to Comments on the Murray Combined Sewer Overflow Control Project

Dear Mr. Graves:

Thank you for your comments on the Murray Combined Sewer Overflow (CSO) Control Project State Environmental Policy Act Determination of Nonsignificance. Following are responses to the specific concerns expressed in your letter.

Plants. Grass removed or disturbed during construction in Lowman Beach Park will be restored to maintain the existing park use, with the exception of approximately 32 to 64 square feet of existing grass that will be replaced with one or two access hatches that will be placed on top of the proposed new diversion structure. Other landscaped areas in the park that are removed or disturbed will be replanted as required by the City of Seattle Parks Department. Landscaping on the storage tank site will contain drought tolerant or native plantings or both.

Recreation. King County intends to apply for Right-of-entry and Revocable Use Permits from the City of Seattle Department of Parks and Recreation for work in Lowman Beach Park. The area and duration of staging in Lowman Beach Park will be limited to what is needed to construct the facilities to be located in the park and the contractor will be required to maintain safe pedestrian access to the section of Lowman Beach Park that will remain open during construction, to the maximum extent practicable.

Utilities. King County will work with City of Seattle Department of Parks and Recreation to address any potential impacts to the existing irrigation lines in Lowman Beach Park resulting from construction activities.

Like you, King County looks forward to working cooperatively with the City of Seattle to achieve a successful project and to minimize project impacts on Lowman Beach Park. If you have SEPA-related questions about the Murray CSO Control Project, please contact Sue Meyer,
Water Quality Planner, at 206-684-1171 or sue.meyer@kingcounty.gov. For other questions about the project, please contact the project manager, Erica Jacobs, at 206-684-1138.

Sincerely,

[Signature]

Wesley Sprague
Supervisor

cc: Erica Jacobs, Project Manager, King County Wastewater Treatment Division (WTD)
Shahrzad Namini, Project Manager, WTD
Sue Meyer, Water Quality Planner, WTD
Appendix E

PRELIMINARY GEOTECHNICAL/ENVIRONMENTAL DOCUMENTATION
memorandum

date April 23, 2010
to Brian Matson/Carollo
    Allen DeSteiguer/Carollo
cc Sue Meyer/King Co WTD
from Lloyd Skinner
subject TM 210.3, Draft Environment Conditions Technical Memorandum, Barton Basin
    Puget Sound CSO Project, E00022E06

To protect public health and the environment, King County is working to reduce combined sewer overflows
(CSOs). CSOs occur in older parts of the city during heavy rain events when stormwater enters the sewer
system. If volumes exceed system capacity, a combination of stormwater and diluted sewage is discharged
through outfalls into Puget Sound. The Washington State Department of Ecology (DOE) has established a control
target of one untreated event per outfall per year (WAC 173-245). In order to meet this target, WTD is
conducting planning efforts to meet the DOE requirement by 2030. The Puget Sound CSO project is part of these
planning efforts. The project covers four basins within the City of Seattle – Barton Basin, Murray Basin, South
Magnolia Basin, and North Beach Basin. Within each basin, nine potential alternatives for locating CSO control
facilities were developed and evaluated. – Six of the nine alternatives were removed from consideration through
the evaluation and screening process in December, 2009.

The purpose of this draft technical memorandum is to summarize existing environmental conditions for the three
alternatives under consideration for the Barton Basin.

DESCRIPTION OF BARTON BASIN ALTERNATIVES

The Barton Basin is located in West Seattle. The basin’s western boundary is formed by the Puget Sound
shoreline. Lincoln Park is located at its north boundary. The approximate eastern edge of the basin is along 30th
Avenue SW, and the southern boundary extends from about SW 106th Street on the west to SW Roxbury Street on
the east (Figure 1).

Following an extensive review that included environmental, community, technical, operational, and cost
considerations, three alternatives are now being assessed for controlling CSOs in the Barton Basin. These are
known as Pipe Storage in Upper Fauntleroy Way (Alternative 1E), Storage at the former Fauntleroy School site
(Alternative 1F), and Upper Basin Green Stormwater Infrastructure (the “GSI” Alternative). A brief description
of each remaining alternative is included below.

Alternative 1E: Pipe Storage in Upper Fauntleroy Way. This alternative includes a buried, large diameter
pipe that would store 0.22 million gallons of CSO flows in Upper Fauntleroy Way, located east of the Fauntleroy
Ferry Terminal and above the main arterial in the area, Fauntleroy Way. The pipe would be approximately 12
feet in diameter, and roughly 265 feet long. Ancillary facilities would include a diversion structure in SW Director Street, as well as odor and electrical controls. Alternative 1E is shown in Figure 2.

Alternative 1F: Storage at Former Fauntleroy School Site. This alternative would locate a 0.22 million gallon rectangular storage tank in the parking lot of the former Fauntleroy School, located uphill from Alternative 1E along SW Director Street. Also located on the site would be Odor and electrical control facilities, and a diversion structure would be constructed in SW Director Street. The tank would be underground, and its dimensions would be approximately 75’ by 55’. Alternative 1F is shown in Figure 3.

GSI Alternative: Upper Basin Green Stormwater Infrastructure. The GSI alternative would reduce CSOs by intercepting stormwater runoff from existing impervious surfaces before it reaches the pipes of the combined sewer system. The intercepted rainwater would instead be directed to “rain gardens” located along the sides of the streets in the basin, and then be detained and infiltrated directly into the soil rather than sent to the combined sewer system. The GSI alternative would be used in a subbasin of about 200 acres located along the upper reaches of the Barton Basin, as illustrated in Figure 4.

METHODOLOGY

Environmental conditions were assessed by reviewing existing documentation and supplementing the available information with reconnaissance-level site visits for field verification. Available information that was reviewed included City of Seattle and King County GIS data bases, City critical area maps, zoning and shoreline designations, and available information from state and federal resource agencies on habitats and species. For historic and cultural resources, Washington Department of Archaeology and Historic Preservation data were reviewed. No test pits, borings, or other invasive sampling methods were used.

EXISTING ENVIRONMENTAL CONDITIONS

During the assessment of possible measures to control CSOs in Barton Basin, several land use and environmental issues were considered. These included Seattle Comprehensive Plan, zoning, and shoreline designations, other potential permitting requirements, cultural resources, fish and wildlife, wetlands and streams, soils and sediments, and water quality. The following discussion summarizes the assessment of existing environmental conditions in the Barton Basin.

Land Use Setting. The Barton Basin is a primarily residential single-family area of West Seattle. One of Seattle’s largest parks, Lincoln Park (135 acres), is located on the Puget Sound shoreline at the northwest corner of the basin. The Fauntleroy Ferry Terminal is located just south of the park. The land rises rapidly east of the shoreline, with a steep slope/potential landslide feature extending north to south parallel to the shoreline for the length of the basin (see Figure 5). One major stream, Fauntleroy Creek, descends west from the upper plateau to the shoreline, near the midpoint of the basin.

Upper Fauntleroy Way, the location of the storage pipe of Alternative 1E, is a narrow lane between SW Henderson and SW Director Street, with several houses located on the east side. The west side of the street has no houses; a narrow, steep vegetated hillside extends from the street down to Fauntleroy Way SW.

The former Fauntleroy School, the location of Alternative 1F, is currently used by various community-based organizations. The storage tank would be buried in the large parking lot behind the school.

The 200-acre neighborhood identified for the Green Stormwater Infrastructure alternative is a single-family area with a regular street grid pattern of about 30 blocks near the top of the basin. The rain gardens associated with the alternative would be constructed in public street right of way (typically between the curb and the sidewalk).
Regulatory Setting. King County projects in Seattle are subject to the provisions of Seattle’s Land Use Code (Seattle Municipal Code (SMC), Title 23). The Land Use Code applies a zoning designation to non-street property in the City, and a Master Use Permit is required from Seattle’s Department of Planning and Development (DPD) prior to construction or use of a parcel. For street rights of way, Seattle’s Department of Transportation (SDOT) issues street use permits. The zoning designations for the Barton Basin are illustrated on Figure 5. Large areas of single family zoning (SF 5000, SF 7200) predominate.

Alternative 1E in Upper Fauntleroy Way would include facilities in the road right of way, and would require street use permits from SDOT. Similarly, the rain gardens of the GSI alternative would require approval from SDOT. The former Fauntleroy School is zoned SF 5000, and would require a Master Use Permit from Seattle’s Department of Planning and Development (DPD).

Seattle’s Shoreline Master Program applies an overlay zone to areas within 200 feet of the shoreline of Puget Sound, as well as to the shorelines of major rivers and lakes. None of the alternatives for the Barton Basin would be located within the shoreline overlay zone.

The Seattle Municipal Code also includes provisions that apply to Environmental Protection and Historic Preservation (SMC Title 25). Five categories of environmentally critical areas are defined (SMC 25.09.020): geologic hazard and steep slope areas; flood prone areas; wetlands; fish and wildlife habitat conservation areas; and abandoned landfills. The code includes provisions to protect these areas, and generally establishes buffers/setbacks and provisions for projects located in proximity to these areas. Figure 5 indicates the locations of environmentally critical areas within the Barton Basin. Title 25 also includes provisions relating to noise control, tree protection, and preservation of historic landmarks.

Alternative 1E in Upper Fauntleroy Way has no designated critical areas. However, the northern edge of the Fauntleroy Creek riparian corridor (a fish and wildlife habitat conservation area) extends to approximately SW Director Street, at the south end of Upper Fauntleroy Way. The hillside at the west edge of Upper Fauntleroy Way is also a steep slope area. In addition, several Douglas fir and Pacific Madrone trees along the western edge of the street appear to meet the definition of “exceptional tree” in SMC 25.11.020 and 25.11.050.

The northern portion of the parking lot at the former Fauntleroy School, Alternative 1F, is designated as a potential landslide area; otherwise, no critical areas are located at this site. Observations of the parking lot and surrounding area in the immediate vicinity of Alternative 1F did not reveal any steep slope areas.

No critical areas are designated in the subbasin identified for the GSI Alternative.

Cultural Resources. A review of potential cultural, archaeological, and historic resources within Barton Basin has been conducted. Based on site characteristics and location, the project area for Alternative 1E, Pipe Storage in Upper Fauntleroy Way, has a high probability of containing archaeological resources. Significant archaeological resources have been uncovered adjacent to the project area.

No known archaeological sites have been identified in the vicinity of the former Fauntleroy School site. Based on location and site characteristics, the site has a medium probability of containing archaeological resources. Also, the former school has been nominated as a Seattle Landmark.

No known archaeological resources have been identified in the upper subbasin location of the GSI Alternative, and the project area has a low probability of containing archaeological resources.

Fish and Wildlife. Fauntleroy Creek is located in the vicinity of the Barton basin alternatives. Its headwaters occur within Fauntleroy Park, approximately 525 feet east of the Alternative 1F. According to critical areas
mapping, coho (*Oncorhynchus kisutch*) and cutthroat trout (*Oncorhynchus clarkii*) are present in Fauntleroy Creek.

Based on critical areas mapping and State and County inventories of fish usage, it is likely that coho and cutthroat trout utilize Fauntleroy Creek to the south of Alternatives 1E and 1F. In 1998 a culvert under Fauntleroy Way SW was replaced to enhance fish passage with a weir and pool fish ladder system. According to the City, coho and cutthroat spawning is limited to the stream reaches below 45th Avenue SW by a passage barrier (culvert) at the roadway. Juvenile rearing is documented throughout the system. The stream and riparian corridor is separated from the Alternative 1E project site by developed roadways (SW Director Street and Fauntleroy Way SW) and from the Alternative 1F project site by developed and cleared areas to the south of the parking lot.

**Wetlands, Streams, and Shoreline.** No wetlands, streams, or shoreline areas are mapped within the locations of the proposed alternatives. The Alternative 1E project site along Upper Fauntleroy Way is approximately 300 feet from the Puget Sound shoreline, outside of the Shoreline District. Other basin alternatives are located further landward and also outside of the Shoreline Zone.

**Soils and sediments.** There are no known contaminated areas located in the vicinity of the three Barton Basin alternatives. Similarly, no known liquefaction areas are located at these sites. No steep slopes are located on any of the sites.

**Other Environmental Issues.** There are several additional environmental elements that will be considered in more detail as more detailed design information becomes available for the alternatives. These include traffic and parking, public services and utilities, aesthetics, recreation, and construction issues.

**Summary Matrix**

Table 1 summarizes the existing environmental conditions for each Barton Basin alternative as detailed above.
<table>
<thead>
<tr>
<th>ISSUE</th>
<th>ALTERNATIVE</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Zoning</strong></td>
<td><strong>1E</strong> Not Applicable (Street ROW)</td>
</tr>
<tr>
<td></td>
<td><strong>1F</strong> SF 5000</td>
</tr>
<tr>
<td></td>
<td><strong>GSI</strong> Not Applicable (Street ROW)</td>
</tr>
<tr>
<td><strong>Shoreline Master Program</strong></td>
<td>Not Applicable</td>
</tr>
<tr>
<td></td>
<td>Not Applicable</td>
</tr>
<tr>
<td></td>
<td>Not Applicable</td>
</tr>
<tr>
<td><strong>Critical Areas</strong></td>
<td><strong>Fish and Wildlife</strong></td>
</tr>
<tr>
<td></td>
<td>Coho and cutthroat use of stream approx. 100 feet to south</td>
</tr>
<tr>
<td></td>
<td>Coho and cutthroat use of stream approx. 100 feet to south</td>
</tr>
<tr>
<td></td>
<td>Juvenile salmonid use extends throughout Fauntleroy Creek system,</td>
</tr>
<tr>
<td></td>
<td>into upper basin</td>
</tr>
<tr>
<td><strong>Streams, Wetlands, and Shorelines</strong></td>
<td>None identified</td>
</tr>
<tr>
<td></td>
<td>None identified</td>
</tr>
<tr>
<td></td>
<td>None identified</td>
</tr>
<tr>
<td><strong>Soils and sediments</strong></td>
<td>No identified contaminated sites or mapped geologic hazards</td>
</tr>
<tr>
<td></td>
<td>No identified contaminated sites or mapped geologic hazards</td>
</tr>
<tr>
<td></td>
<td>None identified</td>
</tr>
<tr>
<td><strong>Exceptional Trees</strong></td>
<td>Douglas fir and Pacific Madrone along west edge of Upper Fauntleroy Way</td>
</tr>
<tr>
<td></td>
<td>None identified</td>
</tr>
<tr>
<td></td>
<td>None identified</td>
</tr>
<tr>
<td><strong>Cultural Resources</strong></td>
<td>High Probability; known archeological resources</td>
</tr>
<tr>
<td></td>
<td>Moderate Probability; no known resources</td>
</tr>
<tr>
<td></td>
<td>Low Probability; no known resources and within street ROW</td>
</tr>
</tbody>
</table>
To protect public health and the environment, King County is working to reduce combined sewer overflows (CSOs). CSOs occur in older parts of the city during heavy rain events when stormwater enters the sewer system. If volumes exceed system capacity, a combination of stormwater and diluted sewage is discharged through outfalls into Puget Sound. The Washington State Department of Ecology (DOE) has established a control target of one untreated event per outfall per year (WAC 173-245). In order to meet this target, WTD is conducting planning efforts to meet the DOE requirement by 2030. The Puget Sound CSO project is part of these planning efforts. The project covers four basins within the City of Seattle – Barton Basin, Murray Basin, South Magnolia Basin, and North Beach Basin. Within each basin, nine potential alternatives for locating CSO control facilities were developed and evaluated. Six of the nine alternatives were removed from consideration through the evaluation and screening process in December, 2009.

The purpose of this draft technical memorandum is to summarize existing environmental conditions for the three alternatives under consideration for the Murray Basin.

DESCRIPTION OF MURRAY BASIN ALTERNATIVES

The Murray Basin is located in West Seattle, immediately north of the Barton Basin. Lincoln Park is located at the southwest border of the basin. Lowman Beach Park is located just north of Lincoln Park along the water. The Puget Sound shoreline marks the western boundary of the basin, and its eastern boundary is near 35th Ave SW. On the north, the basin boundary follows a diagonal from about SW Raymond on the southwest to about SW Hudson on the northeast. See Figure 1.

Following an extensive review that included environmental, community, technical, operational, and cost considerations, three alternatives are now being assessed for controlling CSOs in Murray Basin. These are Alternative 1A, Rectangular Tank Storage at the Bottom of the Basin in Lowman Beach Park; Alternative 1C, Pipe Storage in Beach Drive and Murray Avenue; and Alternative 1F, Beach Drive Area Underground Storage.

Alternative 1A: Rectangular Tank Storage at Bottom of Basin in Lowman Beach Park. This alternative includes a 1.0 million gallon storage tank located in Lowman Beach Park. The tank would be located below
grade. Its dimensions would be approximately 70 feet by 155 feet. Additional facilities would include electrical controls, an odor control facility, and a diversion structure. Alternative 1A is shown in Figure 2.

**Alternative 1C: Pipe Storage in Beach Drive and Murray Avenue.** Alternative 1C requires construction of two large-diameter storage pipes in the street right of way near the bottom of the basin. A 12-foot diameter pipe, approximately 900 feet long and storing about 0.72 million gallons, would be placed under Beach Drive SW. A second pipe, also measuring 12 feet in diameter, would be located under Murray Avenue SW. This pipe would store 0.28 million gallons, and would be about 350 feet long. Diversion structures, electrical controls, and odor control facilities would also be needed for this alternative. Alternative 1C is shown in Figure 3.

**Alternative 1F: Beach Drive Area Underground Storage.** This alternative includes acquisition of several apartment buildings across Beach Drive SW from Lowman Beach Park, and construction of a 1.0 million gallon storage tank near the bottom of the basin. The tank would be located below grade. Additional facilities associated with this alternative include odor control and electrical controls, as well as a diversion structure located in Lowman Beach Park. Figure 4 illustrates Alternative 1F.

**METHODOLOGY**

Environmental conditions were assessed by reviewing existing documentation and supplementing the available information with reconnaissance-level site visits for field verification. Available information that was reviewed included City of Seattle and King County GIS data bases, City critical area maps, zoning and shoreline designations, and available information from state and federal resource agencies on habitats and species. For historic and cultural resources, Washington Department of Archaeology and Historic Preservation data were reviewed. No test pits, borings, or other invasive sampling methods were used.

**EXISTING ENVIRONMENTAL CONDITIONS**

**Land Use Setting.** The Murray Basin is primarily a single family residential area in West Seattle. Like the Barton Basin, the topography of the Murray Basin rises fairly steeply east from the water, and a steep slope/potential landslide band parallels the shoreline above Beach Drive (Figure 5). The Pelly Creek ravine extends from nearly California Avenue SW down to the shoreline at Lowman Beach Park. California Avenue SW is a major north-south arterial that bisects the basin. Neighborhood commercial and lowrise multifamily housing are located along California Avenue SW. An area of lowrise multifamily housing is also located along Beach Drive SW east of Lowman Beach Park. Several small commercial areas are also located along 35th Ave SW at the upper east end of the basin. Land uses at the sites of the three Murray Basin alternatives are described below.

Lowman Beach Park, the location of Alternative 1A, is a 4.1 acre waterfront park located north of Lincoln Park. It includes lawn/open space, a tennis court, and a tidal beach area on Puget Sound.

Immediately east of Lowman Beach Park is Beach Drive SW, which has one lane of travel in each direction and parking on both sides. Murray Avenue SW is located above Beach Drive SW, and extends northeast from its intersection with Lincoln Park Way SW. Alternative 1C would locate buried storage pipes in the Beach Drive and Murray Avenue rights of way.

The triangular parcel of land east of Lowman Beach Park, bounded by Beach Drive SW and Lincoln Park Way SW, is occupied by several lowrise multifamily buildings. These buildings would be acquired and removed if Alternative 1F is implemented.

**Regulatory Setting.** King County projects proposed in Seattle are subject to the provisions of Seattle’s Land Use Code (Seattle Municipal Code (SMC), Title 23). The Land Use Code applies a zoning designation to non-street
property in the City, and a Master Use Permit, issued by Seattle’s Department of Planning and Development (DPD), is required prior to construction or use of a parcel. For uses and projects in street rights of way, Seattle’s Department of Transportation (SDOT) issues street use permits. The zoning designations for the Murray Basin are illustrated on Figure 5. Large areas of single family zoning (SF 5000, SF 7200) predominate.

Lowman Beach Park is zoned Single Family Residential (SF 5000), and Alternative 1A would require a Master Use Permit. Alternative 1C would be located in street rights-of-way, and would require street use permits from SDOT. The multifamily buildings located across Beach Drive SW from Lowman Beach Park are zoned Lowrise 1. Alternative 1F would require a Master Use Permit from DPD.

Seattle’s Shoreline Master Program applies an overlay zone to areas within 200 feet of the shoreline of Puget Sound, as well as to the shorelines of major rivers and lakes. Lowman Beach Park is located within the shoreline district, and is designated as Conservancy Recreation under Seattle’s Shoreline Master Program. A shoreline “substantial development permit” from DPD would be required for Alternative 1A. The portion of Beach Drive SW used for Alternative 1C is also in the shoreline district, and is designated Urban Residential. Alternative 1F is not within the shoreline district and would not require a shoreline substantial development permit from DPD.

The Seattle Municipal Code also includes provisions that apply to Environmental Protection and Historic Preservation (SMC Title 25). Five categories of environmentally critical areas are defined (SMC 25.09.020): geologic hazard and steep slope areas; flood prone areas; wetlands; fish and wildlife habitat conservation areas; and abandoned landfills. The code includes provisions to protect these areas, and generally establishes buffers/setbacks and provisions for projects located in proximity to these areas. Figure 5 indicates the locations of environmentally critical areas within the Murray Basin. Title 25 also includes provisions relating to noise control, tree protection, and preservation of historic landmarks.

Alternative 1A at Lowman Beach Park is located in a designated liquefaction zone, one of the geologic hazard and steep slope critical areas, according to Seattle’s environmentally critical area maps. It is also located in the riparian corridor of Pelly Creek, which is piped through the park and enters Puget Sound via an outfall. Three large trees (two American sycamores and one Douglas fir) located in the park appear to meet the definition of “exceptional tree” in SMC 25.11.020 and 25.11.050.

Portions of Beach Drive SW and Murray Avenue SW (Alternative 1C), as well as the northern portion of the multifamily property east of Lowman Beach Park (Alternative 1F), are also located within the riparian corridor of Pelly Creek. Large willows located within a ditch along the west side of Murray Ave SW (Alternative 1C) may meet the definition of “exceptional tree” in SMC 25.11.020 and 25.11.050. The property located within Alternative 1F contain large Douglas fir trees and a flowering cherry tree that may meet the definition of “exceptional tree” in SMC 25.11.020 and 25.11.050.

Cultural Resources. A review of potential cultural, archaeological, and historic resources within Murray Basin has been conducted. No archaeological or cultural resources have been identified in the vicinity of Alternative 1A at Lowman Beach Park. However, based on site characteristics and location, the project area for Alternative 1A has a high probability of containing archaeological resources. Similarly, no archaeological or cultural resources have been identified in the vicinity of Alternative 1C. Based on site characteristics and location, the Beach Drive SW portion of Alternative 1C has a high probability of containing archaeological resources, while the Murray Avenue SW portion has a low probability of containing such resources. Alternative 1F is similar to Alternative 1A, in that there have been no archaeological or cultural resources identified in the area, but its location and site characteristics indicate a high probability of containing archaeological resources.

Fish and Wildlife. Pelly Creek, as detailed below, is not indicated as a stream or shown as containing listed fish species by Salmonscape mapping (USFWS 2009). Priority Habitats and Species (PHS) mapping indicates Pelly
Creek as a stream but does not indicate any listed fish species (WDFW 2008). Fish access appeared to be unavailable to the piped outlet of Pelly Creek along the Puget Sound shoreline within Lowman Beach Park.

**Wetlands, Streams, and Shoreline.** During an April 2010 site visit, staff biologists from ESA Adolfson observed surface flow originating from Pelly Creek Natural Area, to the east of Murray Avenue SW (at the northern end of the proposed Alternative 1C alignment within this roadway). Immediately east of the roadway, the surface flow spread out into a small (approximately 400 square foot) wetland area before entering a culvert which directed the flow south along the east side of Murray Avenue SW. After approximately 450 feet, the culvert appeared to pass under Murray Ave SW and discharge into a surface channel that parallels the west side of Murray Ave SW. If Pelly Creek is determined to be a regulated stream in the vicinity of Murray Avenue SW, then a portion of Alternative 1C would be within a riparian zone. In addition, required buffers associated with the small wetland area at the west end of the Pelly Creek Natural Area could extend into the Alternative 1C area.

A piped outflow was observed in the seawall at Lowman Beach Park with flowing water at approximately the same location as it is indicated by Seattle Critical Areas mapping.

**Soils and sediments.** There are no known contaminated areas located in the vicinity of the three Murray Basin alternatives. Alternative 1A is located within a designated liquefaction zone; no steep slopes are present. Alternative 1C contains no liquefaction areas or steep slopes, although Murray Avenue SW is adjacent to a steep slope area. Alternative 1F contains no liquefaction areas or steep slopes. However, the east and south portions of the site are adjacent to designated steep slope areas, and a designated landslide area, is adjacent to the east side of the property.

**Other Environmental Issues.** There are several additional environmental elements that will be considered in more detail as more detailed design information becomes available for the alternatives. These include traffic and parking, public services and utilities, aesthetics, recreation, and construction issues.

**Summary Matrix**

Table 1 summarizes the existing environmental conditions for each Murray Basin alternative as detailed above.
### TABLE 1. ENVIRONMENTAL CONDITIONS SUMMARY
MURRAY BASIN

<table>
<thead>
<tr>
<th>ISSUE</th>
<th>ALTERNATIVE</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Zoning</strong></td>
<td></td>
</tr>
<tr>
<td>1A</td>
<td>Single Family Residential</td>
</tr>
<tr>
<td>1C</td>
<td>Not Applicable (Located in ROW)</td>
</tr>
<tr>
<td><strong>Shoreline Master Program</strong></td>
<td></td>
</tr>
<tr>
<td>1A</td>
<td>Conservancy Recreation</td>
</tr>
<tr>
<td>1F</td>
<td>Urban Residential</td>
</tr>
<tr>
<td><strong>Critical Areas</strong></td>
<td></td>
</tr>
<tr>
<td><strong>Fish and Wildlife</strong></td>
<td></td>
</tr>
<tr>
<td>1A</td>
<td>Non-fish bearing stream</td>
</tr>
<tr>
<td>1F</td>
<td>Non-fish bearing stream</td>
</tr>
<tr>
<td><strong>Streams, Wetlands, and Shorelines</strong></td>
<td>Piped portion of Pelly Creek would likely be moved during construction</td>
</tr>
<tr>
<td><strong>Soils and sediments</strong></td>
<td></td>
</tr>
<tr>
<td>1A</td>
<td>No identified contaminated sites, steep slopes or landslide areas; project area within designated liquefaction zone.</td>
</tr>
<tr>
<td>1F</td>
<td>No identified contaminated sites, steep slopes or landslide areas; project area within liquefaction zone. Murray Ave SW adjacent to steep slopes.</td>
</tr>
<tr>
<td><strong>Exceptional Trees</strong></td>
<td></td>
</tr>
<tr>
<td>1A</td>
<td>American Sycamores and Douglas fir tree within Lowman Beach Park</td>
</tr>
<tr>
<td>1F</td>
<td>Project area along Murray Ave SW immediately adjacent to large willows</td>
</tr>
<tr>
<td><strong>Cultural Resources</strong></td>
<td></td>
</tr>
<tr>
<td>1A</td>
<td>High Probability; no known resources identified</td>
</tr>
<tr>
<td>1F</td>
<td>High probability for pipe storage area in Beach Drive SW and low probability for pipe storage area in Murray Ave SW; no known resources identified</td>
</tr>
</tbody>
</table>
memorandum

date September 21, 2010

to Brian Mattson, Carollo
Sue Meyers, King County WTD

from Lloyd Skinner
Lizzie Zemke

subject Murray Basin Alternative 1B

This memorandum was prepared to describe the results of a recon-level investigation conducted by ESA Adolfson (ESA) of a potential site for a 1 MG storage tank in the vicinity of Murray Avenue SW and Lincoln Park Way SW in the City of Seattle.

On-Site Observations
On September 21, 2010, ESA biologists Aaron Booy and Lizzie Zemke visited the Alternative 1B Murray Basin site to identify potential critical areas constraints. While it was our intention to identify as completely as possible all on-site critical areas, we did not remove any vegetation and we did not collect any soil samples during the site investigation. A more detailed site investigation, including soil sampling and formal wetland delineation, will follow. The following descriptions of the onsite stream and wetland should be considered preliminary until a more complete site investigation can be conducted.

The Alternative 1B site is triangular in shape and is bounded on the east by Murray Avenue SW, on the west by Lincoln Park Way SW, and by a residential lot on the north. The site consists almost entirely of a well-vegetated, steep-sided ravine. On-site upland vegetation is characterized by a dense cover of non-native invasive shrubs including Japanese knotweed, English Ivy, Himalayan Blackberry, cherry laurel, and holly. A large, multiple-trunked native red alder tree, as well as western red cedar, big-leaf maple, red elderberry and sword fern, are also present.

Streams. We observed a reach of Pelly Creek flowing across the bottom of the ravine in an open channel. The creek enters the site from the north in an open channel and exits the site through a grated manmade structure connected to a pipe near the west edge of the site. Very little water was flowing in the channel at the time of our site visit despite a particularly heavy rainfall that occurred three days prior to the site visit. Based on the relatively low flow observed in the channel, it is possible that the channel dries up in at least some years.

Under the Seattle Municipal Code, streams are classified as Type 1-5 waters, according to Washington Administrative Code (WAC) section 222-16-031. Under WAC 222-16-031, Pelly Creek would be considered either a Type 4 or 5 water due to its small size and relatively low habitat value. The distinguishing feature between Type 4 and Type 5 waters is that Type 4 waters flow perennially and Type 5 waters flow intermittently.

Wetlands. We observed two areas of wetland adjacent to the stream channel. Vegetation in the wetland consisted of lady fern, weeping willow, and Himalayan blackberry. Due to the dense cover of vegetation, it was not possible without removing some vegetation to determine whether or not these two areas actually constitute one larger wetland.

ESA applied the Washington State Wetland Rating System (Ecology Publication #04-06-25) to determine on a preliminary basis the wetland category according to the City of Seattle Municipal Code. A definitive wetland rating can be determined only after the wetland or wetlands have been formally delineated. Based on the preliminary rating, the on site wetland would be considered a Category III wetland, and due to its relatively low habitat score would require a 60-foot buffer.
According to SMC 25.09.160, development is prohibited on or over a wetland of any category or size that abuts any Type 1-5 water.

Exceptional Trees. SMC 25.11, Tree Protection, provides means for protecting trees in Seattle. Based on the definition of exceptional trees provided in SMC 25.11, none of the trees identified on the site appear to meet the definition of an exceptional tree.

Mapped Critical Areas
The channel of Pelly Creek, the Riparian Corridor associated with the creek channel, a wetland, and a steep slope have been mapped on the site by the City of Seattle.

Recommendations
In order to accurately classify the wetland and to understand potential regulatory constraints posed by the wetland, a formal wetland delineation should be conducted on the site. Once the true size and classification of the wetland are known, development options, permit requirements, and avoidance, minimization, and possible mitigation approaches can be investigated.

The mitigation the City would require for a project that proposed impacts to the stream and its associated wetlands would need to be determined following a formal wetland delineation and after discussion with City staff. Assuming the City will allow impacts to the stream and wetland if mitigation were to be provided, the Code includes the following provisions:

Impacts to a Category III wetland require a 2:1 mitigation to impact ratio for wetland restoration or creation and an 8:1 mitigation to impact ratio for wetland enhancement.

Impacts to a Type 4 or 5 stream would require, at a minimum, implementation of a plan that assures that the watercourse and riparian management area function will be restored so that it prevents erosion, protects water quality, and provides diverse habitat, and results in greater protection of the watercourse and riparian management area.
ARCHAEOLOGICAL AND HISTORICAL RESOURCES IN THE
BARTON SUB-BASIN,
SEATTLE, WASHINGTON

Prepared for
King County Wastewater Treatment Division,
Environmental and Community Services
Seattle, Washington

P00034P07
Work Order #13

by
Margaret Nelson, Jana Boersema, and Mike Wolverton

October 26, 2009

Cascadia Archaeology
PO Box 51058
Seattle, WA 98115
King County Wastewater Division, Barton, Murray, Magnolia, and North Beach Sub-basins:

Probability Factors for Prehistoric Site Occurrence and Distribution

High
1. known or reported site
2. confluence of fresh water and fresh/salt water
3. adjacent to fresh water source (permanent/intermittent)
4. saddle/pass on travel corridor
5. spit-lagoon complex
6. low bench or terrace above lower creek or saltwater beach

Medium:
1. ridge crest or hill top
2. smaller creek/tributary
3. high bench or terrace overlooking water, flat
4. protected beaches: on depositional beaches; southern exposure
5. intermittent water source (spring, intermittent creek, middle creek/river courses)
6. in proximity to other important resources (plant, animal, mineral)

Low:
1. Steep slopes
2. erosional beaches
3. areas subject to landslides (except where not deeply buried at bottom of slopes)
4. not near fresh water
Status of Historic Inventory Listings (from City of Seattle, Department of Neighborhoods):

No-Altered: Lack of integrity or distinctive architecture; no further study warranted. Not significant.

Yes-Hold: Initial survey completed, inventory form not completed. Requires additional information.

Yes-Inventory: Full inventory warranted; include assessment on potential local and/or National Register listing.
Barton sub-basin showing recorded historic and ethnographic sites. Parcels in red are on Seattle historic inventory. Parcels in black were recorded by historic survey, but are not considered significant. Red dot (no. 15) is an archaeological site, no. 17 is an ethnographic site, and no. 19 is an ethnographic place name (Refer to table, following pages).
<table>
<thead>
<tr>
<th>Map No.</th>
<th>Address</th>
<th>Historic Name</th>
<th>Common Name</th>
<th>Parcel No.</th>
<th>Date Built</th>
<th>Status</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>9260 California AVE</td>
<td>Fauntleroy Community Church &amp; YMCA</td>
<td>Common Name</td>
<td></td>
<td>1908</td>
<td>SL</td>
</tr>
<tr>
<td>2</td>
<td>7710 35th AVE</td>
<td>Gatewood Substation</td>
<td>Residential</td>
<td>1932300020</td>
<td>1954</td>
<td>Yes-Inventory (SCL007)</td>
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<tr>
<td>3</td>
<td>9659-48th AVE</td>
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<td>Residential</td>
<td>2346800190</td>
<td>unknown</td>
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<tr>
<td>4</td>
<td>9251-9259 45th AVE</td>
<td>Trolley Stop Café</td>
<td>The Original Bakery</td>
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<td>1926</td>
<td>Yes-Inventory (WS010)</td>
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<tr>
<td>5</td>
<td>7750 35th AVE</td>
<td>Unknown</td>
<td>Residential</td>
<td>1932300105</td>
<td>1909</td>
<td>No-altered</td>
</tr>
<tr>
<td>6</td>
<td>3800 SW Barton ST</td>
<td>SW Barton Street Standpipe</td>
<td>Residential</td>
<td>2491200590</td>
<td>1927</td>
<td>Yes-Inventory (SPU015)</td>
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<tr>
<td>7</td>
<td>8011 Fauntleroy WAY</td>
<td>Lincoln Park Shelter House</td>
<td></td>
<td>2624039006</td>
<td>1932</td>
<td>Yes-Inventory (DPR051)</td>
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<tr>
<td>8</td>
<td>8603 Fauntleroy WAY</td>
<td>Lincoln Park Colman Pool/Bathhouse</td>
<td></td>
<td>3424039001</td>
<td>1941</td>
<td>Yes-Inventory (DPR048)</td>
</tr>
<tr>
<td>9</td>
<td>8011 Fauntleroy WAY</td>
<td>Lincoln Park Concession &amp; Comfort Station</td>
<td></td>
<td>3524039020</td>
<td>1951</td>
<td>Yes-Inventory (DPR049)</td>
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<tr>
<td>10</td>
<td>7367 47th AVE</td>
<td>Lincoln Park Maintenance Shop</td>
<td></td>
<td>2624039006</td>
<td>1931</td>
<td>Yes-Inventory (DPR050)</td>
</tr>
<tr>
<td>11</td>
<td>9131 California AVE</td>
<td>Fauntleroy School</td>
<td></td>
<td>3524039040</td>
<td>1917</td>
<td>Nom to SL 2008</td>
</tr>
<tr>
<td>12</td>
<td>4807 SW Barton ST</td>
<td>Residential</td>
<td></td>
<td>2487201245</td>
<td>1936</td>
<td>Inventory (Luttrell 2006)</td>
</tr>
<tr>
<td>13</td>
<td>9103 Fauntleroy WY</td>
<td>Residential</td>
<td></td>
<td>2487201235</td>
<td>1939</td>
<td>Inventory (Luttrell 2006)</td>
</tr>
<tr>
<td>14</td>
<td>9105 Fauntleroy WY</td>
<td>Residential</td>
<td></td>
<td>2487201255</td>
<td>1961</td>
<td>Rec NR-eligible (Luttrell 2006)</td>
</tr>
<tr>
<td>15</td>
<td>S of Brace Pt.</td>
<td>Glory of the Seas</td>
<td>45K1441</td>
<td>None</td>
<td>1869</td>
<td>Not eval-potentially eligible to NR</td>
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<tr>
<td>16</td>
<td>Fauntleroy WY</td>
<td>Human remains</td>
<td></td>
<td></td>
<td></td>
<td>Found 1918</td>
</tr>
<tr>
<td>17</td>
<td>S of ferry dock/Brace Pt.</td>
<td>Psayahu</td>
<td>horned snake; spiritual monster</td>
<td></td>
<td></td>
<td>Ethnog</td>
</tr>
<tr>
<td>18</td>
<td>9016 Fauntleroy WY</td>
<td>shell midden</td>
<td></td>
<td>2487700175</td>
<td>Prehistoric</td>
<td>Not recorded</td>
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<tr>
<td>19</td>
<td>Williams Point</td>
<td>Telxha'idus</td>
<td>“crowded, tight; crowded face/cliff”</td>
<td></td>
<td></td>
<td>Ethnog</td>
</tr>
</tbody>
</table>

SL=Seattle Landmark; NR=National Register of Historic Places
Barton sub-basin probability map. Areas not shaded are considered low probability for archaeological resources.
ARCHAEOLOGICAL AND HISTORICAL RESOURCES IN THE
MURRAY SUB-BASIN,
SEATTLE, WASHINGTON

Prepared for
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Seattle, Washington

P00034P07
Work Order #13

by
Margaret Nelson, Jana Boersema, and Mike Wolverton

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Cascadia Archaeology
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<table>
<thead>
<tr>
<th>Map No.</th>
<th>Address</th>
<th>Historic Name</th>
<th>Common Name</th>
<th>Parcel #</th>
<th>Date</th>
<th>Status</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>5415 California AVE</td>
<td>Unknown</td>
<td>Providence Medical Group Clinic</td>
<td>7625701285</td>
<td>1951</td>
<td>Yes-Hold</td>
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<tr>
<td>2</td>
<td>5400 Fauntleroy WAY</td>
<td>Fairmount Playfield Shelter House</td>
<td>9396700060</td>
<td>1961</td>
<td>Yes-Inventory (DPR023)</td>
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<td>5247-5251-1/2 California AVE</td>
<td>Unknown</td>
<td>Rick's Barber Shop &amp; 2 others</td>
<td>7625700530</td>
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<td>5046-5048 California AVE</td>
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<td>West Seattle Licenses &amp; Diva's</td>
<td>1297300235</td>
<td>1923</td>
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<tr>
<td>5</td>
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<td>Unknown</td>
<td>50-50 Grocery</td>
<td>7625702240</td>
<td>1926</td>
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<tr>
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<td>5421-5425 California AVE</td>
<td>None</td>
<td>Worldwide School</td>
<td>7625701295</td>
<td>1962</td>
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<td>7</td>
<td>5437 California AVE</td>
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<td>Bodiworks &amp; 2 others</td>
<td>7625701310</td>
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<td>8</td>
<td>5405 California AVE</td>
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<td>Affirmations Salon</td>
<td>7625701276</td>
<td>1924</td>
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<tr>
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<td>2805 SW Holden ST</td>
<td>Hughes (E.C.) Playfield Shelter House</td>
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<td>1950</td>
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<td>5038-5042 California AVE</td>
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<td>Bel-Air Apts, Alki Style Barber &amp; Images</td>
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<td>Better Roofing Company</td>
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<td>1925</td>
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<tr>
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<td>6531 35th AVE</td>
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<td>B &amp; K Construction</td>
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<td>LaPorte Eide (commercial)</td>
<td>2810600005</td>
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<td>Watkins Food Products</td>
<td>DeSautel Chiropractic</td>
<td>7625702472</td>
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<td>21</td>
<td>35th AVE (6900 36th Ave SW)</td>
<td>SW Myrtle ST Tank No. 2</td>
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<td>2489200285</td>
<td>1946</td>
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<td>21</td>
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<td>SW Myrtle ST Tank No. 1</td>
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<td>1919</td>
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<td>#</td>
<td>Address</td>
<td>Name</td>
<td>Zip Code</td>
<td>Date</td>
<td>Status</td>
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</tr>
<tr>
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<td>--------</td>
<td>--------------</td>
<td></td>
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<tr>
<td>21</td>
<td>6900 35TH AVE</td>
<td>SW Myrtle Street Reservoir</td>
<td>2489200285</td>
<td>1947</td>
<td>Yes-Inventory (0)</td>
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<tr>
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<tr>
<td>23</td>
<td>6048 California AVE</td>
<td>Unknown Ken's Mane Event Barber</td>
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<tr>
<td>24</td>
<td>5622 41st AVE</td>
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<td>2461900640</td>
<td>1906</td>
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<tr>
<td>25</td>
<td>6053-6055 California AVE</td>
<td>Westhome Bakery Agult's King Fu, Paint Your Wagon</td>
<td>7625703375</td>
<td>1924</td>
<td>Yes-Inventory (WS020)</td>
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<tr>
<td>26</td>
<td>6045-6049 California AVE</td>
<td>Unknown Stuffed Shirt Catering &amp; 2 Other</td>
<td>None listed</td>
<td>1926</td>
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<tr>
<td>27</td>
<td>7101 California AVE</td>
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SL=Seattle Landmark
Murray sub-basin probability map. Areas not shaded are considered low probability for archaeological resources.
March 26, 2010

Mr. Allen de Steiguer
Carollo Engineers
1218 Third Avenue, Suite 1600
Seattle, WA 98101

RE: PRELIMINARY GEOLOGIC/GEOTECHNICAL EVALUATION OF
BARTON ALTERNATIVES, SEATTLE, WASHINGTON

Dear Mr. de Steiguer:

At your request, we have performed a preliminary evaluation of three potential alternatives for a proposed Combined Sewer Overflow (CSO) project in the Fauntleroy District of Seattle; the project is called the Barton CSO. The purposes of our preliminary study are to understand the geologic conditions in this area and to determine the geotechnical limitations and opportunities for the three potential sites for the CSO project.

The scope of our preliminary study included a literature review consisting of Shannon & Wilson and City of Seattle files, a site reconnaissance, a meeting with you to discuss our preliminary findings, and preparation of this report.

SITE DESCRIPTION

At this preliminary alternatives stage of the Barton CSO, the project consists of three potential sites, as shown in a LiDAR image, Figure 1. From east to west, the three sites are (1) Green Stormwater System, (2) Fauntleroy School, and (3) Upper Fauntleroy.

The Green Stormwater System consists of a combination of roadside rain gardens and permeable “green” alleyways allowing stormwater to infiltrate into the ground. Only minor excavations are required for this alternative. The project site is a long, narrow area located in the Sunrise Heights and Delridge neighborhoods, between SW Myrtle Street and SW Roxbury Way and centering on 32nd Avenue SW. As shown in Figure 1, the project site ranges from 1½ to 4 blocks west and 1½ to 3 blocks west of 32nd Avenue SW. The project site is located primarily on the east-facing slope above the Longfellow Creek drainage that also slopes gently to the south. However, a small portion of the project, located west of 35th Avenue SW between about SW Ida
Street and SW Thistle Street appears to be located within the upper portion of the headwaters for a drainage basin that drains to the northwest and terminates at Lowman Beach Park.

At the former Fauntleroy School site, a 50-foot-wide by 80-foot-long rectangular tank ranging in depth from about 25 to 40 feet would be buried in the northeastern corner of the former playground/parking lot of the school. Ancillary structures would be located just west of the tank. The level playground area appears to have been created by excavating the eastern half of the site and filling the western half. The tank would be located mostly in the cut portion, where the vegetated cut slope in the northeastern corner is about 6 to 8 feet high. The ancillary structures would be located in the fill portion. At the western edge of the fill portion of the former playground, the fill slope appears to be about 15 feet high.

At the Upper Fauntleroy site, a 12-foot-diameter pipe with ancillary drain and diversion structures would be buried north of the intersection of SW Director Street and Upper Fauntleroy Way SW. The pipe would be constructed within the street right-of-way (ROW) and would be approximately 30 to 35 feet deep. The ancillary structures would be located at the north and south limits of the buried pipe. The ground surface slopes very gently down from east to west to the western edge of Upper Fauntleroy Way SW, but then drops very steeply down about 16 feet to Fauntleroy Way SW. The ground surface is relatively level westward to the ferry terminal entrance. The ground surface also drops steeply to the south from SW Director Street to a 20- to 25-foot-deep ravine. This ravine has been filled along the Upper Fauntleroy Way SW and Fauntleroy Way ROWs.

**GEOLOGIC CONDITIONS**

The soil conditions in the project area are the result of nonglacial and glacial processes during the Pleistocene Epoch, post-glacial geologic processes, and human modification of the ground surface. The long, broad ridge on which the Green Alternative is proposed to be constructed is underlain by Vashon till and advance outwash deposited during the last glaciaation in the Puget Lowland, as shown in Figure 1. Locally, these very dense soils are overlain by a relatively thin layer of recessional outwash or weathered and topsoil zones. Based on the boring logs obtained for this area, this relatively thin layer is loose to medium dense and is typically 0 to 2 feet thick; however, locally, it may be 5 to 10 feet thick and may have as much as 25 feet of fill material placed over it. In the southeastern corner of the green alternative project area (near SW Barton
Street and 29th Avenue SW), post-glacial depression deposits consist of a mixture of soft peat and loose to medium dense silt and sand. Both the advance and recessional outwash deposits are relatively pervious, whereas the Vashon till is relatively impervious. Permeability of the post-glacial depression deposits is highly variable.

In the Sunrise Heights neighborhood, the ridge is bounded on the west by steep slopes in three areas, as seen in the LiDAR image, Figures 1 and 2. The 30- to 40-foot-high head of a west-facing drainage system is located at SW Othello Street and 36th Avenue SW. Part of the bowl is a park, but the rest is covered with residences. The ground surface in the park is hummocky, indicative of past landslide activity. One landslide is recorded in this area in the Seattle Landslide database. The head of another drainage system is located at about 38th Avenue SW, between SW Henderson Street and SW Cloverdale Street. The slopes are steep and covered with vegetation or retaining walls. No landslides are recorded in this area in the Seattle Landslide database. The drainage divide in this area is 38th Avenue SW. The most extensive and deepest ravines are located west of 37th Avenue SW between approximately SW Barton Street and SW Roxbury Street. The slopes of this ravine are steep and many residences are built close to the top-of-slope around the perimeter of the ravine. Two landslides are reported in the Seattle Landslide database on the northern edge of the ravine system, along SW Barton Street.

As shown in Figure 1, Vashon recessional outwash (Qvrc) covers much of the area near the Fauntleroy School and the Upper Fauntleroy site. Our knowledge of this comes from borings completed for previous projects as well as soil exposures observed during our site reconnaissance. In general, the recessional outwash is a loose to medium dense, slightly silty to silty sand or gravelly sand that has a relatively high permeability. Near the Fauntleroy School, silty, gravelly sand extends to at least 15 feet deep, the limit of the boring closest to the prospective site. Based on borings about 300 feet to the south, fine-grained recessional soils may also be expected in this package of recessional sediments. The depth to overridden glacial soils is unknown. No unstable slopes were noted on the northern side of playground, but the southern edge of the playground is bordered by a deep ravine with unstable side slopes.

Recessional outwash also dominates the Upper Fauntleroy site. Three borings along 47th Avenue SW between SW Director Street and SW Concord Street indicate the presence of medium dense, clean to slightly silty, gravelly sand that has a relatively high permeability. This sand extends down to at least 20 feet deep, the limit of boring penetrations. South of the southern end of
47th Avenue SW, fill is about 20 feet deep across the mouth of the ravine. The depth to
overridden glacial soils is unknown. The groundwater level was at about 13 feet in one of the
borings, indicated by heaving soils at that depth. The slope to the south of SW Director Street is
steep and could potentially be unstable. The slope to the west of 47th Avenue SW is also very
steep. The southern end of the cut slope is supported by a stacked block retaining wall and the
slope behind a bus stop is protected by a concrete retaining wall. To the north, the slope was
equally steep, but no signs of instability were observed.

GEOTECHNICAL APPLICATIONS

For the green option in the Sunrise Heights area, the infiltration of road and alley runoff may
locally raise groundwater levels perched on the till layer. Because of the spotty distribution and
variable thickness of the weathered till and overlying recessional outwash on top of the relatively
impermeable till, increased water levels could result in changes, real or perceived, to moisture
levels in residential yards, basements, and crawl spaces on both the subject and adjacent
properties. The more promising target area in the Sunrise Heights neighborhood may be
between SW Kenyon Street and SW Thistle Street, where the published geologic map indicates
more permeable advance outwash deposits near the ground surface.

Proposed roadside rain gardens and “green alleyways” could likely be successfully implemented;
however, we recommend that complaints be tracked and periodic inspections be performed to
evaluate unintended consequences in the residential neighborhoods.

Water that seeps through cracks or windows in the till cap or runs laterally off of the till will
likely flow into the advance outwash sand and gravel that underlies the till. This unit has a large
storage capacity; however, the contact at which the outwash meets underlying fine-grained soil is
the focus of landslide activity throughout Seattle. Due the proximity of steep and potentially
unstable ground to the proposed infiltration target areas, we do not recommend implementation
of the rain gardens and green alleyways northwest of the intersection of SW Webster Street and
32nd Avenue SW and south of SW Barton Street.

The proposed tank at the Fauntleroy School site would likely require temporary shoring to
reduce the overall impact to the site. Although the groundwater conditions at the site are not
currently known, we do not anticipate that relatively impermeable or watertight shoring would be
required. A 5 to 10-foot-deep sloped excavation along the north and portions of the east and west walls could reduce the overall height of the shoring to about 20 feet, which could allow for a cantilevered shoring system. Along the south wall and deeper portions of the east and west walls, we would anticipate that a tieback soldier pile wall or a soil nail wall system would be adequate. Based on the anticipated subsurface conditions, uplift and liquefaction are unlikely to be a concern at this site. However explorations would be required to determine the depth to groundwater and the grain size distribution and relative density of the soils at the site.

At the Upper Fauntleroy site, the excavation for the storage pipe would also likely require temporary shoring. Existing utilities, both buried and overhead, within the ROW may have to be relocated. Based on available groundwater data, approximately 15 to 20 feet of groundwater drawdown would be required to create a dry excavation base for the pipe. Fine-grained lacustrine and estuarine deposits were encountered in some of the borings in the vicinity of the site. The potential impacts to adjacent structures and utilities resulting from groundwater-drawdown induced settlement from the increase in effective stress in these fine-grained deposits would need to be considered. If required to mitigate settlement, a groundwater recharge system would likely be effective for controlling drawdown away from the excavation given the relatively high permeability of the recessional outwash soils expected at the site. In conjunction with dewatering, a braced, soldier-pile and lagging shoring system could likely be used to for the storage pipe excavation. Relatively impermeable or watertight shoring would be required if dewatering or dewatering and recharge are not allowed. Given the highly variable relative density of the adjacent soils and the proximity of existing structures and steep slopes, and in particular the potentially unstable steep slope identified along SW Director Street, we anticipate that a driven or vibrated sheet pile shoring system could result in unacceptable vibrations and settlements. A variable moment or vibration damping hammer could reduce, but not eliminate, the potential for unacceptable vibrations and settlement. Alternative, relatively impermeable shoring systems such as secant piles or ground-improvement-based, such as soil-mixing or jet grouting would likely be cost prohibitive for temporary support of shoring for a storage pipeline unless they were incorporated into the final storage structure.

LIMITATIONS

This preliminary evaluation is intended for use in comparing alternatives for the Barton CSO project. No subsurface explorations were performed for this project. After selection of the
preferred alternative, subsurface explorations and testing will be completed for preliminary design of the chosen facilities.

Sincerely,

SHANNON & WILSON, INC.

David C. Ward, P.E., L.E.G.
Senior Principal Engineer

DCW:MSK:WTL/wtl

Enc: Figure 1 – Site Plan
     Figure 2 – Site Plan
March 26, 2010

Mr. Allen de Steiguer  
Carollo Engineers  
1218 Third Avenue, Suite 1600  
Seattle, WA  98101

RE:  PRELIMINARY GEOLOGIC/GEOTECHNICAL EVALUATION OF  
MURRAY ALTERNATIVES, SEATTLE, WASHINGTON

Dear Mr. de Steiguer:

At your request, we have performed a preliminary evaluation of three potential alternatives for  
the proposed Murray Combined Sewer Overflow (CSO) project in West Seattle. The purposes  
of our preliminary study are to understand the geologic conditions in this area and to determine  
the geotechnical limitations and opportunities for the CSO project.

The scope of our preliminary study included a literature review consisting of Shannon & Wilson  
and City of Seattle files, a site reconnaissance, a meeting with you to discuss our preliminary  
findings, and preparation of this report.

SITE DESCRIPTION

The CSO project site is located in and around the intersection of Beach Drive SW, Lincoln Park  
Way SW, and 48th Avenue SW. As shown in a LiDAR image, Figure 1, the three proposed  
alternatives include:

- An approximately 80-foot by 170-foot, buried rectangular vault ranging from about 20 to  
  35 feet below the ground surface in Lowman Beach Park
- Two buried 12-foot diameter pipes with ancillary diversion and flushing chambers. One  
  900-foot-long pipe in Beach Drive SW (about 30 to 45 feet deep) and one 350-foot-long  
  pipe in Murray Avenue SW (about 25 feet deep).
- A large, buried trapezoid-shaped vault, about 30 to 45 feet deep, located south of the  
  intersection of Beach Drive SW and Lincoln Park Way SW.
Topography of the Murray CSO project is complicated. As indicated in Figure 1, the area in which the three alternatives is located is the low point of an extensive drainage system originating to the southeast, east, northeast, and north of the site. The drainage system generally drains from east to west. Lowman Beach Park is the low point of the ravine system prior to its reaching the beach of Puget Sound. The modest fan offshore of the park was likely built by the streams that formerly flowed in the ravines and emptied into the sound at the park location.

The Lowman Beach Park site is now relatively level, having been filled in many years ago. From here, the ground rises gently to the north along Beach Drive SW. Beach Drive SW is a relatively gently sloping surface because of the cuts and fills that were made for the road grade. Because of the steep topography to the north, the cuts range from about 10 to 34 feet. Much of the western side of the road is cut, but two small swales were filled to depths of 2 to 6 feet.

Moving to the northeast from the multi-street intersection, 48th Avenue SW is built on the western side slope of a major ravine. Cuts 5 to 15 feet high on the western side and fills 0 to 5 feet deep on the eastern side were utilized to build this road, as it climbs the side of the ravine. The Murray Avenue SW site is located on the eastern side of the same ravine, and appears to have been mostly filled for its subgrade, although old street grades were not available for the assessment. To the east of this road, the ground surface rises steeply up to large apartment buildings. On the west side of the road, the ground surface drops gradually to the middle/bottom of the ravine.

Lincoln Park Way SW rises at a relatively steep gradient to the southeast of the multi-street intersection, the result of a fill embankment as high as about 20 to 25 feet on its western side. In the triangular piece of land between Lincoln Park Way SW and Beach Drive SW, the first floor of the apartment buildings are located level with Beach Drive SW, but the ground in between the buildings is lower than the street by about 6 feet. To the south of the depressed triangle site, the ground rises very abruptly to the south. The street on the steep hillside is supported by a 20-foot-high concrete crib wall. This street is used for access to four large condominiums on the uphill side of the street. The ground surface continues to rise steeply to the south, up to a narrow, flat ridge at about elevation 130 feet.
GEOLOGIC CONDITIONS

Geology

The lower part of the ravine system is covered with recessional outwash. The strip along the shoreline is underlain by beach deposits. Underlying these natural deposits are older glacial deposits of clay, sand, and gravel. The ground has been modified significantly for the construction of roads, residences, and the existing pump station, as discussed in the previous section of this report.

In and east of Lowman Beach Park, the original ground has been filled to depths ranging from 7 to 12 feet. The fill consists mostly of loose to dense, silty, slightly sandy gravel and gravelly sand; however, one boring encountered clayey soils. Many of these fill soils contain some organics, wood, boulders, and foreign debris. Underlying the fill are about 10 to 30 feet of very loose to medium dense alluvium (sands and gravels) with organic materials in their matrices, and soft peat layers that were deposited after the disappearance of the last glacial ice. In two recently completed borings, a 2- to 3-foot-thick layer of soft to medium stiff, organic silt was encountered at about sea level.

The recent soils described above are underlain at depths of 21 to 40 feet by medium dense to very dense recessional outwash, consisting of slightly silty to silty, gravelly sand and sandy gravel. In one boring near the middle of the park, hard glacial clay was encountered at a depth of about 34 feet; however, in other adjacent borings, recessional outwash continued down to the bottoms of the borings at 46.5 and 54 feet. Glacially overridden soil was not encountered in these borings.

To the north of the multi-street intersection, along Beach Drive SW, the centerline is all in a cut. No explorations are available for the roadway, but borings for a residence on the western side of the road indicate that 5 to 10 feet of fill are underlain by glacially overridden lake silt. The ground surface may also be covered by a thin layer of colluvium, the result of past landslide activity.

The hillside south of the triangular property south of the intersection of Beach Drive SW and Lincoln Park Way SW is comprised of 2 feet of colluvium overlying glacially overridden soils, all of which appear to be very dense, sandy gravel in the lower part of the slope.
Slope Stability

In the Lowman Beach Park area, several landslides recorded in the Seattle Landslide Study database are located on the steep hillside surrounding the bowl-like area. The closest report is at a residential site on the western side of Beach Drive SW, where fill failed in 1932. Three landslides occurred on the steep slope to the east of Murray Avenue SW, but they do not appear to have had any effect on the lower part of the slope or the street.

GEOTECHNICAL APPLICATIONS

Storage Tanks

The tank alternatives in the vicinity of the Lowman Beach Park site would likely require the use of relatively impermeable shoring. Based on our review of the available subsurface and groundwater data, we anticipate that the dewatering and groundwater recharge requirements to control groundwater-drawdown induced settlements could be significant. Given the presence of the very loose soils, the presence of organic soils and peat, and the proximity of existing structures, utilities, and other improvements, we anticipate that a driven or vibrated sheet pile shoring system could result in unacceptable vibrations and settlements. A variable moment or vibration damping hammer could reduce, but not eliminate, the potential for unacceptable vibrations and settlement. A secant pile, soil-mixed or slurry wall system, potentially incorporated into the final structure, could reduce the likelihood of impacts to adjacent structures and reduce the dewatering requirements. These types of shoring systems, which are generally less flexible than sheet pile shoring systems, are also likely more appropriate for the tank storage alternative east of Beach Drive where a 45-foot-deep excavation would be required near the toe of an existing steep slope.

The available subsurface data does not indicate the presence of a suitable groundwater cutoff layer. Therefore, some dewatering and potentially some groundwater recharge will likely still be required even if relatively impermeable shoring is used. For this preliminary study, the relatively impermeable shoring could be assumed to extend to twice the excavation depth to help control the groundwater. Depending on the contractor’s selected means and methods, caving soils identified in a boring drilled for the Murray Pump Station Improvements Project (GeoDesign, Inc., 2006) may cause difficulties during excavation of the shoring.
Provisions to control uplift may also be required depending on the depth, size, and design of the structure. Given the proposed structure footprint sizes for the two tank alternatives, uplift piles or anchors may be needed. Uplift piles could be drilled shafts installed by the secant pile drill rig, auger cast piles, or micropiles.

Based on our review of the existing borings and the previously completed analyses (GeoDesign, Inc., 2006), liquefaction is likely a concern at this site. The uplift piles, if required, or deep foundation elements would likely be required to limit liquefaction induce settlement of the tanks. As an alternative, ground improvement could be performed to reduce the potential for liquefaction under the tanks. Ground improvement alternatives could include increasing the density of the ground through compaction grouting, reducing the ability of the ground to shear by creating confining cells of improved ground under the tank footprint, or decreasing the ability of the ground to develop excess porewater pressures by installing stone columns or vertical drains. Seismicity-induced lateral spreading was identified as posing little risk but was not analyzed or evaluated (GeoDesign, 2006).

**Storage Pipes**

For the storage pipe alternative along Beach Drive SW, three construction approaches were considered: open trench, microtunnel boring machine (MTBM), and conventional large-diameter boring machine (TBM). In our opinion, it is likely that the MTBM or TBM alternative would be more suitable than an open excavation. The proposed 45-foot-deep storage pipe would be very challenging to construct as an open excavation.

In the vicinity of Lowman Beach Park, soft to medium stiff silt, organic silt and peat deposits were encountered in some of the borings. Based on available data, which indicates a typical depth to groundwater of between about 4 and 10 feet below ground surface, approximately 20 feet of groundwater drawdown would be required to create a dry excavation base for the pipe. The potential impacts to adjacent structures and utilities resulting from groundwater drawdown-induced settlement from the increase in effective stress in these deposits would need to be considered. If required to mitigate settlement, a groundwater recharge system could be evaluated. Relatively impermeable shoring would be required if dewatering and recharge is not feasible.
For this preliminary study, the relatively impermeable shoring could be assumed to extend to twice the excavation depth to help control the groundwater. We anticipate that a driven or vibrated sheet pile shoring system could result in unacceptable vibrations and settlements. A variable moment or vibration damping hammer could reduce, but not eliminate, the potential for unacceptable vibrations and settlement. Alternative, relatively impermeable shoring systems such as secant piles or ground-improvement-based, such as soil-mixing, jet grouting, or a ground-freezing system would likely be required if construction-induced vibrations cannot be controlled.

In the general vicinity of the multi-street intersection of Beach Drive SW, Lincoln Park Way SW, and 48th Avenue SW, glacially overridden lake silt is anticipated to be present. Groundwater is likely perched above this silt in the overlying fill and recessional outwash soils. The overridden lake silt is relatively impermeable and unlikely to produce much groundwater or consolidate as a result of the change in effective stress. In this area and in conjunction with limited dewatering, a braced, soldier-pile and lagging shoring system could likely be used to for the storage pipe excavation. However, because of the depth of the excavation in this area, in excess of 30 feet, an open trench for the pipeline will be challenging to construct.

A MTBM in the 12-foot-diameter range are available, but are not common. Since groundwater is anticipated along the tunnel drive, the MBTM will likely be a closed-face pressure balance machine, either slurry pressure balance (SPB) or earth pressure balance (EPB). The SPB machine is better suited for excavating cohesionless granular soils and the EPB machine is better suited for cohesive clayey soils. Consequently, an EPB machine is likely the best machine for this project. Intermediate jacking stations are commonly required about every 800 to 1,000 feet, so for the longer alternatives, one might be needed. An intermediate jacking station consists of a fabricated steel cylinder with integrated hydraulic jacks that are incorporated into the pipeline string between two consecutive pipe segments. Their function is to distribute the jacking load along the pipeline string on long drives. To construct the tunnel, a launch and retrieval shaft will be required at each end of the project. The south end of the alignment would be a logical choice for a launch shaft and staging area, because of the open area available in Lowman Beach Park or the triangular site to east of Beach Drive SW if the combined pipe and tank storage options is selected. The launch shaft will have to be sized to accommodate the MBTM, a 12-foot section of pipe, the jacking mechanism, and the reaction block. Typically, a launch shaft for a
12-foot-diameter MTBM is about 25 feet wide by 40 feet long. If the launching shaft is located at the south end of the alignment, the shaft would need to be about 25 feet deep. The retrieval shaft is generally smaller since it is only needed for the removal of the MTBM. Typical retrieval shafts are 25 feet square. The depth of the shaft would range from about 35 to 55 feet deep depending on the alternative. In general, the shoring for the shafts would have considerations similar to those for the shoring of an open excavation.

Although a conventional TBM could also be considered, in our opinion, for the lengths of the various alternatives, it would not offer a significant advantage. Conventional TBMs are also available as SPB and EPB machines. However, the footprint for TBM shafts is larger than the footprint required for MTBMs. For normal operation of a conventional TBM, the launch shaft should be sized to accommodate placement of the TBM and trailing gear. Typically, a launch shaft for a 12-foot-diameter TBM and trailing gear is about 30 to 35 feet wide by 140 feet long. A reduced shaft length could be considered, but would result in slower tunneling progress because the trailing gear could not be installed until the TBM had already mined about 100 feet. A typical retrieval shaft for a 12-foot-diameter TBM is about 30 to 35 feet wide by 50 feet long. The depths of the shafts would be similar to those for the MTBM. In general, the shoring for the shafts would have considerations similar to those for the shoring of an open excavation.

For the storage pipe along Murray Avenue SW, only the open trench construction approach was considered. Based on our understanding of the likely subsurface conditions, the potential for drawdown-induced settlement sensitive soils is relatively low along this alternative. In these areas and in conjunction with limited dewatering, a braced, soldier-pile and lagging shoring system could likely be used for the storage pipe excavation. However, the shoring for the excavation at the toe of the rockeries along Murray Avenue SW may require stressed anchors to reduce potential movements behind the shoring wall.

**LIMITATIONS**

This preliminary evaluation is intended for use in comparing alternatives for the Murray CSO project. No subsurface explorations were performed for this project. After selection of the
preferred alternative, subsurface explorations and testing will be completed for preliminary
design of the chosen facilities.

Sincerely,

SHANNON & WILSON, INC.

David C. Ward, P.E., L.E.G.
Senior Principal Engineer

DCW:MSK:WTL/wtl

Enc: Figure 1 – Site Plan
September 20, 2010

Mr. Allen de Steiguer
Carollo Engineers
1218 Third Avenue, Suite 1600
Seattle, WA 98101

RE: PRELIMINARY GEOLOGIC/GEOTECHNICAL EVALUATION OF MURRAY COMBINED SEWER OVERFLOW (CSO) ALTERNATIVE 1B, SEATTLE, WASHINGTON

Dear Mr. de Steiguer:

At your request, we have performed a preliminary evaluation of an additional alternative (Alternative 1B) for the proposed Murray CSO project in West Seattle. The purposes of our preliminary study are to understand the geologic conditions in this area and to evaluate the potential geotechnical limitations and opportunities for the CSO project.

The scope of our preliminary study included a literature review consisting of Shannon & Wilson and City of Seattle (City) files and preparation of this letter report. No subsurface explorations were performed as a part of this scope of work.

SITE DESCRIPTION

Alternative 1B is located primarily in a triangular parcel as bounded by Lincoln Park Way SW and Murray Avenue SW shown in the enclosed figure provided by TetraTech, Inc. The alternative includes an approximately 72- by 155-foot, buried rectangular vault ranging from about 20 to 25 feet below the ground surface (bgs).

The topography of the Murray CSO project is complicated. As indicated in Figure 1, the CSO alternative is located just east of the low point of an extensive drainage system originating to the southeast, east, northeast, and north of the site. The drainage system generally drains from east to west. Lowman Beach Park is the low point of the ravine system prior to its reaching the beach of Puget Sound. The modest fan offshore of the park was likely built by the streams that formerly flowed in the ravines and emptied into the sound at the park location.
The Lowman Beach Park site is now relatively level, having been filled many years ago. From here, the ground rises gently to the east and northeast. Street grade profiles indicate that about 7 feet of fill was placed for Beach Drive SW in the block to the south of the multi-street intersection of 48th Avenue SW, Beach Drive SW, and Lincoln Park Way SW.

Lincoln Park Way SW rises at a relatively steep gradient to the southeast of the multi-street intersection, the result of a fill embankment as high as about 20 to 25 feet on its western side. Northeast of the fill embankment, the ground surface may have been filled to a thickness of approximately 5 feet in the middle of the former drainage ravine, based on a projection of the former creek surface and the current ground surface elevation.

Murray Avenue SW is located on the eastern side of the same ravine and appears to have been mostly filled for its subgrade, although old street grades were not available for the assessment. To the east of this road, the ground surface rises steeply up to large apartment buildings.

GEOLOGIC CONDITIONS

Geology

Our preliminary interpretation of the soil conditions at the Alternative 1B site is based on two borings that were drilled in or adjacent to Beach Drive SW, about 240 feet south of the multi-street intersection. These borings are located about 210 feet southeast of the proposed Alternative 1B site. We have extended our interpretation up-gradient along the former ravine to the northeast to the Alternative 1B site, based on local geology knowledge, City street grade profiles, and geologic principles of deposition.

The fill embankment for Lincoln Park Way is likely to be about 20 to 25 feet thick, overlying creek/fan alluvium. No borings are available for this embankment; however, nearby fill consists mostly of loose to dense, silty, slightly sandy gravel and gravelly sand. Some of these fill soils contain some organics, wood, boulders, and foreign debris. Underlying the fill are at least 30 feet of very loose to dense, silty sand and gravel (alluvium) with organic materials in their matrices, and soft peat layers that were deposited after the disappearance of the last glacial ice. In two recently completed borings, a 2- to 3-foot-thick layer of soft to medium stiff, organic silt was encountered at about sea level. Glacially overridden soils were not encountered in the borings along Beach Drive SW.
Based on our hypothetical projection of subsurface conditions, as noted above, the bottom of the proposed tank could be about 7 to 10 feet below the level of the former creek bed that is buried below 5 to 15 feet of fill. The depth to suitably bearing glacial soil is unknown.

**Slope Stability**

In the Lowman Beach Park area, several landslides recorded in the Seattle Landslide Study database are located on the steep hillside surrounding the bowl-like area. The closest report is at a residential site on the western side of Beach Drive SW, where fill failed in 1932. Three landslides occurred on the steep slope to the east of Murray Avenue SW, but they do not appear to have had any effect on the lower part of the slope or the street.

**GEOTECHNICAL APPLICATIONS**

**Retaining Wall**

We understand that a retaining wall may be included as part of Alternative 1B to reduce the overall height of the required shored excavation for the tank storage structure (tank). We anticipate that the retaining wall would primarily support fill placed to construct Lincoln Park Way SW and Murray Avenue SW and potentially the loose to dense alluvium that underlies the fill. In our opinion, the retaining wall could consist of a cantilevered soldier pile and lagging wall, a tied-back soldier pile and lagging wall, or a soil nail wall. A tied-back soldier pile and lagging wall, as opposed to cantilevered wall, may be required to reduce potential movements of the roadways behind the retaining wall. Depending on the consistency and depth of underlying natural soils, fill composition, and the compactive effort used in the original roadway fill construction, a soil nail wall might not be appropriate.

**Shoring and Groundwater Control**

Based on our understanding of the likely subsurface conditions, loose to dense saturated sands, soft to medium stiff silt, organic silt and peat deposits that were encountered near Lowman Beach Park could extend upgrade along the former drainage and could also be present both within the excavation and below the proposed storage tank. In addition, available data suggests the groundwater is present within 5 to 10 feet bgs. The design of the shoring for the tank storage would need to consider the presence of these loose and soft soils and peat deposits, the groundwater conditions, and the stability and potential deflection of the proposed retaining wall.
The tank could require as much as 20 to 25 feet of groundwater drawdown to create a dry excavation base. The potential impacts to adjacent structures and utilities resulting from groundwater drawdown-induced settlement from the increase in effective stress in the loose and soft soils and peat deposits would need to be considered. If required to mitigate settlement, relatively impermeable shoring and/or a groundwater recharge system could be evaluated. The available subsurface data do not indicate the presence of a suitable groundwater cutoff layer. Therefore, some dewatering and potentially some groundwater recharge will likely still be required even if relatively impermeable shoring is used.

Based on our review of the available subsurface and groundwater data, we anticipate that the dewatering and groundwater recharge requirements to control groundwater-drawdown-induced settlements could be significant. For this preliminary study, we have assumed that relatively impermeable shoring would be required and that it would extend to twice the excavation depth to help control the groundwater. Given the presence of the soft and loose soils, the presence of organic soils and peat, and the proximity of existing structures, utilities, and other improvements, we anticipate that a driven or vibrated sheet pile shoring system could result in unacceptable vibrations and settlements. A variable moment or vibration damping hammer could reduce, but not eliminate, the potential for unacceptable vibrations and settlement. A secant pile or slurry wall system, potentially incorporated into the final structure, could reduce the likelihood of impacts to adjacent structures and reduce the dewatering requirements. These types of shoring systems, which are generally less flexible than sheet pile shoring systems, are also likely more appropriate to support the proposed retaining wall. Other ground-improvement-based, relatively impermeable shoring systems such as soil-mixing, jet grouting, or a ground-freezing system could be also be considered. These systems are typically not incorporated into the final structure. Soil-mixing and jet grouting might not be appropriate depending on thickness, continuity, and extent of the organic soils and/or peat deposits.

Uplift

Provisions to control uplift may also be required depending on the depth, size, and design of the structure. Given the proposed structure size for Alternative 1B, uplift piles or anchors may be needed. Uplift piles could be drilled shafts installed by the secant pile drill rig, augercast piles, or micropiles.
Liquefaction

Based on our understanding of the likely subsurface conditions, liquefaction is likely a concern at this site. The uplift piles, if required, or deep foundation elements would likely be required to limit liquefaction-induced settlement of the tank. As an alternative, ground improvement could be performed to reduce the potential for liquefaction under the tank. Ground improvement alternatives could include increasing the density of the ground through compaction grouting, reducing the ability of the ground to shear by creating confining cells of improved ground under the tank footprint, or decreasing the ability of the ground to develop excess porewater pressures by installing stone columns or vertical drains.

LIMITATIONS

This preliminary evaluation is intended for use in comparing alternatives for the Murray CSO project. No subsurface explorations were performed for this project. After selection of the preferred alternative, subsurface explorations and testing will be completed for preliminary design of the chosen facilities.

Sincerely,

SHANNON & WILSON, INC.

David C. Ward, P.E., L.E.G.
Senior Principal Engineer

DCW:MSK:WTL/dcW

Enc: Figure 1 – Site Plan
<table>
<thead>
<tr>
<th>Item Description</th>
<th>Quantity</th>
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<td>LF</td>
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<td>$300,000</td>
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<tr>
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<td>$3,600</td>
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<td>Drop Structure, Flow Control Channel</td>
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<td>5</td>
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<td>$1,500</td>
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<td>Foundation Walls</td>
<td>5</td>
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<td>$400</td>
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**Project:** King County CSO  
**Subject:** Barton Alternative 1E - Pipe Storage in Upper Fauntleroy Way  
**By:** Tt  
**Date:** 21-Dec-10

### Large Diameter Pipe Storage (12-foot)

#### Capital Cost Estimate

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<tr>
<th>Item</th>
<th>Description</th>
<th>Quantity</th>
<th>Unit</th>
<th>Unit cost, $</th>
<th>Cost, $</th>
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<td>Slab on Grade</td>
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<td>7</td>
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<td>Pipe Drain Structure</td>
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<td>Assume twice that</td>
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<tr>
<td></td>
<td>Base Slab</td>
<td>18</td>
<td>CY</td>
<td>$500</td>
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<td>of Div Struct</td>
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<td>Top Slab</td>
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**DIVISION 4 - MASONRY**

- Odor Control Bldg  
  8” CMU Walls; Grouted @ 24”  
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<tbody>
<tr>
<td>900</td>
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  Assume 10ft high walls

**DIVISION 5 - METALS**

- Odor Control Bldg  
  Metal Decking  
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<tbody>
<tr>
<td>506</td>
<td>SF</td>
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<td>$1,524</td>
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- Open Web Joists (Gable)  
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<th>Cost, $</th>
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<tbody>
<tr>
<td>4</td>
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- Miscellaneous Plates/Shapes  
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<tr>
<td>2,000</td>
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- Ladder Rungs & Misc. Tank Metals  
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- Hatches  
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**DIVISIONS 7 & 8 - ARCHITECTURAL**

- Odor Control Bldg  
  Roofing, doors, windows, finishes, etc  
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<tr>
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**DIVISION 15 - MECHANICAL**

- Storage Pipe  
  Submersible Pumps and Valving  
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- Flushing Gate  
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- Air Gap (no tank)  
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- Diversion Structure  
  Slide Gate  
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- Level Sensors  
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- Odor Control Bldg  
  Heating, Ventilating, Plumbing  
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- Odor Control Equipment  
  Scrubber, Fan, Sound Enclosure  
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- FRP and Foul Air Piping  
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**DIVISION 16 - ELECTRICAL**

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- Standby Generator  
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- Telemetry  
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**Subtotal**  

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**Contingency**  

<table>
<thead>
<tr>
<th>Percentage</th>
<th>$944,402</th>
</tr>
</thead>
<tbody>
<tr>
<td>30%</td>
<td>$944,402</td>
</tr>
</tbody>
</table>

**Total Estimated Construction Cost**  

<table>
<thead>
<tr>
<th>Cost, $</th>
<th>$4,092,000</th>
</tr>
</thead>
</table>
## Rectangular Storage Tank Capital Cost Estimate

### DIVISION 1 - GENERAL REQUIREMENTS

<table>
<thead>
<tr>
<th>Item</th>
<th>Description</th>
<th>Quantity</th>
<th>Unit</th>
<th>Unit cost, $</th>
<th>Cost, $</th>
<th>Notes</th>
</tr>
</thead>
<tbody>
<tr>
<td>Mobilization</td>
<td>1 LS</td>
<td>$127,318</td>
<td>$127,318</td>
<td>4% of subtotal</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Temporary Traffic Control</td>
<td>1 LS</td>
<td>$95,489</td>
<td>$95,489</td>
<td>3% of subtotal</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Temporary Erosion &amp; Sediment Control</td>
<td>1 LS</td>
<td>$31,830</td>
<td>$31,830</td>
<td>1% of subtotal</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

### DIVISION 2 - SITE WORK

#### ACP Removal

<table>
<thead>
<tr>
<th>Item</th>
<th>Description</th>
<th>Quantity</th>
<th>Unit</th>
<th>Unit cost, $</th>
<th>Cost, $</th>
</tr>
</thead>
<tbody>
<tr>
<td>Storage Tank</td>
<td>445 SY</td>
<td>$20</td>
<td>$8,900</td>
<td>includes sawcut, removal,</td>
<td></td>
</tr>
<tr>
<td>Odor Control Building</td>
<td>70 SY</td>
<td>$20</td>
<td>$1,400</td>
<td>disposal</td>
<td></td>
</tr>
<tr>
<td>Diversion Structure</td>
<td>25 SY</td>
<td>$20</td>
<td>$500</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Clearing &amp; Grubbing</td>
<td>0.04 SF</td>
<td>$25,000</td>
<td>$918</td>
<td>for secondary driveway entrance</td>
<td></td>
</tr>
<tr>
<td>Sewer Bypassing</td>
<td>1 LS</td>
<td>$60,000</td>
<td>$60,000</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

**Excavation**

<table>
<thead>
<tr>
<th>Item</th>
<th>Description</th>
<th>Quantity</th>
<th>Unit</th>
<th>Unit cost, $</th>
<th>Cost, $</th>
</tr>
</thead>
<tbody>
<tr>
<td>Storage Tank</td>
<td>4,000 BCY</td>
<td>$15</td>
<td>$60,000</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Diversion Structure</td>
<td>568 BCY</td>
<td>$25</td>
<td>$14,200</td>
<td></td>
<td></td>
</tr>
<tr>
<td>18 in RCP Diversion to Tank</td>
<td>243 BCY</td>
<td>$25</td>
<td>$6,075</td>
<td></td>
<td></td>
</tr>
<tr>
<td>18 in RCP to CSO</td>
<td>195 BCY</td>
<td>$25</td>
<td>$4,875</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

**Haul/Disposal - Tank + Diversion + Trenches**

<table>
<thead>
<tr>
<th>Item</th>
<th>Description</th>
<th>Quantity</th>
<th>Unit</th>
<th>Unit cost, $</th>
<th>Cost, $</th>
</tr>
</thead>
<tbody>
<tr>
<td>Shoring</td>
<td>6,258 LCY</td>
<td>$11</td>
<td>$68,833</td>
<td>25% increase for loose cy</td>
<td></td>
</tr>
</tbody>
</table>

**Diversion Structure**

<table>
<thead>
<tr>
<th>Item</th>
<th>Description</th>
<th>Quantity</th>
<th>Unit</th>
<th>Unit cost, $</th>
<th>Cost, $</th>
</tr>
</thead>
<tbody>
<tr>
<td>Storage Tank</td>
<td>1,992 CY</td>
<td>$18</td>
<td>$35,856</td>
<td>material, hull to site</td>
<td></td>
</tr>
<tr>
<td>Diversion Structure</td>
<td>222 CY</td>
<td>$18</td>
<td>$3,996</td>
<td>material, hull to site</td>
<td></td>
</tr>
<tr>
<td>18 in RCP Diversion to Tank</td>
<td>219 CY</td>
<td>$18</td>
<td>$3,942</td>
<td>material, hull to site</td>
<td></td>
</tr>
<tr>
<td>18 in RCP to CSO</td>
<td>175 CY</td>
<td>$18</td>
<td>$3,150</td>
<td>material, hull to site</td>
<td></td>
</tr>
</tbody>
</table>

**AC Surface Restoration**

<table>
<thead>
<tr>
<th>Item</th>
<th>Description</th>
<th>Quantity</th>
<th>Unit</th>
<th>Unit cost, $</th>
<th>Cost, $</th>
</tr>
</thead>
<tbody>
<tr>
<td>Storage Tank</td>
<td>1,992 CY</td>
<td>$18</td>
<td>$35,856</td>
<td>material, hull to site</td>
<td></td>
</tr>
<tr>
<td>Diversion Structure</td>
<td>222 CY</td>
<td>$18</td>
<td>$3,996</td>
<td>material, hull to site</td>
<td></td>
</tr>
<tr>
<td>18 in RCP Diversion to Tank</td>
<td>219 CY</td>
<td>$18</td>
<td>$3,942</td>
<td>material, hull to site</td>
<td></td>
</tr>
<tr>
<td>18 in RCP to CSO</td>
<td>175 CY</td>
<td>$18</td>
<td>$3,150</td>
<td>material, hull to site</td>
<td></td>
</tr>
<tr>
<td>AC Surface Restoration</td>
<td>540 SY</td>
<td>$45</td>
<td>$24,300</td>
<td>4 in + 2 in wearing course, 6&quot; gr base + hauling</td>
<td></td>
</tr>
</tbody>
</table>

### DIVISION 3 - CONCRETE

**Diversion Structure**

<table>
<thead>
<tr>
<th>Item</th>
<th>Description</th>
<th>Quantity</th>
<th>Unit</th>
<th>Unit cost, $</th>
<th>Cost, $</th>
</tr>
</thead>
<tbody>
<tr>
<td>Base Slab</td>
<td>9 CY</td>
<td>$500</td>
<td>$4,500</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Walls</td>
<td>38 CY</td>
<td>$800</td>
<td>$30,400</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Top Slab</td>
<td>4 CY</td>
<td>$900</td>
<td>$3,600</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

**Drop Structure, Flow Control Channel**

<table>
<thead>
<tr>
<th>Item</th>
<th>Description</th>
<th>Quantity</th>
<th>Unit</th>
<th>Unit cost, $</th>
<th>Cost, $</th>
</tr>
</thead>
<tbody>
<tr>
<td>48-inch drop manhole</td>
<td>1 EA</td>
<td>$10,000</td>
<td>$10,000</td>
<td></td>
<td></td>
</tr>
<tr>
<td>42-inch RCP Sewer Pipe</td>
<td>240 LF</td>
<td>$250</td>
<td>$60,000</td>
<td></td>
<td></td>
</tr>
<tr>
<td>36-inch RCP Sewer Pipe</td>
<td>30 LF</td>
<td>$225</td>
<td>$6,750</td>
<td></td>
<td></td>
</tr>
<tr>
<td>48-inch manhole</td>
<td>5 EA</td>
<td>$7,500</td>
<td>$37,500</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

**Storage Tank**

<table>
<thead>
<tr>
<th>Item</th>
<th>Description</th>
<th>Quantity</th>
<th>Unit</th>
<th>Unit cost, $</th>
<th>Cost, $</th>
</tr>
</thead>
<tbody>
<tr>
<td>Base Slab</td>
<td>336 CY</td>
<td>$500</td>
<td>$168,000</td>
<td>earth pressures; static +</td>
<td></td>
</tr>
<tr>
<td>Walls</td>
<td>484 CY</td>
<td>$800</td>
<td>$387,200</td>
<td>dynamic liquid pressures;</td>
<td></td>
</tr>
<tr>
<td>Top Elevated Slab</td>
<td>156 CY</td>
<td>$900</td>
<td>$140,400</td>
<td>HS20 traffic + soil over</td>
<td></td>
</tr>
<tr>
<td>Miscellaneous fill/appurtenances</td>
<td>20 CY</td>
<td>$800</td>
<td>$16,000</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
### Project: King County CSO
### Subject: Barton Alternative 1F - Rectangular Storage at Fauntleroy School
### By: Tt
### Date: 21-Dec-10

#### Rectangular Storage Tank

**Capital Cost Estimate**

<table>
<thead>
<tr>
<th>Item Description</th>
<th>Quantity</th>
<th>Unit</th>
<th>Unit cost, $</th>
<th>Cost, $</th>
<th>Notes</th>
</tr>
</thead>
<tbody>
<tr>
<td>Odor Control Bldg</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Strip Footings</td>
<td>5</td>
<td>CY</td>
<td>$300</td>
<td>$1,500</td>
<td>Assume 20' sq x 10' high</td>
</tr>
<tr>
<td>Foundation Walls</td>
<td>5</td>
<td>CY</td>
<td>$400</td>
<td>$2,000</td>
<td></td>
</tr>
<tr>
<td>Slab on Grade</td>
<td>7</td>
<td>CY</td>
<td>$275</td>
<td>$2,035</td>
<td></td>
</tr>
<tr>
<td>Electrical Equip Pad</td>
<td>11</td>
<td>CY</td>
<td>$275</td>
<td>$3,025</td>
<td>Assume 12&quot; thick</td>
</tr>
</tbody>
</table>

**DIVISION 4 - MASONRY**

Odor Control Bldg
8" CMU Walls; Grouted @ 24" 900 SF $30 $27,000 Assume 10ft high walls

**DIVISION 5 - METALS**

Odor Control Bldg
- Metal Decking 506 SF $3 $1,265
- Open Web Joists (Gable) 4 EA $1,500 $6,000
- Miscellaneous Plates/Shapes 2,000 LB $2 $4,000
- Ladder Rungs and Misc. Tank Metals 1 LS $30,000 $30,000
- Hatches 1 LS $40,000 $40,000

**DIVISIONS 7 & 8 - ARCHITECTURAL**

Roofing, doors, windows, finishes, etc 1 LS $15,000 $15,000

**DIVISION 15 - MECHANICAL**

Storage Tank
- Tipping Bucket 2 EA $75,000 $150,000 div by 9 times 20% inflation
- Submersible Pumps and Valving 1 LS $40,000 $40,000
- Drain Gate 1 EA $10,000 $10,000
- Air Gap (no tank) 1 EA $10,000 $10,000 Need to confirm cost with Cloyd
- Diversion Structure
  - Slide Gate 1 EA $10,000 $10,000
  - Level Sensors 1 EA $5,000 $5,000
- Odor Control Bldg
  - Heating, Ventilating, Plumbing 1 EA $70,000 $70,000
- Odor Control Equipment
  - Scrubber, Fan, Sound Enclosure 1 LS $40,000 $40,000
  - FRP and Foul Air Piping 1 LS $40,000 $40,000

**DIVISION 16 - ELECTRICAL**

- Electrical Panel/Controls 1 LS $60,000 $60,000
- Standby Generator 1 LS $60,000 $60,000
- Telemetry 1 LS $60,000 $60,000

**Subtotal** $3,437,590 $3,182,954

Contingency 30% $1,031,277

**Total Estimated Construction Cost** $4,469,000
# KING COUNTY CSO PROJECT - BARTON BASIN (ALTERNATIVE 1F)

## PROJECT COST ESTIMATE

**NOVEMBER 2010**

<table>
<thead>
<tr>
<th>Project Parcel #</th>
<th>Tax Parcel #</th>
<th>Owner</th>
<th>Parcel Address</th>
<th>Acquisition Type</th>
<th>Just Compensation (Offer)</th>
<th>Title Costs</th>
<th>Appraisal Cost</th>
<th>Appraisal Review Cost</th>
<th>Admin. Settlement</th>
<th>Relocation Cost (rounded)</th>
<th>Negotiation Cost (Acquisition &amp; Relocation Costs)</th>
<th>Statutory Evaluation Allowance</th>
<th>Potential Condemnation/ Settlement</th>
<th>Total Parcel Costs</th>
</tr>
</thead>
<tbody>
<tr>
<td>352403-9040</td>
<td>352403-9040</td>
<td>Fauntleroy Community Services Agency - 43,560 SF Temporary Construction Easement for 36 months</td>
<td>9131 California Ave SW, Seattle, WA</td>
<td>TCE</td>
<td>$260,000</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>352403-9040</td>
<td>352403-9040</td>
<td>FCSA - for Above grade facilities (2,500 SF)</td>
<td>9131 California Ave SW, Seattle, WA</td>
<td>Easement</td>
<td>$50,000</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>352403-9040</td>
<td>352403-9040</td>
<td>FCSA - for subterranean easement (3,500 SF)</td>
<td>9131 California Ave SW, Seattle, WA</td>
<td>Subterranean Easement</td>
<td>$52,500</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>Parking Replacement for 20 stalls for 36 months</td>
<td>9131 California Ave SW, Seattle, WA</td>
<td>Lease</td>
<td>$72,000</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>Playground Equipment</td>
<td></td>
<td></td>
<td>$25,000</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>Replacement of playground (14,000 SF)</td>
<td></td>
<td></td>
<td>$280,000</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>Street Use 600 LF @ 20 feet for 12 months</td>
<td></td>
<td></td>
<td>$185,000</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

## ASSUMPTIONS:

* Fee values estimated at tax assessed values only.
* Subterranean Easement estimated at 75% of assessed value
* Parking Stalls Lease based on Colliers Parking Survey
* Playground Replacement may be needed if we use party of playground for staging

---

*Note: The document contains a table listing various project costs and acquisitions, along with their respective costs and the assumptions made about the values.*
# Project: King County CSO

**Subject:** Murray Alternative 1A - Rectangular Storage at Lowman Beach Park  
**By:** Tt  
**Date:** 21-Dec-10

## Rectangular Storage Tank

### Capital Cost Estimate

<table>
<thead>
<tr>
<th>Item</th>
<th>Description</th>
<th>Quantity</th>
<th>Unit</th>
<th>Unit cost, $</th>
<th>Cost, $</th>
<th>Notes</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>DIVISION 1 - GENERAL REQUIREMENTS</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Mobilization</td>
<td>1</td>
<td>LS</td>
<td>$455,376</td>
<td>$455,376</td>
<td>4% of subtotal</td>
<td></td>
</tr>
<tr>
<td>Temporary Traffic Control</td>
<td>1</td>
<td>LS</td>
<td>$227,688</td>
<td>$227,688</td>
<td>2% of subtotal</td>
<td></td>
</tr>
<tr>
<td>Temporary Erosion &amp; Sediment Control</td>
<td>1</td>
<td>LS</td>
<td>$113,844</td>
<td>$113,844</td>
<td>1% of subtotal</td>
<td></td>
</tr>
<tr>
<td><strong>DIVISION 2 - SITE WORK</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>ACP Removal</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Beach Drive in front of Park</td>
<td>1,244</td>
<td>SY</td>
<td>$20</td>
<td>$24,889</td>
<td>Full Road restoration</td>
<td></td>
</tr>
<tr>
<td>Pump Station Rd</td>
<td>511</td>
<td>SY</td>
<td>$20</td>
<td>$10,222</td>
<td>Full Road restoration</td>
<td></td>
</tr>
<tr>
<td>Clearing &amp; Grubbing</td>
<td>0.30</td>
<td>AC</td>
<td>$25,000</td>
<td>$7,576</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Excavation</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Storage Tank</td>
<td>10,500</td>
<td>BCY</td>
<td>$25</td>
<td>$262,500</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Diversion Structure</td>
<td>568</td>
<td>BCY</td>
<td>$25</td>
<td>$14,200</td>
<td></td>
<td></td>
</tr>
<tr>
<td>18 inch RCP Diversion to Tank</td>
<td>195</td>
<td>BCY</td>
<td>$25</td>
<td>$4,875</td>
<td></td>
<td></td>
</tr>
<tr>
<td>6 inch DI to Pump Station</td>
<td>50</td>
<td>BCY</td>
<td>$25</td>
<td>$1,250</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Haul/Disposal - Tank+Diversion+Trenches</td>
<td>14,141</td>
<td>LCY</td>
<td>$11</td>
<td>$155,554</td>
<td>25% increase for loose cy</td>
<td></td>
</tr>
<tr>
<td>Shoring</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Diversion Structure</td>
<td>5,200</td>
<td>SF</td>
<td>$45</td>
<td>$234,000</td>
<td>braced or tieback</td>
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</tr>
<tr>
<td>18 inch RCP Diversion to Tank</td>
<td>5,080</td>
<td>SF</td>
<td>$45</td>
<td>$228,600</td>
<td>braced</td>
<td></td>
</tr>
<tr>
<td>Secant Piles for Tank(total 184 @ 50ft ea)</td>
<td>9,200</td>
<td>LF</td>
<td>$300</td>
<td>$2,760,000</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Crane Rental</td>
<td>230</td>
<td>HR</td>
<td>$1,500</td>
<td>$345,000</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Crane Crew</td>
<td>230</td>
<td>HR</td>
<td>$240</td>
<td>$55,200</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Dewatering</td>
<td>1</td>
<td>LS</td>
<td>$800,000</td>
<td>$800,000</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Install 18 inch Diversion to Tank</td>
<td>60</td>
<td>LF</td>
<td>$50</td>
<td>$3,000</td>
<td>assume rcp, class 3</td>
<td></td>
</tr>
<tr>
<td>Install 6 inch DI to Pump Station</td>
<td>90</td>
<td>LF</td>
<td>$40</td>
<td>$3,600</td>
<td>tyton jnt; shoring included</td>
<td></td>
</tr>
<tr>
<td>Pipe Bedding</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>18 inch Diversion to Tank</td>
<td>16</td>
<td>LCY</td>
<td>$44</td>
<td>$704</td>
<td></td>
<td></td>
</tr>
<tr>
<td>6 inch DI to Pump Station</td>
<td>10</td>
<td>LCY</td>
<td>$44</td>
<td>$440</td>
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<tr>
<td>12 in Compacted Gravel Fill - Tank</td>
<td>10,850</td>
<td>SF</td>
<td>$2</td>
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<td>12 in compacted gravel fill - Div Structure</td>
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<tr>
<td>48&quot; MH (to 25 ft deep) div str conn</td>
<td>1</td>
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<td>$7,500</td>
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<td>Imported Backfill/Compaction</td>
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<td>2,445</td>
<td>CY</td>
<td>$18</td>
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<td>CY</td>
<td>$18</td>
<td>$3,996</td>
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<td>40</td>
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<td>$18</td>
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<td>$2,000,000</td>
<td>$2,000,000</td>
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<tr>
<td><strong>DIVISION 3 - CONCRETE</strong></td>
<td></td>
<td></td>
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<tr>
<td>Diversion Structure</td>
<td></td>
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<tr>
<td>Base Slab</td>
<td>9</td>
<td>CY</td>
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<td>$4,500</td>
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<tr>
<td>Walls</td>
<td>38</td>
<td>CY</td>
<td>$800</td>
<td>$30,400</td>
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<td>Top Slab</td>
<td>4</td>
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<tr>
<td>Storage Tank</td>
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<tr>
<td>Base Slab</td>
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<td>Top Slab</td>
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<td>$603,900</td>
<td>HS20 traffic + soil over</td>
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<td>Miscellaneous fill/appurtenances</td>
<td>20</td>
<td>CY</td>
<td>$800</td>
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<tr>
<td>Augercast piles (total 144 @ 60ft ea)</td>
<td>8,640</td>
<td>LF</td>
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<td>Crane Mobilization (Secant &amp; Auger Cast pile</td>
<td>1</td>
<td>EA</td>
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<tr>
<td>Crane Rental</td>
<td>120</td>
<td>HR</td>
<td>$1,500</td>
<td>$180,000</td>
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<tr>
<td>Crane Crew</td>
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<td>HR</td>
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<tr>
<td>Odor/Electrical Underground Structure</td>
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<tr>
<td>Base Slab</td>
<td>70</td>
<td>CY</td>
<td>$300</td>
<td>$21,000</td>
<td>Estimated from B&amp;C's 90 dra</td>
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Estimated from B&C's 90 dra estimated from B&C's 90 dra.
### Rectangular Storage Tank

#### Capital Cost Estimate

<table>
<thead>
<tr>
<th>Item Description</th>
<th>Quantity</th>
<th>Unit</th>
<th>Unit cost, $</th>
<th>Cost, $</th>
<th>Notes</th>
</tr>
</thead>
<tbody>
<tr>
<td>Interior Walls</td>
<td>17</td>
<td>CY</td>
<td>$500</td>
<td>$8,500</td>
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<tr>
<td>Exterior Walls</td>
<td>80</td>
<td>CY</td>
<td>$500</td>
<td>$40,000</td>
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<tr>
<td>Top Slab (includes beams)</td>
<td>45</td>
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<tr>
<td>Equip Pads</td>
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<td>CY</td>
<td>$250</td>
<td>$2,750</td>
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<tr>
<td>Miscellaneous concrete</td>
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<td>CY</td>
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<td>$1,000</td>
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</tr>
<tr>
<td>Waterproofing/protection board</td>
<td>1,620</td>
<td>SF</td>
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<td>$8,100</td>
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#### DIVISION 4 - MASONRY

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<tbody>
<tr>
<td>Odor Control Bldg</td>
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<td>SF</td>
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#### DIVISION 5 - METALS

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</tr>
</thead>
<tbody>
<tr>
<td>Ladder Rungs and Misc. Tank Metals</td>
<td>1</td>
<td>LS</td>
<td>$50,000</td>
<td>$50,000</td>
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<tr>
<td>Hatches</td>
<td>1</td>
<td>LS</td>
<td>$80,000</td>
<td>$80,000</td>
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<tr>
<td>Misc. Odor Control/Electrical Structure Metals</td>
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<td>LS</td>
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#### DIVISIONS 7 & 8 - ARCHITECTURAL

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<th>Unit cost, $</th>
<th>Cost, $</th>
</tr>
</thead>
<tbody>
<tr>
<td>Misc doors, hardware etc</td>
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#### DIVISION 15 - MECHANICAL

<table>
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<th>Quantity</th>
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<th>Notes</th>
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</thead>
<tbody>
<tr>
<td>Storage Tank Tip Bucket</td>
<td>4</td>
<td>EA</td>
<td>$75,000</td>
<td>$300,000</td>
<td>tip bucket price = N. Creek div by 9 times 20% inflation</td>
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<tr>
<td>Submersible Pumps and Valving</td>
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<td>LS</td>
<td>$200,000</td>
<td>$200,000</td>
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<tr>
<td>Drain Gates</td>
<td>3</td>
<td>EA</td>
<td>$20,000</td>
<td>$60,000</td>
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</tr>
<tr>
<td>Air Gap (no tank)</td>
<td>1</td>
<td>EA</td>
<td>$20,000</td>
<td>$20,000</td>
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</tr>
<tr>
<td>Diversion Structure</td>
<td>1</td>
<td>EA</td>
<td>$10,000</td>
<td>$10,000</td>
<td>No gates since weir controlled.</td>
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<tr>
<td>Odor Control Equipment</td>
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</tr>
<tr>
<td>Heating, Ventilating, Plumbing</td>
<td>1</td>
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<td>$100,000</td>
<td>$100,000</td>
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<tr>
<td>Scrubber, Fan, Sound Enclosure</td>
<td>1</td>
<td>LS</td>
<td>$60,000</td>
<td>$60,000</td>
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<tr>
<td>FRP and Foul Air Piping</td>
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#### DIVISION 16 - ELECTRICAL

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<tbody>
<tr>
<td>Electrical Panel/Controls</td>
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<td>LS</td>
<td>$150,000</td>
<td>$150,000</td>
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<td>Standby Generator</td>
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<td>$100,000</td>
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<tr>
<td>Telemetry</td>
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<table>
<thead>
<tr>
<th></th>
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<th></th>
<th></th>
<th>subtotal w/o traffic/erosion</th>
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<tr>
<td>Subtotal</td>
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<td>$12,181,000</td>
<td>$11,384,411</td>
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<tr>
<td>Restricted Site Impact</td>
<td>0.00%</td>
<td></td>
<td>$0</td>
<td>$0</td>
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<tr>
<td>Phasing/Restricted Work Hour Impact</td>
<td>0.00%</td>
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<td>$0</td>
<td>$0</td>
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<tr>
<td>Subtotal</td>
<td></td>
<td></td>
<td>$12,181,000</td>
<td>$11,384,411</td>
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<tr>
<td>Contingency</td>
<td>30%</td>
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<td>Total Estimated Construction Cost</td>
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<td>$15,835,300</td>
<td>$15,038,711</td>
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### Rectangular Storage Tank Capital Cost Estimate

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<th>Unit</th>
<th>Unit cost, $</th>
<th>Cost, $</th>
<th>Notes</th>
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<td><strong>DIVISION 1 - GENERAL REQUIREMENTS</strong></td>
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<tr>
<td>Mobilization</td>
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<td>1</td>
<td>LS</td>
<td>$463,435</td>
<td>$463,435</td>
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<td>$231,717</td>
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<tr>
<td>Temporary Erosion &amp; Sediment Control</td>
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<td>1</td>
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<tr>
<td>ACP Removal</td>
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<td></td>
<td></td>
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</tr>
<tr>
<td>Beach Drive in front of Park</td>
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<td>1,244</td>
<td>SY</td>
<td>$20</td>
<td>$24,889</td>
<td>Full Road restoration</td>
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<tr>
<td>Clearing &amp; Grubbing</td>
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<td>0.21</td>
<td>AC</td>
<td>$25,000</td>
<td>$5,165</td>
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<td>Excavation</td>
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<td>625</td>
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<td>6 inch DI to MH</td>
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<td>22</td>
<td>BCY</td>
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<td>$556</td>
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<td>Haul/Disposal - Tank+Diversion+Trench</td>
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<td>SF</td>
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<td>Pipe Bedding</td>
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<td>$800</td>
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<td>6 inch DI from drain pumps to MH</td>
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<td>LCY</td>
<td>$44</td>
<td>$220</td>
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<td>48&quot; MH (to 30 ft deep) div str conn</td>
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<td>EA</td>
<td>$10,000</td>
<td>$10,000</td>
<td>mh+exc+backfill</td>
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<td>Install 6 inch RCP Div Str to Tank</td>
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<td>$500,000</td>
<td>$500,000</td>
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<tr>
<td>Imported Backfill/Compaction</td>
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<tr>
<td>Storage Tank</td>
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<td>6,730</td>
<td>CY</td>
<td>$18</td>
<td>$121,140</td>
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<td>222</td>
<td>CY</td>
<td>$18</td>
<td>$3,996</td>
<td>material, haul to site</td>
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<tr>
<td>18 inch RCP Diversion to Tank</td>
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<td>CY</td>
<td>$18</td>
<td>$10,260</td>
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<td>AC Surface Restoration</td>
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<td>1,244</td>
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<td>$45</td>
<td>$56,000</td>
<td>4 in + 2 in wearing course, 6&quot; gr base + h:</td>
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<td>Park Restoration Allowance</td>
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<td>LS</td>
<td>$200,000</td>
<td>$200,000</td>
<td>Restoration after construction staging</td>
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<tr>
<td><strong>DIVISION 3 - CONCRETE</strong></td>
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<td></td>
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</tr>
<tr>
<td>Base Slab</td>
<td></td>
<td>9</td>
<td>CY</td>
<td>$500</td>
<td>$4,500</td>
<td></td>
</tr>
<tr>
<td>Walls</td>
<td></td>
<td>38</td>
<td>CY</td>
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<td>975</td>
<td>CY</td>
<td>$500</td>
<td>$487,500</td>
<td>earth pressures; static +</td>
</tr>
<tr>
<td>Walls</td>
<td></td>
<td>1,552</td>
<td>CY</td>
<td>$800</td>
<td>$1,241,600</td>
<td>dynamic liquid pressures;</td>
</tr>
<tr>
<td>Top Slab</td>
<td></td>
<td>780</td>
<td>CY</td>
<td>$900</td>
<td>$702,000</td>
<td>HS20 traffic + soil over</td>
</tr>
<tr>
<td>Miscellaneous fill/appurtenances</td>
<td></td>
<td>20</td>
<td>CY</td>
<td>$800</td>
<td>$16,000</td>
<td></td>
</tr>
<tr>
<td>Augercast piles (total 195 @ 60ft ea)</td>
<td></td>
<td>11,700</td>
<td>LF</td>
<td>$60</td>
<td>$702,000</td>
<td></td>
</tr>
<tr>
<td>Crane Mobilization</td>
<td></td>
<td>1</td>
<td>EA</td>
<td>$10,500</td>
<td>$10,500</td>
<td>assume 10’ sq x 20’ deep</td>
</tr>
<tr>
<td>Crane Rental</td>
<td></td>
<td>163</td>
<td>HR</td>
<td>$1,500</td>
<td>$244,500</td>
<td></td>
</tr>
<tr>
<td>Crane Crew</td>
<td></td>
<td>163</td>
<td>HR</td>
<td>$240</td>
<td>$39,120</td>
<td></td>
</tr>
<tr>
<td>Secant Piles (total 147 @ 50ft ea)</td>
<td></td>
<td>7,350</td>
<td>LF</td>
<td>$300</td>
<td>$2,205,000</td>
<td></td>
</tr>
<tr>
<td>Secant Piles (total 57 @ 65ft ea)</td>
<td></td>
<td>3,705</td>
<td>LF</td>
<td>$300</td>
<td>$1,111,500</td>
<td>15ft longer for ret wall</td>
</tr>
<tr>
<td>Crane Rental</td>
<td></td>
<td>255</td>
<td>HR</td>
<td>$1,500</td>
<td>$382,500</td>
<td></td>
</tr>
<tr>
<td>Crane Crew</td>
<td></td>
<td>255</td>
<td>HR</td>
<td>$240</td>
<td>$61,200</td>
<td></td>
</tr>
<tr>
<td>Shotcrete face of retaining wall</td>
<td></td>
<td>2,400</td>
<td>SF</td>
<td>$16</td>
<td>$38,400</td>
<td></td>
</tr>
<tr>
<td>Cap beam over retaining wall secants</td>
<td></td>
<td>20</td>
<td>CY</td>
<td>$400</td>
<td>$8,000</td>
<td></td>
</tr>
<tr>
<td>Odor Control Bldg</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Strip Footings</td>
<td></td>
<td>5</td>
<td>CY</td>
<td>$300</td>
<td>$1,500</td>
<td>assume 20’ sq x 10’ high</td>
</tr>
</tbody>
</table>
**Project:** King County CSO  
**Subject:** Murray Alternative 1F - Beach Drive Area Underground Storage  
**By:** Tt  
**Date:** 21-Dec-10

### Rectangular Storage Tank Capital Cost Estimate

<table>
<thead>
<tr>
<th>Item Description</th>
<th>Quantity</th>
<th>Unit</th>
<th>Unit cost, $</th>
<th>Cost, $</th>
<th>Notes</th>
</tr>
</thead>
<tbody>
<tr>
<td>Foundation Walls</td>
<td>5</td>
<td>CY</td>
<td>$400</td>
<td>$2,000</td>
<td></td>
</tr>
<tr>
<td>Slab on Grade</td>
<td>7</td>
<td>CY</td>
<td>$275</td>
<td>$2,035</td>
<td></td>
</tr>
<tr>
<td>Electrical Equip Pad</td>
<td>11</td>
<td>CY</td>
<td>$275</td>
<td>$3,025</td>
<td>Assume 12&quot; thick</td>
</tr>
</tbody>
</table>

**DIVISION 4 - MASONRY**

- **Odor Control Bldg**
  - 8" CMU Walls; Grouted @ 24"  
    | Quantity | Unit | Unit cost, $ | Cost, $ |
    |----------|------|--------------|---------|
    | 900      | SF   | $12          | $10,800 | Assume 10ft high walls                   |

**DIVISION 5 - METALS**

- **Odor Control Bldg**
  - Metal Decking  
    | Quantity | Unit | Unit cost, $ | Cost, $ |
    |----------|------|--------------|---------|
    | 506      | SF   | $3           | $1,525  |
  - Open Web Joists (Gable)  
    | Quantity | Unit | Unit cost, $ | Cost, $ |
    | 4        | EA   | $1,500       | $6,000  |
  - Miscellaneous Plates/Shapes  
    | Quantity | Unit | Unit cost, $ | Cost, $ |
    | 2,000    | LB   | $2           | $4,000  |
  - Ladder Rungs and Misc. Tank Metals  
    | Quantity | Unit | Unit cost, $ | Cost, $ |
    | 1        | LS   | $50,000      | $50,000 |
  - Hatches  
    | Quantity | Unit | Unit cost, $ | Cost, $ |
    | 1        | LS   | $80,000      | $80,000 |

**DIVISIONS 7 & 8 - ARCHITECTURAL**

- Roofing, doors, windows, finishes, etc  
<table>
<thead>
<tr>
<th>Quantity</th>
<th>Unit</th>
<th>Unit cost, $</th>
<th>Cost, $</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>LS</td>
<td>$15,000</td>
<td>$15,000</td>
</tr>
</tbody>
</table>

**DIVISION 15 - MECHANICAL**

- **Odor Control Equipment**
  - Tipping Bucket  
    | Quantity | Unit | Unit cost, $ | Cost, $ |
    |----------|------|--------------|---------|
    | 5        | EA   | $75,000      | $375,000| div by 9 times 20% inflation               |
  - Submersible Pumps and Valving  
    | Quantity | Unit | Unit cost, $ | Cost, $ |
    | 1        | LS   | $200,000     | $200,000|
  - Drain Gates  
    | Quantity | Unit | Unit cost, $ | Cost, $ |
    | 4        | EA   | $20,000      | $80,000 |
  - Air Gap (no tank)  
    | Quantity | Unit | Unit cost, $ | Cost, $ |
    | 1        | EA   | $20,000      | $20,000 |
  - Diversion Structure  
    | Quantity | Unit | Unit cost, $ | Cost, $ |
    | 1        | EA   | $10,000      | $10,000 |
  - Level Sensors  
    | Quantity | Unit | Unit cost, $ | Cost, $ |
    | 1        | EA   | $10,000      | $10,000 |

- **Storage Tank Tip Bucket Price = N. Creek**  
- **Odor Control Equipment**
  - Heating, Ventilating, Plumbing  
    | Quantity | Unit | Unit cost, $ | Cost, $ |
    | 1        | EA   | $100,000     | $100,000|
  - Scrubber, Fan, Sound Enclosure  
    | Quantity | Unit | Unit cost, $ | Cost, $ |
    | 1        | LS   | $60,000      | $60,000 |
  - FRP and Foul Air Piping  
    | Quantity | Unit | Unit cost, $ | Cost, $ |
    | 1        | LS   | $60,000      | $60,000 |
  - Diversion Structure  
    | Quantity | Unit | Unit cost, $ | Cost, $ |
    | 1        | LS   | $10,000      | $10,000 |

**DIVISION 16 - ELECTRICAL**

- **Electrical**
  - Electrical Panel/Controls  
    | Quantity | Unit | Unit cost, $ | Cost, $ |
    | 1        | LS   | $150,000     | $150,000|
  - Standby Generator  
    | Quantity | Unit | Unit cost, $ | Cost, $ |
    | 1        | LS   | $100,000     | $100,000|
  - Telemetry  
    | Quantity | Unit | Unit cost, $ | Cost, $ |
    | 1        | LS   | $80,000      | $80,000 |

**Total Estimated Construction Cost**

<table>
<thead>
<tr>
<th>Subtotal</th>
<th>$12,397,000</th>
</tr>
</thead>
<tbody>
<tr>
<td>Restricted Site Impact</td>
<td>10.00%</td>
</tr>
<tr>
<td>Phasing/Restricted Work Hour Impact</td>
<td>0.00%</td>
</tr>
<tr>
<td><strong>Subtotal</strong></td>
<td>$13,636,700</td>
</tr>
<tr>
<td>Contingency</td>
<td>30%</td>
</tr>
<tr>
<td><strong>Total Estimated Construction Cost</strong></td>
<td><strong>$17,727,710</strong></td>
</tr>
</tbody>
</table>
### Project: King County CSO
### Subject: Community Suggested Alternative 2A - Rectangular Storage at Lincoln Park
### By: Tt
### Date: 21-Dec-10

#### Rectangular Storage Tank Capital Cost Estimate

<table>
<thead>
<tr>
<th>Item Description</th>
<th>Quantity</th>
<th>Unit</th>
<th>Unit cost, $</th>
<th>Cost, $</th>
<th>Notes</th>
</tr>
</thead>
<tbody>
<tr>
<td>Mobilization</td>
<td>1</td>
<td>LS</td>
<td>$563,298</td>
<td>$563,298</td>
<td>4% of subtotal</td>
</tr>
<tr>
<td>Temporary Traffic Control</td>
<td>1</td>
<td>LS</td>
<td>$281,649</td>
<td>$281,649</td>
<td>2% of subtotal</td>
</tr>
<tr>
<td>Temporary Erosion &amp; Sediment Control</td>
<td>1</td>
<td>LS</td>
<td>$140,825</td>
<td>$140,825</td>
<td>1% of subtotal</td>
</tr>
</tbody>
</table>

#### DIVISION 1 - GENERAL REQUIREMENTS

<table>
<thead>
<tr>
<th>Item Description</th>
<th>Quantity</th>
<th>Unit</th>
<th>Unit cost, $</th>
<th>Cost, $</th>
<th>Notes</th>
</tr>
</thead>
<tbody>
<tr>
<td>Mobilization</td>
<td>1</td>
<td>LS</td>
<td>$563,298</td>
<td>$563,298</td>
<td>4% of subtotal</td>
</tr>
<tr>
<td>Temporary Traffic Control</td>
<td>1</td>
<td>LS</td>
<td>$281,649</td>
<td>$281,649</td>
<td>2% of subtotal</td>
</tr>
<tr>
<td>Temporary Erosion &amp; Sediment Control</td>
<td>1</td>
<td>LS</td>
<td>$140,825</td>
<td>$140,825</td>
<td>1% of subtotal</td>
</tr>
</tbody>
</table>

#### DIVISION 2 - SITE WORK

<table>
<thead>
<tr>
<th>Item Description</th>
<th>Quantity</th>
<th>Unit</th>
<th>Unit cost, $</th>
<th>Cost, $</th>
<th>Notes</th>
</tr>
</thead>
<tbody>
<tr>
<td>ACP Removal</td>
<td>2,222</td>
<td>SY</td>
<td>$20</td>
<td>$44,440</td>
<td>Full lot restoration</td>
</tr>
<tr>
<td>Odor bldg</td>
<td>267</td>
<td>SY</td>
<td>$20</td>
<td>$5,340</td>
<td>Full Road restoration</td>
</tr>
<tr>
<td>Diversion struct</td>
<td>133</td>
<td>SY</td>
<td>$20</td>
<td>$2,660</td>
<td>Full Road restoration</td>
</tr>
<tr>
<td>Large Diameter Pipe Storage</td>
<td>104</td>
<td>SY</td>
<td>$21</td>
<td>$2,178</td>
<td></td>
</tr>
<tr>
<td>Genset pad</td>
<td>89</td>
<td>SY</td>
<td>$20</td>
<td>$1,780</td>
<td>Full Lot restoration</td>
</tr>
<tr>
<td>Clearing &amp; Grubbing</td>
<td>0.28</td>
<td>AC</td>
<td>$25,000</td>
<td>$6,887</td>
<td>Pipeline area</td>
</tr>
<tr>
<td>Excavation</td>
<td>15,700</td>
<td>BCY</td>
<td>$25</td>
<td>$392,500</td>
<td></td>
</tr>
<tr>
<td>Large Diameter Pipe Storage</td>
<td>2,593</td>
<td>BCY</td>
<td>$25</td>
<td>$64,815</td>
<td></td>
</tr>
<tr>
<td>Diversion Structure</td>
<td>845</td>
<td>BCY</td>
<td>$25</td>
<td>$21,125</td>
<td></td>
</tr>
<tr>
<td>Odor Structure</td>
<td>833</td>
<td>BCY</td>
<td>$25</td>
<td>$20,825</td>
<td></td>
</tr>
<tr>
<td>24 inch lines to exist force mains.</td>
<td>7,600</td>
<td>BCY</td>
<td>$25</td>
<td>$190,000</td>
<td></td>
</tr>
<tr>
<td>Haul/Disposal · Tank+Diversion+Trenches</td>
<td>31,223</td>
<td>LCY</td>
<td>$11</td>
<td>$343,448</td>
<td>25% increase for loose cy</td>
</tr>
<tr>
<td>Shoring</td>
<td>4,216</td>
<td>SF</td>
<td>$45</td>
<td>$189,720</td>
<td>braced or tieback</td>
</tr>
<tr>
<td>Odor Structure</td>
<td>4,000</td>
<td>SF</td>
<td>$45</td>
<td>$180,000</td>
<td></td>
</tr>
<tr>
<td>Large Diameter Pipe Storage</td>
<td>9,600</td>
<td>SF</td>
<td>$45</td>
<td>$432,000</td>
<td></td>
</tr>
<tr>
<td>24 inch lines to exist force mains.</td>
<td>1</td>
<td>LS</td>
<td>$50,000</td>
<td>$50,000</td>
<td>Trench Box.</td>
</tr>
<tr>
<td>Secant Files for Tank(total 230 @ 50ft ea)</td>
<td>11,500</td>
<td>LF</td>
<td>$300</td>
<td>$3,450,000</td>
<td></td>
</tr>
<tr>
<td>Crane Rental</td>
<td>350</td>
<td>HR</td>
<td>$1,500</td>
<td>$525,000</td>
<td></td>
</tr>
<tr>
<td>Crane Crew</td>
<td>350</td>
<td>HR</td>
<td>$240</td>
<td>$84,000</td>
<td></td>
</tr>
<tr>
<td>Crane Mobilization (Secant piles)</td>
<td>1</td>
<td>EA</td>
<td>$10,500</td>
<td>$10,500</td>
<td></td>
</tr>
<tr>
<td>Dewatering</td>
<td>1</td>
<td>LS</td>
<td>$400,000</td>
<td>$400,000</td>
<td></td>
</tr>
<tr>
<td>Install 4-24 inch Force Mains</td>
<td>2,400</td>
<td>LF</td>
<td>$50</td>
<td>$120,000</td>
<td>assumption, class 3</td>
</tr>
<tr>
<td>Install 7” inch DI to Div to Tank</td>
<td>10</td>
<td>LF</td>
<td>$40</td>
<td>$400</td>
<td>tyton jnt; shoring included</td>
</tr>
<tr>
<td>Pipe Bedding</td>
<td>800</td>
<td>LCY</td>
<td>$44</td>
<td>$35,200</td>
<td></td>
</tr>
<tr>
<td>12 in compacted gravel fill · Stor Tank</td>
<td>11,840</td>
<td>SF</td>
<td>$2</td>
<td>$17,760</td>
<td></td>
</tr>
<tr>
<td>12 in compacted gravel fill · Div Structure</td>
<td>816</td>
<td>SF</td>
<td>$2</td>
<td>$1,632</td>
<td></td>
</tr>
<tr>
<td>12 in compacted gravel fill · Lg. Diam. St.</td>
<td>2,800</td>
<td>SF</td>
<td>$2</td>
<td>$5,600</td>
<td></td>
</tr>
<tr>
<td>48” MH (to 25 ft deep) div str conn</td>
<td>1</td>
<td>EA</td>
<td>$7,500</td>
<td>$7,500</td>
<td>mh+exc+backfill</td>
</tr>
<tr>
<td>Miscellaneous Utility Relocation</td>
<td>1</td>
<td>LS</td>
<td>$100,000</td>
<td>$100,000</td>
<td></td>
</tr>
<tr>
<td>Imported Backfill/Compaction</td>
<td>5,297</td>
<td>CY</td>
<td>$18</td>
<td>$95,346</td>
<td>material, haul to site</td>
</tr>
<tr>
<td>Storage Tank</td>
<td>715</td>
<td>CY</td>
<td>$18</td>
<td>$12,870</td>
<td>material, haul to site</td>
</tr>
<tr>
<td>Odor Structure</td>
<td>388</td>
<td>CY</td>
<td>$18</td>
<td>$6,984</td>
<td>material, haul to site</td>
</tr>
<tr>
<td>Large Diameter Pipe Storage</td>
<td>415</td>
<td>CY</td>
<td>$19</td>
<td>$7,881</td>
<td>material, haul to site</td>
</tr>
<tr>
<td>24 inch lines to exist force mains.</td>
<td>6,250</td>
<td>CY</td>
<td>$18</td>
<td>$112,500</td>
<td>material, haul to site</td>
</tr>
<tr>
<td>AC Surface Restoration</td>
<td>2,815</td>
<td>SY</td>
<td>$45</td>
<td>$126,662</td>
<td>4 in + 2 in wearing course,</td>
</tr>
<tr>
<td>Sidewalk/Landscaping/Curb Replacement on Fauntleroy</td>
<td>1</td>
<td>LS</td>
<td>$250,000</td>
<td>$250,000</td>
<td></td>
</tr>
<tr>
<td>Parking Lot striping, curbing replacement</td>
<td>1</td>
<td>LS</td>
<td>$6,000</td>
<td>$6,000</td>
<td></td>
</tr>
<tr>
<td>Replace light poles/foundation</td>
<td>10</td>
<td>LS</td>
<td>$7,000</td>
<td>$70,000</td>
<td>Price per Bothell office/typ detail;</td>
</tr>
<tr>
<td>Park Restoration Allowance</td>
<td>1</td>
<td>LS</td>
<td>$2,000,000</td>
<td>$2,000,000</td>
<td></td>
</tr>
</tbody>
</table>

#### DIVISION 3 - CONCRETE

<table>
<thead>
<tr>
<th>Item Description</th>
<th>Quantity</th>
<th>Unit</th>
<th>Unit cost, $</th>
<th>Cost, $</th>
<th>Notes</th>
</tr>
</thead>
<tbody>
<tr>
<td>Diversion Structure · Large Diameter Pipe Storage</td>
<td>9</td>
<td>CY</td>
<td>$500</td>
<td>$4,500</td>
<td>assume 10’ sq x 20’ deep</td>
</tr>
<tr>
<td>Walls</td>
<td>38</td>
<td>CY</td>
<td>$800</td>
<td>$30,400</td>
<td></td>
</tr>
<tr>
<td>Top Slab</td>
<td>4</td>
<td>CY</td>
<td>$900</td>
<td>$3,600</td>
<td></td>
</tr>
<tr>
<td>Diversion Structure · Rectangular Tank</td>
<td>45</td>
<td>CY</td>
<td>$500</td>
<td>$22,500</td>
<td></td>
</tr>
<tr>
<td>Walls</td>
<td>167</td>
<td>CY</td>
<td>$800</td>
<td>$133,600</td>
<td></td>
</tr>
<tr>
<td>Top Slab (includes beams)</td>
<td>34</td>
<td>CY</td>
<td>$900</td>
<td>$30,600</td>
<td></td>
</tr>
</tbody>
</table>
### Project: King County CSO
### Subject: Community Suggested Alternative 2A - Rectangular Storage at Lincoln Park
### By: Tt
### Date: 21-Dec-10

#### Rectangular Storage Tank
**Capital Cost Estimate**

<table>
<thead>
<tr>
<th>Item Description</th>
<th>Quantity</th>
<th>Unit</th>
<th>Unit cost, $</th>
<th>Cost, $</th>
<th>Notes</th>
</tr>
</thead>
<tbody>
<tr>
<td>Storage Tank</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Base Slab</td>
<td>1,147</td>
<td>CY</td>
<td>$500</td>
<td>$573,500</td>
<td>sized for seismic/lateral earth pressures; static +</td>
</tr>
<tr>
<td>Walls</td>
<td>1,570</td>
<td>CY</td>
<td>$800</td>
<td>$1,256,000</td>
<td>dynamic liquid pressures; HS20 traffic + soil over</td>
</tr>
<tr>
<td>Top Slab</td>
<td>810</td>
<td>CY</td>
<td>$900</td>
<td>$729,000</td>
<td></td>
</tr>
<tr>
<td>Miscellaneous fill/appurtenances</td>
<td>30</td>
<td>CY</td>
<td>$800</td>
<td>$24,000</td>
<td></td>
</tr>
<tr>
<td>Install 12 Ft Dia RCP Storage Pipe</td>
<td>175</td>
<td>LF</td>
<td>$1,000</td>
<td>$175,000</td>
<td>includes pipe for flushing chamber</td>
</tr>
<tr>
<td>Odor/Electrical Underground Structure</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Base Slab</td>
<td>70</td>
<td>CY</td>
<td>$300</td>
<td>$21,000</td>
<td>Estimated from B&amp;C's 90 draw 20x40 - assume 12 ft deep</td>
</tr>
<tr>
<td>Interior Walls</td>
<td>17</td>
<td>CY</td>
<td>$500</td>
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<td>Waterproofing/protection board</td>
<td>1,620</td>
<td>SF</td>
<td>$5</td>
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<tr>
<td>Odor Control Bldg</td>
<td></td>
<td></td>
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</tr>
<tr>
<td>Division 4 - Masonry</td>
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<tr>
<td>Ladder Rungs and Misc. Tank Metals</td>
<td>1</td>
<td>LS</td>
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<tr>
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<tr>
<td>Misc Odor Control/Electrical Structure Metals</td>
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<tr>
<td>Division 5 - Metals</td>
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<tr>
<td>Storage Tank Tip Bucket</td>
<td>5</td>
<td>EA</td>
<td>$75,000</td>
<td>$375,000</td>
<td>div by 9 times 20% inflation</td>
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<td>Submersible Pumps and Valving</td>
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<td>Drain Gates</td>
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<td>Air Gap (no tank)</td>
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<td>EA</td>
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<td>$15,000</td>
<td>Need to confirm cost with Cloyd</td>
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<td>Diversion Structure</td>
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<tr>
<td>Odor Control Equipment</td>
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<td>Heating, Ventilating, Plumbing</td>
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<tr>
<td>Scrubber, Fan, Sound Enclosure</td>
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<td>Provides allowance for additional</td>
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**Subtotal** | $15,068,000 | $14,082,450 |

**Restricted Site Impact** | 0.00% | $0 |

**Phasing/Restricted Work Hour Impact** | 20.00% | $3,013,600 |

**Subtotal** | $18,081,600 |

**Contingency** | 30% | $5,424,480 |

**Total Estimated Construction Cost** | $23,506,080 |
# KING COUNTY CSO PROJECT- MURRAY BASIN (ALTERNATIVE 1A )
## PROJECT COST ESTIMATE

### NOVEMBER 2010

<table>
<thead>
<tr>
<th>Project Parcel #</th>
<th>Tax Parcel #</th>
<th>Owner</th>
<th>Parcel Address</th>
<th>Acquisition Type</th>
<th>Just Compensation (Offer)</th>
<th>Title Costs</th>
<th>Appraisal Cost</th>
<th>Appraisal Review Cost</th>
<th>Admin. Settlement</th>
<th>Relocation Cost (rounded)</th>
<th>Negotiation Cost (Acquisition &amp; Relocation Costs)</th>
<th>Statutory Evaluation Allowance</th>
<th>Potential Condemnation/ Settlement</th>
<th>Total Parcel Costs</th>
</tr>
</thead>
<tbody>
<tr>
<td>431570-1200</td>
<td>CITY OF SEATTLE PARKS (177,000 SF)</td>
<td>7005 Beach Dr. SW, SEATTLE 98136</td>
<td>Acquisition Cost</td>
<td>$10M - $15M</td>
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<td>$10M - $15M</td>
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<td>$1.8M</td>
<td>$1.8M</td>
<td>$1.8M</td>
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### ASSUMPTIONS:

* Fee values estimated at tax assessed values only.

We are assuming that park replacement would not be required, and we would pay approximately market value for park
Street Use Fees are based on SDOT’s Use Code #31
### KING COUNTY CSO PROJECT: MURRAY BASIN (ALTERNATIVE 1F)
#### PROJECT COST ESTIMATE

**NOVEMBER 2010**

<table>
<thead>
<tr>
<th>Project</th>
<th>Net Impact</th>
<th>Source</th>
<th>Design/Builder</th>
<th>Cost Estimate (FTE)</th>
<th>Fee Cost</th>
<th>Construction Costs</th>
<th>Full</th>
<th>Cost Allocation &amp; Estimated End Date</th>
<th>Estimated Total</th>
<th>Rental Costs</th>
<th>Full Impact</th>
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<td></td>
</tr>
</tbody>
</table>

**VALUES ARE PLACEHOLDERS FOR PLANNING LEVEL ONLY – VALUES DO NOT REFLECT INDEPENDENT FEE APPRAISAL VALUES**

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**Preliminary Estimates Only**

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**Rental Costs**

City Park Forest Fire based on value of assessed land at a rate used inepam (public and private) at rate of 3.0%

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**Assumptions**

- All Compensation based on 90% of appraisals, and includes property, property rights and property costs (tax and demolition if any).
- All costs, vegetation costs, appraisal and appraised removal costs are estimated only, not assumed for City of Seattle's SFOTT.
- Potential Condemnation/Relocation costs noted in 10% of cost of all Compensation (an increase of 10% on appraised cost) not assumed for City of Seattle's SFOTT at this time.
- Indirect Reimbursement (CRM) for owners' money of offer, not assumed for City of Seattle's SFOTT at this time.
- Negligibility, Reimbursement, SFOTT for owners' money of offer, not assumed for City of Seattle's SFOTT at this time.
- Negligibility Costs includes forested areas and vegetation costs and non-cancelled buildings costs based on current SFOTT rate.
- Landfills are assumed to be eligible for non-cancelled $50,000 replacement value of their locations, as landfill, and non-cancelled building at full appraised value (appraised) per unit (item) difference.
- Forest mowing and trail supplement costs are calculated as per dwelling unit basis and lessoner would expect costs as per RCW tax reform.
- Actual number of tenants to be rehoused TBD.
# KING COUNTY CSO PROJECT- MURRAY BASIN (ALTERNATIVE 2A)
## PROJECT COST ESTIMATE

**NOVEMBER 2010**

<table>
<thead>
<tr>
<th>Project Parcel #</th>
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<th>Owner</th>
<th>Parcel Address</th>
<th>Acquisition Type</th>
<th>Just Compensation (Offer)</th>
<th>Title Costs</th>
<th>Appraisal Cost</th>
<th>Appraisal Review Cost</th>
<th>Admin. Settlement</th>
<th>Relocation Cost (rounded)</th>
<th>Negotiation Cost (Acquisition &amp; Relocation Costs)</th>
<th>Statutory Evaluation Allowance</th>
<th>Potential Condemnation/ Setttement</th>
<th>Total Parcel Costs</th>
</tr>
</thead>
<tbody>
<tr>
<td>352403-9020</td>
<td>CITY OF SEATTLE PARKS</td>
<td>8603 FAUNTLEROY WAY SW, SEATTLE 98136</td>
<td>TCE</td>
<td>$340,000</td>
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<td></td>
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</tr>
<tr>
<td>4315701200</td>
<td>CITY OF SEATTLE PARKS (43,560 SF) for 12 months</td>
<td>Lowman Beach Park Property</td>
<td>TCE for staging</td>
<td>$200,000</td>
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<td></td>
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<td></td>
<td></td>
<td></td>
<td>$200,000</td>
</tr>
<tr>
<td>4315701200</td>
<td>CITY OF SEATTLE PARKS (43,560 SF) for 12 months</td>
<td>In Lincoln Park Parking Lot</td>
<td>Easement</td>
<td>$1,300,000</td>
<td></td>
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<td></td>
<td></td>
<td>$1,300,000</td>
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<tr>
<td></td>
<td>CITY OF SEATTLE PARKS (43,560 SF) for 12 months</td>
<td>next to Lowman Beach Park</td>
<td>staging and storage in Beach Dr. SW</td>
<td>$140,000</td>
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<td></td>
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<td></td>
<td></td>
<td></td>
<td>$140,000</td>
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<tr>
<td></td>
<td>CITY OF SEATTLE PARKS (43,560 SF) for 12 months</td>
<td>SDOT (9,000 SF) for 12 months</td>
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<td>$1,980,000</td>
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</table>

**ASSUMPTIONS:**

* Fee values estimated at tax assessed values only.
* Subterranean easement estimated at 75% of assessed value
* Street Use Cost based on SDOT fee schedule Use #31, Construction in Street

---

*Fee values estimated at tax assessed values only.*

Subterranean easement estimated at 75% of assessed value

Street Use Cost based on SDOT fee schedule Use #31, Construction in Street
## WTD Business Case Evaluation Results

### Barton Basin CSO Life Cycle Cost

#### WTD Borrowing Cost as Discount Rate (1)

<table>
<thead>
<tr>
<th>Scenario</th>
<th>Lifetime</th>
<th>Initial Capital Outlay</th>
<th>Total Project Life Costs (2)</th>
<th>Total Project Life Benefits</th>
<th>Net Project Life Costs</th>
<th>Average Project Annual Cost</th>
<th>Annual Costs over(under) Status quo</th>
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</thead>
<tbody>
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<td>Status Quo</td>
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<td>$0</td>
<td>$0</td>
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<tr>
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#### Budget Office Discount Rate (3)

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<th>Annual Costs over(under) Status quo</th>
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<tr>
<td>Status Quo</td>
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Notes:

1. WTD Discount rate based on recent WTD borrowing costs net of 3% annual inflation. 2.73%
2. Costs include risk and uncertainty, if estimated.
3. Discount rate net of inflation, per the King County Budget Office. 7.00%

The option with the largest net equivalent annualized cost is the financially preferred option.

First Year of Construction **2014**

Additional inflation rate > 3% **1.00%**
### Rectangular Storage at Fauntleroy School

**Lifetime (in years)**: 35

**First year of O&M costs**: Please provide

**Electricity Supplier (SCL or PSE)**: SCL

**Indicate "Plant" or "Off-Site"**: Off-Site

**All project costs through**:
- 2014
- 2015
- 2016
- 2017
- 2018
- 2019
- 2020
- 2021
- 2022
- 2023
- 2024
- 2025
- 2026
- 2027
- 2028
- 2029
- 2030
- 2031
- 2032
- 2033

### Total Benefits

<table>
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<th>Year</th>
<th>Benefit 1</th>
<th>Benefit 2</th>
<th>Benefit 3</th>
<th>Benefit 4</th>
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### Capital and O&M

<table>
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<th>Year</th>
<th>Capital and O&amp;M</th>
<th>Debt-related and O&amp;M</th>
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### Benefits

Additional description of benefits 1, 2, etc.

### Uncertainties

Additional description of uncertainties 1, 2, etc.

### Risks

Additional description of risks 1, 2, etc.
### Current year (from latest summary sheet)

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# Describe Alternate GSI Alt1

**GSI with Contracted Maintenance**

**Lifetime (in years)**
- Provided: 35

**First year of O&M costs**
- Provided: 2015

**Electricity Supplier (SCL or PSE)**
- Provided: Information in the results summary sheet

### Current year (2013-2014)

| Year | Capital outlays | Debt issuance | Debt service | Energy use | Chemical spending | Materials and Supplies | Other Costs | Labor
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### Additional description of benefits, risks, etc.

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### Additional description of uncertainties, etc.

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Additional description of benefits 1, 2, etc.

Additional description of uncertainties 1, 2, etc.

Additional description of risks 1, 2, etc.
## Describe Alternate GSI Alt. 2

**GSI with County Maintenance**

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### Total Energy Use

- **Natural Gas**
  - $0

### Total Chemical Spending

- Sodium hypochlorite required in gal.
  - $0

### Materials and Supplies

- $0

### Other Costs

- Labor Hours
  - $0

### Labor

- $0

### Benefits

- $0

### Uncertainties

- $0

### RISKS

- $0
### Current year (Best estimate only)

| Year | 2018 | 2019 | 2020 | 2021 | 2022 | 2023 | 2024 | 2025 | 2026 | 2027 | 2028 | 2029 | 2030 | 2031 | 2032 | 2033 | 2034 | 2035 | 2036 | 2037 | 2038 | 2039 | 2040 | 2041 | 2042 | 2043 | 2044 | 2045 | 2046 | 2047 | 2048 | 2049 | 2050 | 2051 | 2052 | 2053 | 2054 | 2055 | 2056 | 2057 | 2058 | 2059 | 2060 | 2061 | 2062 | 2063 | 2064 | 2065 |
|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|
| Capital and O&M (Net benefits) | $0 | $0 | $0 | $0 | $0 | $0 | $0 | $0 | $0 | $0 | $0 | $0 | $0 | $0 | $0 | $0 | $0 | $0 | $0 | $0 | $0 | $0 | $0 | $0 | $0 | $0 | $0 | $0 | $0 | $0 | $0 | $0 | $0 | $0 | $0 | $0 | $0 | $0 | $0 | $0 | $0 | $0 | $0 | $0 | $0 |
| Risk (Net benefits) | $0 | $0 | $0 | $0 | $0 | $0 | $0 | $0 | $0 | $0 | $0 | $0 | $0 | $0 | $0 | $0 | $0 | $0 | $0 | $0 | $0 | $0 | $0 | $0 | $0 | $0 | $0 | $0 | $0 | $0 | $0 | $0 | $0 | $0 | $0 | $0 | $0 | $0 | $0 | $0 | $0 | $0 | $0 | $0 | $0 |
| Capital outlays | $0 | $0 | $0 | $0 | $0 | $0 | $0 | $0 | $0 | $0 | $0 | $0 | $0 | $0 | $0 | $0 | $0 | $0 | $0 | $0 | $0 | $0 | $0 | $0 | $0 | $0 | $0 | $0 | $0 | $0 | $0 | $0 | $0 | $0 | $0 | $0 | $0 | $0 | $0 | $0 | $0 | $0 | $0 | $0 | $0 |
| Debt issuance | $0 | $0 | $0 | $0 | $0 | $0 | $0 | $0 | $0 | $0 | $0 | $0 | $0 | $0 | $0 | $0 | $0 | $0 | $0 | $0 | $0 | $0 | $0 | $0 | $0 | $0 | $0 | $0 | $0 | $0 | $0 | $0 | $0 | $0 | $0 | $0 | $0 | $0 | $0 | $0 | $0 | $0 | $0 | $0 | $0 |
| Debt service | $0 | $0 | $0 | $0 | $0 | $0 | $0 | $0 | $0 | $0 | $0 | $0 | $0 | $0 | $0 | $0 | $0 | $0 | $0 | $0 | $0 | $0 | $0 | $0 | $0 | $0 | $0 | $0 | $0 | $0 | $0 | $0 | $0 | $0 | $0 | $0 | $0 | $0 | $0 | $0 | $0 | $0 | $0 | $0 | $0 |
| Total Energy use | $0 | $0 | $0 | $0 | $0 | $0 | $0 | $0 | $0 | $0 | $0 | $0 | $0 | $0 | $0 | $0 | $0 | $0 | $0 | $0 | $0 | $0 | $0 | $0 | $0 | $0 | $0 | $0 | $0 | $0 | $0 | $0 | $0 | $0 | $0 | $0 | $0 | $0 | $0 | $0 | $0 | $0 | $0 | $0 | $0 |
| Natural Gas (therms) | $0 | $0 | $0 | $0 | $0 | $0 | $0 | $0 | $0 | $0 | $0 | $0 | $0 | $0 | $0 | $0 | $0 | $0 | $0 | $0 | $0 | $0 | $0 | $0 | $0 | $0 | $0 | $0 | $0 | $0 | $0 | $0 | $0 | $0 | $0 | $0 | $0 | $0 | $0 | $0 | $0 | $0 | $0 | $0 | $0 |
| Electricity (kWh) | $0 | $0 | $0 | $0 | $0 | $0 | $0 | $0 | $0 | $0 | $0 | $0 | $0 | $0 | $0 | $0 | $0 | $0 | $0 | $0 | $0 | $0 | $0 | $0 | $0 | $0 | $0 | $0 | $0 | $0 | $0 | $0 | $0 | $0 | $0 | $0 | $0 | $0 | $0 | $0 | $0 | $0 | $0 | $0 | $0 |
| Other chemical costs | $0 | $0 | $0 | $0 | $0 | $0 | $0 | $0 | $0 | $0 | $0 | $0 | $0 | $0 | $0 | $0 | $0 | $0 | $0 | $0 | $0 | $0 | $0 | $0 | $0 | $0 | $0 | $0 | $0 | $0 | $0 | $0 | $0 | $0 | $0 | $0 | $0 | $0 | $0 | $0 | $0 | $0 | $0 | $0 | $0 |
| Materials and Supplies | $0 | $0 | $0 | $0 | $0 | $0 | $0 | $0 | $0 | $0 | $0 | $0 | $0 | $0 | $0 | $0 | $0 | $0 | $0 | $0 | $0 | $0 | $0 | $0 | $0 | $0 | $0 | $0 | $0 | $0 | $0 | $0 | $0 | $0 | $0 | $0 | $0 | $0 | $0 | $0 | $0 | $0 | $0 | $0 | $0 |
| Other Costs | $0 | $0 | $0 | $0 | $0 | $0 | $0 | $0 | $0 | $0 | $0 | $0 | $0 | $0 | $0 | $0 | $0 | $0 | $0 | $0 | $0 | $0 | $0 | $0 | $0 | $0 | $0 | $0 | $0 | $0 | $0 | $0 | $0 | $0 | $0 | $0 | $0 | $0 | $0 | $0 | $0 | $0 | $0 | $0 | $0 |
| Labor | $0 | $0 | $0 | $0 | $0 | $0 | $0 | $0 | $0 | $0 | $0 | $0 | $0 | $0 | $0 | $0 | $0 | $0 | $0 | $0 | $0 | $0 | $0 | $0 | $0 | $0 | $0 | $0 | $0 | $0 | $0 | $0 | $0 | $0 | $0 | $0 | $0 | $0 | $0 | $0 | $0 | $0 | $0 | $0 | $0 |
| Benefits | $0 | $0 | $0 | $0 | $0 | $0 | $0 | $0 | $0 | $0 | $0 | $0 | $0 | $0 | $0 | $0 | $0 | $0 | $0 | $0 | $0 | $0 | $0 | $0 | $0 | $0 | $0 | $0 | $0 | $0 | $0 | $0 | $0 | $0 | $0 | $0 | $0 | $0 | $0 | $0 | $0 | $0 | $0 | $0 | $0 |

**Total Benefits**

1. **Capital and O&M**
2. **Risk**
3. **Capital outlays**
4. **Debt issuance**
5. **Debt service**
6. **Total Energy use**
   1. **Natural Gas (therms)**
   2. **Electricity (kWh)**
7. **Other chemical costs**
8. **Materials and Supplies**
9. **Other Costs**
10. **Labor**

**Total Energy use**

1. **Natural Gas (therms)**
2. **Electricity (kWh)**

**Materials and Supplies**

1. **Sodium hypochlorite required in gal.**
2. **Bisulfide required in gal.**
3. **Other chemical costs - enter $**
4. **Materials and Supplies**
5. **Other Costs**
6. **Labor**
7. **Benefits**
8. **Uncertainties**
9. **Risks**

**Total Benefits** includes:

- Net benefits from capital and O&M
- Net benefits from reducing risk

**Uncertainties** includes:

- Additional description of uncertainties 1, 2, etc.

**Risks** includes:

- Additional description of risks 1, 2, etc.
# WTD Business Case Evaluation Results

## Murray Basin CSO Life Cycle Cost

### WTD Borrowing Cost as Discount Rate (1)

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<th>Lifetime</th>
<th>Initial Capital Outlay</th>
<th>Total Project Life Costs (2)</th>
<th>Total Project Life Benefits</th>
<th>Net Project Life Costs</th>
<th>Average Project Annual Cost</th>
<th>Annual Costs over(under) Status quo</th>
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### Budget Office Discount Rate (3)

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**Notes:**

1. WTD Discount rate based on recent WTD borrowing costs net of 3% annual inflation. 2.73%
2. Costs include risk and uncertainty, if estimated.
3. Discount rate net of inflation, per the King County Budget Office. 7.00%

The option with the largest net equivalent annualized cost is the financially preferred option.
### Description

**Rectangular Storage in Lowman Beach Park**

### Current Year

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<th>Total Benefits</th>
<th>Capital Outlays</th>
<th>Energy Use</th>
<th>Chemical Spending</th>
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### Additional Costs

- Debt Issuance
- Capital Outlays
- Energy Use
- Chemical Spending
- Materials and Supplies
- Other Costs (Flushing Water)
- Labor

### Benefits

- Additional description of benefits 1, 2, etc.

### Uncertainties

- Additional description of uncertainties 1, 2, etc.

### Risks

- Additional description of risks 1, 2, etc.
## Describe Alternate 1A

### Benefits

- **Benefits (in rows)**: The benefits are listed in rows.
- **Current year (from Results summary sheet)**: The current year is shown.
- **Total Benefits (from below)**: The total benefits are calculated from the rows.
- **Capital and O&M**: The capital and O&M costs are included.
- **Debt-related and O&M**: The debt-related and O&M costs are included.
- **Uncertainty (from below)**: The uncertainty is calculated from the below rows.

### Capital outlays

- **Debt issuance**: The debt issuance costs are listed.
- **Other Costs (Flushing Water)**: The other costs for flushing water are included.

### Energy use

- **Natural Gas**: The natural gas usage is listed.
- **Electricity**: The electricity usage is listed.

### Chemical spending

- **Sodium hypochlorite required in gal**: The sodium hypochlorite required in gallons is listed.
- **Other chemical costs - Carbon Repl. and other**: Other chemical costs are included.

### Materials and Supplies

- **Other Costs (Flushing Water)**: The other costs for flushing water are included.

### Labor

- **Labor**: The labor costs are listed.

### Benefits

- **Inches**: The inches used are listed.
- **Additional description of benefits 1-4, etc.**: Additional comments on benefits are provided.

### Uncertainties

- **Inches**: The inches used are listed.
- **Additional description of uncertainties 1-4, etc.**: Additional comments on uncertainties are provided.

### Risks

- **Inches**: The inches used are listed.
- **Additional description of risks 1-4, etc.**: Additional comments on risks are provided.

---

### Current year (from Results summary sheet)

| Year | 2037 | 2038 | 2039 | 2040 | 2041 | 2042 | 2043 | 2044 | 2045 | 2046 | 2047 | 2048 | 2049 | 2050 | 2051 | 2052 | 2053 | 2054 | 2055 | 2056 | 2057 | 2058 | 2059 | 2060 | 2061 | 2062 | 2063 |
|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|
| Total Benefits (from below) | $0 | $0 | $0 | $0 | $0 | $0 | $0 | $0 | $0 | $0 | $0 | $0 | $0 | $0 | $0 | $0 | $0 | $0 | $0 | $0 | $0 | $0 | $0 | $0 | $0 |
| Capital and O&M | $83,269 | $85,011 | $86,899 | $88,896 | $91,017 | $93,269 | $95,661 | $98,184 | $100,838 | $103,524 | $106,250 | $108,998 | $111,767 | $114,556 | $117,366 | $120,207 | $123,070 | $125,962 | $128,876 | $131,811 | $134,767 | $137,743 | $140,740 | $143,758 |
| Debt-related and O&M | $83,269 | $85,011 | $86,899 | $88,896 | $91,017 | $93,269 | $95,661 | $98,184 | $100,838 | $103,524 | $106,250 | $108,998 | $111,767 | $114,556 | $117,366 | $120,207 | $123,070 | $125,962 | $128,876 | $131,811 | $134,767 | $137,743 | $140,740 | $143,758 |
| Uncertainty (from below) | $0 | $0 | $0 | $0 | $0 | $0 | $0 | $0 | $0 | $0 | $0 | $0 | $0 | $0 | $0 | $0 | $0 | $0 | $0 | $0 | $0 | $0 | $0 | $0 | $0 |

### Chemical spending

- **Sodium hypochlorite required in gal**: Sodium hypochlorite required in gallons is listed.
- **Other chemical costs - Carbon Repl. and other**: Other chemical costs for carbon replacement and other are included.

### Materials and Supplies

- **Other Costs (Flushing Water)**: Other costs for flushing water are included.

### Labor

- **Labor**: Labor costs are listed.

### Benefits

- **Inches**: Inches used are listed.
- **Additional description of benefits 1-4, etc.**: Additional comments on benefits are provided.

### Uncertainties

- **Inches**: Inches used are listed.
- **Additional description of uncertainties 1-4, etc.**: Additional comments on uncertainties are provided.

### Risks

- **Inches**: Inches used are listed.
- **Additional description of risks 1-4, etc.**: Additional comments on risks are provided.
**Describe Alternate 1F: **
Bottom of the Basin Storage on Private Properties

**Murray Alt 1F**

**Lifetime (in years):** 35

**First year of O&M costs:** 2015

**Electricity Supplier (SCL or PSE):** SCL

**Indicate "Plant" or "Off-Site":** Off-Site

All project costs through Current year (from Results summary sheet)

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**Total Energy use**

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**Materials and Supplies**

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**Benefits**

1. 
2. 
3. 
4. 

**UNCERTAINTIES**

1. 
2. 
3. 
4. 

**RISKS**

1. 
2. 
3. 
4. 

**Additional description of benefits 1, 2, etc.**

**Additional description of uncertainties 1, 2, etc.**

**Additional description of risks 1, 2, etc.**
**Current year (non-baseline summary sheet)**

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**Total Energy use**

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**Total Chemical spending**

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<th>Bleach required in gal</th>
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<th>Other Costs (Flushing Water)</th>
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**Benefits**

1. 
2. 
3. 
4. 

Additional description of benefits 1, 2, etc.

**Uncertainties**

1. 
2. 
3. 
4. 

Additional description of uncertainties 1, 2, etc.

**Risks**

1. 
2. 
3. 
4. 

Additional description of risks 1, 2, etc.
### Alternate 1F

**Murray Alt 1F**

#### Lifetime (in years)
- First year of O&M costs
- Electricity Supplier (SCL or PSE)
- Indicate "Plant" or "Off-Site"

#### Current year (from Results summary sheet)
- Total Benefits
- Capital and O&M
  - Debt-related and O&M
  - Risk
  - Uncertainty
- Capital outlays
- Debt issuance
- Debt service

#### Total Energy use
- Natural Gas
- Electricity
  - Electricity Use kwh
  - Demand kW or kVa

#### Total Chemical spending
- Sodium hypochlorite required in gal.
- Bisulfide required in gal.
- Other chemical costs - Carbon Repl. $

#### Materials and Supplies
- Other Costs (Flushing Water)

#### Labor
- Labor Hours

#### Benefits
- 1.
- 2.
- 3.
- 4.
- Additional description of benefits 1, 2, etc.

#### Uncertainties
- 1.
- 2.
- 3.
- 4.
- Additional description of uncertainties 1, 2, etc.

#### Risks
- 1.
- 2.
- 3.
- 4.
- Additional description of risks 1, 2, etc.

#### Financials

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<th>Debt-related and O&amp;M</th>
<th>Risk</th>
<th>Uncertainty</th>
<th>Capital outlays</th>
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#### Energy Usage

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<th>Electricity Use kwh</th>
<th>Demand kW or kVa</th>
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#### Chemical Spending

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#### Materials and Supplies

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### Describe Alternate 2a: Rectangular Storage in Lownan Beach Park

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<td><strong>Labor</strong></td>
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</table>

#### Benefits

1. **Additional description of benefits 1, 2, etc.**

#### Uncertainties

1. **Additional description of uncertainties 1, 2, etc.**

#### Risks

1. **Additional description of risks 1, 2, etc.**
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<thead>
<tr>
<th>Description</th>
<th>2018</th>
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<td>Debt-related and O&amp;M</td>
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<td>Materials and Supplies</td>
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<tr>
<td>Other Costs (Flushing Water)</td>
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</tbody>
</table>

**Additional description of benefits 1, 2, etc.”**

**UNCERTAINTIES**

**Additional description of uncertainties 1, 2, etc.”**

**RISKS**

**Additional description of risks 1, 2, etc.”**
### Describe Alternate 2a

**Costs**

#### First year of O&M costs

Electricity Supplier (SCL or PSE) → Indicate "Plant" or "Off-Site" →

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<th>Current year (from Results summary sheet)</th>
<th>2060</th>
<th>2061</th>
<th>2062</th>
<th>2063</th>
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<td>Capital and O&amp;M</td>
<td>$507,390</td>
<td>$501,311</td>
<td>$521,733</td>
<td>$539,872</td>
<td>$558,143</td>
<td>$577,192</td>
<td>$569,746</td>
<td>$571,911</td>
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<td>Debt-related and O&amp;M</td>
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<td>$0</td>
<td>$0</td>
<td>$0</td>
<td>$0</td>
<td>$0</td>
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<tr>
<td>Risk (from above)</td>
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<td>$0</td>
<td>$0</td>
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<tr>
<td>Uncertainty (from below)</td>
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<td>$0</td>
<td>$0</td>
<td>$0</td>
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</tbody>
</table>

**Annual Costs**

- **Capital outlays**
  - Debt issuance
  - Debt service
- **Energy use**
  - Natural Gas: $29,355
  - Electricity Use: $29,945
- **Chemical spending**
  - Sodium hypochlorite: $29,649
  - Bisulfide: $29,945
- **Materials and Supplies**
  - Other chemical costs: $30,245
- **Labor**
  - $60,000
- **Other Costs (Flushing Water)**
  - $554,233

#### Benefits

1. Additional description of benefits 1, 2, etc.

#### Uncertainties

1. Additional description of uncertainties 1, 2, etc.

#### Risks

1. Additional description of risks 1, 2, etc.
Appendix G

ALTERNATIVE RISK REGISTERS
<table>
<thead>
<tr>
<th>Risk #</th>
<th>Description of Risk Event</th>
<th>Add'l Info</th>
<th>Threat (T); Opportunity (O)</th>
<th>Cost (C); Schedule (S); Both (B)</th>
<th>Probability</th>
<th>Impact</th>
<th>Workshop Rating</th>
<th>Description (Accept/Avoid/Transfer/Mitigate)</th>
</tr>
</thead>
<tbody>
<tr>
<td>1.03</td>
<td>County procured construction permits delayed</td>
<td>T</td>
<td>B</td>
<td>M</td>
<td>M</td>
<td>MM</td>
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<td>Example Threat with Cost Impacts</td>
</tr>
<tr>
<td>1.04</td>
<td>All SDOT design standards cannot be met which results in lengthy negotiations and project delay.</td>
<td>T</td>
<td>S</td>
<td>M</td>
<td>L</td>
<td>MM</td>
<td></td>
<td>Example Opportunity with Schedule Impacts</td>
</tr>
<tr>
<td>1.06</td>
<td>City Council is slow in approving conditional use permit</td>
<td>T</td>
<td>S</td>
<td>M</td>
<td>M</td>
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<td>Example Opportunity with Schedule Impacts</td>
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<tr>
<td>1.11</td>
<td>Contractor cannot meet noise limits or complaints require monitoring arbitration</td>
<td>T</td>
<td>B</td>
<td>M</td>
<td>M</td>
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<td>1.14</td>
<td>Permit appeals (if CCU required) delay project</td>
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<td>L</td>
<td>M</td>
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<td>1.15</td>
<td>Permit not approved and redesign required</td>
<td>T</td>
<td>B</td>
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<td>Example Opportunity with Schedule Impacts</td>
</tr>
<tr>
<td>2.01</td>
<td>Fauntleroy school becomes a Seattle Landmark</td>
<td>T</td>
<td>C</td>
<td>H</td>
<td>L</td>
<td>HL</td>
<td></td>
<td>Example Opportunity with Schedule Impacts</td>
</tr>
<tr>
<td>2.02</td>
<td>Archaeological resources found when completing geotechnical assessment</td>
<td>T</td>
<td>B</td>
<td>M</td>
<td>H</td>
<td>MH</td>
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<td>Example Opportunity with Schedule Impacts</td>
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<tr>
<td>2.03</td>
<td>SEPA appeal is successful EIS Required</td>
<td>T</td>
<td>B</td>
<td>L</td>
<td>H</td>
<td>LH</td>
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<td>Example Opportunity with Schedule Impacts</td>
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<tr>
<td>2.04</td>
<td>SEPA appeal is unsuccessful; project delayed by process</td>
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<td>M</td>
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<td>2.05</td>
<td>Archaeological resources found during construction</td>
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<td>Example Opportunity with Schedule Impacts</td>
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<tr>
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<td>Unknown utilities discovered during construction Public utilities assumed</td>
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<td>M</td>
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<td>Conflict with utilities causes alignment change during design</td>
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<td>Dewatering volume greater than anticipated</td>
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<td>Contaminated soils discovered during construction</td>
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<td>Vibration during construction impacts historic school</td>
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<tr>
<td>Risk #</td>
<td>Description of Risk Event</td>
<td>Add'l Info</td>
<td>Threat (T); Opportunity (O)</td>
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<td>Probability</td>
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<td>Description (Accept/Avoid/Transfer/Mitigate)</td>
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<td>4.01</td>
<td>Automatic flushing gates malfunction causing unplanned manual operation</td>
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<td>4.02</td>
<td>Auto cleaning not as effective as designed; manual cleaning required more frequently</td>
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<td>5.04</td>
<td>Community protests above-grade odor control and electrical facilities blocked views</td>
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<td>C</td>
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<td>5.09</td>
<td>Day care at school will protest use of site resulting in loss of business</td>
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<td>H</td>
<td>HH</td>
<td></td>
<td>Mitigate: quieter equipment; work hours restrictions; sound barrier; worker behaviour requirements</td>
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<tr>
<td>5.10</td>
<td>Construction worker behavior inappropriate; complaints by public; loss of business</td>
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<tr>
<td>5.11</td>
<td>Temporary offsite parking for community center is difficult to find; delay in start of construction</td>
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<tr>
<td>5.12</td>
<td>Community protests to CSO/County Board based on temporary/permanent package offered to FCSA</td>
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<tr>
<td>7.07</td>
<td>Small contractor supplies (SCS) language requirements changes; causes bid protest</td>
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<tr>
<td>7.08</td>
<td>Lack of competition increase bids</td>
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<tr>
<td>7.12</td>
<td>Union protests background checks</td>
<td>T</td>
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<td>9.04</td>
<td>Tenant and/or Owner opposes project site in the parking lot; complicates acquisition and negotiations</td>
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<td>11.5</td>
<td>CSO program</td>
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<td>12.9</td>
<td>Interfaces</td>
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<td>13.8</td>
<td>Safety</td>
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<td>Risk #</td>
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<td>Description (Accept/Avoid/Transfer/Mitigate)</td>
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<td>1.03</td>
<td>County procured construction permits delayed e.g. building, street use, clearing and grading, etc. (not a risk per SN)</td>
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<td>1.04</td>
<td>All SDOT design standards cannot be met which results in lengthy negotiations and project delay.</td>
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<tr>
<td>1.06</td>
<td>SDOT does not approve haul routes, delays to traffic permit</td>
<td>T S M M MM</td>
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<td>1.07</td>
<td>Contractor cannot meet noise limits or complaints require monitoring arbitration</td>
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<td>1.08</td>
<td>Permit not approved and redesign required</td>
<td>T B L H LH</td>
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<td>2.01</td>
<td>Archaeological resources found when completing geotechnical assessment</td>
<td>T B M H MH</td>
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<td>2.02</td>
<td>SEPA appeal is successful</td>
<td>T B L H LH</td>
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<td>2.03</td>
<td>SEPA appeal is unsuccessful; project delayed by process</td>
<td>T B H M HM</td>
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<td>2.04</td>
<td>Archaeological resources found during construction</td>
<td>T B H H HH Accept</td>
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<td>3.01</td>
<td>Unknown utilities discovered during construction Public utilities assumed</td>
<td>T B H L HL</td>
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<tr>
<td>3.02</td>
<td>Conflict with utilities causes alignment change during design</td>
<td>T B L H LH</td>
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<tr>
<td>3.03</td>
<td>Declining geotechnical conditions</td>
<td>T B L M LM</td>
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<td>3.04</td>
<td>Limited haul routes require significant restoration Overlay given; this assumes roadway rebuild</td>
<td>T B H L HL</td>
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<td>3.05</td>
<td>Contaminated soils discovered during construction</td>
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<td>4.01</td>
<td>Automatic flushing gates malfunction causing unplanned manual operation</td>
<td>T C L L LL</td>
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<td>4.02</td>
<td>Auto cleaning not as effective as designed; manual cleaning required more frequently</td>
<td>T C L L LL</td>
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<td>5.03</td>
<td>Community protests removal of treasured roses and exceptional trees to County and City Council</td>
<td>Project delays and DOE fines</td>
<td>T B H</td>
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<td>Avoid - select another alternative</td>
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<td>5.04</td>
<td>Community protests above-grade odor control and electrical facilities; forces structures to be below grade</td>
<td>Block views</td>
<td>T B H</td>
<td></td>
<td>HH</td>
<td>Avoid - select another alternative</td>
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<td>5.05</td>
<td>Potential disruption during construction to Ferry traffic results in reduced haul/work hours</td>
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<td>T B H</td>
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<td>M</td>
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<tr>
<td>5.06</td>
<td>Community protests to City about truck volumes and staging area impacts; haul/work hours are limited</td>
<td></td>
<td>T B H</td>
<td></td>
<td>M</td>
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<td>7.01</td>
<td>Small Contractor Supplies (SCS) language requirements change; causes bid protest</td>
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<td>HL</td>
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<td>7.02</td>
<td>Lack of competition increase bids</td>
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<td>T C L M</td>
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<tr>
<td>9.02</td>
<td>Not enough room in ROW for odor control and electrical facilities; private property acquisition required; owners slow to respond or refuse to sell</td>
<td></td>
<td>T B L H</td>
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<td>LH</td>
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<tr>
<td>9.03</td>
<td>Private property owners refuse to grant easements for staging or construction zone limits</td>
<td></td>
<td>T B L H</td>
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<td>LH</td>
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<tr>
<td>11.0</td>
<td>Contractor / Vendor Issues</td>
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<td>12.02</td>
<td>Off-site staging required; difficult to negotiate; Fauntleroy School not available</td>
<td>Assume KC supplies</td>
<td>T B M M</td>
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<td></td>
<td>MM</td>
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<tr>
<td>12.03</td>
<td>Overlapping construction with Barton Pump Station upgrade requires design location change</td>
<td></td>
<td>T B M M</td>
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<td>MM</td>
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<tr>
<td>12.04</td>
<td>Sequencing between adjacent contractors create difficulty; pullout not done</td>
<td></td>
<td>T S H L</td>
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<td>HL</td>
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<tr>
<td>12.05</td>
<td>Barton Pump station construction is delayed and excavation and hauling occurs at same time. Haul routes changed; delay in construction</td>
<td></td>
<td>T B H L</td>
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<tr>
<td>1.02</td>
<td>DOE does not approve KC’s GSI design for CSO control as stand-alone project</td>
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<td>H M HM</td>
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<tr>
<td>1.03</td>
<td>SDOT applies cost policies as per other projects to the GSI alternative</td>
<td>T C</td>
<td>L M LM</td>
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<tr>
<td>1.05</td>
<td>Potential major street repaving required by SDOT in order to obtain permit; requires concrete pavement section</td>
<td>T B</td>
<td>L L LL</td>
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<tr>
<td>2.02</td>
<td>Increased groundwater base flows to Longfellow Creek due to groundwater infiltration; community support increase advances project faster</td>
<td>O S</td>
<td>M M MM</td>
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<tr>
<td>3.02</td>
<td>Water does not flow into the rain garden at curb cuts</td>
<td>T C</td>
<td>L M LM</td>
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<tr>
<td>3.03</td>
<td>Realities of implementation (driveways/mailboxes) may require field changes / adjustments</td>
<td>T C</td>
<td>M L ML</td>
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<tr>
<td>3.04</td>
<td>Soil field testing reveals design infiltration is higher than assumed for planning</td>
<td>O B</td>
<td>L M LM</td>
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<tr>
<td>3.06</td>
<td>Unknown or unidentified underground utilities discovered during construction</td>
<td>T B</td>
<td>L L LL</td>
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<tr>
<td>3.07</td>
<td>Surveys are late or in error; discrepancies in ROW</td>
<td>T S</td>
<td>L LL</td>
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<tr>
<td>3.09</td>
<td>Infiltration leads to localized flooding and/or slope instability</td>
<td>T C</td>
<td>L M LM</td>
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<tr>
<td>4.01</td>
<td>Residents alter rain garden after construction affecting performance</td>
<td>T C</td>
<td>H L HL</td>
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<tr>
<td>4.04</td>
<td>Facility not maintained and water bypasses the rain garden and goes into CSS pipe system</td>
<td>T C</td>
<td>M L ML</td>
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<td>4.07</td>
<td>Stormwater percolation contaminates soil; soil replaced in life cycle</td>
<td>T C</td>
<td>M L ML</td>
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<tr>
<td>5.01</td>
<td>Community acceptance is mixed and does not allow the required square footage needed for CSO control</td>
<td>T B</td>
<td>L L LL</td>
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<tr>
<td>5.02</td>
<td>Residents object to alternative use of planting strips</td>
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<td>L</td>
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<td>5.03</td>
<td>GSI basin community (forms organization to take over maintenance) becomes more cohesive and more involved; take over maintenance</td>
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<td>O</td>
<td>C</td>
<td>L</td>
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<tr>
<td>5.06</td>
<td>Community protests loss of parking, asks for alternative to be reconsidered or replacement in kind</td>
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<tr>
<td>6.0</td>
<td>Experience/Capability of the Team / Resource Availability</td>
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<tr>
<td>6.03</td>
<td>Limited availability of native plants during construction</td>
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<td>11.0</td>
<td>CSO program</td>
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<td>12.0</td>
<td>Interfaces</td>
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<tr>
<td>12.01</td>
<td>SPU decided to build and maintain projects</td>
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<td>13.0</td>
<td>Safety</td>
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<td>1.0</td>
<td>Land Use and Permitting</td>
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<td>1.01</td>
<td>County procured construction permits delayed</td>
<td>e.g. building, street use; clearing and grading, etc.</td>
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<td>1.05</td>
<td>Permit appeals (if CCU required) delay project</td>
<td>Assumes shoreline permit included in CCU</td>
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<td>1.06</td>
<td>CRZ (Conservancy Recreation shoreline designation) requires rezoning or code amendment; difficult to achieve</td>
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<td>1.10</td>
<td>Initiative 42 - Council does not believe all other options have been exhausted; results in delay of permit</td>
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<tr>
<td>1.11</td>
<td>Unknown permit requirements and coordination drive O&amp;M costs up</td>
<td>Access issue during O&amp;M phase</td>
<td>T</td>
<td>H</td>
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<td>HM</td>
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<td></td>
<td>City requires replacement park</td>
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<td>2.01</td>
<td>Archaeological resources found when completing geotechnical assessment</td>
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<td>2.02</td>
<td>SEPA appeal is successful</td>
<td>EIS Required</td>
<td>T</td>
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<td>2.06</td>
<td>Archaeological resources found during construction</td>
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<td>Vibration impacts adjacent properties</td>
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<td>4.02</td>
<td>Auto cleaning not as effective as designed; manual cleaning required more frequently</td>
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<td>Conceptual design of hatches not compatible with current park use</td>
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### Risk Identification

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<td>Communities protest project due to construction impacts</td>
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<td>Community orchestrates major political effort at both County and City level delaying project</td>
<td>Occurs pre-construction; includes opposition to changed use of park after construction; potential construction noise</td>
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#### Contractor / Vendor Issues

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<td>Dewatering must stop if simultaneous CSO event occurs</td>
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#### Safety

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<tr>
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<td>Auto or pedestrian accident in construction zone</td>
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<td>1.0</td>
<td>County procured construction permits delayed</td>
<td>e.g. building, street use; clearing and grading, etc.</td>
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<td>Permit appeals (if CCU required) delay project</td>
<td>Assumes shoreline permit included in CCU</td>
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<td>City requires separate permit because of large staging area and lengthy time of equipment storage - reviews use under CR criteria.</td>
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<td>All SDOT design standards cannot be met which results in lengthy negotiations and project delay.</td>
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<td>2.0</td>
<td>SEPA appeal is successful</td>
<td>EIS Required</td>
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<td>SEPA appeal is unsuccessful; project delayed by process</td>
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<td>Extreme storm event alters terrain during construction</td>
<td>Major landslide</td>
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<td>Shoring system design challenges</td>
<td>small site; major deep excavation in vicinity of steep slopes</td>
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<td>9.01</td>
<td>Cloudy title on private property delays acquisition</td>
<td>Will be known prior to closing</td>
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<td>Private property acquisition more complicated and costly than anticipated causing project delay</td>
<td>2 out of 6 properties will require condemnation; approval must go through KC Council</td>
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<td>9.04</td>
<td>Staging/stockpiling area unavailable or difficult to find</td>
<td>Few vacant parcels in immediate neighborhood</td>
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<td>Replacement of rentals 'in-kind' significantly more expensive than planned</td>
<td>Involves condemnation and relocation process</td>
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<td>Finding replacement tenant housing in similar neighborhood may take longer than planned</td>
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<td>13.01</td>
<td>Auto or pedestrian accident in construction zone</td>
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<td>Example Threat with Cost Impacts</td>
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<td>At the Lincoln park site: CRZ (Conservancy Recreation Zone) requires rezoning; difficult to achieve</td>
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<td>Example Opportunity with Schedule Impacts</td>
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<td>County procured construction permits delayed e.g. building, street use; clearing and grading, etc.</td>
<td>T</td>
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<td>Permit appeals (if CCU required) delay project Assumes shoreline permit included in CCU</td>
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<td>Example Opportunity with Schedule Impacts</td>
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<td>Initiative 42 - Council does not believe all other options have been exhausted; results in delay of permit</td>
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<td>City Determines the use is incompatible with park use; replace park required</td>
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**Risk Indentification**

**Risk Type**

**Risk Qualification**

**Risk Mitigation / Response**
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<td>4.03</td>
<td>Technically complex system; Failure of gate controls leads to CSO event</td>
<td>Complex system reliability risk; not a passive system; operations and signals off-site; Pros and cons table noted high risk of failure</td>
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<td>Occurs pre-construction; includes opposition to staging area; more traffic; less parking; cumulative projects in basin; potential construction noise</td>
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<td>5.08</td>
<td>SPU cannot provide additional capacity; additional pipe needed back to Barton</td>
<td>System capacity issue due to loss of hydraulic capacity during transition from force main to gravity</td>
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<td>HH</td>
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<td>Additional parking required to mitigate loss to community during construction</td>
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