

**Meeting Notes**  
**Barton, Murray, Magnolia, North Beach CSO Facilities Project**  
**E00022E06**

**King County Department of Natural Resources and Parks**  
**Wastewater Treatment Division**

**Date of Meeting:** August 5, 2009      **Date of Notes:** August 6, 2009      **Work Order No:** 7562A.10

**Time:** 1:00 pm

**Location:** King Street Center 8th Floor Conference Room

- Purpose:**
1. Summarize input from July 21 CSO team meeting and July 29 meeting with Seattle Parks.
  2. Review alternatives development and evaluation strategy and overall process.
  3. Review alternatives developed for Barton/Murray basins.
  4. Obtain additional feedback from CSO team.

**Meeting #** 207-1 - CSO Control Alternatives Development  
Barton/Murray Basin CSO Control Alternatives

<b>Attendees:</b>	<u>County</u>	<u>Consultant</u>
Shahrzad Namini	Shaun O'Neil	Kevin Dour
Betsy Cooper	Sekhar Palepu	Bob Eimstad
Chris Okuda	John Phillips	Karl Hadler
Bill Wilbert	Kevin Sandquist	Jeff Lykken
Wes Sprague	Kevin Schock	Brian Matson
Kathy Mathena	Bob Swarner	Bob Wheeler
Sue Meyer	Martha Tuttle	Ellen Blair
Lee Miller	Mary Wohleb	Lisa Adolfson
Ukwenga Oleru	Monica Van Der Vieren	Regina Raichart
Josh	Karl Zimmer	

SPU  
Sahba Mohandessi

**Distribution:** Attendees, Allen de Steiguer, Hien Dung, Pam Erstad, Ron Kohler, Mary Beth Gilbrough

**ACTION ITEMS**

Item #	Action	Action By	Due By
1	Review the schedule and determine where input from the advisory board is required. Include this work in the schedule so that input is received at the appropriate time.	Matson	9/2/09
2	Look at revising the process schematic or providing more definition to prevent revisiting criteria and alternatives at a set point.	Matson	8/19/09

3	Update schedule information to reflect facility plan deadline and new dates for Workshop No. 1 and 2.	Matson	8/19/09
4	Document how you determined the sites and the flexibility with siting options. Site technical reasons such as topography and show areas that meet the minimum requirements rather than a single site.	Kevin Dour/ Allen de Steiguer/ Karl Hadler	8/11/09
5	Illustrate the focus area for alternative development on graphics and summaries and document why.	Kevin Dour/ Allen de Steiguer/ Karl Hadler	8/11/09
6	Determine if there are any feasible alternatives with storage in Subbasin B_8.	Kevin Dour	8/19/09
7	Determine whether the storage volume required assumes that flows go to West Point or if a portion of the flow pumped out of storage goes to wet weather facilities such as Alki.	Kevin Schock/ Ed Wicklein	9/2/09
8	Document the O&M requirements for approaches including frequency of use and duration of use.	Kevin Dour/ Allen de Steiguer/ Karl Hadler	8/11/09
9	Confirm the diameter of the existing outfall at Barton.	Kevin Dour	8/11/09
10	Provide comments on Barton Basin alternatives to Shahrzad.	Team	8/10/09

## DISCUSSION

### 1. Alternative Development Process Review

#### a. Public Participation

- i. Need to define the problem and present approaches (e.g. storage, peak flow reduction, etc.) for the public before we present the alternatives so they have an understanding of what we are trying to solve and the infrastructure options available to address the problem.
- ii. The public participation process needs to account for the political sensitivity of the work within these basins.
- iii. Public participation will occur throughout the alternative development and evaluation process.

#### b. Advisory Board

- i. An advisory board will be assembled within King County to provide recommendations and guidance on big picture policy and political issues.
- ii. The project will require input from the advisory board at key milestones throughout the project. The technical schedule will be looked at with respect to the advisory board and public participation efforts to see where we need input and when so that information is not received too late.

- c. The Brightwater siting process did not include a process with feedback loops to adjust criteria. The project needs to reach a point where criteria and alternatives are fixed so the evaluation does not enter into a constant "do loop". The team will look at revising the process or providing more definition to prevent revisiting criteria and alternatives at a set point.
  - d. King County Review
    - i. The next meeting (scheduled for August 11) will allow the team to provide additional feedback on the alternative development process as well as the initial Barton alternatives.
    - ii. Provide comments focusing on:
      - 1. Is the range of alternatives complete?
      - 2. Are there additional alternatives we are missing?
      - 3. Are there alternatives that should be eliminated because of a fatal flaw?
  - e. Schedule Updates
    - i. Update presentation graphic to reflect facility plan deadline of December 31, 2010.
    - ii. Workshop No. 1 and 2 will be scheduled in December 2009 to provide more time for public participation and detailed evaluation of the final three alternatives.
  - f. Storage Volume Calculations
    - i. Determine whether storage volume required assumes that flows go to West Point or if a portion of the flow pumped out of storage goes to wet weather facilities such as Alki.
    - ii. Alki is permitted to treat and discharge more total volume (longer duration) than it sees today, however, there is no more capacity at peak times.
2. Barton Basin Control Alternatives
- a. See attached handout showing the initial alternatives matrix and summaries.
  - b. Alternative Development Phase
    - i. Flow monitoring centered attention around the trunk sewer that runs along Director Street in the Barton Basin since this carries a significant portion of the basin flow. Murray flows are spread throughout the basin so that the focus for alternatives really becomes the bottom of the basin to capture enough flow. Consultant to illustrate the focus area on graphics and summaries and document why.
    - ii. Document how the sites were determined and the flexibility with siting options. Note technical reasons such as topography and show areas that meet the minimum requirements.
  - c. Barton Alternative Summaries
    - i. Determine if there are any feasible alternatives with storage in Subbasin B\_8.
    - ii. The technical summaries provided for each alternative are an initial starting point for the evaluation process and provide basic information to the team. The team should provide comments and clarifications on the summaries, however, these will continue to be developed as the team evaluates the nine alternatives in the next step of the process.

- iii. Alternative 1B would provide management of overflows for the entire basin, however, modeling may show that slightly more than 110,000 gallons of storage is required to relieve the peak flows from other locations to the Barton Pump Station.
- iv. There will be disruption to the ferry terminal for bottom of the basin options. Potential issues include staging, trenching, etc. One lane of traffic will be closed for the Barton Pump Station improvements. The community has not had too many issues with improvements to the Barton Pump Station.
- v. There are cultural resource issues associated with the site shown in Alternative 1E.
- vi. Consultant will document the O&M requirements for alternatives including frequency of use and duration of use.
- vii. No new outfalls are anticipated. The existing outfalls are assumed for end of pipe treatment approaches. Confirm the diameter of the existing outfall at Barton.
- viii. Peak Flow Reduction Alternative
  - 1. Pipes in alleys are not desirable. SPU prefers utilities in streets for a number of reasons. Peak flow reduction options would also be trying to capture flows on the streets. Therefore, MS4 development is assumed to be within the streets and not in alleys.
  - 2. MS4s are assumed to connect to the existing system in an adjacent basin. The evaluation process will need to look at the capacity of those systems, outfall locations and impacts, etc. to determine the feasibility of this approach.
  - 3. No treatment is assumed for disconnected area flows. This assumption would need to be confirmed during detailed evaluation.
  - 4. Approximately 665 rooftops and associated right of way would need to be disconnected in the Barton Basin to eliminate the need for storage. The evaluation process needs to consider the disruption to homeowners and streets during construction.

END OF NOTES  
CSO Control Alternatives Development  
Barton/Murray Basin CSO Control Alternatives  
8/06/09

**Meeting Notes**  
**Barton, Murray, Magnolia, North Beach CSO Facilities Project**  
**E00022E06**

**King County Department of Natural Resources and Parks**  
**Wastewater Treatment Division**

**Date of Meeting:** August 11, 2009    **Date of Notes:** August 13, 2009    **Work Order No:** 7562A.10

**Time:** 12:30 pm

**Location:** King Street Center 3E

**Purpose:**

1. Receive comments on alternatives development process.
2. Receive comments on Barton Basin alternatives.
3. Review alternatives developed for the Murray basin.

**Meeting #** 307-1 - CSO Control Alternatives Development  
Barton/Murray Basin CSO Control Alternatives

**Attendees:**

	<u>County</u>	<u>Consultant</u>
Shahrzad Namini	Norm Alberg	Brian Matson
Betsy Cooper	Linda Sullivan	Karl Hadler
Chris Okuda	Sekhar Palepu	Jeff Lykken
Bill Wilbert	John Phillips	Ellen Blair
Sue Meyer	Kevin Sandquist	
Martha Tuttle	Kevin Schock	<u>SPU</u>
Mary Wohleb	Bob Swarner	Sahba Mohandessi
Hien Dung	Monica Van Der Vieren	
Pam Erstad		

**Distribution:** Attendees, Allen de Steiguer, Kevin Dour, Wes Sprague, Ron Kohler, Mary Beth Gilbrough, Kathy Mathena, Lee Miller, Ukwenga Oleru, Shaun O'Neil, Mike Sand, Karl Zimmer

**ACTION ITEMS**

Item #	Action	Action By	Due By
1	A clear problem statement is required to guide the alternatives development. In addition, the team needs to document the process for the public and the decision makers.	Jeff Lykken/ Allen de Steiguer/ Karl Hadler	TBD
2	Confirm the detailed schedule is posted on the project website.	Allen de Steiguer	8/19/09
3	Evaluate if several smaller facilities up in the Murray Basin is an option.	Jeff Lykken	9/16/09
4	Refine the number of acres for the disconnection option to maximize the reduction in storage requirements.	Jeff Lykken	9/16/09

## DISCUSSION

1. Alternative Development Process:
  - a. The total of nine alternatives to be evaluated is somewhat arbitrary (it originated from 3 approaches at 3 sites) but helps us limit the scope to the most viable alternatives.
  - b. A clear problem statement is required to guide the alternatives development. In addition, the team needs to document the process for the public and the decision makers.
  - c. For alternatives evaluation and screening:
    - i. Identify key points of input.
    - ii. Define the project driver (schedule).
    - iii. Confirm resources to get input.
  - d. Define feasible parcels based on technical criteria.
  - e. Confirm the detailed schedule is posted on the project website.
2. Barton Basin Alternatives Comments:
  - a. Comments were grouped into three general categories:
    - i. Need to define and document the alternatives identification process.
    - ii. Examine other potential alternatives such as GSI, distributed storage and sending flows to the Delridge Basin.
    - iii. Feedback on criteria that will be used during the alternatives analysis.
  - b. A meeting will be scheduled in the future to discuss comments in detail.
3. Murray Basin Alternatives:
  - a. Are several smaller facilities up in the basin an option? TetraTech to evaluate.
  - b. Wastewater can be sent to the Alki WWTP as long as it does not impact the permit conditions. In general, Alki cannot accept more flow during peaking events but can accept additional flow following the peak event. Therefore, wastewater from a storage basin can be discharged following the peak even if it goes to Alki and not West Point.
  - c. The constructability of a circular storage tank in Lowman Beach Park will be evaluated.
  - d. Alternative 1J - The Pipeline can be filled by gravity. It is possible to make the pipe more shallow but the flow would need to be captured as it comes from a higher elevation or pump it from the Murray Diversion Structure.
  - e. Tetrattech will refine the number of acres for the disconnection option to maximize the reduction in storage requirements.
  - f. Alternative 2K - The Alki WWTP would require upgrade to handle additional peak flows for this option.

END OF NOTES  
CSO Control Alternatives Development  
Murray Basin CSO Control Alternatives  
8/11/09

**Meeting Notes**  
**Barton, Murray, Magnolia, North Beach CSO Facilities Project**  
**E00022E06**

**King County Department of Natural Resources and Parks**  
**Wastewater Treatment Division**

**Date of Meeting:** August 19, 2009    **Date of Notes:** August 28, 2009    **Work Order No:** 7562A.10

**Time:** 1:00 pm

**Location:** King Street Center 8th Floor

**Purpose:**

1. Receive comments on alternatives development process.
2. Receive comments on Murray Basin alternatives.
3. Review alternatives developed for the South Magnolia Basin.

**Meeting #** 407-1 - CSO Control Alternatives Development  
 South Magnolia Basin CSO Control Alternatives

<b>Attendees:</b>	<u>County</u>	<u>Consultant</u>
Shahrzad Namini	Mary Wohleb	Bob Eimstad
Betsy Cooper	Sekhar Palepu	Brian Matson
Jim Weber	John Phillips	Allen de Steiguer
Sue Meyer	Kevin Schock	Karl Hadler
Martha Tuttle	Monica Van Der Vieren	Jeff Lykken
Hien Dung	Kathy Mathena	Kevin Dour
Pam Erstad	Darren Depew	Bob Wheeler
		Lloyd Skinner
		Jennifer Corrigan
		<u>SPU</u>
		Sahba Mohandessi

**Distribution:** Attendees, Ron Kohler, Mary Beth Gilbrough, Lee Miller, Ukwenga Oleru, Shaun O'Neil, Mike Sand, Karl Zimmer, John Cameron, Karen Huber, Chris Okuda, Kevin Sandquist, Bob Swarner

**ACTION ITEMS**

Item #	Action	Action By	Due By
1	A PDF of the schedule will be posted to the project website. Create a specific tab on the project website for alternative development.	Allen de Steiguer	9/4/09
2	An additional column needs to be added to the comment form to indicate which comments King County needs to respond to.	Mary Wohleb	9/2/09
3	Need to examine capping pump station capacity at Barton. This would increase storage requirements at	Jeff Lykken/	9/9/09

	Barton, but would benefit the alternatives available in Murray.	Kevin Dour	
4	Examine downstream capacity for S. Magnolia conveyance	John Phillips	9/24/09

## DISCUSSION

### 1. General

- a. A PDF of the schedule will be posted to the project website.
- b. Initial public meetings on the project are scheduled for October 5 - 16, 2009. Exact dates for each basin will be available soon.

### 2. Alternative Development Process

- a. A series of project memoranda have been developed to document the alternative development process. An additional memo documenting the draft considerations/criteria for alternative development will be prepared in the next few weeks (prior to the public meetings).
- b. Create a specific tab on the project website for alternative development.

### 3. Murray Basin Alternatives Comments

- a. Three general areas of comments received:
  - i. Why aren't we considering X?
  - ii. Specific issues to consider during evaluation.
  - iii. Comments on the alternatives development process.
- b. An additional column needs to be added to the comment form to indicate which comments King County needs to respond to.
- c. Distributed storage at Murray would still require some storage at the bottom of the basin.
- d. Need to examine capping pump station capacity at Barton. This would increase storage requirements at Barton, but would benefit the alternatives available in Murray.

### 4. South Magnolia Basin Alternatives

- a. Need to develop a process for assessing downstream impacts including increasing conveyance capacity to 4.3 mgd from south Magnolia to the Interbay Pump station.
- b. The team has not looked in detail at staging or construction impacts. These will be a significant issue for all of the alternatives.
- c. Ownership issues associated with pipe storage including maintenance, odor control, in-line/off-line, etc. need to be considered for those alternatives.

END OF NOTES

CSO Control Alternatives Development  
South Magnolia Basin CSO Control Alternatives  
8/19/09

## Meeting Notes

### Barton, Murray, Magnolia, North Beach CSO Facilities Project

#### E00022E06

**King County Department of Natural Resources and Parks  
Wastewater Treatment Division**

**Date of Meeting:** August 26, 2009    **Date of Notes:** August 31, 2009    **Work Order No:** 7562A.10

**Time:** 1:00 pm

**Location:** King Street Center 5B/C

**Purpose:**

1. Receive comments on alternatives development process.
2. Receive comments on South Magnolia Basin alternatives.
3. Review alternatives developed for the North Beach Basin.

**Meeting #** 507-1 - CSO Control Alternatives Development  
South Magnolia/North Beach Basin CSO Control Alternatives

<b>Attendees:</b>	<u>County</u>	<u>Consultant</u>
Shahrzad Namini	Norm Alberg	Brian Matson
Sue Meyer	Linda Sullivan	Allen de Steiguer
Martha Tuttle	John Phillips	Karl Hadler
Mary Wohleb	Kevin Schock	Kevin Dour
Hien Dung	Jim Weber	Ellen Blair
Pam Erstad	Ukwenga Oleru	Lloyd Skinner
Kathy Mathena	Meredith Redman	
		<u>SPU</u>
		Martha Burke

**Distribution:** Attendees, Betsy Cooper, Chris Okuda, Ron Kohler, Lee Miller, Shaun O'Neil, Sekhar Palepu, Kevin Sandquist, Bob Swarner, Mike Sand, Karl Zimmer, Monica Van Der Vieren, Sahba Mohandessi, Jeff Lykken

#### ACTION ITEMS

Item #	Action	Action By	Due By
1	King County will provide an example for documentation of calibration.	Kevin Schock	9/4/09
2	Check to see if South Magnolia has a plan for developing 32nd Avenue West.	Monica Van Der Vieren	9/24/09
3	Confirm setback requirements from bluffs	Pam Erstad	9/24/09
4	County will review calculations of rooftop area for disconnection.	Kevin Schock	9/24/09

5	Review Crown Hill site status	Hien Dung	9/24/09
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## DISCUSSION

1. Alternative Development Process
  - a. The Shoreline Permit Plan requires an alternatives analysis to document why facilities cannot be elsewhere.
  - b. The King County right-of-way group is looking into alternative sites in each of the basins.
  - c. Calibration is complete. Long-term simulation of the South Magnolia Basin is being run now.
  - d. The team will review the site selection criteria. Criteria for each basin should be consistent if possible. Differences will need to be thoroughly explained based on basin specific drivers.
2. South Magnolia Basin Alternatives Comments
  - a. Check to see if South Magnolia has a plan for developing 32nd Avenue West.
  - b. Setback of 300 feet from bluffs is required by the City of Seattle.
  - c. No new outfalls are anticipated. Any additional flow to the existing outfalls will need to be addressed in the facility plans.
  - d. Rooftop area for disconnection was based on a GIS analysis of connected impervious area and square footage of residential buildings in each basin. King County will review calculations of rooftop area for disconnection.
  - e. Any additional overland flows caused by rooftop disconnection will need to be addressed.
3. North Beach Basin Alternatives
  - a. The Crown Hill Elementary Scholl site may not be possible due to federal funding issues. King County will provide more detail on the issue including restrictions and timing.

END OF NOTES  
CSO Control Alternatives Development  
North Beach Basin CSO Control Alternatives  
8/26/09

**Meeting Notes**  
**Barton, Murray, Magnolia, North Beach CSO Facilities Project**  
**E00022E06**

**King County Department of Natural Resources and Parks**  
**Wastewater Treatment Division**

**Date of Meeting:** September 16, 2009      **Date of Notes:** September 22, 2009      **Work Order No:** 7562A.10

**Time:** 1:00 pm

**Location:** King Street Center 8th Floor

**Purpose:**

1. Review response to Barton Basin alternative comments.
2. Present revisions to Barton Basin alternatives.
3. Review Informational needs for non-technical criteria associated with Barton Basin alternatives.

**Meeting #** 100-51 - Barton Non-technical Criteria Review

**Attendees:**

	<u>County</u>	<u>Consultants</u>
Chris Okuda	Shahrzad Namini	Bob Eimstad
Hien Dung	John Phillips	Brian Matson
Pam Erstad	Kevin Schock	Karl Hadler
Sue Meyer	Martha Tuttle	Jeff Lykken
Ron Kohler	Jim Weber	Kevin Dour
Kathy Mathena	Monica Van Der Vieren	Jennifer Corrigan
Ukwenga Oleru		Lisa Adolfson
		Ellen Blair

SPU  
Sahba Mohandessi

**Distribution:** Attendees, John Cameron, Betsy Cooper, Karen Huber, Sekhar Palepu, Mary Wohleb, Kevin Sandquist, Lee Miller, Bob Swarner, Shaun O'Neil, Mike Sand, Karl Zimmer, Allen de Steiguer

**ACTION ITEMS**

Item #	Action	Action By	Due By
1	Schedule meeting to discuss the approach to evaluating stormwater treatment requirements.	Brian Matson	9/30/09
2	New or modified comment sheets will be provided so the County can comment on revisions to basin alternatives.	Allen de Steiguer	9/25/09

## DISCUSSION

1. Response to Barton Basin Alternative Comments
  - a. Need to discuss approach to evaluating stormwater treatment requirements.
  - b. Copy of responses to comments are on the project web site.
2. Revisions to Barton Basin Alternatives
  - a. New or modified comment sheets will need to be provided so the County can comment on revisions to basin alternatives.
  - b. Concerned about showing ancillary facilities such as odor control on a separate (adjacent) property from the storage facility.
  - c. Preferred parcels will need to be determined in January for detailed evaluation of three alternatives.
  - d. For Alternative 1D, extend blue outline north and do not consider traffic at this point.
3. Criteria Information Needs
  - a. Criteria leads are responsible for completing the evaluation criteria sheets for all alternatives. The leads are also responsible for assembling information and data necessary to complete the ratings. Leads should also evaluate whether additional questions/information is needed. The information to complete the matrix is needed by November.
  - b. The leads can add or modify criteria and evaluation questions. The criteria, questions and evaluation ratings should be complete by the middle of October. Try to keep questions focused and prioritize to 5 or so key issues.

END OF NOTE

Barton Non-technical Criteria Review Regular Team Meeting  
9/16/09

**Meeting Notes**  
**Barton, Murray, Magnolia, North Beach CSO Facilities Project**  
**E00022E06**

**King County Department of Natural Resources and Parks**  
**Wastewater Treatment Division**

**Date of Meeting:** September 17, 2009      **Date of Notes:** September 21, 2009      **Work Order No:** 7562A.10

**Time:** 1:00 pm

**Location:** KSC 603

**Purpose:** Murray Non-Technical Criteria Review

**Meeting #** 100-52

**Attendees:**

<u>County</u>	<u>SPU</u>	<u>Consultant</u>
Hien Dung	Sahba Mohandessi	Ellen Blair
Sue Meyer		Jennifer Corrigan
Shahrzad Namini		Allen de Steiguer
Chris Okuda		Kevin Dour
John Phillips		Jeff Lykken
Monica Van Der Vieren		Brian Matson
Mary Wohleb		Lloyd Skinner
Kart Zimmer		Bob Wheeler

**Distribution:** Attendees

**ACTION ITEMS**

Item #	Action	Action By	Due By
1.	Modify comment form to add column to indicate which ones county needs to respond to.	Carollo team	9/22/09
2.	Review/comment on Memo, "Technical Considerations for Alternatives Development"	County team	9/24/09
3.	Criteria information needs response by basin.	Category leads	10/12/09

**DISCUSSION**

1. The county provided an updated on public meetings.
  - a. Barton/Murray open houses are scheduled for October 7 and 8.
2. The Carollo team presented highlights of responses to comments by the county on the initial nine alternatives.
  - a. Comment #5; need to consider how to get public participation in peak flow reduction; consider risk of success. Need to be more specific in response to comments.
  - b. Comment #10; opportunity to transfer flows to Delridge basin not as great as Barton basin.
  - c. Comment #21; prepare information on how long to get rights of entry.
  - d. Comment #25; Actiflo is no longer a pilot process, but considered available for full scale.

- e. Comment #26; Is there a more programmatic approach to sizing end of pipe treatment alternatives.
2. The Carollo team provided detailed graphics of the initial nine alternatives.
  - a. Alt. 1C; team indicated that lengths of pipe storage in the two locations could be modified.
  - b. Alt. 1D; team noted that some of the length of pipe would have to be tunneled due to depth.
  - c. Alt. 1E; team noted that this storage tank could be located almost anywhere in the basin, though an undeveloped site next to a water reservoir is shown. Team recognized that lower in the basin would be better from an energy and cost standpoint.
  - d. Alt. 1F; relative sizes of pipe storage would vary depending on how large a tank would be feasible on the site shown.
  - e. Alt. 3A; team noted the reduced feasible area for the treatment plant due to footprint shape and area constraints.
3. The Carollo team provided review of information needed to inform alternatives evaluation for the initial nine alternatives.
  - a. Category leads to be responsible for getting together resources to provide information.
  - b. Information is needed by second week in October.
4. The Carollo team asked for comments on the usefulness of the Technical Memorandum, "Technical Considerations for Alternatives Development."
  - a. The team was confused about the purpose of the table. Carollo team to review and revise the memo.

END OF NOTES  
MEETING 100-52  
9/17/09

**Meeting Notes**  
**Barton, Murray, Magnolia, North Beach CSO Facilities Project**  
**E00022E06**

**King County Department of Natural Resources and Parks**  
**Wastewater Treatment Division**

**Date of Meeting:** September 22, 2009      **Date of Notes:** September 22, 2009      **Work Order No:** 7562A.10

**Time:** 1:00 pm

**Location:** King Street Center 8th Floor

**Purpose:**

1. Review response to South Magnolia Basin alternative comments.
2. Present revisions to South Magnolia Basin alternatives.
3. Review Informational needs for non-technical criteria associated with South Magnolia Basin alternatives.

**Meeting #** 100-53 - South Magnolia Non-technical Criteria Review

**Attendees:**

	<u>County</u>	<u>Consultants</u>
Betsy Cooper	Shahrzad Namini	Allen de Steiguer
Chris Okuda	John Phillips	Karl Hadler
Hien Dung	Meredith Redman	Jennifer Corrigan
Pam Erstad	Monica Van Der Vieren	Lloyd Skinner
Sue Meyer		Bob Wheeler

SPU  
Sahba Mohandessi

**Distribution:** Attendees, John Cameron, Karen Huber, Sekhar Palepu, Mary Wohleb, Ron Kohler, Kathy Mathena, Kevin Sandquist, Lee Miller, Ukwenga Oleru, Bob Swarner, Shaun O'Neil, Kevin Schock, Mike Sand, Martha Tuttle, Jim Weber, Karl Zimmer, Brian Matson, Jeff Lykken, Kevin Dour

**ACTION ITEMS**

Item #	Action	Action By	Due By
1	Provide information on street end plan for 32nd Avenue W.	John Phillips	10/14/09
2	New or modified comment sheets will be provided so the County can comment on revisions to basin alternatives.	Allen de Steiguer	9/25/09
3	Show sub-basin and basin boundaries on the maps. Clarify odor control and electrical labels on figures.	Basin Leads	10/14/09
4	Determine if SPU has any planned projects at their	Sahba Mohandessi	10/14/09

	pump station in South Magnolia.		
5	Confirm the need for standby generators at CSO facilities.	Shahrzad Namini	10/14/09
6	Confirm design requirements for odor control with the odor control task force.	Shahrzad Namini	10/14/09
7	Request direction from the management advisory team on mitigation plans and constraints.	Shahrzad Namini	10/14/09
8	Confirm initial understanding that the CSO facilities would be classified as non-essential.	Pam Erstad	10/14/09
9	Estimate street use fees for pipeline storage in the right-of-way.	Hien Dung	9/30/09

## DISCUSSION

1. Response to South Magnolia Basin Alternative Comments
  - a. The technical and non-technical evaluation will be an iterative process. Non-technical was selected to be first because the schedule for developing technical information was longer. In addition, this is just the request for information to be assembled. Depending on the technical details developed this could be modified in October, but time is still available to assemble information for completing the evaluation matrices in November.
  - b. It is possible to send 1 mgd to the EBI. The Magnolia pipeline needs to be evaluated to verify that the hydraulic grade line is below the top of the manholes and manholes are not surcharged.
2. Revisions to South Magnolia Basin Alternatives
  - a. Provide a summary of changes to alternatives to facilitate team review. As detail is added we need to have a method for identifying changes.
  - b. Modeling is required to determine if tanks can be eliminated and how big the remaining tank needs to be for distributed storage alternatives such as Alternative 1.2.
  - c. Consider how the tanks are to be cleaned.
  - d. Convey and treat option should discharge to the EBI and not the Interbay Pump Station.
  - e. Review inflection point on tunnel option. Is it feasible to considering range of locations for the west portal or does this restrict potential locations for the west portal?
  - f. Alternative 1.2 potential area needs to consider the commercial area and be based on technical criteria.
  - g. Show sub-basin and basin boundaries on the maps.
  - h. Confirm the need for standby generators at CSO facilities.
  - i. Confirm design requirements for odor control with the odor control task force. The facilities are used infrequently and generally in cold weather with low solids concentrations.

- j. Clarify odor control and electrical labels on figures.
- k. Floatables need to be addressed for treatment facilities. What is the basis of design?
- l. There is an active fire station on 34th Ave W near McGraw Street. The alternative showing pipelines in the right-of-way will likely need to be modified to avoid impacting this facility.

3. Criteria Information Needs

- a. Magnolia wants to create green streets near the downtown area (McGraw and 32nd Ave W).
- b. Wolf Creek flows into the sewer system on the North side of Magnolia, not in our project area in South Magnolia.
- c. We need to know if SPU is planning any improvements to their pump station.
- d. The community may be interested in a natural drainage project around 32nd Ave W.
- e. The people near the Sound around 32nd Ave W are concerned about increased drainage/sub-surface flows. Green infrastructure may help mitigate the impacts of gray infrastructure on sub-surface flows.
- f. Request direction from the management advisory team on mitigation plans and constraints.
- g. Estimate street use fees for pipeline storage in the right-of-way. Initial estimate is \$2.5 million for 950 linear feet on 34th Ave W which would make this alternative impractical.
- h. Confirm initial understanding that the CSO facilities would be classified as non-essential.

END OF NOTE

South Magnolia Non-technical Criteria Review Regular Team Meeting  
9/22/09

**Meeting Notes**  
**Barton, Murray, Magnolia, North Beach CSO Facilities Project**  
**E00022E06**

**King County Department of Natural Resources and Parks**  
**Wastewater Treatment Division**

**Date of Meeting:** September 23, 2009      **Date of Notes:** September 25, 2009      **Work Order No:** 7562A.10

**Time:** 1:00 pm

**Location:** King Street Center 7044 North Wind

**Purpose:**

1. Review response to North Beach Basin alternative comments.
2. Present revisions to North Beach Basin alternatives.
3. Review Informational needs for non-technical criteria associated with North Beach Basin alternatives.

**Meeting #** 100-54 - North Beach Non-technical Criteria Review

<b>Attendees:</b>	<u>County</u>	<u>Consultants</u>
Shahrzad Namini	Meredith Redman	Brian Matson
Chris Okuda	Kevin Schock	Karl Hadler
Hien Dung	Bob Swarner	Jennifer Corrigan
Pam Erstad	Mary Wohleb	Lloyd Skinner
Sue Meyer	Monica Van Der Vieren	Bob Wheeler
Jim Weber		

SPU  
Sahba Mohandessi

**Distribution:** Attendees, Betsy Cooper, John Cameron, Karen Huber, John Phillips, Sekhar Palepu, Ron Kohler, Kathy Mathena, Kevin Sandquist, Lee Miller, Ukwenga Oleru, Shaun O'Neil, Mike Sand, Martha Tuttle, Karl Zimmer, Allen de Steiguer, Jeff Lykken, Kevin Dour

**ACTION ITEMS**

Item #	Action	Action By	Due By
1	Need to determine if environmental funding sources would be available if we eliminate the North Beach Force Main by implementing an alternative that transfers wastewater and stormwater via an overland route to the 8th Ave Interceptor.	Shahrzad Namini/ Brian Matson	11/15/09

**DISCUSSION**

1. Response to North Beach Basin Alternative Comments:
  - a. Review responses to comments. Address any issues with consultant team.
2. Revisions to North Beach Basin Alternatives:

- a. Need to consider priming of force mains as an issue for startup of Alternative 1B, 1C, 2A, 2B, and 3B.
- b. Consider option of incorporating North Beach Pump Station requirements into option 1C, 2A, and 2B. Eliminating the North Beach Force Main has several advantages including elimination of upgrade costs in the future.
- c. Combining the North Beach Pump Station and CSO Pump Station in Alternative 1C may have higher pumping costs for base flows to the 8th Avenue interceptor (over the ridge) instead of to Carkeek Pump Station (around the ridge). Pumping costs need to be considered in the evaluation.
- d. Need to determine if environmental funding sources would be available if we eliminate the North Beach Force Main by implementing an alternative that transfers wastewater and stormwater via an overland route to the 8th Ave Interceptor.
- e. Examine if flow can be routed by gravity in Alternative 1D. Determine if electrical and odor control can be at the bottom of the basin.
- f. Need to provide information on Carkeek Treatment Facility improvements as part of Alternative 2A and 2B.
- g. Increasing CSOs at Carkeek is contradictory to Native American tribes goal of reducing overflows in the area and promoting geoduck habitat/harvesting.
- h. The team is consulting the PAO on condemning properties with CCRs and homeowner association rights to refuse property transactions.
- i. Consider odor control facilities within layout of pump stations.
- j. Treatment facilities within the shoreline zone and residential areas are currently prohibited. The team needs to assess the impacts of trying to obtain a zoning change.
- k. Provide elevations of structures for criteria evaluation.
- l. Need to consider the impact of I/I control on groundwater flows and surface flows. Basic assumption at this preliminary stage is that we would need to provide a stormwater conveyance system for flows that are removed from the combined sewer system.

END OF NOTE  
North Beach Non-technical Criteria Review  
9/23/09

**Meeting Notes**  
**Barton, Murray, Magnolia, North Beach CSO Facilities Project**

**E00022E06**

**King County Department of Natural Resources and Parks**  
**Wastewater Treatment Division**

**Date of Meeting:** October 21, 2009      **Date of Notes:** November 3, 2009      **Work Order No:** 7562A.10

**Time:** 1:00 pm

**Location:** King Street Center 7045 North Wind

- Purpose:**
1. Overview of organization of October meetings.
  2. Review/status update of Non-Technical information needs development.
  3. Review/status update of action items from last round of meetings.
  4. Presentation and discussion of Storage Alternatives CSO control approach.
  5. Review of Storage Alternatives application in each of four basins.
  6. Overview of Technical Information needs for Storage Alternatives.

**Meeting #** 100-55 - Technical Review Meeting #1 - Storage Schematics

**Attendees:**

<u>County</u>	<u>Consultants</u>
Shahrzad Namini	Brian Matson
Chris Okuda	Jeff Lykken
Ron Kohler	Kevin Dour
John Phillips	Karl Hadler
Sue Meyer	
Jim Weber	<u>SPU</u> Sahba Mohandessi

**Distribution:** Attendees, Betsy Cooper, John Cameron, Karen Huber, Mary Wohleb, Lee Miller, Hien Dung, Meredith Redmon, Kevin Sandquist, Ukwenga Oleru, Shaun O'Neil, Mike Sand, Martha Tuttle, Pam Erstad, Allen de Steiguer, Jennifer Corrigan, Lloyd Skinner, Bob Wheeler, Ellen Blair

**ACTION ITEMS**

Item #	Action	Action By	Due By
1	Schedule a separate meeting for briefing and to receive input from O&M staff. Provide handout materials electronically.	Ron Kohler	11/3/09
2	Check Orange Book requirements for odor control, backup power, redundancy requirements to make sure the schematic designs comply with the Ecology standards.	Jim Weber	11/10/09

3	Check space requirements of vertical versus horizontal activated carbon vessel. Use worst case footprint for planning.	Kevin Dour	11/10/09
4	Check air change requirements and use conservative value to develop the site footprint.	Jim Weber	11/10/09
5	Provide SDOT right of way use fee structure to team.	Hien Dung	11/10/09
6	Provide information on SPU use of odor control for CSO tanks.	Sabha Mohandessi	11/10/09
7	Determine need for H2S sampling.	John Phillips	11/10/09

## DISCUSSION

1. There is a meeting scheduled to discuss storage volumes required. Different models are producing different storage requirements. We are proceeding with the alternatives analysis based on the volumes developed by the County several months ago.
2. Schedule a separate meeting for briefing and to receive input from O&M staff. Provide handout materials electronically.
3. Check Orange Book requirements for odor control, backup power, redundancy requirements to make sure the schematic designs comply with the Ecology standards.
4. Check space requirements of vertical versus horizontal activated carbon vessel. Use worst case footprint for planning.
5. Right of way access for routine maintenance not acceptable.
6. Weirs are preferable to gates to keep solids in the sewer system.
7. Inline storage tanks are preferable with a flow-through design.
8. Check air change requirements and use conservative value to develop the site footprint. Changes during design can have a significant impact on the site footprint. Spaces are Class 1/Div 1.
9. Standby power is more important if it is a point of failure during the peak flow event such as a diversion gate. Pumps to drain the storage facility are not as critical because failure would simply delay return to the sewer system after the peak event.
10. A 12 hour draining period should be assumed for planning purposes.
11. Assume corrosion resistant materials for hatches and other pieces of equipment due to a humid, corrosive environment.
12. No special coatings are required for concrete.
13. Sand buildup is a concern in the storage tanks. Consider if a grit box is required.
14. Include washdown amenities in schematic design for cells likely to get most of flow.
15. Need to add SDOT right of way use fees to alternatives costs for evaluation.
16. The MAT wants to look at a range of storage volumes for alternatives.
17. County safety team to review operational aspects of alternatives.
18. Slope tunnel storage back towards sewer to facilitate solids removal.

END OF NOTES

Technical Review Meeting #1 - Storage Schematics  
10/21/09

**Meeting Notes**  
**Barton, Murray, Magnolia, North Beach CSO Facilities Project**  
**E00022E06**

**King County Department of Natural Resources and Parks**  
**Wastewater Treatment Division**

**Date of Meeting:** October 22, 2009      **Date of Notes:** November 3, 2009      **Work Order No:** 7562A.10

**Time:** 1:00 pm

**Location:** King Street Center 7045 North Wind

- Purpose:**
1. Overview of organization of October meetings.
  2. Presentation and discussion of Pump Station approach for CSO control.
  3. Review of Pump Station Alternatives application in each of four basins.
  4. Review/status update of Non-Technical information needs development
  5. Overview of Technical Information needs.

**Meeting #** 100-56 - Technical Review Meeting #2 - Pump Station Schematic

**Attendees:**

<u>County</u>		<u>Consultants</u>
Shahrzad Namini	Sekhar Palepu	Allen de Steiguer
Chris Okuda	Kevin Schock	Kevin Dour
Ron Kohler	Bob Swarner	Karl Hadler
Lee Miller	Mary Wohleb	
Pam Erstad	Monica Van Der Vieren	
Sue Meyer		<u>SPU</u>
Jim Weber		Sahba Mohandessi

**Distribution:** Attendees, Betsy Cooper, John Cameron, Karen Huber, John Phillips, Hien Dung, Meredith Redmon, Kathy Mathena, Kevin Sandquist, Ukwenga Oleru, Shaun O'Neil, Mike Sand, Martha Tuttle, Karl Zimmer, Brian Matson, Jeff Lykken, Jennifer Corrigan, Lloyd Skinner, Bob Wheeler, Ellen Blair

**ACTION ITEMS**

Item #	Action	Action By	Due By
1	Provide a summary of pump station capacity and head requirements for each alternative.	Allen de Steiguer	11/3/09
2	Provide County Design Standards.	Shahrzad Namini	11/3/09
3	Review the pump station design guidelines. Hold a separate meeting to review any deviations that may be appropriate for a CSO pump station.	Allen de Steiguer/ Kevin Dour/ Karl Hadler	11/13/09

4	Consider retrofit of SPU pump station for the South Magnolia alternatives that impact PS 77.	Allen de Steiguer	11/17/09
5	Look at gravity flow all the way to Interbay Pump Station to eliminate storage needs.	Allen de Steiguer	11/17/09
6	Provide Seattle Design Review Board requirements.	Hien Dung	11/17/09

## DISCUSSION

### 1. Pump Station Schematic:

- a. The cost of operation of a high head pump station will be significant. Provide a summary of capacity and head requirements for each alternative.
- b. The schematic does not cover pump stations downstream of storage to drain the storage basin.
- c. Submersible and VTSH pump stations are not typically employed in King County pump stations. Need to assess cost benefits of going with non-standard dry-pit pump station design.
- d. No access to the wet wells is assumed. Try to verify that 2 air changes per hour is acceptable.
- e. Prefer that generator fuel storage tanks are above ground for generators smaller than 500kW.
- f. Use one generator sized for peak flow in a separate room in lieu of multiple generators.
- g. Review the pump station design guidelines. Include standard requirements in schematic design and cost analysis. Hold a separate meeting to review any deviations that may be appropriate for a CSO pump station.
- h. Check City of Seattle requirements for height restrictions and view shed issues.
- i. Consider ancillary facilities in the site footprint such as access roads, restroom, HVAC, etc.
- j. Fencing and security to be provided for pump stations.
- k. Consider retrofit of SPU pump station for the South Magnolia alternatives that impact PS 77.
- l. Look at gravity flow all the way to Interbay Pump Station to eliminate storage needs.

### 2. Force Mains:

- a. The design maximum velocity in force mains is 10 feet per second.
- b. The most practical route is assumed for planning purposes. Non-technical issues may affect routing and final evaluation.

END OF NOTES

Technical Review Meeting #2 - Pump Station Schematic  
10/22/09

**Meeting Notes**  
**Barton, Murray, Magnolia, North Beach CSO Facilities Project**  
**E00022E06**

**King County Department of Natural Resources and Parks**  
**Wastewater Treatment Division**

**Date of Meeting:** October ~~2228~~, 2009      **Date of Notes:** November 9, 2009      **Work Order No:** 7562A.10

**Time:** 1:00 pm

**Location:** King Street Center 8th Floor Conference Room

**Purpose:**

1. Presentation and discussion of End of Pipe Treatment approach for CSO control.
2. Review of End of Pipe Treatment Alternatives application in each of four basins.
3. Review/status update of Non-Technical information needs development.
4. Overview of Technical Information needs.

**Meeting #** 100-57 - Technical Review Meeting #3 - End of Pipe Treatment Schematic

<b>Attendees:</b>	<u>County</u>	<u>Consultants</u>
Chris Okuda	Sekhar Palepu	Brian Matson
Ron Kohler	John Phillips	Jeff Lykken
Karl Zimmer	Bob Swarner	Karl Hadler
Pam Erstad	Jim Weber	Lloyd Skinner
	Mary Wohleb	
		<u>SPU</u>
		None

**Distribution:** Attendees, Shahrzad Namini, Betsy Cooper, John Cameron, Karen Huber, Hien Dung, Lee Miller, Meredith Redmon, Kathy Mathena, Kevin Sandquist, Sue Meyer, Ukwenga Oleru, Shaun O'Neil, Mike Sand, Martha Tuttle, Kevin Schock, Monica Van Der Vieren, Allen de Steiguer, Kevin Dour, Jennifer Corrigan, Bob Wheeler, Ellen Blair, Sahba Mohandessi

**ACTION ITEMS**

Item #	Action	Action By	Due By
1	Look at space requirements for sodium hypochlorite and dechlorination.	Karl Hadler	12/1/09
2	Include access for chemical truck and boom trucks in facility layout and costs.	Allen de Steiguer/ Kevin Dour/ Karl Hadler	12/1/09
3	Include an HVAC room.	Karl Hadler	11/3/09

## DISCUSSION

1. Overview of Non-Technical Issues:
  - a. The Broadview Community may weigh in on the North Beach alternatives because they are interested in the impacts on Carkeek facilities.
  - b. Need to start planning coordination effort with the City of Seattle Department of Planning and Development.
  - c. The team is working on a definition and requirements for above grade and below grade facilities based on City of Seattle code.
  - d. South Magnolia alternatives should look at discharge downstream of the Interbay Pump Station.
  - e. The November 3 meeting with O&M staff will look at approaches and criteria information needs for storage, pump stations and end of pipe treatment.
  
2. End of Pipe Treatment Schematic:
  - a. Fecal coliform limits mandate disinfection.
  - b. The type of disinfection process has not been confirmed yet. UV has been assumed for comparison purposes and is a common technology for CSO facilities. A detailed comparison of UV versus sodium hypochlorite will likely need to be conducted if end of pipe treatment makes it to the next round of alternatives.
  - c. Look at space requirements for sodium hypochlorite and dechlorination. The space requirements are expected to be large and may preclude certain sites.
  - d. Sludge and screening are assumed to be recycled to the sewer. Consider the impact on sewers and conveyance facilities.
  - e. Bremerton CSO Treatment Facility has met discharge requirements for a number of years. Salem has on been in operation for about a year. These facilities may be visited if end of pipe treatment makes it to the next round of alternatives.
  - f. Need to determine if a pump station is required or flow through treatment facility is by gravity. This is basin specific and the costs of a pump station, if applicable, need to be included in the alternative.
  - g. Include access for chemical truck and boom trucks in facility layout and costs.
  - h. Include an HVAC room.
  - i. The screenings area will require a cover.
  - j. Consider how the facility will drain and the standard operating procedures for startup and shutdown. Alki is required to drain automatically. Alki requires approximately 15 to 20 minutes to start up.
  - k. The sand used in high rate clarification stays in the tanks during standby periods. Makeup sand will be required for losses during operation. Routine maintenance may require disinfection of the sand.
  - l. The convey and treat options in North Beach assume high rate clarification and disinfection at Carkeek combined with the existing facility. It is not feasible to retrofit the existing basins but a new facility would likely fit on the site.

END OF NOTES

Technical Review Meeting #3 - End of Pipe Treatment Schematic  
10/28/09



**Meeting Notes**  
**Barton, Murray, Magnolia, North Beach CSO Facilities Project**  
**E00022E06**

**King County Department of Natural Resources and Parks**  
**Wastewater Treatment Division**

**Date of Meeting:** October 29, 2009      **Date of Notes:** November 20, 2009      **Work Order No:** 7562A.10

**Time:** 1:00 pm

**Location:** King Street Center 8th Floor Conference Room

**Purpose:**

1. Review of Alternatives Analysis upcoming work.
2. Overview of technical information needs.
3. Discuss O&M coordination meeting format and agenda.

**Meeting #** 100-58 - Technical Review Meeting #4 - Criteria Information Needs

**Attendees:**

<u>County</u>		<u>Consultants</u>
Shahrzad Namini	Kevin Schock	Brian Matson
Chris Okuda	John Phillips	Jeff Lykken
Ron Kohler	Jim Weber	Kevin Dour
Karl Zimmer	Monica Van Der Vieren	Allen de Steiguer
		Karl Hadler

SPU  
Sahba Mohandessi

**Distribution:** Attendees, Pam Erstad, Betsy Cooper, John Cameron, Karen Huber, Hien Dung, Lee Miller, Meredith Redmon, Kathy Mathena, Kevin Sandquist, Sue Meyer, Bob Swarner, Ukwenga Oleru, Shaun O'Neil, Mike Sand, Martha Tuttle, Sekhar Palepu, Mary Wohleb, Lloyd Skinner, Jennifer Corrigan, Bob Wheeler, Ellen Blair

**ACTION ITEMS**

Item #	Action	Action By	Due By
1	Carollo will provide a written description of the approach and instructions for preparation work.	Brian Matson	11/6/2009
2	Discuss how to account for impacts of alternatives on downstream facilities.	Basin Leads	11/3/2009
3	Provide summary of storage, pumping and treatment requirements for each alternative to O&M staff.	Basin Leads	11/3/2009

## DISCUSSION

1. Alternatives Analysis Upcoming Work
  - a. The November meetings will include an overview of alternatives but focus on schematic design of storage, pumping and end-of-pipe treatment.
  - b. Carollo will provide a written description of the approach and instructions for preparation work.
  
2. Overview of Technical Information Needs
  - a. Technical criteria will be completed by the basin leads but input on certain issues like technical complexity will be required from O&M team.
  - b. Criteria evaluation will be relative to each alternative.
  - c. The team needs direction from O&M on whether access in the right-of-way will be allowed and, if so, what the restrictions on frequency, timing, etc. will be from the O&M team. For now assume no access in the right-of-way is allowed and assess the impact of this requirement on specific alternatives. If there is a significant benefit to relaxing the requirement in certain instances (e.g., significant cost savings), the issue can be reconsidered by the team and/or management advisory team.
  - d. Include definition of low/medium/high rating with criteria.
  - e. Provide list of O&M information that requires decisions (key issues).
  - f. Discuss how to account for impacts of alternatives on downstream facilities.
  - g. Commissioning is generally captured within the criteria and the only significant difference between alternatives would be that employing end-of-pipe treatment.
  - h. Proven technology is really about the reliability of operation and less about proof that it has been used in the past to control CSOs.

END OF NOTES

Technical Review Meeting #4 - Criteria Information Needs  
10/29/09

			Technical Information Needs						
Category	Sample Criteria	Sample Questions	General Questions	Bottom of Basin Storage	Upper Basin Storage	Convey and Store	Convey and Treat	End of Pipe Treatment	Stormwater Disconnection
<b>Technical</b>									
	1. Technical Complexity								
		1. Does implementation require complex flow measurement, algorithms, or PLC programming and infrastructure to direct flow to the alternative storage or treatment facility? Will the technology reliably meet CSO control objectives using the required controls? (Note: Re-worded to clarify).	A. What data measurements are required to determine a CSO event is imminent?						
		2. How many individual sites are included in the alternative and what is the consistency of technical and construction approach across the sites?	A. How many parcels at the bottom of the basin would be required for the facility. B. What additional space requirements may be needed beyond the standard footprint for County operation and maintenance? C. What additional space requirements may be needed beyond the standard footprint for temporary construction & staging. D. What additional space		A. Can a control cabinet be located within the right-of-way for facilities in the street? B. Can part or all of OCU's be located within right-of-way for facilities in the street? C. Can pipe storage access be within the paved right-of-way or must structures be built for side entry?				A. Are there temporary construction easement requirements for stormwater construction projects

			Technical Information Needs						
Category	Sample Criteria	Sample Questions	General Questions	Bottom of Basin Storage	Upper Basin Storage	Convey and Store	Convey and Treat	End of Pipe Treatment	Stormwater Disconnection
			requirements may be needed for mitigation?						
	2. Compatibility with Existing WW system								
		1. Do the standards of other agencies affect the design and operation of the facility?	<p>A. SDOT: Do road access requirements such as driveway entrance affect siting?</p> <p>B. SPU: What drainage requirements apply to projects in the rights of way?</p> <p>C. SDOT: What are road use permit &amp; construction requirements for diversion structure and pipe to storage tank?</p> <p>D. A. What SPU standards apply for construction that affects</p>		existing sewer systems?				
		2. Is the alternative stand alone or does its implementation affect other parts of the WW system including the West Point Treatment Plant?							
	3. Flexibility/ Adaptive Management								
		1. Can the alternative meet changing control criteria?							
		2. Can the alternative be	A. Are there						

			Technical Information Needs						
Category	Sample Criteria	Sample Questions	General Questions	Bottom of Basin Storage	Upper Basin Storage	Convey and Store	Convey and Treat	End of Pipe Treatment	Stormwater Disconnection
		easily modified to meet future flow conditions?	<p>planned land use and/or drainage code changes that could affect future flows?</p> <p>B. Is space available to increase storage volume if necessary?</p> <p>C. If so, what are the impacts to the existing &amp; adjacent properties?</p> <p>D. Are there technical limitations to accommodating future flow conditions?</p>						
	4. Constructability/ Implementation Schedule								
		1. Are construction risks associated with groundwater, steep slopes, or soil materials significant?	<p>A. What are the hydrogeological and soil conditions documented in the potential area for storage tank placement?</p> <p>B. What the existing and estimated post-development slope conditions in the potential area for storage tank placement?</p>						A. What are the hydrogeological and soil conditions documented in the potential area for stormwater disconnection? (as relates to storm/sanitary sewer construction in R/W).
		2. Are construction risks associated with access, staging, availability of specialty contractors, availability of power,	A. What are the available undeveloped parcels within 1-mile <OR						

			Technical Information Needs						
Category	Sample Criteria	Sample Questions etc. significant?	General Questions	Bottom of Basin Storage	Upper Basin Storage	Convey and Store	Convey and Treat	End of Pipe Treatment	Stormwater Disconnection
			<p>OTHER SUGGESTED DISTANCE?&gt; of proposed placement area that could be used for construction staging?</p> <p>B. Is construction staging area on-site or immediately adjacent to site required?</p> <p>C. Can construction access or temporary access issues be identified for construction within parts/all of the proposed placement area?</p>						
		3. Can the alternative meet the project schedule?	<p>A. What are critical path task/elements in the alternative's estimated schedule?</p> <p>B. Are there requirements, permits, reviews, etc. required by other agencies that may impact the schedule?</p>						
<b>O&amp;M</b>									
	1. Staffing								
		1. Can the facility be easily (automatically) started up? Can the facility operate autonomously under the design conditions?	<p>A. Can the proposed facility be operated automatically?</p> <p>B. What is the proposed</p>						N/A

			Technical Information Needs						
Category	Sample Criteria	Sample Questions	General Questions	Bottom of Basin Storage	Upper Basin Storage	Convey and Store	Convey and Treat	End of Pipe Treatment	Stormwater Disconnection
			method/control for startup and operation of the proposed alternative? C. What are potential risks/difficulties with automatic operation of the proposed alternative?						
		2. What level of staffing is required for operation and shutdown (how often is the facility used, how long is the facility in use, how many operators are required, what level of operator experience is required, what are travel times)? What are peak staff requirements?	A. What are the County's standards/requirements for staffing and operating the proposed facility? B. What is the anticipated frequency of use based upon modeling data?						A. Does the county have any responsibility for maintenance of resulting systems.?
		3. Does the alternative impact downstream treatment facility processes?							
	2. Training								
		1. What level and frequency of training is required? Is the existing staff familiar with the technology? Is similar equipment in use in the West Section?	A. What are the County's standards/requirements for staff training? B. Is County staff familiar with the operation/maintenance of the proposed facility, system, and technology?						A. Does the county have any responsibility for maintenance of resulting systems.?
		2. Are similar control approaches specified							

			Technical Information Needs						
Category	Sample Criteria	Sample Questions	General Questions	Bottom of Basin Storage	Upper Basin Storage	Convey and Store	Convey and Treat	End of Pipe Treatment	Stormwater Disconnection
		with identical components? Can the facilities be used to simulate an event for testing and training?							
	3. 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?	A. What are the startup procedures for the treatment facility? Can treatment facility be started and operated remotely? Can treatment facility be started and operated automatically? B. What are the risks or special considerations with automatic & remote operation?						
		2. Proven technology? Are the control systems routinely used for similar facilities and similar applications?	A. Will disconnection reliably reduce uncontrolled CSO according to permit requirements? B. How would KC monitor success?						
	4. Maintenance								
		1. What is the level of normal maintenance? How many mechanical/instrumentation components are required?	A. What are the County's standards and/or requirements for routine maintenance of this type of facility?						A. Will there be any routine maintenance requirements for stormwater disconnection (if treatment systems are required)?

			Technical Information Needs						
Category	Sample Criteria	Sample Questions	General Questions	Bottom of Basin Storage	Upper Basin Storage	Convey and Store	Convey and Treat	End of Pipe Treatment	Stormwater Disconnection
									B. What will be required by the County? C. What will be required by SPU?
		2. Are facility components accessible? Is there access and staging for chemical, vector and boom trucks? Are traffic control procedures required for routine maintenance?	A. Are there specific County requirements beyond minimum code/regulatory standards?						
		3. Do the facilities require interaction with other agencies?							
	5. Safety								
		1. Does the facility have access requirements in the right of way or require confined space entry? Are traffic control procedures required? Does access require street use permit or lane closure?							
<b>Cost Effectiveness</b>									
	1. Project Costs								
		1. Are the Project Costs predictable and quantifiable in terms of design, permitting and mitigation costs?	A. Are there any location specific features/risks which may present uncertainty in design and construction? (slopes on site requiring retaining wall, known difficult geological and/or hydrogeological						

			Technical Information Needs						
Category	Sample Criteria	Sample Questions	General Questions	Bottom of Basin Storage	Upper Basin Storage	Convey and Store	Convey and Treat	End of Pipe Treatment	Stormwater Disconnection
			conditions, etc?) B. Is there high variability in potential mitigation costs to consider that may affect the recommended outcome of the analysis?						
		2. 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?	A. What the anticipated permit requirements/mitigation measures?						
		3. What is the relative premium to provide flexibility and durability to meet future uncertainty?	A. What additional features are needed to provide flexibility? B. Are there design and construction considerations which can/should be included in the facility to accommodate these potential system changes or expansion?						
	2. Operation Costs								
		1. Compared to other alternatives, are operational costs predictable and quantifiable, e.g. does operational complexity for uncertain weather conditions pose uncertainties in costs?	A. What the fixed costs associated with operating this alternative? B. What are the variable costs associated with operating this alternative?						

			Technical Information Needs						
Category	Sample Criteria	Sample Questions	General Questions	Bottom of Basin Storage	Upper Basin Storage	Convey and Store	Convey and Treat	End of Pipe Treatment	Stormwater Disconnection
		2. Compared to other alternatives, are operational costs for training, energy, staffing, and external agency costs greater, the same or lower?	<p>A. What are the County's standards/requirements for staffing and training for operation of this type of facility?</p> <p>B. What are the external agency costs associated with the operation of this type of facility? (disposal costs, operational permits, etc?)</p>						
		3. Are additional, new staff positions required for operation?	<p>A. Are there currently O&amp;M staff shortages for operation of this type of facility?</p> <p>B. Will operation of this new facility require additional staff? If so, what the estimated FTE need?</p> <p>C. What is the estimated cost per FTE?</p>						
	3. Maintenance Costs								
		1. Does the alternative require more or less maintenance resources than other alternatives?	A. What are the anticipated tasks for maintaining this type of facility?						
		2. Does the alternative require maintenance skills beyond the County's typical							

			Technical Information Needs						
Category	Sample Criteria	Sample Questions	General Questions	Bottom of Basin Storage	Upper Basin Storage	Convey and Store	Convey and Treat	End of Pipe Treatment	Stormwater Disconnection
		expertise compared to other alternatives?							
		3. Does maintenance cost increase with capacity?	A. Are any of the anticipated tasks variable depending upon frequency of use/volume stored or treated?						
	4. External Costs								
		1. How does the cost of land and land development compare with other alternatives?	A. What are the relative costs of land in the potential area of facility placement compared with other alternatives? B. Are there any unique site features which would increase the cost of development compared with other alternatives?						
		2. Are there extra costs imposed by external agencies and/or stakeholders resulting from their design standards or durability requirements?	A. are there new or differing design standards or requirements for construction of this type of facility? B. Does City of Seattle have any design standards or requirements that would supersede King County's standards or requirements?						

			Technical Information Needs						
Category	Sample Criteria	Sample Questions	General Questions	Bottom of Basin Storage	Upper Basin Storage	Convey and Store	Convey and Treat	End of Pipe Treatment	Stormwater Disconnection
		3. Are there extra costs for durability elements to insure successful operation and maintenance, e.g. what are extra costs to insure successful operation of elements under external control?	A. What elements are under external control? B. What are the anticipated features or requirements to ensure durability or meet external requirements?						
	5. Grant Opportunities								
		1. Does the alternative have attributes that make it more or less amendable to external grant funding?	A. Are there any potential grant opportunities identified? B. If so, what are the specific requirements? C. Are there any design features which can be showcased to take advantage of any identified grant opportunity?						

PRELIMINARY DRAFT

## Alternative Narrowing Process

11/23/09

### The Purposes of December King County CSO Narrowing Workshops

1. Describe and respond to King County staff clarifying questions related to the narrowing process.
2. Provide an opportunity for King County staff to ask questions and for clarifications of the criteria and ratings and then confirm the criteria and ratings.
3. Conduct an initial straw poll with King County staff of their Alternative preferences
4. Primarily to narrow the 9 alternatives for each Basin to three alternatives that will be further evaluated and considered.
5. Important though is to provide the reasons and justification on why alternatives were and were not selected for public, agency, and participants' understanding.

### What Information Will We Have?

1. Final revised Barton, Murray, and South Magnolia Basin Alternatives summary sheets (1 for each alternative).
2. Final revised table of criteria ratings and descriptions of Low, Moderate, and High impact.
3. Final revised Alternative Rating Sheets for Barton, Murray, and South Magnolia Basins (summary & expanded to include description of ratings).
4. Comment logs relating to Barton, Murray, and South Magnolia Basin Alternatives.
5. Summary of major changes to Barton, Murray, and South Magnolia Basin Alternatives and overall evaluation criteria.
6. Cost information for Barton, Murray, and South Magnolia Basins.
7. Community input from public meetings
8. Initial Straw Poll Results (Available after December 9<sup>th</sup> Workshop)

### What process Will We Use?

1. King County staff will ask questions and for clarifications of the criteria and ratings.
2. King County staff will confirm the criteria and the ratings for use in the narrowing of the 9 Alternatives to 3 Alternatives
3. King County staff will participate in an initial Straw Poll of Alternative preferences
4. Directions for Straw Poll Preference Process
  - o For each Basin there will be an enlarged wall chart of the criteria and ratings for all Alternatives for that Basin
  - o For all King County staff, 3 Green Dots and unlimited Red Dots
  - o King County staff place Green Dots on Alternatives that they believe should move forward for further evaluation and consideration, if any
  - o King County staff place Red Dots on Alternatives that should not move forward, if any
  - o King County staff write on wall charts their justifications and rationales for why any Alternative should be considered further or why it should not be considered further

- King County staff write on wall charts any comments/questions/or thoughts on any Alternative
- 5. Following the Initial Straw Poll by King County staff, the Team will meet at subsequent Workshop meetings in an Iterative Process to work toward the narrowing of Alternatives for further consideration to 3.
  - Alternatives clearly not meriting further consideration
  - Alternatives clearly meriting further consideration
  - Iterative Process for remaining Alternatives to decide what will be and not be considered further
  - Truth Test – Do we have the right 3 Alternatives to consider further?
  - Identify reasons and rationale for selection or non-selection
  - Team Agreement on 3 Alternatives to consider further, *or*
  - Potential for a small number of Alternatives, identify what additional information is needed to narrow all the way to 3 Alternatives

**Meeting Notes**  
**Barton, Murray, Magnolia, North Beach CSO Facilities Project**  
**E00022E06**

**King County Department of Natural Resources and Parks**  
**Wastewater Treatment Division**

**Date of Meeting:** November 3, 2009      **Date of Notes:** November 4, 2009      **Work Order No:** 7562A.10  
**Time:** 8:30am  
**Location:** West Point Conference Room  
**Purpose:** 1. Brief O&M staff on CSO control approaches

**Meeting #** 100-59A - O&M Briefing

**Attendees:** County

Pedro De Arteaga  
Al Brooks  
Bob Bucher  
Pam Elardo  
Dan Grenet  
Ron Kohler  
Bill Lockinger  
Eugene Sugita  
Karl Zimmer

Consultants

Allen de Steiguer  
Kevin Dour  
Jeff Lykken  
Brian Matson  
Karl Hadler

**Distribution:** Attendees

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**Meeting Purpose:**

1. Overview of CSO Project and Alternatives Being Considered
2. Summarize and Describe CSO Control Approaches
3. Present Alternative Evaluation Methodology
4. Obtain Input on Key O&M Criteria

(cont'd next page)

## ACTION ITEMS

Item #	Action	Action By	Due By
1	Prepare table of project elements for each of the CSO control approaches so that county O&M staff can provide input on labor hours for preventative maintenance, response to operations, pre-season regular O&M response, and event and post event response.	Carollo	11/16/09
2	Complete table above	Ron Kohler	12/1/09
3	Research O&M costs for Densmore submersible station	Karl Zimmer	12/1/09
4	Research post event clean up requirements for Salem and Bremerton facilities	Carollo	12/1/09
5	Provide specific criteria for right-of-way access requirements to the design team.	Ron Kohler	11/13/09

## DISCUSSION AND COMMENTS

### 1. Storage Tank CSO Control Approach

- a. Flow meters and level sensors may be required in upper basin collection systems for control of distributed storage options. This has a significant impact on the complexity of operations.
- b. Added sites including flow meters and sensors adds two days of labor per year per site.
- c. Hard-sided structures essential for above grade enclosures for durability and vandal resistance.
- d. Temperature control needed in all indoor spaces.
- e. Consider proximity of salt water environment on corrosion and provide protection.
- f. Include adequate space for access in all site planning. Include consideration of carbon delivery, boom trucks, and other larger vehicles, plus at least two maintenance vehicles during a single service event.
- g. Include space needs for all elements of projects for checking by O&M of summary of technical elements matrix.
- h. Provide for adequate space for all elements, for instance, restroom.
- i. Restroom at all facilities now a WTD policy.
- j. Consider security and safety of both county and public during activities at each site.
- k. Look at service cycle to determine need for hard surface access at all sites.
- l. Consider what project elements will project to or above grade, like access hatches for equipment and air inlets.
- m. Surface access needed for gates, pumps. Consider surface loading rates in design.

- n. Consider how to get power to submersible pumps from space that is above high water level to counteract failures from water in power cables/conduits. Meet Class 1 Div 1 requirements. Submersible pump electrical disconnection should be above grade.
  - o. Consider adequate space for odor control in site planning in case air volume requirements are increased by Fire Marshal during design.
  - p. Electrical sizing should include load for temporary ventilation.
2. Storage Pipe CSO Control Approach
- a. Consider flow through facility as design approach to allow limitation of access to confined space, and to reduce permitting requirements for access.
  - b. Determine criticality of having a generator backup for gates and pumps for all storage facilities; if power is out and storage fills by gravity, what is impact of not draining immediately after storm events.
  - c. Need to measure and monitor tank volumes for CSO control records.
  - d. For storage approaches, allow main tank to fill first to allow most dilute flow to fill cleaning chamber, i.e. fill from downstream toward upper end of tank.
  - e. Address road closure issues associated with storage in the streets in the evaluation of location and alternatives in general. Location of the storage pipe in the street can have a significant impact on traffic control, access, etc.
  - f. Recommend combining odor control and generator in a small building if possible. Behind the curb if in the right of way is preferable.
  - g. Look at the design of the flushing gate. Need to store water for flushing but do not want to capture solids.
3. Tunnel Storage CSO Control Approach
- a. Reverse slope of tunnel to drain back toward the sewer. Acknowledged that slope of tunnel is set by direction of tunneling.
4. Pump Station (Convey and Store, Convey and Treat) CSO Control Approach
- a. Submersible pumps not desirable. Only submersible pump in system is Densmore. Problems with access to equipment.
  - b. Submersible pump station costs need to be captured for comparison to dry pit pump station. Additional maintenance costs need to be factored in to O&M budget.
  - c. Series pumping for high head increases maintenance costs.
  - d. Use single generator set, no multiple generator designs.
  - e. O&M staffing needs are concentrated in the wet weather season. This makes it difficult to level the workload. Need to assess if staff can service multiple facilities at the same time.
  - f. Consider if surge control devices are required and the footprint required.
  - g. Intermittent operation creates a number of O&M issues such as the reliability of automatic startup, force main full or empty during standby, etc. Need to capture in the criteria assessment and cost data.
  - h. Design for peak capacity with provisions for firm capacity in the future.
5. End of Pipe Treatment CSO Control Approach
- a. Document decisions on process elements, e.g. if UV is the only method of disinfection, this decision needs to be documented, relative to siting space needs.

- b. Compare space needs, capital, and O&M costs when considering disinfection technologies.
- c. Document redundancy and reliability assumptions in plant layouts relative to footprint and durability.
- d. Consider automated startup complexity with the number and type of project elements to address reliability.
- e. Consider affects on treatment efficiency if there is too little flow into the facility.
- f. Consider needs for post event flushing and cleaning in staffing and access elements of the project. Assume solids pumped back to sewer. Consider rate of return to sewer relative to solids movement and downstream effects.
- g. Research post event effort required for other projects, e.g. Salem, Bremerton, Alki, and Carkeek. Cleaning system should be robust and accounted for in space and costs.

END OF NOTES  
O&M BRIEFING  
11/3/09

PRELIMINARY DRAFT

**Meeting Notes**  
**Barton, Murray, Magnolia, North Beach CSO Facilities Project**  
**E00022E06**

**King County Department of Natural Resources and Parks**  
**Wastewater Treatment Division**

**Date of Meeting:** November 18, 2009      **Date of Notes:** November 30, 2009      **Work Order No:** 7562A.10

**Time:** 1pm

**Location:** KSC 8<sup>th</sup> Floor

**Purpose:** Murray Basin November Work Session

**Meeting #** 100-62

**Attendees:**

County

Consultants

Betsy Cooper

Sekhar Palepu

Ellen Blair

Hien Dung

John Phillips

Jennifer Corrigan

Pam Erstad

Bob Swarner

Allen de Steiguer

Ron Kohler

Martha Tuttle

Kevin Dour

Kathy Mathena

Jim Weber

Karl Hadler

Sue Meyer

Mary Wohleb

Jeff Lykken

Shahrzad Namini

Monica Van Der Vieren

Brian Matson

Chris Okuda

Lloyd Skinner

**Distribution:** Attendees

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**Meeting Purpose:**

1. Describe process to short list alternatives
2. Recap Murray Alternatives
3. Present strawman rating matrix for Murray for discussion
4. Summarize action items needed to complete Murray evaluation for December workshop.

(cont'd next page)

## ACTION ITEMS

Item #	Action	Action By	Due By
1.	The Community Impact category leads will meet with the basin leads to discuss criteria and information needs. Portal size will need to be considered for Alternative 1D.	Monica Van der Vieren and Martha Tuttle, King County; basin leads	11/24
2.	Revisions should be tracked by labeling alternatives with version numbers.	Basin leads	ongoing
3.	Bob Swarner will check if there is capacity to convey additional flow to the 63 <sup>rd</sup> Ave. pump station along Beach Drive.	Bob Swarner, King County	12/3
4.	The basis of design will include emergency power and odor control at Murray Pump Station.	Brian Matson, Carollo; Jeff Lykken and Kevin Dour, Tetra Tech	12/3
5.	Staging will assumed to be on land for purposes of rating the Environmental criteria.	Sue Meyer, King County	12/3
6.	The word "significant" will not be used when discussing potential environmental impacts during the alternatives analysis phase. "Significant" has a specific meaning under SEPA.	Basin leads	11/24
7.	The MAT will direct the project team how to handle potential fees for construction use of SDOT right of way for the alternatives evaluation process.	Shahrazad Namini, King County	12/3
8.	Category leads will not use potential costs to rate criteria outside of the cost category. However, category leads will provide comments in the criteria matrix about potential costs and related assumptions.	Land Use and Permitting category lead, King County; basin leads	12/3
9.	The project team will provide comments on the criteria to the category leads by November 24. Any comments that are outside of a project team member's category will be sent to Mary Wohleb by November 24.	Project team	11/24
10.	Category leads will provide comments on the criteria and ratings to Brian Matson no later than December 3.	Category leads	12/3
11.	The project website calendar will be updated as meeting dates are set.	Allen deSteiguer, Carollo	11/30

## DISCUSSION AND COMMENTS

1. Murray Alternatives. The alternatives were presented in turn. Following are some of the comments during the presentation.

- a. Could you reroute Barton force main to storage, for 1B?
- b. Can we make beach drive larger diameter, shorten pipe?
- c. Construction impacts for tunnel portals need to be included in the evaluation.
- d. Category leads need to meet with Basin leads to clarify details of alternatives in order to complete the initial evaluation.
- e. Alternative 1D: South end of tunnel will close roadway to several residences unless it is moved out of the right of way. Need to capture impacts in community category ratings.
- f. Alternative 1E: location of upper basin storage was limited by 200-ft head limitation on single stage pumping.
- g. Need to document changes in alternatives over the course of the August to November meetings.
- h. We should look at increasing the capacity of the peaking pump station and transfer more flow to 63<sup>rd</sup> Ave. PS. There may be a control issue at the Alaska St. CSO point.
- i. Alternative 1F: includes acquisition of residential units including multi family units.
- j. Relative to Murray PS upgrades for generator and odor control, CSO projects should include, where feasible and in proximity, provisions for these improvements at Murray PS and consider an advantage in the "adaptive management" question in the technical criteria category. Backup power for CSO alternatives could be sized to serve Murray PS also.
- k. Alternative 1G: Requires upgrades at Alki WWTP, 63<sup>rd</sup> Ave. PS, and outfall capacity. Should allow some costs for these in this alternative, realizing that much of the detail may not be developed until this alternative moves forward.
- l. Alternative 3A: This use is prohibited by the zoning code in this area.
- m. Alternative 4A: Need to consider O&M impacts and costs even if county not doing the work. Possibly add a line in the life cycle costs for external costs?
- n. Community Impact ratings need to look a property issues, including long term effects of a re-zone for a treatment plant for instance and whether the impact is the facility itself of the effect of the change in zoning.
- o. Staging areas. Think we should assume land staging for Murray projects, versus potential for marine staging in Barton.
- p. SEPA versus evaluation ratings: do not use the word "significant" as it has a specific meaning in SEPA.
- q. Permitting and property acquisition complexity: Important to be rated without cost; cost should be included in the cost category.

2. Evaluation Process. The process was reviewed. Key points included the following.

- a. December meetings will look at bigger picture of comparing alternatives against each other, versus the ratings being done now for each alternative being evaluated by the questions.
- b. December meetings will focus on how to use the ratings in making a decision with the objective to shortlist three alternatives in each basin.
- c. Process has to be credible, defensible, and explainable.

- d. Deadline for comments on criteria and alternatives is November 24. Mary will collect and send to Carollo.
- e. Matrices will be finalized by the category and basin leads by December 3.
- f. Category leads who want to update or refine titles or criteria questions must have those done by December 3, too. Last update to the criteria was September 10.

END OF NOTES  
O&M BRIEFING  
11/3/09

**PRELIMINARY DRAFT**

# King County Puget Sound Beach CSO Control Projects

## Alternative Narrowing (9 to 3) Workshop for Barton

Dec. 10, 2009, 1:00 PM – 4:00 PM

King Street Center 7th Floor (Rm 7044/7045)

### DRAFT Summary

#### Attendance

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

#### Project Overview

During heavy rains when flows in the combined sewer system exceed the capacity of the Barton Pump Station, the system can overflow into Puget Sound at the Barton outfall. When this happens, about 90 percent of the combined volume of the overflow is storm water and the rest is diluted sewage. These events are called combined sewer overflows, or CSOs.

Each year, the Barton CSO discharges into Puget Sound off Fauntleroy approximately 8 times, for a total of 8 million gallons of mixed storm water and raw sewage.

CSOs help to avoid sewer backups into homes and businesses and onto streets, but CSOs can be a public health and environmental concern. State regulations require King County to reduce the number of CSOs each year, with a long-term goal of less than one untreated discharge per location per year.

#### Meeting Purposes

1. Primarily to narrow the 9 “gray” Alternatives for the Barton Basin to 3 “gray” Alternatives that will be further evaluated and considered.
2. Provide the reasons and rationale why Alternatives were and were not recommended for public, agency, and participants’ understanding.

#### Information Available for Workshop

1. Final revised Barton Basin Alternatives summary sheets (1 for each alternative)
2. Final revised table of criteria 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)

## ***King County Puget Sound Beach CSO Control Projects***

4. Comment logs relating to Barton, Murray, and South Magnolia Basin Alternatives
5. Summary of major changes to Barton, Murray, and South Magnolia Basin Alternatives and overall evaluation criteria
6. Preliminary planning level cost information for comparison purposes for Barton Basin
7. Community input from public meetings
8. Initial Straw Poll Results

### **Agenda**

*Brief Review of Initial Straw Poll Results for Barton, Murray, and South Magnolia Basins (Bob Wheeler, Triangle Associates)*

*Initial Barton Alternative Narrowing - Discussion (facilitated by Bob Wheeler, Triangle Associates)*

- Alternatives clearly not meriting further consideration
- Alternatives clearly meriting further consideration
- Iterative Process for remaining Alternatives to decide what will be and not be considered further
- Identify reasons and rationale for being recommended or not recommended

*Presentation of Preliminary Planning Level Cost Information for Comparison Purposes (Brian Matson, Carollo Engineers)*

- Methodology for determining costs
- Review of methodology for creating comparative cost ratings
- Discussion – Does cost information change any of the three alternatives currently identified for further evaluation?

*Team Agreement on 3 Alternatives to consider further (facilitated by Bob Wheeler, Triangle Associates)*

- Truth Test – Do we have the right 3 Alternatives to consider further?
- Additional reasons and rationale for recommendation or non-recommendation

### **Summary of Workshop Outcome**

King County staff agreed that the three “gray” CSO control alternatives to evaluate further include:

- 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 Basin Lead for the Barton Basin supported these choices.

## King County Puget Sound Beach CSO Control Projects

### Key Points of Discussion

- O&M staff strongly object 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.
- Alternative 1E could be difficult to implement because of identified cultural resources, but the engineering design must be further refined to better understand the potential impacts to cultural 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.
- O&M staff are concerned that as constraints to the alternatives emerge, it will be tempting to move O&M access into the ROW. O&M staff will not guarantee that a facility can be serviced 24/7 in the absence of safe, protected access outside of the ROW.

### Key Points of Discussion about Cost

- 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. No condemnation costs were assumed.
- 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.

Action Items	Responsibility
King County staff may provide additional comments about which alternatives they do and do not prefer and their rationale for the Murray and Magnolia basins until Dec. 15. Comments may be e-mailed to Allen de Steiguer or Ellen Blair.	King County staff
Barton CSO project staff will report to WTD management that the CSO alternatives were rated and evaluated without regard to potential impacts to or from the Barton pump station project.  Pam Erstad noted that “piece-mealing” of projects is a consideration for shoreline permitting.	Shahrzad Namini, King County
Barton CSO project staff and Barton Pump Station project staff will meet to develop information for Shahrzad Namini to take to WTD management in early January.	Shahrzad Namini and Sue Hildreth, King County
The consultant team PM and the basin leads will meet with Jim Weber and Rob Kohler to discuss and confirm preliminary planning estimates of project cost and life cycle cost.	Brian Matson, Carollo

## King County Puget Sound Beach CSO Control Projects

Action Items	Responsibility
Shahrzad Namini will meet with appropriate King County staff and/or consultant team staff to identify a schedule for developing more refined cost estimates.	Shahrzad Namini, King County
All documents containing cost estimates will be labeled "Preliminary planning level costs for comparison purposes" for the December 2009 alternatives narrowing workshops.	Basin leads
Determine how much flow the Barton Pump Station would need to convey in order to eliminate the need for storage in the Barton basin.	Jeff Lykken, Tetra Tech

### Reasons and Rationale for Recommendation & Non-Recommendation of Alternatives for Further Evaluation

**RECOMMENDED** → *Alternative 1A: Rectangular Storage, Bottom of Basin/Alternative 1C: Pipe Storage, Bottom of Basin*

Alternative 1A and Alternative 1C were deemed similar enough to be put forth for further evaluation as a single alternative.

#### Reasons and Rationale for Recommendation

- Major reason for recommending this alternative is that all of the basin flow is captured passively, which poses the least risk to meeting the CSO control requirement. No pumping or back-up power generation would be required.
- Cleaning a rectangular tank is easier, occurs less frequently and requires less staff time than cleaning a circular tank (Alternative 1B).
- Considering both rectangular and pipe storage will allow the design team more flexibility in optimizing the storage configuration.
- King County owns property adjacent to the Barton Pump Station that might be useful for siting or constructing this alternative.
- Alternative 1A is moderate cost and Alternative 1C is low cost relative to all potential Barton CSO control alternatives.

#### Cautions and Other Considerations

- Shoreline use permit may be provided only if there are no other viable alternatives.
- Construction could disrupt Fauntleroy ferry traffic. This would pose a major community impact and WSDOT might oppose.
- Moderate likelihood that cultural/archaeological resources are present, which could delay the project schedule.
- 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. The community members should be notified as soon as possible that a bottom of the basin alternative is being evaluated to elicit specific community concerns and ideas.
- Property acquisition may be necessary.

## King County Puget Sound Beach CSO Control Projects

- There will be less environmental impact and permitting will be easier if no marine access is used for construction.
- Locating storage at the bottom of the basin could complicate permitting and community relations and delay the Barton Pump Station Upgrade project and vice versa.
- Moderate risk of cost estimate changing dramatically based on permitting and property acquisition costs.

### **Not Recommended** → *Alternative 1B: Circular Storage, Bottom of Basin*

#### Reasons and Rationale for Not Being Recommended

- Circular storage requires more frequent maintenance and more staff time than rectangular or pipe storage. O&M staff strongly oppose this option.
- 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.
- Same cautions and considerations as Alternative 1A and 1C.

### **Not Recommended** → *Alternative 1D: Right of Way Pipe Storage, Bottom of Basin*

#### Reasons and Rationale for Not Being Recommended

- Construction would be very disruptive to arterial (Fauntleroy Way SW) traffic (roughly 150 ft of 12 ft diameter pipe in street Right of Way). This would pose a major community impact and WSDOT might oppose because of impact to Fauntleroy ferry traffic.
- Similar benefits to Alternatives 1A and 1C, which were recommended.
- Provides no additional technical or operational benefits compared to Alternative 1C.
- Maintenance access is an issue. Fauntleroy Way SW is a busy arterial. Access would be restricted if entry were within the paved road or special provisions would be required so the structures could be accessed from the side of the road a safe distance from the paved area.

#### Benefits and Other Considerations

- 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 using parks or been residential parcels as a facility site, thus avoiding one element of potential community impact.
- No property acquisition needed.
- Moderate likelihood that cultural/archaeological resources are present, which could delay the project schedule.
- May minimize interaction with Barton Pump Station project.

### **RECOMMENDED** → *Alternative 1E: Pipe Storage, Upper Fauntleroy Way SW*

#### Reasons and Rationale for Recommendation

- Captures approximately 50% of basin flow. Low risk of not meeting the CSO control requirement.

## **King County Puget Sound Beach CSO Control Projects**

- Avoids major construction impact to Fauntleroy Way SW arterial and Fauntleroy ferry traffic, unlike other bottom of basin alternatives.
- 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.
- No property acquisition needed for storage pipe installation (may need easements for electrical and odor control facilities).
- May minimize interaction with Barton Pump Station project.
- Lower cost relative to other Barton CSO control alternatives.
- Lower risk of cost estimate changing dramatically.

### Cautions and Other Considerations

- Potential impact to known cultural resources. Further refinement of design will determine if impact to cultural resources can be avoided. Impact to cultural resources could result in significant project delay and/or denial of permit.
- Major disruption of approximately 150 ft of street Right of Way in a non-arterial street (Upper Fauntleroy Way SW) affecting several residences.
- 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.

**RECOMMENDED** → *Alternative 1F: Rectangular Storage in the Vicinity of Fauntleroy School*

### Reasons and Rationale for Recommendation

- Avoids impact to Fauntleroy Way SW arterial and Fauntleroy ferry traffic.
- Minimal if any disruption to street Right of Way.
- Minimal potential for environmental impacts or permitting difficulties.
- 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.
- Low cost relative to other Barton CSO control alternatives.
- Low risk of cost estimate changing dramatically.

### Cautions and Other Considerations

- 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.
- Avoids interaction with Barton Pump Station project.

## King County Puget Sound Beach CSO Control Projects

### **Not Recommended** → *Alternative 1G: Rectangular Storage, Basin 416*

#### Reasons and Rationale for Not Being Recommended

- Technically complex compared to other storage alternatives.
- Diversion structure is high in the basin; less than half of the basin flow is captured. Telemetry and instrumentation will be necessary to predict and capture adequate flows to meet the CSO control requirement. Highest difficulty in managing and controlling flows for meeting CSO control requirement relative to other storage alternatives. Additional storage might be required to ensure adequate flow can be diverted.
- May require use of a city park. Seattle Dept. of Parks and Recreation staff have stated that department policy opposes use of park property, particularly well-used parks.
- Community members may object to use of city park.
- Moderate cost relative to other Barton CSO control alternatives.

#### Benefits and Other Considerations

- Another property location may be available for a storage facility. Seattle Public Utilities property may be available for storage facility.
- Avoids impact to Fauntleroy Way arterial and Fauntleroy ferry traffic.
- Avoids interaction with Barton Pump Station project.
- Construction could impact approximately 800 ft of street Right of Way, but impacted streets are not arterial.
- 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 Cove Park.

### **Not Recommended** → *Alternative 3A: End of Pipe Treatment, Bottom of Basin*

#### Reasons and Rationale for Not Being Recommended

- Technically complex. Too complex a solution for the amount of flow.
- Treatment facility in shoreline is currently prohibited by code.
- O&M more complicated and time-consuming for staff than storage.
- Permitting effluent discharge to Puget Sound could cause significant schedule delay.
- 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.
- Community members may object to treatment facility in residential neighborhood.
- Locating storage treatment facility at the bottom of the basin could complicate permitting and community relations and/or delay the Barton Pump Station Upgrade project and vice versa.
- High cost relative to all other Barton CSO control alternatives.

#### Benefits and Other Considerations

- Captures all flow in basin passively at bottom of basin. Highly reliable flow control for meeting CSO control requirement.

## **King County Puget Sound Beach CSO Control Projects**

- There will be less environmental impact and permitting will be easier if no marine access is used for construction.

**Not Recommended** → *Alternative 4A: Peak Flow Reduction, Basin 416*

### Reasons and Rationale for Not Being Recommended

- Directing additional stormwater to Municipal Separate Storm Sewer System (MS4) system could have water quality and flooding impacts to Longfellow Creek. This could delay or halt the project schedule because of environmental and permitting impacts and/or community opposition.
- Project schedule could be significantly delayed because of need to coordinate with City of Seattle and work required on hundreds of private properties.
- Construction would impact several blocks of non-arterial streets.
- High cost relative to all other Barton CSO control alternatives even before considering the possibility that stormwater will require treatment.
- High risk that cost estimate will change dramatically.
- Estimated costs do not include provisions for stormwater treatment which would likely be required.

### Benefits and Other Considerations

- Avoids impact to Fauntleroy Way arterial and Fauntleroy ferry traffic.
- Avoids interaction with Barton Pump Station project.
- 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.

# King County Puget Sound Beach CSO Control Projects

## Alternative Narrowing (9 to 3) Workshop for Murray

Dec. 16, 2009, 1:00 PM – 4:00 PM

King Street Center 8th Floor Conference Center

### DRAFT Summary

#### Attendance

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

#### Project Overview

During heavy rains when flows in the combined sewer system exceed the capacity of the Murray Pump Station, the system can overflow into Puget Sound at the Murray outfall. When this happens, about 90 percent of the combined volume of the overflow is storm water and the rest is diluted sewage. These events are called combined sewer overflows, or CSOs.

Each year, the Murray CSO discharges into Puget Sound off Lowman Beach Park approximately 5 times, for a total of 5 million gallons of mixed storm water and raw sewage.

CSOs help to avoid sewer backups into homes and businesses and onto streets, but CSOs can be a public health and environmental concern. State regulations require King County to reduce the number of CSOs each year, with a long-term goal of less than one untreated discharge per location per year.

#### Meeting Purposes

1. Primarily to narrow the 9 alternatives for the Murray Basin to 3 recommended alternatives that will be further evaluated and considered.
2. Provide the reasons and rationale why alternatives were and were not recommended for public, agency, and workshop participants' understanding.

#### Information Available for Workshop

1. Final revised Murray Basin Alternatives summary sheets (1 for each alternative)
2. Final revised table of criteria 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. Comment logs relating to Barton, Murray, and South Magnolia Basin Alternatives

## **King County Puget Sound Beach CSO Control Projects**

5. Summary of major changes to Barton, Murray, and South Magnolia Basin Alternatives and overall evaluation criteria
6. Preliminary planning level cost information for comparison purposes for Murray Basin
7. Community input from public meetings
8. Initial Straw Poll Results

### **Agenda**

*Review Results of Dec. 10 Barton Workshop* (Jeff Lykken, Tetra Tech)

*Review of Initial Straw Poll Results for Murray* (Jeff Lykken, Tetra Tech)

*Initial Murray Alternatives Narrowing - Discussion* (facilitated by Bob Wheeler, Triangle Associates)

- Alternatives clearly not meriting further consideration
- Alternatives clearly meriting further consideration
- Iterative Process for remaining alternatives to decide what will be and not be considered further
- Identify reasons and rationale for being recommended or not recommended

*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 – Does cost information change any of the three alternatives currently identified for further evaluation?

*Team Agreement on 3 Alternatives to Consider Further* (facilitated by Bob Wheeler, Triangle Associates)

- Truth Test – Do we have the right 3 alternatives to consider further?
- Additional reasons and rationale for recommendation or non-recommendation

### **Summary of Workshop Outcome**

King County staff agreed that the CSO control alternatives to evaluate further include:

- 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 Targeting Residences (Alternative 5A)

The project team decided to recommend four alternatives for further evaluation instead of three. New analysis discussed at the Dec 16, 2009 workshop suggested that the peak flow reduction component of Alternative 5A (Peak Flow Reduction Targeting Residences) could potentially be less technically complex and less costly than originally anticipated. The project team recommends that Alternative 1C and Alternative 5A be evaluated in parallel to determine if peak flow reduction can be used to eliminate the pipe storage in Murray Ave that is part of Alternative 1C.

## **King County Puget Sound Beach CSO Control Projects**

The Basin Lead for the Murray Basin supported these choices.

### **Action Items**

<b>Action Items</b>	<b>Responsibility</b>
Sahba Mohandessi will be contacted to coordinate with SPU about briefings to City of Seattle departments.	Mary Wohleb, King County
Drawings for the Hidden Lake project control gate will be sent to Jeff Lykken at Tetra Tech.	Monica Van Der Vieren, King County
For any short-listed alternatives, evaluation of storage that is higher in a basin (such as storage on Murray Ave. as part of Murray CSO control Alternative 1C) will need to consider whether a larger storage volume is required given control complexities and hydraulic response times.	Basin leads
Shahrzad Namini will validate with King County management that bottom of basin alternatives are feasible in the Barton basin.	Shahrzad Namini, King County
Based on a comment from Bob Swarner and further evaluation by the team, the potential location for Barton CSO control Alternative 1E: Pipe Storage in Upper Fauntleroy Way will also include Director St.	Jeff Lykken, Tetra Tech

### **Key Points of Discussion**

- The process to narrow the alternatives is a collaborative effort by the project team that uses several tools, including the “straw poll” that was conducted December 9, 2009, to generate discussion and inform the team’s recommendations. Documenting this process is a critical piece of the project.
- One goal of the alternative narrowing process is to, where possible, recommend a set of alternatives that includes the range of complexity and constraints in the basin.
- An emergency generator and odor control upgrade project is required 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. As the CSO control alternatives are narrowed and refined, King County will determine if the emergency generator and odor control upgrade project can be combined with the CSO control project.
- Depending on the location of the CSO control alternative, the availability of electricity may be an issue.
- 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 can have problems. King County is having problems with existing weirs that are set at the wrong height and that have sedimentation problems.
- A CSO treatment facility is much more complex than storage.
- Life cycle costs have not been calculated yet, but O&M costs will be small compared to capital costs for the alternatives.

## ***King County Puget Sound Beach CSO Control Projects***

### **Reasons and Rationale for Recommendation & Non-Recommendation of Alternatives for Further Evaluation**

**RECOMMENDED** → *Alternative 1A: Rectangular Storage, Bottom of Basin*

#### Reasons and Rationale for Being Recommended

- Passively captures 100% of basin flow. Most reliable location to capture the highest volume of peak flows.
- Lowest level of technical complexity and operational management required to achieve compliance compared to other CSO control approaches.
- Off-street construction limits traffic impacts in residential area with limited access and avoids permitting costs associated with street right-of-way construction.
- Sufficient space to accommodate staging and construction.
- O&M access already exists in the park.
- Low cost relative to other Murray CSO control alternatives.
- Low risk of cost estimate changing dramatically.
- 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.

#### Challenges

- May require property acquisition.
- 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.
- Seattle Dept. of Parks and Recreation has a policy that opposes the use of parks for utilities. There is a significant risk that parks issues would prevent this alternative from moving forward.
- 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.
- Some community members have expressed strong opposition to additional utility work in Lowman Beach Park.

#### Other Considerations

- None.

## **King County Puget Sound Beach CSO Control Projects**

**Not Recommended** → *Alternative 1B: Circular Storage, Murray Ave & Lincoln Park Way*

### Reasons and Rationale for Not Being Recommended

- Requires significant pump station at bottom of basin in addition to the storage facility to pump additional flows from Barton.
- Potential facility location is designated a critical area (environmental) and permitting could extend the project schedule or stop the project.
- Soft ground associated with stream flows may be difficult to construct on.
- Circular storage requires more frequent maintenance and more staff time than rectangular or pipe storage.
- The site has steep slopes which might make it difficult to permit the project.
- Potential facility location is identified as a greenbelt in a neighborhood plan. Community members may oppose any construction there.
- If greenbelt is not used, requires purchase of residential properties. Still have potential environmental impacts to stream on the residential properties.

### Benefits

- Off-street construction limits traffic impacts in residential area with limited access and avoids permitting costs associated with street right-of-way construction.
- Could potentially need to use only City of Seattle-owned property.

### Other Considerations

- Passively captures approximately 50% of basin peak flow (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 required to achieve compliance compared to other CSO control approaches.

**RECOMMENDED** → *Alternative 1C: Distributed Storage Beach Drive & Murray Ave*

### Reasons and Rationale for Being Recommended

- Project is mostly located within right-of-way. Would not require use of Lowman Beach Park or purchase of residential properties.
- Captures 100% of basin peak flow (between both locations).
- Minimal environmental impacts.
- 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 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 both control CSOs and manage the additional flows from Barton pump station without adding additional pumping capacity at Murray.

### Challenges

- Technically more complex than a single, bottom of the basin storage facility.

## ***King County Puget Sound Beach CSO Control Projects***

- 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.
- Construction would be very disruptive to street right-of-way for Beach Drive and Murray Ave. This would pose a major community impact. However, construction impacts are not static in a single area because of open cut & cover construction.

### Other Considerations

- 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 one location at the bottom of the basin.
- Maintenance access is an issue. Access would be restricted if entry were within the paved road or special provisions would be required so the structures could be accessed from the side of the road a safe distance from the paved area.

**Not Recommended** → *Alternative 1D: Bottom of Basin - Tunneling*

### Reasons and Rationale for Not Being Recommended

- Tunneling portals would require large areas in a compact, residential neighborhood.
- Tunneling under private property could require permission from private property owners.
- Construction would completely block Beach Drive near Lowman Beach Park, which is the only access route to residences south of the park.
- No on-the-ground geotechnical investigations have been done to confirm that the material is suitable for tunneling. There is a risk that tunneling is not feasible in this location.
- Tunneling is a more complex and risky construction method than cut-and-cover.

### Benefits

- Passively captures 100% of basin flow. Most reliable location to capture the highest volume of peak flows.
- Lowest level of technical complexity and operational management required to achieve compliance compared to other CSO control approaches.
- 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.
- Lower risk of cost estimate changing dramatically compared to other Murray CSO control alternatives.
- This alternative can be combined with the planned emergency generator and odor control project at Murray pump station.

### Other Considerations

- Relocation of sanitary sewer, water and other underground utilities would be required along Beach Drive. This may result in utility disruptions.
- Any easement requirements for boring under private property were not considered in the evaluation criteria.

## King County Puget Sound Beach CSO Control Projects

### **Not Recommended** → *Alternative 1E: Upper Basin Storage*

#### Reasons and Rationale for Not Being Recommended

- 32 mgd pump station would be needed at the bottom of basin.
- This alternative is very disruptive to multiple areas in the Murray basin. It includes major construction impacts and a permanent facility at the bottom of the basin, major construction impacts and a permanent facility in the upper basin, and major construction impacts to 2550 lineal feet of street right-of-way.
- High cost compared to other Murray CSO control alternatives.

#### Benefits

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

#### Other Considerations

- Seattle Dept. of Parks and Recreation has a policy that opposes the use of parks for utilities. There is a significant risk that parks issues would prevent this alternative from moving forward.
- A plan shoreline permit from the City of Seattle may be needed in which case a formal alternatives analysis would be needed. This could delay the project schedule.
- Some community members have expressed strong opposition to additional utility work 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.
- 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.

### **RECOMMENDED** → *Alternative 1F: Bottom of Basin - Combined Pipe/Rectangular Storage*

#### Reasons and Rationale for Being Recommended

- Passively captures 100% of basin flow.
- Although this alternative involves multiple facilities, they are located proximal to each other and management is less complicated than distributed storage.
- Avoids construction in Lowman Beach Park and in the shoreline zone.
- This alternative can be combined with the planned emergency generator and odor control project at Murray pump station.
- Low cost relative to other Murray CSO control alternatives.
- Low risk of cost estimate changing dramatically.

#### Challenges

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

## ***King County Puget Sound Beach CSO Control Projects***

- Construction would be located in Beach Drive right-of-way resulting in traffic disruptions.
- Requires purchase of residential properties.

### Other Considerations

- Relocation of sanitary sewer, water and other underground utilities may be required along Beach Drive. This may result in utility disruptions.

**Not Recommended** → *Alternative 2A: Convey & Treat at Alki*

### Reasons and Rationale for Not Being Recommended

- High cost compared to other Murray CSO control alternatives.
- Construction would be very disruptive:
  - Construction of 13,500 lineal feet of force main in Beach Drive.
  - Would require upgrades to the existing 63<sup>rd</sup> 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.
- 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 cause significant schedule delay.

### Benefits

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

### Other Considerations

- Seattle Dept. of Parks and Recreation has a policy that opposes the use of parks for utilities. There is a significant risk that parks issues would prevent this alternative from moving forward.
- Some community members have expressed strong opposition to additional utility work in Lowman Beach Park.
- 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.

**Not Recommended** → *Alternative 3A - End of Pipe Treatment, Bottom of Basin*

### Reasons and Rationale for Not Being Recommended

- Technically complex.
- Treatment facility in shoreline is currently prohibited by code.

## **King County Puget Sound Beach CSO Control Projects**

- O&M more complicated and time-consuming for staff than storage.
- Permitting effluent discharge to Puget Sound could cause significant schedule delay.
- Community members may object to treatment facility in residential neighborhood.
- High cost relative to all other Murray CSO control alternatives.

### Benefits

- 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.

### Other Considerations

- Would require construction of an above-grade facility, possibly in Lowman Beach Park. Seattle Dept. of Parks and Recreation has a policy that opposes the use of parks for utilities. There is a significant risk that parks issues would prevent this alternative from moving forward.
- Some community members have expressed strong opposition to additional utility work in Lowman Beach Park.
- If Lowman Beach Park is not used, it would be necessary to purchase residential properties to site the storage facility.

**RECOMMENDED** → *Alternative 5A: Peak Flow Reduction Combined w/Storage*

### Reasons and Rationale for Being Recommended

- Storage volume required for CSO control will be reduced with effective rooftop disconnection. Flows to West Point Treatment Plant will also be reduced.
- 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 a good 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.
- 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 significantly reduce the amount of storage required in the basin.
- 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.
- 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.
- 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.

## ***King County Puget Sound Beach CSO Control Projects***

- Many community members have expressed interest in an option other than a traditional “gray” facility.
- 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.
- The storage facility would not require use of Lowman Beach Park or purchase residential properties.

### **Challenges**

- 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.
- Project schedule could be significantly 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. This would pose a major community impact.

### **Other Considerations**

- Relocation of sanitary sewer, water and other underground utilities would be required along Beach Drive. This may result in utility disruptions.
- Maintenance access to the storage facility is an issue. Access would be restricted if entry were within the paved road or special provisions would be required so the structures could be accessed from the side of the road a safe distance from the paved area.