

BARTON BASIN ALTERNATIVES  
 PRELIMINARY DRAFT DISCUSSION PURPOSES ONLY

CATEGORY / CRITERIA	1A	1B	1C	1D	1E	1F	1G	3A	4A
<b>LAND USE AND PERMITTING</b>									
1. Land Use Compatibility	2	2	2	3	3	3	2	1	3
2. City of Seattle Planning Policies (Comp Plan)	2	2	2	3	3	3	2	1	3
3. Municipal Code and Shoreline Management Program	2	2	2	3	3	3	3		3
4. Permitting Complexity	2	2	2	1	2	2	2	1	2
5. Property Acquisition Complexity	2	2	2	2	2	3	1	2	2
<b>ENVIRONMENT</b>									
1. Cultural Resources	2	2	2	1	1	2	3	2	3
2. Fish and Wildlife	1	1	1	1	3	3	2	1	2
3. Wetlands and Streams	1	1	1	2	3	3	3	1	3
4. Soils and Sediments	2	2	2	2	3	3	2	2	2
5. Water Quality	3	3	3	3	3	3	3	3	1
<b>TECHNICAL</b>									
1. Technical Complexity	3	3	3	3	2	2	1	1	3
2. Compatibility with Existing WW system	2	2	2	2	2	2	2	3	3
3. Flexibility/Adaptive Management	2	2	2	2	3	3	3	2	2
4. Constructability/Implementation Schedule	2	2	2	1	2	3	2	2	2
<b>O&amp;M</b>									
1. Staffing	3	3	3	3	2	2	2	1	3
2. Training	3	2	3	3	3	3	3	1	3
3. Reliability	3	3	3	3	2	2	2	2	3
4. Maintenance	3	3	3	3	2	2	2	1	3
5. Safety	3	3	3	1	2	3	3	3	2
<b>COST EFFECTIVENESS</b>									
1. Project Capital Costs	2	2	3	3	3	3	2	1	1
2. Life Cycle Costs									
3. Cost Variability/Risk	2	2	2	3	3	3	2	3	1
<b>COMMUNITY IMPACT</b>									
1. Location	2	2	2	3	3	2	2	1	3
2. Long Term Risk, New Facilities	2	2	2	3	3	2	2	1	2
3. Construction Impacts	1	1	1	1	1	2	1	1	2

Barton, Murray, Magnolia and North Beach CSO Projects  
Alternatives Analysis

BARTON BASIN ALTERNATIVES

CATEGORY / CRITERIA	1A: RECTANGULAR STORAGE, BOTTOM OF BASIN		ALTERNATIVE 1B: CIRCULAR STORAGE, BOTTOM OF BASIN		ALTERNATIVE 1C: PIPE STORAGE, BOTTOM OF BASIN	
	IMPACT RATING	DESCRIPTION	IMPACT RATING	DESCRIPTION	IMPACT RATING	DESCRIPTION
1. City of Seattle Comprehensive Plan	2	Section 6.5 of the Seattle Comprehensive Plan (Utilities Element of the Planning Policies, U16) states that the City should work cooperatively with King County to identify and expeditiously address combined sewer overflows. Elsewhere in the Comp Plan (Land Use Element, Section 2.1, LU 61 & 62), uses in Single Family Residential neighborhoods should affirm and encourage residential use by one household as the principal use or should only encourage uses that are permitted outright. Location may require review for consistency with City parks policies.	2	Section 6.5 of the Seattle Comprehensive Plan (Utilities Element of the Planning Policies, U16) states that the City should work cooperatively with King County to identify and expeditiously address combined sewer overflows. Elsewhere in the Comp Plan (Land Use Element, Section 2.1, LU 61 & 62), uses in Single Family Residential neighborhoods should affirm and encourage residential use by one household as the principal use or should only encourage uses that are permitted outright. Location may require review for consistency with City parks policies.	2	Section 6.5 of the Seattle Comprehensive Plan (Utilities Element of the Planning Policies, U16) states that the City should work cooperatively with King County to identify and expeditiously address combined sewer overflows. Elsewhere in the Comp Plan (Land Use Element, Section 2.1, LU 61 & 62), uses in Single Family Residential neighborhoods should affirm and encourage residential use by one household as the principal use or should only encourage uses that are permitted outright. Location may require review for consistency with City parks policies.
2. Seattle Municipal Code (SMC/Zoning Code)	2	Located on or adjacent to existing pump station. Although zoning is Single Family Residential, pump stations, storage tanks, etc are most likely considered water-related uses. Barton St. End park in potential placement area may require review for consistency with Parks policies.	2	Located on or adjacent to existing pump station. Although zoning is Single Family Residential, pump stations, storage tanks, etc are most likely considered water-related uses. Water-related uses are preferred next in line to water-dependent uses within the Shoreline District. Barton St. End park in potential placement area may require review for consistency with Parks policies.	2	Located on or adjacent to existing pump station. Although zoning is Single Family Residential, pump stations, storage tanks, etc are most likely considered water-related uses. Water-related uses are preferred next in line to water-dependent uses within the Shoreline District. Barton St. End park in potential placement area may require review for consistency with Parks policies.
3. Shoreline Master Program Compatibility	2	Because this option involves acquisition of Single Family Residential properties, it is uncertain if this option will be considered compatible with existing land uses in the area. Storage is most likely considered a "Utility Service Use". A Utility Service Use is allowed outright within the Shoreline District only if it can be demonstrated that it requires a shoreline location, although water-related uses (pump stations will likely be considered a water-related use) are preferred next in line to water-dependent uses within the Shoreline District.	2	Because this option involves acquisition of Single Family Residential properties, it is uncertain if this option will be considered compatible with existing land uses in the area. Storage is most likely considered a "Utility Service Use". A Utility Service Use is allowed outright within the Shoreline District only if it can be demonstrated that it requires a shoreline location, although water-related uses (pump stations will likely be considered a water-related use) are preferred next in line to water-dependent uses within the Shoreline District.	2	Because this option involves acquisition of Single Family Residential properties, it is uncertain if this option will be considered compatible with existing land uses in the area. Storage is most likely considered a "Utility Service Use". A Utility Service Use is allowed outright within the Shoreline District only if it can be demonstrated that it requires a shoreline location, although water-related uses (pump stations will likely be considered a water-related use) are preferred next in line to water-dependent uses within the Shoreline District.
4. Permitting Complexity	2	This alternative will require a Shoreline Permit. Potential for marine access will add federal and state permits in addition to local permits. This could add up to a year or more to the schedule. Affected roadways have high traffic volume in residential and neighborhood commercial land uses with regional transportation use. Will require careful traffic planning to maintain access. Work hours likely to be restricted. Permit review likely to be most complex. The large size of facility and associated construction impacts (temporary) may be considered a "high impact" use by the City.	2	This alternative will require a Shoreline Permit. Potential for marine access will add federal and state permits in addition to local permits. This could add up to a year or more to the schedule. Affected roadways have high traffic volume in residential and neighborhood commercial land uses with regional transportation use. Will require careful traffic planning to maintain access. Work hours likely to be restricted. Permit review likely to be most complex.	2	This alternative will require a Shoreline Permit. Potential for marine access will add federal and state permits in addition to local permits. This could add up to a year or more to the schedule. Affected roadways have high traffic volume in residential and neighborhood commercial land uses with regional transportation use. Will require careful traffic planning to maintain access. Work hours likely to be restricted. Permit review likely to be most complex.
5. Property Acquisition Complexity	2	Single family residential, neighborhood has expressed concerns, waterfront real estate. Acquisition is possible	2	Single family residential, neighborhood has expressed concerns, waterfront real estate. Acquisition is possible	2	Single family residential, neighborhood has expressed concerns, waterfront real estate. Acquisition is possible

Barton, Murray, Magnolia and North Beach CSO Projects  
 Alternatives Analysis

BARTON BASIN ALTERNATIVES

CATEGORY / CRITERIA	1A: RECTANGULAR STORAGE, BOTTOM OF BASIN		ALTERNATIVE 1B: CIRCULAR STORAGE, BOTTOM OF BASIN		ALTERNATIVE 1C: PIPE STORAGE, BOTTOM OF BASIN	
	IMPACT RATING	DESCRIPTION	IMPACT RATING	DESCRIPTION	IMPACT RATING	DESCRIPTION
<b>ENVIRONMENT</b>						
1. Cultural Resources	2	No known archaeological sites. Based on site characteristics, project area has high probability of containing archaeological resources. Ethnographic site located south of ferry dock. Residential properties next to ferry dock are on Seattle Historic Inventory.	2	No known archaeological sites. Based on site characteristics, project area has high probability of containing archaeological resources. Ethnographic site located south of ferry dock. Residential properties next to ferry dock are on Seattle Historic Inventory.	2	No known archaeological sites. Based on site characteristics, project area has high probability of containing archaeological resources. Ethnographic site located south of ferry dock. Residential properties next to ferry dock are on Seattle Historic Inventory.
2. Fish and Wildlife	1	Assuming marine access is required, construction would likely have adverse effects on fish and wildlife and/or their habitat in Puget Sound. Fauntleroy Creek, which is used by coho salmon, crosses through project area south of ferry dock.	1	Assuming marine access is required, construction would likely have adverse effects on fish and wildlife and/or their habitat in Puget Sound. Fauntleroy Creek, which is used by coho salmon, crosses through project area south of ferry dock.	1	Assuming marine access is required, construction would likely have adverse effects on fish and wildlife and/or their habitat in Puget Sound. Fauntleroy Creek, which is used by coho salmon, crosses through project area south of ferry dock.
3. Wetlands, Streams, and Shoreline	1	Assuming marine access is required, construction would impact Puget Sound shoreline. Fauntleroy Creek crosses through project area south of ferry dock.	1	Assuming marine access is required, construction would impact Puget Sound shoreline. Fauntleroy Creek crosses through project area south of ferry dock.	1	Assuming marine access is required, construction would impact Puget Sound shoreline. Fauntleroy Creek crosses through project area south of ferry dock.
4. Soils and Sediments	2	No known contaminated sites in project area. Project area is within liquifaction zone. Steep slopes located in project area on south side of ferry terminal. No potential or known landslide areas in project area.	2	No known contaminated sites in project area. Project area is within liquifaction zone. Steep slopes located in project area on south side of ferry terminal. No potential or known landslide areas in project area.	2	No known contaminated sites in project area. Project area is within liquifaction zone. Steep slopes located in project area on south side of ferry terminal. No potential or known landslide areas in project area.
5. Water Quality	3	No new untreated discharges to surface waters.	3	No new untreated discharges to surface waters.	3	No new untreated discharges to surface waters.

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	IMPACT RATING	DESCRIPTION	IMPACT RATING	DESCRIPTION	IMPACT RATING	DESCRIPTION
<b>TECHNICAL</b>						
1. Technical Complexity	3	At bottom of basin and will capture peak flow using a weir in a diversion structure. Most reliable and will not require telemetry to divert flows.	3	At bottom of basin and will capture peak flow using a weir in a diversion structure. Most reliable and will not require telemetry to divert flows.	3	At bottom of basin and will capture peak flow using a weir in a diversion structure. Most reliable and will not require telemetry to divert flows.
2. Compatibility with Existing WW system	2	May prolong peak event to existing system because stored flows will be fed back into the system after peak event passes. More pounds of BOD, TSS will be routed through treatment facilities.	2	May prolong peak event to existing system because stored flows will be fed back into the system after peak event passes. More pounds of BOD, TSS will be routed through treatment facilities.	2	May prolong peak event to existing system because stored flows will be fed back into the system after peak event passes. More pounds of BOD, TSS will be routed through treatment facilities.
3. Flexibility/Adaptive Management	2	Limited space available for expansion or construction of auxillary tank. Property is limited at the bottom of the basin and ability to expand in the future could be problematic.	2	Limited space available for expansion or construction of auxillary tank. Property is limited at the bottom of the basin and ability to expand in the future could be problematic.	2	Limited space available for expansion or construction of auxillary tank. Property is limited at the bottom of the basin and ability to expand in the future could be problematic.
4. Constructability/Implementation Schedule	2	There may be construction difficulties with groundwater and excavation. Limited construction access and issues associated with ferry traffic.	2	There may be construction difficulties with groundwater and excavation. Limited construction access and issues associated with ferry traffic.	2	There may be construction difficulties with groundwater and excavation. Limited construction access and issues associated with ferry traffic.
<b>O&amp;M</b>						
1. Staffing	3	Facility can be automatically started (gravity overflow) and run autonomously under design conditions. Minimal staffing required for operation and shut down. Some staffing/supervision may be needed for cleaning. Facility should not impact downstream facilities.	3	Facility can be automatically started (gravity overflow) and run autonomously under design conditions. Minimal staffing required for operation and shut down. Some staffing/supervision may be needed for cleaning. Facility should not impact downstream facilities.	3	Facility can be automatically started (gravity overflow) and run autonomously under design conditions. Minimal staffing required for operation and shut down. Some staffing/supervision may be needed for cleaning. Facility should not impact downstream facilities.
2. Training	3	Staff familiar with storage facilities and technology - North Creek. Similar control approaches to other facilities within the system can be specified for consistency.	2	Staff familiar with storage facilities within the system. There are no other circular storage tanks in the KC system.	3	Staff familiar with storage facilities and technology - Henderson & Mercer Street Tunnel. Similar control approaches to other facilities within the system can be specified for consistency.
3. Reliability	3	System is not complex. Gravity diversion over a weir. Power not critical for ability to store peak flows. Storage is a proven technology for controlling peak flow events.	3	System is not complex. Gravity diversion over a weir. Power not critical for ability to store peak flows. Storage is a proven technology for controlling peak flow events.	3	System is not complex. Gravity diversion over a weir. Power not critical for ability to store peak flows. Storage is a proven technology for controlling peak flow events.
4. Maintenance	3	Alternative requires less maintenance than other alternatives. Automatic flushing gates should provide most, if not all, the cleaning needed. Minimal telemetry/controls to maintain (typical level sensing and pump system controls). Assumes no entry.	3	Alternative requires less maintenance than other alternatives. Automatic flushing gates should provide most, if not all, the cleaning needed. Minimal telemetry/controls to maintain (typical level sensing and pump system controls). Assumes no entry.	3	Alternative requires less maintenance than other alternatives. Automatic flushing gates should provide most, if not all, the cleaning needed. Minimal telemetry/controls to maintain (typical level sensing and pump system controls). Assumes no entry.
5. Safety	3	No street access required. No traffic control procedures required. No street use/closure permit required.	3	No street access required. No traffic control procedures required. No street use/closure permit required.	3	No street access required. No traffic control procedures required. No street use/closure permit required.

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	IMPACT RATING	DESCRIPTION	IMPACT RATING	DESCRIPTION	IMPACT RATING	DESCRIPTION
<b>COST EFFECTIVENESS</b>						
1. Project Capital Costs	2	Relative cost = 1.8	2	Relative cost = 1.8	3	Relative cost = 1.1
2. Life Cycle Costs						
3. Cost Variability/Risk	2	Variability Ratio = 1.5	2	Variability Ratio = 1.5	2	Variability Ratio = 1.7
Note: Project Capital Costs for Barton Alternatives range from a low \$2.4M to a high of \$38.5M						
<b>COMMUNITY IMPACT</b>						
1. Location	2	Small, above ground facilities and vents may cause limited reduction in land use. Design must consider surrounding land use.	2	Small, above ground facilities and vents may cause limited reduction in land use. Design must consider surrounding land use.	2	Small, above ground facilities and vents may cause limited reduction in land use. Design must consider surrounding land use.
2. Potential Community Impacts	2	Community has expressed concern about facility changing character and nature of the neighborhood. However, facilities can be design such that any small aboveground facilities can fit into community vision that is consistent with current surrounding uses. Back to back construction at the site (first the Pump Station upgrade and then a CSO facility) will cause more intense construction fatigue for the nearby neighbors.	2	Community has expressed concern about facility changing character and nature of the neighborhood. However, facilities can be design such that any small aboveground facilities can fit into community vision that is consistent with current surrounding uses. Back to back construction at the site (first the Pump Station and then a CSO facility) will cause more intense construction fatigue for the nearby neighbors.	2	Community has expressed concern about facility changing character and nature of the neighborhood. However, facilities can be design such that any small aboveground facilities can fit into community vision that is consistent with current surrounding uses.
3. Construction Impacts	1	Neighbors are close and will be affected by construction traffic and noise. Ferry riders will be affected by construction traffic. State Patrol will need to direct traffic during Ferry hours. Neighbors accessing Cove Park will be affected.	1	Neighbors are close and will be affected by construction traffic and noise. Ferry riders will be affected by construction traffic. State Patrol will need to direct traffic during Ferry operating hours. Impact to Ferry System. Neighbors accessing Cove Park will be affected.	1	State Patrol will need to direct traffic during Ferry operating hours—impact to State Ferry System. Neighbors are close and will be affected by construction traffic and noise. Ferry traffic will be affected by construction. Neighbors accessing Cove Park will be affected.

Barton, Murray, Magnolia and North Beach CSO Projects  
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BARTON BASIN ALTERNATIVES

CATEGORY / CRITERIA	ALTERNATIVE 1D: R/W PIPE STORAGE, BOTTOM OF BASIN		1E: PIPE STORAGE, UPPER FAUNTLEROY WAY SW		1F: RECTANGULAR STORAGE NEAR FAUNTLEROY SCHOOL	
	IMPACT RATING	DESCRIPTION	IMPACT RATING	DESCRIPTION	IMPACT RATING	DESCRIPTION
<b>LAND USE AND PERMITTING</b>						
1. City of Seattle Comprehensive Plan	3	Section 6.5 of the Seattle Comprehensive Plan (Utilities Element of the Planning Policies, U16) states that the City should work cooperatively with King County to identify and expeditiously address combined sewer overflows for which the County maintains responsibility. In addition, no residential property acquisition will be necessary under this alternative.	3	Section 6.5 of the Seattle Comprehensive Plan (Utilities Element of the Planning Policies, U16) states that the City should work cooperatively with King County to identify and expeditiously address combined sewer overflows for which the County maintains responsibility. In addition, no residential property acquisition will be necessary under this alternative.	3	Section 6.5 of the Seattle Comprehensive Plan (Utilities Element of the Planning Policies, U16) states that the City should work cooperatively with King County to identify and expeditiously address combined sewer overflows for which the County maintains responsibility. In addition, no residential property acquisition will be necessary under this alternative and it's location is within a former school parking lot.
2. Seattle Municipal Code (SMC/Zoning Code)	3	Utilities would be buried underground in the ROW which would only temporarily disrupt public access. Zoning: N/A (Located in ROW).	3	Utilities would be buried underground in the ROW which would only temporarily disrupt public access. Zoning: N/A (Located in ROW).	3	Zoning is Single Family Residential. Existing use is school parking lot.
3. Shoreline Master Program Compatibility	3	Utilities would be buried underground in the ROW.	3	N/A - Not within Shoreline District.	3	N/A - Not within Shoreline District.
4. Permitting Complexity	1	This alternative may require a Shoreline Permit for portions of the alternative within 200-ft of the shoreline. Potential for marine access will add federal and state permits in addition to local permits. This could add up to a year or more to the schedule. Affected roadways have high traffic volume in residential and neighborhood commercial land uses with regional transportation use. Will require careful traffic planning to maintain access. Work hours likely to be restricted. Permit review likely to be most complex.	2	Only local permits required from SDOT (no federal or state permits required). Traffic impacts for local residents. Provisions for temporary and emergency access required.  SDOT Street Use permit fees could be extremely high because of size of facilities (pipe storage) and number of structures located within ROW (Costs accounted for in Cost Effectiveness Category).	2	Public facilities may require City Council approval. No state or federal permit nexus - local permits only. Roadways not affected, or affected roadways are low volume and provide access to few residents
5. Property Acquisition Complexity	2	SDOT (Fauntleroy Way major arterial), may require additional property for ancillary facilities (odor control, electrical, generator, etc.). Acquisition is possible.	2	SDOT residential street, may require additional property for ancillary facilities (odor control, electrical, generator, etc.). Acquisition is possible.	3	Fauntleroy Community Association (own's property) may be amenable to locating facility on property.

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	IMPACT RATING	DESCRIPTION	IMPACT RATING	DESCRIPTION	IMPACT RATING	DESCRIPTION
<b>ENVIRONMENT</b>						
1. Cultural Resources	1	Based on site characteristics, project area has high probability of containing archaeological resources. Significant archaeological resources found in project area north of ferry dock. No historic resources in project area.	1	Based on site characteristics, project area has high probability of containing archaeological resources. Significant archaeological resources found adjacent to project area. Executive Order 0505 process would cause delay of up to a year or more and could result in denial of project. No historic resources in project area.	2	No known archaeological sites. Based on site characteristics, project area has medium probability of containing archaeological resources. Fauntleroy School has been nominated as a Seattle Landmark.
2. Fish and Wildlife	1	Fauntleroy Creek, which is used by coho salmon, crosses project area in pipe south of ferry dock.	3	No impacts anticipated.	3	No impacts anticipated.
3. Wetlands, Streams, and Shoreline	2	Fauntleroy Creek crosses project area in pipe south of ferry dock. No wetlands or shoreline in project area.	3	No wetlands, streams, or shoreline within project area.	3	No wetlands or shoreline within project area. Fauntleroy Creek located south of project area. No impacts to creek or creek buffer anticipated.
4. Soils and Sediments	2	No known contaminated sites in project area. Project area is within liquifaction zone. No steep slopes and/or potential or known landslide areas.	3	No known contaminated sites. Project area is not within liquifaction zone. No steep slopes and/or potential or known landslide areas.	3	No known contaminated sites in project area. Project area is not within liquifaction zone. No steep slopes and/or potential or known landslide areas.
5. Water Quality	3	No new untreated discharges to surface waters.	3	No new untreated discharges to surface waters.	3	No new untreated discharges to surface waters.

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	IMPACT RATING	DESCRIPTION	IMPACT RATING	DESCRIPTION	IMPACT RATING	DESCRIPTION
<b>TECHNICAL</b>						
1. Technical Complexity	3	At bottom of basin and will capture peak flow using a weir in a diversion structure. Most reliable and will not require telemetry to divert flows.	2	Mid-Basin Alternative but close to bottom of the basin. Will require some telemetry and possibly predictive algorithms. Considered more reliable since close to the bottom of the basin.	2	Mid-Basin Alternative. Will require some telemetry and possibly predictive algorithms. Closer to bottom of basin so will be more reliable than up-basin alternatives.
2. Compatibility with Existing WW system	2	May prolong peak event to existing system because stored flows will be fed back into the system after peak event passes. More pounds of BOD, TSS will be routed through treatment facilities.	2	May prolong peak event to existing system because stored flows will be fed back into the system after peak event passes. More pounds of BOD, TSS will be routed through treatment facilities.	2	May prolong peak event to existing system because stored flows will be fed back into the system after peak event passes. More pounds of BOD, TSS will be routed through treatment facilities.
3. Flexibility/Adaptive Management	2	Ability to expand in the R/W is limited because of space and ground surface restrictions. Ability to lengthen pipe limited because of steep excavation depths north and south of the placement area.	3	May be able to lengthen pipe and expand capacity northward past Henderson Street. Will need to reconfigure drain chamber.	3	Area available within parking lot of Fauntleroy School to expand tank or construct auxillary tank.
4. Constructability/Implementation Schedule	1	There may be construction difficulties with groundwater and excavation. Difficult construction conditions within street R/W; issues associated with ferry traffic.	2	There may be construction difficulties with groundwater, archaeological conditions, and excavation. Difficult construction conditions within street R/W; issues associated residential access during construction.	3	No significant construction issues or risks beyond typical structure excavation and construction. Few, if any, traffic or access issues identified.
<b>O&amp;M</b>						
1. Staffing	3	Facility can be automatically started (gravity overflow) and run autonomously under design conditions. Minimal staffing required for operation and shut down. Some staffing/supervision may be needed for cleaning. Facility should not impact downstream facilities.	2	Facility can be automatically started and run autonomously under design conditions. However, facility will be started using monitoring and telemetry. This may require operator response to ensure proper startup and operation of the facility. Some staffing/supervision may be needed for cleaning. Facility should not impact downstream facilities.	2	Facility can be automatically started and run autonomously under design conditions. However, facility will be started using monitoring and telemetry. This may require operator response to ensure proper startup and operation of the facility. Some staffing/supervision may be needed for cleaning. Facility should not impact downstream facilities.
2. Training	3	Staff familiar with storage facilities and technology - Henderson & Mercer Street Tunnel. Similar control approaches to other facilities within the system can be specified for consistency.	3	Staff familiar with storage facilities and technology - Henderson & Mercer Street Tunnel. Similar control approaches to other facilities within the system can be specified for consistency.	3	Staff familiar with storage facilities and technology - North Creek. Similar control approaches to other facilities within the system can be specified for consistency.
3. Reliability	3	System is not complex. Gravity diversion over a weir. Power not critical for ability to store peak flows. Storage is a proven technology for controlling peak flow events.	2	System requires telemetry/controls to effectively store peak flows. System will need a motorized gate or other mechanism to actively divert flows when a peak event is imminent. Power is critical for operation of telemetry & monitoring equipment and ability to store peak flows. Storage is a proven technology for controlling peak flow events.	2	System requires telemetry/controls to effectively store peak flows. System will need a motorized gate or other mechanism to actively divert flows when a peak event is imminent. Power is critical for operation of telemetry & monitoring equipment and ability to store peak flows. Storage is a proven technology for controlling peak flow events.
4. Maintenance	3	Alternative requires less maintenance than other alternatives. Automatic flushing gates should provide most, if not all, the cleaning needed. Minimal telemetry/controls to maintain (typical level sensing and pump system controls). Assumes no entry.	2	Alternative requires less maintenance than most other alternatives. Automatic flushing gates should provide most, if not all, the cleaning needed. More complex telemetry/controls than bottom of the basin alternatives (pump station monitors, possible flow meters, level sensing and pump system controls). Assumes no entry.	2	Alternative requires less maintenance than most other alternatives. Automatic flushing gates should provide most, if not all, the cleaning needed. More complex telemetry/controls than bottom of the basin alternatives (pump station monitors, possible flow meters, level sensing and pump system controls). Assumes no entry.
5. Safety	1	Street access required. Traffic control procedures required. Street use/closure permit required. Heavily travelled roadway.	2	Street access required. Traffic control procedures required. Street use/closure permit required. Residential street is less travelled than other alternatives.	3	No street access required. No traffic control procedures required. No street use/closure permit required.

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	IMPACT RATING	DESCRIPTION	IMPACT RATING	DESCRIPTION	IMPACT RATING	DESCRIPTION
<b>COST EFFECTIVENESS</b>						
1. Project Capital Costs	3	Relative cost = 1.2	3	Relative cost = 1.0	3	Relative cost = 1.4
2. Life Cycle Costs						
3. Cost Variability/Risk	3	Variability Ratio = 1.2	3	Variability Ratio = 1.2	3	Variability Ratio = 1.1
Note: Project Capital Costs for Barton Alternatives range from a low \$2.4M to a high of \$38.5M						
<b>COMMUNITY IMPACT</b>						
1. Location	3	Facility does not impede land use.	3	Facility does not impede land use.	2	Small, above ground facilities and vents may cause limited reduction in land use. Design must consider surrounding land use.
2. Potential Community Impacts	3	Does not change community vision of itself as facilities in street.	3	Does not change community vision of itself as facilities in street.	2	Design can help small aboveground facilities fit into community vision that is consistent with current surrounding uses.
3. Construction Impacts	1	Construction duration, access limitations, and traffic disruption will be significant to ferry traffic as well as utilities relocations, nearby residences, emergency vehicle access. Construction controls used to reduce impacts will be difficult to implement.	1	Construction duration, access limitations, and traffic disruption as well as utilities relocations will adversely impact up to 7 residences, emergency vehicle access. Construction controls used to reduce impacts will be difficult to implement.	2	Construction traffic and hauling will use residential arterials. Wooded area provides visual buffer from nearby residences. Some aspects of construction can be reduced through design and construction controls.

Barton, Murray, Magnolia and North Beach CSO Projects  
Alternatives Analysis

BARTON BASIN ALTERNATIVES

CATEGORY / CRITERIA	ALTERNATIVE 1G: RECTANGULAR STORAGE, BASIN 416		ALTERNATIVE 3A - END OF PIPE TREATMENT, BOTTOM OF BASIN		ALTERNATIVE 4A: PEAK FLOW REDUCTION, BASIN 416	
	IMPACT RATING	DESCRIPTION	IMPACT RATING	DESCRIPTION	IMPACT RATING	DESCRIPTION
<b>LAND USE AND PERMITTING</b>						
1. City of Seattle Comprehensive Plan	2	Storage is compatible with existing land use within ROW, but may not be fully consistent with Seattle Parks policies (if tank is located within Roxhill Playground). According to the Seattle Department of Parks and Recreation Non-Park Uses of Park Lands - Policy endorsed by City Council Resolution #29475 (October 1996), it is the policy of the Department to eliminate and prevent unauthorized non-park uses.	1	The large size of facility would most likely be contrary to Land Use policies LU 58, 61, & 62.	3	Section 6.5 of the Seattle Comprehensive Plan (Utilities Element of the Planning Policies, U16) states that the City should work cooperatively with King County to identify and expeditiously address combined sewer overflows for which the County maintains responsibility.
2. Seattle Municipal Code (SMC/Zoning Code)	2	Zoning is Single Family Residential, but pipe will be located within ROW, except for small storage tank and ancillary facilities on public/private property. If located on Parks property, will need to demonstrate consistency with Dept. policies.	1	Zoning is Single Family Residential. New sewage treatment plants or expansion of existing are prohibited in SFR areas.	3	Consistent with SMC
3. Shoreline Master Program Compatibility	3	N/A - Not within Shoreline District.		New treatment plants are not allowed in Shoreline District	3	N/A - Not within Shoreline District.
4. Permitting Complexity	2	No federal or state nexus. Local permits, SDOT Street Use. Seattle Parks approval may be necessary. Affected roadways have moderate traffic volume in residential and neighborhood commercial land uses. Will require careful traffic planning to maintain access. Work hours may be restricted. Permit review likely to be more complex.	1	This alternative will require a Shoreline Permit. Potential for marine access will add federal and state permits in addition to local permits. This could add up to a year or more to the schedule. Affected roadways have high traffic volume in residential, and neighborhood commercial land uses with regional transportation use. Will require careful traffic planning to maintain access. Work hours likely to be restricted. Permit review likely to be most complex. Treatment plant is an inconsistent use for single-family residential zone.	2	ROW permits required. Water quality treatment issues may increase permitting complexity. Affected roadways have moderate traffic volume in residential and neighborhood commercial land uses. Will require careful traffic planning to maintain access. Work hours may be restricted. Permit review likely to be complex.
5. Property Acquisition Complexity	1	Assumes tank would be located in Roxhill Playground. Difficult acquisition because it is an active public property. Rating would change from 1 to 2 if tank located on private property.	2	Single family residential, neighborhood has expressed concerns, waterfront real estate. Acquisition is possible	2	Street use permits, may require rights of entry for property disconnection. May require property acquisition for stormwater treatment facilities.

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<b>ENVIRONMENT</b>						
1. Cultural Resources	3	No known cultural resources in portion of project area located within Barton Basin. Based on project site characteristics, project site located within Barton Basin has low probability of containing archaeological resources. Need to check area east of Barton Basin in vicinity of Roxhill Playground.	2	No known archaeological sites. Based on site characteristics, project area has high probability of containing archaeological resources. Ethnographic site located south of ferry dock. Residential properties next to ferry dock are on Seattle Historic Inventory.	3	No known archaeological sites. No known cultural resources in project area. Based on site characteristics, project area has low probability of containing archaeological resources. Disconnections in upper basin not expected to impact archaeological or historic resources.
2. Fish and Wildlife	2	Roxhill Playground identified on Priority Habitat and Species (PHS) map.	1	Assuming marine access is required, construction would likely have adverse effects on fish and wildlife and/or their habitat in Puget Sound. Fauntleroy Creek, which is used by coho salmon, crosses through project area south of ferry dock.	2	Construction of this alternative would not affect fish and wildlife, or their habitat. Operation could have adverse effects on fish and wildlife if treatment was not required for stormwater discharges.
3. Wetlands, Streams, and Shoreline	3	No wetlands, streams, or shoreline within project area.	1	Assuming marine access is required, construction would impact Puget Sound shoreline. Fauntleroy Creek crosses through project area south of ferry dock. No wetlands in project area.	3	No wetlands, streams or shoreline in project area.
4. Soils and Sediments	2	No known contaminated sites in project area (contaminated sites located at south end of Roxhill Playground). No steep slopes or potential or known landslide areas in project area. Liquifaction zone in Roxhill Playground.	2	No known contaminated sites in project area. Project area is within liquifaction zone. Steep slopes located in project area on south side of ferry terminal. No potential or known landslide areas in project area.	2	No known contaminated sites in project area. Project area is not within liquifaction zone. No steep slopes and/or potential or known landslide areas. Operation could impact sediment quality if treatment was not required for stormwater discharges.
5. Water Quality	3	No new untreated discharges to surface waters.	3	No new untreated discharges to surface waters.	1	It is assumed that stormwater treatment would not be required. If stormwater treatment was required, rating would change from 1 to 3.

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<b>TECHNICAL</b>						
1. Technical Complexity	1	Furthest away from CSO overflow. Will involve complex telemetry and possibly predictive algorithms.	1	Complex wastewater equipment and instrumentation	3	No wastewater equipment or telemetry.
2. Compatibility with Existing WW system	2	May prolong peak event to existing system because stored flows will be fed back into the system after peak event passes. More pounds of BOD, TSS will be routed through treatment facilities.	3	Will not affect the operation of the existing treatment system.	3	Will not affect the operation of the existing treatment system.
3. Flexibility/Adaptive Management	3	Area available within Roxhill Playground to expand tank or construct auxillary tank.	2	Limited space available for expansion or construction of auxillary tank. Property is limited at the bottom of the basin and ability to expand in the future could be problematic.	2	Additional separation could be undertaken if initial efforts do not provide control.
4. Constructability/Implementation Schedule	2	No significant construction issues or risks beyond typical structure excavation and construction. Possible traffic and access issues regarding temporary construction conditions associated with Roxhill Playground.	2	There may be construction difficulties with groundwater and excavation. Limited construction access and issues associated with ferry traffic.	2	There may be construction difficulties with groundwater and excavation. Difficult construction conditions within street R/W; issues associated with residential for rooftop disconnections.
<b>O&amp;M</b>						
1. Staffing	2	Facility can be automatically started and run autonomously under design conditions. However, facility will be started using monitoring and telemetry. This may require operator response to ensure proper startup and operation of the facility. Some staffing/supervision may be needed for cleaning. Facility should not impact downstream facilities.	1	Facility can be automatically started but will require operator response to ensure proper startup and operation. staffing/supervision may be needed for cleaning. Facility should not impact downstream facilities.	3	Facility is passive and does not require staff for startup. Periodic maintenance of possible stormwater treatment facility.
2. Training	3	Staff familiar with storage facilities and technology - North Creek. Similar control approaches to other facilities within the system can be specified for consistency.	1	There are no other high-rate clarification treatment systems in the KC system. Staff un-familiar with Actiflo or packaged HRC system.	3	There are numerous stormwater conveyance and treatment facilities throughout the area.
3. Reliability	2	System requires telemetry/controls to effectively store peak flows. System will need a motorized gate or other mechanism to actively divert flows when a peak event is imminent. Power is critical for operation of telemetry & monitoring equipment and ability to store peak flows. Storage is a proven technology for controlling peak flow events.	2	System requires telemetry/controls to effectively store peak flows. Power is critical for operation of treatment facility, telemetry & monitoring equipment. Treatment technology is proven.	3	System is not complex. Gravity stormwater and treatment system. Peak flow reduction, when effectively implemented, is a proven technology for controlling peak flow events.
4. Maintenance	2	Alternative requires less maintenance than most other alternatives. Automatic flushing gates should provide most, if not all, the cleaning needed. More complex telemetry/controls than bottom of the basin alternatives (pump station monitors, possible flow meters, level sensing and pump system controls). Assumes no entry.	1	System will require the most maintenance of all alternatives. The treatment plant will have numerous systems (chemical, pumping, controls, disinfection, etc.) to maintain.	3	Minimal maintenance compared to other alternatives. Typical stormwater piping and treatment system maintenance.
5. Safety	3	No street access required. No traffic control procedures required. No street use/closure permit required.	3	No street access required. No traffic control procedures required. No street use/closure permit required.	2	Maintenance of storm sewers will require manhole access in streets.

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<b>COST EFFECTIVENESS</b>						
1. Project Capital Costs	2	Relative cost = 1.9	1	Relative cost = 16.1	1	Relative cost = 5.1
2. Life Cycle Costs						
3. Cost Variability/Risk	2	Variability Ratio = 1.6	3	Varability Ratio = 1.1	1	Variability Ratio = 4.1
Note: Project Capital Costs for Barton Alternatives range from a low \$2.4M to a high of \$38.5M						
<b>COMMUNITY IMPACT</b>						
1. Location	2	Small, above ground facilities and vents may cause limited reduction in land use. Design must consider surrounding land use.	1	Changes land use.	3	No above grade facilities anticipated.
2. Potential Community Impacts	2	Design can help small aboveground facilities fit into community vision that is consistent with current surrounding uses.	1	Significant O&M activities and storage of chemicals. Incompatible with land use.	2	Project will not increase the risk of flooding or slope instability. Traffic will be impacted due to access of facilities from roadway for maintenance.
3. Construction Impacts	1	Due to construction duration, multiple sites, temporary closure of playground, and pipeline alignment along residential arterials, impacts will be significant.	1	Neighbors are close and will be affected by construction traffic and noise. Ferry riders will be affected by construction traffic.	2	Rating a 2 because cut and cover work is quicker. Roads will be torn up. There will be significant traffic and access impacts during construction. Neighbors will be affected by construction noise.