

Henderson North CSO Reduction (Henderson North) Project

Frequently Asked Questions

Regulations

What is a “CSO” and why is the Henderson North Project needed?

Sewers in the project area carry raw sewage away from the neighborhood for treatment at King County's treatment plants before discharge to Puget Sound. When it rains, these same sewers also carry untreated stormwater from neighborhood roofs, foundation drains, and some streets. During heavy rains, if the amount of raw sewage and stormwater exceeds the sewer system capacity, the excess flows overflow through outfalls into Lake Washington. The term for these overflows is “Combined Sewer Overflows,” or CSOs, and they are a public health and environmental concern. The goal of the Henderson North Project is to reduce the number of these sewage overflows from the project area so that this area complies with regulatory standards. The project area is located in southeast Seattle and includes Seward Park in Basin 44 and Martha Washington Park in Basin 45.

What are the regulatory standards that this project must meet?

Currently the regulatory limit is one CSO per outfall per year over a long-term, rolling average of 20 years. In addition, CSO discharges into Lake Washington must also meet Federal and State water quality standards. SPU is confident our new facilities will comply with these requirements. But after we build the project, SPU will perform additional monitoring to make sure the system is in compliance with the regulatory standards.

What timelines do regulators require for the project?

The Washington State Department of Ecology and the U.S. Environmental Protection Agency established the following regulatory deadlines SPU must meet for the Henderson North Project:

October 31, 2014:	Complete and submit draft plans and specifications.
March 30, 2015:	Complete and submit final plans and specifications.
May 31, 2015:	Begin construction.
December 31, 2018:	Complete construction and be ready to operate.
December 31, 2019:	Demonstrate the project meets regulatory water quality discharge standards and overflow frequency requirements.

How big is the problem?

SPU monitors overflow activity at its CSO outfalls, including two combined sewer overflow (CSO) outfalls located offshore of Seward Park (Basin 44) and 57th Ave S near Martha Washington Park (Basin 45). The flow monitoring information collected includes CSO event frequency, duration, and volume. SPU reports these data, along with rainfall information, to Ecology both monthly and annually (see table on following page). Hydrologic and hydraulic modeling results (backed up by measured overflow volumes) indicate Basin 44 (Seward Park area) will require a storage volume of 2.65 million gallons to meet regulatory standards. Basin 45 (Martha Washington Park area) will need to be able to store about 16,000 gallons to meet regulatory standards.

BASIN	CSO FREQUENCY (2009 THROUGH 2011)		TOTAL CSO DISCHARGE VOLUME (MILLION GALLONS)
	TOTAL	AVERAGE ANNUAL	
Basin 44	237	16.9	518
Basin 45	69	4.9	6.25

Why is the storage volume at Seward Park (2.65 million gallons) so much larger than in 57th Ave S right-of-way (16,000 gallons)?

Basin 44 is a much larger area than Basin 45. The two areas also have different system capacities to convey flow to King County but will operate as a single system.

Project Description

How does the existing system in the project area operate and what will the project change?

Basin 44 drains toward Seward Park and then south to PS 10, which is located in 57th Ave S adjacent to Martha Washington Park. Basin 45 also drains to Pump Station 10, which pumps flows south to King County’s Henderson Pump Station at the corner of Seward Park Ave S and S Henderson Street. The Henderson Pump Station conveys flow to one of King County’s wastewater treatment plants. The Henderson North Project will not change how the system flows are directed but will add storage and real time controls to manage the flows between Basins 44 and 45 to reduce the CSOs to meet regulatory standards.

What does the Henderson North Project include?

SPU proposes to build underground storage at two locations: Seward Park (Basin 44) and the 57th Ave S right-of-way near Martha Washington Park (Basin 45). The project components include:

Basin 44 (Seward Park)

Storage Tank (CSO Facility 8A): A 2.65-million-gallon offline storage tank located beneath the tennis courts in the south portion of Seward Park. Flows will enter the storage tank by gravity and will drain by pumps. Tipping buckets used to clean the storage tank will be located in a gallery above the tank floor.

Facilities Vault: Underground facilities vault located in Basin 44 adjacent to the storage tank, containing odor control, mechanical equipment, electrical equipment, and control systems.

Conveyance: New gravity sewers to convey flows to the new storage tank, and force mains to convey pumped flows from the tank back to the sewer system.

Modifications to Existing System: The sewer system includes an existing flow control device, called a HydroBrake, which will be removed and replaced with an automated gate to increase the storage efficiency within the basin. Additionally, SPU will relocate approximately 450 feet of gravity sewer to facilitate the installation of the new storage tank.

Basin 45 (57th Ave S right-of-way)

Storage Pipe (CSO Facility 29A): A 16,000-gallon offline storage pipe located in the right-of-way of 57th Avenue South near Pump Station 10. Flows will enter the storage pipe by gravity, and the storage pipe will drain by gravity and a float-actuated control valve.

Conveyance: New gravity sewers to convey flows to and from the new storage pipe.

Modifications to Existing System: The HydroBrake will be removed to improve conveyance efficiency within the basin.

In addition, SPU is incorporating the following three additional elements into the project.

UPARR Grant Transfer: The National Park Service (NPS) Urban Park and Recreation Recovery (UPARR) program funded several park improvements within Seward Park through a federal grant in 1984. Because of the grant, all of Seward Park is "protected," meaning any loss in recreational use at the Park must be approved by NPS. SPU was granted approval from NPS for a "conversion." This "conversion" removed the grant protection from a small area (3,850 square feet) in Seward Park and transferred the protection to a portion of Lake Washington Boulevard Park north of Seward Park (UPARR replacement area) near the intersection of Lake Washington Boulevard South and 53rd Avenue South.

Outfall Replacement: SPU will replace the CSO Outfall 44 pipe that conveys CSOs from Basin 44 into Lake Washington because the existing 24-inch-diameter wood stave pipe is in poor condition. SPU made a decision to replace the 780-foot long outfall pipe as part of the proposed project (rather than as a separate project) because a single construction project will be less disruptive to the park. Work on the outfall will replace the upland, nearshore and offshore sections of pipe

Shoreline Treatment: The proposed location for the underground storage tank is adjacent to the shoreline. SPU has options on how the shoreline could be treated after construction of the tank. The final configuration of the shoreline will be decided during the project's design phase. The options are:

- The shoreline could be retained in its current state with the existing concrete bulkhead, and the area between the tennis courts and the lake could be planted with lawn and upland native landscaping.
- Alternatively, SPU could remove the existing bulkhead and construct a new, round-gravel beach, with native beach and upland landscaping shoreward and large woody debris anchored in the water. Between the beach and the new storage tank, SPU would install a new stone wall to protect the tank and tennis courts from wave action during storms.

Site Selection

What alternatives were considered in the selection process?

SPU developed and evaluated a variety of alternatives to control the CSOs in the Henderson North basins as follows:

- Step 1 – Identified and Evaluated High-level CSO Control Options
- Step 2 – Developed and Evaluated Storage Themes
- Step 3 – Developed and Evaluated Storage Alternatives
- Step 4 – Evaluated Top Alternatives to Select Recommended Alternatives
- Step 5 – Performed Value Analysis and Re-configuration of Top Alternatives
- Step 6 – Refined Recommended Alternative

The process of developing alternatives began with identifying high-level CSO control options. A “CSO control option” is a technology that can be implemented to reduce CSOs. The four high-level CSO control options considered were treatment, storage, sewer separation with green stormwater infrastructure (GSI), and flow transfers. These control options were evaluated for costs, technical feasibility, and community impacts. The evaluation identified storage as the only viable CSO control option.

The following four different storage themes were developed: tunnel storage, pump and store in Martha Washington Park, storage in Seward Park, and storage near Martha Washington Park. These storage themes were evaluated for costs and community impacts. The evaluation identified storage in Seward Park and storage near Martha Washington Park as viable storage themes.

Alternatives were further developed for the two surviving storage themes, Storage in Seward Park and Storage near Martha Washington Park, by investigating specific locations within park areas. The alternatives were evaluated using a Triple Bottom Line (TBL) analysis approach. TBL analysis is an economic analysis technique that evaluates the financial, social, and environmental costs, benefits, and risks of each alternative. The TBL analysis resulted in the following top alternatives being selected for preliminary engineering:

Basin 44

Storage under Seward Park Tennis Courts (Tennis Court Alternatives)

Storage under Seward Park Parking Lot

Basin 45

Storage on Private Property at South Holly Street and 57th Avenue South

Storage in Martha Washington Park

The project team performed an additional round of TBL analysis to select one alternative for each basin as the recommended alternative. For Basin 44, the Tennis Courts Alternative was selected as the recommended alternative because:

- Seward Park is a destination park and the Tennis Courts Alternative location would have less short-term (construction) and long-term impacts on recreation in Seward

- Park than the Alternative 44 b – Storage under Seward Park Parking Lot location, and
- Other environmental impacts were not significant as defined by State Environmental Policy Act (SEPA) (i.e., there was not a reasonable likelihood of more than a moderate adverse impact on environmental quality).

The City Council must still approve the selected alternative in Seward Park. This decision is expected in spring 2014.

For Basin 45, Storage on Private Property at South Holly Street and 57th Avenue South was selected as the recommended alternative because a willing property seller was identified and constructing a large storage tank in street right-of-way was more costly and disruptive to the community as a whole. Martha Washington Park was excluded because City of Seattle Ordinance 118477 does not allow a change from park use to another use if a reasonable alternative exists, such as private property.

A value analysis was performed as the design progressed into preliminary engineering to optimize the performance, function, safety, and quality of the proposed facilities, while also identifying areas of potential cost savings. During the value analysis, a design modification was proposed to implement a real time control (RTC) gate to operate Basin 44 and Basin 45 as a single system rather than two separate systems. Additional modeling of the proposed Lake Line Control Gate indicated that the storage volume in Basin 44 could increase from 2.4 million gallons to 2.65 million gallons, and the storage volume in Basin 45 could decrease from 200,000 gallons to 16,000 gallons. The smaller Basin 45 storage facility then could be located in the 57th Avenue South right-of-way adjacent to Pump Station 10, near Martha Washington Park. .

How was the public involved?

SPU considered impacts to the public at each phase of the site selection process and during the TBL analysis used in the process of selecting the recommended alternative. The objective of public involvement and the SEPA and National Environmental Policy Act review for the project is to help ensure that SPU considers and addresses concerns by the following:

- Disclosing and managing the temporary and long-term impacts to the public associated with the CSO control alternative
- Informing and educating the public about the need for the project, alternatives considered, possible solutions, and how the project could affect them
- Obtaining public feedback on alternatives and potential decisions
- Responding to questions and concerns raised by the public
- Informed decision-making

The public outreach program included the following activities:

- Presentations at community meetings from June 2010 to February 2012. The targeted groups included the Mount Baker Community Club, the Southeast District Council, the Lakewood Seward Park Community Association, the Friends of Seattle Olmsted Parks, Friends of Seward Park and Friends of Martha Washington Park.
- Presenting at the City of Seattle Parks Commission Board meeting on January 27, 2011
- Holding Public Workshops on November 18, 2010; December 14, 2010; January 19, 2011; and March 10, 2011

- Holding a public scoping meeting on June 7, 2011 to identify the range or “scope” of issues to be studied in the EIS for Basin 44
- Holding alternatives workshop on June 9, 2011 for Basin 45
- Holding open houses for project status on February 26, 2012 and October 23, 2013 for Basin 45 CSO
- Presentations to Friends of Seward Park and Friends of Seattle Olmsted Parks in November, 2013
- Holding open house for project status open house on November 13, 2013 for Basin 44
- Developing and maintaining a website and listserv for the Henderson North Project, as part of SPU’s CSO Control Program website
- Providing an e-mail address and phone number for citizens to ask questions and send comments
- Providing translation services and similar support as requested

The meetings, workshops, and other outreach efforts focused on:

- Explain the purpose and extent of the City’s CSO Control Program.
- Summarize the history of the combined sewers in Seattle, CSOs, and regulatory drivers.
- Describe the status of combined sewers in the Henderson North area.
- Explain SPU’s priorities in reducing CSOs, types of control solutions, and their applicability to the Henderson North area.
- Explain the overall decision process and rationale for identifying, evaluating, and narrowing alternatives to preferred solutions to achieve control in Basin 44 and Basin 45.
- Show the conceptual design of the alternatives that were considered and the recommended alternatives in Basins 44 and 45.
- Engage the public in the site selection process at key stages, solicit public input and respond to questions.
- Distribute literature about the CSO Control Program and other information.
- Post frequently asked questions and responses (FAQs) on the project website.

SPU mailed, e-mailed, and posted on its website notices and meeting logistics information. The outreach efforts generated a wide range of comments and questions related to the topics listed below. Summaries of public comments and questions from the community meetings, workshops and open houses are posted on the Henderson North website.

Why was Seward Park considered for this project?

When selecting a project site, we first look for property already owned by SPU, and then we consider whether we can construct in the city-owned right-of-way (typically in the street). If neither of those options work, then we look for other city-owned property, with parks being the last to be considered. Consistent with city ordinances, we site facilities in parks only when no other reasonable alternative exists. For CSO reduction projects, we are working along the shoreline and much of the shoreline is park property, including Lake Washington Boulevard. Seward Park was selected because combined sewage flows to the Lake Line in Seward Park, where the CSO outfall is also located. Private property and street right-of-way options were not technically reasonable alternatives for Basin 44.

Once construction is complete, the project will include restoration of the site, which is closely coordinated with Parks staff and includes input from stakeholders.

Why not just remove roof drains that are connected to the system?

Removing roof drains from the sewer system can help to reduce CSOs. Starting in 2012, SPU will be offering the RainWise rebate program that provides incentives for homeowners to disconnect roof drains and channel the runoff into a rain garden or cistern. However, it is very important to consider the surrounding topography when disconnecting a roof drain. Improper roof drain disconnection can sometimes lead to flooding of one's own property or a neighbor's property or affect the stability of an existing hillside. Disconnecting roof drains, while helpful at reducing CSOs, will not eliminate enough stormwater to reduce the CSOs down to regulatory targets. A large amount of stormwater still enters the combined sewer system through other sources (e.g., foundation drains and area drains).

Who will make the decision that the underground storage facility can be sited in Seward Park?

SPU will make the recommendation to the City Council and City Council will decide whether the facility can be sited in Seward Park. City Council will also determine how much mitigation is necessary to the Parks Department. We have briefed the Parks Board of Commissioners and we work closely with Parks staff to consider all the implications of siting the underground storage facility in Seward Park.

Design of the Facilities

Will the change in storage design from a 2.4 to 2.65 million gallon tank in Seward Park and 200,000 gallon storage tank to a 16,000 gallon storage pipe in 57th Ave S increase flow from Basin 45 or additional flows to Lake Washington?

Flows from Basin 44 flow south to Basin 45, where the combined flows are pumped further south, ultimately to a King County Pump Station on S. Henderson St. Increasing the storage volume in Seward Park from 2.4 to 2.65 Million Gallons (MG) will allow SPU to retain excess Basin 44 flows in the Basin 44 storage tank (instead of letting them flow south to Basin 45).

Under either approach, the storage facilities would be designed to reduce the number of overflows from each basin to a long-term average of no more than one overflow per year.

Will the storage tank be larger in Seward Park with the change from 2.4 to 2.65 million gallons in storage capacity? If not, were the tank walls originally over-designed?

The underground storage tank will be able to accommodate the extra volume by reducing the thickness of the tank walls, which will maintain the same footprint as the slightly smaller tank. During the initial phases of design, a fairly conservative wall thickness was assumed because detailed subsurface information was not available. As design work progressed, the design team gathered sufficient information and completed more detailed analyses to be able to reduce the wall thickness.

Will the storage facilities leak sewage?

The underground storage facilities are being designed to seismic and structural design standards, which are intended to prevent leaking as well as structural failure. Buried concrete storage tanks are relatively common and are used around the Puget Sound region and other parts of the country to store either drinking water or sewage.

How will the facilities be designed so that they don't rupture during a seismic event (e.g., earthquake or fault movement)?

All our facilities are built to code, including seismic requirements (e.g., design ground accelerations). Past experience shows that underground structures, like tanks and transportation tunnels, perform better than above-ground structures in earthquakes.

The proposed sites have shallow groundwater; how will these facilities impact groundwater flow?

Underground facilities, such as basements, tanks, pipes, and other structures, routinely encounter groundwater. Routine methods exist to control or account for groundwater which will be implemented during construction and included in the facility design.

How will you control the odors from the new storage tank and pipe when they go into operation?

Odors could be generated during operation (i.e., during heavy rainstorms), particularly in Basin 44 at the diversion weir (due to turbulence) or the large storage tank (due to the increased detention time). The level of odor emissions would depend on the wastewater characteristics (dissolved sulfide, dissolved oxygen, pH, temperature, etc.), wastewater hydraulics, and facility operation (cleaning, etc.). The level of odor emissions likely will be dampened because the sewage would be diluted with stormwater. The tank will have an automated cleaning system that will flush it after each use. The tank will also include an odor control system which will maintain a slight negative pressure to minimize fugitive odor emissions.

For the storage pipe in Basin 45, the design of the new structures and diversion pipes to the storage pipe would minimize odor generation by creating structures that limit turbulence. SPU staff would manually wash down the storage pipe periodically from above-ground locations to minimize formation of odorous gases.

What about noise during daily operation of facility?

When the Basin 44 facility is operating, you might notice a low, continuous hum from fans that are part of the odor control system. The exhaust vent will be located adjacent to the tennis court parking lot so that it is not in a recreation area of the park and to utilize the existing hillside and trees to minimize potential noise at neighboring properties. SPU crews will be on site occasionally to make sure everything is operating well.

How will the new, impervious paved area for the Seward Park CSO facility impact the water quality of stormwater runoff?

The proposed project includes up to approximately 7,900 square feet of new impervious surface. The paved area east of the tennis courts will be used for pedestrian access to the park property south of the tennis courts, intermittently as needed by SPU and Parks maintenance crews. . Because the maintenance vehicles will be infrequent, City Code classifies this new paved area as a non-pollution generating impervious surface. Neither the additional paving to the east of the tennis courts nor the quantity of new paving would trigger City Stormwater Code requirements for stormwater treatment.

The project will install a water quality treatment system to treat runoff from the tennis court parking lot, which currently is untreated before it is discharged to Lake Washington.

Won't the new paved surfaces reduce the area available for habitat improvements along the shoreline in Seward Park?

The project team recently completed a land survey of the site and offshore area. The survey showed that the strip of land in between Lake Washington and the tennis courts is wider than was shown in earlier project diagrams. The location of the bulkhead wall at the shoreline will not change, so there will be no change in the amount of upland or shoreline area. In addition, the project team has relocated the tennis courts about 5 feet to the west so that the proposed access path does not extend as far to the east. The net result is that the square footage available for restoration planting is approximately the same as was described in the Final EIS.

How accessible will the park area be that is south of tennis courts in Seward Park?

The paved maintenance access way on the east side of the tennis courts will enable pedestrian access to the park property south of the tennis courts, affording additional lakefront opportunities for passive recreation.

Will the restoration plans in Seward Park be consistent with Olmsted legacy?

As noted in the Final EIS, the Olmsted vision for Seward Park focused on passive means for experiencing the park. The paved maintenance access way would enable pedestrian access to the park property south of the tennis courts, affording additional lakefront opportunities for passive recreation and maintaining framed views of Mt Rainier and Lake Washington. In addition, the majority of the above-ground features would be located in the UPARR Conversion Area which is not a commonly used area for passive or active recreation. The above-ground features will be at least partially screened with vegetation.

Will the project in Seward Park encroach on private property?

The project is located on Parks property and would not encroach on private properties.

Will excavation of the underground storage facility undermine the hillside west of the tennis courts in Seward Park or cause erosion and slope stability problems? Will a retaining wall be required?

Neither the proposed tank nor the rebuilt tennis courts will encroach on the hillside. All disturbed non-paved areas will be landscaped to help ensure the project does not increase erosion over the long-term. A retaining wall will not be built on the west side.

Construction

Where will the contractor store materials for construction? What about parking and traffic control?

The Contractor is preparing a work plan and traffic control plan at each storage location for staging materials, employee parking, traffic control and travel route to the site. We have been obtaining input from the affected communities and stakeholders that will be incorporated into these plans, and will share these with the community once they are prepared.

For Basin 44 in Seward Park, the Contractor will confine equipment and materials staging to the area within construction limits. The tennis courts and the parking lot immediately north of the courts will not be available for use during construction. The Contractor will not be using Parking Lot 2, so this will remain available for daily and event use throughout construction. Contractor employees will use on-street public parking and will not be allowed to park within Seward Park, except as needed within construction limits.

For Basin 45, the Contractor is expected to obtain a temporary revocable use permit from Seattle Parks for a small area adjacent to the proposed storage pipe in 57th Ave S. This small area will allow the Contractor better access to complete construction quickly and a location for construction dewatering tanks (Baker Tank) before discharging from the site. Otherwise the Contractor will be limiting work and employee parking to the street right-of-way.

For traffic control, the Contractor will employ measures, such as flagging, to limit the impact to access and use of Seward Park and maintain critical access, such as for emergencies and to private property. The traffic control plan will include the specific details for managing traffic flow and minimizing disruptions.

How much noise is expected from construction at Seward Park?

Construction noise is regulated by city ordinance and we also build noise standards into our construction contracts. Typical sources of noise during construction are related to excavation, delivery vehicles, the equipment operation and materials placement. Other sources include:

Dewatering pumps: Because of the close proximity to Lake Washington, once excavation begins the contractor likely would need to dewater the excavated area 24 hours per day. The noise of the dewatering pumps would be within the construction noise levels evaluated in the Final EIS.

Generator: Temporary, construction phase power would be provided by Seattle City Light, so a generator should not be needed. SPU is working with City Light to avoid the miscommunication that resulted in a generator being required for a few weeks on the Genesee CSO Reduction Project located just north and east of the intersection of Lake Washington Boulevard South and 53th Avenue South, understandably resulting in noise complaints from project neighbors.

Temporary energy dissipation structure: An energy dissipation structure, if needed, would help slow and spread the water pumped from the excavated area. The noise of the water flowing over the energy dissipation structure would be well within the construction phase noise described in the Final EIS.

Should we be concerned about vibration during construction at Seward Park?

SPU does not anticipate that construction-related activities will create enough vibration to damage nearby homes or sewers because construction best management practices will be implemented. As a precaution, pre and post-construction surveys of adjacent homes and private sewer lines will be conducted and any construction-related damage would be repaired. Threshold levels of acceptable vibration will be established partly based on structure or utility type and condition as well as industry standards and specified in the contract documents. Instrumentation will be installed for monitoring of vibration levels to check whether vibration intensities are within specified limits. Monitoring will also

include a pre-construction survey of adjacent buildings, structures, and utilities. The monitoring plan will be developed based on the specific construction methods.

Likely vibration sources include installation of temporary shoring to support excavation sides and excavation of soil and bedrock from the excavation. Unlike the Genesee CSO Reduction Project, where sheetpiles were used as temporary shoring, the Henderson North Project will rely on drilled, cast-in-place secant piling. Installation of secant piles will produce significantly less vibration than driving sheetpiles.

Excavation for the storage tank will require excavating rock, which has the potential to create vibration; however, potential construction related vibration can be managed by establishing and adhering to applicable standard industry thresholds.

Funding

Who pays for the project?

CSO reduction projects are paid for through Seattle Public Utilities' drainage and wastewater rates approved by the City Council. Portions of the project cost may be paid for through bonds, typically over a 30-year period, but drainage and wastewater rates still provide the revenue to pay back the bonds. Seattle Public Utilities may also pursue federal and state loans and grants to help fund the project.

What will these projects cost?

The current estimated total project cost to reduce the Henderson North CSOs is approximately \$72 million dollars.

Who do we contact for additional information?

Contact Alan Lord, PE, Project Manager for additional information. Alan's contact information is:

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You can also send an email to SPU_HCSO@seattle.gov.