



Puget Sound Regional Council

Stormwater Parks for Water Quality and Human Health

Central Puget Sound Stormwater Parks



Prepared by Puget Sound Regional Council
January 2021



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This report was prepared by the Puget Sound Regional Council.

This project has been funded wholly or in part by the United States Environmental Protection Agency under assistance agreement PC-01J18101 to the Washington State Department of Ecology. The contents of this document do not necessarily reflect the views and policies of the Environmental Protection Agency, nor does mention of trade names or commercial products constitute endorsement or recommendation for use.

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STORMWATER WETLAND PARK

City of Arlington



Facility type

Constructed wetlands providing stormwater treatment and flow/flood control, wastewater treatment, trails, and other recreational opportunities

Construction date

Construction completed in 2011

Facility size

21-acre park with a 9-acre wetland

Size of basin managed

280 acres (Old Town Arlington)

Facility Description

Arlington's Stormwater Wetland Park contains a constructed wetland that not only treats stormwater from Old Town Arlington, but clean backwash water from the City's water treatment plant, and reclaimed water from the City's Water Reclamation Facility before infiltrating or discharging into the Stillaguamish River. The wetlands consist of a series of wetland cells and weirs that improve water quality through infiltration, aeration, and vegetative uptake. Along with providing water treatment, the 9 acres of different wetlands types provide multiple habitat niches.

Public recreation features on the site include shoreline access, wildlife viewing areas, water features, a 4,200-foot trail network, dog park, and picnic tables. The facility also provides for educational opportunities to instruct the public on proper stormwater management and control practices, which helps meet NPDES permit requirements.

The opportunity to build the wetlands came in 2000, when the city obtained a 27-acre

parcel through purchase and donation. The parcel was on the site of an old farm with over 1,400 feet of Stillaguamish River frontage. City staff had identified many issues that could be addressed with the facility: stormwater treatment and flow/flood control, stormwater education, wastewater treatment (temperature, dissolved oxygen, emerging contaminants), waterfront access, wetland creation, and other recreational opportunities. The project was conceptual for years and evolved over time.

Departments involved Public Works, Natural Resources, Parks & Recreation, Community & Economic Development

Contractors Landau Associates, Reece Construction

Public engagement

Public meetings hosted by the City of Arlington helped shape the project. The public wanted park-like features. Concerns of neighboring landowners over water pollution led to the installation of groundwater monitoring wells that monitor urban runoff into the groundwater and floodplain. Farmers had some concerns about the loss of farmland.

Maintenance and monitoring

The facility is maintained by Public Works. After 10 years of operation, sediment must be removed from the first cell. The city contracted with Snohomish Conservation District to prepare a study to inform how best to remove the sediment while maintaining the habitat. A maintenance project is being planned. Monitoring is provided by a combination of city staff and volunteers/interns looking for community service or educational projects.

Challenges and lessons learned

- A facility can provide many functions when well sited and designed
- A single facility can replace parcel by parcel systems allowing for major cost savings
- Green infrastructure can provide cost savings over gray infrastructure
- A stormwater park needs to be an allowed use in the zoning code
- These types of projects require staff from multiple disciplines/departments to work together (stormwater, natural resources, planning, and parks staff)
- Early outreach to the public leads to greater public acceptance, volunteers can be helpful
- Consider irrigation needs and prepare for regular maintenance until vegetation is established. Once established, periodic maintenance is required – an excellent outdoor learning opportunity for students and community volunteer groups
- Practice due diligence in design and permitting to avoid setbacks

Cost \$1,325,000 to treat 280 acres of historic downtown Arlington lacking modern treatment

Funding Sources Stormwater Utility, Sewer Utility, Washington Department of Ecology

For more information contact

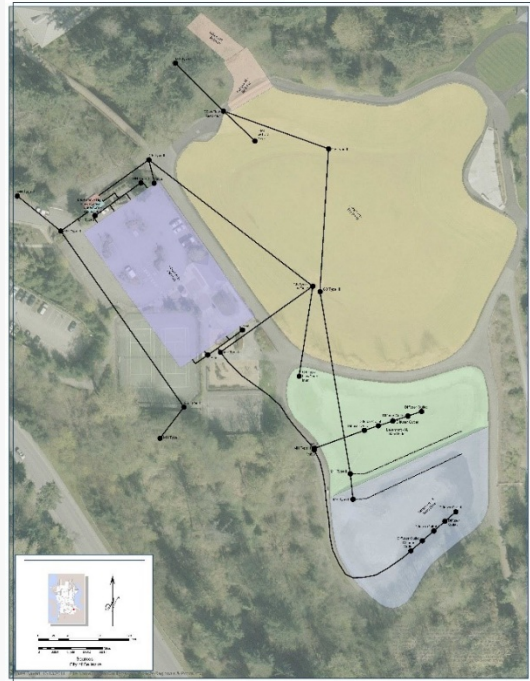
James Kelly (jkelly@arlingtonwa.gov), City of Arlington Public Works Director and Bill Blake (bill@skagitcd.org), Executive Director, Skagit Conservation District

Additional information

- Project description: <https://srp.rco.wa.gov/project/270/14667>
- Drawings: <https://www.arlingtonwa.gov/DocumentCenter/View/800/Stormwater-Wetland-PDF>

LAKEMONT COMMUNITY PARK

City of Bellevue



Facility type

Stormwater detention vault and sand filter treatment basins within a larger community park

Construction date

1990s

Facility size

Approximately 5 acres in a 16-acre park

Drainage basin area

215 acres (Lakemont residential neighborhood)

Facility Description

One of the oldest stormwater parks in the area, the Lakemont facility was built by the developer as part of the agreement to develop the Lakemont community in the 1990s. The city was concerned about protecting Lewis Creek and Lake Sammamish from erosion, phosphorus, and other pollution.

Lakemont Community Park is 16 acres and features a play area, two picnic shelters, a basketball court, two tennis courts, a skate bowl, trails, restrooms, and a softball field. More than three miles of multiple-use trails cut through the Lakemont neighborhood, connecting Lakemont Park and Lewis Creek Park. Lakemont Park's distinguishing feature is a large stormwater management system.

This system reduces flooding and helps protect Lewis Creek and Lake Sammamish from pollution. From the park, soft surface trails lead down to Lewis Creek open space.

The stormwater system at Lakemont Community Park is a prominent feature consisting of a large detention vault below the parking lot that traps sediment and pollutants, two sand filter basins, and a high flow storage basin. Typically, water is directed into the vault then onto the sand filter basins before sending the treated water to Lewis Creek. During major storms, a flow control diverts overflow to the high flow storage area. Although a rare occurrence, if the water level reaches the top of the storage facility, it flows over the spillway into Lewis Creek.

Departments involved Parks, Utilities

Contractors No information available

Public engagement No information available (built by developer on undeveloped land)

Maintenance and monitoring

The Parks department maintains the amenities and landscaping within the Park. The Utilities Department maintains the infrastructure for the stormwater facility including the vault, sand filters and underground piping. The Stormwater facility is inspected annually with maintenance of the sand filters performed on average every 3 to 5 years and cleaning of the vault every 5 to 8 years. Two large valves operate the water distribution to the sand filters. To date, these have been replaced once over the life of the facility. Water quality monitoring of the facility was integrated into the construction of the facility but has since been deactivated after establishing that the facility was performing as designed.

Challenges and lessons learned

- This is an older facility that is working well with low maintenance needs. Bellevue has many regional stormwater facilities in its parks, such as vaults under tennis and basketball courts.
- The Utilities Department collaborates regularly with the Parks Department to manage the surface water drainage system. Much of the City's stream network is protected from development by incorporating them into the City's parks and open space network. Trails are also a part of this citywide network.
- The city is working on a citywide Watershed Management Plan, bringing together multiple departments to look for opportunities to improve the water quality of Bellevue.
- The city is looking at opportunities to include additional stormwater parks. Regional facilities are evaluated as opportunities arise but are difficult to site based on the topography of the city creating smaller drainage basins.

Cost Not available

Funding Sources Funded by the developer

For more information City of Bellevue Storm and Surface Water Utility (425-452-7840)

Additional information

- Park webpage: <https://bellevuewa.gov/city-government/departments/parks/parks-and-trails/parks/lakemont-community-park>

MOUNTAIN AIRE STORMWATER POND AND TRAILS

City of Poulsbo and Quadrant Homes



Contacts

Charlie Roberts (croberts@cityofpoulsbo.com), Engineer, Poulsbo Public Works

Facility type

Stormwater pond that provides flow control and treatment, surrounded by trails

Construction date

Completed Fall 2015

Facility size

The pond is about 2 acres. The wetland, trail, and storm pond together are 10 acres.

Size of basin managed

39 acres (190 residential lots)

Facility Description

This public private partnership developed out of the need to provide stormwater and sewer facilities for a new Quadrant Homes housing development, Mountain Aire. It also serves an additional development called Poulsbo Meadows.

The development required mitigation for routing the sewer connection through part of a wetland and stream buffer. The city worked with the developer on a joint solution, resulting in a sewer connection and a stormwater pond that manages stormwater from the developments. It also includes a dispersion trench that feeds the wetland. The wetland feeds Lemolo Creek. Buffer enhancement and mitigation were also part of this project. The project was turned into a community amenity by adding trails and attractive vegetation

around the pond and surrounding area. The stormwater pond trail is above the sewer line and connects to the adjacent community and other trails in the area. Part of the trail also doubles as a maintenance access road. Signage along the trail helps to educate visitors about how the area is protected to provide wildlife habitat and maintain critical area functions.

Departments involved Public works, Planning & Economic Development

Contractors Team 4 Engineering was hired to complete the design by Quadrant Homes (developer)

Public engagement

The Mountain Aire development went through the city's subdivision public process. The pond and trail system were included within the overall development process.

Maintenance and monitoring

The 10-acre parcel that includes the pond and trails/maintenance road was deeded to the city. The city maintains the pond and trails and charges stormwater connection and maintenance fees. Maintenance was considered early in the project design. Five years of wetland and wetland buffer monitoring has not raised any issues of concern. This monitoring was part of the enhancement and mitigation in the critical area.

Challenges and lessons learned

- Working closely with other departments and doing early coordination can help to identify opportunities for multi-benefit projects.
- Having political support is important, including having expectations that development will contribute funding and/or land to projects that protect water quality.
- Building maintenance needs into the project design helps make ongoing maintenance easier.
- Stormwater fee structures can provide incentives to help meet water quality goals, such as basing fees on quantity of impervious surface and discounting for adding green infrastructure.
- In planning for a stormwater park, identifying which portion of the land is for stormwater and which is for recreation can help in applying for grants.

Cost

100% Developer funded improvement

Funding Sources Quadrant Homes, City of Poulsbo Stormwater Utility

Additional information

- The city is planning a stormwater park in the west waterfront area of Poulsbo



MADISON VALLEY STORMWATER IMPROVEMENTS

City of Seattle



Contacts

Grace Manzano (grace.manzano@seattle.gov, main project contact) and Dave LaClergue (dave.laclergue@seattle.gov, Green Stormwater Infrastructure and planning), Seattle Public Utilities

Facility type

Provides flow/flood control, it is part of the combined sewer system

Construction date

Construction completed in 2013

Facility size

The above ground storage facility at the 30th and John site is approximately 260 feet by 110 feet, or about 28,600 square feet and is part of a half-city block public amenity. The Washington Park tank (100 feet in diameter and 26 feet in height) creates a public plaza in a corner of the park. Earth berms around the lower lawn area allows for additional temporary stormwater storage during wet weather events.

Size of basin managed

4 million gallons total

Facility Description

The Madison Valley stormwater improvement project has two locations in Seattle's Madison Valley. Together, the two sites and underground infrastructure are capable of containing the stormwater of a 150-year event. The project greatly reduced potential for sewer backups and stormwater flooding while creating new open space for the community.

In heavy rains when underground pipelines become full, the above ground holding area on

30th Ave E is activated, storing water until the pipelines clear. At Washington Park, a 1.3-million-gallon storage tank was designed with an overlook on top to double its function as public infrastructure. Other parts of the site were transformed into a reforested park. Most of the time, these areas serve as attractive open spaces for the community with native plants and trees, walking paths, play areas, and art.

The project was catalyzed by a storm in 2004 that flooded the area and backed up sewers. The mayor and city council were supportive of the project, as was the community. The community was concerned about the construction impacts but also understood that the project was needed to increase the safety for their neighbors downhill. The community asked for park amenities. Seattle Public Utilities worked with the community and Seattle Parks and Recreation to design these community centered facilities. All of the properties were acquired from willing sellers.

Departments involved Seattle Public Utilities was the lead and partnered with Seattle Parks and Recreation to build both sites

Contractors RH2 Engineering (30th Ave E & E John St), Stantec (Washington Park)

Public engagement

Extensive community participation was an integral part of the design process. Public engagement was led by Seattle Public Utilities.

Maintenance and monitoring

The facility is maintained by Seattle Public Utilities. A valve was replaced in both locations. At Washington Park, a gate is being upgraded to utilize the tank more frequently during storm events. Water level monitoring equipment triggers warnings to Seattle Public Utilities staff if certain levels are reached during a wet weather event.

Challenges and lessons learned

- Creative and willing partners are important for these types of complex projects. Consultants can help with creative approaches.
- Political support was key. For identifying new opportunities, talk to other departments (utilities, transportation, parks, community development, etc.) about overlapping needs and interests. Keep these opportunities in mind in planning, permitting, and developing projects.

Cost \$34.5 million (all phases and additional drainage improvements)

Funding Sources Seattle Public Utilities, King County Flood Control District

Additional information

- Presentation with drawings:
<http://www.seattle.gov/Documents/Departments/SPU//111412CDWACPresentationMadisonValley.pdf>

Lake Washington Park



CROMWELL PARK

City of Shoreline



Facility type

Constructed wetland added to an existing park during major renovation, provides treatment and flow/flood control

Design/construction

2007-2010

Facility size

1.33 acres in a 9-acre park

Drainage basin area

109-acre basin (residential neighborhood, can handle 435,000 gallons)

Facility Description

The city had identified areas with stormwater issues. The area downstream of Cromwell Park had water quality and flooding issues, so a regional stormwater retrofit facility was proposed for Cromwell Park during a major renovation of the park.

The stormwater facility type chosen was a constructed wetland, which added an additional natural feature with native plants to the park. The wetland attracts wildlife and has interpretive signs to provide education on habitat and stormwater. Walking trails were added around and through the wetland.

Retrofits such as this one that have been completed in Shoreline may have led to the City of Shoreline being the first Salmon Safe-certified city in Washington.

Departments involved

Public Works, Parks Department

Contractors

PACE Engineers

Public engagement

Led by the Parks department as part of the park's planned renovation.

Maintenance and monitoring

The Public Works department performs maintenance one to two times per year on the wetland. They check for and remove invasive plants. Maintenance has been minimal at Cromwell Park. Plant selection, monitoring, and maintenance are key to the facility's success.

Challenges and lessons learned

- The community had concerns about mosquitoes and odors but ended up being very happy with the wetland. The community now enjoys viewing the wildlife attracted to the wetland and the process of seeing the wetlands fill up with water after a rainstorm.
- Shoreline continues to evaluate possible stormwater facility improvement opportunities during park renovations projects. This is a good opportunity to incorporate stormwater management at a lower cost and less disruption for the community.
- Consider climate change and the greater need for stormwater infrastructure. This will affect the location and design of the facility.
- Shoreline is considering how to best use current detention pond space and may incorporate recreational features or even create new parks where stormwater facilities are renovated.

Cost

\$1.6 million for park renovation and wetland

Funding Sources

Park Bond (two-thirds), Surface Water Utility Fund (one-third)

For more information

Dan Sinkovich (dsinkovich@shorelinewa.gov), City of Shoreline, Utility Operations Specialist

Sources and additional information

- Trust for Public Land case study: <https://www.tpl.org/sites/default/files/Cromwell%20Park.pdf>
- Salmon Safe city certification: <https://salmonsafe.org/shoreline/>



POINT DEFIANCE STORMWATER TREATMENT FACILITY

City of Tacoma/Metro Parks Tacoma



Contacts	Dana de Leon (ddeleon@cityoftacoma.org), Principal Engineer, City of Tacoma Environmental Services
Facility type	Provides stormwater treatment and visual interest in a park
Construction date	2015
Facility size	5,500 square feet
Size of basin managed	754 acres, 8 million gallons per day

Facility Description

This facility, on a steep slope at the northeast entrance of Point Defiance Park, treats stormwater from the basin uphill before dispersing it into Puget Sound. It consists of a series of cascade pools, troughs, and treatment cells with proprietary media and an underdrain system. The facility discharges treated water into a bioswale and then Puget Sound.

The facility is a six-pool waterfall that provides visual interest to the entrance of the park. It is not open to the public but can be seen from all sides.

The project started with Tacoma Parks talking to the city about the area's undersized outfalls. The two agencies partnered and brought in Tacoma Public Schools. The partners agreed on three main goals for the project: treat as much stormwater as possible, make it attractive, and provide a learning opportunity for students. The city upsized the outfall and

Tacoma Parks provided the land for the facility, which treats stormwater for the entire 754-acre basin. It is used as a lab for students to learn about stormwater.

Departments involved Tacoma Public Utilities, Metro Tacoma Parks, Tacoma Public Schools

Contractors Parametrix (Design Engineer), Site Workshop (Landscape Architect), Ceccanti Inc. (General Contractor), Oldcastle Precast (Precast Concrete), Contech Engineered Solutions (Manufacturer)

Public engagement

Tacoma Parks led the public outreach in coordination with other park improvements.

Maintenance and monitoring

Tacoma Public Works maintains the treatment facility and Tacoma Parks maintains the irrigation and landscaping.

Challenges and lessons learned

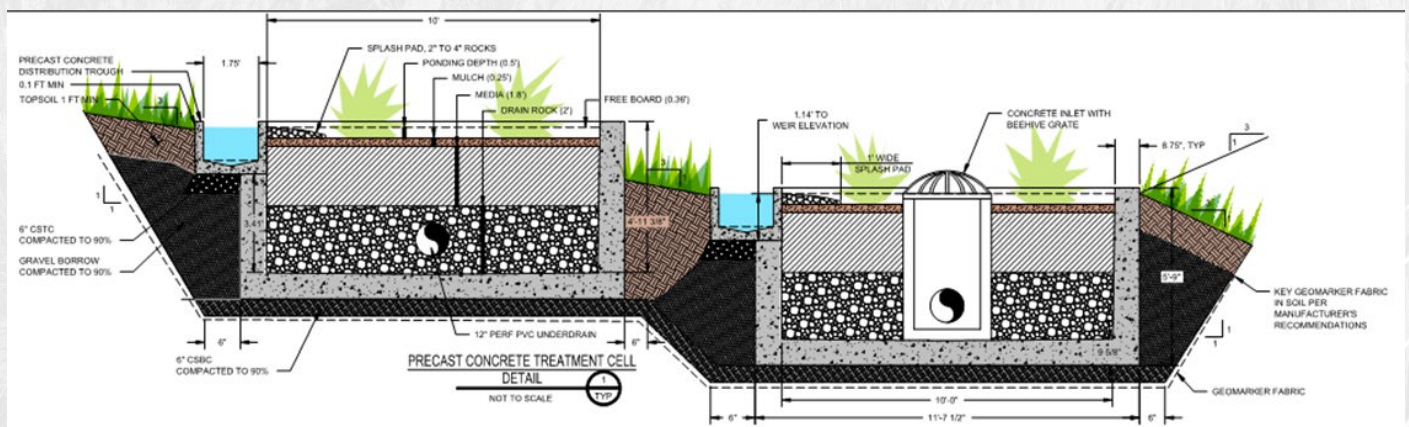
- ILAs can help address issues when multiple partners are involved, especially for maintenance.
- Having goals for the project can help guide it and keep it moving forward.
- Adding regional stormwater facilities to parks is a good way to provide large-scale stormwater treatment. Work with the parks department for opportunities to plan retrofits into future park renovation projects.
- A funding strategy for regional facilities is to charge development projects in the basin a fee in lieu of constructing onsite stormwater management.
- The parks board provided valuable insights on issues to address, such as safety and siting.
- Think about maintenance early, incorporating maintenance considerations into design can make ongoing maintenance easier.
- Having flexibility in the design can enable the facility to treat a larger area.

Cost \$2,464,600

Funding Sources Tacoma Surface Water Management, Metro Parks Tacoma, Washington State Department of Ecology

Additional information

- City of Tacoma project description: https://www.cityoftacoma.org/government/city_departments/environmentalservices/surface_water/green_stormwater_infrastructure_gsi/gsi_projects/point_defiance_regional_stormwater_treatment_facil
- Tacoma Parks description: <https://www.metroparkstacoma.org/project/stormwater-treatment-facility/>



MANCHESTER STORMWATER PARK

Kitsap County



Contacts

Tim Beachy (tbeachy@co.kitsap.wa.us), PE, Capital Improvements PM, Michelle Perdue (mperdue@co.kitsap.wa.us), Stormwater Monitoring and Outreach Manager, Kitsap County Public Works

Facility type

Small park with natural and engineered stormwater infrastructure that provides treatment and flood control

Construction date

2015

Facility size

0.5 acres

Size of basin managed

100 acres (community of Manchester)

Facility Description

Manchester Stormwater Park treats stormwater from roads, parking lots, and residential and commercial properties in the small Kitsap County community of Manchester. Treatment cells around the perimeter of the park process stormwater through engineered filter media and plants. A spiral rain garden intercepts flows from groundwater and light storms and treats it through a bioretention soil mix and plants in the rain garden. The rain garden extends the life of the more expensive engineered treatment media in the treatment cells. Treated water is discharged to Puget Sound.

The stormwater park provides a community gathering space for farmers' markets, celebrations, relaxation, and education.

Before the stormwater park was built, Manchester did not have any stormwater treatment structures and stormwater drained untreated through one pipe into Puget sound. The stormwater park was built on a vacant lot in Manchester that was once a gas station. The project was initially designed to replace an aging and undersized outfall. However, Kitsap County recognized the opportunity for multiple benefits: treating a larger drainage area, reducing flooding, and providing a community amenity.

It is estimated that more than 100,000 pounds of contaminated suspended solids will be cleansed from the upstream stormwater runoff in its first 10 to 20 years.

Departments involved Kitsap County Public Works

Contractors Parametrix, N.L. Olson & Associates, Northwest Cascade

Public engagement

Public engagement was key to the success of this project and helped shape the design of the park. The community wanted a gathering space and interpretive signage on environmental solutions.

Maintenance and monitoring

The Port of Manchester takes care of mowing and garbage collection, Kitsap County Public Works maintains the rest of the facility, and the University of Washington's Green Futures Lab provides water quality monitoring. Monitoring indicates that the stormwater park is effective in treating pollutants and is especially effective at treating bacteria and metals in the runoff.

Challenges and lessons learned

- Have goals for the project
- It helps to have a champion as there are many issues to work through with innovative projects
- Do public outreach early
- Formal agreements can help when multiple departments and agencies are involved, especially for maintenance
- Having a use agreement helps with liability concerns when a group wants to reserve the park

Cost

\$4M (Phase I \$2.3M: stormwater park and surrounding roadway/sidewalks, Phase II \$0.4M: new outfall, roadway and sidewalk improvements, Phase III \$1.2M: stormwater conveyance, roadway and sidewalks construction)

Funding Sources Kitsap County Public Works Stormwater and Roads Divisions, Washington State Department of Ecology grant

Additional information

- Monitoring information:
<http://greenfutures.washington.edu/2019/07/25/manchester-stormwater-park/>
- Detailed project description:
<https://www.waterworld.com/home/article/14070125/manchesters-stormwater-park>

