Stormwater Parks for Water Quality and Human Health

Central Puget Sound Stormwater Parks

Prepared by Puget Sound Regional Council
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STORMWATER WETLAND PARK
City of Arlington

<table>
<thead>
<tr>
<th>Facility type</th>
<th>Constructed wetlands providing stormwater treatment and flow/flood control, wastewater treatment, trails, and other recreational opportunities</th>
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<td>Construction date</td>
<td>Construction completed in 2011</td>
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<td>Facility size</td>
<td>21-acre park with a 9-acre wetland</td>
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<tr>
<td>Size of basin managed</td>
<td>280 acres (Old Town Arlington)</td>
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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 (j.kelly@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
Central Puget Sound Stormwater Parks

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:  
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/
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**
- Detailed project description: https://www.waterworld.com/home/article/14070125/manchesters-stormwater-park
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:  
- Tacoma Parks description:  
  https://www.metroparkstacoma.org/project/stormwater-treatment-facility/
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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