Kitsap County Stormwater Park Study

Whispering Firs Stormwater Park

Kitsap County (the County) commissioned the Stormwater Park Study to identify, evaluate, and prioritize potential locations for large-scale stormwater park projects that provide both effective stormwater quality treatment and valuable community park amenities. The Study Area encompassed the Kitsap Peninsula within the County boundary, including unincorporated lands, incorporated cities, and Tribal territories. This project built on the County's Stormwater Management Action Plans (SMAPs) and other planning efforts, including those by local Tribes and neighboring cities. The County convened a Working Group comprised of representatives from the County Stormwater, Parks, Community Development, and Public Health departments; Cities of Port Orchard and Poulsbo; and Port Gamble S'Klallam Tribe and Suquamish Tribe. Together, the Working Group shaped the County's vision for how stormwater parks can provide watershed and community benefits to Kitsap County, as well as actively participated in identifying priority basins and sites and shaping preliminary stormwater park concepts.

Using lessons learned from existing stormwater parks, this project developed and used a rigorous, science-based and stakeholder-inclusive process to identify the top sites for future stormwater parks within the Study Area. The overall project goal is to improve watershed health and support healthier communities, while building a working relationship and a shared vision with Working Group partners and their representative jurisdictions.

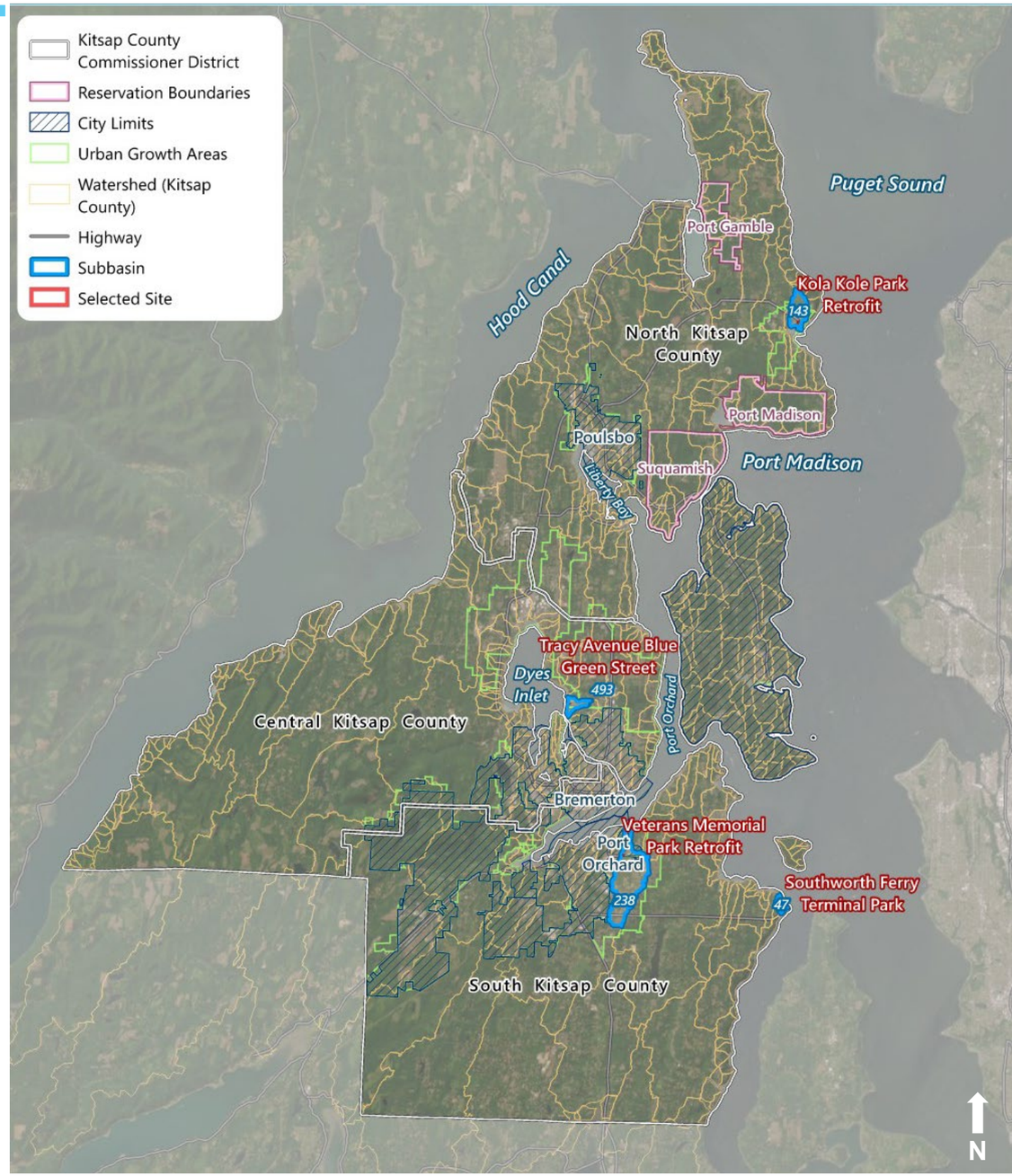
This project has been funded wholly or in part by the United States Environmental Protection Agency under assistance agreement PC-01J95801-2 to the Washington State Department of Ecology.

Stormwater Park Concept Summary

Basin and Site Overview

The following sites were selected with Working Group input to be developed into preliminary stormwater park concepts. The summary sheet package provides information on the basin characteristics, site characteristics, and preliminary stormwater park concepts. These preliminary concepts communicate the vision and opportunities for the stormwater parks and serve as a foundation for further concept and design development under future funding.

Site Name	Kitsap District	New Park or Retrofit	Basin Number	Page Number
Kola Kole Park	North	Retrofit	Basin 143	p. 3-6
Tracy Ave Blue Green Street	Central	New	Basin 493	p. 7-10
Southworth Ferry Terminal Park	South	New	Basin 47	p. 11-14
Veterans Memorial Park	South	Retrofit	Basin 238	p. 15-18



Basin 143

Basin Description

Basin 143 is located in North Kitsap County. The basin is a mostly urbanized watershed near Kingston with a high need for water quality and flow control improvements. Approximately 25 percent of the basin is impervious surface, and 22 percent of the basin is untreated impervious surface. There is a large overlap with the Kitsap County PROS plan: 70 percent of the basin overlaps with a park walkshed, meaning that the parks and green space access gap is low. The community is identified as a disadvantaged community by the Kitsap County Equity Atlas. With these considerations in mind, there is an opportunity to create a stormwater park to provide water quality and flow control benefits while also providing neighborhood amenities and park spaces.

Subbasin Prioritization Criteria

Water Quality	Flow Control	Terrestrial Habitat Health	Aquatic Habitat Health	Green Space Access Gap	Priority Community
High	Medium-High	Low	Low	Low	High

Subbasin Statistics

Statistic	Value
County Region	North Kitsap County
Watershed Acres	362 acres
% Impervious	25%
% Untreated impervious area	22%
Land use	Urbanized residential and commercial
Park and Walkshed Overlap	70%
Disadvantaged Community	Yes

Aerial map showing the basin area (Source: Herrera)

Kola Kole Park Retrofit | *Basin 143, Site A*

Site Description

Kola Kole Park is an existing community park currently undergoing redesign and engagement as part of Kitsap County Parks planning efforts. The park site is currently a grassy field surrounded by mature trees to the west and south. The park site has existing buildings that are used by the Kingston Co-Op Preschool and Boy Scout Troop 1555, in addition to a basketball court and a playground.

Early community engagement led by Kitsap County Parks indicates a desire for fields for youth sports practices and community use, as well as improved lighting and other park features. The site offers an opportunity for a partnership with Kitsap County Parks to consider if there are opportunities to incorporate stormwater strategies with the desired park amenities.

Stormwater is conveyed from the neighborhoods north of the park as well as along NE State Highway 104. With minimal additional conveyance, untreated stormwater could be rerouted to the site to be treated at the park through stormwater retrofit strategies.

Site Characteristics

Characteristic	Value
Parcel Owner	Kitsap County Parks
Parcel Location	Kingston
Parcel Size	3.0 acres
Drainage Area (approx.)	30 acres (8% of basin)
Existing Land Use	Park
Average Slope	2%
Partnership Potential	Kitsap County Parks, Kingston Co-Op Preschool

Aerial map of the site and surrounding areas. Site area of interest is highlighted in red. (Source: Herrera)

Images of the site from Google Street View (Source: Google Maps)

Kola Kole Park Retrofit | *Basin 143, Site A*

Concept Description: *A Place of Coming Together*

Martha George, former Suquamish Tribe chairwoman, named the park Kola Kole, which means "Place of Coming Together"[a]. Kola Kole has been an important community space since its opening, and the root of its name inspires the concept for a future stormwater park retrofit.

At Kola Kole Park, stormwater is diverted from Bannister St NE and NE 2nd St through a step pool channel to a large bioretention gallery, which creates a gathering space to bring young athletes, families, Scouts, students, and many other community members together around water. Located in a former gravel parking lot in the southwest corner of the park, the bioretention gallery anchors new paths and connections to a central node. Rock seating offers an opportunity for visitors to sit and observe the naturalized features and wildlife and pollinator habitat of the stormwater facility. Paths around youth sports fields, as well as connections to the Scouts building, community center, and ferry dock, create amenities for park visitors to actively use the park. Youth sports fields for practice are located on the eastern half of the park (field improvements TBD), with an opportunity for high-flow stormwater detention to be designed under the retrofitted fields (further study needed). Bioretention bulbs at crosswalks on Bannister St NE and a bioretention ditch retrofit on NE Maine St provide additional benefit to treat runoff from the streets that border the park.

a. Muhrlein, H. "How Kola Kole Park got its name" Kitsap Daily News. February 4, 2013.

Design Assumptions

Category	Assumption
Approximate % Impervious	35%[a]
Soil Type	Indianola Loamy Sand
Soil Description	Deep, somewhat excessively drained Glacial outwash
Assumed Soil Design Infiltration Rate	2.5 in/hr
Existing Conditions	Existing playfields used for pickup and practice. Preliminary community outreach indicates interest in improving fields for youth athletic practices. [b]

a. Percent impervious area estimated for drainage area using NOAA C-CAP data, then applied to subareas draining to stormwater strategies for sizing.

b. Working Group input from Kitsap Parks Department

Stormwater Strategies

Strategy	Description	TIA Managed[a]	Approx Size[a]
Bioretention Gallery	Naturalized bioretention area with native plants. Includes underdrain.	12 acres	4,600 SF
Bioretention Bulbs	Two bulbs at crosswalks to manage road runoff.	0.3 acres	50 – 100 SF each
Bioretention Ditch Retrofit	Retrofit existing ditch to treat portion of Hwy 104	1 acre	400 SF
Infiltration Vault	*Infiltration vault is not sited within the stormwater park concept.*	*Opportunity present to consider infiltration vault of approximately 12,000 SF underground to manage 8 to 9 acres of stormwater.*	

a. Refer to project technical memo for methods

Park Strategies

Strategy	Description	Approx Size
New Paths	New walking paths connect neighborhood amenities (community center, ferry terminal) to stormwater park amenities.	1,500 LF
Youth Sports Practice Fields	TBD – elements undergoing Parks planning	TBD

Planning-Level Stormwater Cost Estimate

Total Stormwater Management Costs [a, b]	**$2,400,000**
Total Direct Construction	$1,690,000
Total Non-Construction	$710,000
Cost per TIA Managed ($/SF)	$4.30 / SF

a. King County WQBE Toolkit used for scalar planning-level stormwater cost estimating. Contingency included.

b. Cost estimate only includes stormwater management strategies. Park strategies and long-term holistic maintenance are not included.

Kola Kole Park Retrofit | *Basin 143, Site A*

Legend

- Street
- Contour (5ft)
- Catch Basin (ex.)
- Stormwater Outfall (ex.)
- Stormwater Pipe (ex.)
- Ditch (ex.)
- Tax Parcel
- Paths
- Bioretention Area
- Proposed Conveyance Pipe
- Proposed High-Flow Conveyance Pipe

1. Step Pools
2. Bioretention Gallery
3. Basketball Courts to Remain
4. Existing Boy Scouts Building
5. Youth Sports Practice Fields (TBD)
6. Opportunity for subsurface stormwater storage with infiltration (TBD)
7. Crosswalk with Bioretention Curb Bulbs
8. Bioretention Retrofit to Ex. Ditch

0 40 80 160 feet N

Basin 493

Basin Description

Basin 493 is located in Central Kitsap County. The basin is a developed watershed with a high need for water quality and flow control improvements. Approximately 24 percent of the basin is impervious surface, and the majority of the impervious surface does not receive existing stormwater treatment. There is only a 1 percent overlap with Kitsap County park walksheds, meaning that a stormwater park could help improve the access gap to park and open space.

Subbasin Prioritization Criteria

Water Quality	Flow Control	Terrestrial Habitat Health	Aquatic Habitat Health	Green Space Access Gap	Priority Community
High	High	Low	Medium	High	Medium

Subbasin Statistics

Statistic	Value
County Region	Central Kitsap County
Watershed Acres	159 acres
% impervious	24%
% untreated impervious area	23%
Land use	Residential
Park and Walkshed Overlap	1%
Disadvantaged Community	No

Aerial map showing the basin area (Source: Herrera)

Tracy Avenue Blue Green Street | *Basin 493*

Site Description

NW Tracy Avenue is a County-owned road that connects the predominantly residential Tracyton neighborhood with the Tracyton Boat Launch on Dyes Inlet. The road is two lanes with an overwide ROW and no pedestrian amenities.

Stormwater is conveyed to and down NW Tracy Avenue in a combination of ditches and stormwater pipes with no treatment. Stormwater is conveyed to Dyes Inlet via two outfalls (one on each side of the road) at the boat launch.

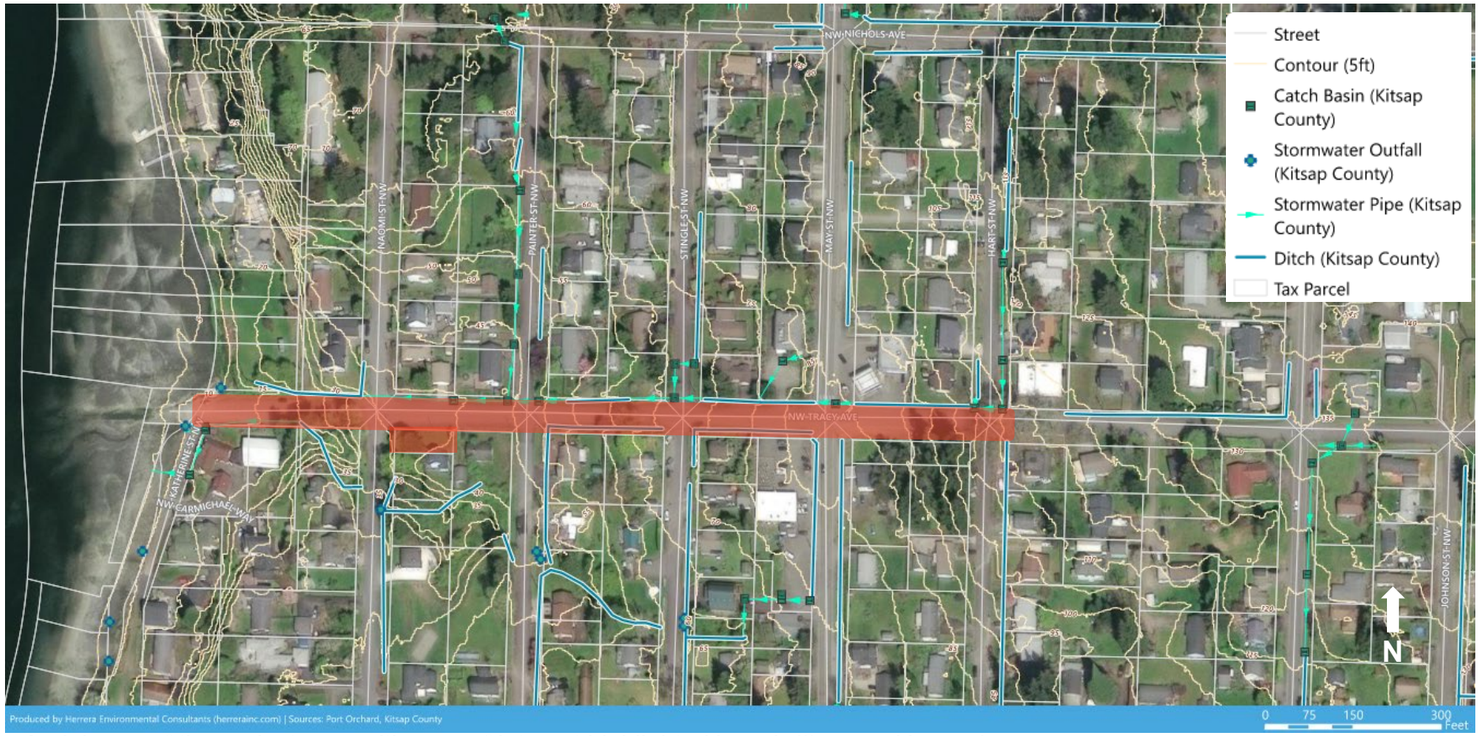
The boat launch is part of the County ROW and consists of a ramp to the water, limited formal parking and turn around, and a bench with a view of the water.

A vacant parcel owned by the Port of Tracyton is located at the southeast corner of NW Tracy Avenue and Naomi Avenue. The parcel is a grassy field with a covered concrete pad but appears to be otherwise unprogrammed.

All of the areas described above could be considered as part of a linked stormwater park, which represents an opportunity for a partnership with the Port of Tracyton and the Tracyton neighborhood.

Site Characteristics

Characteristic	Value
Parcel Owner	Port of Tracyton, Kitsap County
Parcel Location	Tracyton
Parcel Size	2.2 acres
Drainage Area (approx.)	80 acres (50% of basin)
Existing Land Use	Vacant + Road ROW
Average Slope	5%
Partnership Potential	Port of Tracyton & Neighborhood



Aerial map of the project area with area of interest highlighted in red. (Source: Herrera)

Images of the project area from Google Street View (Source: Google Maps)

Tracy Avenue Blue-Green Street | *Basin 493*

Concept Description: *Neighborhood Blue-Green Street*

The Tracy Avenue blue-green street is a stormwater park concept expanded to the neighborhood transportation realm and an example of public utility and transportation partnerships to achieve multiple community and environmental benefits.

In alignment with the County's capital planning for the Tracyton Green Streets Stormwater Retrofit Project, Tracy Ave is re-envisioned to be a meandering slow street. The existing 60-feet-wide ROW is reduced to a two-lane slow street with 12-foot wide lanes. The remaining ROW area is redistributed into alternating, stepped bioretention amenities, sidewalks, vegetated sidewalk buffers, and curb bulbs to create a safer, more enjoyable pedestrian street that brings community members to the boat launch and shoreline.

The public parcel on the southeast side of NW Tracy Ave and Naomi St NW is converted into a parklet with a central bioretention amenity. On the southwest side of the same intersection, an existing ditch through a shaded hillside could be considered for future acquisition and incorporation into the blue-green street design.

The blue-green street culminates at the Tracyton boat launch, which is improved into a pedestrian-focused plaza and boat launch. The existing stormwater outfalls are improved through naturalization to add rocks and emergent plants to slow and disperse flow before it reaches Dyes Inlet.

Design Assumptions

Category	Assumption
Approximate % Impervious	39%[a]
Soil Type	Alderwood Very Gravelly Sandy Loam
Soil Description	Moderately well drained Glacial till
Assumed Soil Design Infiltration Rate	0.3 in/hr
Existing Conditions	ROW and small adjacent parcels along Tracy Ave, which is undergoing a transportation planning effort for a green street.

a. Percent impervious area estimated for drainage area using NOAA C-CAP data, then applied to subareas draining to stormwater strategies for sizing.

Stormwater Strategies

Strategy	Description	TIA Managed[a]	Approx Size[a]
Bioretention	Roadside bioretention area with native plants and ditch improvements. Three bioretention, north side	8.8 acres	2,700 SF (total)
Bioretention	Roadside bioretention area with native plants and ditch improvements. Two bioretention, south side	1.5 acres	500 SF (total)
Regional biofiltration	Stepped high-rate bioretention media with native planting, south side near outfall	21.5 acres	400 SF (total)

a. Refer to project technical memo for methods

Park Strategies

Strategy	Description	Approx Size
New Sidewalk	New street sidewalk to boat launch	3,000 LF
New paths	Walking paths through parklet	300 LF
Boat launch	Improvements and community amenities	2,600 SF

Planning-Level Stormwater Cost Estimate

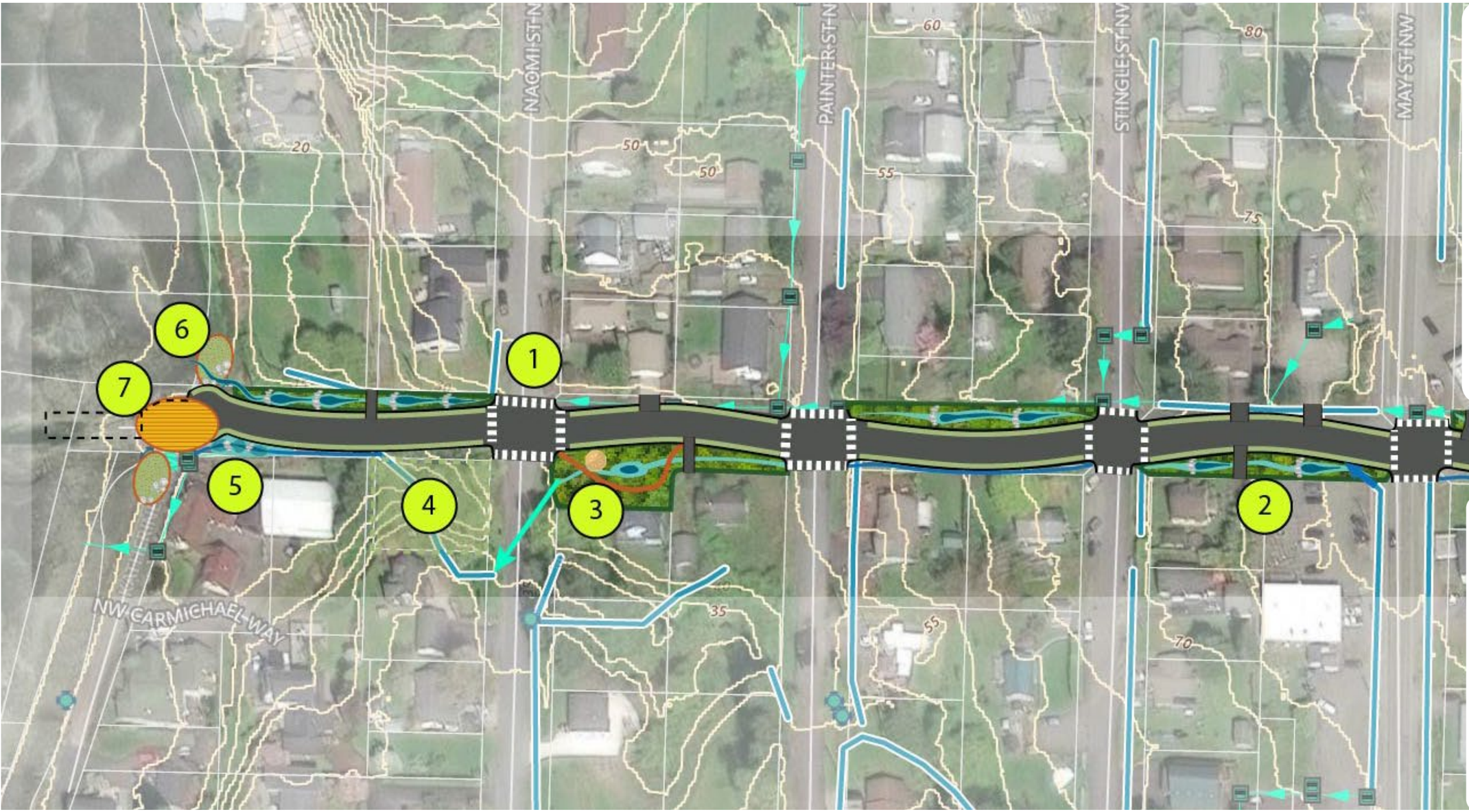
Total Stormwater Management Costs [a, b]	$2,880,000
Total Direct Construction	$1,860,000
Total Non-Construction	$1,020,000
Cost per TIA Managed ($/SF)	$2.09/SF

a. King County WQBE Toolkit used for scalar planning-level stormwater cost estimating. Contingency included.

b. Cost estimate only includes stormwater management strategies. Park strategies and long-term holistic maintenance are not included.

Tracy Avenue Blue Green Street | *Basin 493*

Kitsap County Stormwater Park Study



1. Safe Crosswalks with Curb Bumpouts typ.
2. Bioretention typ.
3. Parklet with Bioretention Improvements and Trail
4. Potential Acquisition Consideration to Expand Stormwater and Park Amenities
5. Stepped high-rate regional biofiltration
6. Outfall Improvements with Rocks and Emergent Plants
7. Tracyton Boat Launch Improvements with Pedestrian-focused Plaza

- Street
- Contour (5ft)
- Catch Basin (ex.)
- Stormwater Outfall (ex.)
- Stormwater Pipe (ex.)
- Ditch (ex.)
- Tax Parcel
- Proposed Conveyance Pipe
- Proposed Conveyance Swale / Ditch
- Vegetated Sidewalk Buffer 4-6 ft
- Sidewalk (4 ft)
- Trail
- Two Lane Slow Road (10-12 ft per lane)
- Bioretention with Rock Weir (Adapted Ex. Ditch)

0 50 100 200 feet

N

Basin 47

Basin Description

Basin 47 is located in South Kitsap County. The basin is a moderately developed watershed with a high need for water quality and flow control improvements. Approximately 27 percent of the basin is impervious surface with no existing stormwater treatment. Three percent of the basin overlaps with a Kitsap County park walkshed, meaning that there is an opportunity to improve access to parks and open spaces. With these considerations in mind, there is an opportunity to create a stormwater park to provide water quality and flow control benefits while also providing neighborhood amenities and park spaces.

Subbasin Prioritization Criteria

Water Quality	Flow Control	Terrestrial Habitat Health	Aquatic Habitat Health	Green Space Access Gap	Priority Community
High	High	Low	Medium	High	Medium

Subbasin Statistics

Statistic	Value
County Region	South Kitsap County
Watershed Acres	85 acres
% impervious	27%
% untreated impervious area	27%
Land use	Residential, grassy
Park and Walkshed Overlap	3%
Disadvantaged Community	No

Aerial map showing the basin area (Source: Herrera)

Southworth Ferry Terminal Park | *Basin 47*

Site Description

Stormwater park opportunity in South Kitsap County to retrofit the Southworth Ferry Terminal parking lot and ferry operations parcels owned by WSDOT.

The site is currently a parking lot with some grassy areas on the perimeter of the lot. The site offers an opportunity for a partnership with WSDOT to develop a new stormwater park that could be completed in tandem with the WSDOT Ferry Terminal Redevelopment Project (Phase 2).

Stormwater is conveyed along SE Southworth Ferry Drive from the roadway and residential neighborhood surrounding the terminal. This untreated stormwater could be rerouted to the southwest corner of the parking lot where there is an existing grassy area.

This park could be an amenity for ferry riders while they wait for the ferry. There are no sidewalks in the area to invite people to the park but could be an additional opportunity for neighborhood improvement associated with a stormwater park.

Site Characteristics

Characteristic	Value
Parcel Owner	WSDOT
Parcel Location	Southworth
Parcel Size	7.5 acres
Drainage Area (approx.)	45 acres (53% of basin)
Existing Land Use	Parking, docks
Average Slope	8%
Partnership Potential	WSDOT

Aerial map of the site and surrounding areas. Site area of interest is highlighted in red. (Source: Herrera)

Images of the site from Google Street View (Source: Google Maps)

Southworth Ferry Terminal Park | *Basin 47*

Concept Description: *Stormwater Overlook*

In partnership with WSDOT and the ongoing Southworth Ferry Terminal renovation planning, the Southworth Ferry Terminal stormwater park is an example of integrating stormwater amenities into regional transportation infrastructure. This concept assumes the alternative from the renovation planning that relocates the terminal building (Alternative 4) is moved forward. The former terminal building area creates an opportunity for bioretention amenities and an overlook plaza. A bioretention planter is located near the upper parking lot, treating runoff as it approaches the ferry terminal parking lot. A large bioretention area along the southern perimeter is paired with a natural surface walking trail, which provides people a place to stretch while waiting for the Southworth ferry. This bioretention area is adjacent to a parcel that could be considered for acquisition, which could expand options and area available to treat stormwater. From the southern perimeter, the trail brings users through a restored native planting area, which opens into an overlook into the Puget Sound at the plaza and third bioretention area.

Design Assumptions

Category	Assumption
Approximate % Impervious	35%[a]
Soil Type	Kapowsin Gravelly Loam Urban Land – Alderwood Complex
Soil Description	Moderately well drained Glacial till classification
Assumed Soil Design Infiltration Rate	0.3 in/hr
Existing Conditions	Southworth Ferry Terminal (WSDOT) is undergoing planning for future renovations and improvements. This concept assumes Alternative 4, which relocates the terminal building, as the base condition for a stormwater park partnership. [b]

a. Percent impervious area estimated for drainage area using NOAA C-CAP data, then applied to subareas draining to stormwater strategies for sizing.

b. WSDOT, Southworth Terminal Preservation

Stormwater Strategies

Strategy	Description	TIA Managed[a]	Approx Size[a]
Bioretention 1	Naturalized bioretention area with native plants, southwest	3.4 acres	1,100 SF
Bioretention 2	Naturalized bioretention area with native plants, northeast by plaza	1.4 acres	500 SF
Bioretention 3	Walled bioretention planter, northwest	0.6 acres	300 SF

a. Refer to project technical memo for methods

Park Strategies

Strategy	Description	Approx Size
New Trails	Compacted gravel pathway through shady habitat area that follows the path of stormwater between Bioretention 1 and Bioretention 2	1,000 LF
Plaza	Community hardscape plaza with views over the Puget Sound	10,000 SF
Sidewalk	ADA accessible sidewalk and path	300 LF

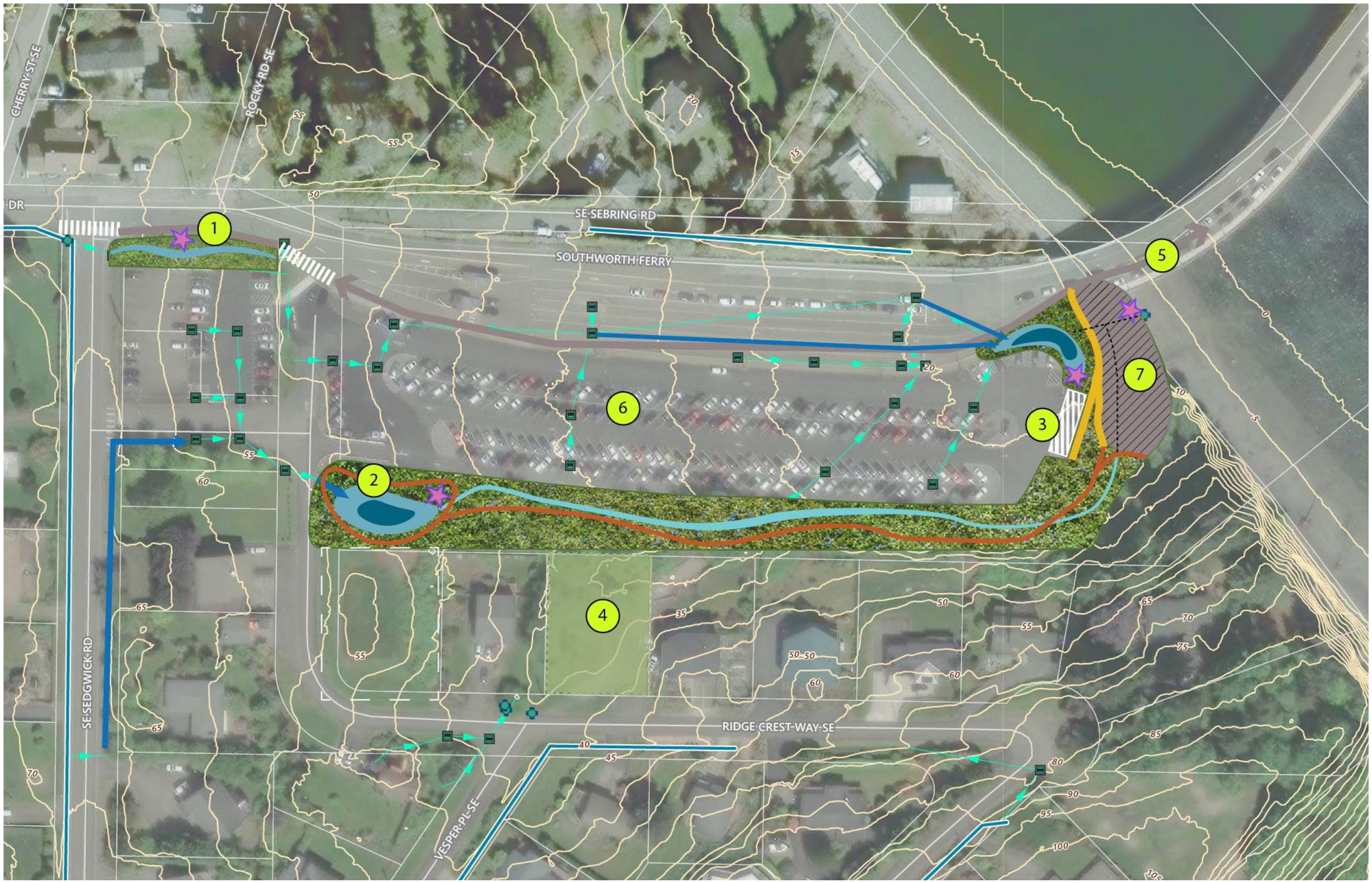
Planning-Level Stormwater Cost Estimate

Total Stormwater Management Costs [a, b]	$1,360,000
Total Direct Construction	$970,000
Total Non-Construction	$410,000
Cost per TIA Managed ($/SF)	$5.83 / SF

a. King County WQBE Toolkit used for scalar planning-level stormwater cost estimating. Contingency included.

b. Cost estimate only includes stormwater management strategies. Park strategies and long-term holistic maintenance are not included.

Southworth Ferry Terminal Park | *Basin 47*



Legend

- Street
- Contour (5ft)
- Catch Basin (ex.)
- Stormwater Outfall (ex.)
- Stormwater Pipe (ex.)
- Ditch (ex.)
- Tax Parcel
- Gravel Paths
- Bioretention Area
- Proposed Conveyance Pipe
- Sidewalk (ex.)
- New Sidewalk (ADA)
- Swale
- Educational Sign

1. Bioretention Planter
2. Bioretention with Trail
3. Relocated ADA Parking
4. Potential Acquisition Consideration
5. To New Ferry Terminal Building (TBD)
6. Existing Parking to Remain
7. Overlook Plaza

0 50 100 200 feet

N

Basin 238

Basin Description

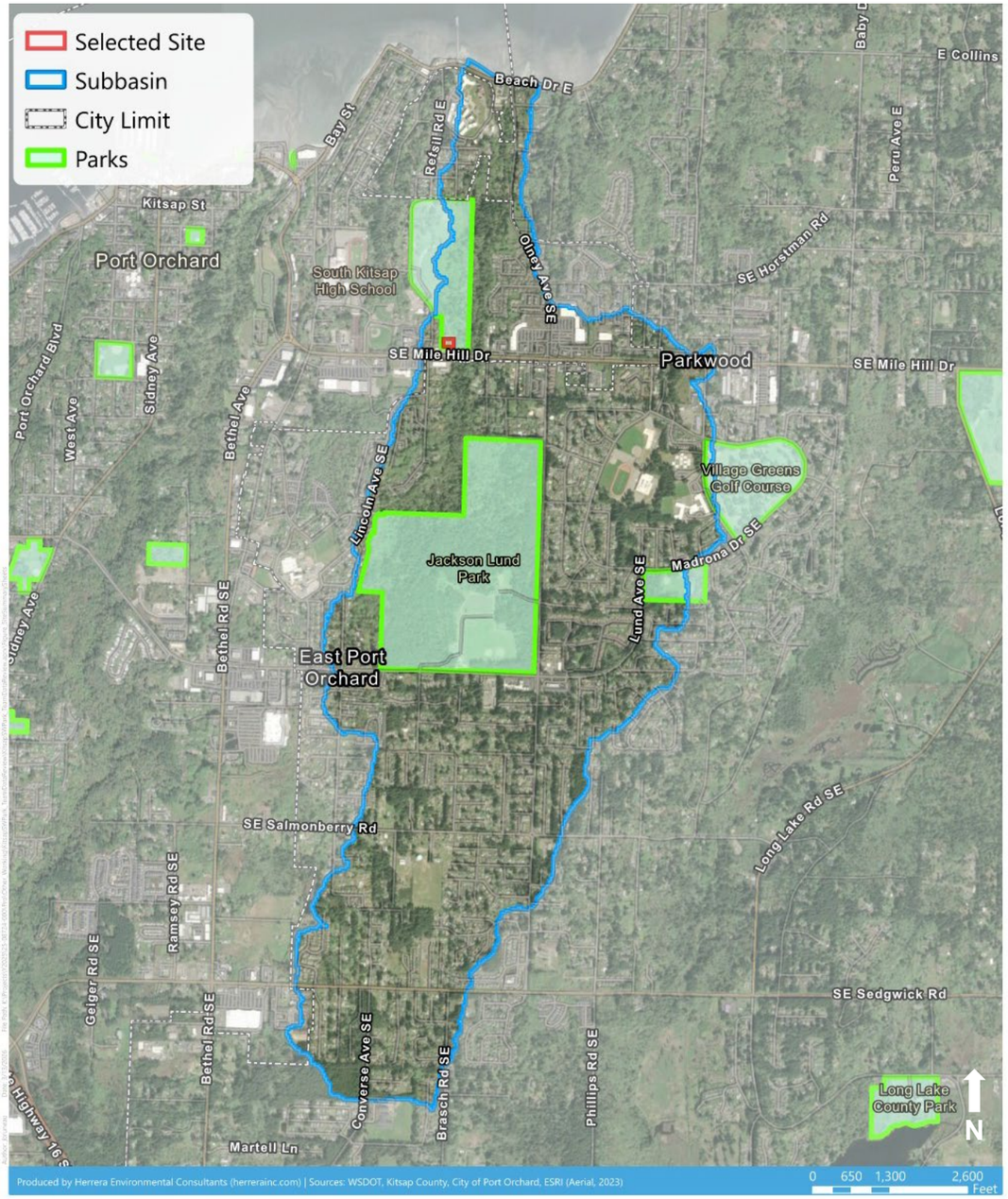
Basin 238 is located in South Kitsap County. The basin is an urbanized watershed with a high need for water quality and flow control improvements. Approximately 28 percent of the basin is impervious surface with majority of the impervious surfaces not having existing stormwater treatment. Approximately 66 percent of the basin overlaps with a Kitsap County park walkshed, meaning that there is already a significant access to parks and open spaces in this area. A stormwater park could still provide water quality and flow control benefits combined with neighborhood amenities and park spaces.

Subbasin Prioritization Criteria

Water Quality	Flow Control	Terrestrial Habitat Health	Aquatic Habitat Health	Green Space Access Gap	Priority Community
High	High	Low	Medium	Low	Medium

Subbasin Statistics

Statistic	Value
County Region	South Kitsap County
Watershed Acres	1,452 acres
% impervious	28%
% untreated impervious area	21%
Land use	Urbanized, residential and commercial
Park and Walkshed Overlap	66%
Disadvantaged Community	No



Aerial map showing the basin area (Source: Herrera)

Veterans Memorial Park Retrofit | *Basin 238*

Site Description

Veterans Memorial Park (also know as Retsil Veterans Park) is an existing park owned by Kitsap County Parks that has been identified as a candidate for improved drainage in the Kitsap County PROS Plan. Multiple locations in the park could be candidates for stormwater park amenities.

One location on the south side is currently a grassy field surrounded by mature trees along the entrance to the maintenance access road off SE Mile Hill Dr. Stormwater is conveyed along Karcher Road SE and SW Mile Hill Dr near this location. The untreated stormwater that currently discharges to Karcher Creek could be rerouted to the site to be treated at the stormwater park with minimal new conveyance required.

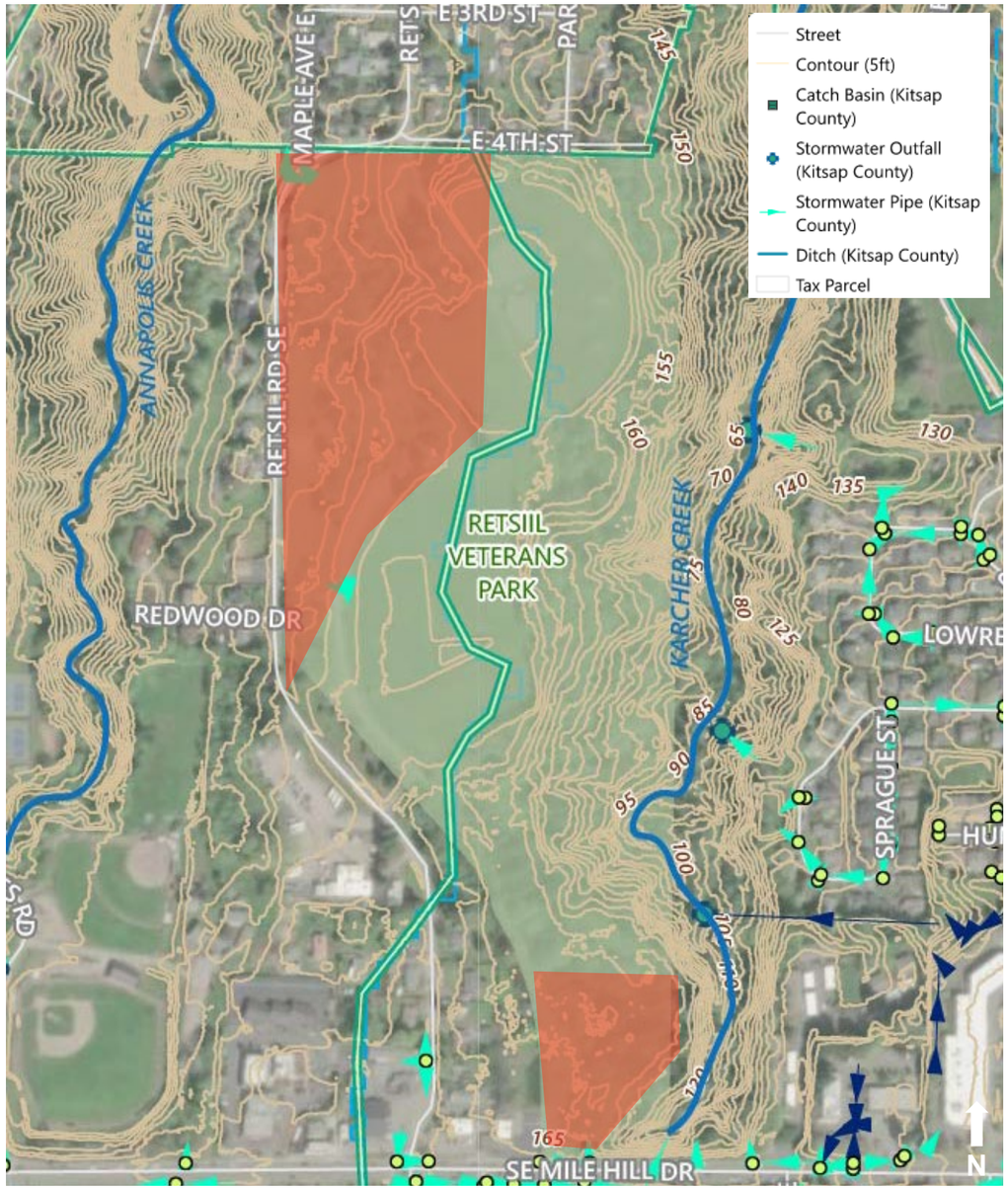
Another location is in the northwest corner of the park near the intersection of Retsil Rd SE and E 4th St. This area is grassed and upstream of an 18-inch outfall that discharges untreated road runoff directly to Annapolis Creek. This runoff could be rerouted to this area for treatment.

A stormwater park at Veterans Memorial Park could also bring an opportunity to make other desired improvements indicated in the PROS Plan, such as lighting, recreation fields, playground, and benches.

The Working Group provided feedback that many high school students walk through this area on their way to school, jobs, and activities. Stormwater park improvements to this area could be an excellent opportunity for community and student education.

Site Characteristics

Characteristic	Value
Parcel Owner	Kitsap County Parks
Parcel Location	Port Orchard
Parcel Size	48 acres
Drainage Area (approx.)	25 acres (2% of basin)
Existing Land Use	Park
Average Slope	2%
Partnership Potential	Kitsap County Parks



Aerial map of the site and surrounding areas. Site area of interest is highlighted in red. (Source: Herrera)

Images of the site from Google Street View (Source: Google Maps)

Veterans Memorial Park Retrofit | *Basin 238*

Concept Description: *Watershed Walk*

Veterans Memorial Park straddles the watershed boundary of two creeks, Annapolis Creek (to the west) and Karcher Creek (to the east). The Veterans Memorial Stormwater Park Retrofit creates an interpretive stormwater walk between two bioretention areas, each connected to one of two creeks. The walking path brings people around existing sports fields and along the watershed boundary of the creeks. At each bioretention facility and along the route between them, interpretive signage shares educational information about watershed health, stormwater, and how bioretention helps improve creek health. The Karcher Creek bioretention area is paired with shady picnic pavilions and space for community gatherings. The Annapolis Creek bioretention area treats stormwater from the park, Retsil Road, and a few residential blocks to the north, serving as an example of how bioretention can receive stormwater from a variety of neighborhood areas.

Design Assumptions

Category	Assumption
Approximate % Impervious	54%[a]
Soil Type	Indianoloa Loamy Sand Harstine Gravelly Sandy Loam
Soil Description	Ranges from excessively drained to moderately well drained soils Glacial outwash and glacial till present, assumed infiltration limited due to glacial till.
Assumed Soil Design Infiltration Rate	0.3 in/hr
Existing Conditions	Veterans Memorial Park sports fields with parking lot Some walking trails present [b]

a. Percent impervious area estimated for drainage area using NOAA C-CAP data, then applied to subareas draining to stormwater strategies for sizing.

b. Unable to locate specific routes for existing walking trails through desktop analysis methods. Existing trails may be incorporated into concepts under future work.

Stormwater Strategies

Strategy	Description	TIA Managed[a]	Approx Size[a]
Bioretention 1 (to Karcher Creek)	Naturalized bioretention area with native plants	14 acres	4,300 SF
Bioretention 2 (to Annapolis Creek)	Naturalized bioretention area with native plants	4 acres	1,300 SF

a. Refer to project technical memo for methods

Park Strategies

Strategy	Description	Approx Size
New Trails	Dirt recreation trails connect Bioretention 1 and 2 with interpretive signage and watershed education	7,600 LF
Picnic Pavilion	Community gathering space (natural surface) adjacent to Bioretention 1 with shaded picnic pavilions	52,000 SF
Overlook	Community gathering space with benches and interpretive signage overlooks Karcher creek	7,000 SF
Gathering Area	Informal community gathering space near ball fields and trails to Bioretention 2	17,000 SF

Planning-Level Stormwater Cost Estimate

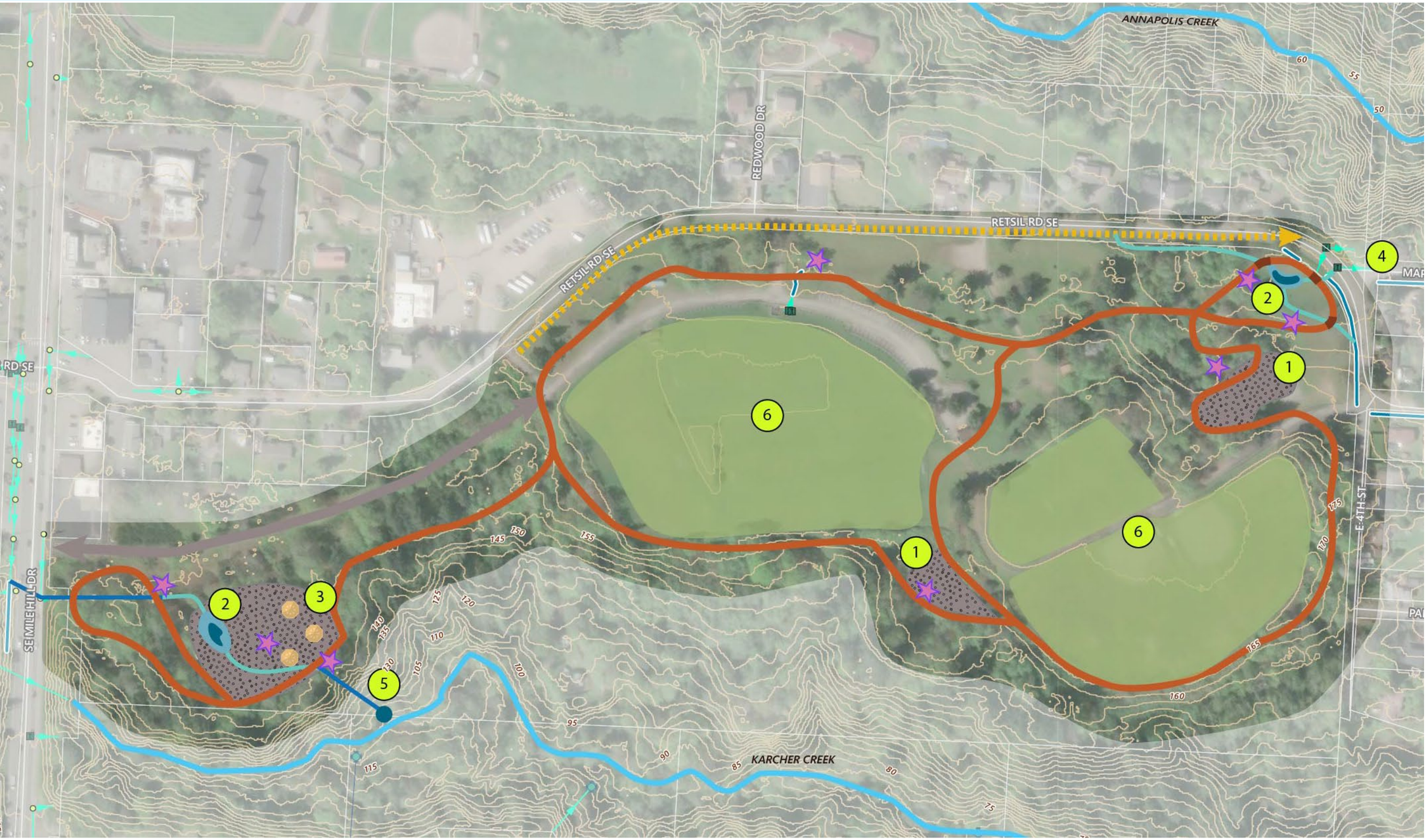
Total Stormwater Management Costs [a, b]	$3,450,000
Total Direct Construction	$2,440,000
Total Indirect Non-Construction	$1,010,000
Cost per TIA Managed ($/SF)	$4.39 / SF

a. King County WQBE Toolkit used for scalar planning-level stormwater cost estimating. Contingency included.

b. Cost estimate only includes stormwater management strategies. Park strategies and long-term holistic maintenance are not included.

Veterans Memorial Park Retrofit | *Basin 238*

Kitsap County Stormwater Park Study



Legend

- Street
- Contour 5ft
- Stormwater Outfalls (ex.)
- Stormwater City Structures (ex.)
- Stormwater CB Private (ex.)
- Stormwater Pipe Private (ex.)
- Stormwater Pipe City (ex.)
- Ditch (ex.)
- Creek (ex.)
- New Creek Outfall
- Tax Parcel
- Gathering Areas
- Bioretention Area
- Existing Maintenance Access Road
- Paths
- Swale
- Conveyance Pipe
- Existing Ditch with Improvements
- Educational Sign

1. Gathering Spaces
2. Bioretention
3. Forested Picnic Pavilion
4. Stormwater to Annapolis Creek
5. Stormwater to Karcher Creek
6. Existing Sports Fields with Drainage Improvements

N

0 100 200 400 feet