

Implementing Vision 2040: Sustainable Stormwater Management Innovative Practices in the Puget Sound Region



Amalia Leighton, PE / AICP
Director, Planner, Civil Engineer

with

Peg Staeheli, ASLA, LEED AP
Principal Landscape Architect

Kathryn Gwilym, PE, LEED AP
Principal Civil Engineer

www.svrdesign.com | [tw. @svrdesign](https://twitter.com/svrdesign) | [fb. www.facebook.com/svrdesign](https://www.facebook.com/svrdesign)



Department of Commerce
Innovation is in our nature.



Implementing Vision 2040: Sustainable Stormwater Management

Understanding of Regulations

The purpose of stormwater code is to maintain and protect the health and safety of waters of the state.

Our healthy environment is why people live here and choose to do business here.

Purpose of Presentation

This presentation will highlight innovative practices from Cities and Counties in Western Washington that demonstrate ways to develop, grow and prosper while meeting stormwater requirements.

These practices include integration of stormwater topics into:

- County and City – Planning and Policies
- Municipal Codes
- Development Partnering



DEPARTMENT OF ECOLOGY

Definition of Low Impact Development

From 2012 Stormwater Management Manual for Western Washington - Volume I:

Low Impact Development (LID) – A stormwater and land use management strategy that strives to mimic pre-disturbance hydrologic processes of infiltration, filtration, storage, evaporation, and transpiration by emphasizing conservation, use of on-site natural features, site planning, and distributed stormwater management practices that are integrated into a project design.

LID Best management Practices - Distributed stormwater management practices, integrated into a project design, that emphasize pre-disturbance hydrologic processes of infiltration, filtration, storage, evaporation and transpiration. LID BMPs include, but are not limited to, bioretention/rain gardens, permeable pavements, roof downspout controls, dispersion, soil quality and depth, minimal excavation foundations, vegetated roofs, and water re-use.

COUNTY AND CITY – PLANNING AND POLICIES

Overview

Kitsap County

- County Resolution – “Water as a Resource”
- Green Streets Planning
- Basin Planning

Multiple Agency Planning & Policy Coordination

- Lake Ballinger/McAleer Creek Watershed Forum

City of Shoreline

- Watershed Partnering
- Surface Water Master Plan
- Greenworks Program

COUNTY – PLANNING AND POLICIES

Kitsap County – Water As A Resource Policy

Kitsap County Resolution 109-2009

Creating Kitsap County “Water as a Resource” Policy

Whereas the Kitsap County Board of Commissioners recognizes that storm and surface water runoff is the leading transport medium of pollution into Puget Sound and its associated wetlands, creeks, streams and rivers.

Whereas traditional development patterns and practices on private and public property have exacerbated the negative impacts of runoff by shifting the natural hydrology from a regime dominated by evaporation and infiltration to one dominated by surface flow.

Whereas recent state studies indicate that commercial, highway and industrial land uses have high pollutant loading rates but the majority of the pollutant load to Puget Sound and local Kitsap County water bodies comes from residential land uses and the public infrastructure that supports these uses.

Whereas local groundwater studies indicate that approximately 80% of Kitsap County citizens obtain their drinking water from groundwater resources and these resources are only replenished by the infiltration of precipitation that falls on Kitsap County.

Whereas the Kitsap County Sewage Treatment Plants discharge large volumes of water into Puget Sound each year. With appropriate treatment this water could be better utilized to lower dependence on ground water.

Whereas regional studies show that sewage plants discharge over 80% of the dissolved inorganic nitrogen load south of Edmonds into Puget Sound. This nitrogen is a contributor to low dissolved oxygen in low circulation areas of Puget Sound.

Whereas the Kitsap County Board of Commissioners wishes to establish a culture of innovative development and operating practices that treat water as a resource rather than a waste stream.

NOW THEREFORE, BE IT RESOLVED by the Kitsap County Board of County Commissioners that the “Water is a Resource NOT a Waste Stream” Policy is hereby adopted.

Adopted this 22nd day of ___ June ____, 2009.

BOARD OF COUNTY COMMISSIONERS

http://www.kitsapgov.com/sswm/resource_policy.htm

Brookwood Green Street



Brookwood Lane in Central Kitsap

Brookwood Lane in Central Kitsap is Kitsap County’s first Green Street. The Brookwood residents wanted to reduce flooding impacts and liked the idea of building rain gardens to protect Puget Sound. In September 2011, ten rain gardens were built in the road right-of-way in this neighborhood.

Partnerships at Work

This project is a partnership among the Kitsap Conservation District (KCD), Kitsap County Public Works Surface and Stormwater Management (SSWM) Division, Washington Conservation Corps (WCC), and the Department of Ecology.



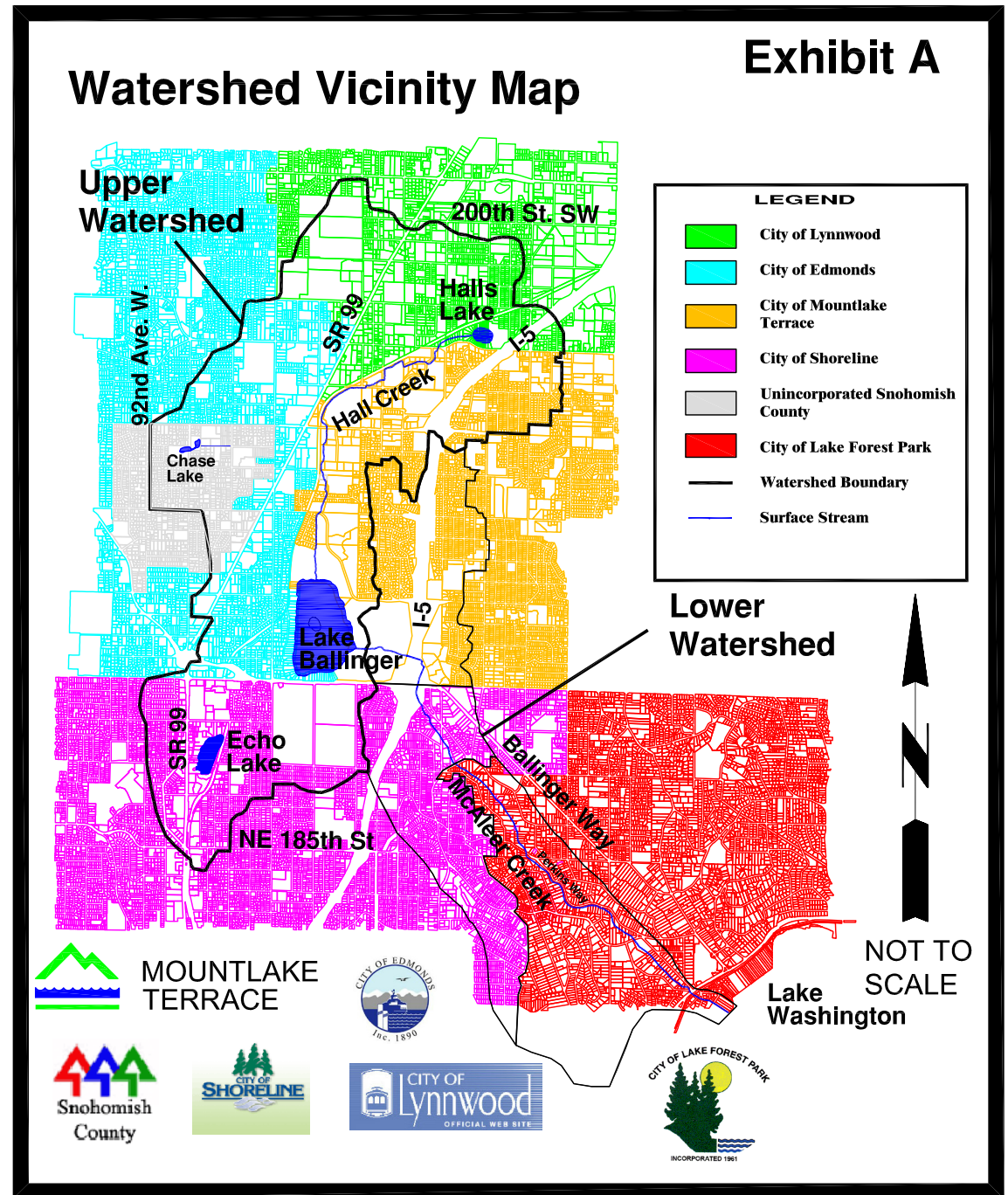
http://www.kitsapgov.com/sswm/pdf/Brookwood_Green_Street_Fact_Sheet.pdf

MULTIPLE AGENCY – PLANNING AND POLICIES

Lake Ballinger/McAleer Creek

Watershed Forum

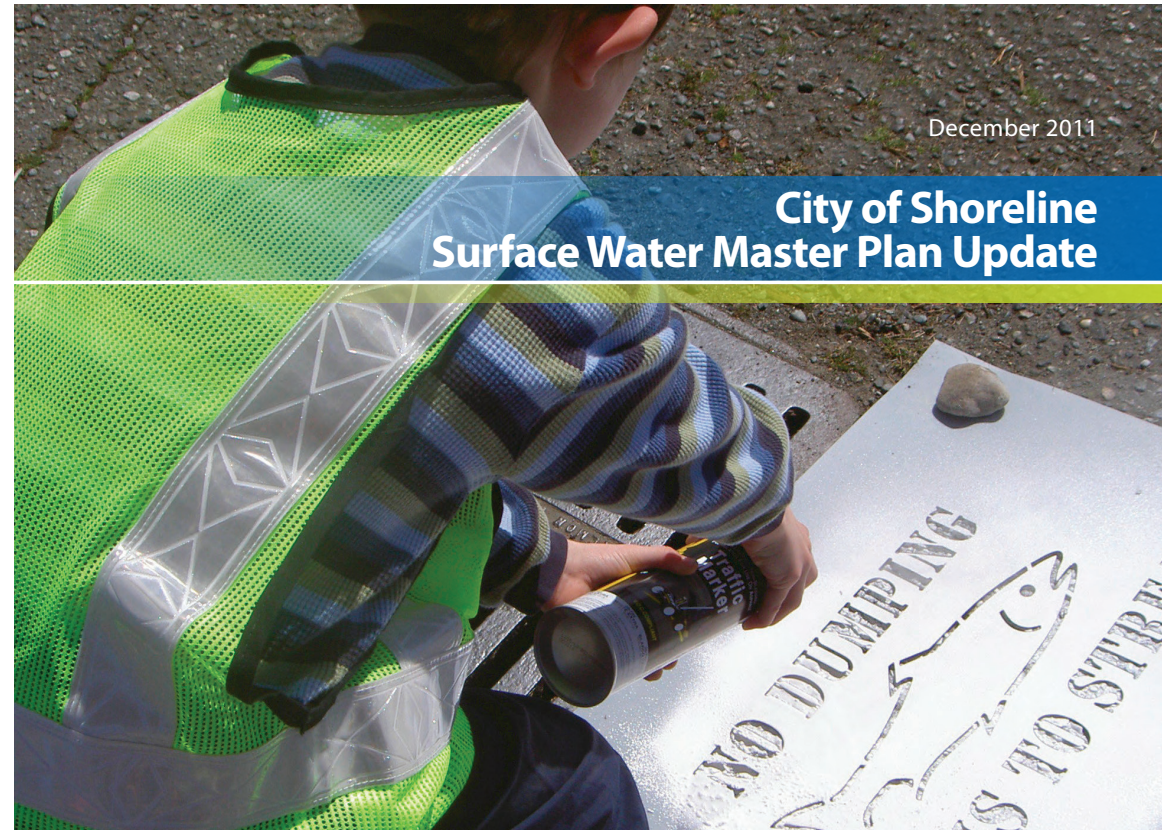
- Watersheds don't obey city or county boundaries
- 5 cities and 1 county coordinate around McAleer Creek



CITY – PLANNING AND POLICIES

City of Shoreline

- 2011 updated anticipated LID requirement
- Policies for level of service
- Outline operations and maintenance level of service to assess required funding



December 2011

City of Shoreline Surface Water Master Plan Update



Prepared in Association with SvR Design Company



SAIC®



CITY – PLANNING AND POLICIES
City of Shoreline

<http://shorelinewa.gov/government/departments/public-works/surface-water-and-environmental-services/surface-water-management/soak-it-up-lid-rebate-program>

MUNICIPAL CODES

Overview

City of Kirkland

- Integrated LID into municipal codes
- Outreach around successful projects

City of Fife

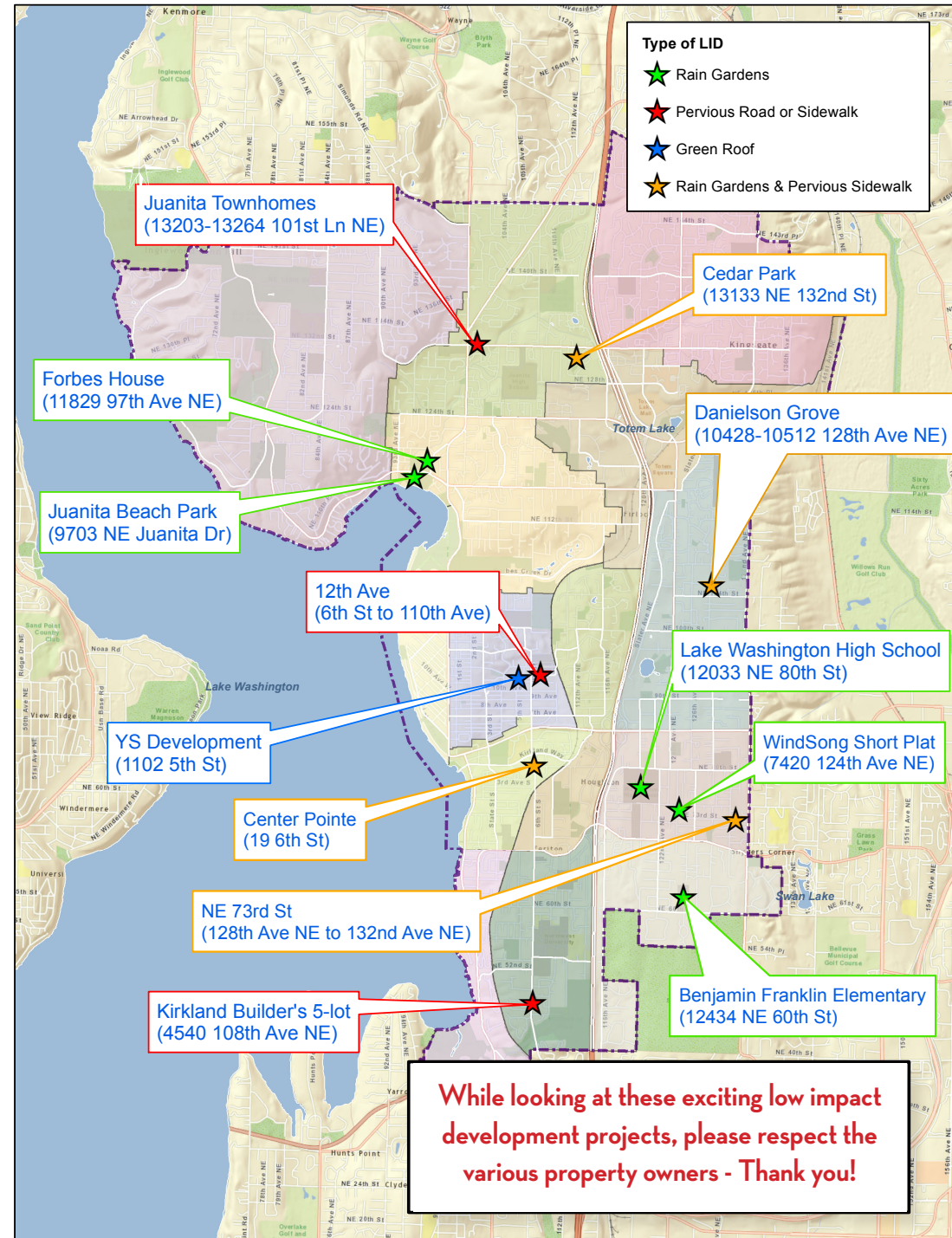
- Integrated LID into municipal codes

MUNICIPAL CODES

City of Kirkland

- Updated codes for coordinated LID integration
- Updated standard plans and specifications
- Reviewed CIP for opportunities to implement LID

<http://www.kirklandwa.gov/depart/Public Works/Storm Surface Water/Development and Construction/Low Impact Development.htm>



MUNICIPAL CODES

City of Fife

- Updated codes
- Created simple spreadsheet for development teams to use
- Identified how LID could be used with landscape requirements

FIFE GREEN FACTOR

Version 7.0-10-08

Parcel size (ENTER THIS VALUE FIRST!) enter sq ft of parcel

Minimum score 0.30 for areas under 1000 sq ft. Minimum score 0.40 for areas over 1000 sq ft. Minimum score 0.50 for areas over 10000 sq ft.

Types of Areas**	Square Feet	Factor	Total
A Vegetation planted with a soil depth of less than 24"			
1 Lawn or grass pavers or ground covers	<input type="text"/>	0.2	
B Vegetation planted with a soil depth of more than 24"			
1 Lawn, grass pavers or other plants less than 3' tall at maturity	<input type="text"/>	0.2	
2 Shrubs taller than 3' at maturity - calculated at 15 sq ft per plant (typically planted no closer than 10' on center)	<input type="text"/>	0.3	
3 Tree canopy for "small trees" in File Title 19.04 or equivalent canopy spread of 10' - calculated at 50 sq ft per tree	<input type="text"/>	0.7	
4 Tree canopy for "medium trees" in File Title 19.04 or equivalent canopy spread of 20' - calculated at 100 sq ft per tree	<input type="text"/>	0.3	
5 Tree canopy for "large trees" in File Title 19.04 or equivalent canopy spread of 30' - calculated at 200 sq ft per tree	<input type="text"/>	0.3	
6 Permeable paving that drains only itself. It must be at grade - calculated at 250 sq ft per tree	<input type="text"/>	0.4	
C Green roofs			
1 Over at least 2" and less than 4" of growth medium	<input type="text"/>	0.5	
2 Over at least 4" of growth medium	<input type="text"/>	0.8	
D Vegetated walls			
<input type="text"/>	<input type="text"/>	0.4	
<input type="text"/>	<input type="text"/>	0.8	
<input type="text"/>	<input type="text"/>	0.7	
<input type="text"/>	<input type="text"/>	0.7	
E Low impact development facilities including, but not limited to, rain gardens, stormwater planters, and bioretention swales			
Bonuses			
1 Landscaping that consists entirely of drought tolerant or native species, as reviewed by the Director	<input type="text"/>	0.1	
2 Landscaping visible to passers-by from adjacent public right of way or public open spaces	<input type="text"/>	0.2	
3 Landscaped areas where at least 50% of annual irrigation needs are met through the use of harvested rainwater	<input type="text"/>	0.1	
4 Landscaping to be maintained in food cultivation	<input type="text"/>	0.1	

gross factor (sum of E)

Do not count public rights of way in parcel size calculation.
To calculate your green factor score, you may count the landscape elements that are in public rights of way if they are contiguous with the parcel.

LOW IMPACT DESIGN STANDARDS ROADSIDE BIORETENTION SWALE WITH CURB

ROAD AND CURB DETAIL 3

ROAD PAVEMENT SECTION PER CIVIL ENGINEER OR LANDSCAPE ARCHITECT

AMENDED SOILS PER 21 FOR AMENDED SOIL GUIDELINES

GRAVEL BACKFILL PER 2005 WSDOT STANDARD SPECIFICATION 9-01.12(4)

STREET TREE BEYOND TYP. DEPTH VARIES. REFER TO FMC TITLE 21 FOR SWALE GUIDELINES. SWALE BOTTOM OF SWALE TOWARDS DRAIN INFT.

MULCH

UTILITY FASMENT 10' TYP.

OPTIONAL SLOTTED STORM DRAIN SIZED PER CIVIL ENGINEER, 6" MIN.

NOTES

1. DIMENSIONS ARE MINIMUM AND SUBJECT TO CITY PUBLIC WORKS DIRECTOR APPROVAL
2. TOP OF CURB AND FACE OF WALK MAY BE SAME ELEVATION PER PUBLIC WORKS DIRECTOR

http://www.cityoffife.org/?p=city_departments&a=community_development&b=fife_green_factor

DEVELOPMENT PARTNERING

Overview

City of Bellevue

- Bel-Red EIS integrated stormwater planning
- Recognized opportunities to partner with development
- Identified potential incentives to offer developers

City of Marysville

- Downtown Master Plan integrating stormwater management

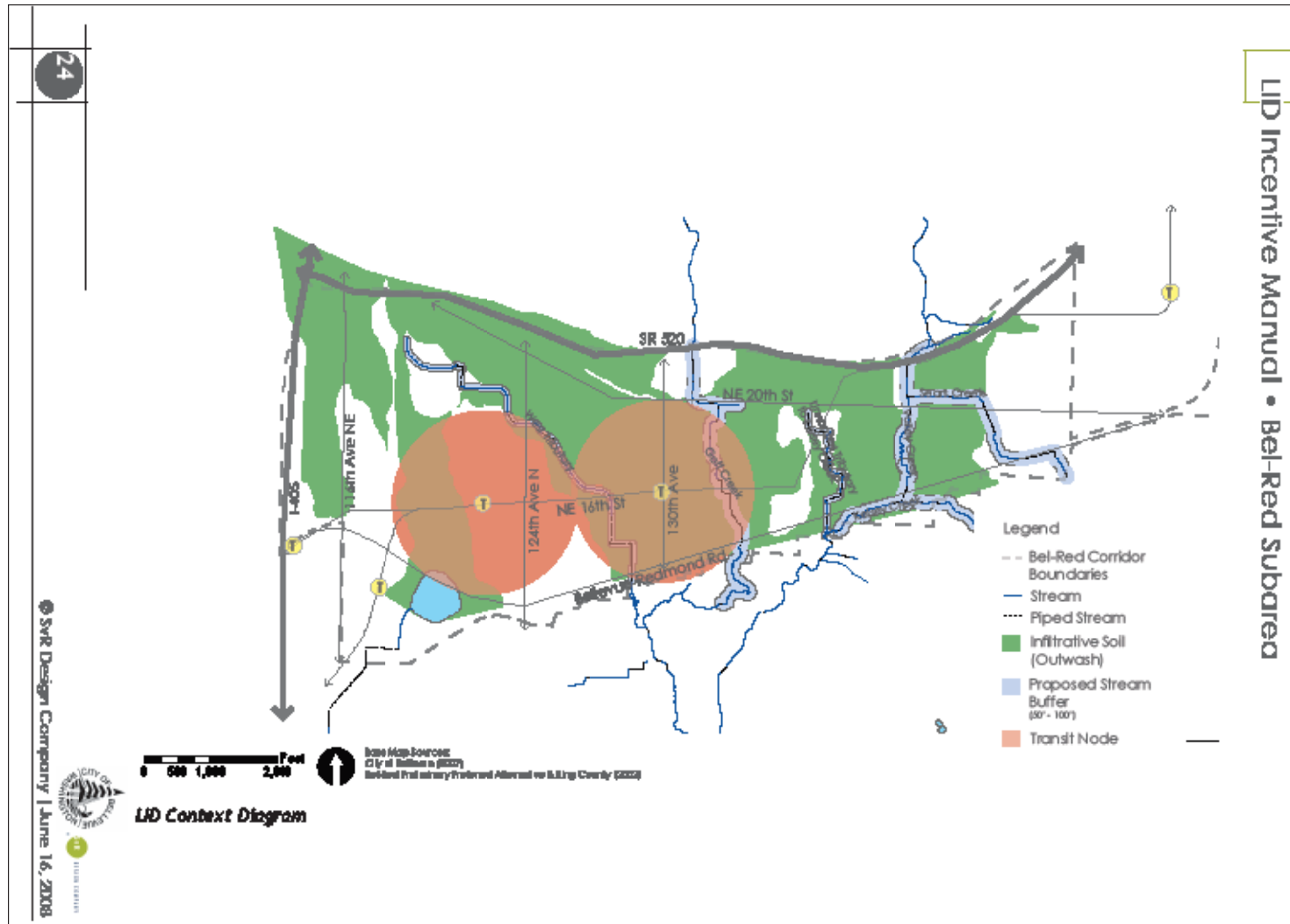
City of Seattle

- Regional facilities integrated within private development
- Water quality capacity benefits future redevelopment

DEVELOPMENT PARTNERING

City of Bellevue

Bellevue's EIS process looked at stormwater and creeks and how LID could be implemented in the Bel-Red Corridor.



http://www.ci.bellevue.wa.us/bel-red_intro.htm

DEVELOPMENT PARTNERING

City of Bellevue

The study also looked at soil conditions within the Bel-Red Corridor to help determine what LID facilities could be applicable.

SVR Design Company | June 16, 2008


stormwater coordination
at the policy level

LID Incentive Manual • Bel-Red subarea


LID & Natural Drainage Practices (NDP) summary by location & incentives

Infiltrative Soil	Creek Buffer	Transit Nodes	Incentives
<p>NDP</p> <ul style="list-style-type: none"> biofiltration swale stormwater planters raingardens tree preservation dispersal/infiltration trench porous pavement amended soils increased landscaping 	<p>NDP</p> <ul style="list-style-type: none"> creek restoration bioretention swale biofiltration swale raingardens tree preservation dispersal or infiltration trench amended soils increased landscaping 	<p>NDP</p> <ul style="list-style-type: none"> stormwater planters porous pavements tree preservation tree pit/tree box filters vegetated roofs increased landscaping 	<p>Incentives</p> <ul style="list-style-type: none"> FAR and/or height bonus landscape code flexibility critical area setback flexibility parking requirement adjustment transfer of development rights* reduction of stormwater fees* maintenance of LID by City* grant money/rebate* City builds LID* LID design services* signage bonus* allow for LID in public ROW <p><small>* encourages retrofit of existing system</small></p>


tree preservation




creek restoration




raingarden




stormwater planter




vegetated roof




biofiltration swale




tree pit




dispersal and infiltration trench




porous pavement




amended soils




dispersal




tree pit




vegetated roof




biofiltration swale



tree pit



dispersal



25

DEVELOPMENT PARTNERING

City of Marysville

Marysville Downtown Master Plan Addresses Stormwater

- Redevelopment of downtown
- Manage stormwater from adjacent parcels
- Integrate stormwater into the urban design of the streetscape

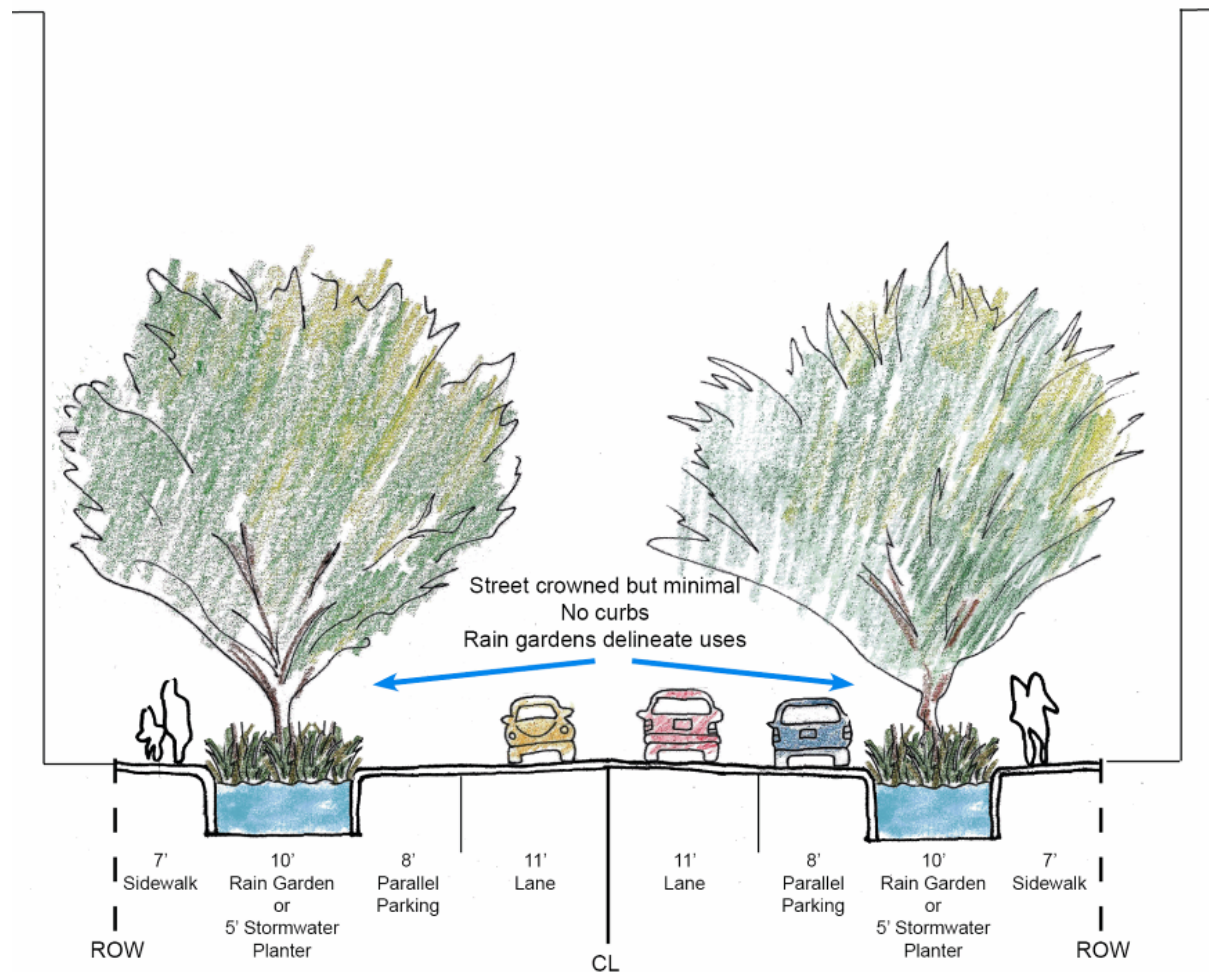


Figure 57. Standard street cross-section, rain gardens or stormwater planters.

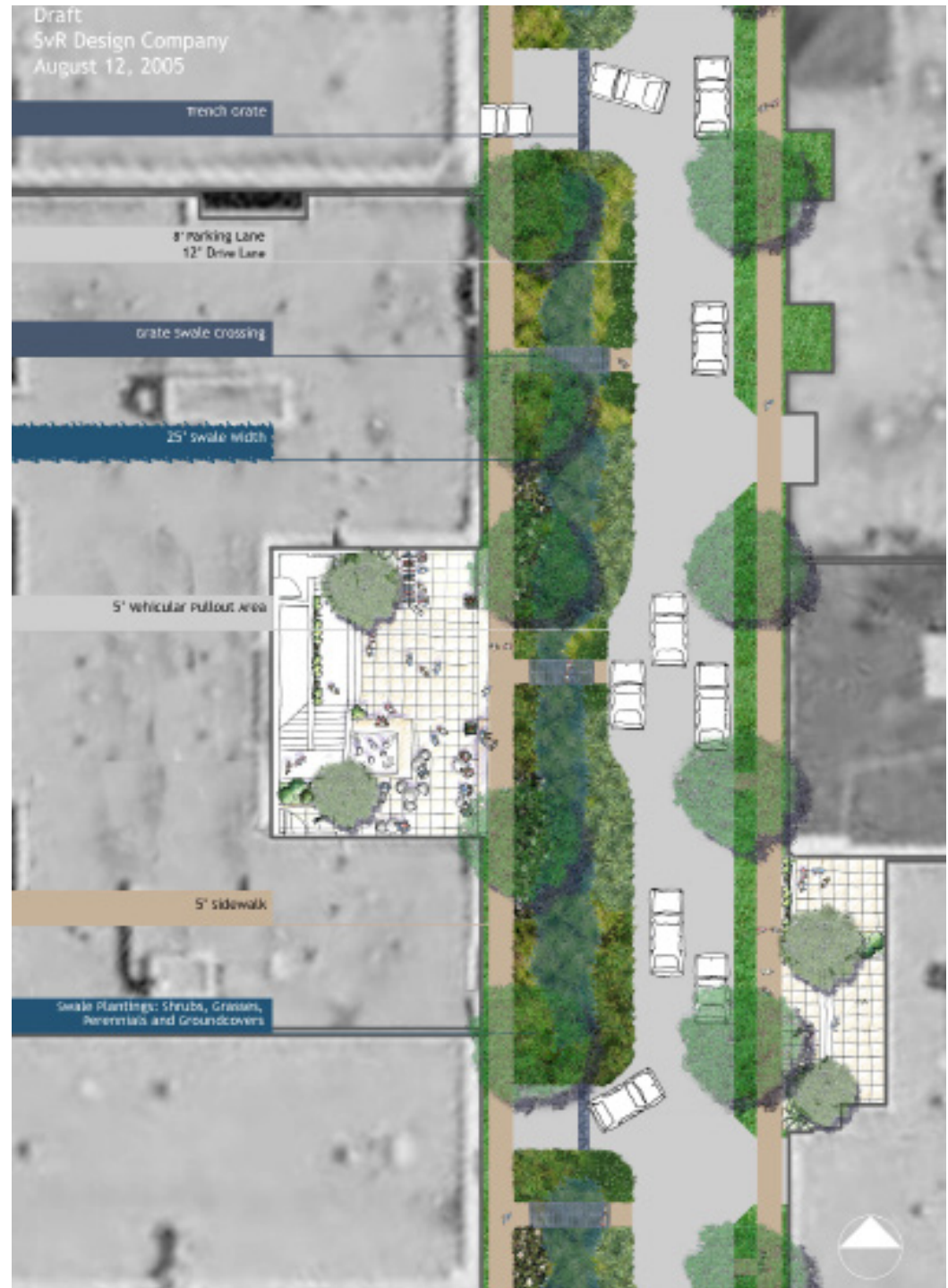
DEVELOPMENT PARTNERING

City of Seattle

Swale on Yale

- Treats 630 acres of redeveloping area in Seattle
- \$10 million project
 - \$1 million grant from Ecology
 - \$1.8 million loan from Ecology
 - \$1.2 million from Vulcan
- Integrates stormwater into urban design of the streetscape

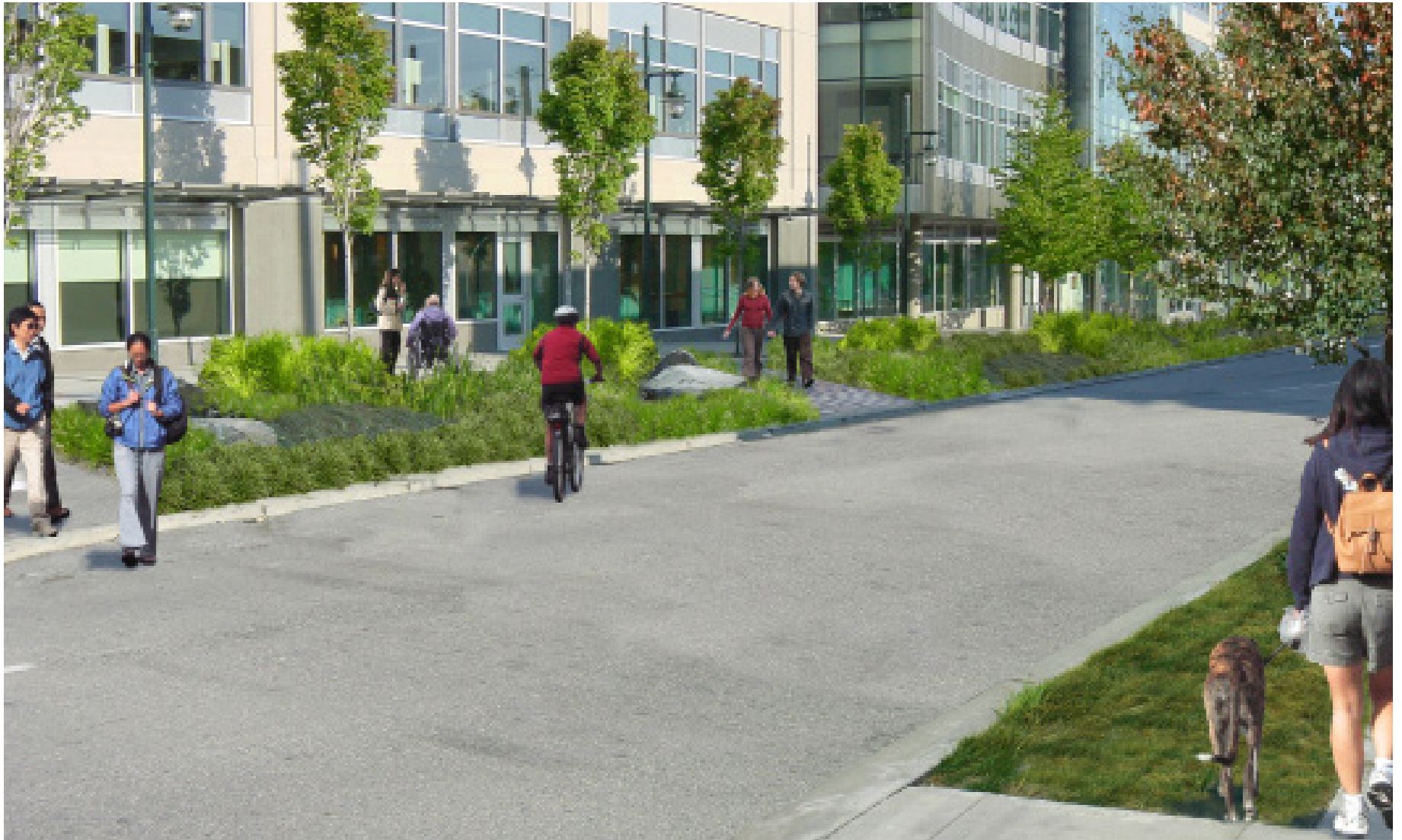
<http://www.seattle.gov/util/MyServices/DrainageSewer/Projects/SwaleOnYale/index.htm>



DEVELOPMENT PARTNERING

City of Seattle

Swale on Yale



<http://www.seattle.gov/util/MyServices/DrainageSewer/Projects/SwaleOnYale/index.htm>

DEVELOPMENT PARTNERING

City of Seattle

Swale on Yale



<http://www.seattle.gov/util/MyServices/DrainageSewer/Projects/SwaleOnYale/index.htm>

DEVELOPMENT PARTNERING

City of Seattle

Thornton Creek Water Quality Channel

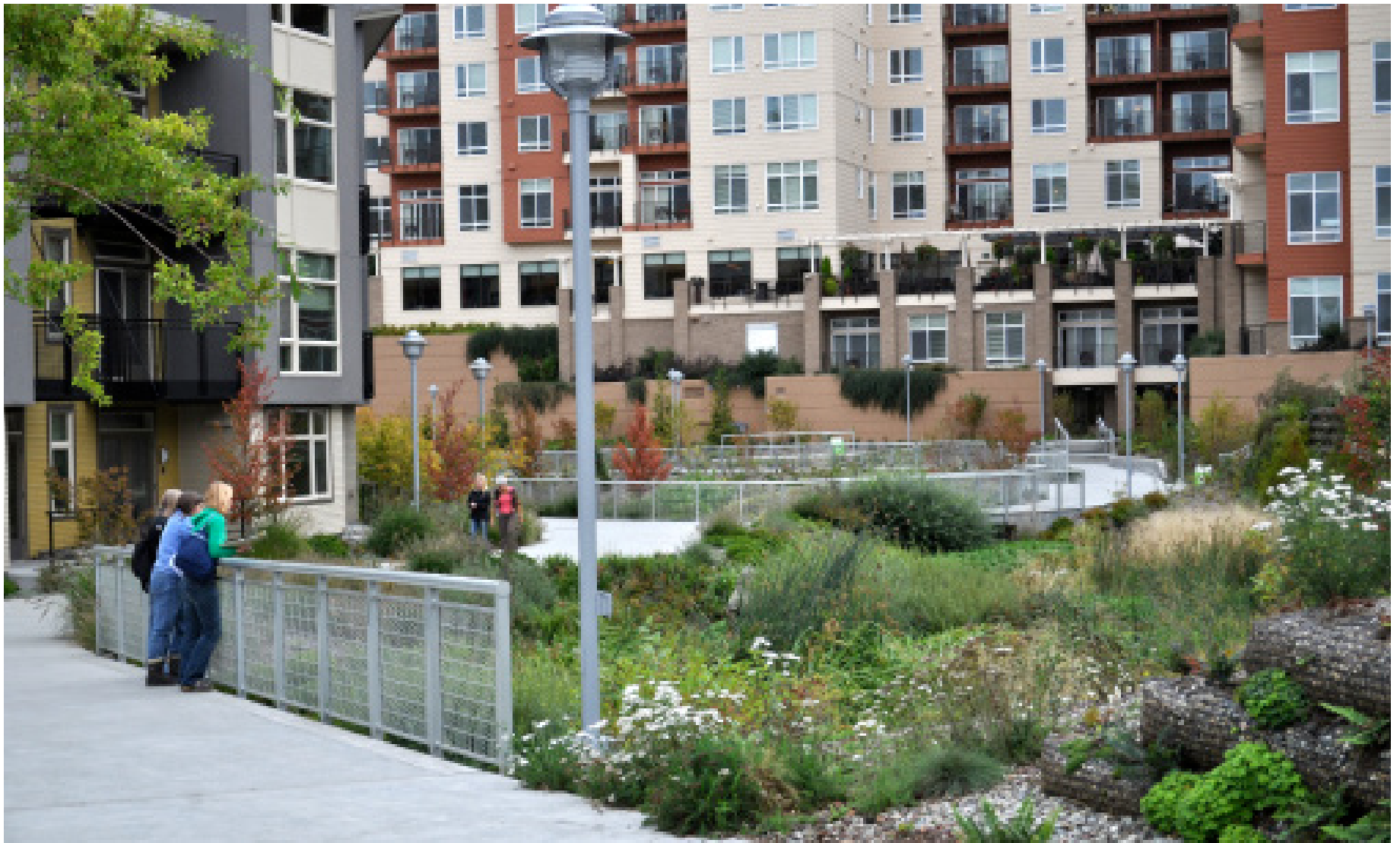
- Treats 680 acres of adjacent redeveloping station area
- Regional facility that integrates stormwater and open space adjacent to new residential and commercial development



DEVELOPMENT PARTNERING

City of Seattle

Thornton Creek Water Quality Channel



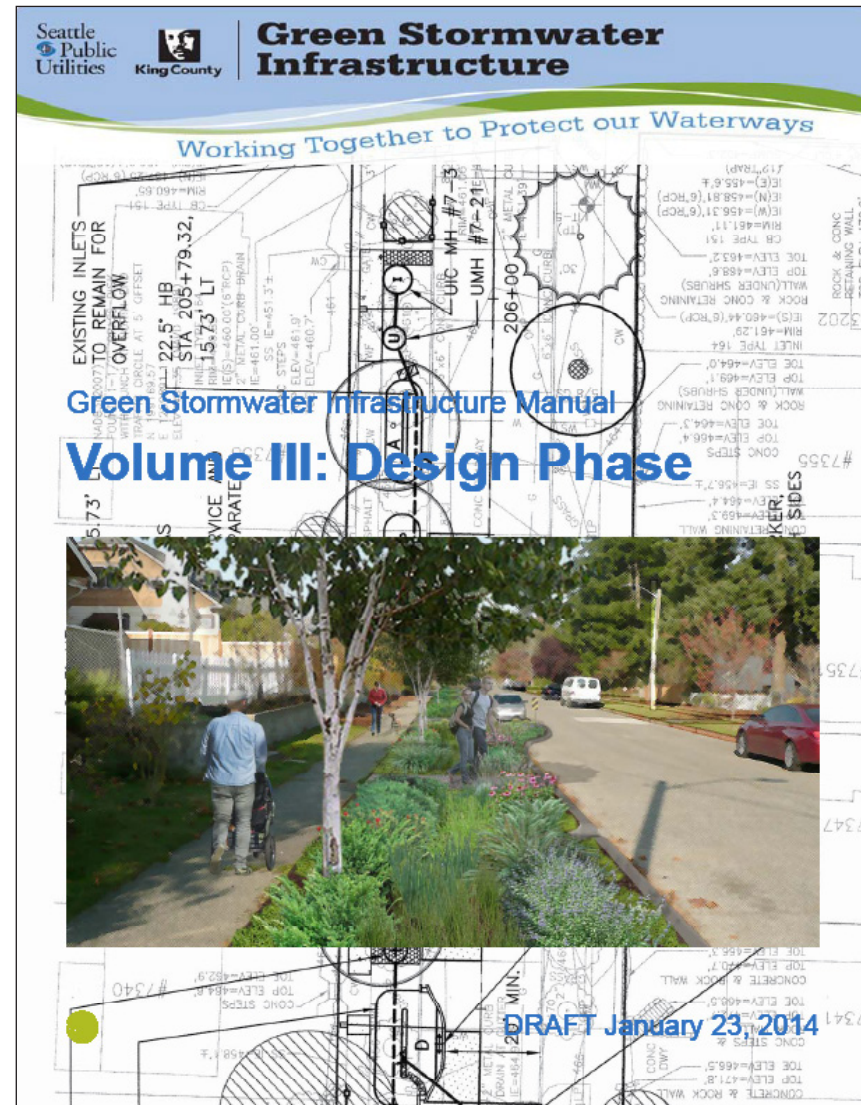
<http://www.seattle.gov/util/Engineering/Projects/DrainageSystem/ThorntonCreek/index.htm>

DEVELOPMENT PARTNERING

City of Seattle and King County Wastewater Treatment Division

Green Stormwater Infrastructure Program

- King County and Seattle are partnering to make design and implementation of green stormwater infrastructure (GSI) consistent, clear and predictable
- Addresses both creek basins and combined sewer basins



<http://www.seattle.gov/util/EnvironmentConservation/Projects/DrainageSystem/GreenStormwaterInfrastructure/StormwaterCode/index.htm>

Implementing Vision 2040: Sustainable Stormwater Management Innovative Practices in the Puget Sound Region



Amalia Leighton, PE / AICP
Director, Planner, Civil Engineer

with

Peg Staeheli, ASLA, LEED AP
Principal Landscape Architect

Kathryn Gwilym, PE, LEED AP
Principal Civil Engineer

www.svrdesign.com | [tw. @svrdesign](https://twitter.com/svrdesign) | [fb. www.facebook.com/svrdesign](https://www.facebook.com/svrdesign)



Department of Commerce
Innovation is in our nature.

