

2025 Green Stormwater Infrastructure Target + Urban Forestry



Green Stormwater Infrastructure Target + Urban Forestry

PURPOSE OF BRIEFING

- Provide overview of 2025 Green Stormwater Infrastructure Resolution, Executive Order, and draft Strategy -- particularly as they relate to street trees
- Provide overview of connections and areas of coordinated program development between SPU GSI Program and SDOT Urban Forestry Program (and Trees for Neighborhoods)
- Provide overview of design guidance developed in a coordinated fashion between SPU GSI Program and SDOT Urban Forestry Program
- Q + A // Discussion

Green Stormwater Infrastructure Strategy + Urban Forestry

GSI RESOLUTION, EXECUTIVE ORDER + STRATEGY

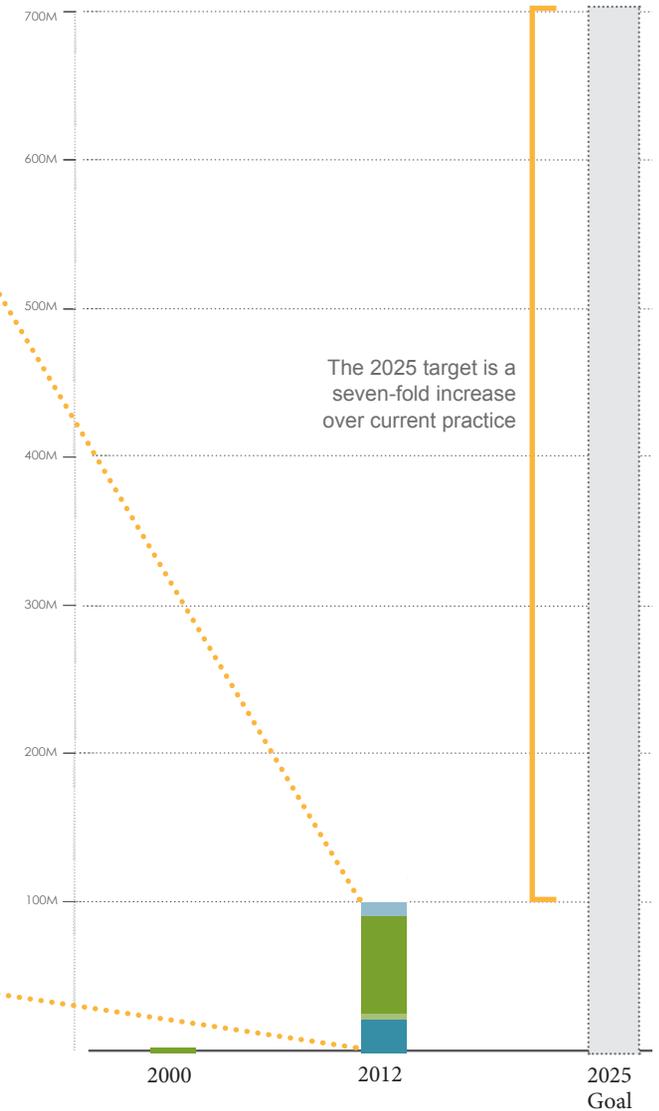
Seattle City Council unanimously passed Resolution 31549 in July of 2013, establishing green stormwater infrastructure (GSI) as a critical aspect of a sustainable drainage system and challenging Seattle to rely on GSI to manage stormwater runoff whenever possible.

The GSI Resolution and related Executive Order also adopted a new implementation target for Seattle:

Manage 700 million gallons of runoff annually with GSI by the year 2025.

Table 1. 2000-2012 Implementation Baseline

GSI Baseline 2000-2012	gallons managed
1) Required by Stormwater Code	
Single family; parcel-based; right-of-way; trails and sidewalks;	8.7M
2) Voluntary Utility-Led & Funded Retrofit Projects	
Seattle Public Utilities SEASTreets; Carkeek Cascade; Broadview Green Grid; Pinehurst Green Grid; Highpoint Redevelopment; Ballard I	67M
3) Voluntary Utility-Incentivized Retrofits	
Seattle Public Utilities RainWise; ReLEAF street tree planting	2.5M
4) Voluntary Non-Utility Led/Funded Retrofits	
Seattle Department of Transportation Street tree planting & retention; permeable pave sidewalks not installed for Stormwater Code	1.9M
Seattle Parks & Recreation Capital projects & street tree-equivalent planting and retention	10M
Community-Led Projects Voluntary green roof installations; projects led by community groups, businesses, or other non-profit organizations (not funded by SPU or WTD)	10.4M
Total	100.5M



Green Stormwater Infrastructure Strategy + Urban Forestry

GSI RESOLUTION, EXECUTIVE ORDER + STRATEGY

Where do trees fit in?



Figure 1. Green Stormwater Infrastructure Examples

- 1 Roadside Bioretention
- 2 Pervious Concrete
- 3 Vegetated Roof
- 4 Street Trees
- 5 Stormwater Cisterns
- 6 Compost-Amended Soil
- 7 Biofiltration
- 8 Residential Raingarden

Throughout the Strategy, GSI is defined as:

A set of distributed stormwater best management practices that use or mimic natural processes to slow, infiltrate, evapotranspire, and/or harvest and reuse stormwater runoff from impervious surfaces, on or near the site where it is generated.

Q: Were all trees in Seattle “counted” in the GSI baseline?

A: No. Street trees and trees in parks that act like street trees (are adjacent to impervious surfaces and help minimize runoff from those impervious surfaces) were counted and will be tracked/counted moving forward.

In general, the 2000-2012 baseline does not include rainwater infiltration and evaporation provided by all vegetated shallow depressions, informal gullies and ditches, all pervious or semi-pervious surfaces, mulched soil cover, vegetated riparian areas, wetlands, and forested areas within Seattle, though the ecosystem services value of these systems is enormous. These areas are stewarded via programs such as GSP.

Range of Approaches for Addressing Stormwater Challenges in Seattle

Protecting and restoring critical ecological services and in-tact ecosystem patches	← GSP is focused here
Preventing pollution with practical programmatic approaches	
Using smart operational fixes	
Enforcing regulations	
Investing in new or improved infrastructure	← 2025 GSI Strategy is focused here

GSI in the Right-of-Way + Urban Forestry

SPU's GSI Program + SDOT's Urban Forestry Program Coordination

Optimizing Trees and Bioretention in the Right-of-Way

Designers working to implement GSI in the public right-of-way use an iterative design approach to ensure the best possible combination of stormwater performance and tree canopy improvement in the streetscape. "Figure 10. Bioretention and Street Tree Siting" below is an example of an in-process design drawing, showing trees slated for protection, transplantation, replacement, and new planting.

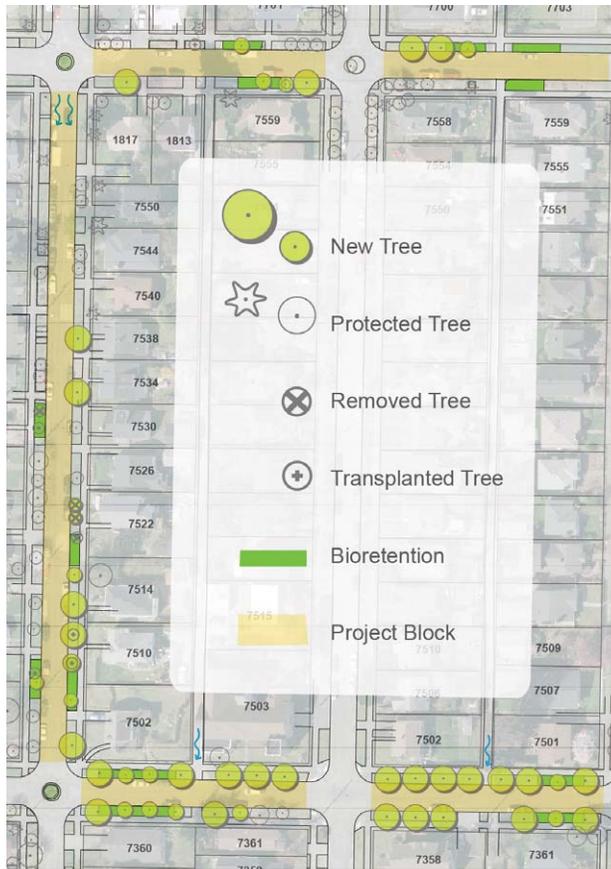


Figure 10. Bioretention and Street Tree Siting

The iterative approach includes these steps:

- **Existing Conditions Assessment** -- Walking the entire proposed project area with a Seattle Department of Transportation landscape architect and assessing the current condition of every street tree. Established trees are flagged for protection. Diseased or poorly planted trees are marked as potential opportunities for replacement with a healthier or more suitable species. Immature trees are noted for possible transplantation if necessary.
- **30%, 60%, 90% Design** -- Different aspects related to optimizing stormwater performance and tree canopy improvements are examined as the design becomes more detailed. At 30% design, for example, proposed general locations for new street trees may be identified. These will be solidified at 60% and finalized at 90%, when species selection will also be finalized. This is typically done with significant input from community members.
- **Construction/Planting and Long Term Maintenance** When the project has been designed and built, both the bioretention facilities and new street trees are recorded and mapped as public assets. Seattle Public Utilities maintains the bioretention cells and Seattle Department of Transportation maintains the street trees.

Table 7. Example Tree Canopy and Bioretention Optimization
Ballard Roadside Bioretention Phase II (excerpt)

Trees removed (diseased or poorly planted)	4
New trees planted	44
Trees retained/protected (established trees that were designed around)	33
Trees transplanted in project area or given to interested property owner	4
Approximate gallons managed with bioretention	1.5M



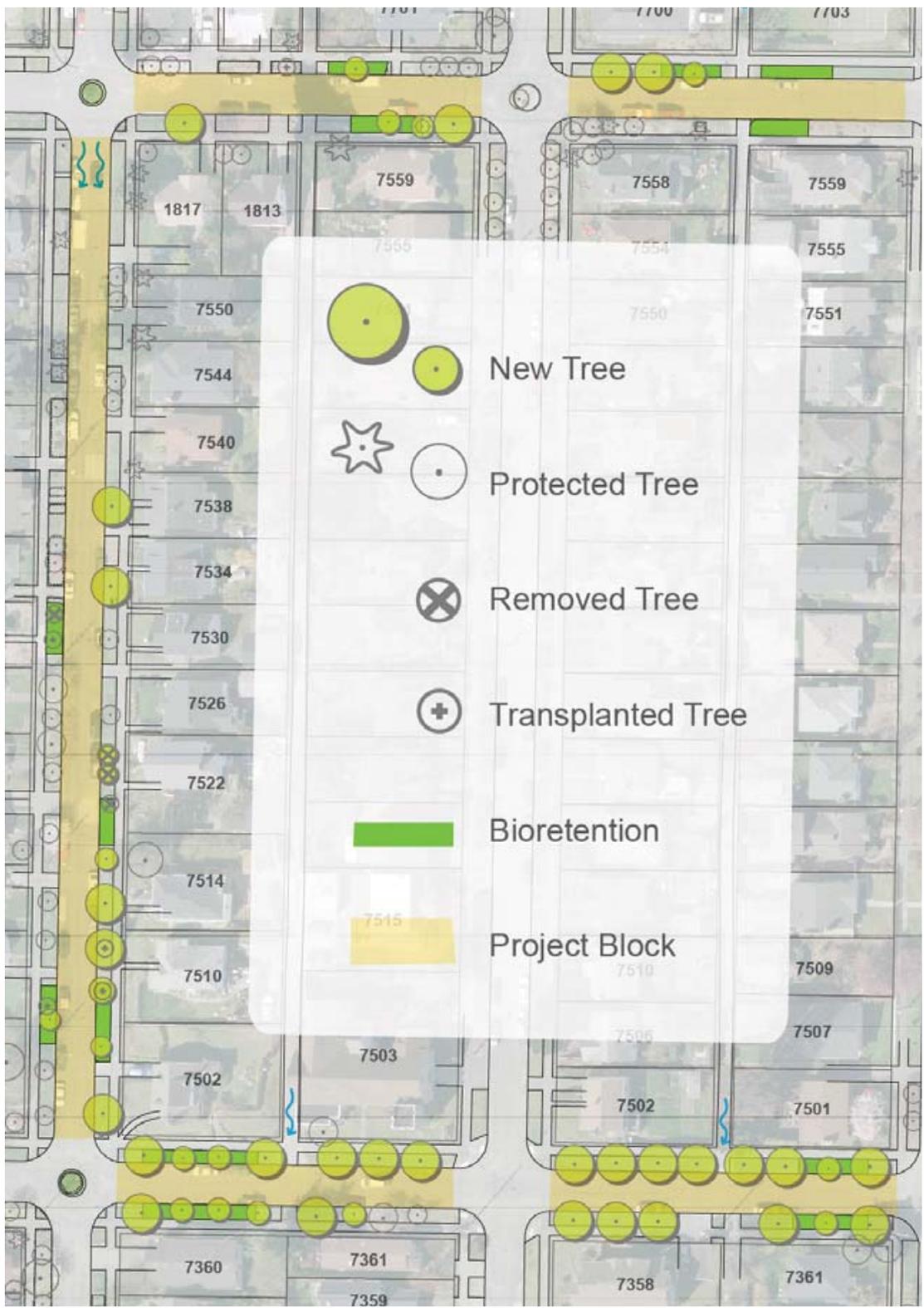


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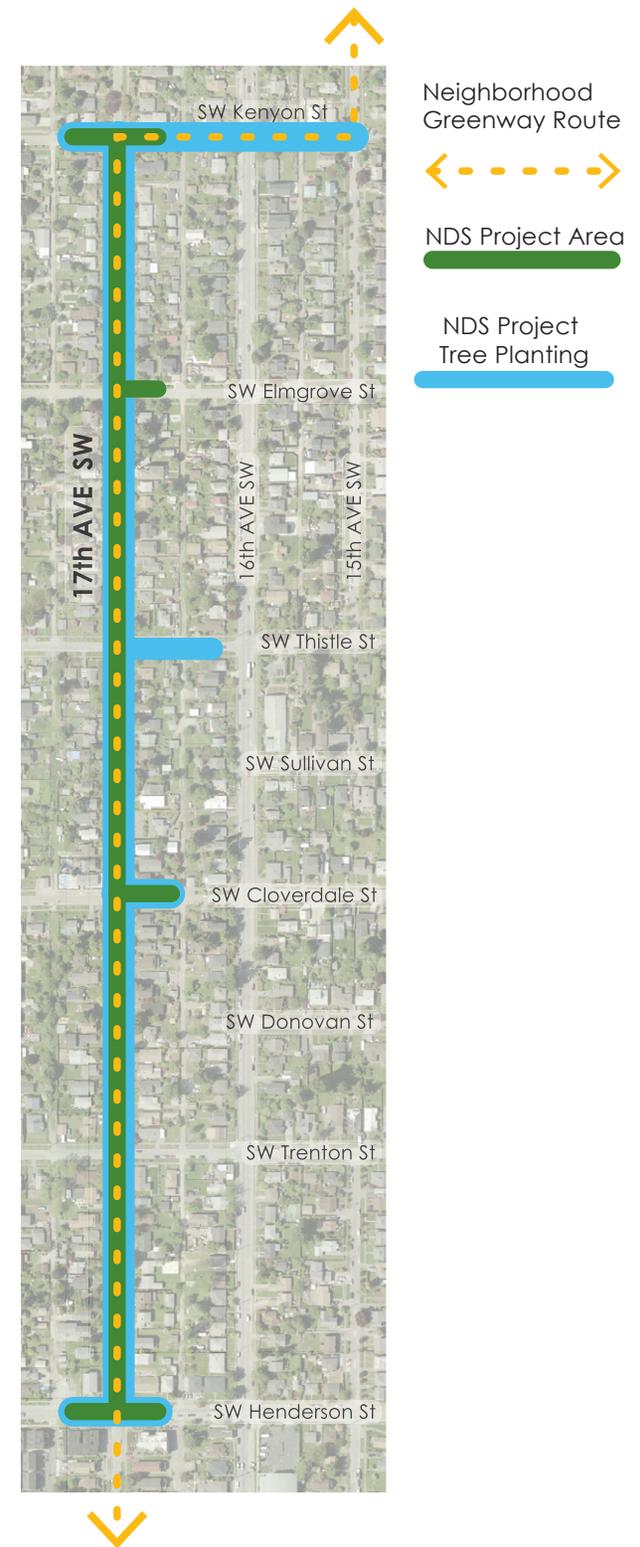
GSI in the Right-of-Way + Urban Forestry

Layered Goals in Roadside GSI Projects

Example: Delridge Neighborhood Greenway

- Coordinated public outreach + engagement process
- Project improves water quality in Longfellow Creek, adds street trees within (and beyond) project area, and improves walking and biking safety and experience along Neighborhood Greenway
- In addition, Trees for Neighborhoods offering tree planting and care workshop

NOTE: "NDS" = Natural Drainage Systems



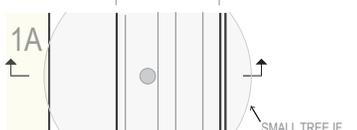
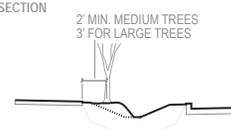
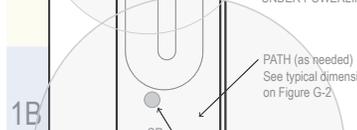
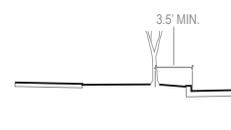
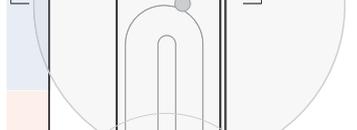
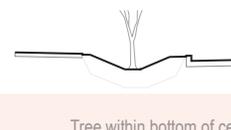
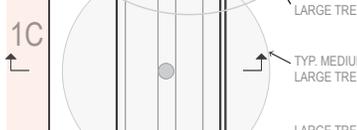
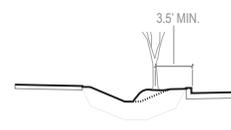
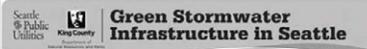
GSI in the Right-of-Way + Urban Forestry

Design Guidance Developed Collaboratively (SPU + SDOT)

See Handout

			
OBSERVE	DETERMINE	DRAW	IDENTIFY
Existing conditions.	Bioretention Cell Type & Strategy.	Rough design for bioretention cells w/existing trees.	Remaining open areas for new tree plantings.
Engineer Landscape Architect Arborist	Engineer (Lead) Design Team	Engineer (Lead) Design Team	Landscape Architect (Lead) Design Team
Example Resources: - SDOT Urban Forestry Assessment - Team Site Walk - GIS & Online Maps	Example Resources: - Site Analysis - GSI Design Manual Tables 8-9 to 8-12	Example Resources: - GSI Design Manual Block Templates in Appendix D.	Example Resources: - GSI Design Manual Appendix D. - Figures BPT-1 to BPT-5
Reference Materials			GSI Figure #
Guidance notes and excerpts from GSI manual			BTP-2
Strategies for Trees along ROW Bioretention : GSI Cells without Underdrains Diagram			BTP-3
Strategies for Trees along ROW Bioretention : GSI Cells with Underdrains Diagram			BTP-4
Strategies for Trees along ROW Bioretention : GSI Vertical Wall Cells with & without Underdrains Diagram			BTP-5
Tree Planting within Bioretention with Sloped Sides			BTP-6
Seattle Standard Plan No. 030, 100a, 100b, 100c, 101, and 110.			
Right-of-Way Improvement Manual			
Prepared by: SvR Design Company			
 Green Stormwater Infrastructure in Seattle Working Together to Protect our Waterways		Strategies for Trees Along R.O.W. Bioretention Cells DESIGN WORKFLOW & GUIDANCE NOTES September 24, 2015	
		GSI MANUAL BTP-1	

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PLAN	6± SIDEWALK	10' MIN.	SECTION
1A		SMALL TREE IF UNDER POWERLINE	
1B		PATH (as needed) See typical dimensions on Figure G-2	
1C		LARGE TREE TYP. MEDIUM TO LARGE TREE	
1D		LARGE TREE	
Prepared by: SvR Design Company			
 Green Stormwater Infrastructure in Seattle Working Together to Protect our Waterways		Strategies for Trees Along R.O.W. Bioretention Cells GSI CELLS WITHOUT UNDERDRAINS DIAGRAM September 24, 2015	
		GSI MANUAL BTP-3	

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Green Stormwater Infrastructure + Street Trees in Seattle

Q + A // Discussion

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Darren Morgan, Urban Forestry Manager
Seattle Department of Transportation



Central Waterfront concept



14th Ave. NW concept