SPU Green Stormwater Infrastructure Program & Project Update

Creeks, Drainage & Wastewater Advisory Committee

October 8, 2014

Don Anderson, Shanti Colwell

Seattle Public Utilities

GSI Program & Projects Agenda

- **Green Infrastructure Program**
- **Active GSI Projects**
  - Delridge NDS *(design)*
  - Ballard Natural Drainage System Phase 2 *(design)*
- **GSI Program - Looking Ahead**

Green Stormwater Infrastructure

Tries to make this…

…function more like this.

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Stormwater Challenges

Too Much Runoff: flooding, sewer back-ups, overflows



Too Much Pollution: damage to local waterways


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GSI Design Approaches








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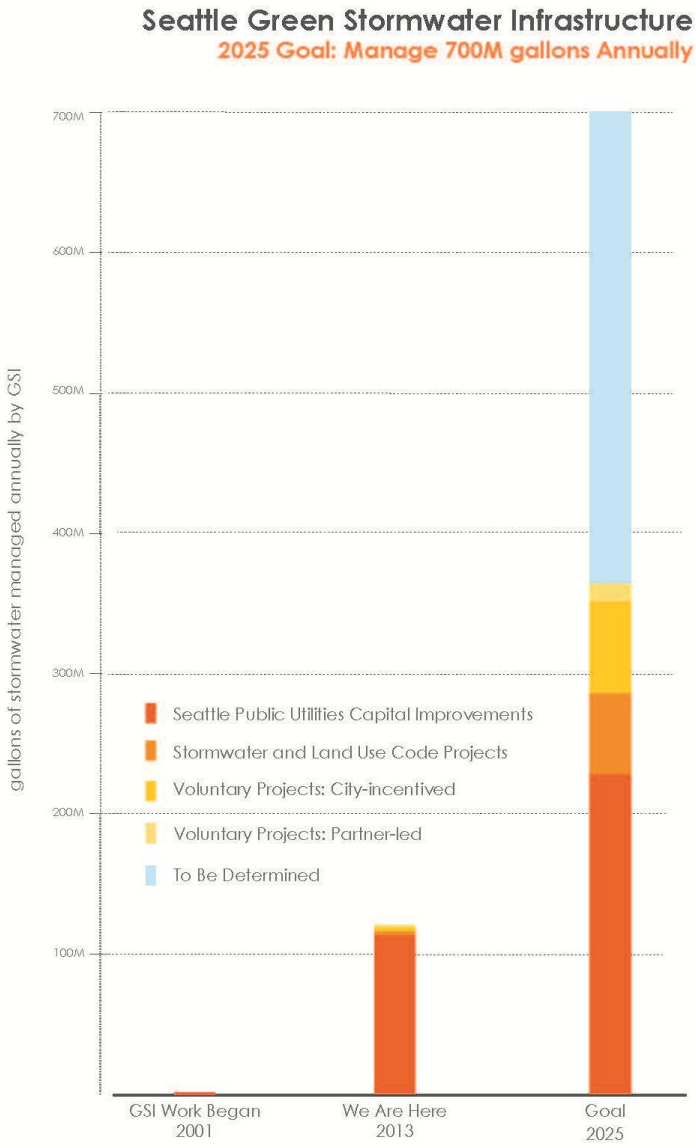
Policy + Program Development



In July 2013, City Council unanimously passed Resolution 31549:

- GSI should be relied upon to manage stormwater wherever possible
- Target to manage 700MG annually with GSI by 2025
- City Departments shall collaborate with OSE to produce Implementation Strategy for meeting new target

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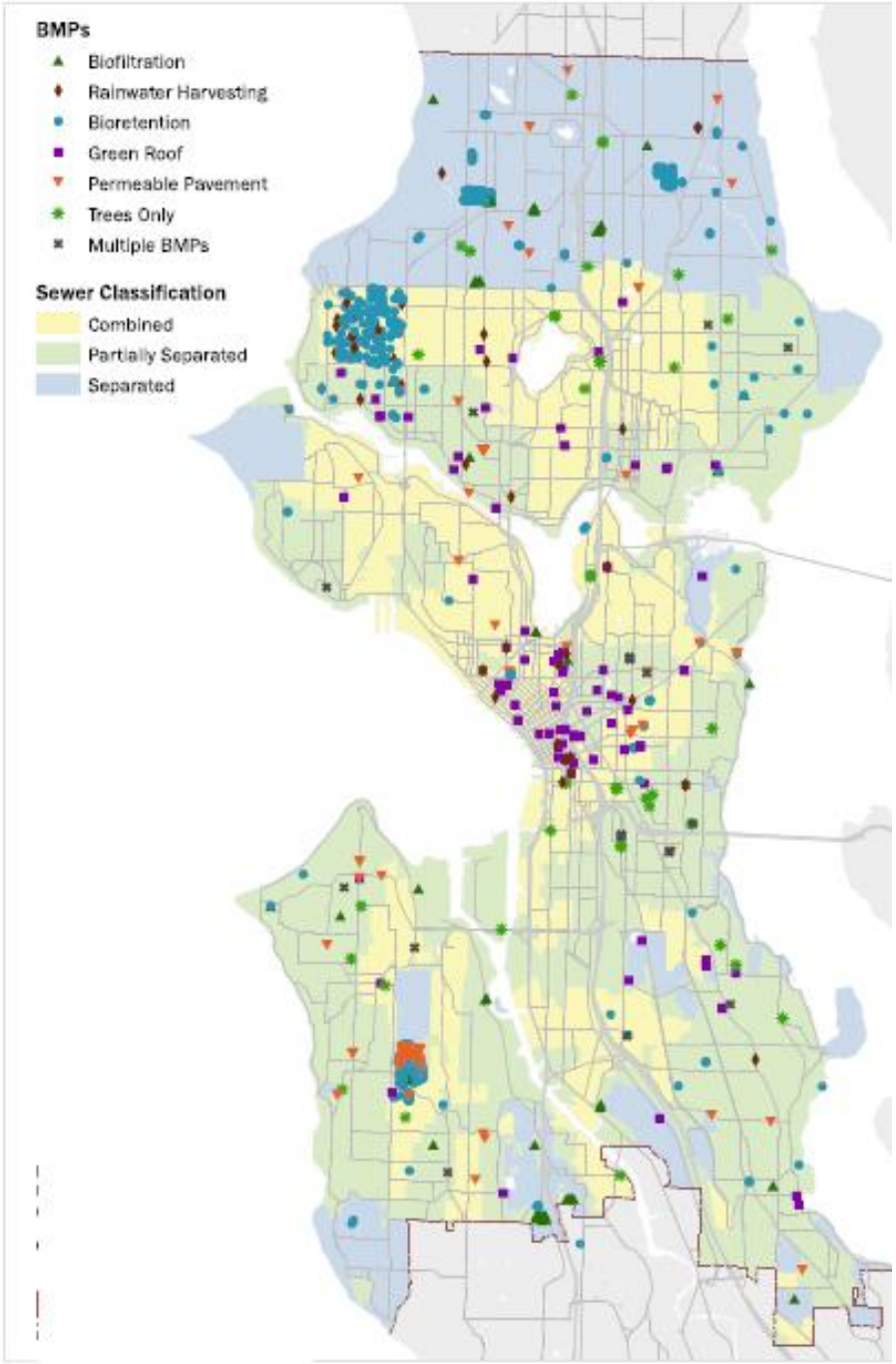

Existing GSI Projects in Seattle

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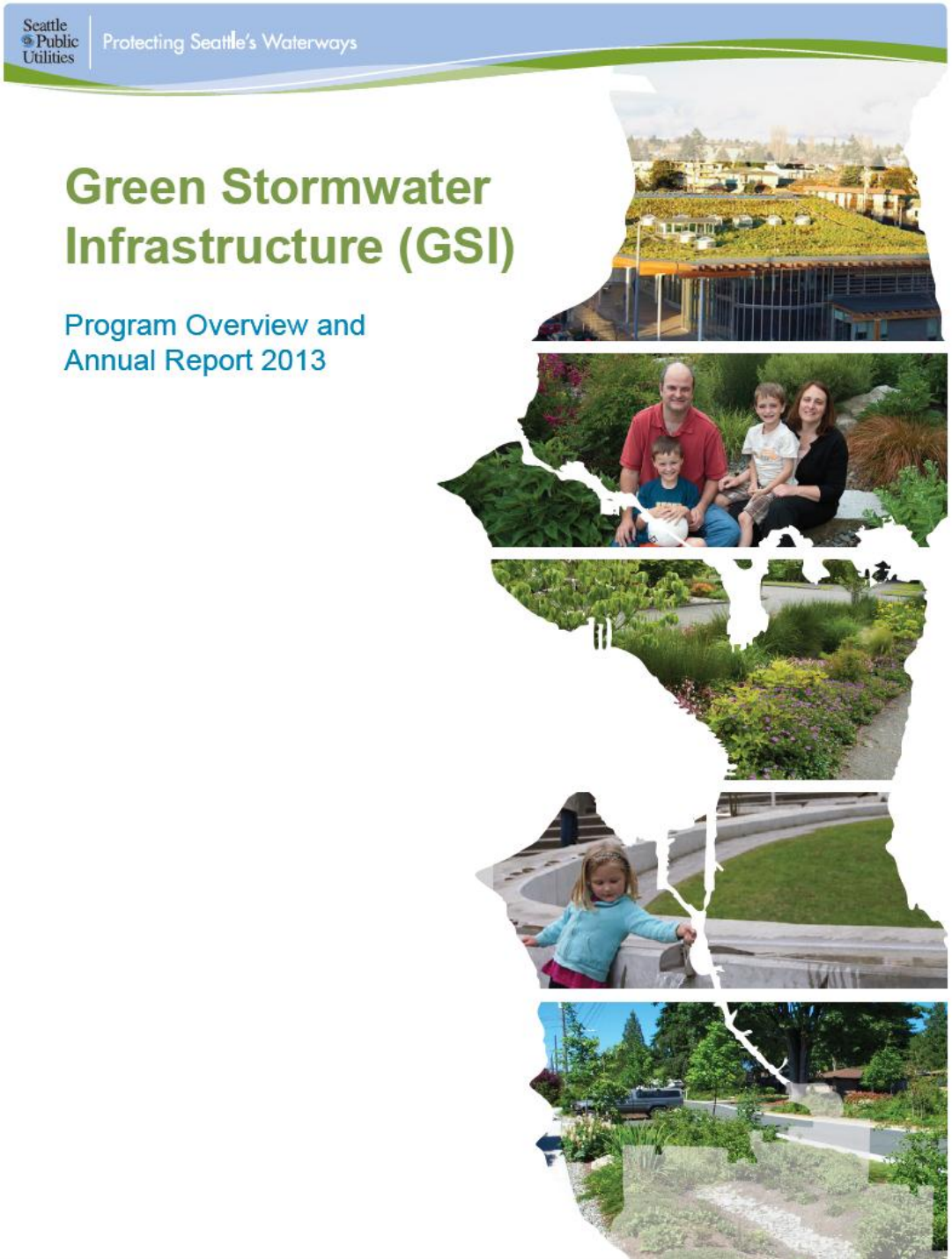
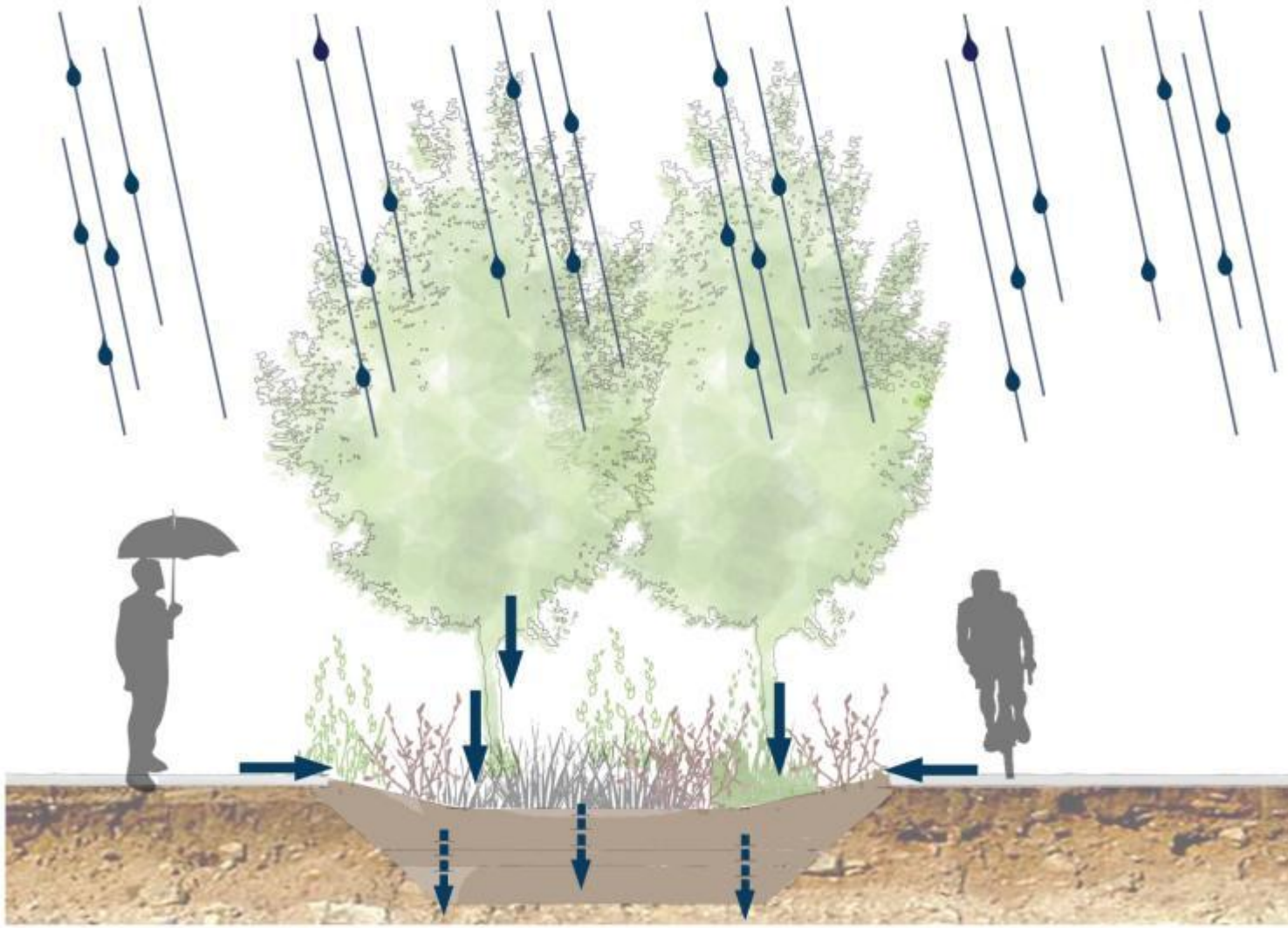
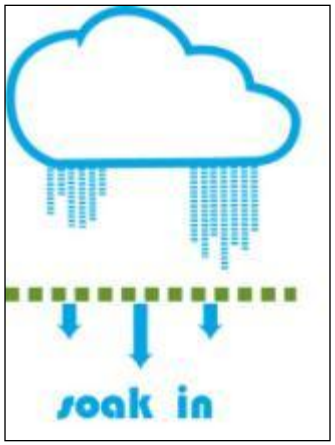
GSI Annual Report

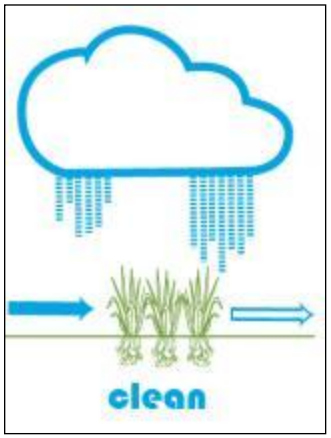
seattle.gov/util/greeninfrastructure



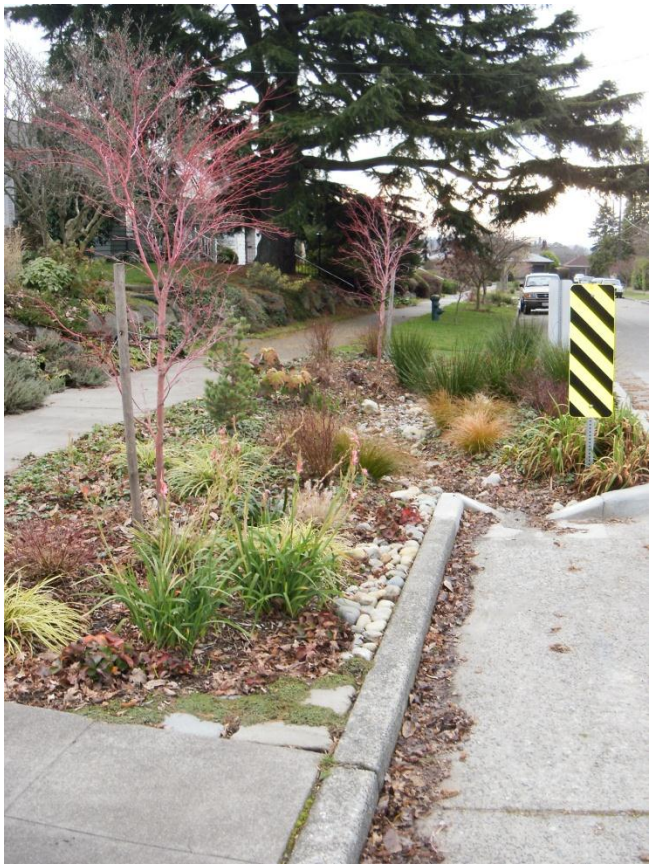
Bioretention (Rain Garden)



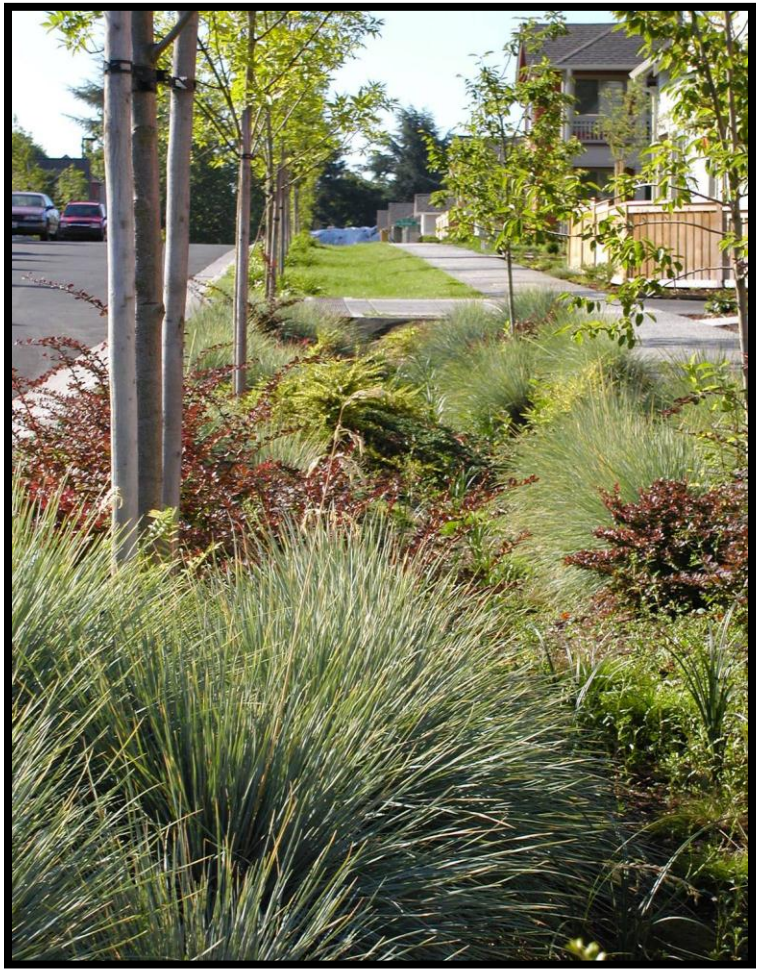




Public Rights-of-Way Retrofits = Natural Drainage Solutions (NDS)



GSI Policy + Program Development



- GSI Manuals Developed
  CIP Project procedural expectations, for technical design and community engagement
- Pre-Vetted Concepts
  SDOT, SPU & DPD
- multidisciplinary team

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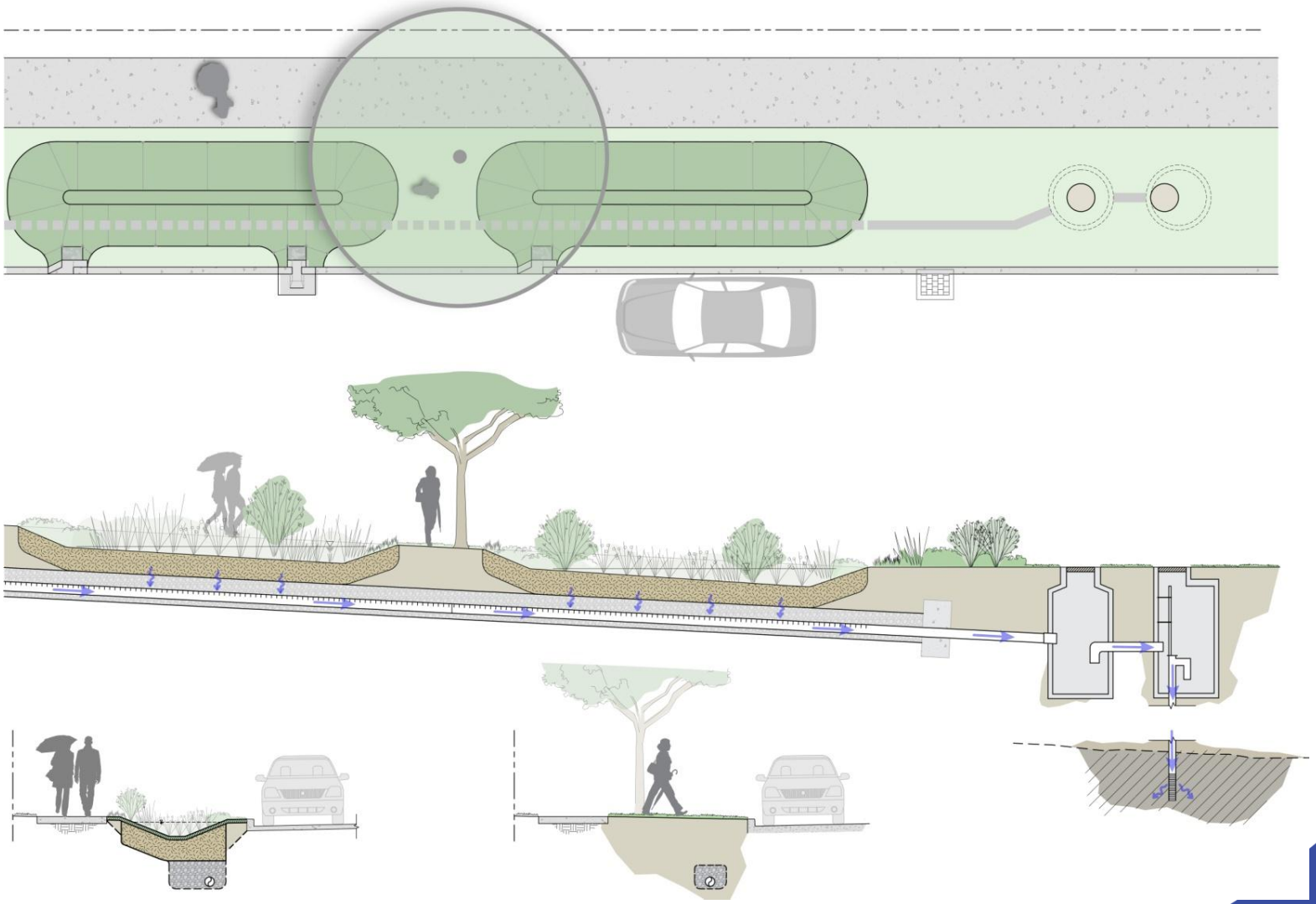
Right of Way Context- Typical Elements



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Public Rights-of-Way Retrofits in Design or Construction

- Capitol Hill Water Quality Project (Swale on Yale)
  - Phase 1 completed construction
- KCWTD's Barton Project
  - Phase 1 completed construction
  - Phase 2 construction 2015
- Venema NDS
  - Construction start likely Oct/Nov 2014, ~10-month project

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Venema Creek NDS

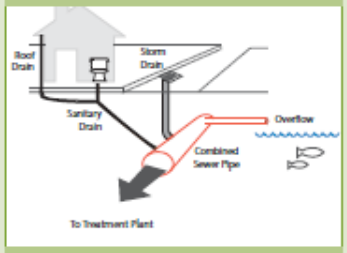
122nd Conceptual Street Perspective

* Trees and plantings are shown at approximately one-year from planting.

Creek basins

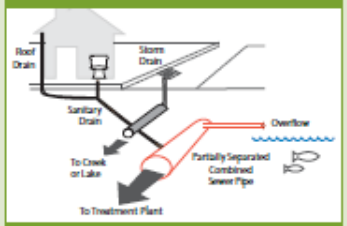
Polluted runoff drains directly to urban creeks. GSI in creek basins helps protect urban creeks.

Combined sewer



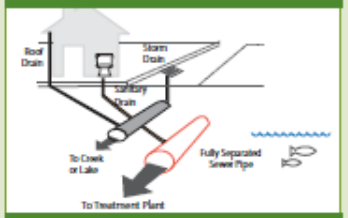
GSI in combined sewer systems helps prevent sewage overflows of polluted runoff and untreated sewage into waterbodies.

Partially separated sewer



GSI in partially separated systems captures and cleans polluted runoff before it flows into waterways or causes sewage overflows.

Fully separated sewer



GSI in fully separated systems captures and cleans polluted runoff before it flows into Puget Sound and Lake Washington.

Seattle's Drainage Basins and How GSI Helps

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Active SPU GSI CIP Projects

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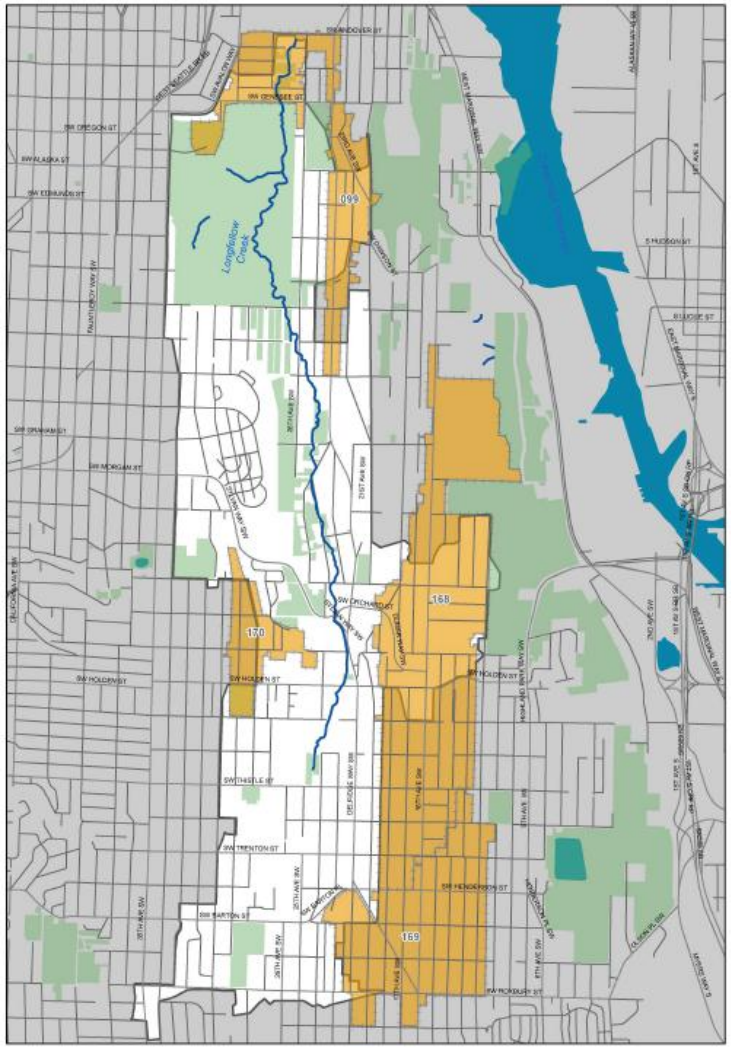
Delridge NDS - Project Basics



Entire Longfellow Creek Basin

***Project Problem**: CSO overflows into Longfellow Creek*

***Project Factors**:*

- West Seattle, South Delridge Neighborhood
- CSO Basins 168 & 169
- Delridge Retrofit Projects
- Co-location of SDOT Greenway
- Historically underserved and ethnically diverse community; Languages include: Spanish, Vietnamese, Somali

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Project Area

- 17th Avenue SW from SW Henderson to Kenyon Streets, with side streets to the alley and further (design-permitting) on Kenyon
- Dropped Block from SG2 – Henderson to Barton, future area contractions may occur

(blue area includes the current GSI project area, dashed green lines include the SDOT Greenway project)

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Purposes & Performance Goals

- Reduce CSO frequency and volume into Longfellow Creek
- Partner with SDOT in co-locating Greenway and GSI improvements to realize:
  - shared benefits in the built environment (traffic calming & GSI)
  - efficiencies in design and outreach
  - enhanced community value
- Bioretention cell bottom area of 5,890 SF and 17 blocks
- 220,000 gal/year CSO control volume reduction from Longfellow Creek; modeling estimates the annual reduction of 4.16 MG of flows to King County

The intent for all performance goals is to keep them scalable – geography could contract

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GSI Within Existing Landscape Strips

17th Avenue SW, Typical Landscape Strip

Design Considerations

- 10', 12' strips
- Parking – illegal and legal
- Existing Trees
- Concrete Panel Road
- Utilities
- Driveways, Sidewalks
- Slopes < 5%
- Adjacent Property Owner Support

Other project constraints: regulatory deadline, performance goals for gallons of runoff, informed consent with adjacent property owners, neighborhood equity issues, O&M concerns, Greenway coordination concerns.

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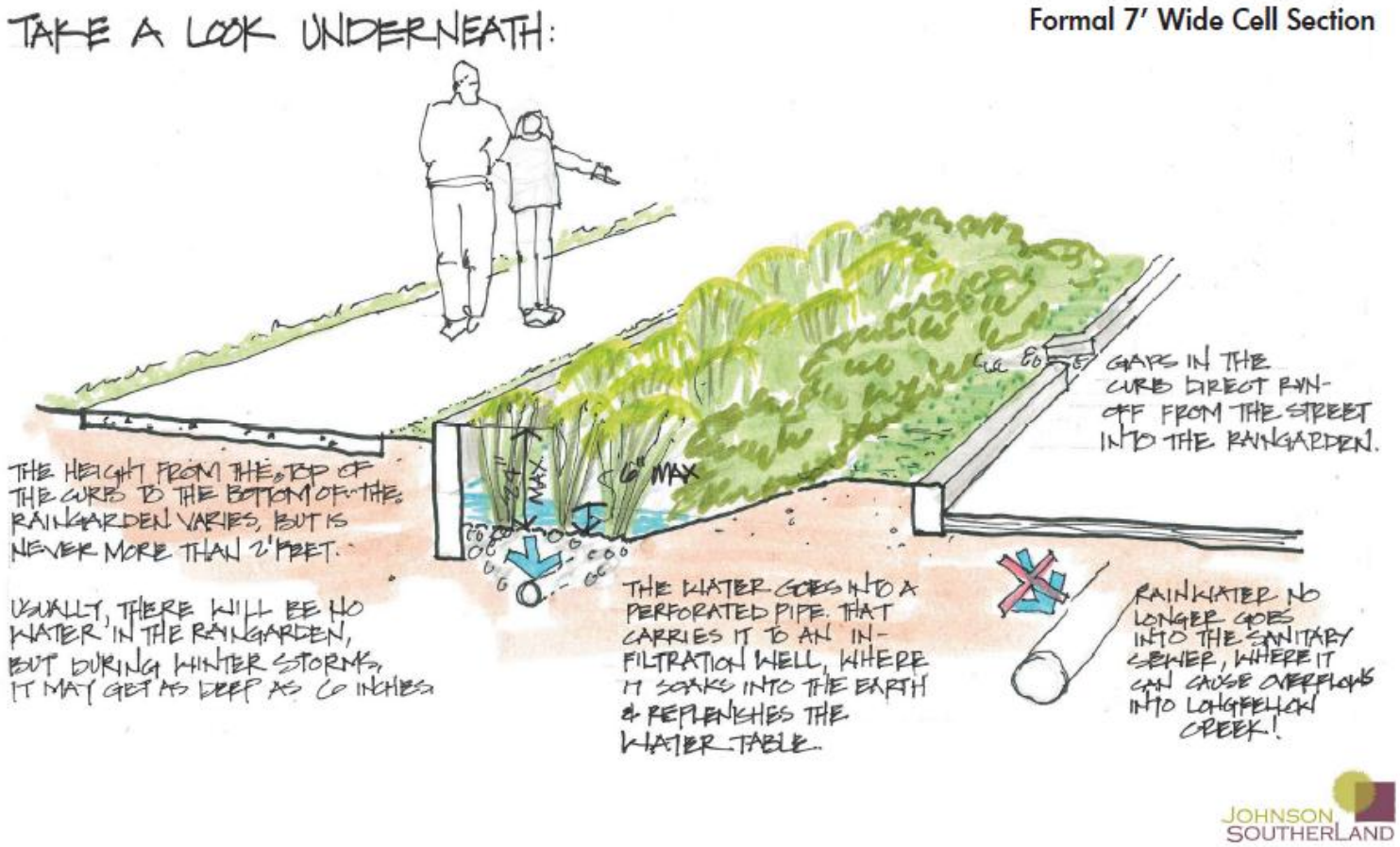
Typical NDS



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Example bioretention layout

- Bioretention cells intermittent along any block
- Sited to avoid utilities, significant trees, driveways
- Curb bump-outs at some intersections provide traffic calming *and* room for GSI

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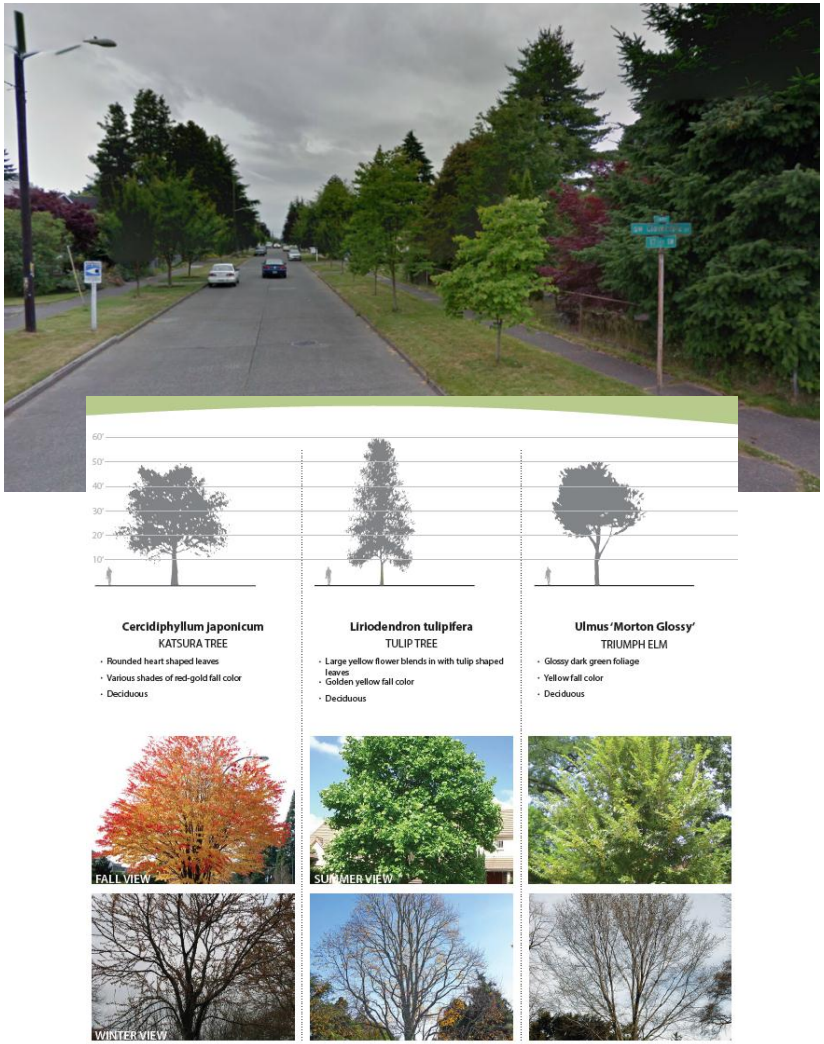
Tree & Planting Design Process



- Existing Tree Survey & Assessment – in partnership with SDOT
- Context of existing public and private trees
- Consideration of GSI Program approved trees and plantings
- Create a cohesive tree plan across the project while interjecting variety into the existing monocultures
- Appropriate species for specific locations constraints

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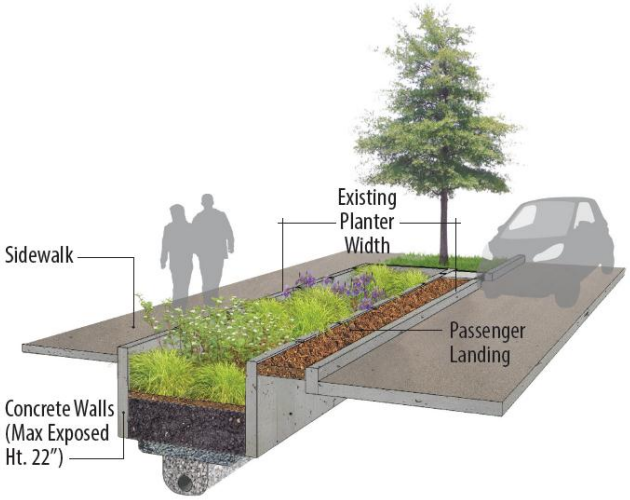
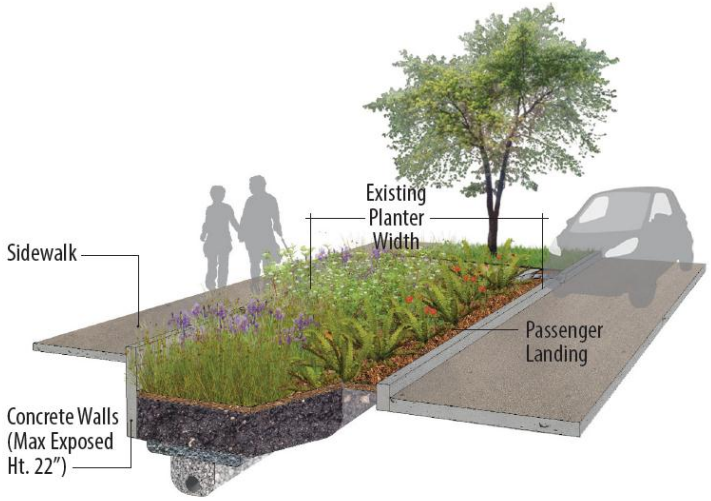
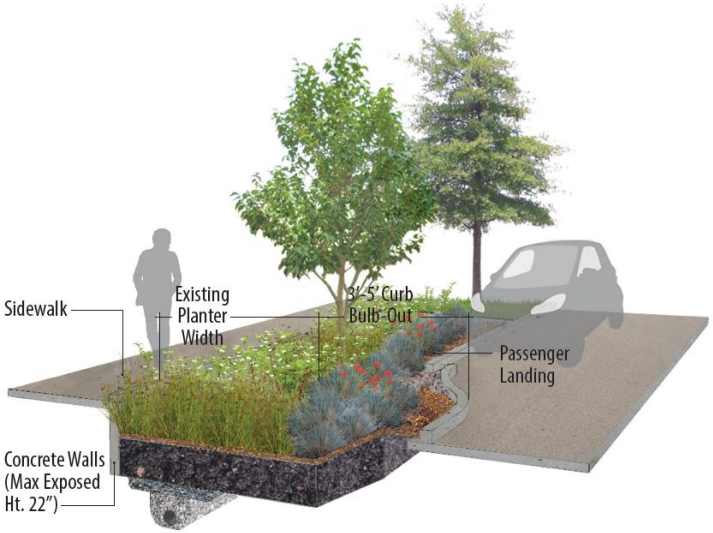
Delridge NDS Sections



A — *Double Wall Drainage Cell*



B — *Single Wall Drainage Cell*



C — *Curb Bulb Drainage Cell*

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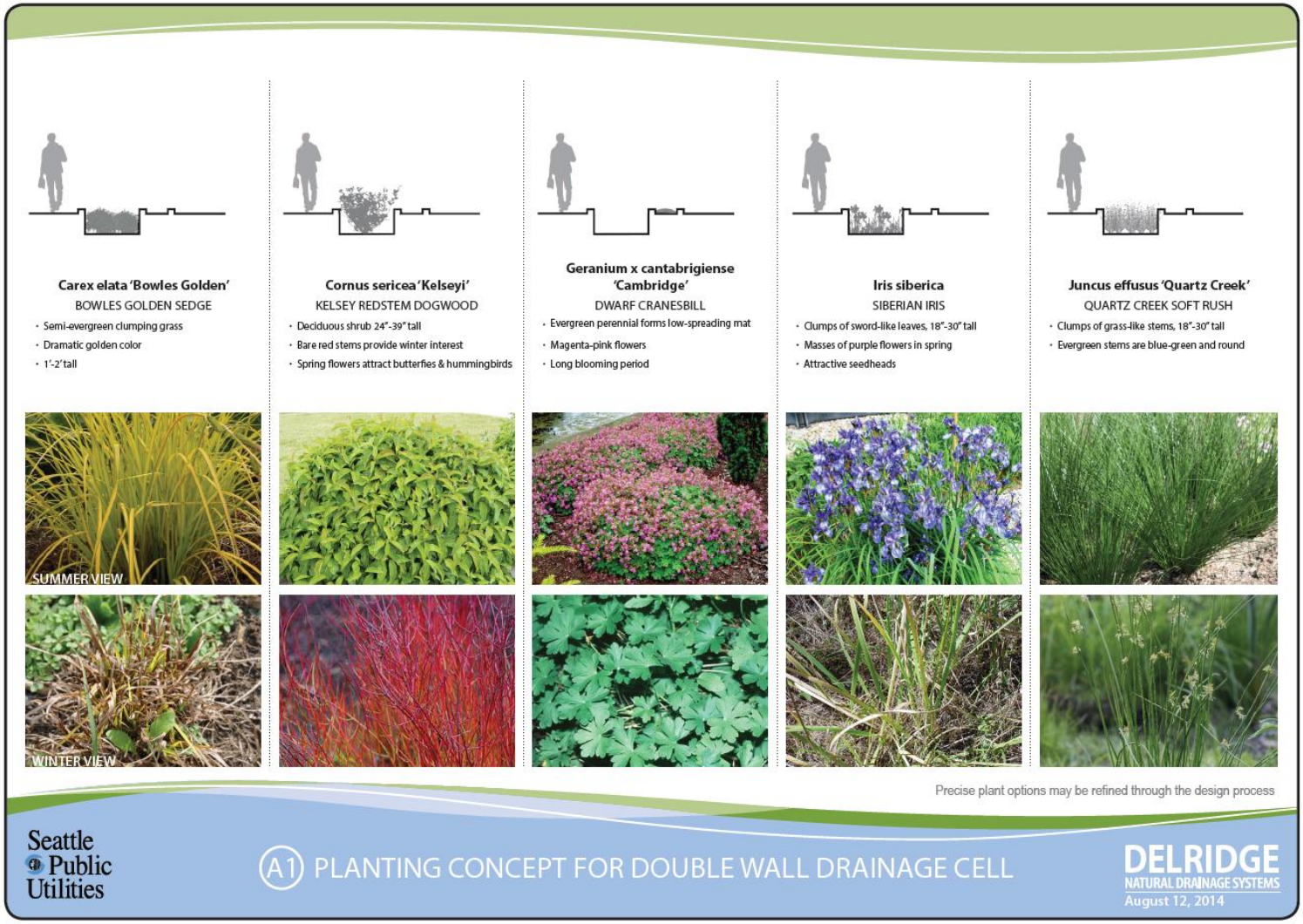
Delridge Landscape Palettes



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Community Engagement

- White Center CDA community based organizations – ambassador model
- SDOT Coordination
- Surveys, three public meetings, two walk-and-talks, many door-to-door discussions
- Ongoing community engagement continues *- August walk-and-talk, Neighborhood Associations*

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Neighborhood Greenway Design Elements

Greenways can include some combination of the following:

- 20 mph and wayfinding signs
- Stop signs
- Bicycle pavement markings
- Pavement repairs
- Speed humps
- Crossing improvements at busy streets
- Bicycle parking
- Roadside Raingardens

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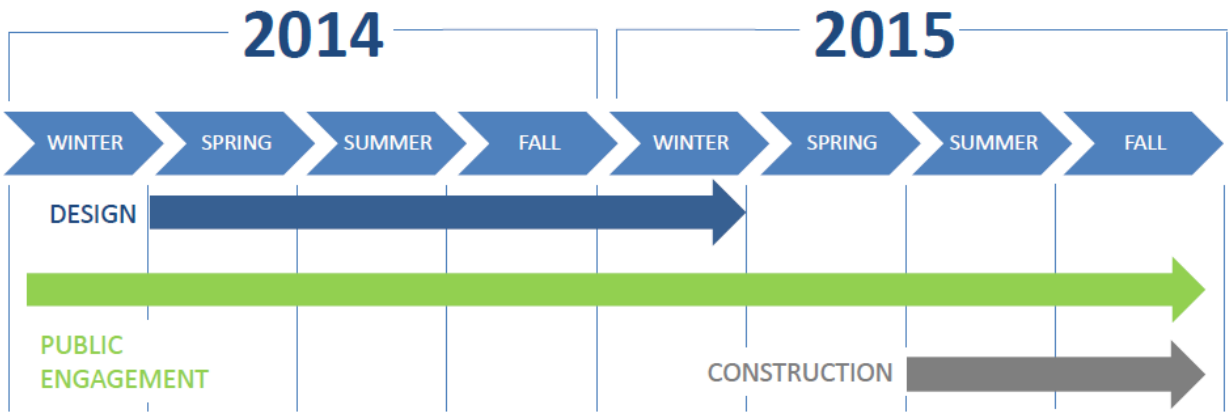
Delridge NDS Project Timeline



- Regulatory Deadline through our NPDES Permit – must give NTP by 10/31/2015
- Permitting processes and timelines
- Wet weather construction
- Planting seasons

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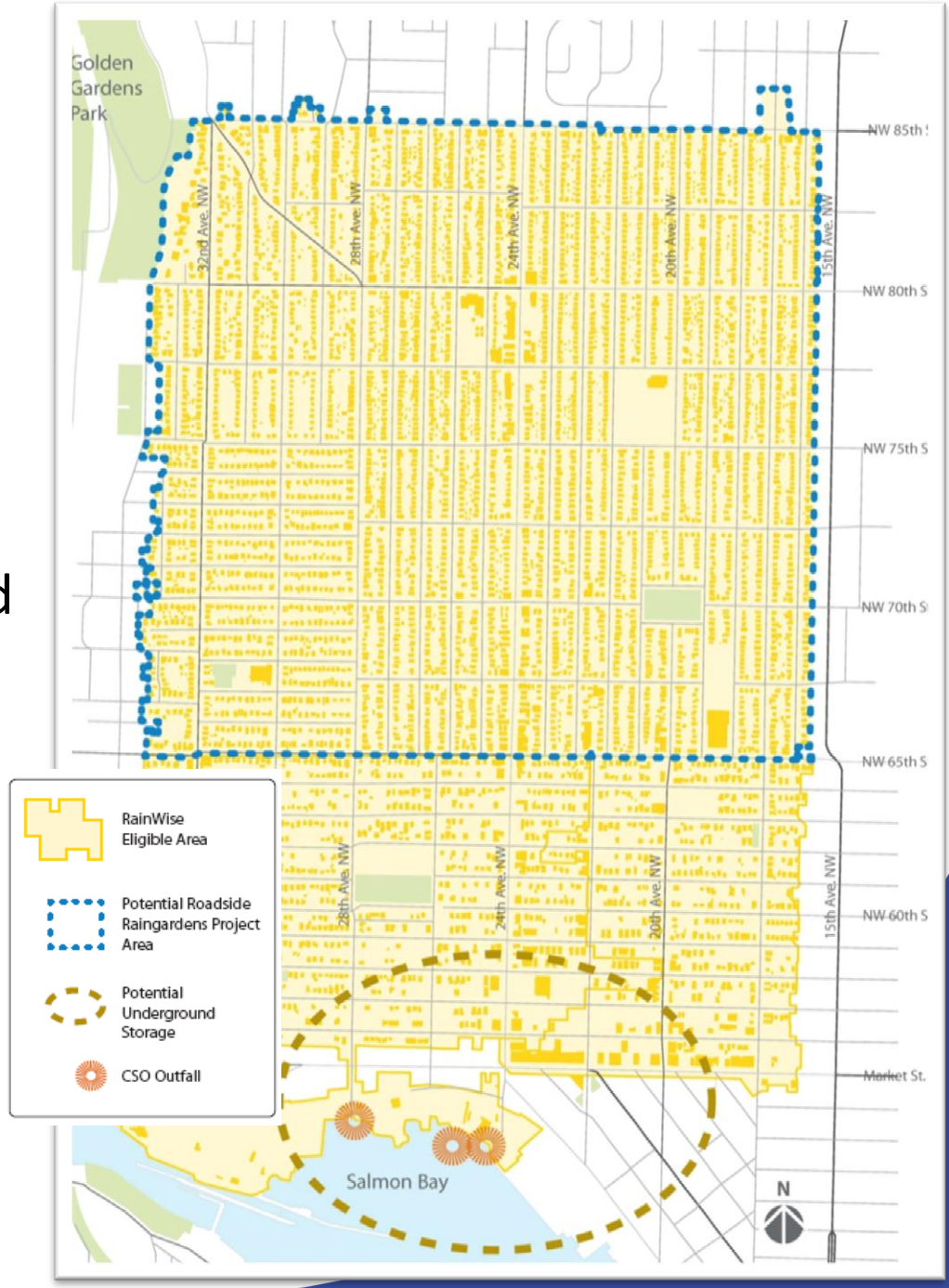
Ballard NDS 2015 – Project Basics

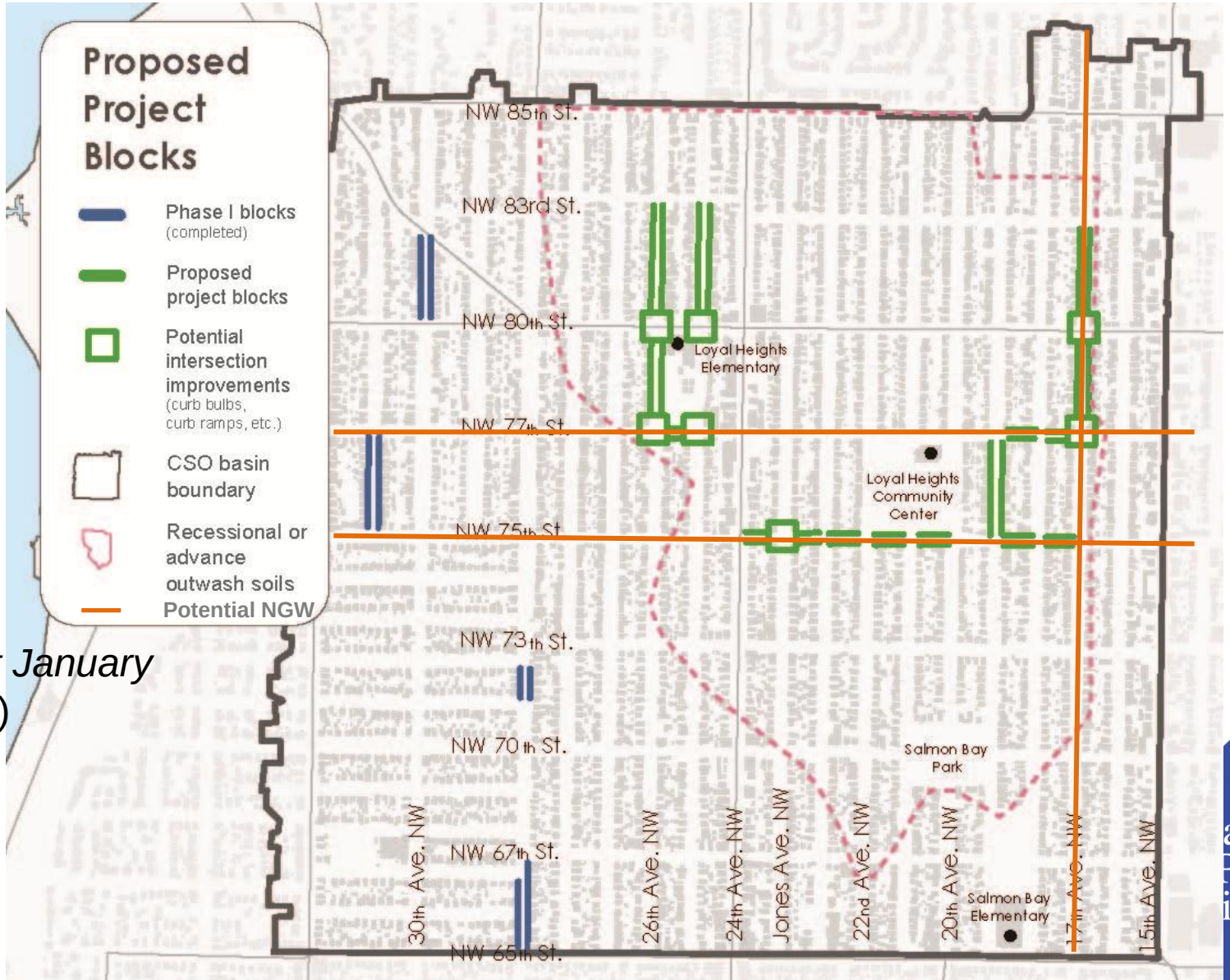
***Project Problem**: Combined sewer overflows(CSO) into Salmon Bay*

***Project Factors**:*

- Loyal Heights Neighborhood
- CSO Basins 150/151 & 152
- Partnering with SDOT programs
- Apply Lessons learned from Ballard Phase 1
- Combine with SPU CSO storage facility in Ballard-Fremont-Wallingford area



Ballard NDS 2015 - Recommended Option



(draft January 2014)

Ballard NDS 2015- Lessons Learned

Learned	Looking Forward
TAKE YOUR TIME	Allow sufficient time for project scoping, site selection, design, construction, and monitoring. Build in time to respond to community and technical analysis
DO YOUR HOMEWORK	Conduct wet-weather soil testing and groundwater monitoring in advance and validate test results with outside experts. Conduct more tests to assess soil conditions and measure how well water absorbs in areas
LISTEN TO THE COMMUNITY	Gather information from residents about what they know about existing conditions in their neighborhood. Engage residents early in siting Identify locations that provide opportunities to improve community safety and livability.

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Ballard NDS 2015 Public Engagement

- Community based organizations (Loyal Heights School & Community Center) ambassador model
- Partner with SDOT programs
- Community Survey, three public meetings, two walk-and-talks, many door-to-door discussions
- Ongoing community engagement – *Block parties, neighborhood association briefings, additional door-to-door discussions*

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Ballard NDS 2015 –
Neighborhood Greenways (NGW)

- Safe, Calm residential streets
- Provides traffic slowing benefits
- Improves vehicle sightlines and pedestrian crossing distances at key intersections
- Enhances streetscape aesthetics and continuity
- Contributes to tree canopy goals

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Ballard NDS 2015 - SRTS

SDOT Safe Routes to School (SRTS)
encourages physical activity through walking & bicycling

Safety improvements on our streets including

- Roadside Raingardens
- ADA ramps
- Curb bulbs
- Marked crosswalks

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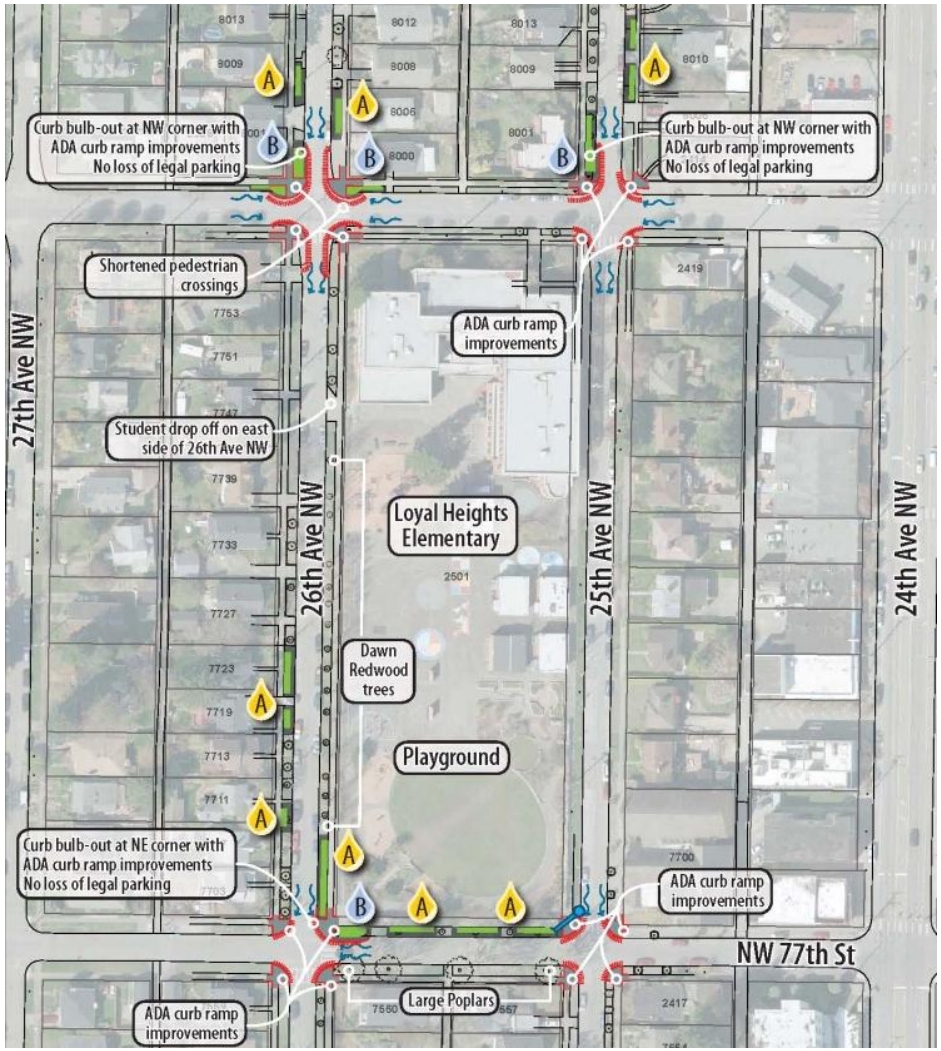
Ballard NDS 2015

Loyal Heights Elementary School



- Curb bulbs at end of blocks where parking is illegal - improves sightlines
- Curb bulbs and diversion work trigger curb ramps at 4 intersections around school to increase mobility and safety of students on bikes
- Shorten crossing on 80th by school

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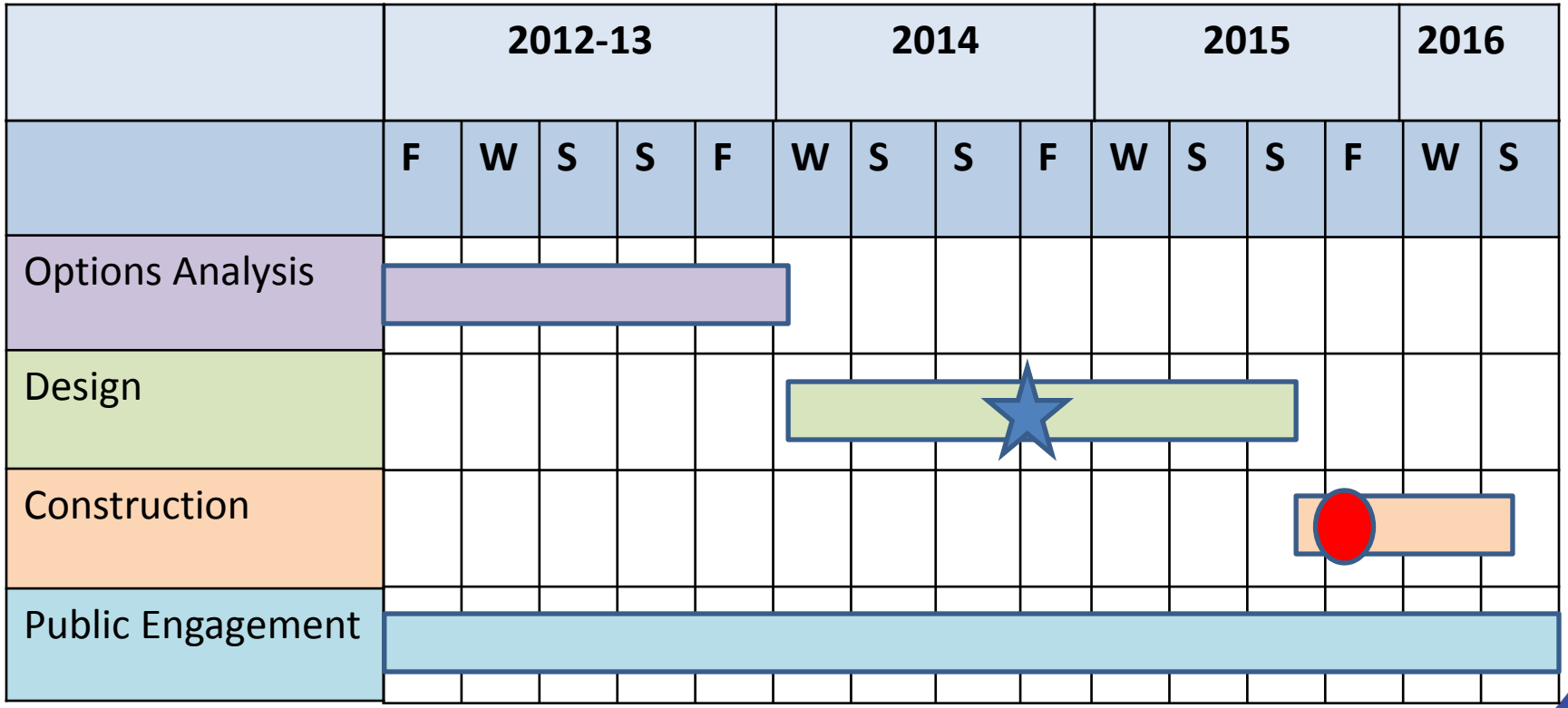
Ballard NDS 2015 Timeline



= We are here

= Regulatory deadline 10-31-15

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Ballard NDS 2015 – Performance Goals

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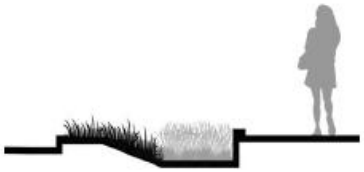
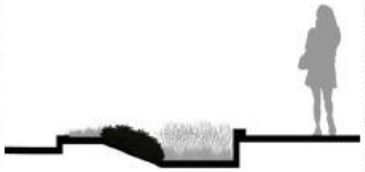
Ballard NDS 2015 - Planting Palette

DRAFT: For Discussion Only



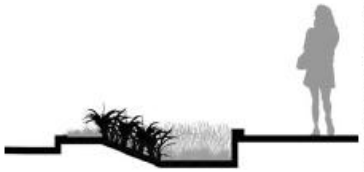
Galanthus elwesii
Giant Snowdrop

- Bulb with three-lobed, bell shaped flowers
- Blooms in winter
- Dark green foliage



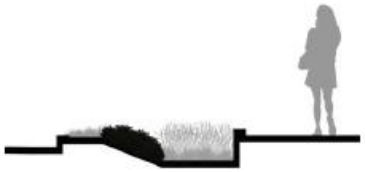
Geranium x cantabrigiense 'Cambridge'
Perennial Geranium

- Clump forming mound shape
- Fragrant blooms in late spring and early summer
- Semi-evergreen foliage



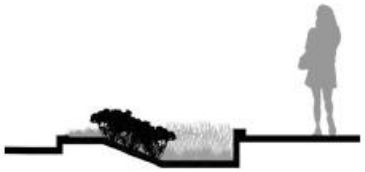
Hemerocallis 'Stella De Oro'
Stella De Oro Dwarf Daylily

- Dwarf daylily with showy gold flowers
- Long summer bloom season
- Each bloom lasts one day



Helianthemum 'Henfield Brilliant'
Sunrose

- Low, compact form
- Profuse orange flowers, long summer bloom period
- Silver evergreen foliage



Sedum 'Autumn Fire'
Autumn Fire Sedum

- Clump-forming perennial succulent
- Blooms in fall, changing from pink to deep red, to copper
- Flowers persist into winter

Spring/Summer

Fall/Winter

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PLANTING CONCEPT A | **FLORAL** colorful blooms through the seasons

BALLARD NATURAL DRAINAGE SYSTEMS

GSI Program – Looking Ahead

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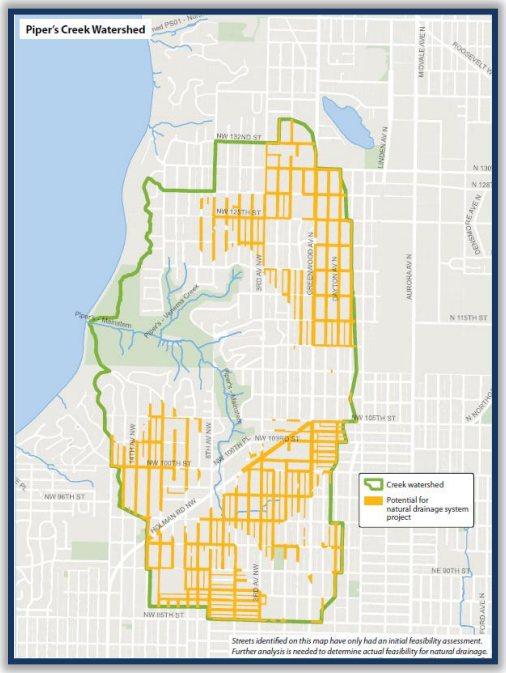
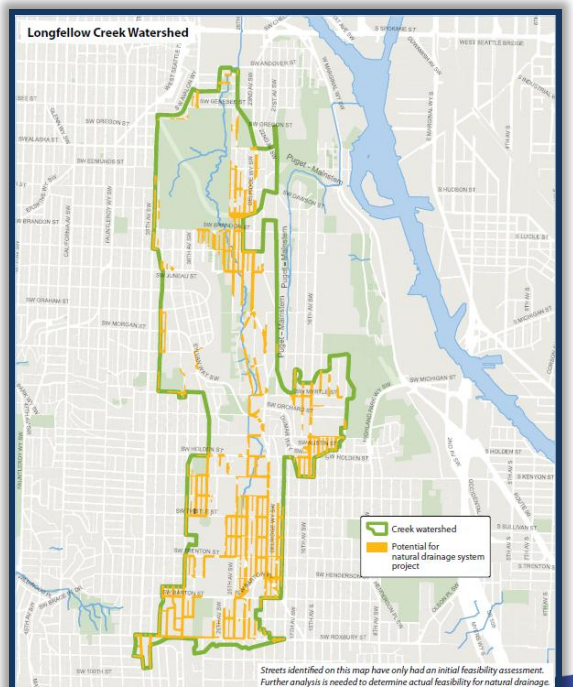
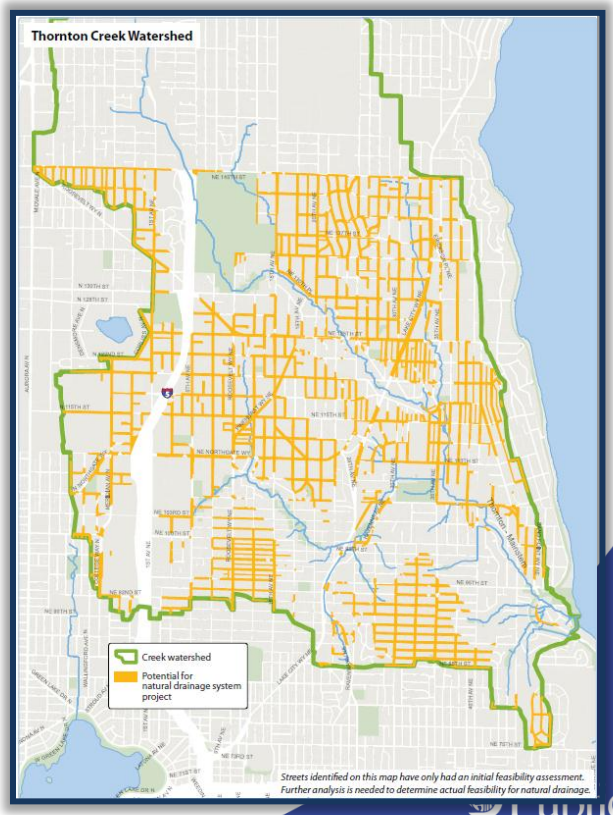
GSI Policy + Program Development

- Integrated Plan
- Developed neighborhood-driven GSI partnering option for EPA submittal
- Goal: Treat 80% AAV from 44 acres of impervious area with bioretention (appx 4% of area shown below).







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GSI Policy + Program Development

- Stormwater Code
- Updating on-site stormwater management requirements
- LID code integration
- Review and update land-use codes

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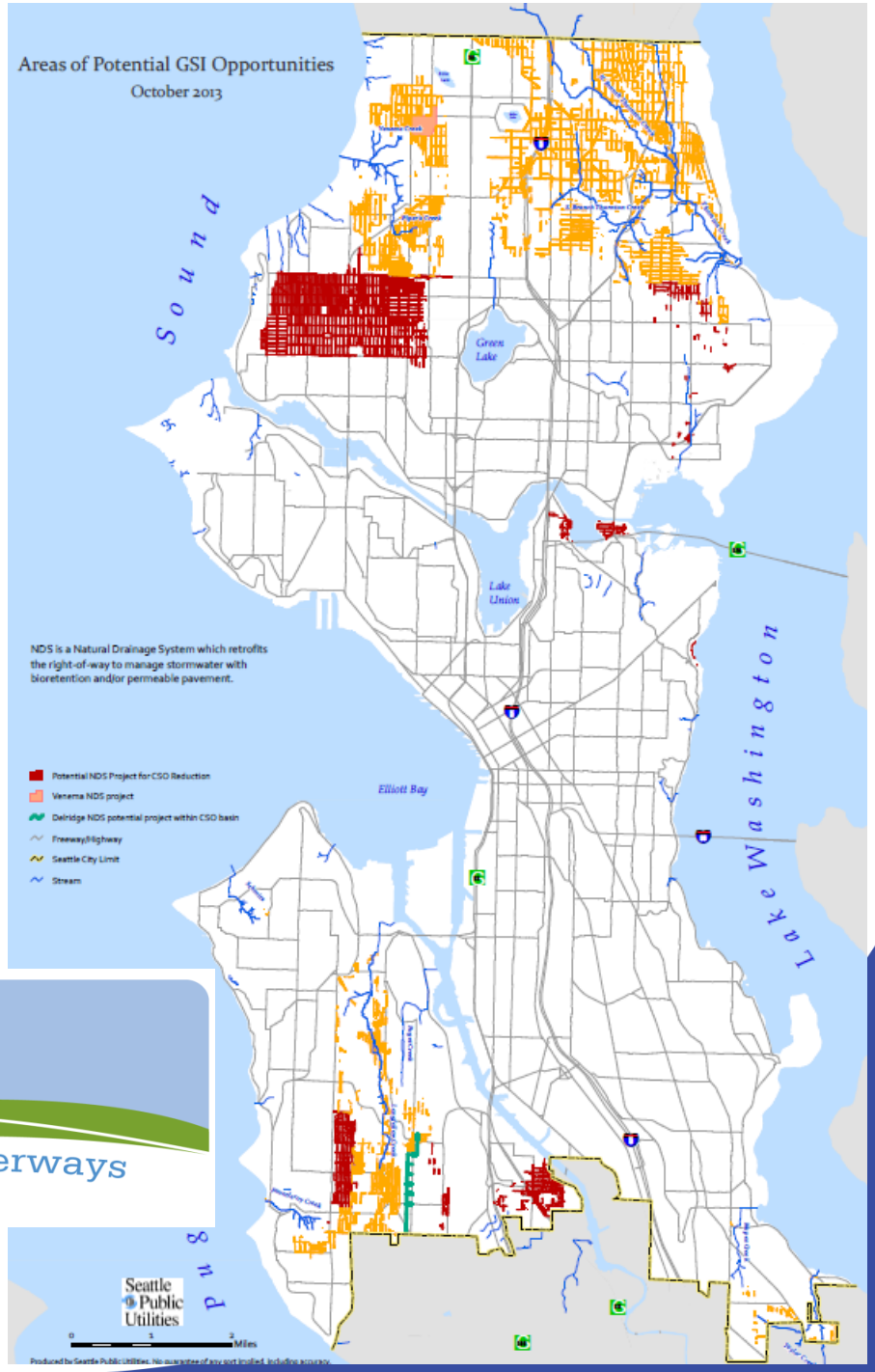
GSI Retrofits: Public Rights-of-Way Potential for CSO reduction or Integrated Plan



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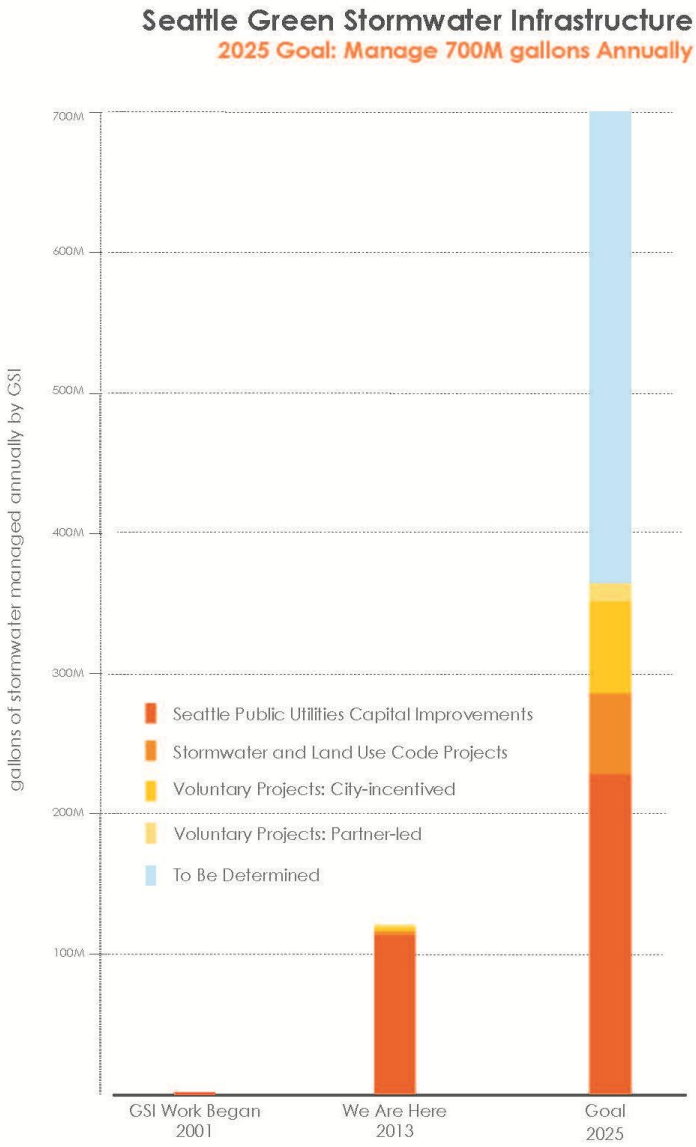
Green Stormwater Infrastructure

Working Together to Protect our Waterways

Policy + Program Development



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- Target to manage 700MG annually with GSI by 2025
- City Departments shall collaborate with OSE to produce **Implementation Strategy for meeting new target**

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Questions?

GSI Program Manager: Tracy Tackett, P.E.
Delridge NDS Project Manager: Don Anderson, P.E.
Ballard NDS Phase 2 Project Manager: Grace Manzano

www.seattle.gov/util/greeninfrastructure