Barton CSO Project – Green Stormwater Infrastructure (GSI)

Sunrise Heights & Westwood Community Meeting

March 28 and 31, 2012

King County

Department of
Natural Resources and Parks
Wastewater Treatment Division

Meeting Agenda

- Project background (Mary Wohleb)
- Review existing conditions and characteristics that team has found (Steve Burke)
- Considerations for bioretention swale locations (Steve Burke)
- Bioretention swale design overview (Jennifer Lathrop)
- Schedule and community input (Mary Wohleb)
- Hear community perspectives, concerns, and questions at discussion tables (Team)

What is a Combined Sewer Overflow (CSO)?

- Barton currently averages 4 overflows per year
- Dept. of Ecology requires no more than 1 overflow per year.

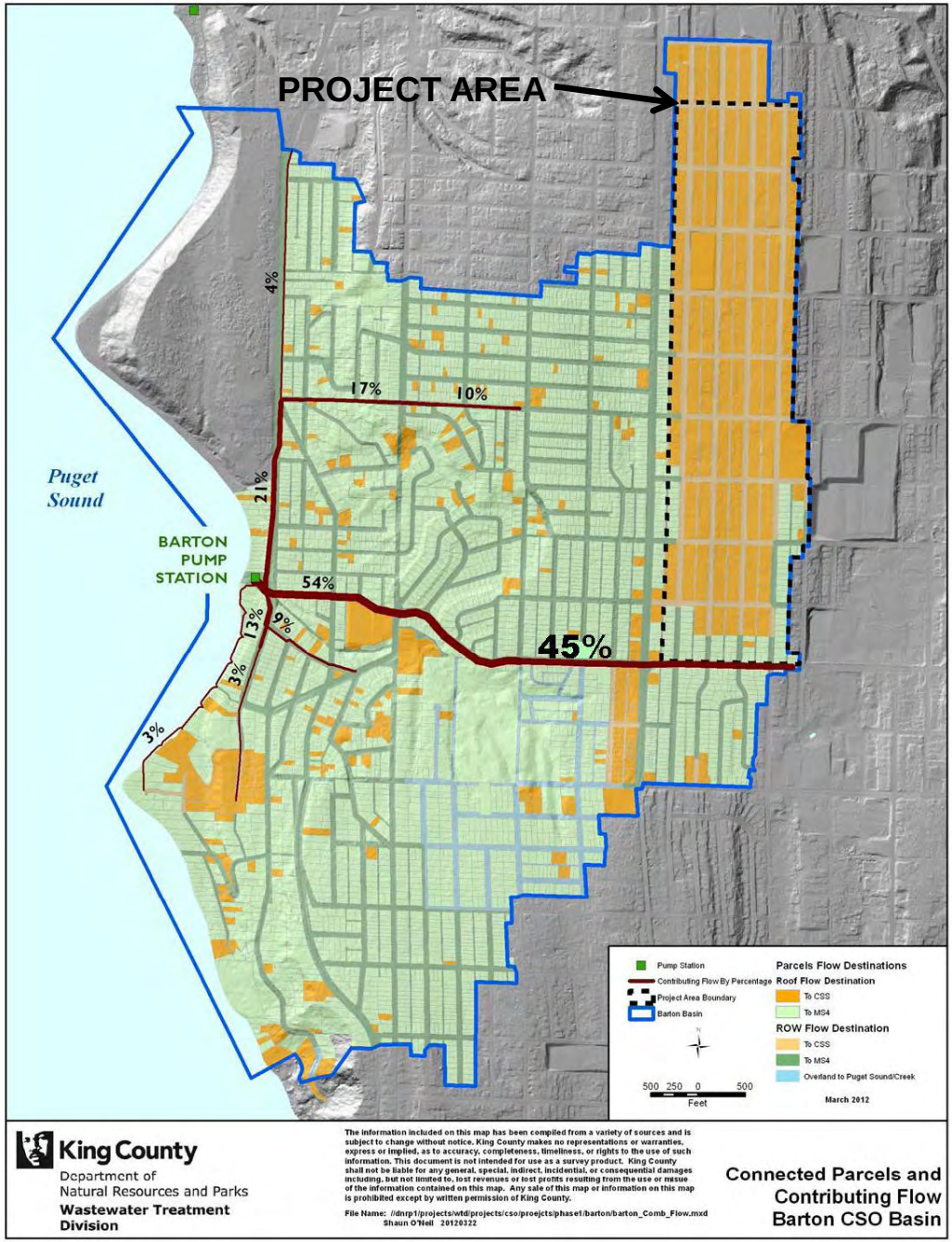
Combined Sewer Overflow

Barton Basin Description and Requirements

- 1,111 acres
- Five sub-basins
- Constructed Combined Sewer system conveyed flows to the Barton Pump station then on to West Point Treatment Plant

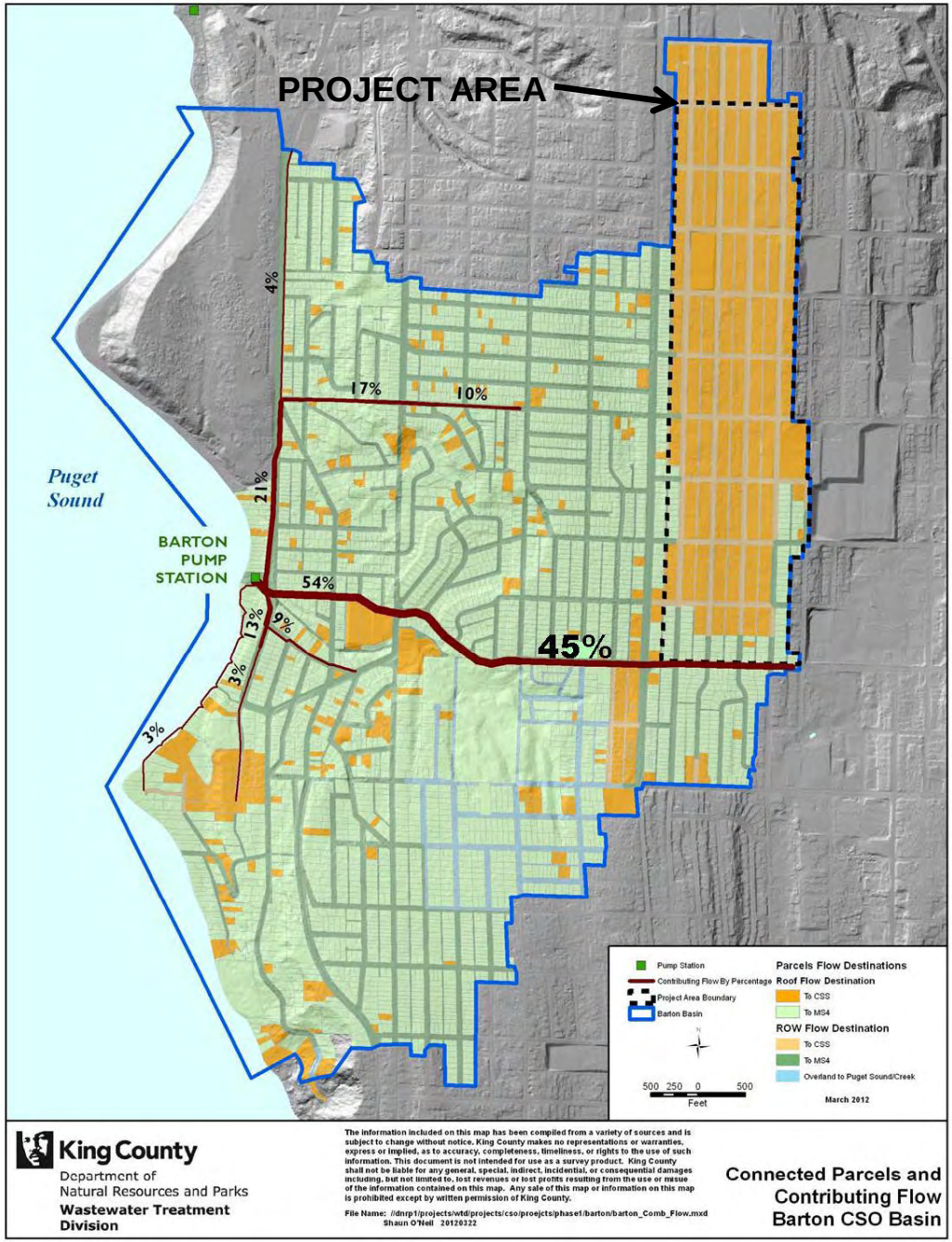
Contribution to the Combined Sewer System (CSS)

- 45% of stormwater flows entering the combined sewer come from the project area
- Stormwater runoff from the streets drain to combined sewer



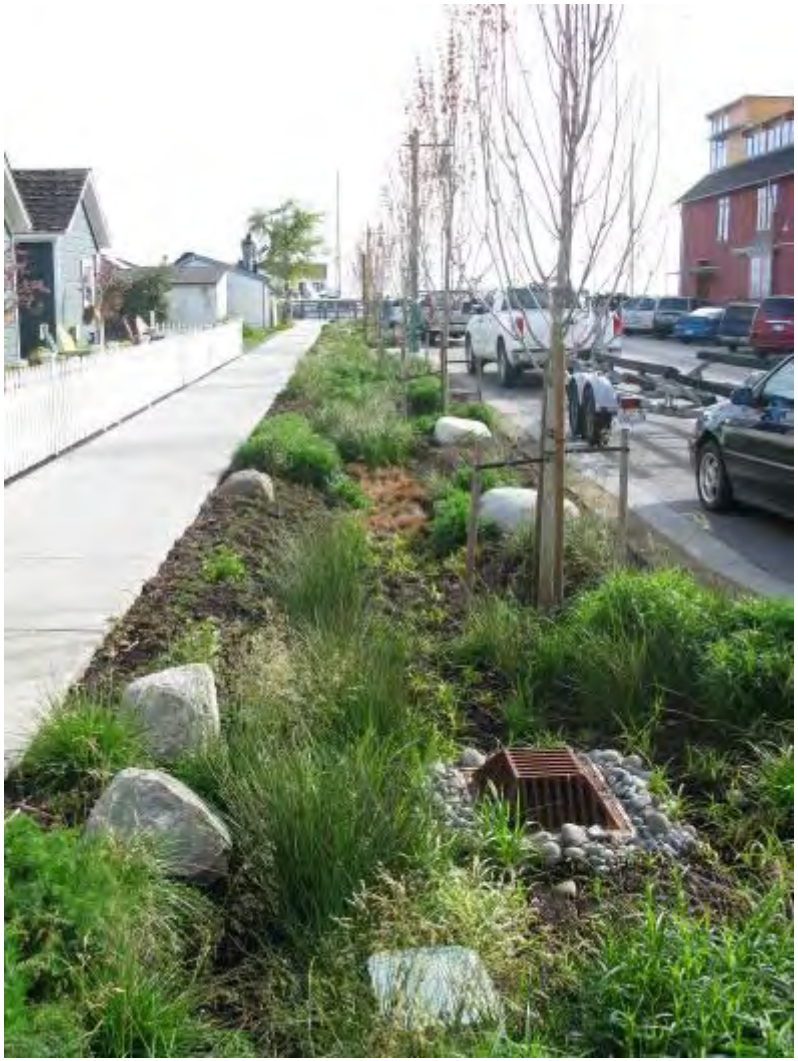
Project Area Connection

- Approximately 150 acres in the project area are connected to the combined sewer system (CSS)
- Reduce overall volume of stormwater entering the CSS through green stormwater infrastructure (GSI)



GSI for CSO Control

High Point, Seattle during 25-year storm event



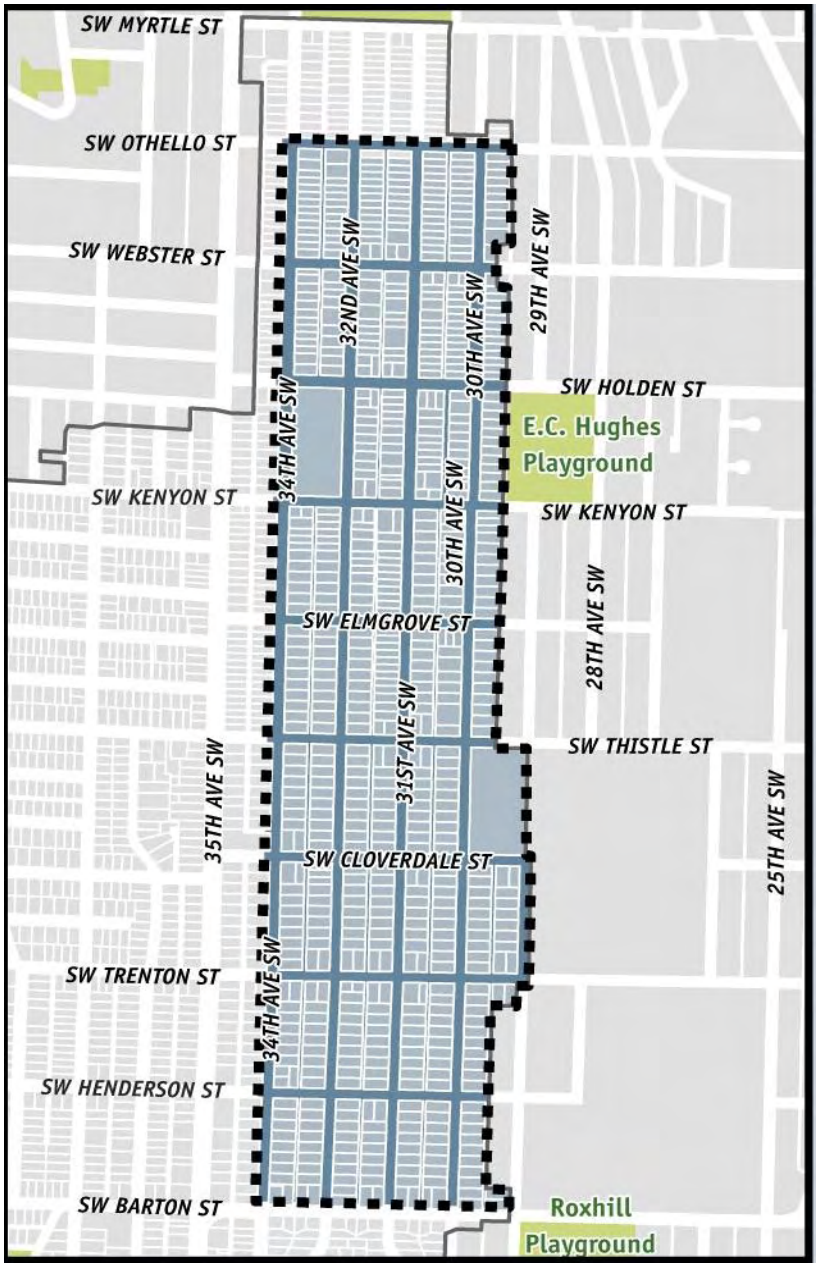
Port Townsend after storm event

Why this Neighborhood?

- Predominately connected
- 45% flow contribution
- Initial high level analysis appears there were enough blocks connected to meet the CSO control target
- Many flat or slightly sloping streets
- Wide planter strips on many streets
- Can be constructed in the public right-of-way

Project scope:

- Construct bioretention swales in the planter strips in the city-owned right-of-way on up to 40 blocks to control CSOs



King County Approach

- We are taking the time
- Geotechnical testing
- Design to infiltrate
- Understand surface flows and use of Flow Model
- Design for your streets
- Careful and rigorous construction sequence
- Early and on-going community involvement

What We've Heard from You

- Existing Drainage Concerns
- Pests
- Parking
- Access
- Vegetation and Trees
- Maintenance

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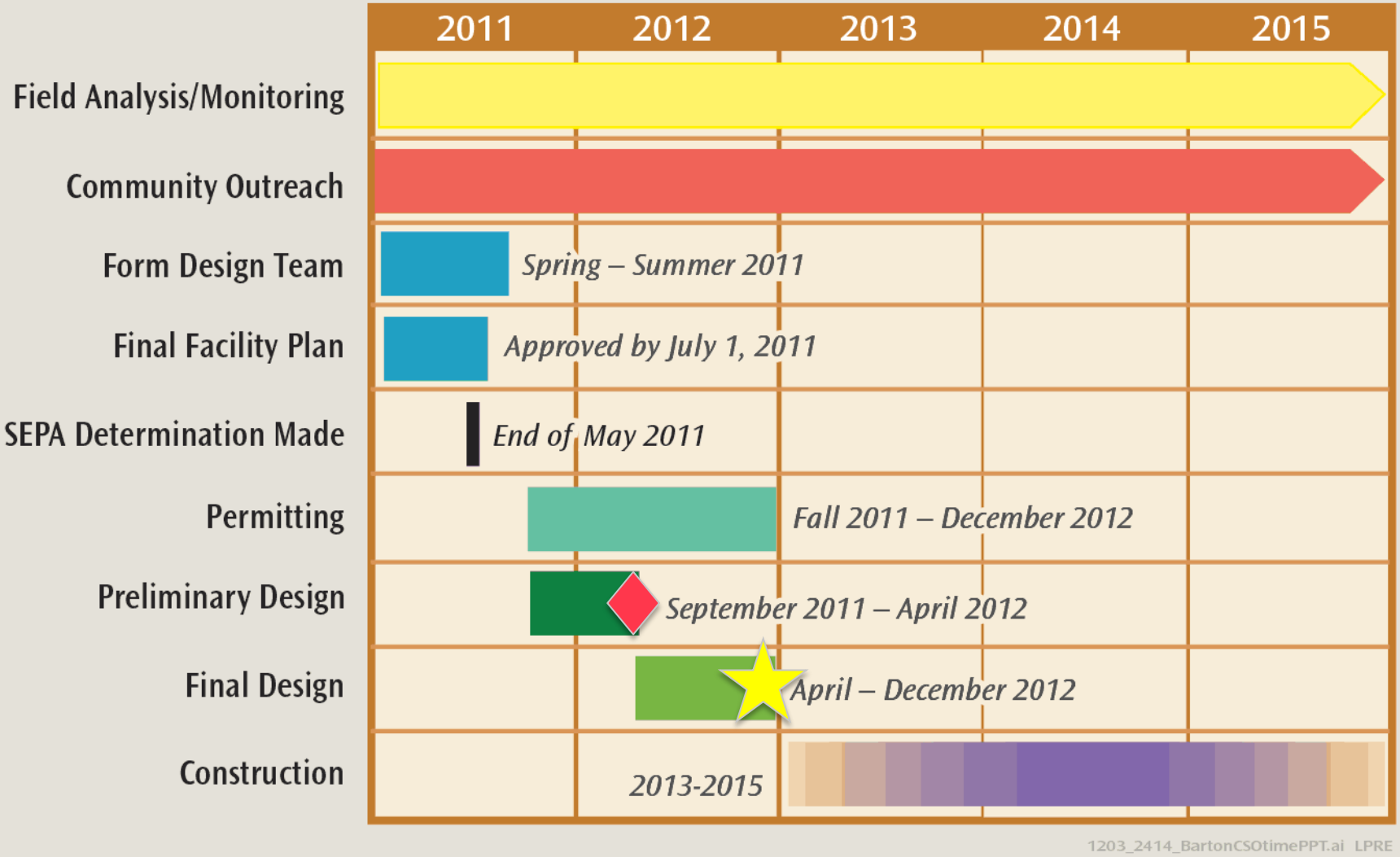
BARTON BASIN CSO-GSI PROJECT

ANTICIPATED TIMELINE



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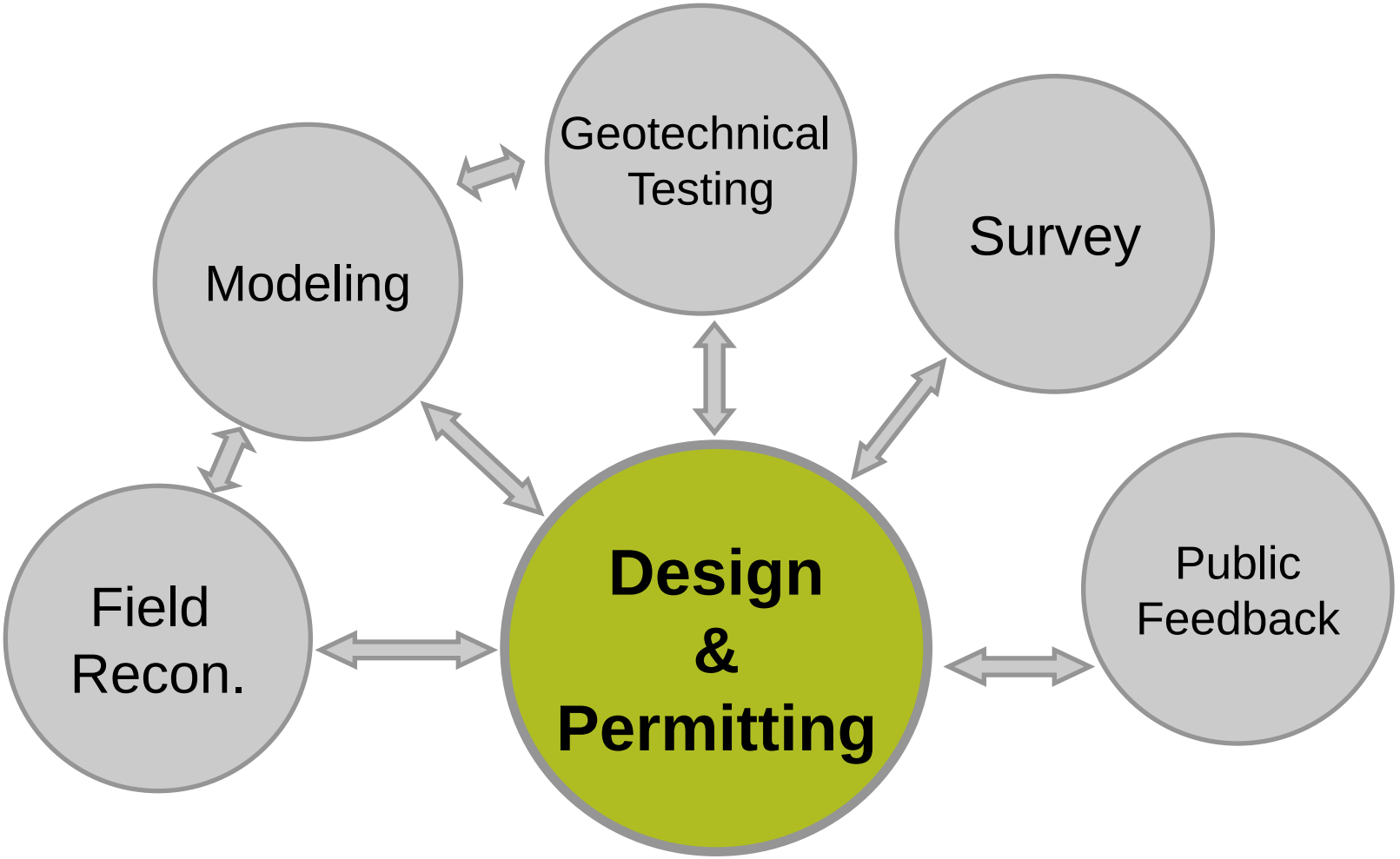
Design Process



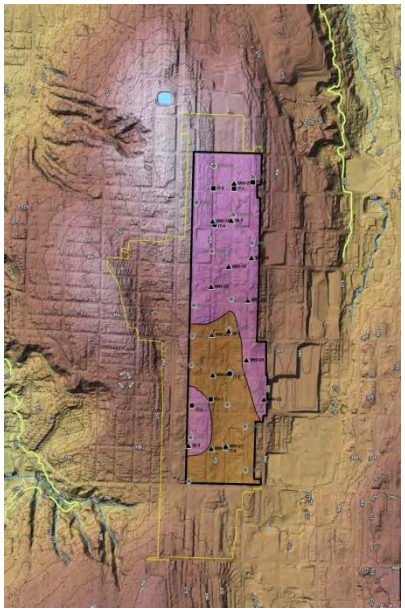
Overview of Field Reconnaissance

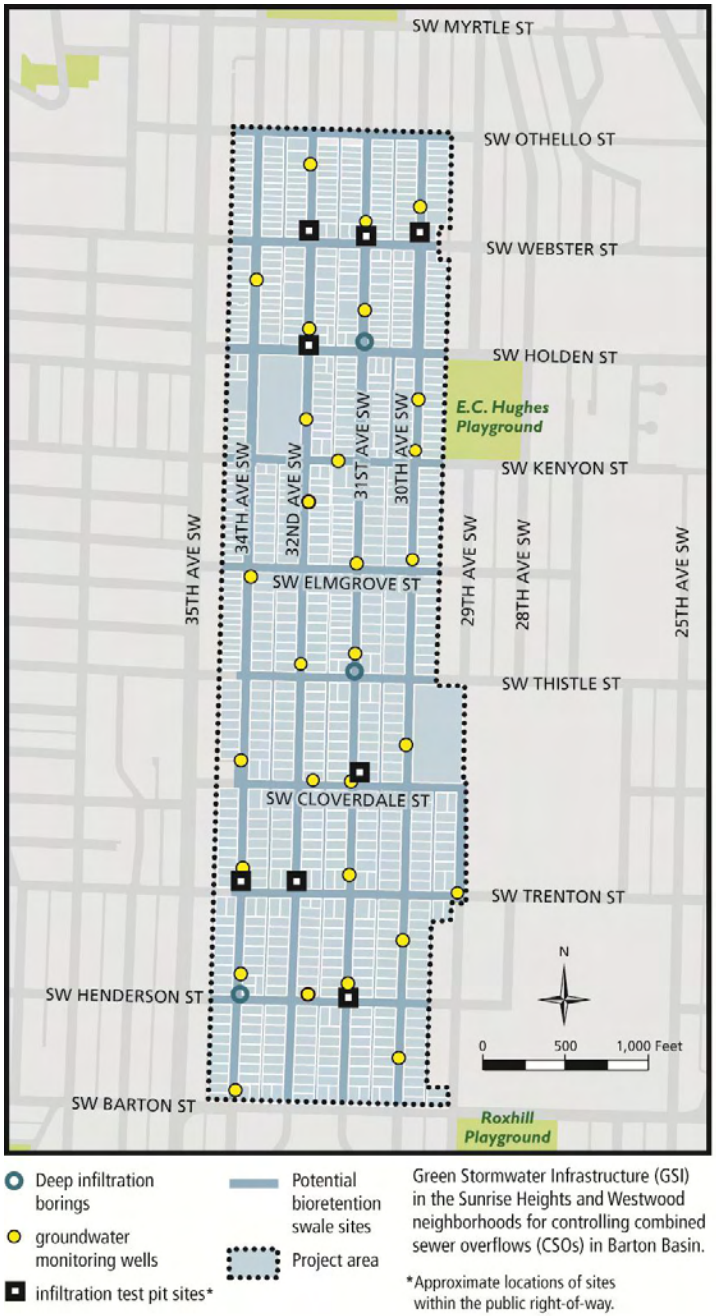
image courtesy Google

- Understanding Above- and Below-Ground Features
- Geotechnical Testing
- Initial Land Survey
- Data Review

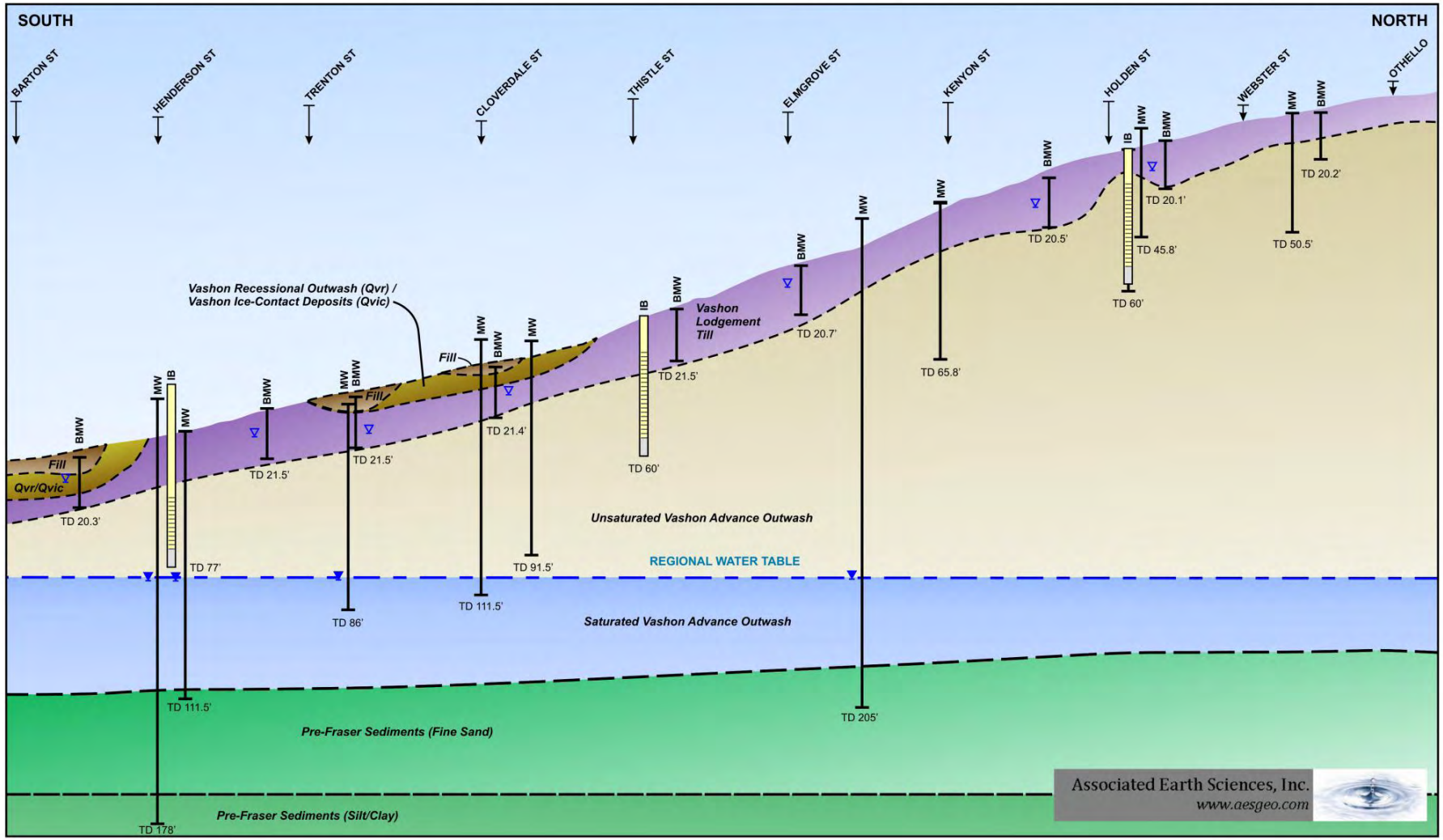
Neighborhood Geology

- Soil types
- Soil layers
- How and where water flows underground
- Water table characteristics





CROSS-SECTION OF MONITORING WELLS TO TEST SOILS AT DIFFERENT DEPTHS THROUGHOUT THE PROJECT AREA



LEGEND:

BMW - GROUNDWATER MONITORING WELLS TO MEASURE SHALLOW GROUNDWATER LEVELS (20 FT. DEEP)

MW - GROUNDWATER MONITORING WELLS TO MEASURE DEEP GROUNDWATER LEVELS (45-205 FT.)

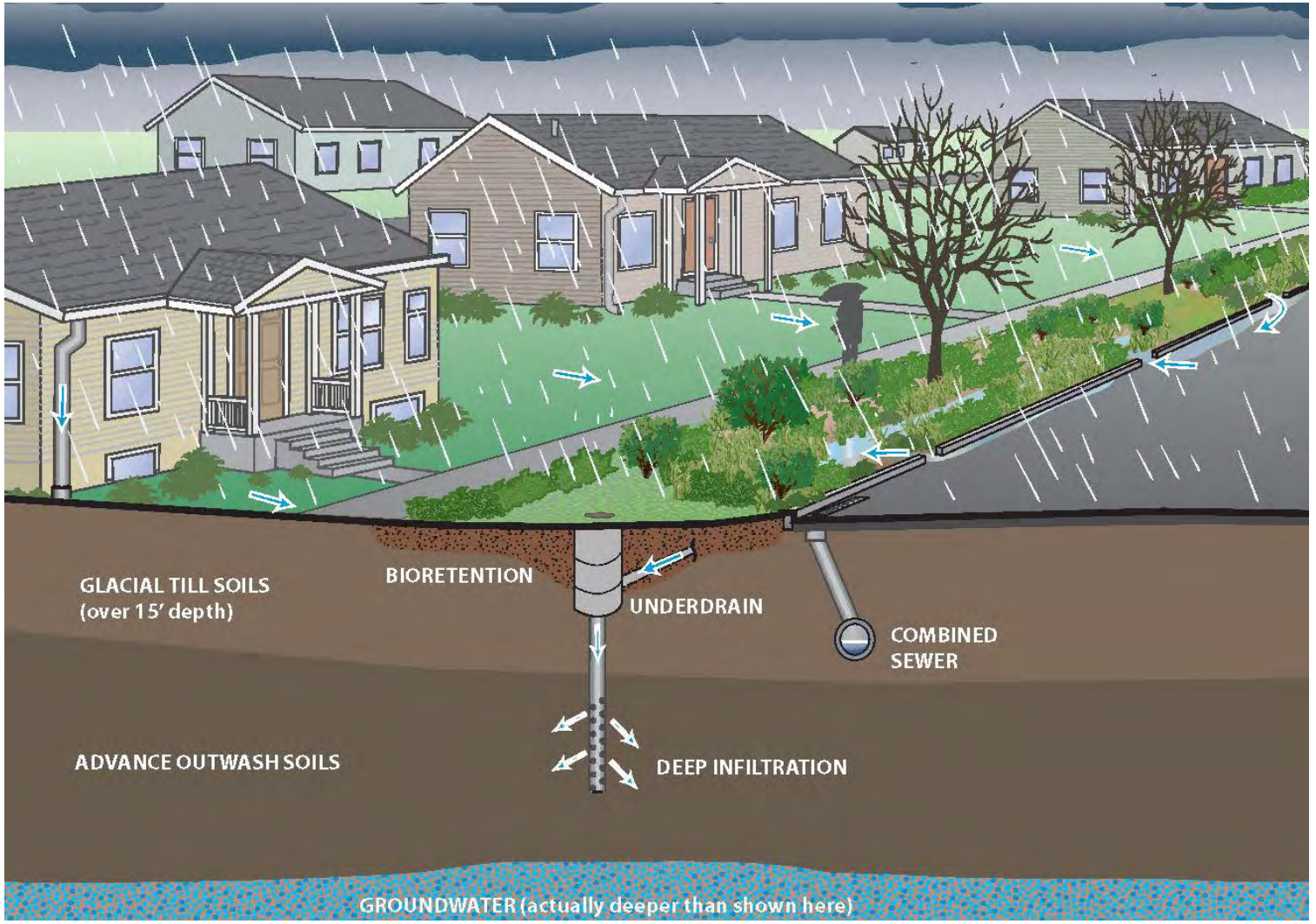
IB - DEEP INFILTRATION BORINGS TO FIND OUT THE RATE WATER FLOWS THROUGH THE UNSATURATED VASHON SOIL LAYER (BEIGE LAYER)

▽ - WATER LEVELS, AS MEASURED BY WELLS

TD - TOTAL DEPTH OF WELL UNDERGROUND

NOTE: SLOPE SHOWN IS NOT TO SCALE (STEEPER THAN ACTUAL)

Bioretention with Deep Well Infiltration Design



Site Characteristics – Field Survey

32nd Ave SW (Webster to Holden)

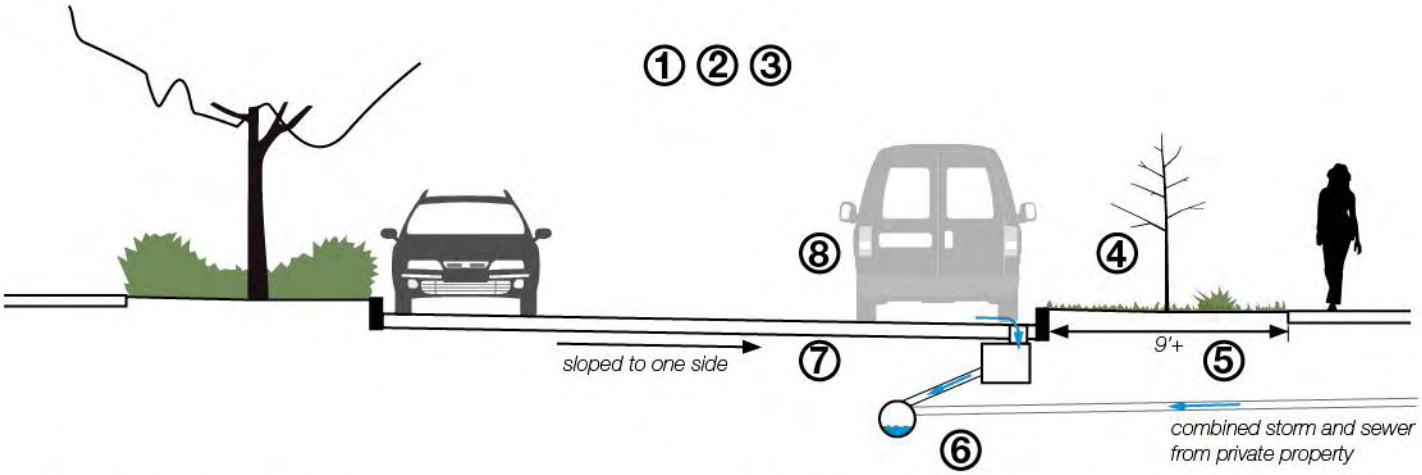
31st Ave SW (Webster to Holden)

SW Kenyon St (34th to 31st)

34nd Ave SW (Trenton to Henderson)

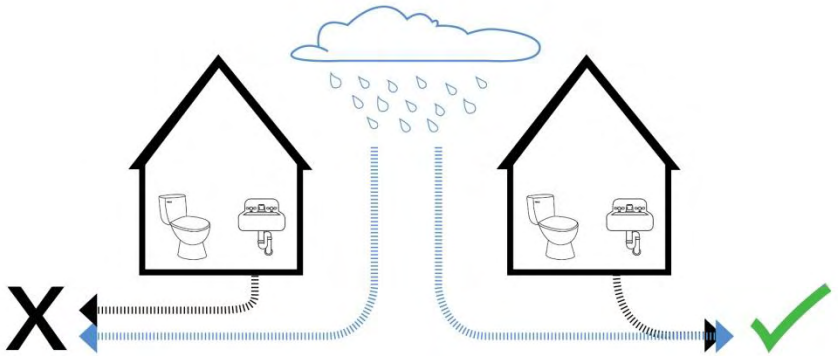
Street Selection

- Factors below helped select the most effective streets in the project area for bioretention in the right-of-way
- Selection criteria are guides, not set in stone – other streets may be used to meet project goals



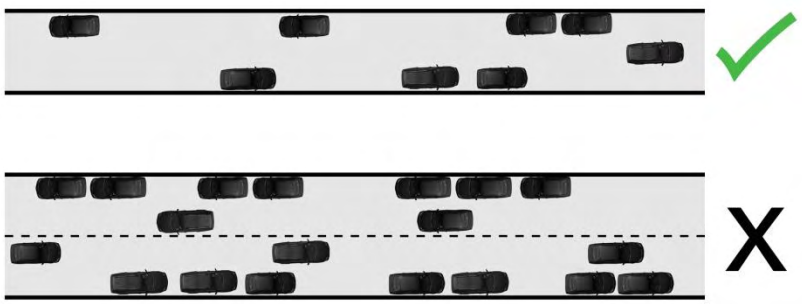
① Residential streets
② Flatter roads (under 5% grade)
③ Minimal driveways
④ Open areas without mature trees
⑤ Wider planter strips (9' or greater)
⑥ Minimal public & private utility conflicts
⑦ Cross slope of road
⑧ Minimal impact to on-street parking

Street Selection: Combined Sewer



- Streets draining to a combined sewer are needed
- A few streets have separate storm sewer and were excluded

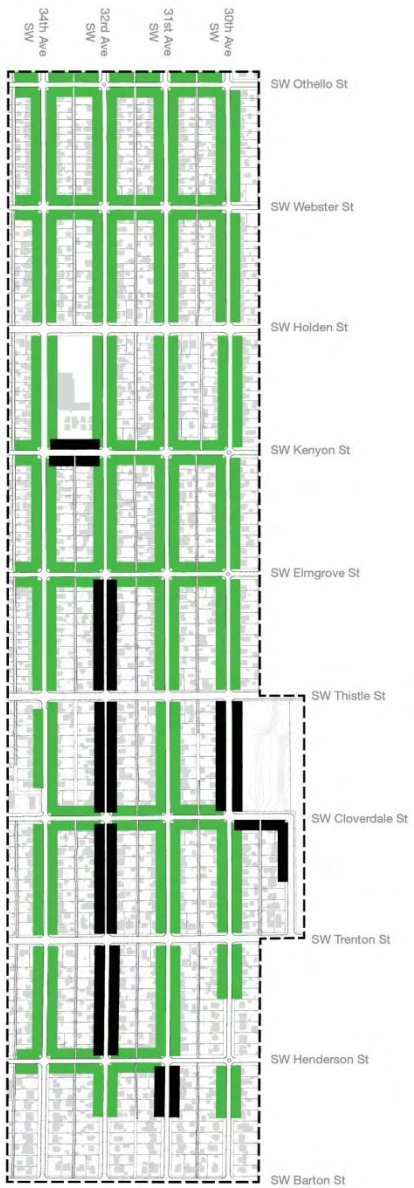
Street Selection: Non-Arterials



- Arterials more difficult due to permitting and restrictions on traffic flow

Street Selection: Planter Strips

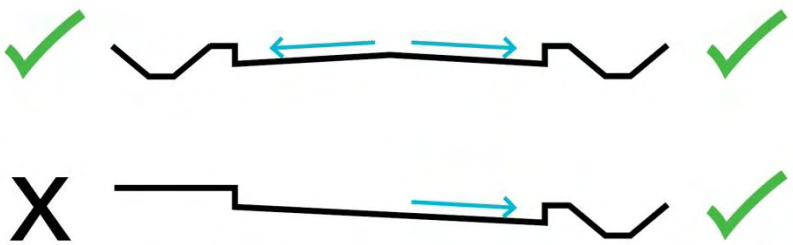
- Wider planter strips are more effective and preferred for bioretention



Street Selection: Flatter Streets

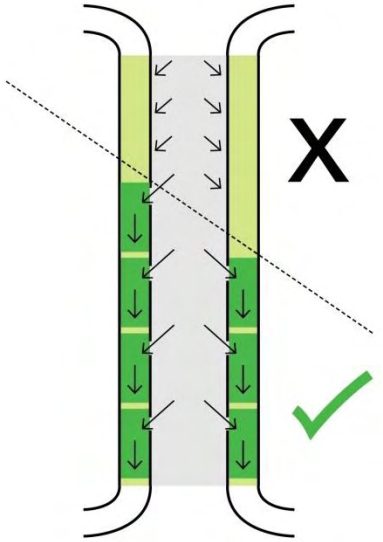
- Flatter streets (the slope from one end of block to the other) are preferred for bioretention

Street Selection : Side Slope

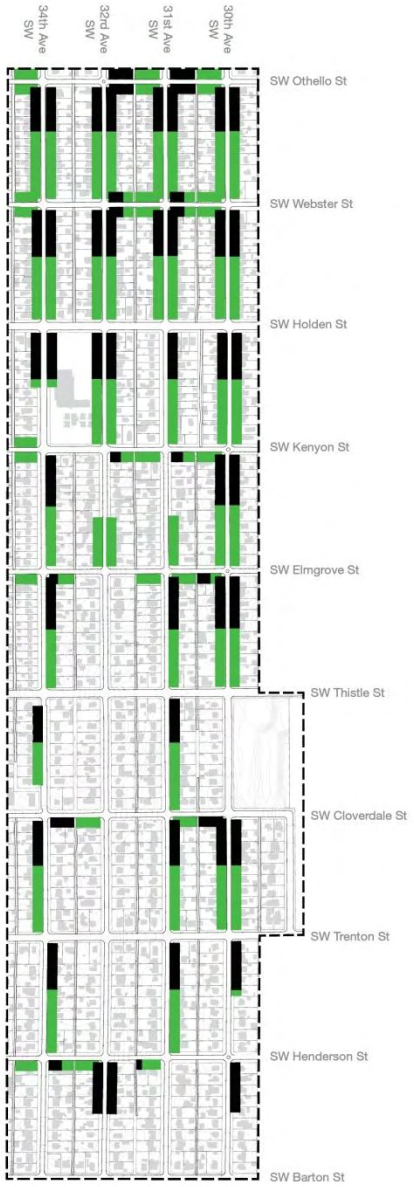


- Either side of crowned road can work
- The lower side of a “thrown” road (e.g. road sloping only to one side) is preferable

Street Selection: Lower Portion of Blocks

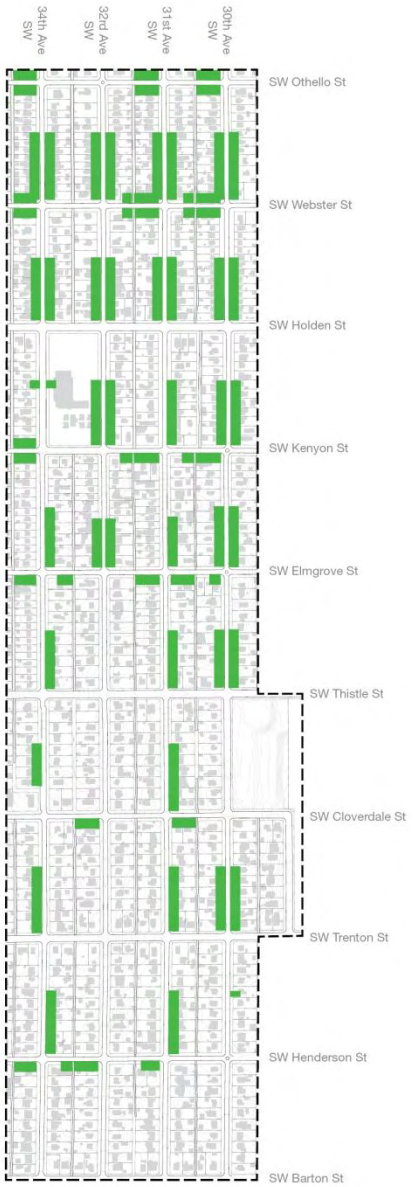


- The lower (downhill) portion of each block is more effective
- Street runoff from entire block can be captured in bioretention in most cases



Street Selection: Initial Steps

1. Identified streets for closer examination based on initial criteria
2. Considered additional characteristics
3. Revised identified streets based upon further analysis

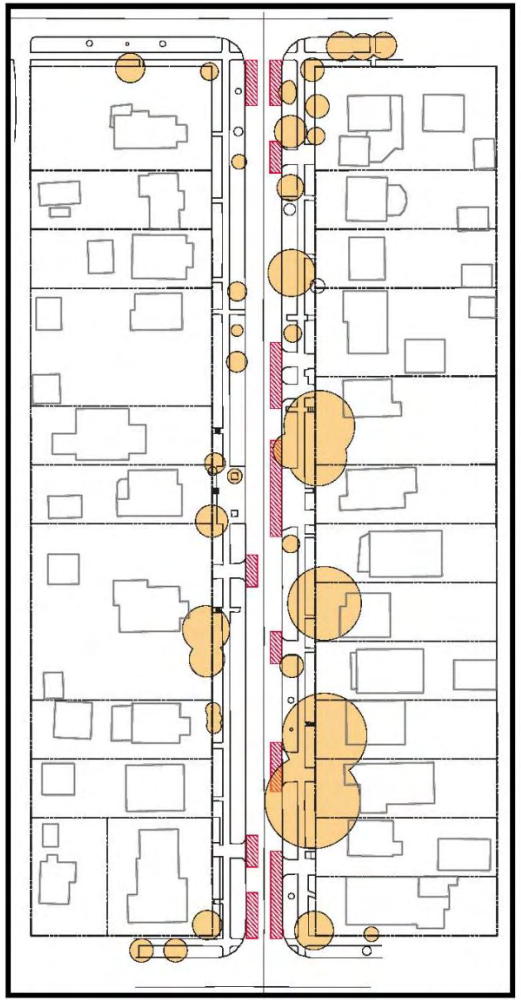


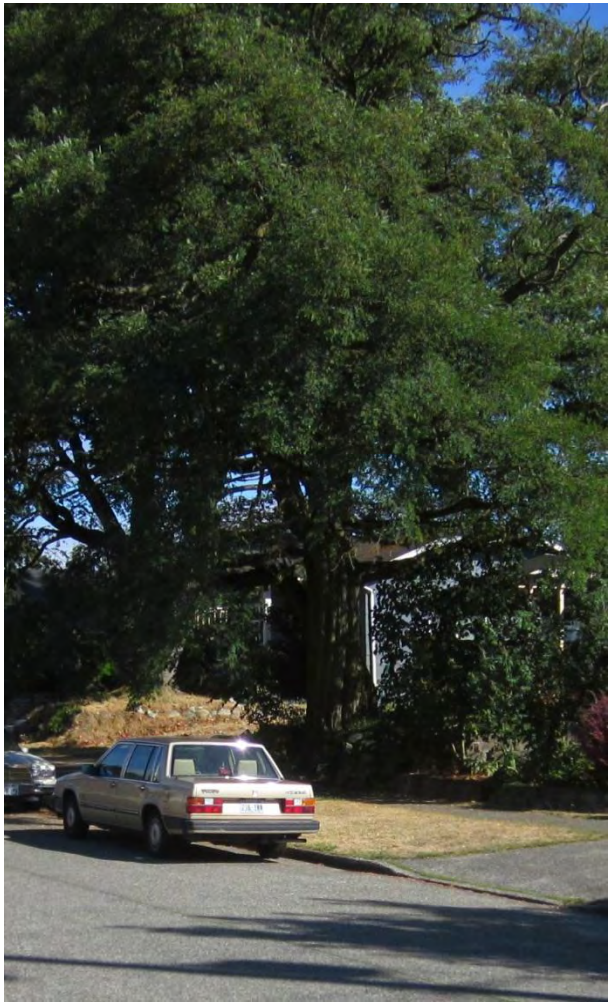
Street Selection: Refined Selection

Factors leading to refined selection included:

- Fewer Driveways
- Open Areas Without Mature Trees
- Opportunity to Collect Alley Drainage
- Utility Main Locations
- Bigger Catchment Areas
- Parking Use & Access

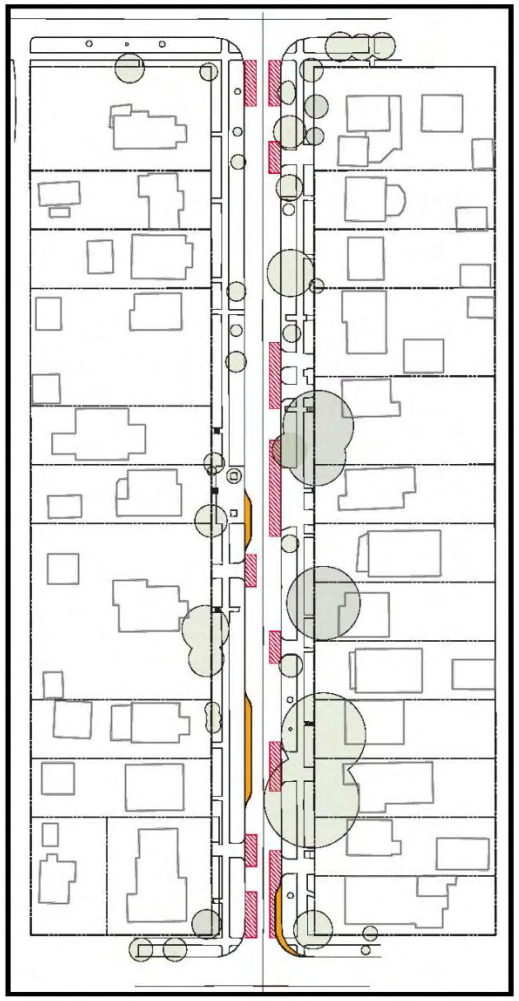
Site Considerations: Existing Trees and Driveways





- Preservation of large existing trees is a priority
- Protect large trees on private property adjacent to ROW
- Small or unhealthy trees in ROW may be removed and/or replaced
- Maintain driveway access

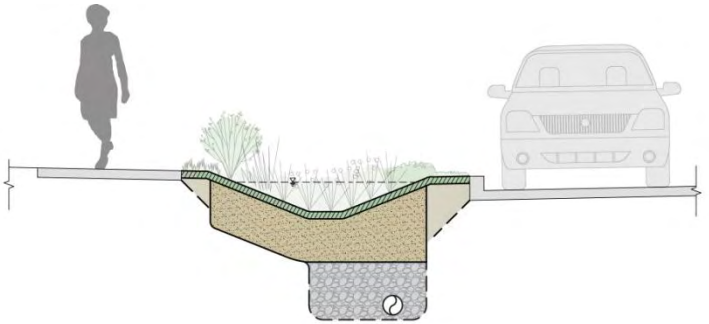
Site Considerations: Where to Locate Curb Bulbs



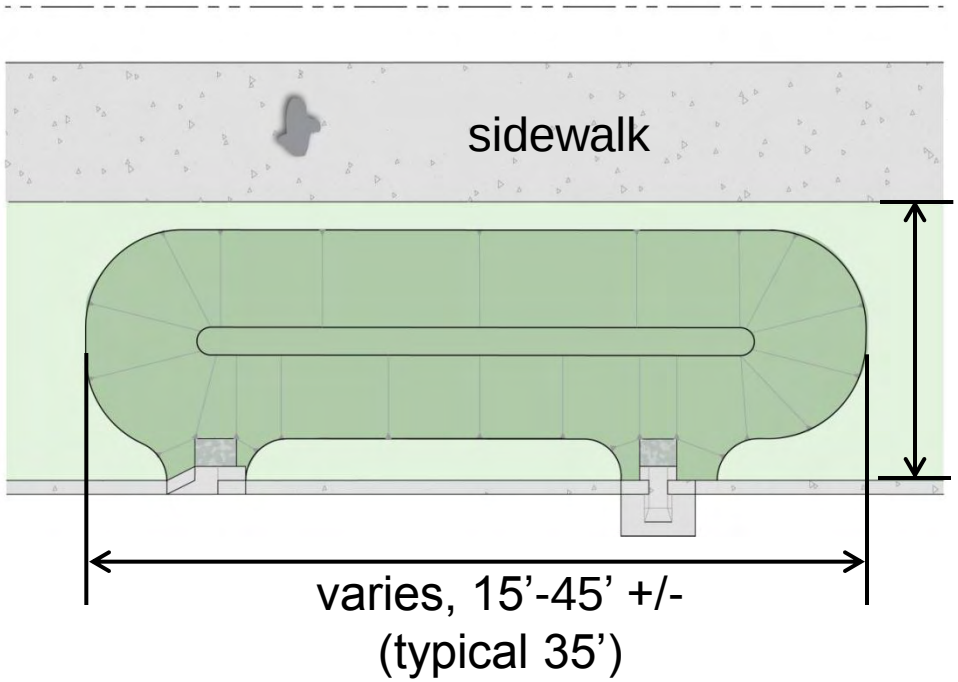
Curb bulb locations based on:

- Efficient removal of stormwater (4:1 trade off)
- Parking regulations
- Observation of parking patterns
- Locations of existing trees
- Accessibility

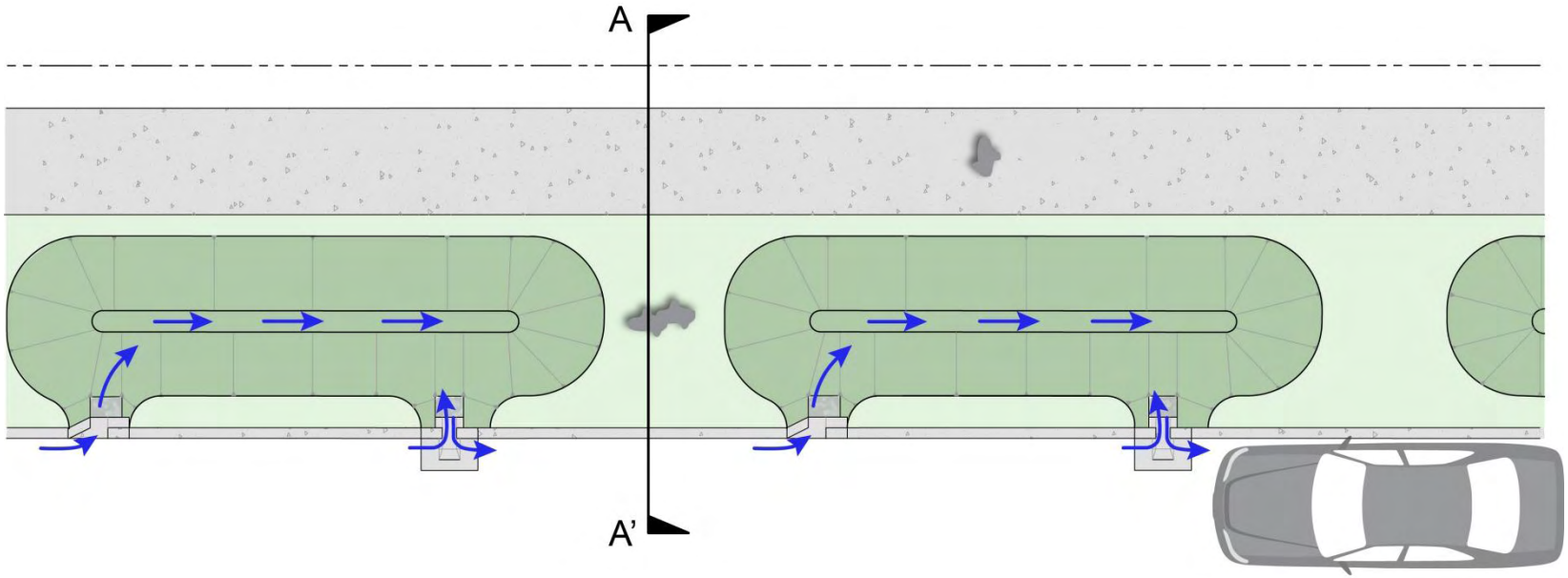
Bioretention: Length/ Width/ Depth

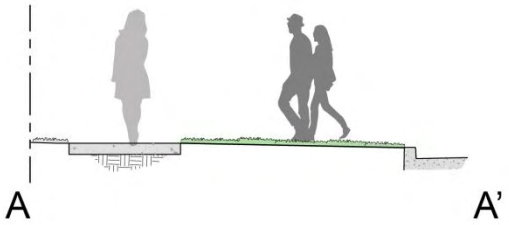


- Temporary ponding 0”-12”
- Typically drains out within 24 hours

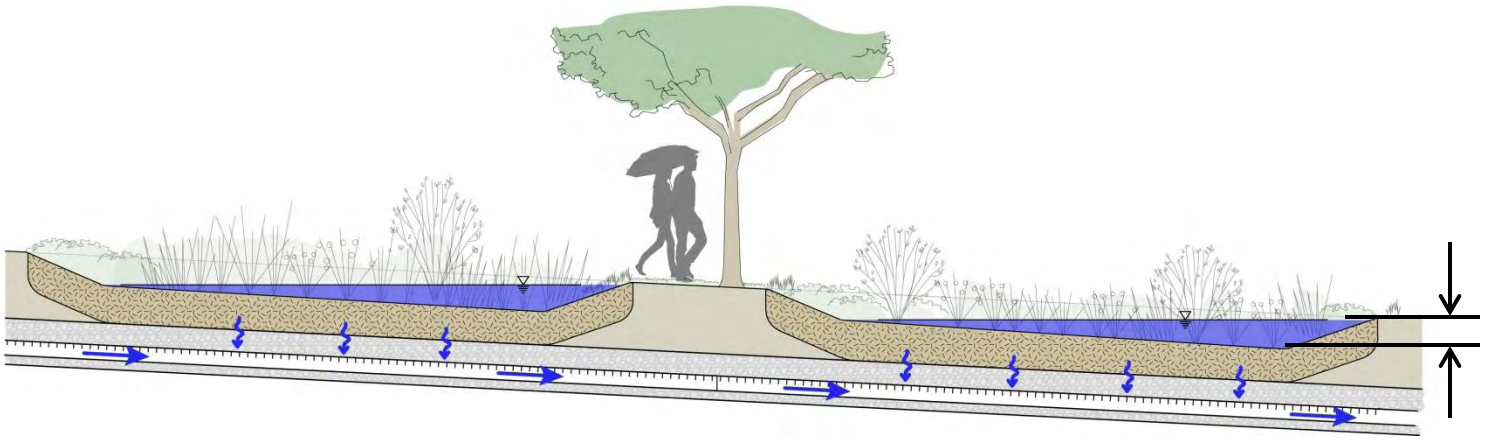


Bioretention: Crossings & Flows





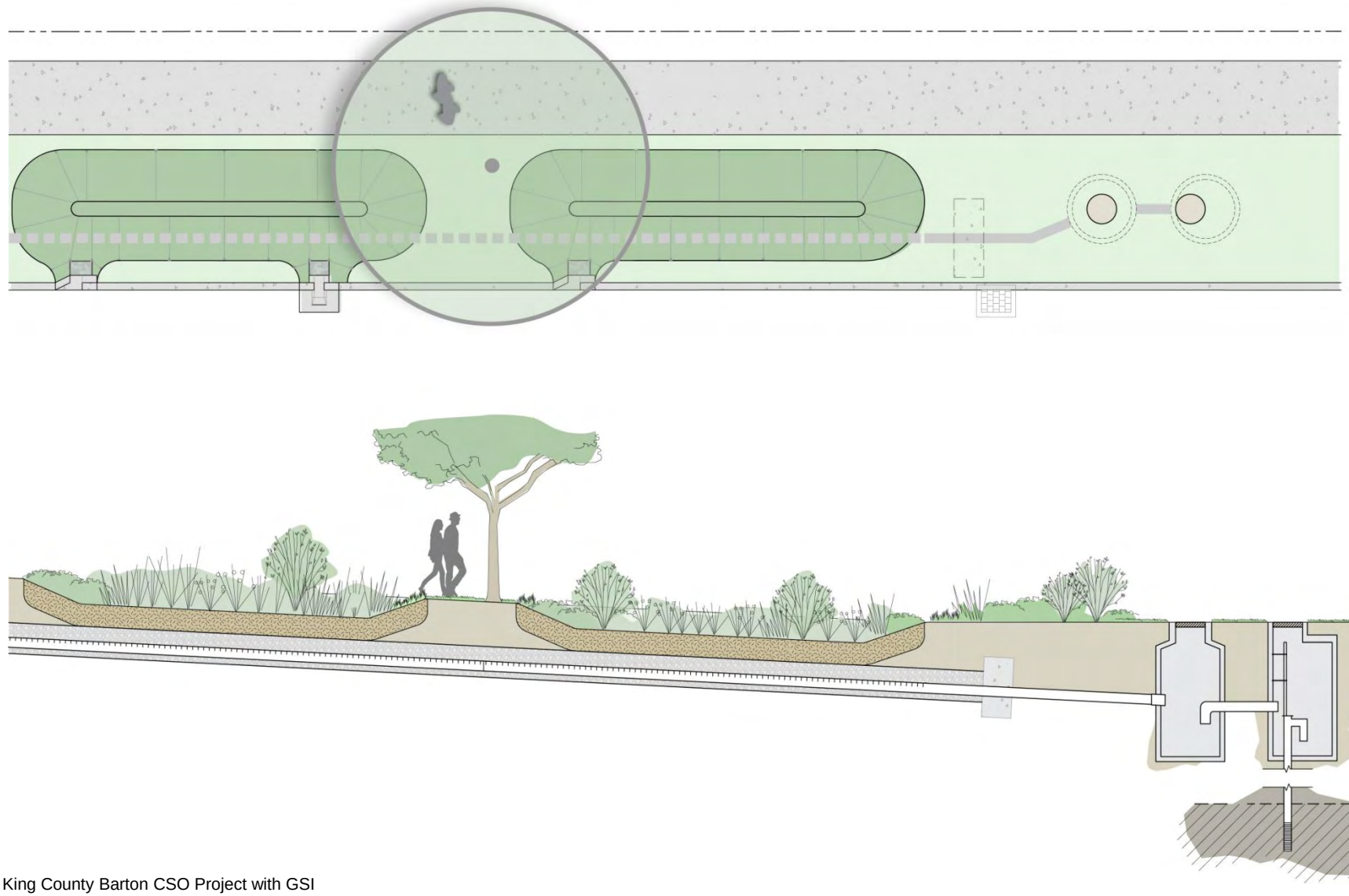
Bioretention: Ponding & Collection During Storm Events



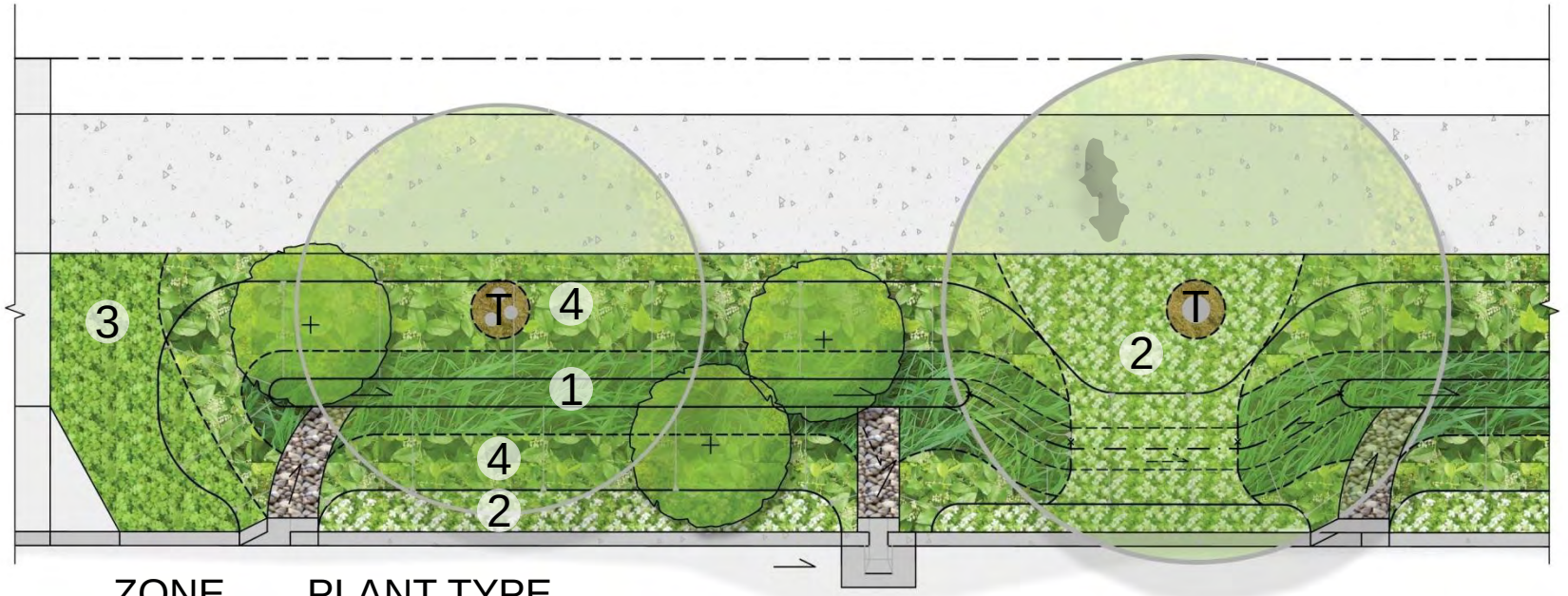
- Temporary ponding 0”-12”
- Typically drains out within 24 hours

- Underdrain pipe carries filtered water to deep infiltration well

Bioretention: Collection System

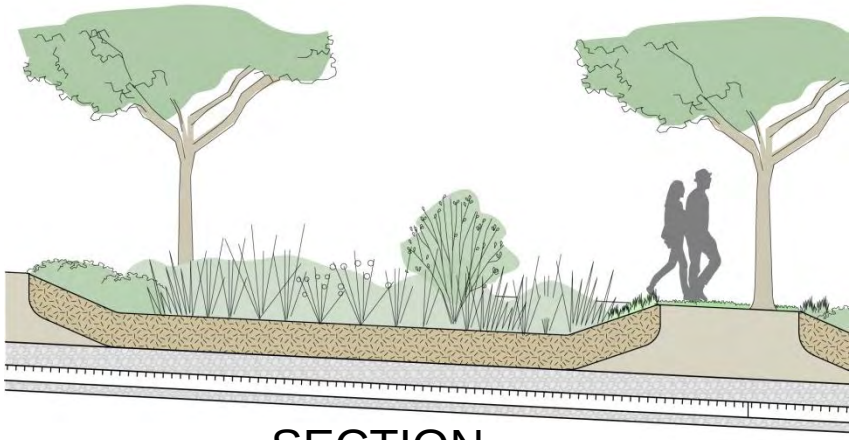


Bioretention: Planting Overview



ZONE	PLANT TYPE
1	Emergents
2	Steppables
3	Groundcovers
4	Low Shrubs
4	Accent Shrubs / Small Trees
2, 4	Tree

PLAN



SECTION

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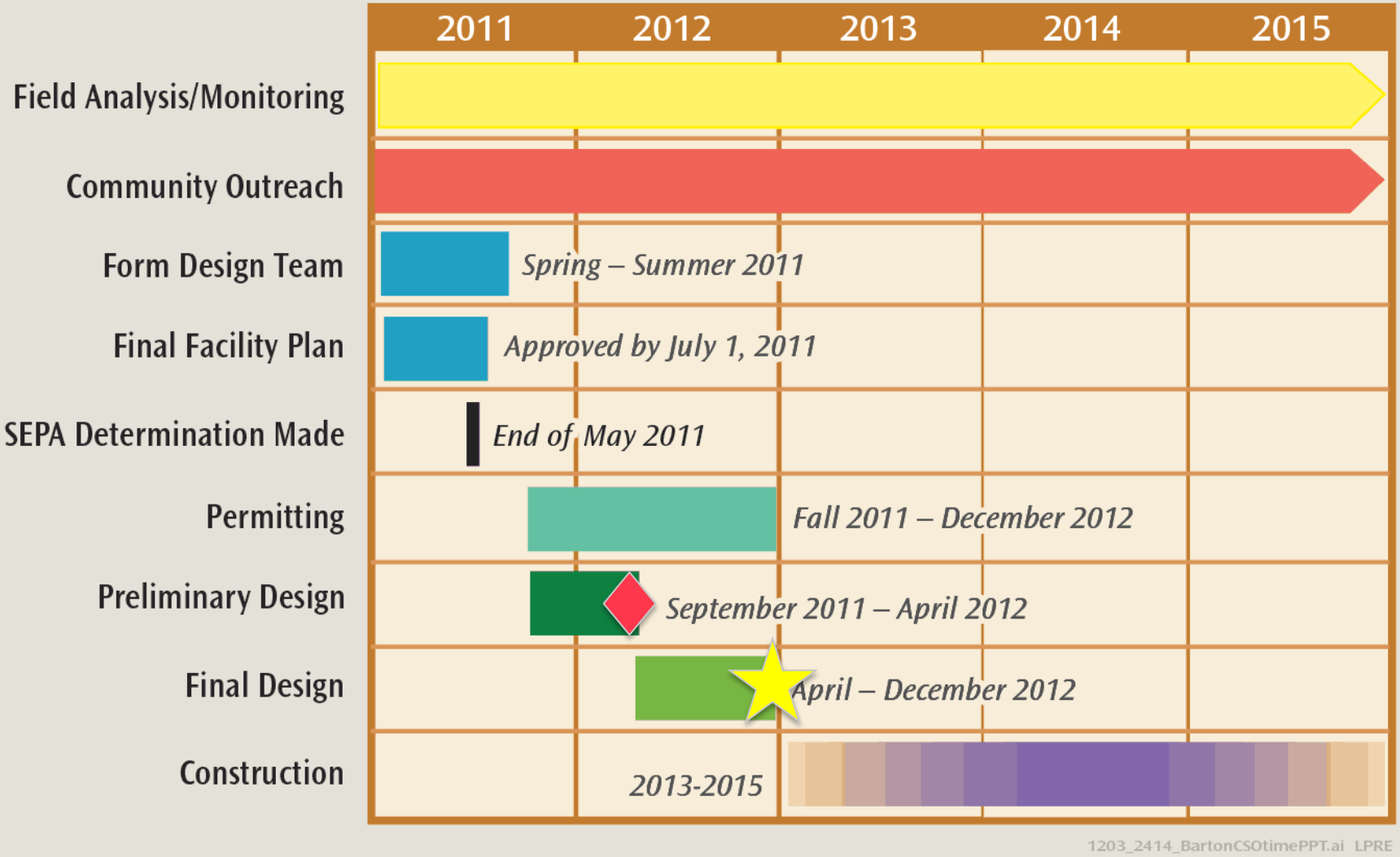
Wastewater Treatment Division

BARTON BASIN CSO-GSI PROJECT

ANTICIPATED TIMELINE



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Community Input on Design

- Webpage – Locations will be posted
- Block level meetings
- Community Meetings – Learn more about the plants and plant selection
- Project updates
- Any time there is field work
- Phone, email and in person

For More Information

- **Kristine Cramer, King County Community Relations**
  Email: Kristine.Cramer@kingcounty.gov

  Phone: (206) 263-3184

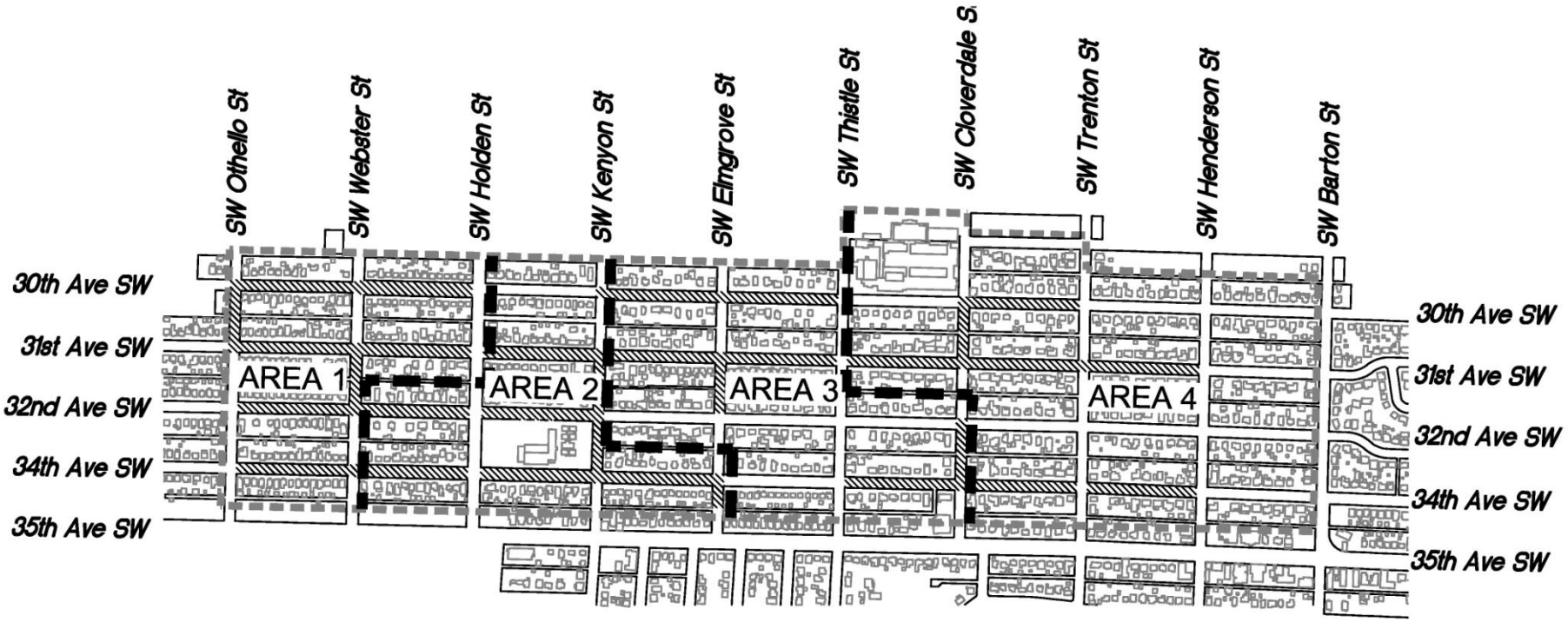
- **Mary Wohleb, King County Project Manager**

  Email: Mary.Wohleb@kingcounty.gov

  Phone: (206) 296-8028

- **Web**: www.kingcounty.gov/environment/wtd/construction/seattle/bartonCSO-GSI.aspx

Break Out Sessions



- Tables for Areas 1-4 for Site-Specific Discussion
- Table for General Questions/Comments