



THE HEIGHTS  
Vancouver, WA

**GGLO**  
City of Vancouver  
Stormwater & Urban Forestry  
Guidance Package  
August 4, 2021

DESIGN + DEVELOPMENT TEAM

Owner

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Vancouver, WA

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- 4 PART 01 / STORMWATER**
- 4 SECTION 01.0 / GOALS & DESIGN APPROACH
- 5 SECTION 01.1 / STANDARD PLANS
- 8 SECTION 01.2 / STANDARD SECTIONS
  
- 10 PART 02 / URBAN FORESTRY**
- 10 SECTION 02.0 / GOALS & DESIGN APPROACH
- 11 SECTION 02.1 / SOIL
- 12 SECTION 02.2 / PLANT PALETTES

**Goals**

The goal of this study is to identify and develop a network of interconnected stormwater and urban forestry best management practices (BMPs). These BMP shall meet specific development and place-making goals, as outlined in the Heights District Plan. This is bridging document intended to guide others in developing standardized engineering details and plans, specific to the Heights District.

Objectives include:

- Identify a BMP “kit of parts” and standard plans to identify how those BMPs can be configured as part of a system
- Allow for flexibility
- Develop an achievable approach that is sensitive to cost, maintenance, and place-making goals
- Express biophilia (human connection to natural systems) and provide opportunities for education and demonstration
- Maximize use of low impact development techniques to showcase innovation and protect the health of downstream watersheds

**Background**

Work completed in this study builds upon, and is consistent with, completed and ongoing efforts related to the Heights District Plan and Design Guidelines. This study has been developed alongside the new HX zoning overlay requirements for the Heights District and should reflect consistent language and approach.

**Design Approach**

This study overlays internal street typologies, neighborhood districts, and open space/public realm networks, as identified in the Heights District Plan. The character and needs of each street typology have been reviewed and evaluated from a needs perspective related to use, intensity, place-making and spatial constraint. The Heights District Plan was then reviewed to identify typical conditions related to unmitigated hard-surfaces, access, visibility, parking configuration, and adjacent pedestrian uses.

GGLO identified four typical conditions that were then further developed to demonstrate how specific stormwater and urban forestry BMPs could be configured, as part of a public realm network. Those 4 typical plans include:

- Loop Retail Street
- Loop Residential Street
- Standard / Internal Street
- Surface Parking Lot

Typical BMPs were identified during the development of these plans. These typical BMPs are identified in this document and can then be further developed into standardized City engineering details and plans, specific to the Heights District Plan.



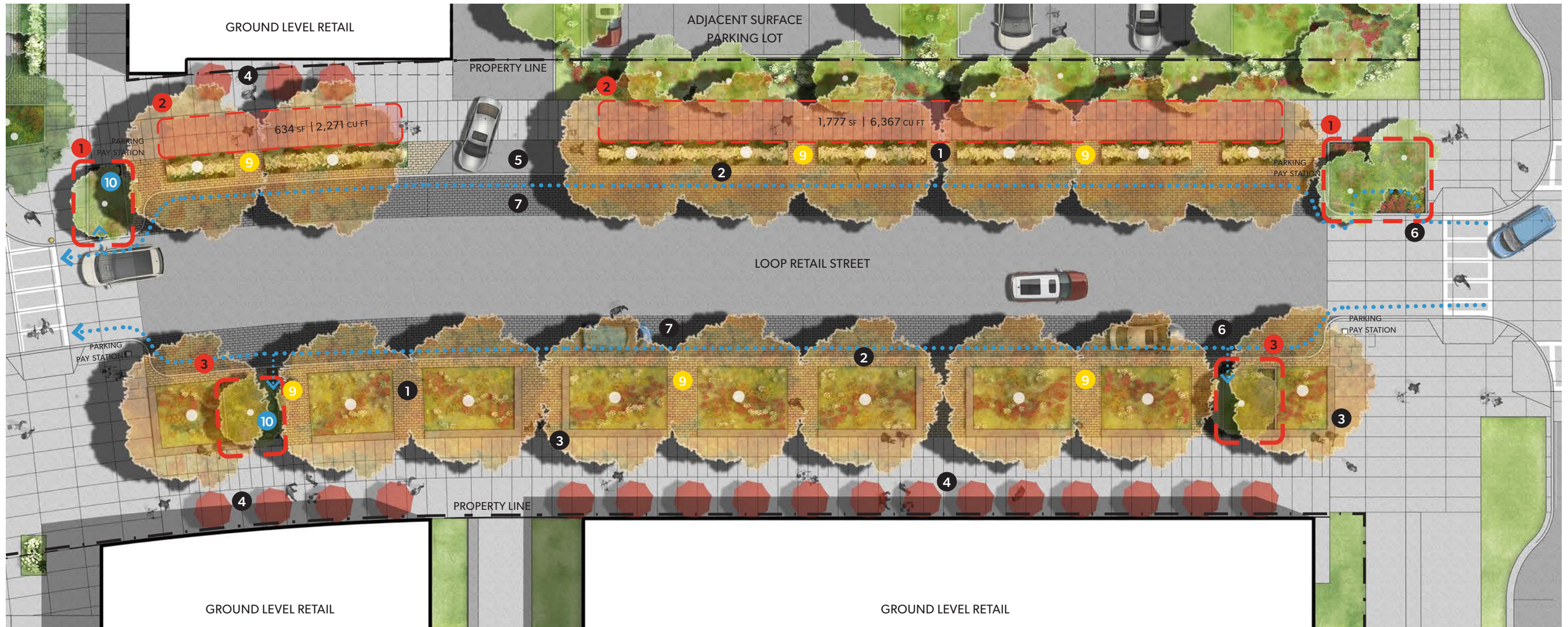
Heights District Street Typologies



Approved Heights District Plan



Neighborhoods District Plan



LOOP RETAIL STREET

SCALE: 1" = 20'

- |                            |                     |                          |   |
|----------------------------|---------------------|--------------------------|---|
| 1 Parking Cut-Through Path | 5 Driveway          | 9 Pedestrian Light       | 1 Curb-bulb Bioretention, Fig. 1   Page 8   |
| 2 2' Wide Walk-Off Strip   | 6 Curb Inlet        | 10 Bioretention Overflow | 2 Silva Cell   Fig. 2, Page 8               |
| 3 Seatwall                 | 7 Mortar-Set Pavers |                          | 3 Retail Loop Bioretention   Fig. 3, Page 8 |
| 4 Outdoor Retail Area      |                     |                          |   |

MATERIALS

- |  |  |
|--|--|
| A. Loop Public Sidewalk<br>material: CIP Concrete - 2ft x 4ft scoring                          | E. 2ft Wide Parking Walk-Off Strips<br>material: Precast Concrete Permeable Pavers |
| B. Loop Retail Zone<br>material: CIP Concrete - 4ft scoring                                    | F. Loop Parallel Parking Stalls<br>material: Mortar-set Precast Concrete Pavers    |
| C. Loop Intersections - Pedestrian and Vehicular<br>material: CIP Concrete - 4ft x 8ft scoring | G. Driving Lanes<br>material: Asphalt  |
| D. Parking Cut-Through Paths<br>material: Precast Concrete Permeable Pavers                    |  |





MATERIALS

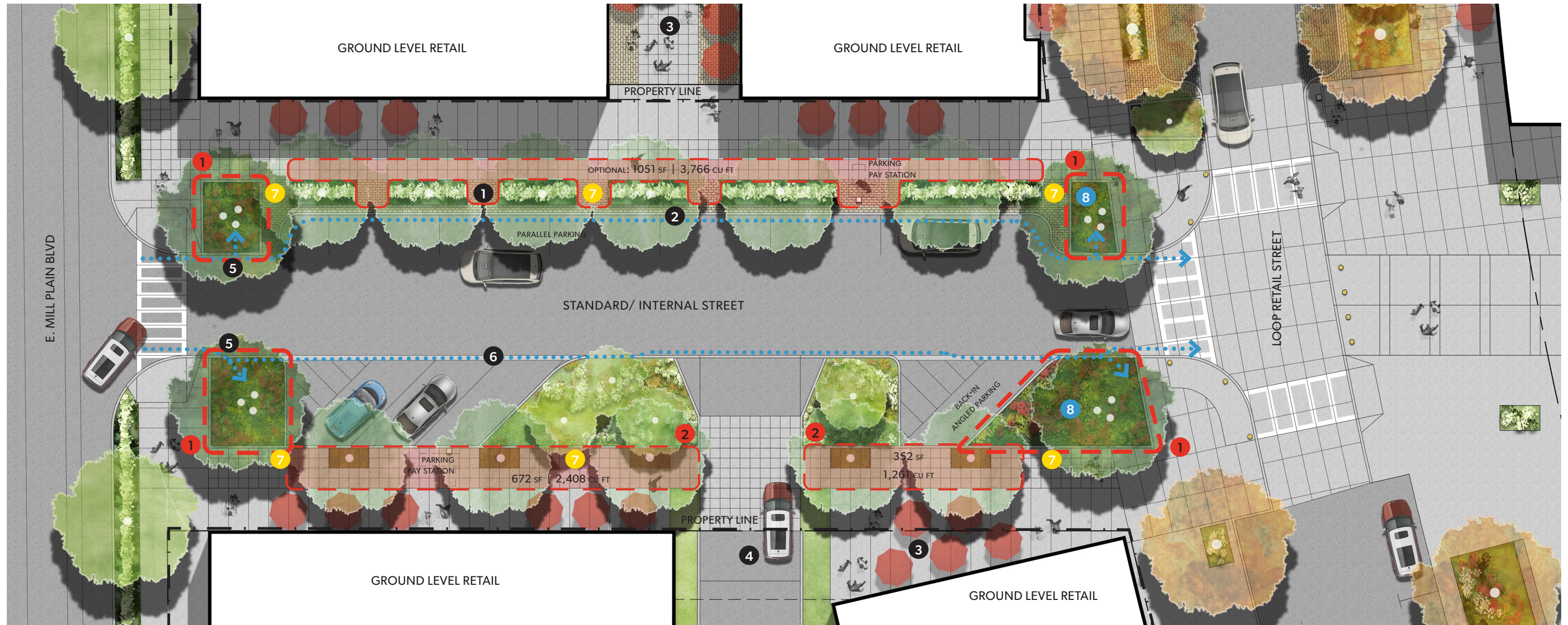
- A. Loop Public Sidewalk  
material: CIP Concrete - 2ft x 2ft scoring
- B. Loop Intersections - Pedestrian and Vehicular  
material: CIP Concrete - 4ft x 8ft scoring
- C. Parking Cut-Through Paths  
material: Precast Concrete Permeable Pavers
- D. 2ft Wide Parking Walk-Off Strips  
material: Precast Concrete Permeable Pavers
- E. Loop Parallel Parking Stalls  
material: Mortar-set Precast Concrete Pavers
- F. Driving Lanes  
material: Asphalt

LOOP RESIDENTIAL STREET

SCALE: 1" = 20'

- 1 Parking Cut-Through Path
- 3 Pocket Park
- 5 Alley
- 7 Mortar-Set Pavers
- 9 Bioretention Overflow
- 1 Bioretention Swale | Fig. 5, Page 9
- 2 2' Wide Walk-Off Strip
- 4 Bioretention Bridge
- 6 Curb Inlet
- 8 Pedestrian Light
- 2 Silva Cell | Sim Fig. 2, Page 8





STANDARD / INTERNAL STREET

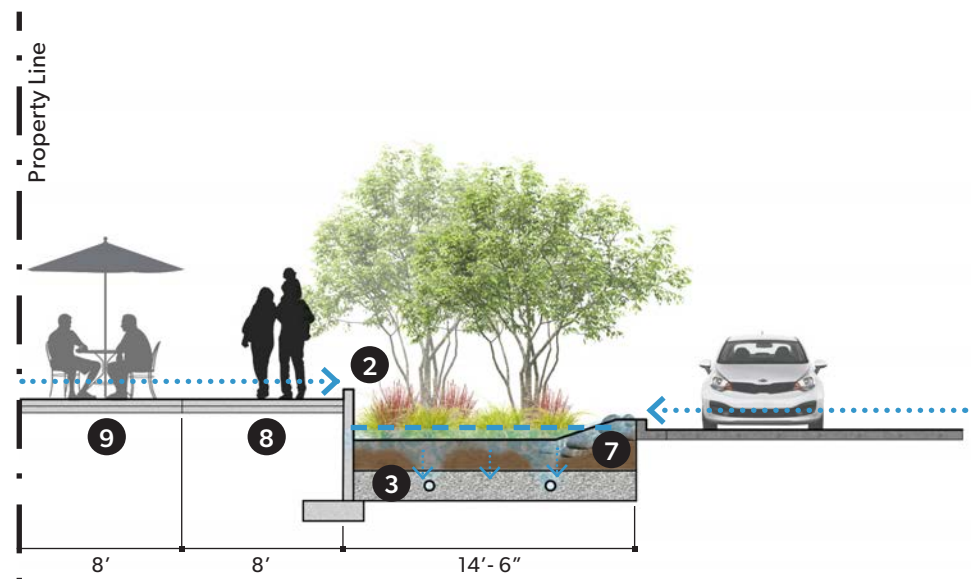
SCALE: 1" = 20'

- |                            |                    |                         |   |
|----------------------------|--------------------|-------------------------|---|
| 1 Parking Cut-Through Path | 4 Driveway         | 7 Pedestrian Light      | 1 Curb-bulb Bioretention   Fig. 1, Page 8   |
| 2 2' Wide Walk-Off Strip   | 5 Curb Inlet       | 8 Bioretention Overflow | 2 Silva Cell w/ Tree Grate   Fig. 4, Page 9 |
| 3 Outdoor Retail Area      | 6 Drainage Channel |                         |   |

MATERIALS

- |  |  |
|--|--|
| A. Public Sidewalk<br>material: CIP Concrete - 2ft x 2ft scoring                               | E. 2ft Wide Parking Walk-Off Strips<br>material: Precast Concrete Permeable Pavers |
| B. Retail Zone<br>material: CIP Concrete - 4ft scoring   | F. Parking Stalls<br>material: Asphalt   |
| C. Loop Intersections - Pedestrian and Vehicular<br>material: CIP Concrete - 4ft x 8ft scoring | G. Driving Lanes<br>material: Asphalt  |
| D. Parking Cut-Through Paths<br>material: Precast Concrete Permeable Pavers                    | H. Tree Grates<br>material: see city standard detail T03-026A                      |





- 1 Seatwall, 18" H x 18" W
- 2 6" H Raised Curb
- 3 Perforated Underdrain
- 4 Planting Beyond
- 5 Approved Street Tree
- 6 6" CIP Curb & 18" Walk-Off Strip w/ Permeable Pavers
- 7 Flow Dispersion
- 8 Public Sidewalk
- 9 Retail Zone

Figure 1: Curb-Bulb Bioretention

SCALE: 1/8" = 1'

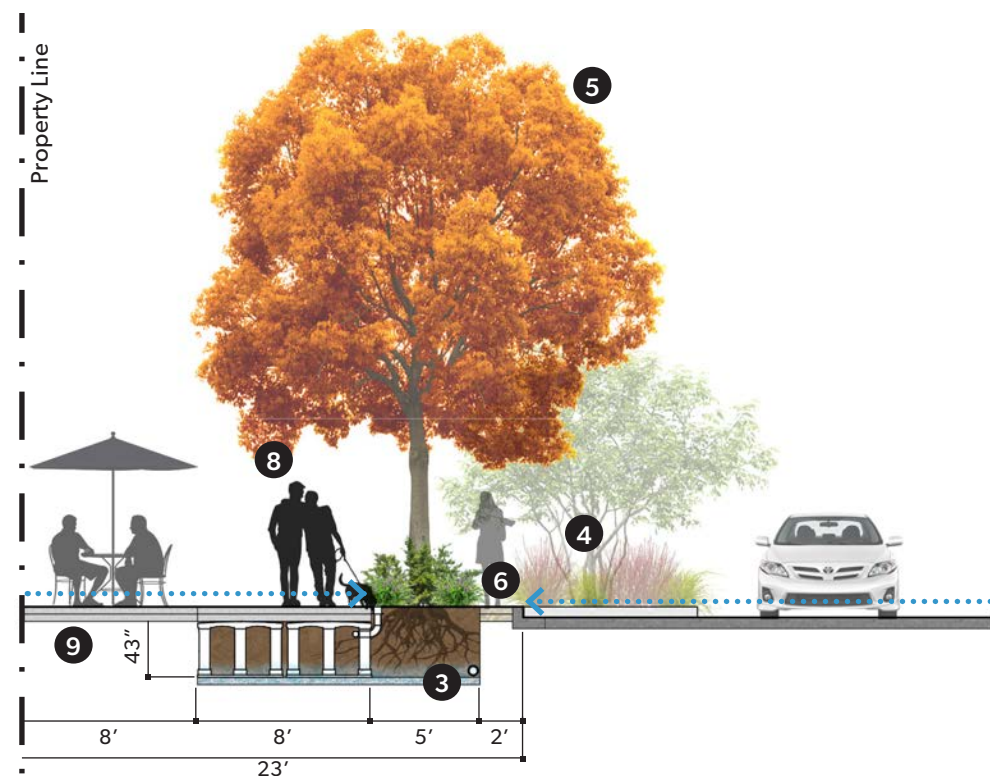


Figure 2: Silva Cell Planter

SCALE: 1/8" = 1'

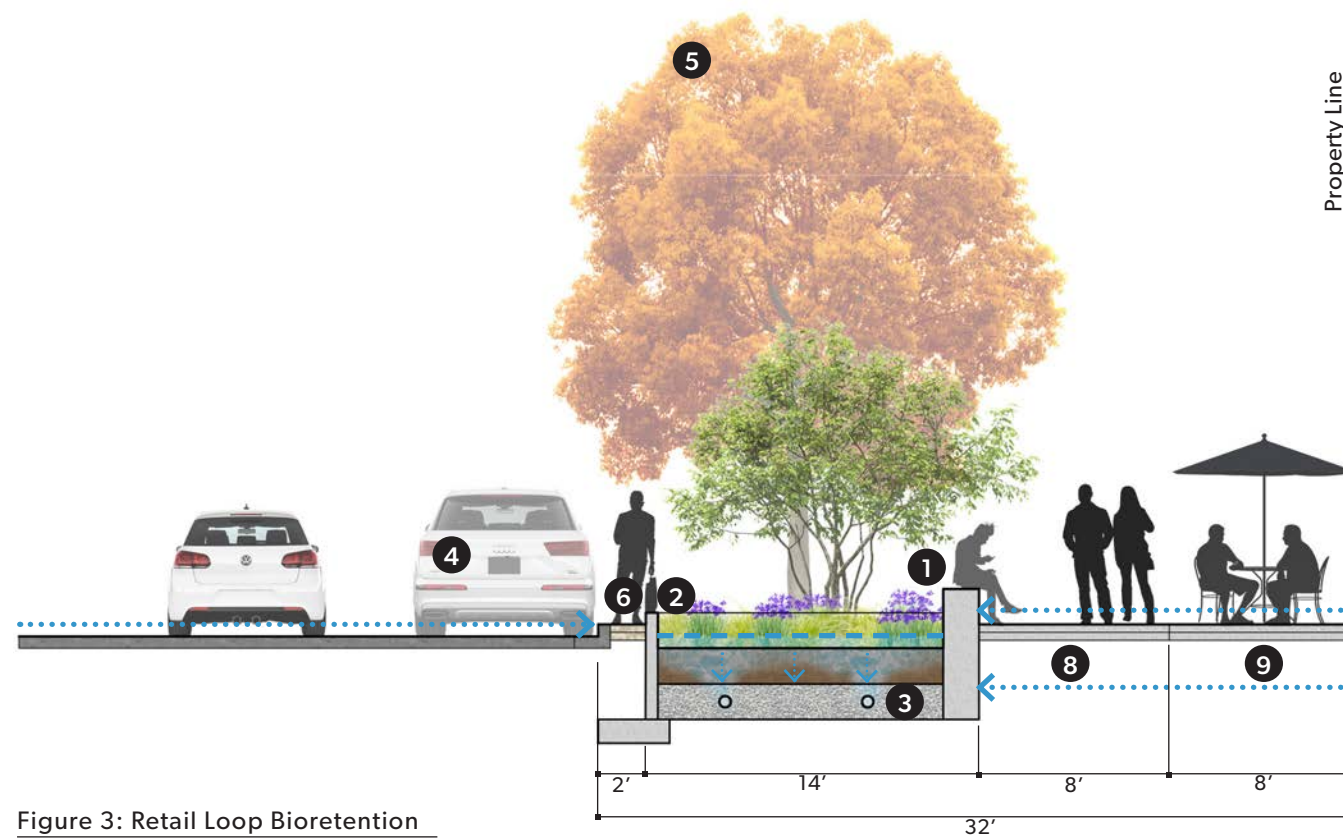


Figure 3: Retail Loop Bioretention

SCALE: 1/8" = 1'



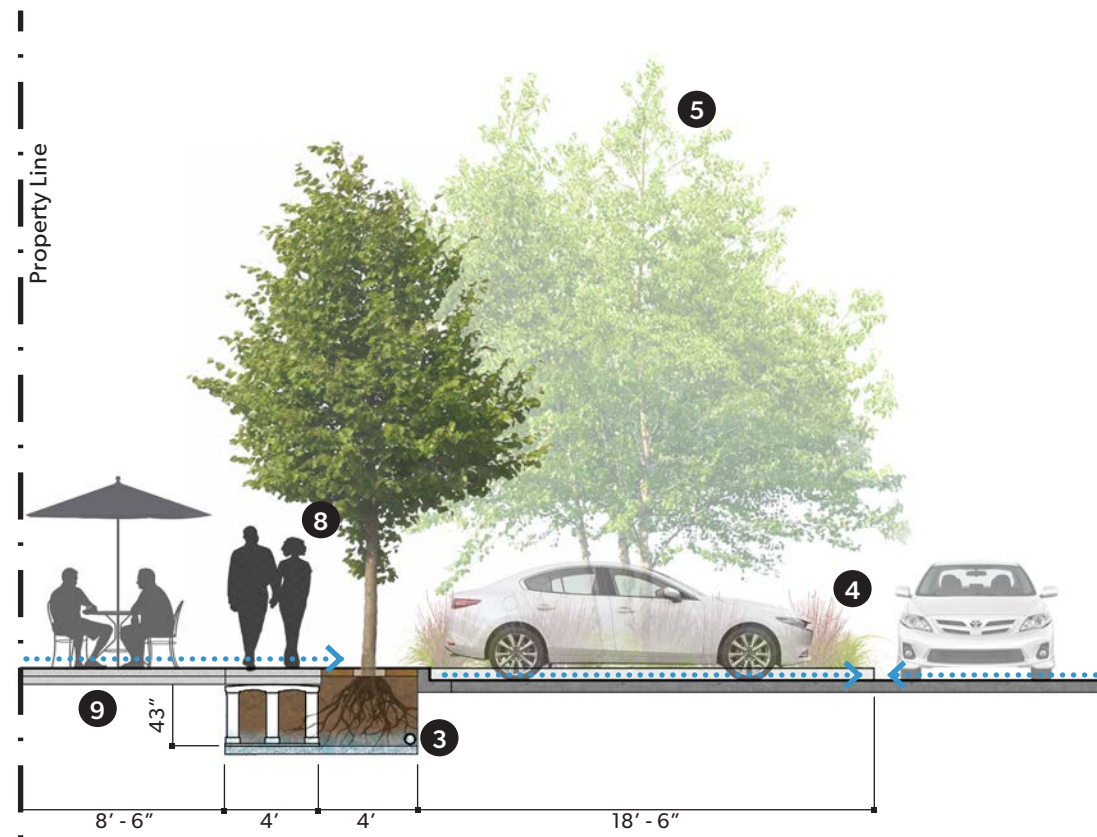


Figure 4: Silva Cell w/ Tree Gate  
SCALE: 1/8" = 1'



Figure 5: Bioretention Swale  
SCALE: 1/8" = 1'

- 1 Culvert / Parking Cut Through Beyond
- 3 Underdrain
- 4 Planting Beyond
- 5 Approved Street Tree
- 6 6" CIP Curb & 18" Walk-Off Strip w/ Permeable Pavers
- 7 Sideyard
- 8 Public Sidewalk
- 9 Retail Zone

**Goals**

The goal for this study is to develop an Urban Forestry kit of parts and best practices that can be applied systematically throughout the Heights District. Minimum soil volumes and soil quality will be applied throughout the district. Tree species are selected from the City of Vancouver approved Street Tree List. These selections are intended to provide clear guidance and structure, flexibility and diversity. These recommendations are established per the approved street typologies in the Heights District Plan. Understory plant selections are also selected per street typology and reinforce place-making and identity of the Neighborhood Character Districts.

Objectives include:

- Create iconic, identifiable street typologies through the use of urban forestry and plant palettes
- Provide suitable soil volumes for street trees to become easily established and thrive in an urban environment
- Use tree and plant species to express the inherent beauty in native and adaptive species of the region
- Express biophilia (human connection to natural systems) and provide opportunities for education and demonstration
- Establish a diversity of tree and plant species that bolster existing habitats for wildlife and pollinators

**Background**

Work completed in this study builds upon, and is consistent with, completed and ongoing efforts related to the Heights District Plan and Design Guidelines. This study has been developed alongside the new HX zoning overlay requirements for the Heights District and should reflect consistent language and approach.



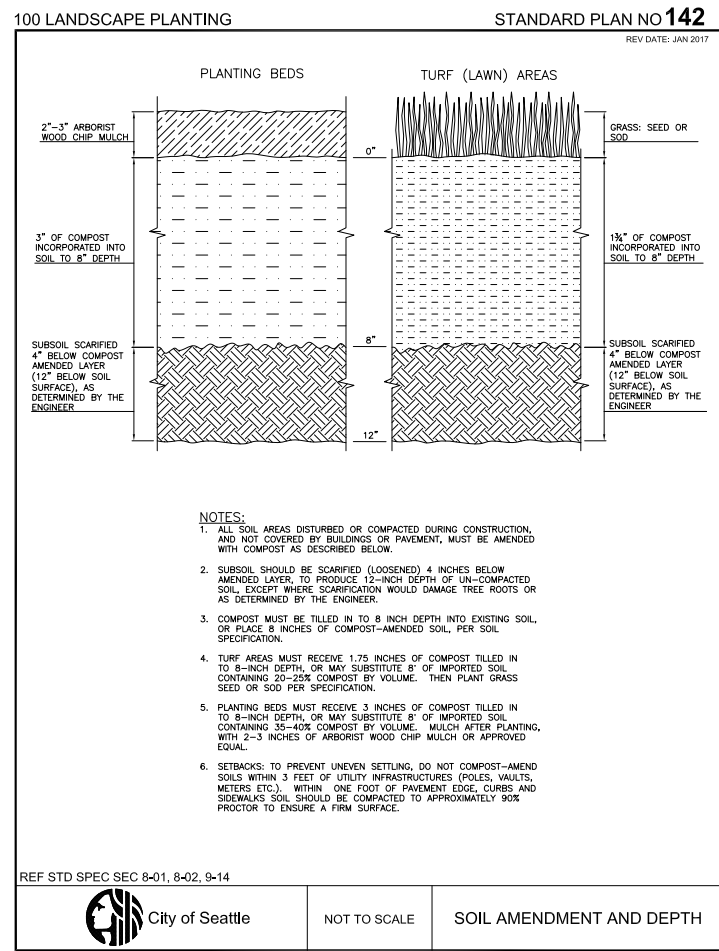
Approved Heights District Plan



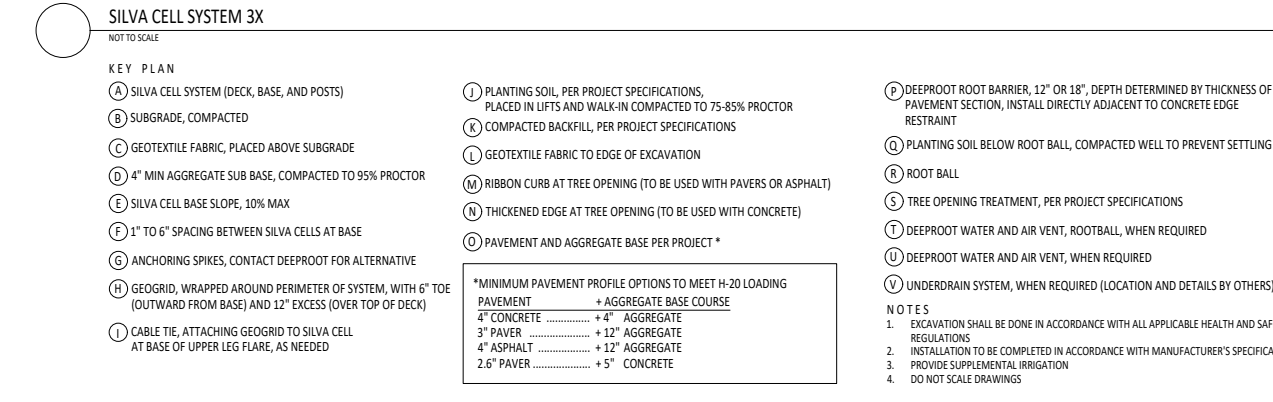
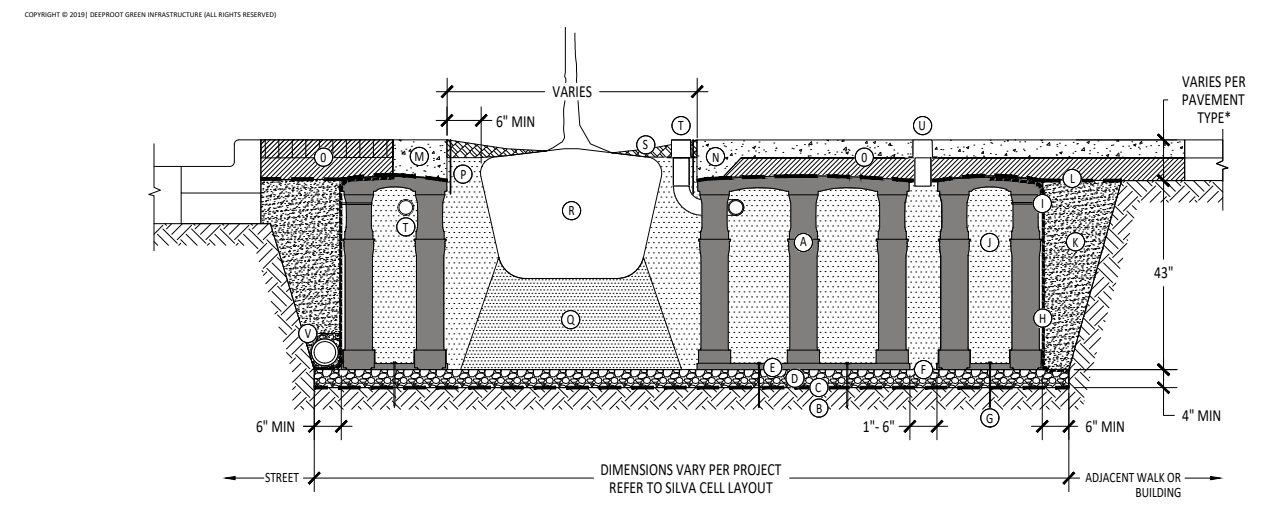
Heights District Street Typologies



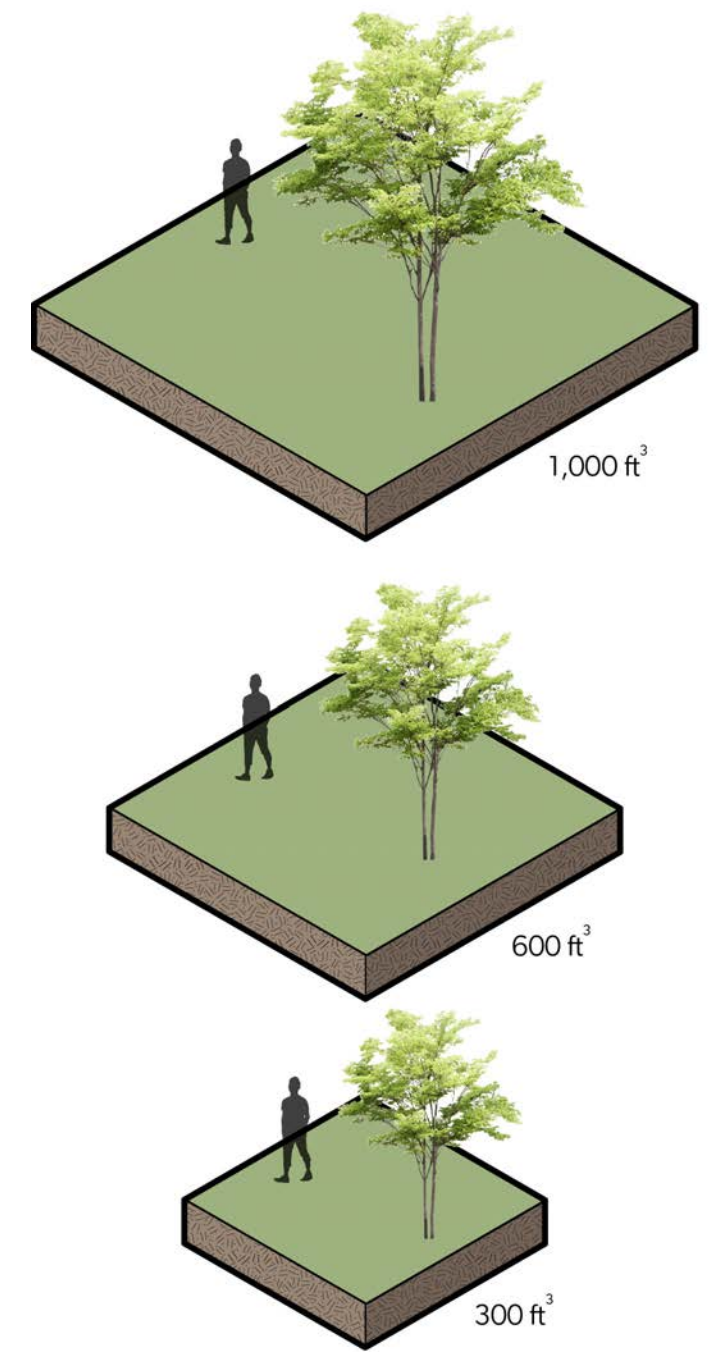
Neighborhoods District Plan



Seattle Soil Amendment Detail



Silva Cell System 3X Detail



Tree Soil Volume Visualization

deeptroot  
 DeepRoot Green Infrastructure  
 www.deeptroot.com  
 T 415 781 9700  
 F 415 781 0191

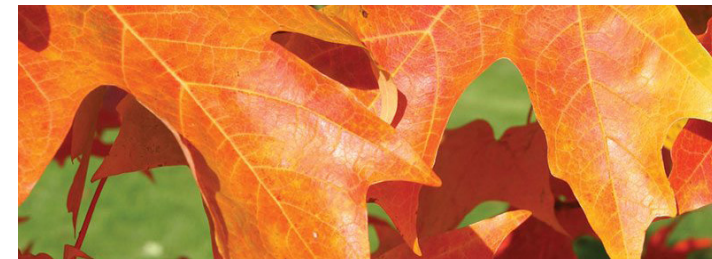
SILVA CELL SYSTEM 3X  
 NOT TO SCALE  
 FEET



Commemoration Maple | Leaf



Key Plan



Commemoration Maple | Fall Leaf



Commemoration Maple | Bark

Commemoration Maple | *Acer saccharum*

- Use: Primary Street Tree on Loop Streets
- Size: 50' Height, 35' Width
- Soil Volume: 1,000 ft<sup>3</sup>
- Traits: Bright Orange Fall Color

LOOP RETAIL STREET | TREES



Arctic Fire Dogwood | *Cornus stolonifera* 'Arctic Fire'



Pee Wee Oak Leaf Hydrangea | *Hydrangea quercifolia* 'Pee Wee'



Japanese Rose | *Rosa rugosa* 'Alba'



Evergreen Huckleberry | *Vaccinium ovatum* 'Thunderbird'



Autumn Moor Grass | *Sesleria autumnalis*



New Zealand Sedge | *Carex testacea*



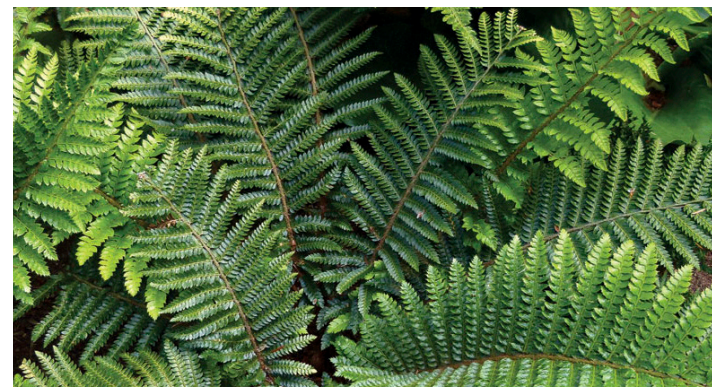
Soft Caress Mahonia | *Mahonia eurybracteata* 'Soft Caress'



Dwarf Sweetbox | *Sarcococca hookeriana* var. *humilis*



Bear's Breeches | *Acanthus mollis*



Japanese Tassel Fern | *Polystichum polyblepharum*



Panchito Manzanita | *Arctostaphylos x coloradensis* 'Panchito'



Bishop's Hat | *Epimedium x perralchicum* 'Frohleiten'

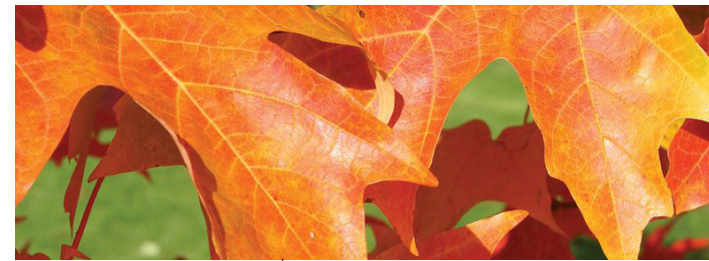
LOOP RETAIL STREET | SHRUBS & GROUNDCOVER



Commemoration Maple | Leaf



Key Plan



Commemoration Maple | Fall Leaf



Commemoration Maple | Bark

Commemoration Maple | *Acer saccharum*

- Use: Primary Street Tree on Loop Streets
- Size: 50' Height, 35' Width
- Soil Volume: 1,000 ft<sup>3</sup>
- Traits: Bright Orange Fall Color

LOOP RESIDENTIAL STREET | TREES



Vine Maple | *Acer circinatum*



Pee Wee Oak Leaf Hydrangea | *Hydrangea quercifolia* 'Pee Wee'



Blizzard Mock Orange | *Philadelphus lewisii* 'Blizzard'



Low Oregon Grape | *Mahonia repens*



Blue Oat Grass | *Helictotrichon sempervirens*



Pink Fountain Grass | *Pennisetum orientale* 'Karley Rose'



Buttercup Winterhazel | *Corylopsis pauciflora*



Panchito Manzanita | *Arctostaphylos x coloradensis* 'Panchito'



Cheyenne Spirit Coneflower | *Echinacea* 'Cheyenne Spirit'



Yarrow | *Achillea millefolium*



Western Sword Fern | *Polystichum munitum*



Bishop's Hat | *Epimedium x versicolor* 'Sulphureum'

LOOP RESIDENTIAL STREET | SHRUBS & GROUND COVER



Scarlet Oak | *Quercus coccinea*

Use: Primary Street Tree  
 Size: 50' Height, 40' Width  
 Soil Volume: 1,000 ft<sup>3</sup>  
 Traits: Bright Red in Fall



Green Vase Zelkova | *Zelkova serrata* 'Green Vase'

Use: Primary Street Tree  
 Size: 50' Height, 40' Width  
 Soil Volume: 1,000 ft<sup>3</sup>  
 Traits: Clean Appearance and Form



Red Rage Tupelo | *Nyssa sylvatica* 'Haymanred'

Use: Secondary Street Tree  
 Size: 35' Height, 20' Width  
 Soil Volume: 600 ft<sup>3</sup>  
 Traits: Bright Red in Fall, Glossy Foliage



Key Plan

STANDARD / INTERNAL STREET | TREES





Paperbark Maple | *Acer griseum*

Use: Secondary Street Tree  
 Size: 25' Height, 20' Width  
 Soil Volume: 300 ft<sup>3</sup>  
 Traits: Unique Bark, Red in Fall



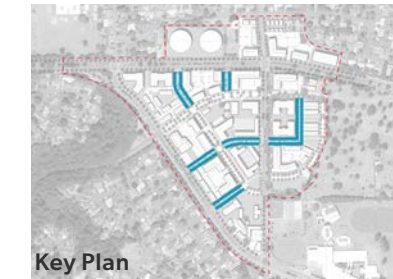
Chinese Flowering Dogwood | *Cornus kousa 'Chinesis'*

Use: Secondary Street Tree  
 Size: 20' Height, 20' Width  
 Soil Volume: 300 ft<sup>3</sup>  
 Traits: Long Lasting White Flowers, Red in Fall



Galaxy Magnolia | *Magnolia liliflora x sprengeri*

Use: Secondary Street Tree  
 Size: 30' Height, 25' Width  
 Soil Volume: 300 ft<sup>3</sup>  
 Traits: Large Showy Flowers



Key Plan

STANDARD / INTERNAL STREET | TREES



Mountain Laurel | *Kalmia latifolia* 'Sarah'



Snowberry | *Symphoricarpos albus*



Teddy Bear Rhododendron | *Rhododendron* 'Teddy Bear'



Evergreen Huckleberry | *Vaccinium ovatum* 'Thunderbird'



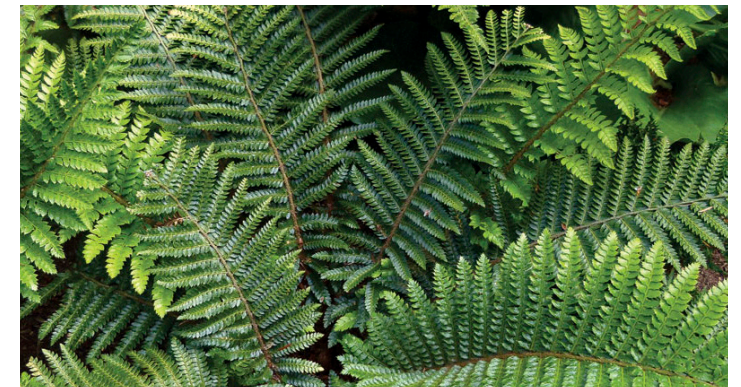
Low Oregon Grape | *Mahonia repens*



Blue Mist Fothergilla | *Fothergilla gardenii* 'Blue Mist'



Salal | *Gaultheria shallon*



Japanese Tassel Fern | *Polystichum polyblepharum*



Golden Variegated Sweet Flag | *Acorus gramineus* 'Ogon'



Big Blue Liriope | *Liriope muscari* 'Big Blue'



Elijah Blue Fescue | *Festuca glauca* 'Elijah Blue'



Kinnikinnick | *Arctostaphylos uva-ursi*

STANDARD / INTERNAL STREET | SHRUBS & GROUND COVER



Heritage River Birch | *Betula nigra* 'Cully' HERITAGE

Use: Primary Bioretention Tree  
 Size: 40' Height, 30' Width  
 Soil Volume: 1,000 ft<sup>3</sup>  
 Traits: Exfoliating Bark, Bright Yellow Fall Color



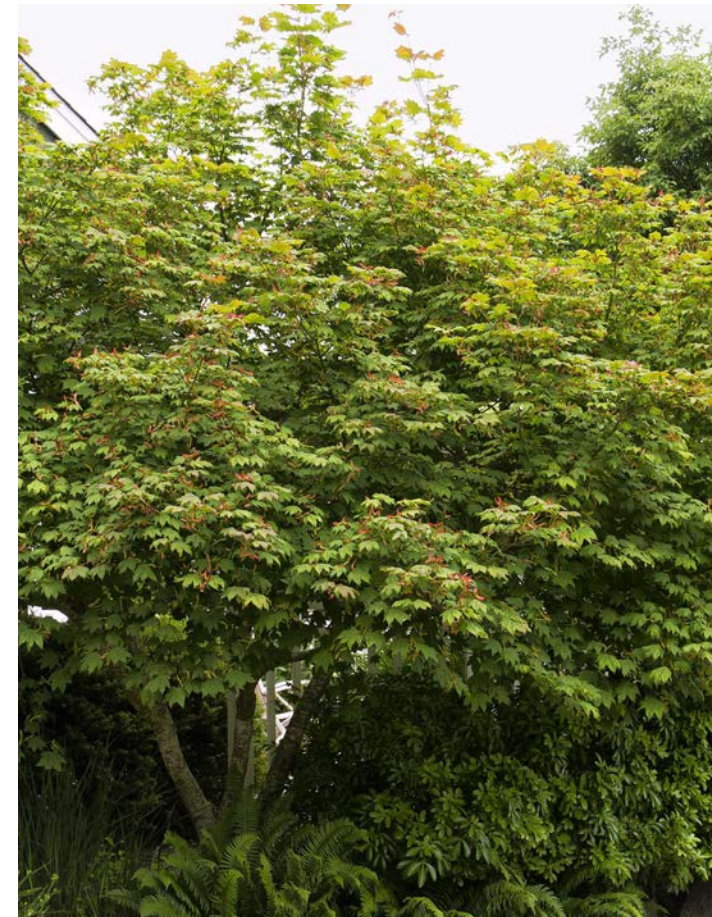
River Birch | Catkin



River Birch | Fall Leaf



River Birch | Bark



Vine Maple | *Acer circinatum*

Use: Secondary Bioretention Tree  
 Size: 25' Height, 25' Width  
 Soil Volume: 300 ft<sup>3</sup>  
 Traits: Bright Red Fall Color



Vine Maple | Samara



Vine Maple | Fall Leaf



Vine Maple | Leaf

BIORETENTION | TREES



Arctic Fire Dogwood | *Cornus stolonifera* 'Arctic Fire'



Snowberry | *Symphoricarpos albus*



Kelseys Dwarf Dogwood | *Cornus sericea* 'Kelsey'



Salal | *Gaultheria shallon*



New Zealand Sedge | *Carex testacea*



California Grey Rush | *Juncus patens* 'Elk Blue'



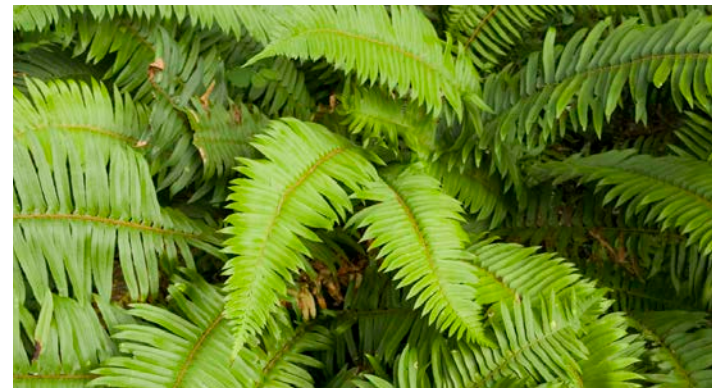
Small-Fruited Bulrush | *Scirpus microcarpus*



Bowles Golden Sedge | *Carex elata* 'Bowles Golden'



Siberian Iris | *Iris sibirica*



Western Sword Fern | *Polystichum munitum*



Woods Rose | *Rosa woodsii*



Deer Fern | *Blechnum spicant*

BIORETENTION | SHRUBS & GROUNDCOVER