SvR DESIGN COMPANY

Civil Engineering
Landscape Architecture
Environmental Restoration
Planning

Planning and Design: Applied LID Techniques – Redevelopments, Housing, Mixed Use, Infrastructure

Peg Staeheli, ASLA, LEED® AP

March 17, 2009

Planning

Involve, collaborate

Policy

Land Use

Zoning

Finance

Finance

Taxes/Bonds

Local / State/ Federal

Private

Low Impact Development

the Human Connection

Permitting

Public/private

Certainty

Maintenance

Public Crews

Private

Volunteers

Construction

New approaches

APPENDIX A

CIVIL PERMIT SUBMITTAL CHECKLI

*** Insert this chart on civil cover sheet to be submitted**

Civil Permit Submittal Checklist		
Submitted? (to be completed by DPD reviewer)		
YES	NO	
		Approved SIP drawing copies of ROW surrounding parcels: attached

Planning - Take All Phases Into Account

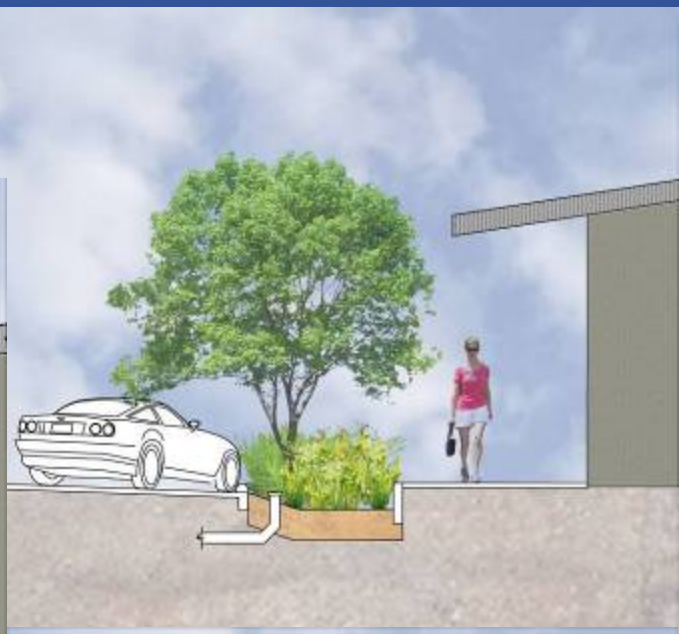
- Policies, Codes & Covenants
- Incentives (why change?)
- Private:
  - New Developments
  - Redevelopments
  - Retrofits
- Public
  - Infrastructure
  - Facilities
  - Capital Improvement Program
- Education, Communication
- Design, Permitting & Construction
- Inspection & Commissioning
- Long term Maintenance

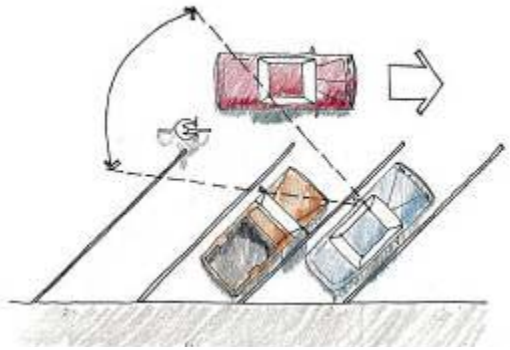
Design

- It takes a team
- Every little bit counts
- Think again, add another
- Remember the Treatment Train
- Dispersal
- Distributed approach
- Share!

Winslow Way Bainbridge Island WA

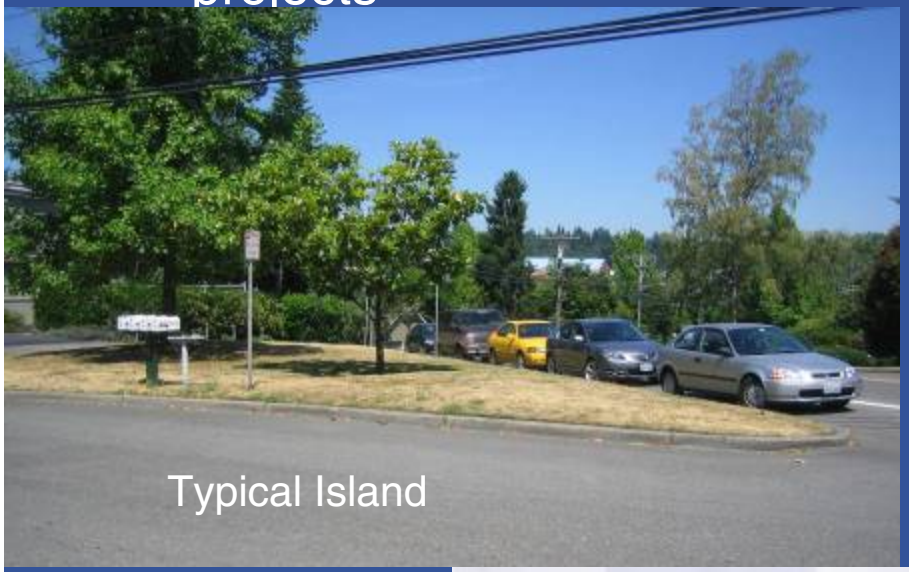
- Finding room in the arterial for peds, bikes, cars and drainage





Kirkland, WA LID CIP

- Analysis of opportunities and constraints for capital improvement projects

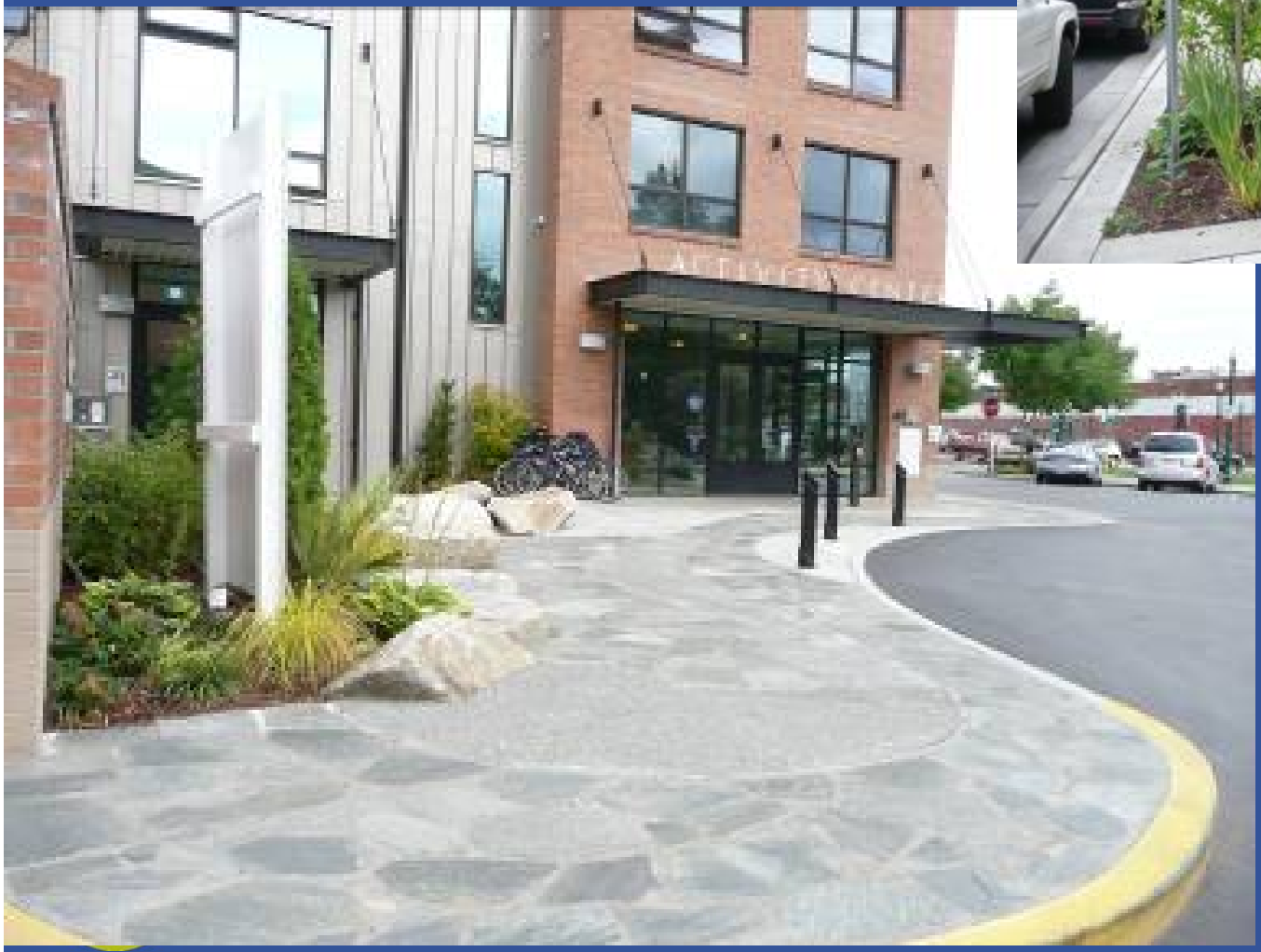


Typical Island

Raingarden Island

"Tweak" the street and treat the stormwater

Puyallup - Pioneer Place



Roof downspouts to planter boxes

Porous concrete integrated into entry

Grading and Soils

- Soil Management Plan
- Rough Grading versus fine grading
- Soil amendments
- Follow the path of the water
- Use the landscape
- Furrows – residential scale swales
- Strategic use of rocks, boulders and gravel

Green Roofs/Porous Pavements

Texas

Maryland Housing Retrofit

Olympia, WA - Cooper Crest Housing Development

- Reduced Footprint
- Shared drainage paths
- Rain gardens

Growing Vine Street

- Urban Drainage
- Cascade of Pools
- Cleans Stormwater Runoff
- Art Integration
- P-Patch

Cisterns

Pearl Center, San Antonio
Texas

Seattle

Austin, Texas

Swales – What are they?
A non- technical view

- Swale — Graded Depression
- Ditch — Deep – cut steep side slopes
- Conveyance Swale — Purpose to move water
- Bioswale — Regulated/engineered to clean water
- Bioretention Swale — Generally – planted and soil retains water
- Natural Drainage Swale — Generally – engineered system of swales
- Raingarden — Generally – organic shaped depression with modified soil and plants to soak up and retain water. Typically has overflow.
- Stormwater planter — Generally – more structural to complement building- functions as retention to reduce stormwater discharge. Planted
- Furrow — Small conveyance swale

Swale Types

- Vegetated
- Conveyance
- Grass Lined

Case Study
High Point Redevelopment

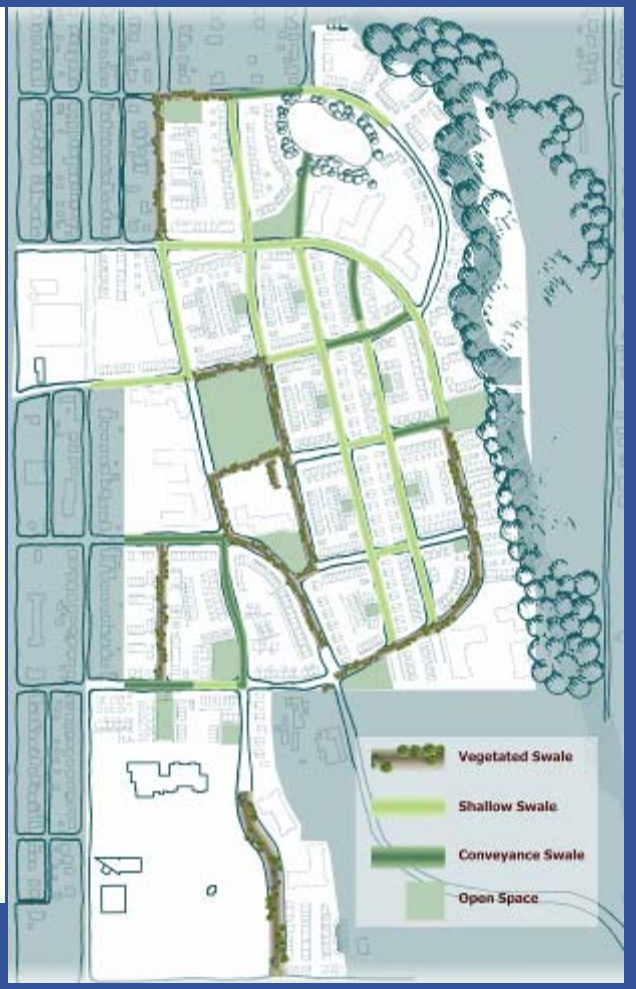
- Redevelopment of 716 1940s Era Housing Units
- Urban Revitalization of 120 acres
- Integration with Surrounding West Seattle Community
- Goal to Create an Urban Pedestrian-Oriented, Mixed-Use, Mixed-Income Community

High Point Redevelopment- Applied LID

1600 housing units, commercial,
16 to 36 du per acre of ground related housing

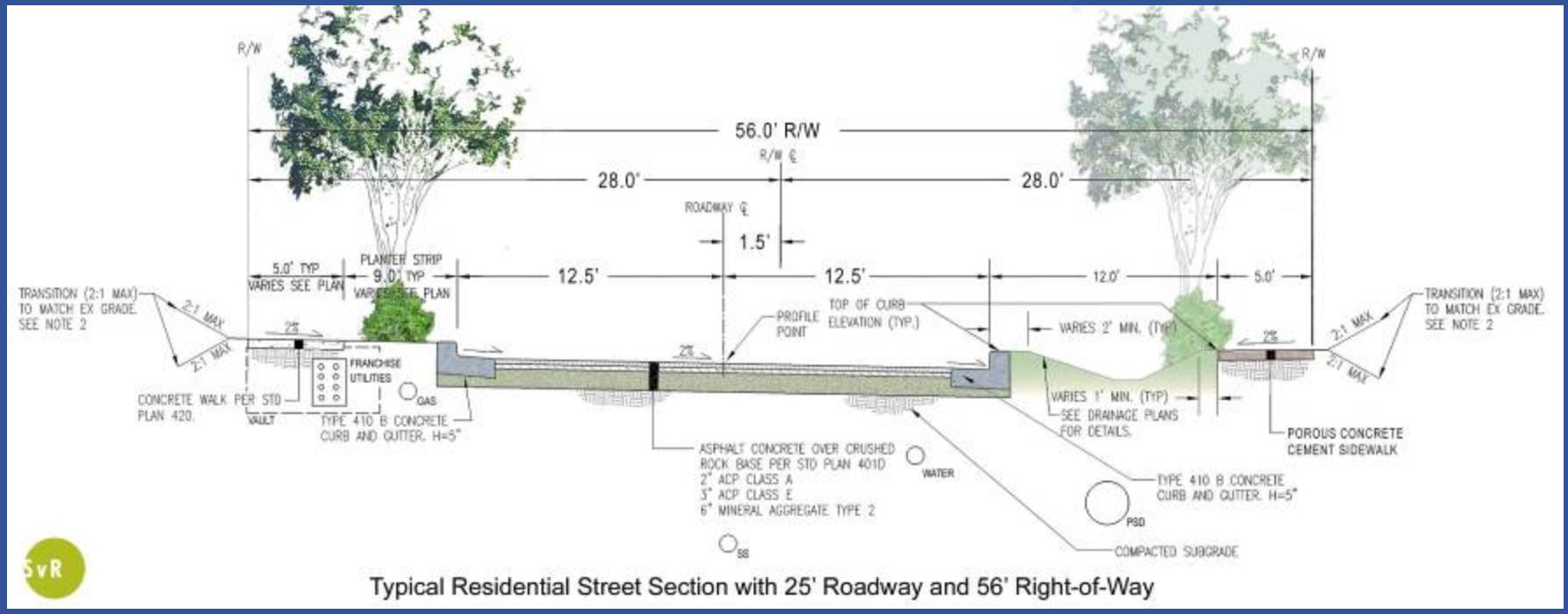
- 15,000 LF of Swales
  - Vegetated
  - Shallow Grass
  - Grass Conveyance
- Small Storm Events
  - Disperse within block
- Large Storm Events
  - Traditional Storm Drain Conveyance Pipe
- Storm Water Detention and Wetpond
  - 22 ac ft including freeboard)

Master Plan 2001



Drainage Master Plan 2002

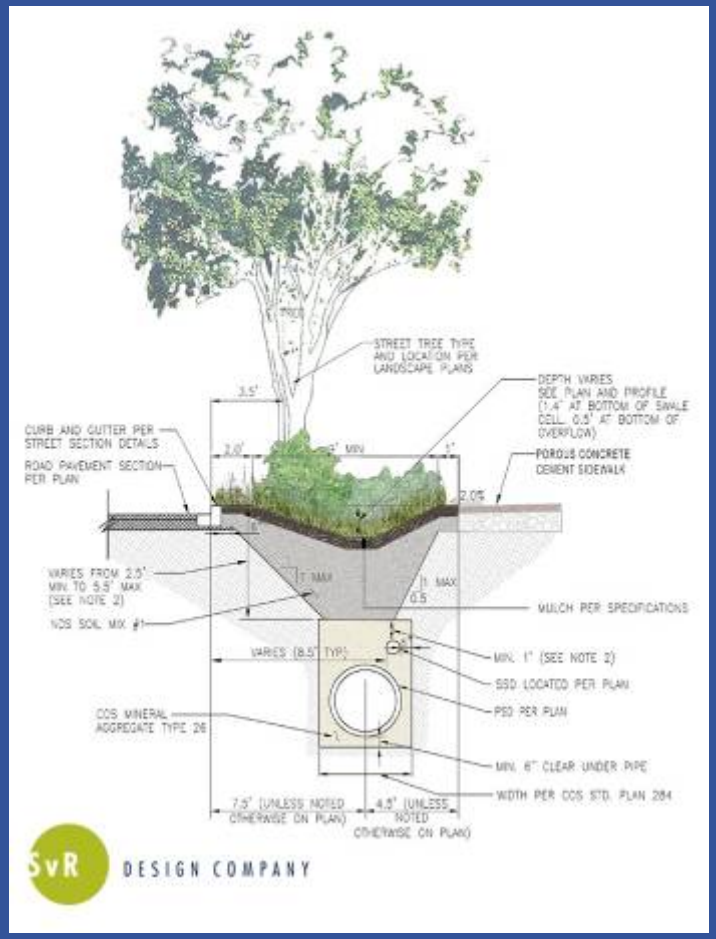
ROW Street Section with NDS Swale



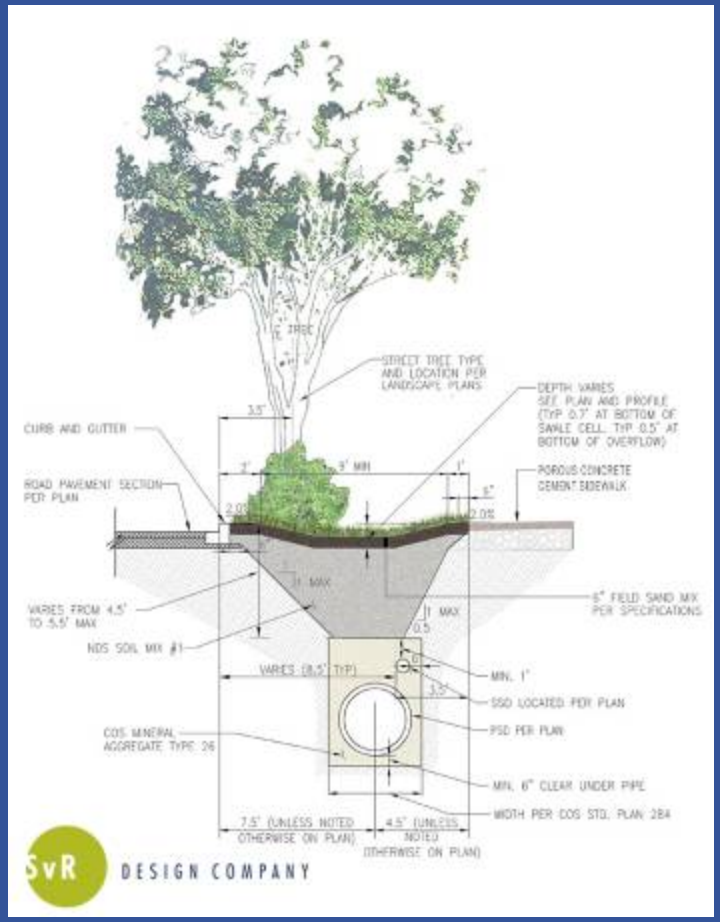
Typical Residential Street Section with 25' Roadway and 56' Right-of-Way

- The cross sections for the NDS swales were developed through discussions with various City of Seattle departments (decisions by inches)
- Street widths: 25 feet/56 right of way; 28 feet/56 ft rw; 32 feet/60 ft rw
- Curb height, swale width, street tree locations, berm locations, side slopes, bottom width, etc. were established
- Porous sidewalks on the swale side

Developing Cross Section & Swale Length in ROW



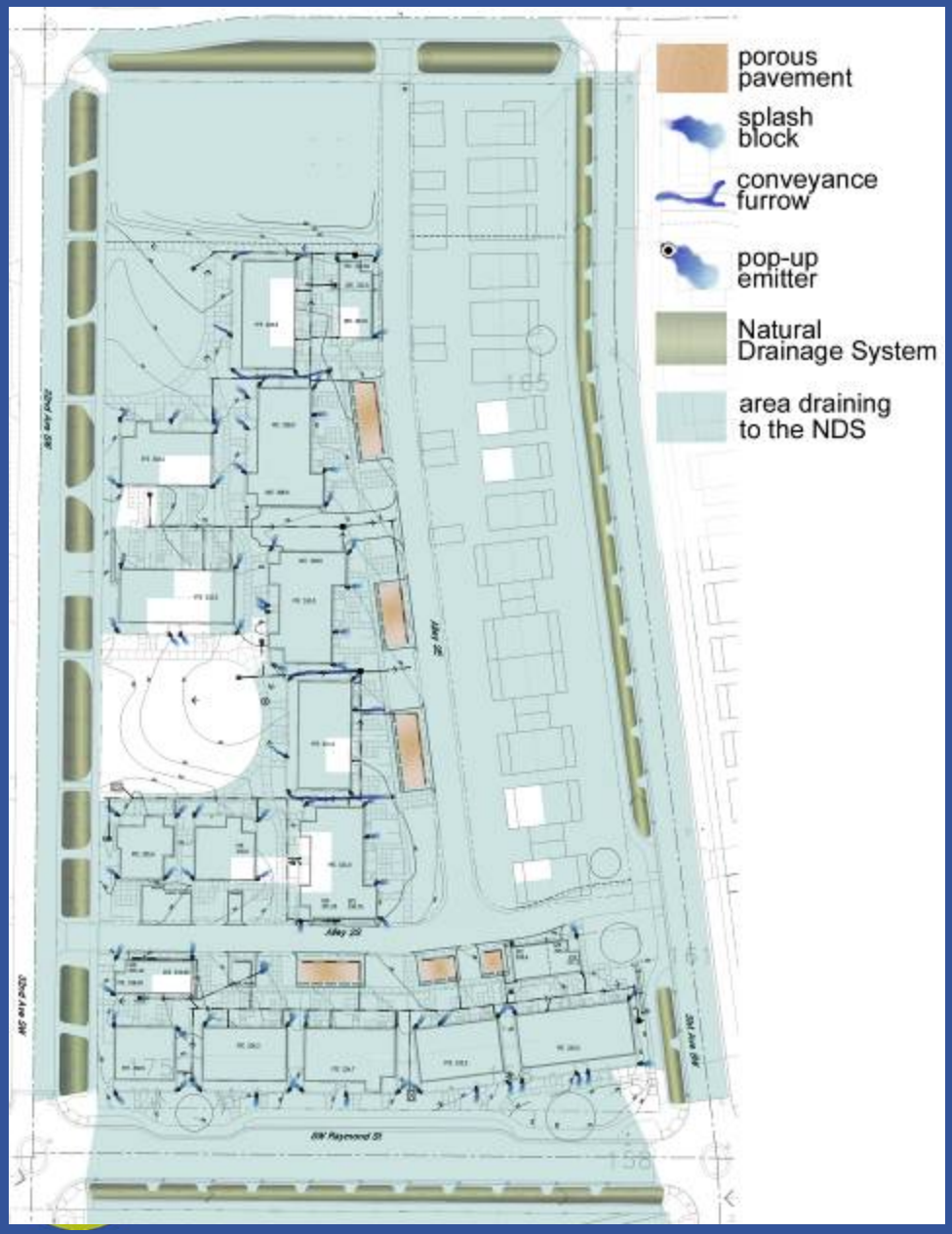
- Vegetated swale
- 5'+/- compost gravelly soil
- 18" deep, 10" ponding



- Grass-lined swale
- 5' +/- compost gravelly soil
- 8" deep, 2" ponding

High Point Public Natural Drainage Systems

Block-Level Drainage Design



- Surface Dispersal
- Porous Pavement
- Splash Block
- Conveyance Furrow
- Pop-Up Emitter
- East NDS – Deep and Shallow Swales
- South NDS – Deep and Shallow Swales
- North NDS – Deep with Weirs
- West NDS – Porous SEA Street
- Grading!

High Point Natural Drainage Strategies

Housing: Block - level Design Tools to Meet Effective Impervious - Average 60%

And Furrows, Gravel Pockets, Flow Spreaders and Dispersal Trenches

Housing Sites Drainage Dispersion, Splashblocks, Rain Gardens & Art

Splash Blocks by Myersculpture

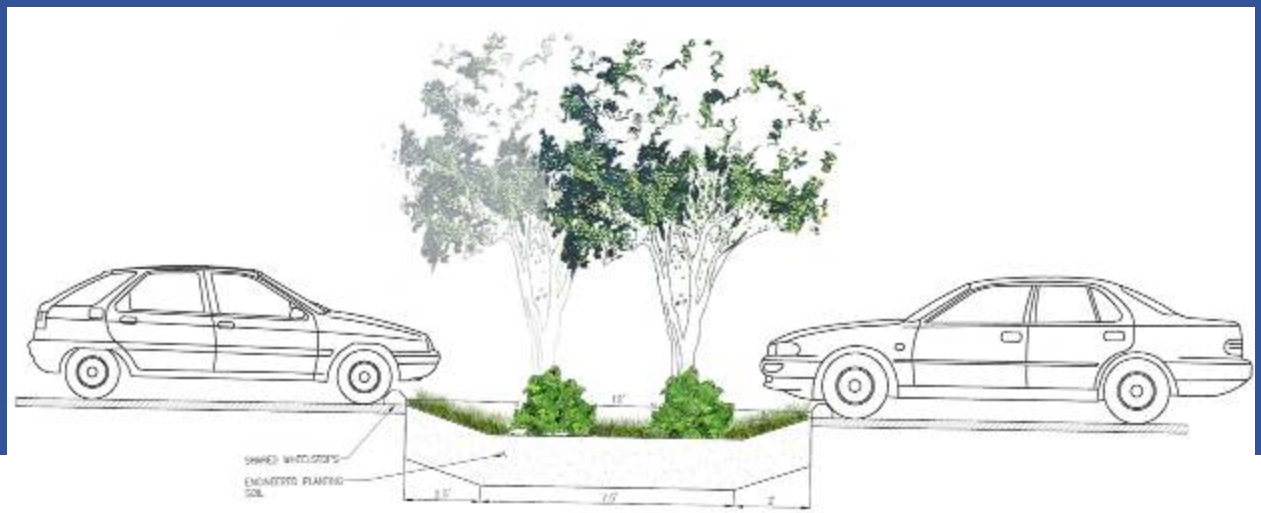
Parking Lots

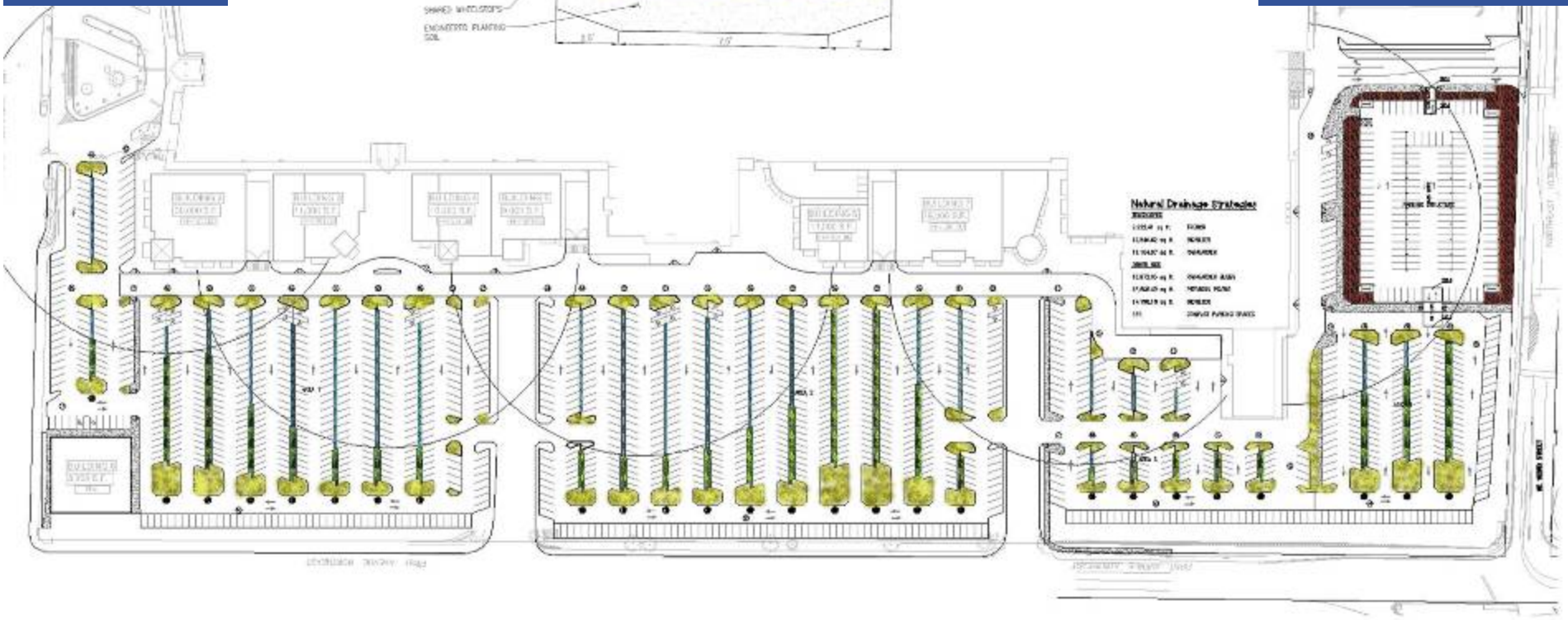
- Retrofits
- New big box
- Large facilities

- Common Denominator
- It works
- It is easy
- It looks great

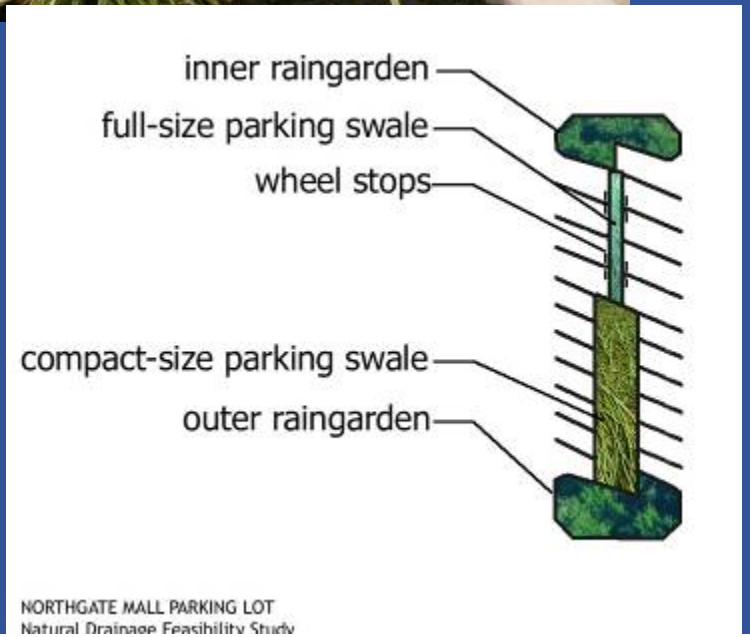
Northgate Shopping Area, Seattle WA

Northgate Mall Parking Lot, Seattle, WA





Northgate Mall Parking Lot, Seattle, WA



- Redevelopment of Existing 20-Acre Parking Lot
- 595,000 SF Parking Lot
- 1499 Parking Stalls
- LID Components:
  - Swales
  - Raingardens
  - Pervious Asphalt Areas
  - Biofiltration Planters
- Client Assistance Memo #515 – on Green Parking Lots for Seattle DPD

Chino, CA

Portland, Oregon

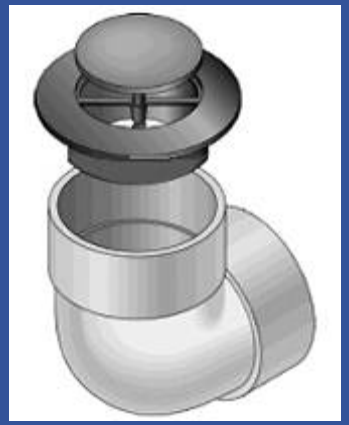
Oregon Museum
of Science and Industry (OMSI)

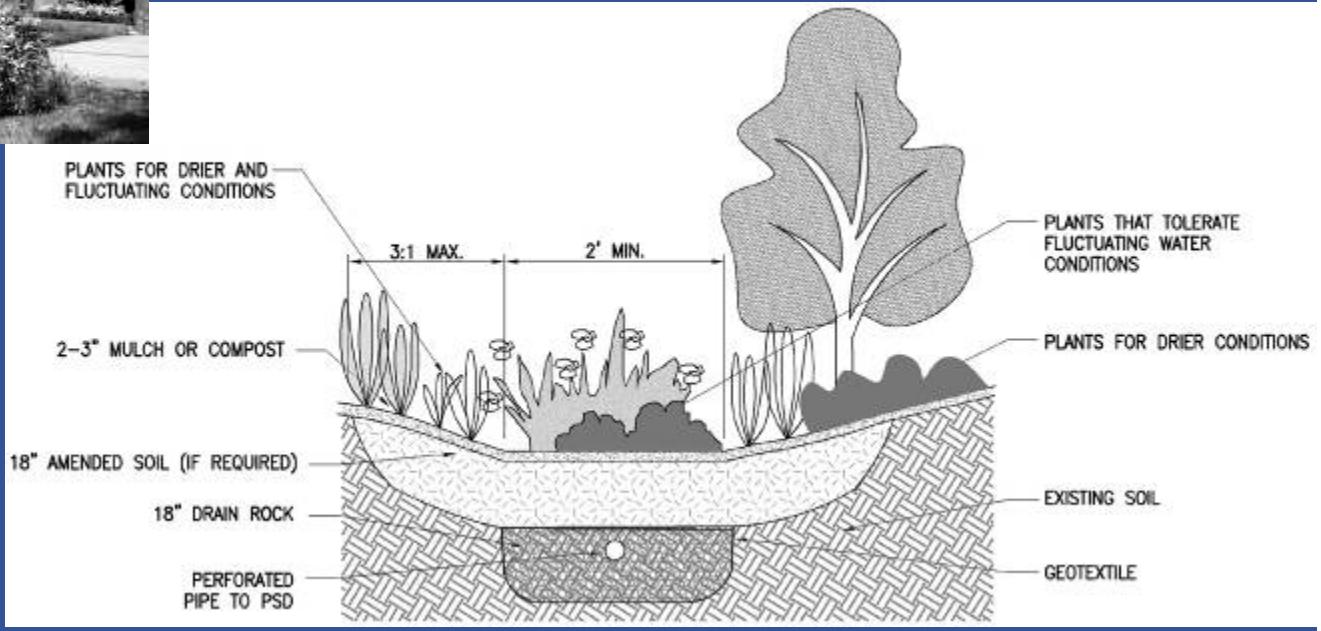
Raingardens and Stormwater Planters

- Garden-Style Treatment of Runoff
- Depression
- Plant Choices
- Placement
  - Planters (Multi-story buildings)
  - Yards / Sites
  - Street Right of Way

High Point Rain Gardens and Pop-up Emitters

- Small storm detention
- Overflows over land or through grate to NDS





- Releases flow away from building

SvR

High Point Raingarden

- Built into Yards
- Maintained by Owners
- Roof-Top Runoff
- Vegetation
  - Grasses
  - Small Shrubs

Seattle Public Utilities Rain Catchers

- Different Palettes

Raingardens – Malmo, Sweden

- Advanced Applications
- What Makes the Difference?
  - Planning
  - Permitting
  - City advocacy
- ADA Issues
- Regional Sustainability Study Tour of Sweden-Denmark (June 2-8, 2007)

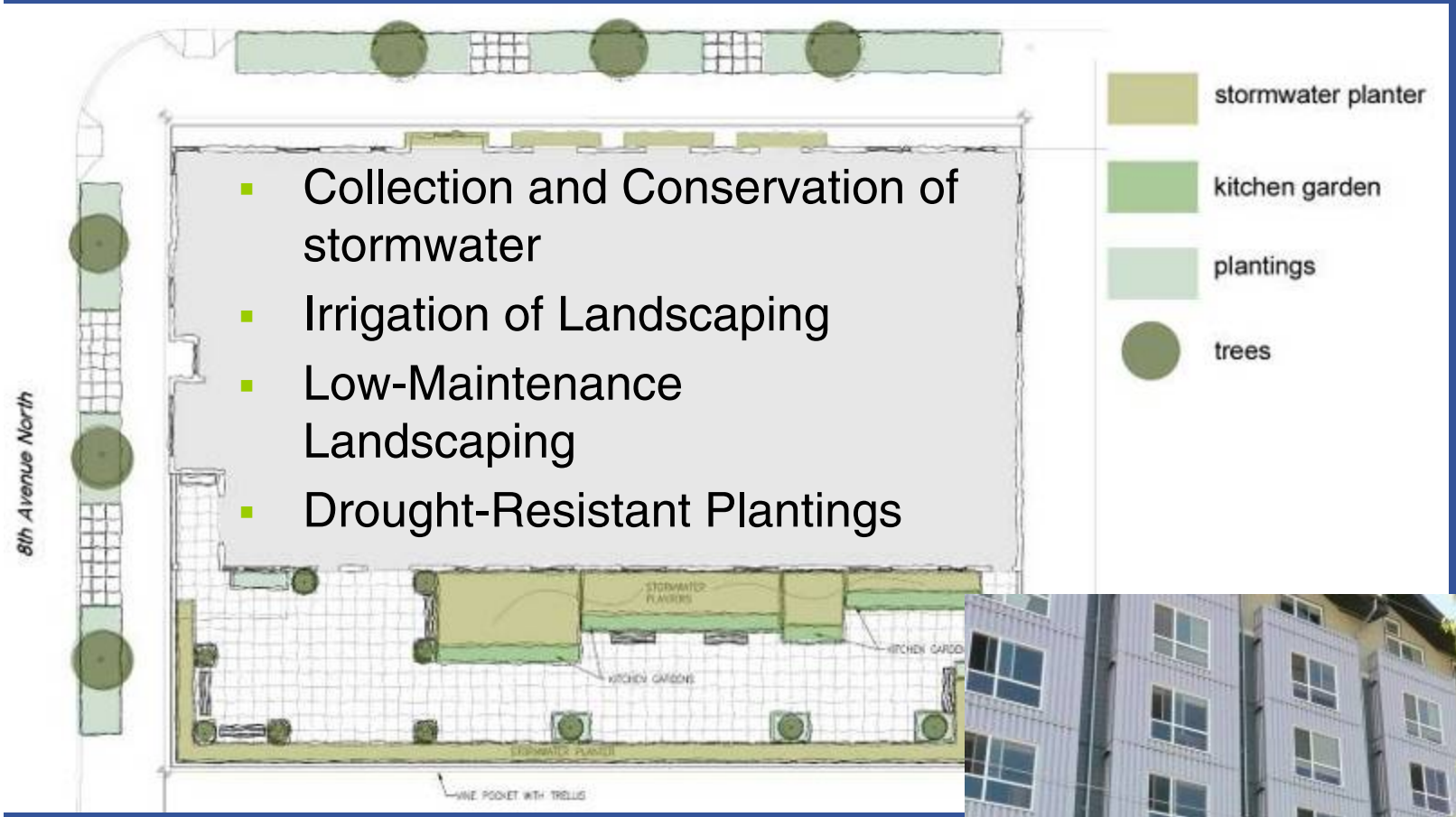
New Orleans Raingarden Project

Oretha Castle Haley Boulevard

New Orleans Public Works Chief Engineer: Nguyen Phan with Richard Scheirman

SvR

Denny Park Apartments, Seattle 2003

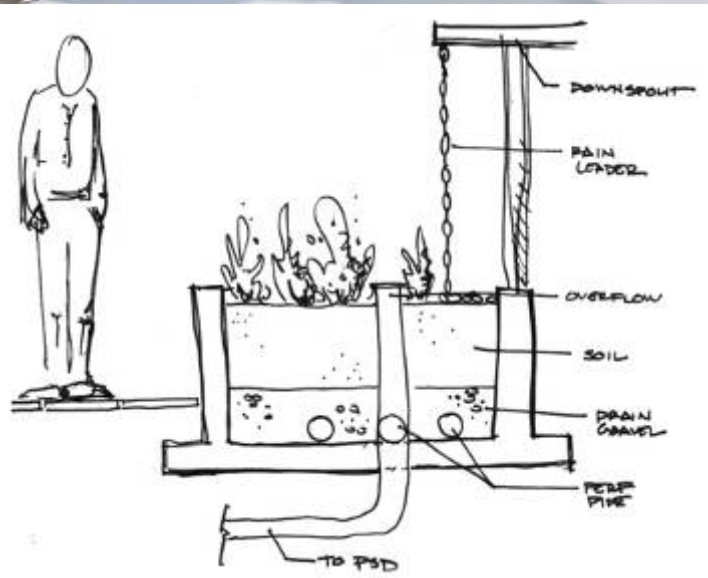


- Collection and Conservation of stormwater
- Irrigation of Landscaping
- Low-Maintenance Landscaping
- Drought-Resistant Plantings

- Green Communities Project
- 50-unit, Six-Story Mixed-Use Building
- Dense Urban Environment
- Low-Income Housing

Denny Park Apartments – Construction 2004-05

- Client Champion
- Maximize Space
- Give Reason



Denny Park Apartments, Seattle 2007

Site visit 2007

Example of O&M needs

- Works for stormwater but
- Natives…volunteering
- Maintenance staff changes
- Resident communication
- Weeding the planters

Stormwater
Planter on
building edge

SvR

Permeable Pavements

- Pervious Material Types
  - Porous Portland Cement Concrete
  - Porous Asphalt Concrete
  - Pavers
  - Grass Pave
  - Open-Celled Paving Grids
- Design Considerations Overview
- Construction
  - Pre-planning
  - Construction Issues
  - Post Construction
- Maintenance
- Lessons Learned

Porous Portland Cement Concrete Pavement

- Mix with no fine aggregates
- Voids in pavement allow water to flow through section
- First installed in 1852 in the UK
- Used in the United States since 1970's for paving applications, mainly in the Southeast Regions but has spread across U.S.
- Low-volume residential streets

32nd Avenue SW, Seattle, WA

Parking Lot

Seattle's 32nd Ave SW
Porous Cement Concrete Pavement in Snow

- Studies underway in colder climates
- Been installed in cold climates such as Iowa, Pennsylvania, Colorado

Olympia, WA

- Almost 8 years of porous pavement installations






People's Food Co-op Portland

Has it all!!!

- Green Roof
- Pavers in plaza
- Rain Garden along street & in plaza
- Retail Integration Works Very Well
- Dramatic Site Work Can Assist with Rain Garden Aesthetic
- Be Bold!!!

SvR DESIGN COMPANY

Civil Engineering
Landscape Architecture
Environmental Restoration
Planning

Planning and Design: Applied LID Techniques – Redevelopments, Housing, Mixed Use, Infrastructure

Peg Staeheli, ASLA, LEED® AP

March 17, 2009