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Westside Stormwater Retrofits

Bureau of Environmental Services

Danny Kapsch

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Development and Stormwater Impacts

Then

Now

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Development and Stormwater Impacts

Stormwater runoff causes…

- In-stream impacts like erosion, pipe exposure, and habitat destruction
- Pollution movement into streams and groundwater
- Millions of dollars to build and maintain pipes, ditches, sumps, and other stormwater systems and provide treatment

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Stormwater Retrofits Basic Approach

Stormwater retrofits mimic the natural hydrologic cycle in a manner that is safe and effective for the site and neighboring properties

Basic stormwater management components:

- Collect and convey
- Slow or detain
- Evaporate, transpire & infiltrate (where possible)
- Safe overflow & escape route

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Most Important Step: Site Assessment

Purpose is to identify and document important site conditions:

- Where is your runoff currently draining?
- Where are the impervious surfaces that create stormwater runoff?
- How is runoff collected and conveyed on your property and where does it go?
- Where are the landscaped or pervious areas?
- What other site conditions exist, (i.e. slopes, soils, public infrastructure, maintenance issues etc.)?

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Helpful Resources

- www.portlandmaps.com
  - Type in the site address
  - Aerial maps
  - Sewer maps/drainage info.
  - Plumbing records/Historic Permits
  - Hazard information
- Records research
  - BDS Permit Center
    1900 SW 4th Ave.
  - Records Research hotline
    503-823-7760

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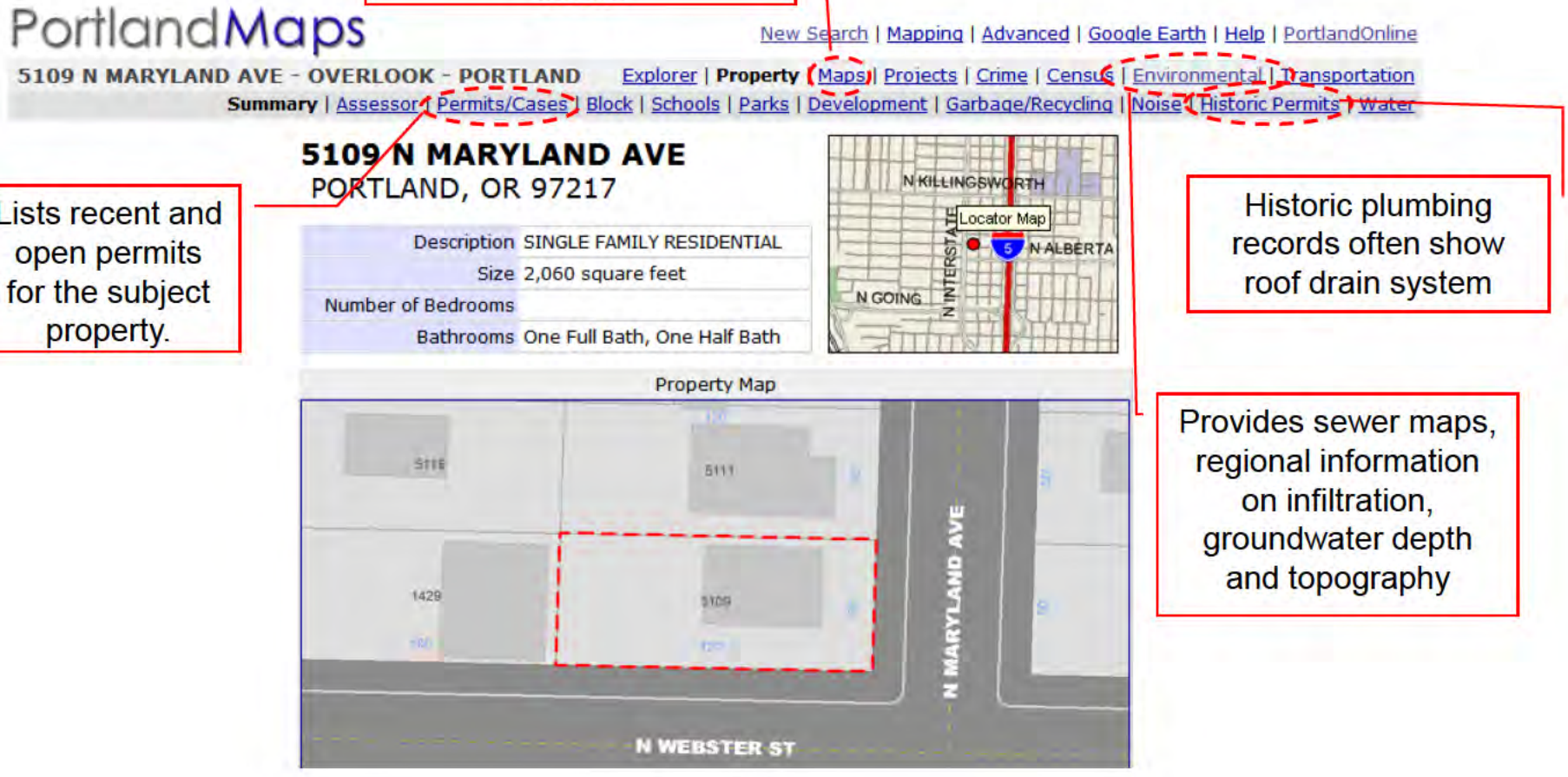
Portland Maps: www.portlandmaps.com

Aerial, hazards (steep slopes, landslide etc.) and others



Lists recent and open permits for the subject property.

Historic plumbing records often show roof drain system

Provides sewer maps, regional information on infiltration, groundwater depth and topography

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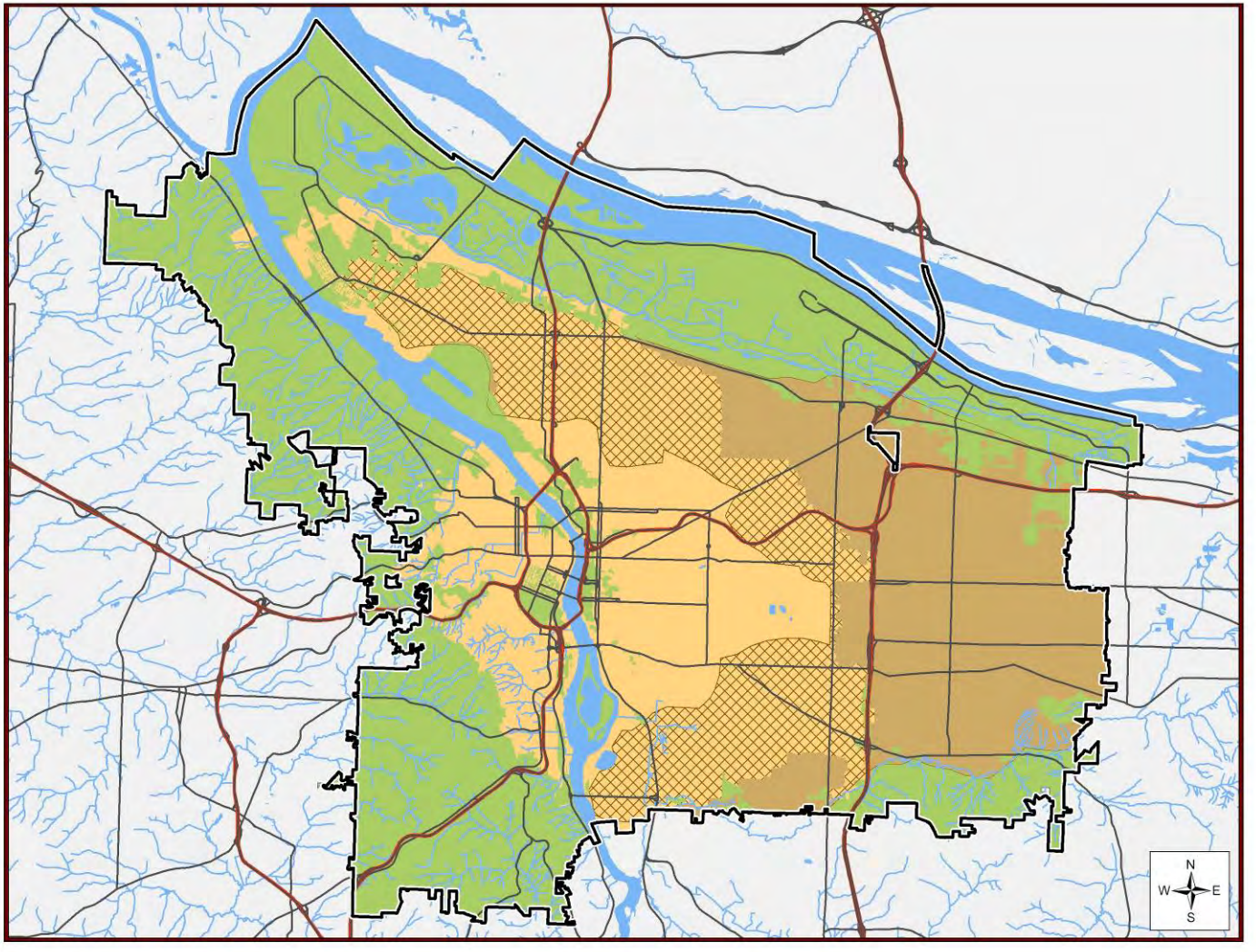
Portland Stormwater Drainage Systems (use it!)

- Natural Waterways
- Combined Sewer
- Sumps/dry wells
- Combined sewer with sumps



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Other things to look for

- **Clogged standpipes**
- Curb outlets
- Broken downspouts
- Standpipe material (ABS, cast iron, concrete etc.)
- **Erosion/sediment patterns**
- **Ponding water**
- **Seeps/springs**
- Water/moisture in basement
- Disconnection tags
- **Rat holes**
- Funky disconnections
- Smiling/frowning gutters
- Roof drainage offsite
- Curb and guttered street

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To Infiltrate, or not, that is the question

- Safe and effective stormwater management can be difficult in West Portland
  - Poorly draining soils are typical
  - Steep slopes, landslide hazards, and erosion concerns abound
  - Seeps/springs and other existing issues indicate poorly draining soils/high groundwater
  - Utilize public drainage systems when safety is a concern

Photo courtesy of Oregon Department of Geology and Mineral Industries

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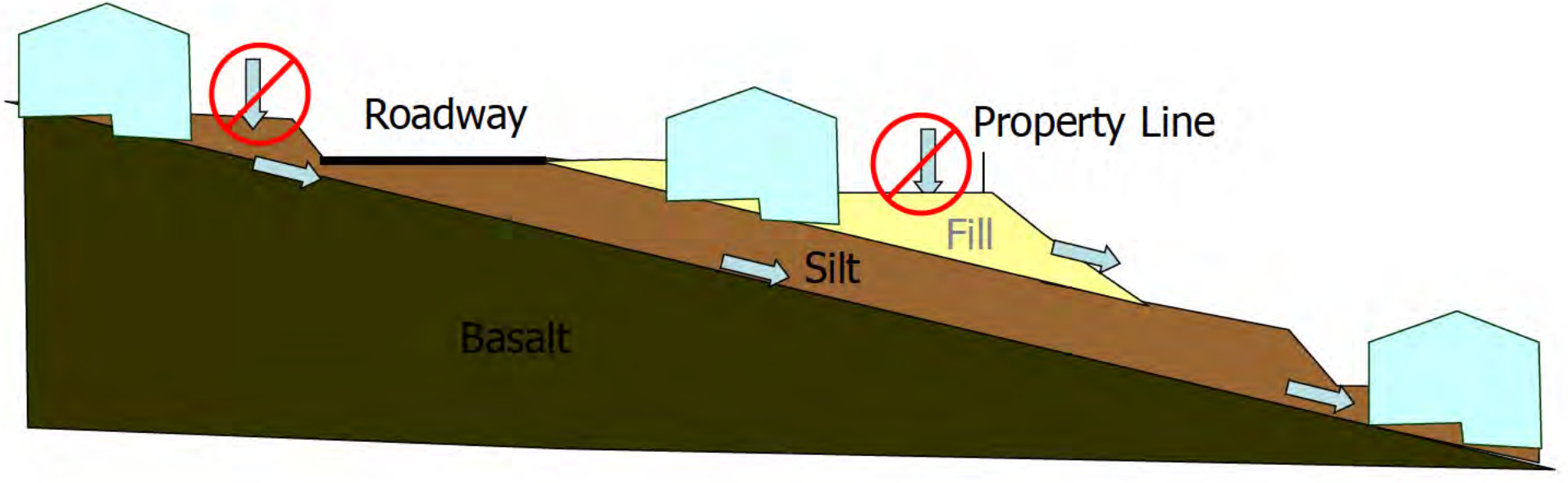
Westside Concerns

Location Considerations: Use public drainage system in West Hills!

Avoid sending water to neighboring down-slope properties



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Westside Concerns

Location considerations take away message:

- No infiltration on or uphill of steep slopes
- West hills typically has poor infiltration and weak soils (some exceptions)
- Other slopes in Portland prone to slope creep, raveling, erosion problems
- If in doubt, call an engineering geologist or geotechnical engineer

Just because you can, doesn't mean you should!

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Non-infiltration Retrofit Options

- Impervious Area Reduction/trees
- Rain barrel/cisterns
- Flow-through lined planters
- Ecoroofs

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Reducing Stormwater Runoff

Plant trees:

- Trees help intercept rain and reduce stormwater reaching the ground
- Friends of Trees is a great community resource (503) 248-TREE (8733) www.friendsoftrees.org

Remove Impervious Area:

- Reduces stormwater runoff
- Provides pervious areas for stormwater management

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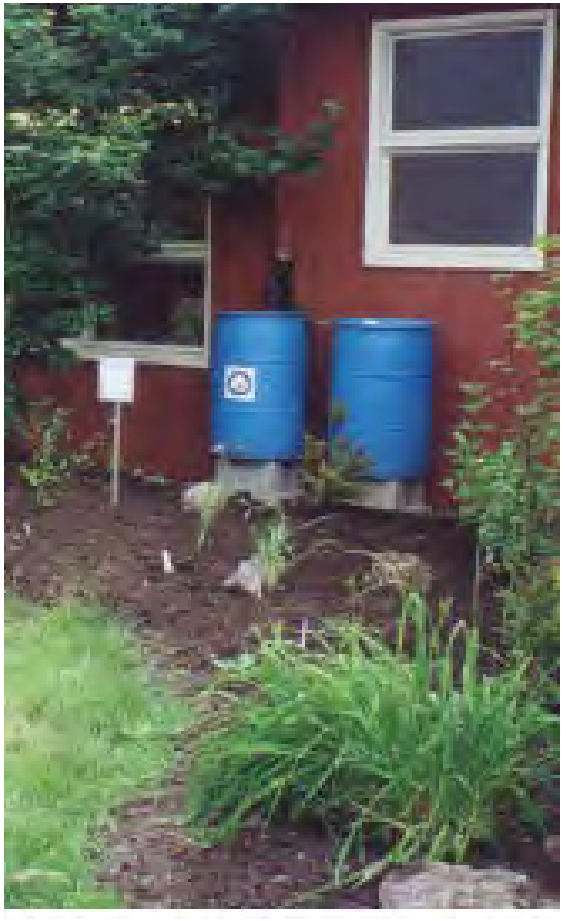
Rain Barrels/Cisterns



- Not disposal systems! Great for stormwater detention and conveyance
  - On average, one rain barrel will fill up with < 0.2 inches of rain
- Where's the overflow going?

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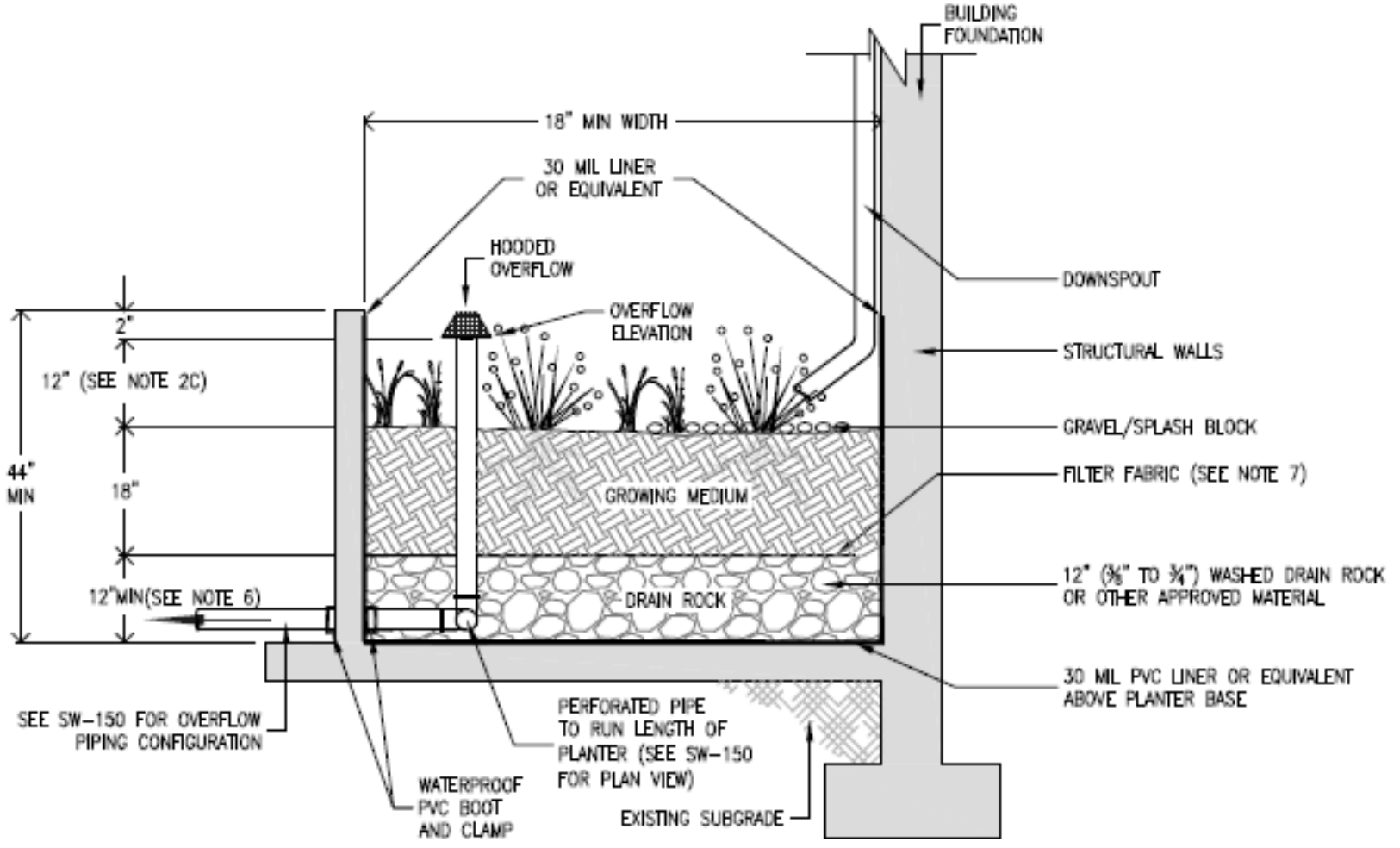
Flow-Through Lined Planters



Specs and notes from 2008 Stormwater Management Manual Appendix G

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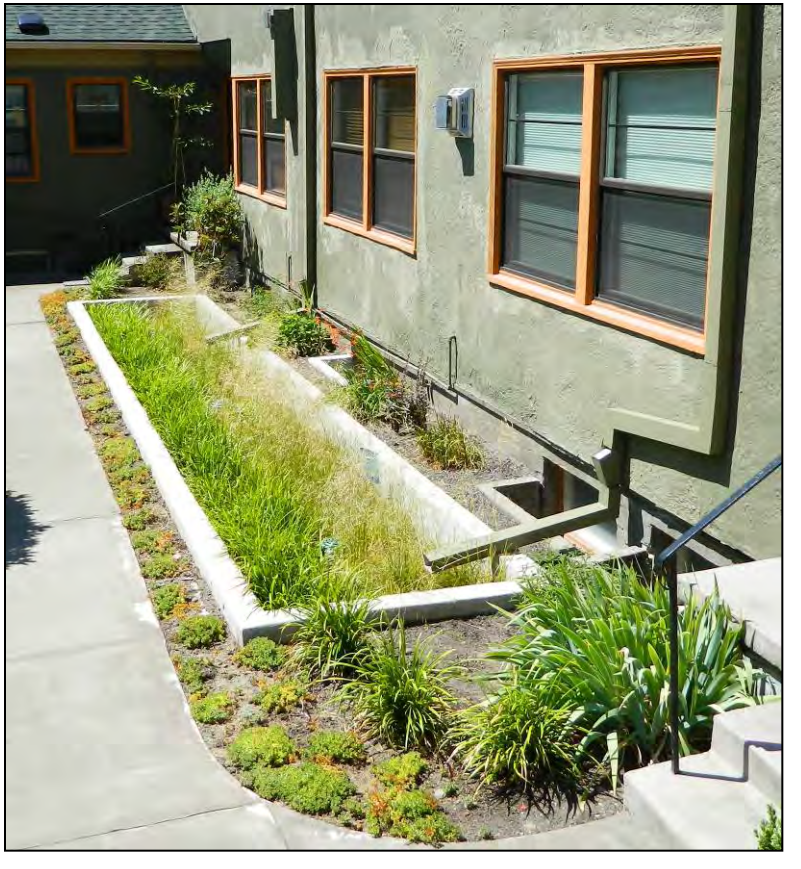
Flow-Through Lined Planters



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Ecoroofs

Location:

- Rooftops with less than 25% slope (generally flat roofs)

Design:

- Building must meet structural requirements for additional weight

Permits:

- Permits required

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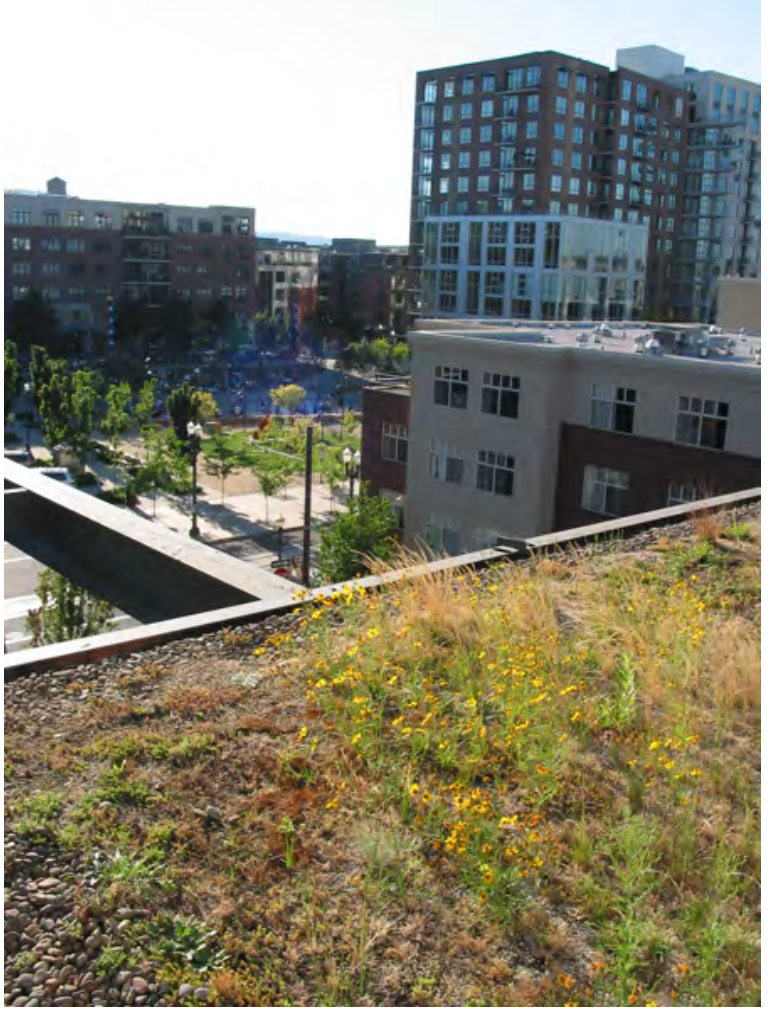
Ecoroofs



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Infiltration Retrofit Options

Most common residential stormwater retrofit facility types in areas appropriate for infiltration

- Downspout Disconnection
- Rain gardens/dry creekbeds
- Soakage trenches/drywells

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Downspout Disconnection

Setbacks:

- 6 feet from basements 2 feet from slab/crawl foundations
- Discharge 5 feet from property lines
- 100’ from slopes 10% or greater

Sizing/Design:

- Drainage area should be at least 10% of the roof area
- Make sure landscape gently slopes away from buildings
- Not appropriate for steep slopes or poorly draining soils

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Rain Gardens

Design:

- Great for areas where slope is not ideal for simple splashblock disconnection
- Plant with native drought tolerant species
- Best in areas with adequate soil infiltration (1-2”/hour)

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Rain Gardens

Setbacks:

- Same as for downspout disconnection
- Deepest part 10 feet from building foundations
- 100’ from slopes of 10% or greater

Design:

- Great for areas where grade is not ideal for simple splashblock disconnection
- Plant with native drought tolerant species
- Best in areas with adequate soil infiltration (Rain garden should drain completely in 24 hours)

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Rain Gardens

Sizing:

- Based on results of infiltration test
- Infiltrating area of rain garden a % of roof area:

  2.00”/hr = 10%

  1.50”/hr = 12%

  1.00”/hr = 15%

  0.50”/hr = 21%

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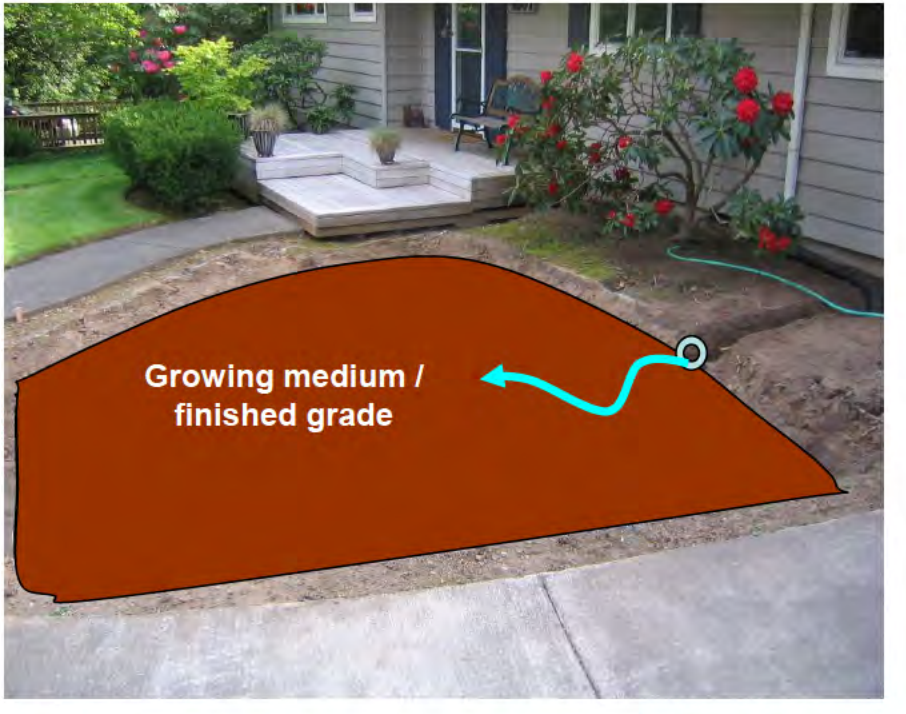
Rain Gardens

Bermed

Depressed



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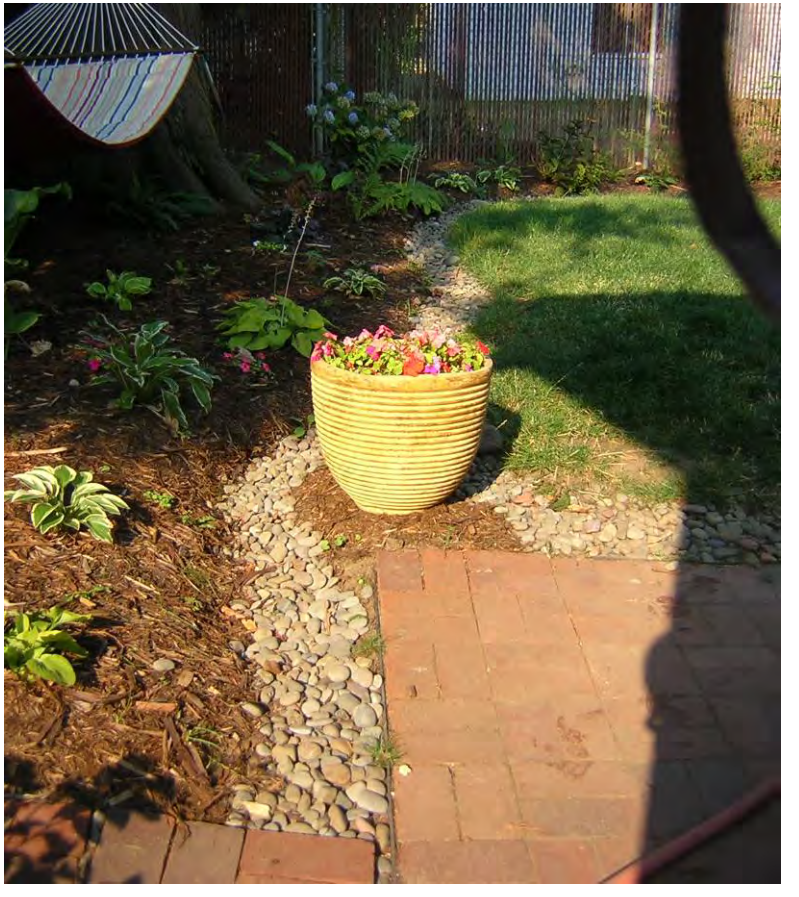
Rain Gardens

Dry creek bed swale



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Rain Gardens/swales for runoff diversion/ erosion control

Dry creek bed swale utilized to divert flow

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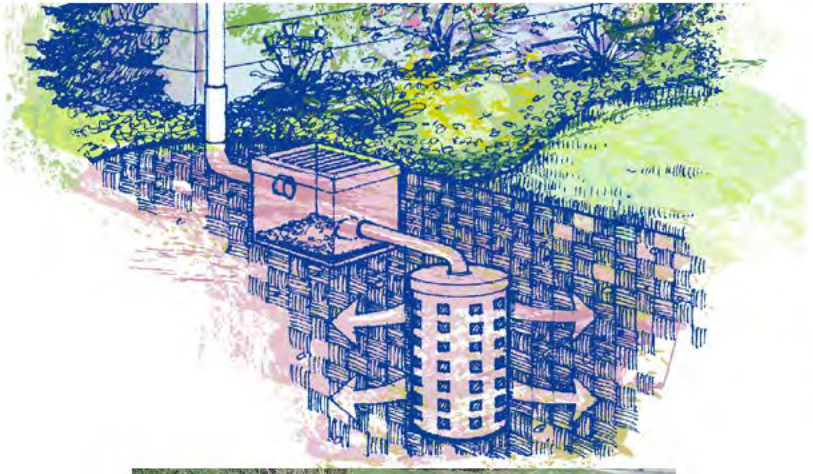
Subsurface Facilities

Mini-Drywells for <500 sf roof



Drywells

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Subsurface Facilities

Residential-Scale Soakage Trench

Infiltrator Trench

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Pervious Pavement

Form:

Concrete, asphalt, or pavers with void spaces to allow water to pass through

Function:

Allows infiltration of entire surface area to avoid generating stormwater runoff

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Pervious Pavement

Pavers

Concrete

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Maintenance Considerations

****Poorly maintained systems result in stormwater issues and property damage****

- Property owners responsible for maintaining stormwater systems
  - Inspect and maintain gutters, downspouts and piping
    - Remove debris and repair as needed, consider sedimentation and leaf traps
- Proper maintenance is key to facility function
  - Inspect and maintain stormwater facilities just as you would gutters, downspouts, and internal pipes
    - Remove sediment and trash, repair cracks, check for leaks, repair as needed
  - Inspect and maintain landscaping just like you would existing landscaping
    - Weed, prune, mow, remove invasives, replace dead plants
    - No pesticides or herbicides!

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BES Ecoroof Grant Program

- Property owners can be reimbursed up to $5/sq. ft.
- Grant applications due twice a year
- More information online at
  www.portlandonline.com/bes/ecoroofgrants

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Clean River Rewards

- Only City of Portland stormwater utility ratepayers are eligible (not every property in Portland pays stormwater utility fees)
- Ratepayer (not always the property owner) will receive the discount
- Ongoing discounts on the onsite stormwater management fee
  - Up to 100% discount for managing stormwater onsite
  - Sliding scale and pro-rated for partial or flow-through systems
  - Residential accounts: up to $7/month
  - MFR/Commercial accounts: up to $3/1,000 ft^2/month
- More information, including registration forms or online registration at www.CleanRiverRewards.com

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Treebate Program

This is a seasonal program that ends April 30th and reinstates September 1st

Program and Planting Information:

- www.portlandonline.com/bes/treebate
- Jennifer Karps at 503-823-2263 or

  Jennifer.Karps@portlandoregon.gov