TYSONS CORNER, VIRGINIA
URBAN STORMWATER CONCEPTS

COUNTY OF FAIRFAX, VIRGINIA
DEPARTMENT OF PUBLIC WORKS AND ENVIRONMENTAL SERVICES
APRIL 2012

Tysons Corner Stormwater Concepts

http://www.fairfaxcounty.gov/tysons/design/

This presentation supplements the "***Tysons Corner Urban Design Guidelines"*** and provides conceptual guidance for implementing the stormwater management vision of the adopted Tysons Corner Comprehensive Plan Amendment

Tysons Corner Stormwater Concepts

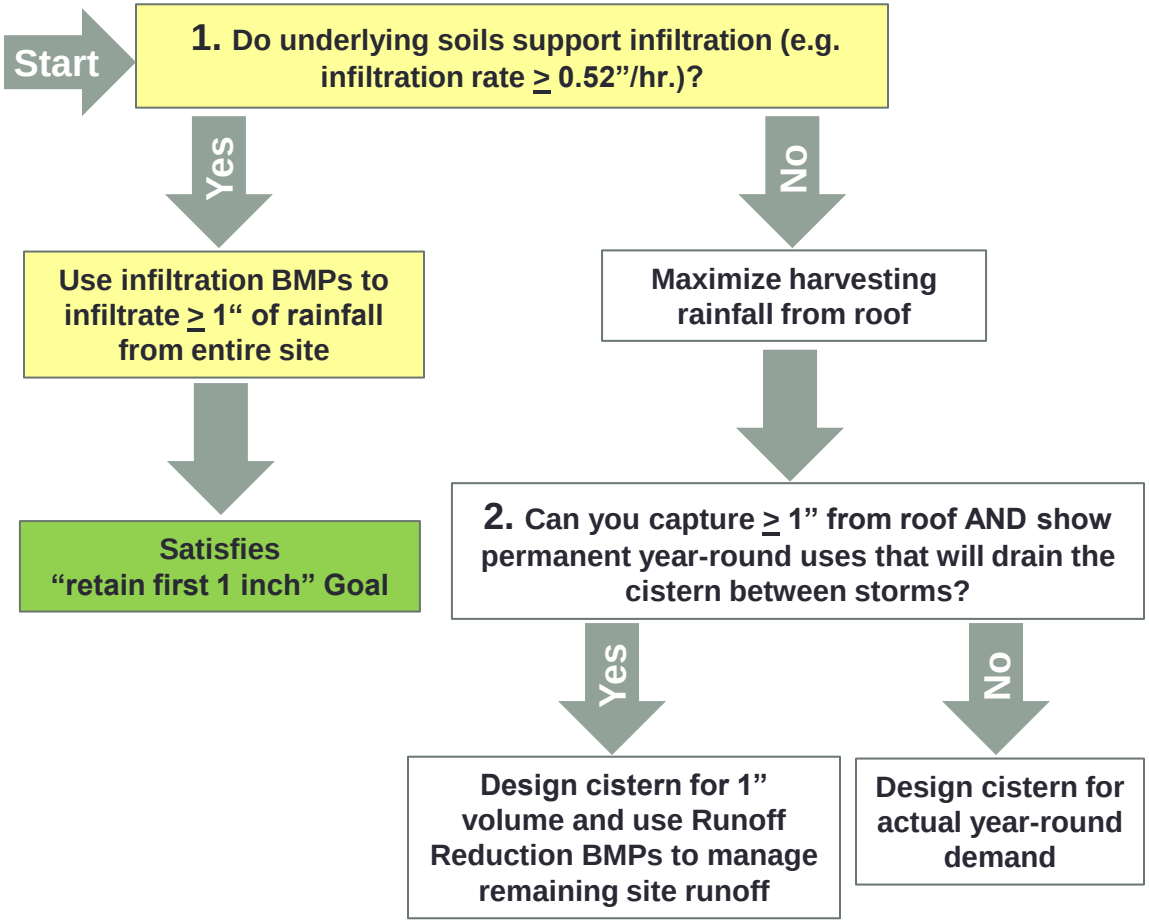
Tysons Corner Comprehensive Plan Stormwater Goals:

- ✓ "*At a minimum,* ***the first inch of rainfall should be retained on-site through infiltration, evapotranspiration and/or reuse*** *…*"
- ✓ ***"Reduction of runoff volume is the single most important stormwater design objective for Tysons"***
- ✓ ***"… all available measures should be implemented to the extent possible."***
- ✓ ***"… attain LEED credit for stormwater quality / quantity"***
- ✓ ***"… return water into the ground where soils are suitable or reuse it, where allowed"***
- ✓ ***"… incorporate Low Impact Development into streets"***
- ✓ ***must also meet PFM requirements for quality, quantity, flooding, stream protection, etc.***

Tysons Corner Stormwater Concepts

Tysons Corner Comprehensive Plan Recommendation:

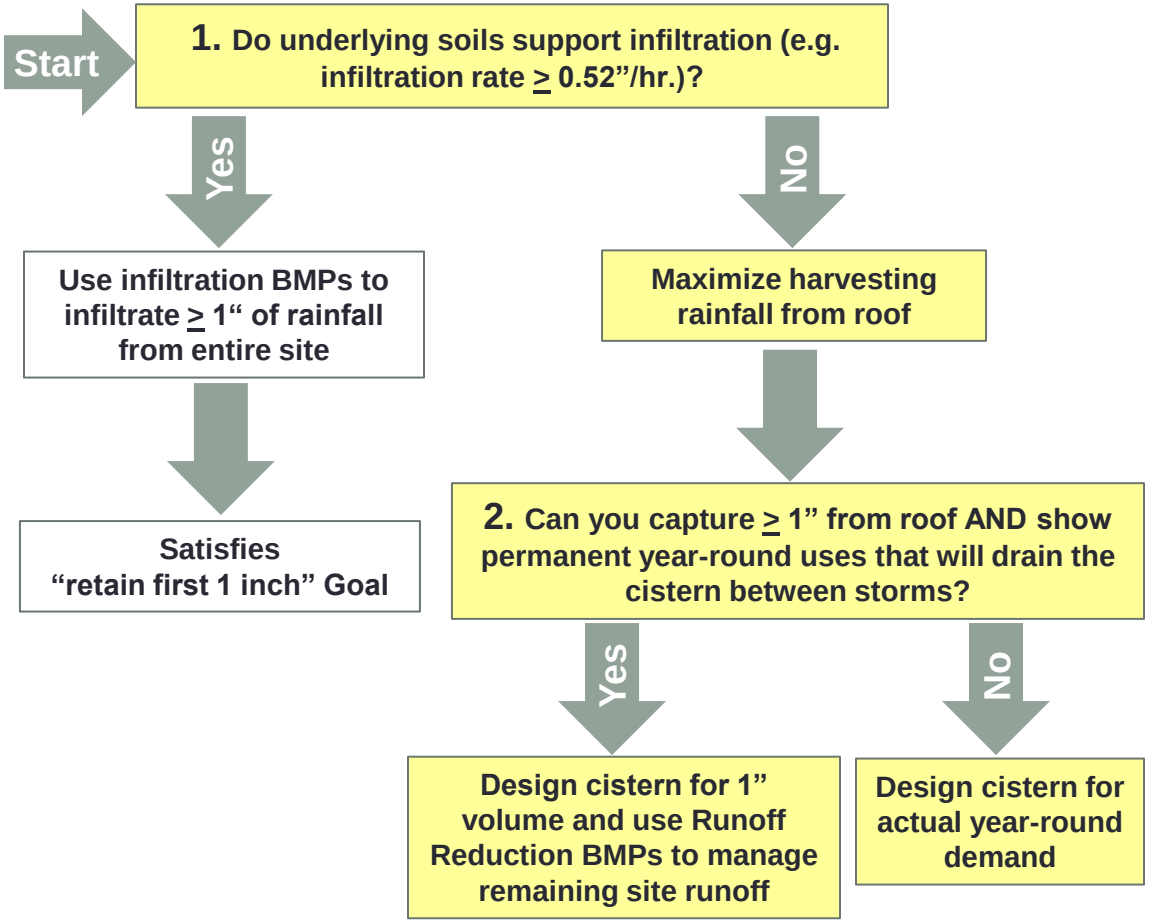
"*Stormwater management and water quality controls for redevelopment should be designed to* ***return water into the ground where soils are suitable*** or reuse it, *where allowed, to the extent practicable. Reduction of stormwater runoff volume is the single most important stormwater design objective for Tysons.*"



Tysons Corner Stormwater Concepts

Tysons Corner Comprehensive Plan Recommendation:

"*Stormwater management and water quality controls for redevelopment should be designed to return water into the ground where soils are suitable* ***or reuse it, where allowed, to the extent practicable****. Reduction of stormwater runoff volume is the single most important stormwater design objective for Tysons."*



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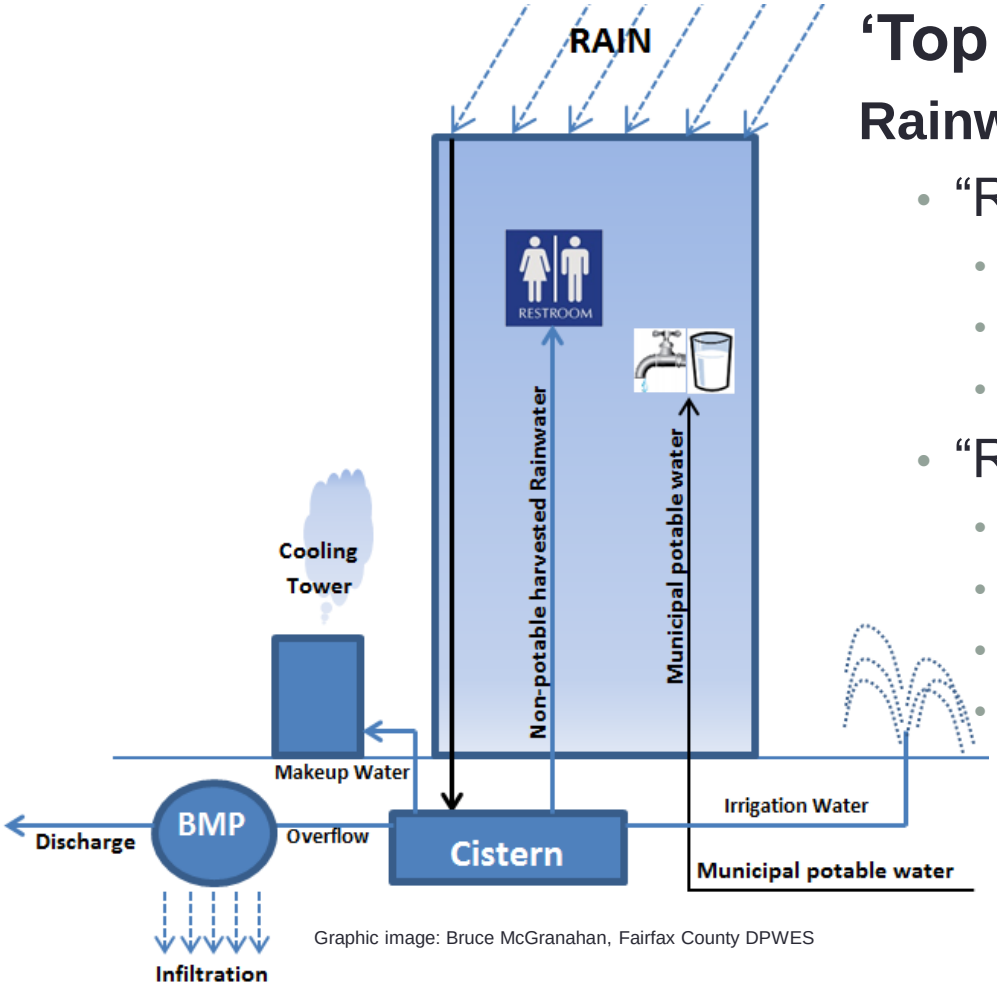

Graphic image: Bruce McGranahan, Fairfax County DPWES

'Top Tier' BMPs

Rainwater Harvesting

- "Reuse" for interior uses
  - cooling tower makeup water
  - water closet flushing
  - laundry
- "Reuse" for exterior uses
  - washing (i.e. vehicles, building facade, equipment)
  - irrigation
  - discharge to landscape water features
  - discharge to subsurface infiltration pit

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"Top Tier" BMPs cont'd

- **Infiltration Practices**
  - Infiltration trench or basin
  - Subsurface infiltration chambers
- **Permeable Pavement**
  - Porous asphalt streets, alleys, parking
  - Pervious concrete streets, alleys, parking
  - Interlocking pavers for alleys, parking
  - Interlocking pavers for sidewalk accents
  - Interlocking pavers for courtyards
- **Bioretention w/ Infiltration**
  - Landscaping rain gardens
  - Bioretention filter
  - Bioretention basin
  - Bioretention swale
  - Terraced or planter box rain gardens
  - Parking island, median, perimeter bioretention
  - Streetscape stormwater planters w/ infiltration
  - Extended tree islands w/ infiltration

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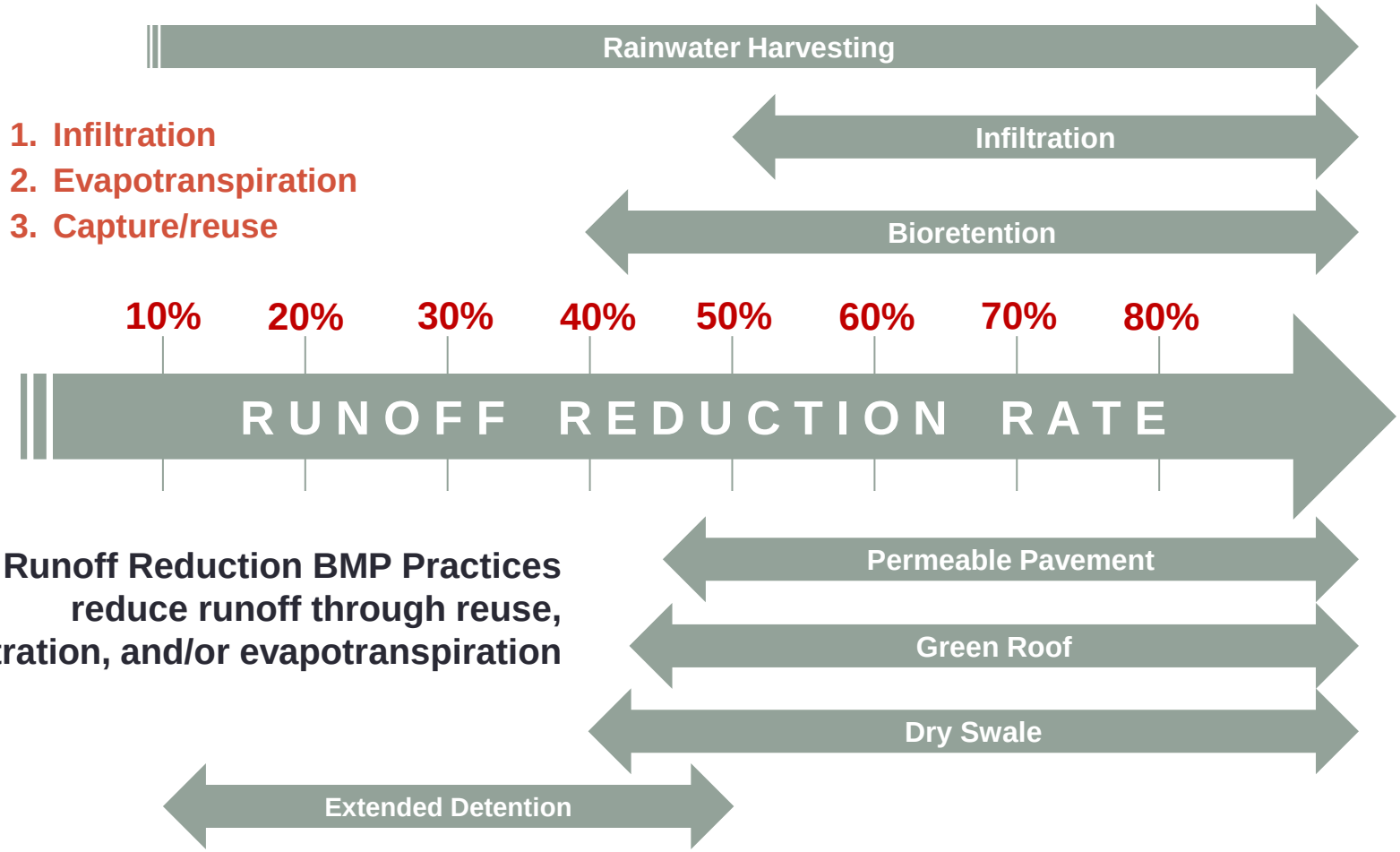
1. Infiltration
2. Evapotranspiration
3. Capture/reuse



Runoff Reduction BMP Practices reduce runoff through reuse, infiltration, and/or evapotranspiration

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Tysons Corner Comprehensive Plan Recommendation:

"*At a minimum, stormwater management* ***measures that are sufficient to attain both the stormwater design-quantity control and stormwater design-quality control credits of the most current version of the LEED-NC or LEED-CS*** *rating system (or the equivalent of these credits) should be provided. If, on a given site, the attainment of the stormwater design LEED credits (or equivalent) is demonstrated not to be fully achievable, all available measures should be implemented to the extent possible in support of this goal.*"

LEED certification

- **Reduce stormwater runoff; 1 point**
  - ***(Runoff Reduction Practices)***
- **Use captured rain to reduce potable water consumption; 1 point**
  - ***(Rainwater Harvesting)***
- **Reduce wastewater and potable water demand; 1 point**
  - ***(Rainwater Harvesting)***
- **Conserve existing natural areas; 1 point**
  - ***(Environmental site design)***

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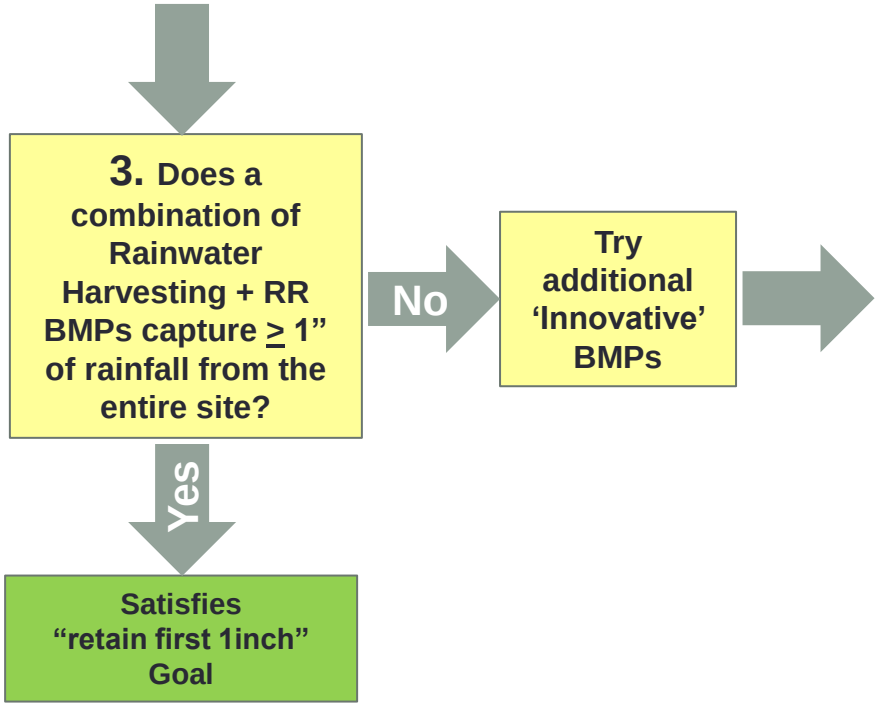

"Second Tier" BMPs

- Innovative urban BMPs that have **been accepted and used in another jurisdiction** and have a runoff reduction and/or total phosphorus reduction rate assigned.

"Third Tier" BMPs

- Other innovative urban BMPs or new ideas.

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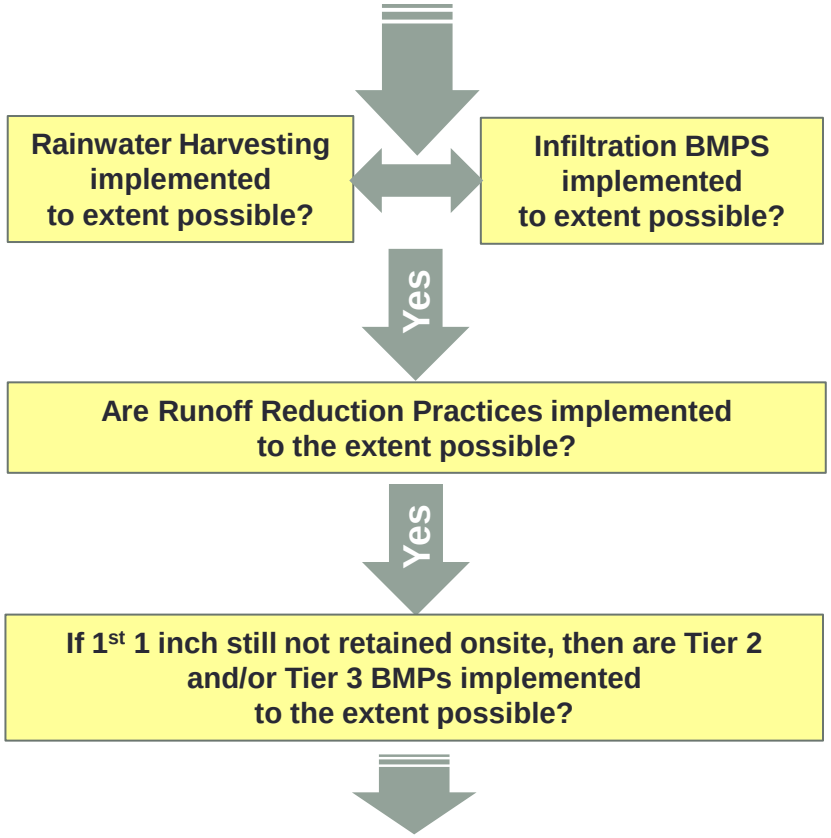
Tysons Corner Comprehensive Plan Recommendation:

"If, on a given site, the retention on-site of the first inch of rainfall is demonstrated not to be fully achievable, all available measures should be implemented to the extent possible in order to support this goal and achieve partial retention of the first inch of rainfall."



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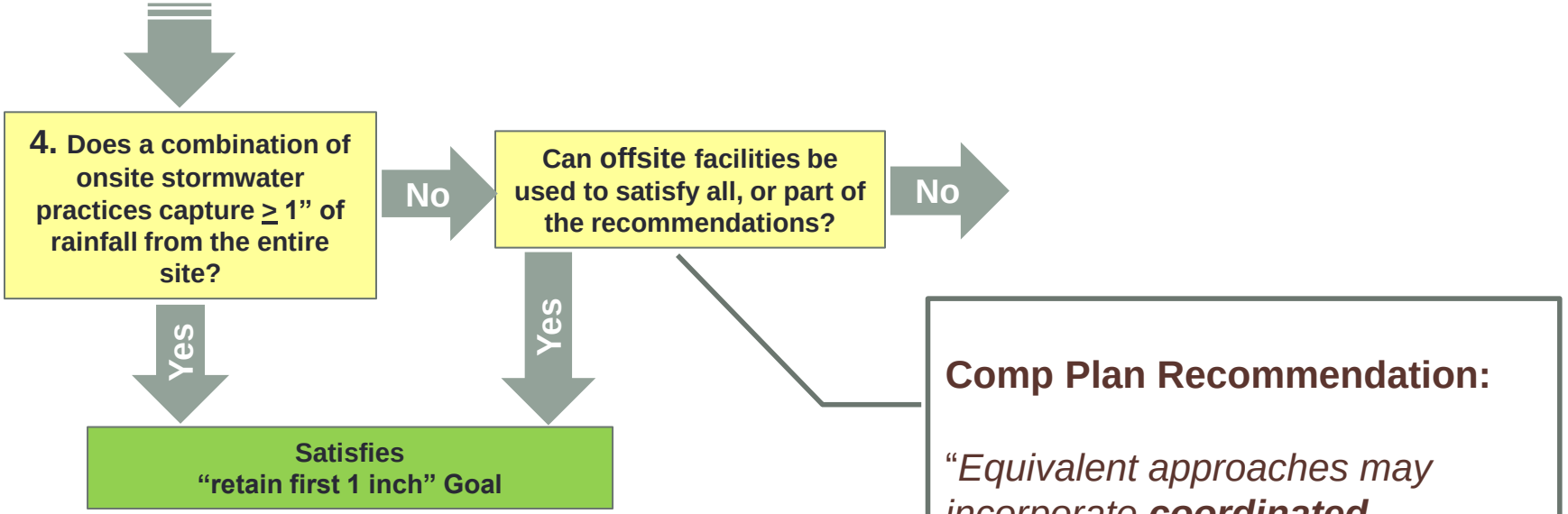

Comp Plan Recommendation:

"*Equivalent approaches may incorporate* ***coordinated stormwater management on multiple development sites and/or off-site controls****. Additional stormwater management efforts should be encouraged.*"

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5. Have **all available measures been implemented to the extent possible** in order to support this goal and achieve partial retention of the first inch of rainfall?

1. **Infiltration BMPs**
2. **Rainwater Harvesting and Reuse**
3. **Runoff Reduction BMPs**
4. **Other Onsite Innovative BMPs**
5. **Coordinated Offsite BMPs, if needed**

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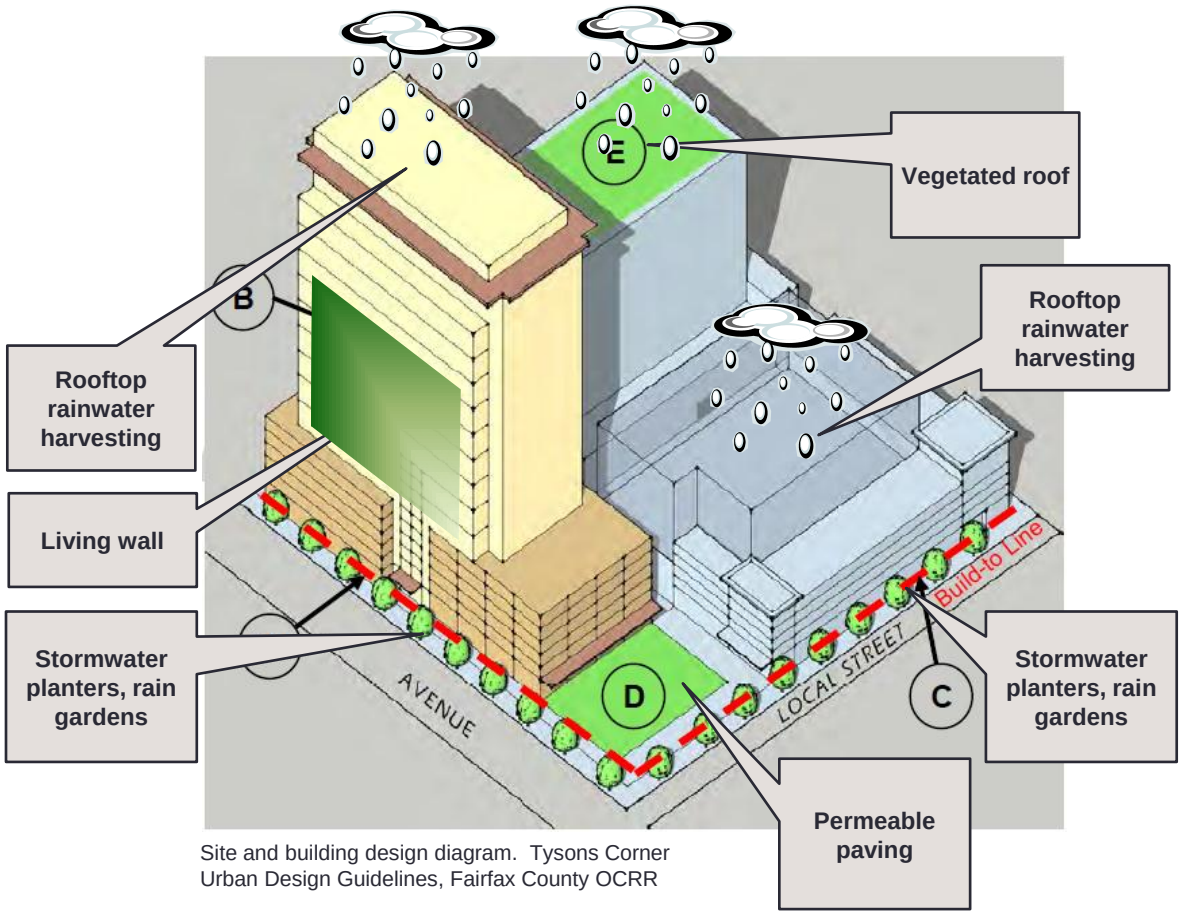
Urban Stormwater Management:

- Minimize pollution at the source (reduce impervious area, good housekeeping, etc.)
- Treat pollutants close to their source
- Use small scale, distributed approaches
- Be opportunistic. Use multiple practices and treatment trains
- Obtain pollutant removal primarily through runoff reduction



Site and building design diagram. Tysons Corner Urban Design Guidelines, Fairfax County OCRR

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Carroll Creek Linear Park, downtown Frederick, MD. Permeable pavers and planting beds offer opportunities for stormwater infiltration and bioretention.

Streetscapes offer opportunities for permeable pavers, and functional stormwater planters

Landscape amenity panel ornamental planting with metal edging. Washington, DC

Landscape amenity panel planting including free-standing planters and raised beds. Chicago, IL. Image credit: Haddonstone.

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Streetscape planters can double as bioretention, filtering, or infiltration practices

Streetscape Washington, DC

Michigan Avenue Streetscape, Chicago, IL Image: Bruno Carvalho

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Streetscape planters can slow and filter runoff

Continuous flow-through stormwater planter with multiple bridge pedestrian crossings Image: Harrison Design, San Mateo County Sustainable Green Streets and Parking Lots Design Guidebook, 2009

Permeable Interlocking Pavers. MARTA (Metropolitan Atlanta Rapid Transit Authority) station-Decatur, Georgia. Photo: Interlocking Pavement Concrete Institute

Permeable pavers reduce impervious area and can infiltrate stormwater into underlying soils or to an aggregate storage layer w/ slow-release underdrain

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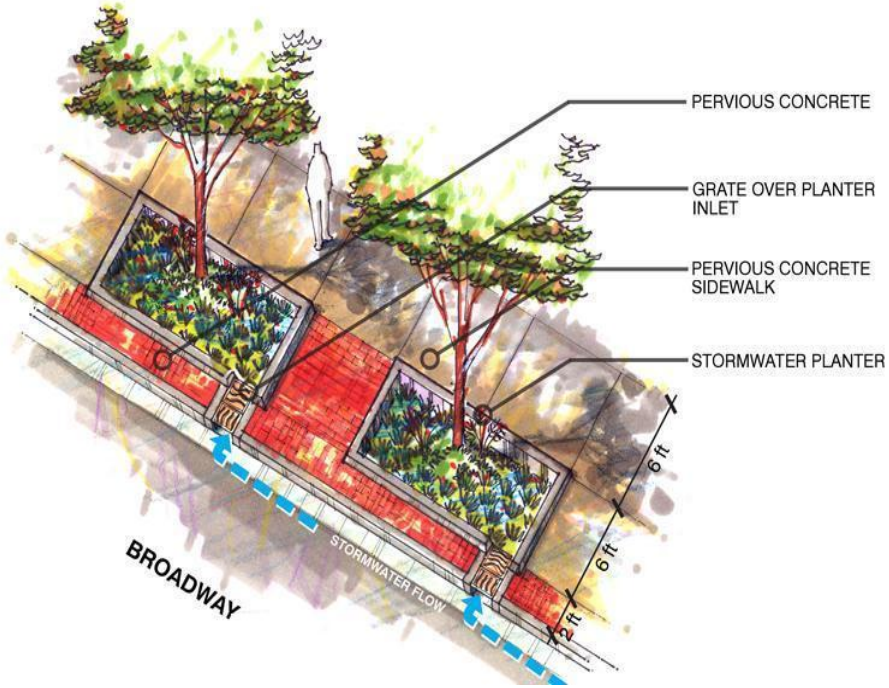
Stormwater infiltration planters at the Rush University Medical Center in Chicago. Image: City of Chicago and Hitchcock Design Group. Source: ASLA

Stormwater Planters in the streetscape manage runoff while supporting street trees



Source: City of Spokane

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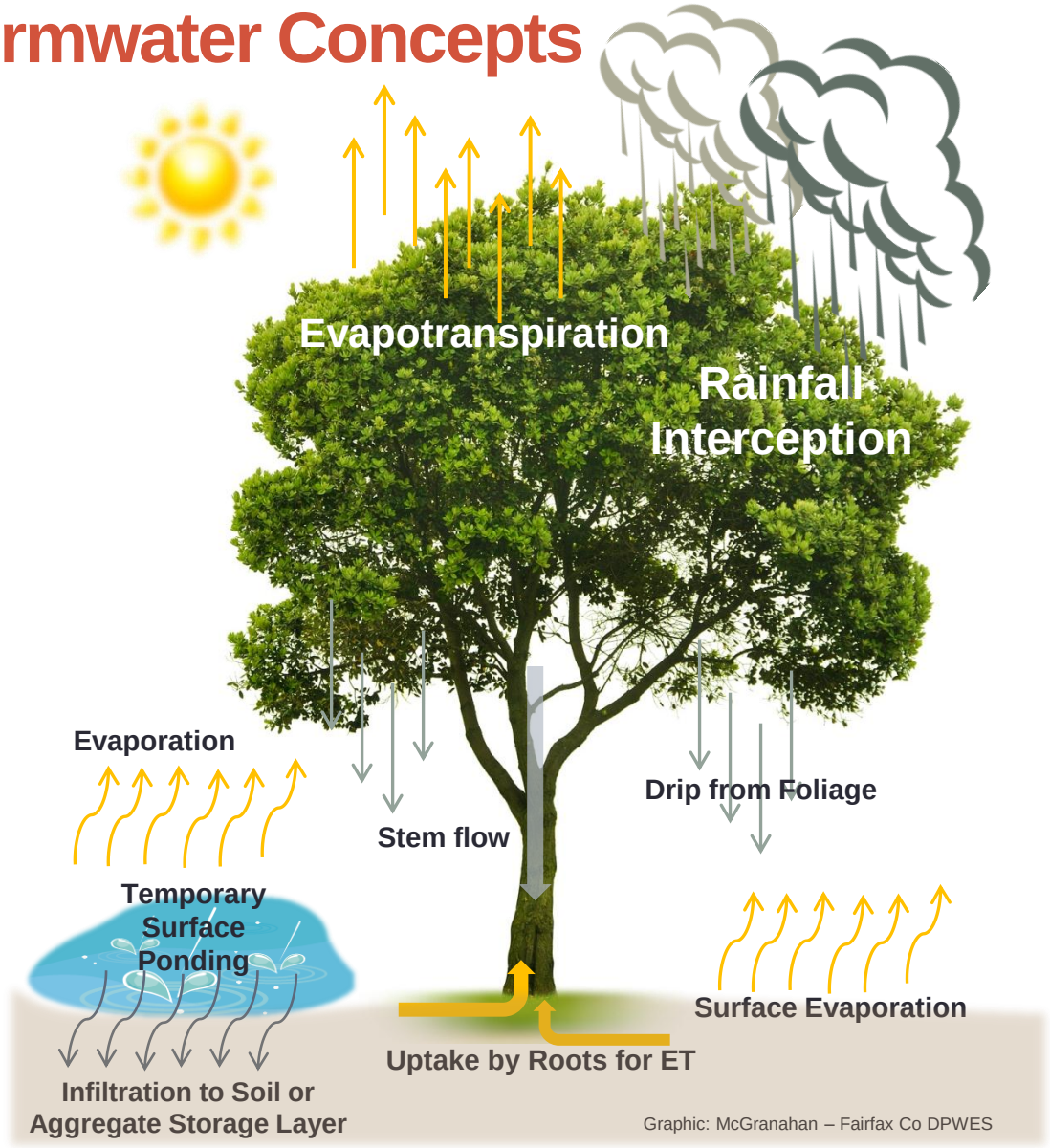
Urban forests, made up of publicly and privately maintained street and park trees, offer myriad benefits to the urban environment

- Trees capture and hold rainfall in leaves and branches.
- Trees provide the greatest stormwater and environmental benefit when their canopy covers impervious areas and intercepts water before it falls to the ground.



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Tree-lined street of Washington DC
Source: longislandgardensgirl

Image: VegNews

Image: SpacingToronto

Above right: City of Chicago Bureau of Forestry

Urban Reforestation

Preserving trees or planting trees on existing turf or barren ground has stormwater benefits.

Trees intercept rainfall before it reaches the ground, retaining a portion in the tree crown and thereby reducing runoff volume and peak flow.

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Stormwater planter at Columbus Square. **Philadelphia Water Department**

Flow-through planters are completely contained systems that only allow runoff to soak through the planter's imported soil bed and then into an underdrain system.

Flow-through planters should be used where native soil conditions are unfavorable to infiltration, where there is underlying soil contamination, and/or where there is a seasonal high water table.

Stormwater planters can be infiltration planters or flow-through planters.

Infiltration planters depend on native soil conditions that allow runoff to soak into the underlying soil. Infiltration planters are more desirable because they allow for greater volume reduction and further ease the burden on local storm drain facilities.

Urban Bio-retention Cell, Portland Oregon, Photo courtesy of DCdot, Anacostia Waterfront Transportation Architecture Design Guidelines.

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SOURCE: Philadelphia Water Department

Photo: Kevin Robert Perry . SW 12th Ave Green Street Project , Sustainable Stormwater Management Program, Portland, Oregon

Photo: Kevin Robert Perry, **City of Portland**.
SW 12th Avenue Green Street

Stormwater planters are an attractive treatment alternative

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Bioretention planters at Washington Navy Yard.
Image: **Greater**, Greater Washington

A stormwater tree trench is a system of trees that are connected by an underground infiltration structure.

On the surface, a stormwater tree trench looks just like a series of street tree pits. However, under the sidewalk, there is an engineered system to manage the incoming runoff. Source: Philadelphia

Stormwater planters can be continuous planters with pedestrian walkways or bridges

Green Streets, Environmental Services, City of Portland

Stormwater planter in Portland. Flickr image: Lisa Town

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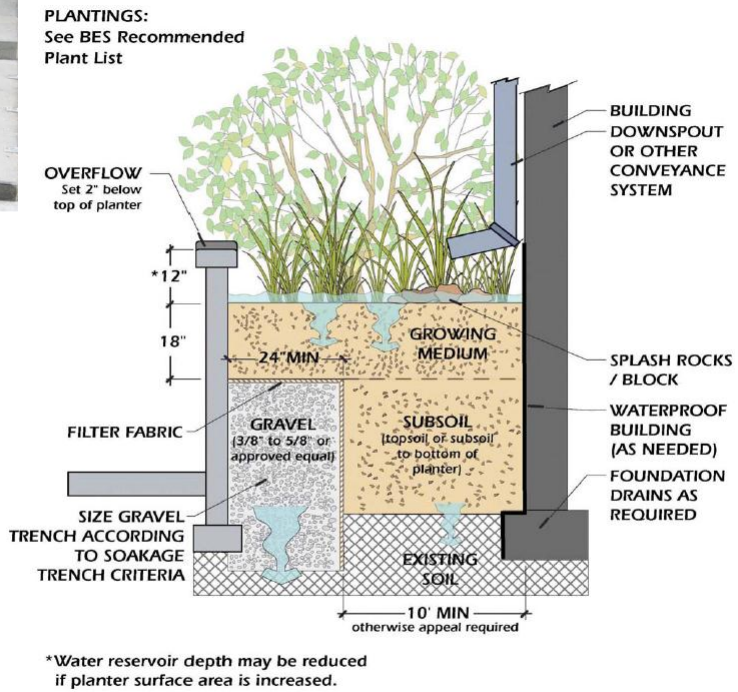
Infiltration planters at Portland State University.
Source: Portland Stormwater Management Manual



Infiltration Planter

Source: Portland Stormwater Management Manual

Stormwater Planters are designed to allow runoff to filter through layers of topsoil (thus capturing pollutants) and then either infiltrate into the native soils (infiltration planter) or be collected in a pipe to be discharged off-site (flow-through planter). The planter is sized to accept runoff and temporarily store the water in a reservoir on top of the soil.

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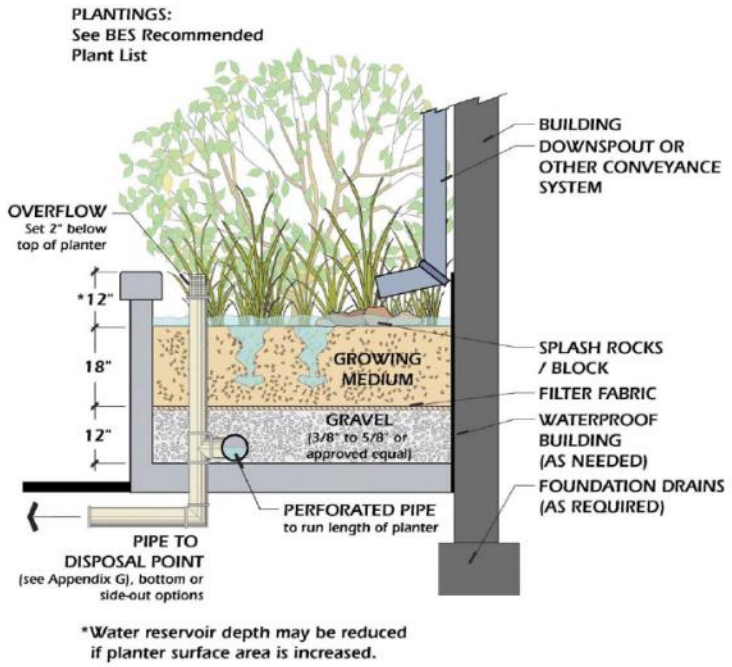
Flow-through planter at Liberty Center Parking Garage.
Source: Portland Stormwater Management Manual

The flow-through planter box is designed with an impervious bottom or is placed on an impervious surface.

Water quality treatment, attenuation of flow, and some volume reduction is achieved as the water filters through the soil. Flow control is obtained by storing the water in a reservoir above the soil. This type of planter can be used adjacent to a building if lined properly.



Flow-Through Planter Box

Detail: Portland Stormwater Management Manual

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Flow-through planter at Waterview Recreation Center, Philadelphia.

Source: Tookany / Tacony - Frankford Watershed Partnership

Rooftop drainage or rainwater harvesting overflow can be diverted to flow-through planters for filtering and to slow the discharge rate

Narrow flow-through planter at Mt. Diablo Recycling Center in Pittsburgh. Source: Blue-Green Building

Flow-through planters use engineered growing media. Image: City of Chicago and Hitchcock Design Group. Source: Blue-Green Building

Flow-through planter at Temple Sinai, Oakland. Source: Blue-Green Building

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Flow-through planters can be designed to complement the building architecture

Flow-through Planters on the campus of Portland State University.
Flickr photo: Natalie Blackburn

Stormwater planter along side the pedestrian street at the base of the Meriwether Building in the South Waterfront District in Portland, Oregon. Flickr image: Lisa Town

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Flow-through planter with decorative railing.
Source: PortlandOnline.com

Flow-through planters

Flow-through planters at Buckman Terrace Apartments. Portland Stormwater Management Manual

Flow-through planters at Rush University Medical Center, Chicago, IL. Image: Kim Waterman

Perforated pipe used for distribution of inflow in a stormwater planter. Source: www.wsud.org

NY DEC

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Water Features in the streetscape can reuse harvested rainwater and facilitate storage and evaporation

Water Street, Houston, Texas. Flickr photo: Fang Guo

John Ross Building, Portland, Oregon. Photo courtesy of the City of Portland

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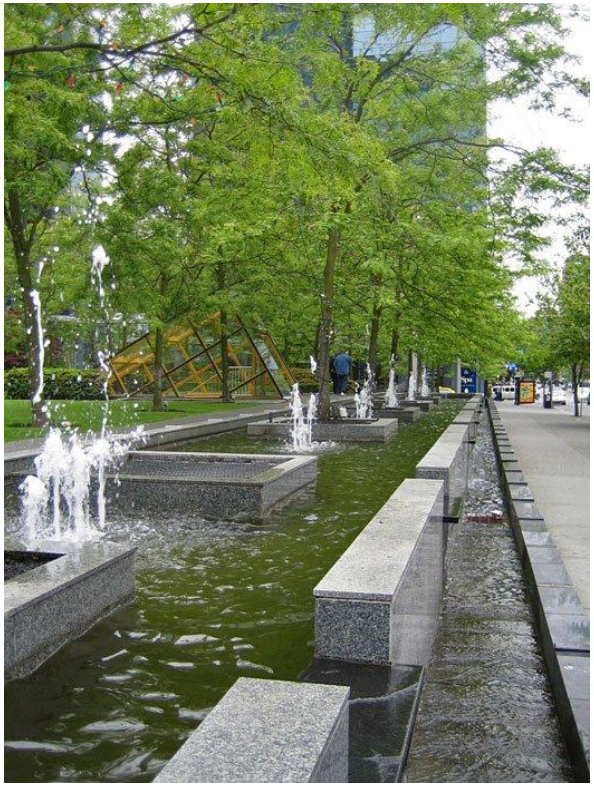
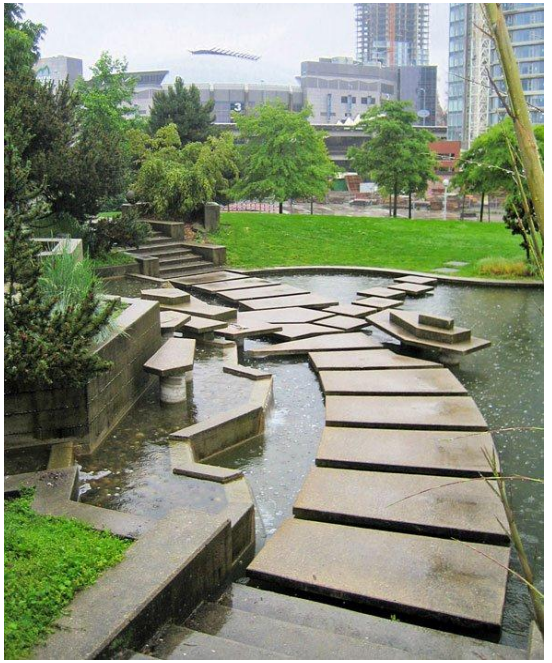


One Wall Centre, Vancouver, British Columbia.
Flickr image: Brian

Water Feature, Vancouver, British Columbia
Flickr image: Brian

Attractive water features can double as places for rainwater reuse and storage



Andy Livingstone Park, Vancouver, British Columbia.
Flickr image: Brian

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Balfour Street, Chippendale. Image WSUD.ORG: Sydney Metropolitan Catchment Management Authority. Artist: Will Cole

Kogarah Town Square, Sydney. Image WSUD.ORG: Sydney Metropolitan Catchment Management Authority

Attractive water features can include biofiltration or infiltration

Ku-Ring-Gai Council, Sydney. Image WSUD.ORG: Sydney Metropolitan Catchment Management Authority

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Water features can also be dramatic focal points with stormwater benefits

Image: renewolf

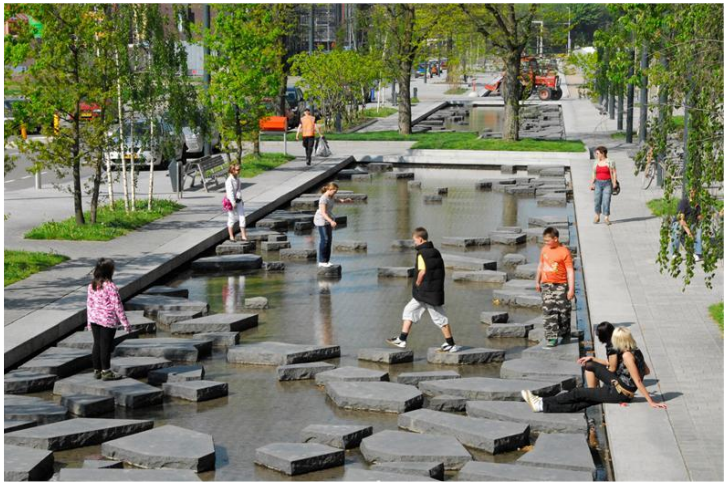

Image: Michel De Broin.

Roombeek the Brook, Enschede, The Netherlands.
Image: Buro Sant en Co Landscape Architects

Roombeek is a commercial street and also the urban core of the district. The small stream, which gives its name to the street and has in the past flowed underground, has been restored and brought up to the surface again. Now the water is part of the urban environment and has become the district's new central point. Its asymmetrical design, which widens and narrows along the street, accentuates its different spatial features. The base of the stream is treated with a rough structure that reduces the flowing speed of the water and creates a constant reflective pattern on the water surface.

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Large or small, water features can be an attractive addition to the streetscape

Photo: Hoerr Schaudt Landscape Architects, Source: Landscape Architecture Foundation

Water feature at the Dominion, Austin, TX

Waterscape at San Jose City Hall. Flickr photo: Tom Clifton

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City Garden, St. Louis, MO. Image: Urbanophile.com

Teardrop Park, New York, NY
Images: Elizabeth Felicella and Paul Warchol

Water features can provide recreation and community gathering places

Jamison Square Park, Portland, Oregon.

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Discovery Green, Houston, TX, Image: Hargreaves Associates

Lincoln Center Plaza, New York, Image: glenwoodnyc.com

Water features in parks

Pershing Square, Los Angeles, CA

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Water features add beauty and interest to parks while helping manage stormwater

Thirteen-tier fountain at Meridian Hill Park (Malcolm X Park). Photo by Ben Schumin
Source: Wikimedia Commons

Civic Plaza: DuPont Circle, Washington, DC.
Image: Greater Washington Real Estate

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A water feature can be the centerpiece of a pocket park

Pocket Park in Corsicana, Texas
Source: Parks&Recreation.corsicana.tx.us, Corsicana Daily Sun, Caperton Realty

Paley Park, New York City, NY. Image: Flicker_tayloliz

Stepped waterfall and pool at 48th Street and 1st Avenue, NY.
Image: Gabrien Symon/Business Insider

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Oregon Convention Center.
Image: James Henck

A swale with check dams or a dry bioswale can be a functional amenity in a landscaped area

A **dry bioswale** in front of the Pepsi-Cola Bottling Co. building in Eugene where grasses, sedges, and rocks will capture and slow rainwater, allowing it to infiltrate into the ground below.
Photo by Derek Godwin.
Source: Oregon State University

Photo: Pennsylvania Horticultural Society from the Journal Stormwater

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A courtyard or common area can house infiltration basins or trenches

Infiltration basins - Buckman Heights courtyard.
Source: Portland Stormwater Management Manual

Infiltration Trench.
Image: Bellingham, Washington

Infiltration trench filled with gravel, Lynbrook Estate.
Photo: Melbourne Water

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Rain Gardens reduce runoff, filter and treat pollutants through biological uptake and microbial processes in the soil media and vegetation

Rain Garden in Friends of Mint Plaza, San Francisco.
Image: localecology.org

Rain Garden on San Pablo Boulevard in El Cerrito, California. Image: Citizens for a Green El Sobrante

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Rain garden at EPA building. Source: Art of Gardening
http://artofgardeningbuffalo.blogspot.com/2009/04/epas-rain-garden.html

Parking lot rain garden.
Image: West Virginia DEP

Rain gardens can be an attractive addition to the landscape while functioning as a runoff reduction and stormwater treatment strategy

Native plant rain garden. Source: NRCS
http://www.ia.nrcs.usda.gov/features/urbanphotos.html

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Rain garden in front of City Hall in Brisbane, CA. Photo: San Mateo County

Rain gardens can be located in courtyards, parking lots, or in urban streetscapes

Parking lot bioretention cell. Source: NRCS http://www.ia.nrcs.usda.gov/features/urbanphotos.html

Rain garden at 110th Street and Amsterdam Avenue, Manhattan. Photo: New York City Global Partners

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Atwater Place Development, Portland Oregon.
Photo courtesy of the City of Portland

Bioswales and rain gardens can be integrated with the building architecture

The Merriweather development, Portland, Oregon. Photo courtesy of the City of Portland

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Image: Kevin Robert Perry. Source: San Mateo County Sustainable Green Streets and Parking Lots Design Guidebook, 2009

Image: Kevin Robert Perry. Source: San Mateo County Sustainable Green Streets and Parking Lots Design Guidebook, 2009

Rain garden. Image: Kevin Robert Perry. Source: San Mateo County Sustainable Green Streets and Parking Lots Design Guidebook, 2009

Rain gardens can be any size or shape, and can be molded to fit in "leftover" spaces in parking lots, along street frontages, or where streets intersect at odd angles.

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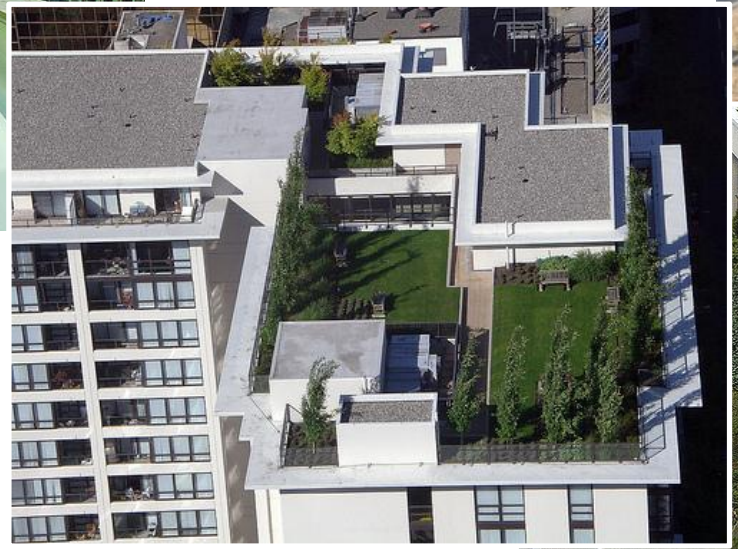
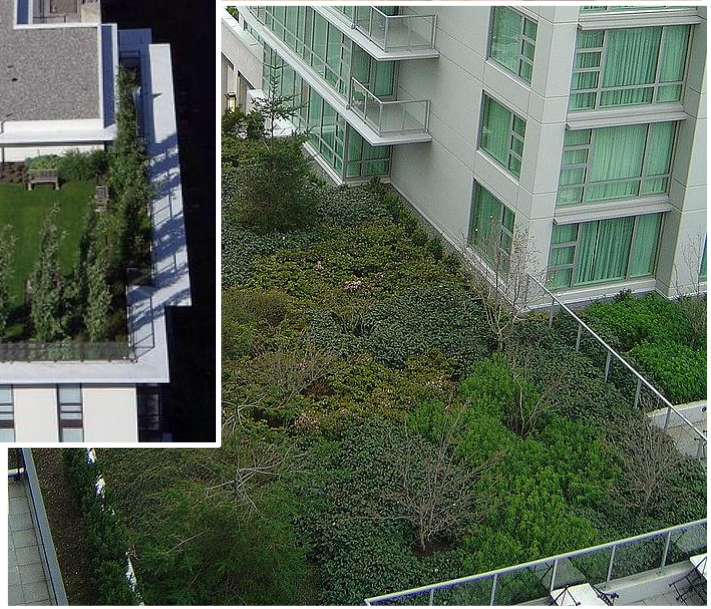
Green roof. Source: Arlington County

A vegetated Green Roof, or Eco-Roof, provides stormwater runoff reduction, improves insulation, creates wildlife habitat, helps lower urban air temperatures, and can add outdoor activity space



Rooftop plaza on Electric Avenue, Vancouver. Image: Flickr photo by Beach650

Albemarle County's green roof. Source: http://www.albemarle.org



Victoria BC Marriott green roof. Source: WikiCommons

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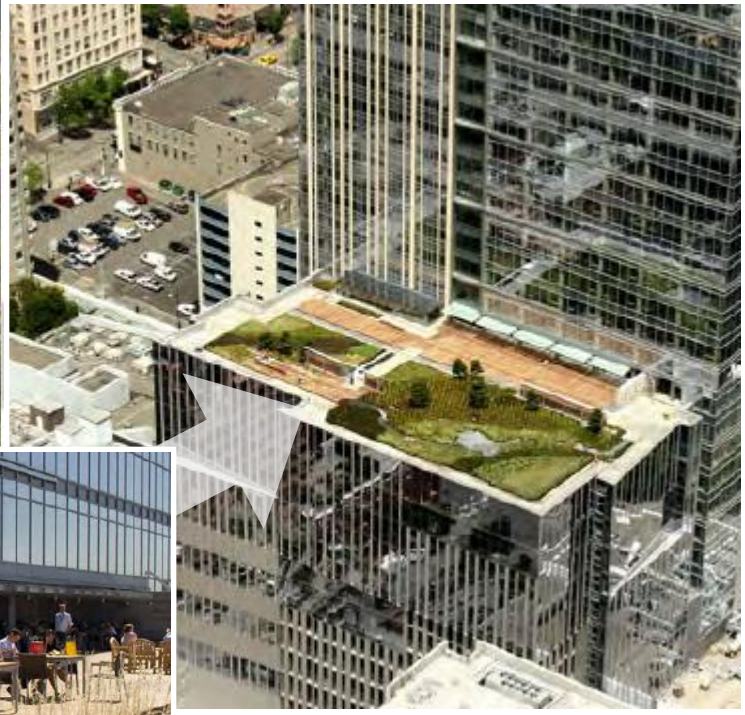
Rooftop Haven for Urban Agriculture,
Gary Corner Youth Center, Chicago, IL
Hoerr Schaudt Landscape Architects,
Image: Scott Shigley

Washington Mutual Center Roof Garden by Phillips Farevaag Smallenberg.
Seattle, WA Image: Lara Swimmer Photography



Long view of Washington Mutual Center Roof Garden
by Phillips Farevaag Smallenberg. Seattle, WA
Image: Joseph Fry (PFS)

Vegetated ‘Green’ Roof

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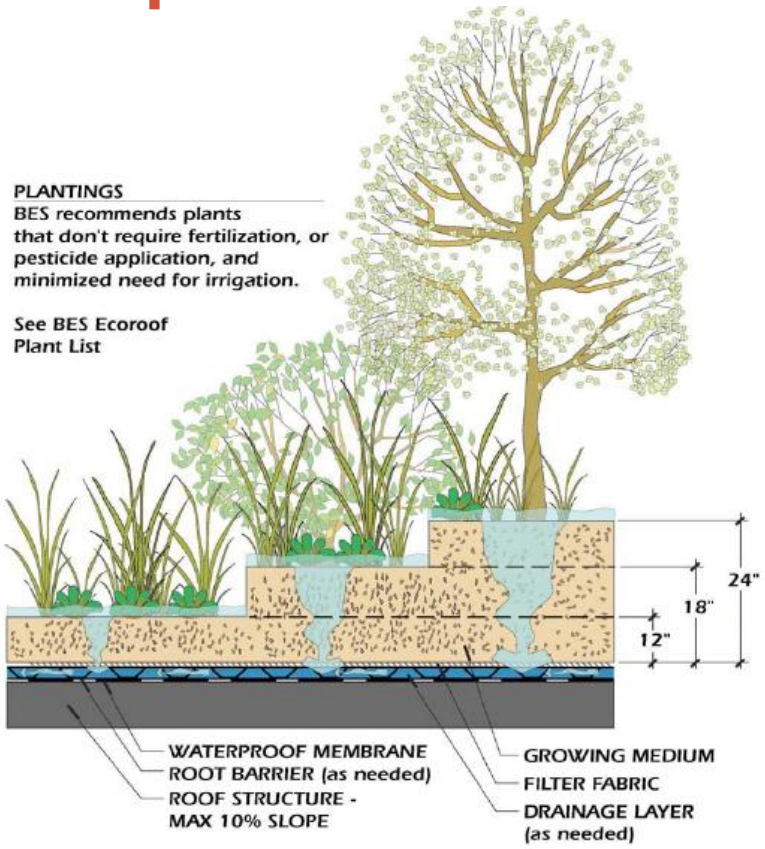
An Intensive Vegetated Roof can even support trees.

Photo: SW 2nd Ave. and SW Market St. Roof Garden. Portland Stormwater Management Manual

Even a small green roof helps to reduce runoff. Photo: Buckman Terrace green roof. Portland Stormwater Management Manual



Roof Garden

Source: Portland Stormwater Management Manual

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Living Wall on the Musée du Quai Branly in Paris, design by Jean Nouvel and Patrick Blanc

Living walls can provide a large vertical green space with a small footprint

Portland Airport, Photo Courtesy of Tournesol

Harvested rainwater can be used to irrigate living walls

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Photo: atheneumhotel.com
Green wall designed by Patrick Blanc for The Athenaeum Hotel in London

Living walls can be part of a building or used in the landscape

Flickr photo by Gsmick

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Photo: **PNC Bank**. The wall is a product of Green Living™ Technologies of Rochester, New York, and designed by Kari Katzander of Mingo Design also of New York.

Living Green Wall in Paris. Creative Commons Photo: **auxabonnÃ©sabsent**

Living walls can also be an attractive focal point on a building

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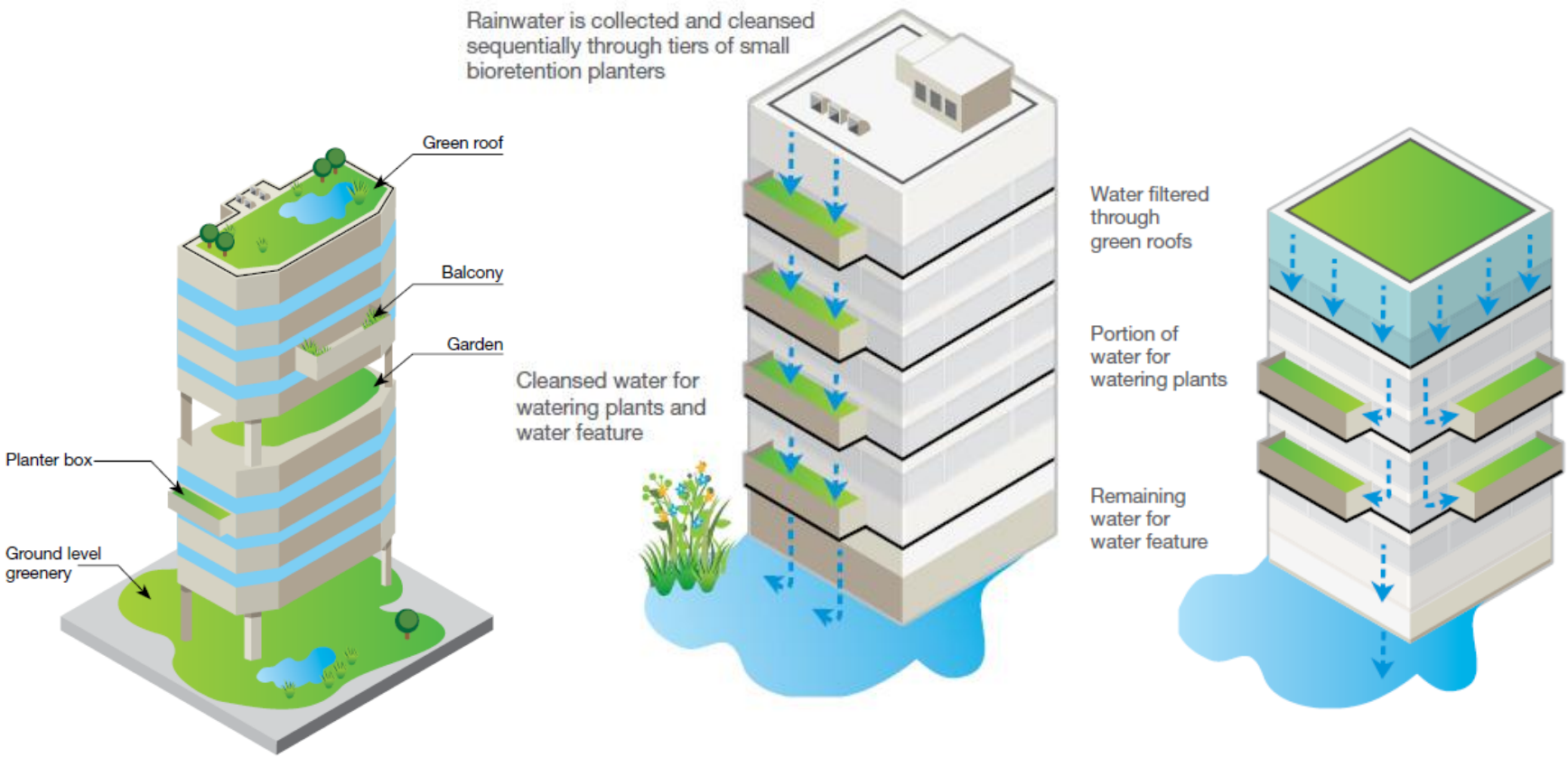

Source: **Active Beautiful Clean Waters Design Guidelines**; Public Utilities Board, **City of Singapore** July 2011

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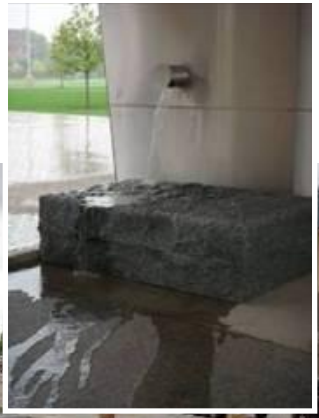
Rooftop disconnection to a stormwater planter diverts runoff for storage, infiltration or filtering
Image: City of Portland



Rooftop Disconnection to Pervious Area
City of Ann Arbor

Benito Juarez High School, Chicago, IL directs roof runoff to permeable pavement and stormwater planters.
Images: Kim Burgess, City of Baltimore

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Vine Street in Seattle.
Photo stream by Lisa Town. Source:
Inspiration Wall

Buster Simpson's "***Beckoning Cistern***", A painted aluminum and stainless steel installation reaches 34' into the air to channel rain water from the roof into a 6 ft. by 10ft. "cuff" before it steps down along the Vine Street runnel.

Creative rainwater harvesting 'Runnel and Cistern' system on Vine Street in Seattle

Tysons Corner Stormwater Concepts

Stormwater swale along Vine Street in Seattle. Photo stream by Lisa Town
Source: Inspiration Wall

Urban swale with check dams at the downstream end of the runnel/ cistern system.
Image: LocalEcology.org

Swales can even be part of the urban landscape like this Runnel and Cistern system on Vine Street in Seattle

Tysons Corner Stormwater Concepts

Tysons Corner Comprehensive Plan Recommendation:

"***LID techniques of stormwater management should also be incorporated into new and redesigned streets where allowed and practicable.***"

'Incorporated into streets' where allowed and practicable

- Permeable Pavement
- Stormwater Planters
- Curb bump-outs / Curb extensions
- Green gutters
- Proprietary Devices
- "Green streets and alleys"

Tysons Corner Stormwater Concepts

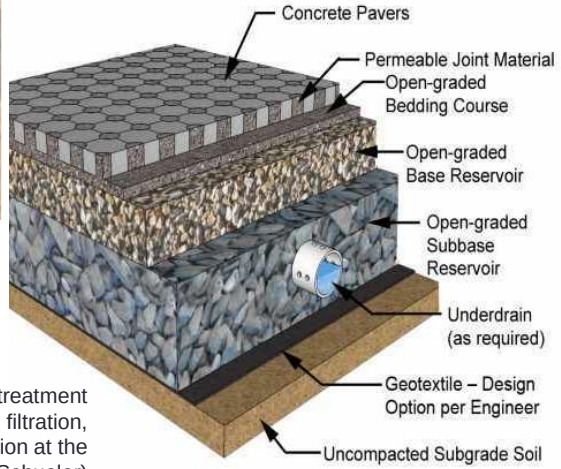
Image: Kevin Robert Perry, Nevue Ngan Landscape Architects.
Source: San Mateo County Sustainable Green Streets and Parking Lots Design Guidebook, 2009

Permeable paving can be porous asphalt, pervious concrete or interlocking pavers that allow infiltration or temporary storage of runoff in an open-graded gravel reservoir beneath the base course

SOURCE: Philadelphia Water Department

Even when infiltration is limited permeable paving can provide filtering and temporary storage of stormwater runoff

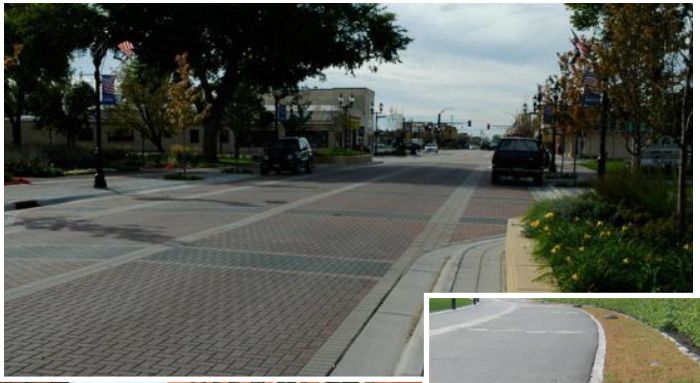
SOURCE: Philadelphia Water Department



Even without infiltration some treatment is provided by the adsorption, filtration, and microbial decomposition at the base-subgrade interface (Schueler)

SOURCE: Virginia DCR

Tysons Corner Stormwater Concepts

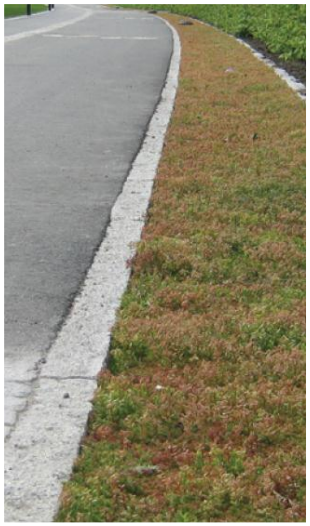


City streetscape Osseo, Minnesota. Photo: Interlocking Pavement Concrete Institute

Permeable pavers, porous asphalt, and bioretention cells at the Silver Lake beach parking lot, Wilmington, MA. (GeoSyntec Consultants) Image: Massachusetts DCR

Permeable pavers and green gutters reduce runoff from parking areas, alleys and roadways

Green alley using permeable pavers. 5th Street in Richmond, Virginia



Green gutters help capture and slow stormwater runoff within very narrow and shallow landscaped areas along a street's edge.

While infiltration of stormwater is a possibility, the primary purpose of using green gutters is to provide a site design measure using a strip of landscaping to help filter out pollutants and slow the flow of water.

Image: Kevin Robert Perry: San Mateo County Sustainable Green Streets and Parking Lots Design Guidebook, 2009

Tysons Corner Stormwater Concepts

Stormwater curb extensions are landscape areas that extend into the street and capture stormwater runoff.

Conventional curb extensions are commonly used for pedestrian safety and traffic calming.

A stormwater curb extension shares these same attributes plus adds a stormwater benefit by allowing water to flow into the landscape space.

Green Streets, Environmental Services, City of Portland

Curb bump-out. Photo: Natural Resources Defense Council

Source: Wilkes East Neighborhood, Gresham, Oregon

Green Streets, Environmental Services, City of Portland

Source: Philadelphia Water Department

Tysons Corner Stormwater Concepts

Curb extensions and stormwater planters can even be retrofitted into existing streets

Curb extension with planters. Image: Kevin Robert Perry, Nevue Ngan Landscape Architects. Source: San Mateo County Sustainable Green Streets and Parking Lots Design Guidebook, 2009

Source: City of Portland. Southeast Ankeny Green Street Project

Image: Kevin Robert Perry, Nevue Ngan Landscape Architects. Source: San Mateo County Sustainable Green Streets and Parking Lots Design Guidebook, 2009

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Retrofit stormwater planter, Capitol Street, Richmond. Source: VA DGS See more construction photos at http://greenvacapitol.org/

Stormwater planter retrofit in Sacramento above and right. Photos: BuffaloRising

Examples of Stormwater planter retrofits

Tysons Corner Stormwater Concepts

Major Stormwater Planter retrofit in Lansing, Michigan

Stormwater planters in Lansing, Michigan. Photos: Dan Christian

Tysons Corner Stormwater Concepts

Major Stormwater Planter retrofit in Lansing, Michigan

Stormwater planter in Lansing, Michigan. Photo: Dan Christian

Stormwater planters in Lansing, Michigan. Photos: Robert Domm Source: National Transportation Enhancements Clearinghouse http://www.enhancements.org/

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Other Stormwater Practices

Compost soil amendments can help restore compacted soils and improve soil infiltration

Proprietary stormwater devices
Image: Contech

Contained planter boxes reduce impervious area and retain some rainwater. Images: top Interiorzine, bottom Portland Stormwater Management Manual.

What other innovative BMPs or designs will emerge?
Photo: HeavenlyTahoe

Tysons Corner Stormwater Concepts

Non-Structural Stormwater Practices

Good Turf Management Practices. Reduced pesticide and fertilizer use. Image: Suffolk County Water Authority

Proper Disposal
Image: americanconcretewashouts.com

Recycling and good refuse management

Maintenance / Good Housekeeping Images: Wilmington, NC

Minimize Pollutants at the Source!

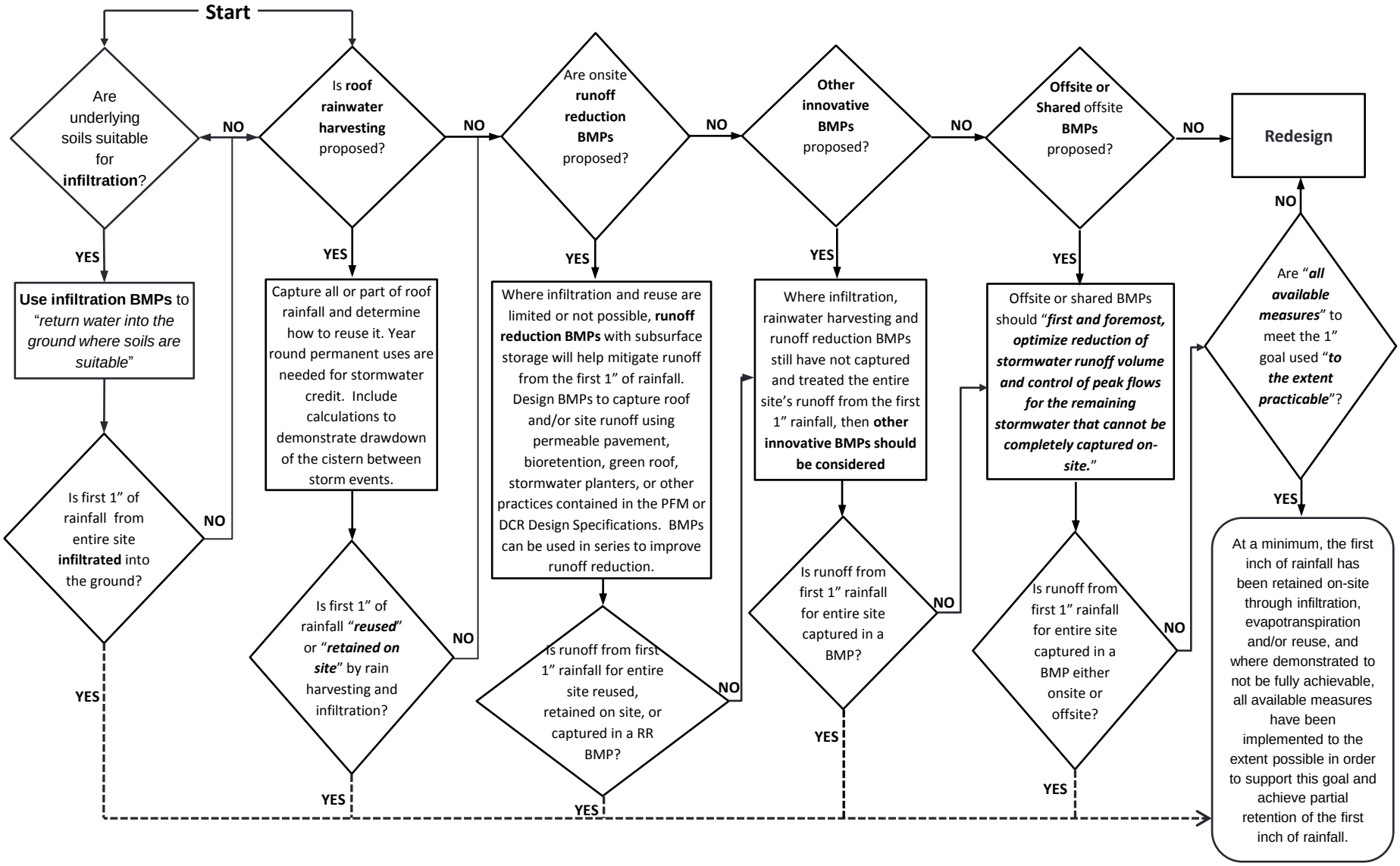
Tysons Corner Stormwater Concepts

Tysons Corner Comprehensive Plan Recommendation:

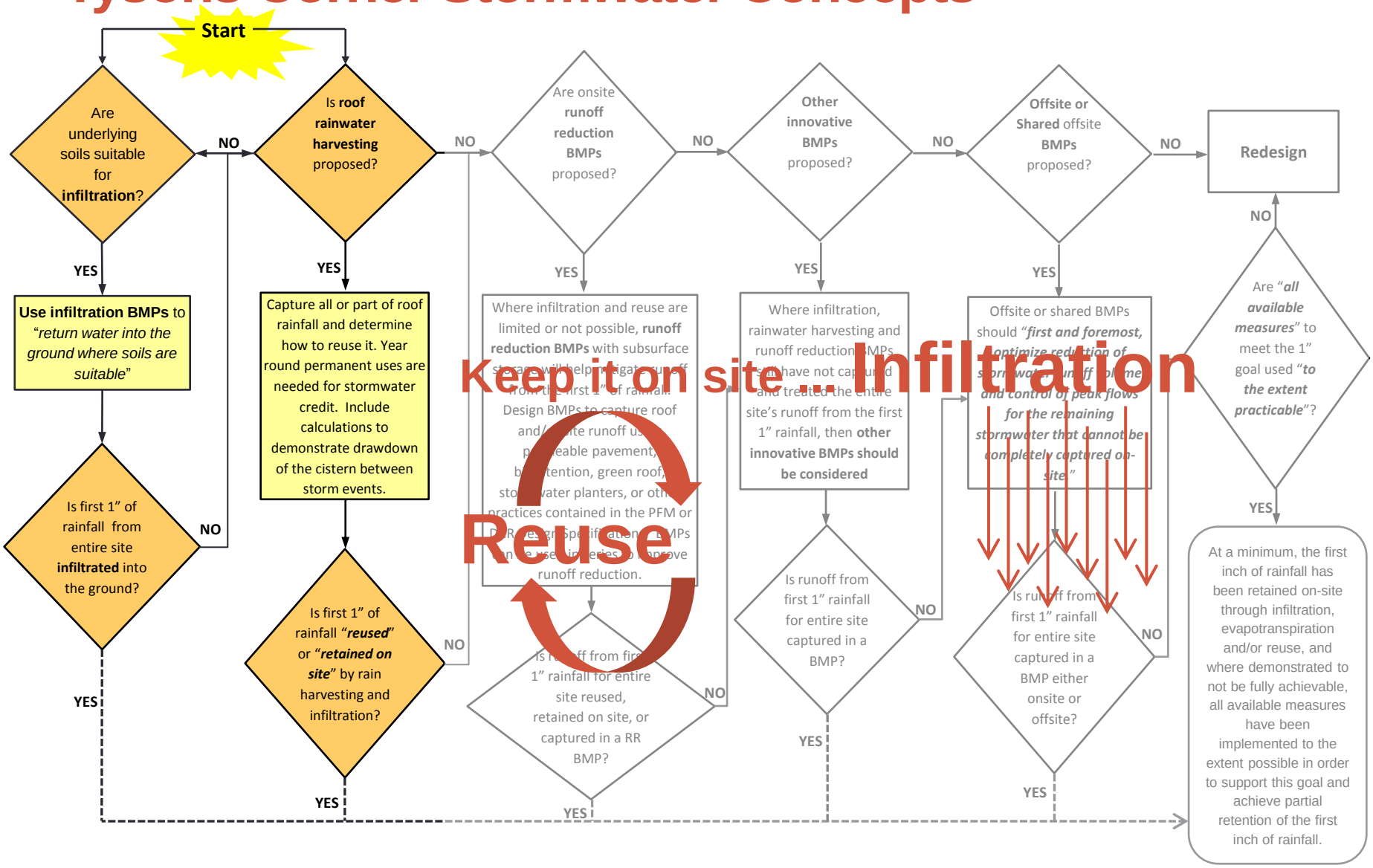
"***Restoration and/or stabilization of degraded streams on development sites should be pursued where feasible;*** *restoration and stabilization techniques that incorporate* ***ecologically and aesthetically beneficial, vegetated approaches are preferred.*** *Off-site efforts to restore and/or stabilize streams in Tysons Corner should also be encouraged.* The above guidelines *are intended to improve stormwater management controls sufficiently to allow for improvements to the habitat and recreational values of streams in Tysons Corner through natural restorative processes and/or through restoration projects."*

Images: Ruth Mott Foundation Gilkey Creek Relocation and Restoration. Source: Landscape Architecture Foundation

Tysons Corner Stormwater Concepts



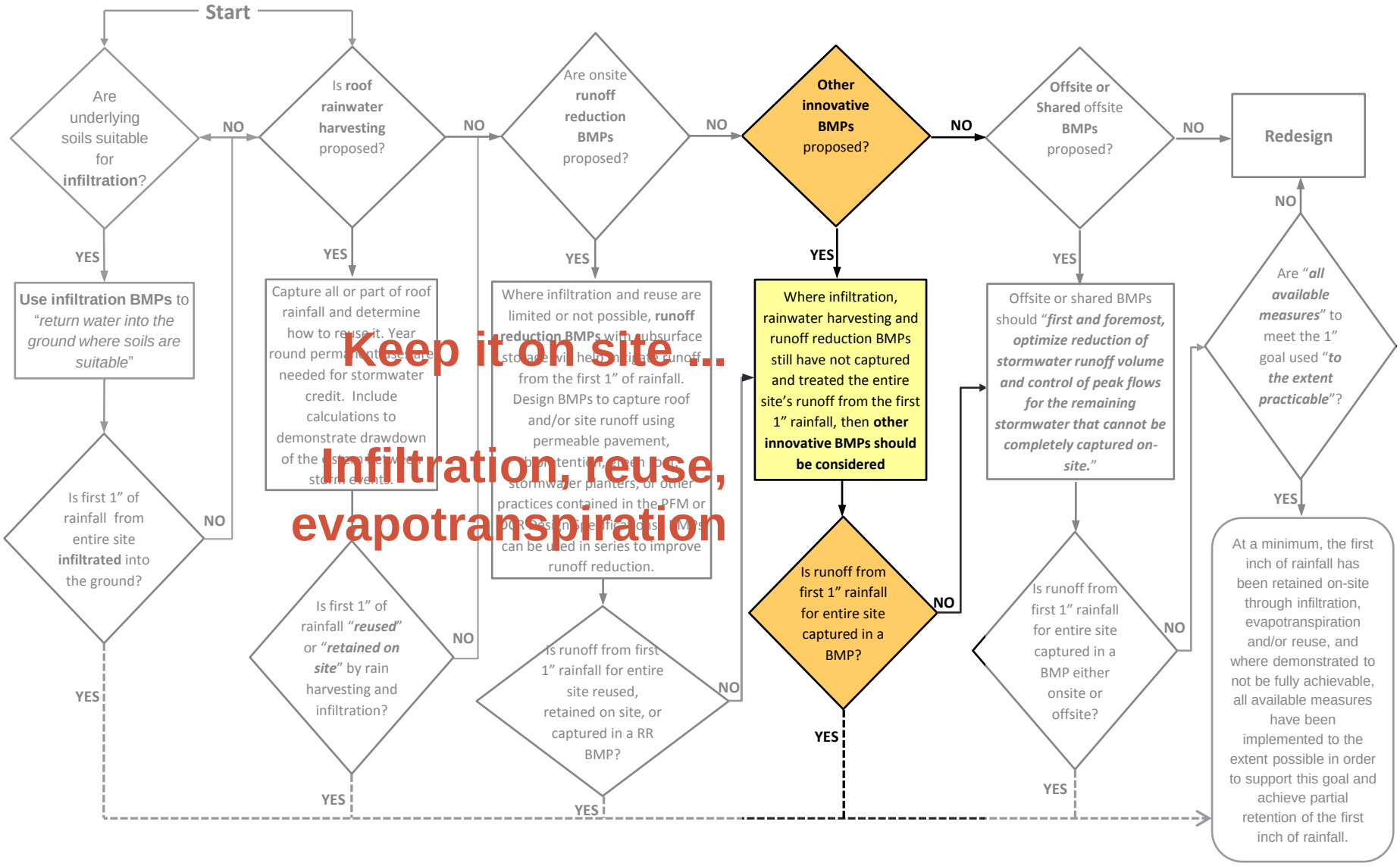
Tysons Corner Stormwater Concepts



Tysons Corner Stormwater Concepts

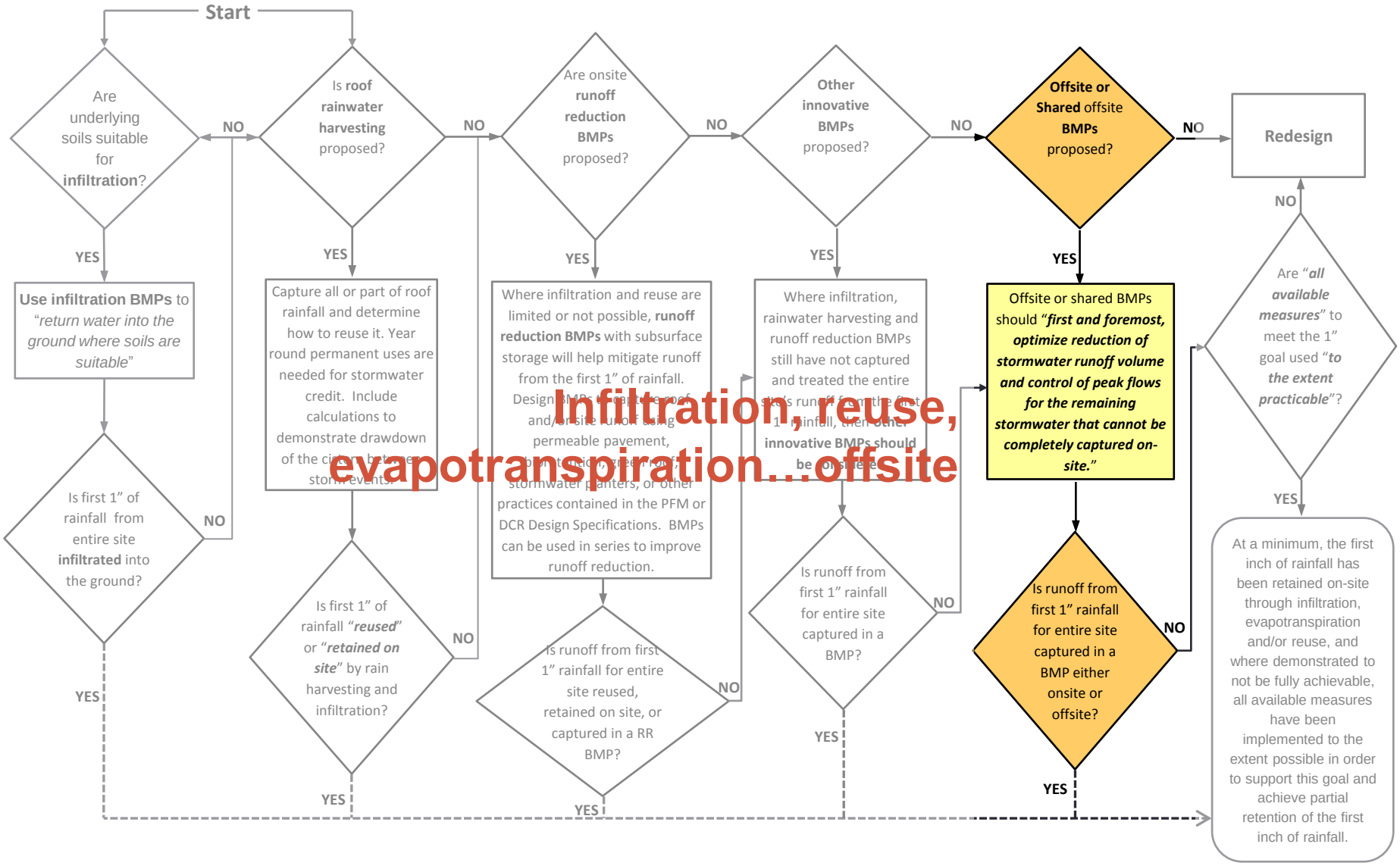
Keep it on site … evapotranspiration storage, runoff reduction

Tysons Corner Stormwater Concepts



Keep it on site… Infiltration, reuse, evapotranspiration

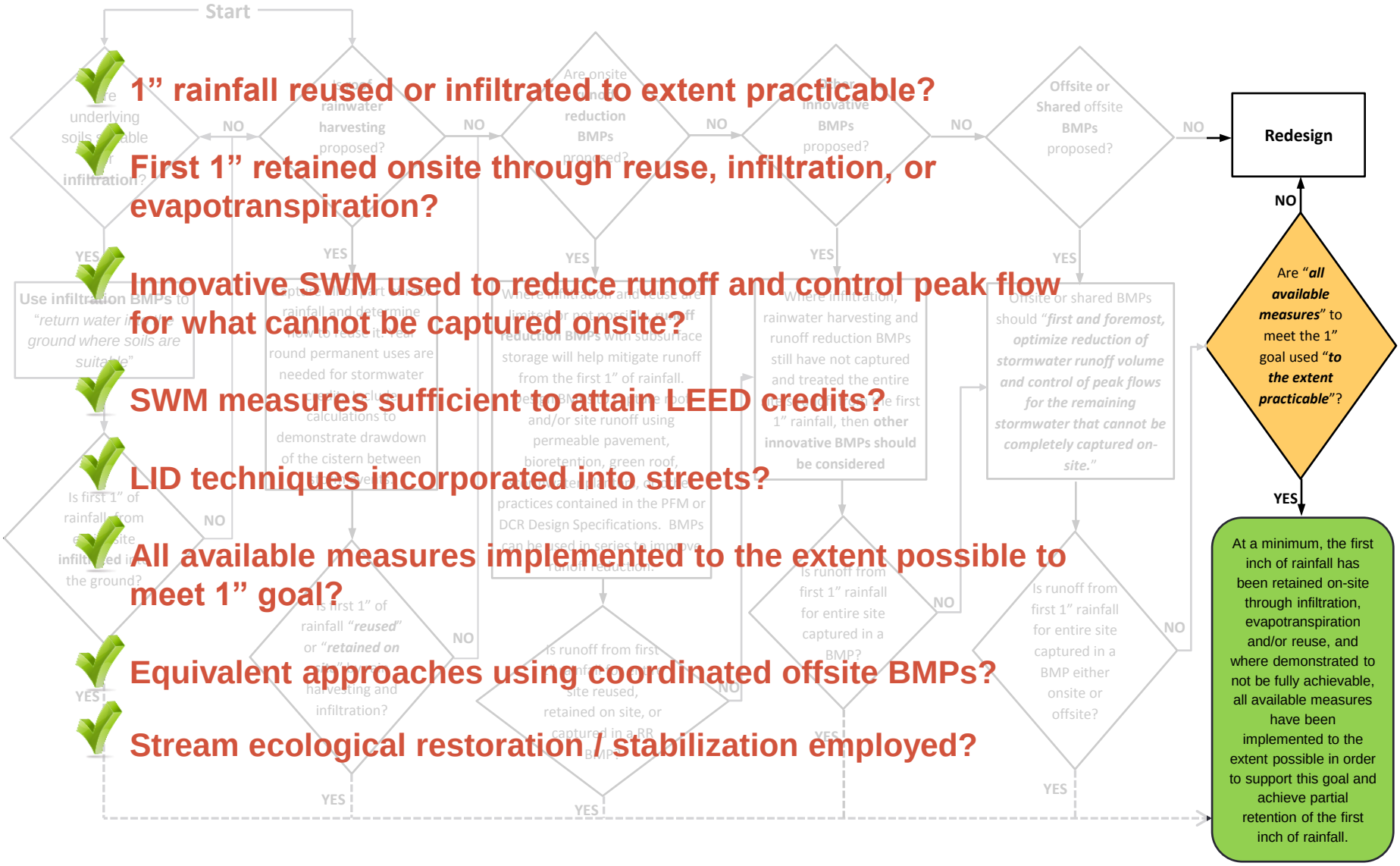
Tysons Corner Stormwater Concepts



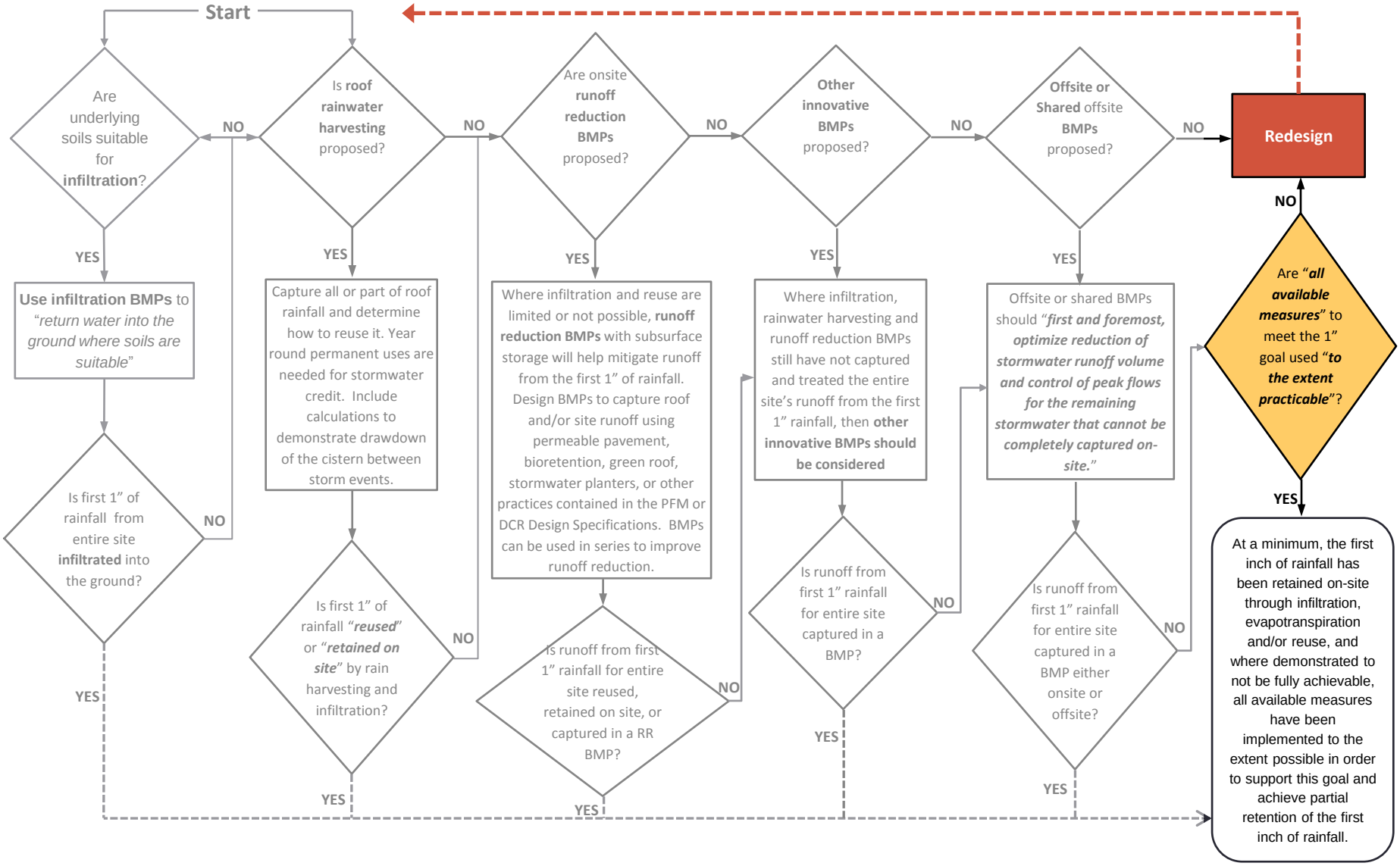
Infiltration, reuse, evapotranspiration…offsite

Tysons Corner Stormwater Concepts

- 1" rainfall reused or infiltrated to extent practicable?
- First 1" retained onsite through reuse, infiltration, or evapotranspiration?
- Innovative SWM used to reduce runoff and control peak flow for what cannot be captured onsite?
- SWM measures sufficient to attain LEED credits?
- LID techniques incorporated into streets?
- All available measures implemented to the extent possible to meet 1" goal?
- Equivalent approaches using coordinated offsite BMPs?
- Stream ecological restoration / stabilization employed?



Tysons Corner Stormwater Concepts



Address questions or comments to:

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Code Development and Compliance Division
Land Development Services
Department of Public Works and Environmental Services
12055 Government Center Parkway
Fairfax, Virginia 22035-5503
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703-324-1780, TTY 711

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DEPARTMENT OF PUBLIC WORKS AND ENVIRONMENTAL SERVICES