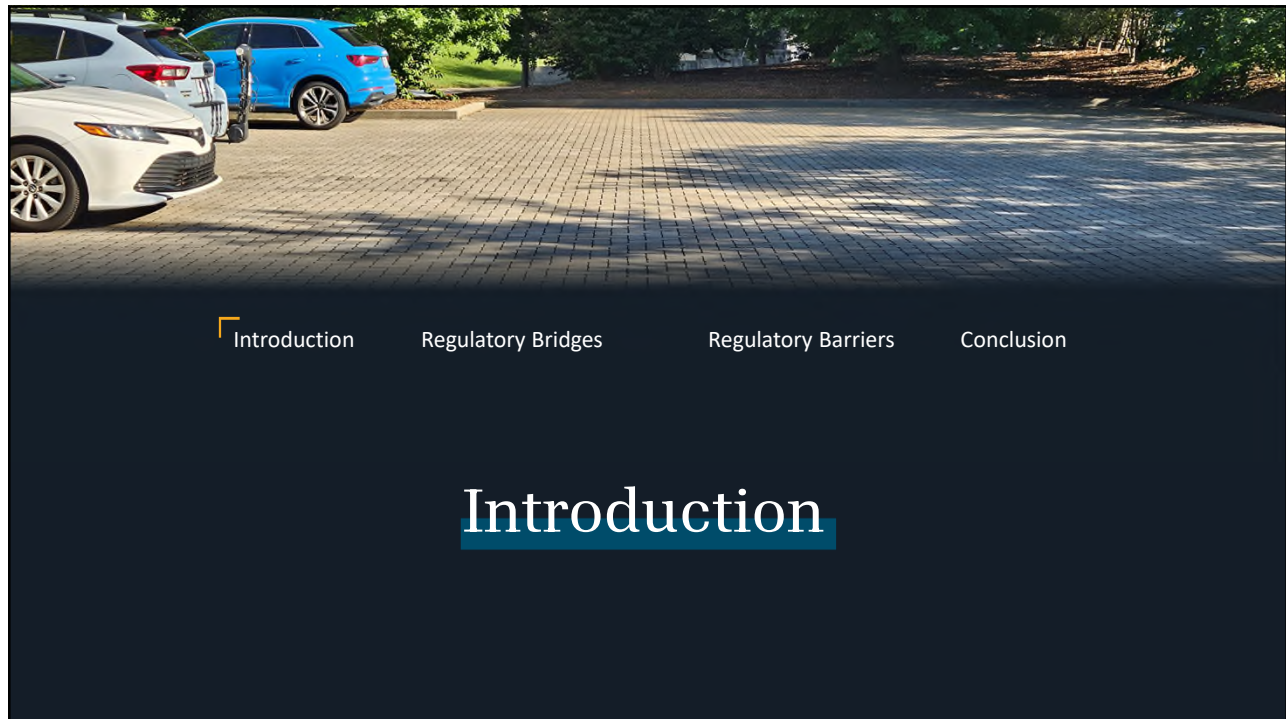


The information provided here is for informational and educational purposes and current as of the date of publication. The information is not a substitute for legal advice and does not necessarily reflect the opinion or policy position of the Municipal Association of South Carolina. Consult your attorney for advice concerning specific situations.



It Isn't Easy Being Green!

Despite its many benefits, it can be so challenging to get it approved

- | We need ordinances to “create green pastures”
- | Great ideas wilt if we can't get them approved
- | It's a small world!



Museum of the Moving Image

SC Association of Stormwater Managers



Introduction

Regulatory Bridges

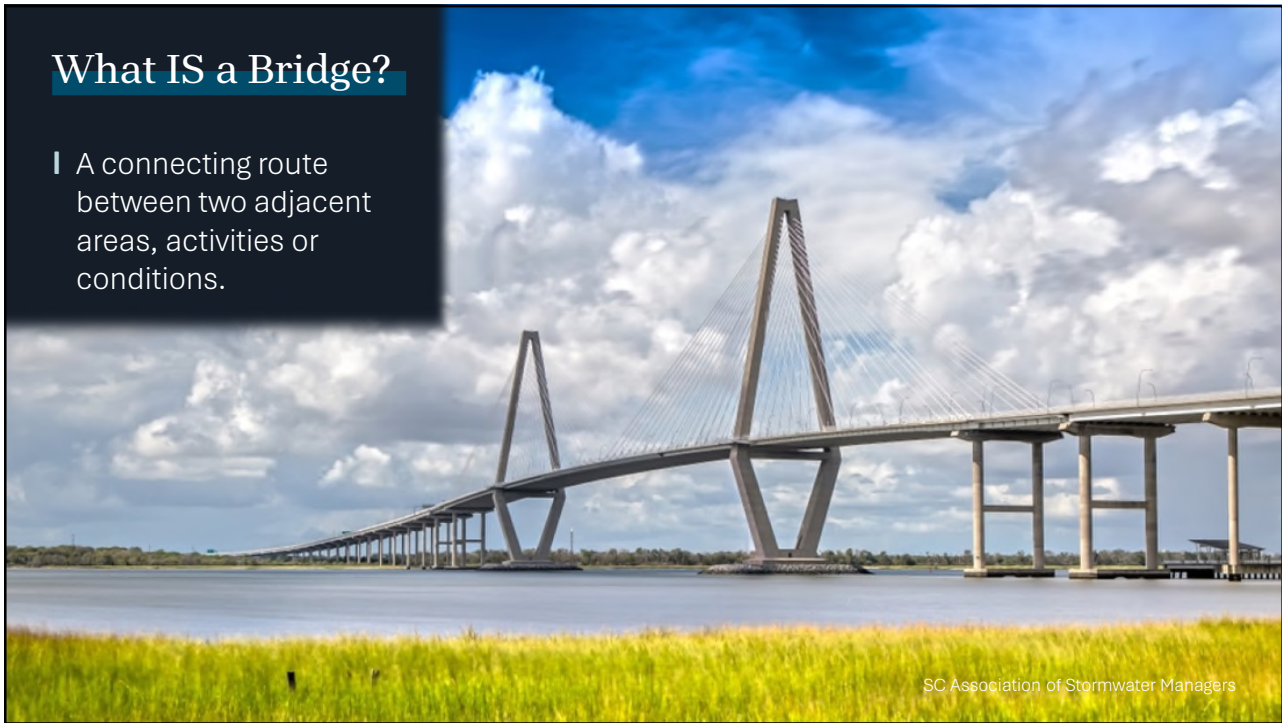
Regulatory Barriers

Conclusion

Regulatory Bridges

What IS a Bridge?

I A connecting route between two adjacent areas, activities or conditions.



SC Association of Stormwater Managers

Bridge 1: Clear Design Standards

Currituck County, NC

MINOR STORMWATER PLANS: Treat 4.0" of runoff from impervious surfaces using GSI

LID Practice	Minor SW Plans	Major SW Plans
Stormwater Swale	✓	X
Cistern	✓	X
Planter Box	✓	X
Permeable Pavement	✓	✓
Shallow Marsh	✓	✓
Bioretention Cell	✓	✓
Infiltration System	✓	✓
Stormwater Wetland	✓	✓
Rainwater Harvesting	✓	✓
Green Roof	✓	✓

Planter Boxes

What is a Planter Box?

Planter Boxes are an LID stormwater solution that are well-suited areas with low drainage soils, high water tables, or for small properties lacking space for larger stormwater systems. These versatile structures enhance aesthetic appeal and effectively manage stormwater on-site, reducing runoff and promoting water infiltration in locations where other LID options might be impractical.

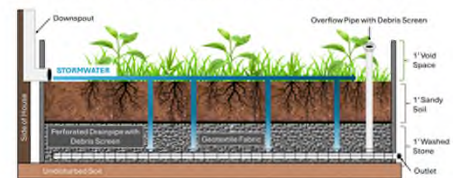
How does a Planter Box work?

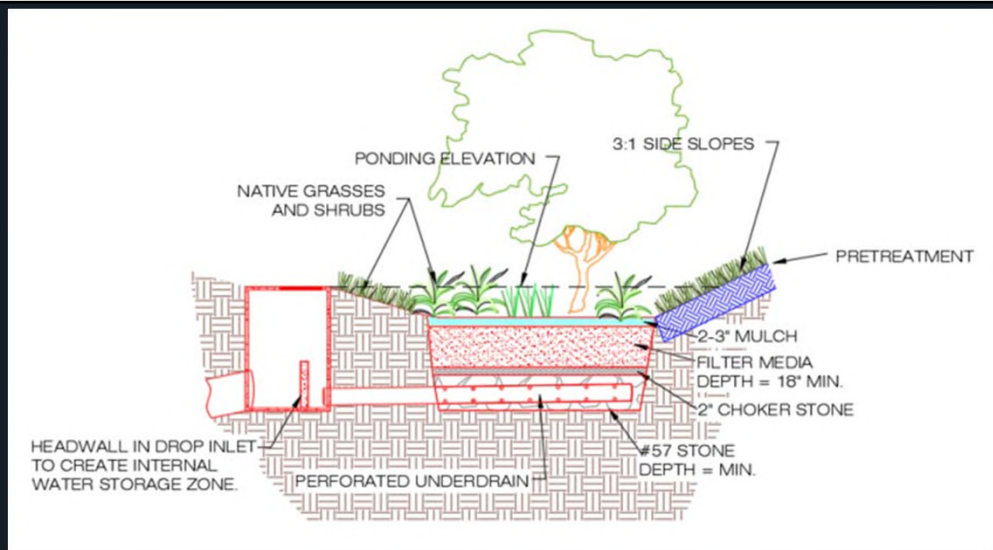
Planter Boxes manage stormwater by capturing runoff from impervious surfaces, such as rooftops or paved areas, which flows into the box through an inlet pipe or a roof downspout. Once inside, the stormwater percolates through the soil layer and plant roots, which act as a natural filter, trapping pollutants and allowing cleaner water to seep into the stone layer. At the base of the planter box, a perforated pipe collects the filtered water and channels it through the outlet pipe to the larger drainage network. Planter Boxes are also equipped with an overflow pipe to handle excess water during heavy rainfall events, so that the system does not become overloaded.

Example of a Planter Box



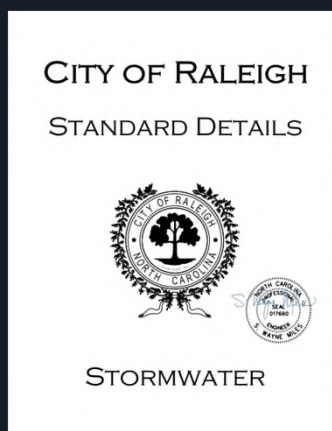
Photo credit: City of



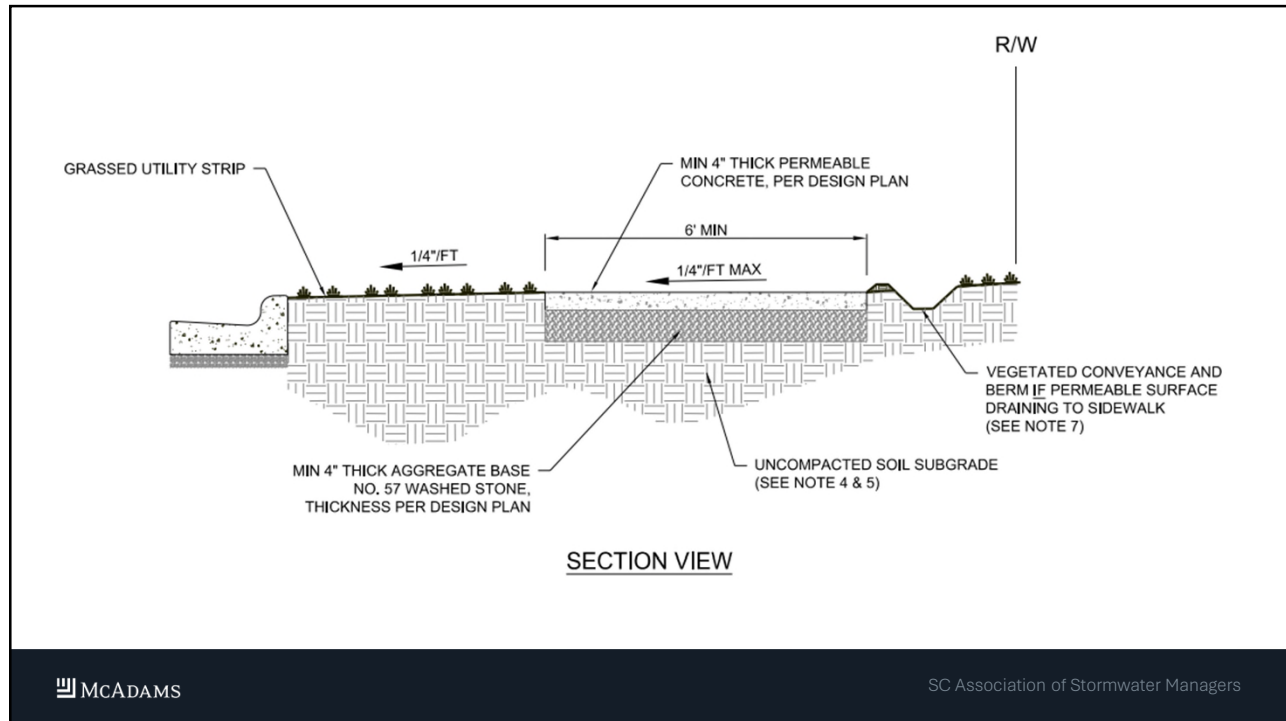


Southern Lowcountry Stormwater Design Manual

Bridge 2: Engineering Details

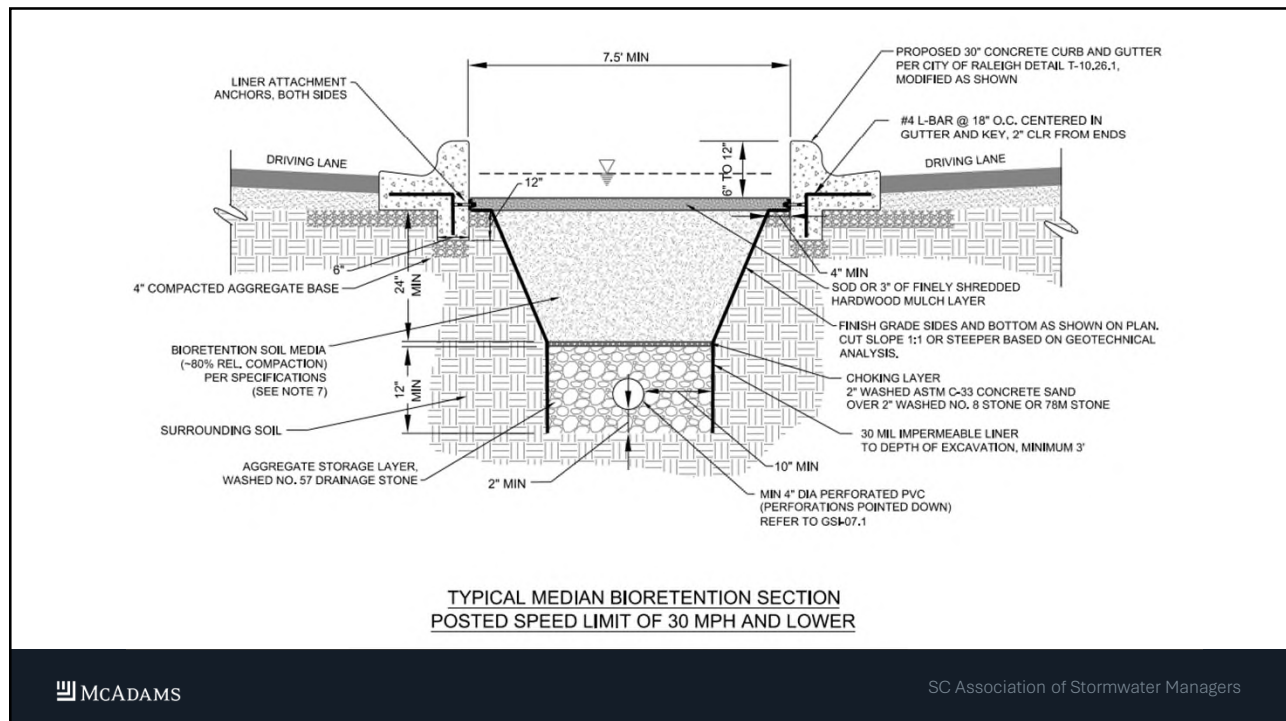


SW-20.28	Slope Terracing	pdf
SW-30.01	Curb-Side And Bump-Out Bioretention (For 30 MPH & Below)	pdf
SW-30.02.1	Median Bioretention (For 30 MPH and Below)	pdf
SW-30.02.2	Media Bioretention (For Above 30 MPH)	pdf
SW-30.03.1	Curb-Cut Inlet (Tapered Street Relief)	pdf
SW-30.03.2	Curb-Cut Inlet (Cast Iron Gate)	pdf
SW-30.04	Permeable Paver Parking Lane	pdf
SW-30.05	Permeable Concrete Sidewalk	pdf
SW-30.06.1	Green Infrastructure Example Configuration	pdf
SW-30.06.2	Green Infrastructure General Notes	pdf
SW-30.07.1	Underdrain Detail	pdf
SW-30.07.2	Underdrain Connection To Existing Infrastructure	pdf



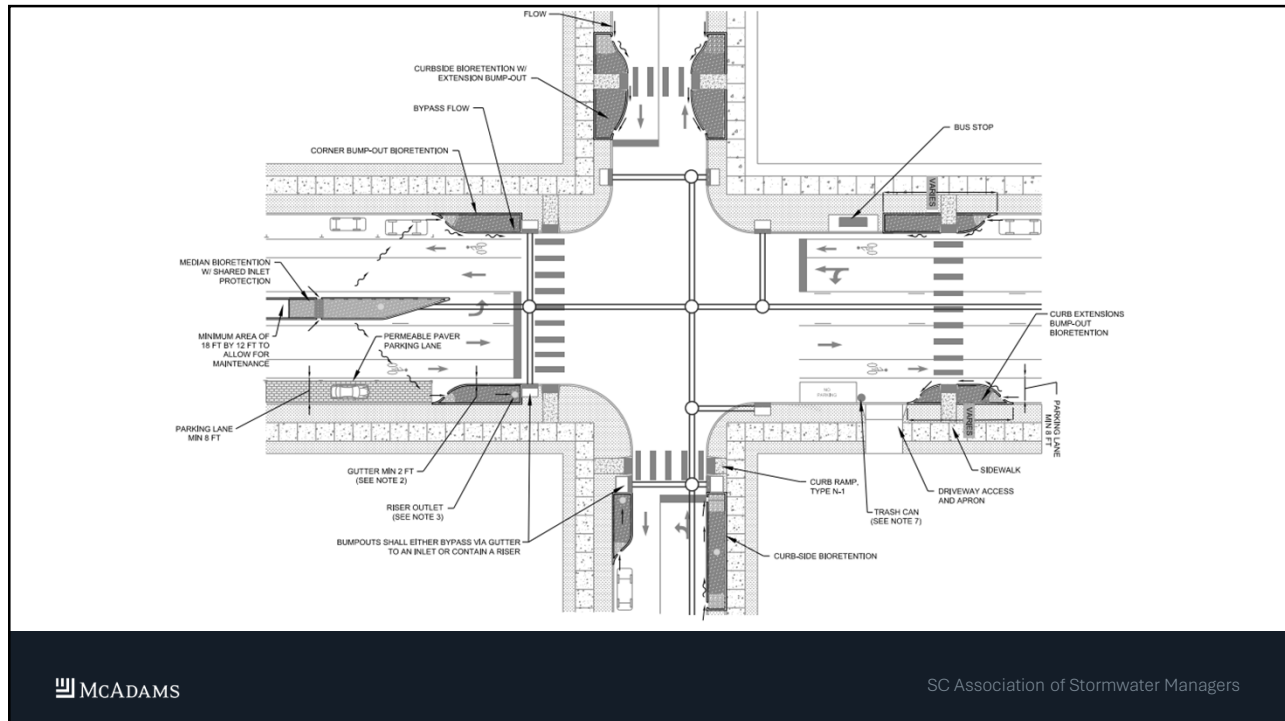
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Bridge 3: Incentives for GSI

A lot of possibilities



- | A faster review + permitting process
- | Higher density
- | Relaxed setbacks
- | Allowance to direct a reasonable amount runoff to vegetated areas in lieu of an SCM
- | Utility fee credits
- | Recognition through an award program
- | Creating awareness of inherent incentives: fewer pipes, better appearance

Bridge 3: Incentives, continued

Currituck County, NC, continued

Treat 1.5" storm using GSI, AND match peak flow from the 5-yr storm to the 2-yr storm



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Match peak flow from the 10-yr storm post-development to the 2-yr storm



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Bridge 4: Requiring GSI

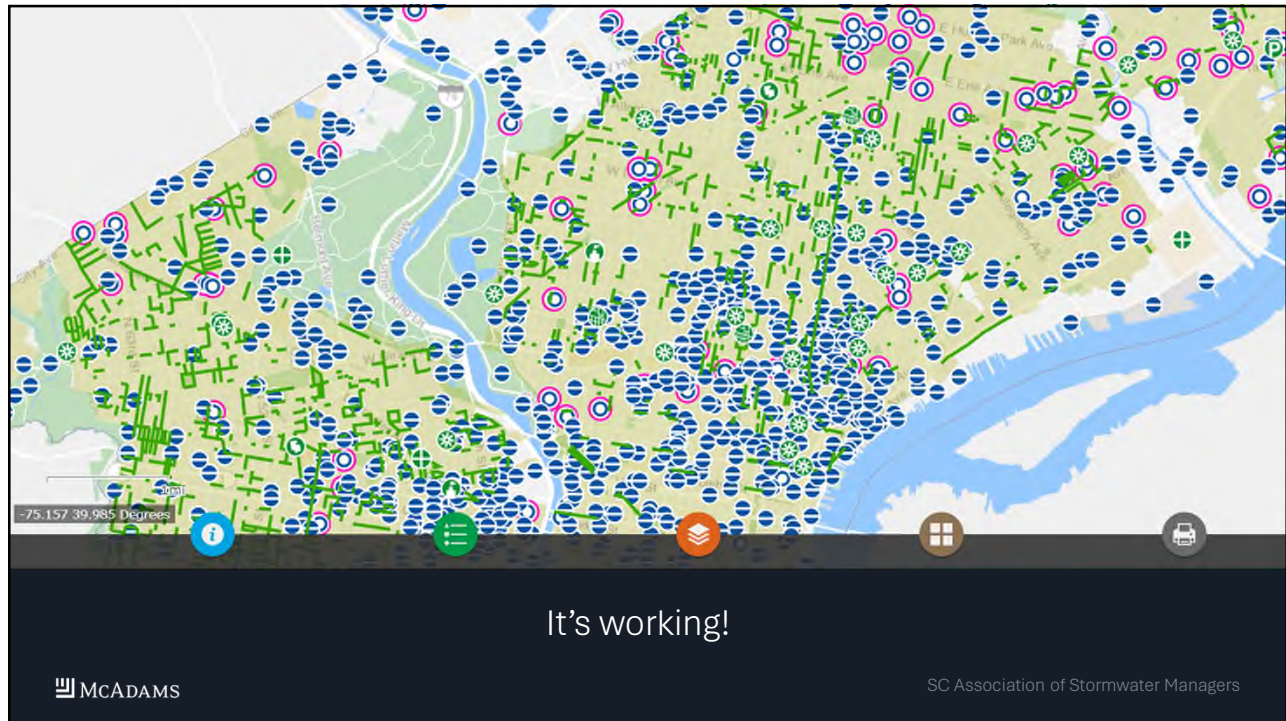
Philadelphia Green City, Clean Waters Program

- | >15,000 sq ft of impervious surface – infiltrate 1.5" of runoff from all directly connected impervious area (DCIA)
- | Another SCM may only be used where infiltration is not feasible, or infiltration would cause property or environmental damage

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Photo credit: Terrain





Catalyst 5: Updating Parking Lot Stds

- | Stalls that flow to vegetated areas, not to inlets
- | Permeable pavement stalls
- | Innies and not outies



Let's not require parking lots to be designed
for the 25-year shopping event!



Introduction

Regulatory Bridges

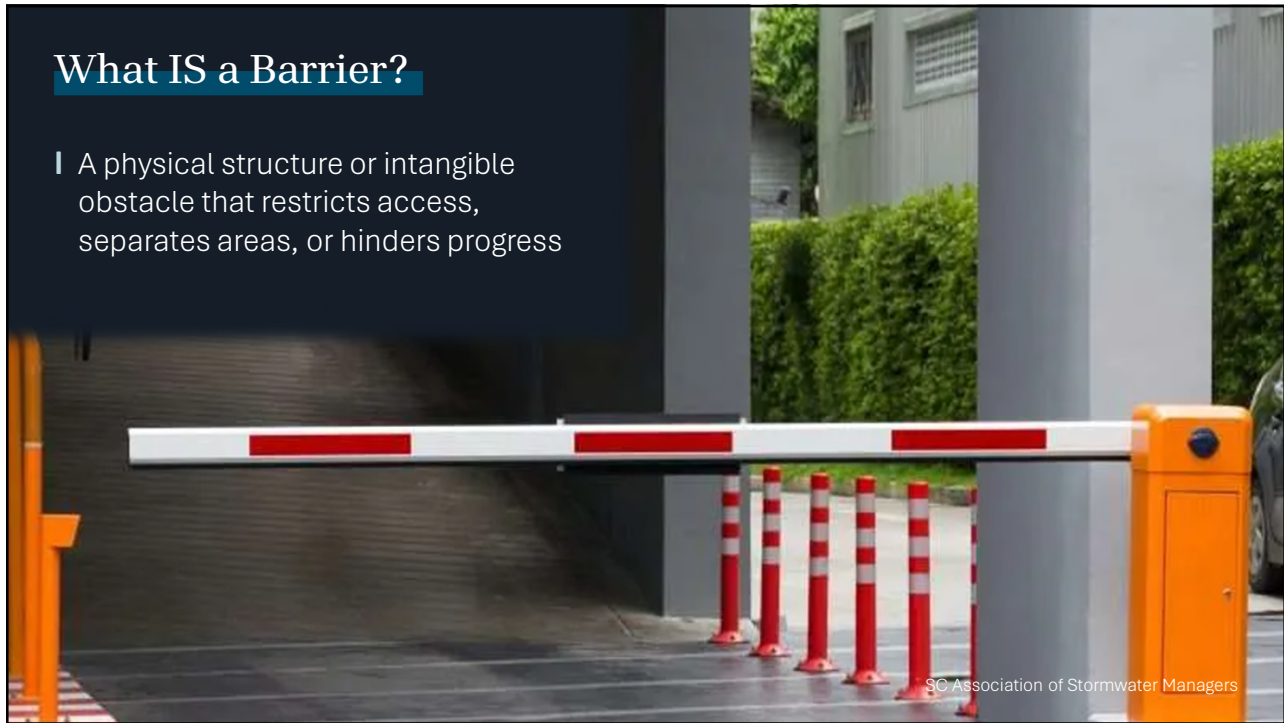
Regulatory Barriers

Conclusion

Regulatory Barriers

What IS a Barrier?

- I A physical structure or intangible obstacle that restricts access, separates areas, or hinders progress



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Barrier 1: What is GSI?

Green stormwater infrastructure (GSI) refers to the **idea** of using nature-based and neighborhood-sensitive solutions designed to manage stormwater ... by mimicking natural hydrologic processes. Rather than relying solely on traditional "gray" infrastructure such as pipes and concrete channels, GSI incorporates features like rain gardens, permeable pavement systems, infiltration trenches, filter strips, urban canopy establishment, constructed wetlands, and bioretention areas. These practices are integrated into streetscapes, parks, and open spaces to capture, filter, and absorb stormwater runoff at its source.

- A tree becomes green stormwater infrastructure if it is used to intercept rainfall
- A planted mulched island is green stormwater infrastructure if its depressed

- I It is much easier to point to a pipe or culvert or pond rather than a design philosophy.



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Barrier 2: Cross Departmental Regulation



- | Other department regulations can sometimes impose unnecessary costs or requirements on stormwater measures.
- | Many times this is a remanent of older regulations that need updating.

a. Utility facilities in residential areas or adjoining residential uses shall maintain residential setbacks, be fenced (unless totally enclosed within a structure), and either be screened from view or designed to have a residential appearance (UDO 5.3.3.M.1). If screening option is used, the standards of UDO 9.7 apply.

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Stormwater Contortionist

Development Design Standards



One of the wonderful benefits of Green Infrastructure is that we can make aesthetic and functional use out of spaces not used by others

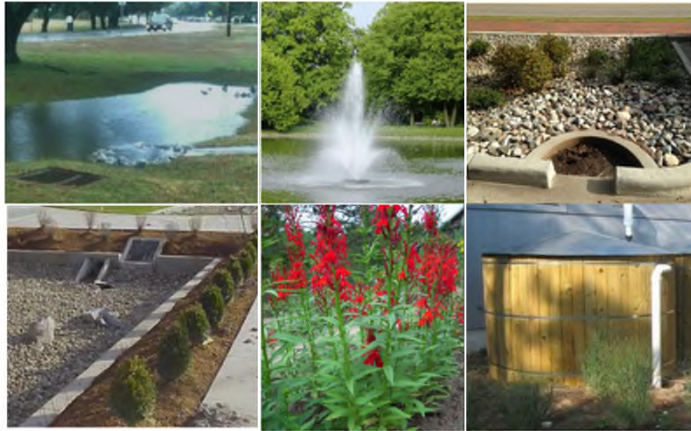


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Barrier 3: Literal Adherence

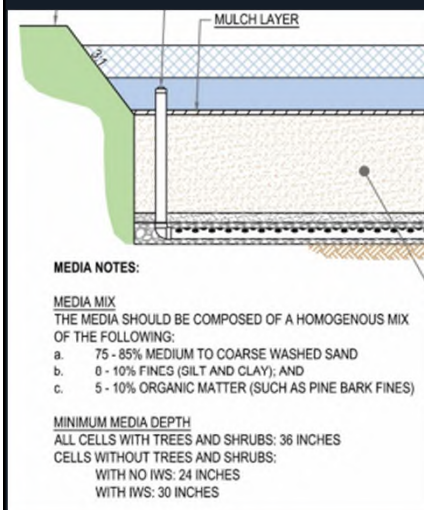
C-0. Minimum Design Criteria for all SCMs



I Sometimes providing base level design standards can prevent the design and use of better measures when conditions are not ideal

Barrier 3: Literal Adherence

Development Design Standards



I Required Minimum Depths

- For media-based measures sometimes lack of fall does not allow for the full depth of media within measures

I Groundwater Interactions

- Some measures are inherently disallowed in whole geographies due to interpretations of applicability

BIORETENTION MDC 1. SEPARATION FROM THE SHWT.

The lowest point of the bioretention cell shall be a minimum of two feet above the SHWT. However, the separation may be reduced to no less than one foot if the applicant provides a hydrogeologic evaluation prepared by a licensed professional.

The separation from the seasonal high water table is needed to ensure that the media does not become saturated and unable to function effectively. See Part A-2 for more information about conducting soil tests for SCMs.

Barrier 4: Strict Constructionism

Unless it says you can, then you cannot

BIORETENTION MDC 10: PLANTING PLAN.

For bioretention cells with vegetation other than sod, the planting plan shall be designed to achieve a minimum of 75 percent plant coverage at five years after planting. The maximum coverage with tree or shrub canopy shall be 50 percent at five years after planting. If sod is used, then it shall be a non-clumping, deep-rooted species.

7.2.3 Requirements for Perimeter Buffers and Landscape Areas

(c) *Type C*

This buffer area is intended to function as an intermittent visual obstruction from the ground to a height of at least twenty (20) feet, and create the impression of spatial separation without eliminating visual contact between uses. Vegetative material within this buffer shall meet the following criteria:

1. Upper-story trees shall be planted at a density of three (3) trees for every one hundred (100) linear feet of buffer, with a maximum spacing of forty (40) feet between trees. Upper-story trees shall attain a height at maturity of no less than sixty (60) feet.
2. Understory or ornamental trees shall be planted at a density of five (5) trees for every one hundred (100) linear feet of buffer, with a maximum spacing of twenty-five (25) feet between trees. Understory or ornamental trees shall attain a height at maturity of no less than fifteen (15) feet.

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Barrier 4: Strict Constructionism

Unless it says you can, then you cannot

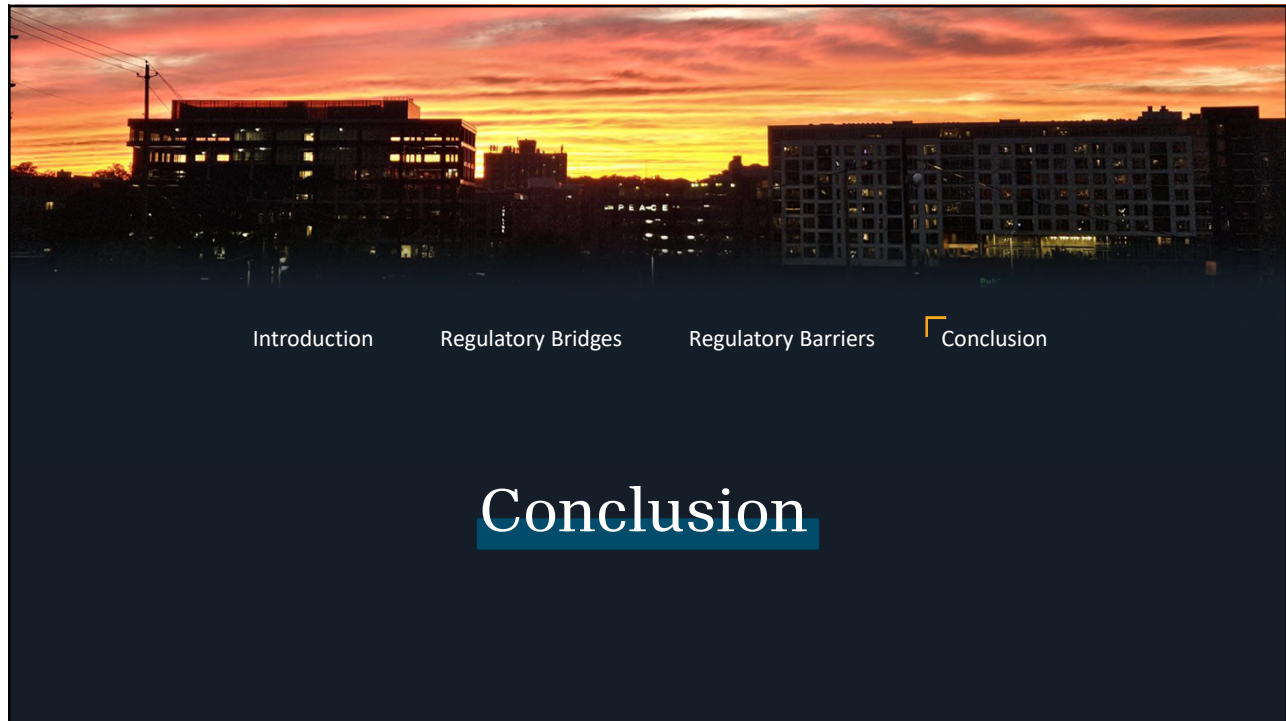


Pavement Cross Slopes

Normal crown for the pavement section shall be 0.02' per foot.

A desirable rate of superelevation should not exceed 0.04' per foot where required. Superelevation should not exceed 0.06' per foot. Superelevation is required along all collector streets and thoroughfares unless the horizontal curvature is large enough to support a normal crown. Tangent

- ! An inverted crown road slopes toward the centerline, creating a "V" shaped cross-section.
- ! This forces water to drain along the center of the road into drains, making it ideal for narrow alleys, residential streets.



Conclusion



I Bridges:

- Making it predictable
- Providing a starting place for design
- Providing financial or regulatory incentives
- Requiring it
- Greening our parking areas

I Barriers:

- Lack of a definition
- Conflicting regulations across departments
- Literal adherence to regulations
- Letting standard details become constrictions

I Fixing a barrier is a bridge!



N. Azalea Street Culvert Repair

McAdams Efforts to Date

INITIAL SITE VISIT

- | Site Investigation + Documentation
- | Scoping + Next Steps Discussions

PROPOSAL DELIVERY

- | Above- + Below-ground Surveying
- | Hydrologic + Hydraulic Analysis
- | Civil Construction Drawings

REGULATORY CONSULT

- | McAdams Wetlands Professional
- | United States Army Corps of Engineers (USACE)
- | Consensus of NWP 3 (non-PCN)



Photo: ClearWater Solutions (Oct. 2025)



Photo: ClearWater Solutions (Oct. 2025)

Barrier 4: Strict Constructionism

Unless it says you can, then you cannot

Pavement Cross Slopes

Normal crown for the pavement section shall be 0.02' per foot.

A desirable rate of superelevation should not exceed 0.04' per foot where required. Superelevation should not exceed 0.06' per foot. Superelevation is required along all collector streets and thoroughfares unless the horizontal curvature is large enough to support a normal crown. Tangent



- An inverted crown road (or reverse crown) is a road surface that slopes down toward the centerline, rather than away from it, creating a "V" shape in the cross-section. This design forces water to drain along the center of the road into drains, making it ideal for narrow alleys, residential streets, ...

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ASCE International LID Conference

Barrier 4: Permitting Tool Gymnastics

- Developers and Owners are alright to build it, if we are sure it will be acceptable and meet the need

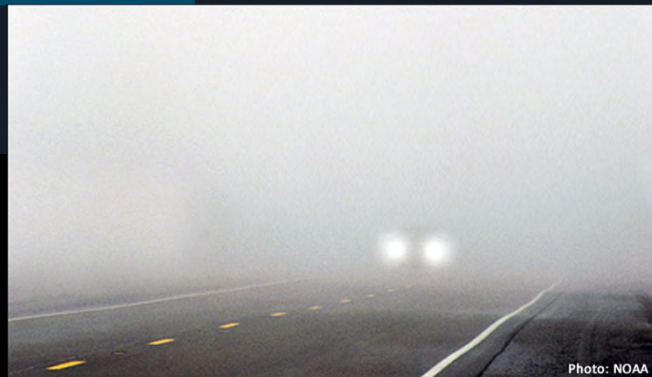


Photo: NOAA

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ASCE International LID Conference