Sustainable Stormwater Manual

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GUIDANCE FOR SUSTAINABLE STORMWATER DRAINAGE ON THE TEXAS COAST

FOR NONPOINT SOURCE POLLUTION & FLOOD MANAGEMENT

3RD EDITION

Document is available for download at **https://cleancoast.texas.gov/**.

Updated April 2021

Manual Vision and Goals

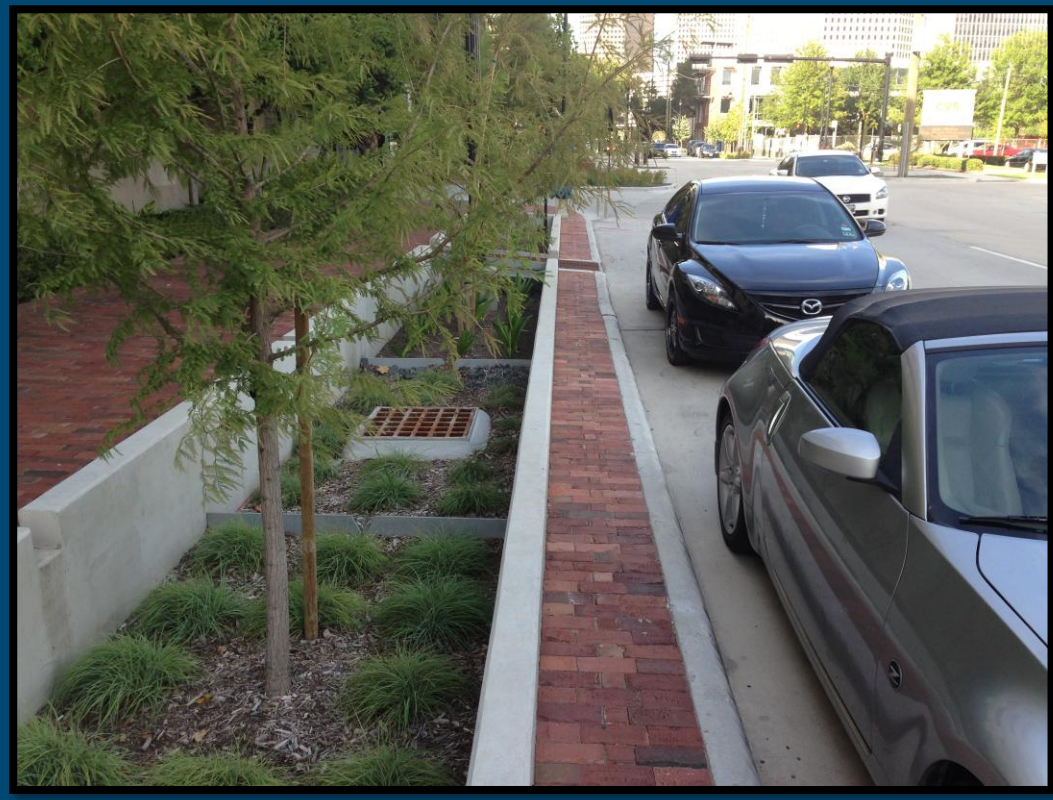
- **Preserve unique coastal water resources**
  - **Manage water quality from stormwater runoff (nonpoint source pollution)**
  - **Floodplain management**
  - **Shoreline restoration**

- **LID/Green Infrastructure guidance**
  - **Lower cost vs grey (for same benefit)**
  - **Incentivized approach**
  - **Resilient and sustainable**
  - **Attractive measures**

Manual Purpose

Provide tools and resources to local governments

- Technical design guidance
- Construction details
- Maintenance guidance
- Model criteria/ordinance
- Design method incentivizes LID/GI
- Retrofits and creek restoration



Can be adopted by local governments, either whole or in-part

Benefits of Sustainable Design

- **Environmental:**
- **Pollution abatement**
- **Habitat improvements**
- **Protection of downstream water resources**
  - Manage waterway erosion/shoreline loss
- **Groundwater recharge/water supplies/baseflow sustenance**
- **Ecosystem Services Preservation and Restoration**

Benefits of Sustainable Design

- **Land Value and Public Safety:**
- **Reduced downstream flooding and property damage**
- **Enhanced lot yield**
- **Aesthetic value**
- **Quality of Life**

Benefits of Sustainable Design

- **Economic:**
- **Sustain and enhance coastal tourism**
- **Seafood safety and production**
- **Saltwater recreational fishing**
- **Sediment Management**
- **Retrofit projects – employment, suppliers, materials**

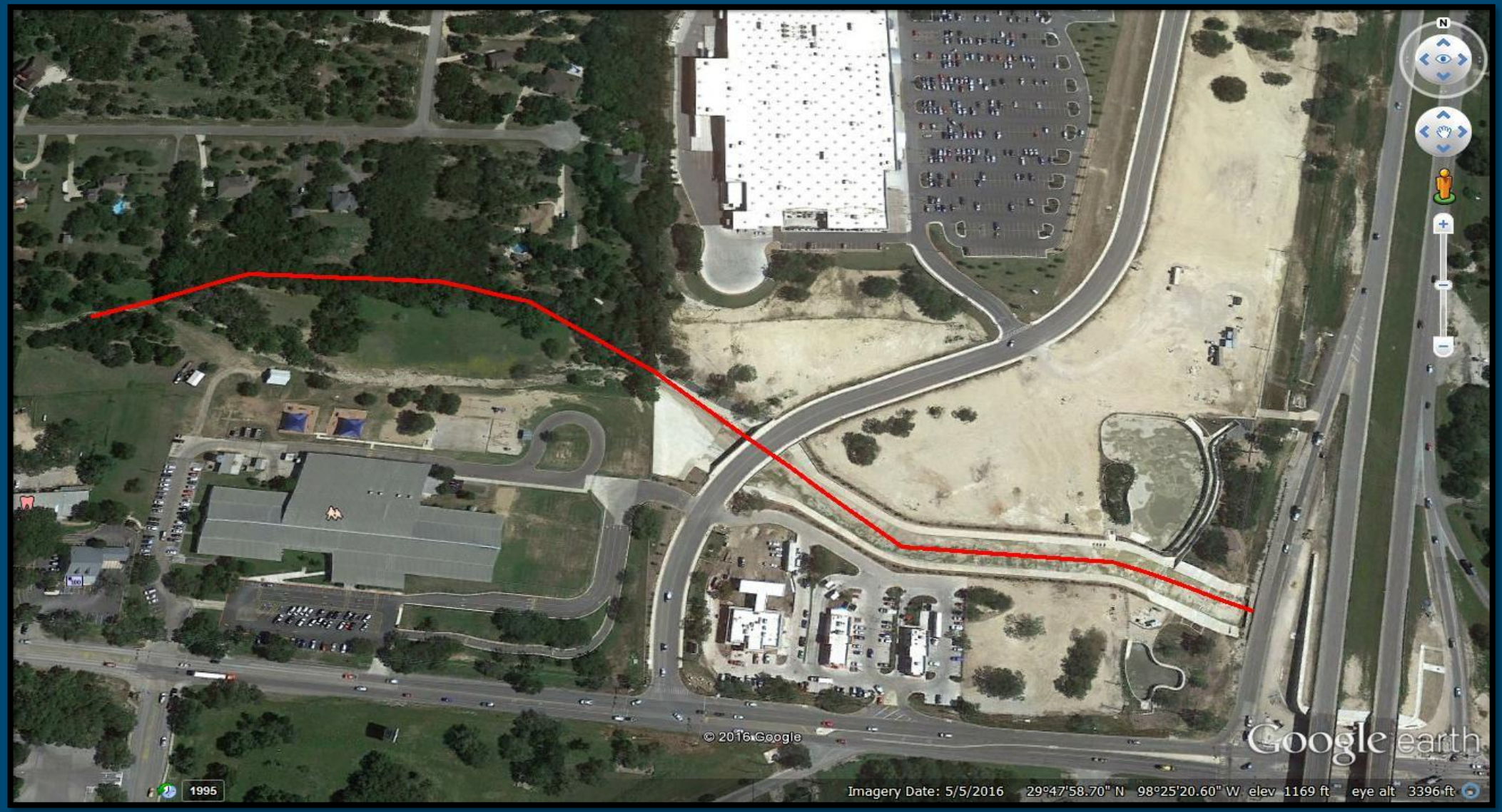
Manual Chapters

- Sustainable and resilient site design
- Construction phase erosion and sediment control practices
- Performance standards/design approach
  - Incentivized method for LID and GI implementation
- Structural Practices Design Criteria
- Retrofitting Existing Development
- Floodplain Management

Sustainable Site Design
(Preserve Natural Features – let it do the work)

- Site Assessment (soils, vegetation, topography, etc.)
- Wetlands (avoid mitigation costs and project delays)
- Floodplain preservation
- Establish buffer zones
- Conservation design
- Reduce impervious cover

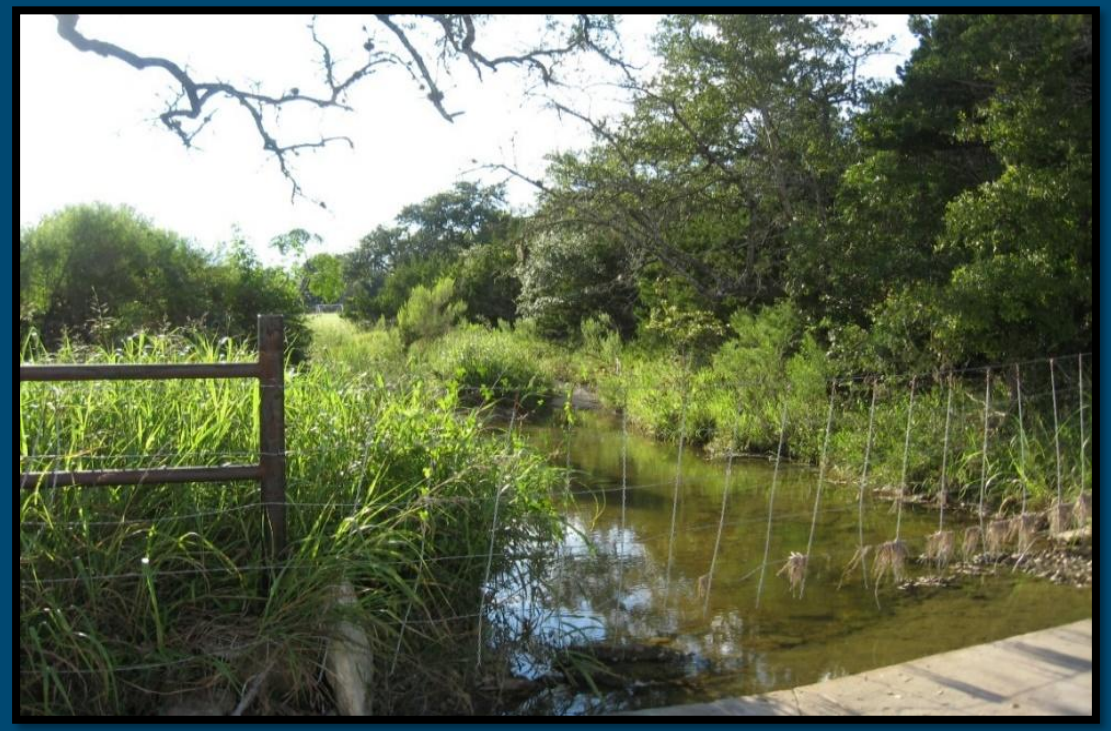
Why Buffer Zones Matter



Buffer zones

Tool to manage stormwater runoff pollution, reduce flood risk, and protect habitat

- **Not technically difficult**



Keep natural drainages and reduce constructed channels

Impervious cover runoff management = water quality, floodplain, and habitat protection

Streams can enlarge 2 to 7 times in unmanaged urban areas – potential future capital projects

Need – reduced runoff from streets and reduce <u>connected</u> impervious cover

Disconnect impervious cover
Water breaks, not parking lot islands

Retain runoff, no irrigation

No stormwater benefits - requires irrigation

Erosion And Sediment Control

- Suggested techniques to minimize erosion
  - Soils, vegetation, topography, etc.
- Temporary erosion and sediment control details
- Spill prevention and control
- Creek crossing guidance (likely problem areas)

Construction Runoff Tools

Construction phasing
Stabilize disturbed areas during grading
Sediment basins and top of water drawdown

Performance Standards – LID/GI Incentives

Stormwater Credits (Effective Impervious Cover (IC) Mgmt)

- Rainwater harvesting (reduce IC up to 75%)
- Rain gardens (aid in roof-top disconnection, reduce roof IC up to 90%)
- Porous pavement (reduce IC by 90%)
- Conservation landscaping (reduce IC by 5%)
- Vegetated swales (reduce IC by 20%)
- Vegetated filter strips (reduce IC by 50%)

If Effective IC < 20%, water quality measures may not be necessary

LID is an integrated site planning and stormwater management design process, not a BMP

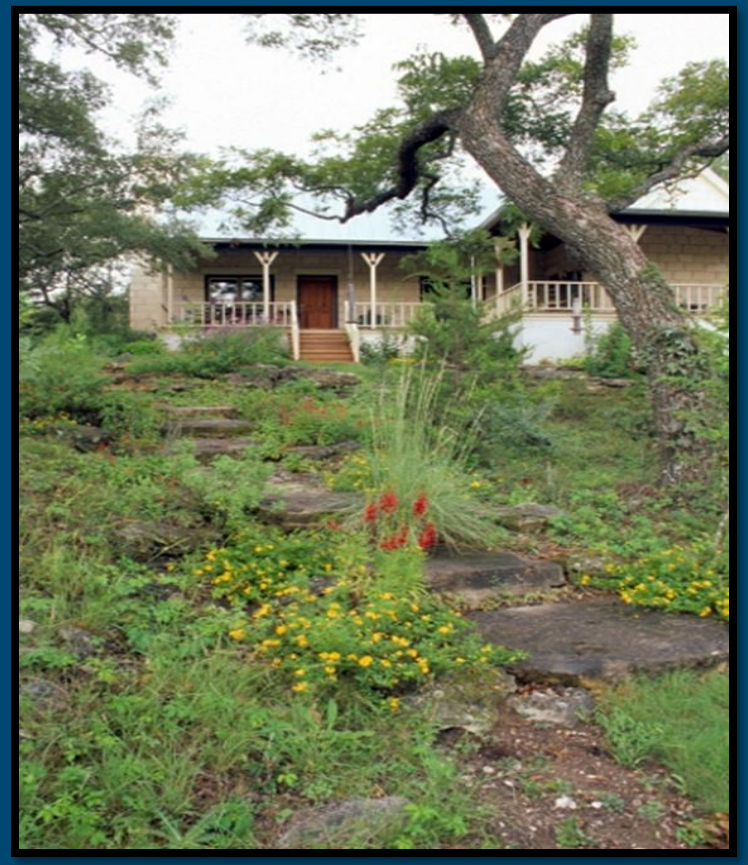
Runoff - Slow it, spread it, soak it, sink it, save it

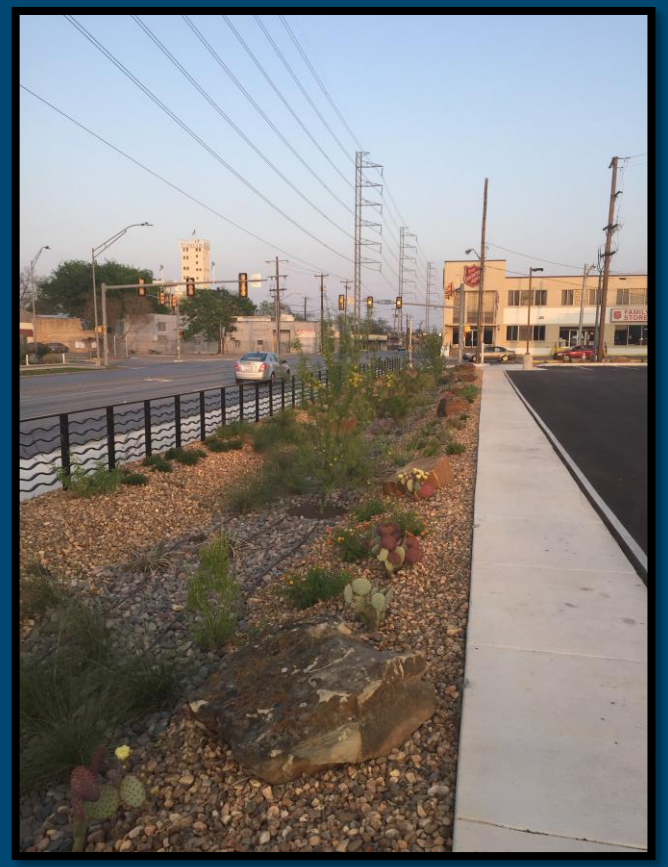
Stormwater Credit Approach

Maintain Existing Flow Path Travel Time

Maximize sheet flow and grass channels
Curb cuts instead of inlets and storm drains
Slow the flow manages flooding too if sized properly!

LID/GI Measures (Stormwater management and water supply)





Conservation landscaping with Native Plants

"Everyday benefits through water demand reduction"

More Water Supply/Water Quality Measures

Rainwater harvesting that uses rainwater to flush indoor toilets

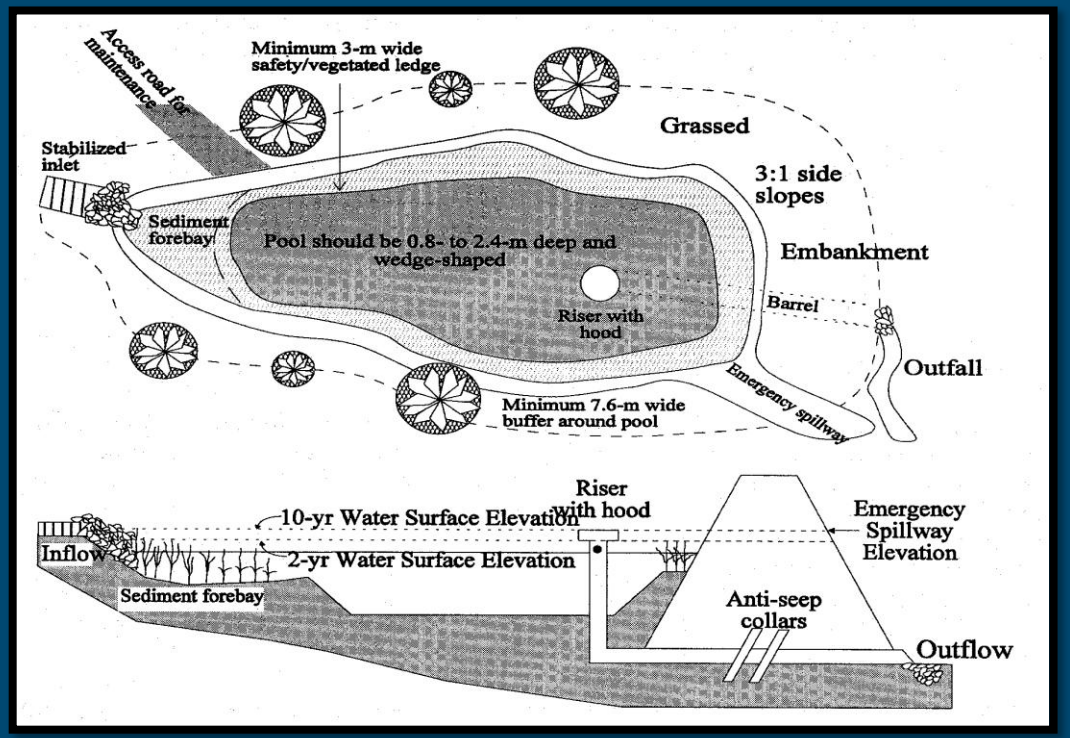
Aquatic Center permeable pavement parking lot

Structural Practices Design Criteria

- **Design guidelines that illustrate:**
- **Siting requirements**
- **Safety considerations**
- **Stabilization and vegetation requirements**
- **Construction phase runoff**
- **Maintenance requirements**

Structural Practices

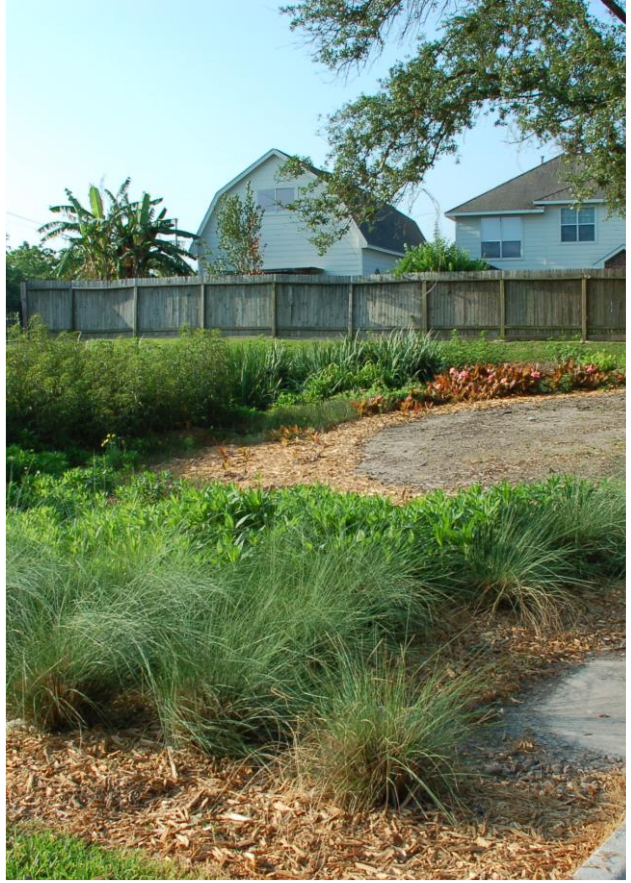
- Vegetated swales and filter strips
- Porous pavement
- Enhanced detention/wetlands
- Bioretention/infiltration
- Rainwater harvesting/storage
- Rooftop runoff disconnection



Retrofitting

- Manage runoff from existing impervious areas/hot spots
- Improve water quality at the receiving waterway
- Natural channel design and waterway restoration to stabilize eroding banks and enhance habitat
- Flood mitigation
- Shoreline stabilization
- Solve Nuisance Drainage Issues

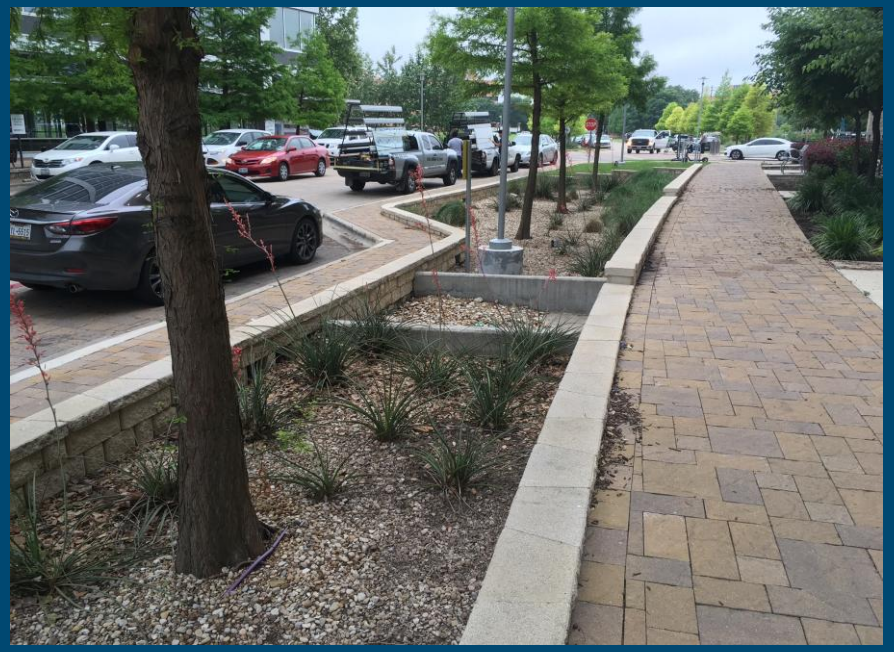





Photos courtesy Texas Community Watershed Partners

Retrofit Locations

From parking lots to neighborhood open space



Developed or downtown areas

Rainwater harvesting, pervious pavers, bioretention basins, roadside median bioswales, manufactured systems

Stormwater Management Model Ordinance

- Permit procedures and requirements
- Waivers to requirements
- Performance criteria for stormwater management
- Requirements for plan approval
- Maintenance requirements and enforcement

Can be adopted in whole or in-part, support provided by Clean Coast Texas

Sustainable Stormwater Manual

- Resource for local governments to:
  - Manage stormwater runoff and flooding from new and existing development
  - Enhance water quality
  - Protect habitat
  - Restore waterways
- Provides method to maximize use of LID and GI in new development while helping developers reduce costs and enhance appearance
- Takes long-term view with maintenance in mind
- Help local governments manage future capital costs
- Protects against sea level rise

Questions

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