

# GREEN INFRASTRUCTURE

... harnessing nature's processes for flood resilient communities

TEXAS A&M  
AGRI LIFE  
EXTENSION



Green infrastructure (GI) is an approach to managing stormwater and mitigating flooding to build a community's resilience. The solutions include protecting natural areas or integrating green with concrete gray infrastructure that provide services like storing stormwater runoff.

Stormwater is often viewed as a nuisance. Traditionally, managing flood volume has been separate from treating water quality<sup>1</sup>. GI practices can address both. For example, undeveloped areas with native vegetation can trap and slow runoff, allowing it to seep into the soil where heavy metals and excess nutrients are removed. Having more impervious surfaces like this protects our communities from flooding while improving water quality.

GI can be used as an innovative tool to offset the runoff from developed areas, while offering benefits for all—beyond just water management. Solutions may center on managing flood water but projects offer many other benefits including opportunity for recreation and healthier lifestyles, higher property values, improved aesthetics, habitat for wildlife. Integrating GI within our communities can enhance our way of life.

## TYPES OF GREEN INFRASTRUCTURE

GI can be protected where it currently exists, constructed where it is lacking, or retrofitted into the gray infrastructure system. No matter the budget or size of a site, there are GI solutions for every type of project.

### *Preservation, Restoration, Conservation.....*

In its simplest form, GI is preserving existing natural areas and open spaces. These methods identify the most ecologically valuable areas and help to maintain and restore their productivity.



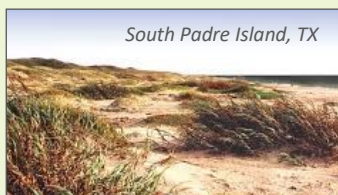
Katy, TX

◇ Restoring two acres of native prairie where a 500 acre expanse once existed. These small pockets of prairies support important

pollinators, offset urban heat island effects, and provide flood water detention.

◇ Removing a dam to restore historic stream flows and habitat for native fishes. The banks are re-vegetated with native plants to reduce erosion and are maintained by removing invasive species.

◇ Defending against coastal storm surge by conserving natural sand dunes. Public access is limited to



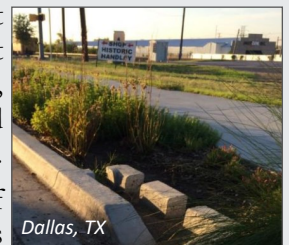
South Padre Island, TX

narrow foot paths to protect the fragile habitat. Native vegetation helps trap sand and regenerate the dunes while still providing opportunity for recreation and ecotourism.

### *Constructed, Reconstructed, Retrofitting.....*

Alternately, GI can be engineered to mimic natural processes to manage stormwater. These practices integrate natural features within developed areas using new GI construction or by reconstructing current infrastructure to include GI.

◇ Installing a native plant rain garden in a street median to capture runoff, improve water quality and beautify the neighborhood.



Dallas, TX

◇ Designing a network of parks and green corridors to collect and clean stormwater runoff, facilitate movement of the community along porous pavement walking trails, and offer education about stormwater management.

◇ Developing conservation subdivisions with smaller property lots that are grouped together, leaving 50% of the neighborhood undeveloped as public green space.



<sup>1</sup> National Parks and Recreation Association. Green Infrastructure and Health Policy Scan Summary.

# GREEN INFRASTRUCTURE ACROSS TEXAS

*... harnessing nature's processes for flood resilient communities*

## PRESERVATION, CONSERVATION, RESTORATION

### A Network of Open Space in El Paso



With a comprehensive Open Space Plan, El Paso is working to become a “city in unique harmony with its natural setting.” The City envisions a network of parks and natural areas connected by trails that follow the arroyos and drainage features. The plan emphasizes balancing development with preservation. The community’s input reflected their pride in protecting El Paso’s rugged, native habitats and how these areas improve the overall quality of life.

### San Antonio Pays to Protect Distant Lands



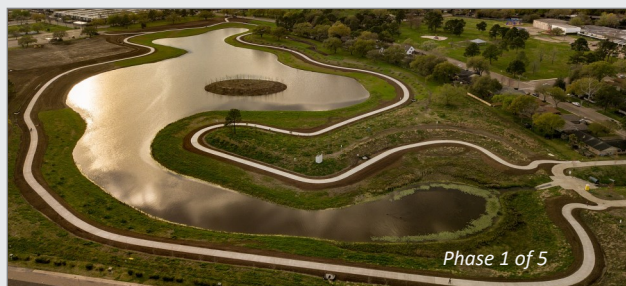
Residents of San Antonio rely heavily on the Edwards Aquifer laying beneath their city for drinking water. The aquifer, however, relies on clean water runoff from areas located well outside the city. If contaminated, the feasibility and cost of clean up would be near impossible. To protect this irreplaceable resource, the people of San Antonio pay a higher sales tax to fund preservation of distant lands laying above the contributing and recharge zones.



## CONSTRUCTED, RECONSTRUCTED, RETROFITTED

### From Golf Course to Flood Control

Once a former golf course, Exploration Green is becoming a complex of five stormwater wetlands serving the community with flood mitigation and outstanding recreational amenities. The constructed wetlands not only slow stormwater but also remove pollutants and beautify the public green space. The timeline for completion was expedited after the park’s value was demonstrated during the record-breaking Hurricane Harvey of 2017.



### GI on the Streets in Deep Ellum, Dallas

The Elm Street Streetscape project widened sidewalks and narrowed streets to increase pedestrian safety. Integrated GI has beautified the area and improved the public realm experience.

GI practices included permeable pavements, bioretention and infiltration and rain gardens using native and adapted species. The significant increase of vegetation in a previously hardscaped area also improves air quality in this heavily congested area.

