

Recommendations for improving stormwater management in San Antonio using green infrastructure

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Promoting Green Infrastructure within the Unified Development Code

- What is green infrastructure (GI) and what are its benefits?
- How is stormwater currently managed in San Antonio?
- How can its management be improved?
- What is the Unified Development Code (UDC) and how can it be modified to meet community goals and improve resilience?

Green infrastructure (GI) Definitions

- Clean Water Act - range of measures that use plant or soil systems, permeable surfaces or substrates, stormwater harvest and reuse, or landscaping to store, infiltrate and reduce flows to surface waters.
- Wikipedia - a network providing “ingredients” for solving urban and climatic challenges by building with nature.
- Nature-based solutions, Sustainable urban stormwater systems and Low Impact Development (LID) are types of GI.



Rain garden



Green roof



Permeable pavement



Infiltration trench



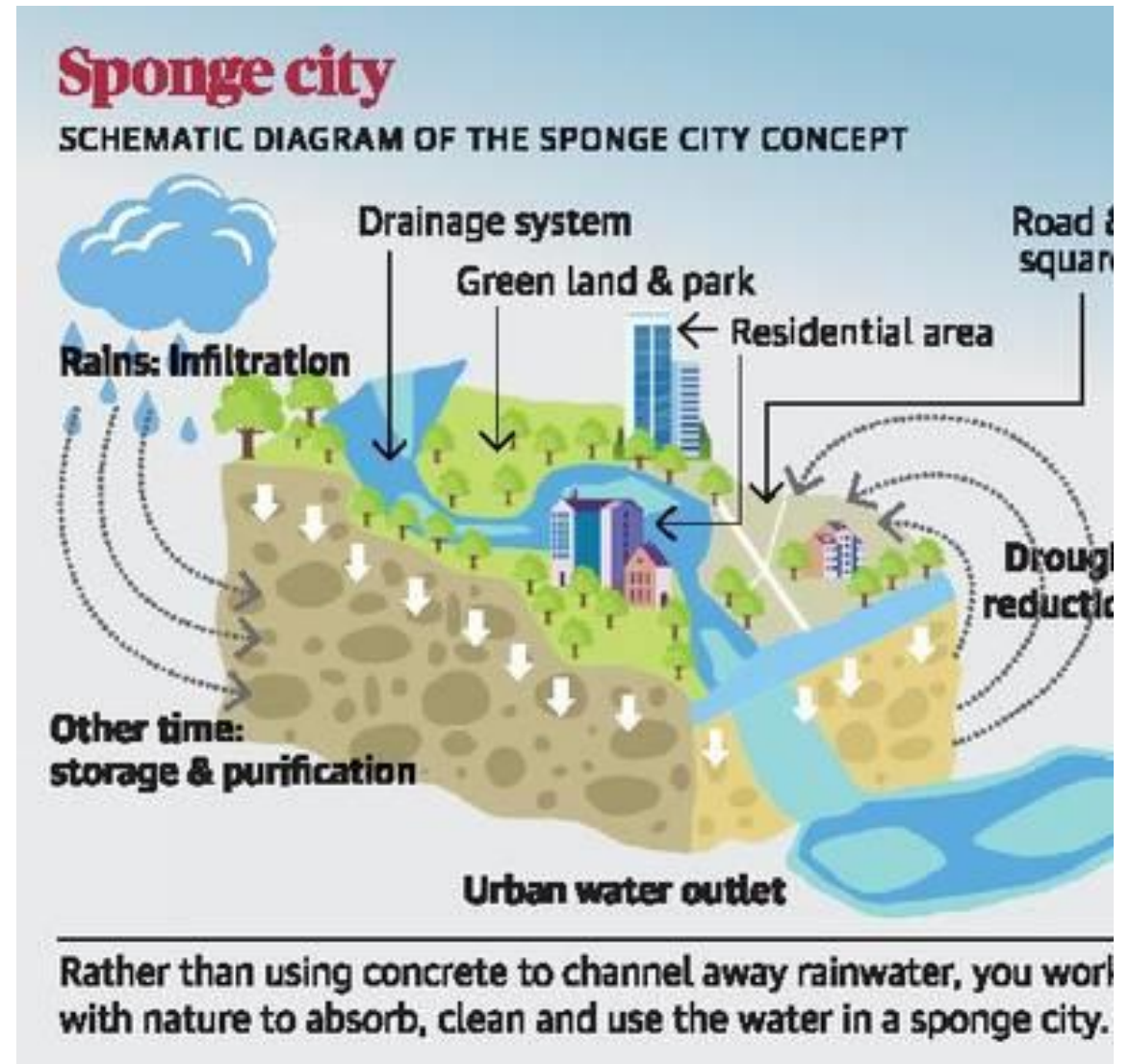
Landscape water body



Grassed swale

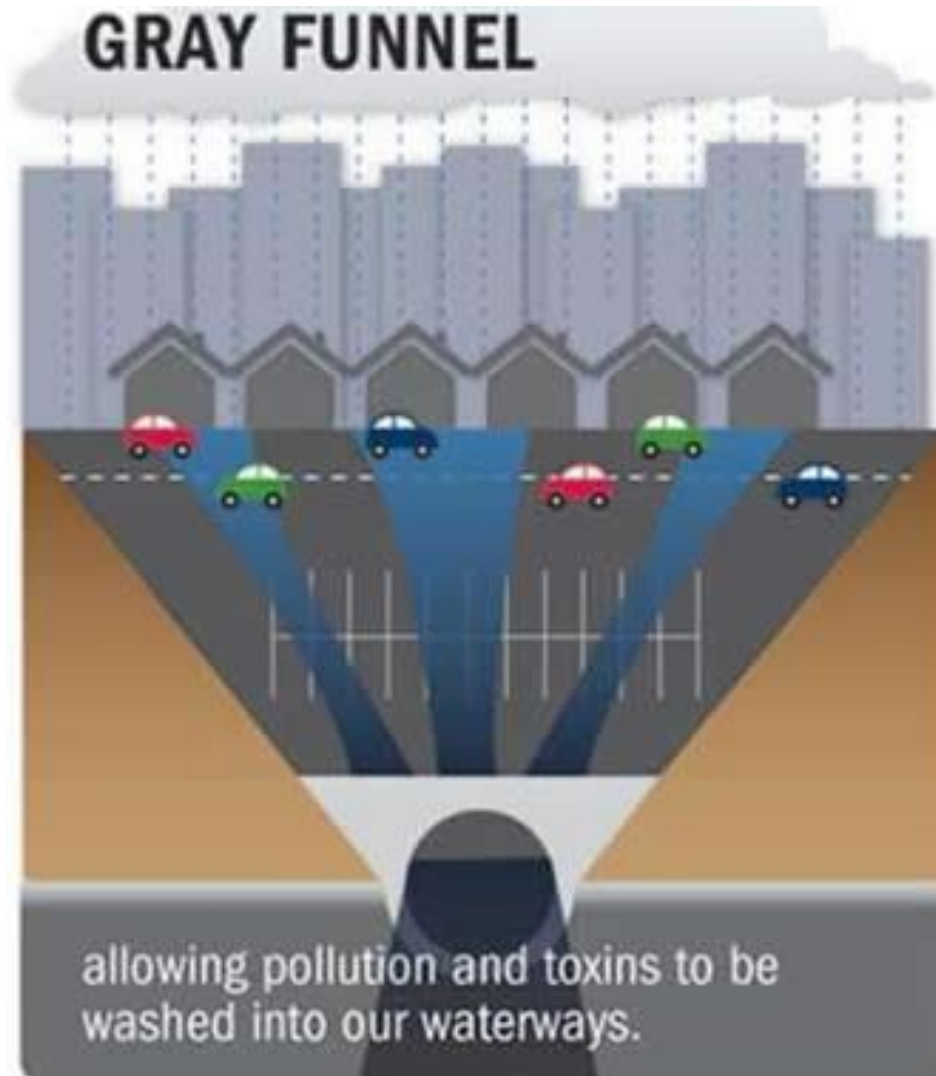
Increasing the use of GI for managing stormwater

- Improves air and water quality,
- Reduces floods and the need for flood control projects,
- Recharges aquifers and groundwater,
- Maintains stream and rivers flows along with increased biodiversity,
- Reduces irrigation needs,
- Reduces heat stress,
- Improves public health,
- Provides climate resilience, recreational opportunities and community cohesiveness.



- Since our stormwater management uses the gray funnel model.....
- By the time stormwater is collected, there is too much water going too fast to control with green infrastructure.
- **An alternative approach is recommended.**

Currently our stormwater is managed with the gray funnel model



Our flood control projects exacerbate flash flooding in creeks, increase summer temperatures and can disrupt neighborhoods.

- These “improved” channels empty into “natural” creeks or rivers.
- There is no way a “natural” creek or river can receive this amount of stormwater without loss of ecological integrity, bank stability, water quality, healthy aquatic ecosystems, flooding resiliency, etc.
- And the trash continues to flow as debris catchments are not included.



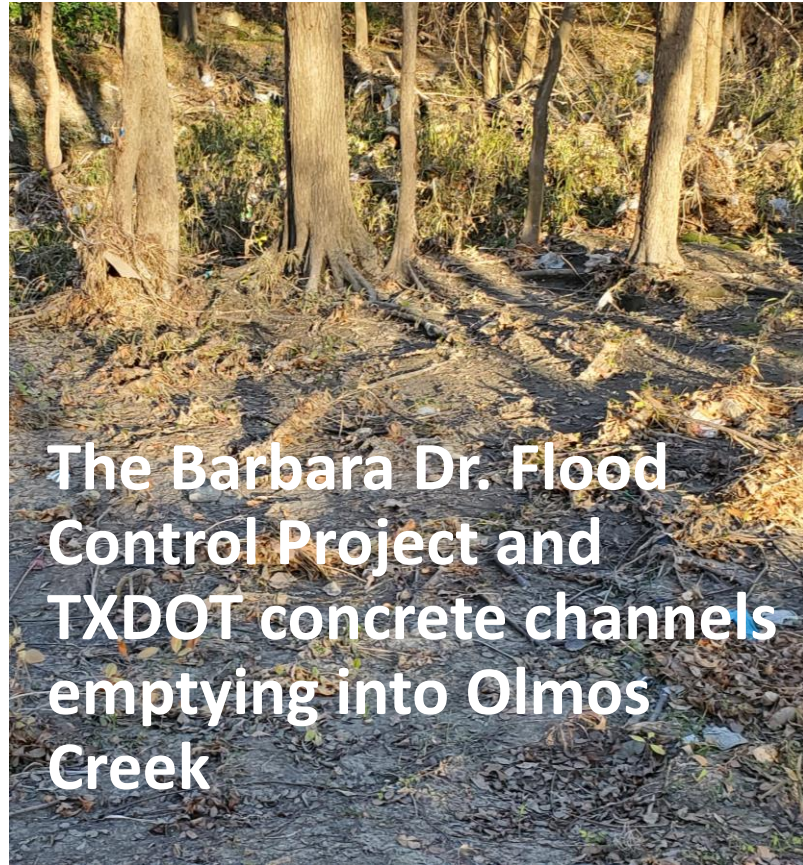
Barbara Drive Drainage project; does not contain a debris collection point or use natural channel design, thus exacerbating the existing negative impact to Olmos Creek.



Google



These 2 concrete channeled streams will drain directly into the "natural" floodplain of Olmos creek



The Barbara Dr. Flood Control Project and TXDOT concrete channels emptying into Olmos Creek



The Ira Lee Flood Control Project emptying into Salado Creek

Discharge damage to “natural” floodplains

The UDC is not the only solution, retrofits and restoration will also be required, but that is another story



<https://www.ycic.org/single-post/2016/10/19/urban-stream-restoration-cost-effective>



Daylighting a stream

To slow the water down so more GI can be used and to reduce the need for massive flood control projects, a watershed approach is recommended



Conventional infrastructure with centralized stormwater facilities



Green infrastructure with distributed stormwater facilities

The watershed approach allows commercial sites and neighborhoods to be constructed or retrofitted with appropriately scaled green infrastructure, enhancing quality of life within communities; cooling temperatures and storing more soil water and carbon.

An aerial, high-angle photograph of a city street intersection at night. The scene is illuminated by streetlights and the lights of buildings, creating a vibrant urban atmosphere. Light trails from moving vehicles are visible, particularly a prominent yellow taxi in the lower right. The buildings are modern, with many windows lit up. The text is overlaid in the center of the image.

The Unified Development Code directs new development and here are some recommendations. Will you help to make these changes happen?

Stormwater Mgt	Current	Proposed
	No water quality regulations are required, runoff from parking lots, streets, etc. can be discharged directly into a drainage channels and creeks.	Required water quality features for new development will remove pollutants and sediment and reduce stormwater runoff.
Floodplain Mgt	If calculations show no increase in elevation, the project can pay a fee-in-lieu-of vs detaining stormwater on site.	New developments will be required to detain stormwater on site equal to a 25 yr event.
	Current	Proposed
	Only water elevation is regulated ~ 2,000 ft downstream from a project.	Rules to slow the discharge will be added to enable more GI usage and protect our streams; their water, banks and vegetation.
Park Dedication	Floodplain development permits are still issued, ~256 in 2017.	No new permits will be issued allowing reclamation of or building in floodplains.
	Current	Proposed
	Club houses and swimming pools can be used to meet park dedication requirements.	At least 60% of park dedication must be green space.



In summary, GI provides multiple infiltration locations; reduces runoff and ensures the most polluted portion of stormwater is filtered before entering our creeks and rivers. These benefits are called ecosystem services.

