XVI World Water Congress
International Water Resources Association (IWRA)
Cancun, Quintana Roo. Mexico. 29 May- 3 June, 2017

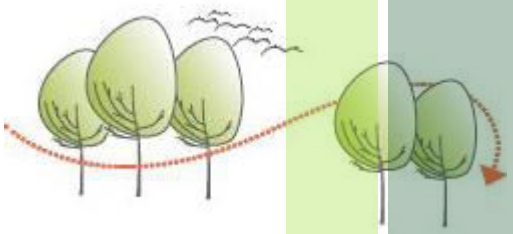
URBAN GREEN INFRASTRUCTURE

An initiative for the US-Mex Border Region

"resiliency and competitiveness for cities in the border between méxico and the united states"

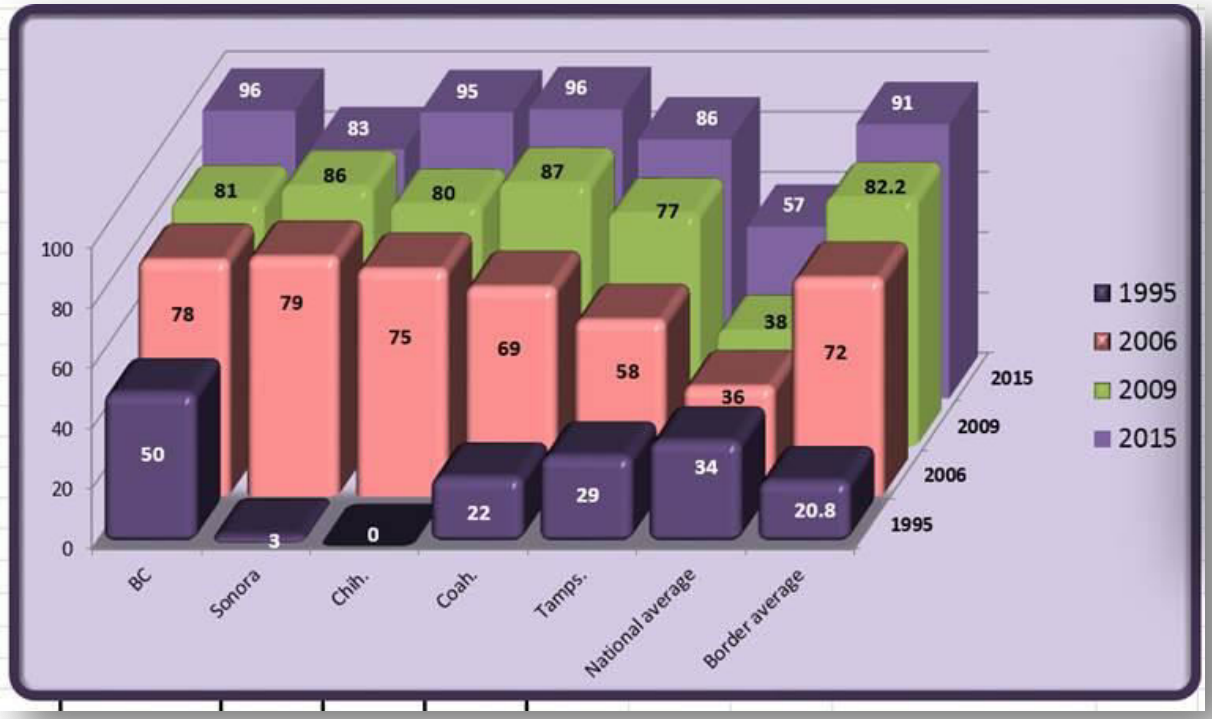
BORDER ENVIRONMENT COOPERATION COMMISSION

Maria Elena Giner
General Manager



water public space mobility biodiversity

- ✓ Mexican border population with wastewater treatment from 21% in 1995 to over 90% in 2012.
- ✓ The elimination of 450 MGD of untreated wastewater flowing into shared water bodies.
- ✓ Growth of 50% in population while increasing its urban footprint by 4 times, decreasing infiltration, and significantly increasing runoff.
- ✓ The key issue to water quality is the threat of stormwater and its impacts of flooding.
- ✓ Stormwater carries sediments and other pollutants that flow into binational rivers contributing to the pollution of potable water sources.



Source: CONAGUA (2016), "Situación del Subsector Agua Potable, Drenaje y Saneamiento. Edición 2016" Cuadro 2.1 pág. 29 y Cuadro 3.12 pág. 77 / and BECC calculations 2017.

context

PROBLEMS

FLOODING

PROBLEMS

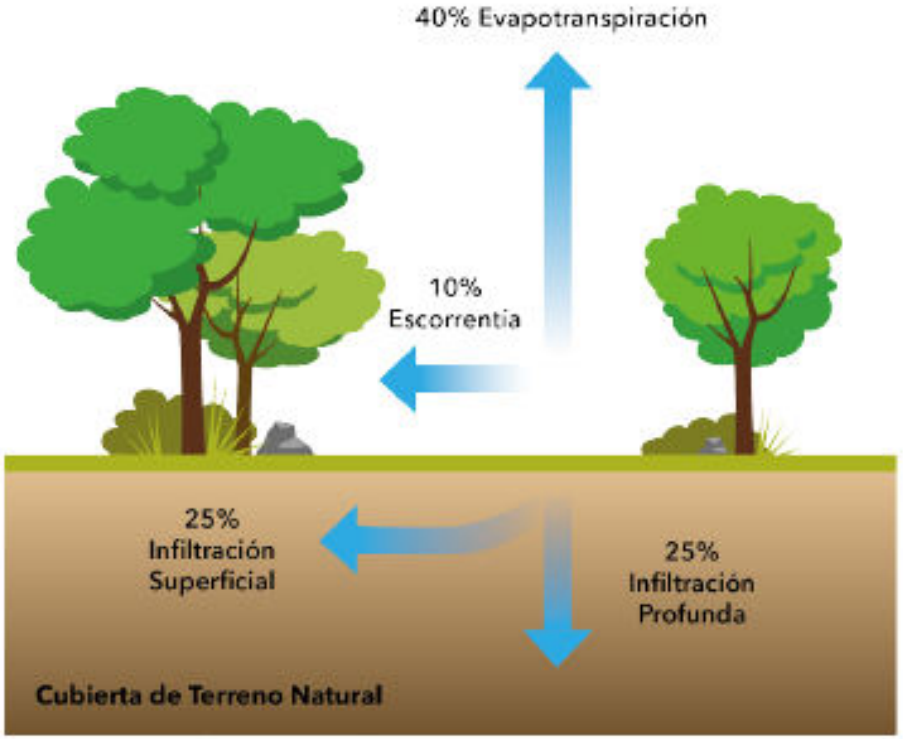
AIR QUALITY

Provide local border communities with a comprehensive strategic model for the integration of **GREEN INFRASTRUCTURE**(GI) in their urban planning, as a means to mitigate the environmental, economic, and social impacts of inadequate stormwater management

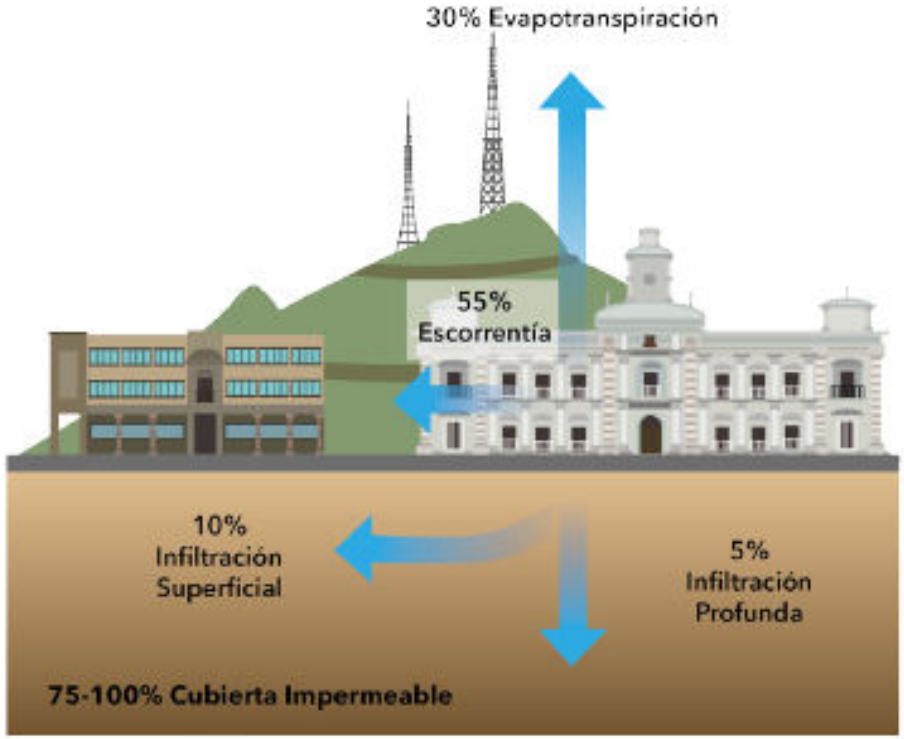
purpose

RELEVANCY IN THE **URBAN** CONTEXT

Natural environment



Urban environment



¿How does STORMWATER HARVESTING link with watershed health?

Green infrastructure

Green infrastructure uses plants, soils, and nature itself to manage stormwater and create healthier urban environments.

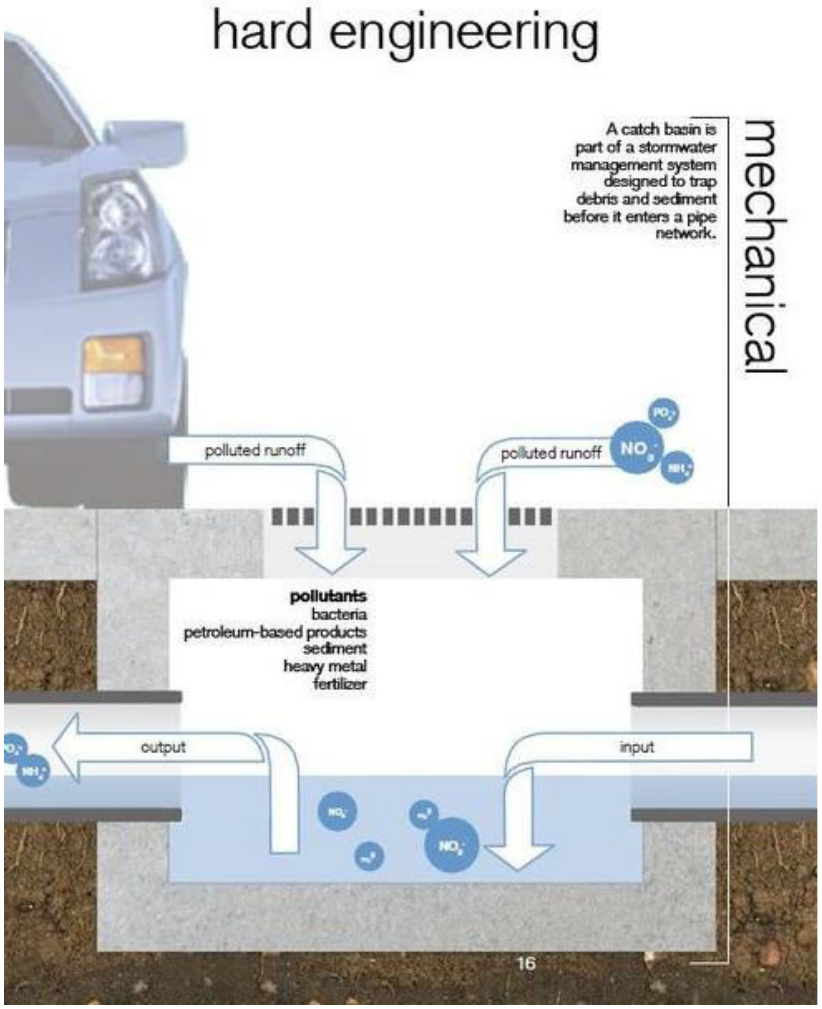
Green infrastructure practices can be used to reduce the need for expensive gray infrastructure—pipes, storage facilities, and treatment systems—because plants and soils soak up, store, and use the rainwater.

Communities also can create or preserve existing vegetated areas to maintain a high quality of life for residents through flood protection, cleaner air and water, and more appealing transportation corridors and outdoor spaces.

(EPA, 2015)

definition

Grey Infrastructure Green Infrastructure



Grey Infrastructure Green Infrastructure

green Infrastructure

ENVIRONMENTAL benefits

- Improves **WATER QUALITY** by reducing polluted runoff entering waterways
- Conserves water by **RECYCLING** and using captured rainwater
- Controls stormwater **FLOODING**
- Modulates **URBAN CLIMATE** (heat islands) and reduces **GHG EMISSIONS**
- Improves **AIR QUALITY**and reduces noise pollution
- Recovers **BIODIVERSITY** in urban development

ECONOMIC benefits

- Strengthens **LOCAL ECONOMY**
- Road maintainance **COSTS REDUCTIONS**
- **ENERGY** consumption costs reduction
- **LAND VALUE** increase
- Public health and medical **COSTS SAVINGS**

SOCIAL benefits

- Enchances community and infrastructure **RESILIENCY**
- Promotes physical and mental **HEALTH**
- Pedestrians and cyclists **COMFORT**
- Natural spaces for **CITIZENS ENCOUNTERS**

Management model

- ✓ Bottoms up approach
- ✓ Community involvement - regulation of codes
- ✓ Composed of three elements: institutional capacity building, technical and legal.



More tan 800 participants on 3 Forums: Chihuahua, Arizona and Coahuila



More tan 300 people trained on 6 Project implementation workshops



Capacity Building Phase I: Training

- IV Border Green Infrastructure Forum/ Texas – Aug. 2017
- Green Infrastructure Series of events in Sonora, Nuevo León and Tamaulipas / May-Aug 2017
- Rainwater Harvesting Certification by Watershed Management Group
  - ✓ 5 municipal staff certified

2014

2015

2016

2017

Training content

FORUMS

- ✓ Technical aspects
- ✓ Impacts on health and well-being
- ✓ Impacts on Economic Development

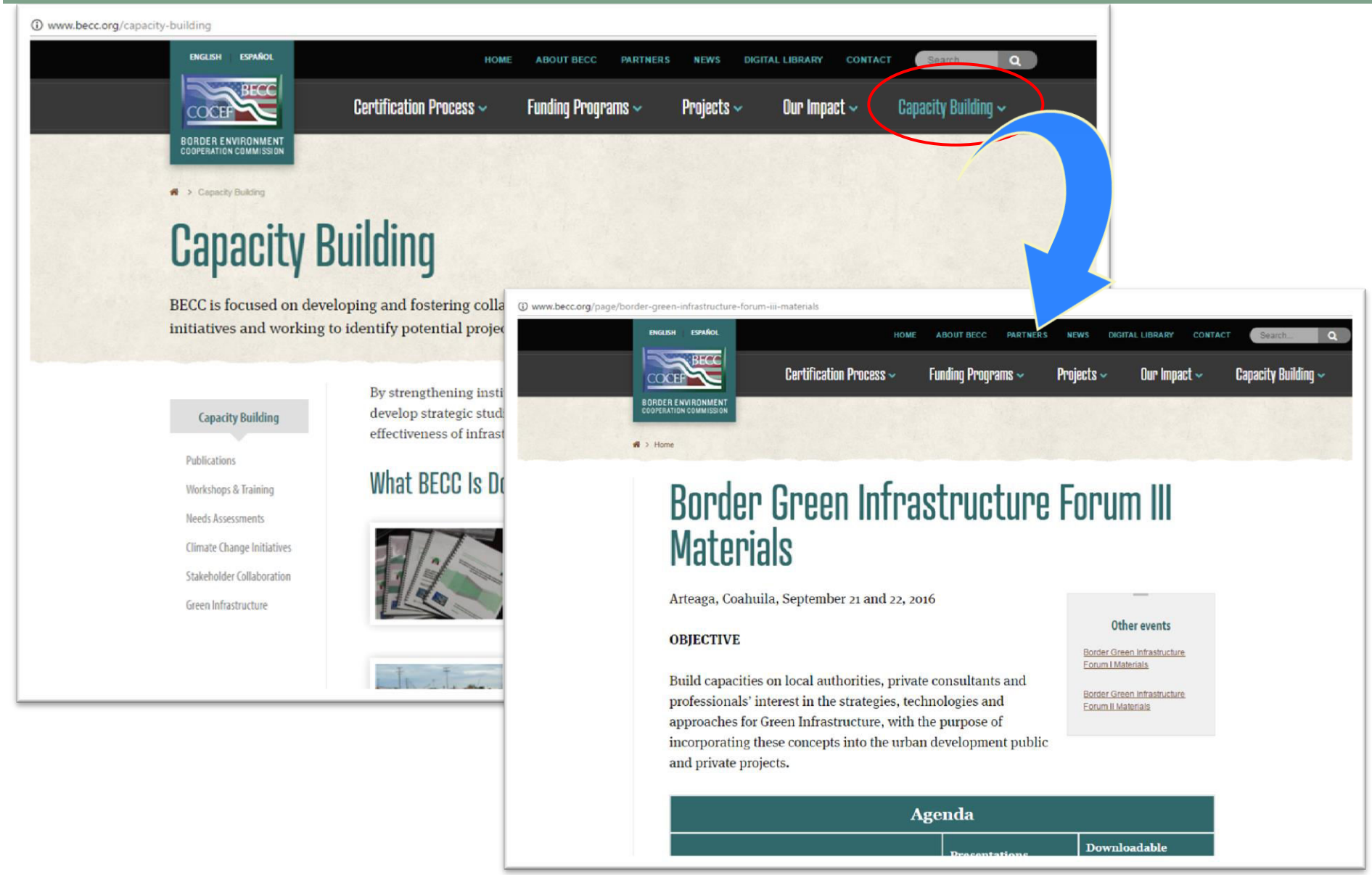
WORKSHOPS

- ✓ GI opportunities identification
- ✓ Stormwater collection basin design
- ✓ Native vegetation
- ✓ Hands-on training

CERTIFICATION PROGRAM

- ✓ Train the trainer
- ✓ Rainwater Harvesting

Information dissemination

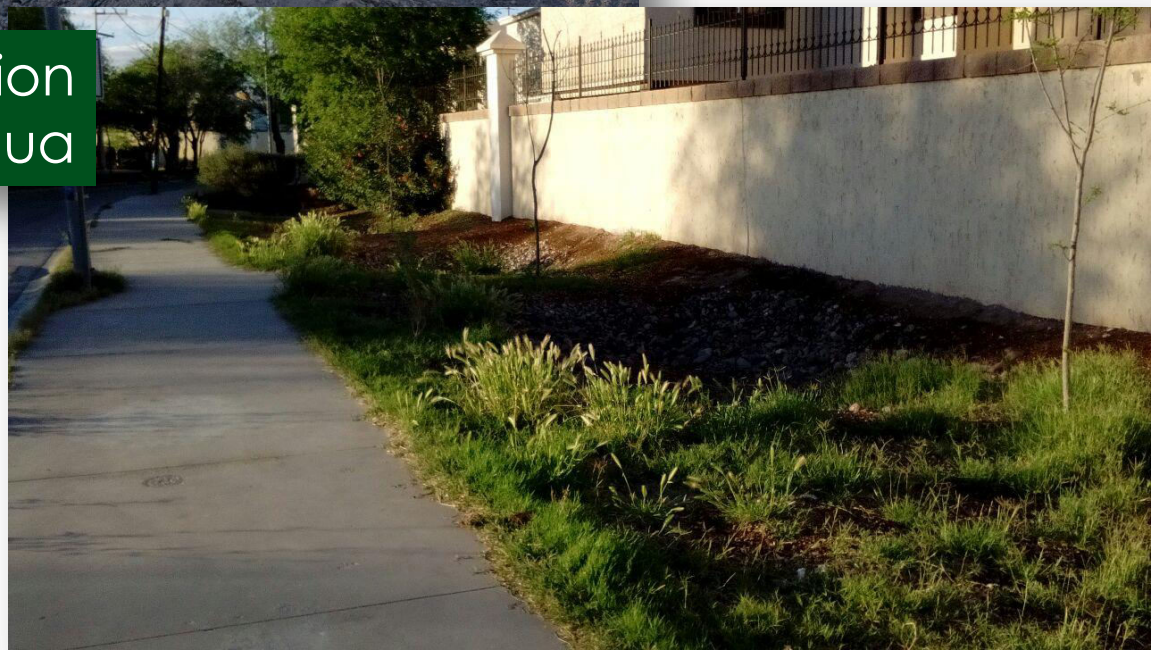


Phase II: Project implementation

Phase II: Project implementation

Construction Process
Hermosillo, Sonora

System Evolution
Nogales, Sonora



System Evolution
Ciudad Juárez, Chihuahua

Construction Process and System Evolution Hermosillo, Sonora

Legal Framework Adjustments

1. **Green Infrastructure Design Guidelines Manual for Border Municipalities**

2. **Municipal Codes**

   Revision of municipal codes and introduction Green Infrastructure concepts:

   - Nogales, Sonora
   - Tijuana, Baja California
   - Ciudad Juárez, Chihuahua

3. **State Legislature/ SONORA**

   Introduction of Green Infrastructure concept into the State's *Ley del Equilibrio Ecológico y la Protección al Ambiente*, as well as onto the *Ley del Ordenamiento Territorial*

   - Promoted by the President of the Energy and Environment Commission from the State Congress

Design Guidelines Manual

content

Glossary of terms

1. Green Infrastructure; definition and development models

2. Green Infrastructure relevance in the Urban Context
   i. Management models examples
   ii. Green infrastructure benefits

3. Green infrastructure design principles

4. Micro-scale green infrastructure
   i. Design phase
   ii. Construction phase
   iii. Green infrastructure Techniques

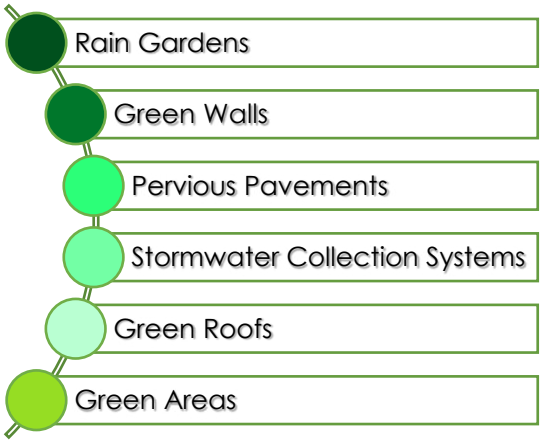
5. Macro-scale green infrastructure (urban level, watershed level)

6. Methodology for green infrastructure implementation
   i. Master plans
   ii. Monitoring and assessment

Green Infrastructure in the municipal codes

- Tijuana, Baja California
- Nogales and Hermosillo, Sonora
- Ciudad Juárez, Chihuahua

- ✓ Proposed reform of construction codes and urban development norms
- ✓ Introduction of basic GI concepts



- ✓ Establishment of the mandatory nature of implementing GI elements in Project development
- ✓ Focuses in private residential development as well as public areas

conclusion

- ✓ Shift in paradigm in the development of conventional stormwater infrastructure
- ✓ Intended to influence public policy at the local level
- ✓ Replicable and scalable
- ✓ Resulting in more livable cities, improved water quality, stronger binational environmental health, and the development of innovative public policies

Contact

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