**URBAN SPRAWL AND ECOLOGICAL FRAGMENTATION**

A Study Between the Relationship of an Emerging City and Its Environment

Comparing Montgomery to Conroe, Texas.

**LAND COVER ANALYSIS**

40,000 Acres of Wetlands Lost in Montgomery County

**ECOREGION MAP**

**IMPERVIOUS SURFACES COMPARISON**

Montgomery, Texas

Conroe, Texas

**Historical Timeline of Montgomery**

- 1879: Trading Post
- 1941: Montgomery County Courthouse
- 1855: Montgomery City Hall
- 1877: Lone Star Flag
- 1880: Cedar Lake Park
- 1905: High School Expanded
- 1910: Memory Park Built
- 2010: City Takes Over Farmstead Park

Montgomery started as a trading post and was later founded in 1857 by John Shepherd.

**Comparison between Montgomery and Conroe, Texas**

- **Montgomery**
  - Most Impervious: 4.0%
  - Least Impervious: 6.0%
  - Total: 11.0%

- **Conroe**
  - Most Impervious: 8.0%
  - Least Impervious: 11.0%
  - Total: 19.0%

In 2015, the City of Montgomery took over the maintenance of Farmstead Park, a site containing 8 historic buildings.
These seven datascapes were generated in GIS from local and national data and then compiled to create a comprehensive suitability map. This map displays the most and least suitable land for preservation based on the criteria of natural resources, animal habitat, and recent development. Land that was in a known animal habitat, had low population density, closer to parks, or had less development was considered higher priority than lands that were very developed. This was due to the belief that land that had seen less impact would be more suitable for preservation, rather than land that already had development interest.
To discourage future flooding, protect low income housing and cultural sites, and preserve ecological diversity, development is minimized in the floodplain.
The main intent of this project was to create a sense of ecological unity by connecting different sections of the city. A spectrum of strategies was created to achieve this goal and further guide creative design solutions. In the graphic on the right Y axis is a scale of rural to urban design, flexible for the diverse landscape of Montgomery. Meanwhile, the X axis ranges from minimal impact strategies, based on preserving and enhancing existing natural areas, to strategies that involve more construction and involvement, yet still keep the ecological context in mind with greener infrastructure that will help enhance the nature.

**CONSTRANTS**
- Floodplain proximity
- Limited walkability
- Development demand

**OPPORTUNITIES**
- Abundance of vacant land
- Unused urban greenspace
- Community supported design opportunities

**ECOLOGICAL PRESERVATION**
- Keep natural space along the floodplains to allow for safe flooding.
- Establish educational nature hubs to keep the community aware of their environment.
- Provide ecologically beneficial drainage solutions.

**CREATE GREENSPACE**
- Bring nature to the city with pocket parks.
- Install greenery and improve walkability in the downtown areas.
- Lessen the impact of development on nature and drainage.

**INCREASE FUNCTIONALITY**
- Encourage outdoor exploration and increase activity with walking and biking trails.
- Foster interactions between people and nature.
- Provide spaces for people to gather and use as they desire.

**URBAN**
- Pocket Park
- Park
- Green sidewalks

**RURAL**
- Wildflower field
- Nature trails
- Bioswales

**GREEN INFRASTRUCTURE**
- Preservation land
- Boardwalk

**DISTRICT SPECIFIC DESIGN SOLUTIONS FOR THE EVOLVING LANDSCAPE**

- **Taking existing green patches in the downtown area and utilizing them to create small social and natural spaces to increase activity and walkability**
- **Effort to revitalize existing parks and add new ones with more native plants, open space, and connectivity to other green spaces in the city**
- **A way to reconstruct the walkability and natural aesthetic of roads downtown, to make a safer and more green roadway and sidewalks**
- **Keep natural space along the floodplains to allow for safe flooding.**
- **Establish educational nature hubs to keep the community aware of their environment.**
- **Provide ecologically beneficial drainage solutions.**

- **Identifying current land to be preserved to keep wildlife habitats and surrounding area natural and beautiful.**
- **Taking existing drainage and rivers, and improving the drainage and enhancing nature around it.**
- **Complete revitalization of current rivers and wetlands to make them usable by people and more functional for drainage.**

- **Forming and adding nature trails in existing and new natural areas to allow people to experience the natural surroundings with minimal human impact.**
- **Reforming roads and improving walkability in city to provide safe transportation for all farms, with an emphasis on the natural surroundings.**
GREEN INFRASTRUCTURE AND OPEN SPACE MASTER PLAN

**Preservation of Space**
1. BIKE/WALKING TRAILS
2. BOARDWALK
3. WILDFLOWER PASTURE
4. NATURE PARK CENTER
5. RECREATIONAL LAKE
6. EDUCATIONAL GARDEN
7. COMMUNITY PARK
8. Pocket Parks
9. GROWTH MAPPING
10. OPEN GREENSPACE
11. PROPOSED NEIGHBORHOOD
12. COMMERCIAL
13. MIXED USE APARTMENTS
14. POCKET PARKS
15. GREEN SIDEWALKS

**Urban Ecology**
16. BIKE/WALKING TRAILS
17. LONESTAR PLAZA
18. OPEN GREENSPACE
19. PROPOSED NEIGHBORHOOD
20. COMMERCIAL
21. MIXED USE APARTMENTS
22. POCKET PARKS
23. GREEN SIDEWALKS

**Transportation**
- Proposed
- Existing
- Primary
- Secondary
- Residential Roads
- Biking/Walking
- Green Sidewalks

**Green Space Network**
- Existing Parks
- Wetland
- Recreation
- Wildflower Pasture
- Preservation Land
- Greenway Network
- Greenway Sidewalks

**Land Use Zoning**
- Civic Use
- Water
- Industry
- Mixed Residential
- Mixed Use
- Agriculture
- Commercial
- Single Family Residential
- Conservation Land
- Recreation/Open Space
WEAVING ECOLOGY INTO THE URBAN FABRIC

LONESTAR PLAZA
This plaza is a proposed gateway into the city of Montgomery’s planned commercial district. While providing housing, retail, social event space, and recreational areas, it brings a much needed green ecosystem into an expanding urban district, and connects to the existing downtown through the use of green sidewalks and bike trails.

STORE FRONT WALKWAY
The store front creates an easily accessible and aesthetic walk through the commercial plaza.

VEGETATED CUSHION
This space allows existing single family residential homes a buffer from the growing urban plaza, and creates an inviting green area for relaxation or exercise.

BRINGING PEOPLE INTO THE WILD

PRESERVATION TRAILS
This plot of land within the floodplain was originally intended to be completely used for high density residential. The design intent was to convert it into an ecological preservation and wetland conservatory with housing on the border. By compromising with the development demand and enhancing the existing natural features of the site, this design aims to envoke community interaction with nature. This location also provides a safehaven for the local wildlife and endangered species in the ecoregion.

BOARDWALK OVER RESTORED WETLAND

NATURAL BIKE AND TRAIL SYSTEM
To increase usage and activity within Montgomery's downtown, several design strategies were implemented to make the area a more functional and pleasing space. Use of permeable paving, green sidewalks, plant buffers, and rainwater filtration all help to combat flooding and rainwater waste, something the Texas urban landscape desperately needs.

**Native Plants**
- Native shrubs and trees can help reduce the need for irrigation and slow down stormwater runoff.

**Bioretention Drainage**
- Stormwater can be diverted into bioswale and infiltrate through soil to remove any pollutants.

**Permeable Paving**
- ADA compliant pavers can infiltrate stormwater.
ECOLOGICAL SUCCESSION AND IMPACTS

SITE IMPERVIOUS AREA DECREASED BY 16.5%

MAINTENANCE COSTS DECREASED BY 22%

70% OF PERMEABLE PARKING ADDED

$4 BILLION ADDED IN GREEN BENEFITS OVER 50 YEARS