J. J. Seabrook
Stream Restoration, Rain Garden, and Urban Trail Project:
POST-CONSTRUCTION REFLECTION

Michelle Adlong, P.E.
Susan Kenzle, RLA, ISA
CITY OF AUSTIN

WATERSHED PROTECTION DEPARTMENT
Civil Engineers · Landscape Architect · Biologists · Ecologists

PUBLIC WORKS DEPARTMENT
Civil Engineers · Bike & Urban Trail Program

TRANSPORTATION DEPARTMENT
Traffic Engineers

PARKS AND RECREATION DEPARTMENT
Trails Coordinator

J.J. SEABROOK NEIGHBORHOOD ASSOCIATION

PARTNERSHIPS
**STREAM RESTORATION**
Create a stable, hydrologically connected & ecologically improved stream system

**WATER QUALITY**
Reduce pollution from urban stormwater runoff

**NEIGHBORHOOD CONNECTIVITY**
Construct urban trail for bicycle & pedestrian use

**COMMUNITY SENSE OF PLACE**
Create a place to explore & learn about the natural environment

**TRAFFIC CALMING**
Reconfigure intersections & streets to improve traffic safety

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**GOALS & TIMELINE**

- **STREAM RESTORATION**
  - Preliminary Engineering Complete: 2011
  - Final Design Done: Aug. 2013

- **WATER QUALITY**
  - Construction Complete: Oct. 2015

- **NEIGHBORHOOD CONNECTIVITY**
  - Ground Breaking: Sept. 2014

- **COMMUNITY SENSE OF PLACE**

- **TRAFFIC CALMING**
  - Ribbon Cutting Seed Toss

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- **J.J. Seabrook Neighborhood Association Master Plan**: 2010
- **Riparian Establishment & Monitoring**: 2017
PRECONSTRUCTION CONDITIONS

Approx. 200 Ac. drainage area includes Mueller mixed-use redevelopment

Stream is bisected by dual-lane road & culvert

Wet pond restricts future sediment supply

Interruption at upstream reach has no summer flow, some stagnant pools

Mowed & compacted parkland with no riparian buffer

Perennial flow at downstream reach fed by spring

Spring
PRECONSTRUCTION CONDITIONS

Immediate drainage area lacks water quality treatment

Existing trees & vegetation

Mowed & compacted parkland with no riparian buffer
PRECONSTRUCTION CONDITIONS

Pershing Drive culvert disconnected the creek & park

Pershing Drive pavement & culvert disconnected the park
CONSTRAINTS

- **ECONOMIC:** Construction boom further limited pool of contractors, resulting in higher cost project
- **BUREAUCRATIC:** Available contracting mechanisms limited contractors
- **REGULATORY:** Avoiding adverse flood impact

OPPORTUNITIES

- **MISSION DRIVEN:** Poor water quality of Tannehill Branch made this a high priority project and allowed stream restoration
- **FUNDING:** Drainage utility fee was a source of funding. Bond funding from 1980s paid for the bridge.
- **SPACE:** Ample space in right-of-way and public greenbelt
- **COMMUNITY:** Stakeholder support and integration into neighborhood plan and bike plan
BEFORE / AFTER CONSTRUCTION
STREAM CHANNEL

2000

BEFORE

2016

AFTER
Infiltration rain garden in right-of-way provides some stormwater treatment.
BEFORE / AFTER CONSTRUCTION
URBAN TRAIL & SWALE

- Removal of pavement and installation of swale for water quality.
- Conversion of traffic lane to urban trail for traffic calming and neighborhood connectivity.

Reduces total suspended solids by 1800 pounds per year compared to pre-project
(by two rain gardens and removal of 18000 square feet of impervious cover)
UNIQUE COMPONENTS: CULVERT REMOVAL

Pershing Drive culvert disconnected the creek & park.
UNIQUE COMPONENTS: CULVERT REMOVAL

Bridge installation
Pedestrian bridge reconnects the creek and the park trail

UNIQUE COMPONENTS: CULVERT REMOVAL
UNIQUE COMPONENTS: LOG HABITAT STRUCTURES

- Root Wad
- Salvaged Willow
- Cross-channel Log
UNIQUE COMPONENTS: LOG HABITAT STRUCTURES

- Root Wad
- Floodplain Logs
- Cross-channel Log
UNIQUE COMPONENTS: STORMWATER DAYLIGHTING
UNIQUE COMPONENTS: SALVAGED SOIL

CUTBANK REVEALS SOIL COLUMN

TOPSOIL STOCKPILE

IMPORTED TOPSOIL MIX

Large wood chunks
UNIQUE COMPONENTS: SALVAGED SOIL

Rich soil vs. "Red Death"
PROJECT GOALS

Stream Restoration
Create a stable, hydrologically connected & ecologically improved stream system

Water Quality
Reduce pollution from urban stormwater runoff

PROJECT DESIGN

- Channel Improvements
- Culvert Removal
- Instream Habitat Structures
- Riparian Revegetation
- Soil Salvage Plan
- Spring enhancement
- WQ Swales
- Rain Gardens

POST-PROJECT MONITORING

- Riparian Functional Assessment (RFA)
- Environmental Integrity Index (EII)
- Revegetation Assessment
- Lysimeter (WQ)
Rapid method used by U.S. Army Corps of Engineers (Fort Worth District) to assess a project’s potential impacts to a stream or wetland.

<table>
<thead>
<tr>
<th>Core Elements</th>
<th>Pre-project</th>
<th>1 Year Post-Project</th>
<th>Reference Site</th>
</tr>
</thead>
<tbody>
<tr>
<td>Channel Condition</td>
<td>23</td>
<td>29</td>
<td>22</td>
</tr>
<tr>
<td>Riparian Buffer Condition</td>
<td>0</td>
<td>6</td>
<td>19</td>
</tr>
<tr>
<td>In-stream condition</td>
<td>11</td>
<td>14</td>
<td>23</td>
</tr>
<tr>
<td>Hydrologic Condition</td>
<td>16</td>
<td>23</td>
<td>25</td>
</tr>
<tr>
<td><strong>Overall Score</strong></td>
<td><strong>49</strong></td>
<td><strong>72</strong></td>
<td><strong>89</strong></td>
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MONITORING: Riparian Functional Assessment

RFA measures:
- Hardwood Demography
- Woody Species Richness
- Plant Structural Distance
- Riparian Zone Width
- Soil Compaction & organic matter
- In-stream Cover
- Snags & Large Woody Debris
- Normalized on a 0 – 100 scale

RFA SCORE

2013\(^1\) (pre-construction) 48
2016\(^1\) (~6 months post construction) 4
2018 (~2 years post construction) ?
2020 (~4 years post construction) 

An improvement in scores over time would signal success

1. RFA scoring methodology changed in 2014; scores are not directly comparable. Scores are still on 0-100 scale.
Program to continuously monitor and assess chemical, biological, physical integrity of Austin’s creeks and streams. All watersheds monitored on 2-year rotating basis.

6 CATEGORIES OF DATA
- Contact Recreation – E. Coli Bacteria
- Non-contact Recreation – Visual Assessment
- Water Quality – Chemistry
- Sediment Quality & Chemistry
- Habitat Quality – Visual assessment & direct measurements
- Aquatic Life – Benthic Macroinvertebrates & Diatom Community

### JJ Seabrook Scores

<table>
<thead>
<tr>
<th>Pre-Project (2013)</th>
<th>Post-Project (2017)</th>
<th>Reference Site (Barton Creek)</th>
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<tbody>
<tr>
<td>56, 62, 63</td>
<td>pending</td>
<td>80s</td>
</tr>
</tbody>
</table>
REVEGETATION

Aug. 2015

Wetland Fringe 20lbs/AC
Blackland Prairie 10lbs/AC
Container plants: Bunch grasses

Grow Zone


Container plants: trees & shrubs
REVEGETATION
LESSONS LEARNED

SUCCESS
- Soil reuse, flexibility w/ embankment construction (compaction, moisture content)
- Minimal seeding/planting to jumpstart riparian revegetation + volunteer tree seedling planting
- Grow zone
- Reuse of trees/logs
- Natural channel design
- Water quality retrofits

NOT SUCCESS
- Qualifications based bid process vs. low bid
- 3-yr landscape maintenance contract
- Paucity of ecologically oriented landscape companies (low bid)
LESSONS LEARNED

Plant installation:
- Constant vigilance needed by designer
  - Correct plants
  - Planting technique
  - Planting locations
  - Hydromulch coverage
- Show up for plant deliveries, especially trees
- Reject poor plants

- Pot blew off. rootball got desiccated
- Improperly covered trees
- Girdled
- Root bound
- Shallow hole
SUMMARY

- 900 ft of stream restored
- 1,800 lbs of TSS/yr removed
- 1,200 ft of urban trail added
- 2,250 ft of park loop trail created
- 1 culvert removed
- 1 spring daylighted
Thank you!

Michelle.adlong@austintexas.gov
Susan.kenzle@austintexas.gov