J.J. Seabrook

Stream Restoration, Rain Garden, and Urban Trail Project:

POST-CONSTRUCTION REFLECTION

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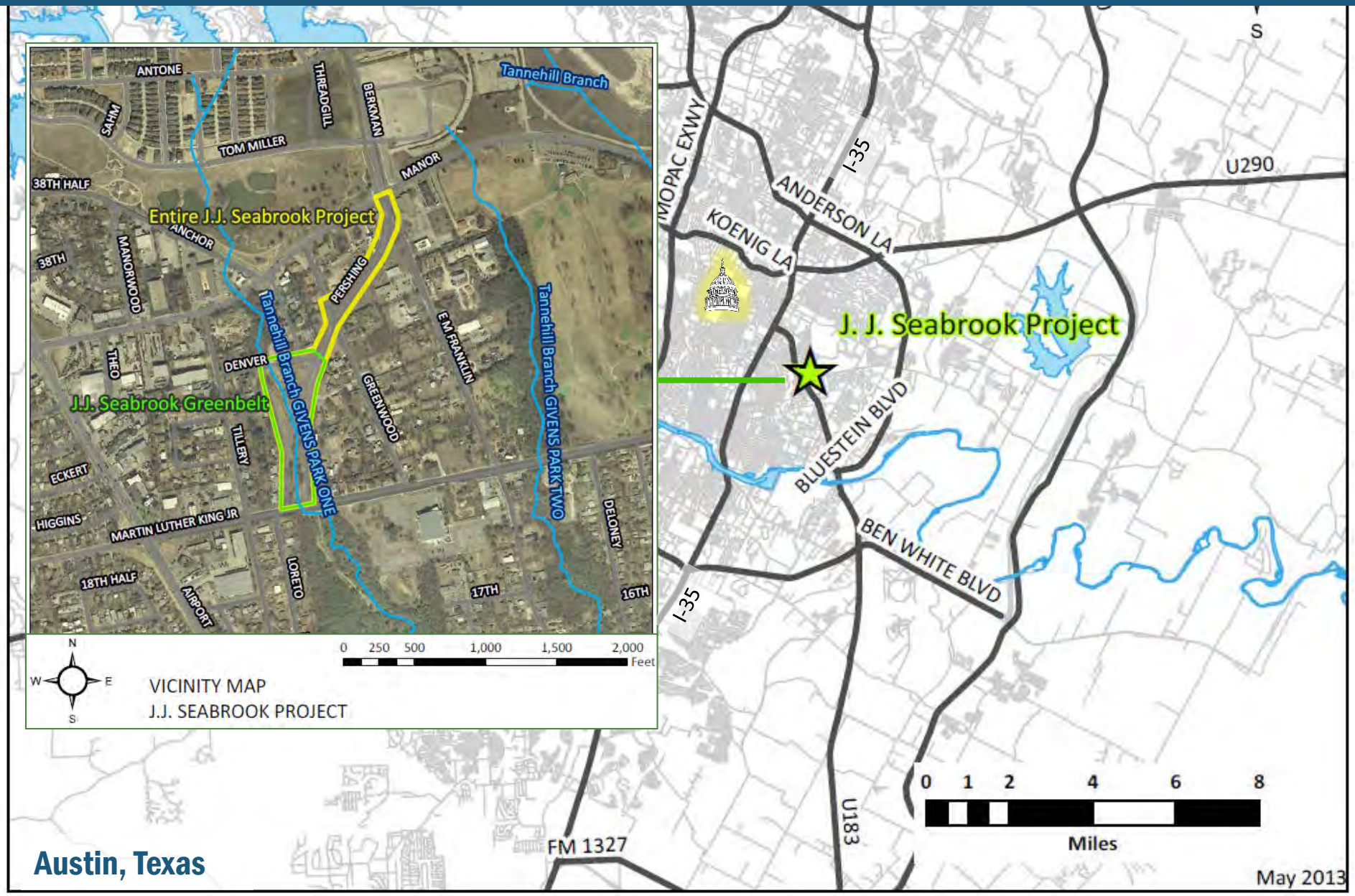
CITY OF AUSTIN FOUNDED 1839

WATERSHED PROTECTION

LOCATION



Austin, Texas

PARTNERSHIPS

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

GOALS & TIMELINE

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

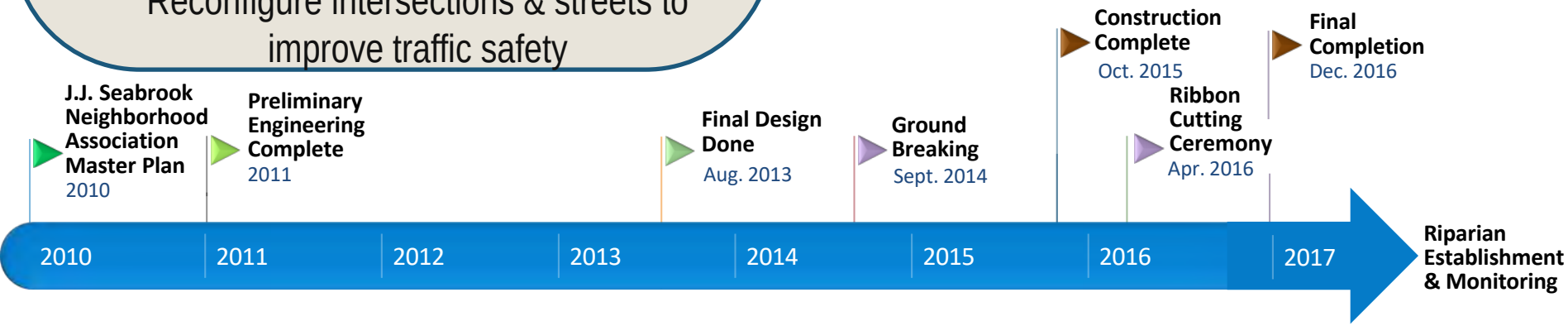
COMMUNITY SENSE OF PLACE

Create a place to explore & learn about the natural environment

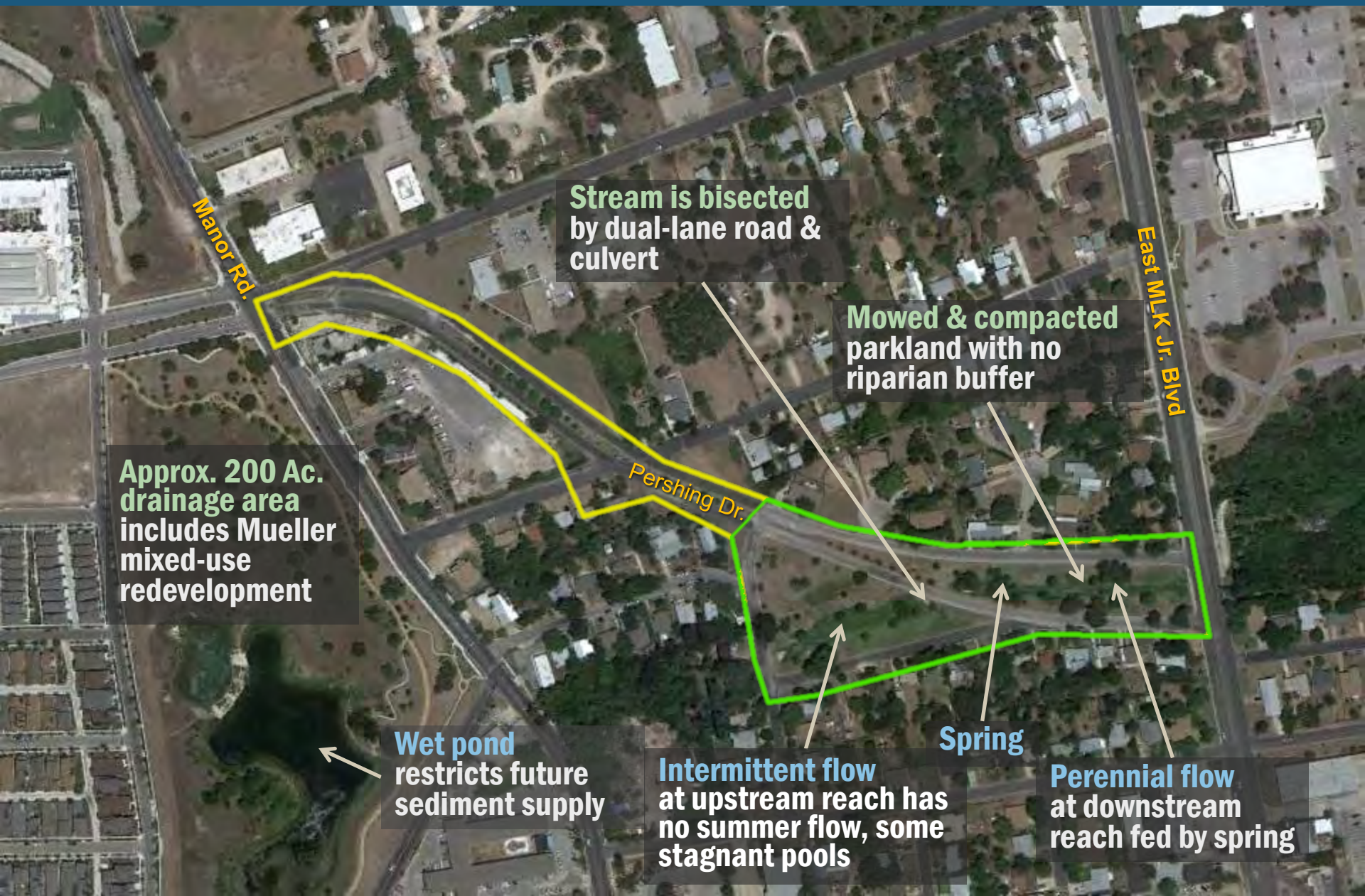
TRAFFIC CALMING

Reconfigure intersections & streets to improve traffic safety

Ribbon Cutting Seed Toss



PRECONSTRUCTION CONDITIONS



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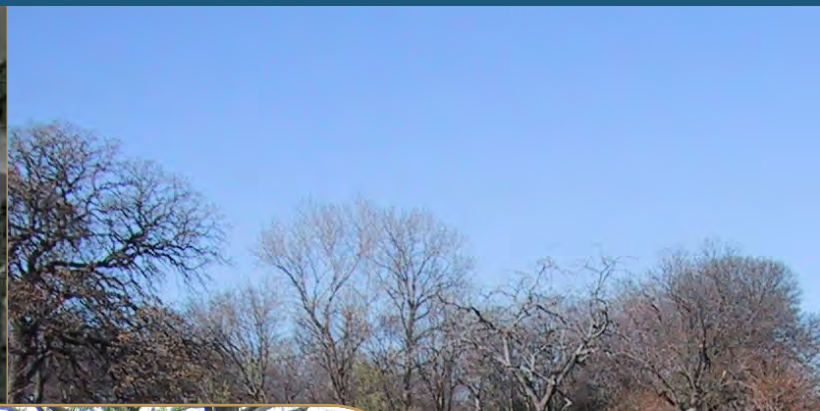
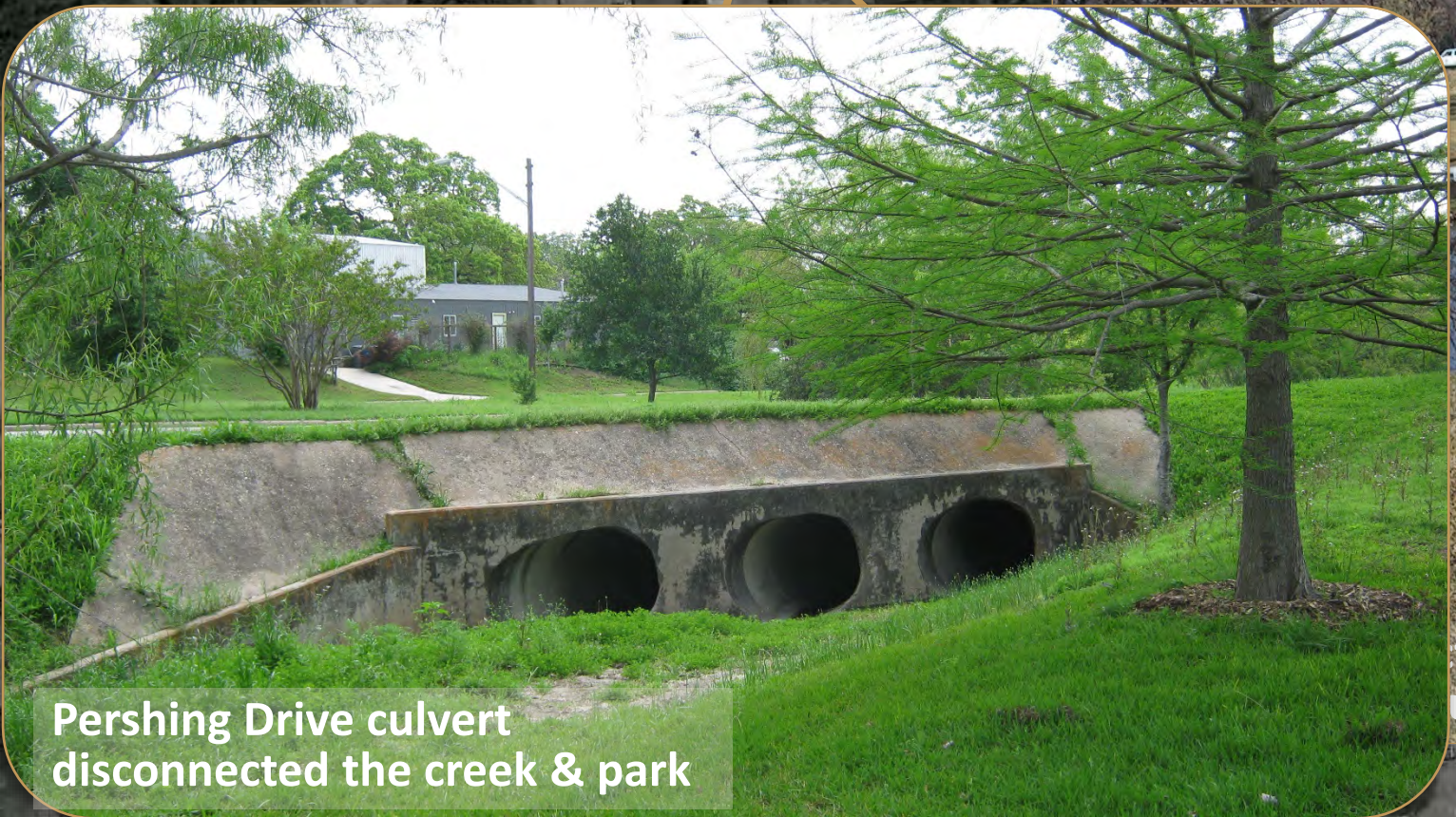




Pershing Drive culvert disconnected the creek & park

ted parkland
uffer

CONSTRAINTS/OPPORTUNITIES

CONSTRAINTS

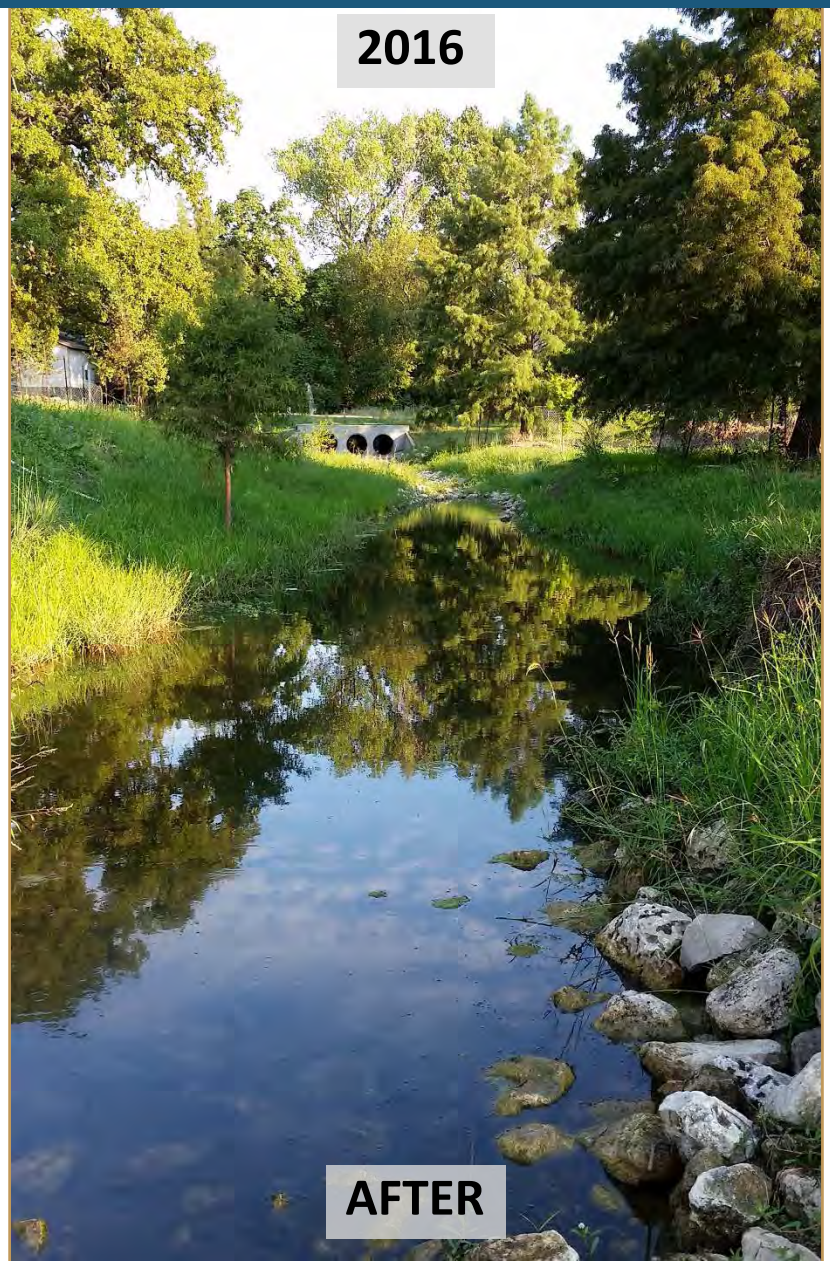
- **ECONOMIC:** Construction boom further limited pool of contractors, resulting in higher cost project
- **BUREAUCRATIC:** Available contracting mechanisms limited contractors
- **REGULATORY:** Avoiding adverse flood impact

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

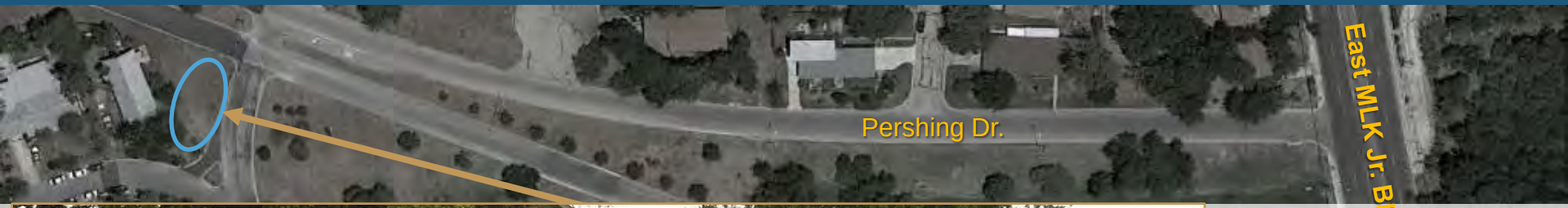
BEFORE / AFTER CONSTRUCTION

STREAM CHANNEL



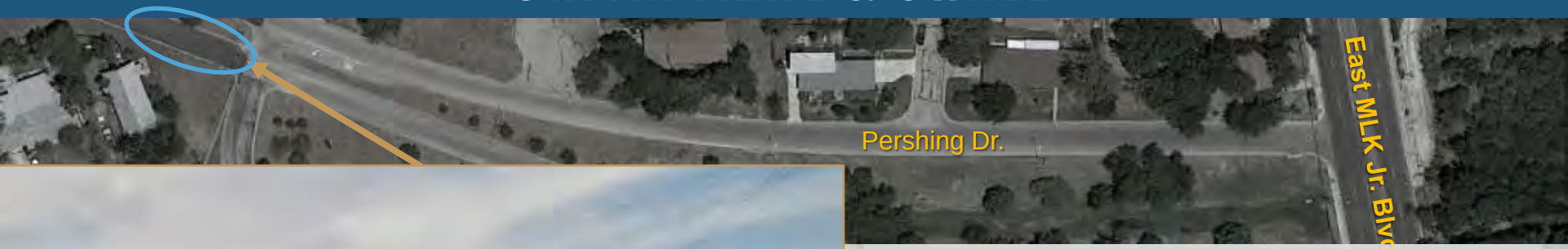
BEFORE / AFTER CONSTRUCTION

DENVER RAIN GARDEN



Infiltration rain garden in right-of-way provides some stormwater treatment

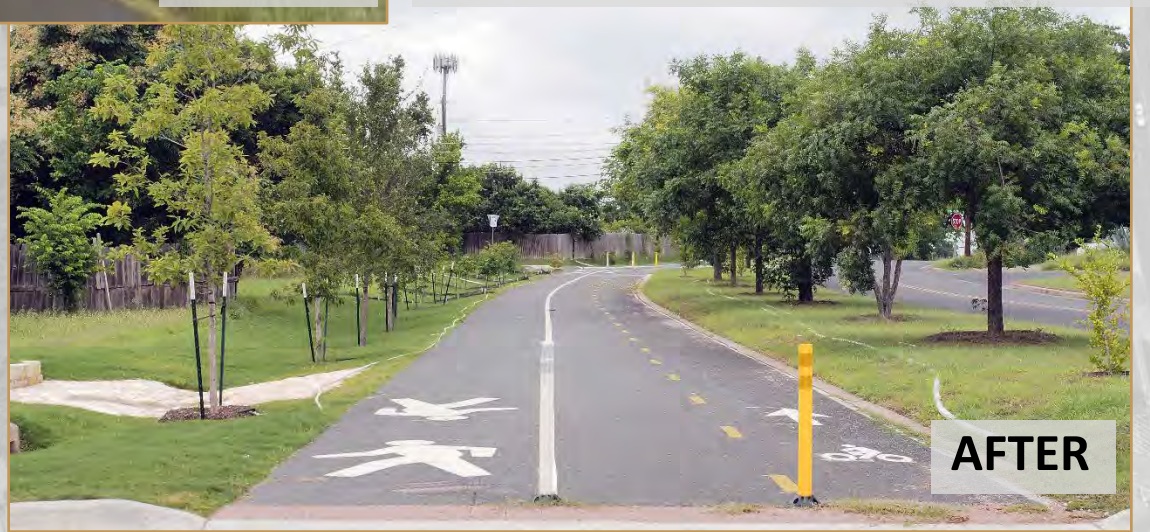
BEFORE / AFTER CONSTRUCTION
URBAN TRAIL & SWALE



- 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

UNIQUE COMPONENTS: CULVERT REMOVAL

Pedestrian bridge reconnects the creek and the park trail

UNIQUE COMPONENTS: LOG HABITAT STRUCTURES

UNIQUE COMPONENTS: LOG HABITAT STRUCTURES

UNIQUE COMPONENTS: STORMWATER DAYLIGHTING

UNIQUE COMPONENTS: SALVAGED SOIL

CUTBANK REVEALS SOIL COLUMN

TOPSOIL STOCKPILE

IMPORTED TOPSOIL MIX

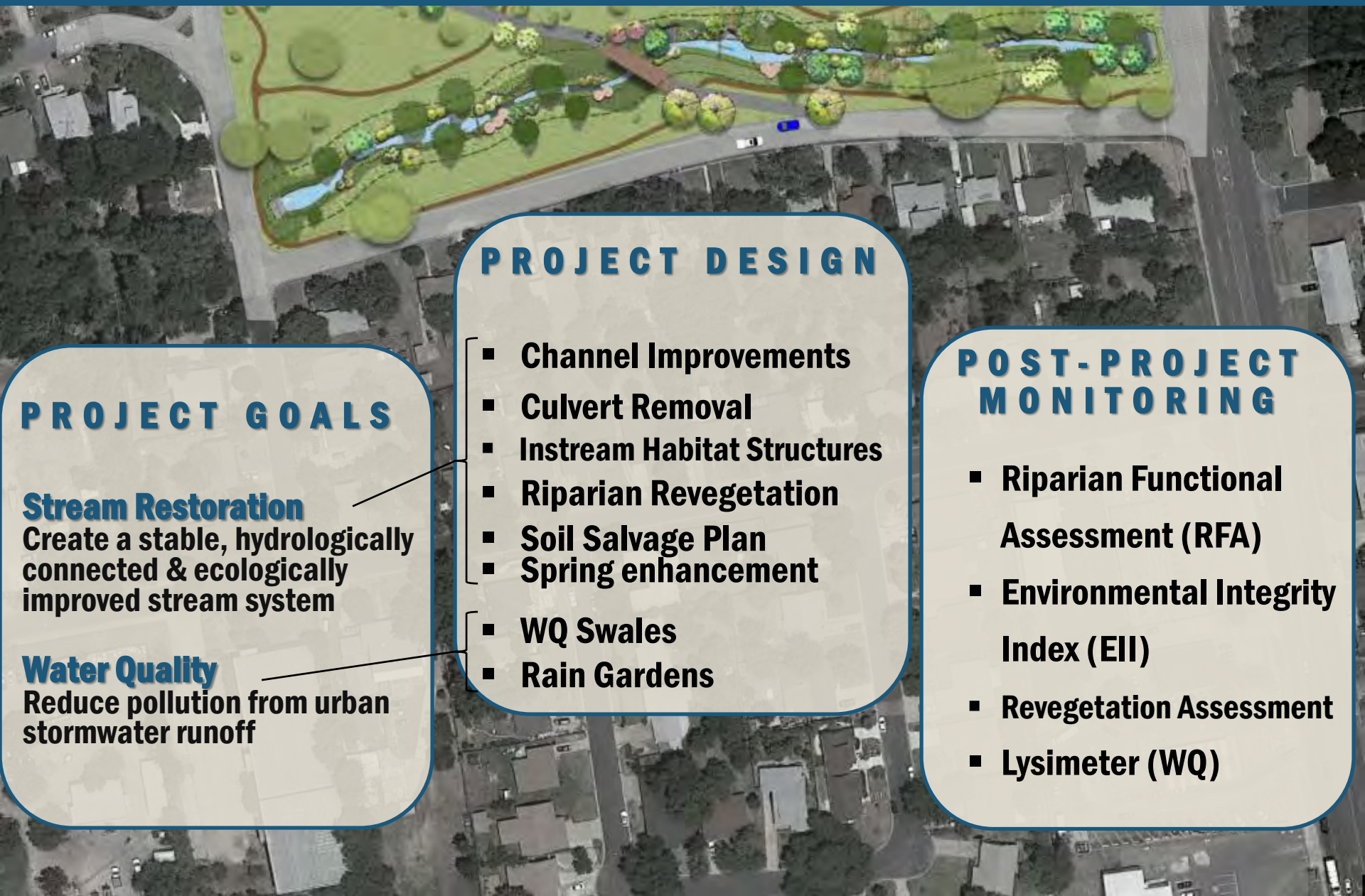
UNIQUE COMPONENTS: SALVAGED SOIL

RICH SOIL

VS.

"RED DEATH"

MONITORING



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)

MONITORING: Texas Rapid Assessment Method

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.

Core Elements	Pre-project	1 Year Post-Project	Reference Site
Channel Condition	23	29	22
Riparian Buffer Condition	0	6	19
In-stream condition	11	14	23
Hydrologic Condition	16	23	25
Overall Score	*49*	*72*	*89*

U.S. Army Corps of Engineers. 2015. The Texas Rapid Assessment Method (TXRAM). Wetland and Streams Modules, Version 2.0. Final

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)	2016[1] (~6 months post construction)	2018 (~2 years post construction)	2020 (~4 years post construction)	Reference Sites Score
48	4	?	?	75-100

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.
2. Richter & Duncan (2012) *Riparian Functional Assessment: Choosing Metrics that Quantify Restoration Success in Austin, Texas*
3. WPD working document (2016): *City of Austin Riparian Functional Assessment Quality Assurance Project Plan.*

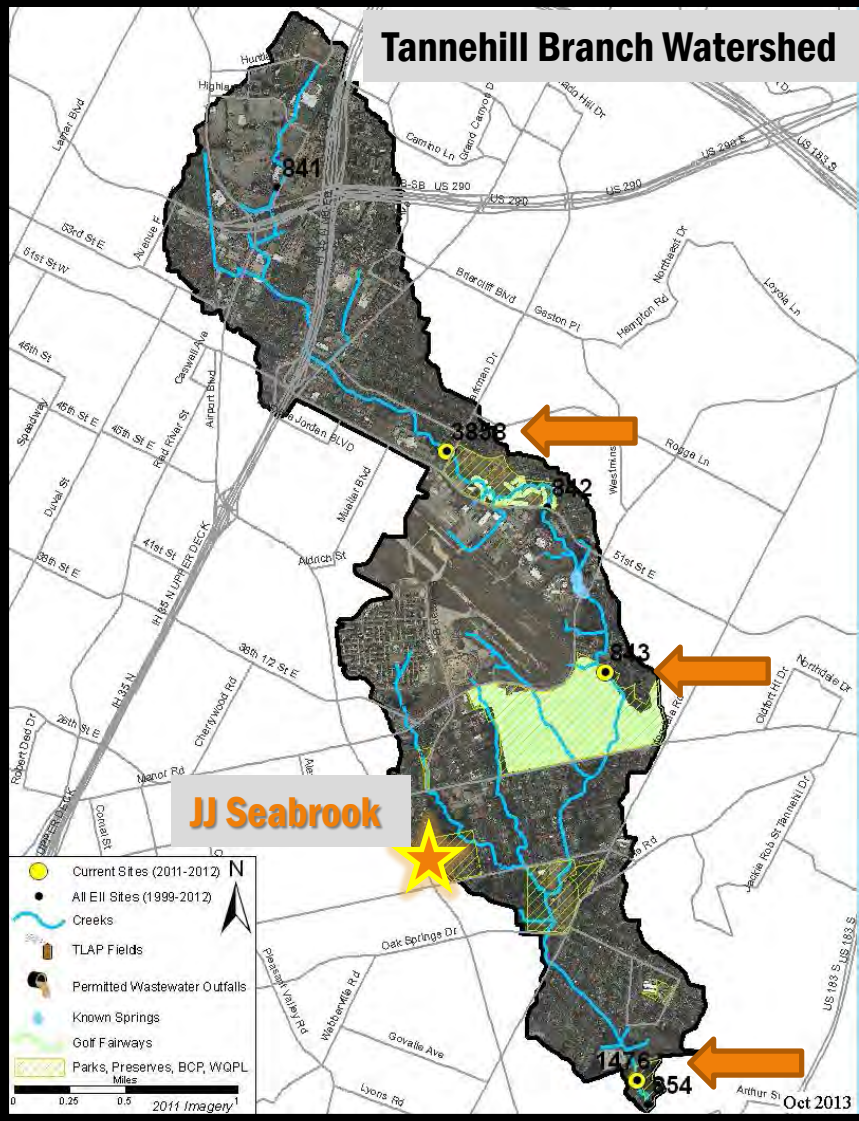
MONITORING: Environmental Integrity Index

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		Reference Site (Barton Creek)
Pre-Project (2013)	Post-Project (2017)	
56, 62, 63	pending	80s



REVEGETATION

Container plants: trees & shrubs

Wetland Fringe 20lbs/AC

Blackland Prairie 10lbs/AC

Container plants: Bunch grasses

REVEGETATION

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

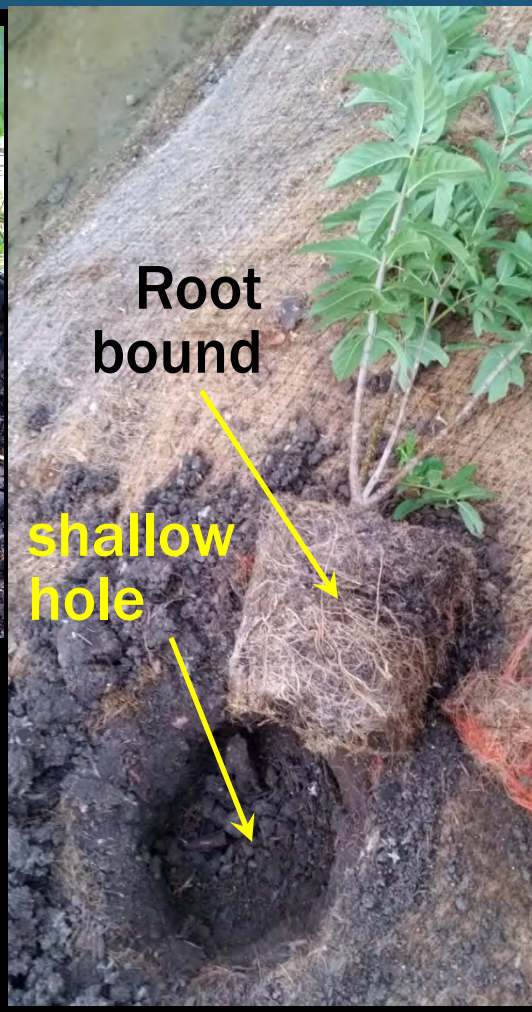
NOT SUCCESS

- 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



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!

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WATERSHED PROTECTION