STEWART

Mecklenburg County Park and Recreation
The Natural Place To Be...
www.parkandrec.com

McAlpine Creek Greenway Case Study

Low Water Bridges: The Do's and Dont's

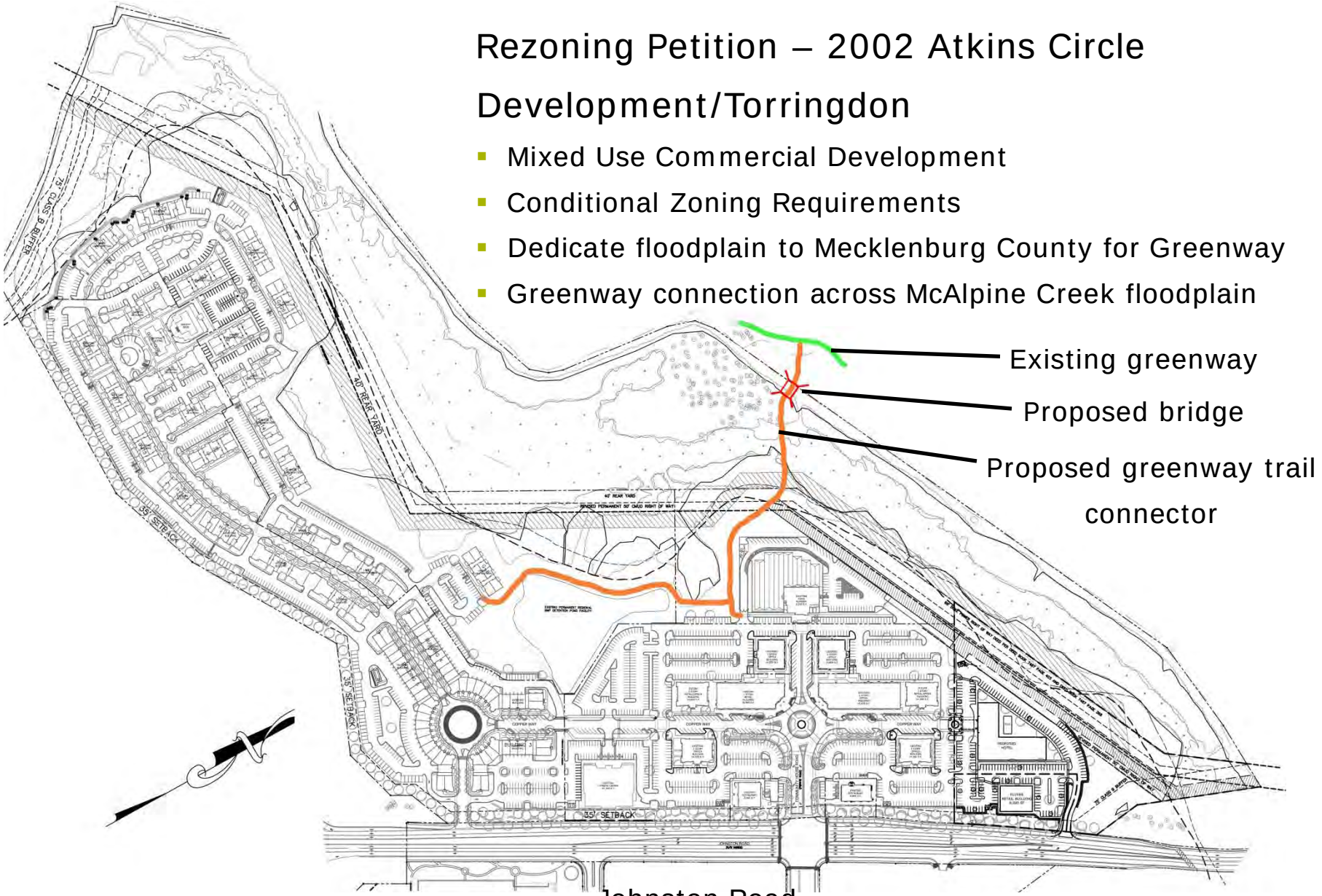
Carolina Thread Trail Forum 12.6.12

CAROLINA THREAD TRAIL

History

Rezoning Petition – 2002 Atkins Circle Development/Torringdon

- Mixed Use Commercial Development
- Conditional Zoning Requirements
- Dedicate floodplain to Mecklenburg County for Greenway
- Greenway connection across McAlpine Creek floodplain

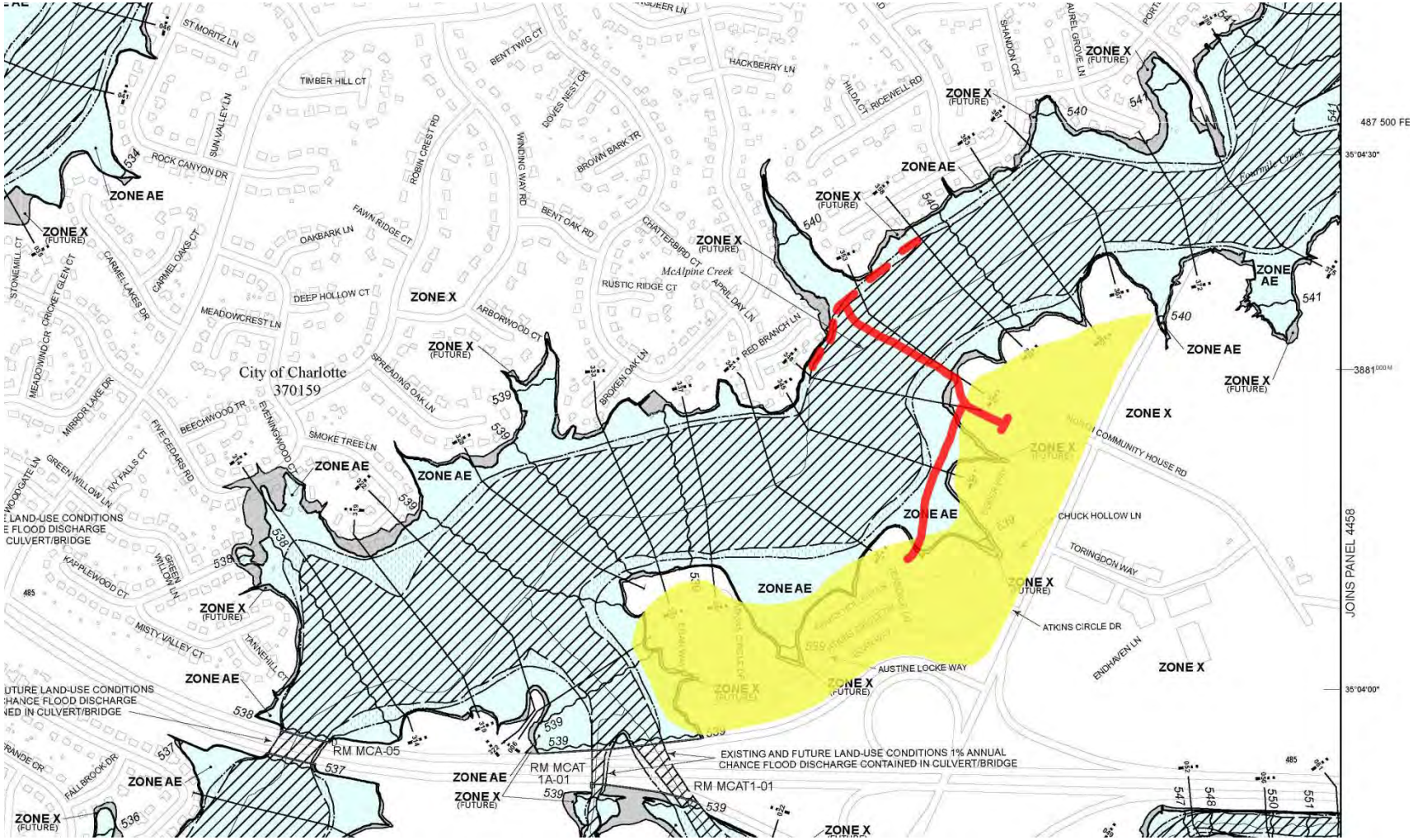


History

Developer donated trail, boardwalk, and bridge

History

McAlpine Creek Floodplain



History

2007

Greenway Connector Design

- Locate creek crossing/establish trail route
- Survey project corridor
- Wetland evaluation
- Construction plans – asphalt trail, broad walk, bridge

History

Review by Mecklenburg County Floodplain Management

- FEMA model obtained from county
- Insert proposed trail and boardwalk with low elevation bridge
- No-rise condition results
- Approved for construction

History

2008

Developer Installation

- 1400 LF asphalt trail 10 feet wide
- 100 LF elevated timber boardwalk (over small wetland area)
- 45 LF Prefab Steel bridge and concrete abutments

History

Project complete June 2008 donated to Mecklenburg County

Problem

Summer 2008:

Bridge Maintenance Issues

- Debris build up on upstream face of bridge
- Erosion around concrete abutments
- Erosion of creek channel

Problem

- Continuous dead wood and debris buildup
- Maintenance for LUESA stormwater team

Problem

- McAlpine drainage basin has dead and dying trees, partly because of continued development and runoff

- Wide floodplain and inorganic debris

Problem

What caused the problem?

- Bridge too low
- Floating branches and debris cannot pass bridge
- Debris build up increases velocity
- Erosion around concrete abutments
- Unsafe condition – close bridge access

Solution

May 2009 – Parks & Recreation commits to re-construct bridge

Public Safety

Long Term Maintenance Costs

Environmental Concerns (erosion)

Solution

Mecklenburg County Stormwater Services and Floodplain Management agrees to partner with Park & Rec to complete flood study

- Cost savings
  - decreases long-term maintenance
- Permit agency involved in study
  - Decreases re-design engineering fees
- Neighborhood concerns
  - Increased flooding
  - Wildlife
  - Traffic Control
  - Access to commercial/connectivity

Solution

June 2009

Mecklenburg County Floodway Management completes flood study and recommends raising bridge 5 feet

- Modeled as solid obstruction including handrail and bridge rail
- Construct earth fill ramps to bridge

Solution

July 2009

Bridge Design Alternatives

- Enlarge concrete abutments
- Additional helical piers for abutment foundations
- Earth fill approach ramp to new bridge abutment elevation
- Steel, gusset, jack system to raise bridge

Solution

August 2009

Approval of flood study and construction plans

- Install earth fill ramps at 5%
- Heavily armor face of fill slopes with rip rap
- Stabilize creek bank at bridge abutments with rip rap

Initiate Project Start-Up

- Parks and Recreation budget
- COE Nationwide permit application
- Schedule

Solution

November 2009

Crane removes bridge from abutments to protect from further damage

- Limit maintenance
- Reduce erosion
- Eliminate pedestrian liability

Solution

February 2010

NWP 42 approved

- Applied for limited fill in wetland to have construction access on east side of creek
- Again utilized in-house staff and operational budget to limit construction expense
- Profile to 6’-8’ depth, keep existing underwater depth, therefore, no net fill

Solution

March 2010

Introduced to PermaTrak precast concrete boardwalk product

Developed alternative plan to use elevated precast concrete boardwalk on approach to bridge in lieu of earth fill ramps

- Environmentally sound due to elimination of fill necessary
- Sustainability of hopefully 75 years or more
- Up front costs greater but long term benefits

Solution

June 2010

Pre-Construction Notification for DWQ/COE approval for maintenance crossing

- Provided access to east bank from existing greenway
- Key element for installation of pilings, piers and concrete boardwalk

Solution

July 2011

Building Permit Application

- Applied for building permit through CTAC as self-contracted to reduce the application timeframe
- Temporarily impeded, when liability issues arose
- Explained to risk management that we could transfer permit to general contractor at later date

Solution

December 2011

Building Permit Approved

- Several details modified, earth fill ramps remain
- Many alternatives considered
- Pre-fabricated and pre-engineered concrete boardwalk system being considered as an alternative
- Still modeled as solid obstruction even though creek flow will pass under

Solution

January 2012

Detail Revised

- Revisit pre-cast opportunity
- Contacted Perma-Trak for price information
- Decision made to select pre-cast product for trial
- Contacted Mecklenburg County Floodway to revise flood model

Solution

February 2012

Purchase Order Issued to PermaTrak

- Fabricate precast concrete treads
- Investigate longevity of steel support structure (H beam)
- Decided to bid alternate concrete pilings

Solution

July 2012

Contract awarded to JD Goodrum

- Low bid of 3 general contractors
  – RFBA July 3, 2012
- Pre-construction meeting
- Start construction with ENTP July 25, 2012

Solution

Abutment construction

Temporary Access Corridor

Solution

Special Inspections

Note helical pier caps

Solution

Foundation steel

Steel wall reinforcing

Solution

One foundation complete,
one more to go

Forming the wing walls

Solution

Move forms to opposite bank

H-beam pilings

Solution

30’ depth to refusal

One side complete

Solution

Cut to length and angle at 5% slope

Before and after backfill

Solution

Rip rap placement

Armored against erosion

Solution

Extremely good day to re-set bridge

Solution

Solution

Solution

Solution

Solution

Solution

Solution

Solution

Solution

Solution

Solution

Solution

It fits!

Solution

Bridge safely in place

Solution

Time to construct ramps

Note welded pilings caps

Solution

Just like fancy Lincoln Logs!

Neoprene spacer

Solution

Boardwalk almost to grade

Bulkhead detail

Solution

Construction nearing completion

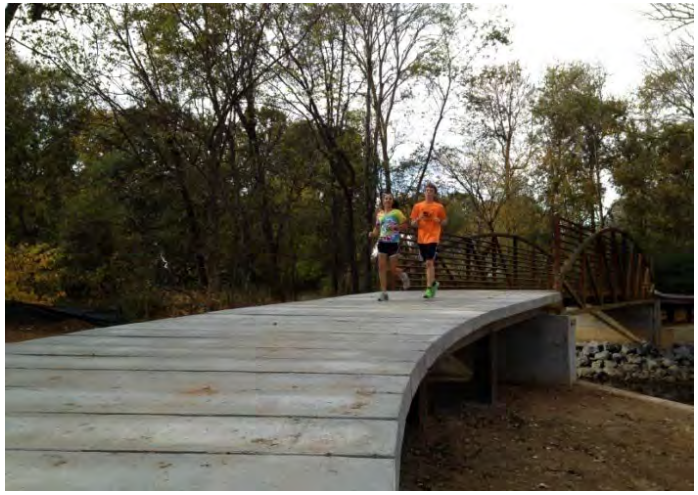
Solution

Greenway trail connection made with concrete

Solution

Curb stops at point where handrail is to be fabricated

Solution

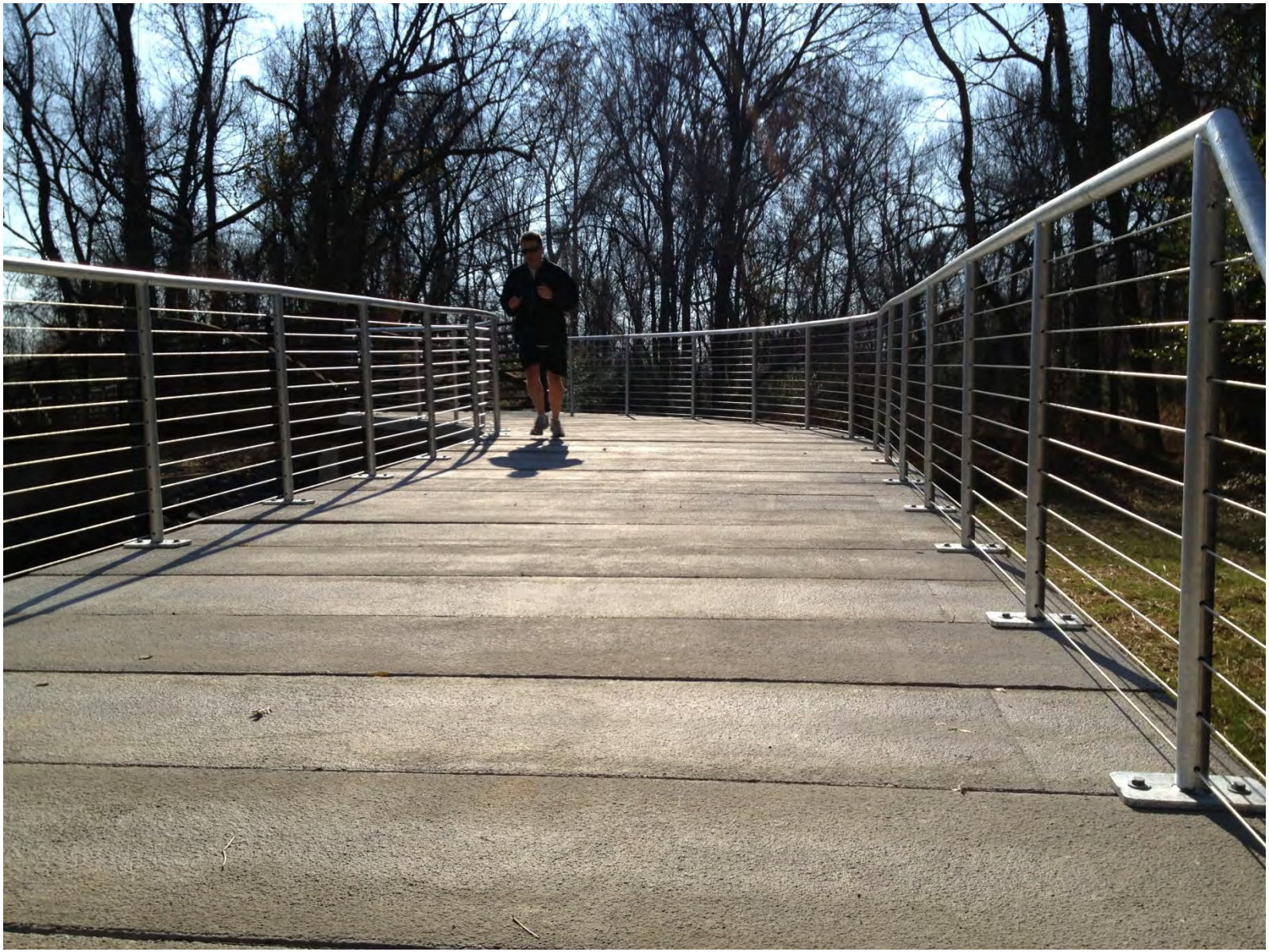


Trail already in use and not 100% complete

Solution

November 2012 - Project Complete

Solution



Solution

Solution

Solution

CAROLINA THREAD TRAIL®

Weaving Communities Together

STEWART

Mecklenburg County Park and Recreation

The Natural Place To Be...

www.parkandrec.com