Lilburn, GA

STORMWATER BMP AND STREAM RESTORATION IN A CITY PARK

July | 2013
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Project Location

Gwinnett County, GA:

- Population: 825,000
- Area: 437 sq. miles
- 1,300 miles storm drainage system
- 80,000 structures maintained
- Stormwater Utility income $32M/yr
Watershed Improvement Program

Watershed Assessment - 1999

Watershed Protection Plan - 2000

Watershed Improvement Plans (WIPs) 2001- present

Project Implementation 2005 - present
Gwinnett County
Watershed Improvement Program Goals

- Meet Permit Requirements (NPDES, MS4, MNGWPD, TMDLs)
- Improve and Protect Water Quality
- Improve Aquatic Habitat
- Meet Water Quality Standards/Designated Use [303(d) listed]
- Improve Natural and Urban Environment for the public’s use
Gwinnett County: Watershed Improvement Plans 2001–2010

- Stream Walks
- BMP Inventory
- GIS WQ Modeling
- CIP Development

BC completed WIPs for 60% of County ~ 300 sq. miles.
Project Location

• Camp Creek
• 7 sq. mile drainage area at project site
• Within 100 yr FEMA floodplain (Zone AE)
• City owned property
• Greenway
• 303(d) listed for fecal coliform bacteria (urban runoff)
Site Information – Pre-Restoration

• 900 linear feet
• 30 foot wide channel with 8 to 12 foot vertical banks
• Railroad overpass just upstream
Lilburn City Park Camp Creek Restoration

• Incised channel, no connection to floodplain (Rosgen F-5)
• Poor habitat
• Stream eroding into left bank and encroaching historic inert waste landfill and park facilities
• Steep, vertical banks - safety hazard to park patrons
• Debris jams throughout
Pre-Construction Conditions

• Municipal complex (courts, police, etc.)
• On downtown square, high visibility
• Park has large greenspace, amphitheater, walking trails, playground, etc.
• Camp Creek flows along eastern border of parcel
• Camp Creek fenced off from park
• Five pipe outfalls; direct stormwater discharges to creek from 30 developed acres, no treatment
• Flooding problems in park
Pre-Construction Monitoring

• Water Quality Sampling
  • High bacteria, high TSS during storms, high nitrogen, high organic content

• Habitat Assessment
  • Suboptimal

• Benthic macro-invertebrate assessment
  • Poor

• Geomorphic measurements
  • F-5, Incised, aggraded in places
  • Debris jams
Alternative 1

- Priority 3
  Stream Restoration
- Stabilize banks in place
- Create floodplain benches and reconnect to floodplain where feasible
- Remove concrete debris
- Revegetate
Alternative 2

• Priority 1 Stream Restoration
• Relocate stream into right floodplain
• Utilize old channel for bioretention treatment of 30 acres
• Remove invasives and revegetate
Project Benefits

- Improved stream access to floodplain for water quality benefit
- Moved stream away from park facilities and landfill
- Enlarged park area and provides new amenity for patrons
- Combined several storm sewer outfalls
- Bioretention stormwater treatment (3 cascading cells, fieldstone outfall) for 30 acres
Construction

- 150 days – Substantial Completion (March – July 2012)
- First built new channel, Camp Creek isolated from construction
- Removed plug and activated new channel
- Combined outfalls and built 3 cascading bioretention cells
- Plantings – three phases
Design & Construction - Stream

- C-5 Type Channel
- 975 linear feet
- 0.2% slope
- 2 stone cross vanes
- 5 stone J-hooks
- 2 log J-hooks
- 3 double stone J-hooks
- Toe wood/brush mattresses
Stream Construction

Cleared and flagged for new channel

Roughed in new channel
Stream Construction
Stream Construction

Log vane

Scour log and toe wood/brush mattress
Stream Construction

Stone J-hook

Completed Stone J-hook
Completed Project

New Channel

Old Channel, Now Bio-Retention
Completed Project
Completed Project
Completed Project
Design & Construction – Bioretention BMP

- 5 outfalls – total drainage area – 30 acres
- Designed system of 3 cascading bioretention cells in old channel
- Underdrain system with valve (only to be used if needed)
- Engineered soil
- Outfall connection to stream
- Plantings
Bioretention BMP

Underdrain Installation

Installing Engineered Soil
Bioretention BMP

Engineered soil installed in 1-ft lifts, water in, no compaction

Type 3 Rip-rap at outfalls
Bioretention BMP

Cobble and mulch installed

Sod and Irrigation System
Bioretention BMP
Bioretention BMP

Complete, planted BMP

Fieldstone Outfall Structure
Connection to creek
Post-Construction

• Plantings
• Maintenance
• LOMR
• Water Quality and Geomorphic Monitoring
• Construction Cost - $772k
Flood of September 2009

Railroad Crossing
Post Flood Repairs by City
February 2011 - Preconstruction

Railroad Crossing
During Construction – Installing Fieldstone Cross Vanes, Structures 1 and 2

Railroad Crossing

Railroad Crossing
April 2012 – Construction

[Image of a construction site with a railroad crossing indicated]
June 2012 – End of Construction

[Image of a railroad crossing with text: Railroad Crossing]
January 2013 – Near Bankfull Event

Railroad Crossing
Acknowledgements

- Gwinnett County Department of Water Resources
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