

Lilburn, GA

STORMWATER BMP AND STREAM RESTORATION IN A CITY PARK

July | 2013

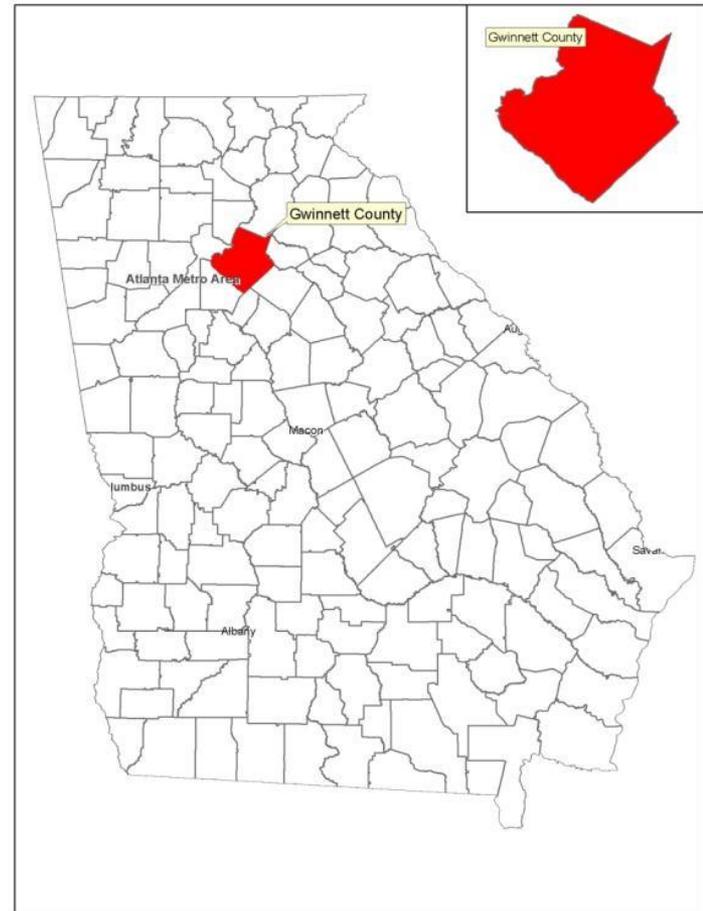
Jill Stachura



Project Location

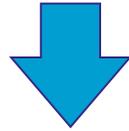
Gwinnett County, GA:

- 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



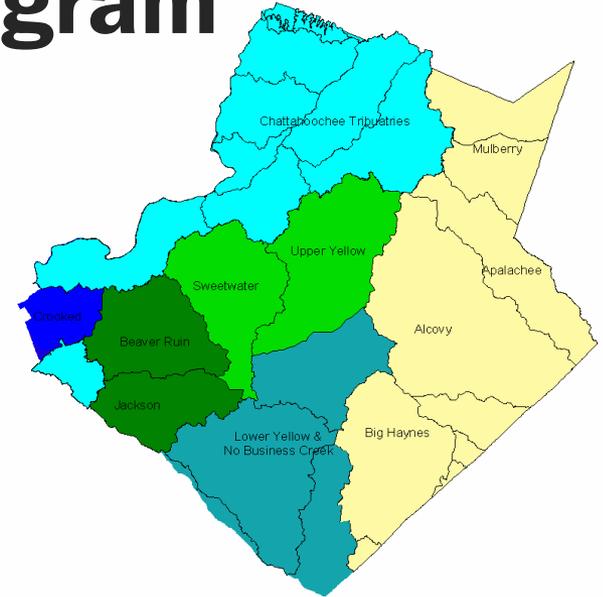
Watershed Protection Plan - 2000



Watershed Improvement Plans (WIPs) 2001- present



Project Implementation 2005 - present



Gwinnett County Watershed Improvement Program Goals

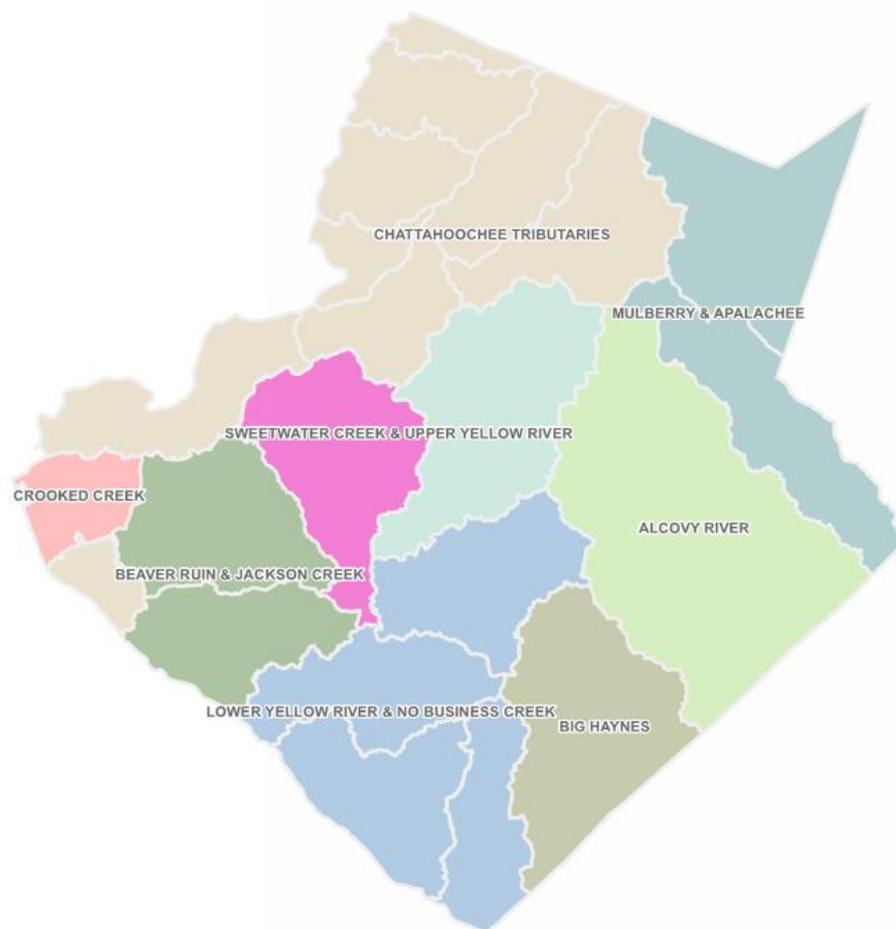


- Meet Permit Requirements (NPDES, MS4, MNGWPD, TMDLs)
- Improve and Protect Water Quality
- Improve Aquatic Habitat
- Meet Water Quality Standards/ Designated Use [303(d) listed]
- Improve Natural and Urban Environment for the public's use

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



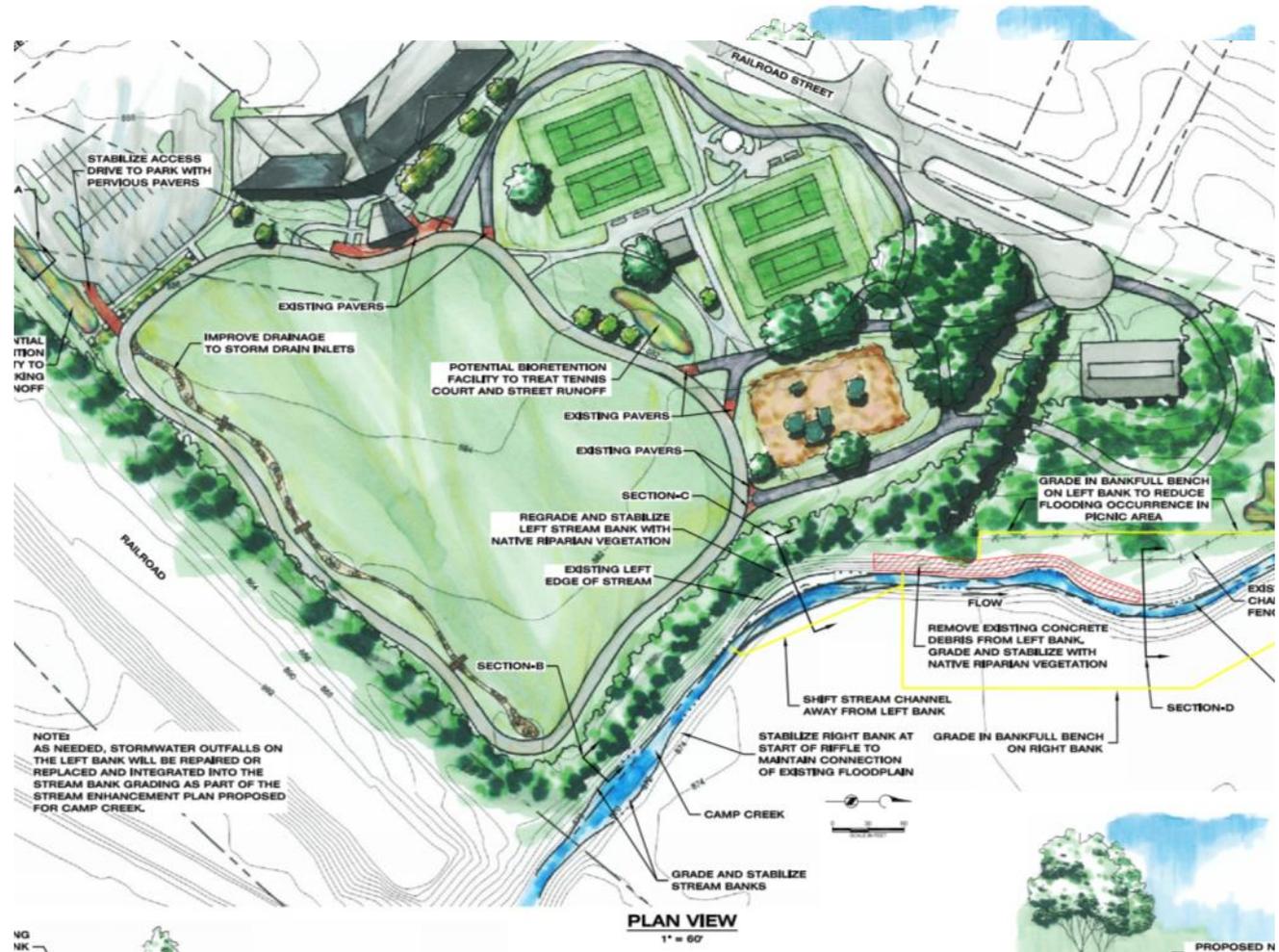
Pre-Construction Monitoring

- 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



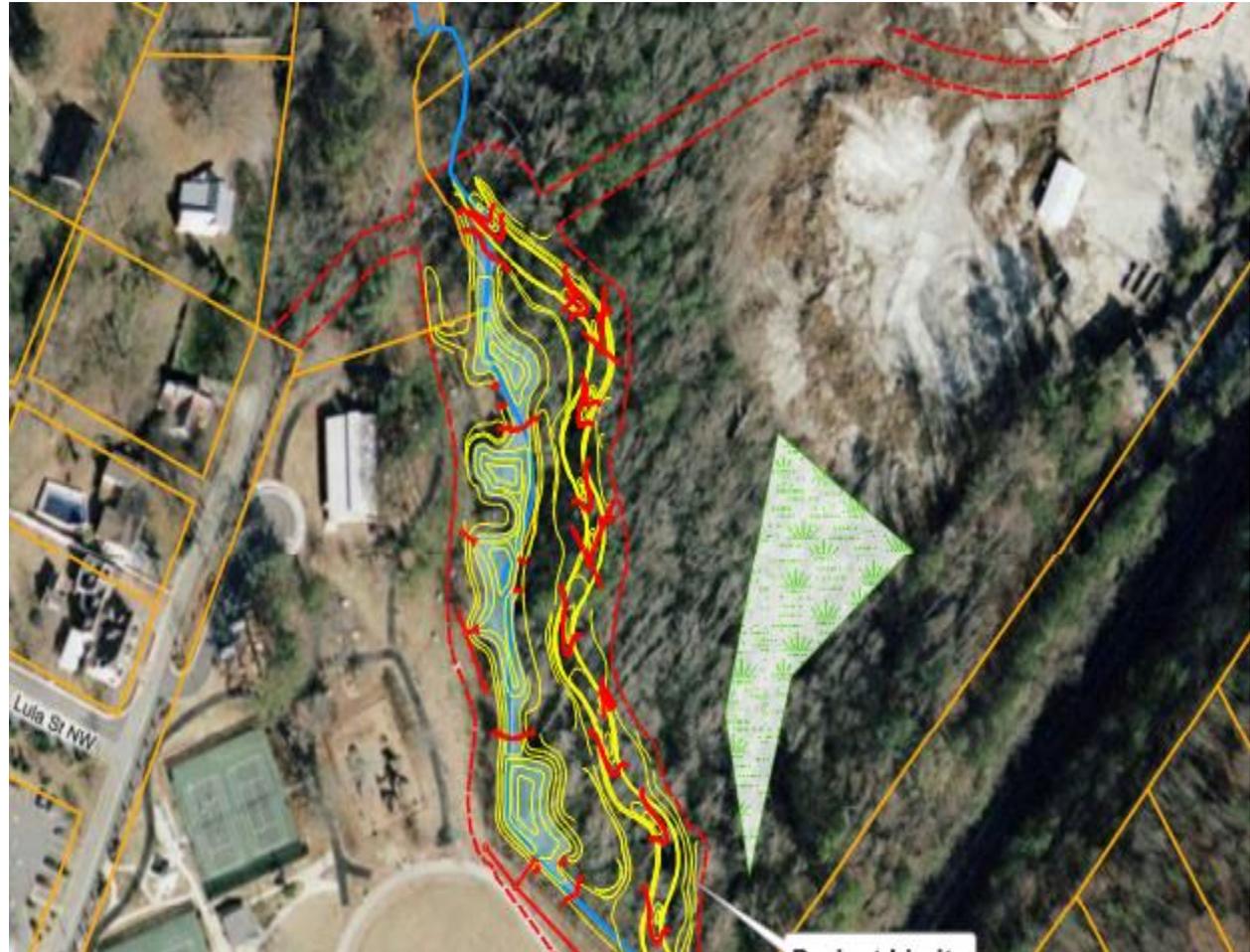
Alternative 1

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



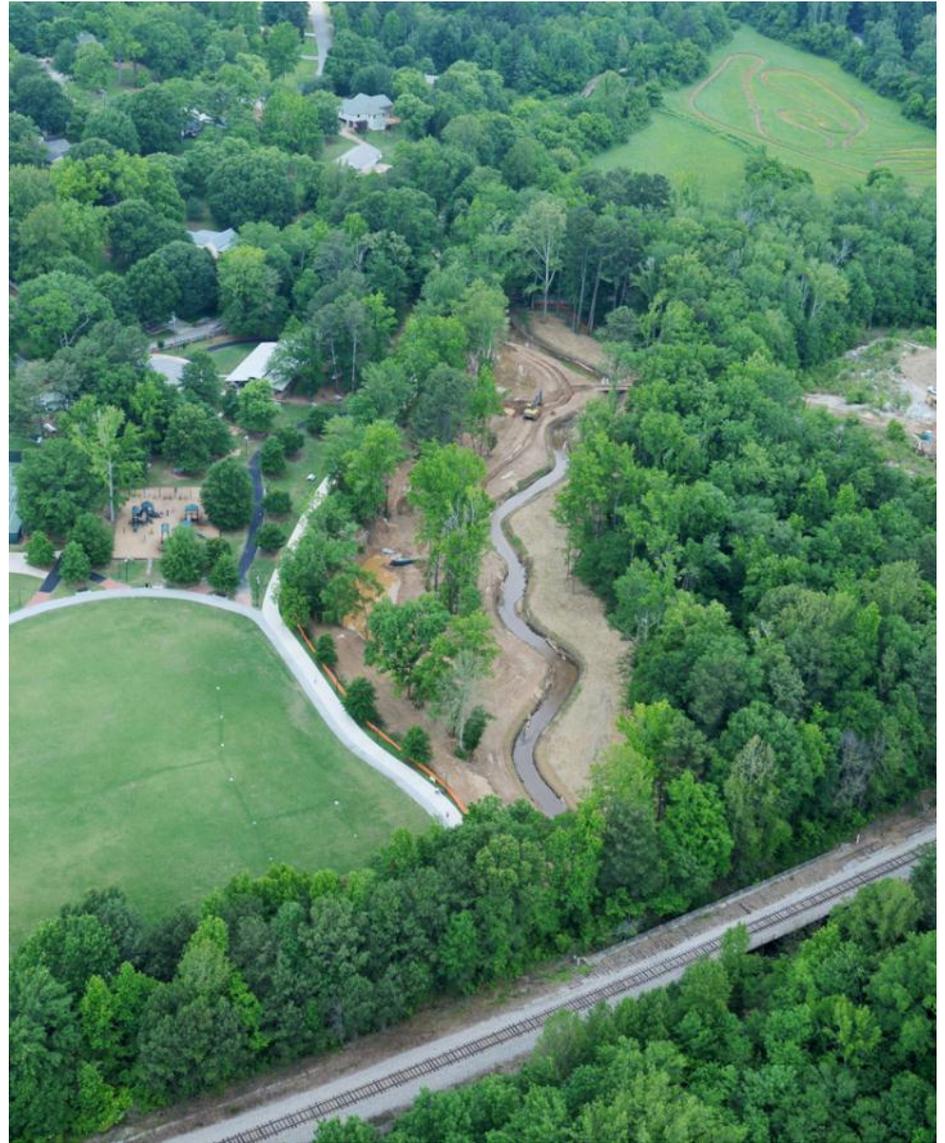
Alternative 2

- 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



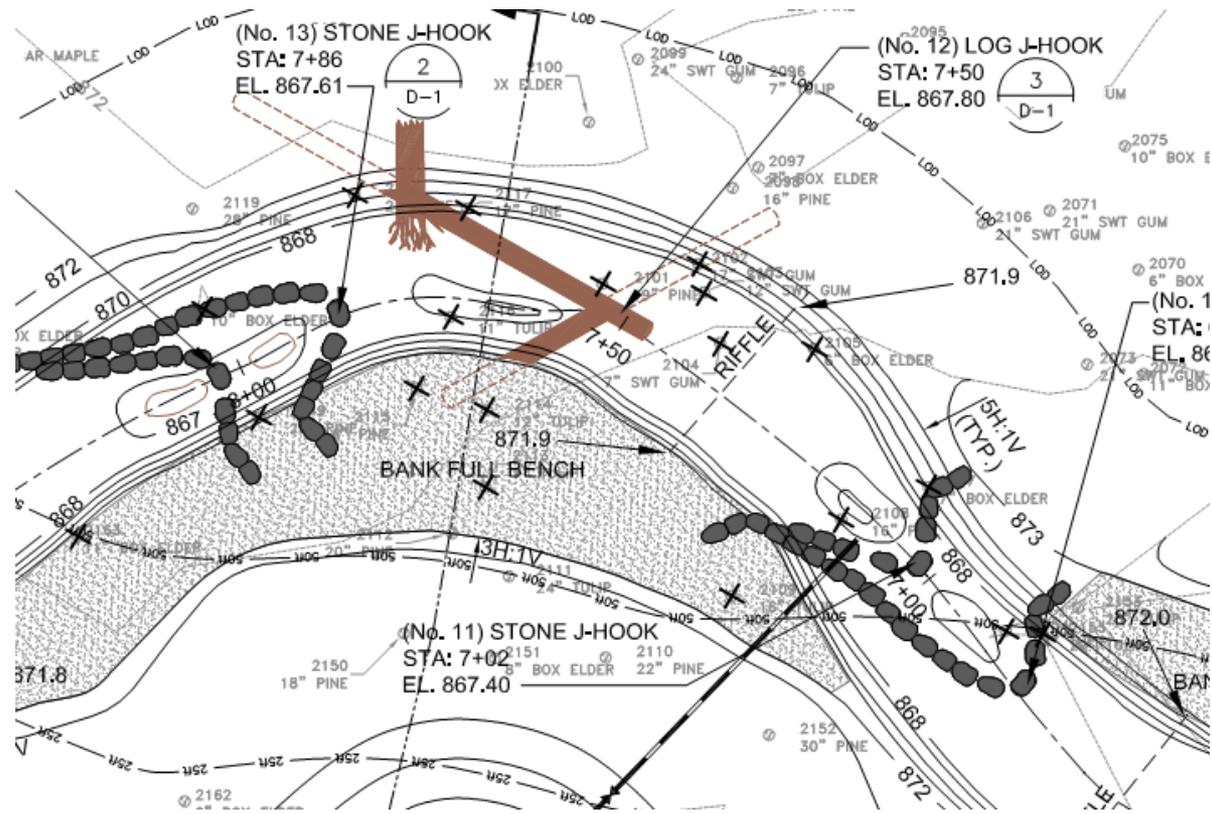
Construction

- 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



Completed Project



Completed Project

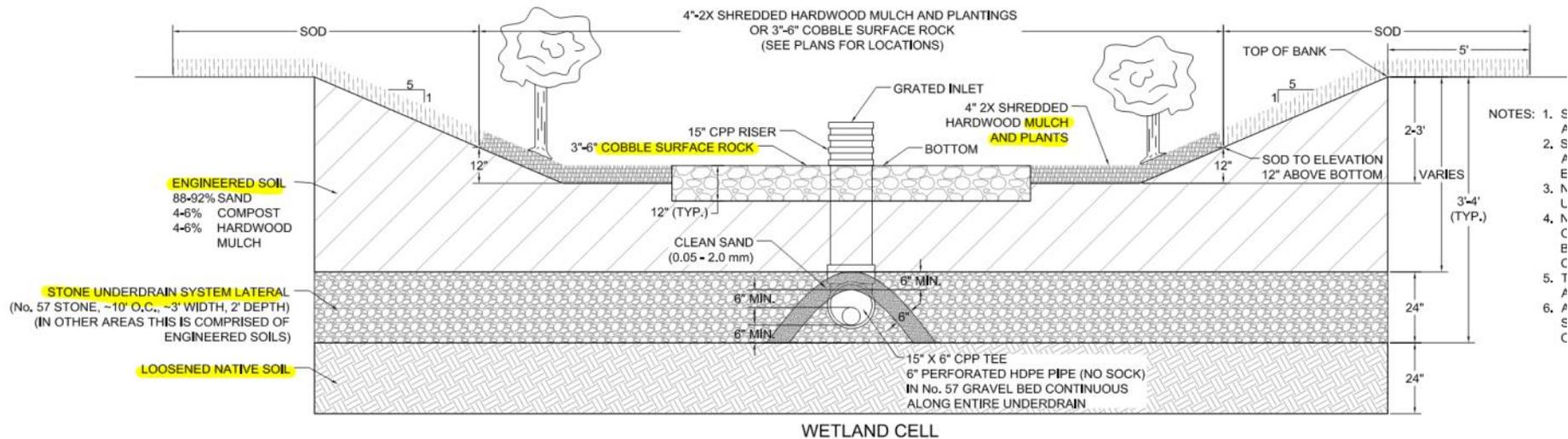


Completed Project



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



Post Flood Repairs by City



February 2011 - Preconstruction



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



April 2012 – Construction



June 2012 – End of Construction



January 2013 – Near Bankfull Event



Acknowledgements

- Gwinnett County Department of Water Resources
- City of Lilburn
- Georgia Development Partners
- Meanders River Restoration, Inc.

