



October 2015

Utilizing a County-Owned Golf Course for Watershed Restoration in Gwinnett County, GA

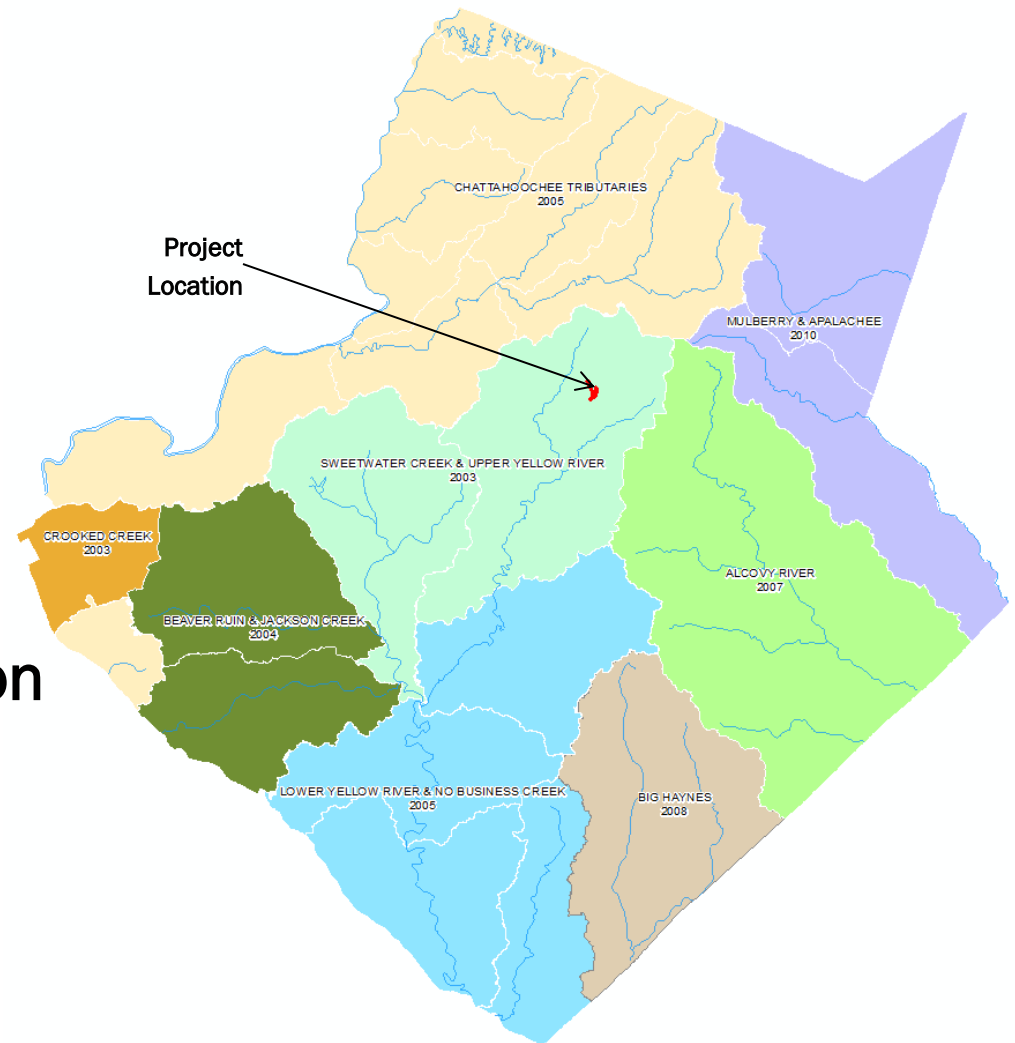
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Brown and Caldwell

Overview

- Project Identification
- Project Implementation:
Phase I –Stream
Restoration and LID
- Phase II – BMP Restoration
and Stream stabilization
- Project Benefits



Historic Aerials

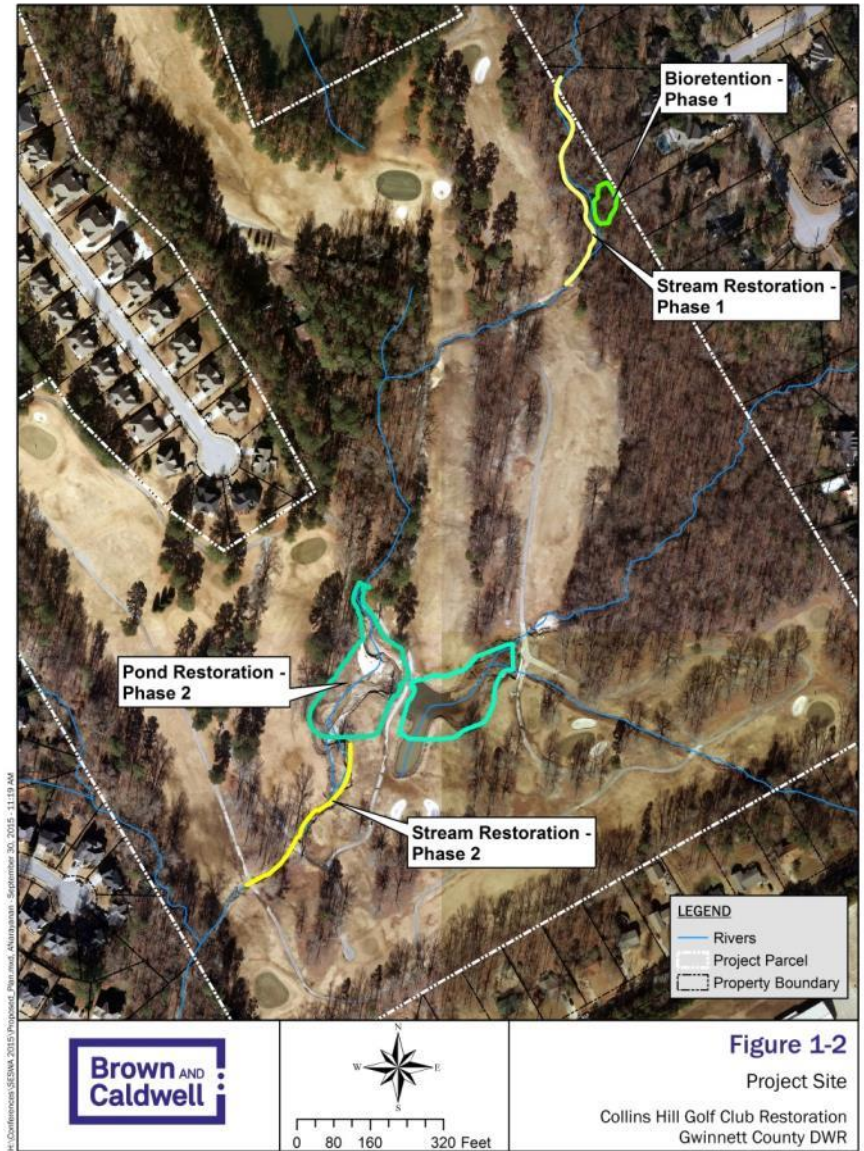
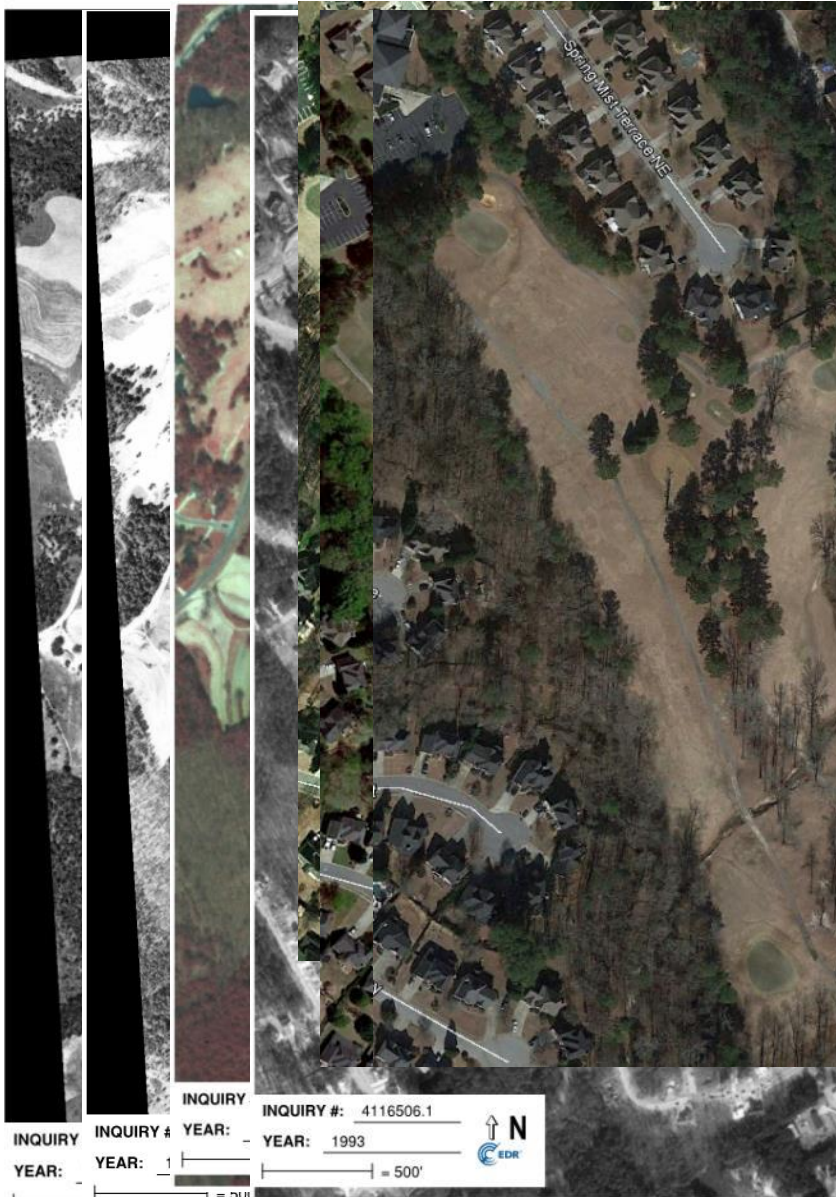


Figure 1-2

Project Site

Collins Hill Golf Club Restoration
 Gwinnett County DWR

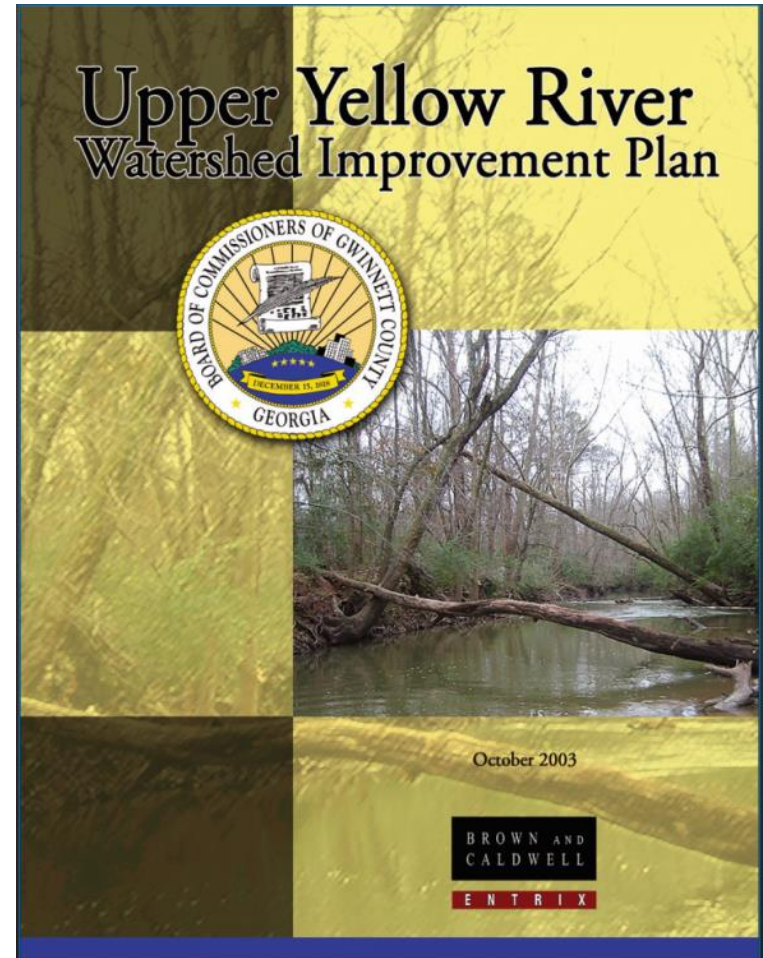
Project Background

Collins Hill Golf Course – Parcel owned by Gwinnett County Parks and Recreation

Project identified by Gwinnett County Department of Water Resources

Identified as 4 separate projects in Upper Yellow River WIP (2003)

UYR WIP Identified 183 Capital Improvement projects



Project Background

- 2 Stream Restoration projects
- 2 BMP Restoration projects

Project Description & Evaluation Upper Yellow River Watershed

BMP ID: UYR-3445-1216
Proposed Retrofit

BMP Characteristics

Existing BMP: Wet Pond	TSS Removal:	62,980 lbs/yr
Recommendation : S4	TSS Removal:	80 %
	TP Removal:	50 %
Volume: 119,726 cubic feet	TN Removal:	30 %
Volume Increase: 0 cubic feet	Fecal Removal:	70 %
Maximum Area: 30,115 square feet	Metals Removal:	50 %
Estimated Cost: \$13,838	O&M Burden:	Low
Cost Add on:		

Site Characteristics

Land use:	PRC	Soil Class:	Cfs
Zoning:	BG	SCS Hydrologic Soil Group:	C
City/County:	LAWRENCEVILLE	Located in NWI Wetland?:	TRUE
		In how many parcels?:	1
Description:	Erosion Around Inlet And Downstream From Pond, Concrete Spillway Broken And Under Cut, Evidence Of Recent Flooding		

Watershed Characteristics

Drainage Area:	403.4 acres	Tributary or Sub-watershed:	WC01
Impervious Cover:	16.3 %	WQ Volume:	345,125 cubic feet
Urban 2-Year Q:	249 cfs	CP Volume:	1,074,737 cubic feet
Rural 2-Year Q:	137 cfs	25-Year Volume:	1,074,737 cubic feet
Urban 25-Year Q:	572 cfs	TSS Yield:	1,330 lbs/acre/yr
Rural 25-Year Q:	417 cfs	TSS Load:	536,547 lbs/yr

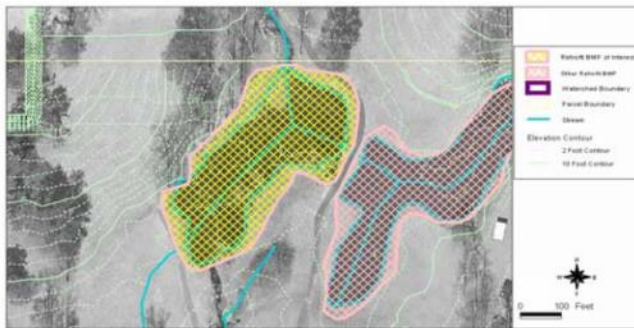


Figure 1 Plan View of Proposed Retrofit BMP

Project Description & Evaluation Upper Yellow River Watershed

BMP ID: UYR-3445-1216
Proposed Retrofit



Figure 2 Location of Proposed Retrofit BMP

Retrofit BMP Evaluation

Issue	Issue Score	TSS		Habitat			
		Multiplier	Max Score	Score	Multiplier	Max Score	Score
<i>Water Quality Benefits</i>							
Fecal Coliform:	1.7	0.1	0.5	0.2	0.1	0.5	0.2
TSS:	1.7	0.1	0.5	0.2	0.1	0.5	0.2
Phosphorus:	1.7	0.1	0.5	0.2	0.1	0.5	0.2
Metals:	1.7	0.1	0.5	0.2	0.1	0.5	0.2
<i>Hydrologic Controls</i>							
Flood Protection:	0.0	0.2	1.0	0.0	0.2	1.0	0.0
Channel Protection:	0.0	0.2	1.0	0.0	0.2	1.0	0.0
<i>Property Protection</i>							
Property Protection:	0.0	0.4	2.0	0.0	0.4	2.0	0.0
<i>Habitat and Biological Integrity</i>							
Habitat/Biology:	0.7	0.4	2.0	0.3	0.4	2.0	0.3
<i>Implementation Issues</i>							
Site Constraints:	5.0	0.08	0.4	0.4	0.08	0.4	0.4
County Program Compatibility:	5.0	0.08	0.4	0.4	0.08	0.4	0.4
Neighborhood Acceptance:	4.0	0.08	0.4	0.3	0.08	0.4	0.3
Environmental Impacts:	5.0	0.08	0.4	0.4	0.08	0.4	0.4
Relative Ease of O&M:	5.0	0.08	0.4	0.4	0.08	0.4	0.4
<i>Benefit/Cost Considerations</i>							
Pounds TSS removed/\$	5.0	18.0	90.0	90.0	-	-	-
Habitat protected or restored/\$	0.0	-	-	-	18.0	90.0	0.0
Total Project Score:					92.9		2.9



Watershed Characteristics

Drainage area: 0.65 sq.mi.

16% impervious

Wildcat creek upstream (500 LF): 0.30 sq.mi.

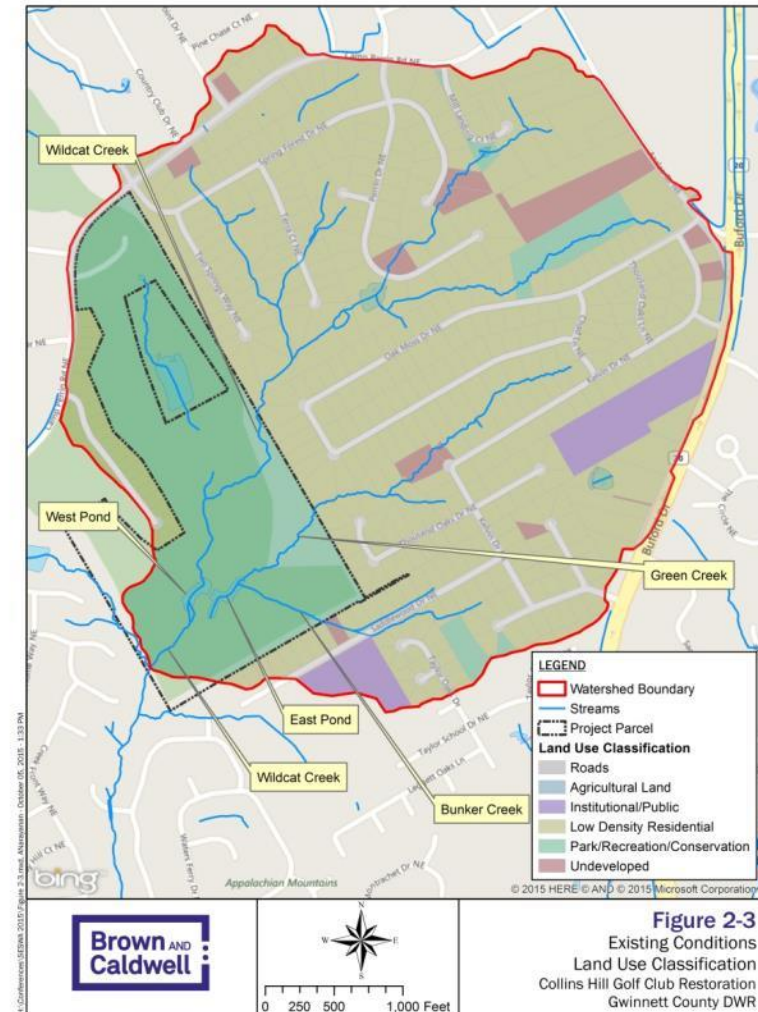
Wildcat creek downstream (350 LF): 0.65 sq.mi.

East pond inlet: 0.22 sq.mi.

West pond inlet: 0.40 sq.mi.

Bioretention area: 4.4 acres

Completely developed watershed, predominantly low density residential land use



Existing Conditions - Pond

0.45-acre East pond

1.14-acre West pond (breached)

0.16-acre forested/shrub wetland (once open water)

Average depth <1 ft.

NWL at 1,016.57 ft.

140-acre project site owned by Gwinnett County



Existing Conditions - Pond



Existing Conditions - Pond



Existing Conditions - Stream



4/18/2012

Existing Conditions - Stream



Pre-construction Monitoring

Visual inspection – Establish GPS-based photo benchmarks

Physical habitat assessment – Macroinvertebrate sampling in accordance with GaDNR standard operating procedure
(**Suboptimal Upper Reach 103 and Marginal Lower Reach 85**)

Pebble count – modified Wohlman Pebble Count

TSS Loading estimation – assess exposed banks

Benthic Macroinvertebrate Collection and Assessment
(**Marginal to suboptimal**)

Water Quality Sampling (July-Oct 2012)– during storm events for E.Coli, BOD, TN, TP, TSS, DO, pH

Permits and Regulatory

Ga EPD Stream buffer variance

US Army Corps Nationwide Permit 27 (2012)

US Army Corps Nationwide Permit 3, 16, 27, 43 (2014)

- NWP 3 – Maintenance
- NWP 16 – Return Water From Upland Contained Disposal Areas
- NWP 27 – Aquatic Habitat Restoration, Establishment, and Enhancement Activities
- NWP 43 – Stormwater Management Facilities

Proposed Design Features - Stream

In-stream structures – log j-hook (8), cross vane (1)

Bankfull benches

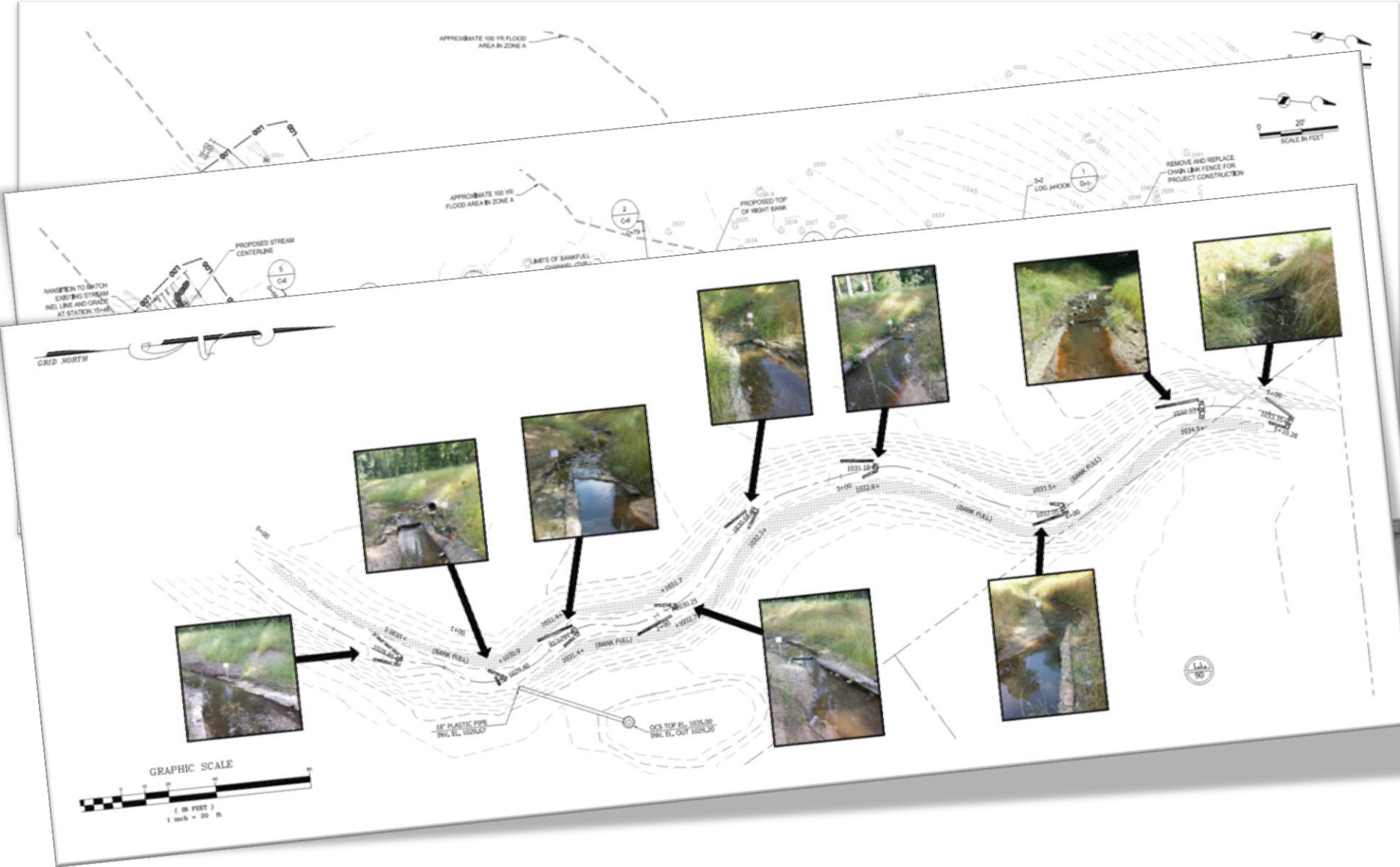
Enhancement of riparian buffer

Removing invasive species

Three zones of planting



Proposed Design Features - Stream



Phase 1 Construction

October 2013 – March 2014

Pump around active construction phases



Proposed Design Features - Bioretention

Surface area - 2,800 SF

Treats runoff from 4.4 ac.

Constructed - Dec 2013



Proposed Design Features - Ponds

East and West pond excavation

West Pond dam/berm construction

Cascade outfall structure

60" culvert between ponds

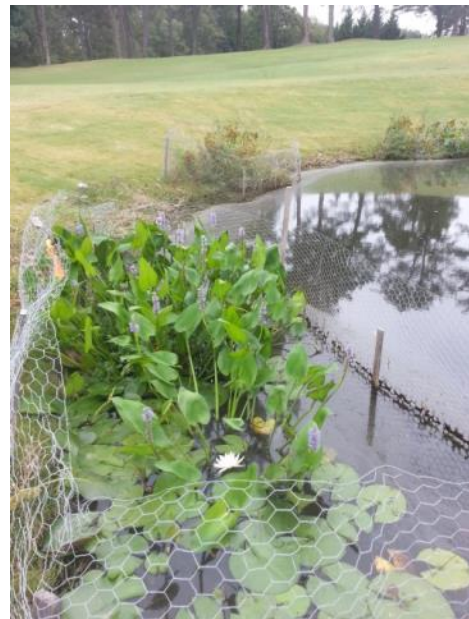
Triple culvert replacement

Littoral zone planting

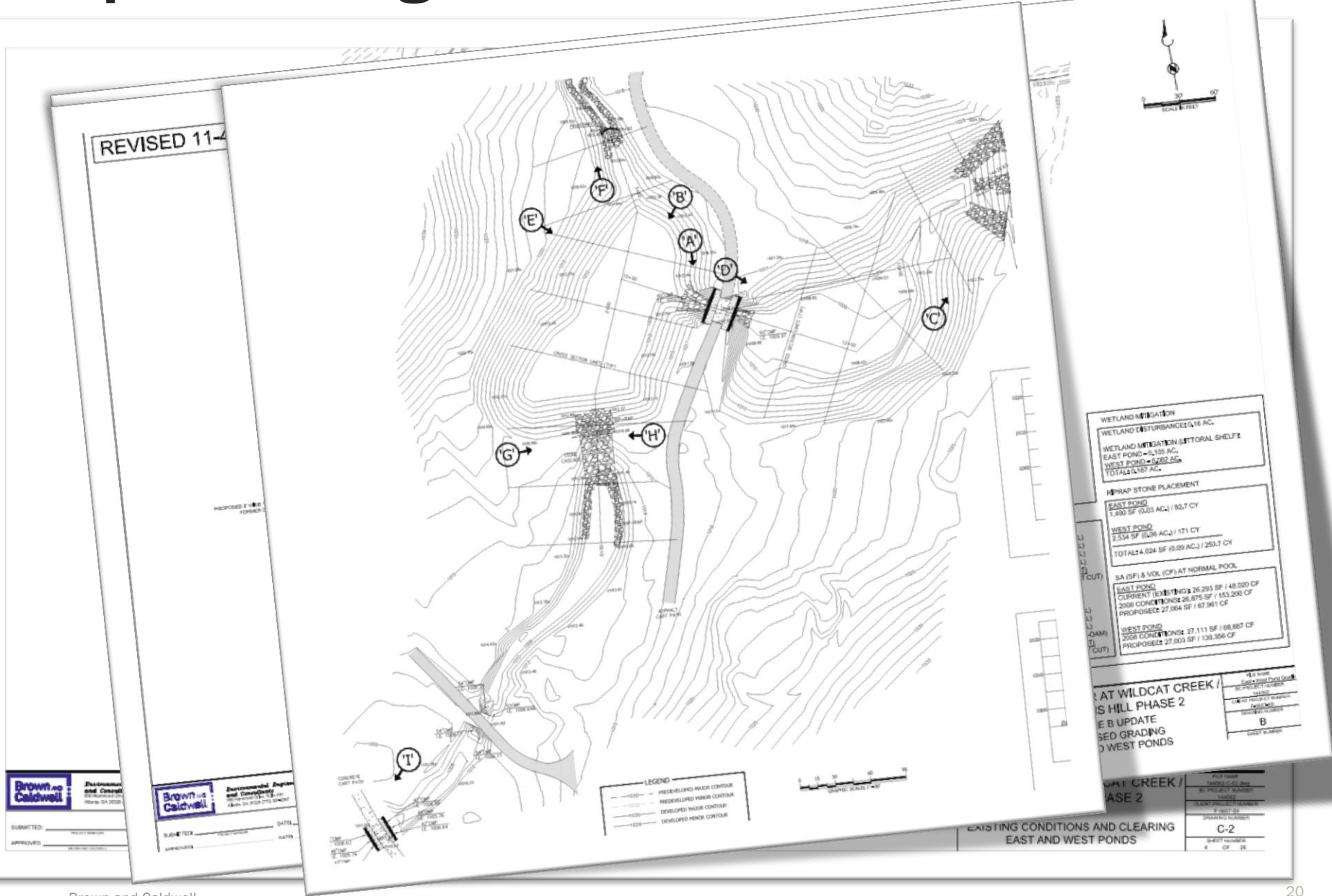
	East Pond		West Pond	
	Existing	Proposed	Existing	Proposed
Wet Surface area (Ac.)	0.45	0.45	0 (1.14*)	0.51
Total surface area (Ac.)	0.45	0.65	0 (1.14*)	0.77
NW Depth (ft.)	2	4.75	0	4.75
Wet volume (CF)	39,000	59,000	0	75,000
Total volume (CF)	39,000	136,000	0	165,000



Proposed Design Features - Ponds



Proposed Design Features - Ponds



Phase 2 Construction

Oct 2014-June 2015



Phase 2 Construction



Phase 2 Construction



07/2015

Project Benefits

Additional flood storage capacity

Reduce 1-100 year peak flows

Stream restoration will provide floodplain connectivity

Improve water quality and habitat for Wildcat Creek

TSS load reduction at project outlet > 450,000 lb/yr



Acknowledgements

Gwinnett County Department of Water Resources

Gwinnett County Parks and Recreation

Cornerstone Golf Partners

Georgia Development Partners

Golder Associates Inc.

Columbia Engineering & Services, Inc.