

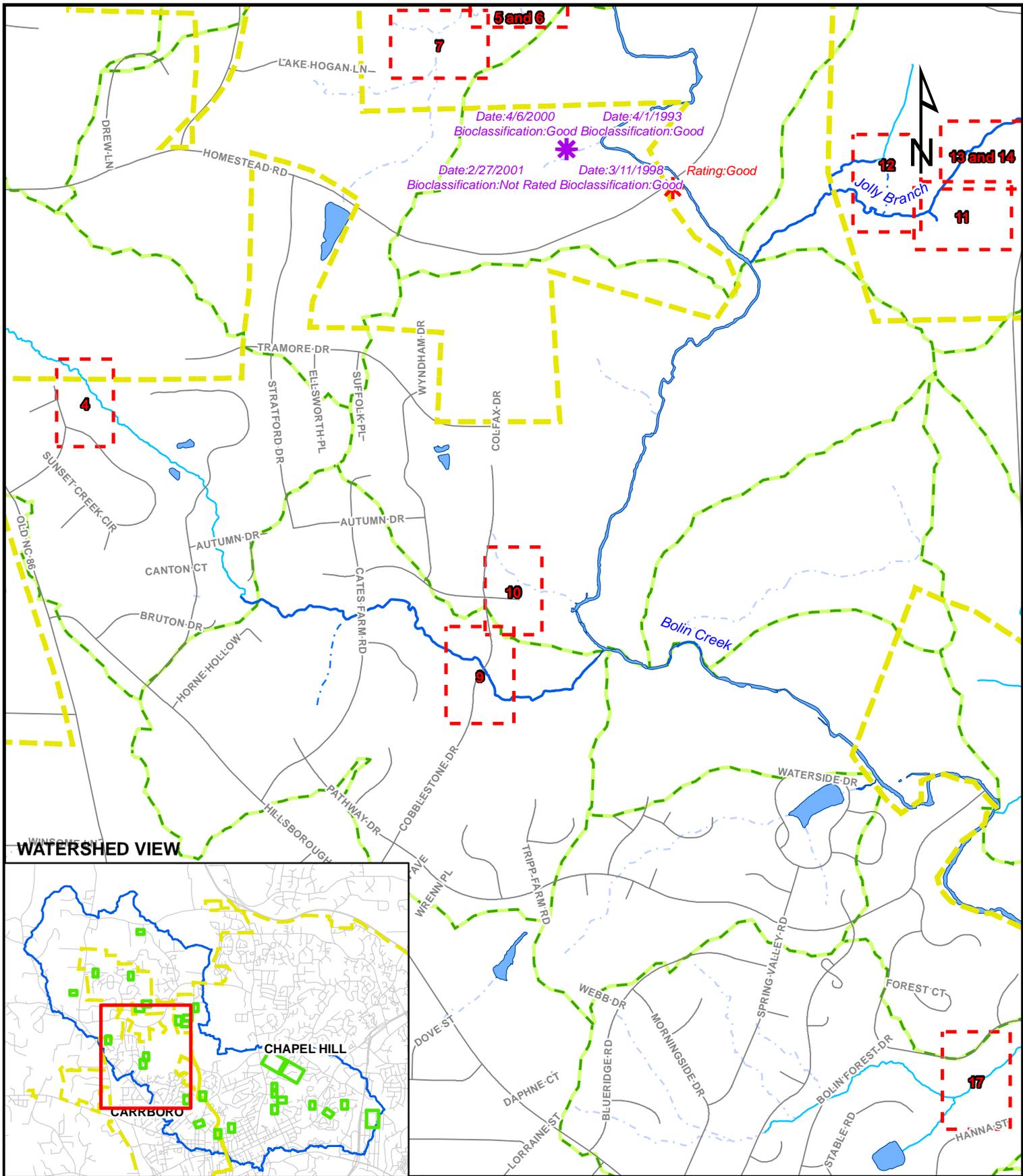
## **SITE 10**

### **Construction of Stormwater Wetland on Ephemeral Channel**

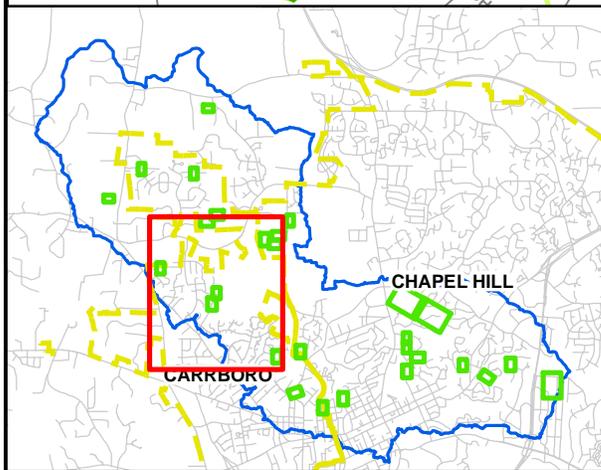
Index Sheet No.: 15  
Raw Data Name: TA 12



Estimated Construction Cost: \$48,300



**WATERSHED VIEW**



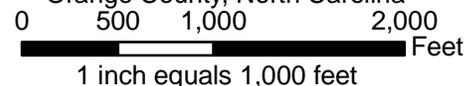
**Legend**

- Ambient Monitoring
- Benthic Monitoring
- Fish Sampling
- Municipal Boundary
- Orange County Roads
- Subwatersheds
- Perennial Stream
- Intermittent Stream
- Ephemeral Stream
- Stream, unknown flow



**SITE 10  
VICINITY MAP**

Geomorphic Analysis and Identification of Potential Sites for Stormwater BMPs  
Orange County, North Carolina



**Project Description**

	Drainage Area (acres)	Impervious Area (acres)	% Impervious
Site 10	36.0	7.7	21.3%

**Location**

Site 10 is located to the east of Rockgarden Rd and Cobblestone Dr., behind several houses and adjacent to a sewer easement. To get to the site from downtown Carrboro, take Greensboro St. until it joins with Hillsborough Rd., and proceed north for a half mile before turning right on Cobbleston Dr. At the intersection with Rockgarden Rd. turn right into a dead end road. The site is downhill and to the north of the dead end.

**Problem Description**

Site 10 consists of an ephemeral stream (drainage area approximately 36 acres) that flows diffusely through a flat wooded area behind the yards of two houses, and then becomes concentrated where the slope of the valley begins to steepen. The stream flows directly into Bolin Creek after only a short distance downhill. Where the flow concentrates, a discernible head cut has formed, and is advancing upstream. The head cut is most likely caused by an increased amount of flow in the watershed due to the increase in impervious area, and the lowering of bed elevations of Bolin Creek, which is causing a corresponding drop in the bed of the tributary stream. Currently, the contributing drainage area of the stream has no water quality or water quantity treatment.

**Proposed Solution**

The topographically flat area present at Site 10 provides a good location to construct a stormwater wetland or bio-retention area at minimal cost. Due to the ephemeral nature of the drainage feature and large area available, a stormwater wetland is advised. A large enough area is present that the wetland could treat the calculated water quality treatment volume (WQv) for the contributing drainage area. A bio-retention area could be constructed, if a smaller surface area were used than what is proposed, otherwise the cost of the bioretention area, which is typically much higher than that of a comparably sized stormwater wetland, would be prohibitively expensive.

Potential pollution removal rates using this method have been estimated and are shown in **Table 10.1**.

*Bolin Creek Watershed  
Geomorphic Analysis and Potential Site Identification for Stormwater BMPs and Retrofits*

**Table 10.1**

SITE 15-01	Pollutant Load (lbs)		
	TN	TP	TSS
EXISTING CONDITION	13.07	1.32	178.06
STORMWATER WETLAND TREATMENT REMOVAL %	37.00%	35.00%	85.00%
NET REDUCTION	4.84	0.46	151.35
FUTURE CONDITION	8.24	0.86	26.71

The stream that flows through Site 10 is labeled as “unknown flow” by both the Carrboro and Chapel Hill stream data, and therefore would need to be verified as ephemeral before construction of an in-line stormwater wetland. Earth Tech based our ephemeral classification purely on field experience and experience with DWQ stream classification forms.

The current nutrient export rates, and potential benefit of a stormwater wetland here have been calculated based on land use, drainage area and percent imperviousness of the drainage area, and are displayed in **Table 10.1**:

**Constraints**

The biggest constraint at this site could potentially be landowner cooperation and land acquisition. The access easement could be obtained to the current dead end of Rockgarden Rd, which is uphill of the project site. In addition, an existing sewer line runs parallel to the project site, indicating that a drainage easement may exist at the site. .

**Alternatives**

No alternatives are proposed for this site.

**Cost-Estimate Breakdown**

**Table 10.2** shows a conceptual itemized cost estimate. These costs represent construction and maintenance costs only. The cost for stormwater wetlands is derived from an equation developed by Brown and Schueler (1997).

**Table 10.2**

SITE 10				
Pay Item Description	Estimated Quantity	Unit	Unit Bid Price	Bid Amount
Stormwater Wetland	31652.0	CF	Equation Derived	\$42,031
<b>Total</b>				<b>\$42,031</b>
Mobilization (5%)	1.0	LS		\$2,102
Contingencies (10%)	1.0	LS		\$4,203
<b>Total + Mobilization and Contingencies</b>				<b>\$48,336</b>
<b>Maintenance Costs</b>				
Maintenance (5% of base construction cost)	1.0	Year		\$2,417



STORMWATER WETLAND AREA

LEVEL SPREADER

**ROCKGARDEN RD**

**COBBLESTONE DR**

**Legend**

- Stormwater Lines
- Impervious Surfaces
- Perennial Stream
- Intermittent Stream
- Ephemeral Stream
- Stream, unknown flow
- Contours

**EarthTech**  
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**CONCEPTUAL PLAN VIEW**  
BOLIN CREEK WATERSHED  
Geomorphic Analysis and Potential Site  
Identification For  
Stormwater Structures and Retrofits

0 20 40 80 Feet  
1 inch equals 40 feet



**SITE 10**

STORMWATER WETLAND AREA

LEVEL SPREADER

ROCKGARDEN RD

COBBLESTONE DR

**Legend**

- Stormwater Lines
- Perennial Stream
- Intermittent Stream
- Ephemeral Stream
- Stream, unknown flow



**AERIAL PHOTO VIEW**

BOLIN CREEK WATERSHED  
Geomorphic Analysis and Potential Site  
Identification For  
Stormwater Structures and Retrofits

