

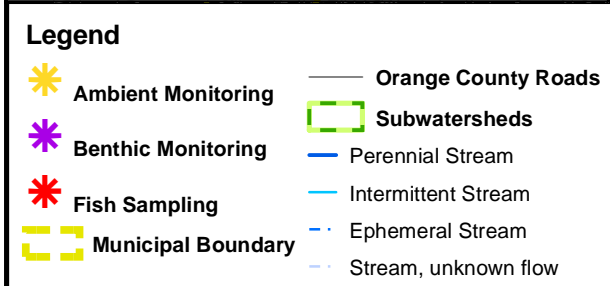
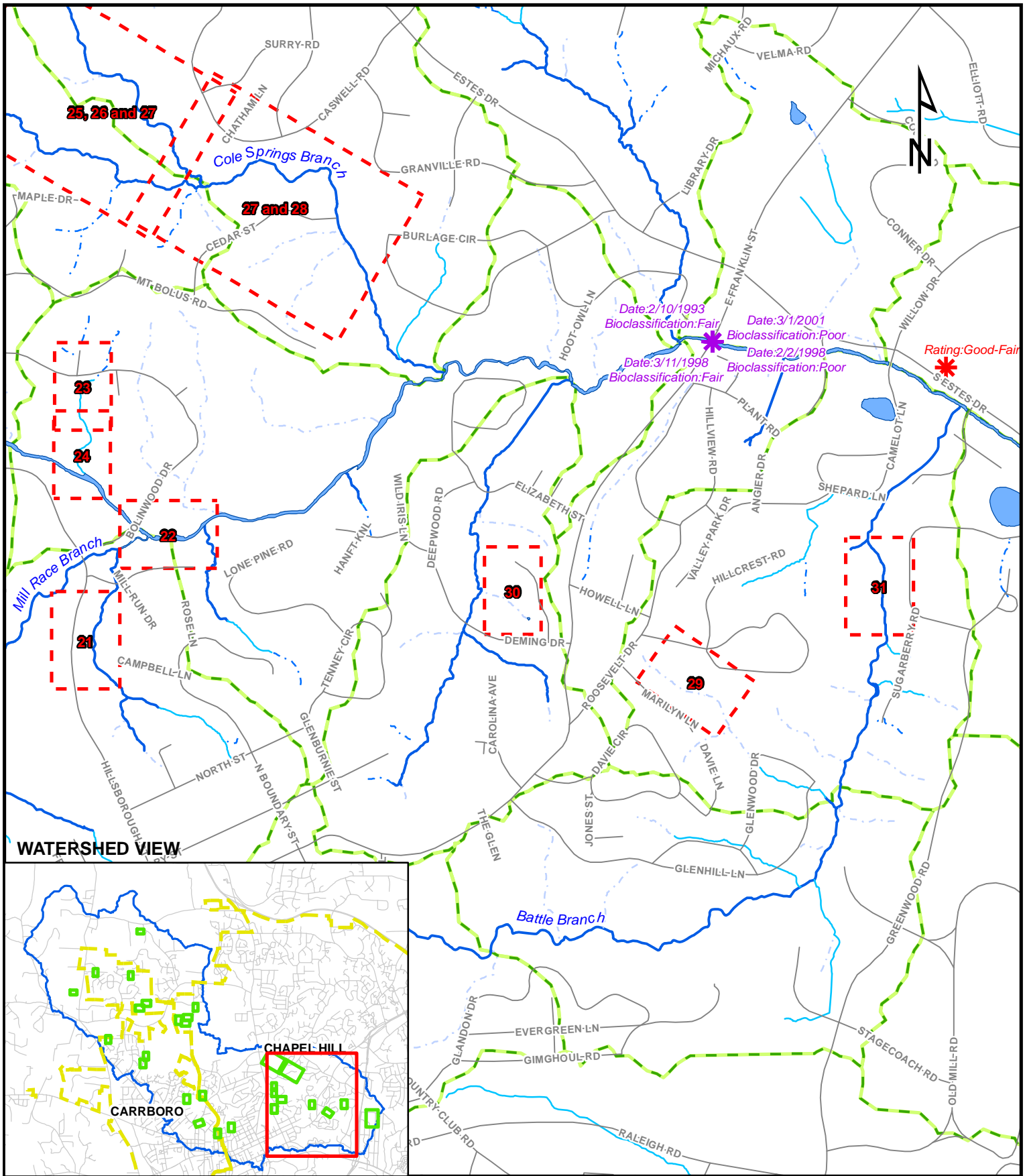
SITE 30

Retrofit of Existing Sediment Basin and Stabilization of Hillside erosion.

Index Sheet No.: 30
Raw Data Name: IJ 60



Estimated Construction Cost: \$28,500



SITE 30 VICINITY MAP

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

0 500 1,000 2,000 Feet

1 inch equals 1,000 feet

Project Description

	Drainage Area (acres)	Impervious Area (acres)	% Impervious
Site 30	1.3	0.5	39.9%

Location

Site 30 is downhill and to the west of Hoteling Ct. The site can be reached from E. Franklin Street by turning onto Deming Drive,, taking the first right turn onto Hoteling Ct. and parking at the end of the cul-de-sac.

Problem Description

Site 30 consists of an existing sediment basin on a steep hillside, just below a residential development constructed on top of the hillside. The basin has filled in since the construction of the residential area, and is no longer storing the runoff produced from the street, rooftops and driveways. In addition, there is no evidence that the basin was ever intended for water quality treatment. Runoff flows over the rip-rap berm of the basin, into an apparently ephemeral drainage and then into a perennial stream at the bottom of the hill.

A concrete pipe outlet is located uphill of the existing basin, but has no stormwater control structure immediately below it. Because of this, the steep slope below the outlet has begun to erode. In the span of a month, between two visits to the site, the hillside below the outlet visibly increased in erosion. Evidence of the increased peak flows being produced by the drainage area can also be seen in the perennial stream located downhill from the site. Significant bank erosion is apparent where the ephemeral drainage joins with the stream, which is otherwise stable throughout most of its course.

Proposed Solution

The existing sediment basin at this site provides a good location for a stormwater retrofit. The solution at Site 30 is targeted at the treatment of pollutants from runoff, the stabilization of an actively eroding hillside to reduce sediment export and the attenuation of peak flows to prevent impacts to the perennial stream downhill from the site. This will be accomplished through the following:

- Retrofit the basin into a small, bioretention area with an overflow to a level spreader. An underdrain may be required to meet the required infiltration rate (NCDWQ, 2007).
- Stabilize the eroding hillside below the existing outlet by constructing a concrete lined “flume” with friction blocks. The friction blocks will provide a means of reducing the velocity of storm flow before entering the wet detention basin.
- Provide an energy dissipation basin where the flume meets the bio-retention area

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

These retrofits will reduce the velocities from the residential stormwater system before they flow reaches the receiving channel. A bioretention area will allow for treatment of the pollutants from the residential area and attenuate the peak flows of the site.

Based on the above treatment, pollutants are expected to be reduced in the amounts shown in **Table 30.1**.

Table 30.1

SITE 30	Pollutant Load (lbs)		
	TN	TP	TSS
EXISTING CONDITION	19.88	2.01	270.19
WET DETENTION TREATMENT REMOVAL %	25.00%	40.00%	85.00%
NET REDUCTION	4.97	0.80	229.67
FUTURE CONDITION	14.91	1.20	40.53

Constraints

Site access and construction will be difficult due to the steep terrain. This BMP is located on private property. Tree removal will be required.

Alternatives

There are no alternatives proposed for this site.

Cost-Estimate Breakdown

Table 30.2 shows a conceptual itemized cost estimate for Site 30. These costs represent construction and maintenance costs only. The cost for the bioretention area is derived from a cost per cubic foot treated for bioretention areas as reported by Schueler, et. al. (2007). The contingency fee for this site has been increased due to the difficulty of access and proximity to a utility easement.

Table 30.2

SITE 30				
Pay Item Description	Estimated Quantity	Unit	Unit Bid Price	Bid Amount
Bio-Retention Area	1882.00	CF	12.62	\$23,751
			Total	\$23,751
Mobilization (5%)	1.00	LS		\$1,188
Contingencies (15%)	1.00	LS		\$3,563
			Total + Mobilization and Contingencies	\$28,501
Maintenance Costs				
Maintenance (5% of base construction cost of BMP)	1.0	Year		\$1,425



HOTELING CT

SITE 30

BIORETENTION AREA

INLET

CONCRETE LINED WITH FRICTION BLOCKS

LEVEL SPREADER

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



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 30

HOTELING CT

BIORETENTION AREA

INLET

CONCRETE LINED WITH FRICTION BLOCKS

LEVEL SPREADER

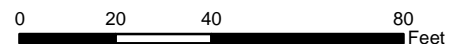
Legend

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




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



1 inch equals 40 feet