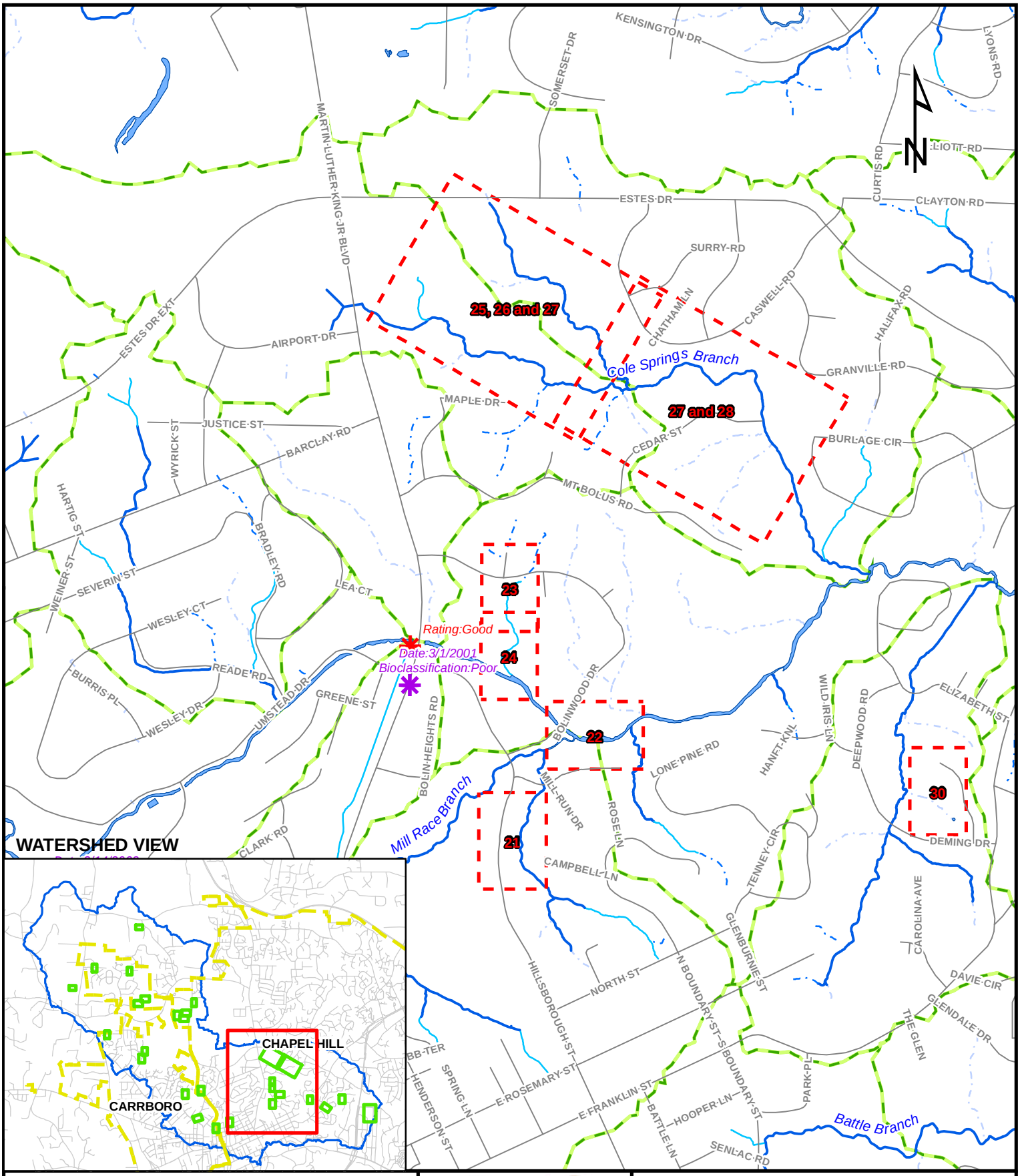
SITE 23

Retrofit of Existing Sediment Basin in Residential Area off Bolinwood Drive

Index Sheet No.: 25
Raw Data Name: BD 57

Estimated Construction Cost: $32,000



Legend

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

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SITE 23
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 23	14.5	2.6	18.1%

Location

Site 23 is located just south of Bolinwood Drive, near its intersection with Mullin Ct. The site is approximately 700 feet to the east of the intersection of Bolinwood Drive and Martin Luther King Jr .Blvd.

Problem Description

Site 23 consists of an existing sediment basin at a pipe outlet just south of Bolinwood Drive. The basin was likely built during construction of the surrounding neighborhood to collect sediment from runoff during construction. The basin has now filled in, and consists only of a rip rap berm and a long, flat area of silt and clay. Small trees have grown up in the basin over the intervening years, and the entire site is surrounded by a young forest. Stormwater from the culvert currently passes over the basin without any significant retention or detention, and then concentrates into a scoured channel just downhill of the basin. Due to these existing conditions, there is no water quality treatment of the runoff of the contributing drainage area, which consists of a residential area of large houses and driveways. The ephemeral drain downstream of the old basin is eroding and shows signs of hydraulic stress from concentrated flows. The downstream channel is incised and actively headcutting upstream. This headcut is addressed in Site 24.

Proposed Solution

The existing basin at Site 23 poses a good opportunity for a BMP retrofit in the form of a bioretention area. The existing basin is relatively long, which will provide an adequate flow path ratio of greater than 3:1, which is recommended for bioretention areas (DWQ, 2007). In addition, excavation will be limited to digging out the depth needed for adequate water quality storage volume. The storage volume in the bioretention area will reduce the runoff volume for the downstream reach, change the timing of peak flows and reduce peak flows leaving the site. This site would assist in the successful stabilization of the reach in site 24.

The current nutrient export rates, and potential benefit of a bioretention area here have been calculated based on land use, drainage area and percent imperviousness of the drainage area, and are displayed in **Table 23.1**:

Table 23.1

SITE 23	Pollutant Load (lbs)		
	TN	TP	TSS
EXISTING CONDITION	6.89	0.45	172.89
BIORETENTION TREATMENT REMOVAL %	35.00%	45.00%	85.00%
NET REDUCTION	2.41	0.20	146.95
FUTURE CONDITION	4.48	0.25	25.93

Constraints

Orange County tax parcel GIS data indicates that the property on which Site 23 is located is privately owned by a single landowner. The nearest right of way to this site is Bolinwood Drive. If Site 23 is constructed, it is advisable to implement these two designs simultaneously and access may be more feasible by selected pathway through the forest along the reach from the downstream site.

Alternatives

There are no alternatives proposed for this site.

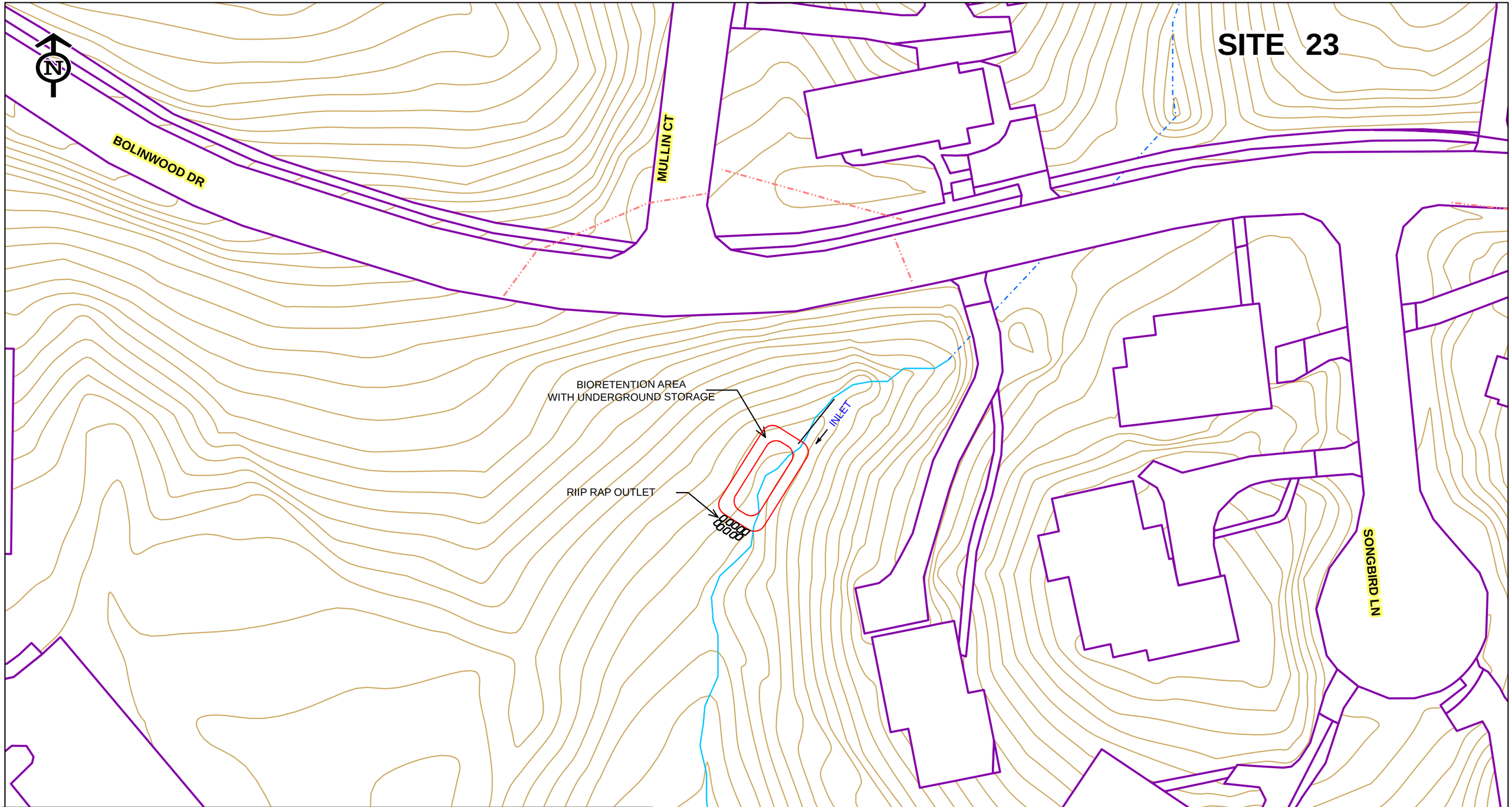
Cost-Estimate Breakdown

Table 23.2 shows a conceptual itemized cost estimate for Site 23. These costs represent construction and maintenance costs only. The cost for the bio-grade step 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.

Table 23.2

SITE 23 Construction Cost

Pay Item Description	Estimated Quantity	Unit	Unit Bid Price	Bid Amount
Bio-Retention Area	2115.00	CY	12.62	$26,691
			Total	$26,691
Mobilization (5%)	1.00	LS		$1,335
Contingencies (15%)	1.00	LS		$4,004
	Total + Mobilization and Contingencies			**$32,030**
Maintenance Costs				
Maintenance (5% of base construction cost of BMP)	1.0	Year		**$1,601**



Legend

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

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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

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

0 20 40 80 Feet

1 inch equals 40 feet