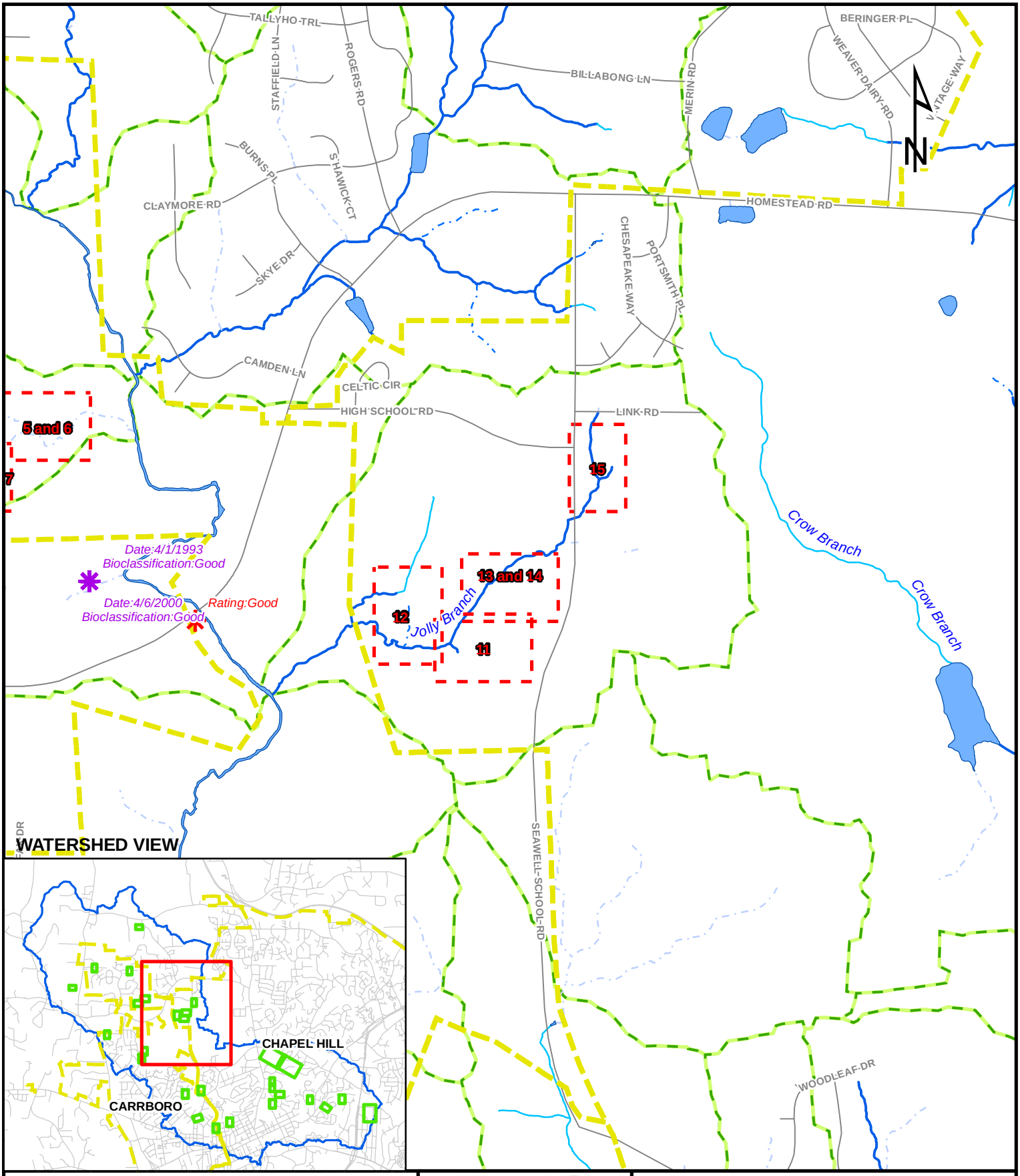
SITE 14

Index Sheet No.: 16
Raw Data Name: None

Estimated Construction Cost: $25,600



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 13 and 14
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 14	2.9	1.5	53.1%

Location

Site 14 is located north of a parking lot of Smith Middle School, off of Seawell School Rd.

Problem Description

Site 14 is situated at the outlet pipe that discharges the storm flow of one of the parking lots of Smith Middle School. Currently, no water quality treatment is provided for the parking lot runoff before it reaches the receiving stream, Jolly Branch. This direct discharge to the stream has caused channel incision and does not provide water quality or quantity treatment of any form. Channel instability will continue due to this direct discharge of stormwater into the receiving channel, Jolly Branch.

Sites 11 through 15 are in close proximity to each other, and could therefore be integrated amongst themselves as a single package. In addition, other similar opportunities for the work proposed here are present throughout the three surrounding campuses, as well as other parts of the Jolly Branch watershed.

Proposed Solution

The outlet pipe at Site 14 provides a good location to intercept the runoff produced by the parking lot and provide treatment for pollutants. Because of the small drainage area and limited space available for construction, a bio-retention area with underground storage is the preffered stormwater BMP here. The underground storage will serve to reduce the peak flows of the runoff from the impervious area and can be designed with a drain layer to augment baseflow to Jolly Branch while regaining needed storage volume for the next rain event. For this particular bio-retention area, the concept of providing a drain for the underground storage is an important one. Without intentional release of the stored rainfall, the BMP would loose some of its benefits during frequent rainfall events. It is suggested that this project be designed with a drain layer or under-drain that will drain the stored volume of rainfall within 3-5 days.

Table 14.1 shows a conceptual itemized cost estimate for both alternatives at Site 14.

Table 14.1

SITE 14	Pollutant Load (lbs)		
	TN	TP	TSS
EXISTING CONDITION	14.77	1.64	382.97
BIO-RETENTION TREATMENT	37.00%	45.00%	85.00%
NET REDUCTION	5.47	0.74	325.53
FUTURE CONDITION	9.31	0.90	57.45

Constraints

Some mature trees are present around the site, thus tree removal will be required.

Alternatives

No alternatives are proposed for this site.

Cost-Estimate Breakdown

Table 14.2 shows a conceptual itemized cost estimate for Site 14. 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).

Table 14.2
SITE 14 Construction Cost

Pay Item Description	Estimated Quantity	Unit	Unit Bid Price	Bid Amount
Bio-Retention Area	1770.00	CF	12.62	$22,337
			Total	$22,337
Mobilization (5%)	1.0	LS		$1,117
Contingencies (10%)	1.0	LS		$2,234
	Total + Mobilization and Contingencies			**$25,688**
Maintenance Costs				
Maintenance (5% of base construction cost)	1.0	Year		**$1,284**

SITE 13 and 14

EXISTING INCISED CHANNEL AND HEADCUT

SMALL BIO-RETENTION AREA

SITE 13

LEVEL SPREADER

SITE 14

EXISTING OUTLET DRAINS PARKING LOT

SMALL WET POND WITH LEVEL SPREADER

SMITH MIDDLE SCHOOL

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 25 50 100 Feet

1 inch equals 50 feet

SITE 13 and 14

EXISTING INCISED CHANNEL AND HEADCUT

SMALL BIO-RETENTION AREA

SITE 13

SITE 14

EXISTING OUTLET DRAINS PARKING LOT

LEVEL SPREADER

SMALL WET POND WITH 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

0 25 50 100 Feet

1 inch equals 50 feet