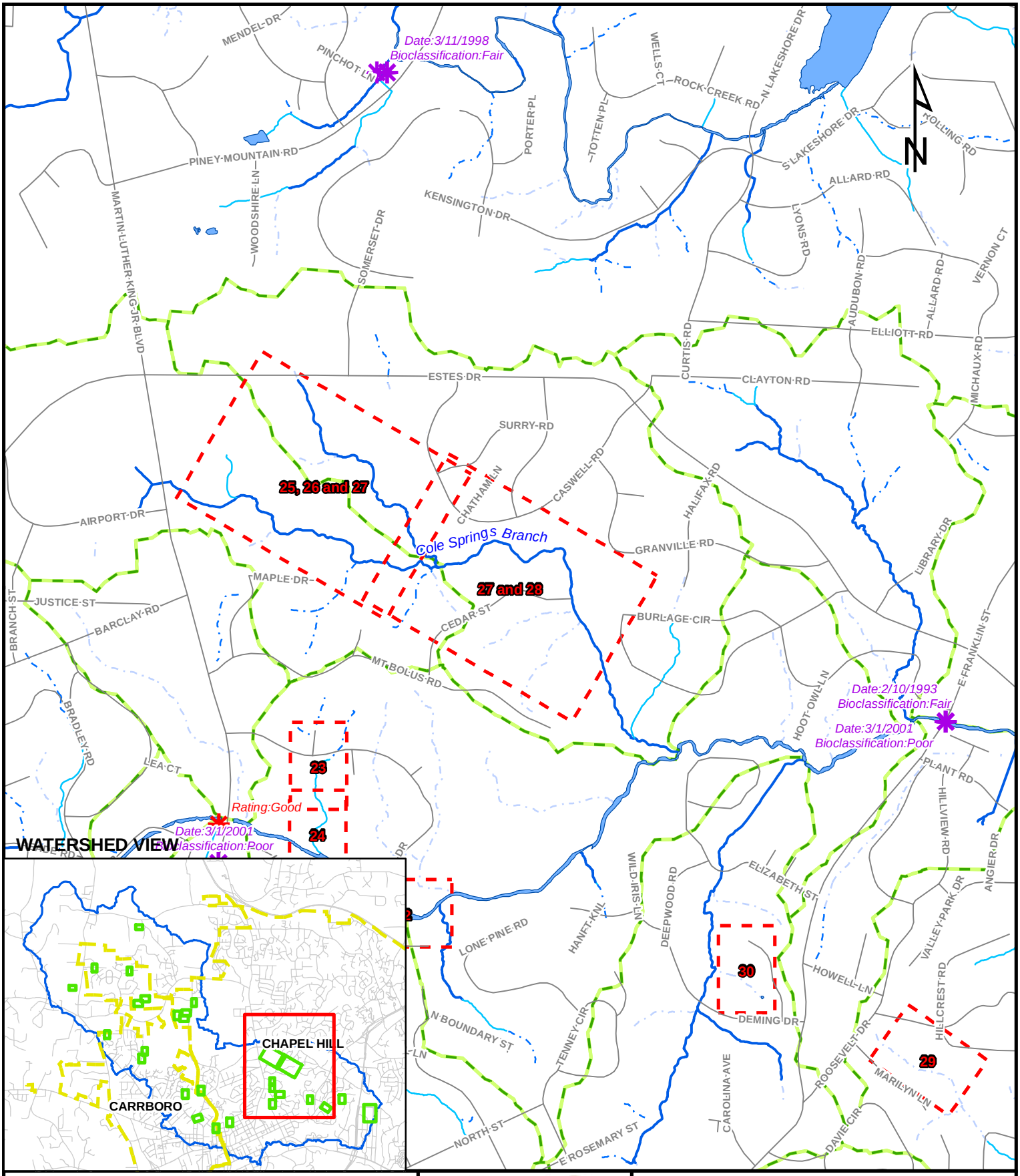
# SITE 27

## Construct Side-Channel Discharge Wetlands to Attenuate Peak Flows

Index Sheet No.: 26
Raw Data Name: BD 65

Estimated Construction Cost: $38,500


Date:3/11/1998
Bioclassification:Fair
25, 26 and 27
Cole Springs Branch
27 and 28
23
24
Rating:Good
Date:3/1/2001
Bioclassification:Poor
Date:2/10/1993
Bioclassification:Fair
Date:3/1/2001
Bioclassification:Poor
30
29
MENDEL DR
PINCHOT LN
PINEY MOUNTAIN RD
WOODSHIRE LN
MARTIN LUTHER KING JR BLVD
SOMERSET DR
KENSINGTON DR
PORTER PL
TOTTEN PL
WELLS CT
ROCK CREEK RD
N LAKESHORE DR
S LAKESHORE DR
ALLARD RD
LYONS RD
AUDUBON RD
VERNON CT
ELLIOTT RD
CURTIS RD
CLAYTON RD
MICHAUX RD
ESTES DR
SURRY RD
CHATHAM LN
CASWELL RD
HALIFAX RD
AIRPORT DR
GRANVILLE RD
LIBRARY DR
MAPLE DR
JUSTICE ST
BARCLAY RD
BRANCH ST
CEDAR ST
BURLAGE CIR
MT BOLUS RD
BRADLEY RD
LEA CT
HOOT OWL LN
E FRANKLIN ST
PLANT RD
HILLVIEW RD
ANGIER DR
ELIZABETH ST
WILD IRIS LN
DEEPWOOD RD
HANFT KNL
LONE PINE RD
VALLEY PARK DR
HOWELL LN
HILLCREST RD
DEMING DR
N BOUNDARY ST
TENNEY CIR
ROOSEVELT DR
MARILYN LN
CAROLINA AVE
DAVIE CIR
NORTH ST
E ROSEMARY ST
WATERSHED VIEW
CHAPEL HILL
CARRBORO
N
Legend
Ambient Monitoring
Benthic Monitoring
Fish Sampling
Municipal Boundary
Orange County Roads
Subwatersheds
Perennial Stream
Intermittent Stream
Ephemeral Stream
Stream, unknown flow
EarthTech
A tyco International Ltd. Company
SITE 27 and 28
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*

Cole Springs Branch

| | Drainage Area (acres) | Impervious Area (acres) | % Impervious |
|---|---|---|---|
| **Site 27** | 161.6 | 33.2 | 20.5% |

**Location**

Site 27 is located approximately 900 feet to the southwest of the intersection of Caswell Rd. and Chatham Ln.

**Problem Description**

The perennial stream along which Site 27 is located, Cole Springs Branch, exhibits severe incision and erosion for most of its course from it's headwaters to where it flows into Bolin Creek. The causes of this widespread degradation are apparent when examining the watershed of the stream, which consists of vast areas of impervious surface, including portions of Horace Williams Airport, the UNC facilities management complex, and high density residential developments. The crossing of Martin Luther King Jr. Blvd. also seems to have adversely affected the stream, as the accumulated and concentrated flow of most of the watersheds impervious area is discharged from a culcert after passing under that road.

While the riparian corridor of the stream after passing under Martin Luther King Jr. Blvd is largely intact, many small tributaries, most of which discharge from residential storm sewer systems, continue to flow into Cole Springs Branch before it meets Bolin Creek downstream. The combined problems of peak flow and pollutant input from all of these small drainages likely compounds the degradation already being caused by the accumulated flow and pollutants from upstream of Martin Luther King Jr. Blvd.

**Proposed Solution**

Site 27 is situated in a wide, flat portion of the Cole Springs Branch floodplain, which provides a good location for the construction of off-line BMPs for peak flow attenuation, pollutant removal and baseflow augmentation.

At least two areas within this valley could be used for off-line stormwater wetlands. Stormwater wetlands are a preferred choice here, as the floodplain may not have the minimum depth required from the water table that is required for bio-retention areas. On the other hand, having a high water table is beneficial to a wetland as it allows for permanent pools (NCDWQ, 2007). These side channel wetlands capture a portion of the runoff volume which reduced the flow rate, velocities and changes the timing of peak flows to the downstream reach. The saturated condition of the wetland may be paralleled to a beaver pond in the expectation to augment baseflow via the saturated soils within the wetland.

Flow diversion into the wetland would be provided by a flow-splitting structure containing a a vane or weir, placed in Cole Springs Branch. This is a common way to

"harvest" storm flows without impeding the base flows of the stream in any way. Such a structure would allow a designed volume of flow to enter into the wetland, while allowing any flow above that volume to continue downstream. If properly placed and designed, a grade control or cross vane can serve this same purpose while acting a grade control for the stream.

## Constraints

Most of the site consists of a mature hardwood forest, and therefore tree removal will be necessary at this site for both BMPs.

The site is located on a privately owned property.

Access to the site for construction may be limited due to the wooded state of the surrounding area, and will have to be arranged with the landowners.

## Alternatives

No alternatives are proposed for this site.

## Cost-Estimate Breakdown

**Table 27.1** shows a conceptual itemized cost estimate for Site 27. 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 27.1**
**Site 27**

| Pay Item Description | Estimated Quantity | Unit | Unit Bid Price | Bid Amount |
|---|---|---|---|---|
| Stormwater Wetland | 6293.0 | CF | Equation Derived | $13,545 |
| Stormwater Wetland | 9880.0 | CF | Equation Derived | $18,583 |
| | | | **Total** | $32,128 |
| Mobilization (5%) | 1.00 | LS | | $1,606 |
| Contingencies (15%) | 1.00 | LS | | $4,819 |
| | | Total + Mobilization and Contingencies | | **$38,554** |
| **Maintenance Costs** | | | | |
| Maintenance (5% of base construction cost of BMP) | 1.0 | Year | | **$1,928** |

# SITE 27 and 28

SURRY RD

CASWELL RD

CHATHAM LN

BURLAGE CIR

CEDAR ST

Site 28

Cole Springs Branch

BIORETENTION AREA

Site 27

SIDE CHANNEL DISCHARGE AREA

SIDE CHANNEL DISCHARGE AREA

## 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 75 150 300 Feet

1 inch equals 150 feet

# SITE 27 and 28

SURRY RD

CASWELL RD

CHATHAM LN

BURLAGE CIR

Site 28

Cole Springs Branch

BIORETENTION AREA

Site 27

SIDE CHANNEL DISCHARGE AREA

SIDE CHANNEL DISCHARGE AREA

CEDAR ST

## 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 75 150 300 Feet

1 inch equals 150 feet