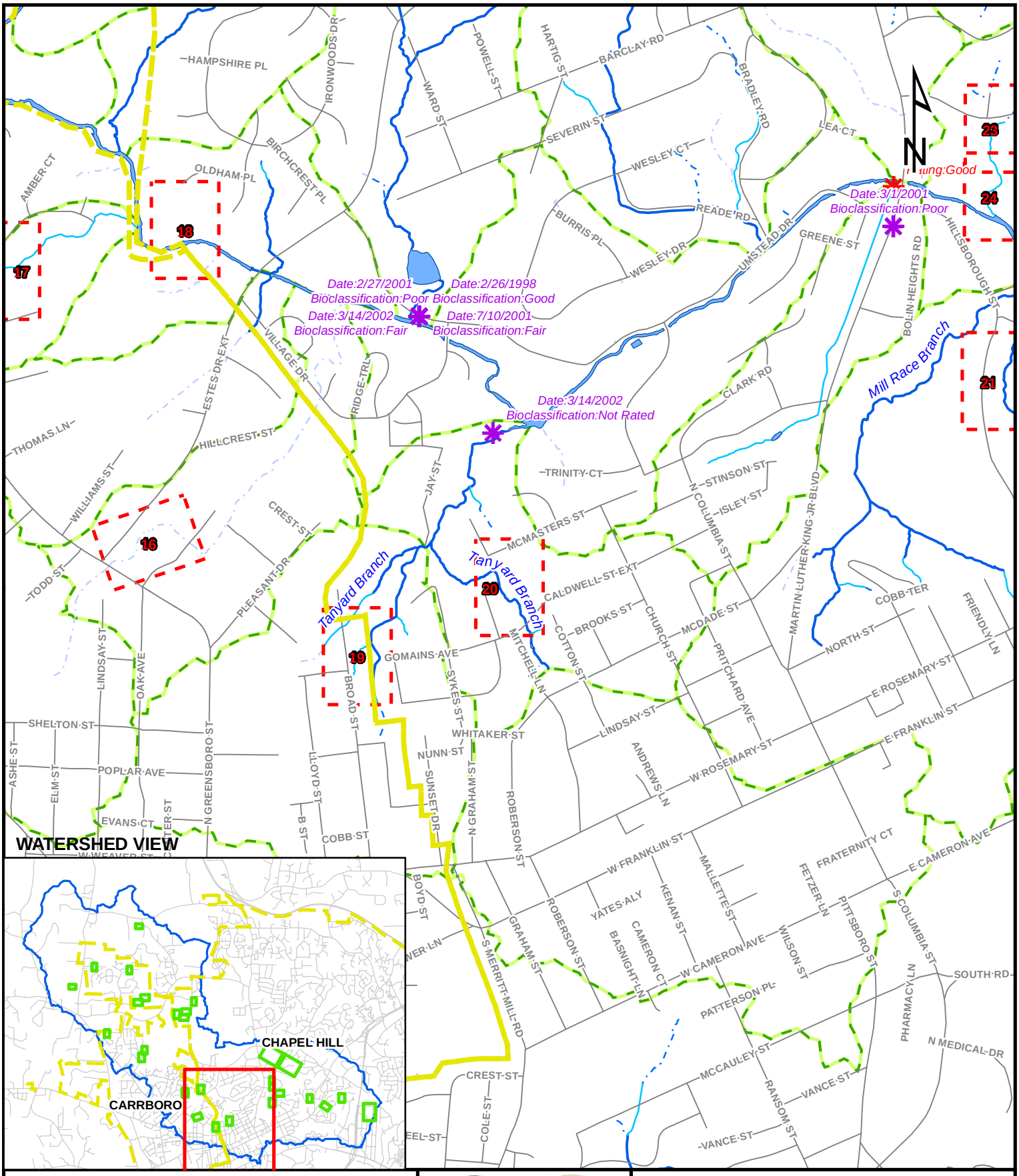
SITE 20

Stream Restoration/Bank Stabilization on Incised Reach of Tanyard Branch

Index Sheet No.: 24
Raw Data Name: TA 24-01

Estimated Construction Cost: $49,500



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 20
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 20	205.9	102.9	50.0%

Location

Site 20 is located north of Caldwell Street Extension, approximately 0.5 miles north of Rosemary Street in downtown Chapel Hill.

Problem Description

Site 20 consists approximately 500 feet of an incised stream channel, Tanyard Branch, with actively eroding, vertical banks and lack of riparian buffer. The stream flows through an urban residential area, and a large culvert before reaching the project site. The eroding streambanks are likely the result of a combination of the upstream road crossing, increased peak flows due to the high percentage of impervious area in the contributing watershed, and lack or riparian vegetation to hold the banks. The mass wasting stream banks are causing export of sediment and associated nutrients. A preliminary investigation of streambank erosion potential using the BANCS model show that approximately 1902 tons of sediment are being exported from the site each year. Concomitant nutrient export associated with the sediment has also been calculated and is listed in **Table 20.1**.

Table 20.1

Pre-Treatment	
Estimated Total Sediment Export	1901.9 tons/year
Erosion per length of Channel	3.7 tons/yr/ft
Pounds of Nitrogen	3803.8 lbs/year
Pounds of Phosphorus	1901.9 lbs/year
Post-Treatment	
Estimated Total Sediment Export	2 tons/year
Erosion per length of Channel	0 tons/yr/ft
Pounds of Nitrogen	3.9 lbs/year
Pounds of Phosphorus	2 lbs/year

Proposed Solution

Bank stabilization is the preferred solution to this problem with the addition of re-vegetation after construction is complete. This relatively short stretch of channel is not long enough to restore completely, but reducing near-bank stress could eliminate the majority of the sediment contributions from this reach. Laying back the banks as much as possible, establishing an interior floodplain or bankfull bench and possibly even

placing a vane in this section would accomplish the goal of reducing stresses. Brush mattresses may be used to quickly stabilize the modified banks.

As this channel is overly wide, a bankfull bench would and modification to channel cross section geometry would promote channel stability. Revegetation is critical for this site.

Constraints

This site will require a certain degree of either site acquisition or agreement of adjacent landowners to implement the project. The sloping back of banks will place the current stream banks further from the stream channel than they are currently, requiring that a certain amount of land be appropriated for this use. According to Orange County Parcel data, one bank of the proposed reach is owned by the Town of Chapel Hill and Orange County. The other bank, however, is under private ownership, and the landowner would need to be contacted to provide permission for any work done.

Alternatives

There are no proposed alternatives at this site.

Cost-Estimate Breakdown

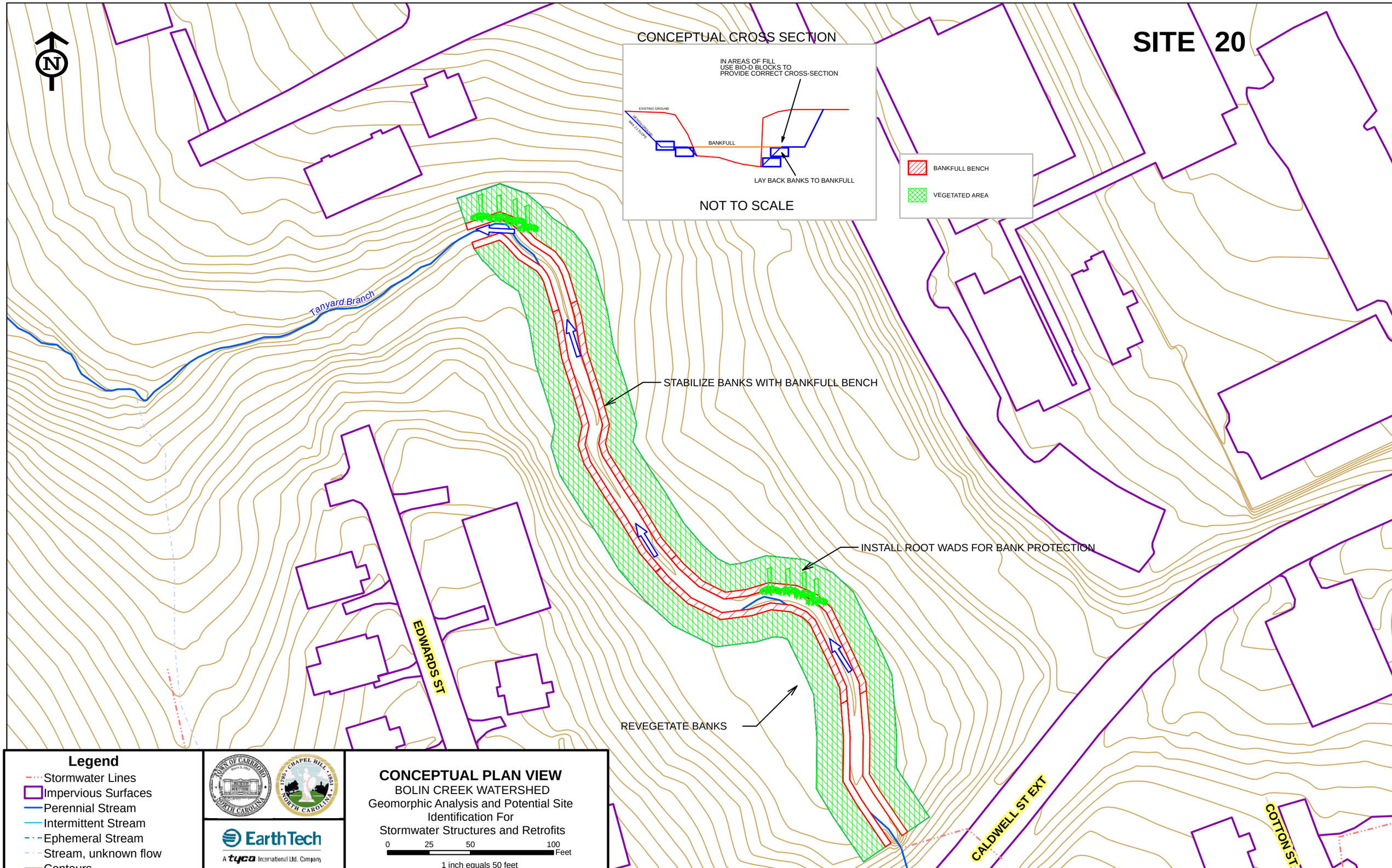
Table 20.2 shows a conceptual itemized cost estimate for Site 20. These costs represent construction costs only.

Table 20.2

SITE 20 Construction Cost

Pay Item Description	Estimated Quantity	Unit	Unit Bid Price	Bid Amount
Excavation	1900.00	CY	15.00	$28,500
Site Preparation and Planting	0.47	AC	7500.00	$3,525
Bio-D Blocks for Bank Stabilization	100.00	LF	20.00	$2,000
Silt Fence	1000.00	LF	3.75	$3,750
Construction Safety Fence	1100.00	LF	2.50	$2,750
Construction Entrance	1.00	Ea	2500.00	$2,500
Root Wads	8.00	Ea	395.00	$3,160
			Total	$43,025
Mobilization (5%)	1.00	LS		$2,151
Contingencies (10%)	1.00	LS		$4,303
	Total + Mobilization and Contingencies			**$49,479**

SITE 20



Legend

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

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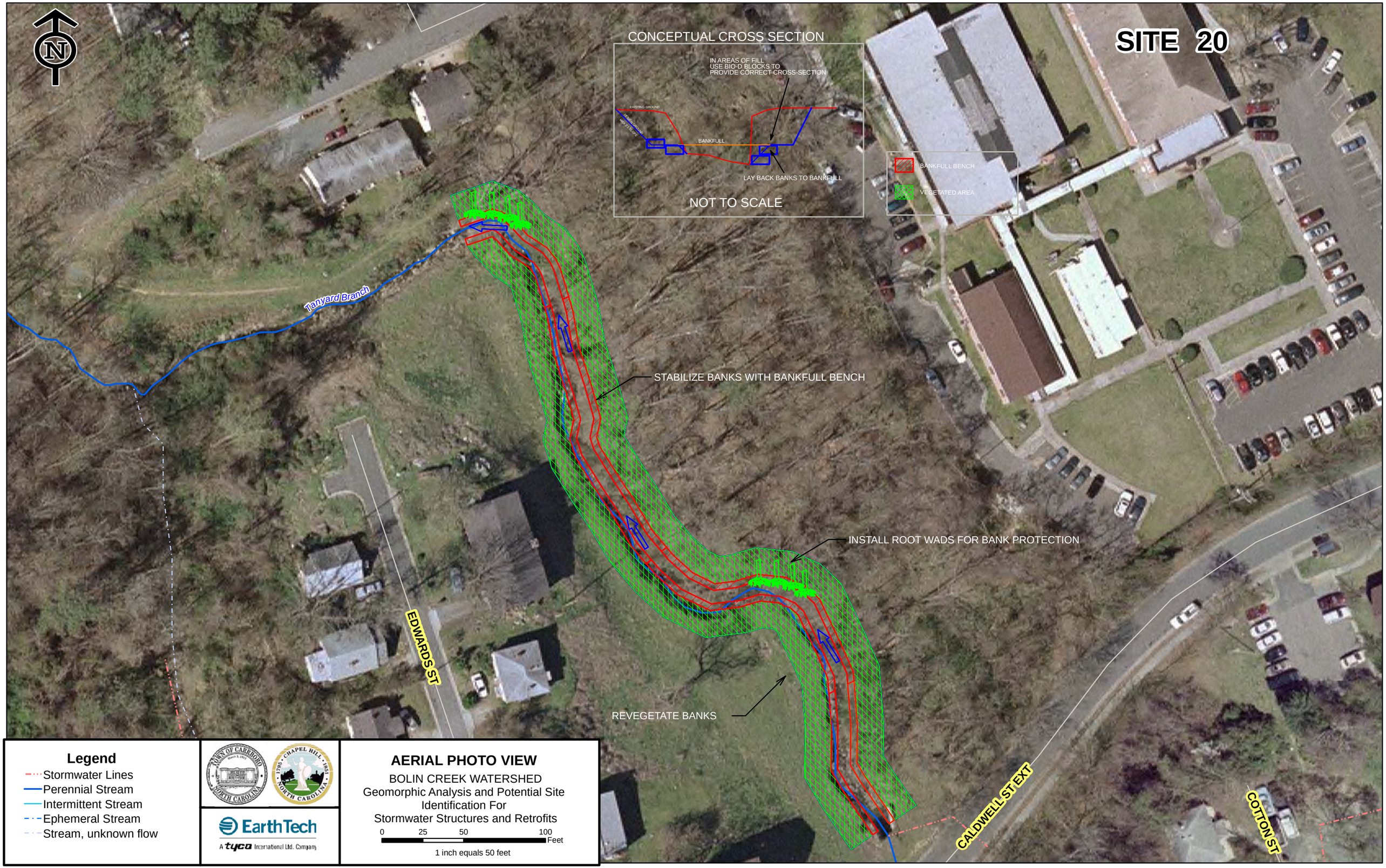
CONCEPTUAL PLAN VIEW
BOLIN CREEK WATERSHED
Geomorphic Analysis and Potential Site Identification For
Stormwater Structures and Retrofits

0 25 50 100 Feet

1 inch equals 50 feet


SITE 20
CONCEPTUAL CROSS SECTION
IN AREAS OF FILL
USE BIO-D BLOCKS TO
PROVIDE CORRECT CROSS-SECTION
EXISTING GROUND
BANKFULL
LAY BACK BANKS TO BANKFULL
NOT TO SCALE
BANKFULL BENCH
VEGETATED AREA
Tanyard Branch
STABILIZE BANKS WITH BANKFULL BENCH
INSTALL ROOT WADS FOR BANK PROTECTION
REVEGETATE BANKS
EDWARDS ST
CALDWELL ST EXT
COTTON 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 25 50 100 Feet
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