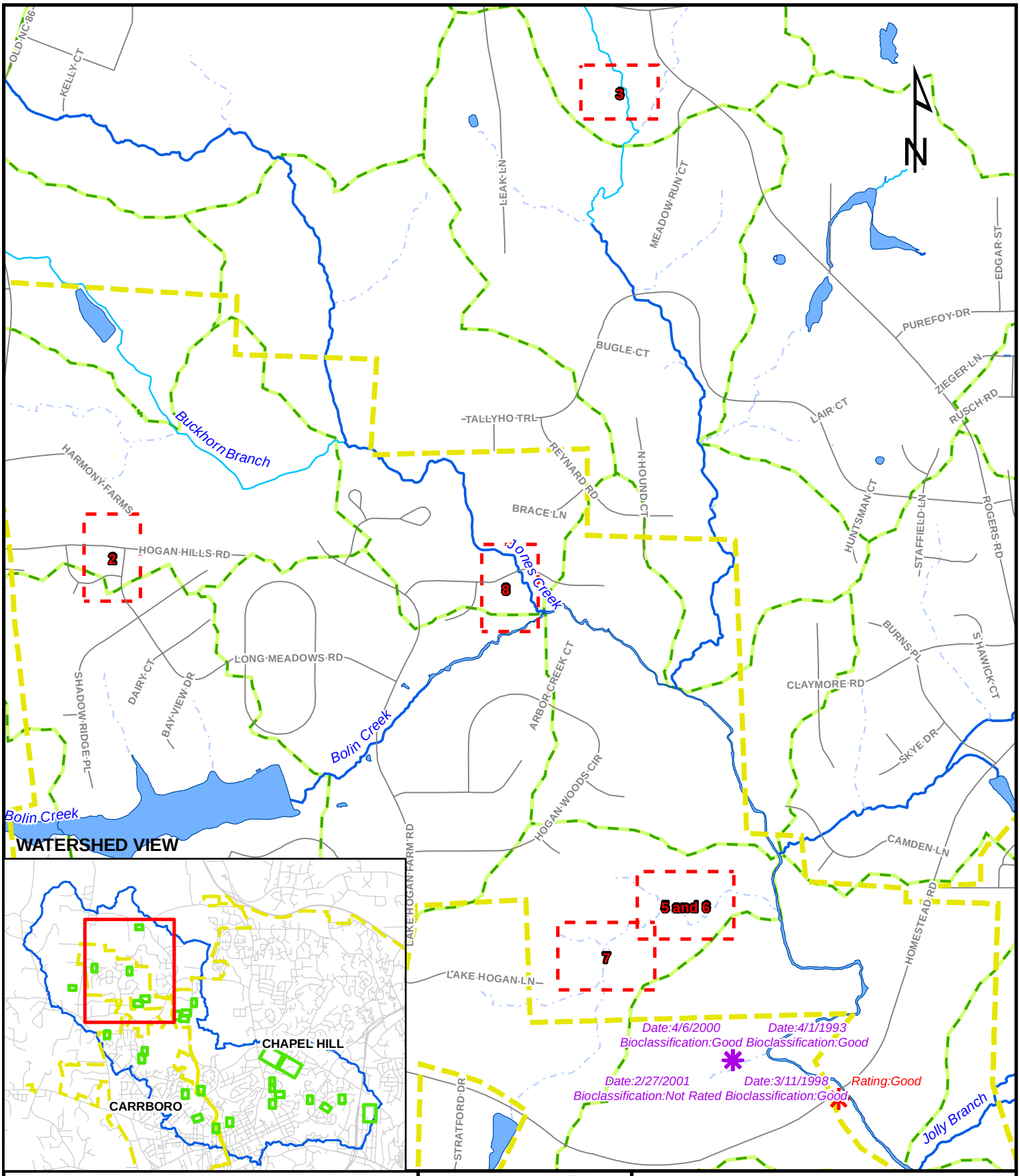
SITE 8

Index Sheet No.: 11
Raw Data Name: IJ 19

Retrofit of Existing Sediment Basin

Estimated Construction Cost: $19,000



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 8
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 8	7.4	1.7	23.0%

Location

Site 8 is located near the intersection of Turtleback Crossing Drive and Painted Turtle Lane, in the Lake Hogan Farms subdivision.

Problem Description

The continuing development of the Lake Hogan Farms subdivision was observed to be impacting the surrounding stream systems, including Jones Creek and Bolin Creek. A number of small sediment basins, likely built during construction of the subdivision, are still in existence in various parts of the subdivision. These provide an opportunity for stormwater BMP retrofits for water quality treatment and the attenuation of peak flows, which should help to alleviate the stress on the surrounding streams.

At present, the BMP at Site 8 only serves as an energy dissipater with some water quantity management. The recessed boulder basin or energy dissipater is a good example of how a discharge outlet must typically be recessed to have an adequate effect of retaining the high velocity flows within a prescribed area. This BMP distributes its flow over a small area of about 20 feet, which then collects as a concentrated flow before entering the channel due to the natural terrain. Earth Tech observed signs of erosion due to this concentrated flow and further deterioration of the streambank of Jones Creek is expected to occur over time. No water quality treatment is presently achieved beyond what would occur due to some diffused flow through vegetation immediately after overflowing the crest of the basin.

Proposed Solution

The treatment at Site 8 should consist of retrofitting the existing basin into a stormwater wetland. This can be done by expanding the volume of the basin and digging out areas within the basin to serve as permanent pools. The wetland should have a constructed forebay to trap sediment and dissipate energy before reaching the remainder of the wetland. Areas of shallow land or low marsh benches can also be constructed to provide a diversity of habitat necessary for maximum pollutant removal. An outlet structure should be constructed consisting of an overflow weir that will discharge into a level spreader. The level spreader is important to ensure that flow spreads out diffusely into the surrounding floodplain, rather than concentrating into areas of scour. The entire site should be planted with native vegetation. A detailed site survey may reveal that the floodplain needs to be graded in order to maintain the diffused flow that will converge with Jones Creek. This project will also benefit from futhur water quality treatment by the use of the vegetated filter strip between the level spreader and Jones Creek, provided the site is adequate to maintain the shallow, diffused flow.

Potential pollution removal rates using this method have been estimated and are shown in **Table 8.1**.

Table 8.1

SITE 8	Pollutant Load (lbs)		
	TN	TP	TSS
EXISTING CONDITION	12.47	1.26	169.43
STORM WATER WETLAND TREATMENT REMOVAL %	40.00%	35.00%	85.00%
NET REDUCTION	4.99	0.44	144.02
FUTURE CONDITION	7.48	0.82	25.42

Constraints

An agreement may have to be worked out with the surrounding landowners to provide drainage and access easements, which are required for stormwater wetlands (NCDWQ, 2007). As with other projects, working in the riparian zone will require care and consideration of water quality effects of the construction project.

Alternatives

No alternatives are proposed for this site.

Cost-Estimate Breakdown

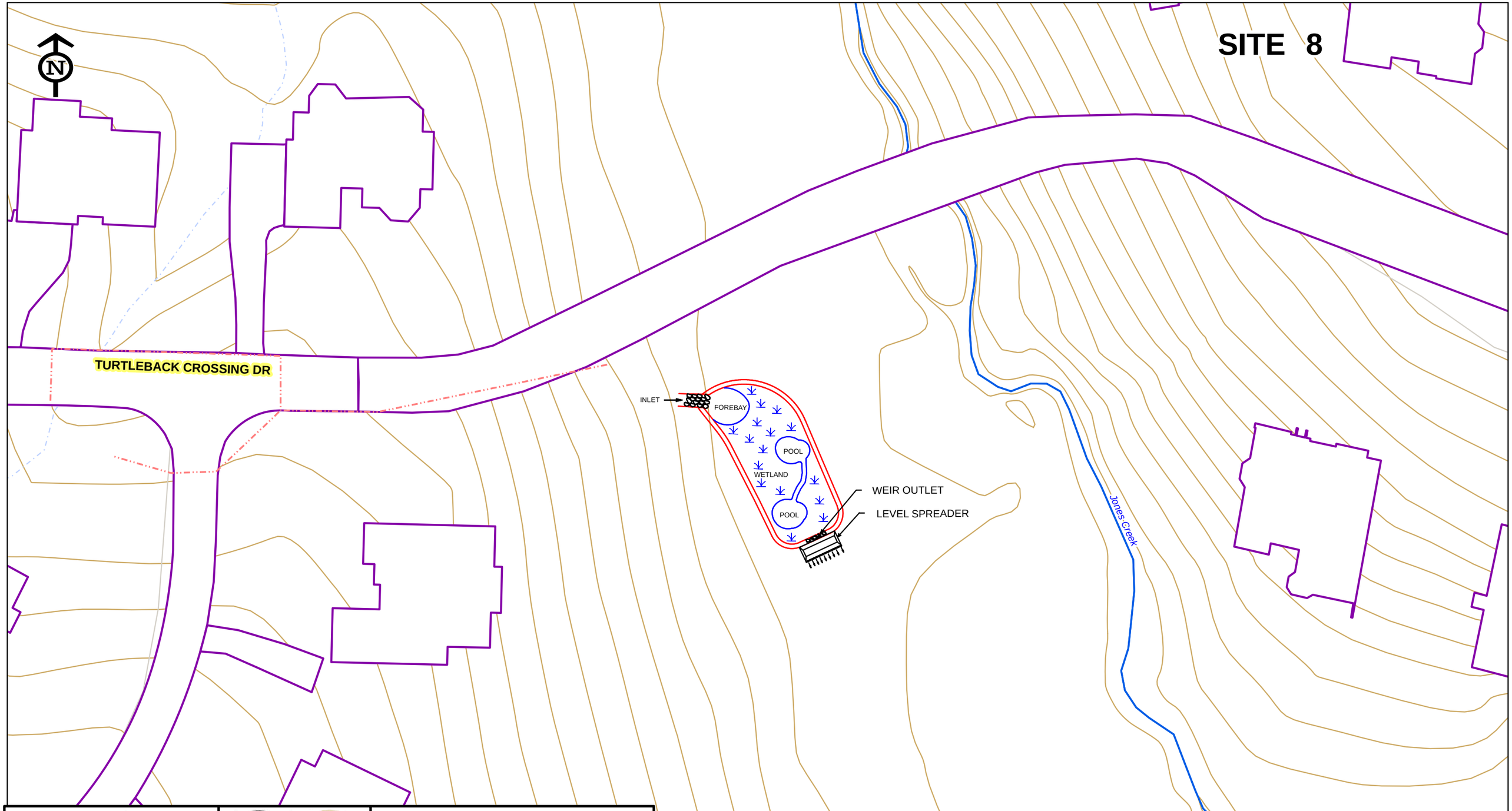
Table 8.2 shows a conceptual itemized cost estimate. These costs represent construction and maintenance costs only. The cost for stormwater wetlands is derived from an equation developed by Brown and Schueler (1997).

Table 8.2

Site 8 Construction Cost

Pay Item Description	Estimated Quantity	Unit	Unit Bid Price	Bid Amount
Stormwater Wetland	8365.0	CF	Equation Derived	$16,536
			Total	$16,536
Mobilization (5%)	1.0	LS		$827
Contingencies (10%)	1.0	LS		$1,654
	Total +	Mobilization and Contingencies		**$19,017**
Maintenance Costs				
Maintenance (5% of base construction cost)	1.0	Year		**$951**

SITE 8



Legend

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

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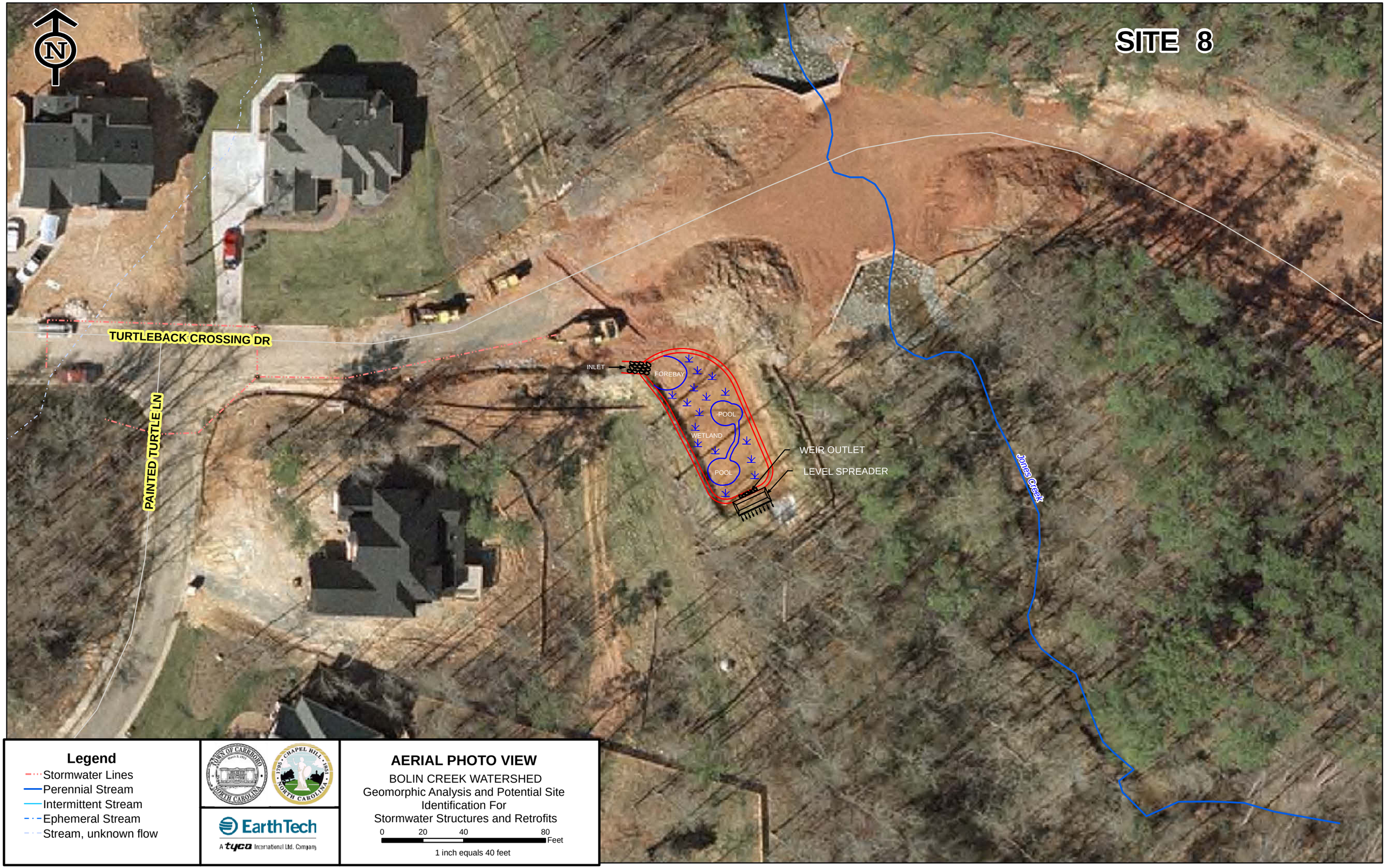
CONCEPTUAL PLAN VIEW
BOLIN CREEK WATERSHED
Geomorphic Analysis and Potential Site Identification For
Stormwater Structures and Retrofits

0 20 40 80 Feet

1 inch equals 40 feet



Legend

- Stormwater Lines
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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