

# The Cub Creek Stream Restoration and Water Quality Enhancement Project



The Design Team



The Landowner



The Funding

---

Blue Ridge Environmental Consultants, P.A.  
336-844-4088 | <http://brec.biz>

# PROJECT HISTORY

- In the Fall of 2006 BREC staff members began working with Town officials to collect data and identify solutions to water quality problems.
- Proactive voluntary solution to water quality, wildlife habitat, and recreation as opposed to state and federally mandated compensatory water quality local ordinances
- To date, 3 phases have been completed.
- Phase I (3000 ‘) was completed in 2008 at a cost of \$300,000. (75% Grant Funded and 25% was provided in matching funds by town labor forces)
- Phases 2a & 2b (6000’) were complete in the Summer of 2012 at a cost of \$500,000. (75% Grant Funded and 25% was provided in matching funds by town labor forces)

# Water Quality Problems.....the need?



In NC, approximately 5000 stream miles (16%) are impaired by sediment, pathogens, low DO, nutrients, & habitat degradation

---

Blue Ridge Environmental Consultants, P.A.  
336-844-4088 | <http://brec.biz>

# Cub Creek Water Quality Problems

Lack of Riparian Buffer

Vertical Eroding Banks

Lack of Floodplain Access



Engineering | Planning | Environmental

Blue Ridge Environmental Consultants, P.A.  
336-844-4088 | <http://brec.biz>

# Cub Creek Water Quality Problems

Lack of Riparian Buffer

Vertical Eroding Banks



Engineering | Planning | Environmental

Blue Ridge Environmental Consultants, P.A.  
336-844-4088 | <http://brec.biz>

# Cub Creek Water Quality Problems



Engineering | Planning | Environmental

---

Blue Ridge Environmental Consultants, P.A.  
336-844-4088 | <http://brec.biz>



# What Can We Restore?

-Structure

-Ecology

-Water Quality

-Recreation

-Aesthetics



## Goals of Restoration Projects?

Enhance functions of natural systems

Physical: Hydrologic & geologic

Chemical: Water quality improvement

Biological: Habitat (optimal & diverse)

Society Value: Recreation & aesthetics

# Restoration Components

- Channel morphology & floodplain connection
- In-stream structures
- Streambank bioengineering
- Riparian buffers
- Habitat enhancements
- Stormwater management
- Monitoring & maintenance
- Public access & education



# LONG RANGE PLAN



© COPYRIGHT 2017 BY BLUE RIDGE ENVIRONMENTAL CONSULTANTS, P.A., ALL RIGHTS RESERVED. THIS PLAN MAY NOT BE REPRODUCED, SOLO, LOANED, OR GIVEN TO OTHERS. REPRODUCTION OR PHOTOCOPYING OF THIS PLAN WITHOUT THE WRITTEN CONSENT OF BLUE RIDGE ENVIRONMENTAL CONSULTANTS, P.A. IS PROHIBITED AND IS A VIOLATION OF FEDERAL COPYRIGHT LAWS, PENALIZED BY FINES UP TO \$500.00 PER OFFENSE.

DO NOT SCALE - PLANS MUST BE RECEIVED AS A COMPLETE SET

<b>PROJECT TITLE</b>	WATER QUALITY & GREENWAY MASTER PLAN	<b>REVISION</b>	
<b>DATE</b>			
BLUE RIDGE ENVIRONMENTAL CONSULTANTS, P.A. ENVIRONMENTAL PLANNING / ENVIRONMENTAL NOBLE ENGINEERING, INC. #4488 100 WEST MAIN STREET FAYETTEVILLE, NC 28404 WWW.BREC.COM			
<b>DATE</b>	02/02/2017		
<b>PROJECT NUMBER</b>			
<b>CITY/TOWN</b>	FAYETTEVILLE		
<b>PROJECT BY</b>	JANIS WALKER		
<b>SCALE</b>	NTS	PH	1/2"
<b>SHEET</b>	C1		

Engineering | Planning | Environmental

Blue Ridge Environmental Consultants, P.A.  
 336-844-4088 | <http://brec.biz>

# PHASE 1 UPDATE



Engineering | Planning | Environmental

Blue Ridge Environmental Consultants, P.A.  
336-844-4088 | <http://brec.biz>

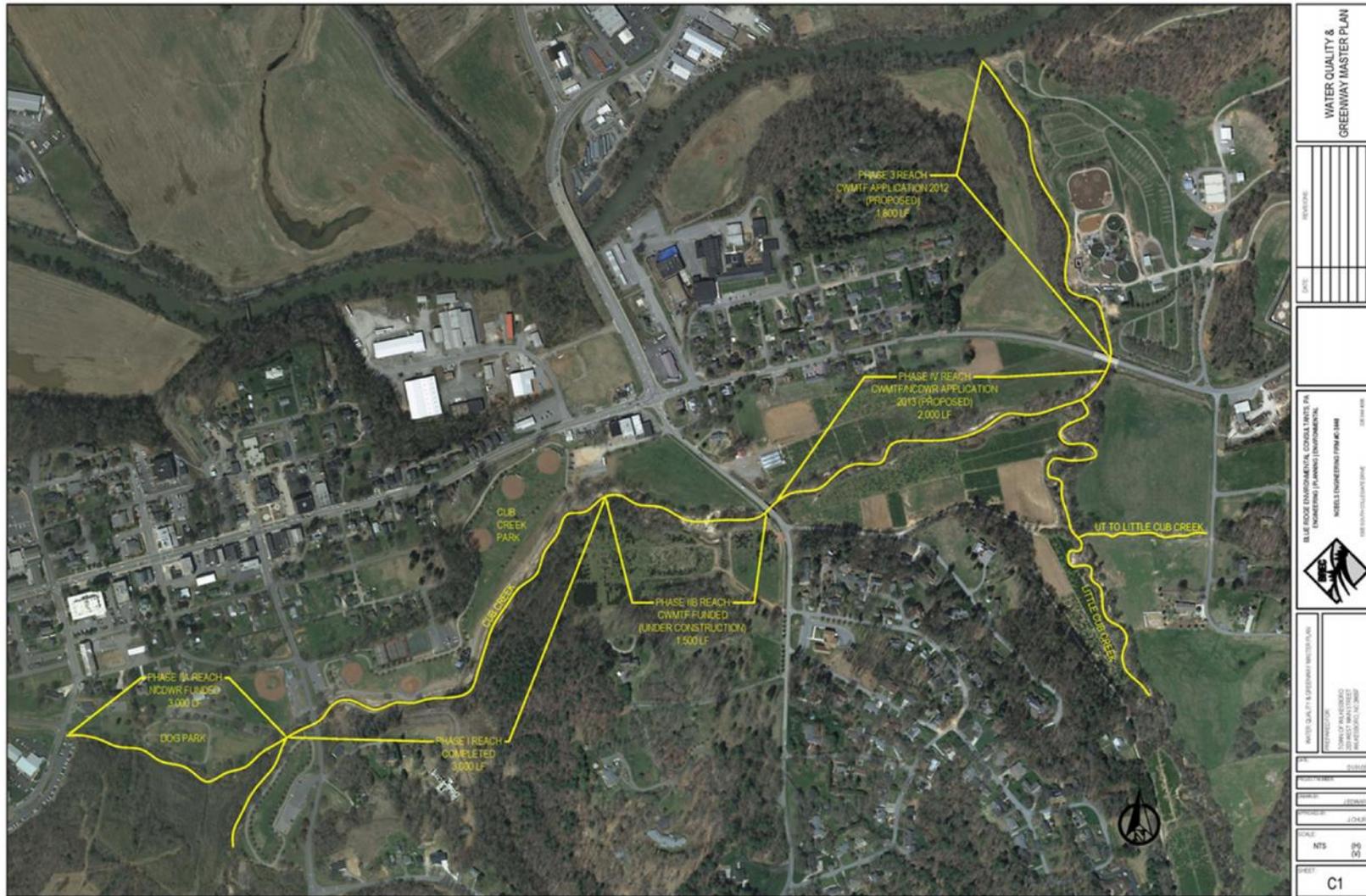


**BEFORE**



**AFTER**

# PHASES 2 A & 2 B



**WATER QUALITY & GREENWAY MASTER PLAN**

DATE	REVISION

DO NOT SCALE - PLANS MUST BE RECEIVED AS A COMPLETE SET

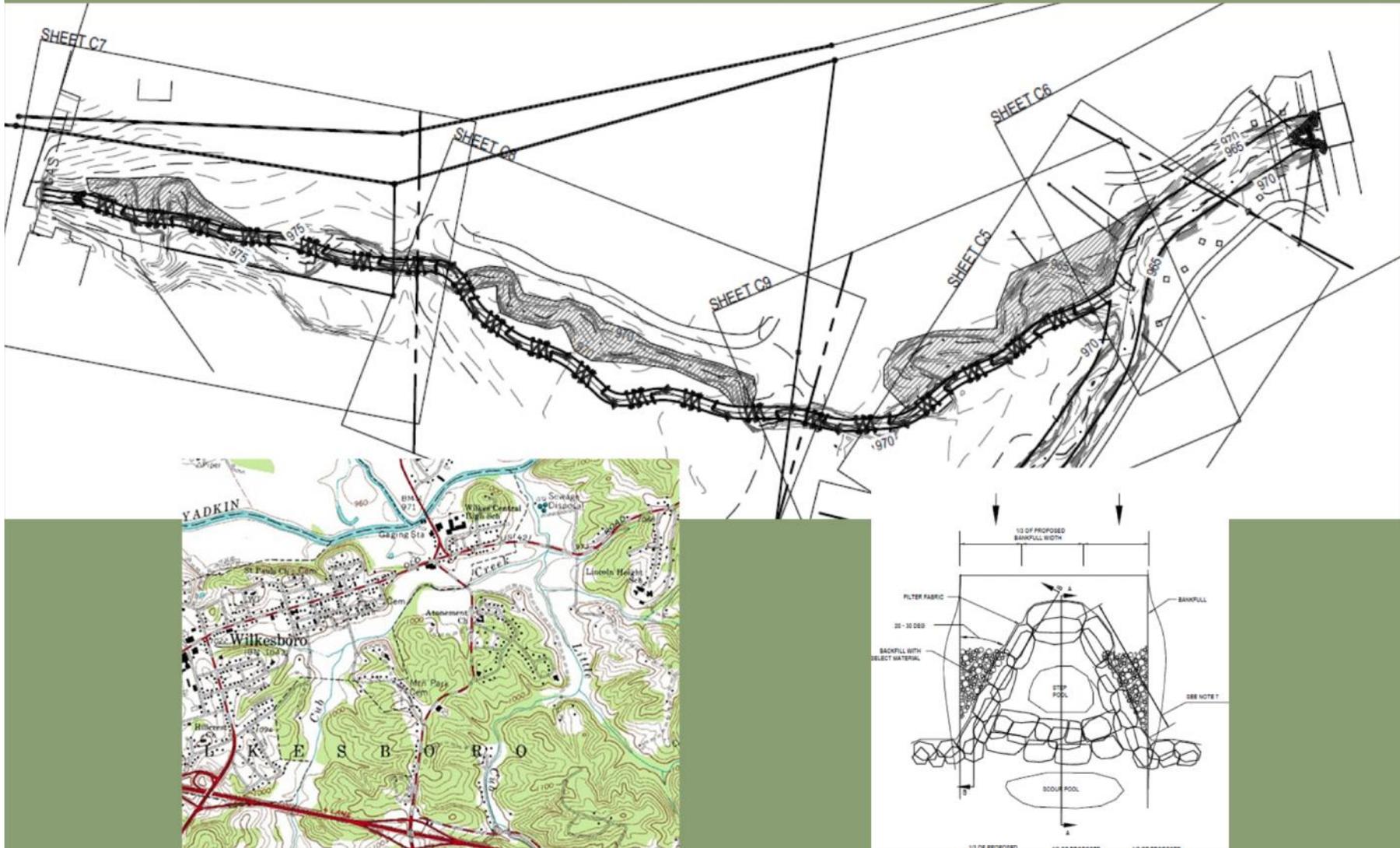
BLUE RIDGE ENVIRONMENTAL CONSULTANTS, P.A.  
ENGINEERING | PLANNING | ENVIRONMENTAL

PROJECT NO. 13-000000  
DATE: 10/2013  
SCALE: NTS 20' = 1" (AS SHOWN)  
SHEET: C1

Engineering | Planning | Environmental

Blue Ridge Environmental Consultants, P.A.  
336-844-4088 | <http://brec.biz>

# The Design – Plan - Permitting



Blue Ridge Environmental Consultants, P.A.  
336-844-4088 | <http://brec.biz>

# The Design – Plan - Permitting

The Multi-disciplinary  
approached included:

- Data Acquisition
- Reference Reach criteria
- Habitat Assessments
- Biological Assessments
- Construction feasibility/Value
- Engineering
- Regulatory approval



# Implementation/Construction

The town provided construction of the project under direction from BREC staff as part of a matching funds requirement



---

Blue Ridge Environmental Consultants, P.A.  
336-844-4088 | <http://brec.biz>

# Implementation/Construction



# Implementation/Construction



# Implementation/Construction



2012/03/20 16:15

# RESULTS and OUTCOMES



Engineering | Planning | Environmental

Blue Ridge Environmental Consultants, P.A.  
336-844-4088 | <http://brec.biz>

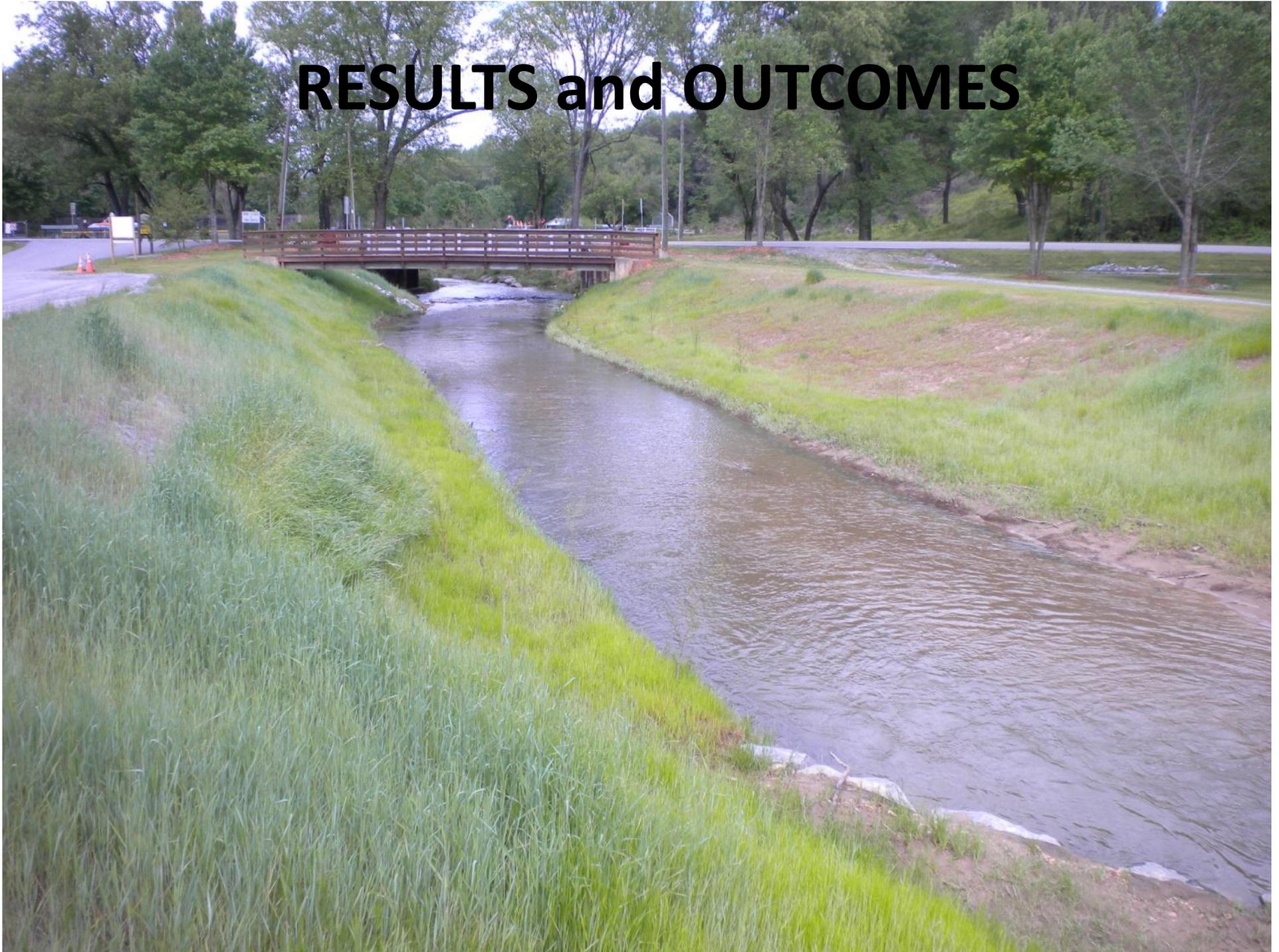
# RESULTS and OUTCOMES



# RESULTS and OUTCOMES



# RESULTS and OUTCOMES



# RESULTS and OUTCOMES



# RESULTS and OUTCOMES



# RESULTS and OUTCOMES

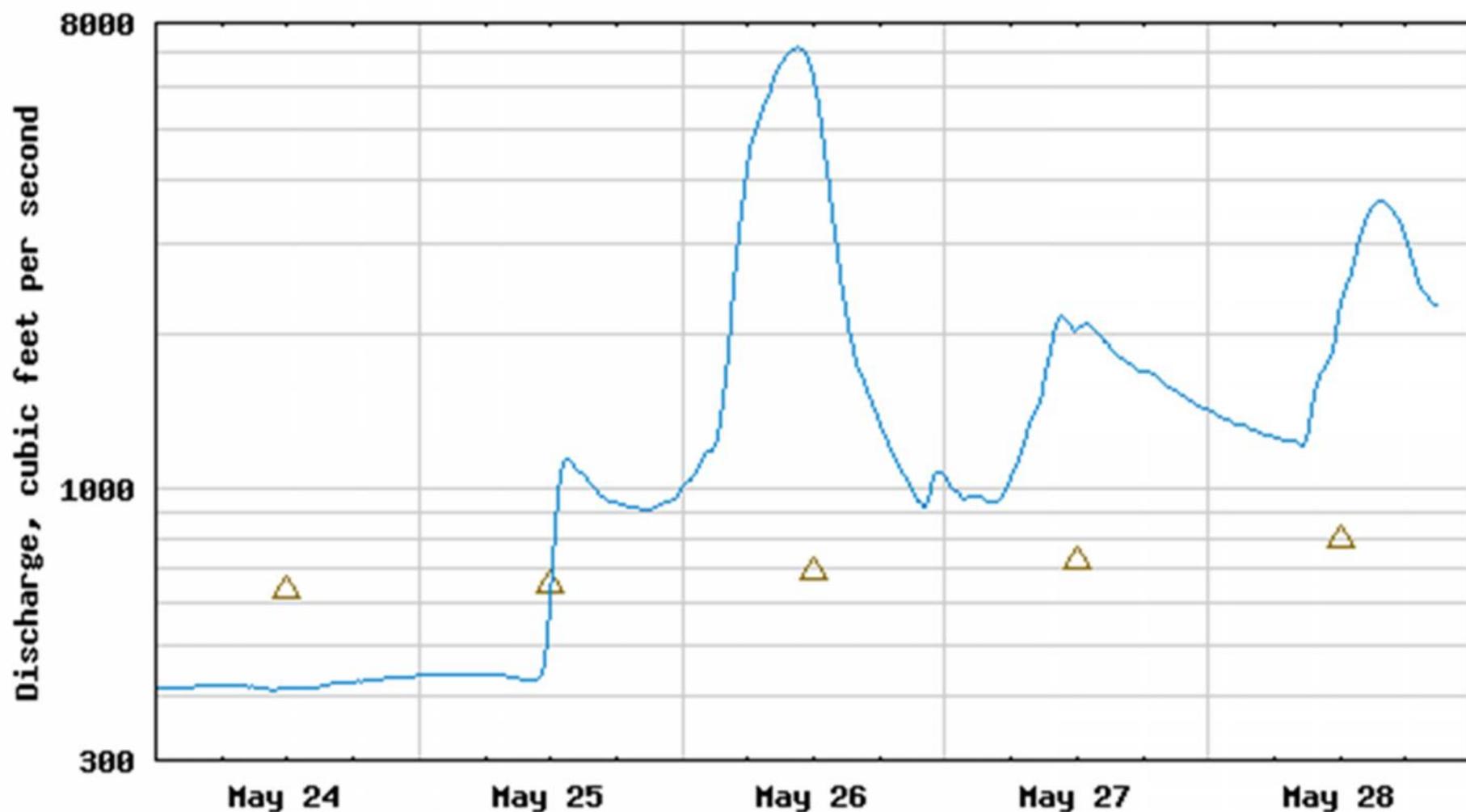


# RESULTS and OUTCOMES





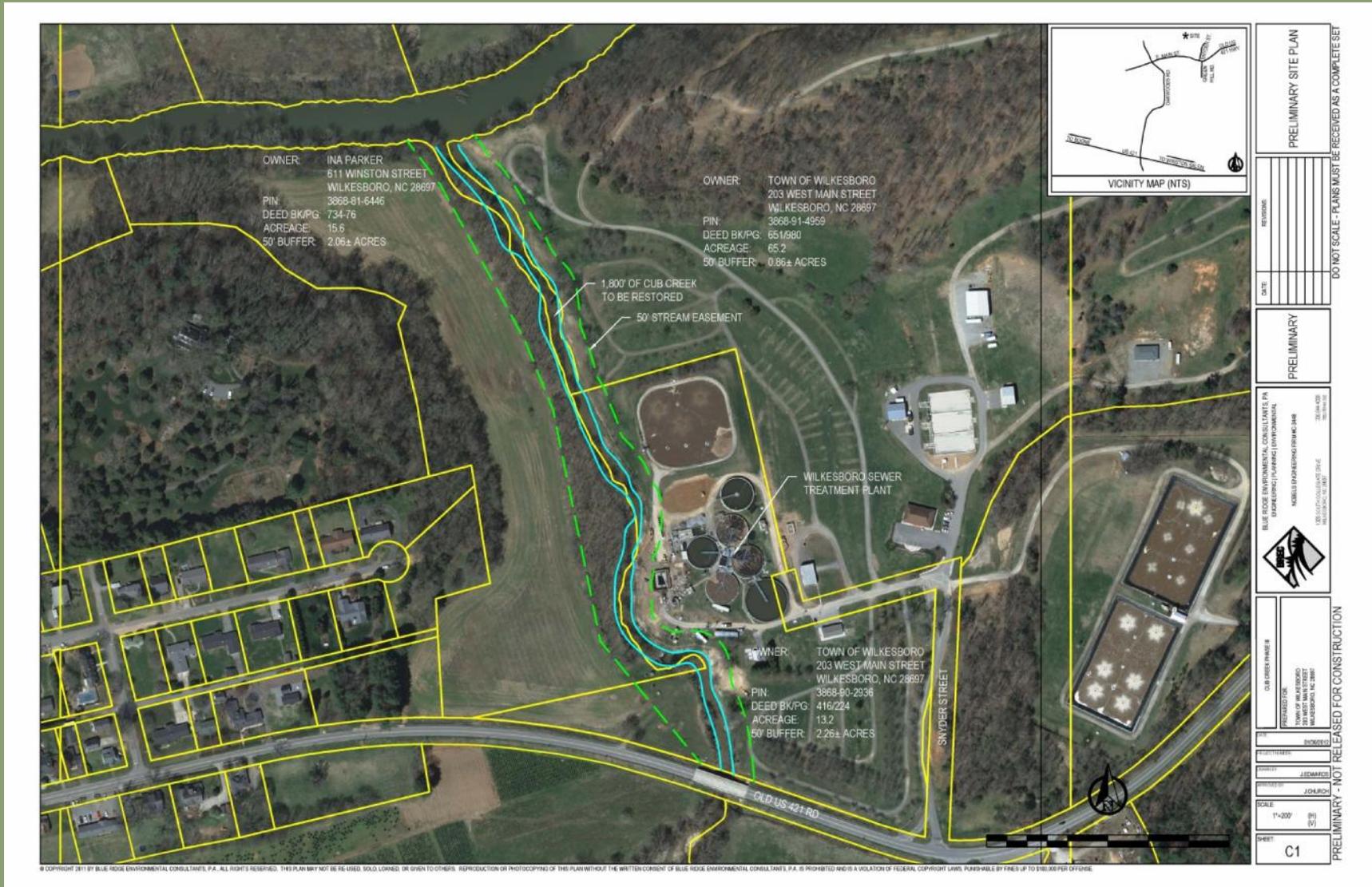
## USGS 02112000 YADKIN RIVER AT WILKESBORO, NC



---- Provisional Data Subject to Revision ----

△ Median daily statistic (46 years) — Discharge

# The Future- PHASE III –IV



Engineering | Planning | Environmental

Blue Ridge Environmental Consultants, P.A.  
336-844-4088 | <http://brec.biz>

# The Future- Bio Retention



Blue Ridge Environmental Consultants, P.A.  
336-844-4088 | <http://brec.biz>

Questions?



Engineering | Planning | Environmental

---

Blue Ridge Environmental Consultants, P.A.  
336-844-4088 | <http://brec.biz>