

21" Cored Slab

L = 115'

Spans: 40 - 40' - 35'

Project# \_\_\_\_\_

TIP# \_\_\_\_\_

Let Date \_\_\_\_\_

## PREDESIGN-PRESURVEY REPORT

WBS# \_\_\_\_\_

County IREDELLBridge# 480183Road# SR 1907 (CHIPLEY FORD RD)Stream CREEK (Fourth Creek)

Type Of Request: POC Force Account TIP NCMA

Date 5/24/12 Name SIMQAssigned To RCH

Checked By \_\_\_\_\_

Prior Survey Date YES (attach copy of prior survey)

Study By Scour Section \_\_\_\_\_

Flood Zone AE Detail Study DETAILED Date 3-18-2008 Panel# 4736

B.M. Info \_\_\_\_\_

Quad Map STATESVILLE WEST Drainage Area 11.3 SQ MI From BLUE RIDGE USGS REG. EO'S  
 Q25 3704 CES Q50 4173 CES Q100 4,604 CES Method URBAN IMPROVEMENTS 20%  
F.I.S

## EXISTING BRIDGE INFORMATION

Location 0.6 MI N. JCT. SR 1929Average Daily Traffic 2900 2010Length 93' Bed- To Crown 16' Water Depth 1'Type Structure TIMBER DECK ON I-BEAMSType Spans 1 @ 17' 9", 1 @ 17' 6", 1 @ 40' 0", 1 @ 18' 0"

Upstream Structure \_\_\_\_\_

Location \_\_\_\_\_

Bed- To Crown \_\_\_\_\_ Prior Survey \_\_\_\_\_

Downstream Structure STR 179Location 50 FT W. JCT. SR 1925Bed- To Crown 15' Prior Survey NO

SCS Watershed \_\_\_\_\_

## ENVIRONMENTAL

Trout Stream NO Anadromous Fish NO Primary Nursery Area NOHigh Quality Waters NO Nutrient Sensitive Waters NONear Water Supply Intake NO CAMA County NOStream Classification CDENR River Basin Info. YADKIN 12-108-20

Fourth Creek from source to South Yadkin River



NC DEPARTMENT OF TRANSPORTATION  
DIVISION OF HIGHWAYS  
BRIDGE MANAGEMENT UNIT

ATTENTION

(PMN) ISSUED: SECTION LOSS: BEAM (3) SPAN (C)  
SEE SKETCH

# BRIDGE INSPECTION REPORT

INSPECTION TYPE: Routine Inspection

COUNTY IREDELL

BRIDGE NUMBER 480183

INSPECTION CYCLE 2 YRS

ROUTE SR1907

ACROSS FOURTH CREEK

M.P. 0

LOCATION 0.6 MI. N. JCT. SR1929

SUPERSTRUCTURE TIMBER DECK ON I-BEAMS

SUBSTRUCTURE END & INTERIOR BENTS:TIMBER CAPS & PILES,TIMBER BULKHEADS

SPANS 1@17'9, 1@17'6, 1@40'0, 1@18'0

LONGITUDE 80° 54' 26.5"

LATITUDE 35° 50' 2.7"

PRESENT CONDITION FAIR

INVENTORY RATING

INSPECTION DATE 04/23/2012

OPERATING RATING

PRESENT POSTING Not Posted NOT POSTED

PROPOSED POSTING

COMPUTER UPDATE

ANALYSIS DATE

POSTING LETTER DATE

SUFFICIENCY RATING

OTHER SIGNS PRESENT 4 DELINEATORS



SOUTH TO NORTH

SIGN NOTICE  
ISSUED FOR

NUMBERED  
REQUIRED

No

WEIGHT LIMIT

No

DELINEATORS

No

NARROW BRIDGE

No

ONE LANE BRIDGE

No

LOW CLEARANCE

## NATIONAL BRIDGE INVENTORY----- STRUCTURE INVENTORY AND APPRAISAL

Run Date: 05/21/2012

| IDENTIFICATION                        |                        |                |                            |
|---------------------------------------|------------------------|----------------|----------------------------|
| (1) STATE NAME -NORTH CAROLINA        | BRIDGE                 | 480183         | SUFFICIENCY RATING = 16.72 |
| (8) STRUCTURE NUMBER(FEDERAL)         | 00000000970183         | STATUS =       | Structurally Deficient     |
| (5) INVENTORY ROUTE (ON/UNDER) - ON   | 31019070               |                |                            |
| (2) STATE HIGHWAY DEPARTMENT DISTRICT | 2                      |                |                            |
| (3) COUNTY CODE                       | 97                     | (4) PLACE CODE | 0                          |
| (6) FEATURE INTERSECTED -             | FOURTH CREEK           |                |                            |
| (7) FACILITY CARRIED                  | SR1907                 |                |                            |
| (9) LOCATION                          | 0.6 MI. N. JCT. SR1929 |                |                            |
| (11) MILEPOINT                        | 0                      |                |                            |
| (16) LAT                              | 35° 50' 2.7"           | (17) LONG      | 80° 54' 26.5"              |
| (98) BORDER BRIDGE STATE CODE         | PCT SHARE              |                |                            |
| (99) BORDER BRIDGE STRUCTURE NO       |                        |                |                            |

| STRUCTURE TYPE AND MATERIAL                 |                              |      |     |
|---------------------------------------------|------------------------------|------|-----|
| (43) STRUCTURE TYPE MAIN:                   | Steel                        |      |     |
| TYPE -                                      | Stringer Multibeam or Girder | CODE | 302 |
| (44) STRUCTURE TYPE APPR :                  |                              |      |     |
| TYPE -                                      |                              | CODE | 000 |
| (45) NUMBER OF SPANS IN MAIN UNIT           | 4                            |      |     |
| (46) NUMBER OF APPROACH SPANS               |                              |      |     |
| (107) DECK STRUCTURE TYPE -                 | 8                            | CODE |     |
| (108) WEARING SURFACE / PROTECTIVE SYSTEM : |                              |      |     |
| (A) TYPE OF WEARING SURFACE -               |                              | CODE |     |
| (B) TYPE OF MEMBRANE -                      |                              | CODE |     |
| (C) TYPE OF DECK PROTECTION -               |                              | CODE |     |

| AGE AND SERVICE              |          |                     |    |
|------------------------------|----------|---------------------|----|
| (27) YEAR BUILT              | 1950     |                     |    |
| (106) YEAR RECONSTRUCTED     | 1987     |                     |    |
| (42) TYPE OF SERVICE : ON -  | Highway  |                     |    |
| UNDER -                      | Waterway | CODE                | 15 |
| (28) LANES: ON STRUCTURE     | 2        | UNDER STRUCTURE     |    |
| (29) AVERAGE DAILY TRAFFIC   | 2900     |                     |    |
| (30) YEAR OF ADT             | 2010     | (109) TRUCK ADT PCT | 6% |
| (19) BYPASS OR DETOUR LENGTH | 2 MI     |                     |    |

| GEOMETRIC DATA                            |                           |                       |      |
|-------------------------------------------|---------------------------|-----------------------|------|
| (48) LENGTH OF MAXIMUM SPAN               | 40 FT                     |                       |      |
| (49) STRUCTURE LENGTH                     | 93 FT                     |                       |      |
| (50) CURB OR SIDEWALK: LEFT               | 0 FT                      | RIGHT                 | 0 FT |
| (51) BRIDGE ROADWAY WIDTH CURB TO CURB    | 23.4 FT                   |                       |      |
| (52) DECK WIDTH OUT TO OUT                | 24 FT                     |                       |      |
| (32) APPROACH ROADWAY WIDTH (W/SHOULDERS) | 18 FT                     |                       |      |
| (33) BRIDGE MEDIAN -                      | No Median                 | CODE                  | 0    |
| (34) SKEW                                 | 0°                        | (35) STRUCTURE FLARED | 0    |
| (10) INVENTORY ROUTE MIN VERT CLEAR       | 999.9 FT                  |                       |      |
| (47) INVENTORY ROUTE TOTAL HORIZ CLEAR    | 23.4 FT                   |                       |      |
| (53) MIN VERT CLEAR OVER BRIDGE RDWY      | 999.9 FT                  |                       |      |
| (54) MIN VERT UNDERCLEAR REF              | Not a Highway or Railroad | 0 FT                  |      |
| (55) MIN LAT UNDERCLEAR RT REF            | Not a Highway or Railroad | 000 FT                |      |
| (56) MIN LAT UNDERCLEAR LT REF -          |                           | 000 FT                |      |

| NAVIGATION DATA                             |                         |      |   |
|---------------------------------------------|-------------------------|------|---|
| (38) NAVIGATION CONTROL -                   | No Navigational Control | CODE | 0 |
| (111) PIER PROTECTION -                     |                         | CODE |   |
| (39) NAVIGATION VERTICAL CLEARANCE          |                         |      | 0 |
| (116) VERT - LIFT BRIDGE NAV MIN VERT CLEAR |                         | FT   |   |
| (40) NAVIGATION HORIZONTAL CLEARANCE        |                         | 0 FT |   |

| CLASSIFICATION                      |                                |  |     |
|-------------------------------------|--------------------------------|--|-----|
| (112) NBIS BRIDGE SYSTEM -          |                                |  | YES |
| (104) HIGHWAY SYSTEM                | Is not on NHS                  |  | 0   |
| (26) FUNCTIONAL CLASS -             | Minor Collector                |  | 08  |
| (100) STRAHNET HIGHWAY -            | Not a STRAHNET Route           |  | 0   |
| (101) PARALLEL STRUCTURE -          | No Parallel Structure          |  | N   |
| (102) DIRECTION OF TRAFFIC -        | 2-way Traffic                  |  | 2   |
| (103) TEMPORARY STRUCTURE -         | Temporary Structure/Conditions |  | T   |
| (110) DESIGNATED NATIONAL NETWORK - | Not on the National Network    |  | 0   |
| (20) TOLL                           | On Free Road                   |  | 3   |
| (31) MAINTAIN -                     | State Highway Agency           |  | 01  |
| (22) OWNER -                        | State Highway Agency           |  | 01  |
| (37) HISTORICAL SIGNIFICANCE -      | Not Eligible                   |  | 5   |

| CONDITION                         |  |  |   |
|-----------------------------------|--|--|---|
| (58) DECK                         |  |  | 7 |
| (59) SUPERSTRUCTURE               |  |  | 5 |
| (60) SUBSTRUCTURE                 |  |  | 4 |
| (61) CHANNEL & CHANNEL PROTECTION |  |  | 7 |
| (62) CULVERTS                     |  |  | N |

| LOAD RATING AND POSTING                |                        |  |     |
|----------------------------------------|------------------------|--|-----|
| (31) DESIGN LOAD                       | Other or Unknown       |  | 0   |
| (63) OPERATING RATING METHOD -         | Allowable Stress       |  |     |
| (64) OPERATING RATING -                | HS-1                   |  | 201 |
| (65) INVENTORY RATING METHOD -         | Allowable Stress       |  |     |
| (66) INVENTORY RATING -                | HS-1                   |  | 201 |
| (70) BRIDGE POSTING -                  | No Posting Required    |  | 5   |
| (41) STRUCTURE OPEN, POSTED ,OR CLOSED |                        |  | D   |
| DESCRIPTION -                          | Open Temporary Shoring |  |     |

| APPRAISAL                           |  |  |      |
|-------------------------------------|--|--|------|
| (67) STRUCTURAL EVALUATION          |  |  | 3    |
| (68) DECK GEOMETRY                  |  |  | 2    |
| (69) UNDERCLEARANCES, VERTI & HORIZ |  |  | N    |
| (71) WATERWAY ADEQUACY              |  |  | 7    |
| (72) APPROACH ROADWAY ALIGNMENT     |  |  | 7    |
| (36) TRAFFIC SAFETY FEATURES        |  |  | 1000 |
| (113) SCOUR CRITICAL BRIDGES        |  |  | 5    |

| PROPOSED IMPROVEMENTS                  |      |                       |      |
|----------------------------------------|------|-----------------------|------|
| (75) TYPE OF WORK -                    |      |                       | CODE |
| (76) LENGTH OF STRUCTURE IMPROVEMENT   |      |                       |      |
| (94) BRIDGE IMPROVEMENT COST           |      |                       |      |
| (95) ROADWAY IMPROVEMENT COST          |      |                       |      |
| (96) TOTAL PROJECT COST                |      |                       |      |
| (97) YEAR OF IMPROVEMENT COST ESTIMATE |      |                       |      |
| (114) FUTURE ADT                       | 5800 | (115) YEAR FUTURE ADT | 2025 |

| INSPECTIONS                        |    |               |            |
|------------------------------------|----|---------------|------------|
| (90) INSPECTION DATE               |    |               | 04/23/2012 |
| (92) CRITICAL FEATURE INSPECTION : |    | (93) CFI DATE |            |
| A) FRACTURE CRIT DETAIL -          | NO | A)            |            |
| B) UNDERWATER INSP -               | NO | B)            |            |
| C) OTHER SPECIAL INSP              | NO | C)            |            |
| SCOUR                              |    |               |            |

## BRIDGE MANAGEMENT UNIT

## DATA ON EXISTING STRUCTURE

Run Date: 05/21/2012

COUNTY : IREDELL      DIVISION : 12      DISTRICT : 2      STRUCTURE NUMBER : 480183      LENGTH : 93 FEET

ROUTE CARRIED : SR1907      FEATURE INTERSECTED : FOURTH CREEK

LOCATED : 0.6 MI. N. JCT. SR1929      BRIDGE NAME :      CITY :

FUNC. CLASS : 08      SYST.ON : NFA      SYST.UNDER : NFA      ADT & YR : 2900 2010      RAIL TYPE : LT 323 RT 323

BUILT : 1950      BY : SHPWC      PROJ :      FED.AID PROJ :      DESIGN LOAD : Other or Unknown

REHAB : 1987      BY : BMU      PROJ :      ALIGNMENT : TAN      SKEW : 90      LANES : ON 2 UNDER

NAVIGATION : VC 0 FT      HC 0 FT      HT. CRN. TO BED : 16 FT      WATER DEPTH : 1 FT

SUPERSTRUCTURE : TIMBER DECK ON I-BEAMS

SUBSTRUCTURE : END & INTERIOR BENTS:TIMBER CAPS & PILES,TIMBER BULKHEADS

SPANS : 1@17'9", 1@17'6", 1@40'0", 1@18'0"

BEAMS OR GIRDERS : SP1,2&4:10LN W18X50 I-BM@2'5"CT, SP3:12LN W21X62 I-BM@2'0"CT

FLOOR : 4X8"TIM,2.5"AWS      ENCROACHMENT :      DECK (OUT TO OUT) : 24 FT

CLEAR ROADWAY : 23.4 FT      BETWEEN RAILS : 23.4 FT      SIDEWALK OR CURB : LT 0 FT RT 0 FT

VERT.CL.OVER : 999.9 FT

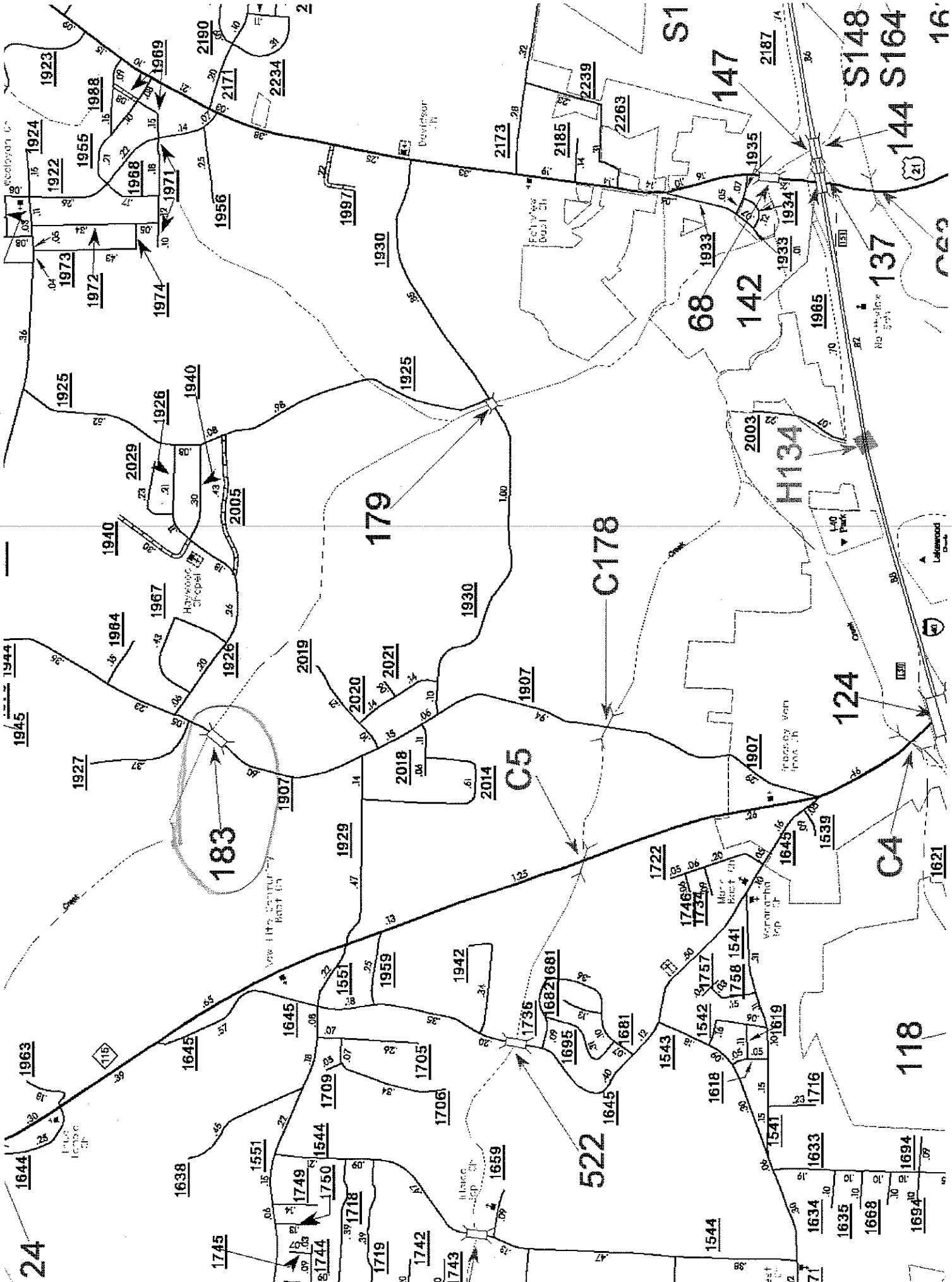
INV.RTG. : HS-1      OPE.RTG. : HS-1      CONTR.MEMBER : P7-Bnt2-Br      POSTED : SV TTST      DATE : 09/01/2010

SYSTEM : Secondary S.R. Route      GREEN LINE ROUTE : N

UNDER ROUTES AND CLEARANCES

REMARKS :

IKEDULL 480183



## Section 5.0 – Engineering Methods

**Table 8—Summary of Discharges**

| Flooding Source             | Location                                                               | Drainage Area<br>(square miles) | Discharges (cfs)  |                  |                  |                    |
|-----------------------------|------------------------------------------------------------------------|---------------------------------|-------------------|------------------|------------------|--------------------|
|                             |                                                                        |                                 | 10% Annual Chance | 2% Annual Chance | 1% Annual Chance | 0.2% Annual Chance |
|                             | Approximately 50 feet upstream of the confluence of Free Nancy Branch  | 27.7                            | 4,396             | 6,458            | 7,137            | 8,983              |
|                             | Approximately 350 feet downstream of I-40                              | 26.6                            | 4,057             | 6,048            | 6,713            | 8,533              |
|                             | Approximately 50 feet upstream of the confluence of Morrison Creek     | 14.9                            | 2,000             | 3,352            | 4,037            | 5,955              |
|                             | Approximately 750 feet downstream of Fort Dobbs Road (SR 1930)         | 14.2                            | 1,932             | 3,242            | 3,907            | 5,769              |
| Fourth Creek<br>(continued) | Approximately 1,010 feet upstream of Fort Dobbs Road (SR 1930)         | 13.2                            | 1,838             | 3,091            | 3,727            | 5,512              |
|                             | Approximately 0.5 mile downstream of South Chipley Ford Road (SR 1907) | 12.0                            | 1,733             | 2,920            | 3,525            | 5,222              |
|                             | Approximately 1,700 feet upstream of South Chipley Ford Road (SR 1907) | 10.6                            | 1,596             | 2,698            | 3,261            | 4,844              |
|                             | Approximately 0.5 mile downstream of Wilkesboro Highway                | 9.4                             | 1,468             | 2,491            | 3,015            | 4,489              |
|                             | Approximately 1,600 feet upstream of Wilkesboro Highway (SR 1645)      | 7.2                             | 1,229             | 2,100            | 2,548            | 3,815              |
|                             | Approximately 1.3 miles upstream of Wilkesboro Highway (SR 1645)       | 6.2                             | 1,113             | 1,909            | 2,320            | 3,484              |
|                             | Approximately 2.1 miles upstream of Wilkesboro Highway (SR 1645)       | 5.1                             | 978               | 1,687            | 2,055            | 3,097              |
|                             | Approximately 3.0 miles upstream of Wilkesboro Highway (SR 1645)       | 4.0                             | 836               | 1,451            | 1,771            | 2,683              |
|                             | Approximately 3.7 miles upstream of Wilkesboro Highway (SR 1645)       | 3.1                             | 703               | 1,229            | 1,504            | 2,289              |
|                             |                                                                        |                                 |                   |                  |                  |                    |

# Environmental Sensitivity Map ---- 2008

Iredell 480183

5/25/2012 1:02 PM



## Legend

- City/Town
- DOQQ Grid
- 24K Grid
- 100K Grid
- Drainage Areas of Selected Sites
- USGS Continuous Gage Station 2003
- USGS Gage Stations CGIA Copy
- Ambient Water Monitoring Stations
- Industrial Outfalls 2006
- Implic Outfalls 2007
- DRAFT Stormwater Controls
- IDDEP
- NIDES Sites
- TIP Bridge 2004 To 2010
- NCDOT Bridges
- TIP Road Section 2004 To 2010
- TIP Road Section 2007 To 2013
- TIP Bridge 2007 To 2013
- TIP Road Section 2007 To 2013
- Airports
- Ferry Routes
- Power/Transmission Line
- Railroad
- Local Roads
- Secondary Road
- Interstate
- Highway US Route
- Highway NC Route
- Surface Water Intake
- Anadromous Spawning Streams
- Water Supply Watersheds
- Primary Nursery
- Secondary Nursery
- Special Secondary Nursery
- SA Water
- ORW
- HQWL ORW\_DWG\_2008
- High Quality Water Zone
- Hazardous Spill Basin Line
- 303D Streams
- 24K Hydrography Line
- Federal Lands
- National Wetlands Inventory
- Hazardous Spill Basin Polygon
- HSB Boundary
- 24K Hydrography Polygon
- 100K Hydrography Line
- 100K Hydrography Polygon
- Streamlined Mapping (18 Counties)
- Trout Water WRC
- Trout Water DWQ
- Soil
- State Boundary
- EEP TLWL Local Planning
- EEP TLW Basinwide Planning
- Sub River Basin
- 14 Digit Hydrologic Catalog Unit
- 8 Digit Hydrologic Catalog Unit
- River Basin
- Physiographic Frame Data
- 500K Physiographic Region
- DOT Division
- Real Areas
- Major Urban
- Minor Urban
- Urban Boundary
- Falls Lake Boundary
- High Rock Boundary
- Catawba Main Stem
- RND Boundary
- Goose Creek Boundary
- Piedmont Hydrogeology
- County

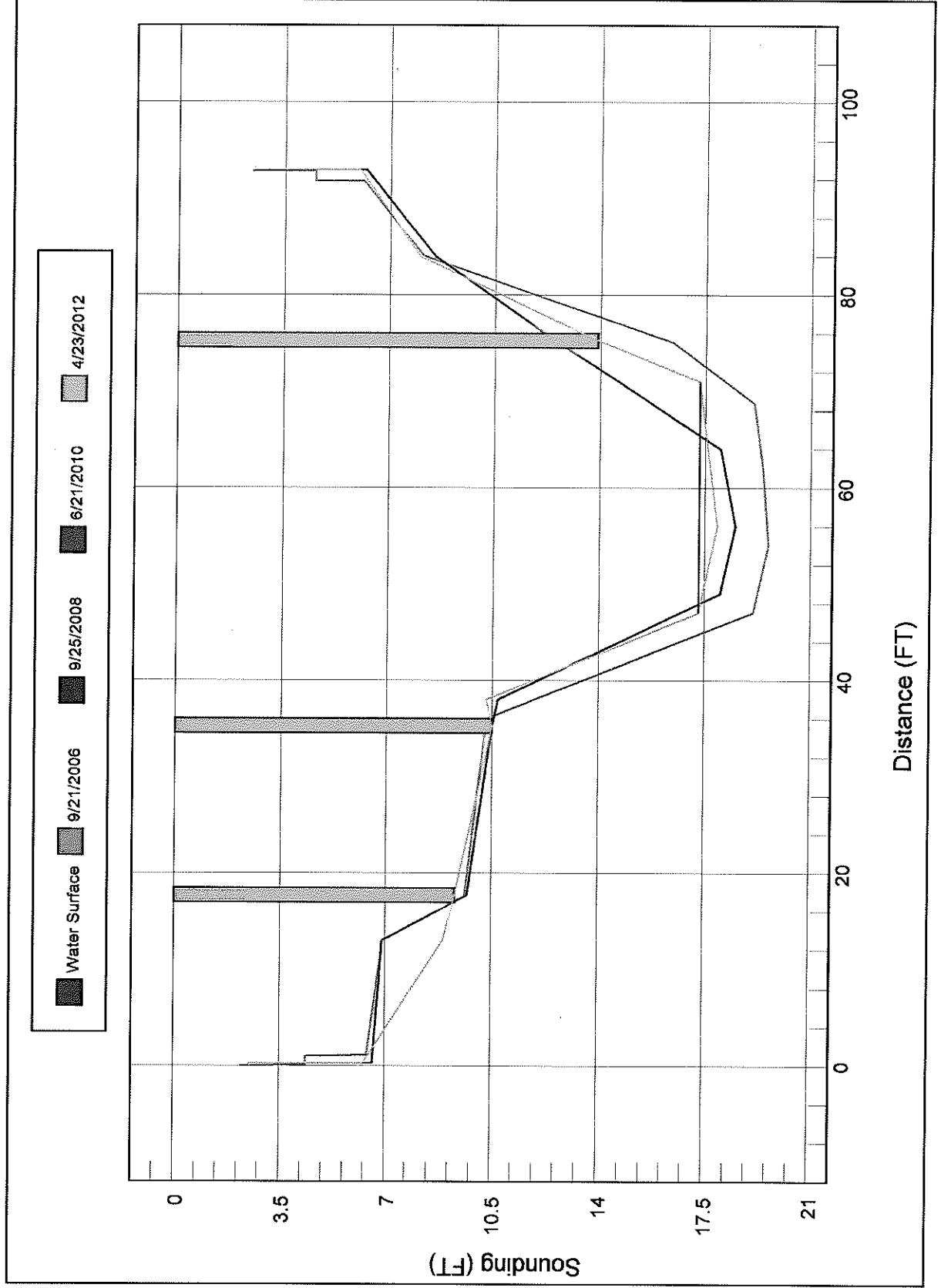
Bridge: 480183

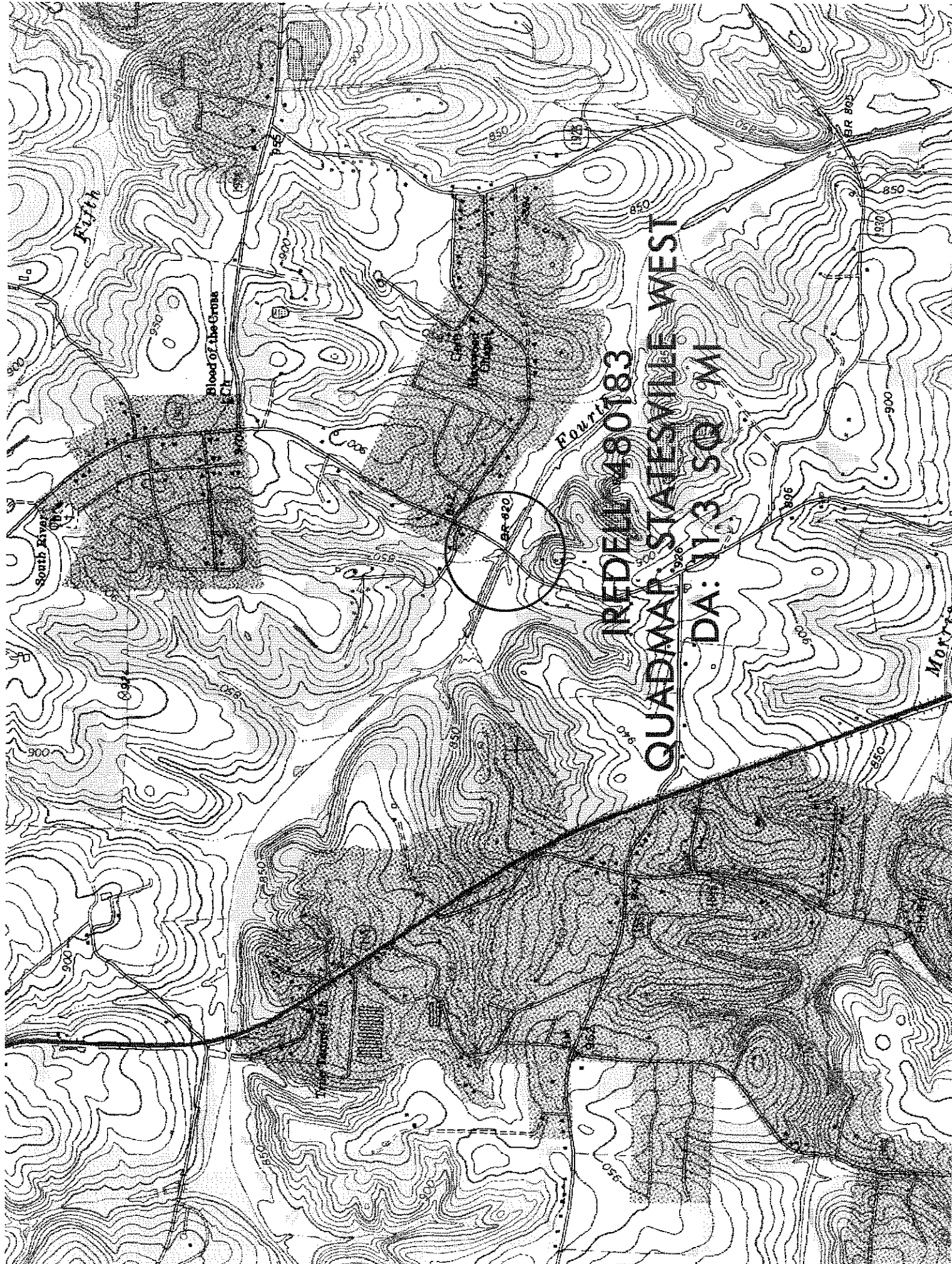
County IREDELL

Date: 04/23/2012

### STREAMBED PROFILE (Downstream)

Top of Rail = 0 FT (Sounding)





REDELL 480183

QUADMAP: STATESVILLE WEST

DA: 113 SQ MI

Irredell 400135





DOWNSTREAM



LOOKING SOUTH

## NORTH CAROLINA DEPARTMENT OF TRANSPORTATION



NCDOT UNITS:  
 BRIDGE MAINTENANCE UNIT  
 HYDRAULIC DESIGN UNIT  
 GEOTECHNICAL UNIT  
 STRUCTURE DESIGN UNIT  
 SOILS AND FOUNDATION SECTION

## BRIDGE SCOUR REPORT

COUNTY: Iredell BRIDGE: 183 ROUTE: SR 1907 STREAM CROSSED: Fourth Creek

ASSESSMENT yes EVALUATION \_\_\_\_\_ BY: JJB DATE 4/27/2009

FHWA STRUCTURE INVENTORY & APPRAISAL CODES:

SUBSTRUCTURE CONDITION (ITEM 60)  
 CHANNEL AND CHANNEL PROTECTION (ITEM 61)  
 WATERWAY ADEQUACY (ITEM 71)  
 SCOUR CRITICAL BRIDGES (ITEM 113)

MONITORING:

PLAN REQUIRED? YES \_\_\_\_\_ NO ☒

FLOOD MONITORING EVENT : (UPSTREAM FACE, FROM TOP OF RAIL):

REQUIRED ACTION: \_\_\_\_\_

CRITICAL MONITORING DEPTH (UPSTREAM FACE, FROM TOP OF RAIL):

REQUIRED ACTION: \_\_\_\_\_

CRITICAL HIGH WATER DEPTH (UPSTREAM FACE, FROM TOP OF RAIL):

REQUIRED ACTION: \_\_\_\_\_

SCOUR CRITICAL DEPTHS(UPSTREAM FACE, FROM TOP OF RAIL):

REQUIRED ACTION: \_\_\_\_\_

INCREASE UNDERWATER INSPECTION CYCLE? YES ☐ NO ☒ FREQUENCY \_\_\_\_\_

COUNTERMEASURES:

PLAN REQUIRED?

YES ☐

NO ☒

SUMMARY OF PLAN:

\_\_\_\_\_  
 \_\_\_\_\_  
 \_\_\_\_\_

CONSTRUCTION COMPLETED DATE \_\_\_\_\_

FINAL CODING AFTER WORK IS COMPLETED (ITEM 113) \_\_\_\_\_ DATE \_\_\_\_\_

BRIDGE MAINTENANCE COMMENTS:

\_\_\_\_\_  
 \_\_\_\_\_  
 \_\_\_\_\_  
 \_\_\_\_\_



rev. 3/97

## ASSESSMENT CRITERIA:

- 1) SPREAD FOOTINGS WITHIN THE POTENTIAL CHANNEL SCOUR AREA ARE INDICATED BY FIELD INVESTIGATION OR BORING LOG ANALYSIS TO BE ON SCOUR RESISTANT MATERIAL.  
GEOTECHNICAL CONCURRENCE BY: \_\_\_\_\_
- 2) AS-BUILT PLANS INDICATE THE SPREAD FOOTINGS WITHIN THE POTENTIAL CHANNEL SCOUR AREA TO BE KEYED AT LEAST 6" INTO ROCK.  
GEOTECHNICAL CONCURRENCE BY: \_\_\_\_\_
- 3) STEEL PILE BENTS WITHIN THE POTENTIAL CHANNEL SCOUR AREA HAVE  
a) AVERAGE PILE TIPS THAT PENETRATE A MINIMUM OF 12 FEET BELOW STREAM BED OR b) HAVE LESS THAN 22 FEET OF TOTAL PILE LENGTH AND INDICATED BY: BORING LOGS, PILE DRIVE RECORDS, OR ROD SOUNDINGS TO BE TIPPED INTO POINT BEARING MATERIAL. a) \_\_\_\_\_  
b) \_\_\_\_\_
- 4) CONCRETE OR TIMBER PILE BENTS WITHIN THE POTENTIAL CHANNEL SCOUR AREA HAVE: a) AVERAGE PILE TIPS THAT PENETRATE A MINIMUM OF 15 FEET BELOW THE STREAM BED OR b) HAVE LESS THAN 18 FEET OF TOTAL PILE LENGTH AND INDICATED BY BORING LOGS OR ROD SOUNDINGS TO BE TIPPED INTO POINT BEARING MATERIAL. a) \_\_\_\_\_  
b) ☒ \_\_\_\_\_
- 5) ALL PIERS AND ABUTMENTS ARE OUTSIDE THE NORMAL CHANNEL SECTION. N/A
- 6) THE BRIDGE HAS EXPERIENCED A FLOOD OF GREATER THAN A 50-YEAR MAGNITUDE WITH NO REPORTED OR APPARENT SCOUR PROBLEM. N/A
- 7) THE BOTTOMS OF THE CHANNEL PIER SPREAD FOOTINGS ARE GREATER THAN 7 FEET BELOW THE STREAM BED. N/A
- 8) THE APPROACH ROADWAY OR BRIDGE IS OVERTOPPED DURING MINOR FLOODS (< 10-YEAR EVENT) REQUIRING CLOSURE AND INSPECTION BEFORE REOPENING. N/A

— —  
THIS STRUCTURE MEETS WHICH OF THE ABOVE LISTED ITEMS FOR CLASSIFICATION AS A LOW RISK STRUCTURE?

4b

BASED ON AN ENGINEERING EVALUATION OF THE AVAILABLE DATA AND REPORTS, THE LOW RISK CLASSIFICATION OF THIS STRUCTURE FOR THE REASON(S) LISTED ABOVE APPEARS REASONABLE.

YES

## COMMENTS

Rods driven to refusal B2: 19.3', B3: 19.94'

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## DECISION:

CLASSIFIED AS:

SCOUR CRITICAL  
UNKNOWN FOUNDATION  
LOW RISK

✓

RECOMMENDED SCOUR CODE 5

## ASSESSMENT COMMENTS:

B2- timber piles 21.8' below Top of Rail with 20 blow/ 0.5" material @ 19.94'.B3- timber piles 23.1' below TOR with 20 blow/ 0.25" material @ 19.3'.1987 rehabilitation work installed 2 timber piles in each EB and 3 piles in each int. bent. Order pile lengths are 30' as indicated on bridge maintenance supervisors report.

SCHEDULE FOR DETAILED STUDY

SCHEDULE FOR FURTHER IN-HOUSE STUDY

ASSESSED BY: JJBFIRM: NCDOTDATE: 4/27/2009APPROVED BY: JLLDATE: 4/27/2009

CHECKED BY: \_\_\_\_\_

FIRM: \_\_\_\_\_

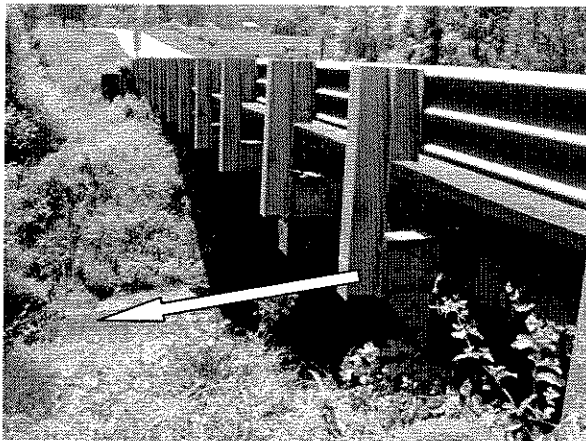
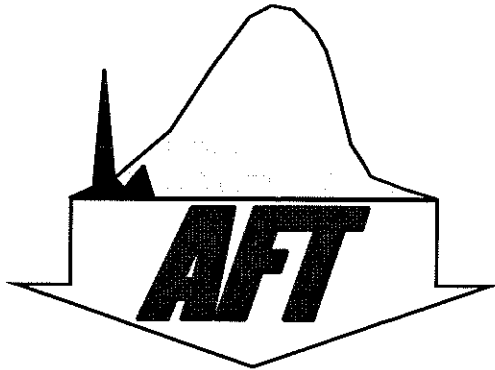
DATE: \_\_\_\_\_

FINAL COMMENTS : Scour Committee Recommends code 5.See report by AFT dated May 19,2009.

# Applied Foundation Testing

201 Shannon Oaks Circle, Suite 200, Cary, NC 27511  
Phone: (919) 654-7381/Fax: (919) 654-7382  
www.testpile.com

North Carolina License No.: P-0294



May 19, 2009

## Final Report of Unknown Bridge Foundation Investigation

NCDOT Bridge No.: 480183  
SR 1907 over Fourth Creek  
Iredell County, North Carolina  
AFT Project No.: 207004NC

Authored By:

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**Thomas G. Santee, P.E.**  
Senior Geotechnical Engineer

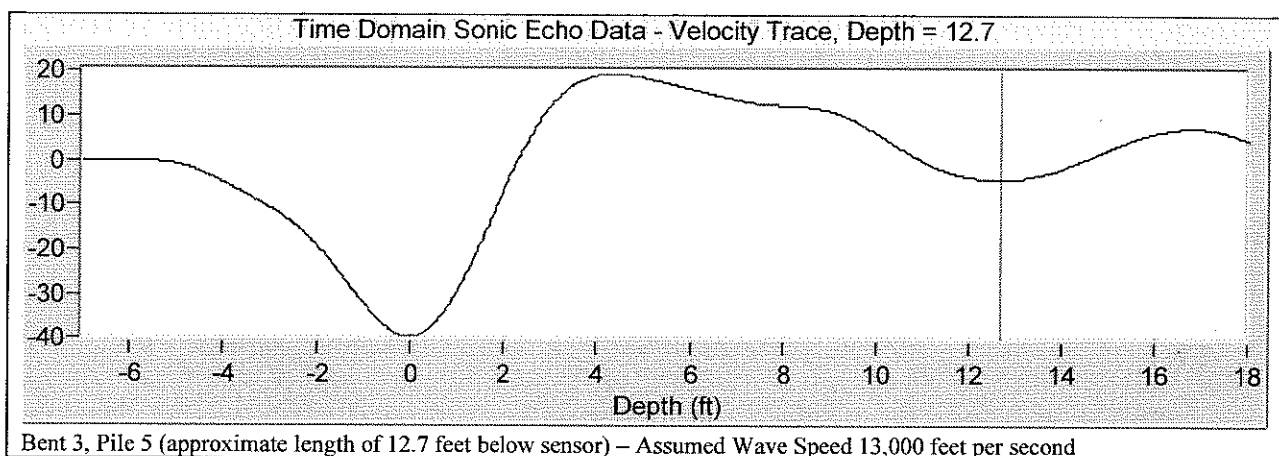
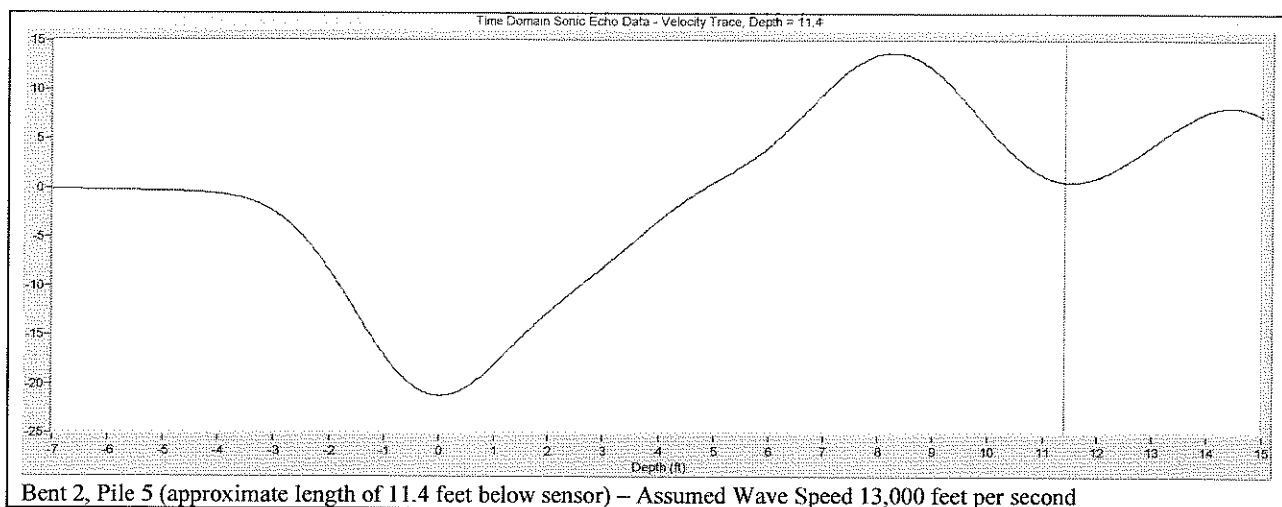
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**Michael J. Simpson, P.E.**  
Geotechnical Engineer  
NC Registration No.: 032060

**For: Mr. Jerry Beard, P.E.**  
North Carolina Department of Transportation  
Hydraulics Unit  
1590 Mail Service Center  
Raleigh, NC 27699-1590



## SONIC ECHO (LOW STRAIN INTEGRITY TESTING)



| Estimated Pile Length From Sonic Echo Test |                                    |                          |                                     |                                      |                                   |
|--------------------------------------------|------------------------------------|--------------------------|-------------------------------------|--------------------------------------|-----------------------------------|
| Pile Location                              | Estimated Length Below Sensor (ft) | Length Above Sensor (ft) | Estimated Pile Length in Place (ft) | Estimated Top of Pile Elevation (ft) | Estimated Pile Tip Elevation (ft) |
| Bent 2, Pile 5                             | 11.4                               | 4.5                      | 15.9                                | 5.9                                  | 21.8                              |
| Bent 3, Pile 5                             | 12.7                               | 4.0                      | 16.7                                | 6.4                                  | 23.1                              |

## ROD DRIVES

| Rod Drive       |                          | 1                   |  |
|-----------------|--------------------------|---------------------|--|
| Start Elevation |                          | 14.9                |  |
| Depth (ft)      | Estimated Elevation (ft) | Blows/Comments      |  |
| 0-4             | 18.9                     | Push                |  |
| 4-5             | 19.9                     | 35                  |  |
| 5-5.04          | 19.94                    | 20/0.5 in w/pinging |  |



## LIMITATIONS

The information presented in this report is based on the project information provided to us, limited research of records performed by Applied Foundation Testing, and industry accepted analysis procedures. Applied Foundation Testing has interpreted the archived information to the best of its abilities and has drawn its conclusions based on available information.

All elevations contained within this report are measured in feet, are relative to the Top of Rail, and are based on an elevation of the Top of Rail (top of guardrail on bridge) of 0.0 feet. All pertinent items are located below the Top of Rail and the negative sign has been omitted when calculating the relative elevations to these pertinent items.

The general scope of work for the bridge included the following.

1. Reviewed the bridge file information provided by the North Carolina Department of Transportation (NCDOT).
2. Reviewed available bridge information at the applicable NCDOT Division Office.
3. Performed any agreed upon field testing.
4. Documentation of our findings.

The naming and numbering conventions of the substructure elements are illustrated in the bridge cross-section and plan sketch attached to this report. Please note, the various reports in the bridge files generally contain inconsistent naming and numbering conventions for substructure elements. Therefore we do not try and match these naming and numbering conventions. AFT does review the naming and numbering conventions in an effort to ensure the information in the bridge files is reflected accurately in the bridge cross section and plan sketch and within the text of this report.

Ultra-seismic testing when performed is done using a Freedom Data PC manufactured by Olson Instruments, Inc. For more information on the test method please refer to National Cooperative Highway Research Program Project Number 21-5 (2) Unknown Subsurface Bridge Foundation Testing Final Report. The ultra-seismic test method is a sonic reflection technique using geophysical data processing techniques to analyze the propagation of induced compression and flexural waves as they reflect from foundation substructure boundaries. When performing this method the foundation element is impacted (with a hand held instrumented hammer) at or near the top (horizontally or vertically) and the resulting wave motion is recorded by a multi-channel (vertical, transverse, and radial) accelerometer. The accelerometer is located on the foundation generally near the ground surface for the first data set and then incremented up the foundation (at a selected fixed distance) for each successive data set until reaching the point of hammer impact. Post processing consists of filtering and stacking all the recorded wave forms. Each data set from every foundation element is unique and there is not a standard method for interpretation. Therefore, foundation boundary depth estimates are based on our experience and engineering judgment.

Low strain integrity testing when performed is done in general accordance with ASTM D5882. Testing is generally accomplished using a Freedom Data PC manufactured by Olson Instruments, Inc. or Profound hardware and software manufactured by The Netherlands Organization (TNO). This test method imparts a small strain stress wave into the pile via a hand held hammer and measures the impact event with a sensitive accelerometer mounted to the pile. Reflections are generated from either the pile toe, irregularities in the pile shaft, and/or changes in soil stiffness. Based on the time period between the impact and reflection from the pile toe and the material wave speed, its length can be estimated. The test method does have limitations and may sometimes provide inconclusive results if the piles are embedded in high friction soils or if the piles have discontinuities. Moreover, piles connected to a cap or beam may be troublesome to analyze due to resonant waves from the cap. In general a number of locations on a pile for both accelerometer placement and hammer impact are tried. Impacts are generated with small and large hammers. Many impact signals are generally obtained. The best signals are then stored on the field computer for later post processing. Post processing consists of exponentially amplifying the signals to overcome damping from shaft friction and emphasize the pile toe reflection. Smoothing is also performed on some of the signals to eliminate high frequencies or noise. The pile material compression wave speed (16,808 feet per second {ft/s} for steel piles, 11,500 to 14,500 ft/s for concrete piles, and 9,000 to 18,000 ft/s for timber piles) is estimated based on pile material type and can have a significant effect on estimated pile length. Each data set from every pile is unique and there is not a standard method for interpretation. Therefore, pile length estimates are based on our experience and engineering judgment.

Rod drives are performed with half inch diameter solid steel rods and a 16 pound hammer using a two foot drop. Blows to drive the rod are generally recorded in one foot increments unless refusal occurs. Refer to the bridge sketch for approximate locations of rod drives.

When historical downstream and upstream streambed soundings are provided to AFT, we develop plots using the provided information to compare channel migration and/or scour along the bridge length. These plots are based on actual information gathered by others and are representative of the depth to the ground measured from the top of rail.

Embedment depths are estimated based on available information provided to AFT and field testing (when conducted). The top of footing elevation is generally based on measurements taken in the field. Rod probes are performed when tops of footings are not exposed. Thalweg elevation is based on the deepest streambed sounding from the noted Bridge Inspection Report. Negative embedment indicates the foundation bottom is above the Thalweg elevation. Ground line elevations are based on deepest stream bed sounding for each bent in most recent bridge inspection report.

Cost Estimate - Irzdeli #133  
 To obtain largest loads

JH  
 1/5/57

2nd Floor - with new 1x8

Change Steel - 10' 40' W21x62 4 new, 6 old

20 17' 6" Cant - W18x50 Replaced

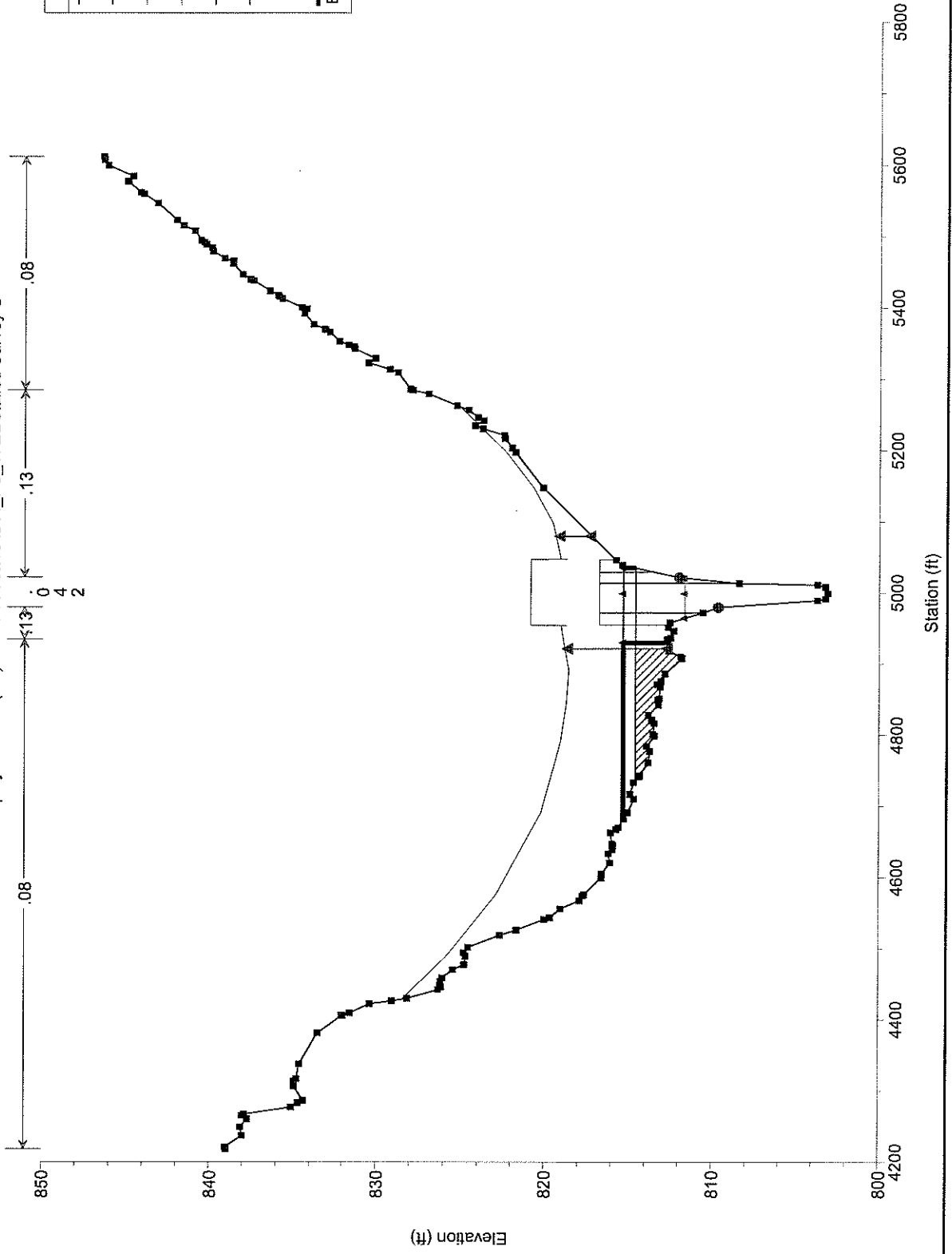
10 17' 6" - W18x50 Old.

3 new 2 piles @ E. Pile

2 piles @ Int. Pile

|                  |          |       |       |                 |
|------------------|----------|-------|-------|-----------------|
| 4x8 x 24         | 70 x 3/4 | 135   | @ 40  | = 5,400.        |
| Reinforcing 12x4 | -        | 50    | @ 40  | = 2,000.        |
| 12 30' Piles     |          |       | @ 100 | = 1,200.        |
| 4 W21x62         |          |       | @ 750 | = 3,000.        |
|                  |          |       |       | 11,700.-        |
| MISC             |          |       |       | 1,300.-         |
|                  |          |       |       | 13,000.-        |
| Column           |          |       |       | 13,000.-        |
| Painting         |          |       |       | 4,000.-         |
|                  |          |       |       | <u>30,000.-</u> |
|                  |          | Total |       | \$ 30,000.-     |

Fourth Creek Detailed Study Plan: Floodway Run 7/15/2008  
 Chipley Ford Rd (FC) TOR Structure ID: L\_FC\_17 Detailed Survey S



| Legend        |     |
|---------------|-----|
| WS 100-FW     | —▲— |
| WS 100-year   | —●— |
| Crit 100-year | —■— |
| Crit 100-FW   | —▲— |
| Ground        | —■— |
| Ineff         | —▲— |
| Bank Sta      | —●— |
| Encroachment  | —■— |