

OFFICE ESTIMATE
1@60, 1@70, 1@70 Bridge

PREDESIGN-PRESURVEY REPORT

County SURRY (DIV. 11)

Project# _____

TIP# _____

Let Date _____

WBS# 17BP.11.R.87

Bridge# 850094

Road# SR1727 (LINVILLE RD)

Stream ARARAT RIVER

Type Of Request: POC Force Account TIP NCMA

Date 7/01/13 Name MJY

Assigned To RCH

Checked By WSh 7-17-13

Prior Survey Date 4@45' (attach copy of prior survey) BRN BK: 4@45' CD FILE NONE

Study By Scour Section YES - attached

Flood Zone AE with FID Detail Study REDELINEATION Date 8/18/09 Panel# 5030 ✓

B.M. Info _____

Quad Map MOUNT AIRY NORTH Drainage Area 64.3 SQ. MI. From USGS STREAM STATS ✓
Q25 7000 cfs ✓ Q50 8300 cfs Q100 9600 cfs Method REG. EQNS.
8000 cfs 9200 cfs REGION 1

EXISTING BRIDGE INFORMATION

Location 0.3 MI. E. JCT. NC 104 ✓

Average Daily Traffic 1800 7% TRK (2010)

Length 180' ✓ Bed-To Crown 19' ✓ Water Depth 1' ✓

Type Structure RC FLOOR ON I-BEAMS; RC CAPS/H-PILES, RCP & B ✓

Type Spans 4@45' ✓

Upstream Structure NA. - TOO MANY TRIBUTARY STREAMS BTW 850094 + THE U/S STRUCTURE

Location _____

Bed-To Crown _____ Prior Survey _____

Downstream Structure 850032 (NC 103, ARARAT RIVER)

Location 0.4 MI. N. JCT. US 52B ✓

Bed-To Crown 15' (D=1') ✓ Prior Survey _____

SCS Watershed _____

HATCHERY SUPPORTED ✓ ENVIRONMENTAL TVA NO ✓

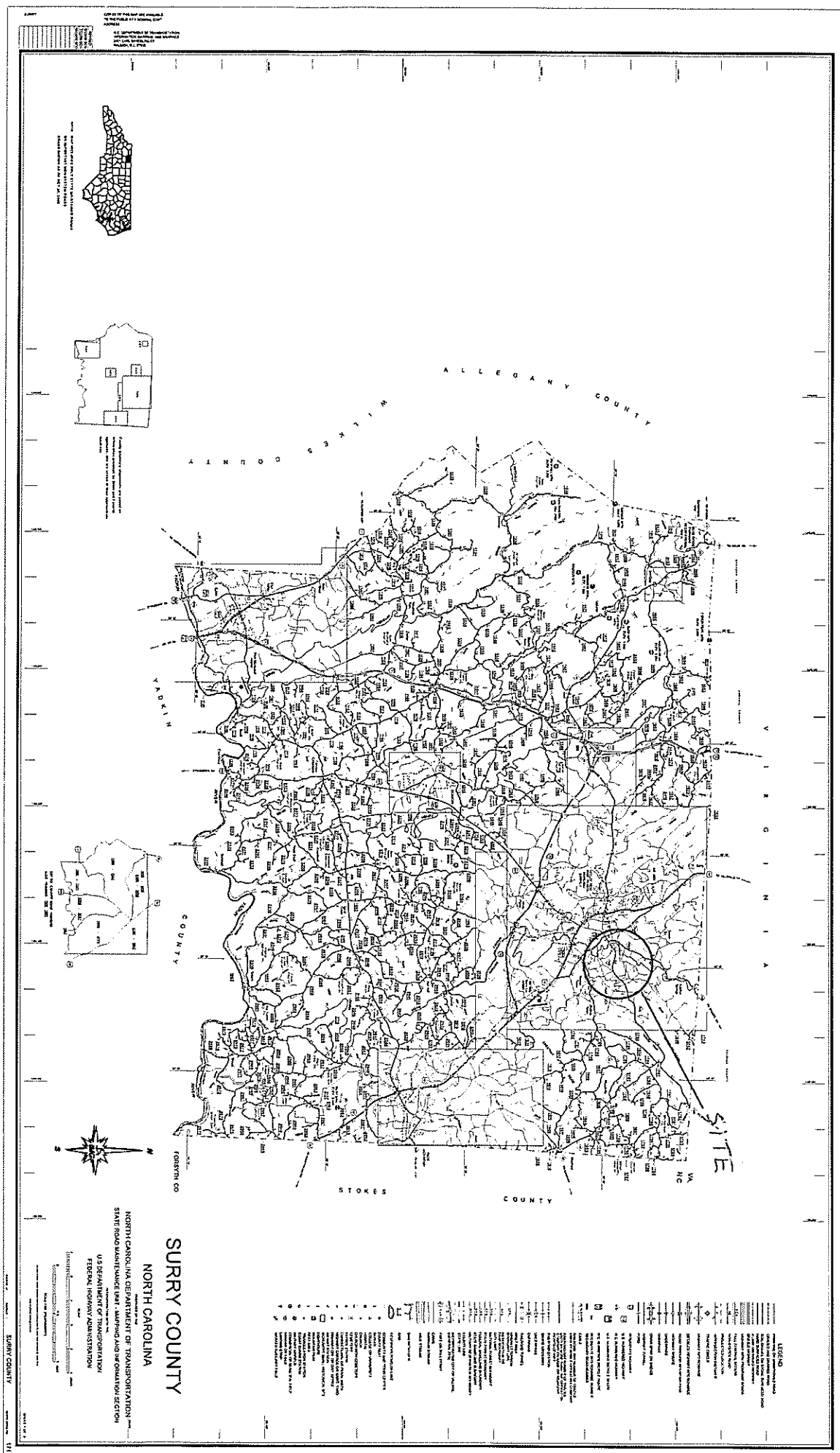
Trout Stream YES ✓ Anadromous Fish NO Primary Nursery Area NO ✓

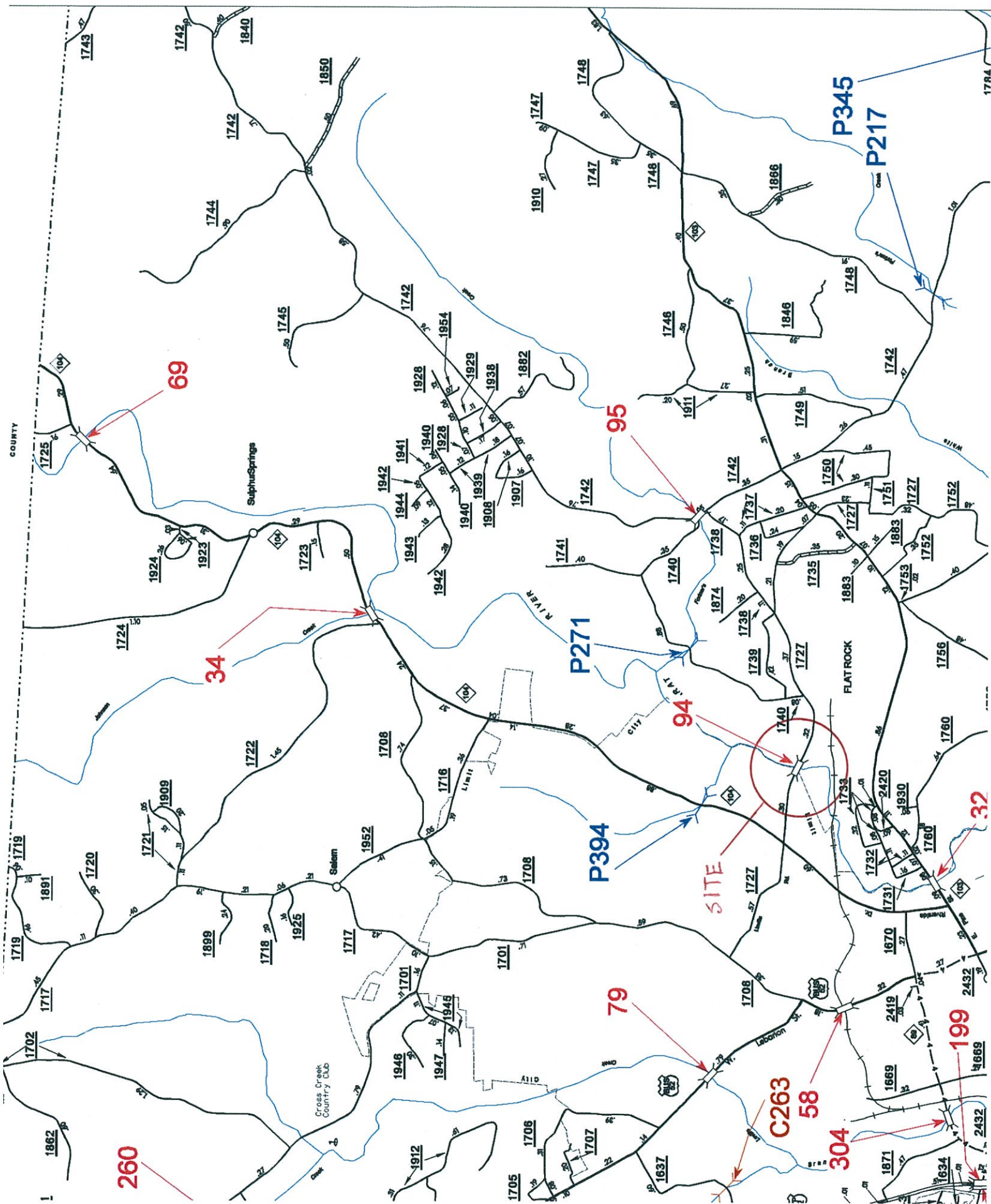
High Quality Waters NO ✓ Nutrient Sensitive Waters NO ✓

Near Water Supply Intake NO ✓ CAMA County NO ✓

Stream Classification C ✓ # 12-72-(4.5)

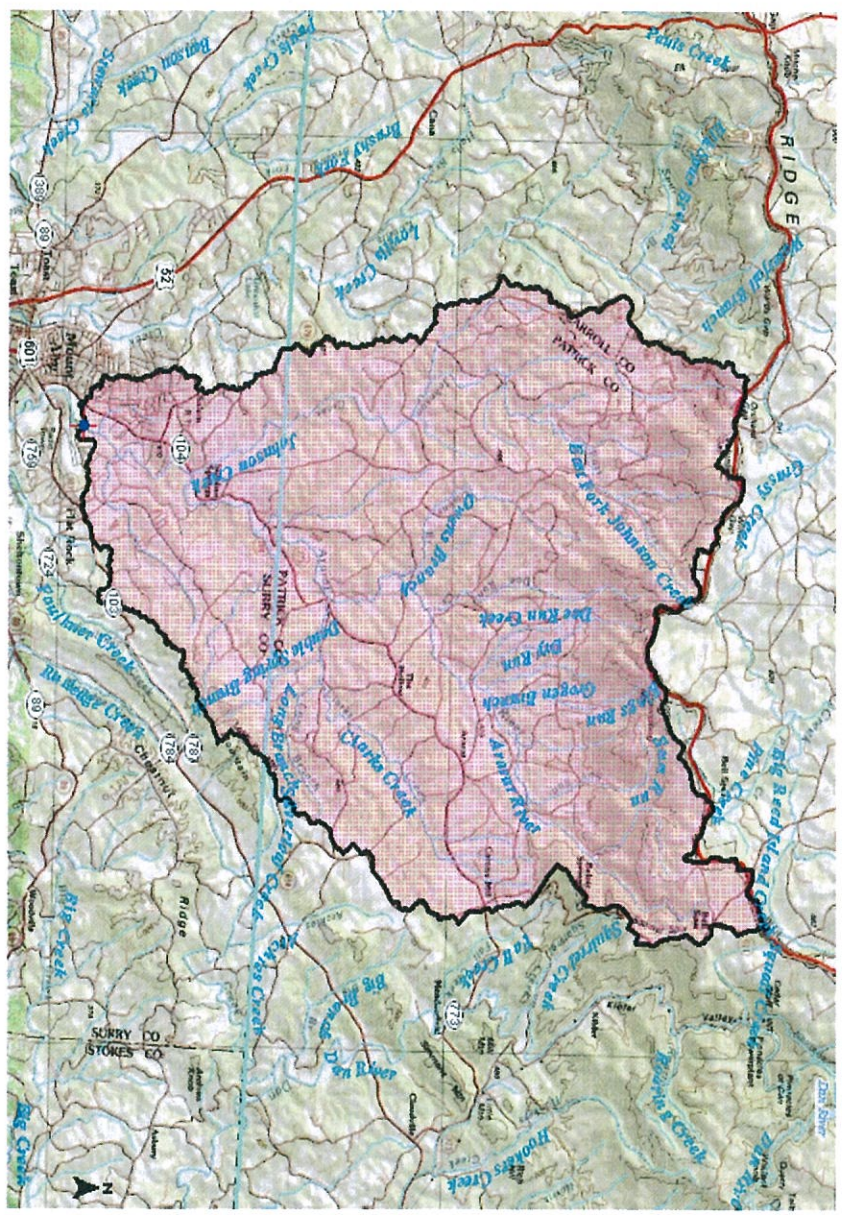
DENR River Basin Info. YADKIN ✓







StreamStats Print Page



- Explanation**
- ★ Global Watershed Point
 - SRTM30 Plus
 - NDOT Point
 - Localities
 - Gauging Station, Continuous Record
 - Low Flow, Partial Record
 - Peak Flow, Partial Record
 - Peak and Low Flow, Partial Record
 - Stage Only
 - Low Flow, Partial Record, Stage
 - Miscellaneous Record
 - Unknown
 - Local H2O
 - Longest ImpathSD
 - Stream Grid
 - Global Watershed
 - Pilot Study Area
 - Inupoly

7/1/2013 2:55:56 PM

850094



North Carolina StreamStats

Streamstats Ungaged Site Report

Date: Mon Jul 1 2013 14:56:07 Mountain Daylight Time

Site Location: North_Carolina

NAD27 Latitude: 36.5108 (36 30 39)

NAD27 Longitude: -80.5921 (-80 35 31)

NAD83 Latitude: 36.5109 (36 30 39)

NAD83 Longitude: -80.5919 (-80 35 31)

Drainage Area: 64.3 mi²

Percent Urban: 7.6 %

Percent Impervious: 0.7 %

Peak Flows Region Grid Basin Characteristics			
100% Peak Southeast US 2009 5158 (64.3 mi ²)			
Parameter	Value	Regression Equation Valid Range	
		Min	Max
Drainage Area (square miles)	64.3	1	9000
Percent Area in Region 1 (percent)	80.117	0	100
Percent Area in Region 2 (percent)	19.883	0	100
Percent Area in Region 3 (percent)	0.000	0	100
Percent Area in Region 4 (percent)	0.000	0	100
Percent Area in Region 5 (percent)	0.000	0	100

Urban Flows Region Grid Basin Characteristics			
100% Peak urban Blue Ridge-Piedmont FS007-00 (64.3 mi ²)			
Parameter	Value	Regression Equation Valid Range	
		Min	Max
Drainage Area (square miles)	64.3 (above max value 41)	0.04	41
Area of Impervious Surfaces (percent)	0.67 (below min value 2)	2	54.6

Warning: Some parameters are outside the suggested range. Estimates will be extrapolations with unknown errors.

Peak Flows Region Grid Streamflow Statistics					
Statistic	Flow (ft ³ /s)	Prediction Error (percent)	Equivalent years of record	90-Percent Prediction Interval	
				Minimum	Maximum
PK2	2450	35		1410	4240
PK5	4150	34		2410	7130
PK10	5380	35		3080	9400
PK25	6960	38		3840	12600
PK50	8310	40		4450	15500
PK100	9570	42		4960	18500
PK200	10800	44		5390	21500
PK500	12600	48		6020	26500

Urban Flows Region Grid Streamflow Statistics					
Statistic	Flow (ft ³ /s)	Standard Error (percent)	Equivalent years of record	90-Percent Prediction Interval	
				Minimum	Maximum
PK2U	549				
PK5U	1070				
PK10U	1520				
PK25U	2440				
PK50U	3100				
PK100U	3830				



NC DEPARTMENT OF TRANSPORTATION
DIVISION OF HIGHWAYS
BRIDGE MANAGEMENT UNIT

ATTENTION **TEMPORARY REPAIRS (BEAM ONE)...**

BRIDGE INSPECTION REPORT

INSPECTION TYPE: Routine Inspection

COUNTY SURRY BRIDGE NUMBER 850094 INSPECTION CYCLE 2 YRS
ROUTE SR1727 ACROSS ARARAT RIVER M.P. 0

LOCATION .3 MI.E.JCT.NC104

SUPERSTRUCTURE REINFORCED CONCRETE FLOOR ON I-BEAMS

SUBSTRUCTURE E.BTS:RC.CAPS/H-PILES;BT.1&3:RCP&B;BTS:.1&2/PILE FTGS.

SPANS 4 @ 45'

LONGITUDE 80° 35' 31.0"

LATITUDE 36° 30' 39.2"

PRESENT CONDITION FAIR

INVENTORY RATING

INSPECTION DATE 09/15/2011

OPERATING RATING

PRESENT POSTING SV 33 TTST 37 SV 33 TTST 37

PROPOSED POSTING

COMPUTER UPDATE

ANALYSIS DATE

POSTING LETTER DATE

SUFFICIENCY RATING

OTHER SIGNS PRESENT 4 DELINEATORS



WEST TO EAST

SIGN NOTICE
ISSUED FOR

NUMBERED
REQUIRED

<u>Yes</u>	WEIGHT LIMIT	<u>1</u>
<u>No</u>	DELINEATORS	<u></u>
<u>No</u>	NARROW BRIDGE	<u></u>
<u>No</u>	ONE LANE BRIDGE	<u></u>
<u>No</u>	LOW CLEARANCE	<u></u>

BRIDGE MANAGEMENT UNIT
DATA ON EXISTING STRUCTURE

Run Date: 10/24/2011

COUNTY : SURRY		DIV : 11		DIST : 1		STRUCTURE NUMBER : 850094		LENGTH : 180 FEET	
ROUTE CARRIED : SR1727				FEATURE INTERSECTED : ARARAT RIVER					
LOCATED : .3 MI.E.JCT.NC104				BRIDGE NAME :				CITY :	
FUNC. CLASS : 19		SYST.ON : NFA		SYST.UNDER : NFA		ADT & YR : 1800 2010		RAIL TYPE : LT 071 RT 071	
BUILT : 1963		BY : SHC		PROJ : 6.800503		FED.AID PROJ :		DESIGN LOAD : H 15	
REHAB :		BY :		PROJ :		ALIGNMENT : TAN 90		LANES : ON 2 UNDER	
NAVIGATION : VC 0.0 FT HC 0.0 FT				HT. CRN. TO BED : 19 FT				WATER DEPTH : 1 FT	
SUPERSTRUCTURE : REINFORCED CONCRETE FLOOR ON I-BEAMS									
SUBSTRUCTURE : E.BTS:RC.CAPS/H-PILES;BT.1&3:RCP&B;BTS:.1&2/PILE FTGS.									
SPANS : 4 @ 45'									
BEAMS OR GIRDERS : 4 LNS.30 I-BMS @ 7' CENTERS									
FLOOR : 7 RC/NO AWS		ENCROACHMENT :				DECK (OUT TO OUT) : 28.4 FT			
CLEAR ROADWAY : 24.0 FT		BETWEEN RAILS : 26.3 FT				SIDEWALK OR CURB : LT 1.1 FT RT 1.1 FT			
VERT.CL.OVER : 99 FT 99 IN		VERT.CL.UNDER : 00 FT 00 IN				HOR.CL.UNDER : 0.0 FT			
INV.RTG. : HS-1		OPE.RTG. : HS-1		CONTR.MEMBER : ext bm		POSTED : SV 33 TTST 37		DATE 09/25/2008	
SYSTEM : Secondary S.R. Route						GREEN LINE ROUTE : N			
2ND OPENING :		3RD OPENING :		4TH OPENING :		5TH OPENING :			
REMARKS :									

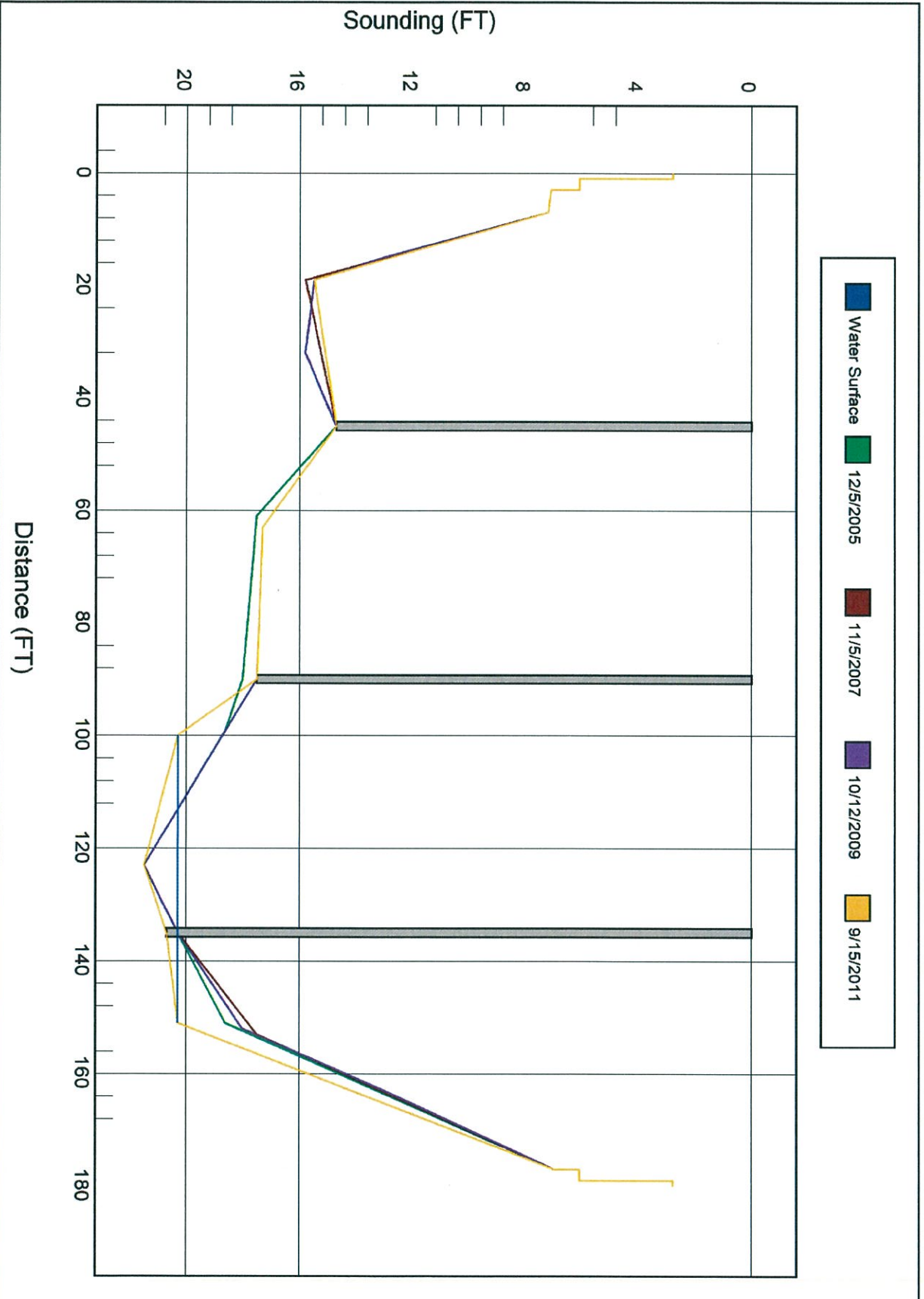
Bridge: 850094

County SURRY

Date: 09/15/2011

Top of Rail = 0 FT (Sounding)

STREAMBED PROFILE (Downstream)



Structure 850094

County SURRY

Date: 09/15/2011

Structure Photos



NORTH PROFILE



SOUTH PROFILE

850094

BRIDGE DEPARTMENT

N. C. STATE HIGHWAY & PUBLIC WORKS COMMISSION

RALEIGH, N. C.

BRIDGE SURVEY REPORT

PROJECT NO. 6800503 SURRY COUNTY, STA. 16 + 57
 BRIDGE OVER ARARAT RIVER Known as Br. 94
 On SR 1727 between # 104 and # 103
CLINDALE RD
 Recommended Width of Roadway 24' Skew 70°
 Recommended Structure 1 @ 19'
H15
 Rip Rap as shown up to El. 191.0
 Temporary Crossing is not req'd
 Present Structure to be removed
 New Location is 220' Up, Stream from Crossing on Present Road
 Nearest Shipping Point Mt. Airy On Southern R. R.
 Distance from Shipping Point to Bridge Site is 2.0 N.E. miles.
 Elevations From B. M. #2 Top of Present Bridge seat Elev. 185.96
North-East corner 195' Rt. Sta 18+18

USE THIS SPACE FOR PHOTOGRAPH
 OF PROPOSED SITE, SHOWING CEN-
 TER LINE, DIRECTION OF FLOW
 AND OTHER IMPORTANT POINTS ON
 PHOTOGRAPH.

Surveyed by R. P. Weathers Assisted by MAH. & JJE Date MAY 62

15

16

17

18

C Sta 16+57
Ct. Gr. Elev. 194.5
4 @ 45'

Ct. Gr. Elev. 194.5

Elev. 189.9
1937 & 1941

RIP RAP ELEV.

12" steel
Pile end bent

Piles

12" steel

25
gravel

25

200

Center Timber

10

10
gravel

ed bent

Elev. 171.0

Foundation Piles

Make fig. of size to rec.
3 ton/ft

3' base channel change
± 150 c.f.

35

40'

20'

40'

20'

RIVER

BRIDGE SCOUR EVALUATION SECONDARY SCREENING DATA SUMMARY AND DECISION REPORT

SITE IDENTIFICATION:

COUNTY Surry CITY/TOWN Mount Airy BRIDGE NO. 94
ROUTE SR 1727 STREAM Ararat River ROAD MILE

INFORMATION RESOURCES AVAILABLE:

HYDRAULIC STUDY REPORT	<u>May 62</u>
CONSTRUCTION PLANS	<u>June 62</u>
FOUNDATION REPORT	<u>-</u>
OTHER AGENCY STUDIES	<u>-</u>
(FEMA, CORPS, T.V.A., SCS)	<u>Floodway (Floodway on map no book)</u>
QUAD MAPS	<u>Mount Airy North</u>
AERIAL PHOTOGRAPHY	<u>-</u>
GAGE DATA	<u>None</u>
BRIDGE INSPECTION REPORT	<u>7-11-91</u>
UNDERWATER INSPECTION REPORT	<u>-</u>
STRUCTURE DATA FILE	<u>7-11-91</u>

STRUCTURE DATA:

*NOTE: ALL ELEVATIONS ARE FROM AN ASSUMED DATUM

BRIDGE LENGTH 180' BUILT (YR.) 1963 PROJ. NO. 6.800503
SUFFICIENCY RATING 53.5 EST. REMAINING LIFE (YRS.) 15
NO. OF SPANS 4 WATERWAY OPENING (SQ. FT.)
UNDERCLEARANCE (BED TO LOW BEAM) 16'

BENT NO.

TYPE

FTG./FOUNDATION TYPE

WIDTH

SKEW

SHAPE

TOP FTG. ELEV.

FOOTING THICKNESS

BOTTOM FTG. ELEV.

EB-1 Spill Thru Abutment	B-1 Pier	B-2 Pier	B-3 Pier	EB-2 Spill Thru Abutment	
Pile	Pile	Pile	Spd. Ft.	Pile	
	2'10"	3'0"	3'0"		
	90	90	90		
	Circ.	Circ.	Rect.		
	175.28	173.61	172.61		
	2.5'	2.5'	2'		
	-	-	170.61		
30'	15'	10.5'	-	25.5'	
159.9	158.5	161.4	-	164.3	
Riprap	-	-	-	Riprap	

TOP OF PILE @
EL. 189.9 ±

PILE LENGTHS (AVERAGE)

PILE TIP ELEV. (AVERAGE)

CONC./RIP RAP PROTECTION

HYDRAULIC DATA:

DRAINAGE AREA 65 sq mi ±

HISTORICAL FLOODS

DATE	ELEV. (FT.)	APPROX. FREQ. (YRS.)	APPROX. DISCHARGE (CFS)
1937 & 1947	190.0 ±	Unk.	Unk.
9-22-79	UNK.	100 + YRS	UNK.

FLOOD FREQUENCY (YRS.)

ELEVATION (FT.)

DISCHARGE (CFS)

AVG. VELOCITY (Q/A)

Q 10	Q 50	Q 100	Q 500

COMMENTS: Flowrates available from FEMA Floodway (1974-1980)

GEOMORPHIC DATA:

CHANNEL: AVG. BASE WIDTH 36' ^{115° skew w/roadway} AVG. TOP WIDTH 86' AVG. DEPTH 5'AT CROSSING: STRAIGHT _____ MILD CURVE ☒ SHARP BEND _____

ANGLE OF APPROACH

FLOW: LOW _____ MILD ☒ HIGH _____WIDTH COMPARED
TO UP ANDDOWNSTREAM: WIDER _____ SAME ☒ NARROWER _____BASED ON COMPARISON OF SECTIONS TAKEN AT DATES 7-11-91, and June 62CHANNEL IS: WIDER _____ FT. SAME ☒ NARROWER _____ FT.SHALLOWER _____ FT. SAME ☒ DEEPER _____ FT.SHIFTED LT. 25 FT. SAME _____ SHIFTED RT. _____ FT.THALWEG, SHIFTED LT. 25 FT. SAME _____ SHIFTED RT. _____ FT.

REPORTED SITE SCOUR PROBLEM:

	MINOR	MODERATE	SEVERE	UNKNOWN
LT. BANK			☒	
RT. BANK				
LT. SPILL SLOPE				
RT. SPILL SLOPE		☒		
PIER (S)				
DEBRIS	<u>B-2</u>			
CHANNEL BED				
OTHER _____				

IS REPORTED PROBLEM CHANNEL FLOW ASSOCIATED?

Yes

BASED ON THE AVAILABLE GEOMORPHIC DATA, THE CHANNEL STABILITY POTENTIAL OVER THE LIFETIME OF THE EXISTING STRUCTURE CAN BEST BE DESCRIBED AS:

- 1) RELATIVELY STABLE WITH LITTLE EXPECTED CHANGE. _____
- 2) POTENTIAL FOR VERY SLOW CHANGE OVER TIME. NOT PRONE TO A MAJOR ONE-EVENT CHANGE. _____
- 3) UNSTABLE. SUBJECT TO RAPID EVOLUTIONARY CHANGE. ✓

SCREENING ANALYSIS:

MUST
SATISFY
BOTH
CONDITIONS

- 1) PIER AND/OR ABUTMENT FOOTINGS WITHIN POTENTIAL CHANNEL SCOUR AREA ARE INDICATED ON THE Construction Plans TO BE ON SCOUR RESISTANT MATERIAL. (THIS FINDING HAS BEEN REVIEWED AND CONCURRED WITH BY W.D. Mancato Yes
(Footings on Bent 3 on rock only.) GEOTECHNICAL UNIT)
- 2) PILE BENT OR PILE FOOTING BRIDGE IN THE PIEDMONT AND MOUNTAIN PROVINCE WITH PILE LENGTH INDICATED TO PENETRATE 20 OR MORE FEET BELOW THE STREAM BED ? No
- 3) PILE BENT OR PILE FOOTING BRIDGE IN THE COASTAL PLAIN WITH PILE LENGTH INDICATED TO HAVE 30 OR MORE FEET OF PENETRATION BELOW THE STREAM BED ? NA
- 4) NO PIERS OR ABUTMENTS WITHIN NORMAL CHANNEL SECTION ? No
- 5) CROSSING HAS EXPERIENCED A FLOOD OF 50 OR MORE YEARS ESTIMATED MAGNITUDE WITH NO REPORTED OR INDICATED SCOUR PROBLEM ? No
- 6) CHANNEL PIER FOOTINGS ARE MORE THAN 7 FEET BELOW BED ? No
- 7) AVERAGE VELOCITY IN BRIDGE OPENING (SIMPLE ANALYSIS $V = Q/A$) FOR THE ESTIMATED 100 YR. EVENT IS LESS THAN 4 FT / SEC ? Unk
- 8) APPROACH ROADWAY OR BRIDGE OVERTOPPED DURING VERY MINOR FLOODS (≤ 10 YR.) REQUIRING CLOSURE AND INSPECTION BEFORE REOPENING ? No

THE STRUCTURE MEETS CRITERIA DESCRIBED IN THE ABOVE LISTED ITEM(S) FOR CLASSIFICATION AS A LOW RISK STRUCTURE. None

BASED ON AN EVALUATION OF THE AVAILABLE DATA AND REPORTS THE CLASSIFICATION OF THIS STRUCTURE AS LOW RISK FOR THE REASON(S) LISTED ABOVE APPEARS REASONABLE AND PRUDENT. No

COMMENTS: Pile foundations could be unstable if scour removes sufficient material. FLOOD OF 1979 WAS 100+ YR EVENT. END BENT SLOPE PROTECTION WASHED OUT.

DECISION:

CLASSIFIED AS:

SCOUR CRITICAL
NON SCOUR CRITICAL
UNKNOWN FOUNDATION
LOW RISK



RECOMMENDED CODE

3

COMMENTS:

SCHEDULE FOR DETAILED STUDY

SCHEDULE FOR FURTHER IN-HOUSE STUDY

SCHEDULE FOR I.W.G.



SCREENING BY: OYN

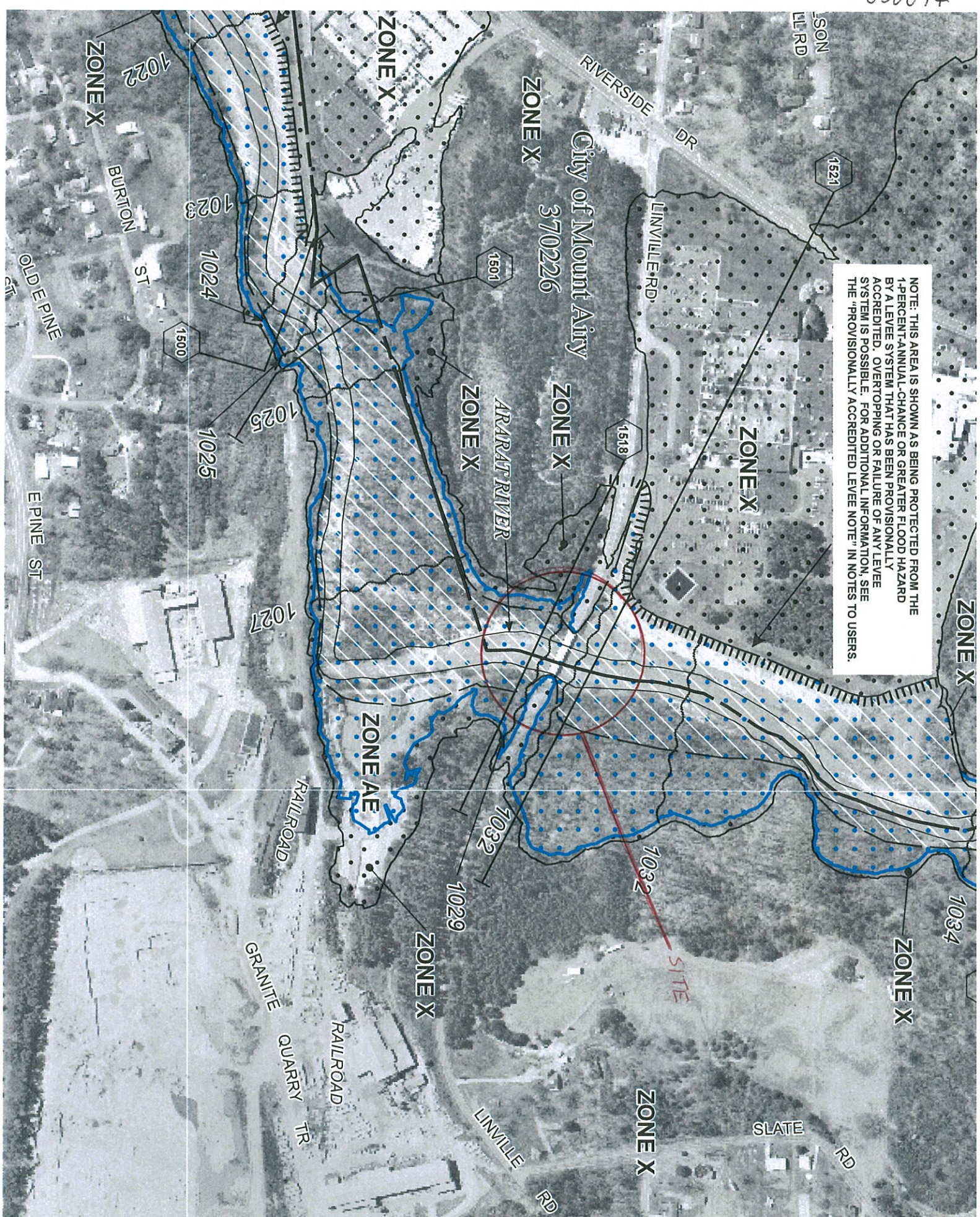
DATE 10-16-91

APPROVED BY: DSF

DATE 10-25-91

COMMENTS: PILES ARE UNTREATED TIMBER, BATTERED 1 1/2" / FT.
BED EL. 176 ± @ B-2. DUE TO RAPID CHANGES IN
CHANNEL SIZE & LOCATION (SEE PROFILES FROM 1985 & 1991 IN
STRUCTURE DATA FILE), A HIGH PROBABILITY OF END BENT #2
BEING LOST DUE TO SCOUR DURING A MAJOR FLOOD EVENT,
AND A SHALLOW PILE FOUNDATION, THIS BRIDGE REQUIRES
A DETAILED STUDY.

NOTE: THIS AREA IS SHOWN AS BEING PROTECTED FROM THE 1-PERCENT-ANNUAL-CHANCE OR GREATER FLOOD HAZARD BY A LEVEE SYSTEM THAT HAS BEEN PROVISIONALLY ACCREDITED. OVERTOPPING OR FAILURE OF ANY LEVEE SYSTEM IS POSSIBLE. FOR ADDITIONAL INFORMATION, SEE THE "PROVISIONALLY ACCREDITED LEVEE NOTE" IN NOTES TO USERS.



000094

FLOODING SOURCE		FLOODWAY			BASE FLOOD WATER-SURFACE ELEVATION (FEET NAVD 88)			
CROSS SECTION	DISTANCE ¹	WIDTH (FEET)	SECTION AREA (SQUARE FEET)	MEAN VELOCITY (FEET PER SECOND)	REGULATORY	WITHOUT FLOODWAY	WITH FLOODWAY	INCREASE
Ararat River								
1257	125,660	500	5,166	5.4	985.2	985.2	986.0	0.8
1270	127,000	480	6,200	4.5	987.5	987.5	988.1	0.6
1294	129,380	400	6,197	4.5	990.6	990.6	991.4	0.8
1303	130,300	200	2,963	7.2	991.3	991.3	992.1	0.8
1313	131,250	150	2,829	7.5	993.5	993.5	994.1	0.6
1359	135,940	450	6,039	3.5	1,000.0	1,000.0	1,000.7	0.7
1378	137,830	160 ²	1,427	14.9	1,000.8	1,000.8	1,001.5	0.7
1381	138,130	250	4,045	5.3	1,005.6	1,005.6	1,005.7	0.1
1399	139,910	615	5,687	3.7	1,006.8	1,006.8	1,007.2	0.4
1414	141,390	600	6,361	3.0	1,008.0	1,008.0	1,008.6	0.6
1415	141,510	700	6,325	3.0	1,008.3	1,008.3	1,008.9	0.6
1435	143,520	500	4,987	3.8	1,012.5	1,012.5	1,013.0	0.5
1449	144,880	500	4,567	4.2	1,015.5	1,015.5	1,016.1	0.6
1464	146,440	230	2,152	8.9	1,016.2	1,016.2	1,016.9	0.7
1466	146,630	430	4,863	3.9	1,018.7	1,018.7	1,019.5	0.8
1481	148,105	325	3,575	5.4	1,019.5	1,019.5	1,020.5	1.0
1500	149,985	342 ^{2,3}	4,098	4.7	1,024.7	1,024.7	1,025.2	0.5
1501	150,140	200	2,381	8.1	1,024.7	1,024.7	1,024.9	0.2
1518	151,790	270	2,986	6.4	1,028.9	1,028.9	1,029.7	0.8
1521	152,060	335 ³	3,996	4.8	1,032.0	1,032.0	1,032.4	0.4
1535	153,460	192	2,410	8.0	1,034.2	1,034.2	1,034.4	0.2
1562	156,210	436 ²	3,015	5.8	1,040.6	1,040.6	1,040.8	0.2

¹ Feet above mouth

² Value is inaccurate, as the floodway has been adjusted in this area to match topographic-based floodplain redelineation

³ Value is inaccurate, as the floodway has been adjusted in this area to comply with FEMA's Guidelines for levee mapping

FEDERAL EMERGENCY MANAGEMENT AGENCY

SURRY COUNTY, NC

AND INCORPORATED AREAS

FLOODWAY DATA

ARARAT RIVER

TABLE 13