



NC DEPARTMENT OF TRANSPORTATION
 DIVISION OF HIGHWAYS
 STRUCTURE MANAGEMENT UNIT

ATTENTION: **PRIORITY MAINTENANCE - UPSTREAM AND
 DOWNSTREAM HEADWALL; UPDATES MADE TO
 APPROACH ROADWAY SKETCH AND CULVERT
 SKETCH**

Structure Safety Report

Routine Element Inspection - Contract

COUNTY: WATAUGA STRUCTURE NUMBER: 940066 FREQUENCY: 24 MONTHS

FACILITY CARRIED: US321 MILE POST: _____

LOCATION: .15 MI.W.JCT.SR1123

FEATURE INTERSECTED: LAUREL CREEK

LATITUDE: 36° 15' 11.99" LONGITUDE: 81° 51' 12.97"

SUPERSTRUCTURE: SINGLE 30'X19'RC ARCH CULVERT;65'ALONG CENTERLINE CULVERT

SUBSTRUCTURE: _____

SPANS: _____

FRACTURE CRITICAL TEMPORARY SHORING SCOUR CRITICAL SCOUR PLAN OF ACTION

PRESENT CONDITION: Fair INSPECTION DATE: 07/28/2017

POSTED SV: Not Posted POSTED TTST: Not Posted

OTHER SIGNS PRESENT: NONE



Sign noticed issued for	Number Required
<u>NO</u> WEIGHT LIMIT	<u>0</u>
<u>NO</u> DELINEATORS	<u>0</u>
<u>NO</u> NARROW BRIDGE	<u>0</u>
<u>NO</u> ONE LANE BRIDGE	<u>0</u>
<u>NO</u> LOW CLEARANCE	<u>0</u>

DIRECTION OF INSPECTION S-N

DIRECTION MATCHES PLANS _____

LOOKING NORTH

INSPECTED BY MATTHEW MOYER	SIGNATURE <i>Matthew Moyer</i>	ASSISTED BY DAVID WAGNER
-------------------------------	-----------------------------------	-----------------------------

Structure Element Scoring

Structure Number: 940066

Inspection Date 7/28/2017

Element Number	Parent Number	Element Name	Location	Total Quantity	Level 1 Quantity	Level 2 Quantity	Level 3 Quantity	Level 4 Quantity
241	0	Reinforced Concrete Culvert	Culverts and Pipes	65	0	1	64	0

Summary of Maintenance Needs

Maintenance By Defect

Structure Number: 940066

Inspection Date: 07/28/2017

MMS Code	Element Name	Defect Name	Recommended Quantity
3370	Reinforced Concrete Culvert	Efflorescence/Rust Staining	25 Feet
3370	Reinforced Concrete Culvert	Exposed Rebar	1 Feet
3370	Reinforced Concrete Culvert	Cracking (RC and Other)	2300 Feet

Element Structure Maintenance Quantities

Structure Number: 940066

Inspection Date 07/28/2017

Location	MMS Code	Description	Maint Quantity	Total Quantity	Severe Quantity	Poor Quantity	Fair Quantity	Good Quantity
Culverts and Pipes	3370	Maintenance of NBI Culverts and Pipes	2326	65	0	64	1	0

Element Condition and Maintenance Data

Structure Number: 940066

Inspection Date: 07/28/2017

Span 1

Culvert Section 1

Concrete Arch Culvert

Element Number	Element Name	Total Qty	CS1 Qty	CS2 Qty	CS3 Qty	CS4 Qty
241	Reinforced Concrete Culvert	65	0	1	64	0 Feet

Element Number	Defect Type	Defect Description	CS	CS Qty	Maint Qty
241	Cracking (RC and Other)	2300 SF. OF LONGITUDINAL CRACKING AND MAP CRACKING UP TO 1/32" WIDE	3	64	2,300 Feet
241	Efflorescence/Rust Staining	25 SF. OF LONGITUDINAL AND VERTICAL CRACKING WITH EFFLORESCENCE	2		25 Feet
241	Exposed Rebar	6" X 1" X 4" DEEP SPALL WITH EXPOSED REBAR IN TOP OF PIPE 25 FT. FROM DOWNSTREAM END	2	1	1 Feet

General Comments

Elements Verified

Location	Name	Component	Element Name	Amount
Span 1	Culvert Section 1	Concrete Arch Culvert	Reinforced Concrete Culvert	65

General Inspection Notes

National Bridge and NC Inspection Items

Structure Number: 940066

Inspection Date: 07/28/2017

National Bridge Inventory Items

Item	Grade Scale	Grade
Item 58: Deck	0 - 9 , N	N
Item 59: Superstructure	0 - 9 , N	N
Item 60: Substructure	0 - 9 , N	N
Item 61: Channel and Channel Protection	0 - 9 , N	7
Item 62: Culvert	0 - 9 , N	5
Item 71: Waterway Adequacy	0 - 9 , N	7
Item 72: Approach Roadway Alignment	0 - 9 , N	8

Note: If NBI Inspection Item is not present, code NBI item with "N"

NC SMU Inspection Items

Item	Grade Scale	Grade	Maint. Qty.	Maint. Code
Headwall	G, F, P, or C	P	294	4675
Wingwall	G, F, P, or C	P	36	3350
Scour	G, F, P, or C	G		
Drift	G, F, P, or C	G	0	3366
Estimated Remaining Life	G, F, P, or C	28		

Note: If NC SMU Inspection Item is not present, leave NC SMU item blank

Inspection Information

Item	Grade Scale	Grade
Regulatory Sign Noticed Issued	YES/NO	N
Priority Maintenance Request Submitted	YES/NO	Y
Inspection Time	Hours	6
Traffic Control Time	Hours	0
Snooper Time	Hours	0
Ladder Used	YES/NO	N
Bucket Truck Used	YES/NO	N
Boat Used	YES/NO	N
Other Equipment Used	YES/NO	N

National Bridge and NC SMU Inspection Item Details

Structure Number: 940066

Inspection Date: 07/28/2017

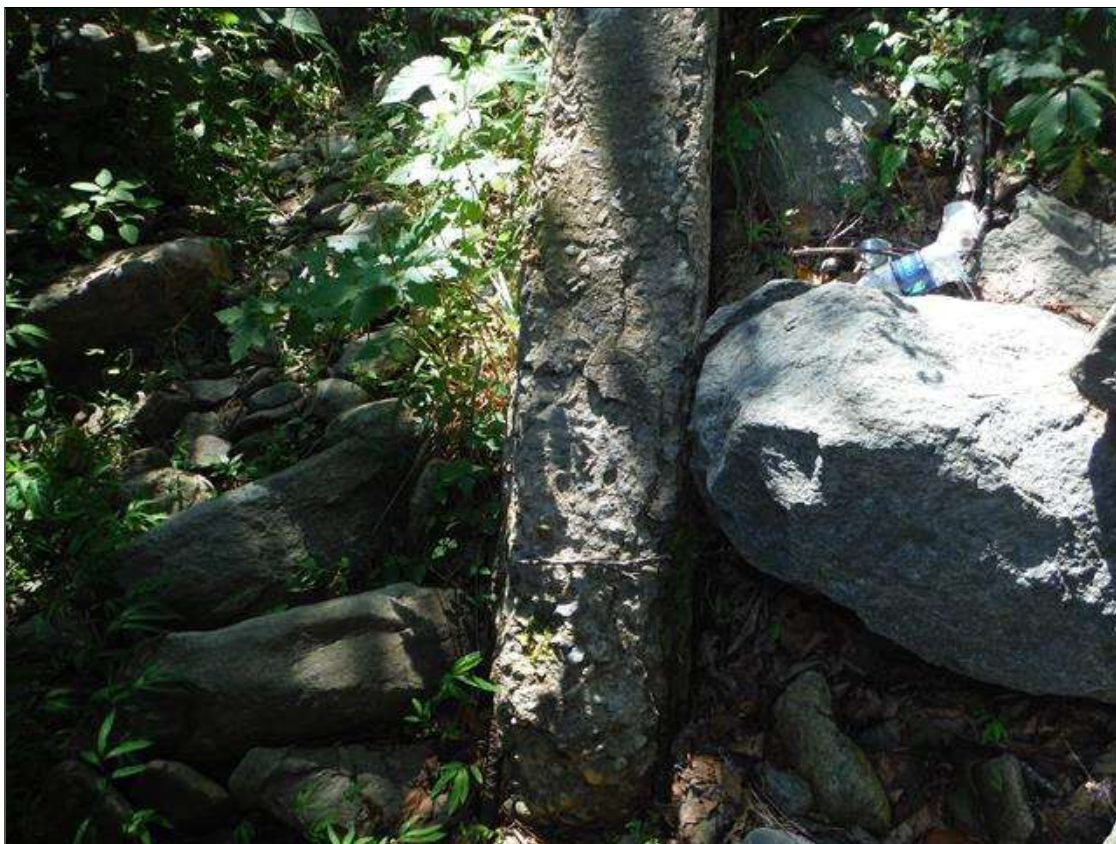
Item	Priority Maintenance Issued	Grade Y	Maint Code	Qty. 0
Details	150 SF. X UP TO 4" DEEP SPALL WITH EXPOSED REBAR IN DOWNSTREAM HEADWALL (PM) 5 FT. X 1 FT. X 4" DEEP SPALL WITH EXPOSED REBAR IN UPSTREAM HEADWALL (PM)			
Item	Headwalls	Grade P	Maint Code 4675	Qty. 294
Details	150 SF. X UP TO 4" DEEP SPALL WITH EXPOSED REBAR IN DOWNSTREAM HEADWALL (PM) 5 FT. X 1 FT. X 4" DEEP SPALL WITH EXPOSED REBAR IN UPSTREAM HEADWALL (PM) 36 FT. X 1 FT. X 2" DEEP SPALL IN UPSTREAM HEADWALL 36" X 7" DELAMINATION AND 12" X 3" X 1" DEEP SPALL IN UPSTREAM HEADWALL 100 SF. OF VERTICAL AND LONGITUDINAL CRACKING WITH EFFLORESCENCE IN UPSTREAM HEADWALL			
Item	Wingwalls	Grade P	Maint Code 3350	Qty. 36
Details	5 FT. X 4 FT. X 2" DEEP SPALL WITH EXPOSED REBAR IN NORTHEAST WINGWALL 6 FT. X 1 FT. X 2" DEEP SPALL WITH EXPOSED REBAR IN NORTHEAST WINGWALL 10 FT. OF ABRASION WITH EXPOSED COARSE AGGREGATE 6" ABOVE WATERLINE IN NORTHWEST WINGWALL			



150 SF. X UP TO 4" DEEP SPALL WITH EXPOSED REBAR IN DOWNSTREAM HEADWALL (PM)



5 FT. X 4 FT. X 2" DEEP SPALL WITH EXPOSED REBAR IN NORTHEAST WINGWALL



6 FT. X 1 FT. X 2" DEEP SPALL WITH EXPOSED REBAR IN NORTHEAST WINGWALL



2300 SF. OF LONGITUDINAL CRACKING AND MAP CRACKING UP TO 1/32" WIDE



Barrel 1 Section 1: 6" X 1" X 4" DEEP SPALL WITH EXPOSED REBAR IN TOP OF PIPE 25 FT. FROM DOWNSTREAM END



5 FT. X 1 FT. X 4" DEEP SPALL WITH EXPOSED REBAR IN UPSTREAM HEADWALL (PM)



36 FT. X 1 FT. X 2" DEEP SPALL IN UPSTREAM HEADWALL



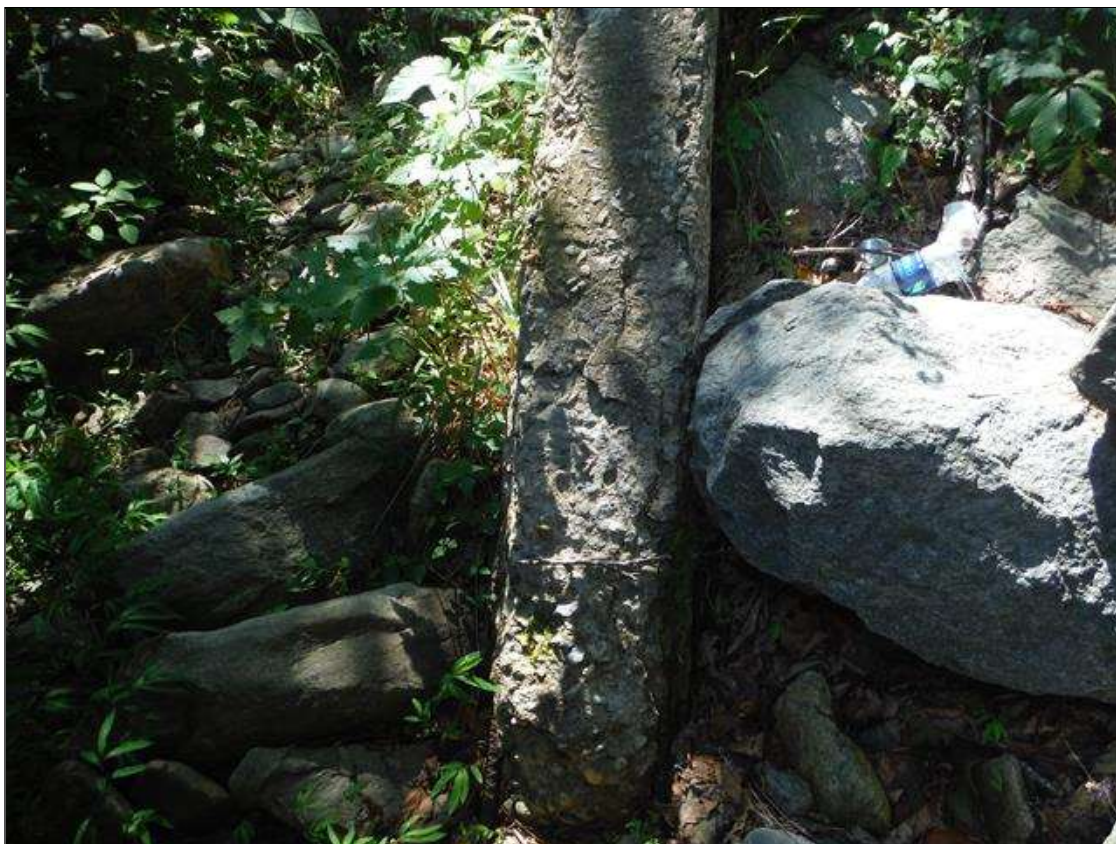
100 SF. OF VERTICAL AND LONGITUDINAL CRACKING WITH EFFLORESCENCE IN UPSTREAM HEADWALL



150 SF. X UP TO 4" DEEP SPALL WITH EXPOSED REBAR IN DOWNSTREAM HEADWALL (PM)



5 FT. X 4 FT. X 2" DEEP SPALL WITH EXPOSED REBAR IN NORTHEAST WINGWALL



6 FT. X 1 FT. X 2" DEEP SPALL WITH EXPOSED REBAR IN NORTHEAST WINGWALL



Barrel 1 Section 1: 2300 SF. OF LONGITUDINAL CRACKING AND MAP CRACKING UP TO 1/32" WIDE



Barrel 1 Section 1: 6" X 1" X 4" DEEP SPALL WITH EXPOSED REBAR IN TOP OF PIPE 25 FT. FROM DOWNSTREAM END



5 FT. X 1 FT. X 4" DEEP SPALL WITH EXPOSED REBAR IN UPSTREAM HEADWALL (PM)



36 FT. X 1 FT. X 2" DEEP SPALL IN UPSTREAM HEADWALL



100 SF. OF VERTICAL AND LONGITUDINAL CRACKING WITH EFFLORESCENCE IN UPSTREAM HEADWALL



DOWNSTREAM PROFILE



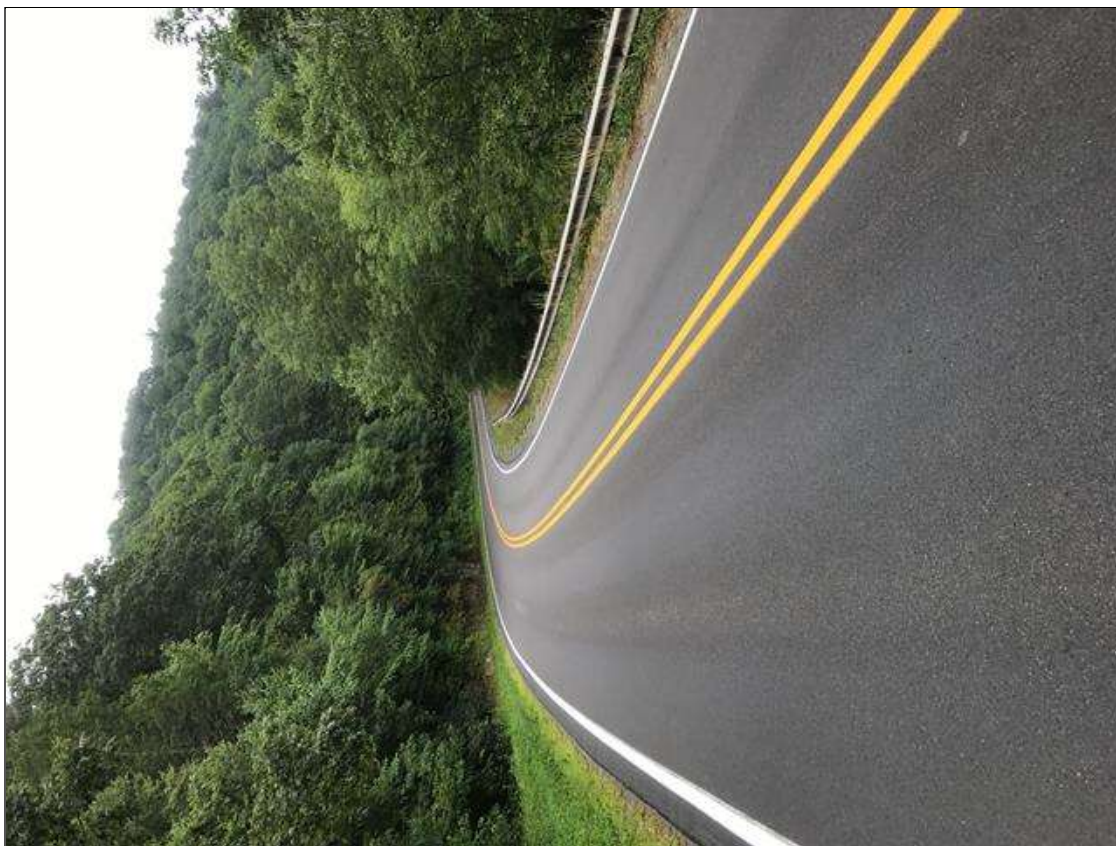
LOOKING DOWNSTREAM, EAST



LOOKING UPSTREAM, WEST



UPSTREAM PROFILE



LOOKING NORTH



LOOKING SOUTH



DOWNSTREAM PROFILE



LOOKING DOWNSTREAM, EAST



LOOKING UPSTREAM, WEST



UPSTREAM PROFILE



LOOKING NORTH

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

Run Date: 11/09/2017

IDENTIFICATION

(1) STATE NAME -NORTH CAROLINA BRIDGE **940066**
 (8) STRUCTURE NUMBER(FEDERAL) 000000001890066
 (5) INVENTORY ROUTE (ON/UNDER) - ON 21003210
 (2) STATE HIGHWAY DEPARTMENT DISTRICT 2
 (3) COUNTY CODE 189 (4) PLACE CODE 0
 (6) FEATURE INTERSECTED - LAUREL CREEK
 (7) FACILITY CARRIED US321
 (9) LOCATION .15 MI.W.JCT.SR1123
 (11)MILEPOINT 0
 (16)LAT 36° 15' 11.99" (17)LONG 81° 51' 12.97"
 (98)BORDER BRIDGE STATE CODE PCT SHARE
 (99)BORDER BRIDGE STRUCTURE NO

SUFFICIENCY RATING = 86.67
 STATUS = Not Deficient

CLASSIFICATION **CODE**

(112)NBIS BRIDGE SYSTEM - YES
 (104)HIGHWAY SYSTEM Is on the NHS 1
 (26) FUNCTIONAL CLASS - Arterial - Other 02
 (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 -
 (110)DESIGNATED NATIONAL NETWORK - On the National Network 1
 (20) TOLL On Free Road 3
 (31) MAINTAIN - State Highway Agency 01
 (22) OWNER - State Highway Agency 01
 (37) HISTORICAL SIGNIFICANCE - Not Eligible 5

STRUCTURE TYPE AND MATERIAL

(43) STRUCTURE TYPE MAIN: Concrete
 TYPE - Culverts (includes frame culverts) CODE 119
 (44) STRUCTURE TYPE APPR :
 TYPE - CODE 000
 (45) NUMBER OF SPANS IN MAIN UNIT 1
 (46) NUMBER OF APPROACH SPANS
 (107)DECK STRUCTURE TYPE - N CODE
 (108)WEARING SURFACE / PROTECTIVE SYSTEM :
 (A) TYPE OF WEARING SURFACE - CODE
 (B) TYPE OF MEMBRANE - CODE
 (C) TYPE OF DECK PROTECTION - CODE

CONDITION **CODE**

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

LOAD RATING AND POSTING **CODE**

(31) DESIGN LOAD HS 20 5
 (63) OPERATING RATING METHOD - Field Evaluation and Document 0
 (64) OPERATING RATING - HS-26 46
 (65) INVENTORY RATING METHOD - Field Evaluation and Document 0
 (66) INVENTORY RATING - HS-20 36
 (70) BRIDGE POSTING - No Posting Required 5
 (41) STRUCTURE OPEN, POSTED ,OR CLOSED A
 DESCRIPTION - Open, No Restriction

AGE AND SERVICE

(27) YEAR BUILT 1952
 (106)YEAR RECONSTRUCTED
 (42) TYPE OF SERVICE : ON - Highway
 UNDER - Waterway CODE 15
 (28) LANES: ON STRUCTURE 2 UNDER STRUCTURE 0
 (29) AVERAGE DAILY TRAFFIC 2700
 (30) YEAR OF ADT 2015 (109) TRUCK ADT PCT 14%
 (19) BYPASS OR DETOUR LENGTH 10 MI

APPRAISAL **CODE**

(67) STRUCTURAL EVALUATION 5
 (68) DECK GEOMETRY N
 (69) UNDERCLEARANCES,VERTI & HORIZ N
 (71) WATERWAY ADEQUACY 7
 (72) APPROACH ROADWAY ALIGNMENT 8
 (36) TRAFFIC SAFETY FEATURES 1NNN
 (113)SCOUR CRITICAL BRIDGES 8

GEOMETRIC DATA

(48) LENGTH OF MAXIMUM SPAN 30 FT
 (49) STRUCTURE LENGTH 30 FT
 (50)CURB OR SIDEWALK: LEFT 0 FT RIGHT 0 FT
 (51) BRIDGE ROADWAY WIDTH CURB TO CURB 0 FT
 (52) DECK WIDTH OUT TO OUT 0 FT
 (32) APPROACH ROADWAY WIDTH (W/SHOULDERS) 24 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 23.92 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

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 5400 (115) YEAR FUTURE ADT 2025

INSPECTIONS

(90) INSPECTION DATE 07/28/2017
 (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

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

BRIDGE MANAGEMENT UNIT

DATA ON EXISTING STRUCTURE

Run Date: 11/09/2017

COUNTY : WATAUGA DIVISION : 11 DISTRICT : 2 STRUCTURE NUMBER : 940066 LENGTH : 30 FEET

ROUTE CARRIED : US321 FEATURE INTERSECTED : LAUREL CREEK

LOCATED : .15 MI.W.JCT.SR1123 BRIDGE NAME : CITY :

FUNC. CLASS : 02 SYST.ON : FA SYST.UNDER : NFA ADT & YR : 2700 2015 RAIL TYPE : LT 0 RT 0

BUILT : 1952 BY : SHPWC PROJ : 7753 FED.AID PROJ : S-519(4) DESIGN LOAD : HS 20

REHAB : BY : PROJ : ALIGNMENT : TAN SKEW : 90 LANES : ON 2 UNDER 0

NAVIGATION : VC 0 FT HC 0 FT HT. CRN. TO BED : 30 FT WATER DEPTH : 1 FT

SUPERSTRUCTURE : SINGLE 30'X19'RC ARCH CULVERT;65'ALONG CENTERLINE CULVERT

SUBSTRUCTURE :

SPANS :

BEAMS OR GIRDERS :

FLOOR : ENCROACHMENT : DECK (OUT TO OUT) : 0 FT

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

VERT.CL.OVER : 999.9 FT

INV.RTG. : HS-20 OPE.RTG. : HS-26 CONTR.MEMBER : POSTED : SV TTST DATE

SYSTEM : Primary U.S. Route GREEN LINE ROUTE : N

UNDER ROUTES AND CLEARANCES

REMARKS :



BRIDGE INSPECTOR'S RECOMMENDATION FOR MAINTENANCE REPAIRS

Bridge: 940066

County WATAUGA

Date: 07/28/2017


These Repairs Should Be Made Within Twelve Months From Date Of This Inspection

MMS Code	Description of Function	Unit	Quantity	Remarks	Est. Cost
 3370	Maintenance and Repair of NBIS Pipes and Culverts	LF	30	150 SF. X UP TO 4" DEEP SPALL WITH EXPOSED REBAR IN DOWNSTREAM HEADWALL (PM)	
 3370	Maintenance and Repair of NBIS Pipes and Culverts	LF	5	5 FT. X 1 FT. X 4" DEEP SPALL WITH EXPOSED REBAR IN UPSTREAM HEADWALL (PM)	

Key

 Priority Maintenance Item

 Critical Finding Item

 Priority Maintenance Level Not Determined

BRIDGE INSPECTOR'S RECOMMENDATION FOR PRIORITY MAINTENANCE REPAIRS

Bridge: 940066

County WATAUGA

THE FOLLOWING MAINTENANCE ITEMS HAVE BEEN SUBMITTED IN CONJUNCTION WITH A PRIORITY MAINTENANCE REQUEST

MMS Code	MMS Description	Quantity
3370	Maintenance and Repair of NBIS Pipes and Culverts	30 LF
Location:		
Pipe	Bent/Span No. 1	DOWNSTREAM HEADWALL
Priority Level	Status	
Priority Maintenance	Division Maintenance Work In Process	
Submitted Date:	Submitted By:	Assisted By:
07/25/2017	MATTHEW MOYER	DAVID WAGNER
Details		
150 SF. X UP TO 4" DEEP SPALL WITH EXPOSED REBAR IN DOWNSTREAM HEADWALL (PM)		

MMS Code	MMS Description	Quantity
3370	Maintenance and Repair of NBIS Pipes and Culverts	5 LF
Location:		
Pipe	Bent/Span No. 1	UPSTREAM HEADWALL
Priority Level	Status	
Priority Maintenance	Division Maintenance Work In Process	
Submitted Date:	Submitted By:	Assisted By:
07/25/2017	MATTHEW MOYER	DAVID WAGNER
Details		
5 FT. X 1 FT. X 4" DEEP SPALL WITH EXPOSED REBAR IN UPSTREAM HEADWALL (PM)		



150 SF. X UP TO 4" DEEP SPALL WITH EXPOSED REBAR IN DOWNSTREAM HEADWALL (PM)



5 FT. X 1 FT. X 4" DEEP SPALL WITH EXPOSED REBAR IN UPSTREAM HEADWALL (PM)

Culvert Segment Details

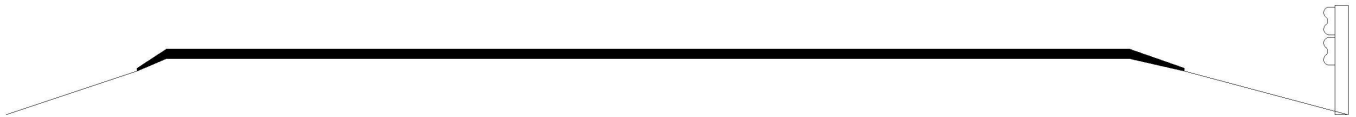
Barrel 1

Has Bands?: No

Distance From Upstream End to Edge of Pavement: 25ft

	Distance From Upstream End of Segment (ft)	Width (ft)	Height (ft)	Pipe Thickness (in)	Corrugation Pattern	Leg Length (ft)	Top Radius (ft)	Bolt Material	Bolt Diameter (in)	# of Long. Bolt Rows	Transverse Spacing b/w Bolt Rows (ft)	Longitudinal Bolt Spacing (ft)	Bolt Condition	Rib Length (ft)	Rib Spacing (ft)	Type	Material
Upstream End	1	30	19													Arch	Concrete
Downstream End	64	30	19													Arch	Concrete

Bridge Inspection Field Sketch



Roadway	22ft Wide	2 Paved Lanes	Looking North
Left Shoulder	3.67ft Wide	0.67ft Paved	3ft Unpaved
Right Shoulder	5ft Wide	1.25ft Paved	3.75ft Unpaved
Left Guardrail			
Right Guardrail	5ft from road		

MEASUREMENTS UPDATED 7/25/2017 BY MJM

Title

APPROACH ROADWAY

Description

LOOKING NORTH

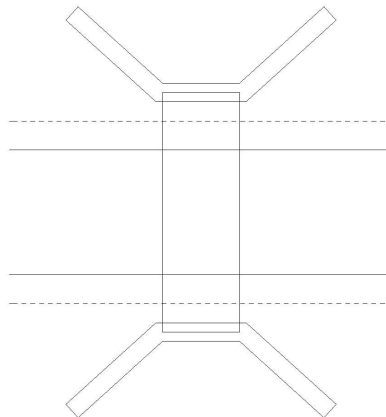
Bridge No: 940066

Drawn By: G.R.R.

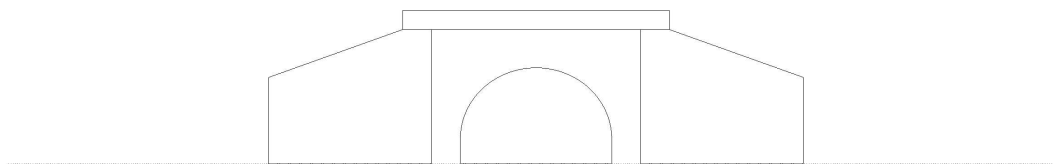
Date: 07/19/2005

File Name: S0126000178

Bridge Inspection Field Sketch



Crown of Roadway



Bed

Looking Downstream

Number of Barrels	Skew	Distance From Crown to Bed	Fill Depth
1	90°	29.6ft	10.6ft
Length Along Center Line of Pipe		Length Along Center Line of Roadway	
65ft		30ft	

Barrel #	Width	Height	Distance From Previous Pipe	Scour at Inlet	Scour at Outlet	Type
1	30ft	19ft	0	0	0	Arch

SPEED LIMIT = 55 MPH

LEFT EOP TO BREAK = 10', BREAK TO HEADWALL = 15'

RIGHT EOP TO GUARDRAIL = 5', GUARDRAIL TO HEADWALL = 13'

WATER DEPTH = 12"

MEASUREMENTS UPDATED 7/25/2017 BY MJM

Title CONCRETE ARCH PROFILE	Description PLAN AND ELEVATION VIEWS
---------------------------------------	--

Bridge No: 940066	Drawn By: DCW	Date: 7/31/2007	File Name: S0126001608
-------------------	---------------	-----------------	------------------------