I-26 Green River Bridges

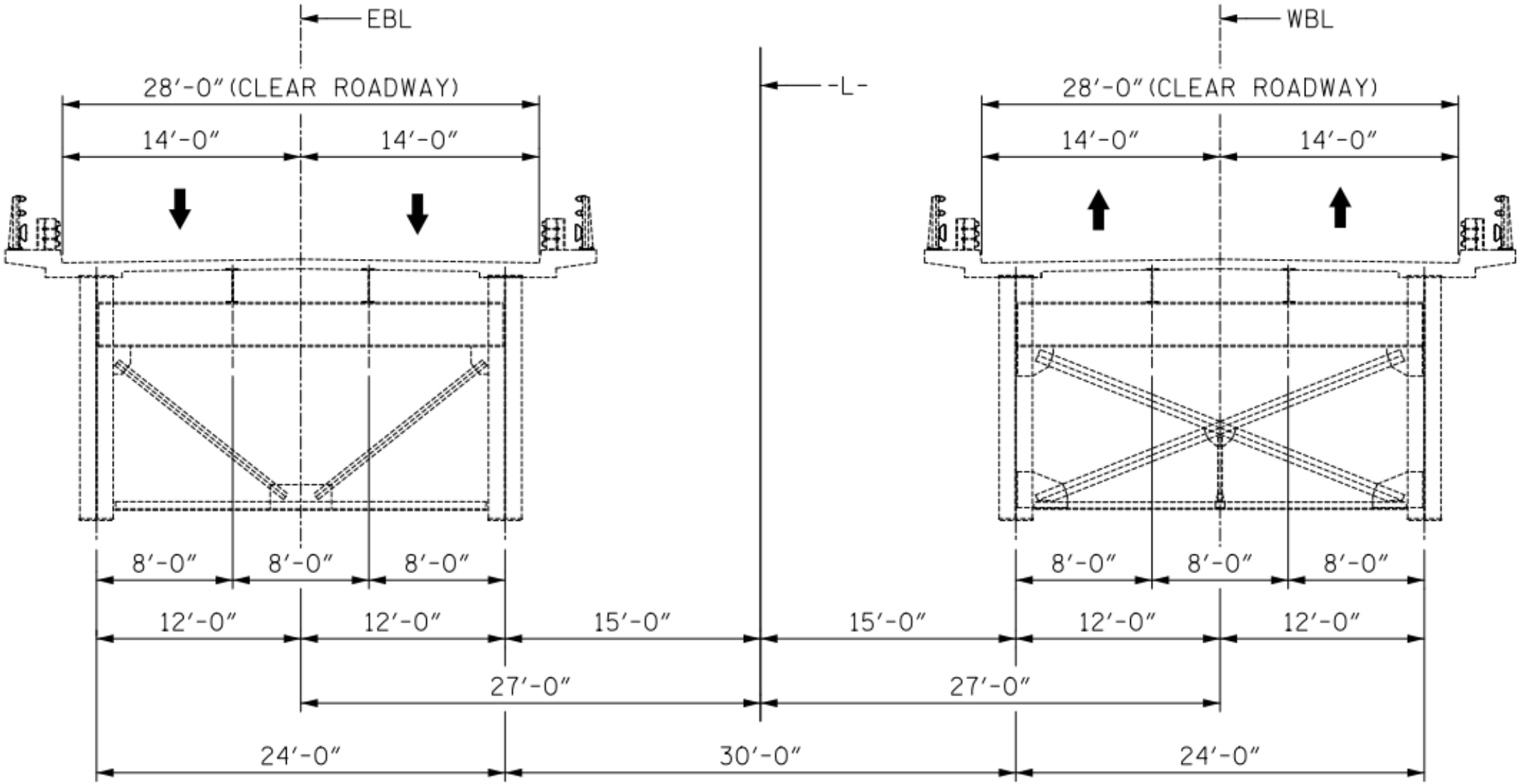
National Bridge Preservation Partnership

September, 2024

Tim Sherrill, PE – NCDOT
John Sloan, PE – AECOM


Winston
Salem
Greensboro
Durham
Raleigh
26
Asheville
40
Hendersonville
Charlotte
Green River Bridges
Wilmington


Peter Guice
Memorial Bridge
Green River
PART OF THE
Broad
River Basin



EXISTING STRUCTURE


100’
260’-0”
330’-2”
260’-0”
100’
230’-0” +/-

Outline

1. History
2. Feasibility Study
3. Load Testing
4. Final Design

Bridge History

Timeline

1968
Original Construction

1976
Added Catwalks

1984
Added Guardrail

1992 & 1993
Load Testing
Non-Destructive Evaluation
Steel Repairs
Cover Plates
LMC Overlay

2012
Expansion Joint Replacement

ADVANCED TECHNOLOGY FOR
LARGE
STRUCTURAL SYSTEMS

Lehigh University

Cracking and Fracture Assessment of the Green River Bridge, I26 in Henderson County, N.C.

A Report to
Division of Highways
North Carolina Department of Transportation

John W. Fisher
Ben T. Yen
Eric J. Kaufmann

April 5, 1993

ATLSS Engineering Center
Lehigh University
Bethlehem, Pennsylvania

An NSF Sponsored Engineering Research Center

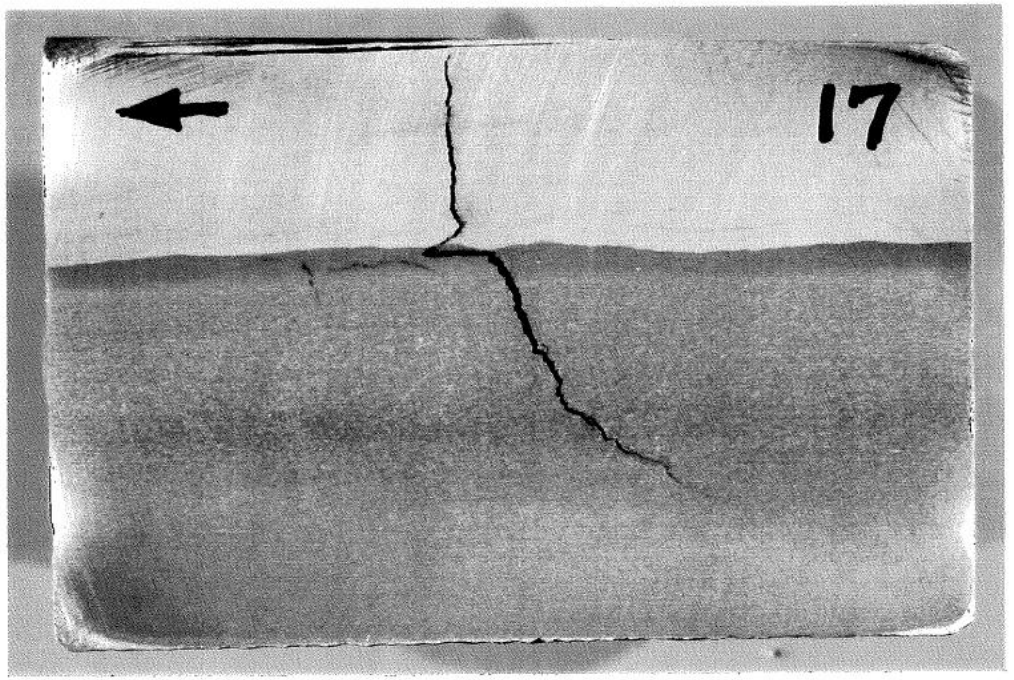


Figure 6: Longitudinal Cross-Section through Core #17 Showing a Transverse Weld Metal Crack and Propagation of the Crack into the Flange. Arrows Show HAZ Cracks and their Propagation into the Base Metal Adjacent to Primary Crack.

Core No.	Girder	Plate Thickness	Description of Core
17	301G1-3	1-1/4"	(Span D, Bottom Flange, Transverse flange-web weld crack, 2-5/8" dia.)
17-1	301G1-3	1-1/4"	(Span D, Bottom Flange, Containing crack tip, 1/2" dia.)
23	301G1-3	1-1/4"	(Span D, Bottom Flange, Transverse flange-web weld crack, 2-5/8" dia.)
25	301G1-3	1-1/4"	(Span D, Bottom Flange, Transverse flange-web weld crack, 2-5/8" dia.)
SP	601G1-2	5/8"	(Span D, Web, Longitudinal web-stiffener weld crack, 2-5/8" dia.)

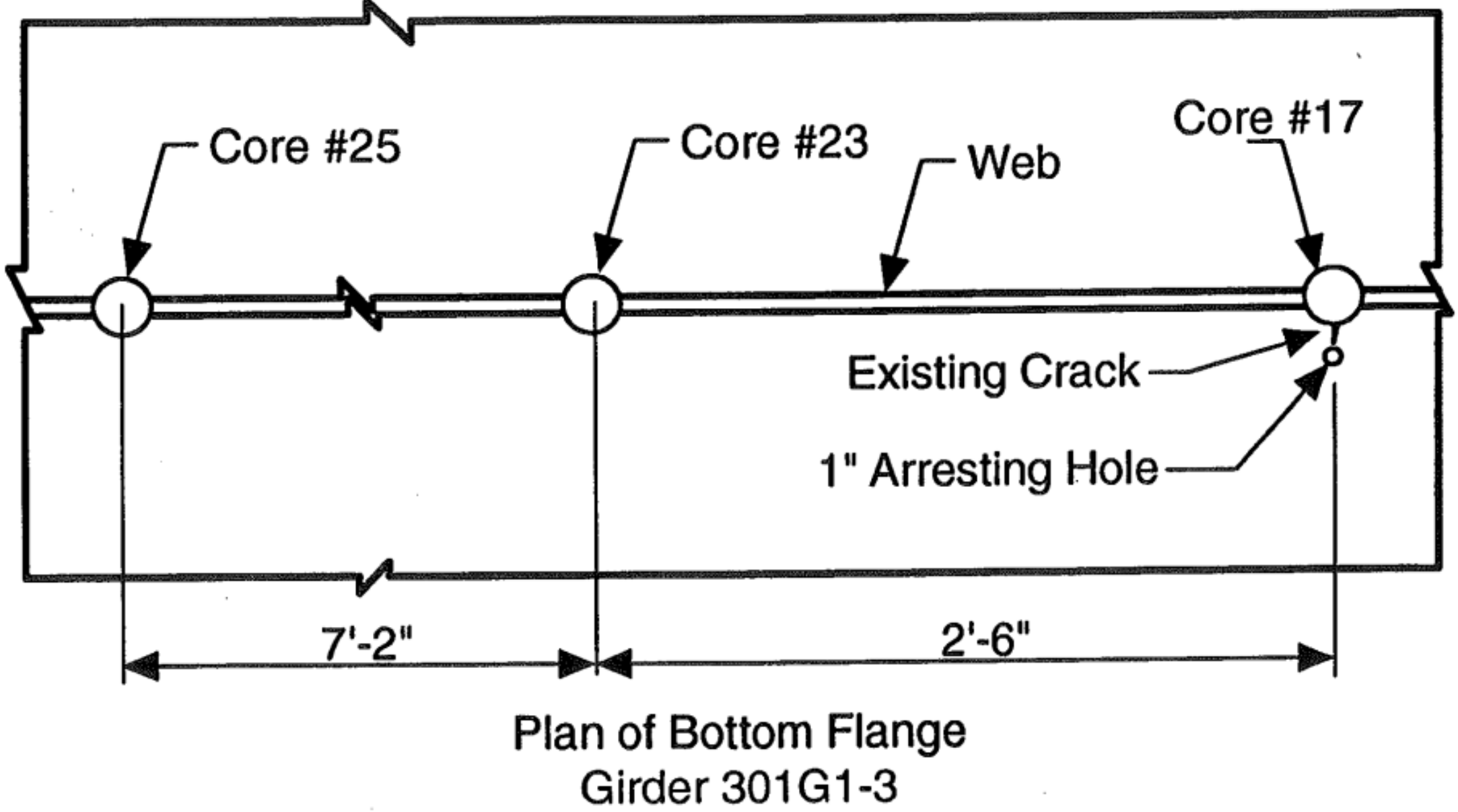
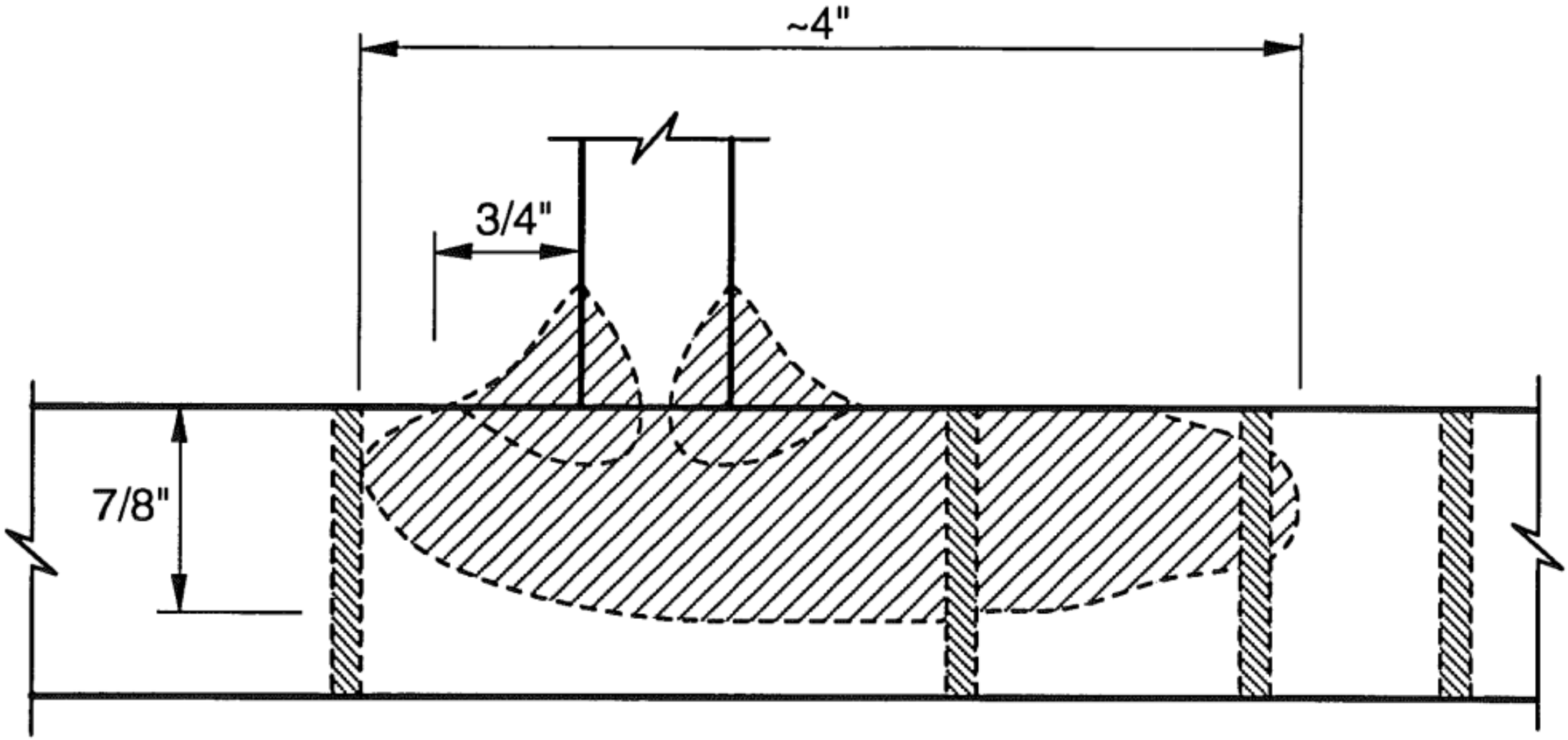
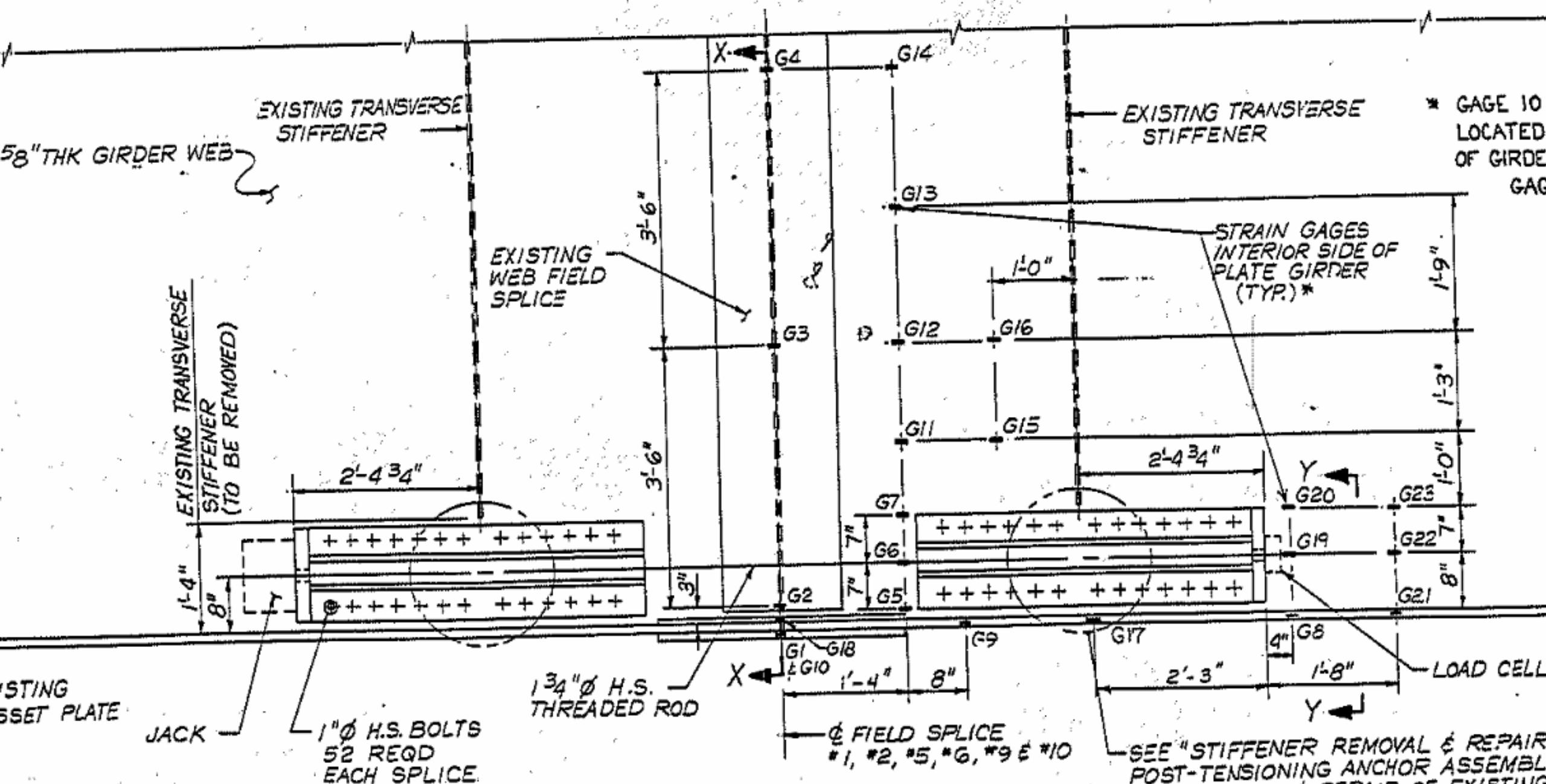


Figure 14a: Schematic of Girder 301G1-3 at Location Where Cores 17, 17-1, 23 and 25 Were Removed.



(a) Schematic of Crack in Flange at Core #17



ANCHORAGE LOCATION

DATE 1-21-93
DATE 1-26-93

Professional Service Industries, Inc.

REPORT OF MAGNETIC PARTICLE INSPECTION

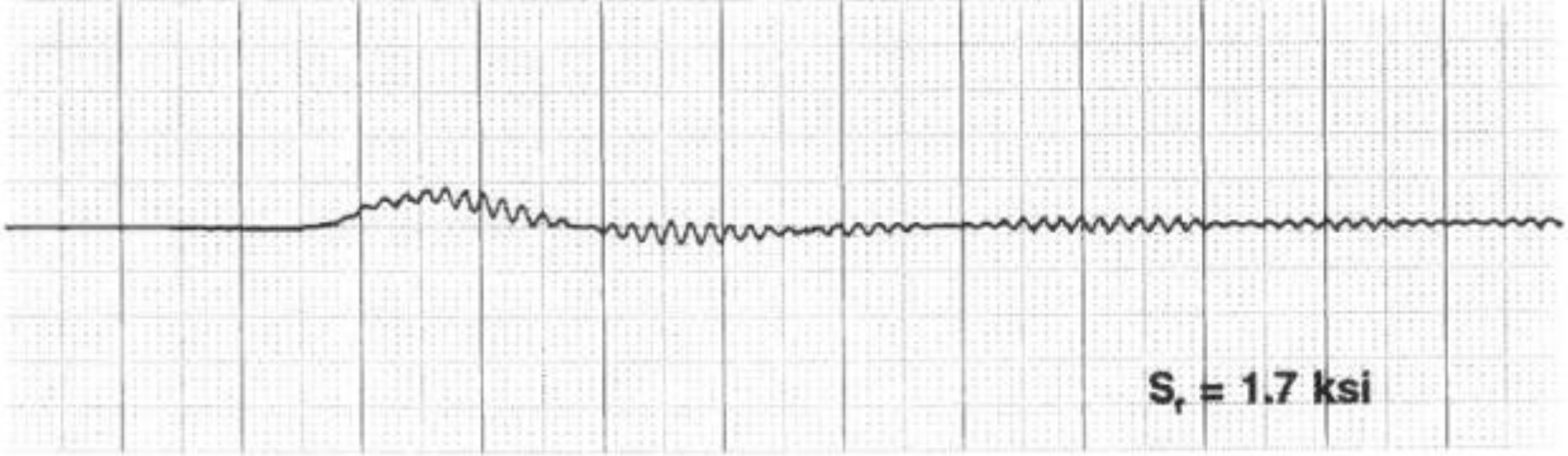
TESTED FOR: North Carolina Department of Transportation
Material & Test Unit
P.O. Box 25201
Raleigh, North Carolina 27611
ATTN: Mr. R.W. Reaves

PROJECT: Inspection For Rehabilitation of I-26 Bridge over Green River
Project #8.1950901 - Henderson County
P.O. #637840 / Req. #9792520

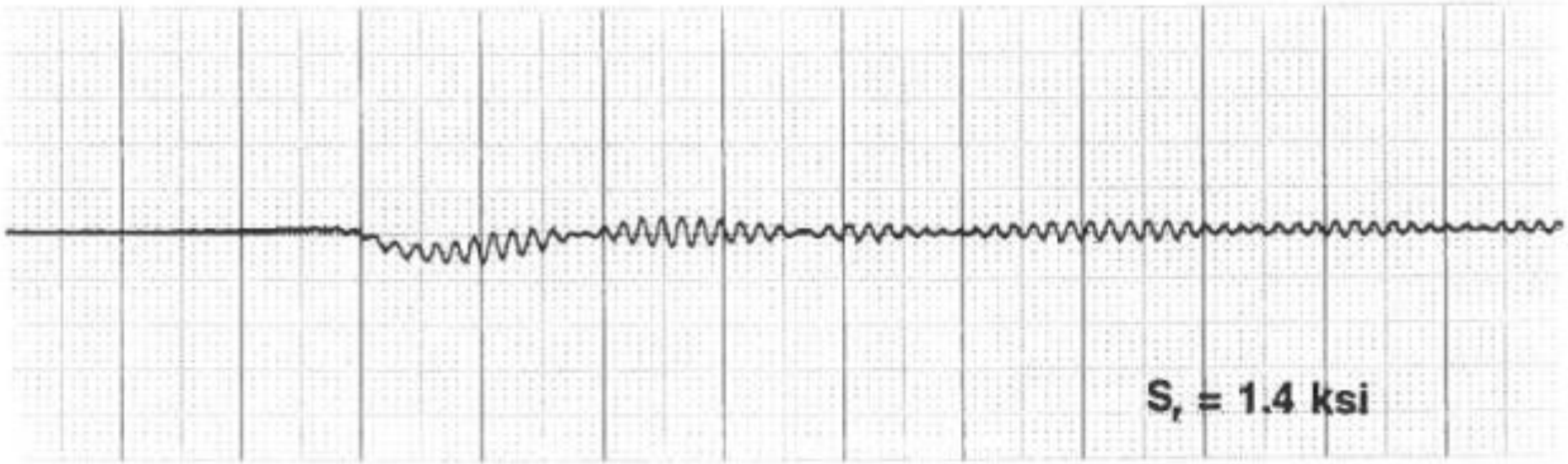
DATE: 7-20-92

OUR REPORT NO.: 456-28249-001

Client Order No.	Lab No.		Production Stage In Process ☐ Final XX Other:	Equipment Identification Model No. DA-400 Serial No. 342
Test Method Standard ASTM E 709				
Acceptance Standard NO CRACKS			For Welds Root Pass ☐ Intermediate ☐ Final Pass XX	Technique: Complete Applicable Sections
Product Form	Type of Material	Drawing No.		



Gage 15
Lateral Brace



Gage 16
Lateral Brace

Truck 1 Right Lane at 40 mph

Feasibility Study

2018

Alternatives

1

No-Build

Review of Existing Structure

2

Conventional

Rehabilitation consisting of a deck overlay and steel repairs

3

Create a Single Bridge

By tying the bridges together with floorbeams and replacing the deck with a fully composite deck

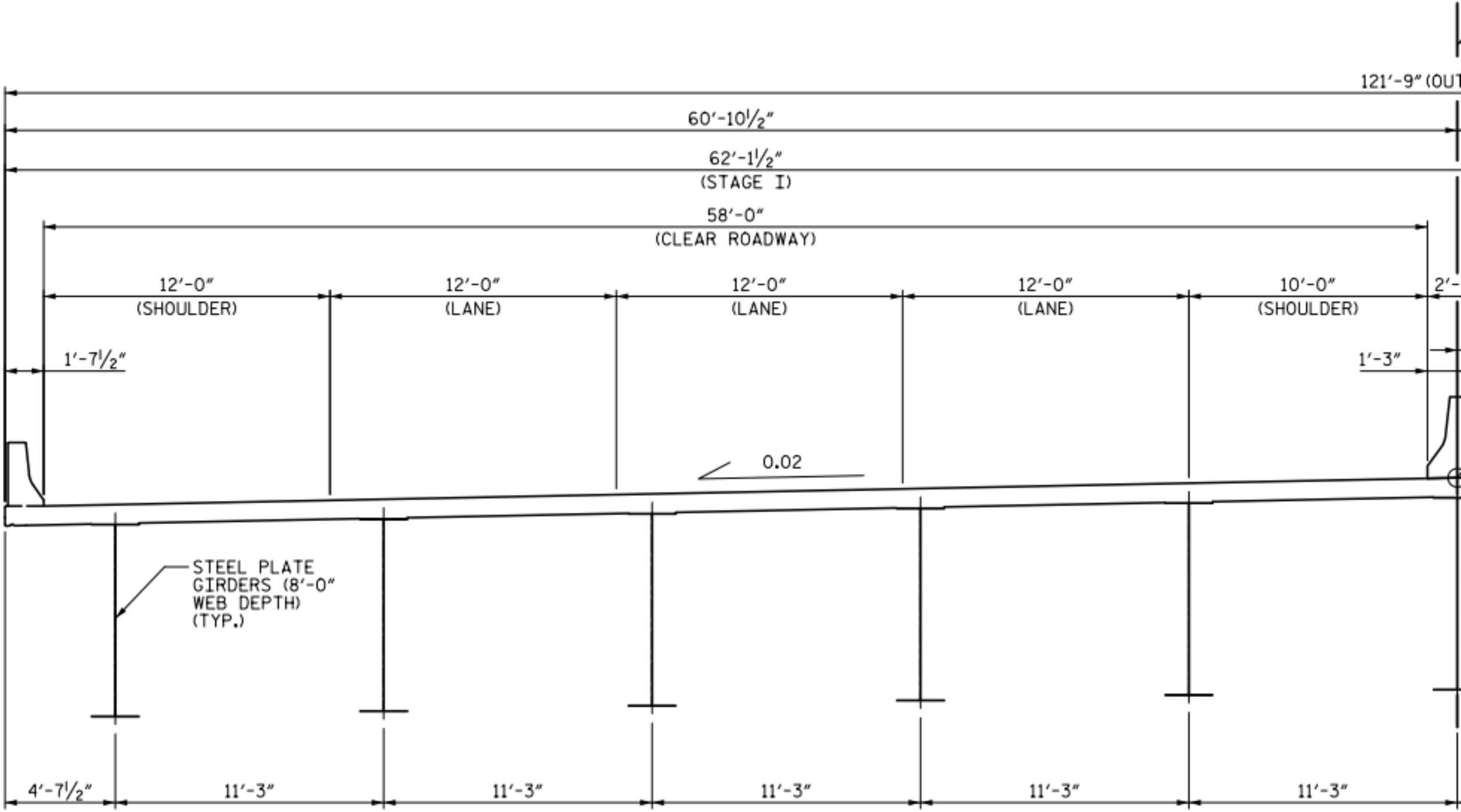
4

Replace

Both bridges with a single bridge

Span 2 Beam 2: upper web to 4th web stiffener from bent 2 exterior face, crack in weld (5in) found after dye-penetrant test performed (photo 1 of 2)


Span 5, beam 1 web underside longitudinal
Stiffener between 2nd and 3rd vertical
stiffener exterior.
Web
Fillet weld
Start and stop of weld
Stiffener


121'-9" (OUT
60'-10 1/2"
62'-1 1/2"
(STAGE I)
58'-0"
(CLEAR ROADWAY)
12'-0"
(SHOULDER)
12'-0"
(LANE)
12'-0"
(LANE)
12'-0"
(LANE)
10'-0"
(SHOULDER)
2'-
1'-7 1/2"
1'-3"
0.02
STEEL PLATE
GIRDERS (8'-0"
WEB DEPTH)
(TYP.)
4'-7 1/2"
11'-3"
11'-3"
11'-3"
11'-3"
11'-3"

Load Testing

March 2019

2543


36”
12”
12”
36”


MACK


BR 113
GB-4
LOWER
EAST
FB-33

Final Design

The Team


Mark Guzda
Load Testing
Greg Cols
Deputy PM
Ed Zhou, PhD
Technical Lead
John Sloan
AECOM PM
Dustin Tuttle
Design
Nicole Brown
Jingsong Liu, PhD
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NCDOT SMU
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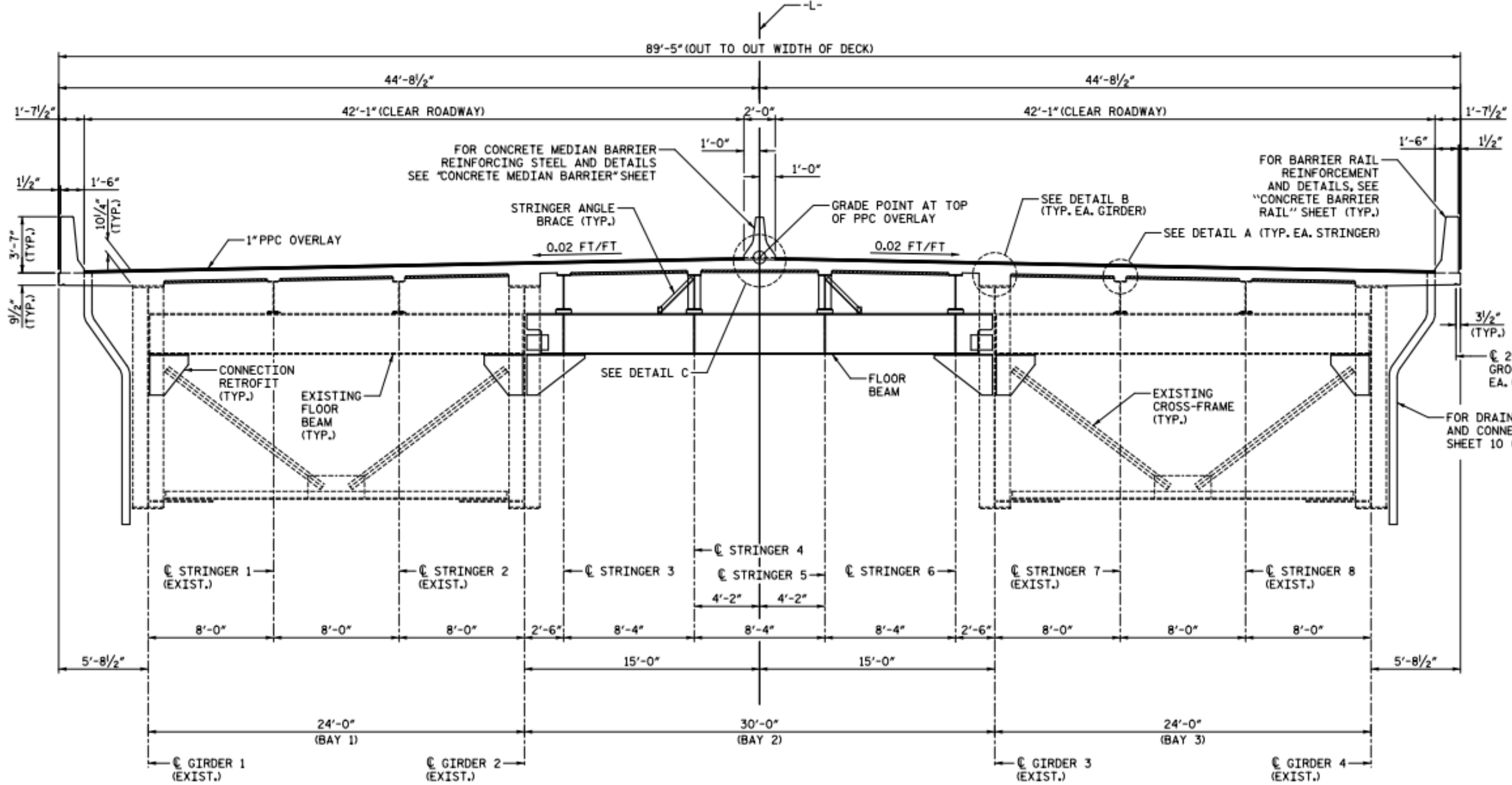
NCDOT Lead
Adam Dockery
Tyler Rogers
NCDOT Division 14
Don Parker
NCDOT Work Zone
Modjeski & Masters
Independent Review


FedEx



TYPICAL SECTION

(CROSSFRAMES SHOWN TYPICAL OF INTERMEDIATE CROSSFRAMES)


UnivarSolutions


STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
AECOM