

**Underwater Inspection of
SFN - 4301714
State Route 2 over the Grand River
(LAK-2-1656R)
July 23, 2014
for
Ohio Department of Transportation
District-12**



(North Elevation of Bridge)

By
GPI/Greenman-Pedersen, Inc.

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Reviewer

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Structure Inventory Data

Structure Data - General Information

Superstructure Type:	Steel beam
Number of Spans:	Three
Total Length:	265 Feet

Substructure Data - General Information

Abutments:	Reinforced concrete Stub Abutments. Abutments are supported by 42" Driven Piles.
Wingwalls:	Reinforced concrete retaining walls continuing from the abutment walls perpendicular to the roadway.
Piers:	Reinforced concrete hammerhead type Piers supported by a footings into undisturbed bedrock.
Slope Protection:	Dumped riprap is placed between fascia to fascia on both East and West Abutments.

Channel Description - General Description of Channel

The Grand River flows South to North under this structure. The thalweg of this river runs between Pier 1R and rear abutment. A maximum depth of 6.0 feet was found under the structure in the thalweg. Flow at this bridge was approximately 1 foot per second.

Inspection Report

Inspection Inventory and Appraisal Information

Structure Location Information

Structure File Number: 4301684
Facility: State Route 2
Feature: Grand River
County: Lake

Inspection Data

Team Leader-Diver: James Henry
P.E. Reviewer: Eric Thorkildsen, P.E.
Type of Equipment Used: Wading/Probing
Dive Team: Michael Nitchman
Marty Faulk
Jason Silva
Alex Kraeger

Date & Time: 07/23/2014
Water Temperature: 70 Degrees F
Waterway Velocity (Current): 1 Foot/Second
Depth Turbidity (Visibility): Less than 2 Foot
Type of Material of Streambed: Typically silt, sand and gravel bottom with less than 1 inch of penetration with river rock of 2 to 6 inches in diameter on 25% of the channel bottom and exposed bedrock.

Presence & Condition of Riprap or Scour Countermeasures: Both embankments are protected by 2 to 4 foot diameter dumped riprap extending out from abutments into river and from fascia to fascia. Placed riprap is present from east shoreline into water to east face of Pier 1R fascia to fascia and extends past upstream and downstream noses approximately 15 feet.

Extent of Marine Growth on Substructure Elements: There is light aquatic growth on the structure; all concrete is smooth and sound.

Substructure Inspection Data

Substructures Inspected:	Pier 1R and Pier 2R.
General Shape:	Reinforced concrete hammerhead type Piers supported by a footings into undisturbed bedrock.
Maximum Water Depth at Substructure Inspected:	Approximately 6.0 feet along the South fascia of the bridge at the midpoint of the channel, between Pier 1 and rear abutment.

Waterline

Water Level References:	The top of Pier 1L at the downstream nose.
Water Surfaces:	The waterline was approximately 13.3 feet below the reference. Reference elevation = 590.05 feet Waterline Elevation = 576.75 feet

Description of Structure

Bridge LAK-2-1656R (4301714) carries the East bound lanes of State Route 2 over the Grand River northeast of Painesville, OH. The bridge was constructed in 1964. The two Piers of this structure were inspected during this underwater inspection. No other SSU's were underwater. The numbering convention will follow that previously established by last underwater inspection report with the west Pier as Pier 1R.

Inspection Operations

The underwater inspection was performed by Greenman-Pedersen Inc. on July 23, 2014. This regularly scheduled Underwater Dive Inspection included a 100% Level I inspection and a 10% Level II inspection. Inspector started inspection on Pier 1R and continued to Pier 2R. Wading, probing and tactile methods were used to complete inspection. Soundings were taken along all substructure units, mid span and up to 30 feet upstream and downstream of the bridge using a survey rod.

Inspection Findings

Channel

- The Channel has stayed relatively the same since the last inspection with some minor changes in streambed elevation.
- Penetrations taken during soundings were typically less than 1 inch.

Pier 1R

- Light to moderate scaling where confirmed as documented in underwater inspection done in 2007 and has not advanced in severity.
- Light timber debris 8 inch diameter tree submerged underwater at upstream nose. (No photo)
- The footer on Pier 1R is exposed 2 vertical inches along entire east face from upstream nose to downstream nose. Top of footer is exposed on all sides where confirmed as documented in underwater inspection done in 2007. No undermining was observed The exposure of the footing appears to be due to local scour of the mudline in the vicinity of the Pier and a high water event within the last year.

Pier 2R

- Light to moderate scaling where confirmed as documented in underwater inspection done in 2007 and has not advanced in severity.
- Heavy timber debris 8 to 12 inch diameter trees submerged underwater and above water at upstream nose. Extends approximately 5 feet upstream of nose and 30 feet down east and west face of Pier. (See photo 9)
- The footer on Pier 2R is exposed 2 vertical inches starting at downstream nose and continuing 4 feet up west face of Pier. No undermining was observed. The exposure of the footing appears to be due to local scour of the mudline in the vicinity of the Pier from timber debris lodged at upstream nose of Pier and a high water event within the last year.
- The scour depression 20 feet upstream of upstream nose was confirmed as documented in underwater inspection done in 2007 and has not advanced in severity.

Comparison to Previous Report and Summary of Inspection

The concrete surfaces of the substructure units inspected at Bridge No. 4301714, were found to have light scaling and sound. Concrete was sounded in numerous locations and found to be in good condition. The last underwater inspection report was completed in 2007. Previous scour depression noted in that inspection were confirmed and have not advanced in severity. Timber debris was present on and around Piers The footer on Pier 1R is exposed 2 vertical inches along entire east face from upstream nose to downstream nose, which is more than what was reported in underwater inspection report from 2007, also top of footer is exposed on all sides where confirmed as documented in underwater inspection done in 2007. The footer on Pier 2R is exposed 2 vertical inches starting at downstream nose and continuing 4 feet up west face of Pier, which is more than what was reported in underwater inspection report from 2007. The exposed footers most likely change with every high flow event along the river.

Conclusions and Recommendations

- Re-inspect the submerged substructure units at the normal maximum recommended interval of five (5) years and after a significant event such as flood, impact or other phenomenon that could affect the structural integrity of the bridge. Timber debris located at Piers and adjacent around Piers should be removed. Large riprap should be placed around exposed footings and Pier noses.

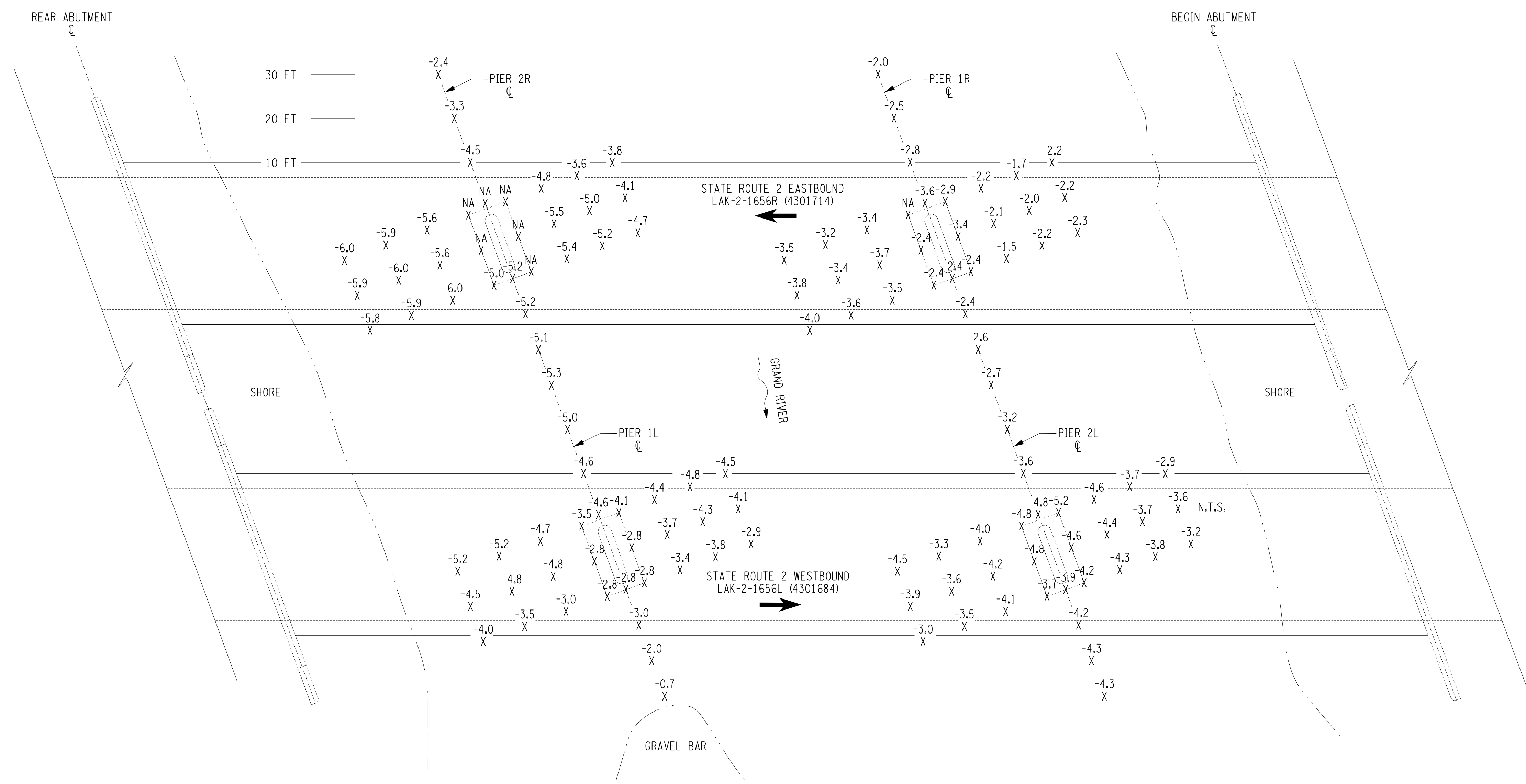
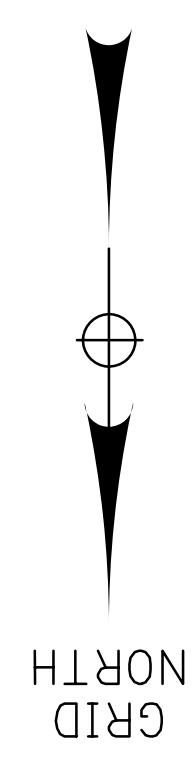
GPI/Greenman-Pedersen, Inc.

Appendix A

Location Map and Soundings



DESIGN SUPERVISOR - JOB MANAGER - DESIGN - CHECK - DRAFTING M. NITCHMAN - CHECK - PROJECT MANAGER -



SOUNDING PLAN

NOTES

1. WATER LINE REFERENCE ELEVATION WAS TAKEN FROM TOP OF PIER 1L AT THE DOWNSTREAM NOSE. ON JULY 23, 2014 THIS DISTANCE WAS 13.3 FEET.
2. SOUNDINGS TAKEN AT PIER AND 10 FEET INCREMENTS AWAY FROM PIERS TO 30 FEET.
3. BOTH LAK-2-1656L AND LAK-2-1656R INCLUDED ON THIS SOUNDING PLAN.

LEGEND

WATER DEPTH IN FEET	-12.5
X	X
NO SOUNDING-TIMBER DEBRIS	NA
	X

 GREENMAN-PEDERSEN, INC. CONSULTING ENGINEERS	SR 2 OVER GRAND RIVER LAK-2-1656R 4301714
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Appendix B

Photographs



Photograph 1
Overall View of
the South
Elevation.
Looking North



Photograph 2
Overall View of
the North
Elevation.
Looking South



Photograph 3
South approach
(upstream)
Looking South.



Photograph 4
North approach
(downstream).
Looking North.



Photograph 5
View of Pier 1R,
West Face.
Looking East.



Photograph 6
View of Pier 1R,
East Face.
Looking West.



Photograph 7
View of Pier 2R
West Face.
Looking East.



Photograph 8
View of Pier 2R
East Face.
Looking West.



Photograph 9
View of Pier 2R
West face.
Timber debris.



Photograph
10
View of
Southeast
shoreline.
Looking East.