GPI Greenman-Pedersen, Inc.
Engineering and Construction Services

Underwater Inspection of
SFN - 4303040
Route 84 over the Grand River
(LAK-84-1888)
July 23, 2014
for
Ohio Department of Transportation
District-12

(West Elevation of Bridge)

By

GPI/Greenman-Pedersen, Inc.

Eric Thorkildsen, P.E. 78663
Reviewer

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Structure Inventory Data

Structure Data - General Information

Superstructure Type:	Prestressed Concrete I-Beam
Number of Spans:	Seven
Total Length:	736 Feet

Substructure Data - General Information

Abutments:	Reinforced concrete Stub Abutments. Begin Abutment is supported by 42" Drilled Shafts and Rear Abutment is supported by 14" Cast-In-Place reinforced concrete Piles.
Wingwalls:	Reinforced concrete retaining walls continuing from the abutment walls perpendicular to the roadway.
Piers:	Reinforced concrete wall type Piers supported by a concrete piles or drilled shafts.
Slope Protection:	Grouted riprap is placed between fascia to fascia on both North and South Abutments.

Channel Description - General Description of Channel

The Grand River flows Southwest to Northeast under this structure. The thalweg of this river runs between Pier 1 and Pier 2. A maximum depth of 5.3 feet was found under the structure in the thalweg. Flow at this bridge was 1 foot per second.

Inspection Report

Inspection Inventory and Appraisal Information

Structure Location Information

Structure File Number:	4303040
Facility:	Route 84
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 1 Foot
Type of Material of Streambed:	Typically gravel bottom with less than 1 inch of penetration between the Piers with river rock of 2 to 6 inches in diameter on 75% of the channel bottom.
Presence & Condition of Riprap or Scour Countermeasures:	Typically there is 4 to 6 inch diameter river rock around Piers with larger 12 to 18 inch diameter rock in some areas. Areas of soft mud and silt were noted however, both embankments are protected by 2 to 4 foot diameter grouted riprap extending out from abutments to 5 feet away from river and from fascia to fascia.
Extent of Marine Growth on Substructure Elements:	There is no aquatic growth on the structure; all concrete is smooth and sound.

Substructure Inspection Data

Substructures Inspected:	Pier 1, Pier 2, Pier 3 and Pier 4.
General Shape:	Reinforced concrete wall type Piers supported by a concrete piles or drilled shafts.
Maximum Water Depth at Substructure Inspected:	Approximately 5.3 feet along the centerline of the bridge at the midpoint of the channel, between Pier 1 and Pier 2.

Waterline

Water Level References:	The top of cap at the Northeast end of Pier 1.
Water Surfaces:	The waterline was approximately 26.0 feet below the reference. Reference elevation = 613.9 feet Waterline Elevation = 587.9 feet

Description of Structure

Bridge LAK-84-1888 (4303040) carries two lanes of Route 84 over the Grand River southeast of Painesville, OH. The bridge was constructed in 2006 to replace the existing structure at this site. The four north Piers of this structure where inspected during this underwater inspection, No other SSU's were underwater. The numbering convention will follow that previously established by ODOT with the North Pier as Pier 1.

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 1 and continued in order to Pier 4. 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

- As mentioned in previous report (2009) the channel alignment is poor and is unchanged. Localized scour holes noted in 2009 report have been reduced in size, while other areas not noted in previous report have localized scour present. Please refer to sounding data to reference these changes.
- Penetrations taken during soundings were typically 1 to 2 inches, except in two locations. 30 feet upstream of Pier 1 and at upstream nose of Pier 3,where there was 6" penetration in to the soft silt/mud.

Pier 1

- Two hairline cracks spaced evenly across on north and south face of Pier 1 from mudline to top of Pier where confirmed as documented in inspection done in 2009, and has not advanced in severity. (See photo 7)
- Timber debris 8 inch diameter tree submerged underwater at upstream nose. Wraps around nose down south face of Pier. (See photo 8)

Pier 2

- Two hairline cracks spaced evenly across on south face of Pier 2 and one hairline crack located midpoint on north face where confirmed as documented in inspection done in 2009, and has not advanced in severity.
- Timber debris with 8 inch diameter tree at upstream nose. Debris pile is approximately 4 to 5 feet high. Tree wraps around nose down entire north and south face of Pier. (See photo 9)
- The footer on Pier 2 is exposed 2 to 4 vertical inches starting 5 feet from upstream nose on the north face continuing around upstream nose to south face of Pier to downstream nose. The exposure of the footing appears to be due to local scour of the mudline in the vicinity of the Pier 2.

Pier 3

- Both the north and south faces of Pier 3 have a hairline vertical crack mid Pier from mudline to top of Pier where confirmed as documented in inspection completed in 2009, and has not advanced in severity.
- The footer on Pier 3 is exposed 12 to 14 vertical inches on upstream nose continuing on south face of Pier to mid Pier. (See photo 10)

Pier 4

- Large timber debris pile adjacent to Pier 4 approximately 8 to 10 feet high. Continues from south face of Pier 4 south to mid span. (See photo 11)
- No other deficiencies noted for Pier 4.

Comparison to Previous Report and Summary of Inspection

The concrete surfaces of the substructure units inspected at Bridge No. 4303040, were found to be smooth and sound. Concrete was sounded in numerous locations and found to be in good condition. The last underwater inspection report was completed in 2009. Previous hairline cracks noted in that inspection were confirmed and have not advanced in severity. Timber debris was present on and around Piers, also with debris piles with whole trees located mid span on shore with some areas of debris being very large. The footer on Pier 2 is exposed 2 to 4 vertical inches on upstream nose continuing on south face of Pier to downstream nose. The exposure of the footing appears to be due to local scour of the mudline in the vicinity of the Pier 2. The footer on Pier 3 is exposed 12 to 14 vertical inches on upstream nose continuing on south face of Pier to mid Pier. 2009 inspection noted that there were no exposed footers. 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 as recommended in 2009 report.

GPI/Greenman-Pedersen, Inc.

Appendix A

Location Map and Soundings

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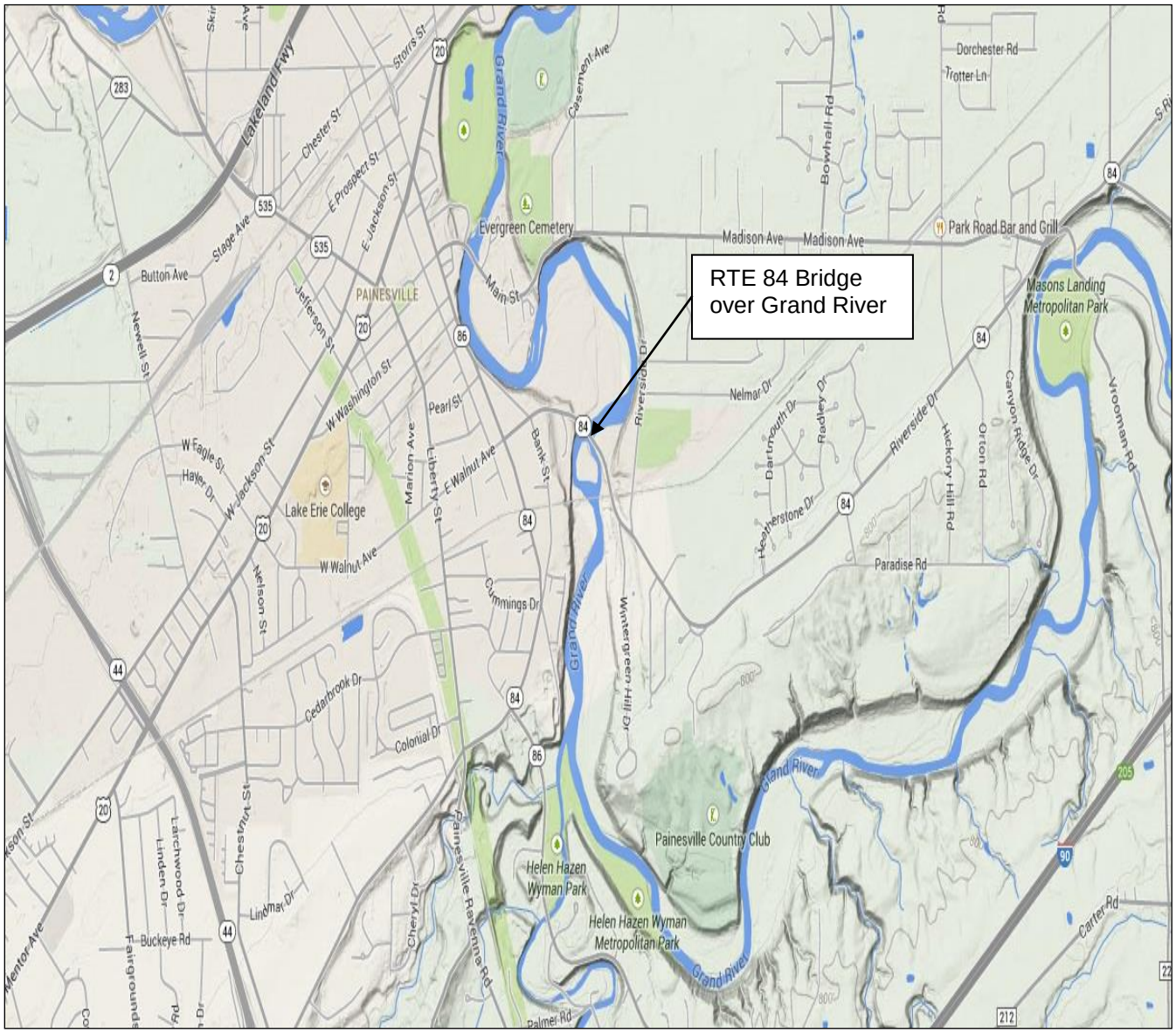
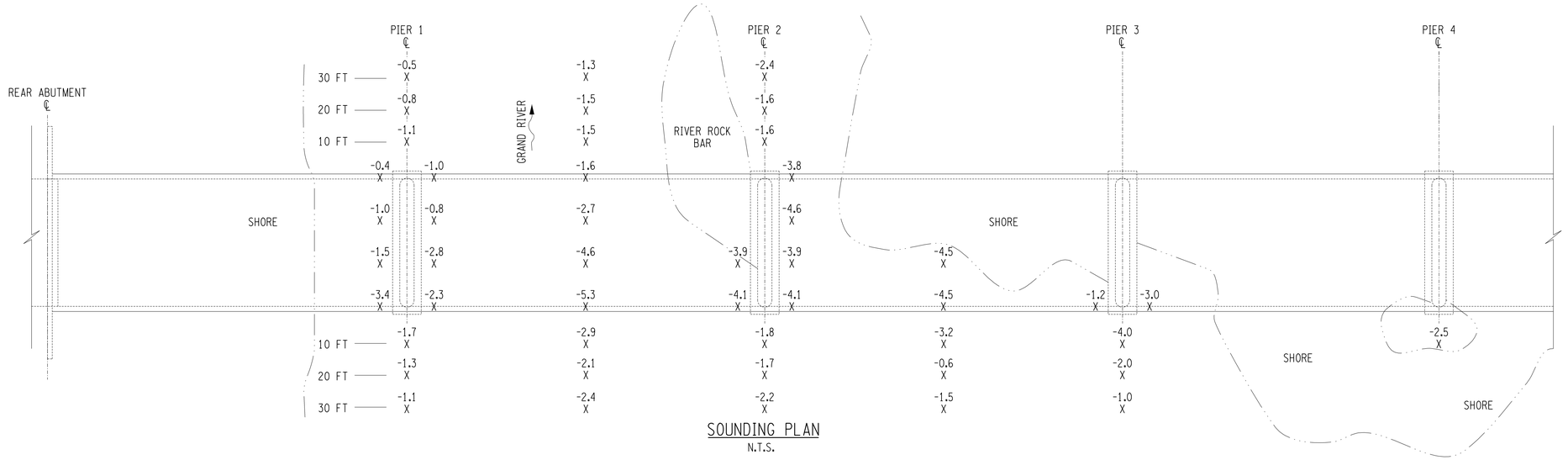

RTE 84 Bridge
over Grand River
Lakeland Fwy
Grand River
Evergreen Cemetery
Madison Ave
Madison Ave
Park Road Bar and Grill
Masons Landing
Metropolitan Park
PAINESVILLE
Main St
Riverside Dr
Nelmar Dr
Bowhall Rd
Dorchester Rd
Trotter Ln
Button Ave
Stage Ave
Chester St
E Prospect St
E Jackson St
Jefferson St
Newell St
W Washington St
Pearl St
Marion Ave
Liberty St
Bank St
E Walnut Ave
W Eagle St
Hayes Dr
W Jackson St
Lake Erie College
W Walnut Ave
Nelson St
Cummings Dr
Cedarbrook Dr
Colonial Dr
Chestnut St
Larchwood Dr
Linden Dr
Buckeye Rd
Fairgrounds
Lin May Dr
Cheryl Dr
Painesville Ravenna Rd
Mentor Ave
Grand River
Wintergreen Hill Dr
Painesville Country Club
Helen Hazen
Wyman Park
Helen Hazen Wyman
Metropolitan Park
Palmer Rd
Dartmouth Dr
Radley Dr
Heatherstone Dr
Riverside Dr
Hickory Hill Rd
Orton Rd
Canyon Ridge Dr
Vrooman Rd
Paradise Rd
Carter Rd



SOUNDING PLAN

N.T.S.

LEGEND

WATER DEPTH IN FEET -12.5 X

NOTES

1. WATER LINE REFERNCE ELEVATION WAS TAKEN FROM TOP OF THE PARAPET AT THE DOWNSTREAM NOSE OF PIER 1. ON JULY 23, 2014 THIS DISTANCE WAS 26.0 FEET.

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

GPI
GREENMAN-PEDERSEN, INC.
CONSULTING ENGINEERS

RTE 84 OVER
GRAND RIVER
LAK-84-1888
4303040

Appendix B

Photographs

	Photograph 1 Overall View of the East Elevation. Looking West
	Photograph 2 Overall View of the West Elevation. Looking East

	Photograph 3 East approach (downstream) Looking Northeast.
	Photograph 4 South approach (upstream). Looking South.

	Photograph 5 West approach (upstream) Looking West
	Photograph 6 View of Pier 1, North Face. Looking Southwest.

Photograph 7
Typical hairline cracks (Pier 1). Looking South.

Photograph 8
Timber debris south face Pier 1.

	Photograph 9 View of Pier 2 and Pier 3, North Face. Timber debris at Pier 2. Looking Southeast.
	Photograph 10 View of Pier 3, South Face. Exposed footer underwater. Looking East.

Photograph 11
View of Pier 4, South Face. Large pile of timber debris. Looking North.