

**Underwater Inspection of
SFN - 2801744
State Route 422 over the La Due Reservoir
(GEA-422-0986 R)
July 25, 2014
For
Ohio Department of Transportation
District-12**



(South 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:	Steel beam
Number of Spans:	Four
Total Length:	216 Feet

Substructure Data - General Information

Abutments:	Reinforced concrete Abutments. Abutments are supported by 12 inch CIP reinforced concrete Piles.
Wingwalls:	None
Piers:	Reinforced concrete column type Piers. Each pier has three round reinforced concrete columns and one 48 inch steel jacketed concrete drilled shaft. Columns are supported onto footer spanning entire pier length. Footer is supported by 12 inch CIP reinforced concrete piles.
Slope Protection:	Dumped riprap is placed between fascia to fascia on both East and West Abutments.

Channel Description - General Description of Channel

The La Due Reservoir flows south to North under this structure. The thalweg of this river runs between Pier 2 and Pier 3 midspan. A maximum depth of 13.7 feet was found under the structure in the thalweg. Flow at this bridge was less than 1 foot per second.

Inspection Report

Inspection Inventory and Appraisal Information

Structure Location Information

Structure File Number:	2801744
Facility:	State Route 422
Feature:	La Due Reservoir
County:	Geauga

Inspection Data

Team Leader-Diver:	James Henry
P.E. Reviewer:	Eric Thorkildsen, P.E.
Type of Equipment Used:	Surface supplied air diving
Dive Team:	Michael Nitchman Marty Faulk Jason Silva Alex Kraeger
Date & Time:	07/25/2014
Water Temperature:	72 Degrees F
Waterway Velocity (Current):	<1 Foot/Second
Depth Turbidity (Visibility):	Less than 1 Foot
Type of Material of Streambed:	Soft silt with 1 to 5 feet of penetration.
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 and 20 to 30 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 1, Pier 2 and Pier3.
General Shape:	Reinforced concrete column type Piers. Each pier has three round reinforced concrete columns and one 48 inch steel jacketed concrete drilled shaft.
Maximum Water Depth At Substructure Inspected:	Approximately 13.7 feet along the South fascia of the bridge at the midpoint of the channel, between Pier 2 and Pier 3.

Waterline

Water Level References:	The top of Pier 2 cap at the north end.
Water Surfaces:	The waterline was approximately 6.1 feet below the reference.

Description of Structure

Bridge GEA-422-0986R (2801744) carries the east bound lanes of State Route 422 over the La Due Reservoir towards Parkman, OH. The bridge was constructed in 1960. The three 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 1.

Inspection Operations

The underwater inspection was performed by Greenman-Pedersen Inc. on July 25, 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 at north column and continued to south on columns ending at steel drilled shaft for each pier. Surface supplied air; 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 fathometer.

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 1 to 5 feet.

Pier 1

- Steel jacketed concrete drilled shaft has moderate corrosion and rust nodules 1/4 to 1/2 inch in diameter cover 25% of shaft from waterline to 2 feet below waterline on entire circumference of shaft. The rest of shaft has light to moderate corrosion present with no rust nodules observed.
- Light to moderate scaling at columns 1, 2 and 3 of Pier 1 where confirmed as documented in underwater inspection done in 2009 and has not advanced in severity (See photo 13).
- Minor construction debris observed at mudline near column 1.

Pier 2

- Steel jacketed concrete drilled shaft has moderate corrosion and rust nodules 3/4 inch in diameter cover 25% of shaft from waterline to 4 feet down from waterline on entire circumference of shaft. The rest of shaft has light to moderate corrosion present with no rust nodules observed.
- 4 feet down from waterline on northeast face of column 2 four areas 2 inches in diameter of honeycombing 8 inches diameter total and 1/4 inch penetration.
- 2 feet above from waterline on south face of column 3 one area of honeycombing 3 feet diameter total and 1/4 inch penetration.
- Timber formwork protrudes 20 inches out of mudline at column 1 was confirmed as documented in underwater inspection done in 2009.
- Light to moderate scaling at columns 1, 2 and 3 of Pier 2 where confirmed as documented in underwater inspection done in 2009 and has not advanced in severity.
- Minor construction debris observed at mudline near steel jacketed drilled shaft.

Pier 3

- Steel jacketed concrete drilled shaft has moderate corrosion and rust nodules 3/4 inch in diameter cover 50% of shaft from waterline to 4 feet down from waterline on entire circumference of shaft. The rest of shaft has light to moderate corrosion present with no rust nodules observed.
- 2 feet above from waterline on south face of column 3 one area of honeycombing 10 inch diameter total and 1/4 inch penetration.

Inspection Findings continued

- Light to moderate scaling typically at columns 1, 2 and 3 of Pier 3 where confirmed as documented in underwater inspection done in 2009 and has not advanced in severity.
- Moderate construction debris observed at mudline near southwest side of column 3.

Comparison to Previous Report and Summary of Inspection

The concrete surfaces of the substructure units inspected at Bridge No. 2801655 were found to have light scaling and sound. Concrete was sounded in numerous locations and found to be typically in good condition. Corrosion on steel jacketed shafts has typically stayed moderate with isolated areas of rust nodules appearing since last underwater inspection in 2009. Areas of honeycombing were observed during inspection that was not noted in 2009 underwater inspection, none of the honeycombing has reinforcement exposed. No other major defects were observed.

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.

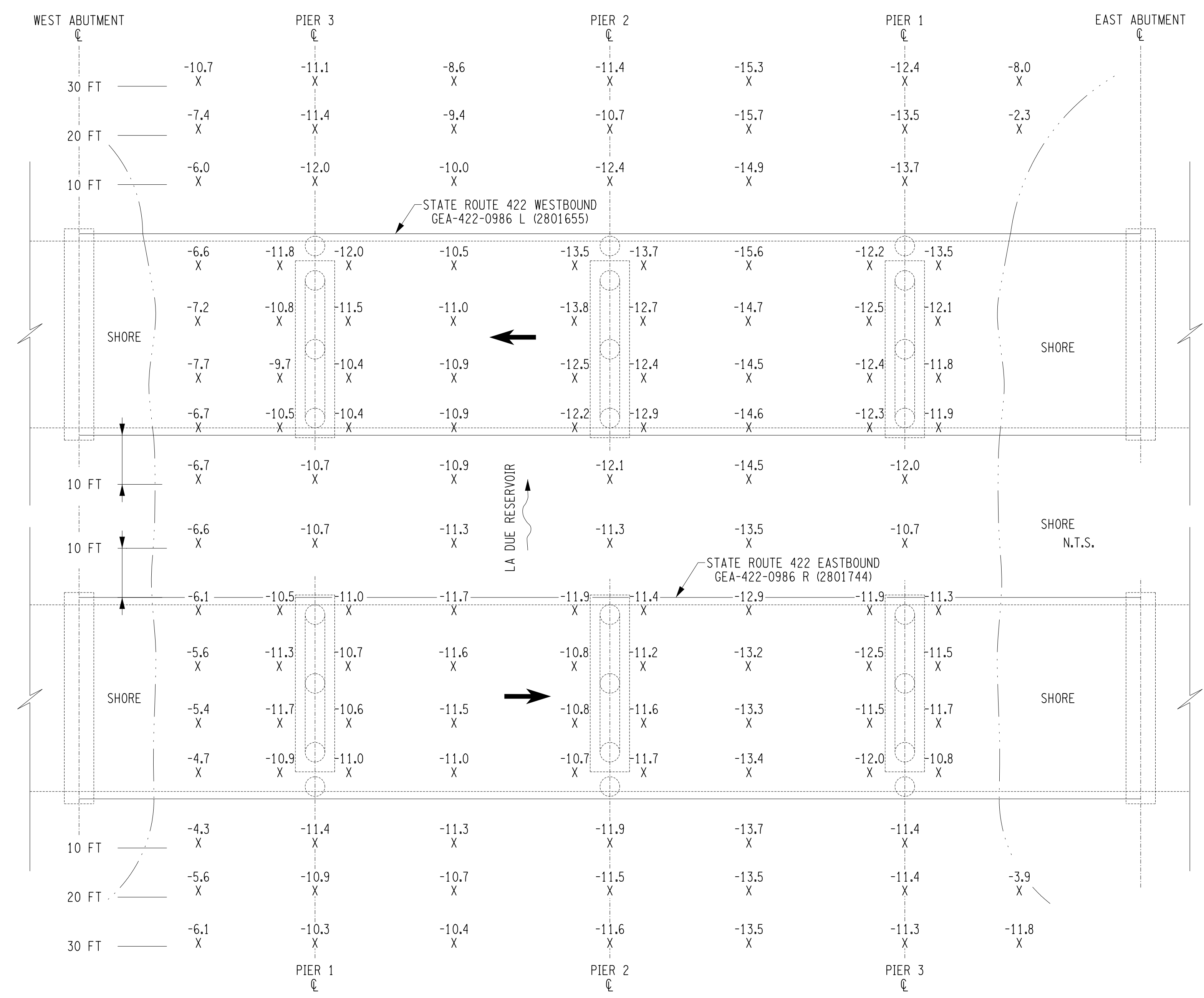
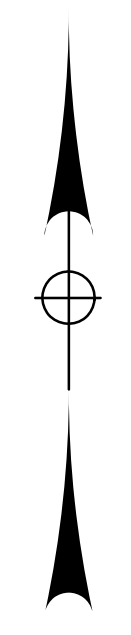
GPI/Greenman-Pedersen, Inc.

Appendix A

Location Map and Soundings

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

GRID NORTH



SOUNDING PLAN
NTS

LEGEND

WATER DEPTH IN FEET -12.5 X

NOTES

1. WATER LINE REFERENCE ELEVATION WAS TAKEN AT TOP OF PIER 2 CAP AT NORTH END ON GEA-422-0986 L. ON JULY 25, 2014 THIS DISTANCE WAS 6.1 FEET.
2. SOUNDINGS TAKEN AT PIER AND 10 FEET INCREMENTS AWAY FROM PIERS TO 30 FEET.
3. BOTH GEA-422-0986 L AND GEA-422-0986 R INCLUDED ON THIS SOUNDING PLAN.

 GREENMAN-PEDERSEN, INC. CONSULTING ENGINEERS	SR 422 OVER LA DUE RESERVIOR GEA-422-0986R 2801744
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Appendix B

Photographs



Photograph 1
Overall View of
the North
Elevation.
Looking
Southwest



Photograph 2
Overall View of
the South
Elevation.
Looking North.



Photograph 3
South approach
(upstream)
Looking South.



Photograph 4
North approach
(downstream).
Looking North.



Photograph 5
View of Pier 1,
East Face.
Looking South
west.



Photograph 6
View of Pier 1,
West Face.
Looking
Southeast.



Photograph 7
View of Pier 2,
East Face.
Looking
Southwest.



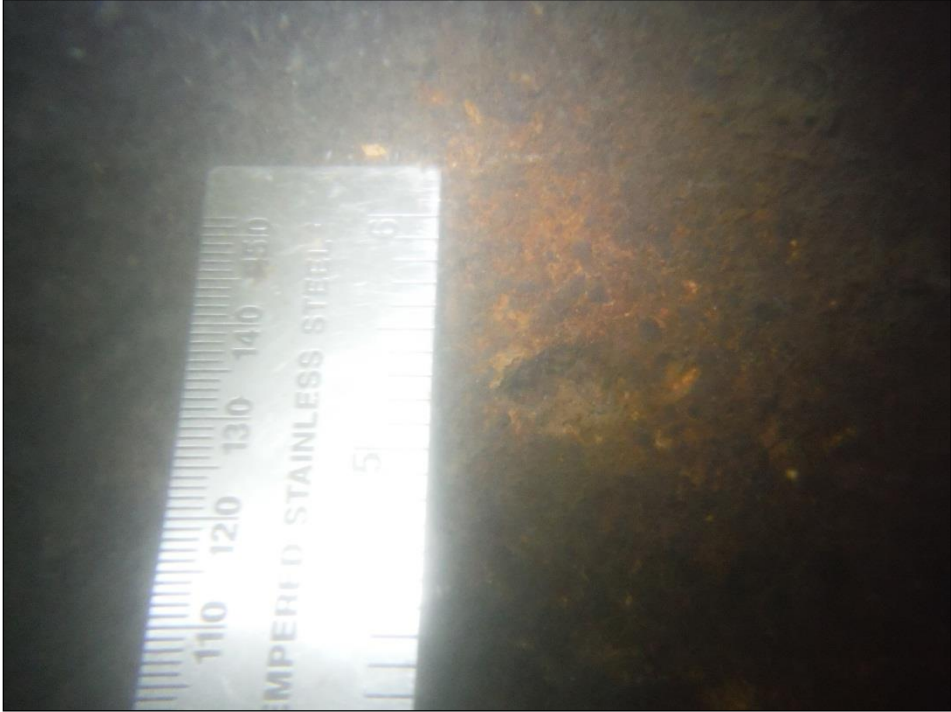

Photograph 8
View of Pier 2,
West Face.
Looking
southeast.



Photograph 9
View of Pier 3
East Face.
Looking
southwest.



Photograph
10
View of Pier 3,
West Face.
Looking East.

 A close-up photograph showing a dark, textured surface with a prominent, irregular rust nodule. The nodule is a mix of brown and orange colors. To the left of the nodule is a stainless steel ruler with markings in millimeters and centimeters. The ruler is labeled "IMPERIO STAINLESS STEEL" and has numbers 110, 120, 130, 140, and 150 visible. The background is dark and out of focus.	<p>Photograph 11 Typical rust nodule on Steel Jacketed Shafts.</p>
 A photograph of a large, cylindrical steel jacketed shaft in a body of water. The shaft is heavily corroded, with a thick layer of orange-brown rust covering most of its surface. The water is dark blue and reflects the shaft. In the background, there is a concrete structure, possibly a bridge pier, and a line of trees on the far shore under a bright sky.	<p>Photograph 12 Typical moderate corrosion. Representative of corrosion underwater on Steel Jacketed Shafts.</p>



Photograph
13
Typical scaling
on columns.



Photograph
14
Typical
embankment
protection.