

BRIDGE INSPECTION REPORT

4303040

BRIDGE NUMBER

LAK 00084 1888

YEAR BUILT

2006

Structure File Number

DIST 12

Bridge Type 221

TYPE SERVICE 1 5

GRAND RIVER

DECK	out/out 42 Deck Area 30,925 sqft		2 INTEGRAL CONCRETE (MONOLITHIC)	
1. FLOOR	1 REINF CONCRT (PRESTRSD, PRECAST)	1	2. WEARING SURFACE	Thk 1 Wear Date 8/16/2006 1
3. CURBS, SIDEWALKS AND WALKWAYS	Left 2 SIDEWALK(>2') / Right 2 SIDEWALK(>2')	1	4. MEDIAN	Lanes on 2
5. RAILING	1 REINFORCED CONCRETE PARAPET	1	6. DRAINAGE	3 SCUPPERS & DWNSPTS 1
7. EXPANSION JOINTS	2 SLIDING METAL PLATE ANGLE	1	8. SUMMARY	8
SUPERSTRUCTURE			7 CONCRETE GIRDER	
9. ALIGNMENT	Max Spans 110	1	10. BEAMS/GIRDERS/SLAB	1
11. DIAPHRAGMS or CROSSFRAMES		1	12. JOISTS/STRINGERS	
13. FLOOR BEAMS			14. FLOOR BEAM CONNECTIONS	
15. VERTICALS			16. DIAGONALS	
17. END POSTS			18. TOP CHORD	
19. LOWER CHORD			20. LOWER LATERAL BRACING	
21. TOP LATERAL BRACING			22. SWAY BRACING	
23. PORTALS			24. BEARING DEVICES	C ELASTOMERIC (LAMIN.) 1
25. ARCH			26. ARCH COLUMNS or HANGERS	
27. SPANDREL WALLS			28. PROTECTIVE COATING SYSTEM	Paint Date 1/1/1951 U UNKNOWN
29. PINS/HANGERS/HINGES			30. FATIGUE PRONE CONNECTIONS	
31. LIVE LOAD RESPONSE		S	32. SUMMARY	8
SUBSTRUCTURE			9 STUB-CAPPED PILE(MULTIPLE ROW PILES)	
33. ABUTMENTS	6 STUB-CAPPED PILE (SINGLE ROW PILES)	1	34. ABUTMENT SEATS	Abutment: ON PILING 1
35. PIERS		1	36. PIER SEATS	5 CAPPED COLUMN Piers: ON PILING 1
37. BACKWALLS			38. WINGWALLS	1
39. FENDERS and DOLPHINS	Piers = 04 02 NN Spans = 7		40. SCOUR	3 2
41. SLOPE PROTECTION	3 RIP RAP (DUMPED ROCK)	2	42. SUMMARY	Dive Date 12/30/1899 7
CULVERTS				
43. GENERAL	N NONE/NOT APPLICABLE		44. ALIGNMENT	
45. SHAPE			46. SEAMS	
47. HEADWALLS or ENDWALLS	Culvert Length 0		48. SCOUR	Culvert Fill Depth 0
49.			50. SUMMARY	
CHANNEL				
51. ALIGNMENT		2	52. PROTECTION	N NONE 2
53. WATERWAY ADEQUACY	8 SLIGHT CHANCE OVERTOPPING	1	54. SUMMARY	5
APPROACHES				
55. PAVEMENT	2 BITUMINOUS	1	56. APPROACH SLABS	1
57. GUARDRAIL	1 STEEL BEAM	1	58. RELIEF JOINTS	
59. EMBANKMENT		1	60. SUMMARY	Percent Legal = 150 8
GENERAL				
61. NAVIGATION LIGHTS			62. WARNING SIGNS	Maint Resp 1 OHIO TRAN DEPT
63. SIGN SUPPORTS	Signs on = N MVC on = 9999.9		64. UTILITIES	2
65. VERTICAL CLEARANCE	Under C = 0 Under NC = 0	N	66. GENERAL APPRAISAL & OPERATIONAL STATUS	7 A
67. INSPECTED BY			68. REVIEWED BY	

SIGNED

PE Number

MJS
INITIALS

SIGNED

72336 MWB
PE Number INITIALS

DATE 10/27/2009

1 1 1 1 1 N N N
SURVEY

DATE 2/3/2010

DECK

FLOOR: MINOR CRACKS. <1% DET.
WS: MINOR CRACKS. <1% DET.
RAILINGS: VERTICAL CRACKS.
EXJTS: LOOSE BOLTS AT FINISH DECK ARMOR.

SUPERSTRUCTURE

BEAMS: ONE SMALL CHIP ON LEFT FASCIA BEAM SPAN 3.
DIAPHRAGMS: 5 SF DELAMINATION TO CONCRETE IN BAY #2 OVER
PIER #1. SEE ATTACHED PHOTOS 1 AND 2 DATED
7/28/08.

SUBSTRUCTURE

PIERS: CRACKS IN STEMS. SEE DIVE REPORT DATED 10/27/09.
SCOUR: SCOUR HOLES AT UPSTREAM NOSES OF PIERS 2 AND 3. SEE
ATTACHED DIVE REPORT DATED 10/27/09.
SLOPE PROTECTION: SOME STONE HAS WASHED AWAY.

CHANNEL

ALIGNMENT: CHANNEL MAKES 90 DEGREE BEND JUST UPSTREAM OF
BRIDGE. BRAIDED CHANNEL DURING HIGH FLOW. SEE
ATTACHED PHOTO DATED 12/03/09. SOME DIAGONAL FLOW
INTO PIER STEMS.
PROTECTION: LARGE STONE AROUND BASES OF PIERS 4, 5 AND 6
HAS PARTIALLY WASHED AWAY. SEE ATTACHED PHOTOS
4 THRU 7 DATED 7/28/08.

APPROACHES

PAVEMENT: SOME CRACKS TO START CONCRETE APPROACH SLAB.

GENERAL

UTILITIES: SOME MISALIGNMENT OF 16" PIPE IN BAY #3. SEE
ATTACHED PHOTO 3 DATED 7/28/08.

Underwater Inspection Report for:
Route 84 over the Grand River in Lake County, Ohio
(Seven Span, Prestressed Concrete I-Beam Bridge)

KCI Personnel on site during inspection:

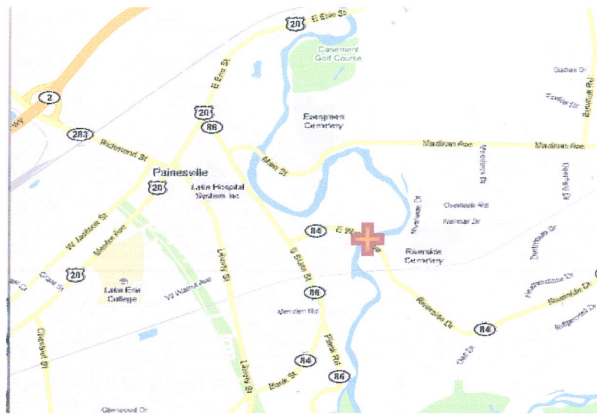
1. Mr. Travis M. Clower, P.E. (Primary Diver / Lead Inspector)
2. Mr. Mark A. Suchan, (Backup Diver / Inspector)
3. Mr. John L. Clower (Supervisor / Inspector)

ODOT Personnel on site during inspection:

1. Mr. Michael J. Sutak



West Elevation of Bridge



Location Map

Prepared for:

ODOT District 12
5500 Transportation Blvd
Garfield Heights, Ohio 44125

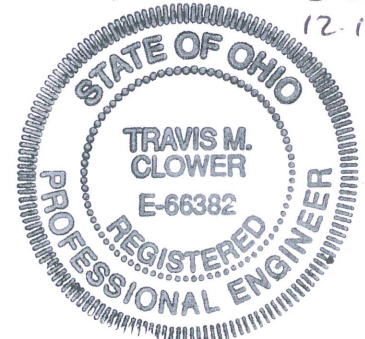


Prepared by:

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388 S. Main Street, Suite 401
Akron, Ohio 44311
Phone: (330) 564-9100



Travis M. Clower
12-10-09



DESCRIPTION

Bridge LAK-84-1888 (SFN 4303040) carries two lanes of Route 84 over the Grand River southeast of Painesville, Ohio. The newly constructed structure (2006) is a seven span prestressed concrete I-beam bridge carried by six pile supported, reinforced concrete solid shaft piers and two abutments. Only the north three piers (Piers 1, 2 and 3) are within the normal river channel and are within the scope of this Underwater Inspection Report. For consistency, the numbering convention will follow that previously established by ODOT with the north pier noted as Pier 1.

INSPECTION OPERATIONS

KCI's three-person dive team performed an underwater inspection on October 27, 2009. A visual inspection was performed from 1-foot above the waterline (splash zone) to the mud line. Where the diver's visibility was limited, tactile methods were used. Soundings were taken along all substructure units and up to 30 feet upstream and downstream of the bridge using a survey story pole.

A hydrographic reference point was established at the northeast end of Pier 1. A measurement of 26.0 feet was taken from the top of the concrete parapet to the water surface.

Hazards Encountered: *Timber Debris around the upstream nose of Pier 2.*

Inspection Mode: *Diving and Walking from shore.*

Flow Direction / Velocity: *Northeast at Ifps*

Direction of Diver / Inspector: *The diver inspected all three piers in order.*

Bottom Composition: *Large softball-size river stone*

Scour Checked By: *Soundings, probing and tactile methods.*

Equipment Used: *SCUBA*

Elements Cleaned: *No significant cleaning required.*

Hydrographic Reference: *The water was 26.0 feet below the top of the concrete parapet at the northeast end of Pier 1.*



OBSERVATIONS

GENERAL

- The concrete surfaces were smooth with little to no scaling.
- The concrete was sounded at numerous locations and found to be in good condition.
- Underwater visibility was less than 1-foot.

CHANNEL

- The channel alignment for this new structure is poor. The upstream channel makes two 90-degree bends just prior to approaching the piers. The water flow changes direction from east to north and then back to east again just upstream of the bridge. This poor alignment creates significant eddy currents and localized scour during high flow events. In Photos 1, 7 and 8, one can see the large piles of stone above water at the northeast corners of Piers 2 and 3. Simultaneously, the upstream noses and southwest corners of the same piers have deeper holes scoured into the streambed (see Soundings). Piers 2 and 3 are textbook examples of poor channel alignment and the resulting redistribution of bottom material.
- The bottom composition surrounding the piers is softball-size river stone except for around the upstream nose of Pier 3. At this location soft silt and mud has settled out of the slower moving water to create a soft muddy bottom.

DEFECTS & DEFICIENCIES

PIER 1 (NORTH PIER)

- There are two hairline vertical cracks spaced evenly across the width of the north face of Pier 1. The cracks travel from the mudline to the top of the pier. These cracks appear at the same locations on the south side of Pier 1 and appear to travel through the pier.

PIER 2

- There are two hairline vertical cracks spaced evenly across the width of the south face of Pier 2. These appear not to travel through the pier. The north face of the pier has only one vertical hairline crack located at the midpoint. This is shown in Photo 9.
- 12-inch diameter timber debris is wedged on the upstream nose of Pier 2 (see Photo 6).
- The 7/28/2008 ODOT inspection found 15 vertical inches of exposed footer on the upstream nose of this pier. No exposed footer was found during this inspection.



DEFECTS & DEFICIENCIES CONTINUED

PIER 3

- Both the north and south faces of Pier 3 have a hairline vertical crack at the midpoint traveling from the mudline to the top of the pier.
- The 7/28/2008 ODOT inspection found 12 vertical inches of exposed footer on the upstream nose of this pier. No exposed footer was found during this inspection.

COMPARISION TO PREVIOUS REPORTING AND SUMMARY

Because this was a new structure built in 2006, a previous underwater inspection report was not available for comparison. However, the 7/28/2008 ODOT topside inspection was available.

Typically the reports will compare defects and deficiencies to see if their condition is changing. Fortunately the amount of defects found during this inspection was small. The hairline vertical cracks found on Piers 1, 2 and 3 were not noted in the 7/28/2008 ODOT topside inspection report. The 2008 inspection did however note exposed footers on both Piers 2 and 3 upstream noses. The vertical exposure was 15 inches and 12 inches respectively. No exposed footers were found during this inspection. The previous scour holes detected in these upstream nose areas have been filled in since 7/28/2008 but will most likely reappear during the next high water event.

RECOMMENDATIONS

The small amount of timber debris lodged on the upstream nose of Pier 2 is insignificant and will probably float away during the next high water event. Hence we are not recommending any action be taken at this time regarding the debris.

Conversely, action should be taken to prevent the localized scour on the upstream noses of the piers found by the ODOT inspector in 2008. Poor channel alignment will continue to cause material to be redistributed during high water events. Although the scour holes had been filled in during the 2009 underwater inspection, they will most likely reappear and continue to be a problem. Very large riprap stone place around the pier noses will help to slow down the erosion.





Photo by T. Clower, 10/27/09

Photo 1 – Facing Southeast. West Elevation of the Bridge.



Photo by T. Clower, 10/27/09

Photo 2 – Facing West. East Elevation of the Bridge.



Photo by T. Clower, 10/27/09

Photo 3 – Facing East. Downstream of the Bridge between Piers 1 and 2.



Photo by T. Clower, 10/27/09

Photo 4 – Facing West. Upstream of the Bridge between Piers 1 and 2.



Photo by T. Clower, 10/27/09

Photo 5 – Facing West. Pier 1 and the North Shore.



Photo by T. Clower, 10/27/09

Photo 6 – Facing North. Pier 2 with Timber Debris on the Upstream Nose.



Photo by T. Clower, 10/27/09

Photo 7 – Facing West. Pier 2 with a pile of stone deposited on the northeast corner.



Photo by T. Clower, 10/27/09

Photo 8 – Facing West. South face of Pier 3



Photo by T. Clower, 10/27/09

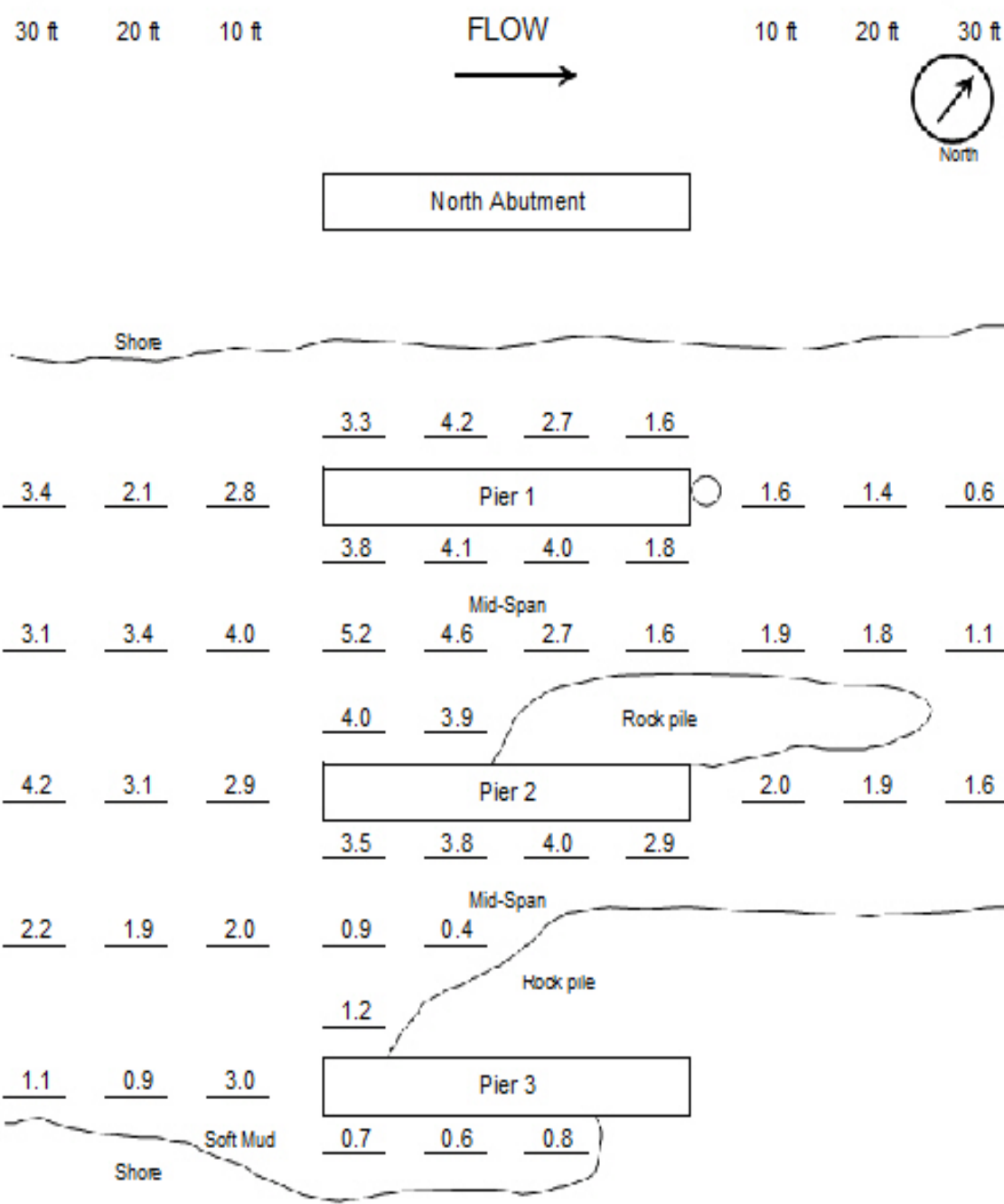
Photo 9 – Facing South. Hairline Vertical Crack at the center of the north face of Pier 2.

SOUNDING SHEET

(All measurements are in feet)

Bridge No.: LAK 84-1888 Inspection Date: 10/27/2009
 Inspectors: JC, MS, TC Clearance Location: Pier 1 NE Top of Parapet

Clearance is the distance measured from the water surface to the clearance location.



LAK-084-1888 SFN 4303040 SR 84 over the Grand River



Braided channel upstream of SR 84.JPG

LAK-84-1888
SFN 4303040



P1: 5 SF DELAM TO CONCRETE DIAPHRAGM.



P2: CLOSE-UP OF P1.

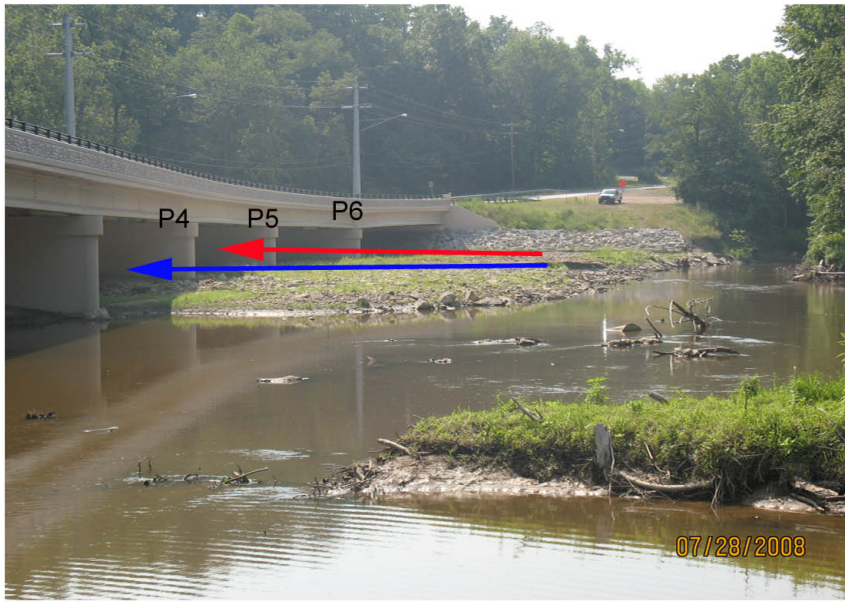


P3: TYPICAL MISALIGNMENT OF 16" PIPE IN BAY #3



P4: NOTE LOG JAM BETWEEN PIER 5 AND UTIL POLE FOUNDATION. HIGH WATER FLOWS THRU HERE.

LAK-84-1888
SFN 4303040



P5: RED LINE AND BLUE LINE SHOW PATH OF HIGH WATER FLOW.



P6: THIS IS THE PATH OF THE RED LINE IN P5. NOTE SOME WASH OUT TO FINISH SIDE OF PIER #4.



P7: THIS IS THE PATH OF THE BLUE LINE IN P5. NOTE THE SMALL POND THAT THE ARROW IS POINTING TO. POND IS AS DEEP AS 3 FT.