

UNDERWATER BRIDGE INSPECTION REPORT

SFN: 3102548	c38 Pier Columns:	1	Bridge Number: HAM-50-0376R
Substructure: 8	c42 Scour:	1	Inspection Date: 08/30/2019
Channel: 6	c51 Alignment:	2	Division: District 8
	c53 Hydraulic Opening:	1	River: Great Miami River

Program Manager: Steve Mary, P.E.	Weather: Sunny
Project Manager: Jason Sander, P.E.	Air Temperature: 84° (F)
Team Leader: Brad Walden	Water Temperature: 74° (F)
Team Members: Zach Harrison (Diver), Adam Wolf	

Route: **US 50**
 Inventory Direction: **West to East**
 County: **Hamilton**
 Location: **N39°10'11.62"**
 W84°45'29.05"
 Bridge Length: **870'**
 Superstructure Type: **Steel Girder**
 Substructure Type: **Reinforced Concrete**
 Foundation Type: **Drilled Shafts**
 Total Substructure Units: **7**
 Substructure Units in Water: **2**
 Water Depth: **10'**
 Water Velocity: **3.0 FPS**
 Underwater Visibility: **< 6"**



Summary of Scour and Channel Conditions:

It appears from the previous inspection report that the primary channel (west bank and pier 1) shows general degradation.

Summary of Substructure Conditions:

Inspected substructure units are in good condition and show no considerable change since the last inspection. No significant distressed concrete was noted from the water line to the mudline.

Repair Recommendation:

Remove tree debris from pier 1.



Consulting Engineers & Scientists

Structure ID #: HAM-50-0376R, US 50 over Great Miami River Date: 08/30/2019

County: Hamilton State: Ohio

Description: West Abutment (Abutment 1)

1. Not inspected; out of water

1. Light marine growth (algae).
2. Visibility less than 6".
3. No foundation or footing exposure.
4. The bottom substrate around the base of pier 1 consists of silty sand, gravel and cobbles.
5. Hammer soundings of the exposed concrete were performed along the entire length of the pier columns; no areas of unsound concrete (delaminations, voids, etc.) were noted.
6. The drilled shaft columns are encased in steel casing and at the time of the inspection approximately 10" of the steel casing was found to be above the water line.
7. The steel casing was noted to be lightly corroded, with minor pitting.
8. The concrete condition at the interface between the cased and uncased portion was good.
9. Moderate to heavy tree debris was noted along the west side of column 1 (south column) and column 2 (middle column), including two large trees with root balls. The west side of these pier columns could not be fully inspected due to the tree debris. While these pier columns are encased in steel casing and the foundation of the pier are drilled shafts, we recommend the removal of the debris, as it could be a contributor to the channel degradation.

1. Light marine growth (algae).
2. Visibility less than 6".
3. No foundation or footing exposure.
4. The bottom substrate around the base of pier 2 consists of silty sand, gravel and cobbles.
5. Hammer soundings of the exposed concrete were performed along the entire length of the pier columns; no areas of unsound concrete (delaminations, voids, etc.) were noted.
6. The drilled shaft columns are encased in steel casing and at the time of the inspection approximately 10" of the steel casing was found to be above the water line.
7. The steel casing was noted to be lightly corroded, with minor pitting.
8. The concrete condition at the interface between the cased and uncased portion was good.

See attached drawings, sketches and photographs of the areas to better visualize the conditions at the time of the assessment.



Consulting Engineers & Scientists

Structure ID #: HAM-50-0376R, US 50 over Great Miami River Date: 08/30/2019

County: Hamilton State: Ohio

Description: Pier 3

1. Not inspected; out of water.



Consulting Engineers & Scientists

Structure ID #: HAM-50-0376R, US 50 over Great Miami River

Date: 08/30/2019

County: Hamilton

State: Ohio

Description: Pier 4

1. Not inspected; out of water.



Consulting Engineers & Scientists

Structure ID #: HAM-50-0376R, US 50 over Great Miami River

Date: 08/30/2019

County: Hamilton

State: Ohio

Description: Pier 5

1. Not Inspected; out of water.



Consulting Engineers & Scientists

Structure ID #: HAM-50-0376R, US 50 over Great Miami River Date: 08/30/2019

County: Hamilton State: Ohio

Description: East Abutment (Abutment 2)

1. Not Inspected; out of water.

Measurement Point (Upstream)	Horizontal Distance (ft)	Vertical Distance Below Reference Point to Ground/Waterline (ft)	Vertical Distance Below Reference Point to Mudline (ft)
Abutment 1 Sta. 198+47.00 Out of Water	0	14.0	
Edge of Channel	81	37.0	
Center of Channel* Edge of Water/Pier 1	106	37.0	45.7 (actual water depth 8.7')
Pier 1	133	37.2	40.8 (actual water depth 3.5')
Mid-Span Pier 1/Pier 2	216	37.6	43.8 (actual water depth 2.8')
Pier 2	299	37.9	40.5 (actual water depth 2.6')
Edge of Channel	322	37.9	
Pier 3 Out of Water	433	35.5	
Mid-Span Out of Water	500	34.6	
Pier 4 Out of Water	567	31.3	
Mid-Span Out of Water	650	27.3	
Pier 5 Out of water	733	24.9	
Mid-Span	799	18.0	
Abutment 2 Sta 207+13.00 Out of Water	866	12.9	

Reference point is from the Upstream Crash Wall (Top of Concrete)

*Perceived Center of Channel

Terracon

Consulting Engineers & Scientists

Structure ID #: **HAM-50-0376R, US 50 over Great Miami River**

Date: **08/30/2019**

County: **Hamilton**

State: **Ohio**

Description: **Bridge Structure, Looking Downstream**



Photos
TERRACON

Terracon

Consulting Engineers & Scientists

Structure ID #: **HAM-50-0376R, US 50 over Great Miami River**

Date: **08/30/2019**

County: **Hamilton**

State: **Ohio**

Description: **Pier 1 and West Abutment (Abutment 1)**



Photos
TERRACON

Terracon

Consulting Engineers & Scientists

Structure ID #: **HAM-50-0376R, US 50 over Great Miami River**

Date: **08/30/2019**

County: **Hamilton**

State: **Ohio**

Description: **Pier 2**



Photos
TERRACON

Terracon

Consulting Engineers & Scientists

Structure ID #: HAM-50-0376R, US 50 over Great Miami River

Date: 08/30/2019

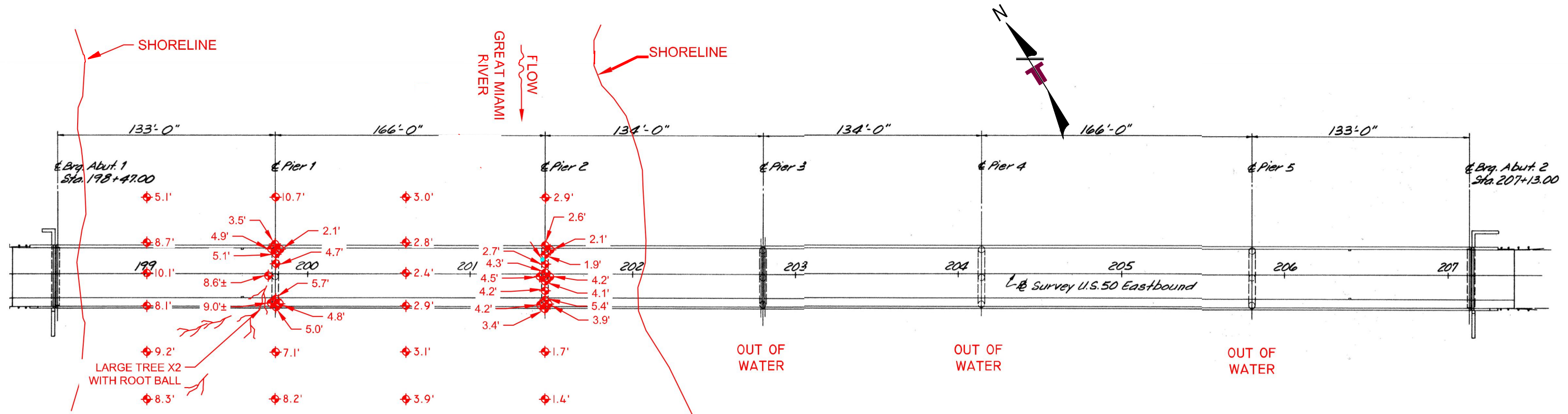
County: Hamilton

State: Ohio

Description: Piers 3, 4 and 5



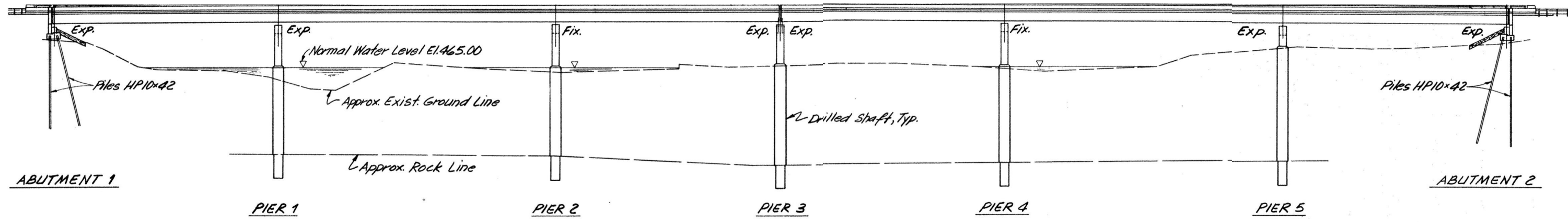
Photos
TERRACON



PARTIAL SOUNDING PLAN
NOT TO SCALE

LEGEND:

- ◆ 6.3' INDICATES WATER DEPTH IN FEET AT THE TIME OF INSPECTION
- 🌳 TREE DEBRIS



BRIDGE PROFILE
NOT TO SCALE

Date: 9/11/2019 9:52 AM File Path: N:\HCN PROJECTS\AUTOCAD\2019\1191191158\BR INS.DWG

REV	DATE	BY	DESCRIPTION

Terracon
Consulting Engineers and Scientist

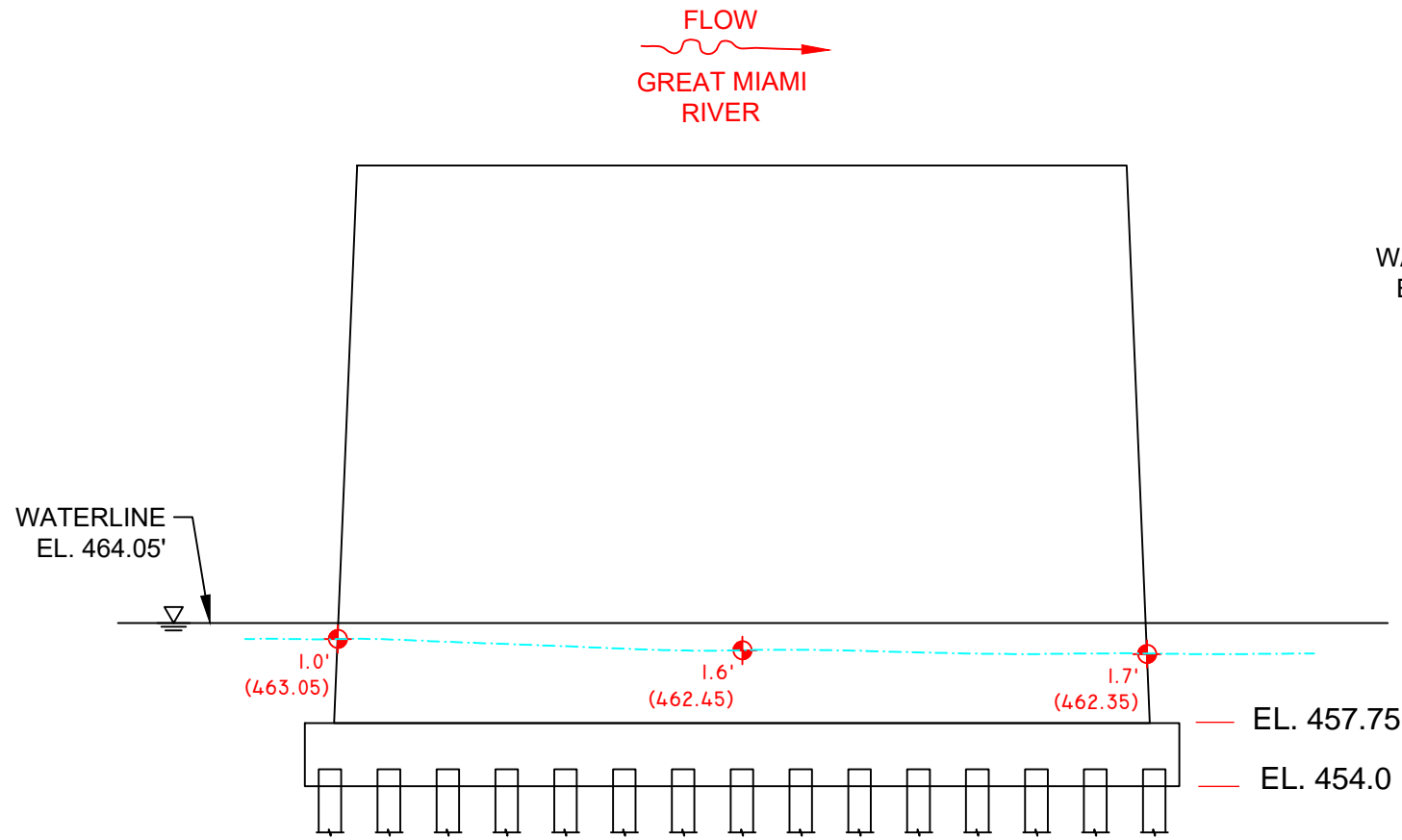
611 LUNKEN PARK DRIVE CINCINNATI, OHIO 45226
PH. (513) 321-5816 FAX. (513) 321-4540



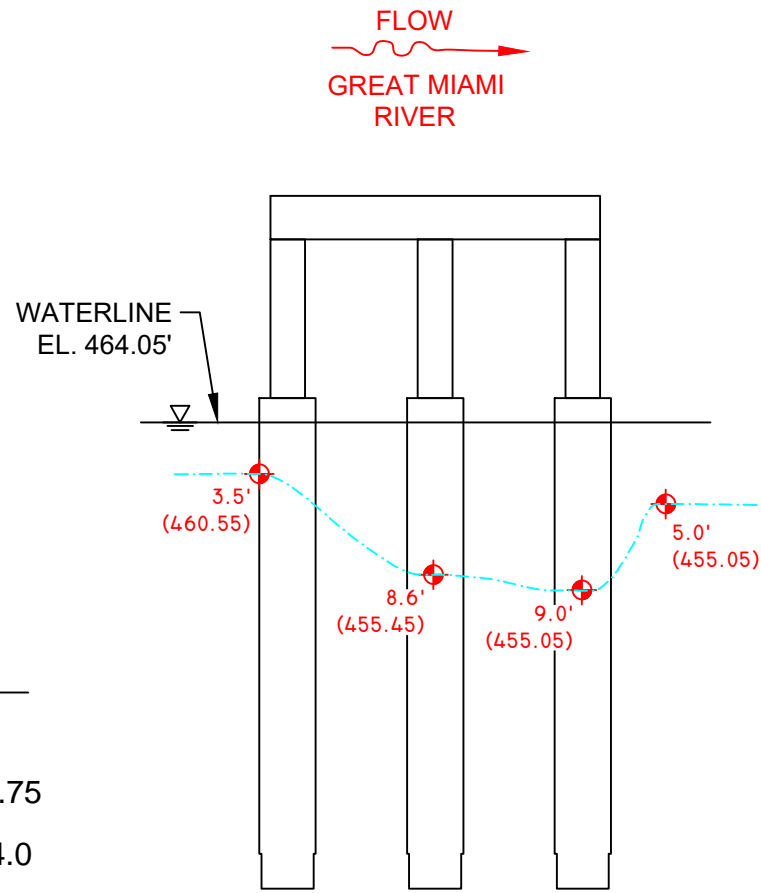
CROSS-SECTIONAL DEPTH PLAN (PARTIAL)

BRIDGE NO. HAM-50-0376 R
OHIO DEPARTMENT OF TRANSPORTATION-DISTRICT 8
US ROUTE 50 OVER GREAT MIAMI RIVER
HAMILTON COUNTY, OHIO

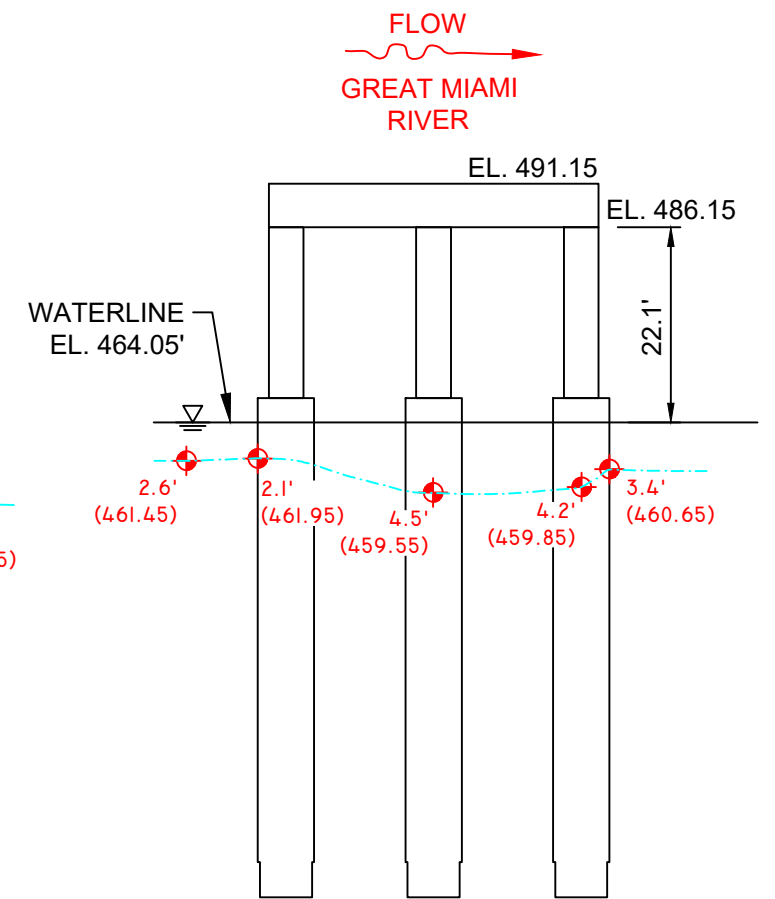
EXHIBIT 1	
DESIGNED BY:	BTW
DRAWN BY:	KM
APPVD. BY:	JS
SCALE:	NOT TO SCALE
DATE:	08/30/2019
JOB NO.:	N1191158
ACAD NO.:	BR INS.DWG
SHEET NO.:	1



PIER 2L ELEVATION
NOT TO SCALE



PIER 1R ELEVATION
NOT TO SCALE



PIER 2R ELEVATION
NOT TO SCALE

LEGEND:

⊕ 6.3' INDICATES WATER DEPTH IN FEET AT THE TIME OF INSPECTION

GENERAL NOTES:

AT THE TIME OF INSPECTION THE WATERLINE WAS LOCATED APPROXIMATELY 22.1 FEET BELOW THE BOTTOM OF BENT CAP AT PIER 2R. THIS CORRESPONDS TO A WATERLINE ELEVATION OF 464.05.

Date: 11/27/2019 7:10 AM File Path: C:\DRAWINGS\1191158\BR INS.DWG

REV.	DATE	BY	DESCRIPTION

Terracon
Consulting Engineers and Scientists

611 LUNKEN PARK DRIVE CINCINNATI, OHIO 45226
PH. (513) 321-5816 FAX. (513) 321-4540



PIER ELEVATIONS
BRIDGE NO. HAM-50-0376
OHIO DEPARTMENT OF TRANSPORTATION-DISTRICT 8
US ROUTE 50 OVER GREAT MIAMI RIVER
HAMILTON COUNTY, OHIO

EXHIBIT 2	
DESIGNED BY:	BTW
DRAWN BY:	KM
APPVD. BY:	JS
SCALE:	NOT TO SCALE
DATE:	07/22/2019
JOB NO.:	N1191158
ACAD NO.:	BR INS.DWG
SHEET NO.:	1

ODOT MANUAL OF BRIDGE INSPECTION APPENDIX F - Underwater Inspection Procedure Checklist

Acceptable written procedures communicate to the next field inspection team leader what is necessary to ensure a safe and successful inspection. Each bridge requiring underwater diving techniques must have written inspection procedures specific to each bridge which address items unique to that bridge. The prior inspection report condition ratings and inspection comments, by themselves, do not suffice for the required procedures. It is valuable to review these items but they do not serve the same purpose as the inspection procedures. The inspection report records what an inspector actually did, what was looked at, and what was found. Procedures lay out what should be done, looked at, etc. Often consultant underwater reports will include a paragraph or section in the written report that communicates the underwater inspection procedures. This will often suffice as adequate inspection procedures and fulfill the intent of the FHWA requirement. This checklist is a framework and should be completed for all underwater diving inspections when inspection procedures do not exist.

I. Bridge Identification

- a. Agency with Inspection Responsibility: **Terracon Consultants, Inc.**

Dive Frequency: 60 months

SFN: **3102548** Bridge Number (County-Route-SLM-SD): **HAM-50-0376R**

Superstructure Type Main Span Type: **Steel Girder**

Approach Span: **NA**

Substructure Type Abutment Type: **Reinforced Concrete**

Pier Type: **Reinforced Concrete**

Total Pier Count: **5**

Total Pier Count in water: **2**

Foundations: **Drilled Shafts**

Feature Intersected: **GREAT MIAMI RIVER**

b. Photographs – Photographs are shown in the underwater inspection report for this structure.



End view



Elevation



Underside

II. Office and Field Assessment

Prior to the inspection, obtain and review copies of the previous underwater inspection reports, routine inspection reports and design plans in preparation of the inspection. Divers should pay particular attention given to any observed areas of deterioration, the channel conditions and factors that may accelerate material deterioration. Changes shall be noted in the inspection procedure. Site conditions should be reviewed prior to diving.

a. Channel Conditions

- Waterway features
- YES** Rapid stream flows,
 - YES** Significant debris accumulation
 - YES** Constricted waterway openings
 - NO** Soft or unstable streambeds
 - NO** Meandering channels
 - NA** Other (which may promote scour and undermining of substructure elements)
 - NO** Navigable Waterway
 - NO** Flow Controls

b. Anticipated Water conditions which may affect the inspection

- NO** Cold Water (Approx. Temp ___)
- YES** Black water - limited
- YES** Rapid stream flows
- NA** Near military facility
- NA** Tribal fishing
- OK** Water quality
- YES** History of Log jams

c. Identify factors that may accelerate the deterioration of the bridge elements:

- NO** Highly corrosive water
- NO** Unprotected steel members
- NO** Other

Risk Factor Narrative:

Refer to report.

III. **Contacts Prior to Work**

(TO BE COMPLETED BY THE BRIDGE OWNER)

Point of contact for immediate action such as closing the bridge due to findings)

Contact Bridge Owner ___ (number) days before the proposed underwater inspection.

Special contracting and scheduling procedures prior to inspection, include recommended lead time

Entity	Contact Name and Title	Contact Phone	Lead Time
Coast Guard	NA	X	X
Property Owner	NA	X	X
Access Equipment	BOAT	TERRACON OWNED	NA
Lake or River draw-down	NA	NA	X
Canal dry time	NA	X	X
Tree removal	X	X	X
Other:			
Other:			

IV. **Dive Team Shall Include the Following:**

Dive Team Narrative:

Refer to report.

Example: The Bridge shall be investigated using a three-member dive team: one supervisor to monitor rack box and take notes, one diver, and one tender/standby diver. There shall be one NBIS Team Leader onsite at all times.

V. **Site Information**

Navigable waterway:	<u>NO</u>	Anticipated current	<u>2 – 3.0 fps</u>
If Yes, (waterway river point)	<u>NA</u>	Scour Critical (item 113):	<u>NA</u>
Anticipated water visibility depth	<u>< 1 ft</u>	POA in place:	<u>NO</u>
Anticipated Dive depth	<u><10 ft</u>	Scour Monitoring devices present:	<u>NO</u>

Verify the Scope of Services when work is contracted for the procedure for underwater elements that are not in water during an inspection. **NA**

Site Information Narrative: **NA**

Refer to report.

The underwater inspection consists of a visual and tactile examination of the accessible surfaces of the substructure items in water. Additional items should reference the scope of services in the contract.

For reference the following items are in water: (FILL in number only if in water...IF NONE, put 0)

Item	Number of Units	Level of Inspection (1, 2 or 3) with Commentary
Piers and Number of Columns	2 PIER COLUMNS	Refer to report, as applicable
Abutment	0	Refer to report, as applicable
Culvert	0	Refer to report, as applicable
Scour Countermeasures	0	Refer to report, as applicable
Fenders or Dolphins	0	Refer to report, as applicable

Photographs should be taken, if water clarity permits, for typical conditions, conditions that have changed since last inspection and significant or noteworthy deficiencies. The type of channel bottom material, the presence or extent of scour, the presence or extent of riprap, the presence or extent of drift and debris, and the location of any foundation exposure or undermining shall be quantified.

Include depth, length, height and location of deficiencies.

VI. **Equipment and Field Logistics**

a. The inspection should be conducted using:

NA Chest waders

NA Hip waders

YES Diving equipment

NA SCUBA (Note that ADCI Consensus Standards require communication systems be employed for both SCUBA and Surface-Supplied (whether air or mixed-gas) dive modes)

YES SCUBA with communication

NA Surface Supplied with communication

b. The channel bottom should be sounded utilizing

X Digital fathometer

X Telescoping survey rod

_____ acoustic imaging

c. During the inspection, the divers should work from

_____ Boat

X Shore

_____ Either

The note taker should work alongside the dive team.

d. Access to the waterway should be obtained from the shore (north bank, southwest quadrant, driveway 30 yards north etc.)

**SHORE- EAST AB
UTMENT**

e. The maximum depth of the channel is typically measured _____ feet from

Reference Datum _____

Soundings should be dictated by the scope of work. When not detailed in the scope they should be repeated from the previous soundings. If neither exist, then they need to be taken in a grid pattern between substructure units 100' upstream and 100' downstream.

VII. Other Narrative Not Included In Previous Sections

Refer to report.

**STATE OF OHIO
BRIDGE INSPECTION FIELD REPORT**

SFN 3102548
DIST 08

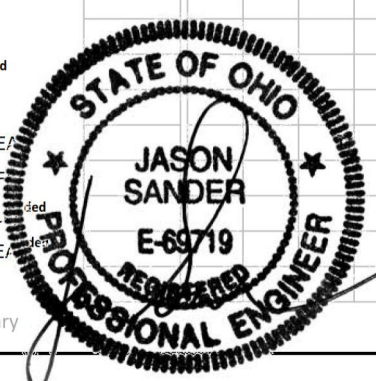
Bridge Number HAM-50-0376R
Feature Intersected GREAT MIAMI RIVER

Year Built 1991
Municipality

	Qty.	condition state				cr
		1	2	3	4	
APPROACH ITEMS						
c1. Wearing Surface (EA)						
c2. Slab (SF)						
c3. Relief Joint (LF)						
c4. Embankment (EA) ^{ded}						
c5. Guardrail (EA)						
N36. Safety Features: Tr, Gr, Tm						
c6. Approach Summary						

	Qty.	condition state				cr
		1	2	3	4	
DECK ITEMS						
c7.1 Floor/Slab (SF)						
c7.2 Edge of Floor/Slab (LF)						
c8. Wearing Surface (SF)						
c9. Curbs/Sidewalk (LF)						
c10. Median (LF)						
c11. Railing (LF)						
N36. Safety Features: Rail						
c12. Drainage (EA) ^{ded}						
c13. Expansion Joint (LF) ^{ded}						
N58. Deck Summary						

	Qty.	condition state				cr
		1	2	3	4	
SUPERSTRUCTURE ITEMS						
c14. Alignment (EA) ^{ded}						
c15.1 Beams/Girders (LF)						
c15.2 Slab (SF)						
c16. Diaphragm/X-Frames (EA)						
c17. Stringers (LF)						
c18. Floorbeams (LF)						
c19. Truss Verticals (EA)						
c20. Truss Diagonals (EA)						
c21. Truss Upper Chord (EA)						
c22. Truss Lower Chord (EA)						
c23. Truss Gusset Plate (EA) ^{ded}						
c24. Lateral Bracing (EA)						
c25. Sway Bracing (EA)						
c26. Bearing Devices (EA) ^{ded}						
c27. Arch (LF)						
c28. Arch Column/Hanger (EA)						
c29. Arch Spandrel Walls (LF)						
c30. Prot. Coating System (L) ^{ded}						
c31. Pins/Hangers/Hinges (EA) ^{ded}						
c32. Fatigue (LF) ^{ded}						
N59. Superstructure Summary						



	Qty.	condition state				cr
		1	2	3	4	
SUBSTRUCTURE ITEMS						
c33. Abutment Walls (LF)	94	94				1
c34. Abutment Caps (LF)						
c35. Abut. Colmns/Bents (EA)						
c36. Pier Walls (LF)						
c37. Pier Caps (LF)						
c38. Pier Columns/Bents (EA)	25	25				1
c39. Backwalls (LF)						
c40. Wingwalls (EA)	4	4				1
c42. Scour (EA) ^{ded}	1	1				1
c43. Slope Protection (EA) ^{ded}	1	1				1
N60. Substructure Summary						8

	Qty.	condition state				cr
		1	2	3	4	
CULVERT ITEMS						
c44. General (LF)						
c45. Alignment (LF) ^{ded}						
c46. Shape (LF) ^{ded}						
c47. Seams (EA) ^{ded}						
c48. Headwall/Endwall (EA)						
c49. Scour (EA) ^{ded}						
c50. Abutments (LF)						
N62. Culvert Summary						

	Qty.	condition state				cr
		1	2	3	4	
CHANNEL ITEMS						
c51. Alignment (LF) ^{ded}	200		200			2
c52. Protection (LF) ^{ded}	200	200				1
c53. Hydraulic Opening (EA) ^{ded}	6	6				1
c54. Navigation Lights (EA) ^{ded}						
N61. Channel Summary						6

	Qty.	condition state				cr
		1	2	3	4	
SIGN/UTILITY ITEMS						
c55. Signs (EA) ^{ded}						
c56. Sign Supports (EA) ^{ded}						
c57. Utilities (LF) ^{ded}						
N59, 60 or 62 General Appraisal						
N41. Operating Status						

Inspector Name Zachary Harrison
 Inspection Date/Type 08/30/2019
 Reviewer Name JASON SANDER P.E.
 Review Date 08/30/2019
 PE Number (Insp or Rev) E69719