

UNDERWATER BRIDGE INSPECTION REPORT



NBI Item 60 Rating: 5
NBI Item 61 Rating: 7
NBI Item 113 Rating: 8

Bridge Number: CUY-00090-2043L
Inspection Date: 12/5/2012
Division: District 12
River: CEI Outlet

Engineer of Record: David Reser
Team Leader: Fred Meek
Substructures Inspected: Bents 1 and 2
Team Members:
KRR, JML

Signature/Seal

Summary of Scour and Channel Conditions:

There is some minor local scour present at the bridge site at Bent 2. There are no significant restrictions in the channel that will adversely impact flow.

Summary of Structural Conditions:

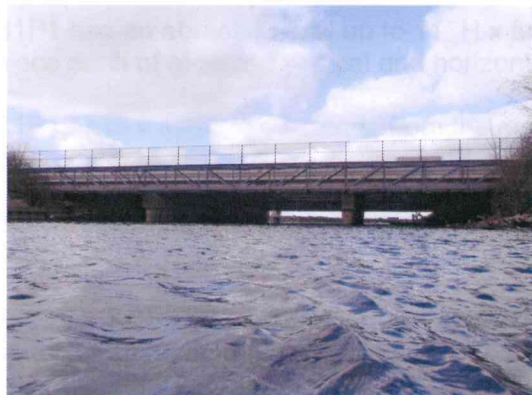
The inspected substructure units are in fair condition. There are several concrete encased piles with spalls and exposed reinforcement. Refer to Photos 1 and 2 for overall views of the bridge and substructure configuration.

Summary Evaluation of Previous Corrective Actions:

There have been no corrective actions performed on the substructure units inspected since the previous underwater bridge inspection.

Summary of Repair Recommendations:

Restore conc. cover to the areas of exposed reinforcement at the spalled areas of the conc. encasements. Place fill material, rip rap, or sand bags to abate scour at Bent 2.



Route: I 90
Inventory Direction: West to East
County: Cuyahoga
Location: .6 mi. West of Martin Luther King Jr. Dr.
Bridge Length: 184 FT
Superstructure Type: Steel Multi-Beam
Substructure Type: CIP Concrete Piles w/Encasements
Foundation Type: Concrete Encased Steel H-Piles
Total Substructure Units: 4
Substructure Units in Water: 2
Deepest Water Depth: 10 FT
Water Velocity: 0 FPS
Underwater Visibility: .25 FT
Water Temperature: 48 °F

Attachments Included:

- A - Drawings
- B - ODOT FORM BR-86



Infrastructure Engineers, Inc.
Corporate Headquarters
2121 Old Hickory Tree Road
St. Cloud, FL 34772
1-888-451-6822

"Protecting the Past, Designing the Future."

www.infrastructureengineers.com

UNDERWATER BRIDGE INSPECTION REPORT



NBI Item 60 Rating: 5
NBI Item 61 Rating: 7
NBI Item 113 Rating: 8

Bridge Number: CUY-00090-2043L
Inspection Date: 12/5/2012
Division: District 12
River: CEI Outlet

Channel Evaluation:

The channel bottom is in good condition and is well aligned with the substructure units. Refer to Photos 3 and 4. The channel is armored with large rock. There is some moderate timber debris along the east shoreline. There is a large log at the channel bottom between Piles 8 and 9 of Bent 2. A jetty north of this structure protects this bridge. The channel bottom material consists of silt, sand, gravel, cobbles and trash debris.

Scour Conditions:

There is some minor local scour at nine piles at Bent 2, which has exposed the bottoms of the concrete encasements.

Substructure Condition:

This inspection includes 40 total piles, 20 at each pile bent. The piles are covered by concrete encasements. The bridge is inventoried from West to East. The piles at the West Pile Bent (Bent 1) and the East Pile Bent (Bent 2) are numbered from left to right when facing upstation (East).

The piles have light to moderate scaling, 1/8" deep to 1/4" deep, starting 3' below the cap and extending to the channel bottom. There is light algae growth below the waterline.

Bent No. 1 - (B=Bent/P=Pile)

B1P1 has an abrasion/spall up to 11" H x full circumference x 1 1/2" D, located at the waterline, with one (1) piece each of exposed vertical and horizontal reinforcement, 3' below the cap. Refer to Photo 5.

B1P19 has a spall that extends from the southeast to the southwest face, 6" H x 2' W x 1/2" D, 5' below the cap. Refer to Photo 6.

B1P20 has a vertical crack on the south face, 1/32" wide, with light efflorescence, extending 4' down from the cap.

Piles 17 through 20 in Bent 2 have intermittent voiding, 3 1/2" H x up to 1 1/2" D, at a cold joint in the concrete encasement at all quadrants, 3' below the cap.

Bent No. 2 - (B=Bent/P=Pile)

B2P1 has areas of abrasion along the full circumference, 1" H x 6" W x 2" D, located 2'-6" below the cap.

B2P2 has a void at the bottom of the concrete encasement on the northwest quadrant, 8" H x 6" W x up to 4" D, with 8" of H-Pile flange exposed. The portion of the exposed H-Pile is in good condition.

B2P4 has a spall at the bottom of the north quadrant extending around the west side to the south face, 6" H x 7" D, with no exposed H-pile observed.



UNDERWATER BRIDGE INSPECTION REPORT



NBI Item 60 Rating: 5
NBI Item 61 Rating: 7
NBI Item 113 Rating: 8

Bridge Number: CUY-00090-2043L
Inspection Date: 12/5/2012
Division: District 12
River: CEI Outlet

B2P5 has a spall at the bottom of the north face extending around the west side to the south face, 4" H x 1'-2" W x 3 1/2" D, with one (1) piece of exposed reinforcement. The exposed reinforcement is in good condition.

B2P6 has a spall, 3' H x 3 1/2" D, with four (4) pieces of exposed vertical reinforcement on the west, northwest, northeast, and east quadrants, 1'-3" below the cap. Maximum reinforcement exposure is 10" high, with loss of epoxy coating (reinforcement is still in good condition). Secondary horizontal reinforcement is exposed at all quadrants within the spall. Refer to Photo 7. B2P6 has another spall at the south quadrant at the channel bottom, 2" H x 6" W x 3" D with no exposed H-pile or steel. This pile is surrounded by sand bags on the channel bottom.

B2P7 has a spall on the bottom of the north face extending west around to the south face, 4" H x 7" D.

B2P12 has a spall in the east quadrant due to insufficient cover, 8" H x 1'-3" W x 1" D, 3'-6" below the cap. There is another spall at the channel bottom, starting in the west face and extending around to the southeast quadrant, 10" H x 8" D, with no H-pile exposure.

B2P13 has a spall in the southeast quadrant, 1' H x 10" W x 1" D, with one (1) piece of exposed secondary horizontal reinforcement, 4' below the cap.

B2P14 has a spall at the bottom of the west quadrant extending south around to the east quadrant, 10" H x 9" D.

B2P15 has a spall, up to 1'-7" H x full circumference x 3" D, with one (1) piece of exposed primary vertical reinforcement, 6" high, on the east quadrant, and several random pieces of exposed secondary horizontal reinforcement in all quadrants, 3' below the cap. Refer to Photo 8. Another spall, 4" H x 6" D, is at the bottom of the west quadrant and extends around to the south quadrant.

B2P16 has a spall in the south quadrant extending west, 4" H x 2'-6" W x 4" D, 2'-6" below the cap. There is another spall, 2" H x 1' W x 2" D, in the west quadrant, at the channel bottom.

B2P17 has a spall that extends from the east quadrant to the north quadrant, 1'-8" H x 2' W x up to 2 1/2" D with no exposed steel, 3' below the cap. Refer to Photo 9.

B2P18 has intermittent spalls in the north, west, and south quadrants, up to 4" H x 5" D, with no exposed steel.

Repair Recommendations:

Restore concrete cover to the areas of exposed reinforcement at the spalled areas of the concrete encasements. Place fill material, rip rap, or sand bags to abate scour at Bent 2.



UNDERWATER BRIDGE INSPECTION REPORT



NBI Item 60 Rating: 5
NBI Item 61 Rating: 7
NBI Item 113 Rating: 8

Bridge Number: CUY-00090-2043L
Inspection Date: 12/5/2012
Division: District 12
River: CEI Outlet



Photo 1 - Upstream (South) Fascia Looking North



Photo 2 - Typical Bent Configuration, Bent 1



Infrastructure Engineers, Inc.
Corporate Headquarters
2121 Old Hickory Tree Road
St. Cloud, FL 34772
1-888-451-6822

"Protecting the Past, Designing the Future."

www.infrastructureengineers.com

UNDERWATER BRIDGE INSPECTION REPORT



NBI Item 60 Rating: 5
NBI Item 61 Rating: 7
NBI Item 113 Rating: 8

Bridge Number: CUY-00090-2043L
Inspection Date: 12/5/2012
Division: District 12
River: CEI Outlet



Photo 3 - Channel View Looking Upstream (South)



Photo 4 - Channel View Looking Downstream (North)



Infrastructure Engineers, Inc.
Corporate Headquarters
2121 Old Hickory Tree Road
St. Cloud, FL 34772
1-888-451-6822

"Protecting the Past, Designing the Future."

www.infrastructureengineers.com

UNDERWATER BRIDGE INSPECTION REPORT



NBI Item 60 Rating: 5
NBI Item 61 Rating: 7
NBI Item 113 Rating: 8

Bridge Number: CUY-00090-2043L
Inspection Date: 12/5/2012
Division: District 12
River: CEI Outlet



Photo 5 - Bent 1, Pile 1, Abrasion/Spall at the Waterline

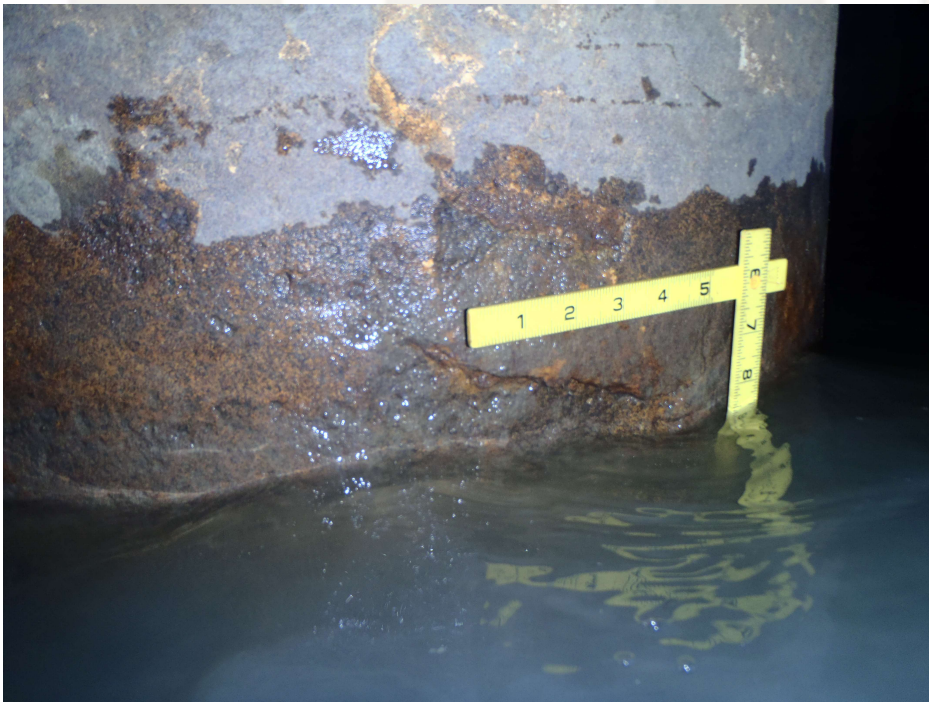


Photo 6 - Bent 1, Pile 19, Spall at South Quadrant, 5' Below the Cap



Infrastructure Engineers, Inc.
Corporate Headquarters
2121 Old Hickory Tree Road
St. Cloud, FL 34772
1-888-451-6822

"Protecting the Past, Designing the Future."

www.infrastructureengineers.com

UNDERWATER BRIDGE INSPECTION REPORT



NBI Item 60 Rating: 5
NBI Item 61 Rating: 7
NBI Item 113 Rating: 8

Bridge Number: CUY-00090-2043L
Inspection Date: 12/5/2012
Division: District 12
River: CEI Outlet



Photo 7 - Bent 2, Pile 6, Spall with Exposed Reinforcement, 1'-3" Below Cap



Photo 8 - Bent 2, Pile 15, Spall with Exposed Reinforcement



Infrastructure Engineers, Inc.
Corporate Headquarters
2121 Old Hickory Tree Road
St. Cloud, FL 34772
1-888-451-6822

"Protecting the Past, Designing the Future."

www.infrastructureengineers.com

UNDERWATER BRIDGE INSPECTION REPORT



NBI Item 60 Rating: 5
NBI Item 61 Rating: 7
NBI Item 113 Rating: 8

Bridge Number: CUY-00090-2043L
Inspection Date: 12/5/2012
Division: District 12
River: CEI Outlet



Photo 9 - Bent 2, Pile 17, Spall at the East to North Quadrant, 3' Below the Cap

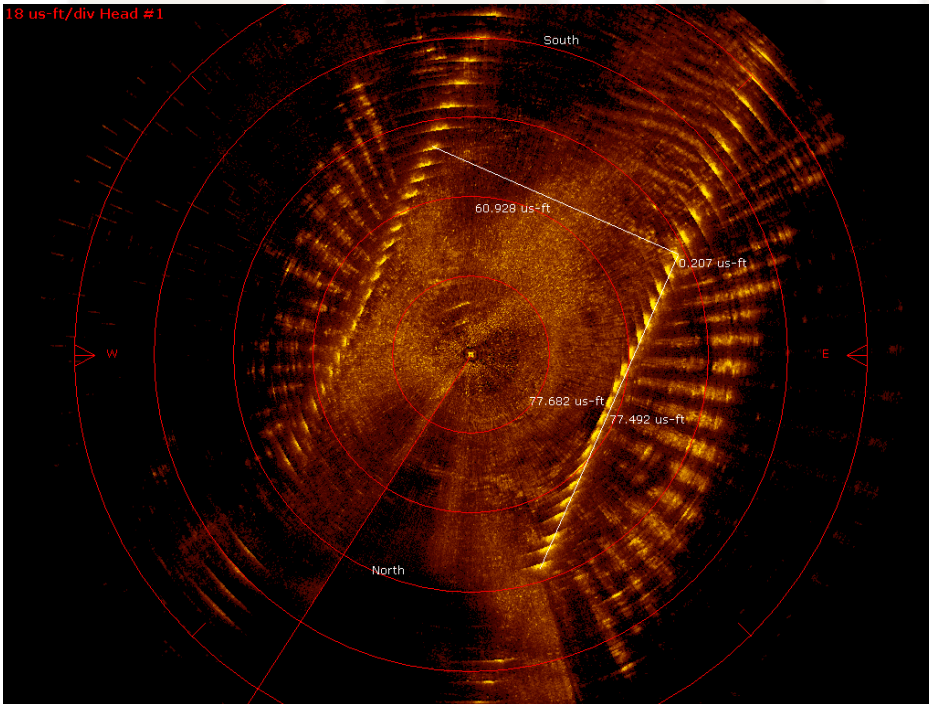


Photo 10 - Span 2, Sonar Image of Channel Bottom at 90' Radius



Infrastructure Engineers, Inc.
Corporate Headquarters
2121 Old Hickory Tree Road
St. Cloud, FL 34772
1-888-451-6822

"Protecting the Past, Designing the Future."

www.infrastructureengineers.com

UNDERWATER BRIDGE INSPECTION REPORT



NBI Item 60 Rating: 5
NBI Item 61 Rating: 7
NBI Item 113 Rating: 8

Bridge Number: CUY-00090-2043L
Inspection Date: 12/5/2012
Division: District 12
River: CEI Outlet

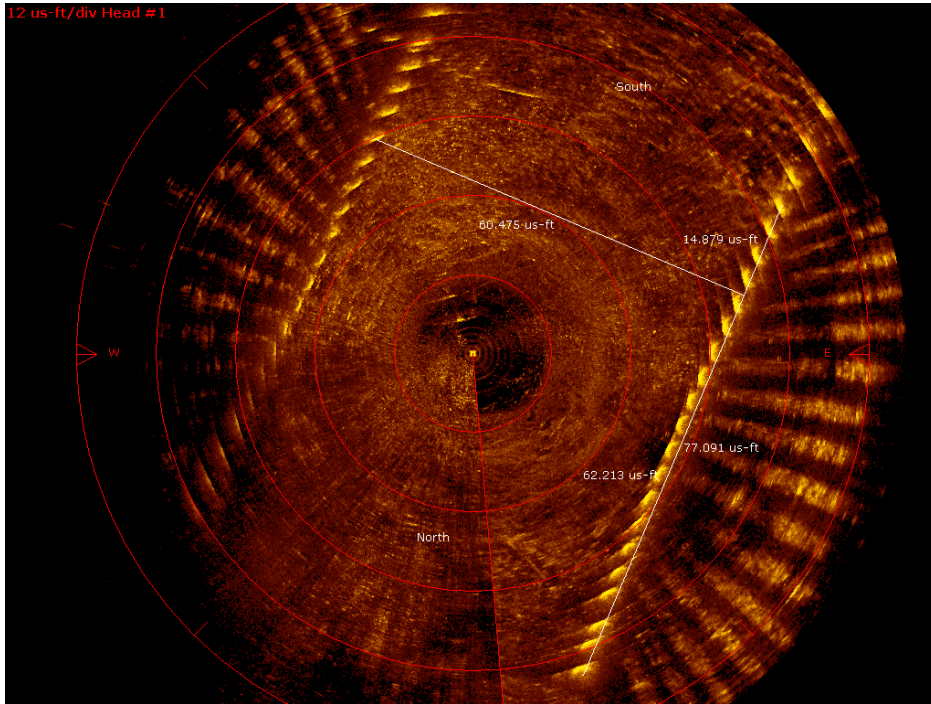


Photo 11 - Span 2, Sonar Image of Channel Bottom at 60' Radius



Infrastructure Engineers, Inc.
Corporate Headquarters
2121 Old Hickory Tree Road
St. Cloud, FL 34772
1-888-451-6822

"Protecting the Past, Designing the Future."

www.infrastructureengineers.com

UNDERWATER BRIDGE INSPECTION REPORT



NBI Item 60 Rating: 5
NBI Item 61 Rating: 7
NBI Item 113 Rating: 8

Bridge Number: CUY-00090-2043L
Inspection Date: 12/5/2012
Division: District 12
River: CEI Outlet

INSPECTION SOUNDING DATA

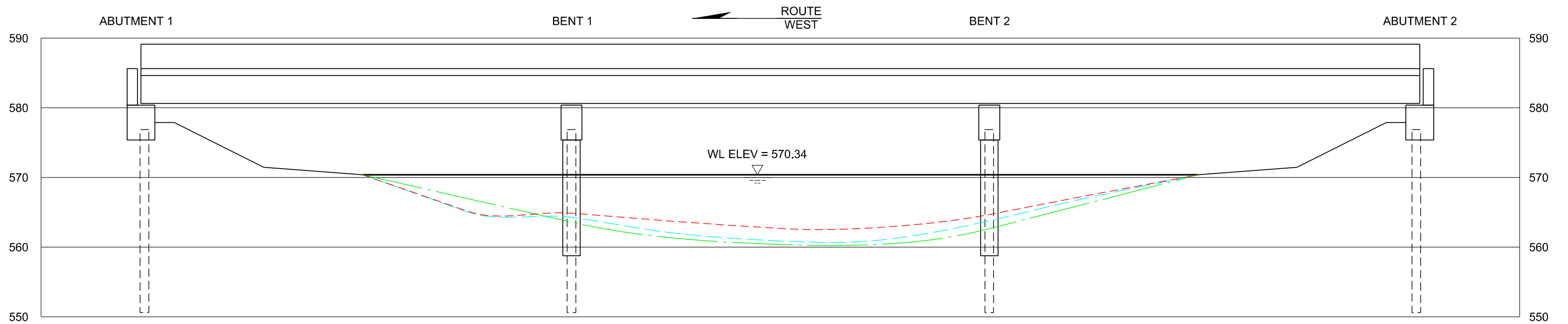
| Station | (L) | (R) |
|-------------|--------|--------|
| Span 1, 1/2 | 0.00 | 0.00 |
| Span 1, 3/4 | 563.84 | 565.14 |
| Bent 1 | 561.74 | 564.84 |
| Span 2, 1/4 | 561.64 | 563.64 |
| Span 2, 1/2 | 561.14 | 562.64 |
| Span 2, 3/4 | 562.54 | 562.84 |
| Bent 2 | 565.54 | 564.64 |
| Span 3, 1/4 | 567.24 | 567.54 |
| Span 3, 1/2 | 0.00 | 0.00 |

All sounding data is presented in elevations referenced to the construction plans. If plans were not provided, a reference datum of 100.00 was used.

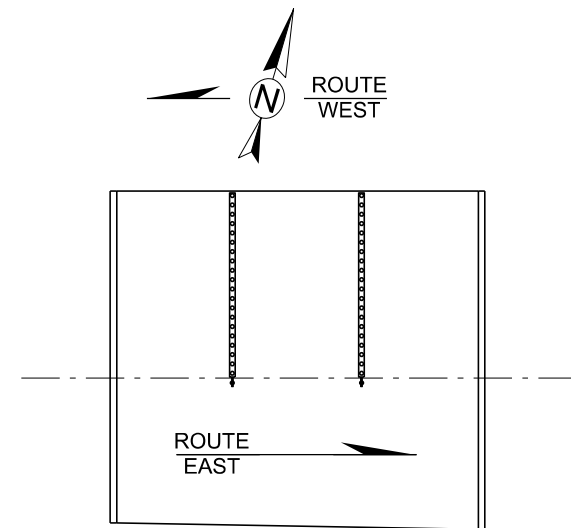
At the time of this inspection, the waterline was located at ELEV 570.34

A measurement of 0.00 reflects the channel bank at this location.





SOUTH ELEVATION



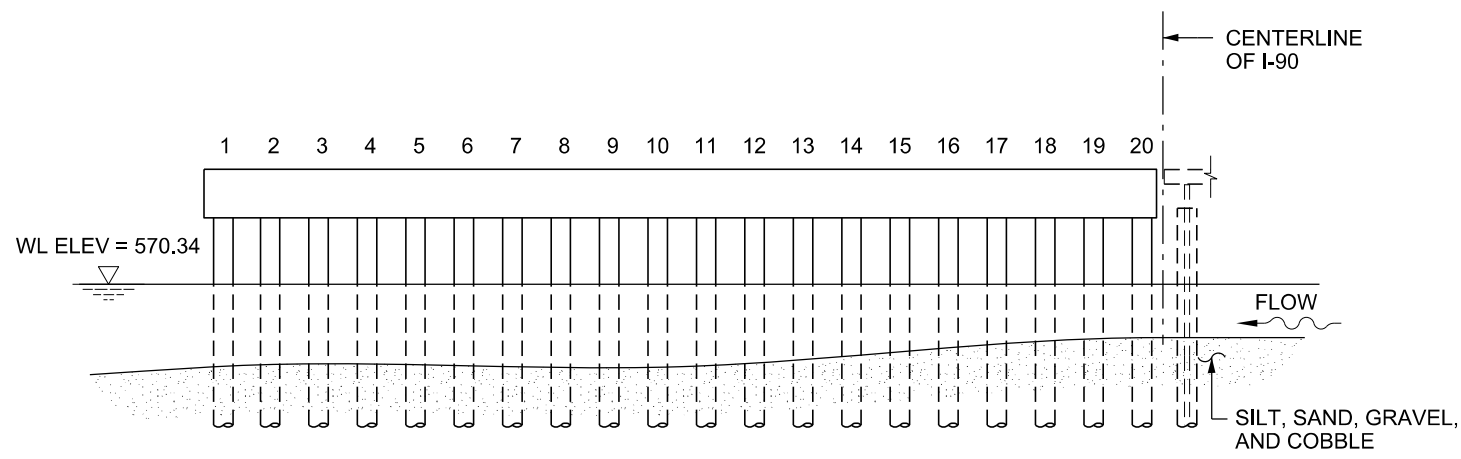
BRIDGE ORIENTATION
NTS

| CHANNEL PROFILE LEGEND | |
|--------------------------|--|
| ORIGINAL | |
| 2012 - UPSTREAM FASCIA | |
| 2012 - DOWNSTREAM FASCIA | |

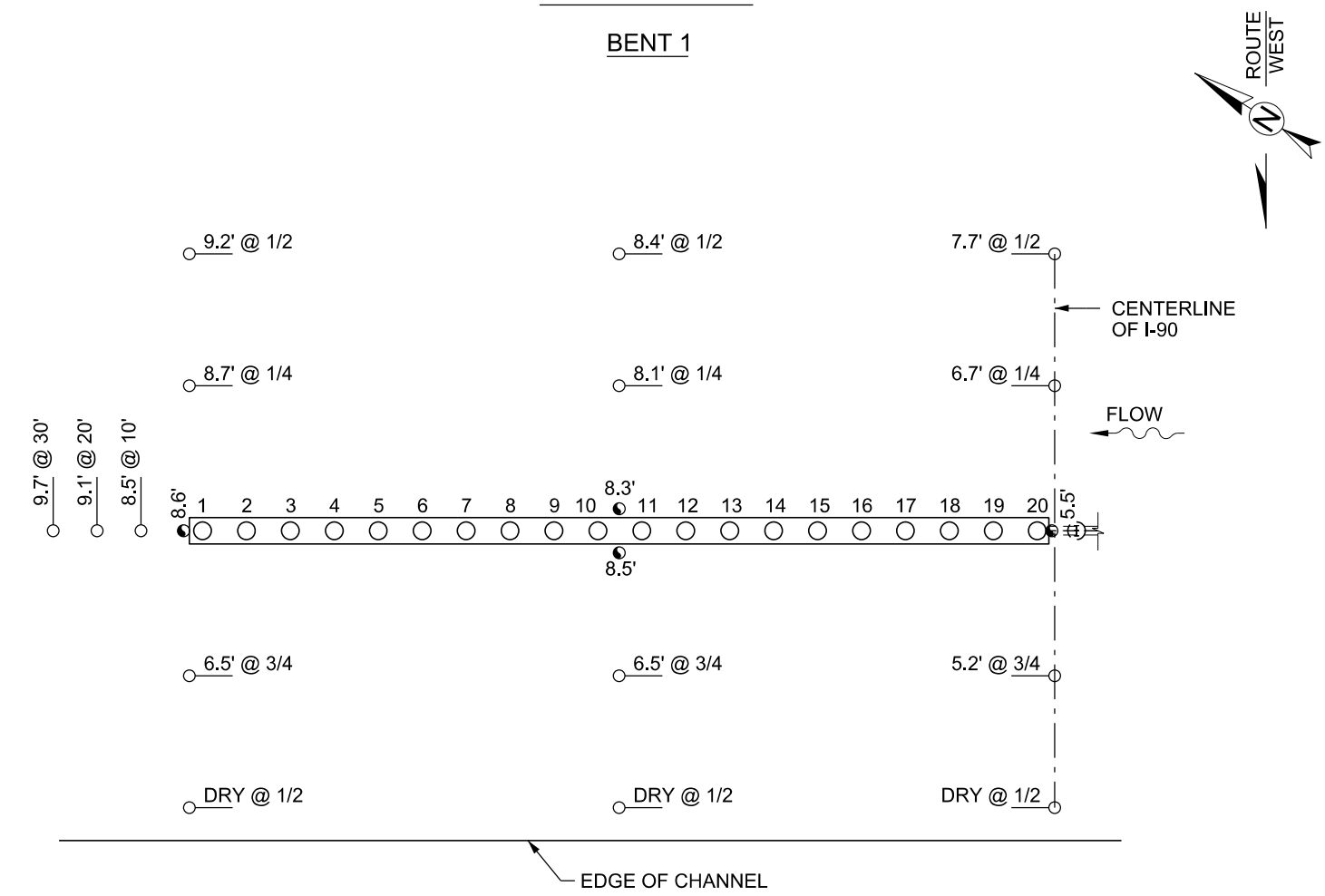
GENERAL NOTES:

1. AT THE TIME OF INSPECTION ON 12-05-2012, THE WATERLINE ELEVATION WAS 570.34 FT, BASED ON THE DATA TAKEN FROM THE U.S.G.S. MONITORING STATION.
2. REFER TO THE INSPECTION SOUNDING DATA FOR DETAILED CHANNEL BOTTOM ELEVATIONS.

| | | | | |
|------------------------------------|--------------------------------|--|---|-------------|
| GRAPHIC SCALE MEASURED IN FEET | DATE DEC, 2012 | | I-90 OVER C.E.I. OUTLET BRIDGE NO. CUY-00090-2043L | PAGE A-1 |
| | INFRASTRUCTURE ENGINEERS, INC. | | PROFILE SHEET | |

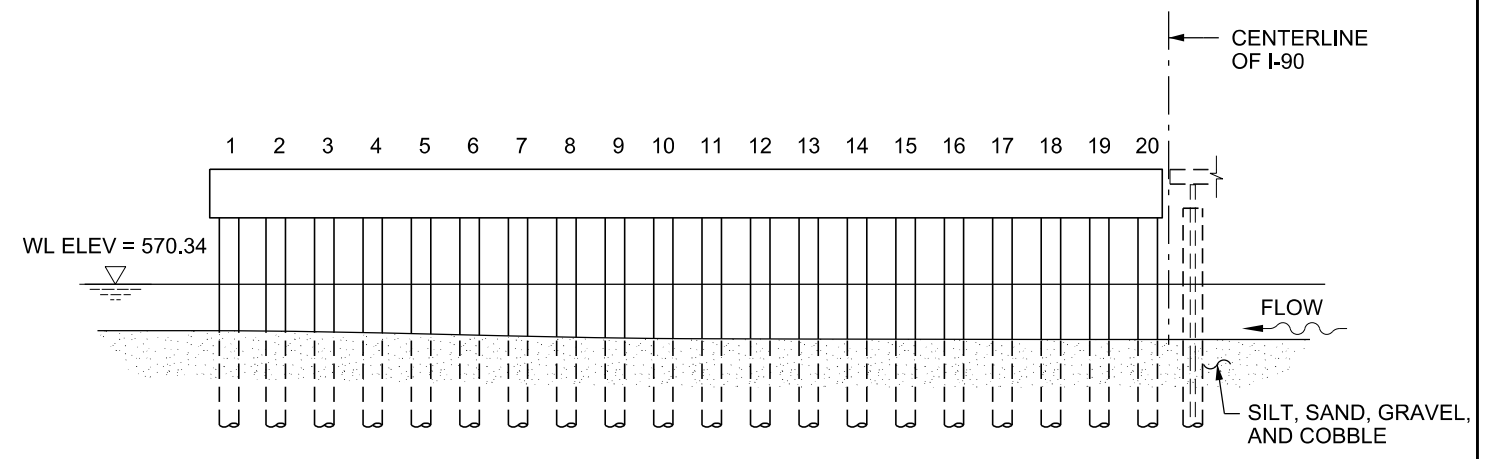


WEST ELEVATION
BENT 1

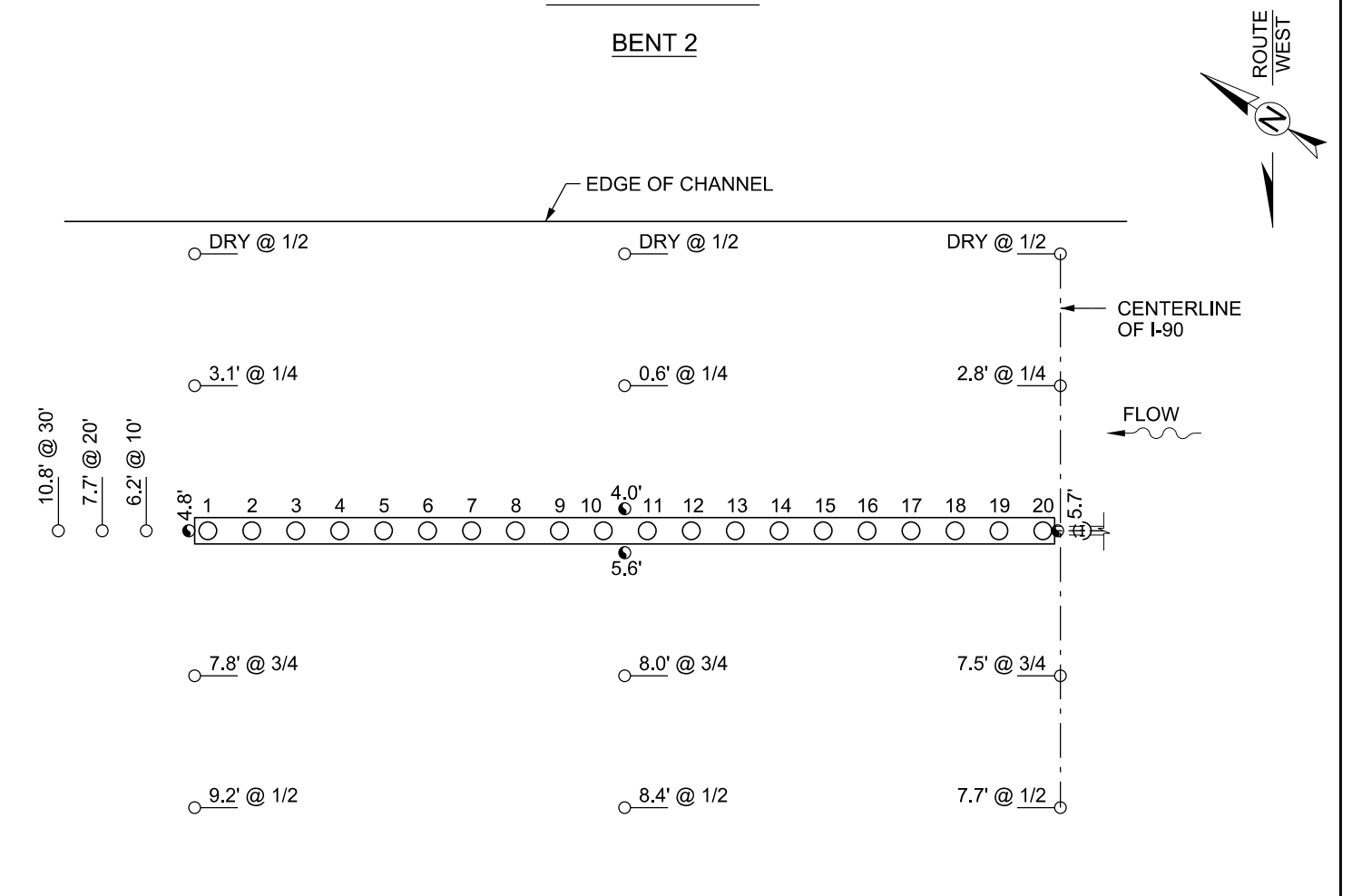


PLAN - BENT 1

LEGEND:
 ● 7.1' SOUNDING LOCATION AND DEPTH AT PIER
 ○ 2.0' @ 20' SOUNDING LOCATION AND DEPTH AT OFFSET DISTANCE OR FRACTION OF SPAN



WEST ELEVATION
BENT 2



PLAN - BENT 2

| | | | | |
|---|-------------------|---|---|--|
| GRAPHIC SCALE MEASURED IN FEET 0 15 30 1" = 15' | DATE DEC, 2012 | 200 East Campus View Blvd. Suite 200 Columbus, Ohio 43235 PH.: 614.310.3048 INFRASTRUCTURE ENGINEERS, INC. | I-90 OVER C.E.I. OUTLET BRIDGE NO. CUY-00090-2043L | |
| | BENTS 1 AND 2 | | PAGE A-2 | |

OHIO DEPARTMENT OF TRANSPORTATION

BRIDGE INSPECTION REPORT

| | | | | | | |
|---|---|---|---|---|---|---|
| 1 | 8 | 0 | 8 | 3 | 1 | 1 |
|---|---|---|---|---|---|---|

STRUCTURE FILE NUMBER

| | | |
|----|---|---|
| C | U | Y |
| CO | | |

| | | | | | | | | |
|-------|---|---|---|------|---|---|---|---|
| 0 | 0 | 9 | 0 | 2 | 0 | 4 | 3 | L |
| ROUTE | | | | UNIT | | | | |

YEAR BUILT 1 9 5 2

DIST 1 2 BRIDGE TYPE _____ CO 3 2 2 TYPE OF SERVICE 1 5 C E I Outlet Channel _____

DECK

| | | | |
|--------------------------------|--|--------------------|--|
| 1. Floor | | 2. Wearing Surface | |
| 3. Curbs, Sidewalks & Walkways | | 4. Median | |
| 5. Railing | | 6. Drainage | |
| 7. Expansion Joints | | 8. SUMMARY | |

SUPERSTRUCTURE

| | | | |
|--|--|--|--|
| 9. Alignment of Members | | 10. Beams/Girders/Slab | |
| 11. Diaphragms or Cross frames | | 12. Joists/Stringers | |
| 13. Floorbeams | | 14. Floorbeam Connections | |
| 15. Verticals | | 16. Diagonals | |
| 17. End posts | | 18. Upper Chord | |
| 19. Lower Chord | | 20. Gusset Plates | |
| 21. Lateral Bracing | | 22. Sway Bracing | |
| 23. Portals | | 24. Bearing Devices | |
| 25. Arch | | 26. Arch Columns or Hangers | |
| 27. Spandrel Walls | | 28. Protective Coating System (PCS) | |
| 29. Pins/Hangers/Hinges | | 30. Fatigue Prone Detail (E & E') | |
| 31. Live Load Response (<i>E or S</i>) | | 32. SUMMARY | |

SUBSTRUCTURE

| | | | |
|--------------------------|---|--|-----|
| 33. Abutments | | 34. Abutment Seats | |
| 35. Piers | 2 | 36. Pier Seats | |
| 37. Backwalls | | 38. Wingwalls | |
| 39. Fenders and Dolphins | | 40. Scour (<i>Insp Type - 1, 2, 3</i>) | 3 1 |
| 41. Slope Protection | 1 | 42. SUMMARY | 5 |

CULVERT

| | | | |
|--------------------------|--|--|--|
| 43. General | | 44. Alignment | |
| 45. Shape | | 46. Seams | |
| 47. Headwall or Endwalls | | 48. Scour (<i>Insp Type - 1,2,3</i>) | |
| 49. Abutments | | 50. SUMMARY | |

CHANNEL

| | | | |
|-----------------------|---|--------------------|---|
| 51. Alignment | 1 | 52. Protection | 1 |
| 53. Hydraulic Opening | 1 | 54. SUMMARY | 7 |

APPROACHES

| | | | |
|----------------|--|--------------------|--|
| 55. Pavement | | 56. Approach Slabs | |
| 57. Guardrail | | 58. Relief Joint | |
| 59. Embankment | | 60. SUMMARY | |

GENERAL

| | | | |
|--|--|---|--|
| 61. Navigation Lights | | 62. Warning Signs | |
| 63. Sign Supports | | 64. Utilities | |
| 65. Vertical Clearance (<i>1, 2-change, N</i>) | | 66. General Appraisal & Operational Status | |

67. Inspected By, First & Last Name

| | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|--|--|--|--|
| F | R | E | D | E | R | I | C | K | | | | |
| M | E | E | K | | | | | | | | | |

| | | | | | |
|-----------|--|--|--|--|--|
| | | | | | |
| PE Number | | | | | |

68. Reviewed By, First & Last Name

| | | | | | | | | | | | |
|---|---|---|---|---|--|--|--|--|--|--|--|
| D | A | V | I | D | | | | | | | |
| R | E | S | E | R | | | | | | | |

| | | | | | |
|-----------|---|---|---|---|---|
| | 7 | 3 | 8 | 7 | 8 |
| PE Number | | | | | |

Date 1 2 1 1 1 2

Date _____

69. Survey (1, 0, N)