

BRIDGE INSPECTION REPORT

1812246
Structure File Number

BRIDGE NUMBER CUY 00322 1534

YEAR BUILT 1939

DIST 12 Bridge Type 322 TYPE SERVICE 1 5 CHAGRIN RIV .25 MI W 174#

DECK	out/out 65.1 Deck Area 9,763 sqft		0 OTHER	
1. FLOOR	1 REINF CONCRT (PRESTRSD, PRECAST)	2	2. WEARING SURFACE	Thk 2 2
3. CURBS, SIDEWALKS AND WALKWAYS	Left 2 SIDEWALK(>2') / Right 2 SIDEWALK(>2')	2	4. MEDIAN	Lanes on 4 1
5. RAILING	6 STEEL POST & STEEL PANEL (DECO)	1	6. DRAINAGE	3 SCUPPERS & DWNSPTS 1
7. EXPANSION JOINTS	2 SLIDING METAL PLATE ANGLE	2	8. SUMMARY	5
SUPERSTRUCTURE			2 WELDED BUILT-UP STEEL	
9. ALIGNMENT	Max Spans 72	1	10. BEAMS/GIRDERS/SLAB	2
11. DIAPHRAGMS or CROSSFRAMES		2	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	3 SLIDING (BRONZE) 2
25. ARCH			26. ARCH COLUMNS or HANGERS	
27. SPANDREL WALLS			28. PROTECTIVE COATING SYSTEM	Paint Date 1/1/1939 1 RED LEAD 4
29. PINS/HANGERS/HINGES			30. FATIGUE PRONE CONNECTIONS	
31. LIVE LOAD RESPONSE		S	32. SUMMARY	5
SUBSTRUCTURE			1 GRAVITY	
33. ABUTMENTS	1 GRAVITY	2	34. ABUTMENT SEATS	Abutment: ON PILING 3
35. PIERS		2	36. PIER SEATS	1 GRAVITY Piers: ON PILING 1
37. BACKWALLS		2	38. WINGWALLS	2
39. FENDERS and DOLPHINS	Piers = 01 NN NN Spans = 2		40. SCOUR	3 2
41. SLOPE PROTECTION	N NONE-NATURAL PROTECTION(GRA)		42. SUMMARY	Dive Date 12/30/1899 4
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	2 STONE 2
53. WATERWAY ADEQUACY	6 (SEE CODING GUIDE)	1	54. SUMMARY	5
APPROACHES				
55. PAVEMENT	2 BITUMINOUS	2	56. APPROACH SLABS	1
57. GUARDRAIL	1 STEEL BEAM	1	58. RELIEF JOINTS	
59. EMBANKMENT		1	60. SUMMARY	Percent Legal = 150 6
GENERAL				
61. NAVIGATION LIGHTS			62. WARNING SIGNS	Maint Resp 3 COUNTY
63. SIGN SUPPORTS	Signs on = N MVC on = 9999.9 Under C = 0		64. UTILITIES	1
65. VERTICAL CLEARANCE	Under NC = 0	N	66. GENERAL APPRAISAL & OPERATIONAL STATUS	4 A
67. INSPECTED BY			68. REVIEWED BY	

SIGNED

PE Number

ACP
INITIALS

SIGNED

60048 MJM
PE Number INITIALS

DATE 12/15/2006

1 1 1 N 1 N N N
SURVEY

DATE 2/25/2007

DECK

FLOOR: TRANSVERSE LEACHED CRACKS AT 25' SPACING; MOTTLED AREAS AND EFFLORESCENCE AROUND THE CRACKS. 120 SF OF SPALLS (MOSTLY HAUNCH). FLOOR IS 5-10% DET.
WEARING SURFACE: CRACKS.

SIDEWALKS: HEAVY SCALING OF LEFT WALK.

EXJTS: PAVED OVER. START EXJT COVER PLATE IS MISSING FROM LEFT SIDEWALK LEAVING A 1" WIDE GAP AT 80 DEGREES F. THERE IS NO PAVED START-LEFT APPROACH SIDEWALK. FINISH EXJT IS CLOSED AT WALKS.

SUPERSTRUCTURE

BEAMS: RUSTING SECTION LOSS; SEE PHOTOS #2 AND #3 DATED 5/10/05. RUSTING THRU HOLES IN BOTH FLANGES OF LEFT BEAM NEAR START ABUTMENT, AND IN LOWER FLANGE OF RIGHT BEAM NEAR MIDDLE OF SPAN #2 AND FROM MIDDLE OF SPAN #2 TO FINISH ABUTMENT; SEE PHOTO #5 DATED 12/6/05.
CROSSFRAMES: ENDFRAME RUSTING SECTION LOSS WITH RUSTING THRU HOLES; SEE PHOTO #5 DATED 12/6/05.
BEARINGS: HEAVY RUSTING.
PAINT: 5-10% RUST. RUSTING IN STRUCTURALLY CRITICAL AREAS; SEE ITEM #10 (BEAMS). PAINT IS 5-10% DET.

SUBSTRUCTURE

ABUTMENTS: DELAMINATIONS. DEEP SPALLS; SEE ATTACHED PHOTO #1 DATED 12/6/05. TWO FULL HEIGHT CRACKS IN FINISH ABUTMENT BELOW BAYS #5 AND #7; SEE ATTACHED PHOTO #4 DATED 12/6/05 (CRACK BELOW BAY #7 IS 1/4 INCH WIDE AT GROUND LEVEL). STONE FACING IS MISSING BELOW RIGHT BAY AT FINISH ABUTMENT; SEE ATTACHED PHOTO #5 DATED 12/6/05.
ABUTMENT SEATS: DEEPS SPALLS AND DETERIORATION. APPROACHING SEAT LOSS AT START ABUTMENT MASONRY PLATE #4. 20 SQUARE INCH SEAT LOSS UNDER START ABUTMENT MASONRY PLATE #5 WITH 5 LF OF NEARBY 360 DEGREE EXPOSURE OF LONGITUDINAL REBARS; SEE ATTACHED PHOTOS #2 AND #3 DATED 5/10/05. 5 SQUARE INCH SEAT LOSS UNDER START ABUTMENT MASONRY PLATE #6; SEE ATTACHED PHOTO #2 DATED 5/10/05. ONE SQUARE INCH SEAT LOSS UNDER START ABUTMENT MASONRY PLATE #7. A TOTAL OF 15 SQUARE INCHES OF SEAT LOSS UNDER MASONRY PLATES #2R, #5R, AND #6R AT FINISH ABUTMENT.
PIER: CRACKS. SCALING.
BACKWALLS: DEEP SPALLS. 2 LF OF 270 DEGREE REBAR EXPOSURE OF START BACKWALL IN BAY #6.
WINGWALLS: FULL HEIGHT CRACKS IN START-LEFT AND FINISH-RIGHT WINGWALLS. CRACK IN START-LEFT WINGWALL IS ONE INCH WIDE AT GROUND LEVEL; SEE ATTACHED PHOTO #6 DATED 12/6/05.
SCOUR: PARTS OF THE PIER FOOTER ARE EXPOSED; SEE ATTACHED SPECIALITY DIVING'S REPORT DATED 10/11/05.

CHANNEL

ALIGNMENT: RIVER FLOWS INTO START ABUTMENT AND FINISH FACE OF PIER #1.
PROTECTION: UNEVEN SETTLEMENT OF STONE SLABS NEAR START ABUTMENT.

APPROACHES

PAVEMENT: CRACKS ASPHALT PATCHES

Approaches

PAVEMENT: CRACKS. ASPHALT PATCHES.

General:

INSPECTION FROM REACHALL ON 5/31/06.

UNDERWATER INSPECTION BY KCI ASSOC. OF OHIO ON 10/24/06.



1812246 P1 12_6_05 det of start abut.jpg



1812246 P2 5_10_05 start abut seat loss.jpg



1812246 P3 5_10_05 start abut seat loss at beam 5.jpg



1812246 P4 12_6_05 finish abut cracks.jpg

Underwater Inspection Report for:

U.S. Route 322 (Mayfield Road) over the Chagrin River in Gates Mills, Cuyahoga County
(Two Span Steel Beam Bridge)

Contractor 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 (Tender / Supervisor)

ODOT personnel on site during inspection:

1. Mr. David Everett



General Elevation View



Location Map

Prepared for:

ODOT District 12
5500 Transportation Blvd
Garfield Heights, Ohio 44125



Prepared by:

KCI Associates of Ohio
39 East Market Street, Suite 404
Akron, Ohio 44308
Phone: (330) 375-9455
dgonano@kci.com



DESCRIPTION

Bridge Number CUY-322-1534 (SFN 1812246) carries four lanes of U.S. Route 322 (Mayfield Road) over the Chagrin River in Gates Mills, Ohio. The bridge has an overall length of approximately 150 feet and was built in 1939. The structure consists of a steel beam bridge supported by two concrete abutments and a single wall pier. The substructure units are partially covered with sandstone masonry facing. For reporting purposes and numbering conventions, ODOT's Bridge Component Nomenclature System will be used with the Direction of Survey as East.

INSPECTION OPERATIONS

KCI's three-person dive team performed an underwater inspection on 10/24/06. A visual inspection was performed from one foot above the waterline (splash zone) to the mudline. Where the diver's visibility was limited, tactile methods were used. Soundings were taken along both abutments and up to 30 feet upstream and downstream of the bridge using a survey rod. The previous underwater inspection report dated 10/11/05 and ODOT BR-86 inspection report dated (12/6/05) were available for comparison. Original plans were available for review.

Hazards Encountered:	<i>Strong current, timber debris, < 0.5 ft of visibility</i>
Inspection Mode:	<i>Diving</i>
Flow Direction / Velocity:	<i>North / ~5 fps</i>
Direction of Diver / Inspector:	<i>Finish side of pier inspected from east river bank, diver tended from upstream start bank to inspect start side of pier (current too strong to approach from start bank)</i>
Channel Bottom:	<i>Riprap and clay</i>
Scour Checked By:	<i>Soundings and probing</i>
Equipment Used:	<i>Superlite 27 Helmet with hard wire communications and surface supplied air, dry suit, survey rod, lights</i>
Elements Cleaned:	<i>N/A</i>
Hydrographic Reference:	<i>Underside of steel beam on finish right midspan</i>

OBSERVATIONS**Bridge**

- The entire width of the Start Abutment was submerged and investigated as an underwater inspection.



- The mortar of the sandstone masonry facing appeared to be in good condition.
- A portion of the Finish Abutment's base on its north side was not inundated by the river and therefore was not considered part of this inspection.
- Riprap surrounds the entire upstream nose of the pier footer and extends outward along the river bottom towards the finish abutment from the edge of the pier footer approximately 8'.
- No undermining of the pier footing was found along the entire pier perimeter.
- There is a submerged 10" diameter tree wedged against the upstream nose of the pier.
- There is a group of submerged timber debris (6" or less) along the left side (northwest) face of the pier.
- There is a submerged 5' long cut stone in the riverbed along the left side of the start (northwest) abutment.

Channel

- The channel alignment is from the upstream side towards the start abutment and towards the finish face of Pier #1. It approaches at approximately a 45-degree angle. This can be seen on Photo #6.
- There was approximately a 3-knot current at the time of inspection.
- The bottom composition on the start side of Pier #1 consisted of sand, silt and mud along the entire length of the pier.
- The bottom composition on the finish side of Pier #1 consisted of large diameter riprap and hard clay along the entire length of the pier. The soundings were deeper on the finish side of the pier showing localized scour at the finish left end.

DEFECTS & DEFICIENCIES

Start (West) Abutment

- The exposed concrete surfaces have up to 1/2" deep scaling throughout. Scaling was worst at the water line.
- There is a 1.5' wide area of spalling and delamination of the concrete below an overhead drainpipe all the way to the mudline. This defect was up to 4" deep. No exposed rebar was noted. (See Photo 3).

Finish (East) Abutment

- The finish right wingwall (southeast) had a large, 3/8" wide crack through the sandstone facing from below the mudline up to the top of the wing wall (see Photo 6).

Pier

- The exposed concrete surfaces have up to 1/2" deep scaling throughout. Scaling was worst at the water line.
- The top surface of the footer is exposed along the entire finish (east) face of the Pier. This footing is also exposed approximately one foot vertically along the side of the



footing along this entire length.

- The top surface of the footer in this nose area was below water and completely exposed.
- Up to 2.0' of the footing face was exposed at the finish left (downstream) end of the pier with small amounts of riprap present. The soundings verify that this is the deepest scour area around the pier footer although no undermining was found.
- Along the start right side of the Pier, for a distance of approximately 15', the top surface of the footer was exposed. Less than a foot (0.7') of the footing surface was exposed vertically along this same area. The remaining length of footing on this side is covered with sand, silt and mud.
- The sandstone facing on the Pier stopped approximately 1.5' above the footing. Mounting hardware for the facing was present on both the Start and Finish sides of the Pier where the missing masonry was.

COMPARISION TO PREVIOUS REPORTING

The length of footer top exposed has increased from the previous underwater inspection dated 10/11/05. This 2006 inspection found exposed footer along the entire finish face of the pier, on both upstream and downstream noses and for 15' along the start right face of the pier. The remaining length of footer on this face is covered with sand, silt and mud.

The maximum amount of vertical footer face exposed has moved locations and decreased slightly. The 2005 inspection report states, "Maximum vertical exposure of 2.5' is located at the south east face app. 15' from the south nose..." The 2006 inspection found the maximum vertical exposure of 2.0' to be located at the finish left (northeast) end of the pier. No footer undermining was found.

A comparison of the current soundings with the previous soundings indicates some changes in the stream channel at different locations. The differences in these locations, of up to 2 feet, are possibly the result of shifting riprap and/or debris rather than scouring of the stream bottom. Monitoring a trend in these soundings at consistent locations on the sounding grid will be helpful in supporting this conclusion.





Photo by M. Suchan, 10/24/06

Photo 1 - Facing North. View of South Elevation of Bridge.



Photo by M. Suchan, 10/24/06

Photo 2 - Facing East. View of start side face (western face) of Pier.



Photo by M. Suchan, 10/24/06

*Photo 3 - Facing West. View of Start (west) Abutment.
Note large spalled area below drain.*



Photo by M. Suchan, 10/24/06

Photo 4 - Facing East. View of Finish (east) Abutment.



Photo by M. Suchan, 10/24/06

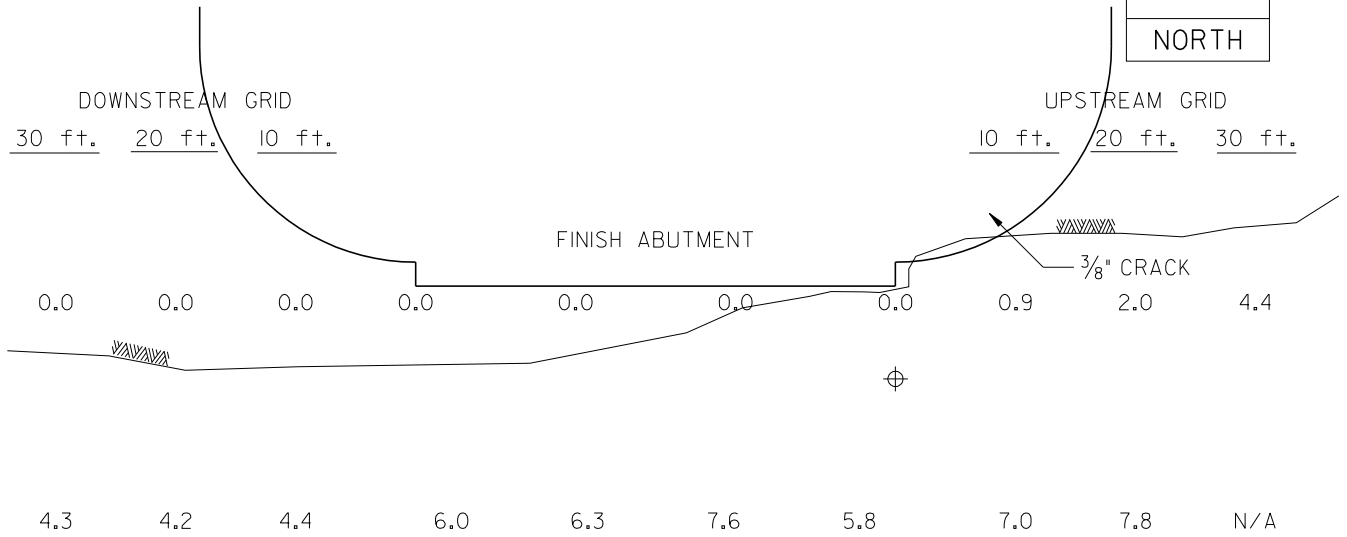
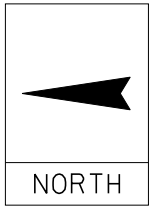
*Photo 5 - Facing North and looking downstream.
View of center pier and pier nose.*



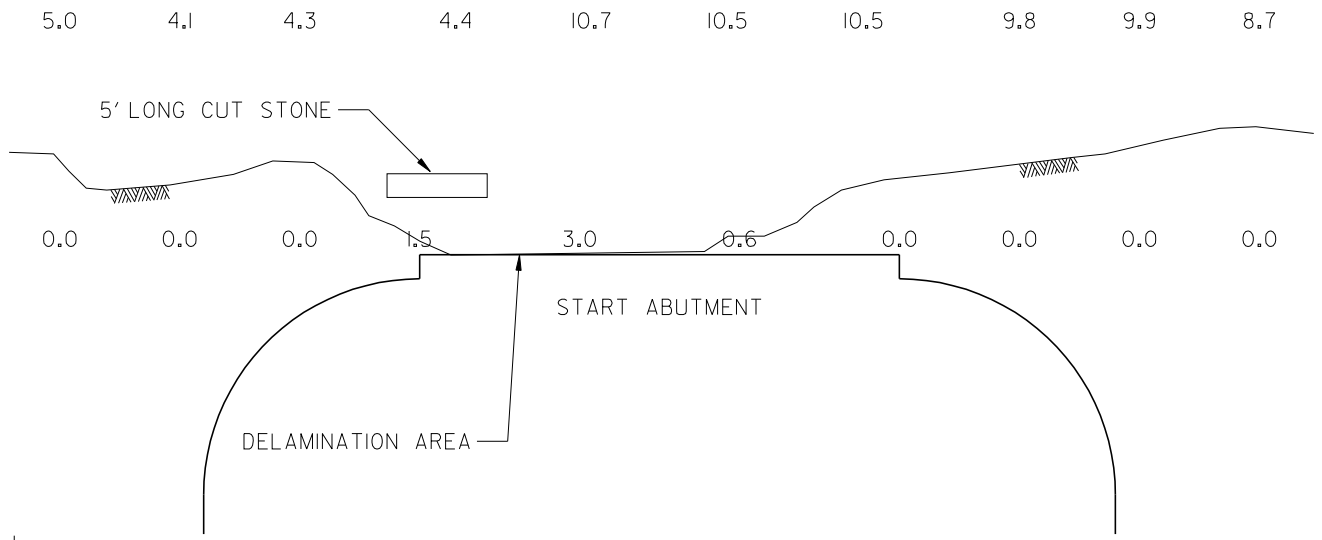
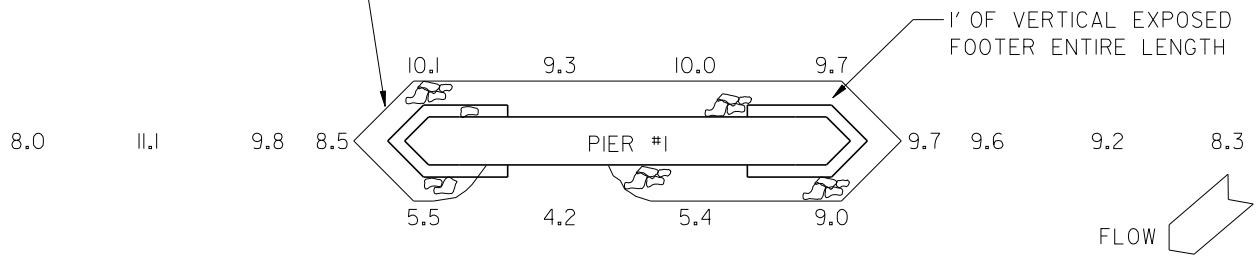
Photo by M. Suchan, 10/24/06

*Photo 6 - Facing East and looking upstream. View of Finish Right
(southeast)Wingwall. Note full height crack (3/8" wide).*

SOUNDINGS



RIPRAP ALONG ENTIRE FINISH (EAST) SIDE OF EXPOSED FOOTER



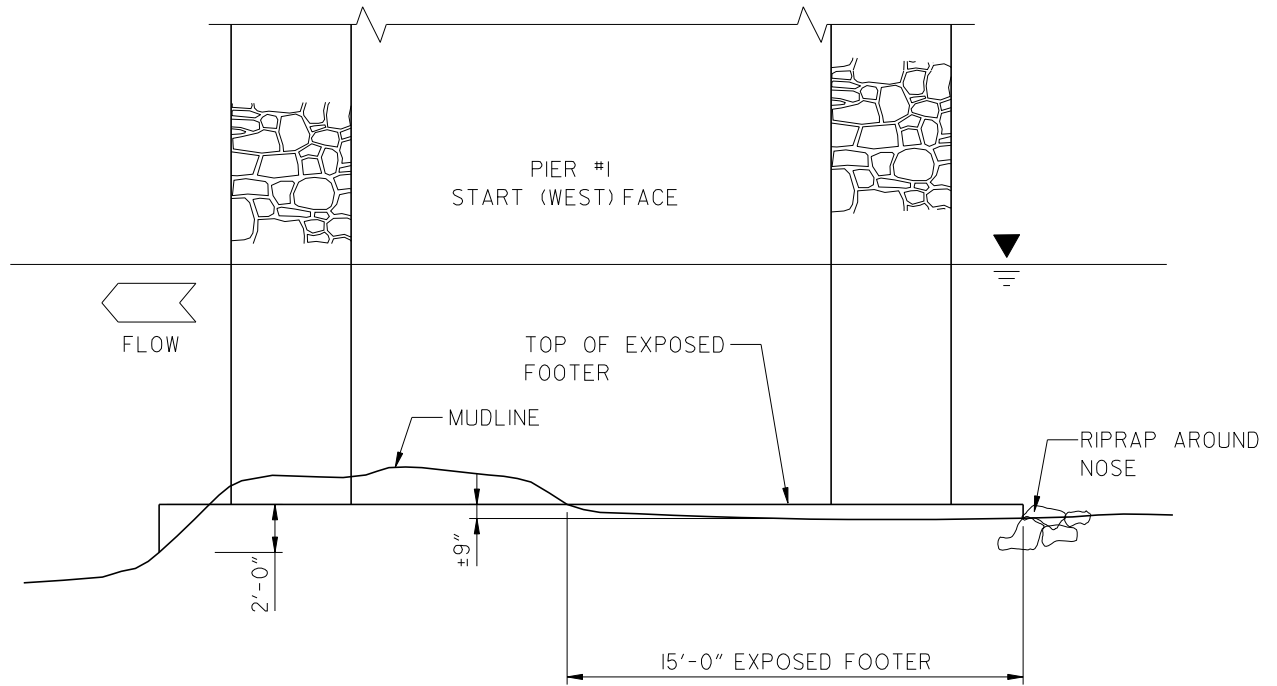
⊕ HYDROGRAPHIC REFERENCE POINT FROM BOTTOM OF CROSS BEAM

REFERENCE TO WATER SURFACE = 14.2'

NOTES:
ALL SOUNDING ARE GIVEN IN TENTHS OF FEET.

DRAWING NOT TO SCALE.

KCI Associates of Ohio
Date Of Inspection: Oct. 24, 2006
Bridge No.: CUY-322-1534 (SFN: 1812246)
US ROUTE 322 OVER CHAGRIN RIVER, GATES MILLS



NOTE:
DRAWING NOT TO SCALE.

KCI Associates of Ohio
Date Of Inspection: Oct. 24, 2006
Bridge No.: CUY-322-1534 (SFN: 1812246)
US ROUTE 322 OVER CHAGRIN RIVER, GATES MILLS



1812246 P5 12_6_05 finish abut missing stone facing.jpg



1812246 P6 12_6_05 crack in start left wing wall.jpg