



# CITY of NOVI CITY COUNCIL

Agenda Item F  
June 7, 2010

**SUBJECT:** Adoption of a Resolution seeking participation in the Michigan Department of Transportation (MDOT) Local Bridge Program for a grant application for the rehabilitation of the Cranbrooke Drive Bridge over Ingersol Creek.

**SUBMITTING DEPARTMENT:** Department of Public Services, Engineering Division *BL*

**CITY MANAGER APPROVAL:** *[Signature]*

EXPENDITURE REQUIRED	\$ 12,400
AMOUNT BUDGETED	\$248,000 (Included in approved FY10-11 budget)
LINE ITEM NUMBER	204-204.00-865.942

### BACKGROUND INFORMATION:

The Cranbrooke Drive bridge over Ingersol Creek (f/k/a as Courter Ditch) was inspected in November 2008 as required every two years by the state (see report dated November 19, 2008, attached). The inspection revealed that the bridge is in fair to poor condition and requires some rehabilitative maintenance work. The rehabilitation would include:

- Repair all delaminated/spalled concrete at each abutment;
- Replace damaged bearings;
- Repair beam ends; and,
- Repair slope paving and stabilize the area with rip rap to prevent future scouring.

It is important to note that the bridge is functional and is not in a condition that requires a closure or presents an immediate hazard to the public.

Engineering staff has prepared and submitted the enclosed application for funding under MDOT's 2010 Local Bridge Program. The total amount requested for the project is \$248,000 which includes \$205,000 for rehabilitative work and \$43,000 for engineering costs. A resolution from City Council is required as part of the application package. Selected projects will receive 95% funding with a local match of 5% for the 2013 fiscal year; however, there is an option to advance construct the project with City funds now and receive reimbursement later. If awarded the grant, the City would save \$235,600 (\$248,000 less a local match of \$12,400).

The project is included in the approved FY2010-11 Capital Improvement Program. The budgeted funds could be used to advance construct the project (with reimbursement in 2013) if a grant is awarded, or to complete the rehabilitation of the bridge if the City does not receive Local Bridge Program funding.

**RECOMMENDED ACTION:** Adoption of a Resolution seeking participation in the Michigan Department of Transportation (MDOT) Local Bridge Program for a grant application for the rehabilitation of the Cranbrooke Drive Bridge over Ingersol Creek.

	1	2	Y	N
Mayor Landry				
Mayor Pro Tem Gatt				
Council Member Crawford				
Council Member Fischer				

	1	2	Y	N
Council Member Margolis				
Council Member Mutch				
Council Member Staudt				



**RESOLUTION**

**WHEREAS,** the Mayor and the City Council of the City of Novi are required under provisions of the Local Bridge Program to review, approve, and state that they are actively seeking participation in certain bridge rehabilitation projects; and,

**WHEREAS,** the staff of the City of Novi has reviewed the bridge system in Novi and found that there is a need for the rehabilitation of the Cranbrooke Drive bridge intersecting the Courter Ditch (Ingersol Creek) to enhance traffic safety and improve the bridge's structural capacity; and,

**WHEREAS,** the available funds are insufficient to fund the bridge project submitted while still maintaining and upgrading the remainder of the road system.

**NOW, THEREFORE, BE IT RESOLVED** that the Mayor and Novi City Council hereby seek participation in the Local Bridge Program for the following project and affirm a commitment to provide local funds in the amount of a 5% match in the event the project receives Federal and State funding.

<u>Bridge and Location</u>	<u>Estimated Total Construction/Design Cost</u>
Cranbrooke Drive over the Courter Ditch (Ingersol Creek)	\$248,000

**CERTIFICATION**

I, Maryanne Cornelius, duly appointed City Clerk of the City of Novi; do hereby certify that the foregoing is a true and complete copy of a Resolution adopted by the City Council of the City of Novi at a Regular meeting held this 7th day of June, 2010.

\_\_\_\_\_  
Maryanne Cornelius  
City Clerk

**CITY COUNCIL**

**Mayor**  
David B. Landry

**Mayor Pro Tem**  
Bob Gatt

Terry K. Margolis

Andrew Mulch

Kathy Crawford

Dave Staudt

Justin Fischer

**City Manager**  
Clay J. Pearson

**Director of Public Services/  
City Engineer**  
Rob Hayes

Department of Public Services  
Field Services Complex  
26300 Delwal Drive  
Novi, Michigan 48375  
248.735.5640  
248.735.5659 fax

## 2010 Local Bridge Program Application



**Deadline:** June 1, 2010

**Applicant:** City of Novi  
45175 W. Ten Mile Road  
Novi, MI 48375

**Contact:** Brian T. Coburn, P.E., Senior Civil Engineer  
Phone: (248) 735-5632  
[bcoburn@cityofnovi.org](mailto:bcoburn@cityofnovi.org)

\*\*\*The resolution from our City Council has been placed on the June 7, 2010 City Council Agenda. The resolution shall be submitted no later than June 14, 2010.

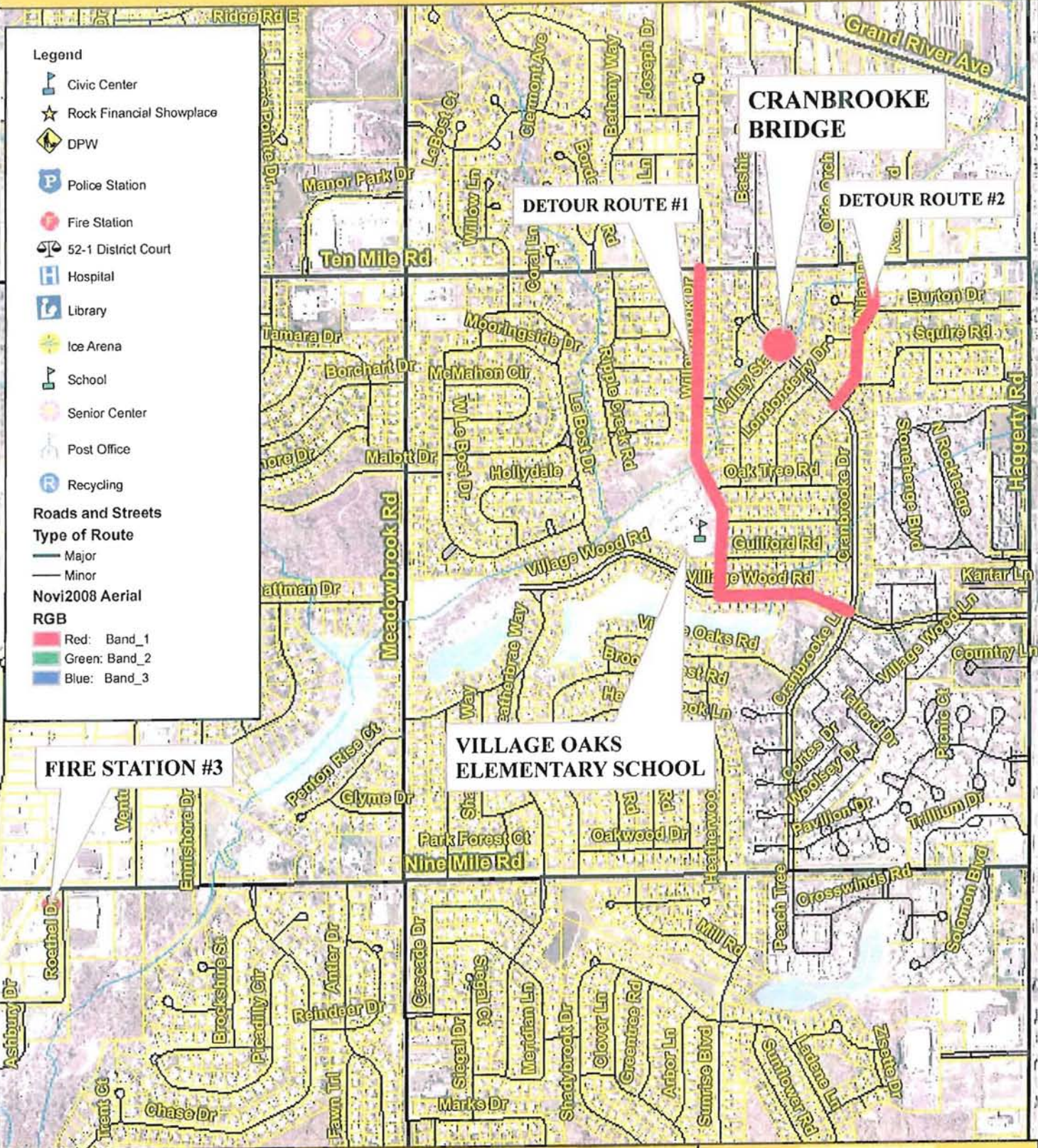


## **Index**

- Map of Area (including emergency facilities, schools and detour routes)
- Application Request
- Economic Importance
- Detour Affect
- Cost
- Williams and Works Inspection Report Summary
- Williams and Works Recommendation
- MDOT Bridge Safety Inspection Report
- MDOT Structural Inventory and Appraisal
- MDOT Bridge Inspection Report
- MDOT Level One Scour Analysis Worksheet
- Photographs



# CITY OF NOVI CRANBROOKE BRIDGE



**Legend**

- Civic Center
- Rock Financial Showplace
- DPW
- Police Station
- Fire Station
- 52-1 District Court
- Hospital
- Library
- Ice Arena
- School
- Senior Center
- Post Office
- Recycling

**Roads and Streets**

**Type of Route**

- Major
- Minor

**Novi2008 Aerial**

**RGB**

- Red: Band\_1
- Green: Band\_2
- Blue: Band\_3

**FIRE STATION #3**

**VILLAGE OAKS ELEMENTARY SCHOOL**



## **Application Request**

The City of Novi is submitting this application for rehabilitation of the bridge on Cranbrooke Drive spanning over the Courter Ditch. An inspection was completed by Williams & Works on behalf of the City of Novi in November of 2008. The inspection report concluded that the the structure is in fair to poor condition. The report stated that the joints between beams are leaking, there are several spalled areas including exposed reinforcement along the top flanges of beams, heavily corroded bearing plates, there is cracking at the bottom of concrete beams near the bearings, heavy water leaking from the backwall and undermined slope protection caused by scour among other issues stated in the inspection report. The rehabilitation would include:

- Repairing all delaminated/spalled concrete at each abutment
- Replaced damaged bearings
- Repairing beam ends
- Repairing the current slope protection and stabilizing the area with rip rap in order to prevent future scour

The Federal Sufficiency Rating Points rated the Cranbrooke Drive bridge structurally deficient with a 69.7 rating.

## **Economic Importance**

Cranbrooke Drive is a residential collector that carries traffic to nearby arterials. Haggerty Road is located east of , and parallel to Cranbrooke Drive and is a heavily traveled corridor. Cranbrooke alleviates the neighborhood traffic from the Haggerty Road corridor.

## **Detour Effect**

If the structure is closed, the detour would have an effect many adjacent residential roads. Cranbrooke Drive is a residential collector road linking Nine Mile Road to Ten Mile Road through densely populated subdivisions of Heathergreen, Fairfield Farms, Lakewood Park Homes and other adjacent subdivisions. The detour would inconveniently reroute many residents, especially those living on Cranbrooke Drive, through lower volume residential streets. A detour would also negatively impact bus routes as there is an elementary school nearby.

### Cost

1) Right-of-Way	(1) \$0
2) Design Engineering	(2) \$25,000
3) Construction Engineering	(3) \$18,000
<b>TOTAL (1,2 &amp; 3)</b>	<b>\$43,000</b>
A. Approach Construction	(A) \$0
B. Structure Construction	(B) \$205,000
<b>TOTAL (A &amp; B)</b>	<b>\$205,000</b>

All above costs include a 15% contingency in addition to what is shown on the Cost Estimate sheet (next page).

### Priority List

- 1) Bridge on Cranbrooke Drive spanning the Courter Ditch

### Resolution

As stated on the cover sheet, the resolution from our City Council has been placed on the June 7, 2010 City Council Agenda. The resolution shall be submitted no later than June 14, 2010.



**Cost Estimate for Design & Reconstruction of the Cranbrooke Drive Bridge over Courtier Ditch**

<u>Structure Repair</u>	<u>Quantity</u>	<u>Unit</u>	<u>Unit Price</u>	<u>Cost</u>
Removal/Replacement of Existing Landscaping in Median (across bridge)	1	LS	\$10,000.00	\$10,000.00
Preformed Waterproofing Membrane	720	Sft	\$3.00	\$2,160.00
Hot Poured Joint Sealer for Deck Joints	256	Ft	\$15.00	\$3,840.00
Excavation	80	Cyd	\$10.00	\$800.00
Structure Backfill	80	Cyd	\$13.00	\$1,040.00
Joint Waterproofing	240	Sft	\$5.00	\$1,200.00
Hand Chipping, Other Than Deck	148	Cft	\$40.00	\$5,920.00
Patch, Forming	295	Sft	\$25.00	\$7,375.00
Patching Conc, C-L	6	Cyd	\$1,000.00	\$6,000.00
Adhesive Anchoring of Reinforcing Bars	30	Ea	\$20.00	\$600.00
Epoxy Coated Steel Reinforcement	3230	Lb	\$1.50	\$4,845.00
Hand Chipping for Beam End Repairs	396	Sft	\$150.00	\$59,400.00
Patching Concrete for Beam End Repairs	13	Cyd	\$1,200.00	\$15,600.00
Forming of Beam End Repair Patches	396	Sft	\$40.00	\$15,840.00
Elastomeric Bearing Pad, 1 inch	35	Sft	\$35.00	\$1,225.00
Slope Protection Repair	1	LS	\$10,000.00	\$10,000.00
Riprap, Heavy	181	Syd	\$50.00	\$9,050.00
Erosion Control Measures	1	LS	\$3,000.00	\$3,000.00
Embankment, CIP	20	Cyd	\$8.00	\$160.00
Subbase, CIP	52	Cyd	\$8.00	\$416.00
Aggregate Base, Modified 6 inch	156	Syd	\$7.50	\$1,170.00
Approach Pavement - Non-Reinf Concrete	156	Syd	\$55.00	\$8,580.00
Turf Establishment - Seed	150	Syd	\$5.00	\$750.00
			Structure Subtotal:	<u>\$168,971.00</u>
Design & Construction Engineering Costs (18%)			Total Engineering Cost:	<u>\$30,414.78</u>
Contingency (20%)	1	LS	\$33,794.20	<u>\$33,794.00</u>
			Total Cost:	<u>\$233,200.00</u>

# Williams & Works

engineers . planners . surveyors *a tradition of service*

November 19, 2008

Mr. William McCusker  
DPW Director  
City of Novi  
26300 Delwal Street  
Novi MI 48375

Re: 2008 Bi-Annual Bridge Inspections-  
Cranbrooke Drive over Courter Ditch

Dear Mr. McCusker:

We have completed our bi-annual inspection of the Cranbrooke Drive structure over Courter Ditch. The enclosed inspection report includes the following items:

- Structure Inventory and Appraisal 1717A form
- Bridge Safety Inspection Report P2502 form
- Level 1 Scour Analysis
- Recommended solutions for identified problems (if any)
- Recommendations for preventative maintenance items (if any)
- Photographs.

In general the structure is in fair to poor condition. The joints between the beams are leaking, with efflorescence present, there are several spalled areas and exposed reinforcement along the top flange of the beams. This is worst at the center joint below the landscaped median of Cranbrook Drive. The toe of the west sidewalk is spalled with exposed reinforcement along nearly the entire length of the walk. The bearing plates are heavily corroded with pack rust evident at the sole plates and the elastomeric pads are cracked and bulging. The bottom of the concrete beams at each bearing is cracked approximately 1" above the bottom of the beam. This deteriorated area extends 6" to 1 ft from the the sole plate of the beam and was observed at each beam end at each abutment. Although no rebar was exposed, it is evident that the concrete bond with the reinforcing bars has been broken.

The abutment seat is delaminated and spalled at several locations along the north abutment. Evidence of heavy water leakage from the backwall is evident along the entire face of both abutments with rust staining and efflorescence present. The existing slope protection has been undermined by scour and has settled and cracked.

# Williams & Works

engineers . planners . surveyors *a tradition of service*

In order to correct these problems, the following is recommended:

- Repair all delaminated/spalled concrete at each abutment
- Replace the bearings
- Repair the beam ends
- Repair the existing slope protection and place additional riprap below the bridge to prevent further scour.

One option for repairing the beam ends and bearings is to fully encase the beam ends in concrete.

Recommended preventative maintenance items include:

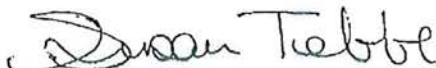
- Seal deck joints. This includes removing the landscaping in the median over the bridge and placing waterproofing on the bridge deck.

No plans detailing the foundation type of the existing bridge are available. For this reason, the SI&A Item 113 - Scour Criticality, has been updated to a code of "U" for unknown foundation type. For this reason, a Level 2 Scour analysis is recommended.

If you should have any questions or require additional information please don't hesitate to call. We appreciate the opportunity to be of service to you and look forward to working with you in the future.

Respectfully submitted,

Williams & Works, Inc.

  
Susan R. Tebbe, P.E.

Encl.



Facility	Federal Structure ID	Inspector Name	Agency/Consultant	Inspection Date	Legend			
CRANBROOKE DRIVE	635489000049B01	Susan Tebbe	Williams & Works	11/11/2008	9 New			
Feature	Latitude	Longitude	Struc Num	Insp Freq	Insp Key	7-8 Good		
COURTIER DITCH	42 27' 56.66"	83 26' 34.12"	8248	24	QZSV	5-6 Fair		
Location	Length	Width	Year Built	Year Recon	Br Type	Scour Eval	No.Pins	3-4 Poor
0.1 MI S OF TEN MILE RD	42	73.82	1974		5	04 U		2 or Less Critical
		04 06 08	NBI INSPECTION					

DECK

- |                                |   |   |   |   |
|--------------------------------|---|---|---|---|
| 1. Surface SIA-58A             | 8 | 8 | 7 | Several transverse cracks in concrete surface in northbound lanes. Bituminous patch at longitudinal joint in southbound lanes. Landscaping across bridge in median. ( 08)<br>Concrete pavement is in good condition. ( 06)<br>( 04)   |
| 2. Expansion Jts               | 7 |   | N | ( 08)<br>( 06)<br>( 04)   |
| 3. Other Joints                |   |   |   | ( 08)<br>( 06)<br>( 04)   |
| 4. Railings                    | 6 | 6 | 5 | Concrete posts steel rails/pedestrian fencing. The last post of the pedestrian railing is damaged, with spalled concrete and exposed/bent reinforcing bars, in the NE quad. Posts and fence on bridge are in fair condition - no spalls to concrete or section loss in railing observed. ( 08)<br>The last post of the pedestrian railing is damaged in the NE quadrant. Fence and post on bridge are in good condition. ( 06)<br>( 04) |
| 5. Sidewalks or curbs          | 7 | 7 | 6 | The west sidewalk along the curb line is spalled and the rebar is visible. Ends of the rebar are visible along the curb line of the east sidewalk. ( 08)<br>The west sidewalk along the curb line is spalled and the rebar is visible. Ends of the rebar are visible along the curb line of the east sidewalk. ( 06)<br>( 04)   |
| 6. Deck Bottom Surface SIA-58B |   |   |   | ( 08)<br>( 06)<br>( 04)   |
| 7. Deck SIA-58                 | 6 | 6 | 6 | Joints between beams show heavy leaking, efflorescence, and minor spalling. No exposed rebar observed. Bottom of concrete deck slabs not visible. ( 08)<br>( 06)<br>small pieces of the deck or the stringers have broke off and are allowing dirt to come through in the grassy median onto the slope paving ( 04)   |
| 8. Drainage                    |   |   |   | Toe of sidewalk is not cast on the bridge deck. Water allowed to drain from bridge from edge of roadway at the toe of sidewalk. No evidence of ponding on the bridge deck. ( 08)<br>( 06)<br>( 04)  |

SUPERSTRUCTURE

- |                          |   |   |   |  |
|--------------------------|---|---|---|--|
| 9. Superstructure SIA-59 | 6 | 6 | 5 | Longitudinal cracks in the east fascia beam under the roadway. Top flange of this beam spalled and wet along 1/2 of the span length. Leaching and spalling between the beams observed. All beam ends are rust stained at bearings. The concrete at the bottom of the beam is cracked/spalled 1" deep x 6" to 1ft long at the bearings - typical for all beam ends at both abutments. ( 08)<br>Longitudinal cracks in the east fascia beam under the roadway. Leaching and spalling between the beams. ( 06)<br>( 04) |
| 10. Paint SIA-59A        | N | N | N | ( 08)<br>( 06)<br>( 04)  |

Facility	Federal Structure ID	Inspector Name	Agency/Consultant	Inspection Date	Legend				
CRANBROOKE DRIVE	635489000049B01	Susan Tebbe	Williams & Works	11/11/2008	9 New				
Feature	Latitude	Longitude	Struc Num	Insp Freq	Insp Key	7-8 Good			
COURTER DITCH	42 27' 56.66"	83 26' 34.12"	0248	24	QZSV	5-6 Fair			
Location	Length	Width	Year Built	Year Recon	Br Type	Scour Eval	No.Pins	3-4 Poor	2 or Less Critical
0.1 MI S OF TEN MILE RD	42	73.82	1974		5 5	U			

04  06  08

NBI INSPECTION

11. Section Loss (08)  
(06)  
(04)
12. Bearings 6 6 4 All steel plates are heavily corroded with some pack rust present. The elastomer is bulging and cracked. The sole plates cast into the beams are also heavily corroded, some with extensive pack rust. Anchor bolts are heavily corroded. (08)  
The elastomer is bulging and cracked. Steel plates are corroded. (06)  
bearing plates where the box beams rest are rusting and flaking off (04)

SUBSTRUCTURE

13. Abutments SIA-60 7 6 4 North abutment seat spalled and delaminated at beams 4E thru 8E and 4W thru 6W. The spalled/delaminated areas extend under the bearings (5-10% of bearing area). The abutment walls are rust stained and efflorescence is present along the entire length of both abutments. 2' x 8" spall at the top of the south abutment. Rebar visible at several of the spalled areas. (08)  
Vertical cracks at the road drainage opening locations in all four quadrants. 2' x 6" spall at the top of the south abutment. Several horizontal leaching cracks 2'-3' long at the top of the abutment. Rebar visible in a few locations. (06)  
(04)

14. Piers SIA-60 N N N (08)  
(06)  
(04)

15. Slope Protection 5 5 5 Slope paving has been severely undermined and has settled and cracked. There is no toe header for the concrete slope paving. Animals have dug between the slope paving and abutment wall at the north abutment. (08)  
Slope paving has been severely undermined and has settled, but few cracks. Animals have dug between the slope paving and abutment wall. (06)  
the slope paving is sliding into the channel, there is no toe header at the slope paving and the channel (04)

APPROACH

16. Approach Pavt 7 6 6 The approach pavement has settled 1/2" +/- in all quadrants. The concrete approach pavement has a few small areas of bituminous patching at the longitudinal joints. Few transverse cracks observed in the northbound lanes. (08)  
Has settled 1/2" +/- in all quadrants. (06)  
(04)

17. Approach Shldr Swalks 7 There are no approach sidewalks present. (08)  
There are no sidewalks present. (06)  
(04)

18. Approach Slopes (08)  
(06)  
(04)

19. Utilities No utilities attached to the bridge. (08)  
There is a cable that was draped from one wingwall to the other on the west side of the bridge. It appears to be a cable TV line that was not installed properly. (06)  
(04)

20. Channel SIA-61 4 5 5 The channel is clear of debris, the banks are in fair condition with slight erosion of the channel bank. The slope paving beneath the bridge is undermined. (08)  
The channel is clear of debris, the banks are in good condition and there are no signs of scour. The slope paving is in fair condition (see comments above). (06)  
(04)

Facility	Federal Structure ID	Inspector Name	Agency/Consultant	Inspection Date	Legend				
CRANBROOKE DRIVE	635489000049B01	Susan Tebbe	Williams & Works	11/11/2008	9 New				
Feature	Latitude	Longitude	Struc Num	Insp Freq	Insp Key	7-8 Good			
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0.1 MI S OF TEN MILE RD	42	73.82	1974		5	5	U		
		04 06 08		NBI INSPECTION					

21. Drainage (08)  
Culverts (06)  
(04)

Guard Rail	Crit Feat Insp(SIA-92)	71 Watr Adeq	8	General Notes
36A 0	Freq Date	72 Appr Align	8	
36B 0	92A Frac Crit	Temp Supp		
36C 0	92B Und. Watr	Hi Ld Hit (M)		
36D 0	92C Spl.Insp	Special Insp Equip.		
	Fatg Sntv.Insp	0	-	



MDOT Bridge ID

6348905 0004900B01

Control Section

6348905 0..

NBI Bridge ID

Struct Num

Region

TSC

County

City Resp

City Location

7- Facility Carried

635489000049B01 8248 07 7B 63 4890 4890 CRANBROOKE DRIV..

6- Feature Intersected

9- Location

Latitude

Longitude

Owner

Maint Resp

COURTER DITCH 0.1 MI S OF TEN MILE RD 42 27' 56.66" 83 26' 34.12" 4 4

Bridge History, Type, Materials

27 - Year Built	1974
106 - Year Reconstructed	
202 - Year Painted	
203 - Year Overlay	
43 - Main Span Bridge Type	5 104
44 - Appr Span Bridge Type	
77 - Steel Type	0
78 - Paint Type	0
79 - Rail Type	1
80 - Post Type	0
107 - Deck Type	2
108A - Wearing Surface	9
108B - Membrane	8
108C - Deck Protection	0

Structure Dimensions

34 - Skew	0
35 - Struct Flared	0
45 - Num Main Spans	1
46 - Num Apprs Spans	0
48 - Max Span Length	38.7
49 - Structure Length	42
50A - Width Left Curb/SW	5.91
50B - Width Right Curb/SW	5.91
33 - Median	2
51 - Width Curb to Curb	62.0
52 - Width Out to Out	73.82
112 - NBIS Length	Y

Inspection Data

90 - Inspection Date	11/11/2008
91 - Inspection Freq	24
92A - Frac Crit Req/Freq	N
93A - Frac Crit Insp Date	
92B - Und Water Req/Freq	N
93B - Und Water Insp Date	
92C - Oth Spec Insp Req/F..	N
93C - Oth Spec Insp Date	
176A - Und Water Insp Mel..	
58 - Deck Rating	6
58A - Deck Surface Rtg	7
59 - Superstructure Rating	5
59A - Paint Rating	N
60 - Substructure Rating	4
61 - Channel Rating	5
62 - Culvert Rating	N

Navigation Data

38 - Navigation Control	0
39 - Vertical Clearance	0
40 - Horizontal Clearance	0
111 - Pier Protection	
116 - Lift Brdg Vert Clear	

Route Carried By Structure(ON Record)

5A - Record Type	1
5B - Route Signing	5
5C - Level of Service	0
5D - Route Number	00000
5E - Direction Suffix	0
10L - Best 3m Unclr-Lt	99 99
10R - Best 3m Unclr- Rt	99 99
PR Number	
Control Section	0
11- Mile Point	0.0
12- Base Highway Network	0
13- LRS Route-Subroute	000.. -
19- Detour Length	2
20- Toll Facility	3
26- Functional Class	19
28A - Lanes On	2
29 - ADT	1300
30 - Year of ADT	1992
32- Appr Roadway Width	40.0
32A/B - Ap Pvt Type/Width	6 40.0
42A- Service Type On	5
47L - Left Horizontal Clear	19.7
47R- Right Horizontal Clear	19.4
53- Min Vert Clr Ov Deck	99 99
100- STRAHNET	0
102 - Traffic Direct	2
109 - Truck %	2
110 - Truck Network	0
114 - Future ADT	1600
115 - Year Future ADT	2012
Freeway	0

Structure Appraisal

36A- Bridge Railing	0
36B-Rail Transition	0
36C- Approach Rail	0
36D- Rail Termination	0
67- Structure Evaluation	6
68- Deck Geometry	
69- Underclearance	
71- Waterway Adequacy	8
72- Approach Alignment	8
103- Temporary Structure	
113- Scour Criticality	U

Miscellaneous

37- Historical Significance	4
98A- Border Bridge State	
98B- Border Bridge %	
101- Parallel Structure	N
EPA ID	
Stay in Place Forms	

Route Under Structure(UNDER Record)

5A - Record Type	
5B - Route Signing	
5C - Level of Service	
5D - Route Number	
5E - Direction Suffix	
10L - Best 3m Unclr-Lt	
10R- Best 3m Unclr- Rt	
PR Number	
Control Section	
11- Mile Point	
12- Base Highway Network	
13- LRS Route-Subroute	
19- Detour Length	
20- Toll Facility	
26- Functional Class	
28A - Lanes Under	
29 - ADT	
30 - Year of ADT	
42B- Service Type Under	5
47L - Left Horizontal Clear	
47R- Right Horizontal Clear	
54A - Left Feature	N
54B- Left Underclearance	99 99
54C- Right Feature	N
54D- Right Underclearance	99 99
Under Clearance Year	
55A - Reference Feature	N
55B- Right Horiz Clearance	327.8
56- Left Horiz Clearance	0
100- STRAHNET	
102 - Traffic Direct	
109 - Truck %	
110 - Truck Network	
114 - Future ADT	
115 - Year Future ADT	
Freeway	

Proposed Improvements

75 - Type of Work	
76- Length of Improvement	
94- Bridge Cost	
95- Roadway Cost	
96- Total Cost	
97- Year of Cost Estimate	

Load Rating and Posting

31- Design Load	6
41- Open, Posted, Closed	A
63- Oper Rtg Method	2
64F- Fed Rtg Method	32.7
64M- Mich Oper Rtg	9 77
65- Inv Rtg Method	2
66- Inventory Load	32.7
70- Posting	5
141- Posted Loading	
195- Analysis ID	
193- Overload Class	

Facility	Federal Structure ID	Inspector Name	Agency/Consultant	Inspection Date			
CRANBROOKE DRIVE	635489000049B01	Susan Tebbe	Williams & Works	11/11/2008			
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Location	Length	Width	Year Built	Year Recon	Br Type	Scour Eval	No.Pins
0.1 MI S OF TEN MILE RD	42	73.82	1974		5	5	U

THERE ARE NO CoRe ELEMENTS FOR THIS STRUCTURE

**WORK RECOMMENDATIONS**

CREW RECOMMENDATIONS			CONTRACT RECOMMENDATIONS		
Deck Patching			Bridge Replacement		
Approach Pavement	L	Seal approach pavement joints.	Superstructure Replacement		
Joint Repair	H	Seal joints on bridge deck. Remove landscaping in median and place waterproofing on bridge deck.	Deck Replacement		
Railing Repair			Overlay		
Detailed Insp			Widen		
Zone Paint			Paint		
Substr. Repair			Zone Paint		
Slope Repair	H	Repair existing slope paving and add additional riprap.	Pin and Hanger		
Brush Cut			Substructure Repair	M	Repair spalled and delaminated concrete on both abutments.
Other Crew Work			Other Contract Work	H	Bearing replacement and beam end repair.

MICHIGAN DEPARTMENT OF TRANSPORTATION  
LEVEL ONE SCOUR ANALYSIS WORKSHEET

Date: 11/12/08 By: Williams & Works Structure No: B01 Control Section: 635489

Job No.: \_\_\_\_\_ Route: Cranbrooke Drive Watercourse: Courter Ditch

All references are to HEC-20, 3rd Edition.

**Data Collection**

- N/A Plans (None available)  
X Bridge Inspection Reports (Maintenance Division)  
N/A Underwater Inspection Reports (Maintenance Division)  
X Review existing Items 60, 61, 71, 92, 93, and 113 of the NBIS  
X Review available construction, design, and maintenance files for repair and maintenance work done on structure

**Field Investigation** Date: 11/11/08

X Channel bottom width approximately one bridge span upstream = 12 feet

X Overbank and channel Manning's roughness coefficients

0.10 Left 0.035 Channel 0.10 Right

X Is there sufficient riprap? Abutments N Piers N/A

X Photographs

X Cross sections at upstream and downstream faces of bridge

Comments:

**Stream Characteristics**

X Complete the attached Figure 2.6 from HEC-20.

Comments:

**Land Use:** Identify the existing and past land use of the upstream watershed:

Urban Area	Yes <u>X</u> No <u>   </u>	Comments: <u>City of Novi</u>
Sand and Gravel Mining	Yes <u>   </u> No <u>X</u>	Comments:
Undeveloped Land	Yes <u>   </u> No <u>X</u>	Comments: <u>Residential</u>



**Lateral Stability:** Refer to HEC-20, Section 2.3.9 on Channel Boundaries and Vegetation for channel bank stability. Comment: Banks are well established with well vegetated point bars.

**Vertical Stability:**

- streambed elevation change from as-built plans? UNKNOWN Yes \_\_\_\_\_ No \_\_\_\_\_
- exposed pier footings (degradation)? Yes \_\_\_\_\_ No X
- exposed abutment footings (degradation)? Yes \_\_\_\_\_ No X
- channel bank caving in (degradation)? Yes \_\_\_\_\_ No X
- eroding floodplain (aggradation)? Yes \_\_\_\_\_ No X
- crossing at confluence or tributaries? Yes \_\_\_\_\_ No X
- bridge sites upstream and downstream? Yes X No \_\_\_\_\_
- grade or hydraulic controls, i.e., dams, weirs, diversions? Yes \_\_\_\_\_ No X
- foundation on rock Yes \_\_\_\_\_ No X
- channel armoring potential Yes \_\_\_\_\_ No X

Comments:

**Stream Stability:** Make a qualitative assessment of the overall stream stability by referring to the above information and Figure 2.6 and Table 3.2 from HEC-20 (attach copies of figures).

Stable \_\_\_\_\_ Unstable \_\_\_\_\_ Degrading \_\_\_\_\_ Aggrading \_\_\_\_\_

Comments: The existing slope protection at the bridge has been undermined due to scour.

RECOMMENDED NBIS ITEM 113 CODE: U

LEVEL TWO ANALYSIS NEEDED: YES X NO \_\_\_\_\_

Worksheet approved by: Juan Torre P.E. License # 45698 Date 11/13/08

## Cranbrooke Dr. Over Courter Ditch


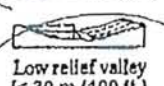


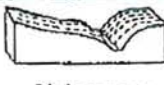
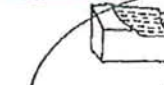
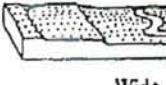
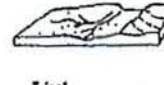







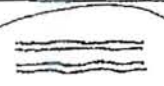



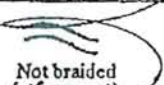
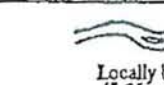
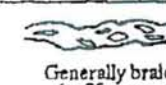
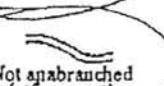

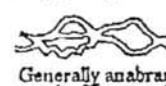


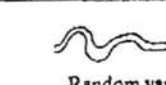
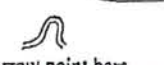
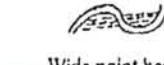
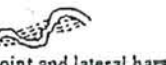
STREAM SIZE (Sect 2.3.2)	Small [< 30 m (100 ft.) wide]	Medium [30-150 m (100-500 ft.)]	Wide [> 150 m (500 ft.)]		
FLOW HABIT (Sect 2.3.3)	Ephemeral	(Intermittant)	Perennial but flashy	Perennial	
BED MATERIAL (Sect 2.3.4)	Silt-Clay	Silt	Sand	Gravel	Cobble or Boulder
VALLEY SETTING (Sect 2.3.5)	 No valley; alluvial fan	 Low relief valley [< 30 m (100 ft.) deep]	 Moderate relief [30-300 m (100-1000 ft.) deep]	 High relief [> 300 m (1000 ft.) deep]	
FLOODPLAINS (Sect 2.3.6)	 Little or none (< 2 x channel width)	 Narrow (2-10 x channel width)	 Wide (> 10 x channel width)		
NATURAL LEVEES (Sect 2.3.7)	 Little or none	 Mainly on concave	 Well developed on both banks		
APPARENT INCISION (Sect 2.3.8)	 Not Incised	 Probably Incised			
CHANNEL BOUNDARIES (Sect 2.3.9)	 Alluvial	 Semi-alluvial	 Non-alluvial		
TREE COVER ON BANKS (Sect 2.3.8)	< 50 percent of bankline	50-90 percent of bankline	> 90 percent of bankline		
SINUOSITY (Sect 2.3.10)	 Straight Sinuosity (1-1.05)	 Sinuous (1.06-1.25)	 Meandering (1.25-2.0)	 Highly Meandering (>2.0)	
BRAIDED STREAMS (Sect 2.3.11)	 Not braided (<5 percent)	 Locally braided (5-35 percent)	 Generally braided (> 35 percent)		
ANABRANCHED STREAMS (Sect 2.3.12)	 Not anabranching (<5 percent)	 Locally anabranching (5-35 percent)	 Generally anabranching (> 35 percent)		
VARIABILITY OF WIDTH AND DEVELOPMENT OF BARS (Sect 2.3.13)	 Equiwidth	 Wider at bends	 Random variation		
	 Narrow point bars	 Wide point bars	 Irregular point and lateral bars		

Figure 2.6. Geomorphic factors that affect stream stability (adapted from Brice and Blodgett).<sup>(10)</sup>

Cranbrooke Drive over Courter Ditch  
11-11-08



Cranbrooke Drive over Courter Ditch – East Fascia shown



Typical condition of deck surface – Northbound lanes shown



Cranbrooke Drive over Courter Ditch  
11-11-08



Typical Approach Pavement Condition



Courter Ditch – Looking Downstream from structure



Cranbrooke Drive over Courter Ditch  
11-11-08



Courter Ditch – Looking Upstream from structure



Toe of west sidewalk – spalled concrete, expose and corroded reinforcing steel.

Cranbrooke Drive over Courter Ditch  
11-11-08



Toe of west sidewalk and top of abutment wall – spalled concrete with exposed reinforcement.



Damaged concrete post in the northeast quadrant of the bridge.



Cranbrooke Drive over Courter Ditch  
11-11-08



Typical condition of joints between beams – Top flange is wet with efflorescence and rust staining.

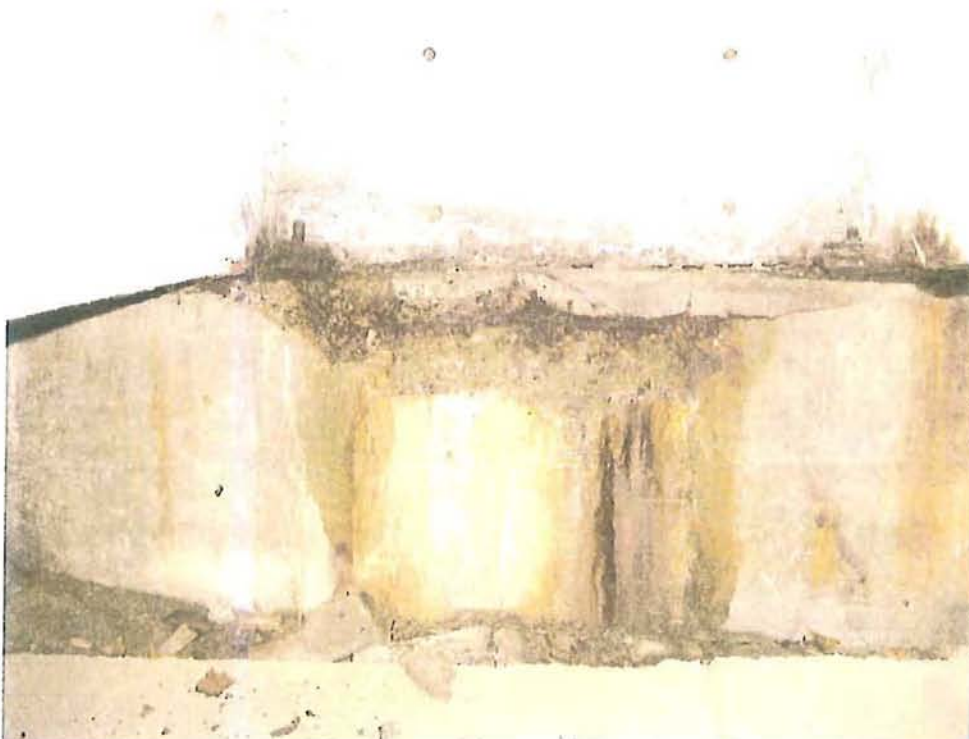


Typical condition of bearings. Bearings have heavy pack rust and section loss. Concrete at bottom of beam at bearings is cracked.

Cranbrooke Drive over Courter Ditch  
11-11-08



North Abut. Seat below beams 3W-6W wet. Beam seat is spalled between beams with exposed rebar. Spalls extend under bearing areas approx. 5%.



North Abut. Typical condition between beams 4E thru 8E. Abutment is wet, seat is spalled and rust stained.



Cranbrooke Drive over Courter Ditch  
11-11-08



North abutment and slope protection. Slope paving is undermined, settled, and cracked throughout.



South abutment and slope protection. Slope paving is undermined, settled, and cracked throughout.