

*Additional Town Comments – Erosion Threshold Analysis (f) – The assessment must confirm that the peak flows and post-development volume from Pond 32 contributing to MOC-2a will not increase the erosion potential across private lands, including the Petro Canada and Esso Gas Stations and further downstream.*

*Additional AECOM input to above – Increased erosion potential resulting from post-development outflow from Pond 32 contributing to MOC-2a may need to consider inlet/outlet/bed erosion protection of the culvert crossing Trafalgar Road at ME-T1.*

*Additional Town Comments – Stormwater Management Plan and Hydrology, Appendix A-3 (d) – Furthermore, we require confirmation that the hydrologic analysis has considered the future 50m (plus additional area for transit stops) for the Trafalgar Road right-of-way in accordance with the Trafalgar Road EA Study. Lastly, we understand that the NOCSS target flows at Dundas Street can be met assuming that post development flows from the full Trafalgar Road right-of-way are not captured or treated in Pond 32. Essentially the study proposed to over-control Pond 32 to meet peak flow rates at Dundas Street and it is this study's recommendation that no further quantity controls would be necessary within the Regions ROW.*

*Additional AECOM input to above – Please refer to AECOM comment #7 above that states that the hydrologic model currently considers the Trafalgar Road catchments to have an impervious area of 57%. The impervious area in the Trafalgar Road catchments should be estimated as 80% to reflect the widened road conditions proposed in the Region's EA and confirmation that sufficient over-control of Pond 32 can accommodate the increased flows due to the widening of Trafalgar Road.*

The April 30<sup>th</sup> EIR/FSS indicates that "All SWM ponds within the EM1 and EM4 catchment area (with the exception of Pond 29) must therefore compensate for the uncontrolled release by slightly over controlling the pond release rates beyond the accepted ME-D3 rates". The proponent should clarify the degree/quantity of over-control designed within Pond 32 and confirm that an impervious area of 80% was applied to reflect the ROW recommendations with the Trafalgar Road EA.

*Additional Town Comments – Stormwater Management Plan and Hydrology, Appendix A-3 (e) – [Regarding Pond 32] The future urbanization of Trafalgar Road will require separate water quality control.*

*Additional AECOM input to above - In the event that connection of stormwater infrastructure or overcontrol is not feasible for adjacent infrastructure (such as Pond 32), utilization of the interim superpipes and OGS units in interim (if required and pending feasibility to be determined during detailed design) could be utilized for ultimate conditions.*

*Additional Town Comments – Stormwater Management Plan and Hydrology, Appendix A-3 (f) – [Regarding Pond 32] Staff would appreciate any fine tuning of the pond outlet at detailed design in order to release the extended detention volume within 24-48 hours without compromising the capacity of culvert ME-T1, target release rates at Dundas Street and the erosion control rate.*

*Additional AECOM input to above – Increases in the expected flow rate above those required by the NOCSS and used in the design of improvements for ME-T1 recommended in the Trafalgar Road EA will exceed the capacity of the proposed culvert crossing. Consideration should also be made for the*

timing of development in the event that Pond 32 and associated development precedes the recommended improvements to ME-T1. Consideration should also be given to potential erosion protection to the inlet/outlet/bed of ME-T1 with any increased release rates.

*Additional Town Comments – SWM Facility Design Criteria (d) – The report should discuss the impact of the emergency flows, 15.20 m<sup>3</sup>/s beyond the pond block to Trafalgar Road culvert ME-T1. Table 7.4 in the December 2012 submission suggests that the capacity of culvert is 7.55 m<sup>3</sup>/s.*

*Additional AECOM input to above – The 7.55 m<sup>3</sup>/s is the flow determined for ME-T1 using rates detailed in the NOCSS and used in the design of improvements for ME-T1 as recommended in the Trafalgar Road EA. Increases in the expected flow rate above those required by the NOCSS (such as the emergency flow of 15.20 m<sup>3</sup>/s) will exceed the capacity of the proposed culvert crossing. Consideration should be made by the proponent for the conveyance of emergency flows in exceedance of upgraded watercourse infrastructure crossing Trafalgar Road.*

Additional Town Comments – SWM Facility Design Criteria (c), response within April 30<sup>th</sup>, 2014 response indicates "The emergency outlet structure is not intended to be a series of large grates, which have been designed to convey the entire emergency Regional flow of 8.5 m<sup>3</sup>/s. While there is no defined emergency spillway (the pond is bounded by roads and lots), a low point in the top of the pond was created at the southwest corner. In the event that the pond outlet AND emergency outlets are blocked, the pond will drain from this low point onto the road (rather than to the north or west, towards the proposed lots)". Flooding onto Regional Roads is noted. Flooding mitigation should be considered including the proponent to evaluate increasing the capacity of the culvert located at ME-T1 to accommodate emergency flows and mitigate flooding of Regional Roads.

**Additional comments upon review of Conservation Halton (CH) Memorandum dated March 13, 2014 are as follows:**

*CH Comment iv (f) – The flood plain model and mapping should be extended to the upstream side of Culvert ME-T5 to ensure that the regulatory flood plain is adequately mapped to the upstream end of the Dundas-Trafalgar lands and to ensure that there are no spills that may impact the Dundas-Trafalgar lands or Trafalgar Road under interim conditions.*

*Additional AECOM input to above – Potential spills over Trafalgar Road should consider sags in the road profile that may not coincide with the location of the culvert crossing.*

*CH Comment viii (a) – With respect to Green Ginger and the Region of Halton lands, we would have no objections to minor increases in flood elevations (including under Regional Storm conditions) as long as Green Ginger and the Region of Halton agree to accommodate these increases in flows and flood elevations in their future respective analysis to our satisfaction.*

*Additional AECOM input to above - It is noted that proposed watercourse crossing upgrades detailed in the Trafalgar Road EA are based on meeting requirements dictated within the NOCSS and any changes to these flows will impact the capacity of proposed water crossing infrastructure improvements recommended for Trafalgar Road. Further coordination between Halton Region and adjacent developments is required to determine and confirm improvements required for watercourse*

infrastructure crossing Trafalgar Road to ensure sufficient conveyance capacity and that design requirements are satisfied.

*CH Comment viii (a) – In the subject situation, it is our understanding that there is the potential that flood elevations may be reduced on the subject lands if the Trafalgar Road culvert south of Dundas Street is enlarged as part of the Trafalgar Road Improvements project. The timing and the culvert changes being considered are not currently known to Conservation Halton, however, the proponent may wish to coordinate with Halton Region staff to determine if reductions in upstream flood elevations as a result of culvert upgrades and the timing of the culvert upgrades may be sufficient to reduce the level of flooding on these lands in a fashion that would warrant alternative requirements/criteria to be applicable.*

*Additional AECOM input to above - The East Morrison Creek culvert crossing Trafalgar Road south of Dundas Street is smaller than ME-D2 and all proposed culverts located farther upstream. Although this crossing will be sized appropriately for ultimate development conditions as part of the Region's Trafalgar Road EA, its limiting capacity should be considered at detailed design in interim development scenario models in the event that development adjacent to Trafalgar Road precedes the proposed improvements to Trafalgar Road.*

**5. References**

AECOM (2014) Minto Communities – Dundas-Trafalgar Inc., North Oakville Environmental Implementation Report (EIR) / Functional Servicing Study (FSS) Update and Response Document (dated January 31, 2014) – Review of Channel Realignment from a Fluvial Geomorphological Perspective, Memo Issued March 11, 2014.

Conservation Halton (2014) Zoning By-Law Amendment and Plan of Subdivision: Z1312.06 & 24T-12013/1312. Minto Communities (Dundas-Trafalgar Inc) 3075 Trafalgar Road, Town of Oakville, EIR/FSS Update and Response Document, Letter to Town of Oakville dated March 13, 2014.

Stonybrook Consulting et al (2014) EIR/FSS Update and Response Document, Environmental Implementation Report / Functional Servicing Study, Dundas-Trafalgar Inc., North Oakville, submitted January 2014.

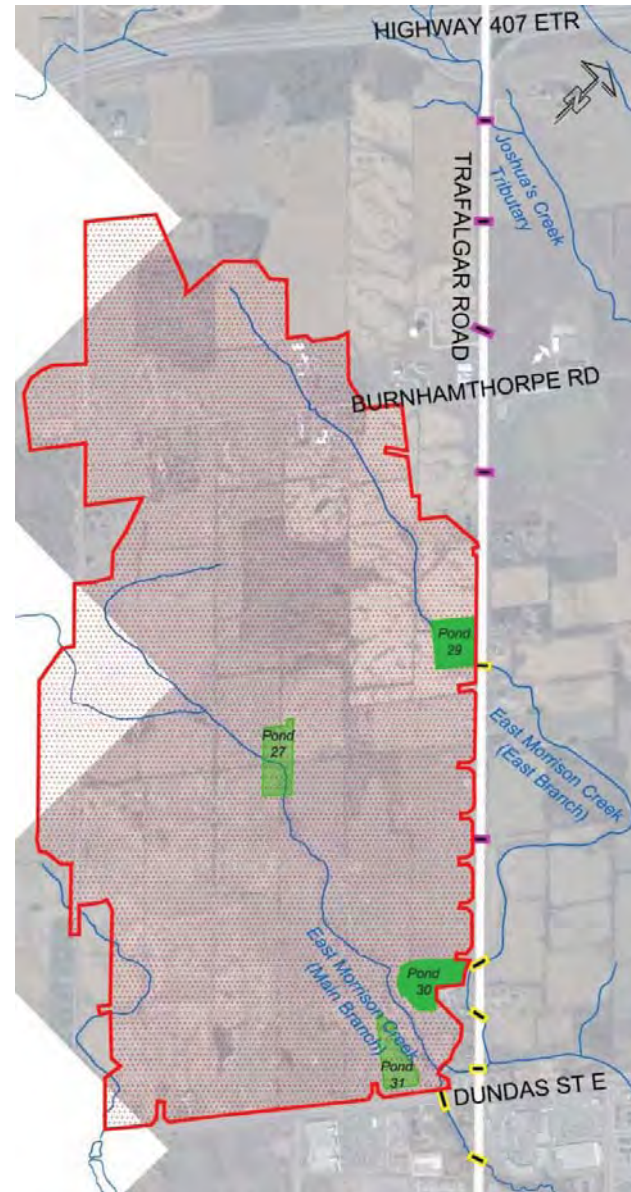
Stonybrook Consulting et al (2014) EIR/FSS Update and Response Document, Environmental Implementation Report / Functional Servicing Study, Dundas-Trafalgar Inc., North Oakville, submitted April 2014.

Town of Oakville (2014) Dundas-Trafalgar Inc. (Minto Communities), Zoning By-law Amendment & Plan of Subdivision, EIR/FSS Update and Response Document, Z. 1312.06, 24T-12013/1312, Memo from Development Engineering Department dated March 12, 2014.

**Memorandum**

To	Sheri Harmsworth	Page 1
Subject	Preliminary Evaluation of Integrating Trafalgar Road SWM with Pond 29 and Pond 30 (North Oakville Main-East Morrison Creek EIR/FSS)	
Prepared By	Janelle Wepler, B.Sc. (Env.), P.Eng., Water Resources Engineer	
Reviewed By	Glenn Farmer, Senior Environmental Technologist	
Date	November 4, 2013	Project Number 60119993

AECOM Canada Limited previously prepared a technical memo (dated November 9<sup>th</sup>, 2012), that evaluated the potential opportunity to integrate Trafalgar Road right-of-way (ROW) stormwater management (SWM) measures with proposed adjacent development SWM measures. More specifically, Pond 29 and Pond 30 (Figure 1) located on the west side of Trafalgar Road, north of Dundas Street East and south of Burnhamthorpe Road East were evaluated for feasibility as a potential end-of-pipe control measure for stormwater runoff generated from the proposed Trafalgar Road Corridor Improvements.



**Figure 1: Proposed SWM Ponds Adjacent to Trafalgar Road**

Review of the EIR/FSS for North Oakville Main-East Morrison Creek prepared by Sernas Associates on behalf of Green Ginger Developments, (May 2012) indicated that both Pond 29 and Pond 30 were potential opportunities for stormwater servicing to the adjacent Trafalgar Road ROW. Data extracted from the May 2012 EIR/FSS indicated a potential surplus volume of 10,599 m<sup>3</sup> in Pond 29 and between 200 and 1865 m<sup>3</sup> surplus volume for Pond 30 (range of surplus due to discrepancies in reported volumes in text of report compared to volumes documented in modeling files included in appendices provided with report).

Both Pond 29 and Pond 30 were found to be located at low points in the road profile however, further review and analyses were recommended for detailed design to confirm details associated with the Trafalgar Road Corridor Improvements and adjacent development SWM ponds. This subsequent review and analyses may include, but not limited to the following:

- Determining the change in impervious area due to the Trafalgar Road Corridor Improvements
- Confirming positive drainage is feasible considering grading constraints
- Verifying feasibility of drainage infrastructure considering design requirements
- Evaluating potential SWM pond design modifications to gain additional surplus storage (i.e., deeper pond depth, increased footprint)
- Calculating the resultant SWM pond performance with the changes to the contributing drainage area from Trafalgar Road.

In addition to the above comments, AECOM's review of the May 2012 EIR/FSS indicated that the Trafalgar Road ROW was not included in the drainage areas serviced by Pond 29 and Pond 30, as shown in Figure 7.2 of the EIR/FSS. Note that Figure 7.4.6 of the NOCSS Implementation Report (August, 2006) includes a SWM pond at the same approximate location of Pond 30 with a contributing drainage area that includes a portion of the Trafalgar Road ROW.

**Review of Documents Subsequent to May 2012 EIR/FSS**

Two subsequent documents were provided to AECOM to review with respect to integration of Trafalgar Road SWM measures:

1. EIR/FSS for North Oakville Main-East Morrison Creek prepared by Sernas Associates on behalf of Green Ginger Developments, (February, 2013)
2. East Morrison Creek EMI EIR/FSS Interim Submission prepared by GHD, (July 19, 2013)

*Pond 29*

The subsequent February 2013 EIR/FSS and July 19, 2013 memorandum did not provide additional details for Pond 29. A summary of available data for Pond 29 within all three reviewed documents is provided in Table 1.

**Table 1: Total and Regional Storage in Pond 29**

Storage Type	Storage Volume (m <sup>3</sup> )		
	May 2012 EIR/FSS	February 2013 EIR/FSS	July 19, 2013 Interim Submission
<b>Total Volume of Pond*</b>	68,458	68,458	n/a
<b>Regional Storm Storage*</b>	57,859	n/a	n/a
<b>Surplus (Calculated)</b>	10,599	n/a	n/a

*\*Volume information extracted from Appendix H-1, GAWSER input code and results table*

The identified surplus volume of 10,599 m<sup>3</sup> within Pond 29 indicates potential for integration of Trafalgar Road SWM measures with Pond 29 as an end-of-pipe SWM measure.

*Pond 30*

Variation in reported required and available storage volumes within Pond 30 were noted in all three reviewed documents, as summarized in Table 2.



**Table 2: Total and Regional Storage in Pond 30**

Storage Type	Storage Volume (m <sup>3</sup> )		
	May 2012 EIR/FSS	February 2013 EIR/FSS	July 19, 2013 Interim Submission
<b>Data Source</b>	Tables 7.13 & 7.15	Tables 7.15 & 7.17	Memo text
<b>Total Volume of Pond</b>	47,000	65,680	46,500-59,500*
<b>Regional Storm Storage</b>	46,800	55,720	42,800-55,900*
<b>Surplus (Calculated)</b>	200	9,960	3,600-3,700*
<b>Data Source</b>	Appendix H-1, GAWSER input code	Appendix H-1, GAWSER input code	n/a
<b>Total Volume of Pond</b>	48,628	59,366	n/a
<b>Regional Storm Storage</b>	46,763	n/a	n/a
<b>Surplus (Calculated)</b>	1,865	n/a	n/a

\*Volume range provided for five (5) pond options

Resultant surplus storage available within Pond 30 for integration of Trafalgar Road ROW SWM measures range from 200-1865 m<sup>3</sup> in the May 2012 EIR/FSS to 9,960 m<sup>3</sup> in the February 2013 EIR/FSS and 3,600-3,700 m<sup>3</sup> in the most recent July 19, 2013 Interim Submission.

Potential surplus volumes should be confirmed to further evaluate the potential for integrating Trafalgar Road ROW SWM with Pond 30.

*Drawing 7.1*

Additional comments regarding the EIR/FSS Drawing 7.1 relevant to the Trafalgar Road ROW are summarized in Table 3.

**Table 3: Comments Regarding EIR/FSS Drawing 7.1 Related to Trafalgar Road ROW**

Comments Regarding Drawing 7.1 of May 2012 EIR/FSS Report Relevant to Trafalgar Road ROW	February 2013 EIR/FSS	July 19, 2013 Interim Submission	AECOM Comments
Northeast corner located outside of subcatchment boundary for SWM facility (Pond 29) and shown as draining towards Trafalgar Road ROW.	Same as May 2012 EIR/FSS	Same as May 2012 EIR/FSS	What is the recommended quality/quantity treatment of stormwater prior to entering the Trafalgar Road ROW?
Pond 29 has two connections to the east branch of East Morrison Creek 1. Storm sewer connection that crosses Trafalgar Road just south of the pond 2. Storm sewer connection located on the west side within the Trafalgar Road ROW flows south (about 700m) then crosses Trafalgar Road ROW and outlets to east branch of East Morrison Creek.	1. Storm sewer connection crosses Trafalgar Road, just south of Pond 29 2. Connection to Pond 29 is removed however same storm trunk still on drawing	Same as February 2013 EIR/FSS	Proposed stormwater infrastructure with the Trafalgar Road ROW may interfere with SWM measures designed for the Trafalgar Road ROW.

**References**

GHD. "Interim Submission: East Morrison Creek EMI EIR/FSS Project No. 07370". July 29, 2013

Green Ginger Developments Incorporated. "Environmental Implementation Report and Functional Servicing Study – North Oakville Main-East Morrison Creek". Beacon Environmental, Geomorphic Solutions, Malone Given Parsons Ltd., RJ Burnside, Sernas Associates, Shad & Associates Inc., Stantec. May, 2012.

Green Ginger Developments Incorporated. "Environmental Implementation Report and Functional Servicing Study – North Oakville Main-East Morrison Creek". Beacon Environmental, Geomorphic Solutions, Malone Given Parsons Ltd., RJ Burnside, Sernas Associates, Shad & Associates Inc., Stantec. February, 2013.

Ontario Ministry of the Environment. "Stormwater Management Planning and Design Manual.". March 2003.

Town of Oakville. "North Oakville Creeks Subwatershed Study.". August 2006.



# Appendix <

Trafalgar Road Corridor Improvements  
EA, Cornwall Road to Highway 407

Stormwater Management  
Report

- [Appendix A - Project Description](#)

**Summary Action Report**  
**Structure 03-1182340 BR01 (MTO Site No. )**  
**Morrison Wedgewood Aqueduct**

Patch repair abutment walls, approach curbs, deck curbs, patch repair and seal cracks in approach and deck wearing surface, patch repair and seal cracks in deck soffit, seal cracks in median and repair channel below structure. Reconstruct approach sidewalk.

Inspection Date 10/24/2012 mm/dd/yyyy  
 Next Biennial Inspection 10/24/2014 mm/dd/yyyy

Condition Index Value (BCI)   
 Current Rep. Value

**Additional Investigations**

Investigation	Priority	Cost	Investigation	Priority	Cost
No additional investigations required.					

**Performance Deficiencies**

No Performance Deficiencies

**Maintenance Needs**

Element Group	Element	Maintenance Required	Priority	Comment
Coatings	Railing Systems/Hand Railings	Bridge Handrail Maintenance	2 yr	Touch up coating

**Repair/Rehabilitation**

Element Group	Element		Repair/Rehabilitation	Priority	Cost	
Abutments	Abutment Walls	Minor Rehabilitation	Patch repair	6-10 yrs	\$5,000	
Approaches	Wearing Surface	Minor Rehabilitation	Patch repair and seal cracks	6-10 yrs	\$2,500	
Approaches	Sidewalk	Minor Rehabilitation	Reconstruct sidewalk	6-10 yrs	\$5,000	
Approaches	Curb/Gutters	Minor Rehabilitation	Patch repairs	6-10 yrs	\$2,500	
Decks	Soffit - Thick Slab	Exterior	Minor Rehabilitation	Patch repairs	6-10 yrs	\$2,500
Decks	Soffit - Thick Slab	Interior	Minor Rehabilitation	Patch repairs	6-10 yrs	\$15,000
Decks	Wearing Surface	Minor Rehabilitation	Seal cracks	6-10 yrs	\$2,500	
Embankments & Streams	Streams & Waterways	Minor Rehabilitation	Repair channel liner	6-10 yrs	\$20,000	
Sidewalks/curbs	Sidewalks/Medians	Raised M	Minor Rehabilitation	Seal cracks	6-10 yrs	\$2,500
Sidewalks/curbs	Curbs	Minor Rehabilitation	Patch repairs	6-10 yrs	\$2,500	
<b>Total Repair/Rehabilitation Cost</b>					<b>\$60,000</b>	


Region of Halton	<input type="text" value="100"/>	%	<input type="text" value="\$91,000.00"/>	<b>Total Associated Work Cost</b>	<input type="text" value="\$31,000"/>
	<input type="text"/>	%	<input type="text"/>	<b>Total Cost</b>	<input type="text" value="\$91,000"/>

**Overall Comments**

Municipal Structure Inspection Form

Structure Number: **03-1182340 BR01**

**Inventory Data**

Structure Name: Morrison Wedgewood Aqueduct Hwy No. 3 Key Photo 

Cross. Type Over:  Road  Rail  Ped  Nav. Water  Non-Nav. Wat.  Other

Cross. Type Under:  Road  Rail  Ped  Nav. Water  Non-Nav. Wat.  Other

Road Name: Trafalgar Road

Structure Location: 0.30 km North of the QEW

Northing: 4813262.0 Easting: 606122.0 Cur. Rep. Value: \$2,125,310

Owner(s)/% Share: Region of Halton 100% \*\*

Heritage Status: Not Considered for Designation

MTO Region: Central Road Side Env.: Urban

MTO District: Central Road Class: Arterial

Old County: Halton Lane Type: Regular

Geographic Twp.: Posted Speed: 60 No. of Lanes: 7

Structure Type: Rigid Frame, Vertical legs AADT: 39890 Pct. Trucks: 0

Structure Material: Reinforced Cast-in-Place Concrete Inspection Route Sequence:

Articulation: Fixed Interchange Number:

Total Deck Length: 8.6 m Road Width: 30.8 m Interchange Structure Number:

Overall Width: 38.7 m Vert. Clear.: 0 m Detour Length: 0 km Skew Angle: 15°

Total Deck Area: 332.82 m<sup>2</sup> No. of Spans: 1 Fill on Structure: 0 m Struct. Dir.: North/South

Special Routes:  Transit  Schoo  Truck  Bicycle Insp. Duration: 1 hr

\*\* Current Replacement Value is based on in kind replacement of the existing structure and calculated using benchmark costs. Capital planning should consider site specific cost factors and requirements for widening or lengthening of the structure.

**Spans**

Span Name	Span Length	Span Name	Span Length
1	7.1 m		

**Historical Data**

Year Built: 1968 yyyy Year of Last Major Rehab: yyyy

Last OSIM Inspection: mm/dd/yyyy Contract No. When Built:

Last Enhanced OSIM: mm/dd/yyyy Last Evaluation: mm/dd/yyyy

Last Enhanced Access: mm/dd/yyyy Current Load Limit: t t t

Last Underwater Insp.: mm/dd/yyyy Load Limit By-Law No.: mm/dd/yyyy

Last Condition Survey: mm/dd/yyyy By-Law Expiry Date: mm/dd/yyyy

Rehab History

Municipal Structure Inspection Form

Structure Number: **03-1182340 BR01**

**Field Inspection Information:**

Inspection Date: 10/24/2012 mm/dd/yyyy  Multi Day Inspection  OSIM  Enhanced OSIM BCI: 72.3

Inspector: D. Kelly Eng. Responsible: D. L. Baxter, P. Eng.

Others in Party: M. Marin

Access Equip.:  Lift  Ladder  Boat  Bridge Master Other:

Other Equip.: Camera, Hammer, Other Hand Tools

Weather: Overcast Temperature: 9 °C

**Additional Investigations Required:**

Investigation	Priority			Estimated Cost
	None	Normal	Urgent	
Detailed Deck Condition Survey	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	\$0
Delamination Survey of Asphalt-Covered Deck	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	\$0
Concrete Substructure Condition Survey	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	\$0
Detailed Coating Condition Survey	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	\$0
Detailed Timber Investigation	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	\$0
Post-Tensioned Strand Investigation	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	\$0
Underwater Investigation	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	\$0
Fatigue Investigation	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	\$0
Seismic Investigation	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	\$0
Structure Evaluation	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	\$0
Monitoring of Deformations, Movements and Settlements	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	\$0
Monitoring of Crack Widths	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	\$0
<b>Total Cost</b>				<b>\$0</b>

**Investigation Notes**

**Overall Structure Notes:**

Recommended Work on Structure:  None  Minor Rehab  Major Rehab  Replace  Remove

Timing of Recommended Work:  1 to 5 years  6 to 10 years

Overall Comments: Patch repair abutment walls, approach curbs, deck curbs, patch repair and seal cracks in approach and deck wearing surface, patch repair and seal cracks in deck soffit, seal cracks in median and repair channel below structure. Reconstruct approach sidewalk.

BCI Change Justification:

Next Inspection: 10/24/2014 mm/dd/yyyy Estimated Load Limit: t t t

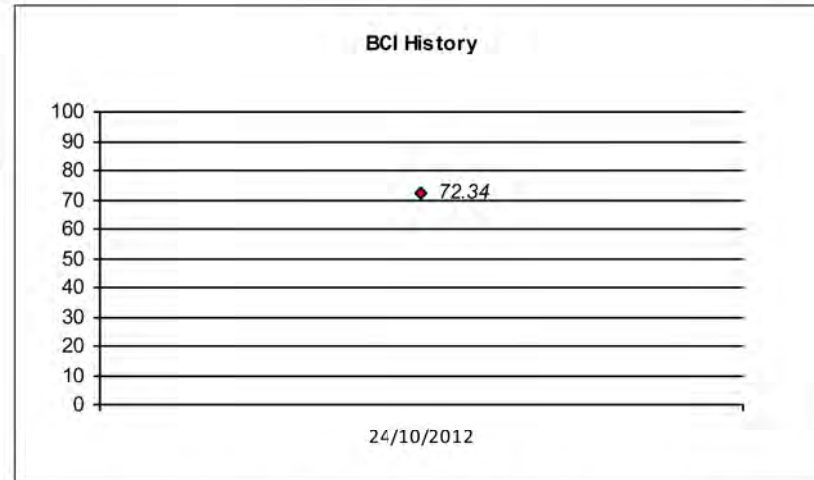


Municipal Structure Inspection Form

Structure Number: **03-1182340 BR01**

**BCI History**

Insp. Date	BCI	Inspector
24-Oct-12	72.34	D. Kelly



All BCI values are based on the MTO BCI methodology published in April 2008. As a result, BCI values for 2007 and earlier are approximate only, with potential discrepancies resulting from changes (over time) in the way quantities for certain elements are calculated.

**Standard Codes**

**Suspected Performance Deficiencies**

00 None	06 Bearing not uniformly loaded/unstable	12 Slippery surfaces
01 Load carrying capacity	07 Jammed expansion joint	13 Flooding/channel blockage
02 Excessive deformations (deflections/rotations)	08 Pedestrian/vehicular hazard	14 Undermining of foundation
03 Continuing settlement	09 Rough riding surface	15 Unstable embankments
04 Continuing movements	10 Surface ponding	16 Other
05 Seized bearings	11 Deck drainage	

**Maintenance Needs**

01 Lift and Swing Bridge Maintenance	07 Repair to Structural Steel	13 Erosion Control at Bridges
02 Bridge Cleaning	08 Repair of Bridge Concrete	14 Concrete Sealing
03 Bridge Handrail Maintenance	09 Repair of Bridge Timber	15 Rout and Seal
04 Painting Steel Bridge Structures	10 Bailey Bridges - Maintenance	16 Bridge deck Drainage
05 Bridge Deck Joint Repair	11 Animal/Pest Control	17 Scaling (Loose or ACR Steel)
06 Bridge Bearing Maintenance	12 Bridge Surface Repair	18 Other

Municipal Structure Inspection Form

Structure Number: **03-1182340 BR01**

**Element Data**

**Approaches - Approach Guiderail**

Element Group	Approaches	Length	0.00	Width	0.00
Element Name	Approach Guiderail	Height	0.00	Count	2.00
Location	Northwest and Southeast Quadrants	Total Quantity <b>2.00</b>			
Material	Steel	<input type="checkbox"/> Limited Inspection			
Element Type	Steel Beam on Wood Posts	Environment			
Protection System	Hot dip galvanizing	<input type="checkbox"/> Benign			
Condition Data	Units	Excell.	Good	Fair	Poor
	Each	0.00	2.00	0.00	0.00
<input type="checkbox"/> Moderate <input checked="" type="checkbox"/> Severe					

Comments  
 Guiderail is end buried in the Northwest and Southeast.

Performance Deficiencies	Maintenance Needs	Priority	Comments
None			

Rehab/Repair Recommendations	Priority	Cost	Comments

**Abutments - Abutment Walls**

Element Group	Abutments	Length	0.00	Width	38.70
Element Name	Abutment Walls	Height	0.60	Count	2.00
Location	North and South Ends	Total Quantity <b>46.44</b>			
Material	Cast-in-place concrete	<input type="checkbox"/> Limited Inspection			
Element Type		Environment			
Protection System	None	<input checked="" type="checkbox"/> Benign			
Condition Data	Units	Excell.	Good	Fair	Poor
	sq. m	0.00	43.44	2.00	1.00
<input type="checkbox"/> Moderate <input type="checkbox"/> Severe					

Comments  
 Wet areas and delaminations adjacent to construction joints.

Performance Deficiencies	Maintenance Needs	Priority	Comments
None			

Rehab/Repair Recommendations	Priority	Cost	Comments
Minor Rehabilitation	6-10 yrs	\$5,000	Patch repair

Municipal Structure Inspection Form

Structure Number: **03-1182340 BR01**

**Abutments - Wingwalls**

Element Group: Abutments Length: 2.85 Width: 0.00  
 Element Name: Wingwalls Height: 1.95 Count: 3.00  
 Location: Southeast, Southwest and Northeast Quadrants Total Quantity: 16.67  
 Material: Cast-in-place concrete  Limited Inspection  
 Element Type: Environment:  Benign  
 Protection System: None  Moderate  Severe  
 Condition Data: 

Units	Excell.	Good	Fair	Poor
sq. m	0.00	16.67	0.00	0.00

  
 Comments:   
 Performance Deficiencies: None  
 Maintenance Needs:   
 Priority:   
 Comments:   
 Rehab/Repair Recommendations:   
 Priority:   
 Cost:   
 Comments:

**Accessories - Utilities**

Element Group: Accessories Length: 0.00 Width: 0.00  
 Element Name: Utilities Conduits Height: 0.00 Count: 3.00  
 Location: East Side Total Quantity: 3.00  
 Material: Steel  Limited Inspection  
 Element Type: Environment:  Benign  
 Protection System: Hot dip galvanizing  Moderate  Severe  
 Condition Data: 

Units	Excell.	Good	Fair	Poor
Each	0.00	3.00	0.00	0.00

  
 Comments: Three conduits on East exterior soffit.  
 Performance Deficiencies: None  
 Maintenance Needs:   
 Priority:   
 Comments:   
 Rehab/Repair Recommendations:   
 Priority:   
 Cost:   
 Comments:

Municipal Structure Inspection Form

Structure Number: **03-1182340 BR01**

**Approaches - Wearing Surface**

Element Group: Approaches Length: 6.00 Width: 30.80  
 Element Name: Wearing Surface Height: 0.00 Count: 2.00  
 Location: North and South Ends Total Quantity: 369.60  
 Material: Asphalt  Limited Inspection  
 Element Type: Environment:  Benign  
 Protection System: None  Moderate  Severe  
 Condition Data: 

Units	Excell.	Good	Fair	Poor
sq. m	0.00	357.60	6.00	6.00

  
 Comments: Light to severe ravelling, narrow to wide cracks, sealed cracks, minor settlement at ends of deck.  
 Performance Deficiencies: None  
 Maintenance Needs:   
 Priority:   
 Comments:   
 Rehab/Repair Recommendations:   
 Priority:   
 Cost:   
 Comments: Minor Rehabilitation 6-10 yrs \$2,500 Patch repair and seal cracks

**Approaches - Approach Slabs**

Element Group: Approaches Length: 6.00 Width: 30.80  
 Element Name: Approach Slabs Height: 0.00 Count: 2.00  
 Location: North and South Ends Total Quantity: 369.60  
 Material: Cast-in-place concrete  Limited Inspection  
 Element Type: Environment:  Benign  
 Protection System: Hot rubberized asphalt membrane  Moderate  Severe  
 Condition Data: 

Units	Excell.	Good	Fair	Poor
sq. m	0.00	363.60	6.00	0.00

  
 Comments:   
 Performance Deficiencies: None  
 Maintenance Needs:   
 Priority:   
 Comments:   
 Rehab/Repair Recommendations:   
 Priority:   
 Cost:   
 Comments:



Municipal Structure Inspection Form

Structure Number: **03-1182340 BR01**

**Barriers - Barrier/Parapet Walls**

Element Group: Barriers Length: 13.00 Width: 0.00  
 Element Name: Barrier/Parapet Walls Interior Height: 1.25 Count: 2.00  
 Location: East and West Sides Total Quantity: 32.50  
 Material: Cast-in-place concrete  Limited Inspection  
 Element Type: Parapet Wall without Railing Environment:  
 Protection System: None  Benign  
 Condition Data: 

Units	Excell.	Good	Fair	Poor
sq. m	0.00	32.50	0.00	0.00

 Moderate  Severe

Comments: Narrow cracks.

Performance Deficiencies	Maintenance Needs	Priority	Comments
None			

Rehab/Repair Recommendations	Priority	Cost	Comments

**Barriers - Barrier/Parapet Walls**

Element Group: Barriers Length: 13.00 Width: 0.00  
 Element Name: Barrier/Parapet Walls Exterior Height: 1.05 Count: 2.00  
 Location: East and West Sides Total Quantity: 27.30  
 Material: Cast-in-place concrete  Limited Inspection  
 Element Type: Parapet Wall without Railing Environment:  
 Protection System: None  Benign  
 Condition Data: 

Units	Excell.	Good	Fair	Poor
sq. m	0.00	27.30	0.00	0.00

 Moderate  Severe

Comments: Narrow cracks.

Performance Deficiencies	Maintenance Needs	Priority	Comments
None			

Rehab/Repair Recommendations	Priority	Cost	Comments

Municipal Structure Inspection Form

Structure Number: **03-1182340 BR01**

**Barriers - Posts**

Element Group: Barriers Length: 0.00 Width: 0.00  
 Element Name: Posts Posts in Chain Link Fence Height: 0.00 Count: 20.00  
 Location: East and West Sides Total Quantity: 20.00  
 Material: Steel  Limited Inspection  
 Element Type: Environment:  
 Protection System: Hot dip galvanizing  Benign  
 Condition Data: 

Units	Excell.	Good	Fair	Poor
Each	0.00	20.00	0.00	0.00

 Moderate  Severe

Comments: Light corrosion at bases.

Performance Deficiencies	Maintenance Needs	Priority	Comments
None			

Rehab/Repair Recommendations	Priority	Cost	Comments

**Barriers - Railing Systems**

Element Group: Barriers Length: 25.00 Width: 0.00  
 Element Name: Railing Systems Height: 0.00 Count: 2.00  
 Location: East and West Sides Total Quantity: 50.00  
 Material: Steel  Limited Inspection  
 Element Type: Chain Link Fence Environment:  
 Protection System: Hot dip galvanizing  Benign  
 Condition Data: 

Units	Excell.	Good	Fair	Poor
m	0.00	50.00	0.00	0.00

 Moderate  Severe

Comments: Overall light corrosion.

Performance Deficiencies	Maintenance Needs	Priority	Comments
None			

Rehab/Repair Recommendations	Priority	Cost	Comments



Municipal Structure Inspection Form

Structure Number: **03-1182340 BR01**

**Approaches - Sidewalk**

Element Group: Approaches Length: 6.00 Width: 1.70  
 Element Name: Sidewalk Height: 0.00 Count: 4.00  
 Location: All Quadrants Total Quantity: 40.80  
 Material: Cast-in-place concrete  Limited Inspection  
 Element Type: Environment:  Benign  
 Protection System: None  Moderate  
 Condition Data: 

Units	Excell.	Good	Fair	Poor
sq. m	0.00	37.80	3.00	0.00

 Severe  
 Comments: Medium settlement of the Southeast sidewalk.

Performance Deficiencies	Maintenance Needs	Priority	Comments
None			

Rehab/Repair Recommendations	Priority	Cost	Comments
Minor Rehabilitation	6-10 yrs	\$5,000	Reconstruct sidewalk

**Approaches - Curb/Gutters**

Element Group: Approaches Length: 6.00 Width: 0.15  
 Element Name: Curb/Gutters Height: 0.15 Count: 2.00  
 Location: Northwest and Southwest Quadrants Total Quantity: 12.00  
 Material: Cast-in-place concrete  Limited Inspection  
 Element Type: Environment:  Benign  
 Protection System: None  Moderate  
 Condition Data: 

Units	Excell.	Good	Fair	Poor
m	0.00	10.00	1.00	1.00

 Severe  
 Comments: Wide cracks.

Performance Deficiencies	Maintenance Needs	Priority	Comments
None			

Rehab/Repair Recommendations	Priority	Cost	Comments
Minor Rehabilitation	6-10 yrs	\$2,500	Patch repairs

Municipal Structure Inspection Form

Structure Number: **03-1182340 BR01**

**Coatings - Railing Systems/Hand Railings**

Element Group: Coatings Length: 0.00 Width: 0.00  
 Element Name: Railing Systems/Hand Railings Height: 0.00 Count: 0.00  
 Location: East and West Sides Total Quantity: 39.40  
 Material: Hot Dip Galvanizing  Limited Inspection  
 Element Type: Environment:  Benign  
 Protection System: None  Moderate  
 Condition Data: 

Units	Excell.	Good	Fair	Poor
sq. m	0.00	35.40	2.00	2.00

 Severe  
 Comments: Breakdown of galvanized coating.

Performance Deficiencies	Maintenance Needs	Priority	Comments
None	Bridge Handrail Maintenance	2 yr	Touch up coating

Rehab/Repair Recommendations	Priority	Cost	Comments

**Decks - Deck Top**

Element Group: Decks Length: 8.60 Width: 38.70  
 Element Name: Deck Top Height: 0.00 Count: 0.00  
 Location: All Total Quantity: 332.82  
 Material: Cast-in-place concrete  Limited Inspection  
 Element Type: Environment:  Benign  
 Protection System: Hot rubberized asphalt membrane  Moderate  
 Severe  
 Condition Data: 

Units	Excell.	Good	Fair	Poor
sq. m	0.00	325.82	7.00	0.00

 Comments:

Performance Deficiencies	Maintenance Needs	Priority	Comments
None			

Rehab/Repair Recommendations	Priority	Cost	Comments

Municipal Structure Inspection Form

Structure Number: **03-1182340 BR01**

**Decks - Soffit - Thick Slab**

Element Group: Decks Length: 7.10 Width: 5.20  
 Element Name: Soffit - Thick Slab Exterior Height: 0.00 Count: 0.00  
 Location: Underside of Deck Total Quantity: 36.92  
 Material: Cast-in-place concrete  Limited Inspection  
 Element Type: Environment:  Benign  
 Protection System: None  Moderate  Severe  
 Condition Data: 

Units	Excell.	Good	Fair	Poor
sq. m	0.00	34.92	1.00	1.00

  
 Comments: One wide crack, concrete patches.

Performance Deficiencies	Maintenance Needs	Priority	Comments
None			

Rehab/Repair Recommendations	Priority	Cost	Comments
Minor Rehabilitation	6-10 yrs	\$2,500	Patch repairs

**Decks - Soffit - Thick Slab**

Element Group: Decks Length: 7.10 Width: 36.70  
 Element Name: Soffit - Thick Slab Interior Height: 0.00 Count: 0.00  
 Location: Underside of Deck Total Quantity: 260.57  
 Material: Cast-in-place concrete  Limited Inspection  
 Element Type: Environment:  Benign  
 Protection System: None  Moderate  Severe  
 Condition Data: 

Units	Excell.	Good	Fair	Poor
sq. m	0.00	238.57	12.00	10.00

  
 Comments: Wet areas, delaminations and severe spalling with exposed corroded rebar on the soffit adjacent to the construction joints.

Performance Deficiencies	Maintenance Needs	Priority	Comments
None			

Rehab/Repair Recommendations	Priority	Cost	Comments
Minor Rehabilitation	6-10 yrs	\$15,000	Patch repairs

Municipal Structure Inspection Form

Structure Number: **03-1182340 BR01**

**Decks - Wearing Surface**

Element Group: Decks Length: 8.60 Width: 30.80  
 Element Name: Wearing Surface Height: 0.00 Count: 0.00  
 Location: All Total Quantity: 264.88  
 Material: Asphalt  Limited Inspection  
 Element Type: Environment:  Benign  
 Protection System: None  Moderate  Severe  
 Condition Data: 

Units	Excell.	Good	Fair	Poor
sq. m	0.00	250.88	7.00	7.00

  
 Comments: Narrow to wide cracks, sealed cracks, light ravelling.

Performance Deficiencies	Maintenance Needs	Priority	Comments
None			

Rehab/Repair Recommendations	Priority	Cost	Comments
Minor Rehabilitation	6-10 yrs	\$2,500	Seal cracks

**Embankments & Streams - Embankments**

Element Group: Embankments & Streams Length: 0.00 Width: 0.00  
 Element Name: Embankments Height: 0.00 Count: 6.00  
 Location: All Quadrants and In Front of Abutments Total Quantity: 6.00  
 Material: Other  Limited Inspection  
 Element Type: Environment:  Benign  
 Protection System: Other  Moderate  Severe  
 Condition Data: 

Units	Excell.	Good	Fair	Poor
Each	0.00	6.00	0.00	0.00

  
 Comments:

Performance Deficiencies	Maintenance Needs	Priority	Comments
None			

Rehab/Repair Recommendations	Priority	Cost	Comments



Municipal Structure Inspection Form

Structure Number: **03-1182340 BR01**

Embankments & Streams - Slope Protection						
Element Group	Embankments & Streams		Length	0.00	Width	0.00
Element Name	Slope Protection		Height	0.00	Count	6.00
Location	All Quadrants and In Front of Abutments		Total Quantity			6.00
Material	Cast-in-place concrete		<input type="checkbox"/> Limited Inspection			
Element Type			Environment			
Protection System	None		<input type="checkbox"/> Benign			
Condition Data	<i>Units</i>	<i>Excell.</i>	<i>Good</i>	<i>Fair</i>	<i>Poor</i>	<input type="checkbox"/> Moderate
	Each	0.00	6.00	0.00	0.00	<input type="checkbox"/> Severe
Comments						
Wide cracks in slope protection in front of abutments.						
Performance Deficiencies		Maintenance Needs		Priority Comments		
None						
Rehab/Repair Recommendations		Priority		Cost Comments		

Embankments & Streams - Streams & Waterways						
Element Group	Embankments & Streams		Length	0.00	Width	0.00
Element Name	Streams & Waterways		Height	0.00	Count	1.00
Location	Under Bridge		Total Quantity			1.00
Material			<input type="checkbox"/> Limited Inspection			
Element Type			Environment			
Protection System			<input type="checkbox"/> Benign			
Condition Data	<i>Units</i>	<i>Excell.</i>	<i>Good</i>	<i>Fair</i>	<i>Poor</i>	<input type="checkbox"/> Moderate
	All	0.00	1.00	0.00	0.00	<input type="checkbox"/> Severe
Comments						
Concrete paved channel liner exhibits cracking and localized undermining						
Performance Deficiencies		Maintenance Needs		Priority Comments		
None						
Rehab/Repair Recommendations		Priority		Cost Comments		
Minor Rehabilitation		6-10 yrs		\$20,000 Repair channel liner		

Municipal Structure Inspection Form

Structure Number: **03-1182340 BR01**

Foundations - Foundations (below ground level)						
Element Group	Foundations		Length	0.00	Width	0.00
Element Name	Foundations (below ground level)		Height	0.00	Count	0.00
Location	At Abutments and Retaining Walls		Total Quantity			0.00
Material			<input checked="" type="checkbox"/> Limited Inspection			
Element Type			Environment			
Protection System			<input type="checkbox"/> Benign			
Condition Data	<i>Units</i>	<i>Excell.</i>	<i>Good</i>	<i>Fair</i>	<i>Poor</i>	<input type="checkbox"/> Moderate
						<input type="checkbox"/> Severe
Comments						
Limited inspection.						
Performance Deficiencies		Maintenance Needs		Priority Comments		
None						
Rehab/Repair Recommendations		Priority		Cost Comments		

Retaining walls - Walls						
Element Group	Retaining walls		Length	6.00	Width	0.00
Element Name	Walls		Height	3.50	Count	1.00
Location	Northwest Quadrant		Total Quantity			21.00
Material	Cast-in-place concrete		<input type="checkbox"/> Limited Inspection			
Element Type			Environment			
Protection System	None		<input type="checkbox"/> Benign			
Condition Data	<i>Units</i>	<i>Excell.</i>	<i>Good</i>	<i>Fair</i>	<i>Poor</i>	<input checked="" type="checkbox"/> Moderate
	sq. m	0.00	21.00	0.00	0.00	<input type="checkbox"/> Severe
Comments						
Performance Deficiencies		Maintenance Needs		Priority Comments		
None						
Rehab/Repair Recommendations		Priority		Cost Comments		



Municipal Structure Inspection Form

Structure Number: **03-1182340 BR01**

Retaining walls - Walls						
Element Group	Retaining walls		Length	3.00	Width	0.00
Element Name	Walls		Height	1.00	Count	2.00
Location	Southeast and Northeast Quadrants		Total Quantity			6.00
Material	Rock		<input type="checkbox"/> Limited Inspection			
Element Type	Gabions		Environment			
Protection System	None		<input type="checkbox"/> Benign			
Condition Data	<i>Units</i>	<i>Excell.</i>	<i>Good</i>	<i>Fair</i>	<i>Poor</i>	<input checked="" type="checkbox"/> Moderate
	sq. m	0.00	6.00	0.00	0.00	<input type="checkbox"/> Severe
Comments						
Performance Deficiencies		Maintenance Needs		Priority	Comments	
None						
Rehab/Repair Recommendations		Priority	Cost	Comments		

Sidewalks/curbs - Sidewalks/Medians						
Element Group	Sidewalks/curbs		Length	20.60	Width	1.80
Element Name	Sidewalks/Medians		Height	0.15	Count	1.00
Location	Centre of Bridge		Total Quantity			40.17
Material	Cast-in-place concrete		<input type="checkbox"/> Limited Inspection			
Element Type			Environment			
Protection System	None		<input type="checkbox"/> Benign			
Condition Data	<i>Units</i>	<i>Excell.</i>	<i>Good</i>	<i>Fair</i>	<i>Poor</i>	<input type="checkbox"/> Moderate
	sq. m	0.00	38.17	1.00	1.00	<input checked="" type="checkbox"/> Severe
Comments						
Wide cracks, light abrasions.						
Performance Deficiencies		Maintenance Needs		Priority	Comments	
None						
Rehab/Repair Recommendations		Priority	Cost	Comments		
Minor Rehabilitation		6-10 yrs	\$2,500	Seal cracks		

Municipal Structure Inspection Form

Structure Number: **03-1182340 BR01**

Sidewalks/curbs - Sidewalks/Medians						
Element Group	Sidewalks/curbs		Length	20.60	Width	1.80
Element Name	Sidewalks/Medians		Height	0.15	Count	2.00
Location	East and West Sides		Total Quantity			80.34
Material	Cast-in-place concrete		<input type="checkbox"/> Limited Inspection			
Element Type			Environment			
Protection System	None		<input type="checkbox"/> Benign			
Condition Data	<i>Units</i>	<i>Excell.</i>	<i>Good</i>	<i>Fair</i>	<i>Poor</i>	<input type="checkbox"/> Moderate
	sq. m	0.00	79.34	1.00	0.00	<input checked="" type="checkbox"/> Severe
Comments						
Medium cracks.						
Performance Deficiencies		Maintenance Needs		Priority	Comments	
None						
Rehab/Repair Recommendations		Priority	Cost	Comments		

Sidewalks/curbs - Curbs						
Element Group	Sidewalks/curbs		Length	8.60	Width	0.15
Element Name	Curbs		Height	0.15	Count	1.00
Location	West Side		Total Quantity			2.58
Material	Cast-in-place concrete		<input type="checkbox"/> Limited Inspection			
Element Type			Environment			
Protection System	None		<input type="checkbox"/> Benign			
Condition Data	<i>Units</i>	<i>Excell.</i>	<i>Good</i>	<i>Fair</i>	<i>Poor</i>	<input type="checkbox"/> Moderate
	sq. m	0.00	2.08	0.25	0.25	<input checked="" type="checkbox"/> Severe
Comments						
Narrow cracks, light to severe abrasions.						
Performance Deficiencies		Maintenance Needs		Priority	Comments	
None						
Rehab/Repair Recommendations		Priority	Cost	Comments		
Minor Rehabilitation		6-10 yrs	\$2,500	Patch repairs		



Repair/Rehabilitation Required				
Element Group	Element	Repair/Rehabilitation	Priority	Cost
Abutments	Abutment Walls	Minor Rehabilitation	6-10 yrs	\$5,000
Approaches	Curb/Gutters	Minor Rehabilitation	6-10 yrs	\$2,500
Sidewalks/curbs	Curbs	Minor Rehabilitation	6-10 yrs	\$2,500
Approaches	Sidewalk	Minor Rehabilitation	6-10 yrs	\$5,000
Sidewalks/curbs	Sidewalks/Medians	Raised M Minor Rehabilitation	6-10 yrs	\$2,500
Decks	Soffit - Thick Slab	Interior Minor Rehabilitation	6-10 yrs	\$15,000
Decks	Soffit - Thick Slab	Exterior Minor Rehabilitation	6-10 yrs	\$2,500
Embankments & Streams	Streams & Waterways	Minor Rehabilitation	6-10 yrs	\$20,000
Decks	Wearing Surface	Minor Rehabilitation	6-10 yrs	\$2,500
Approaches	Wearing Surface	Minor Rehabilitation	6-10 yrs	\$2,500
<b>Total Repair/Rehabilitation Cost</b>				<b>\$60,000</b>

**Associated Work**

	Comments	Estimated Cost
Approaches		\$0
Detours		\$0
Traffic Control		\$10,000
Utilities		\$0
Right-of-Way		\$0
Environmental Study		\$0
Other		\$0
Contingencies	10%	** \$7,000
Engineering	20%	** \$14,000
<b>Total Associated Work Cost</b>		<b>\$31,000</b>
<b>Total Repair/Rehabilitation Cost</b>		<b>\$60,000</b>
<b>Total Cost</b>		<b>\$91,000</b>
Region of Halton Share @ 100%		\$91,000

\*\* If based on a percentage calculated values rounded-up to the nearest thousand dollars.

Justification



Looking North at Bridge



Looking South at Bridge





East Elevation



West Elevation



Light Corrosion on Chain Link Fence Post



Light Corrosion on Chain Link Fence





Breakdown of Galvanized Coating on Chain Link Fence



Narrow Crack on Interior Parapet Wall



Narrow Crack on Exterior Parapet Wall



Severe Abrasion on Curb Over Deck





Wide Crack on Median



Wide Crack on Deck Wearing Surface



Typical Soffit



East Construction Joint





Middle Construction Joint



West Construction Joint



Wide Crack on Exterior Soffit



Displaced Rebar on Interior Soffit





Medium Crack in Sidewalk



North Abutment



South Abutment



Delamination on Abutment Wall





Typical Wingwall



Typical Retaining Wall in Northwest Quadrant



Typical Gabion Basket at East Side of Structure



Wide Crack in Slope Protection in Front of Abutment





Looking Upstream



Looking Downstream



Watercourse Below Structure



Severe Raveling of Approach Wearing Surface





Wide Crack on Approach Curb



Medium Settlement of Approach Sidewalk in Southeast Quadrant



**Summary Action Report**  
**Structure 03-1182320 CU01 (MTO Site No. )**  
**Trafalgar Road**

Inspection Date 10/24/2012 mm/dd/yyyy Condition Index Value (BCI) **74.6**  
 Next Biennial Inspection 10/24/2014 mm/dd/yyyy Current Rep. Value **\$9,724,000**

**Additional Investigations**

Investigation	Priority	Cost	Investigation	Priority	Cost
No additional investigations required.					

**Performance Deficiencies**

No Performance Deficiencies

**Maintenance Needs**

Element Group	Element	Maintenance Required	Priority	Comment
Embankments & Streams	Streams & Waterways	Other	1 yr	Remove tree

**Repair/Rehabilitation**

Element Group	Element	Repair/Rehabilitation	Priority	Cost
Barriers	Posts	Minor Rehabilitation Replace deteriorated posts	1-5 yrs	\$2,500
Barriers	Railing Systems	Minor Rehabilitation Replace damaged section	1-5 yrs	\$2,500
Culverts	Barrels	Minor Rehabilitation Patch repairs	1-5 yrs	\$9,000
Culverts	Inlet Components	Headwall/ Minor Rehabilitation Patch repair and seal cracks	1-5 yrs	\$5,000
Culverts	Inlet Components	Gabion B Minor Rehabilitation Replace broken basket	1-5 yrs	\$5,000
Culverts	Outlet Components	Headwall/ Minor Rehabilitation Patch repair and seal cracks	1-5 yrs	\$5,000
Decks	Wearing Surface	Minor Rehabilitation Patch repairs and seal cracks	1-5 yrs	\$5,000
Barriers	Railing Systems	Minor Rehabilitation Replace missing section	1-5 yrs	\$5,000
Sidewalks/curbs	Curbs	Minor Rehabilitation Seal cracks	1-5 yrs	\$5,000
<b>Total Repair/Rehabilitation Cost</b>				<b>\$44,000</b>

Region of Halton	100%	\$70,400.00	<b>Total Associated Work Cost</b>	<b>\$26,400</b>
			<b>Total Cost</b>	<b>\$70,400</b>


**Overall Comments**

Replace deteriorated guiderail posts, replace damaged section of guiderail, patch repair barrel, inlet and outlet components, repair gabion basket at inlet, seal cracks and patch repair wearing surface, replace missing section of barrier on retaining wall, seal cracks in curb.

**Municipal Structure Inspection Form**

Structure Number: **03-1182320 CU01**

**Inventory Data**

Structure Name	Trafalgar Road	Hwy No.	3	Key Photo		
Cross. Type Over	<input type="checkbox"/> Road <input checked="" type="checkbox"/> Rail <input type="checkbox"/> Ped <input type="checkbox"/> Nav. Water <input type="checkbox"/> Non-Nav. Wat. <input type="checkbox"/> Other					
Cross. Type Under	<input type="checkbox"/> Road <input type="checkbox"/> Rail <input type="checkbox"/> Ped <input type="checkbox"/> Nav. Water <input checked="" type="checkbox"/> Non-Nav. Wat. <input type="checkbox"/> Other					
Road Name	Trafalgar Road					
Structure Location	0.60 km North of Queen Elizabeth Way					
Northing	4813384.0	Easting	605840.0	Cur. Rep. Value	\$9,724,000	
Owner(s)/ % Share	Region of Halton		100%	**		
MTO Region	Central		Heritage Status	Not Considered for Designation		
MTO District	Central		Road Side Env.	Semi Urban		
Old County	Halton		Road Class	Arterial		
Geographic Twp.			Lane Type	Regular		
Structure Type	Rectangular Culvert		Posted Speed	60	No. of Lanes	4
Structure Material	Reinforced Cast-in-Place Concrete		AADT	42822	Pct. Trucks	3
Articulation			Inspection Route Sequence			
Total Deck Length	360 m	Road Width	16 m	Interchange Number		
Overall Width	3.5 m	Vert. Clear.	3.1 m	Interchange Structure Number		
Total Deck Area	1260.00 m <sup>2</sup>	No. of Spans	1	Detour Length	0 km	
Special Routes	<input checked="" type="checkbox"/> Transit <input checked="" type="checkbox"/> Schoo <input type="checkbox"/> Truck <input type="checkbox"/> Bicycle		Fill on Structure	4 m	Skew Angle	90°
			Insp. Duration	2 hr	Struct. Dir.	North/South

\*\* Current Replacement Value is based on in kind replacement of the existing structure and calculated using benchmark costs. Capital planning should consider site specific cost factors and requirements for widening or lengthening of the structure.

**Spans**

Span Name	Span Length	Span Name	Span Length
1	3.0 m		

**Historical Data**

Year Built	1980	Year of Last Major Rehab	
Last OSIM Inspection		Contract No. When Built	
Last Enhanced OSIM		Last Evaluation	
Last Enhanced Access		Current Load Limit	<input type="checkbox"/> t <input type="checkbox"/> t <input type="checkbox"/> t
Last Underwater Insp.		Load Limit By-Law No.	
Last Condition Survey		By-Law Expiry Date	

**Rehab History**



**Municipal Structure Inspection Form**

Structure Number: **03-1182320 CU01**

**Field Inspection Information:**

Inspection Date: 10/24/2012 mm/dd/yyyy  Multi Day Inspection  OSIM  Enhanced OSIM BCI: 74.6

Inspector: D. Kelly Eng. Responsible: D. L. Baxter, P. Eng.

Others in Party: M. Marin

Access Equip.  Lift  Ladder  Boat  Bridge Master Other: \_\_\_\_\_

Other Equip.: Camera, Hammer, Other Hand Tools

Weather: Overcast Temperature: 10 °C

**Additional Investigations Required:**

Investigation	Priority			Estimated Cost
	None	Normal	Urgent	
Detailed Deck Condition Survey	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	\$0
Delamination Survey of Asphalt-Covered Deck	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	\$0
Concrete Substructure Condition Survey	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	\$0
Detailed Coating Condition Survey	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	\$0
Detailed Timber Investigation	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	\$0
Post-Tensioned Strand Investigation	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	\$0
Underwater Investigation	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	\$0
Fatigue Investigation	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	\$0
Seismic Investigation	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	\$0
Structure Evaluation	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	\$0
Monitoring of Deformations, Movements and Settlements	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	\$0
Monitoring of Crack Widths	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	\$0
<b>Investigation Notes</b>				<b>Total Cost</b>
				\$0

**Overall Structure Notes:**

Recommend Work on Structure  None  Minor Rehab  Major Rehab  Replace  Remove

Timing of Recommended Work  1 to 5 years  6 to 10 years

Overall Comments: Replace deteriorated guiderail posts, replace damaged section of guiderail, patch repair barrel, inlet and outlet components, repair gabion basket at inlet, seal cracks and patch repair wearing surface, replace missing section of barrier on retaining wall, seal cracks in curb.

BCI Change Justification:

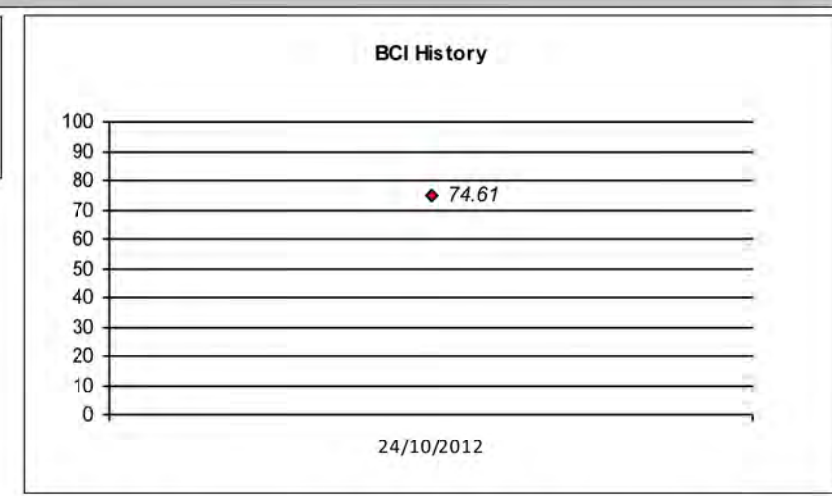
Next Inspection: 10/24/2014 mm/dd/yyyy Estimated Load Limit:  t  t  t

**Municipal Structure Inspection Form**

Structure Number: **03-1182320 CU01**

**BCI History**

Insp. Date	BCI	Inspector
24-Oct-12	74.61	D. Kelly



All BCI values are based on the MTO BCI methodology published in April 2008. As a result, BCI values for 2007 and earlier are approximate only, with potential discrepancies resulting from changes (over time) in the way quantities for certain elements are calculated.

**Standard Codes**

- Suspected Performance Deficiencies**
- 00 None
  - 01 Load carrying capacity
  - 02 Excessive deformations (deflections/rotations)
  - 03 Continuing settlement
  - 04 Continuing movements
  - 05 Seized bearings
  - 06 Bearing not uniformly loaded/unstable
  - 07 Jammed expansion joint
  - 08 Pedestrian/vehicular hazard
  - 09 Rough riding surface
  - 10 Surface ponding
  - 11 Deck drainage
  - 12 Slippery surfaces
  - 13 Flooding/channel blockage
  - 14 Undermining of foundation
  - 15 Unstable embankments
  - 16 Other
- Maintenance Needs**
- 01 Lift and Swing Bridge Maintenance
  - 02 Bridge Cleaning
  - 03 Bridge Handrail Maintenance
  - 04 Painting Steel Bridge Structures
  - 05 Bridge Deck Joint Repair
  - 06 Bridge Bearing Maintenance
  - 07 Repair to Structural Steel
  - 08 Repair of Bridge Concrete
  - 09 Repair of Bridge Timber
  - 10 Bailey Bridges - Maintenance
  - 11 Animal/Pest Control
  - 12 Bridge Surface Repair
  - 13 Erosion Control at Bridges
  - 14 Concrete Sealing
  - 15 Rout and Seal
  - 16 Bridge deck Drainage
  - 17 Scaling (Loose or ACR Steel)
  - 18 Other



Element Data																	
<b>Barriers - Posts</b>																	
Element Group	Barriers			Length	0.00	Width	0.00										
Element Name	Posts			Height	0.00	Count	14.00										
Location	North and South Sides			Total Quantity			14.00										
Material	Wood			<input type="checkbox"/> Limited Inspection													
Element Type	Wood Posts In Steel Flexbeam System			Environment													
Protection System	None			<input type="checkbox"/> Benign													
Condition Data	Units	Excell.	Good	Fair	Poor	<input type="checkbox"/> Moderate											
	Each	0.00	6.00	4.00	4.00	<input checked="" type="checkbox"/> Severe											
Comments	Light to severe end rot. light to severe checking.																
<table border="1"> <thead> <tr> <th>Performance Deficiencies</th> <th>Maintenance Needs</th> <th>Priority</th> <th>Comments</th> </tr> </thead> <tbody> <tr> <td>None</td> <td></td> <td></td> <td></td> </tr> </tbody> </table>										Performance Deficiencies	Maintenance Needs	Priority	Comments	None			
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Rehab/Repair Recommendations	Priority	Cost	Comments														
Minor Rehabilitation	1-5 yrs	\$2,500	Replace deteriorated posts														
<b>Barriers - Railing Systems</b>																	
Element Group	Barriers			Length	15.50	Width	0.00										
Element Name	Railing Systems			Height	0.00	Count	2.00										
Location	North and South Sides			Total Quantity			31.00										
Material	Steel			<input type="checkbox"/> Limited Inspection													
Element Type	Steel Flex Beam on wood post			Environment													
Protection System	Hot dip galvanizing			<input type="checkbox"/> Benign													
Condition Data	Units	Excell.	Good	Fair	Poor	<input type="checkbox"/> Moderate											
	m	0.00	29.00	0.00	2.00	<input checked="" type="checkbox"/> Severe											
Comments	Localized severe impact damage, light corrosion.																
<table border="1"> <thead> <tr> <th>Performance Deficiencies</th> <th>Maintenance Needs</th> <th>Priority</th> <th>Comments</th> </tr> </thead> <tbody> <tr> <td>None</td> <td></td> <td></td> <td></td> </tr> </tbody> </table>										Performance Deficiencies	Maintenance Needs	Priority	Comments	None			
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Rehab/Repair Recommendations	Priority	Cost	Comments														
Minor Rehabilitation	1-5 yrs	\$2,500	Replace damaged section														

Approaches - Approach Guiderail																	
Element Group	Approaches			Length	0.00	Width	0.00										
Element Name	Approach Guiderail			Terminal End	Height	0.00	Count	4.00									
Location	All Quadrants			Total Quantity			4.00										
Material	Steel			<input type="checkbox"/> Limited Inspection													
Element Type	Steel Beam on Wood Posts			Environment													
Protection System	Hot dip galvanizing			<input type="checkbox"/> Benign													
Condition Data	Units	Excell.	Good	Fair	Poor	<input type="checkbox"/> Moderate											
	Each	0.00	4.00	0.00	0.00	<input checked="" type="checkbox"/> Severe											
Comments	Terminal end treatments are provided in each quadrant.																
<table border="1"> <thead> <tr> <th>Performance Deficiencies</th> <th>Maintenance Needs</th> <th>Priority</th> <th>Comments</th> </tr> </thead> <tbody> <tr> <td>None</td> <td></td> <td></td> <td></td> </tr> </tbody> </table>										Performance Deficiencies	Maintenance Needs	Priority	Comments	None			
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Rehab/Repair Recommendations	Priority	Cost	Comments														
<b>Coatings - Railing Systems/Hand Railings</b>																	
Element Group	Coatings			Length	0.00	Width	0.00										
Element Name	Railing Systems/Hand Railings			Height	0.00	Count	0.00										
Location	North and South Sides			Total Quantity			18.60										
Material	Hot Dip Galvanizing			<input type="checkbox"/> Limited Inspection													
Element Type				Environment													
Protection System	None			<input type="checkbox"/> Benign													
Condition Data	Units	Excell.	Good	Fair	Poor	<input type="checkbox"/> Moderate											
	sq. m	0.00	18.60	0.00	0.00	<input checked="" type="checkbox"/> Severe											
Comments	Minor breakdown of galvanized coating.																
<table border="1"> <thead> <tr> <th>Performance Deficiencies</th> <th>Maintenance Needs</th> <th>Priority</th> <th>Comments</th> </tr> </thead> <tbody> <tr> <td>None</td> <td></td> <td></td> <td></td> </tr> </tbody> </table>										Performance Deficiencies	Maintenance Needs	Priority	Comments	None			
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Rehab/Repair Recommendations	Priority	Cost	Comments														



Municipal Structure Inspection Form

Structure Number: **03-1182320 CU01**

Culverts - Barrels						
Element Group	Culverts		Length	360.00	Width	3.00
Element Name	Barrels		Height	3.10	Count	1.00
Location	Under Roadway		Total Quantity			4392.00
Material	Cast-in-place concrete		<input type="checkbox"/> Limited Inspection			
Element Type	Box		Environment			
Protection System	None		<input checked="" type="checkbox"/> Benign			
Condition Data	<i>Units</i>	<i>Excell.</i>	<i>Good</i>	<i>Fair</i>	<i>Poor</i>	<input type="checkbox"/> Moderate
	sq. m	0.00	4374.00	12.00	6.00	<input type="checkbox"/> Severe
Comments						
Severe scaling, delaminations, wet areas and light spalling with exposed corroded rebar adjacent to storm drain outlets and construction joints. Efflorescence staining and stained cracks, severe scouring at base of barrel walls at various points throughout barrel.						
Performance Deficiencies		Maintenance Needs		Priority	Comments	
None						
Rehab/Repair Recommendations		Priority	Cost	Comments		
Minor Rehabilitation		1-5 yrs	\$9,000	Patch repairs		

Culverts - Inlet Components						
Element Group	Culverts		Length	0.00	Width	0.00
Element Name	Inlet Components		Height	0.00	Count	0.00
Location	North Side		Total Quantity			26.00
Material	Cast-in-place concrete		<input type="checkbox"/> Limited Inspection			
Element Type	Headwall/Retaining Wall		Environment			
Protection System	None		<input type="checkbox"/> Benign			
Condition Data	<i>Units</i>	<i>Excell.</i>	<i>Good</i>	<i>Fair</i>	<i>Poor</i>	<input checked="" type="checkbox"/> Moderate
	sq. m	0.00	22.00	2.00	2.00	<input type="checkbox"/> Severe
Comments						
Delamination on Northwest retaining wall, wide cracks separating retaining wall and headwall.						
Performance Deficiencies		Maintenance Needs		Priority	Comments	
None						
Rehab/Repair Recommendations		Priority	Cost	Comments		
Minor Rehabilitation		1-5 yrs	\$5,000	Patch repair and seal cracks		

Municipal Structure Inspection Form

Structure Number: **03-1182320 CU01**

Culverts - Inlet Components						
Element Group	Culverts		Length	0.00	Width	0.00
Element Name	Inlet Components		Height	0.00	Count	0.00
Location	North Side		Total Quantity			36.00
Material	Rock		<input type="checkbox"/> Limited Inspection			
Element Type	Retaining Wall		Environment			
Protection System	None		<input type="checkbox"/> Benign			
Condition Data	<i>Units</i>	<i>Excell.</i>	<i>Good</i>	<i>Fair</i>	<i>Poor</i>	<input checked="" type="checkbox"/> Moderate
	sq. m	0.00	33.00	0.00	3.00	<input type="checkbox"/> Severe
Comments						
Hole in one basket at Northeast quadrant, complete loss of rocks in this basket.						
Performance Deficiencies		Maintenance Needs		Priority	Comments	
None						
Rehab/Repair Recommendations		Priority	Cost	Comments		
Minor Rehabilitation		1-5 yrs	\$5,000	Replace broken basket		

Culverts - Outlet Components						
Element Group	Culverts		Length	0.00	Width	0.00
Element Name	Outlet Components		Height	0.00	Count	0.00
Location	South Side		Total Quantity			42.00
Material	Cast-in-place concrete		<input type="checkbox"/> Limited Inspection			
Element Type	Headwall/Retaining Wall		Environment			
Protection System	None		<input type="checkbox"/> Benign			
Condition Data	<i>Units</i>	<i>Excell.</i>	<i>Good</i>	<i>Fair</i>	<i>Poor</i>	<input checked="" type="checkbox"/> Moderate
	sq. m	0.00	40.00	1.00	1.00	<input type="checkbox"/> Severe
Comments						
Wide crack on retaining wall, small delaminations on headwall.						
Performance Deficiencies		Maintenance Needs		Priority	Comments	
None						
Rehab/Repair Recommendations		Priority	Cost	Comments		
Minor Rehabilitation		1-5 yrs	\$5,000	Patch repair and seal cracks		



Municipal Structure Inspection Form

Structure Number: **03-1182320 CU01**

Decks - Wearing Surface						
Element Group	Decks		Length	15.50	Width	16.00
Element Name	Wearing Surface		Height	0.00	Count	0.00
Location	Above Culvert		Total Quantity			248.00
Material	Asphalt		<input type="checkbox"/> Limited Inspection			
Element Type			Environment			
Protection System	None		<input type="checkbox"/> Benign			
Condition Data	Units	Excell.	Good	Fair	Poor	<input type="checkbox"/> Moderate
	sq. m	0.00	242.00	3.00	3.00	<input checked="" type="checkbox"/> Severe
Comments						
Narrow to wide cracking, asphalt patches, light to severe ravelling, sealed cracks, light wheel track rutting.						
Performance Deficiencies		Maintenance Needs		Priority	Comments	
None						
Rehab/Repair Recommendations		Priority	Cost	Comments		
Minor Rehabilitation		1-5 yrs	\$5,000	Patch repairs and seal cracks		

Embankments & Streams - Embankments						
Element Group	Embankments & Streams		Length	0.00	Width	0.00
Element Name	Embankments		Height	0.00	Count	4.00
Location	All Quadrants		Total Quantity			4.00
Material	Vegetation		<input type="checkbox"/> Limited Inspection			
Element Type			Environment			
Protection System	Vegetation		<input checked="" type="checkbox"/> Benign			
Condition Data	Units	Excell.	Good	Fair	Poor	<input checked="" type="checkbox"/> Moderate
	Each	0.00	4.00	0.00	0.00	<input type="checkbox"/> Severe
Comments						
Performance Deficiencies		Maintenance Needs		Priority	Comments	
None						
Rehab/Repair Recommendations		Priority	Cost	Comments		

Municipal Structure Inspection Form

Structure Number: **03-1182320 CU01**

Embankments & Streams - Slope Protection						
Element Group	Embankments & Streams		Length	0.00	Width	0.00
Element Name	Slope Protection		Height	0.00	Count	4.00
Location	All Quadrants		Total Quantity			4.00
Material	Vegetation		<input type="checkbox"/> Limited Inspection			
Element Type			Environment			
Protection System	None		<input checked="" type="checkbox"/> Benign			
Condition Data	Units	Excell.	Good	Fair	Poor	<input checked="" type="checkbox"/> Moderate
	Each	0.00	4.00	0.00	0.00	<input type="checkbox"/> Severe
Comments						
Performance Deficiencies		Maintenance Needs		Priority	Comments	
None						
Rehab/Repair Recommendations		Priority	Cost	Comments		

Embankments & Streams - Streams & Waterways						
Element Group	Embankments & Streams		Length	0.00	Width	0.00
Element Name	Streams & Waterways		Height	0.00	Count	1.00
Location	Through Culvert		Total Quantity			1.00
Material			<input type="checkbox"/> Limited Inspection			
Element Type			Environment			
Protection System			<input checked="" type="checkbox"/> Benign			
Condition Data	Units	Excell.	Good	Fair	Poor	<input checked="" type="checkbox"/> Moderate
	All	0.00	1.00	0.00	0.00	<input type="checkbox"/> Severe
Comments						
Tree partially obstructing watercourse at inlet.						
Performance Deficiencies		Maintenance Needs		Priority	Comments	
None		Other		1 yr	Remove tree	
Rehab/Repair Recommendations		Priority	Cost	Comments		



Municipal Structure Inspection Form

Structure Number: **03-1182320 CU01**

**Foundations - Foundations (below ground level)**

Element Group: Foundations Length: 0.00 Width: 0.00  
 Element Name: Foundations (below ground level) Height: 0.00 Count: 0.00  
 Location: Below Culvert Total Quantity: 0.00  
 Material:  Limited Inspection  
 Element Type: Environment:  Benign  
 Protection System:  Moderate  
 Severe  
 Condition Data: 

Units	Excell.	Good	Fair	Poor

  
 Comments: Limited inspection.  
 Performance Deficiencies: None  
 Maintenance Needs: 

Priority	Comments

  
 Rehab/Repair Recommendations: 

Priority	Cost	Comments

**Barriers - Railing Systems**

Element Group: Barriers Length: 19.00 Width: 0.00  
 Element Name: Railing Systems Height: 1.00 Count: 1.00  
 Location: North Side Total Quantity: 19.00  
 Material: Steel  Limited Inspection  
 Element Type: Environment:  Benign  
 Protection System: Epoxy zinc/acrylic/acrylic  Moderate  
 Severe  
 Condition Data: 

Units	Excell.	Good	Fair	Poor
m	0.00	16.00	0.00	3.00

  
 Comments: Section of railing missing/broken.  
 Performance Deficiencies: None  
 Maintenance Needs: 

Priority	Comments

  
 Rehab/Repair Recommendations: 

Priority	Cost	Comments
1-5 yrs	\$5,000	Replace missing section

Municipal Structure Inspection Form

Structure Number: **03-1182320 CU01**

**Coatings - Railing Systems/Hand Railings**

Element Group: Coatings Length: 0.00 Width: 0.00  
 Element Name: Railing Systems/Hand Railings Height: 0.00 Count: 0.00  
 Location: North Side Total Quantity: 19.00  
 Material: Hot Dip Galvanizing  Limited Inspection  
 Element Type: Environment:  Benign  
 Protection System: None  Moderate  
 Severe  
 Condition Data: 

Units	Excell.	Good	Fair	Poor
sq. m	0.00	19.00	0.00	0.00

  
 Comments:  
 Performance Deficiencies: None  
 Maintenance Needs: 

Priority	Comments

  
 Rehab/Repair Recommendations: 

Priority	Cost	Comments

**Sidewalks/curbs - Curbs**

Element Group: Sidewalks/curbs Length: 15.50 Width: 0.15  
 Element Name: Curbs Height: 0.15 Count: 2.00  
 Location: North and South Sides Total Quantity: 9.30  
 Material: Cast-in-place concrete  Limited Inspection  
 Element Type: Environment:  Benign  
 Protection System: None  Moderate  
 Severe  
 Condition Data: 

Units	Excell.	Good	Fair	Poor
sq. m	0.00	7.30	1.00	1.00

  
 Comments: Wide cracks, light scaling and abrasions.  
 Performance Deficiencies: None  
 Maintenance Needs: 

Priority	Comments

  
 Rehab/Repair Recommendations: 

Priority	Cost	Comments
1-5 yrs	\$5,000	Seal cracks



Municipal Structure Inspection Form

Structure Number: **03-1182320 CU01**

Sidewalks/curbs - Sidewalks/Medians						
Element Group	Sidewalks/curbs		Length	15.50	Width	1.50
Element Name	Sidewalks/Medians		Height	0.00	Count	2.00
Location	North and South Sides		Total Quantity			46.50
Material	Cast-in-place concrete		<input type="checkbox"/> Limited Inspection			
Element Type			Environment			
Protection System	None		<input type="checkbox"/> Benign			
Condition Data	Units	Excell.	Good	Fair	Poor	<input type="checkbox"/> Moderate
	sq. m	0.00	46.50	0.00	0.00	<input checked="" type="checkbox"/> Severe
Comments						
Light scaling.						
Performance Deficiencies		Maintenance Needs		Priority	Comments	
None						
Rehab/Repair Recommendations		Priority	Cost	Comments		

Municipal Structure Inspection Form

Structure Number: **03-1182320 CU01**

Repair/Rehabilitation Required				
Element Group	Element	Repair/Rehabilitation	Priority	Cost
Culverts	Barrels	Minor Rehabilitation	1-5 yrs	\$9,000
Sidewalks/curbs	Curbs	Minor Rehabilitation	1-5 yrs	\$5,000
Culverts	Inlet Components	Gabion B Minor Rehabilitation	1-5 yrs	\$5,000
Culverts	Inlet Components	Headwall Minor Rehabilitation	1-5 yrs	\$5,000
Culverts	Outlet Components	Headwall Minor Rehabilitation	1-5 yrs	\$5,000
Barriers	Posts	Minor Rehabilitation	1-5 yrs	\$2,500
Barriers	Railing Systems	Minor Rehabilitation	1-5 yrs	\$5,000
Barriers	Railing Systems	Minor Rehabilitation	1-5 yrs	\$2,500
Decks	Wearing Surface	Minor Rehabilitation	1-5 yrs	\$5,000
<b>Total Repair/Rehabilitation Cost</b>				<b>\$44,000</b>
Associated Work				
	Comments	Estimated Cost		
Approaches		\$0		
Detours		\$0		
Traffic Control		\$10,000		
Utilities		\$0		
Right-of-Way		\$0		
Environmental Study		\$0		
Other		\$0		
Contingencies		10%	**	\$5,400
Engineering		20%	**	\$11,000
** If based on a percentage calculated values rounded-up to the nearest thousand dollars.		<b>Total Associated Work Cost</b>		
		<b>\$26,400</b>		
		<b>Total Repair/Rehabilitation Cost</b>		
		<b>\$44,000</b>		
		<b>Total Cost</b>		
		<b>\$70,400</b>		
		Region of Halton Share @ 100%		
		\$70,400		
Justification				





Looking East at Roadway Over Culvert



Looking West at Roadway Over Culvert



North Elevation



South Elevation





Looking North Through Barrel



Looking South Through Barrel at Midspan



Looking North Through Barrel at Midspan



Looking South Through Barrel





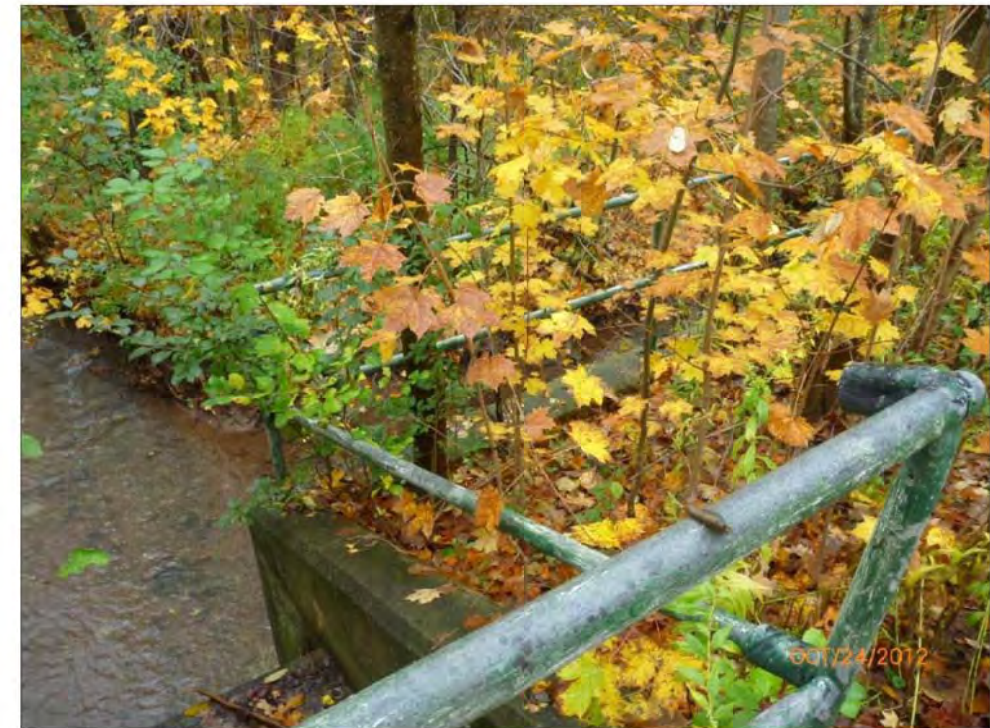
Severe End Rot on Guiderail Post



Severe Impact Damage on Flex Beam Guiderail



Light Corrosion on Guiderail Over Structure



Missing Handrail at Barrel Inlet





Wide Crack on Curb



Light Scaling on Sidewalk



Wide Crack on Wearing Surface



North Construction Joint





South Construction Joint



Delamination on Barrel Soffit



Light Spalling of Barrel Soffit



Spalling Around Storm Sewer Outlet





Severe Scouring of Barrel Walls



Severe Scaling Below Storm Sewer Outlet on Barrel Wall



Tree at Barrel Inlet



Delamination on Inlet Retaining Wall





Loss of Rock at Inlet Gabion Basket



Delamination on Outlet Headwall



Wide Crack on Outlet Retaining Wall



Looking Upstream





Looking Downstream



**Summary Action Report**  
**Structure 03-1182510 CU01 (MTO Site No. )**  
**Trafalgar Road Culvert**

Inspection Date 01/23/2012 mm/dd/yyyy Condition Index Value (BCI)   
 Next Biennial Inspection 01/23/2014 mm/dd/yyyy Current Rep. Value

**Additional Investigations**

Investigation	Priority	Cost	Investigation	Priority	Cost
No additional investigations required.					

**Performance Deficiencies**

No Performance Deficiencies

**Maintenance Needs**

Element Group	Element	Maintenance Required	Priority	Comment
Coatings	Railing Systems/Hand Railings	Bridge Handrail Maintenance	2 yr	Touch up coating

**Repair/Rehabilitation**

Element Group	Element	Repair/Rehabilitation	Priority	Cost
Sidewalks/curbs	Curbs	Minor Rehabilitation Seal cracks	6-10 yrs	\$5,000
<b>Total Repair/Rehabilitation Cost</b>				<b>\$5,000</b>

Region of Halton	<input type="text" value="100"/>	<input type="text" value="\$13,500.00"/>	<b>Total Associated Work Cost</b>	<input type="text" value="\$8,500"/>
	<input type="text" value=""/>	<input type="text" value=""/>	<b>Total Cost</b>	<input type="text" value="\$13,500"/>


**Overall Comments**

Seal cracks in curb.

**Municipal Structure Inspection Form**

Structure Number:

**Inventory Data**

Structure Name	<input type="text" value="Trafalgar Road Culvert"/>	Hwy No.	<input type="text" value="03"/>	Key Photo		
Cross. Type Over	<input checked="" type="checkbox"/> Road <input type="checkbox"/> Rail <input type="checkbox"/> Ped <input type="checkbox"/> Nav. Water <input type="checkbox"/> Non-Nav. Wat. <input type="checkbox"/> Other					
Cross. Type Under	<input type="checkbox"/> Road <input type="checkbox"/> Rail <input type="checkbox"/> Ped <input type="checkbox"/> Nav. Water <input checked="" type="checkbox"/> Non-Nav. Wat. <input type="checkbox"/> Other					
Road Name	<input type="text" value="Trafalgar Road"/>					
Structure Location	<input type="text" value="0.01 km North of Dundas Street East"/>					
Northing	<input type="text" value="603673.0"/>	Easting	<input type="text" value="4815653.0"/>	Cur. Rep. Value	<input type="text" value="\$743,242"/>	
Owner(s)/ % Share	<input type="text" value="Region of Halton"/>		<input type="text" value="100"/>	**		
Heritage Status	<input type="text" value="Not Considered for Designation"/>					
MTO Region	<input type="text" value="Central"/>		Road Side Env.	<input type="text" value="Rural"/>		
MTO District	<input type="text" value="Central"/>		Road Class	<input type="text" value="Arterial"/>		
Old County	<input type="text" value="Halton"/>		Lane Type	<input type="text" value=""/>		
Geographic Twp.	<input type="text" value=""/>		Posted Speed	<input type="text" value="70"/>	No. of Lanes	<input type="text" value="6"/>
Structure Type	<input type="text" value="Rectangular Culvert"/>		AADT	<input type="text" value="0"/>	Pct. Trucks	<input type="text" value="0"/>
Structure Material	<input type="text" value="Reinforced Cast-in-Place Concrete"/>		Inspection Route Sequence	<input type="text" value=""/>		
Articulation	<input type="text" value=""/>		Interchange Number	<input type="text" value=""/>		
Total Deck Length	<input type="text" value="31"/> m	Road Width	<input type="text" value="24"/> m	Interchange Structure Number	<input type="text" value=""/>	
Overall Width	<input type="text" value="2.9"/> m	Vert. Clear.	<input type="text" value="0"/> m	Detour Length	<input type="text" value="0"/> km	
Total Deck Area	<input type="text" value="89.90"/> m <sup>2</sup>	No. of Spans	<input type="text" value="1"/>	Skew Angle	<input type="text" value="0"/> °	
Special Routes	<input type="checkbox"/> Transit <input type="checkbox"/> Schoo <input type="checkbox"/> Truck <input type="checkbox"/> Bicycle		Fill on Structure	<input type="text" value="1.3"/> m	Struct. Dir.	<input type="text" value="East/West"/>
Insp. Duration	<input type="text" value="1"/> hr					

\*\* Current Replacement Value is based on in kind replacement of the existing structure and calculated using benchmark costs. Capital planning should consider site specific cost factors and requirements for widening or lengthening of the structure.

**Spans**

Span Name	Span Length	Span Name	Span Length
1	2.4 m		

**Historical Data**

Year Built	<input type="text" value="1990"/> yyyy	Year of Last Major Rehab	<input type="text" value=""/> yyyy
Last OSIM Inspection	<input type="text" value=""/> mm/dd/yyyy	Contract No. When Built	<input type="text" value=""/>
Last Enhanced OSIM	<input type="text" value=""/> mm/dd/yyyy	Last Evaluation	<input type="text" value=""/> mm/dd/yyyy
Last Enhanced Access	<input type="text" value=""/> mm/dd/yyyy	Current Load Limit	<input type="text" value=""/> t <input type="text" value=""/> t <input type="text" value=""/> t
Last Underwater Insp.	<input type="text" value=""/> mm/dd/yyyy	Load Limit By-Law No.	<input type="text" value=""/> mm/dd/yyyy
Last Condition Survey	<input type="text" value=""/> mm/dd/yyyy	By-Law Expiry Date	<input type="text" value=""/> mm/dd/yyyy

**Rehab History**

Rehab Date	Rehab Description
	Culvert has been extended 2.9m to the East and 3.8m to the West



Municipal Structure Inspection Form

Structure Number: **03-1182510 CU01**

**Field Inspection Information:**

Inspection Date: 01/23/2012 mm/dd/yyyy  Multi Day Inspection  OSIM  Enhanced OSIM BCI: 73.8

Inspector: J.Parkinson Eng. Responsible: D. L. Baxter, P. Eng.

Others in Party: J. Dynes

Access Equip.  Lift  Ladder  Boat  Bridge Master Other: \_\_\_\_\_

Other Equip.: Camera, Hammer, Other Hand Tools

Weather: Cloudy Temperature: -19 °C

**Additional Investigations Required:**

Investigation	Priority			Estimated Cost
	None	Normal	Urgent	
Detailed Deck Condition Survey	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	\$0
Delamination Survey of Asphalt-Covered Deck	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	\$0
Concrete Substructure Condition Survey	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	\$0
Detailed Coating Condition Survey	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	\$0
Detailed Timber Investigation	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	\$0
Post-Tensioned Strand Investigation	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	\$0
Underwater Investigation	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	\$0
Fatigue Investigation	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	\$0
Seismic Investigation	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	\$0
Structure Evaluation	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	\$0
Monitoring of Deformations, Movements and Settlements	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	\$0
Monitoring of Crack Widths	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	\$0
<b>Investigation Notes</b>				<b>Total Cost</b>
				\$0

**Overall Structure Notes:**

Recommend Work on Structure  None  Minor Rehab  Major Rehab  Replace  Remove

Timing of Recommended Work  1 to 5 years  6 to 10 years

Overall Comments: Seal cracks in curb.

BCI Change Justification:

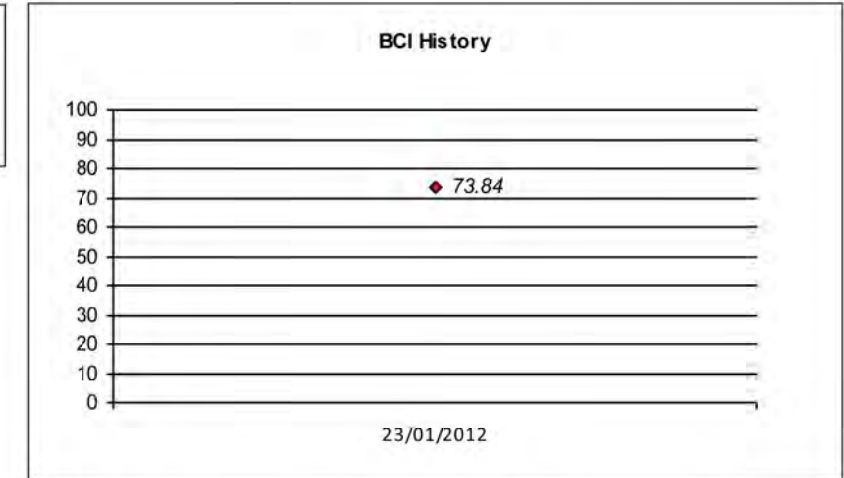
Next Inspection: 01/23/2014 mm/dd/yyyy Estimated Load Limit:  t  t  t

Municipal Structure Inspection Form

Structure Number: **03-1182510 CU01**

**BCI History**

Insp. Date	BCI	Inspector
23-Jan-12	73.84	J.Parkinson



All BCI values are based on the MTO BCI methodology published in April 2008. As a result, BCI values for 2007 and earlier are approximate only, with potential discrepancies resulting from changes (over time) in the way quantities for certain elements are calculated.

**Standard Codes**

**Suspected Performance Deficiencies**

- |   |  |                              |
|---|--|------------------------------|
| 00 None   | 06 Bearing not uniformly loaded/unstable | 12 Slippery surfaces         |
| 01 Load carrying capacity                         | 07 Jammed expansion joint                | 13 Flooding/channel blockage |
| 02 Excessive deformations (deflections/rotations) | 08 Pedestrian/vehicular hazard           | 14 Undermining of foundation |
| 03 Continuing settlement                          | 09 Rough riding surface                  | 15 Unstable embankments      |
| 04 Continuing movements                           | 10 Surface ponding                       | 16 Other                     |
| 05 Seized bearings                                | 11 Deck drainage                         |                              |

**Maintenance Needs**

- |                                      |                                 |                                 |
|--------------------------------------|---------------------------------|---------------------------------|
| 01 Lift and Swing Bridge Maintenance | 07 Repair to Structural Steel   | 13 Erosion Control at Bridges   |
| 02 Bridge Cleaning                   | 08 Repair of Bridge Concrete    | 14 Concrete Sealing             |
| 03 Bridge Handrail Maintenance       | 09 Repair of Bridge Timber      | 15 Rout and Seal                |
| 04 Painting Steel Bridge Structures  | 10 Bailey Bridges - Maintenance | 16 Bridge deck Drainage         |
| 05 Bridge Deck Joint Repair          | 11 Animal/Pest Control          | 17 Scaling (Loose or ACR Steel) |
| 06 Bridge Bearing Maintenance        | 12 Bridge Surface Repair        | 18 Other                        |



**Element Data**

**Culverts - Barrels**

Element Group: Culverts Length: 31.00 Width: 2.43  
 Element Name: Barrels Height: 1.20 Count: 1.00  
 Location: Below Roadway Total Quantity: 225.06  
 Material: Cast-in-place concrete  Limited Inspection  
 Element Type: Environment:  Benign  
 Protection System: None  Moderate  Severe  
 Condition Data: 

Units	Excell.	Good	Fair	Poor
sq. m	0.00	218.06	4.00	3.00

  
 Comments: Narrow stained cracks in culvert extension, light scaling, narrow cracks, light honeycombing, rust stains, narrow to medium cracks in barrel wall. Culvert extended: 3.8m at the West end, 2.9m at the East end.

Performance Deficiencies	Maintenance Needs	Priority	Comments
None			

Rehab/Repair Recommendations	Priority	Cost	Comments

**Culverts - Inlet Components**

Element Group: Culverts Length: 0.00 Width: 2.80  
 Element Name: Inlet Components Height: 0.50 Count: 1.00  
 Location: East Side Total Quantity: 1.40  
 Material: Cast-in-place concrete  Limited Inspection  
 Element Type: Headwall Environment:  Benign  
 Protection System: None  Moderate  Severe  
 Condition Data: 

Units	Excell.	Good	Fair	Poor
sq. m	0.00	1.40	0.00	0.00

  
 Comments:

Performance Deficiencies	Maintenance Needs	Priority	Comments
None			

Rehab/Repair Recommendations	Priority	Cost	Comments

**Culverts - Outlet Components**

Element Group: Culverts Length: 0.00 Width: 3.05  
 Element Name: Outlet Components Height: 2.20 Count: 1.00  
 Location: West Side Total Quantity: 6.70  
 Material: Cast-in-place concrete  Limited Inspection  
 Element Type: Headwall Environment:  Benign  
 Protection System: None  Moderate  Severe  
 Condition Data: 

Units	Excell.	Good	Fair	Poor
sq. m	0.00	6.70	0.00	0.00

  
 Comments: Light honeycombing.

Performance Deficiencies	Maintenance Needs	Priority	Comments
None			

Rehab/Repair Recommendations	Priority	Cost	Comments

**Embankments & Streams - Embankments**

Element Group: Embankments & Streams Length: 0.00 Width: 0.00  
 Element Name: Embankments Height: 0.00 Count: 4.00  
 Location: All Quadrants Total Quantity: 4.00  
 Material: Other  Limited Inspection  
 Element Type: Environment:  Benign  
 Protection System: Vegetation  Moderate  Severe  
 Condition Data: 

Units	Excell.	Good	Fair	Poor
Each	0.00	4.00	0.00	0.00

  
 Comments:

Performance Deficiencies	Maintenance Needs	Priority	Comments
None			

Rehab/Repair Recommendations	Priority	Cost	Comments



Municipal Structure Inspection Form

Structure Number: **03-1182510 CU01**

**Embankments & Streams - Slope Protection**

Element Group: Embankments & Streams Length: 0.00 Width: 0.00  
 Element Name: Slope Protection Height: 0.00 Count: 4.00  
 Location: All Quadrants Total Quantity: 4.00  
 Material: Vegetation  Limited Inspection  
 Element Type: Environment:  Benign  
 Protection System: None  Moderate  
 Condition Data: 

Units	Excell.	Good	Fair	Poor
Each	0.00	4.00	0.00	0.00

 Severe

Comments:

Performance Deficiencies: None  
 Maintenance Needs:   
 Priority:   
 Comments:   
 Rehab/Repair Recommendations:   
 Priority:   
 Cost:   
 Comments:

**Embankments & Streams - Streams & Waterways**

Element Group: Embankments & Streams Length: 0.00 Width: 0.00  
 Element Name: Streams & Waterways Height: 0.00 Count: 1.00  
 Location: Through Structure Total Quantity: 1.00  
 Material:  Limited Inspection  
 Element Type: Environment:  Benign  
 Protection System:  Moderate  
 Condition Data: 

Units	Excell.	Good	Fair	Poor
All	0.00	1.00	0.00	0.00

 Severe

Comments:

Performance Deficiencies: None  
 Maintenance Needs:   
 Priority:   
 Comments:   
 Rehab/Repair Recommendations:   
 Priority:   
 Cost:   
 Comments:

Municipal Structure Inspection Form

Structure Number: **03-1182510 CU01**

**Retaining walls - Walls**

Element Group: Retaining walls Length: 3.00 Width: 0.00  
 Element Name: Walls Height: 2.00 Count: 3.00  
 Location: Northeast, Northwest and Southwest Quadrants Total Quantity: 18.00  
 Material: Rock  Limited Inspection  
 Element Type: Gabions Environment:  Benign  
 Protection System: None  Moderate  
 Condition Data: 

Units	Excell.	Good	Fair	Poor
sq. m	0.00	18.00	0.00	0.00

 Severe

Comments: Outward rotation of Northwest gabion.

Performance Deficiencies: None  
 Maintenance Needs:   
 Priority:   
 Comments:   
 Rehab/Repair Recommendations:   
 Priority:   
 Cost:   
 Comments:

**Retaining walls - Walls**

Element Group: Retaining walls Length: 10.00 Width: 0.00  
 Element Name: Walls Height: 1.90 Count: 1.00  
 Location: Southeast Quadrant Total Quantity: 19.00  
 Material: Precast concrete  Limited Inspection  
 Element Type: Environment:  Benign  
 Protection System: None  Moderate  
 Condition Data: 

Units	Excell.	Good	Fair	Poor
sq. m	0.00	19.00	0.00	0.00

 Severe

Comments:

Performance Deficiencies: None  
 Maintenance Needs:   
 Priority:   
 Comments:   
 Rehab/Repair Recommendations:   
 Priority:   
 Cost:   
 Comments:



Municipal Structure Inspection Form

Structure Number: **03-1182510 CU01**

**Barriers - Railing Systems**

Element Group: Barriers Length: 16.00 Width: 0.00  
 Element Name: Railing Systems Height: 1.00 Count: 1.00  
 Location: Above Headwall Total Quantity: 16.00  
 Material: Steel  Limited Inspection  
 Element Type: Environment:  Benign  
 Protection System: Hot dip galvanizing  Moderate  Severe  
 Condition Data: 

Units	Excell.	Good	Fair	Poor
m	0.00	16.00	0.00	0.00

  
 Comments: Light corrosion.

Performance Deficiencies	Maintenance Needs	Priority	Comments
None			

Rehab/Repair Recommendations	Priority	Cost	Comments

**Sidewalks/curbs - Curbs**

Element Group: Sidewalks/curbs Length: 15.50 Width: 0.20  
 Element Name: Curbs Height: 0.20 Count: 2.00  
 Location: East and West Sides Total Quantity: 12.40  
 Material: Cast-in-place concrete  Limited Inspection  
 Element Type: Environment:  Benign  
 Protection System: None  Moderate  Severe  
 Condition Data: 

Units	Excell.	Good	Fair	Poor
sq. m	0.00	10.40	1.00	1.00

  
 Comments: Narrow to wide cracks, light honeycombing.

Performance Deficiencies	Maintenance Needs	Priority	Comments
None			

Rehab/Repair Recommendations	Priority	Cost	Comments
Minor Rehabilitation	6-10 yrs	\$5,000	Seal cracks

Municipal Structure Inspection Form

Structure Number: **03-1182510 CU01**

**Coatings - Railing Systems/Hand Railings**

Element Group: Coatings Length: 0.00 Width: 0.00  
 Element Name: Railing Systems/Hand Railings Height: 0.00 Count: 0.00  
 Location: Above Headwall Total Quantity: 9.85  
 Material: Hot Dip Galvanizing  Limited Inspection  
 Element Type: Environment:  Benign  
 Protection System: None  Moderate  Severe  
 Condition Data: 

Units	Excell.	Good	Fair	Poor
sq. m	0.00	8.85	0.50	0.50

  
 Comments: Breakdown of protective coating.

Performance Deficiencies	Maintenance Needs	Priority	Comments
None	Bridge Handrail Maintenance	2 yr	Touch up coating

Rehab/Repair Recommendations	Priority	Cost	Comments

**Barriers - Railing Systems**

Element Group: Barriers Length: 15.50 Width: 0.00  
 Element Name: Railing Systems Height: 0.00 Count: 2.00  
 Location: East and West Sides Total Quantity: 31.00  
 Material: Steel  Limited Inspection  
 Element Type: Steel Flex Beam over other railing Environment:  Benign  
 Protection System: Hot dip galvanizing  Moderate  Severe  
 Condition Data: 

Units	Excell.	Good	Fair	Poor
m	0.00	31.00	0.00	0.00

  
 Comments:

Performance Deficiencies	Maintenance Needs	Priority	Comments
None			

Rehab/Repair Recommendations	Priority	Cost	Comments



Municipal Structure Inspection Form

Structure Number: **03-1182510 CU01**

Barriers - Posts						
Element Group	Barriers		Length	0.20	Width	0.20
Element Name	Posts		Height	0.80	Count	7.00
Location	West Side		Total Quantity			7.00
Material	Wood		<input type="checkbox"/> Limited Inspection			
Element Type	Wood Posts In Steel Flexbeam System		Environment			
Protection System	None		<input type="checkbox"/> Benign			
Condition Data	Units	Excell.	Good	Fair	Poor	<input type="checkbox"/> Moderate
	Each	0.00	7.00	0.00	0.00	<input checked="" type="checkbox"/> Severe
Comments						
Light checking.						
Performance Deficiencies		Maintenance Needs		Priority	Comments	
None						
Rehab/Repair Recommendations		Priority	Cost	Comments		

Coatings - Railing Systems/Hand Railings						
Element Group	Coatings		Length	0.00	Width	0.00
Element Name	Railing Systems/Hand Railings		Height	0.00	Count	0.00
Location	Steel Flex Beam		Total Quantity			23.40
Material	Hot Dip Galvanizing		<input type="checkbox"/> Limited Inspection			
Element Type			Environment			
Protection System	None		<input type="checkbox"/> Benign			
Condition Data	Units	Excell.	Good	Fair	Poor	<input type="checkbox"/> Moderate
	sq. m	0.00	23.40	0.00	0.00	<input checked="" type="checkbox"/> Severe
Comments						
Performance Deficiencies		Maintenance Needs		Priority	Comments	
None						
Rehab/Repair Recommendations		Priority	Cost	Comments		

Municipal Structure Inspection Form

Structure Number: **03-1182510 CU01**

Barriers - Posts						
Element Group	Barriers		Length	0.10	Width	0.15
Element Name	Posts		Height	0.10	Count	6.00
Location	East Side		Total Quantity			6.00
Material	Steel		<input type="checkbox"/> Limited Inspection			
Element Type	Steel Posts in Steel Flexbeam System		Environment			
Protection System	Hot dip galvanizing		<input type="checkbox"/> Benign			
Condition Data	Units	Excell.	Good	Fair	Poor	<input type="checkbox"/> Moderate
	Each	0.00	6.00	0.00	0.00	<input checked="" type="checkbox"/> Severe
Comments						
Performance Deficiencies		Maintenance Needs		Priority	Comments	
None						
Rehab/Repair Recommendations		Priority	Cost	Comments		

Foundations - Foundations (below ground level)						
Element Group	Foundations		Length	0.00	Width	0.00
Element Name	Foundations (below ground level)		Height	0.00	Count	0.00
Location	Below Ground Level		Total Quantity			0.00
Material			<input checked="" type="checkbox"/> Limited Inspection			
Element Type			Environment			
Protection System			<input type="checkbox"/> Benign			
Condition Data	Units	Excell.	Good	Fair	Poor	<input type="checkbox"/> Moderate
						<input type="checkbox"/> Severe
Comments						
Limited inspection.						
Performance Deficiencies		Maintenance Needs		Priority	Comments	
None						
Rehab/Repair Recommendations		Priority	Cost	Comments		



Municipal Structure Inspection Form

Structure Number: **03-1182510 CU01**

Decks - Wearing Surface						
Element Group	Decks		Length	15.50	Width	24.00
Element Name	Wearing Surface		Height	0.00	Count	1.00
Location	Above Structure		Total Quantity			372.00
Material	Asphalt		<input type="checkbox"/> Limited Inspection			
Element Type			Environment			
Protection System	None		<input type="checkbox"/> Benign			
Condition Data	<i>Units</i>	<i>Excell.</i>	<i>Good</i>	<i>Fair</i>	<i>Poor</i>	<input type="checkbox"/> Moderate
	sq. m	0.00	372.00	0.00	0.00	<input checked="" type="checkbox"/> Severe
Comments						
Narrow sealed and unsealed cracks.						
Performance Deficiencies		Maintenance Needs		Priority Comments		
None						
Rehab/Repair Recommendations		Priority		Cost Comments		

Approaches - Approach Guiderail						
Element Group	Approaches		Length	0.00	Width	0.00
Element Name	Approach Guiderail		Height	0.00	Count	1.00
Location	Northeast Quadrant		Total Quantity			1.00
Material	Steel		<input type="checkbox"/> Limited Inspection			
Element Type			Environment			
Protection System	Hot dip galvanizing		<input type="checkbox"/> Benign			
Condition Data	<i>Units</i>	<i>Excell.</i>	<i>Good</i>	<i>Fair</i>	<i>Poor</i>	<input type="checkbox"/> Moderate
	Each	0.00	1.00	0.00	0.00	<input checked="" type="checkbox"/> Severe
Comments						
Eccentric loader end treatment is provided in the Northeast.						
Performance Deficiencies		Maintenance Needs		Priority Comments		
None						
Rehab/Repair Recommendations		Priority		Cost Comments		

Municipal Structure Inspection Form

Structure Number: **03-1182510 CU01**

Approaches - Approach Guiderail						
Element Group	Approaches		Length	0.00	Width	0.00
Element Name	Approach Guiderail		Height	0.00	Count	3.00
Location	Northwest, Southwest and Southeast Quadrants		Total Quantity			3.00
Material	Steel		<input type="checkbox"/> Limited Inspection			
Element Type			Environment			
Protection System	Hot dip galvanizing		<input type="checkbox"/> Benign			
Condition Data	<i>Units</i>	<i>Excell.</i>	<i>Good</i>	<i>Fair</i>	<i>Poor</i>	<input type="checkbox"/> Moderate
	Each	0.00	3.00	0.00	0.00	<input checked="" type="checkbox"/> Severe
Comments						
Terminal end treatments provided in the Northwest and Southwest quadrants. Southeast guiderail wraps into a driveway. A terminal end treatment has been provided.						
Performance Deficiencies		Maintenance Needs		Priority Comments		
None						
Rehab/Repair Recommendations		Priority		Cost Comments		



Repair/Rehabilitation Required				
Element Group	Element	Repair/Rehabilitation	Priority	Cost
Sidewalks/curbs	Curbs	Minor Rehabilitation	6-10 yrs	\$5,000
<b>Total Repair/Rehabilitation Cost</b>				<b>\$5,000</b>

Associated Work				
	Comments			Estimated Cost
Approaches				\$0
Detours				\$0
Traffic Control				\$0
Utilities				\$0
Right-of-Way				\$0
Environmental Study				\$0
Other				\$0
Contingencies		10%	**	\$500
Engineering			**	\$8,000
<b>Total Associated Work Cost</b>				<b>\$8,500</b>
<b>Total Repair/Rehabilitation Cost</b>				<b>\$5,000</b>
<b>Total Cost</b>				<b>\$13,500</b>
Region of Halton Share @ 100%				\$13,500

\*\* If based on a percentage calculated values rounded-up to the nearest thousand dollars.

Justification



Looking South at Roadway Over Culvert



East Elevation





West Elevation



Light Corrosion of Light Pipe Handrail



Typical Steel Flex Beam (West Side)



Checking of Flex Beam Wood Post





Wide Vertical Crack in East Concrete Curb



Sealed and Unsealed Narrow Cracks in Wearing Surface



Narrow Stained Crack in Barrel Soffit Extension



Narrow Stained Crack in Barrel Soffit





Light Scaling of Original Barrel Wall



Medium Vertical Crack in Barrel Soffit



Looking East Through Barrel



Looking West Through Barrel





Light Honeycombing of Outlet Headwall



Typical Concrete Retaining Wall (East Side)



Looking Downstream



Looking Upstream



**Summary Action Report**  
**Structure 03-1182530 CU02 (MTO Site No. )**  
**Trafalgar Road Culvert**

Inspection Date 01/23/2013 mm/dd/yyyy Condition Index Value (BCI) 37.8  
 Next Biennial Inspection 01/23/2015 mm/dd/yyyy Current Rep. Value \$668,059

**Additional Investigations**

Investigation	Priority	Cost	Investigation	Priority	Cost
No additional investigations required.					

**Performance Deficiencies**

No Performance Deficiencies

**Maintenance Needs**

No Maintenance Needs

**Repair/Rehabilitation**

Element Group	Element	Repair/Rehabilitation	Priority	Cost
Culverts	Barrels	Replace Replace culvert	Now	\$280,000
Barriers	Posts	Replace Costed under culvert barrel	Now	\$0
<b>Total Repair/Rehabilitation Cost</b>				<b>\$280,000</b>

Region of Halton	100%	\$624,000.00	<b>Total Associated Work Cost</b>	<b>\$344,000</b>
			<b>Total Cost</b>	<b>\$624,000</b>


**Overall Comments**

Replace culvert.

**Municipal Structure Inspection Form**

Structure Number: 03-1182530 CU02

**Inventory Data**

Structure Name	Trafalgar Road Culvert	Hwy No.	03	Key Photo	
Cross. Type Over	<input checked="" type="checkbox"/> Road <input type="checkbox"/> Rail <input type="checkbox"/> Ped <input type="checkbox"/> Nav. Water <input type="checkbox"/> Non-Nav. Wat. <input type="checkbox"/> Other				
Cross. Type Under	<input type="checkbox"/> Road <input type="checkbox"/> Rail <input type="checkbox"/> Ped <input type="checkbox"/> Nav. Water <input checked="" type="checkbox"/> Non-Nav. Wat. <input type="checkbox"/> Other				
Road Name	Trafalgar Road				
Structure Location	0.10 km South of Dundas Street				
Northing	603474.0	Easting	4815849.0	Cur. Rep. Value	\$668,059
Owner(s)/ % Share	Region of Halton	100%	**		
MTO Region	Central	Heritage Status	Not Considered for Designation		
MTO District	Central	Road Side Env.	Rural		
Old County	Halton	Road Class	Arterial		
Geographic Twp.		Lane Type			
Structure Type	Arch Culvert	Posted Speed	70	No. of Lanes	4
Structure Material	Corrugated Steel Pipe	AADT		Pct. Trucks	0
Articulation		Inspection Route Sequence			
Total Deck Length	36.75 m	Road Width	20.75 m	Interchange Number	
Overall Width	3.5 m	Vert. Clear.	0 m	Interchange Structure Number	
Total Deck Area	128.63 m <sup>2</sup>	No. of Spans	1	Detour Length	0 km
Special Routes	<input type="checkbox"/> Transit <input type="checkbox"/> Schoo <input type="checkbox"/> Truck <input type="checkbox"/> Bicycle	Fill on Structure	1.8 m	Skew Angle	0°
		Insp. Duration	1 hr	Struct. Dir.	East/West

\*\* Current Replacement Value is based on in kind replacement of the existing structure and calculated using benchmark costs. Capital planning should consider site specific cost factors and requirements for widening or lengthening of the structure.

**Spans**

Span Name	Span Length	Span Name	Span Length
1	3.5 m		

**Historical Data**

Year Built	1990 yyyy	Year of Last Major Rehab	yyyy
Last OSIM Inspection	mm/dd/yyyy	Contract No. When Built	
Last Enhanced OSIM	mm/dd/yyyy	Last Evaluation	mm/dd/yyyy
Last Enhanced Access	mm/dd/yyyy	Current Load Limit	t t t
Last Underwater Insp.	mm/dd/yyyy	Load Limit By-Law No.	mm/dd/yyyy
Last Condition Survey	mm/dd/yyyy	By-Law Expiry Date	mm/dd/yyyy

**Rehab History**



Municipal Structure Inspection Form

Structure Number: **03-1182530 CU02**

**Field Inspection Information:**

Inspection Date: 01/23/2013 mm/dd/yyyy  Multi Day Inspection  OSIM  Enhanced OSIM BCI: 37.8

Inspector: J.Parkinson Eng. Responsible: D. L. Baxter, P. Eng.

Others in Party: J. Dynes

Access Equip.  Lift  Ladder  Boat  Bridge Master Other: \_\_\_\_\_

Other Equip.: Camera, Hammer, Other Hand Tools

Weather: Cloudy Temperature: -19 °C

**Additional Investigations Required:**

Investigation	Priority			Estimated Cost
	None	Normal	Urgent	
Detailed Deck Condition Survey	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	\$0
Delamination Survey of Asphalt-Covered Deck	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	\$0
Concrete Substructure Condition Survey	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	\$0
Detailed Coating Condition Survey	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	\$0
Detailed Timber Investigation	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	\$0
Post-Tensioned Strand Investigation	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	\$0
Underwater Investigation	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	\$0
Fatigue Investigation	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	\$0
Seismic Investigation	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	\$0
Structure Evaluation	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	\$0
Monitoring of Deformations, Movements and Settlements	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	\$0
Monitoring of Crack Widths	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	\$0
<b>Investigation Notes</b>				<b>Total Cost</b>
				\$0

**Overall Structure Notes:**

Recommend Work on Structure  None  Minor Rehab  Major Rehab  Replace  Remove

Timing of Recommended Work  1 to 5 years  6 to 10 years

Overall Comments: Replace culvert.

BCI Change Justification:

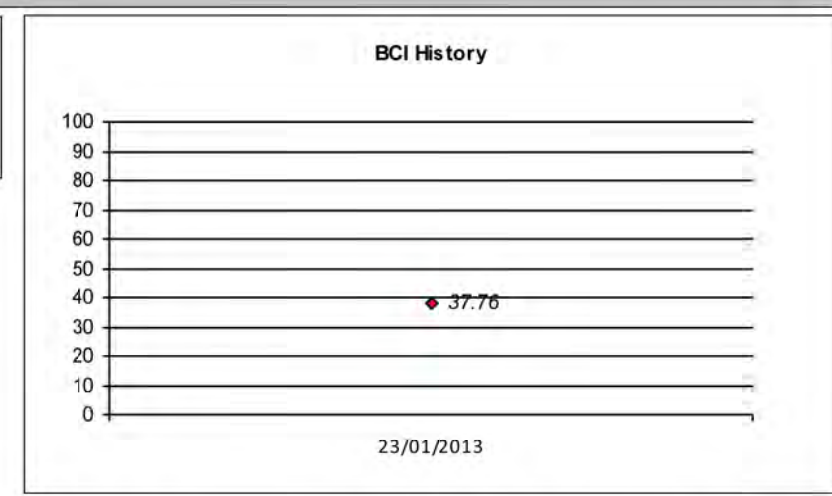
Next Inspection: 01/23/2015 mm/dd/yyyy Estimated Load Limit:  t  t  t

Municipal Structure Inspection Form

Structure Number: **03-1182530 CU02**

**BCI History**

Insp. Date	BCI	Inspector
23-Jan-13	37.76	J.Parkinson



All BCI values are based on the MTO BCI methodology published in April 2008. As a result, BCI values for 2007 and earlier are approximate only, with potential discrepancies resulting from changes (over time) in the way quantities for certain elements are calculated.

**Standard Codes**

- Suspected Performance Deficiencies**
- 00 None
  - 01 Load carrying capacity
  - 02 Excessive deformations (deflections/rotations)
  - 03 Continuing settlement
  - 04 Continuing movements
  - 05 Seized bearings
  - 06 Bearing not uniformly loaded/unstable
  - 07 Jammed expansion joint
  - 08 Pedestrian/vehicular hazard
  - 09 Rough riding surface
  - 10 Surface ponding
  - 11 Deck drainage
  - 12 Slippery surfaces
  - 13 Flooding/channel blockage
  - 14 Undermining of foundation
  - 15 Unstable embankments
  - 16 Other
- Maintenance Needs**
- 01 Lift and Swing Bridge Maintenance
  - 02 Bridge Cleaning
  - 03 Bridge Handrail Maintenance
  - 04 Painting Steel Bridge Structures
  - 05 Bridge Deck Joint Repair
  - 06 Bridge Bearing Maintenance
  - 07 Repair to Structural Steel
  - 08 Repair of Bridge Concrete
  - 09 Repair of Bridge Timber
  - 10 Bailey Bridges - Maintenance
  - 11 Animal/Pest Control
  - 12 Bridge Surface Repair
  - 13 Erosion Control at Bridges
  - 14 Concrete Sealing
  - 15 Rout and Seal
  - 16 Bridge deck Drainage
  - 17 Scaling (Loose or ACR Steel)
  - 18 Other



**Element Data**

**Culverts - Barrels**

Element Group	Culverts	Length	36.75	Width	3.50
Element Name	Barrels	Height	2.10	Count	1.00
Location	Below Roadway	<b>Total Quantity</b> 333.22			
Material	Corrugated steel	<input type="checkbox"/> Limited Inspection			
Element Type	Arch	Environment			
Protection System	Hot dip galvanizing	<input checked="" type="checkbox"/> Benign			
Condition Data	<b>Units</b>	<b>Excell.</b>	<b>Good</b>	<b>Fair</b>	<b>Poor</b>
	sq. m	0.00	24.82	154.20	154.20
<input type="checkbox"/> Moderate <input type="checkbox"/> Severe					

Comments  
Severe corrosion, perforations on barrel inverts, heaving of the barrel invert.

Performance Deficiencies	Maintenance Needs	Priority	Comments
None			

Rehab/Repair Recommendations	Priority	Cost	Comments
Replace	Now	\$280,000	Replace culvert

**Culverts - Inlet Components**

Element Group	Culverts	Length	0.00	Width	12.00	
Element Name	Inlet Components	Gabion Basket	Height	1.60	Count	1.00
Location	Interior of Structure	<b>Total Quantity</b> 19.20				
Material	Rock	<input type="checkbox"/> Limited Inspection				
Element Type		Environment				
Protection System	None	<input type="checkbox"/> Benign				
Condition Data	<b>Units</b>	<b>Excell.</b>	<b>Good</b>	<b>Fair</b>	<b>Poor</b>	
	sq. m	0.00	19.20	0.00	0.00	
<input checked="" type="checkbox"/> Moderate <input type="checkbox"/> Severe						

Comments  
Minor outward rotation.

Performance Deficiencies	Maintenance Needs	Priority	Comments
None			

Rehab/Repair Recommendations	Priority	Cost	Comments

**Coatings - Structural Steel**

Element Group	Coatings	Length	0.00	Width	0.00
Element Name	Structural Steel	Height	0.00	Count	0.00
Location	Culvert Barrel	<b>Total Quantity</b> 333.22			
Material	Hot Dip Galvanizing	<input type="checkbox"/> Limited Inspection			
Element Type		Environment			
Protection System	Hot dip galvanizing	<input checked="" type="checkbox"/> Benign			
Condition Data	<b>Units</b>	<b>Excell.</b>	<b>Good</b>	<b>Fair</b>	<b>Poor</b>
	sq. m	0.00	100.00	133.22	100.00
<input type="checkbox"/> Moderate <input type="checkbox"/> Severe					

Comments  
Breakdown of protective coating.

Performance Deficiencies	Maintenance Needs	Priority	Comments
None			

Rehab/Repair Recommendations	Priority	Cost	Comments

**Culverts - Outlet Components**

Element Group	Culverts	Length	0.00	Width	15.50	
Element Name	Outlet Components	Gabion Basket	Height	1.80	Count	1.00
Location	Exterior of Structure	<b>Total Quantity</b> 27.90				
Material	Rock	<input type="checkbox"/> Limited Inspection				
Element Type		Environment				
Protection System	None	<input type="checkbox"/> Benign				
Condition Data	<b>Units</b>	<b>Excell.</b>	<b>Good</b>	<b>Fair</b>	<b>Poor</b>	
	sq. m	0.00	27.90	0.00	0.00	
<input checked="" type="checkbox"/> Moderate <input type="checkbox"/> Severe						

Comments

Performance Deficiencies	Maintenance Needs	Priority	Comments
None			

Rehab/Repair Recommendations	Priority	Cost	Comments



Municipal Structure Inspection Form

Structure Number: **03-1182530 CU02**

Embankments & Streams - Embankments						
Element Group	Embankments & Streams		Length	0.00	Width	0.00
Element Name	Embankments		Height	0.00	Count	4.00
Location	All Quadrants		Total Quantity			4.00
Material	Other		<input type="checkbox"/> Limited Inspection			
Element Type			Environment			
Protection System	Vegetation		<input type="checkbox"/> Benign			
Condition Data	Units	Excell.	Good	Fair	Poor	<input type="checkbox"/> Moderate
	Each	0.00	4.00	0.00	0.00	<input type="checkbox"/> Severe
Comments						
Performance Deficiencies		Maintenance Needs		Priority	Comments	
None						
Rehab/Repair Recommendations		Priority	Cost	Comments		

Embankments & Streams - Slope Protection						
Element Group	Embankments & Streams		Length	0.00	Width	0.00
Element Name	Slope Protection		Height	0.00	Count	4.00
Location	All Quadrants		Total Quantity			4.00
Material	Vegetation		<input type="checkbox"/> Limited Inspection			
Element Type			Environment			
Protection System	None		<input type="checkbox"/> Benign			
Condition Data	Units	Excell.	Good	Fair	Poor	<input type="checkbox"/> Moderate
	Each	0.00	4.00	0.00	0.00	<input type="checkbox"/> Severe
Comments						
Performance Deficiencies		Maintenance Needs		Priority	Comments	
None						
Rehab/Repair Recommendations		Priority	Cost	Comments		

Municipal Structure Inspection Form

Structure Number: **03-1182530 CU02**

Embankments & Streams - Streams & Waterways						
Element Group	Embankments & Streams		Length	0.00	Width	0.00
Element Name	Streams & Waterways		Height	0.00	Count	1.00
Location	Through Structure		Total Quantity			1.00
Material			<input type="checkbox"/> Limited Inspection			
Element Type			Environment			
Protection System	None		<input type="checkbox"/> Benign			
Condition Data	Units	Excell.	Good	Fair	Poor	<input type="checkbox"/> Moderate
	All	0.00	1.00	0.00	0.00	<input type="checkbox"/> Severe
Comments						
Performance Deficiencies		Maintenance Needs		Priority	Comments	
None						
Rehab/Repair Recommendations		Priority	Cost	Comments		

Sidewalks/curbs - Sidewalks/Medians						
Element Group	Sidewalks/curbs		Length	15.50	Width	1.50
Element Name	Sidewalks/Medians		Height	0.00	Count	1.00
Location	East Side Sidewalk		Total Quantity			23.25
Material	Cast-in-place concrete		<input type="checkbox"/> Limited Inspection			
Element Type			Environment			
Protection System	None		<input type="checkbox"/> Benign			
Condition Data	Units	Excell.	Good	Fair	Poor	<input type="checkbox"/> Moderate
	sq. m	0.00	23.25	0.00	0.00	<input checked="" type="checkbox"/> Severe
Comments						
Performance Deficiencies		Maintenance Needs		Priority	Comments	
None						
Rehab/Repair Recommendations		Priority	Cost	Comments		



Municipal Structure Inspection Form

Structure Number: **03-1182530 CU02**

Sidewalks/curbs - Sidewalks/Medians						
Element Group	Sidewalks/curbs		Length	15.50	Width	0.95
Element Name	Sidewalks/Medians		Height	0.15	Count	1.00
Location	Median		Total Quantity			17.05
Material	Cast-in-place concrete		<input type="checkbox"/> Limited Inspection			
Element Type			Environment			
Protection System	None		<input type="checkbox"/> Benign			
Condition Data	Units	Excell.	Good	Fair	Poor	<input type="checkbox"/> Moderate
	sq. m	0.00	17.05	0.00	0.00	<input checked="" type="checkbox"/> Severe
Comments						
Performance Deficiencies		Maintenance Needs		Priority	Comments	
None						
Rehab/Repair Recommendations		Priority	Cost	Comments		

Barriers - Railing Systems						
Element Group	Barriers		Length	15.50	Width	0.00
Element Name	Railing Systems	Chain Link Fence	Height	1.35	Count	1.00
Location	On Retaining Wall (Black Fence)		Total Quantity			15.50
Material	Steel		<input type="checkbox"/> Limited Inspection			
Element Type			Environment			
Protection System	Epoxy zinc/vinyl		<input type="checkbox"/> Benign			
Condition Data	Units	Excell.	Good	Fair	Poor	<input type="checkbox"/> Moderate
	m	0.00	15.50	0.00	0.00	<input checked="" type="checkbox"/> Severe
Comments						
Performance Deficiencies		Maintenance Needs		Priority	Comments	
None						
Rehab/Repair Recommendations		Priority	Cost	Comments		

Municipal Structure Inspection Form

Structure Number: **03-1182530 CU02**

Sidewalks/curbs - Curbs						
Element Group	Sidewalks/curbs		Length	15.50	Width	0.15
Element Name	Curbs		Height	0.15	Count	2.00
Location	East and West Sides		Total Quantity			9.30
Material	Cast-in-place concrete		<input type="checkbox"/> Limited Inspection			
Element Type			Environment			
Protection System	None		<input type="checkbox"/> Benign			
Condition Data	Units	Excell.	Good	Fair	Poor	<input type="checkbox"/> Moderate
	sq. m	0.00	9.30	0.00	0.00	<input checked="" type="checkbox"/> Severe
Comments						
Performance Deficiencies		Maintenance Needs		Priority	Comments	
None						
Rehab/Repair Recommendations		Priority	Cost	Comments		

Coatings - Railing Systems/Hand Railings						
Element Group	Coatings		Length	0.00	Width	0.00
Element Name	Railing Systems/Hand Railings		Height	0.00	Count	0.00
Location	Chain Link Fence		Total Quantity			20.93
Material	Other		<input type="checkbox"/> Limited Inspection			
Element Type	Epoxy Zinc/Vinyl		Environment			
Protection System	None		<input type="checkbox"/> Benign			
Condition Data	Units	Excell.	Good	Fair	Poor	<input type="checkbox"/> Moderate
	sq. m	0.00	20.93	0.00	0.00	<input checked="" type="checkbox"/> Severe
Comments						
Performance Deficiencies		Maintenance Needs		Priority	Comments	
None						
Rehab/Repair Recommendations		Priority	Cost	Comments		



Municipal Structure Inspection Form

Structure Number: **03-1182530 CU02**

Decks - Wearing Surface						
Element Group	Decks		Length	15.50	Width	20.75
Element Name	Wearing Surface		Height	0.00	Count	1.00
Location	Deck Top		Total Quantity			321.63
Material	Asphalt		<input type="checkbox"/> Limited Inspection			
Element Type			Environment			
Protection System	None		<input type="checkbox"/> Benign			
Condition Data	Units	Excell.	Good	Fair	Poor	<input type="checkbox"/> Moderate
	sq. m	0.00	321.63	0.00	0.00	<input checked="" type="checkbox"/> Severe
Comments						
Sealed and unsealed cracks.						
Performance Deficiencies		Maintenance Needs		Priority	Comments	
None						
Rehab/Repair Recommendations		Priority	Cost	Comments		

Barriers - Railing Systems						
Element Group	Barriers		Length	15.50	Width	0.00
Element Name	Railing Systems		Height	0.00	Count	1.00
Location	Above Structure		Total Quantity			15.50
Material	Steel		<input type="checkbox"/> Limited Inspection			
Element Type	Wood post and 3 cable		Environment			
Protection System	Hot dip galvanizing		<input type="checkbox"/> Benign			
Condition Data	Units	Excell.	Good	Fair	Poor	<input type="checkbox"/> Moderate
	m	0.00	0.00	11.50	4.00	<input checked="" type="checkbox"/> Severe
Comments						
Outward rotation, missing cable stays.						
Performance Deficiencies		Maintenance Needs		Priority	Comments	
None						
Rehab/Repair Recommendations		Priority	Cost	Comments		

Municipal Structure Inspection Form

Structure Number: **03-1182530 CU02**

Approaches - Approach Guiderail						
Element Group	Approaches		Length	0.00	Width	0.00
Element Name	Approach Guiderail		Height	0.00	Count	2.00
Location	Northwest and Southwest Quadrants		Total Quantity			2.00
Material	Steel		<input type="checkbox"/> Limited Inspection			
Element Type			Environment			
Protection System	Hot dip galvanizing		<input type="checkbox"/> Benign			
Condition Data	Units	Excell.	Good	Fair	Poor	<input type="checkbox"/> Moderate
	Each	0.00	2.00	0.00	0.00	<input checked="" type="checkbox"/> Severe
Comments						
Three cable guiderail is end buried in the Northwest and Southwest quadrant.						
Performance Deficiencies		Maintenance Needs		Priority	Comments	
None						
Rehab/Repair Recommendations		Priority	Cost	Comments		

Barriers - Posts						
Element Group	Barriers		Length	0.00	Width	0.00
Element Name	Posts		Height	1.00	Count	6.00
Location	West Side		Total Quantity			6.00
Material	Timber		<input type="checkbox"/> Limited Inspection			
Element Type	Wood Posts in 3-Cable System		Environment			
Protection System	None		<input type="checkbox"/> Benign			
Condition Data	Units	Excell.	Good	Fair	Poor	<input type="checkbox"/> Moderate
	Each	0.00	3.00	2.00	1.00	<input checked="" type="checkbox"/> Severe
Comments						
Severe split in one post, outward rotation.						
Performance Deficiencies		Maintenance Needs		Priority	Comments	
None						
Rehab/Repair Recommendations		Priority	Cost	Comments		
Replace		Now	\$0	Costed under culvert barrel		



Municipal Structure Inspection Form

Structure Number: **03-1182530 CU02**

Foundations - Foundations (below ground level)						
Element Group	Foundations		Length	0.00	Width	0.00
Element Name	Foundations (below ground level)		Height	0.00	Count	0.00
Location	Below Ground Level		Total Quantity			0.00
Material			<input checked="" type="checkbox"/> Limited Inspection			
Element Type			Environment			
Protection System			<input type="checkbox"/> Benign			
Condition Data	Units	Excell.	Good	Fair	Poor	<input type="checkbox"/> Moderate
						<input type="checkbox"/> Severe
Comments	Limited inspection.					
Performance Deficiencies	Maintenance Needs		Priority	Comments		
None						
Rehab/Repair Recommendations	Priority	Cost	Comments			

Approaches - Approach Guiderail						
Element Group	Approaches		Length	0.00	Width	0.00
Element Name	Approach Guiderail		Height	0.00	Count	2.00
Location	Northeast and Southeast Quadrants		Total Quantity			2.00
Material	Steel		<input type="checkbox"/> Limited Inspection			
Element Type			Environment			
Protection System	Hot dip galvanizing		<input type="checkbox"/> Benign			
Condition Data	Units	Excell.	Good	Fair	Poor	<input type="checkbox"/> Moderate
	Each	0.00	2.00	0.00	0.00	<input checked="" type="checkbox"/> Severe
Comments	Eccentric loader end treatments are provided in the Northeast and Southeast quadrant.					
Performance Deficiencies	Maintenance Needs		Priority	Comments		
None						
Rehab/Repair Recommendations	Priority	Cost	Comments			

Municipal Structure Inspection Form

Structure Number: **03-1182530 CU02**

Barriers - Railing Systems						
Element Group	Barriers		Length	15.50	Width	0.00
Element Name	Railing Systems		Height	0.80	Count	1.00
Location	Above Structure		Total Quantity			15.50
Material	Steel		<input type="checkbox"/> Limited Inspection			
Element Type	Steel Flex Beam on wood post		Environment			
Protection System	Hot dip galvanizing		<input type="checkbox"/> Benign			
Condition Data	Units	Excell.	Good	Fair	Poor	<input type="checkbox"/> Moderate
	m	0.00	15.50	0.00	0.00	<input checked="" type="checkbox"/> Severe
Comments						
Performance Deficiencies	Maintenance Needs		Priority	Comments		
None						
Rehab/Repair Recommendations	Priority	Cost	Comments			

Barriers - Posts						
Element Group	Barriers		Length	0.20	Width	0.20
Element Name	Posts		Height	0.80	Count	8.00
Location	East Flex Beam		Total Quantity			8.00
Material	Timber		<input type="checkbox"/> Limited Inspection			
Element Type	Wood Posts in 3-Cable System		Environment			
Protection System	None		<input type="checkbox"/> Benign			
Condition Data	Units	Excell.	Good	Fair	Poor	<input type="checkbox"/> Moderate
	Each	0.00	8.00	0.00	0.00	<input checked="" type="checkbox"/> Severe
Comments						
Performance Deficiencies	Maintenance Needs		Priority	Comments		
None						
Rehab/Repair Recommendations	Priority	Cost	Comments			



Municipal Structure Inspection Form

Structure Number: **03-1182530 CU02**

Coatings - Railing Systems/Hand Railings						
Element Group	Coatings		Length	0.00	Width	0.00
Element Name	Railing Systems/Hand Railings		Height	0.00	Count	0.00
Location	Steel Flex Beam		Total Quantity			9.30
Material	Hot Dip Galvanizing		<input type="checkbox"/> Limited Inspection			
Element Type			Environment			
Protection System	None		<input type="checkbox"/> Benign			
Condition Data	Units	Excell.	Good	Fair	Poor	<input type="checkbox"/> Moderate
	sq. m	0.00	9.30	0.00	0.00	<input checked="" type="checkbox"/> Severe
Comments						
Performance Deficiencies		Maintenance Needs		Priority	Comments	
None						
Rehab/Repair Recommendations		Priority	Cost	Comments		

Municipal Structure Inspection Form

Structure Number: **03-1182530 CU02**

Repair/Rehabilitation Required				
Element Group	Element	Repair/Rehabilitation	Priority	Cost
Culverts	Barrels	Replace	Now	\$280,000
Barriers	Posts	Replace	Now	\$0
<b>Total Repair/Rehabilitation Cost</b>				<b>\$280,000</b>
Associated Work				
	Comments	Estimated Cost		
Approaches		\$70,000		
Detours		\$0		
Traffic Control		\$100,000		
Utilities		\$20,000		
Right-of-Way		\$0		
Environmental Study		\$10,000		
Other		\$0		
Contingencies		10%	**	\$48,000
Engineering		20%	**	\$96,000
		<b>Total Associated Work Cost</b>		<b>\$344,000</b>
		<b>Total Repair/Rehabilitation Cost</b>		<b>\$280,000</b>
		<b>Total Cost</b>		<b>\$624,000</b>
		Region of Halton Share @ 100%		\$624,000
<p>** If based on a percentage calculated values rounded-up to the nearest thousand dollars.</p>				
Justification				





Looking South at Roadway Over Culvert



East Elevation



West Elevation



Outward Rotation of 3 Cable Guiderail (West Side)





Typical Steel Flex Beam (East Side)



Typical Chain Link Fence (East Side)



Missing Cable Stays on Timber Post



Severe Split in Timber Guiderail Post





Sealed Cracks and Unsealed Narrow Cracks in Wearing Surface



Severe Perforations in Barrel Invert



Heaving of Barrel Invert



Minor Outward Rotation of Inlet Component





Severe Corrosion of Bolts in Barrel Obvert



Looking East From Midspan



Looking West From Midspan



Looking West Through Barrel





Looking Downstream



Looking Upstream



**Summary Action Report**  
**Structure 03-1182530 CU01 (MTO Site No. )**  
**Trafalgar Road Culvert**

Inspection Date 09/27/2012 mm/dd/yyyy Condition Index Value (BCI) **84.7**  
 Next Biennial Inspection 09/27/2014 mm/dd/yyyy Current Rep. Value **\$603,720**

**Additional Investigations**

Investigation	Priority	Cost	Investigation	Priority	Cost
No additional investigations required.					

**Performance Deficiencies**

No Performance Deficiencies

**Maintenance Needs**

Element Group	Element	Maintenance Required	Priority	Comment
Barriers	Railing Systems	Bridge Handrail Maintenance	1-5 yrs	Tighten cables
Barriers	Posts	Bridge Handrail Maintenance	1-5 yrs	Replace missing post

**Repair/Rehabilitation**

No Repair/Rehabilitation Requirements


Region of Halton	100%	\$0.00	<b>Total Associated Work Cost</b>	<b>\$0</b>
			<b>Total Cost</b>	<b>\$0</b>

**Overall Comments**

**Municipal Structure Inspection Form**

Structure Number: **03-1182530 CU01**

**Inventory Data**

Structure Name	Trafalgar Road Culvert	Hwy No.	03	Key Photo	
Cross. Type Over	<input checked="" type="checkbox"/> Road <input type="checkbox"/> Rail <input type="checkbox"/> Ped <input type="checkbox"/> Nav. Water <input type="checkbox"/> Non-Nav. Wat. <input type="checkbox"/> Other				
Cross. Type Under	<input type="checkbox"/> Road <input type="checkbox"/> Rail <input type="checkbox"/> Ped <input type="checkbox"/> Nav. Water <input checked="" type="checkbox"/> Non-Nav. Wat. <input type="checkbox"/> Other				
Road Name	Trafalgar Road				
Structure Location	0.20 km North of Dundas Street East				
Latitude	43.48927	Longitude	-79.72129	Cur. Rep. Value	\$603,720
Owner(s)/ % Share	Region of Halton	100%	**		
MTO Region	Central	Heritage Status	Not Considered for Designation		
MTO District	Central	Road Side Env.	Semi Urban		
Old County	Halton	Road Class	Arterial		
Geographic Twp.		Lane Type	Regular		
Structure Type	Open Footing	Posted Speed	60	No. of Lanes	4
Structure Material	Reinforced Cast-in-Place Concrete	AADT	22717	Pct. Trucks	3
Articulation		Inspection Route Sequence			
Total Deck Length	34 m	Road Width	16.8 m	Interchange Number	
Overall Width	2.4 m	Vert. Clear.	0 m	Interchange Structure Number	
Total Deck Area	81.60 m <sup>2</sup>	No. of Spans	1	Detour Length	0 km
Special Routes	<input type="checkbox"/> Transit <input checked="" type="checkbox"/> Schoo <input type="checkbox"/> Truck <input type="checkbox"/> Bicycle	Fill on Structure	0.6 m	Skew Angle	-30°
		Insp. Duration	1 hr	Struct. Dir.	East/West

\*\* Current Replacement Value is based on in kind replacement of the existing structure and calculated using benchmark costs. Capital planning should consider site specific cost factors and requirements for widening or lengthening of the structure.

**Spans**

Span Name	Span Length	Span Name	Span Length
1	1.8 m		

**Historical Data**

Year Built	1990 yyyy	Year of Last Major Rehab	yyyy
Last OSIM Inspection	mm/dd/yyyy	Contract No. When Built	
Last Enhanced OSIM	mm/dd/yyyy	Last Evaluation	mm/dd/yyyy
Last Enhanced Access	mm/dd/yyyy	Current Load Limit	<input type="checkbox"/> t <input type="checkbox"/> t <input type="checkbox"/> t
Last Underwater Insp.	mm/dd/yyyy	Load Limit By-Law No.	mm/dd/yyyy
Last Condition Survey	mm/dd/yyyy	By-Law Expiry Date	mm/dd/yyyy

**Rehab History**



Municipal Structure Inspection Form

Structure Number: **03-1182530 CU01**

**Field Inspection Information:**

Inspection Date: 09/27/2012 mm/dd/yyyy  Multi Day Inspection  OSIM  Enhanced OSIM BCI: 84.7

Inspector: D. Kelly Eng. Responsible: D. L. Baxter, P. Eng.

Others in Party: P. Burton

Access Equip.  Lift  Ladder  Boat  Bridge Master Other

Other Equip. Camera, Hammer, Other Hand Tools

Weather: Clear Temperature: 18 °C

**Additional Investigations Required:**

Investigation	Priority			Estimated Cost
	None	Normal	Urgent	
Detailed Deck Condition Survey	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	\$0
Delamination Survey of Asphalt-Covered Deck	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	\$0
Concrete Substructure Condition Survey	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	\$0
Detailed Coating Condition Survey	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	\$0
Detailed Timber Investigation	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	\$0
Post-Tensioned Strand Investigation	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	\$0
Underwater Investigation	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	\$0
Fatigue Investigation	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	\$0
Seismic Investigation	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	\$0
Structure Evaluation	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	\$0
Monitoring of Deformations, Movements and Settlements	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	\$0
Monitoring of Crack Widths	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	\$0
<b>Investigation Notes</b>				<b>Total Cost</b>
				\$0

**Overall Structure Notes:**

Recommend Work on Structure  None  Minor Rehab  Major Rehab  Replace  Remove

Timing of Recommended Work  1 to 5 years  6 to 10 years

Overall Comments

BCI Change Justification

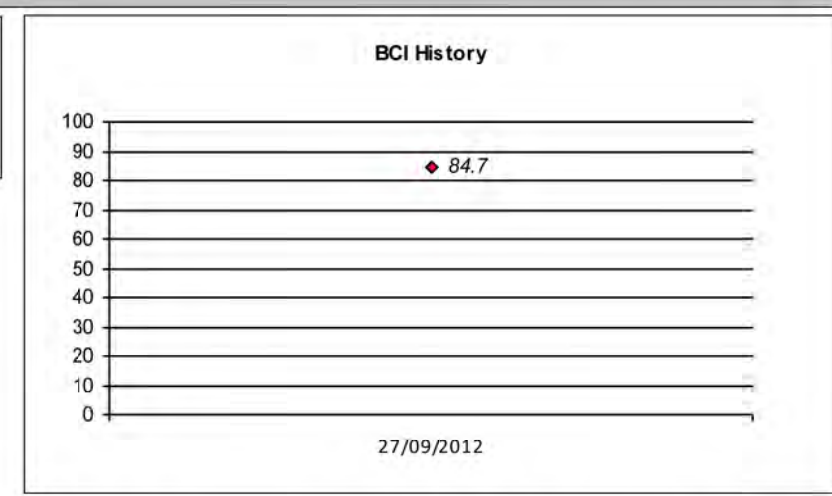
Next Inspection: 09/27/2014 mm/dd/yyyy Estimated Load Limit:  t  t  t

Municipal Structure Inspection Form

Structure Number: **03-1182530 CU01**

**BCI History**

Insp. Date	BCI	Inspector
27-Sep-12	84.7	D. Kelly



All BCI values are based on the MTO BCI methodology published in April 2008. As a result, BCI values for 2007 and earlier are approximate only, with potential discrepancies resulting from changes (over time) in the way quantities for certain elements are calculated.

**Standard Codes**

- Suspected Performance Deficiencies**
- 00 None
  - 01 Load carrying capacity
  - 02 Excessive deformations (deflections/rotations)
  - 03 Continuing settlement
  - 04 Continuing movements
  - 05 Seized bearings
  - 06 Bearing not uniformly loaded/unstable
  - 07 Jammed expansion joint
  - 08 Pedestrian/vehicular hazard
  - 09 Rough riding surface
  - 10 Surface ponding
  - 11 Deck drainage
  - 12 Slippery surfaces
  - 13 Flooding/channel blockage
  - 14 Undermining of foundation
  - 15 Unstable embankments
  - 16 Other
- Maintenance Needs**
- 01 Lift and Swing Bridge Maintenance
  - 02 Bridge Cleaning
  - 03 Bridge Handrail Maintenance
  - 04 Painting Steel Bridge Structures
  - 05 Bridge Deck Joint Repair
  - 06 Bridge Bearing Maintenance
  - 07 Repair to Structural Steel
  - 08 Repair of Bridge Concrete
  - 09 Repair of Bridge Timber
  - 10 Bailey Bridges - Maintenance
  - 11 Animal/Pest Control
  - 12 Bridge Surface Repair
  - 13 Erosion Control at Bridges
  - 14 Concrete Sealing
  - 15 Rout and Seal
  - 16 Bridge deck Drainage
  - 17 Scaling (Loose or ACR Steel)
  - 18 Other



Element Data					
<b>Decks - Wearing Surface</b>					
Element Group	Decks	Length	14.40	Width	16.80
Element Name	Wearing Surface	Height	0.00	Count	1.00
Location	Above Structure	Total Quantity		241.92	
Material	Asphalt	<input type="checkbox"/> Limited Inspection			
Element Type		Environment			
Protection System	None	<input type="checkbox"/> Benign			
Condition Data	Units	Excell.	Good	Fair	Poor
	sq. m	0.00	240.92	1.00	0.00
Comments	<input type="checkbox"/> Severe				
Light to medium ravelling, sealed cracks, narrow cracks.					
Performance Deficiencies		Maintenance Needs		Priority	Comments
None					
Rehab/Repair Recommendations		Priority	Cost	Comments	
<b>Barriers - Railing Systems</b>					
Element Group	Barriers	Length	14.40	Width	0.00
Element Name	Railing Systems	Height	0.00	Count	2.00
Location	Both Sides	Total Quantity		28.80	
Material	Steel	<input type="checkbox"/> Limited Inspection			
Element Type		Environment			
Protection System	None	<input type="checkbox"/> Benign			
Condition Data	Units	Excell.	Good	Fair	Poor
	m	0.00	14.40	0.00	14.40
Comments	<input type="checkbox"/> Severe				
Loose cables due to missing post.					
Performance Deficiencies		Maintenance Needs		Priority	Comments
None		Bridge Handrail Maintenance		1-5 yrs	Tighten cables
Rehab/Repair Recommendations		Priority	Cost	Comments	

Culverts - Barrels					
Element Group	Culverts	Length	34.00	Width	1.80
Element Name	Barrels	Height	1.00	Count	1.00
Location	Through Culvert	Total Quantity		190.40	
Material	Cast-in-place concrete	<input type="checkbox"/> Limited Inspection			
Element Type	Box	Environment			
Protection System	None	<input checked="" type="checkbox"/> Benign			
Condition Data	Units	Excell.	Good	Fair	Poor
	sq. m	114.24	73.16	3.00	0.00
Comments	<input type="checkbox"/> Severe				
Two construction joints noted, efflorescence staining, rust staining, narrow cracks, wet areas.					
Performance Deficiencies		Maintenance Needs		Priority	Comments
None					
Rehab/Repair Recommendations		Priority	Cost	Comments	
<b>Culverts - Inlet Components</b>					
Element Group	Culverts	Length	0.00	Width	0.00
Element Name	Inlet Components	Height	0.00	Count	8.00
Location	West Side	Total Quantity		8.00	
Material	Cast-in-place concrete	<input type="checkbox"/> Limited Inspection			
Element Type	Headwall	Environment			
Protection System	None	<input checked="" type="checkbox"/> Benign			
Condition Data	Units	Excell.	Good	Fair	Poor
	sq. m	5.00	3.00	0.00	0.00
Comments	<input type="checkbox"/> Severe				
Performance Deficiencies		Maintenance Needs		Priority	Comments
None					
Rehab/Repair Recommendations		Priority	Cost	Comments	



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Culverts - Outlet Components						
Element Group	Culverts		Length	0.00	Width	0.00
Element Name	Outlet Components		Height	0.00	Count	8.00
Location	East Side		Total Quantity			8.00
Material	Cast-in-place concrete		<input type="checkbox"/> Limited Inspection			
Element Type	Headwall		Environment			
Protection System	None		<input checked="" type="checkbox"/> Benign			
Condition Data	Units	Excell.	Good	Fair	Poor	<input type="checkbox"/> Moderate
	sq. m	5.00	2.75	0.25	0.00	<input type="checkbox"/> Severe
Comments						
Narrow stained crack.						
Performance Deficiencies		Maintenance Needs		Priority	Comments	
None						
Rehab/Repair Recommendations		Priority	Cost	Comments		

Embankments & Streams - Streams & Waterways						
Element Group	Embankments & Streams		Length	0.00	Width	0.00
Element Name	Streams & Waterways		Height	0.00	Count	1.00
Location	Through Culvert		Total Quantity			1.00
Material			<input type="checkbox"/> Limited Inspection			
Element Type			Environment			
Protection System	None		<input type="checkbox"/> Benign			
Condition Data	Units	Excell.	Good	Fair	Poor	<input type="checkbox"/> Moderate
	All	0.00	1.00	0.00	0.00	<input type="checkbox"/> Severe
Comments						
Performance Deficiencies		Maintenance Needs		Priority	Comments	
None						
Rehab/Repair Recommendations		Priority	Cost	Comments		

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Embankments & Streams - Embankments						
Element Group	Embankments & Streams		Length	0.00	Width	0.00
Element Name	Embankments		Height	0.00	Count	4.00
Location	Each Quadrant		Total Quantity			4.00
Material			<input type="checkbox"/> Limited Inspection			
Element Type			Environment			
Protection System	Vegetation		<input type="checkbox"/> Benign			
Condition Data	Units	Excell.	Good	Fair	Poor	<input type="checkbox"/> Moderate
	Each	0.00	4.00	0.00	0.00	<input type="checkbox"/> Severe
Comments						
Performance Deficiencies		Maintenance Needs		Priority	Comments	
None						
Rehab/Repair Recommendations		Priority	Cost	Comments		

Embankments & Streams - Slope Protection						
Element Group	Embankments & Streams		Length	0.00	Width	0.00
Element Name	Slope Protection		Height	0.00	Count	4.00
Location	Each Quadrant		Total Quantity			4.00
Material	Vegetation		<input type="checkbox"/> Limited Inspection			
Element Type			Environment			
Protection System			<input type="checkbox"/> Benign			
Condition Data	Units	Excell.	Good	Fair	Poor	<input type="checkbox"/> Moderate
	Each	0.00	4.00	0.00	0.00	<input type="checkbox"/> Severe
Comments						
Performance Deficiencies		Maintenance Needs		Priority	Comments	
None						
Rehab/Repair Recommendations		Priority	Cost	Comments		



Barriers - Posts						
Element Group	Barriers		Length	0.00	Width	0.00
Element Name	Posts		Height	0.00	Count	8.00
Location	Both Sides		Total Quantity			8.00
Material	Wood		<input type="checkbox"/> Limited Inspection			
Element Type			Environment			
Protection System			<input type="checkbox"/> Benign			
Condition Data	Units	Excell.	Good	Fair	Poor	<input type="checkbox"/> Moderate
	Each	0.00	7.00	0.00	1.00	<input checked="" type="checkbox"/> Severe
Comments						
One missing post.						
Performance Deficiencies		Maintenance Needs		Priority	Comments	
None		Bridge Handrail Maintenance		1-5 yrs	Replace missing post	
Rehab/Repair Recommendations		Priority	Cost	Comments		

Foundations - Foundations (below ground level)						
Element Group	Foundations		Length	0.00	Width	0.00
Element Name	Foundations (below ground level)		Height	0.00	Count	0.00
Location	Below Ground Level		Total Quantity			0.00
Material			<input checked="" type="checkbox"/> Limited Inspection			
Element Type			Environment			
Protection System			<input type="checkbox"/> Benign			
Condition Data	Units	Excell.	Good	Fair	Poor	<input type="checkbox"/> Moderate
	All					<input type="checkbox"/> Severe
Comments						
Limited inspection.						
Performance Deficiencies		Maintenance Needs		Priority	Comments	
None						
Rehab/Repair Recommendations		Priority	Cost	Comments		

**Repair/Rehabilitation Required**

Associated Work		
	Comments	Estimated Cost
Approaches		\$0
Detours		\$0
Traffic Control		\$0
Utilities		\$0
Right-of-Way		\$0
Environmental Study		\$0
Other		\$0
Contingencies		** \$0
Engineering		** \$0
** If based on a percentage calculated values rounded-up to the nearest thousand dollars.		
<b>Total Associated Work Cost</b>		<b>\$0</b>
<b>Total Repair/Rehabilitation Cost</b>		<b>\$0</b>
<b>Total Cost</b>		<b>\$0</b>
Region of Halton Share @ 100%		\$0
Justification		





Looking North at Roadway Over Culvert



Looking South at Roadway Over Culvert



East Elevation



West Elevation





Medium Ravelling on Wearing Surface



Missing Cable Guiderail Post on East Side of Structure



Efflorescence Staining on Barrel Wall



East Construction Joint





West Construction Joint



Looking East Through Barrel



Looking West Through Barrel



Looking Downstream





Looking Upstream



Stained Crack on Outlet Wingwall