2023 OSIM Bridge Inspections Report

Township of East Garafraxa
065371 Dufferin County Road 3, Unit 2
East Garafraxa, ON L9W 7J8

R.J. Burnside & Associates Limited
15 Townline
Orangeville ON L9W 3R4 CANADA

January 2024
300053343.2023

Township of East Garafraxa
January 2024

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Record of Revisions

Revision	Date	Description
-	November 2023	Draft Report
1	January 2024	Final Report

R.J. Burnside & Associates Limited

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2023

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Senior Vice President, Municipal Services and Structures

Executive Summary

R.J. Burnside & Associates Limited (Burnside) was engaged by the Township of East Garafraxa to undertake the inspection of 31 bridge and culvert structures. Since the 2021 OSIM inspections, at the request of the Township 7 additional structures have been added to the OSIM inspection investigation and structure inventory. The visual inspections were carried out on an element-by-element basis in accordance with the Ministry of Transportation - Ontario Structure Inspection Manual (OSIM). The inspections were completed under the direction of a Professional Engineer to assess their condition and identify any material defects, performance deficiencies, maintenance needs, additional studies and/or repairs/rehabilitation work required on a structure-by-structure basis.

Following the field inspections, recommendations were made based on the data collected and the review of the previous inspection reports. Depending on the condition of each structure, the remedial needs have been provided in three classifications: routine maintenance, additional investigations and repairs and rehabilitations (Capital Works).

The routine maintenance work often requires a minimal scope of work, and in most cases can be carried out by Township staff. The routine maintenance work often requires a minimal scope of work, and in most cases can be carried out by Township staff. The items included in the maintenance needs include recurring items that should be completed each year, i.e., cleaning winter sand/salt off bridge decks, and one-time costs such as placing rip-rap in washouts on slopes adjacent to bridge wingwalls. The total estimated value of the work to be completed by the Township is **$40,000.00**. We recommend that a general allowance to complete the works described above be included in the Township's annual road budget.

Additional studies, investigations, and monitoring programs, as summarized in the table below, are recommended to structures currently demonstrating severe material defects or performance deficiencies which may necessitate an inspector to require more detailed information. These investigations have been identified based on a "normal" or "urgent" priority.

Additional Investigations

Structure No./Name	Additional Investigation	Reasoning	Estimated Cost
0001	Monitoring Crack Widths	During Biennial Inspections - Monitor bolt hole cracking until the structure can be replaced	$0.00
0005	Monitoring Crack Widths	During Biennial Inspections - Monitor bolt hole cracking until the structure can be replaced	$0.00
0006	Structure Evaluation	Determine if the structure was designed to carry the additional dead load of asphalt	$10,000.00
0008	Monitor abutment movement	During Biennial Inspections - To ensure abutments are stable	$0.00
0017	Monitor wingwall movement	During Biennial Inspections – To determine if wingwall rotation is actively progressing	$0.00
0022	Hydraulic/Channel Investigation	Consultation with GRCA to improve channel to provide positive drainage through culvert	$5,000.00
0026	Monitoring Crack Widths	During Biennial Inspections – To determine if wide crack in east abutment is actively progressing	$0.00
0045	Monitoring Program for Abutment Wall	Determine if movement is actively progressing	$1,500.00
		Total	**$16,500.00**

The Capital Works needs include any repair, rehabilitation or replacement work which would typically be completed by a Township hired Contractor, to assist in extending the service life of a structure and increasing the Bridge Condition Index (BCI). In accordance with the OSIM, the capital works required are based on a priority of six to ten years, one to five years, within one year, and urgent and have been estimated as follows:

Capital Works Costs and Timeframes

Time Frame	Capital Cost
< 1 year	$0.00
1 – 5 years	$6,869,500.00
6 – 10 years	$1,416,000.00
TOTAL	**$8,285,500.00**

It should be noted that these costs include recommended replacement costs for structures in need.

Taking into consideration the structures calculated BCI's, several structures have been identified for replacement or rehabilitation. Within the next one to five years, two (2) structures have been identified for replacement and three (3) structure have been identified for rehabilitation/repair.

Current roadside safety needs include costs for new/replacement guide rail and/or end treatments at structure locations as required or an investigation where the need for a guide rail system was not evident based on high level review. The total estimated cost for current roadside safety needs is **$673,000.00**.

It should be noted that all of the aforementioned estimated costs throughout this summary and the report do not include property acquisition costs, utility relocation costs or engineering fees associated with road work beyond the wingwalls, unless specifically identified within the individual OSIM forms. All costs are also exclusive of HST.

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1.0 Introduction

R.J. Burnside & Associates Limited (Burnside) has been engaged by the Township of East Garafraxa to undertake the inspection of 31 road bridge and culvert structures over the span of 3.0 m. Since the 2021 OSIM inspections, at the request of the Township 7 additional structures have been added to the OSIM inspection investigation and structure inventory.

It is noted that all costs referenced within this report are based on the year of most recent inspection and do not account for changes in unit costs (due to inflation, material availability, labour rates, etc.).

The inspections have been completed in accordance with the Ministry of Transportation - Ontario Structure Inspection Manual (OSIM). Inspection of the Township's bridges and culverts are required every two years as per Ontario Regulation 104/97 which states *"The structural integrity, safety and condition of every bridge shall be determined through the performance of at least one inspection in every second calendar year under the direction of a professional engineer and in accordance with the Ontario Structure Inspection Manual."*. These inspections assess the condition of the structure and identify any additional studies or repairs required. A map showing the location of all structures has been provided in Appendix C.

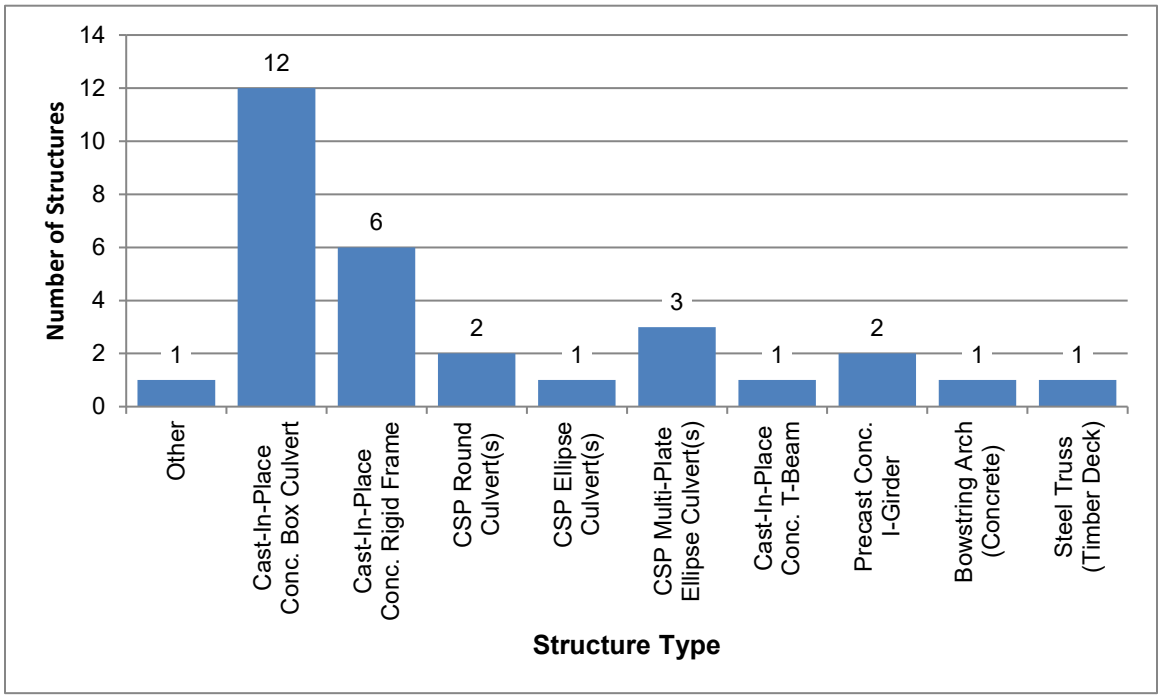
Burnside staff conducted a detailed element-by-element visual assessment of each bridge/culvert in order to identify any material defects, performance deficiencies and maintenance needs on a structure-by-structure basis. All data collected has been documented on the OSIM forms and provided in digital format in Appendix E. In addition, a brief written overview has been provided to clarify the OSIM data.

2.0 Inspection Observations and Recommendations

The following observations and recommendations were made during our recent inspection of the Township's structures. These inspections, along with a review of the previous reports have contributed to the recommendations provided.

The Township of East Garafraxa has an inventory of 31 structures, which is comprised of a variety of structure types. Figure 1 below summarizes the number and types of structures within the inventory.

Figure 1: Types of Structures



Depending on the condition of each structure, some level of remedial action is usually required. The recommendations for remedial work are provided in three classifications, routine maintenance, additional investigations, and repair, rehabilitation, or replacement.

2.1 Routine Maintenance

Routine maintenance needs often require minimal effort to extend the service life of the structure. In most cases, routine maintenance can be undertaken by Township staff or locally contracted out. It is desirable to ensure that all maintenance needs identified at each structure be completed within the calendar year of receiving this Report.

Common structure defects were noted, to varying degrees, at most of the structures inspected. These common defects include:

- Minor erosion of slopes on culvert embankments and adjacent to bridge wingwalls.
- Excessive sand/granular material on deck surface due to winter maintenance or vehicle tracking.
- Clogged deck drains or lack of drainage.
- Erosion of stream banks at the water level.
- Debris collection and heavy vegetation at culvert and bridge openings.
- Lack of, damaged or non code-conforming guide rail.
- Minor asphalt defects (potholes, cracking).
- Lack of or missing hazard warning signs.

These general defects can be addressed within the Township's routine maintenance program and these issues can be added to the Township's in-house road and structure inspection routine.

Routine bridge sweeping, washing of decks, drains, joints, bearing seat areas and girders will improve a structures service life. Removal or trimming of vegetation and addressing minor erosion concerns regularly will pre-empt more serious issues.

The total estimated value of the work to be completed by the Township is approximately **$46,500.00**. We recommend that a general allowance to complete the works described above be included in the Township's annual road maintenance budget.

A summary of maintenance needs is provided in Appendix B, along with estimated costs to complete the work.

2.2 Additional Studies/Investigations

As per the OSIM, additional investigations or surveys may be required to further assess the condition of certain elements that may not be fully determined by a visual inspection. In many cases, where a major rehabilitation of a structure is required or planned, the completion of additional studies or investigations will assist in developing appropriate rehabilitation programs. Studies or investigations may also be required where performance deficiencies are suspected. Typical investigations that may be required include:

- Deck condition surveys.
- Structure evaluations (Load Capacity).
- Monitoring of deformations, settlements, and movement.
- Monitoring crack widths.

A summary of the additional investigations recommended for the Township are summarized in Table 1 below:

Table 1: Additional Investigations

Structure No./Name	Additional Investigation	Reasoning	Estimated Cost
0001	Monitoring Crack Widths	During Biennial Inspections - Monitor bolt hole cracking until the structure can be replaced	$0.00
0005	Monitoring Crack Widths	During Biennial Inspections - Monitor bolt hole cracking until the structure can be replaced	$0.00
0006	Structure Evaluation	Determine if the structure was designed to carry the additional dead load of asphalt	$10,000.00
0008	Monitor abutment movement	During Biennial Inspections - To ensure abutments are stable	$0.00
0017	Monitor wingwall movement	During Biennial Inspections – To determine if wingwall rotation is actively progressing	$0.00
0022	Hydraulic/Channel Investigation	Consultation with GRCA to improve channel to provide positive drainage through culvert	$5,000.00
0026	Monitoring Crack Widths	During Biennial Inspections – To determine if wide crack in east abutment is actively progressing	$0.00
0001	Monitoring Crack Widths	During Biennial Inspections - Monitor bolt hole cracking until the structure can be replaced	$0.00
0005	Monitoring Crack Widths	During Biennial Inspections - Monitor bolt hole cracking until the structure can be replaced	$0.00
0045	Monitoring Program for Abutment Wall	Determine if movement is actively progressing	$1,500.00
		Total	**$16,500.00**

A summary of recommended studies and costs is also included in Appendix B.

2.3 Roadside Safety

During our inspections, Burnside makes note of the condition and effectiveness of roadside safety measures on the approaches to the structures. Where no roadside safety systems are present, Burnside has a responsibility to identify that there should be consideration given to installing roadside safety systems, i.e., guide rail and end treatments.

Roadside safety system requirements are set out in the MTO - Roadside Safety Manual which is a guideline provided to be used as a risk assessment tool in establishing the need, type, and extent of roadside safety measures.

As is discussed in more detail in the Manual, risk management is critical in assessing the need for roadside safety installations. At some structures, and on some roadways, the installation of guide rail systems may be seen as more of a hazard than not having a system. This may be a result of a reduction in road platform width, the ability to remove snow effectively, and the space available to place and anchor end treatments. Section 4.2.2.1 from the MTO - Roadside Design Manual states *that guide rail systems must be offset a minimum of 4.25 m from the roadway centerline, to provide clearance to snowplowing operations*. In addition, local use of a roadway by farm equipment and the location of driveway and field entrances around structures should also be considered in determining the need and effectiveness of guide rail systems.

In consideration of the above, costs to install guide rail on narrow Township roads with a platform width of 8.0 m or narrower have not been included in this report under the rehabilitation plan, unless bridge/road widening to 8.5 m or wider has been recommended as part of the rehabilitation plan. Installation of steel beam guide rail for replacement options is included within the replacement cost estimate.

For the purpose of this Report, where a high level review indicated that guide rail or guiderail components would be required (apparent substandard length of need, substandard end treatments, rigid barriers on the structure, small clear zone between the edge of road and edge of structure, etc.) a general allowance for a typical guide rail system installation has been provided, however, site specific and detailed assessments of need at each structure is not included in this Report. Where the need for a guiderail system was not evident based on high level review, an allowance for an investigation into the need for guiderail was provided. The total estimated cost relating to guide rail installation or investigation is **$673,000.00**.

Where recommendations have been made for installation or corrective measures, Burnside has identified that the work is to be completed within one to five years. However, as each site has unique characteristics relating to the requirements of guiderail, Burnside also recommends that a further investigation and risk analysis of each of the identified sites be completed by the Township within one year to classify the

structures as high, medium, or low priority for guide rail installation or improvements. The study may also outline a timeline for guide rail upgrades based on annual guide rail budget.

2.3.1 Pedestrian and Inspector Safety

During inspections, Burnside makes note of the condition and effectiveness of the pedestrian barricades installed at bridges and culverts. MTO Bulletin, BO2020-03 Guards on Structures, was issued on April 7, 2020, and provides recommendations for the installation of guards on culvert ends and retaining walls for the safety of the public and inspectors.

The bulletin recommends that where an area is accessible to the public and an exposed height of greater than 0.6 m is present, a guard meeting the Ontario Building Code requirements shall be installed to protect the public from fall hazards. Additionally, in areas not accessible to the public and where exposed heights greater than 2.4 m are present, a guard shall be installed on culvert ends, or on top of retaining walls to protect inspectors from fall hazards.

It is further noted in the bulletin that a fall hazard risk assessment is to be completed and the need for guards determined by the MTO, or the Owner as appropriate. Installation of guards is recommended to be included as part of any major capital program, and in unique situations may be completed as a standalone installation if warranted.

Burnside has identified locations that could be considered high risk for pedestrians where the lack of guards, or poor condition of existing guards exist. Costs for replacement / installation of guards have been included in the recommended work programs.

2.4 Repair, Rehabilitation or Replacement

Recommended repair, rehabilitation or replacement work is provided on the OSIM form for each bridge and culvert. The recommended work is indicated for each element and outlines the priority and estimated construction cost. The priorities for the specified rehabilitation or replacement plans are typically identified on the OSIM forms as six to ten years, one to five years, within one year, and urgent.

The costs associated with the recommended work are based on the measured quantities of fair and poor element conditions and unit costs for similar and recent works. In many instances, where only minor works are required, the costs for mobilization, site access and or waterway control items (as required) are difficult to assess and may skew the costs of small-scale works. This work is often best completed by grouping similar efforts together.

For repair programs that require a number of prolonged on-site activities, we have assigned a variable general cost that may range from $40,000.00 to $125,000.00, to address some of the mobilization, insurance, bonding and related costs of being on-site.

Where the recommended work is the replacement of the structure, these general costs are assumed to be included in the overall replacement cost.

Construction cost estimates do not include property acquisition, utilities relocation or support, or engineering fees associated for the works beyond the structure limits, unless specifically identified within the individual OSIM forms.

The total estimated cost for the capital works for all 24 structures within the Township, (including rehabilitation/repair and replacement costs) has been estimated as follows:

Table 2: Capital Works Costs and Timeframes

Time Frame	Capital Cost
< 1 year	$0.00
1 – 5 years	$6,869,500.00
6 – 10 years	$1,416,000.00
TOTAL	**$8,285,500.00**

The total, 10-year estimated capital costs, which includes the above as well as all other associated costs including maintenance, additional investigations, and roadside protection costs, is **$9,021,500.00**. It should be noted that all costs are based on 2023 prices and do not account for inflation. A summary of the capital works needs can be found in Appendix B.

2.5 Load Postings and Recommendations

Load postings may be recommended for structures based on age, condition, noted performance deficiencies or based on the findings of a structural evaluation. A summary of the load postings for the Township's inventory is provided in Table 3 below.

Table 3: Load Postings

Structure Name	Load Posting (tonnes)	Recommendation
0008	12/16/25	No change
0029	15	No change

In accordance with Section 123(2) of the Highway Traffic Act and Regulation 103/97 made under the Act, we recommend that the Township enact an appropriate By-law for the maximum allowable gross weight crossing over the structures identified in the table above.

Further, we recommend that any such By-law established shall be considered valid for a period of 2 years, or until the completion the next bridge inspection report.

3.0 Bridge Condition Index

The Bridge Condition Index (BCI) for each structure has been determined based on the Ministry of Transportation Ontario (MTO) methodology followed in the MTO Document, MTO Bridge Condition index and Overall Measure of Bridge Condition, July 2009.

A new structure would have a BCI value of 100 and the value will decline over time. Monitoring the rate of decline in the BCI and comparing this with an anticipated rate of decline will provide the Township with valuable, long-term planning and asset management information. The reduction in BCI, in theory, is a function of many factors, including traffic volume, truck use, use of de-icing chemicals, exposure to the elements and the type of structure. Each bridge will decline at its own rate, but it is reasonable to expect that the decline begins slowly and accelerates as the structure gets older.

In addition, determining an individual BCI value at any point in time will allow the Township to make estimates of expected remaining service life and or establish target BCI criteria for major rehabilitations or replacements.

The Canadian Highway Bridge Design Code has a target service life of approximately 75 years, but it is recognized that maintenance, repair, and rehabilitations will be required along the way to reach or exceed this target.

As indicated, the BCI for a structure can range from 0 to 100 and a municipal bridge and culvert infrastructure can be organized into several ranges.

Good – BCI Range 70 to 100

A bridge with a BCI greater than 70 is generally considered to be in good to excellent condition, and repair or rehabilitation work is not usually required within the next five years. Routine maintenance, such as sweeping, cleaning, and washing are still recommended.

Fair – BCI Range 50 to 70

A bridge with a BCI between 50 and 70 is generally considered to be in good to fair condition. Repair or rehabilitation work recommended is ideally scheduled to be completed within the next five years. This is the ideal time to schedule major bridge repairs for larger and/or critical structures from an economic perspective. The most effective improvement in a structure's service life can be achieved by completing repairs while in this range.

Poor – BCI Less than 50

A bridge with a BCI rating of less than 50 is generally considered poor with lower numbers representing structures nearing the end of their service life. The repair or rehabilitation of these structures is ideally best scheduled to be completed within approximately one year. However, if it is determined that the replacement of the structure would be a more viable, practical, or economical solution than repairing the structure, the structure can be identified for continued monitoring and scheduled for replacement within a one-to-ten-year range. The lower the BCI the more of a priority, within the one-to-ten-year range, the replacement becomes.

4.0 Structure Inventory Trends

Based on the biennial inspection of each structure, the Bridge Condition Index (BCI) is calculated for each structure. The Bridge Condition Index Distribution graph, shown in Figure 2 below, provides a summary of the current state of the Township's structures, and Figure 3 shows the historical trend of the state of the structures over past inspections where BCI information was available.

Figure 2: Bridge Condition Index Distribution (2023)

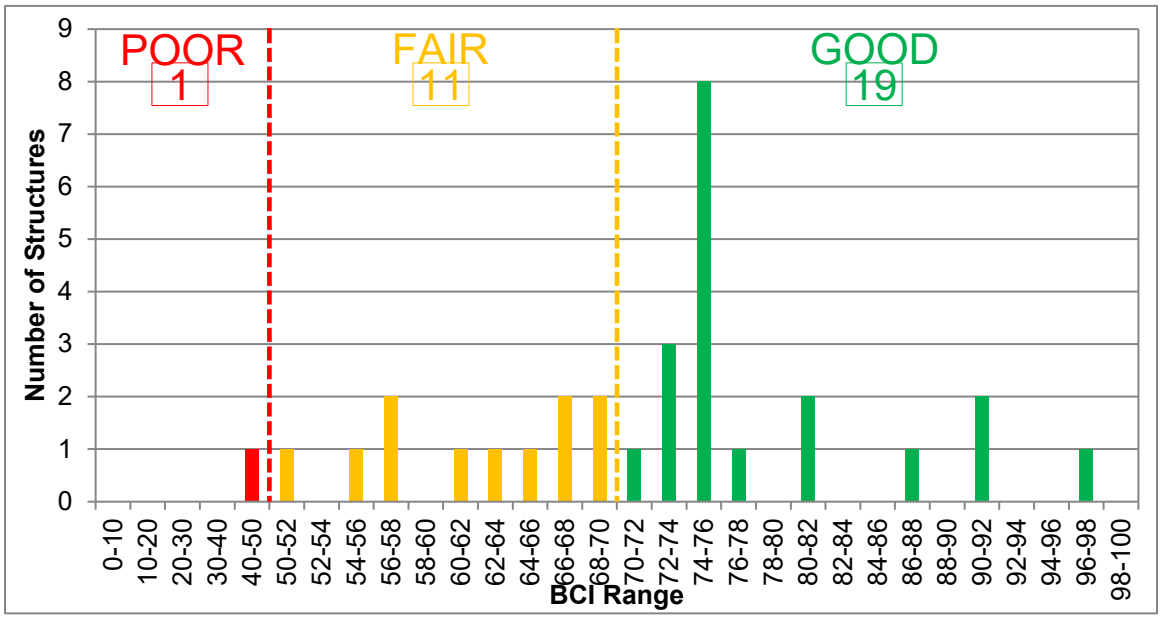
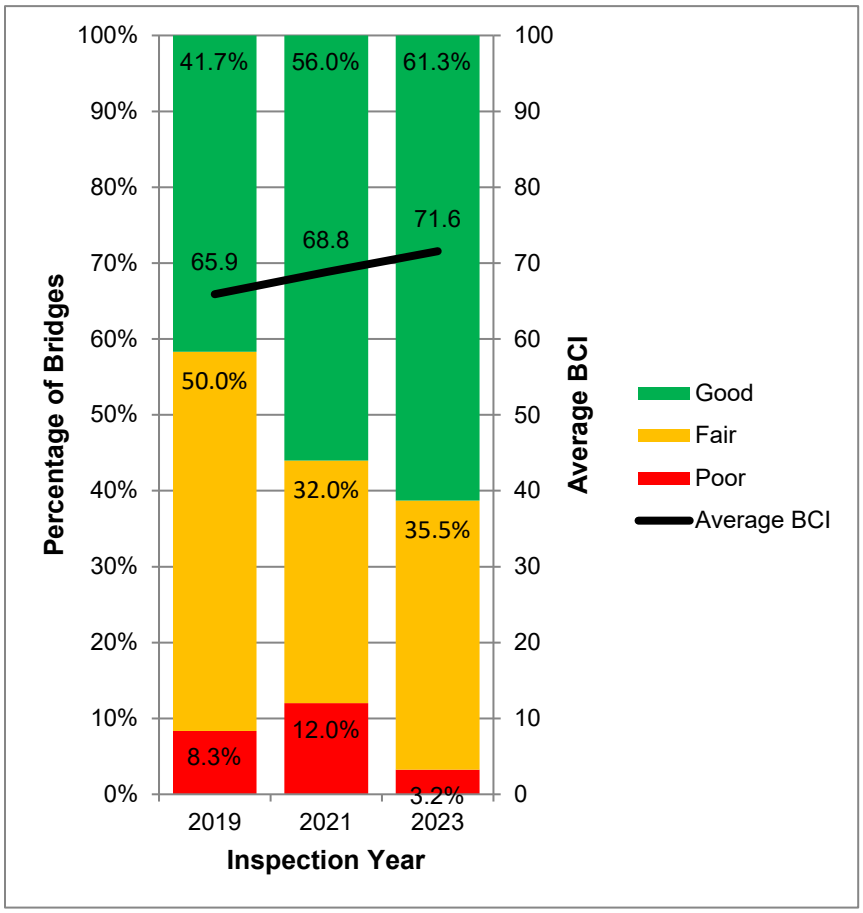


Figure 3: Bridge Condition Index Historical Trend



Currently, only approximately 61.3% of the Township's structures are within the "good" range, with 35.5% of the structures classified as "fair" and 3.2% classified as "poor", as illustrated in Figure 3 above. Of interest, the MTO has established a goal of maintaining 85% of their structures in "good" condition (BCI ≥ 70) by addressing rehabilitations and replacements as necessary. Burnside recognizes that the above goal was not established by the Township, but it is noted that, based on the current state of the inspected structures, the Township is underperforming on the management of their bridge assets when compared to the MTO's established goal.

The trend in Figure 3 identifies that the overall average BCI of the Township's inventory has increased over the last four years mainly due to recently completed repairs and capital works projects, which include the following:

- Bridge 7 – 12th Line - Bridge Rehabilitation (2020);
- Bridge 14 – 10th Sideroad – Localized Barrier Repair (2021);
- Culvert 0001 – 20th Sideroad - Culvert Bolt Hole Temporary Crack Repairs (2022);
- Culvert 0005 – 10th Line - Culvert Bolt Hole Temporary Crack Repairs (2022); and
- Culvert 0047- East Garafraxa - Caledon Townline – Rehabilitation (2023).

Continued maintenance and completion of rehabilitative or replacement works as recommended in this report will help to continue this trend of overall improvement of the Township's bridge assets.

The MTO has also developed theoretical deterioration curves which can be used as a backdrop to estimate the remaining service life of a structure before replacement, or to establish a time frame for future rehabilitations. Burnside has adjusted the MTO theoretical deterioration curve to more accurately reflect the deterioration curve of the structures that are being inspected. It has been observed after inspecting structures for over 10 years, that the structures are deteriorating slower than anticipated based on the MTO theoretical deterioration curve, and therefore the timeline for the rehabilitation/replacement of the structure has been adjusted to reflect this slower deterioration rate.

For the purposes of this report, culverts and bridges less than 4.5 m in span are assumed not to have a rehabilitation cycle. These structures will be monitored and planned for replacement when their BCI drops below a lower limit of 40. However, even though our recommendation is to replace a structure, the costs to repair identified defects are included on the OSIM forms should the Township wish to repair these structures.

For structures with spans greater than 4.5 m, it has been assumed that a structure will be rehabilitated once during its lifetime. The rehabilitations are scheduled when the structures reach a target BCI of 60. However, for certain larger, more significant bridges, rehabilitation options may still be viable for BCI's lower than 60, but these will be considered on a site-by-site basis.

The estimated time until replacement or rehabilitation is required has been provided and the costs for all works required in the next ten years are identified.

5.0 Prioritization and Recommended Work

As an initial measure for prioritizing any required work, the structures have been ranked using their BCI values. A summary of the structures, in ascending order of BCI, along with their associated preliminary construction costs has been included in Appendix B. Two separate summary tables have been created to identify replacement and rehabilitation priority structures.

It should be noted that although the BCI is a good measure of the overall condition of a structure, and therefore relative to construction need, it only represents one input into the decision and planning process for asset management. Other factors are often considered when programming and prioritizing bridge work.

5.1 Structure Priority Number (SPN) (Formerly BSI)

To help prioritize future capital works, at the request of the Township, Burnside has created a Structure Priority Number (SPN), otherwise known as the former MTO Bridge Sufficiency Index (BSI), to assist in expanding on the BCI rating system and capital works programming. The BCI value will be one of the factors in calculating the SPN; other Importance Factors (IF) will include:

- Number of lanes;
- Average annual daily traffic (AADT);
- Load capacity restrictions at the site;
- Detour length;
- Current replacement value (CRV), and
- Site geometry.

The SPN formula is similar to the former MTO, Bridge Sufficiency Index (BSI) that was used for funding applications, and is defined below:

$$SPN = BCI - 0.3 \times IF$$

$where$:

$$IF = I_W + I_V + I_L + I_P + I_D + I_C + I_T + I_G$$

$and\ where$:

$I_W =$ Importance Factor for Structure Width

$I_V =$ Importance Factor for Traffic Volume

$I_L =$ Importance Factor for Load Limit

$I_P =$ Importance Factor for Main Performance Deficiency

$I_D =$ Importance Factor for Detour Length

$I_C =$ Importance Factor for Current Replacement Cost

I_T = Importance Factor for Current Replacement/Rehabilitation Timeline

I_G = Importance Factor for Site Geometry and Pedestrian Safety

Values for $\boldsymbol{I_W}$ =
- 5: For single lane bridge
- 3: Narrow lanes
- 2: Narrow shoulder
- 1: Recommended Sidewalk to improve Pedestrian Safety

(Cumulative – max. 5 points)

Values for $\boldsymbol{I_V}$ =
- 5: > 500
- 4: 250 – 499
- 3: 100 – 249
- 2: 50– 99
- 1: < 50

Values for $\boldsymbol{I_L}$ =
- 5: 1 to 5 tonnes
- 3: 6 to 15 tonnes
- 1: 16 to 25 tonnes
- 0: No Posting

Values for $\boldsymbol{I_P}$ =
- 5: Pedestrian/Vehicular Hazard
- 5: Load Carrying Capacity
- 5: Bearing not Uniformly Loaded/Unstable
- 4: Excessive Deformations
- 3: Continuing Settlement/Movements
- 2: Other
- 1: Rough Riding Surface
- 1: Drainage

Values for $\boldsymbol{I_D}$ =
- 5: Long Detour (>20 km)
- 4: Moderate/Long Detour (>15 km)
- 3: Moderate/Short Detour (>10 km)
- 1: Short Detour (<10 km)

* Add 2 points if road/structure is used when a Provincial Roadway is closed.

Values for I_c =
- 5: > $1,500,000
- 4: $1,000,000 - $1,499,999
- 3: $600,000 - $999,999
- 2: $300,000 - $599,999
- 1: < $300,000

Values for I_T	=	5:	< 1 year
		4:	1 – 5 years
		3:	6 – 10 years
		2:	11 – 30 years
		1:	> 31 years
Values for I_g	=	3:	Inadequate site distances (i.e., visibility)
		3	Inadequate Barrier System
		2:	Inadequate alignment
		1:	Inadequate grade, clearance to water (i.e., navigability)
		1:	Need sidewalk to improve pedestrian safety
		(Cumulative – max. 5 points)	

Below is a list of the prioritized rehabilitations and replacements based on their SPN and corresponding BCI.

Table 4: Prioritized Rehabilitations

Structure No./Name	SPN	BCI	Difference	Years to Rehabilitation
0026	50.94	54.94	4.0	5
0014	66.04	70.44	4.4	3
0003*	95.22	97.62	2.4	3

*Note: Structure 0003 was constructed in 2015; however, given the moisture penetration evident throughout the soffit the Township may consider waterproofing and paving.

Table 5: Prioritized Replacements

Structure No./Name	SPN	BCI	Difference	Years to Replacement
0005	40.10	44.10	4.0	2
0008	42.69	51.49	8.8	4
0045	49.20	56.40	7.2	3
0016	53.14	56.74	3.6	8
0001	55.90	60.30	4.4	10

A summary of the Township's structural inventory in ascending order of SPN has also been included in Appendix B.

5.2 Recommended Work

The budgets and rehabilitation work plans have been provided for the Township's highest priority structures (according to the SPN values). The structures provided below have been identified as requiring either rehabilitation or replacement work in the next five years; and have taken several other factors identified above into consideration.

Table 6: Top Priority Structures (work recommended within 5 years)

Structure No./Name	Road Name	Recommended Work	Estimated Construction Cost	Years to Rehabilitation/ Replacement
0005	10th Line	Replacement	$1,083,000.00	2
0045	Erin Garafraxa Townline	Replacement	$722,000.00	3
0003	10th Line	Rehabilitation	$165,000.00	3
0014	10th Sideroad	Rehabilitation	$478,000.00	3
0008	13th Line	Replacement	$4,108,000.00	4
0026	Erin Garafraxa Townline	Rehabilitation	$313,500.00	5
		Total	**$6,869,500.00**	

Note: estimated costs above do not include engineering, contingencies, or utility relocation costs

6.0 Capital Works Plan

The structures in the 10-year Capital Plan shown below in **Error! Reference source not found.**, have been ordered for rehabilitation of replacement based on their condition during the latest completed inspection, but also take into account additional factors through recent discussions with Township staff, such as low traffic volume roads, schedule reconstruction projects, close proximity of priority structures, etc. and the Township's current **$25,000** annual capital works budget for bridges and culverts (which includes maintenance).

To follow the proposed 10-Year plan, it is recommended the Township increase their bridge and culvert annual capital works budget to approximately **$300,000**.

Costing breakdown for planning and engineering design has been incorporated into the 10-year capital plan provided below. It should be noted that the priorities may change and will need to be re-assessed during each OSIM inspection cycle.

Table 7: 10-Year Capital Plan

Structure No./Name	Road Name	Recommended Work	Estimated Cost
2024			
0008	13th Line	Engineering – Feasibility Study to confirm reconstruction options (including survey)	$33,000
*45	Erin Garafraxa Townline	Engineering – Monitoring of Rotating Abutments	$1,500
2025			
0008	13th Line	Engineering – Design (Rehabilitation)	$110,000
2026			
0008	13th Line	Construction - Rehabilitation	$1,300,000
2027			
0014 *0016 0017	Sideroad 10 East-West Garafraxa Townline 13th Line	Engineering – Design (Minor Rehabilitations under one Contract)	$20,000 $15,000 $15,000
2028			
0014 *0016 0017	Sideroad 10 East-West Garafraxa Townline 13th Line	Construction – Minor Rehabilitations	$150,000 $100,000 $100,000

Structure No./Name	Road Name	Recommended Work	Estimated Cost
2029			
*0026	Erin Garafraxa Townline	Engineering – Design (Major Rehabilitation Replace Centre Portion)	$30,000
2030			
*0026	Erin Garafraxa Townline	Construction – Major Rehabilitation	$260,000
2031			
**0005	10th Line	Engineering – Design Replacement	$70,000
2032			
**0005	10th Line	Construction – Replacement	$750,000
2033			
*45	Erin Garafraxa Townline	Engineering – Design Replacement	$50,000
		Total	**$3,004,500**

* Indicates boundary bridge where cost sharing may be applicable. Costs shown above represent 100% of the estimated cost.

**Township could consider reviewing the feasibility of relining Structure 0005 during the preliminary design phase of the project which could help save on construction costs.

Note: Structure 0045 replacement timing can be adjusted depending on the results of the monitoring program

The cost estimates above do not include contingencies, utility relocation work or property acquisition.

7.0 Summary

The 2023 OSIM inspections were carried out by Burnside on behalf of the Township of East Garafraxa to identify the current condition of all the structures within the Township's inventory. The Summary Reports provided in Appendix A summarize the maintenance needs, additional investigations, and capital works requirements for each structure. The capital works for each structure has been given a priority of six to ten years, one to five years, within one year and urgent, based on the current BCI.

We trust the summary report provides all the information that you require at this time. If you have any questions or comments, please do not hesitate to contact us.

BURNSIDE

[THE DIFFERENCE IS OUR PEOPLE]

Appendix A

Summary Reports

1.1 Structure No. 0001

Structure Name:	Culvert 0001	**2023 BCI =60.30**	
Road Name:	20th Side Rd		
Location:	Concession 10, Lots 20 & 21 (East Garafraxa, in Dufferin County)		
Structure Type:	CSP Ellipse Culvert(s)		
Number of Spans:	1	Span Lengths:	3.9 m
Overall Structure Width:	21.2 m	Roadway Width:	7 m
Year of Construction:	1976	Current Load Limit:	

	Rehabilitation	Replacement
Estimated Capital Works Timelines (Years):	N/A	10.10

Recommendation:	**Structure replacement recommended within 10 years.**

Justification:

Culvert 0001 is generally in fair to good condition. Temporary repairs were completed in 2022 to the bolt hole cracking throughout the culvert barrel to extend the service life of the structure.

Structure No. 0001 (Continued)	2023 BCI = 60.30

Maintenance Need	Element and Comments	Estimated Cost
Hazard Signs	Install hazard warning signs at structure	$1,000.00
	Maintenance Needs Total	**$1,000.00**

Additional Investigations	Estimated Cost
Monitoring Crack Widths,	$0.00

Current Roadside Protection Needs	Estimated Cost
Investigate need for Guide Rail	$1,000.00

Rehabilitation/Repair Required	Priority	Estimated Cost
	N/A	$0.00
	N/A	$0.00
	N/A	$0.00
	N/A	$0.00
	N/A	$0.00
	Rehabilitation Cost Subtotal	**$0.00**

Estimate Value of Replacement Structure	$450,000.00

Associated Work	Rehabilitation	Replacement
Approaches -	$0.00	$0.00
Detours -	$0.00	$0.00
Traffic Control -	$0.00	$15,000.00
Utilities -	$0.00	$0.00
Right of Way -	$0.00	$0.00
Environmental -	$0.00	$0.00
Other -	$0.00	$0.00
Total Associated Work Cost	**$0.00**	**$15,000.00**

Total Capital Works Costs		
Cost	**Rehabilitation**	**Replacement**
Rehab / Replacement Works:	N/A	$465,000.00
Roadside Protection:	N/A	$95,000.00
Staging Costs:	N/A	N/A
Construction Contingencies:	N/A	$47,000.00
Environmental Assessment:	N/A	$10,000.00
Engineering Design:	N/A	$47,000.00
Geotechnical Investigation:	N/A	$20,000.00
Contract Administration:	N/A	$24,000.00
Total Capital Work Cost	**N/A**	**$708,000.00**

1.2 Structure No. 0002

Structure Name:	Structure 0002		**2023 BCI =73.71**
Road Name:	10th Line		
Location:	Concession 10 & 11, Lot 16 East Garafraxa		
Structure Type:	Cast-In-Place Conc. Rigid Frame		
Number of Spans:	1	Span Lengths:	4.3 m
Overall Structure Width:	7.5 m	Roadway Width:	6 m
Year of Construction:	1950	Current Load Limit:	

	Rehabilitation	Replacement
Estimated Capital Works Timelines (Years):	N/A	23.7

Recommendation:	**No Capital Works is estimated to be required within the next 10 years.**

Justification:

Structure 0002 is generally in good condition but is demonstrating signs of concrete deterioration, specifically at the wingwalls. The Township may wish to install a concrete curb to prevent potential loss of road material.

Structure No. 0002 (Continued)	2023 BCI = 73.71

Maintenance Need	Element and Comments	Estimated Cost
Bridge Cleaning	Remove overgrown vegetation around wingwalls	$1,000.00
Erosion Control	Install rock protection on embankments	$1,000.00
	Maintenance Needs Total	**$2,000.00**

Additional Investigations	Estimated Cost
	$0.00

Current Roadside Protection Needs	Estimated Cost
Investigate Need for Replacing with Longer Guide Rail	$500.00

Rehabilitation/Repair Required	Priority	Estimated Cost
Concrete Curbs	N/A	$10,000.00
	N/A	$0.00
	N/A	$0.00
	N/A	$0.00
	N/A	$0.00
	Rehabilitation Cost Subtotal	**$10,000.00**

Estimate Value of Replacement Structure	$600,000.00

Associated Work	Rehabilitation	Replacement
Approaches -	$0.00	$0.00
Detours -	$0.00	$0.00
Traffic Control -	$0.00	$15,000.00
Utilities -	$0.00	$0.00
Right of Way -	$0.00	$0.00
Environmental -	$0.00	$0.00
Other -	$0.00	$0.00
Total Associated Work Cost	**$0.00**	**$15,000.00**

Total Capital Works Costs		
Cost	**Rehabilitation**	**Replacement**
Rehab / Replacement Works:	$10,000.00	$615,000.00
Roadside Protection:	$500.00	$95,000.00
Staging Costs:	N/A	N/A
Construction Contingencies:	$1,000.00	$62,000.00
Environmental Assessment:	$2,500.00	$10,000.00
Engineering Design:	$20,000.00	$62,000.00
Geotechnical Investigation:	N/A	$20,000.00
Contract Administration:	$15,000.00	$31,000.00
Total Capital Work Cost	**$49,000.00**	**$895,000.00**

1.3 Structure No. 0003

Structure Name:	Bridge 0003	**2023 BCI =97.62**	
Road Name:	10th Line		
Location:	Concession 10, Lots 20 & 21 (East Garafraxa, in Dufferin County)		
Structure Type:	Other - Prefabricated Fibreglass Bridge		
Number of Spans:	1	Span Lengths:	8.5 m
Overall Structure Width:	7.5 m	Roadway Width:	7 m
Year of Construction:	2015	Current Load Limit:	

	Rehabilitation	Replacement
Estimated Capital Works Timelines (Years):	3.0	42.6

Recommendation:	**Minor Rehabilitation is recommended within 3 years.**

Justification:

Bridge 0003, which was constructed in 2015, is generally in excellent condition. The Township may wish to install a concrete curb to prevent potential loss of road material. The Township should also consider waterproofing and paving this structure as there is already moisture penetration evident throughout the soffit.

Structure No. 0003 (Continued)	2023 BCI = 97.62

Maintenance Need	Element and Comments	Estimated Cost
		$0.00
		$0.00
	Maintenance Needs Total	**$0.00**

Additional Investigations	Estimated Cost
	$0.00

Current Roadside Protection Needs	Estimated Cost
Investigate Need for Replacing with Longer Guide Rail	$500.00

Rehabilitation/Repair Required	Priority	Estimated Cost
Concrete curb	1 to 5 years	$10,000.00
Waterproof and pave	1 to 5 years	$30,000.00
General Items - Insurance, Mobilization, Access etc.	1 to 5 years	$75,000.00
	Rehabilitation Cost Subtotal	**$115,000.00**

Estimate Value of Replacement Structure	$750,000.00

Associated Work	Rehabilitation	Replacement
Approaches -	$0.00	$0.00
Detours -	$0.00	$0.00
Traffic Control -	$0.00	$15,000.00
Utilities -	$0.00	$0.00
Right of Way -	$0.00	$0.00
Environmental -	$0.00	$0.00
Other -	$0.00	$0.00
Total Associated Work Cost	**$0.00**	**$15,000.00**

Total Capital Works Costs		
Cost	**Rehabilitation**	**Replacement**
Rehab / Replacement Works:	$115,000.00	$765,000.00
Roadside Protection:	$500.00	$95,000.00
Staging Costs:	N/A	N/A
Construction Contingencies:	$12,000.00	$77,000.00
Environmental Assessment:	$2,500.00	$60,000.00
Engineering Design:	$20,000.00	$77,000.00
Geotechnical Investigation:	N/A	$20,000.00
Contract Administration:	$15,000.00	$39,000.00
Total Capital Work Cost	**$165,000.00**	**$1,133,000.00**

1.4 Structure No. 0004

Structure Name:	Culvert 0004	**2023 BCI =73.63**	
Road Name:	11th Line		
Location:	Concession 11 & 12, Lot 16 East Garafraxa		
Structure Type:	Cast-In-Place Conc. Rigid Frame		
Number of Spans:	1	Span Lengths:	4.4 m
Overall Structure Width:	7.3 m	Roadway Width:	7 m
Year of Construction:	1945	Current Load Limit:	

	Rehabilitation	Replacement
Estimated Capital Works Timelines (Years):	N/A	23.6

Recommendation:	**No Capital Works is estimated to be required within the next 10 years.**

Justification:

Culvert 0004 is generally in good condition but is demonstrating signs of minor concrete deterioration.

Structure No. 0004 (Continued)	2023 BCI = 73.63

Maintenance Need	Element and Comments	Estimated Cost
Erosion Control	Install rock protection on embankments	$1,000.00
	Maintenance Needs Total	**$1,000.00**

Additional Investigations	Estimated Cost
	$0.00

Current Roadside Protection Needs	Estimated Cost
	$0.00

Rehabilitation/Repair Required	Priority	Estimated Cost
	N/A	$0.00
	N/A	$0.00
	N/A	$0.00
	N/A	$0.00
	N/A	$0.00
	Rehabilitation Cost Subtotal	**$0.00**

Estimate Value of Replacement Structure	$550,000.00

Associated Work	Rehabilitation	Replacement
Approaches -	$0.00	$0.00
Detours -	$0.00	$0.00
Traffic Control -	$0.00	$15,000.00
Utilities -	$0.00	$0.00
Right of Way -	$0.00	$0.00
Environmental -	$0.00	$0.00
Other -	$0.00	$0.00
Total Associated Work Cost	**$0.00**	**$15,000.00**

Total Capital Works Costs		
Cost	**Rehabilitation**	**Replacement**
Rehab / Replacement Works:	N/A	$565,000.00
Roadside Protection:	N/A	$95,000.00
Staging Costs:	N/A	N/A
Construction Contingencies:	N/A	$57,000.00
Environmental Assessment:	N/A	$10,000.00
Engineering Design:	N/A	$57,000.00
Geotechnical Investigation:	N/A	$20,000.00
Contract Administration:	N/A	$29,000.00
Total Capital Work Cost	**N/A**	**$833,000.00**

1.5 Structure No. 0005

Structure Name:	Culvert 0005	**2023 BCI =44.10**	
Road Name:	10th Line		
Location:	Concession 10 & 11, Lot 14 (East Garafraxa, in Dufferin County)		
Structure Type:	CSP Multi-Plate Ellipse Culvert(s)		
Number of Spans:	1	Span Lengths:	4.6 m
Overall Structure Width:	28.1 m	Roadway Width:	6.5 m
Year of Construction:	1972	Current Load Limit:	

	Rehabilitation	Replacement
Estimated Capital Works Timelines (Years):	N/A	2.1

Recommendation:	**Structure replacement is recommended within 2 years.**

Justification:

Culvert 0005 is generally in fair to good condition. Temporary repairs were completed in 2022 to the bolt hole cracking throughout the culvert barrel to extend the service life. A concrete slab was poured along the base of the culvert; however, water appears to be running underneath the concrete slab causing severe section loss along the culvert invert.

Structure No. 0005 (Continued)	2023 BCI = 44.10

Maintenance Need	Element and Comments	Estimated Cost
Erosion Control	Install rock protection on embankments	$2,000.00
Hazard Signs	Install hazard warning signs at structure	$1,000.00
	Maintenance Needs Total	**$3,000.00**

Additional Investigations	Estimated Cost
Monitoring Crack Widths,	$0.00

Current Roadside Protection Needs	Estimated Cost
Investigate need to extend guide rail over culvert	$1,000.00

Rehabilitation/Repair Required	Priority	Estimated Cost
	N/A	$0.00
	N/A	$0.00
	N/A	$0.00
	N/A	$0.00
	N/A	$0.00
	Rehabilitation Cost Subtotal	**$0.00**

Estimate Value of Replacement Structure	$750,000.00

Associated Work	Rehabilitation	Replacement
Approaches -	$0.00	$0.00
Detours -	$0.00	$0.00
Traffic Control -	$0.00	$15,000.00
Utilities -	$0.00	$0.00
Right of Way -	$0.00	$0.00
Environmental -	$0.00	$0.00
Other -	$0.00	$0.00
Total Associated Work Cost	**$0.00**	**$15,000.00**

Total Capital Works Costs		
Cost	**Rehabilitation**	**Replacement**
Rehab / Replacement Works:	N/A	$765,000.00
Roadside Protection:	N/A	$95,000.00
Staging Costs:	N/A	N/A
Construction Contingencies:	N/A	$77,000.00
Environmental Assessment:	N/A	$10,000.00
Engineering Design:	N/A	$77,000.00
Geotechnical Investigation:	N/A	$20,000.00
Contract Administration:	N/A	$39,000.00
Total Capital Work Cost	**N/A**	**$1,083,000.00**

1.6 Structure No. 0006

Structure Name:	Bridge 0006	**2023 BCI =74.65**	
Road Name:	11th Line		
Location:	Concession 11 & 12, Lot 15 East Garafraxa		
Structure Type:	Precast Concrete I-Girder		
Number of Spans:	3	Span Lengths:	15.8, 22.0,15.8 m
Overall Structure Width:	9.3 m	Roadway Width:	7 m
Year of Construction:	1987	Current Load Limit:	

	Rehabilitation	Replacement
Estimated Capital Works Timelines (Years):	14.7	24.7

Recommendation:	**No Capital Works estimated to be required within 10 years. Future structure rehabilitation should be considered.**

Justification:

Bridge 0006 is generally in good condition with only minor defects noted. A structure evaluation should be completed (if existing drawings are available) to determine if the structure is designed to carry the additional dead load of asphalt if this work is to be included in a major rehabilitation in the future.

Structure No. 0006 (Continued)	2023 BCI = 74.65

Maintenance Need	Element and Comments	Estimated Cost
Bridge Cleaning	Flush expansion joints and remove trees around wingwalls	$2,500.00
Deck Drainage	Replace NE drain and patch spalled concrete	$3,000.00
	Maintenance Needs Total	**$5,500.00**

Additional Investigations	Estimated Cost
Structure Evaluation,	$10,000.00

Current Roadside Protection Needs	Estimated Cost
	$0.00

Rehabilitation/Repair Required	Priority	Estimated Cost
Type A concrete repairs to approach curb/gutters, barrier/parapet walls interior, deck top,	6 to 10 years	$7,500.00
Type B concrete repairs to barrier/parapet walls exterior, soffit,	6 to 10 years	$15,000.00
Type C concrete repairs to abutment walls,	6 to 10 years	$5,000.00
Waterproof and pave	6 to 10 years	$100,000.00
Replace expansion joints	6 to 10 years	$125,000.00
Extend deck drains	6 to 10 years	$10,000.00
Replace guide rail structure connections	6 to 10 years	$15,000.00
General Items - Insurance, Mobilization, Access etc.	6 to 10 years	$125,000.00
	Rehabilitation Cost Subtotal	**$402,500.00**

Estimate Value of Replacement Structure	$4,000,000.00

Associated Work	Rehabilitation	Replacement
Approaches -	$0.00	$0.00
Detours -	$0.00	$0.00
Traffic Control -	$15,000.00	$15,000.00
Utilities -	$0.00	$0.00
Total Associated Work Cost	**$15,000.00**	**$15,000.00**

Total Capital Works Costs		
Cost	**Rehabilitation**	**Replacement**
Rehab / Replacement Works:	$417,500.00	$4,015,000.00
Roadside Protection:	$0.00	$95,000.00
Staging Costs:	N/A	N/A
Construction Contingencies:	$42,000.00	$251,000.00
Environmental Assessment:	$2,500.00	$10,000.00
Engineering Design:	$42,000.00	$251,000.00
Geotechnical Investigation:	N/A	$20,000.00
Contract Administration:	$15,000.00	$201,000.00
Total Capital Work Cost	**$519,000.00**	**$4,843,000.00**

1.7 Structure No. 0007

Structure Name:	Bridge 0007		**2023 BCI =80.92**
Road Name:	12th Line		
Location:	780 m South of County Road 5		
Structure Type:	Bowstring Arch (Concrete)		
Number of Spans:	2	Span Lengths:	26, 26 m
Overall Structure Width:	6.706 m	Roadway Width:	8 m
Year of Construction:	1926	Current Load Limit:	

	Rehabilitation	Replacement
Estimated Capital Works Timelines (Years):	0.0	18.8

Recommendation:	**Forgo rehabilitation and replace structure in future (replacement timeline estimated to exceed 10 years).**

Justification:

Bridge 0007, which was rehabilitated in 2020, is generally in good to excellent condition. Given that the structure has already undergone a major rehabilitation and given the structure type and age, an additional rehabilitation is not recommended, and replacement should be considered as the BCI approaches 40. However, the repairs listed above, such as refacing the abutments, can be completed to help extend the service life of the structure.

Structure No. 0007 (Continued)	2023 BCI = 80.92

Maintenance Need	Element and Comments	Estimated Cost
Bridge Cleaning	Sweep deck wearing surface	$1,000.00
	Maintenance Needs Total	**$1,000.00**

Additional Investigations	Estimated Cost
	$0.00

Current Roadside Protection Needs	Estimated Cost
	$0.00

Rehabilitation/Repair Required	Priority	Estimated Cost
Reface North abutment	N/A	$50,000.00
Type C concrete repairs to south abutment, wingwalls, pier	N/A	$25,000.00
General Items - Insurance, Mobilization, Access etc.	N/A	$125,000.00
	Rehabilitation Cost Subtotal	**$200,000.00**

Estimate Value of Replacement Structure	$4,000,000.00

Associated Work	Rehabilitation	Replacement
Approaches -	$0.00	$0.00
Detours -	$0.00	$0.00
Traffic Control -	$0.00	$15,000.00
Utilities -	$0.00	$0.00
Right of Way -	$0.00	$0.00
Environmental -	$0.00	$0.00
Other -	$0.00	$0.00
Total Associated Work Cost	**$0.00**	**$15,000.00**

Total Capital Works Costs		
Cost	**Rehabilitation**	**Replacement**
Rehab / Replacement Works:	$200,000.00	$4,015,000.00
Roadside Protection:	$0.00	$95,000.00
Staging Costs:	N/A	N/A
Construction Contingencies:	$20,000.00	$251,000.00
Environmental Assessment:	$2,500.00	$60,000.00
Engineering Design:	$20,000.00	$251,000.00
Geotechnical Investigation:	N/A	$20,000.00
Contract Administration:	$15,000.00	$201,000.00
Total Capital Work Cost	**$257,500.00**	**$4,893,000.00**

1.8 Structure No. 0008

Structure Name:	Bridge 0008	**2023 BCI =51.49**	
Road Name:	13th Line		
Location:	13th Line, Concession 13 & 14, Lot 14, Approx. 0.8 km South of Sideroad 15		
Structure Type:	Steel Truss (Timber Deck)		
Number of Spans:	1	Span Lengths:	36.5 m
Overall Structure Width:	4.27 m	Roadway Width:	3.9 m
Year of Construction:	1913	Current Load Limit:	12/16/25 tonnes

	Rehabilitation	Replacement
Estimated Capital Works Timelines (Years):	0.0	4.5

Recommendation:	**Forgo rehabilitation and replace structure within 5 years.**

Justification:

Bridge 0008 had a minor rehabilitation in 2014 and is generally in fair to poor condition demonstrating signs of severe deterioration on the substructure and severe corrosion to the structural steel members. Given the size of the structure, substandard alignment/profile, the Township may wish to complete a feasibility study to identify the preferred reconstruction option at this site to assist with future planning and budgeting.

Structure No. 0008 (Continued)	2023 BCI = 51.49

Maintenance Need	Element and Comments	Estimated Cost
		$0.00
		$0.00
	Maintenance Needs Total	**$0.00**

Additional Investigations	Estimated Cost
Monitoring of Deformations, Settlements and Movements,	$0.00

Current Roadside Protection Needs	Estimated Cost
	$0.00

Rehabilitation/Repair Required	Priority	Estimated Cost
Type C concrete repairs to abutment walls, ballast walls, wingwalls,	N/A	$150,000.00
Painting required to Structural Steel (Full length),	N/A	$400,000.00
Steel repairs to a. bearings, railing system, floor beams, stringers, bracings, bottom chords, top chords, connections, verticals / diagonals,	N/A	$200,000.00
Replace joints	N/A	$100,000.00
Replace barriers	N/A	$40,000.00
Replace bearings	N/A	$80,000.00
Add slope stabilization	N/A	$15,000.00
General Items - Insurance, Mobilization, Access etc.	N/A	$200,000.00
	Rehabilitation Cost Subtotal	**$1,185,000.00**

Estimate Value of Replacement Structure	$3,300,000.00

Associated Work	Rehabilitation	Replacement
Approaches -	$0.00	$0.00
Detours -	$0.00	$0.00
Traffic Control -	$15,000.00	$15,000.00
Utilities -	$0.00	$0.00
Total Associated Work Cost	**$15,000.00**	**$15,000.00**

Total Capital Works Costs		
Cost	**Rehabilitation**	**Replacement**
Rehab / Replacement Works:	$1,200,000.00	$3,315,000.00
Roadside Protection:	$0.00	$95,000.00
Staging Costs:	N/A	N/A
Construction Contingencies:	$110,000.00	$216,000.00
Environmental Assessment:	$2,500.00	$80,000.00
Engineering Design:	$110,000.00	$216,000.00
Geotechnical Investigation:	N/A	$20,000.00
Contract Administration:	$15,000.00	$166,000.00
Total Capital Work Cost	**$1,437,500.00**	**$4,108,000.00**

1.9 Structure No. 0009

Structure Name:	Bridge 0009		**2023 BCI =90.99**
Road Name:	10th Line		
Location:	Concession 10 & 11, Lot 13		
Structure Type:	Precast Concrete I-Girder		
Number of Spans:	3	Span Lengths:	17.9,27,17.9 m
Overall Structure Width:	9.8 m	Roadway Width:	8 m
Year of Construction:	2008	Current Load Limit:	

	Rehabilitation	Replacement
Estimated Capital Works Timelines (Years):	28.0	38.0

Recommendation:	**No Capital Works estimated to be required within 10 years. Future structure rehabilitation should be considered.**

Justification:

Bridge 0009, which was replaced in 2008, is generally in excellent condition with only minor maintenance work recommended at this time.

Structure No. 0009 (Continued)	2023 BCI = 90.99

Maintenance Need	Element and Comments	Estimated Cost
Bridge Cleaning	Remove vegetation around wingwalls	$1,000.00
Other	Reposition ceramar pads between abutment and deck	$1,000.00
	Maintenance Needs Total	**$2,000.00**

Additional Investigations	Estimated Cost
	$0.00

Current Roadside Protection Needs	Estimated Cost
	$0.00

Rehabilitation/Repair Required	Priority	Estimated Cost
	N/A	$0.00
	N/A	$0.00
	N/A	$0.00
	N/A	$0.00
	N/A	$0.00
	Rehabilitation Cost Subtotal	**$0.00**

Estimate Value of Replacement Structure	$4,700,000.00

Associated Work	Rehabilitation	Replacement
Approaches -	$0.00	$0.00
Detours -	$0.00	$0.00
Traffic Control -	$0.00	$15,000.00
Utilities -	$0.00	$0.00
Right of Way -	$0.00	$0.00
Environmental -	$0.00	$0.00
Other -	$0.00	$0.00
Total Associated Work Cost	**$0.00**	**$15,000.00**

Total Capital Works Costs		
Cost	**Rehabilitation**	**Replacement**
Rehab / Replacement Works:	N/A	$4,715,000.00
Roadside Protection:	N/A	$95,000.00
Staging Costs:	N/A	N/A
Construction Contingencies:	N/A	$286,000.00
Environmental Assessment:	N/A	$10,000.00
Engineering Design:	N/A	$286,000.00
Geotechnical Investigation:	N/A	$20,000.00
Contract Administration:	N/A	$236,000.00
Total Capital Work Cost	**N/A**	**$5,648,000.00**

1.10 Structure No. 0010

Structure Name:	Bridge 0010	**2023 BCI =87.55**	
Road Name:	11th Line		
Location:	Concession 11 & 12, Lot 12 (East Garafraxa, Dufferin County)		
Structure Type:	Cast-In-Place Conc. Rigid Frame		
Number of Spans:	1	Span Lengths:	11 m
Overall Structure Width:	9.5 m	Roadway Width:	8 m
Year of Construction:	2003	Current Load Limit:	

	Rehabilitation	Replacement
Estimated Capital Works Timelines (Years):	27.6	37.6

Recommendation:	**No Capital Works estimated to be required within 10 years. Future structure rehabilitation should be considered.**

Justification:

Bridge 0010, which was constructed in 2003, is generally in excellent condition with only minor maintenance work recommended.

Structure No. 0010 (Continued)	2023 BCI = 87.55

Maintenance Need	Element and Comments	Estimated Cost
Bridge Cleaning	Remove vegetation around wingwalls	$1,000.00
	Maintenance Needs Total	**$1,000.00**

Additional Investigations	Estimated Cost
	$0.00

Current Roadside Protection Needs	Estimated Cost
Investigate Need for Replacing with Longer Guide Rail	$500.00

Rehabilitation/Repair Required	Priority	Estimated Cost
	N/A	$0.00
	N/A	$0.00
	N/A	$0.00
	N/A	$0.00
	N/A	$0.00
Rehabilitation Cost Subtotal		**$0.00**

Estimate Value of Replacement Structure	$1,100,000.00

Associated Work	Rehabilitation	Replacement
Approaches -	$0.00	$0.00
Detours -	$0.00	$0.00
Traffic Control -	$0.00	$15,000.00
Utilities -	$0.00	$0.00
Right of Way -	$0.00	$0.00
Environmental -	$0.00	$0.00
Other -	$0.00	$0.00
Total Associated Work Cost	**$0.00**	**$15,000.00**

Total Capital Works Costs		
Cost	**Rehabilitation**	**Replacement**
Rehab / Replacement Works:	N/A	$1,115,000.00
Roadside Protection:	N/A	$95,000.00
Staging Costs:	N/A	N/A
Construction Contingencies:	N/A	$106,000.00
Environmental Assessment:	N/A	$10,000.00
Engineering Design:	N/A	$106,000.00
Geotechnical Investigation:	N/A	$20,000.00
Contract Administration:	N/A	$56,000.00
Total Capital Work Cost	**N/A**	**$1,508,000.00**

1.11 Structure No. 0011

Structure Name:	Culvert 0011	**2023 BCI =68.89**	
Road Name:	20th Line		
Location:	Concession 12 & 13 Lot 12 (East Garafraxa, in Dufferin County)		
Structure Type:	CSP Multi-Plate Ellipse Culvert(s)		
Number of Spans:	1	Span Lengths:	6.3 m
Overall Structure Width:	23.5 m	Roadway Width:	6 m
Year of Construction:	1969	Current Load Limit:	

	Rehabilitation	Replacement
Estimated Capital Works Timelines (Years):	N/A	14.4

Recommendation:	**No Capital Works is estimated to be required within the next 10 years.**

Justification:

Culvert 0011 is generally in fair to good condition but is showing signs of surface corrosion and section loss along the waterline with bolt hole cracks starting to form. Please note that the replacement cost provided assumes replacement with a similar span CSP culvert. The repairs listed above may help extend the lifespan of the structure.

Structure No. 0011 (Continued)	2023 BCI = 68.89

Maintenance Need	Element and Comments	Estimated Cost
Erosion Control	Install erosion protection at inlet and outlet	$2,500.00
Hazard Signs	Install hazard warning signs at structure	$1,000.00
	Maintenance Needs Total	**$3,500.00**

Additional Investigations	Estimated Cost
	$0.00

Current Roadside Protection Needs	Estimated Cost
	$0.00

Rehabilitation/Repair Required	Priority	Estimated Cost
Add slope stabilization	N/A	$10,000.00
Invert paving	N/A	$250,000.00
General Items - Insurance, Mobilization, Access etc.	N/A	$125,000.00
	Rehabilitation Cost Subtotal	**$385,000.00**

Estimate Value of Replacement Structure	$700,000.00

Associated Work	Rehabilitation	Replacement
Approaches -	$0.00	$0.00
Detours -	$0.00	$0.00
Traffic Control -	$0.00	$15,000.00
Utilities -	$0.00	$0.00
Right of Way -	$0.00	$0.00
Environmental -	$0.00	$0.00
Other -	$0.00	$0.00
Total Associated Work Cost	**$0.00**	**$15,000.00**

Total Capital Works Costs		
Cost	**Rehabilitation**	**Replacement**
Rehab / Replacement Works:	$385,000.00	$715,000.00
Roadside Protection:	$0.00	$95,000.00
Staging Costs:	N/A	N/A
Construction Contingencies:	$39,000.00	$72,000.00
Environmental Assessment:	$2,500.00	$10,000.00
Engineering Design:	$39,000.00	$72,000.00
Geotechnical Investigation:	N/A	$20,000.00
Contract Administration:	$15,000.00	$36,000.00
Total Capital Work Cost	**$480,500.00**	**$1,020,000.00**

1.12 Structure No. 0014

Structure Name:	Bridge 0014	**2023 BCI =70.44**	
Road Name:	10th Side Road		
Location:	Concession 13, Lots 10 & 11 (East Garafraxa, Dufferin County)		
Structure Type:	Cast-In-Place Concrete T-Beam		
Number of Spans:	1	Span Lengths:	9.1 m
Overall Structure Width:	6.5 m	Roadway Width:	6 m
Year of Construction:	1930	Current Load Limit:	

	Rehabilitation	Replacement
Estimated Capital Works Timelines (Years):	3.5	20.4

Recommendation:	**Major Rehabilitation is recommended within 4 years.**

Justification:

Structure 0014 is generally in good to fair condition but is demonstrating signs of severe concrete deterioration, specifically on the soffit and abutments. Given the narrow, sub-standard driving platform width, span, and age of the structure, consideration may be given to forgoing the rehabilitation and scheduling the replacement of the structure.

Structure No. 0014 (Continued)	2023 BCI = 70.44

Maintenance Need	Element and Comments	Estimated Cost
Erosion Control	Install rock protection along NW and SW wingwalls	$5,000.00
	Maintenance Needs Total	**$5,000.00**

Additional Investigations	Estimated Cost
	$0.00

Current Roadside Protection Needs	Estimated Cost
Narrow structure - Install guide rail if structure widened during rehabilitation / replacement	$0.00

Rehabilitation/Repair Required	Priority	Estimated Cost
Type A concrete repairs to curbs,	1 to 5 years	$2,500.00
Type B concrete repairs to floor beams, soffit,	1 to 5 years	$40,000.00
Type C concrete repairs to abutment walls, wingwalls,	1 to 5 years	$15,000.00
Widen deck platform (cantilever)	1 to 5 years	$50,000.00
Install side mounted barrier and approach guide rail	1 to 5 years	$95,000.00
Waterproof and pave	1 to 5 years	$30,000.00
Add slope stabilization	1 to 5 years	$10,000.00
General Items - Insurance, Mobilization, Access etc.	1 to 5 years	$125,000.00
	Rehabilitation Cost Subtotal	**$367,500.00**

Estimate Value of Replacement Structure	$900,000.00

Associated Work	Rehabilitation	Replacement
Approaches -	$0.00	$0.00
Detours -	$0.00	$0.00
Traffic Control -	$15,000.00	$15,000.00
Utilities -	$0.00	$0.00
Right of Way -	$0.00	$0.00
Environmental -	$0.00	$0.00
Total Associated Work Cost	**$15,000.00**	**$15,000.00**

Total Capital Works Costs		
Cost	**Rehabilitation**	**Replacement**
Rehab / Replacement Works:	$382,500.00	$915,000.00
Roadside Protection:	$0.00	$95,000.00
Staging Costs:	N/A	N/A
Construction Contingencies:	$39,000.00	$92,000.00
Environmental Assessment:	$2,500.00	$10,000.00
Engineering Design:	$39,000.00	$92,000.00
Geotechnical Investigation:	N/A	$20,000.00
Contract Administration:	$15,000.00	$46,000.00
Total Capital Work Cost	**$478,000.00**	**$1,270,000.00**

1.13 Structure No. 0015

Structure Name:	Culvert 0015	**2023 BCI =74.78**	
Road Name:	13th Line		
Location:	Concession 13 & 14, Lot 10 (East Garafraxa, in Dufferin County)		
Structure Type:	Cast-In-Place Conc. Box Culvert		
Number of Spans:	1	Span Lengths:	7 m
Overall Structure Width:	14.6 m	Roadway Width:	7 m
Year of Construction:	1979	Current Load Limit:	

	Rehabilitation	Replacement
Estimated Capital Works Timelines (Years):	N/A	19.8

Recommendation:	**No Capital Works is estimated to be required within the next 10 years.**

Justification:
Culvert 0015 is generally in good condition with only minor defects noted.

Structure No. 0015 (Continued)	2023 BCI = 74.78

Maintenance Need	Element and Comments	Estimated Cost
Hazard Signs	Install hazard warning signs at structure	$1,000.00
	Maintenance Needs Total	**$1,000.00**

Additional Investigations	Estimated Cost
	$0.00

Current Roadside Protection Needs	Estimated Cost
Investigate Need for Replacing with Longer Guide Rail	$500.00

Rehabilitation/Repair Required	Priority	Estimated Cost
	N/A	$0.00
	N/A	$0.00
	N/A	$0.00
	N/A	$0.00
	N/A	$0.00
	Rehabilitation Cost Subtotal	**$0.00**

Estimate Value of Replacement Structure	$650,000.00

Associated Work	Rehabilitation	Replacement
Approaches -	$0.00	$0.00
Detours -	$0.00	$0.00
Traffic Control -	$0.00	$15,000.00
Utilities -	$0.00	$0.00
Right of Way -	$0.00	$0.00
Environmental -	$0.00	$0.00
Other -	$0.00	$0.00
Total Associated Work Cost	**$0.00**	**$15,000.00**

Total Capital Works Costs		
Cost	**Rehabilitation**	**Replacement**
Rehab / Replacement Works:	N/A	$665,000.00
Roadside Protection:	N/A	$95,000.00
Staging Costs:	N/A	N/A
Construction Contingencies:	N/A	$67,000.00
Environmental Assessment:	N/A	$10,000.00
Engineering Design:	N/A	$67,000.00
Geotechnical Investigation:	N/A	$20,000.00
Contract Administration:	N/A	$34,000.00
Total Capital Work Cost	**N/A**	**$958,000.00**

1.14 Structure No. 0016

Structure Name:	Culvert 0016	**2023 BCI =56.74**	
Road Name:	East-West Garafraxa Townline		
Location:	Lot 10 (East Garafraxa, in Dufferin County)		
Structure Type:	Cast-In-Place Conc. Box Culvert		
Number of Spans:	1	Span Lengths:	3.6 m
Overall Structure Width:	17.7 m	Roadway Width:	6 m
Year of Construction:	1960	Current Load Limit:	

	Rehabilitation	Replacement
Estimated Capital Works Timelines (Years):	N/A	8.4

Recommendation:	**Structure replacement is recommended within 8 years.**

Justification:

Culvert 0016 is generally in fair condition. The low cover over the structure is contributing to severe concrete deterioration to the deck top. A monitoring program conducted in 2022 confirmed the abutment walls are not actively rotating.

Structure No. 0016 (Continued)	2023 BCI = 56.74

Maintenance Need	Element and Comments	Estimated Cost
		$0.00
		$0.00
	Maintenance Needs Total	**$0.00**

Additional Investigations	Estimated Cost

Current Roadside Protection Needs	Estimated Cost
Investigate need for Guide Rail	$1,000.00

Rehabilitation/Repair Required	Priority	Estimated Cost
Type C concrete repairs to barrels, inlet, outlet,	N/A	$75,000.00
Structural Slab	N/A	$50,000.00
Waterproof and pave	N/A	$20,000.00
Add slope stabilization	N/A	$5,000.00
General Items - Insurance, Mobilization, Access etc.	N/A	$125,000.00
	Rehabilitation Cost Subtotal	**$275,000.00**

Estimate Value of Replacement Structure	$450,000.00

Associated Work	Rehabilitation	Replacement
Approaches -	$0.00	$0.00
Detours -	$0.00	$0.00
Traffic Control -	$15,000.00	$15,000.00
Utilities -	$0.00	$0.00
Right of Way -	$0.00	$0.00
Environmental -	$0.00	$0.00
Other -	$0.00	$0.00
Total Associated Work Cost	**$15,000.00**	**$15,000.00**

Total Capital Works Costs		
Cost	**Rehabilitation**	**Replacement**
Rehab / Replacement Works:	$290,000.00	$465,000.00
Roadside Protection:	$1,000.00	$95,000.00
Staging Costs:	N/A	N/A
Construction Contingencies:	$29,000.00	$47,000.00
Environmental Assessment:	$2,500.00	$10,000.00
Engineering Design:	$29,000.00	$47,000.00
Geotechnical Investigation:	N/A	$20,000.00
Contract Administration:	$15,000.00	$24,000.00
Total Capital Work Cost	**$366,500.00**	**$708,000.00**

1.15 Structure No. 0017

Structure Name:	Culvert 0017		**2023 BCI =62.5**
Road Name:	13th Line		
Location:	Lot 10 (East Garafraxa, in Dufferin County)		
Structure Type:	Cast-In-Place Conc. Box Culvert		
Number of Spans:	1	Span Lengths:	2.7 m
Overall Structure Width:	5.9 m	Roadway Width:	5 m
Year of Construction:	1940	Current Load Limit:	

	Rehabilitation	Replacement
Estimated Capital Works Timelines (Years):	N/A	11.3

Recommendation:	**No Capital Works is estimated to be required within the next 10 years.**

Justification:

Culvert 0017 is generally in fair to poor condition and is demonstrating signs of severe concrete deterioration, specifically in the soffit. A monitoring program conducted in 2022 confirmed the wingwalls are not actively rotating; however, the wingwalls should continued to be inspected for possible rotation during future biennial inspections.

Structure No. 0017 (Continued)	2023 BCI = 62.5

Maintenance Need	Element and Comments	Estimated Cost
		$0.00
		$0.00
	Maintenance Needs Total	**$0.00**

Additional Investigations	Estimated Cost
Monitoring of Deformations, Settlements and Movements,	$0.00

Current Roadside Protection Needs	Estimated Cost
Install Guide Rail, end treatments	$95,000.00

Rehabilitation/Repair Required	Priority	Estimated Cost
Type C concrete repairs to barrels, inlet, outlet,	N/A	$25,000.00
Waterproof and pave	N/A	$15,000.00
General Items - Insurance, Mobilization, Access etc.	N/A	$125,000.00
Rehabilitation Cost Subtotal		**$165,000.00**

Estimate Value of Replacement Structure	$400,000.00

Associated Work	Rehabilitation	Replacement
Approaches -	$0.00	$0.00
Detours -	$0.00	$0.00
Traffic Control -	$0.00	$15,000.00
Utilities -	$0.00	$0.00
Right of Way -	$0.00	$0.00
Environmental -	$0.00	$0.00
Other -	$0.00	$0.00
Total Associated Work Cost	**$0.00**	**$15,000.00**

Total Capital Works Costs		
Cost	**Rehabilitation**	**Replacement**
Rehab / Replacement Works:	$165,000.00	$415,000.00
Roadside Protection:	$95,000.00	$95,000.00
Staging Costs:	N/A	N/A
Construction Contingencies:	$17,000.00	$42,000.00
Environmental Assessment:	$2,500.00	$10,000.00
Engineering Design:	$20,000.00	$42,000.00
Geotechnical Investigation:	N/A	$20,000.00
Contract Administration:	$15,000.00	$21,000.00
Total Capital Work Cost	**$314,500.00**	**$645,000.00**

1.16 Structure No. 0019

Structure Name:	Culvert 0019	**2023 BCI =74.64**	
Road Name:	16th Line		
Location:	Concession 16 & 17, Lot 7 (East Garafraxa, in Dufferin County)		
Structure Type:	Cast-In-Place Conc. Box Culvert		
Number of Spans:	1	Span Lengths:	3.5 m
Overall Structure Width:	8 m	Roadway Width:	6 m
Year of Construction:	1960	Current Load Limit:	

	Rehabilitation	Replacement
Estimated Capital Works Timelines (Years):	N/A	19.6

Recommendation:	**No Capital Works is estimated to be required within the next 10 years.**

Justification:
Culvert 0019 is generally in good condition with only minor defects noted.

Structure No. 0019 (Continued)	2023 BCI = 74.64

Maintenance Need	Element and Comments	Estimated Cost
Bridge Cleaning	Remove overgrown vegetation over wingwalls	$1,000.00
	Maintenance Needs Total	**$1,000.00**

Additional Investigations	Estimated Cost
	$0.00

Current Roadside Protection Needs	Estimated Cost
Install Guide Rail, end treatments	$95,000.00

Rehabilitation/Repair Required	Priority	Estimated Cost
	N/A	$0.00
	N/A	$0.00
	N/A	$0.00
	N/A	$0.00
	N/A	$0.00
Rehabilitation Cost Subtotal		**$0.00**

Estimate Value of Replacement Structure	$500,000.00

Associated Work	Rehabilitation	Replacement
Approaches -	$0.00	$0.00
Detours -	$0.00	$0.00
Traffic Control -	$0.00	$15,000.00
Utilities -	$0.00	$0.00
Right of Way -	$0.00	$0.00
Environmental -	$0.00	$0.00
Other -	$0.00	$0.00
Total Associated Work Cost	**$0.00**	**$15,000.00**

Total Capital Works Costs		
Cost	**Rehabilitation**	**Replacement**
Rehab / Replacement Works:	N/A	$515,000.00
Roadside Protection:	N/A	$95,000.00
Staging Costs:	N/A	N/A
Construction Contingencies:	N/A	$52,000.00
Environmental Assessment:	N/A	$10,000.00
Engineering Design:	N/A	$52,000.00
Geotechnical Investigation:	N/A	$20,000.00
Contract Administration:	N/A	$26,000.00
Total Capital Work Cost	**N/A**	**$770,000.00**

1.17 Structure No. 0021

Structure Name:	Culvert 0021	**2023 BCI =73.89**	
Road Name:	12th Line		
Location:	Concession 12 & 13, Lot 5 (East Garafraxa, Dufferin County)		
Structure Type:	CSP Multi-Plate Ellipse Culvert(s)		
Number of Spans:	1	Span Lengths:	3.1 m
Overall Structure Width:	11.7 m	Roadway Width:	7 m
Year of Construction:	2007	Current Load Limit:	

	Rehabilitation	Replacement
Estimated Capital Works Timelines (Years):	N/A	17.2

Recommendation:	**No Capital Works is estimated to be required within the next 10 years.**

Justification:

Culvert 0021 is generally in good condition with only minor defects noted. Please note that the replacement cost provided assumes replacement with a similar span CSP culvert.

Maintenance Need	Element and Comments	Estimated Cost
Hazard Signs	Install hazard warning signs at structure	$1,000.00
	Maintenance Needs Total	**$1,000.00**

Additional Investigations	Estimated Cost
	$0.00

Current Roadside Protection Needs	Estimated Cost
Install Guide Rail, end treatments	$95,000.00

Rehabilitation/Repair Required	Priority	Estimated Cost
	N/A	$0.00
	N/A	$0.00
	N/A	$0.00
	N/A	$0.00
	N/A	$0.00
Rehabilitation Cost Subtotal		**$0.00**

Estimate Value of Replacement Structure	$350,000.00

Associated Work	Rehabilitation	Replacement
Approaches -	$0.00	$0.00
Detours -	$0.00	$0.00
Traffic Control -	$0.00	$15,000.00
Utilities -	$0.00	$0.00
Right of Way -	$0.00	$0.00
Environmental -	$0.00	$0.00
Other -	$0.00	$0.00
Total Associated Work Cost	**$0.00**	**$15,000.00**

Total Capital Works Costs		
Cost	**Rehabilitation**	**Replacement**
Rehab / Replacement Works:	N/A	$365,000.00
Roadside Protection:	N/A	$95,000.00
Staging Costs:	N/A	N/A
Construction Contingencies:	N/A	$37,000.00
Environmental Assessment:	N/A	$10,000.00
Engineering Design:	N/A	$37,000.00
Geotechnical Investigation:	N/A	$20,000.00
Contract Administration:	N/A	$19,000.00
Total Capital Work Cost	**N/A**	**$583,000.00**

1.18 Structure No. 0022

Structure Name:	Culvert 0022		**2023 BCI =74.47**
Road Name:	East Garafraxa - Caledon Townline		
Location:	18th Line, 1.4 km north of East Garafraxa		
Structure Type:	Cast-In-Place Conc. Box Culvert		
Number of Spans:	1	Span Lengths:	1.9 m
Overall Structure Width:	9 m	Roadway Width:	7 m
Year of Construction:	1940	Current Load Limit:	

	Rehabilitation	Replacement
Estimated Capital Works Timelines (Years):	N/A	19.5

Recommendation:	**No Capital Works is estimated to be required within the next 10 years.**

Justification:
Culvert 0022 is generally in good condition with only minor defects noted.

Structure No. 0022 (Continued)	2023 BCI = 74.47

Maintenance Need	Element and Comments	Estimated Cost
Bridge Cleaning	Remove overgrown vegetation over inlet and outlet	$2,000.00
Erosion Control	Install rock protection over embankments	$4,000.00
	Maintenance Needs Total	**$6,000.00**

Additional Investigations	Estimated Cost
Other: Hydraulic/Channel Investigation,	$5,000.00

Current Roadside Protection Needs	Estimated Cost
Install Guide Rail, end treatments	$95,000.00

Rehabilitation/Repair Required	Priority	Estimated Cost
	N/A	$0.00
	N/A	$0.00
	N/A	$0.00
	N/A	$0.00
	N/A	$0.00
	Rehabilitation Cost Subtotal	**$0.00**

Estimate Value of Replacement Structure	$350,000.00

Associated Work	Rehabilitation	Replacement
Approaches -	$0.00	$0.00
Detours -	$0.00	$0.00
Traffic Control -	$0.00	$15,000.00
Utilities -	$0.00	$0.00
Right of Way -	$0.00	$0.00
Environmental -	$0.00	$0.00
Other -	$0.00	$0.00
Total Associated Work Cost	**$0.00**	**$15,000.00**

Total Capital Works Costs		
Cost	**Rehabilitation**	**Replacement**
Rehab / Replacement Works:	N/A	$365,000.00
Roadside Protection:	N/A	$95,000.00
Staging Costs:	N/A	N/A
Construction Contingencies:	N/A	$37,000.00
Environmental Assessment:	N/A	$10,000.00
Engineering Design:	N/A	$37,000.00
Geotechnical Investigation:	N/A	$20,000.00
Contract Administration:	N/A	$19,000.00
Total Capital Work Cost	**N/A**	**$583,000.00**

1.19 Structure No. 0023

Structure Name:	Culvert 0023	**2023 BCI =91.09**	
Road Name:	19th Line		
Location:	Concession 19 & A, Lot 2 (East Garafraxa, Dufferin County)		
Structure Type:	Cast-In-Place Conc. Box Culvert		
Number of Spans:	1	Span Lengths:	4 m
Overall Structure Width:	9.7 m	Roadway Width:	7 m
Year of Construction:	2007	Current Load Limit:	

	Rehabilitation	Replacement
Estimated Capital Works Timelines (Years):	N/A	36.1

Recommendation:	**No Capital Works is estimated to be required within the next 10 years.**

Justification:
Culvert 0023, which was replaced in 2007, is generally in excellent condition.

Structure No. 0023 (Continued)	2023 BCI = 91.09

Maintenance Need	Element and Comments	Estimated Cost
Hazard Signs	Install hazard warning signs at structure	$1,000.00
	Maintenance Needs Total	**$1,000.00**

Additional Investigations	Estimated Cost
	$0.00

Current Roadside Protection Needs	Estimated Cost
Replace guide rail, end treatments	$95,000.00

Rehabilitation/Repair Required	Priority	Estimated Cost
	N/A	$0.00
	N/A	$0.00
	N/A	$0.00
	N/A	$0.00
	N/A	$0.00
Rehabilitation Cost Subtotal		**$0.00**

Estimate Value of Replacement Structure	$450,000.00

Associated Work	Rehabilitation	Replacement
Approaches -	$0.00	$0.00
Detours -	$0.00	$0.00
Traffic Control -	$0.00	$15,000.00
Utilities -	$0.00	$0.00
Right of Way -	$0.00	$0.00
Environmental -	$0.00	$0.00
Other -	$0.00	$0.00
Total Associated Work Cost	**$0.00**	**$15,000.00**

Total Capital Works Costs		
Cost	**Rehabilitation**	**Replacement**
Rehab / Replacement Works:	N/A	$465,000.00
Roadside Protection:	N/A	$95,000.00
Staging Costs:	N/A	N/A
Construction Contingencies:	N/A	$47,000.00
Environmental Assessment:	N/A	$10,000.00
Engineering Design:	N/A	$47,000.00
Geotechnical Investigation:	N/A	$20,000.00
Contract Administration:	N/A	$24,000.00
Total Capital Work Cost	**N/A**	**$708,000.00**

1.20 Structure No. 0024

Structure Name:	Culvert 0024	**2023 BCI =67.88**	
Road Name:	East Garafraxa - Caledon Townline		
Location:	Concession A Townline (East Garafraxa, Dufferin County)		
Structure Type:	Cast-In-Place Conc. Box Culvert		
Number of Spans:	1	Span Lengths:	5.5 m
Overall Structure Width:	10.7 m	Roadway Width:	6 m
Year of Construction:	1950	Current Load Limit:	

	Rehabilitation	Replacement
Estimated Capital Works Timelines (Years):	7.9	17.9

Recommendation:	**Forgo rehabilitation and replace structure in future (replacement timeline estimated to exceed 10 years).**

Justification:

Culvert 0024 is generally in fair condition but is demonstrating signs of severe concrete deterioration. Based on the structure type, low clearance, and narrow driving platform width, a rehabilitation is not recommended, and replacement of the structure should be considered as the BCI approaches 40.

Structure No. 0024 (Continued)	2023 BCI = 67.88

Maintenance Need	Element and Comments	Estimated Cost
Erosion Control	Install rock protection on embankments	$2,000.00
	Maintenance Needs Total	**$2,000.00**

Additional Investigations	Estimated Cost
	$0.00

Current Roadside Protection Needs	Estimated Cost
Install Guide Rail, end treatments	$95,000.00

Rehabilitation/Repair Required	Priority	Estimated Cost
Type C concrete repairs to barrels, inlet, outlet,	N/A	$25,000.00
Waterproof and Pave	N/A	$25,000.00
General Items - Insurance, Mobilization, Access etc.	N/A	$125,000.00
Rehabilitation Cost Subtotal		**$175,000.00**

Estimate Value of Replacement Structure	$550,000.00

Associated Work	Rehabilitation	Replacement
Approaches -	$0.00	$0.00
Detours -	$0.00	$0.00
Traffic Control -	$0.00	$15,000.00
Utilities -	$0.00	$0.00
Right of Way -	$0.00	$0.00
Environmental -	$0.00	$0.00
Other -	$0.00	$0.00
Total Associated Work Cost	**$0.00**	**$15,000.00**

Total Capital Works Costs		
Cost	**Rehabilitation**	**Replacement**
Rehab / Replacement Works:	$175,000.00	$565,000.00
Roadside Protection:	$95,000.00	$95,000.00
Staging Costs:	N/A	N/A
Construction Contingencies:	$18,000.00	$57,000.00
Environmental Assessment:	$2,500.00	$10,000.00
Engineering Design:	$20,000.00	$57,000.00
Geotechnical Investigation:	N/A	$20,000.00
Contract Administration:	$15,000.00	$29,000.00
Total Capital Work Cost	**$325,500.00**	**$833,000.00**

1.21 Structure No. 0026

Structure Name:	Culvert 0026	**2023 BCI =54.94**	
Road Name:	Erin-Garafraxa		
Location:	East Garafraxa/Erin Townline (East Garafraxa, Dufferin County)		
Structure Type:	Cast-In-Place Conc. Box Culvert		
Number of Spans:	1	Span Lengths:	3.6 m
Overall Structure Width:	14.6 m	Roadway Width:	6 m
Year of Construction:	1940	Current Load Limit:	

	Rehabilitation	Replacement
Estimated Capital Works Timelines (Years):	5.0	5.0

Recommendation:	**Major Rehabilitation is recommended within 5 years.**

Justification:

Culvert 0026, which has been previously extended, is generally in fair to good condition overall; however, the original portion of the deck is demonstrating signs of severe concrete deterioration, moisture penetration and severe delamination with exposed corroded reinforcing on the deck. Replacement timeline is based on the condition of the original structure.

Structure No. 0026 (Continued)	2023 BCI = 54.94

Maintenance Need	Element and Comments	Estimated Cost
Hazard Signs	Install hazard warning signs at structure	$1,000.00
	Maintenance Needs Total	**$1,000.00**

Additional Investigations	Estimated Cost
Monitoring Crack Widths,	$0.00

Current Roadside Protection Needs	Estimated Cost
Investigate need for Guide Rail	$1,000.00

Rehabilitation/Repair Required	Priority	Estimated Cost
Removal of Existing Structure (Centre Portion Only)	1 to 5 years	$35,000.00
Concrete in Superstructure	1 to 5 years	$25,000.00
Concrete in Substructure	1 to 5 years	$25,000.00
Waterproof and Pave	1 to 5 years	$20,000.00
General Items - Insurance, Mobilization, Access etc.	1 to 5 years	$125,000.00
	Rehabilitation Cost Subtotal	**$230,000.00**

Estimate Value of Replacement Structure	$450,000.00

Associated Work	Rehabilitation	Replacement
Approaches -	$0.00	$0.00
Detours -	$0.00	$0.00
Traffic Control -	$15,000.00	$15,000.00
Utilities -	$0.00	$0.00
Right of Way -	$0.00	$0.00
Environmental -	$0.00	$0.00
Other -	$0.00	$0.00
Total Associated Work Cost	**$15,000.00**	**$15,000.00**

Total Capital Works Costs		
Cost	**Rehabilitation**	**Replacement**
Rehab / Replacement Works:	$245,000.00	$465,000.00
Roadside Protection:	$1,000.00	$95,000.00
Staging Costs:	N/A	N/A
Construction Contingencies:	$25,000.00	$47,000.00
Environmental Assessment:	$2,500.00	$10,000.00
Engineering Design:	$25,000.00	$47,000.00
Geotechnical Investigation:	N/A	$20,000.00
Contract Administration:	$15,000.00	$24,000.00
Total Capital Work Cost	**$313,500.00**	**$708,000.00**

1.22 Structure No. 0027

Structure Name:	Culvert 0027		**2023 BCI =74.35**
Road Name:	East Garafraxa - Caledon Townline		
Location:	18th Line, 1.4 km north of East Garafraxa		
Structure Type:	Cast-In-Place Conc. Box Culvert		
Number of Spans:	1	Span Lengths:	1.9 m
Overall Structure Width:	14.6 m	Roadway Width:	6 m
Year of Construction:	1945	Current Load Limit:	

	Rehabilitation	Replacement
Estimated Capital Works Timelines (Years):	N/A	19.4

Recommendation:	**No Capital Works is estimated to be required within the next 10 years.**

Justification:

Culvert 0027 is generally in good condition with only minor defects noted. Based on the structure type and span, a rehabilitation is not recommended, and replacement of the structure should be considered as the BCI approaches 40.

Maintenance Need	Element and Comments	Estimated Cost
Hazard Signs	Install hazard warning signs at structure	$1,000.00
	Maintenance Needs Total	**$1,000.00**

Additional Investigations	Estimated Cost
	$0.00

Current Roadside Protection Needs	Estimated Cost
Investigate need for Guide Rail	$1,000.00

Rehabilitation/Repair Required	Priority	Estimated Cost
	N/A	$0.00
	N/A	$0.00
	N/A	$0.00
	N/A	$0.00
	N/A	$0.00
Rehabilitation Cost Subtotal		**$0.00**

Estimate Value of Replacement Structure	$350,000.00

Associated Work	Rehabilitation	Replacement
Approaches -	$0.00	$0.00
Detours -	$0.00	$0.00
Traffic Control -	$0.00	$15,000.00
Utilities -	$0.00	$0.00
Right of Way -	$0.00	$0.00
Environmental -	$0.00	$0.00
Other -	$0.00	$0.00
Total Associated Work Cost	**$0.00**	**$15,000.00**

Total Capital Works Costs		
Cost	**Rehabilitation**	**Replacement**
Rehab / Replacement Works:	N/A	$365,000.00
Roadside Protection:	N/A	$95,000.00
Staging Costs:	N/A	N/A
Construction Contingencies:	N/A	$37,000.00
Environmental Assessment:	N/A	$10,000.00
Engineering Design:	N/A	$37,000.00
Geotechnical Investigation:	N/A	$20,000.00
Contract Administration:	N/A	$19,000.00
Total Capital Work Cost	**N/A**	**$583,000.00**

1.23 Structure No. 0029

Structure Name:	Culvert 0029	**2023 BCI =67.65**	
Road Name:	East Garafraxa - Caledon Townline		
Location:	East Garafraxa/Erin Townline (East Garafraxa, Dufferin County)		
Structure Type:	Cast-In-Place Conc. Box Culvert		
Number of Spans:	1	Span Lengths:	3.7 m
Overall Structure Width:	7.4 m	Roadway Width:	7 m
Year of Construction:	1940	Current Load Limit:	15 tonnes

	Rehabilitation	Replacement
Estimated Capital Works Timelines (Years):	N/A	14.0

Recommendation:	**No Capital Works is estimated to be required within the next 10 years.**

Justification:

Culvert 0029 is generally in good to fair condition but is demonstrating signs of concrete deterioration throughout the barrel. Time to replacement has been identified based on the condition of the barrel.

Structure No. 0029 (Continued)	2023 BCI = 67.65

Maintenance Need	Element and Comments	Estimated Cost
		$0.00
		$0.00
	Maintenance Needs Total	**$0.00**

Additional Investigations	Estimated Cost
	$0.00

Current Roadside Protection Needs	Estimated Cost
Install Guide Rail, end treatments	$95,000.00

Rehabilitation/Repair Required	Priority	Estimated Cost
Type A concrete repairs to deck top, curbs,	N/A	$1,000.00
Type C concrete repairs to barrels, outlet,	N/A	$15,000.00
Waterproof and pave	N/A	$20,000.00
Add slope stabilization	N/A	$8,000.00
General Items - Insurance, Mobilization, Access etc.	N/A	$125,000.00
	Rehabilitation Cost Subtotal	**$169,000.00**

Estimate Value of Replacement Structure	$450,000.00

Associated Work	Rehabilitation	Replacement
Approaches -	$0.00	$0.00
Detours -	$0.00	$0.00
Traffic Control -	$15,000.00	$15,000.00
Utilities -	$0.00	$0.00
Right of Way -	$0.00	$0.00
Environmental -	$0.00	$0.00
Other -	$0.00	$0.00
Total Associated Work Cost	**$15,000.00**	**$15,000.00**

Total Capital Works Costs		
Cost	**Rehabilitation**	**Replacement**
Rehab / Replacement Works:	$184,000.00	$465,000.00
Roadside Protection:	$95,000.00	$95,000.00
Staging Costs:	N/A	N/A
Construction Contingencies:	$19,000.00	$47,000.00
Environmental Assessment:	$2,500.00	$10,000.00
Engineering Design:	$20,000.00	$47,000.00
Geotechnical Investigation:	N/A	$20,000.00
Contract Administration:	$15,000.00	$24,000.00
Total Capital Work Cost	**$335,500.00**	**$708,000.00**

1.24 Structure No. 0031

Structure Name:	Culvert 0031	**2023 BCI =64.59**	
Road Name:	20th Side Road		
Location:	Concession 9, Lots 20 & 21 (East Garafraxa, Dufferin County)		
Structure Type:	Cast-In-Place Conc. Box Culvert		
Number of Spans:	1	Span Lengths:	3.6 m
Overall Structure Width:	7.9 m	Roadway Width:	6 m
Year of Construction:	1940	Current Load Limit:	

	Rehabilitation	Replacement
Estimated Capital Works Timelines (Years):	N/A	12.3

Recommendation:	**No Capital Works is estimated to be required within the next 10 years.**

Justification:

Culvert 0031 is generally in fair to good condition but is showing signs of severe concrete deterioration, specifically to the wingwalls, fascia and soffit.

Structure No. 0031 (Continued)	2023 BCI = 64.59

Maintenance Need	Element and Comments	Estimated Cost
Bridge Cleaning	Remove vegetation around wingwalls	$1,000.00
	Maintenance Needs Total	**$1,000.00**

Additional Investigations	Estimated Cost
	$0.00

Current Roadside Protection Needs	Estimated Cost
Investigate Need for Replacing with Longer Guide Rail	$0.00

Rehabilitation/Repair Required	Priority	Estimated Cost
Type B concrete repairs to soffit,	N/A	$25,000.00
Type C concrete repairs to abutment walls,	N/A	$5,000.00
Waterproof and Pave	N/A	$40,000.00
Add slope stabilization	N/A	$4,000.00
General Items - Insurance, Mobilization, Access etc.	N/A	$125,000.00
Construct concrete curbs	N/A	$30,000.00
	Rehabilitation Cost Subtotal	**$229,000.00**

Estimate Value of Replacement Structure	$400,000.00

Associated Work	Rehabilitation	Replacement
Approaches -	$0.00	$0.00
Detours -	$0.00	$0.00
Traffic Control -	$0.00	$15,000.00
Utilities -	$0.00	$0.00
Right of Way -	$0.00	$0.00
Environmental -	$0.00	$0.00
Other -	$0.00	$0.00
Total Associated Work Cost	**$0.00**	**$15,000.00**

Total Capital Works Costs		
Cost	**Rehabilitation**	**Replacement**
Rehab / Replacement Works:	$229,000.00	$415,000.00
Roadside Protection:	$0.00	$95,000.00
Staging Costs:	N/A	N/A
Construction Contingencies:	$23,000.00	$42,000.00
Environmental Assessment:	$2,500.00	$10,000.00
Engineering Design:	$23,000.00	$42,000.00
Geotechnical Investigation:	N/A	$20,000.00
Contract Administration:	$15,000.00	$21,000.00
Total Capital Work Cost	**$292,500.00**	**$645,000.00**

1.25 Structure No. 41

2023 BCI =75

Structure Name:	41		
Road Name:	Sideroad 10		
Location:	Approximately 300 m west of 9th Line		
Structure Type:	CSP Round Culvert(s)		
Number of Spans:	1	Span Lengths:	2.3 m
Overall Structure Width:	12 m	Roadway Width:	6 m
Year of Construction:	Unknown	Current Load Limit:	N/A

	Rehabilitation	Replacement
Estimated Capital Works Timelines (Years):	N/A	17.8

Recommendation:	**No Capital Works is estimated to be required within the next 10 years.**

Justification:
Structure 41 is generally in good condition with only minor defects noted.

Structure No. 41 (Continued)	2023 BCI = 75

Maintenance Need	Element and Comments	Estimated Cost
Erosion Control	Place rock protection NW	$500.00
Hazard Signs	Install hazard warning signs at structure	$1,000.00
	Maintenance Needs Total	**$1,500.00**

Additional Investigations	Estimated Cost
	$0.00

Current Roadside Protection Needs	Estimated Cost
	$0.00

Rehabilitation/Repair Required	Priority	Estimated Cost
	N/A	$0.00
	N/A	$0.00
	N/A	$0.00
	N/A	$0.00
	N/A	$0.00
Rehabilitation Cost Subtotal		**$0.00**

Estimate Value of Replacement Structure	$350,000.00

Associated Work	Rehabilitation	Replacement
Approaches -	$0.00	$0.00
Detours -	$0.00	$0.00
Traffic Control -	$0.00	$0.00
Utilities -	$0.00	$0.00
Right of Way -	$0.00	$0.00
Environmental -	$0.00	$0.00
Other -	$0.00	$0.00
Total Associated Work Cost	**$0.00**	**$0.00**

Total Capital Works Costs		
Cost	**Rehabilitation**	**Replacement**
Rehab / Replacement Works:	N/A	$350,000.00
Roadside Protection:	N/A	$95,000.00
Staging Costs:	N/A	N/A
Construction Contingencies:	N/A	$45,000.00
Environmental Assessment:	N/A	$10,000.00
Engineering Design:	N/A	$40,000.00
Geotechnical Investigation:	N/A	$20,000.00
Contract Administration:	N/A	$20,000.00
Total Capital Work Cost	**N/A**	**$580,000.00**

1.26 Structure No. 42

Structure Name:	42	**2023 BCI =69.39**	
Road Name:	Sideroad 10		
Location:	Approximately 700 m SW of 10th Line		
Structure Type:	Cast-In-Place Conc. Rigid Frame		
Number of Spans:	1	Span Lengths:	2.75 m
Overall Structure Width:	6 m	Roadway Width:	5 m
Year of Construction:	Unknown	Current Load Limit:	N/A

	Rehabilitation	Replacement
Estimated Capital Works Timelines (Years):	N/A	19.4

Recommendation:	**No Capital Works is estimated to be required within the next 10 years.**

Justification:
Structure 42 is generally in good condition with only minor defects noted.

Structure No. 42 (Continued)	2023 BCI = 69.39

Maintenance Need	Element and Comments	Estimated Cost
Hazard Signs	Replace NE and reinstate NW ands SE hazard warning signs	$500.00
	Maintenance Needs Total	**$500.00**

Additional Investigations	Estimated Cost
	$0.00

Current Roadside Protection Needs	Estimated Cost
	$0.00

Rehabilitation/Repair Required	Priority	Estimated Cost
	N/A	$0.00
	N/A	$0.00
	N/A	$0.00
	N/A	$0.00
	N/A	$0.00
Rehabilitation Cost Subtotal		**$0.00**

Estimate Value of Replacement Structure	$350,000.00

Associated Work	Rehabilitation	Replacement
Approaches -	$0.00	$0.00
Detours -	$0.00	$0.00
Traffic Control -	$0.00	$0.00
Utilities -	$0.00	$0.00
Right of Way -	$0.00	$0.00
Environmental -	$0.00	$0.00
Other -	$0.00	$0.00
Total Associated Work Cost	**$0.00**	**$0.00**

Total Capital Works Costs		
Cost	**Rehabilitation**	**Replacement**
Rehab / Replacement Works:	N/A	$350,000.00
Roadside Protection:	N/A	$95,000.00
Staging Costs:	N/A	N/A
Construction Contingencies:	N/A	$45,000.00
Environmental Assessment:	N/A	$10,000.00
Engineering Design:	N/A	$40,000.00
Geotechnical Investigation:	N/A	$20,000.00
Contract Administration:	N/A	$20,000.00
Total Capital Work Cost	**N/A**	**$580,000.00**

1.27 Structure No. 43

Structure Name:	43	**2023 BCI =75**	
Road Name:	13th Line		
Location:	Approximately 1.7 km north of County Road 3		
Structure Type:	CSP Round Culvert(s)		
Number of Spans:	2	Span Lengths:	1.4, 1.4 m
Overall Structure Width:	14 m	Roadway Width:	6 m
Year of Construction:	Unknown	Current Load Limit:	N/A

	Rehabilitation	Replacement
Estimated Capital Works Timelines (Years):	N/A	17.8

Recommendation:	**No Capital Works is estimated to be required within the next 10 years.**

Justification:
Structure 43 is generally in good condition with only minor defects noted.

Structure No. 43 (Continued)	2023 BCI = 75

Maintenance Need	Element and Comments	Estimated Cost
Erosion Control	Place rock protection on west embankments and in stream at outlet	$2,000.00
Hazard Signs	Install hazard warning signs at structure	$1,000.00
	Maintenance Needs Total	**$3,000.00**

Additional Investigations	Estimated Cost
	$0.00

Current Roadside Protection Needs	Estimated Cost
	$0.00

Rehabilitation/Repair Required	Priority	Estimated Cost
	N/A	$0.00
	N/A	$0.00
	N/A	$0.00
	N/A	$0.00
	N/A	$0.00
	Rehabilitation Cost Subtotal	**$0.00**

Estimate Value of Replacement Structure	$400,000.00

Associated Work	Rehabilitation	Replacement
Approaches -	$0.00	$0.00
Detours -	$0.00	$0.00
Traffic Control -	$0.00	$0.00
Utilities -	$0.00	$0.00
Right of Way -	$0.00	$0.00
Environmental -	$0.00	$0.00
Other -	$0.00	$0.00
Total Associated Work Cost	**$0.00**	**$0.00**

Total Capital Works Costs		
Cost	**Rehabilitation**	**Replacement**
Rehab / Replacement Works:	N/A	$400,000.00
Roadside Protection:	N/A	$95,000.00
Staging Costs:	N/A	N/A
Construction Contingencies:	N/A	$50,000.00
Environmental Assessment:	N/A	$10,000.00
Engineering Design:	N/A	$45,000.00
Geotechnical Investigation:	N/A	$20,000.00
Contract Administration:	N/A	$20,000.00
Total Capital Work Cost	**N/A**	**$640,000.00**

1.28 Structure No. 44

Structure Name:	44	**2023 BCI =74.06**	
Road Name:	15th Line		
Location:	Approximately 400 m north of County Road 3		
Structure Type:	Cast-In-Place Conc. Rigid Frame		
Number of Spans:	1	Span Lengths:	2.45 m
Overall Structure Width:	7 m	Roadway Width:	5 m
Year of Construction:	Unknown	Current Load Limit:	N/A

	Rehabilitation	Replacement
Estimated Capital Works Timelines (Years):	N/A	24.1

Recommendation:	**No Capital Works is estimated to be required within the next 10 years.**

Justification:
Structure 44 is generally in good condition with only minor defects noted.

Structure No. 44 (Continued)	2023 BCI = 74.06

Maintenance Need	Element and Comments	Estimated Cost
		$0.00
		$0.00
	Maintenance Needs Total	**$0.00**

Additional Investigations	Estimated Cost
	$0.00

Current Roadside Protection Needs	Estimated Cost
	$0.00

Rehabilitation/Repair Required	Priority	Estimated Cost
	N/A	$0.00
	N/A	$0.00
	N/A	$0.00
	N/A	$0.00
	N/A	$0.00
Rehabilitation Cost Subtotal		**$0.00**

Estimate Value of Replacement Structure	$350,000.00

Associated Work	Rehabilitation	Replacement
Approaches -	$0.00	$0.00
Detours -	$0.00	$0.00
Traffic Control -	$0.00	$0.00
Utilities -	$0.00	$0.00
Right of Way -	$0.00	$0.00
Environmental -	$0.00	$0.00
Other -	$0.00	$0.00
Total Associated Work Cost	**$0.00**	**$0.00**

Total Capital Works Costs		
Cost	**Rehabilitation**	**Replacement**
Rehab / Replacement Works:	N/A	$350,000.00
Roadside Protection:	N/A	$95,000.00
Staging Costs:	N/A	N/A
Construction Contingencies:	N/A	$45,000.00
Environmental Assessment:	N/A	$10,000.00
Engineering Design:	N/A	$40,000.00
Geotechnical Investigation:	N/A	$20,000.00
Contract Administration:	N/A	$20,000.00
Total Capital Work Cost	**N/A**	**$580,000.00**

1.29 Structure No. 45

Structure Name:	45	**2023 BCI =56.4**	
Road Name:	Erin Garafraxa Townline		
Location:	Immediately east of East West Garafraxa Townline		
Structure Type:	Cast-In-Place Conc. Rigid Frame		
Number of Spans:	1	Span Lengths:	2.45 m
Overall Structure Width:	7 m	Roadway Width:	6 m
Year of Construction:	Unknown	Current Load Limit:	N/A

	Rehabilitation	Replacement
Estimated Capital Works Timelines (Years):	N/A	3.0

Recommendation:	**Structure replacement is recommended within 3 years.**

Justification:

Structure 45 is generally in fair to poor condition with severe defects noted throughout and sliding noted in the portions of the east abutment wall. Rehabilitation would not address concerns of movement in the abutment walls, so replacement is recommended. Replacement timelines have been expedited compared to overall BCI needs due to evidence of movement. The movement should be monitored (quarterly at minimum) over the next year. If found to be actively moving, timelines should be expedited further to urgent replacement.

Structure No. 45 (Continued)	2023 BCI = 56.4

Maintenance Need	Element and Comments	Estimated Cost
Hazard Signs	Replace NW hazard sign and clean dust off remainder of signs	$500.00
	Maintenance Needs Total	**$500.00**

Additional Investigations	Estimated Cost
Monitoring of Deformations, Settlements and Movements;	$1,500.00

Current Roadside Protection Needs	Estimated Cost
	$0.00

Rehabilitation/Repair Required	Priority	Estimated Cost
Type C concrete repairs to barrels, inlet,	N/A	$25,000.00
General Items - Waterway Control, Insurance, Mobilization, Access etc.	N/A	$150,000.00
	Rehabilitation Cost Subtotal	**$175,000.00**

Estimate Value of Replacement Structure	$450,000.00

Associated Work	Rehabilitation	Replacement
Approaches -	$0.00	$0.00
Detours -	$0.00	$0.00
Traffic Control -	$15,000.00	$15,000.00
Utilities -	$0.00	$0.00
Right of Way -	$0.00	$0.00
Environmental -	$0.00	$0.00
Other -	$0.00	$0.00
Total Associated Work Cost	**$15,000.00**	**$15,000.00**

Total Capital Works Costs		
Cost	**Rehabilitation**	**Replacement**
Rehab / Replacement Works:	$190,000.00	$465,000.00
Roadside Protection:	$0.00	$95,000.00
Staging Costs:	N/A	N/A
Construction Contingencies:	$19,000.00	$56,000.00
Environmental Assessment:	$2,500.00	$10,000.00
Engineering Design:	$20,000.00	$52,000.00
Geotechnical Investigation:	N/A	$20,000.00
Contract Administration:	$20,000.00	$24,000.00
Total Capital Work Cost	**$251,500.00**	**$722,000.00**

1.30 Structure No. 46

Structure Name:	46		
Road Name:	East Garafraxa Erin Townline		
Location:	0.01 km East of Second Line		
Structure Type:	CSP Arch Culvert(s)		
Number of Spans:	1	Span Lengths:	3.2 m
Overall Structure Width:	15 m	Roadway Width:	6 m
Year of Construction:	2000	Current Load Limit:	N/A

2023 BCI =76.78

	Rehabilitation	Replacement
Estimated Capital Works Timelines (Years):	N/A	18.8

Recommendation:	**No Capital Works is estimated to be required within the next 10 years.**

Justification:

Structure 46 is generally in good condition but is demonstrating signs of cusping greater than 10 mm in culvert barrel. Any future work on this structure will be cost shared with the Town of Erin.

Maintenance Need	Element and Comments	Estimated Cost
Hazard Signs	Install hazard warning signs at structure	$1,000.00
	Maintenance Needs Total	**$1,000.00**

Additional Investigations	Estimated Cost
	$0.00

Current Roadside Protection Needs	Estimated Cost
Investigate need for Guide Rail	$1,000.00

Rehabilitation/Repair Required	Priority	Estimated Cost
	N/A	$0.00
	N/A	$0.00
	N/A	$0.00
	N/A	$0.00
	N/A	$0.00
	Rehabilitation Cost Subtotal	**$0.00**

Estimate Value of Replacement Structure	$500,000.00

Associated Work	Rehabilitation	Replacement
Approaches -	$0.00	$0.00
Detours -	$0.00	$0.00
Traffic Control -	$0.00	$15,000.00
Utilities -	$0.00	$0.00
Right of Way -	$0.00	$0.00
Environmental -	$0.00	$0.00
Other -	$0.00	$0.00
Total Associated Work Cost	**$0.00**	**$15,000.00**

Total Capital Works Costs		
Cost	**Rehabilitation**	**Replacement**
Rehab / Replacement Works:	N/A	$515,000.00
Roadside Protection:	N/A	$95,000.00
Staging Costs:	N/A	N/A
Construction Contingencies:	N/A	$52,000.00
Environmental Assessment:	N/A	$10,000.00
Engineering Design:	N/A	$52,000.00
Geotechnical Investigation:	N/A	$20,000.00
Contract Administration:	N/A	$26,000.00
Total Capital Work Cost	**N/A**	**$770,000.00**

1.31 Structure No. 47

Structure Name:	47	**2023 BCI =80.04**	
Road Name:	Caledon East Garafraxa Townline		
Location:	Approximately 830 m east of A Line		
Structure Type:	Cast-In-Place Conc. Box Culvert		
Number of Spans:	1	Span Lengths:	5.4 m
Overall Structure Width:	11 m	Roadway Width:	7 m
Year of Construction:	Unknown	Current Load Limit:	N/A

	Rehabilitation	Replacement
Estimated Capital Works Timelines (Years):	N/A	30.0

Recommendation:	**No Capital Works is estimated to be required within the next 10 years.**

Justification:

Structure 47 was rehabilitated in 2023 and is generally in good to excellent condition with only minor defects noted. Staging costs have been included in the replacement costs as this structure is located on a high-volume road. Any future work on this structure will be cost shared with the Town of Caledon.

Structure No. 47 (Continued)	2023 BCI = 80.04

Maintenance Need	Element and Comments	Estimated Cost
		$0.00
		$0.00
	Maintenance Needs Total	**$0.00**

Additional Investigations	Estimated Cost
	$0.00

Current Roadside Protection Needs	Estimated Cost
	$0.00

Rehabilitation/Repair Required	Priority	Estimated Cost
	N/A	$0.00
	N/A	$0.00
	N/A	$0.00
	N/A	$0.00
	N/A	$0.00
Rehabilitation Cost Subtotal		**$0.00**

Estimate Value of Replacement Structure	$550,000.00

Associated Work	Rehabilitation	Replacement
Approaches -	$0.00	$0.00
Detours -	$0.00	$0.00
Traffic Control -	$0.00	$0.00
Utilities -	$0.00	$0.00
Right of Way -	$0.00	$0.00
Environmental -	$0.00	$0.00
Other -	$0.00	$0.00
Total Associated Work Cost	**$0.00**	**$0.00**

Total Capital Works Costs		
Cost	**Rehabilitation**	**Replacement**
Rehab / Replacement Works:	N/A	$550,000.00
Roadside Protection:	N/A	$95,000.00
Staging Costs:	N/A	$250,000.00
Construction Contingencies:	N/A	$90,000.00
Environmental Assessment:	N/A	$10,000.00
Engineering Design:	N/A	$73,000.00
Geotechnical Investigation:	N/A	$20,000.00
Contract Administration:	N/A	$28,000.00
Total Capital Work Cost	**N/A**	**$1,116,000.00**

BURNSIDE

[THE DIFFERENCE IS OUR PEOPLE]

Appendix B

Structure Inventory and Cost Summaries

TOWNSHIP OF EAST GARAFRAXA - STRUCTURE INVENTORY

Structure No.	Inspect. Year	Structure Name	Road Name	Location	Structure Type	Span(s) (m)	Width (m)	Deck Area (m2)	Deterioration Curve	BCI
0001	2023	Culvert 0001	20th Side Road	Concession 10, Lots 20 & 21 (East Garafraxa, in Dufferin County)	CSP Ellipse Culvert(s)	3.9	21.2	83	CS	60.30
0002	2023	Structure 0002	10th Line	Concession 10 & 11, Lot 16 East Garafraxa	Cast-In-Place Conc. Rigid Frame	4.3	7.5	37	BR	73.71
0003	2023	Bridge 0003	10th Line	Concession 10, Lots 20 & 21 (East Garafraxa, in Dufferin County)	Other - Prefabricated Fibreglass Bridge	8.5	7.5	67.5	BR-1	97.62
0004	2023	Culvert 0004	11th Line	Concession 11 & 12, Lot 16 East Garafraxa	Cast-In-Place Conc. Rigid Frame	4.4	7.3	36	BR	73.63
0005	2023	Culvert 0005	10th Line	Concession 10 & 11, Lot 14 (East Garafraxa, in Dufferin County)	CSP Multi-Plate Ellipse Culvert(s)	4.6	28.1	129	CS	44.10
0006	2023	Bridge 0006	11th Line	Concession 11 & 12, Lot 15 East Garafraxa	Precast Concrete I-Girder	15.8, 22.0,15.8	9.3	514	BR-2	74.65
0007	2023	Bridge 0007	12th Line	780m South of County Road 5	Bowstring Arch (Concrete)	26, 26	6.706	369.63	BR-2	80.92
0008	2023	Bridge 0008	13th Line	13th Line, Concession 13 & 14, Lot 14, Approx. 0.8km South of Sideroad 15	Steel Truss (Timber Deck)	36.5	4.27	161.8	BR-2	51.49
0009	2022	Bridge 0009	10th Line	Concession 10 & 11, Lot 13	Precast Concrete I-Girder	17.9,27,17.9	9.8	643	BR-2	90.99
0010	2023	Bridge 0010	11th Line	Concession 11 & 12, Lot 12 (East Garafraxa, Dufferin County)	Cast-In-Place Conc. Rigid Frame	11	9.5	122	BR-1	87.55
0011	2023	Culvert 0011	20th Line	Concession 12 & 13 Lot 12 (East Garafraxa, in Dufferin County)	CSP Multi-Plate Ellipse Culvert(s)	6.3	23.5	148	CS	68.89
0014	2023	Bridge 0014	10th Side Road	Concession 13, Lots 10 & 11 (East Garafraxa, Dufferin County)	Cast-In-Place Concrete T-Beam	9.1	6.5	64	BR-1	70.44
0015	2023	Culvert 0015	13th Line	Concession 13 & 14, Lot 10 (East Garafraxa, in Dufferin County)	Cast-In-Place Conc. Box Culvert	7	14.6	114	CC	74.78
0016	2023	Culvert 0016	East-West Garafraxa Townline	Lot 10 (East Garafraxa, in Dufferin County)	Cast-In-Place Conc. Box Culvert	3.6	17.7	74	CC	56.74
0017	2023	Culvert 0017	13th Line	Lot 10 (East Garafraxa, in Dufferin County)	Cast-In-Place Conc. Box Culvert	2.7	5.9	19	CC	62.50
0019	2023	Culvert 0019	16th Line	Concession 16 & 17, Lot 7 (East Garafraxa, in Dufferin County)	Cast-In-Place Conc. Box Culvert	3.5	8	30	CC	74.64
0021	2023	Culvert 0021	12th Line	Concession 12 & 13, Lot 5 (East Garafraxa, Dufferin County)	CSP Multi-Plate Ellipse Culvert(s)	3.1	11.7	36	CS	73.89
0022	2023	Culvert 0022	East Garafraxa - Caledon Townline	18th Line, 1.4km north of East Garafraxa	Cast-In-Place Conc. Box Culvert	1.9	9	17.1	CC	74.47
0023	2023	Culvert 0023	19th Line	Concession 19 & A, Lot 2 (East Garafraxa, Dufferin County)	Cast-In-Place Conc. Box Culvert	4	9.7	45	CC	91.09
0024	2023	Culvert 0024	East Garafraxa - Caledon Townline	Concession A Townline (East Garafraxa, Dufferin County)	Cast-In-Place Conc. Box Culvert	5.5	10.7	65	BR-1	67.88
0026	2023	Culvert 0026	Erin-Garafraxa	East Garafraxa/Erin Townline (East Garafraxa, Dufferin County)	Cast-In-Place Conc. Box Culvert	3.6	14.6	59.86	BR-1	54.94
0027	2023	Culvert 0027	East Garafraxa - Caledon Townline	18th Line, 1.4km north of East Garafraxa	Cast-In-Place Conc. Box Culvert	1.9	14.6	35.04	CC	74.35
0029	2023	Culvert 0029	East Garafraxa - Caledon Townline	East Garafraxa/Erin Townline (East Garafraxa, Dufferin County)	Cast-In-Place Conc. Box Culvert	3.7	7.4	31.08	BR	67.65
0031	2023	Culvert 0031	20th Side Road	Concession 9, Lots 20 & 21 (East Garafraxa, Dufferin County)	Cast-In-Place Conc. Box Culvert	3.6	7.9	33	CC	64.59
0041	2023	41	Sideroad 10	Approximately 300m west of 9th Line	CSP Round Culvert(s)	2.3	12	27.6	CS	75.00
0042	2023	42	Sideroad 10	Approximately 700m SW of 10th Line	Cast-In-Place Conc. Rigid Frame	2.75	6	20.1	BR	69.39
0043	2023	43	13th Line	Approximately 1.7km north of Counrty Road 3	CSP Round Culvert(s)	1.4, 1.4	14	67.2	CS	75.00
0044	2023	44	15th Line	Approximately 400m north of County Road 3	Cast-In-Place Conc. Rigid Frame	2.45	7	21.35	BR	74.06
0045	2023	45	Erin Garafraxa Townline	Immedieately east of East West Garafraxa Townline	Cast-In-Place Conc. Rigid Frame	2.45	7	21.35	BR	56.40
0046	2023	46	East Garafraxa Erin Townline	0.01 km East of Second Line	CSP Arch Culvert(s)	3.2	15	76.5	CS	76.78
0047	2023	47	Caledon East Garafraxa Townline	Approximately 830m east of A Line	Cast-In-Place Conc. Box Culvert	5.4	11	66	BR-1	80.04

TOWNSHIP OF EAST GARAFRAXA - CAPITAL WORKS BY BCI

Structure No.	Inspect. Year	Road Name	Deterioration Curve	BCI	Years to Rehab	Years to Replace	Total Cost of Rehabilitation	Total Cost of Replacement	Recommended Work	Maintenance Needs	Additional Investigations	Current Roadside Protection Needs	Capital Works Within 1 year	Capital Works 1 - 5 Years	Capital Works 6 - 10 Years	10-Year Capital Works Cost
0005	2023	10th Line	CS	44.10	N/A	2.10	N/A	$ 1,083,000.00	Replace	$ 3,000.00	$ -	$ 1,000.00	$ -	$ 1,083,000.00	$ -	$ 1,083,000.00
0008	2023	13th Line	BR-2	51.49	0.00	4.50	$ 1,437,500.00	$ 4,108,000.00	Replace	$ -	$ -	$ -	$ -	$ 4,108,000.00	$ -	$ 4,108,000.00
0026	2023	Erin-Garafraxa	BR-1	54.94	5.00	5.00	$ 313,500.00	$ 708,000.00	Rehabilitate	$ 1,000.00	$ -	$ 1,000.00	$ -	$ 313,500.00	$ -	$ 313,500.00
0045	2023	Erin Garafraxa Townline	BR	56.40	N/A	3.00	$ 251,500.00	$ 722,000.00	Replace	$ 500.00	$ 1,500.00	$ -	$ -	$ 722,000.00	$ -	$ 722,000.00
0016	2023	East-West Garafraxa Townline	CC	56.74	N/A	8.37	$ 366,500.00	$ 708,000.00	Replace	$ -	$ -	$ 1,000.00	$ -	$ -	$ 708,000.00	$ 708,000.00
0001	2023	20th Side Road	CS	60.30	N/A	10.10	N/A	$ 708,000.00	Replace	$ 1,000.00	$ -	$ 1,000.00	$ -	$ -	$ 708,000.00	$ 708,000.00
0017	2023	13th Line	CC	62.50	N/A	11.25	$ 314,500.00	$ 645,000.00	Replace	$ -	$ -	$ 95,000.00	$ -	$ -	$ -	$ -
0031	2023	20th Side Road	CC	64.59	N/A	12.30	$ 292,500.00	$ 645,000.00	Replace	$ 1,000.00	$ -	$ -	$ -	$ -	$ -	$ -
0029	2023	East Garafraxa - Caledon Townline	BR	67.65	N/A	14.00	$ 335,500.00	$ 708,000.00	Replace	$ -	$ -	$ 95,000.00	$ -	$ -	$ -	$ -
0024	2023	East Garafraxa - Caledon Townline	BR-1	67.88	7.88	17.88	$ 325,500.00	$ 833,000.00	Replace	$ 2,000.00	$ -	$ 95,000.00	$ -	$ -	$ -	$ -
0011	2023	20th Line	CS	68.89	N/A	14.45	$ 480,500.00	$ 1,020,000.00	Replace	$ 3,500.00	$ -	$ -	$ -	$ -	$ -	$ -
0042	2023	Sideroad 10	BR	69.39	N/A	19.39	N/A	$ 580,000.00	Replace	$ 500.00	$ -	$ -	$ -	$ -	$ -	$ -
0014	2023	10th Side Road	BR-1	70.44	3.50	20.44	$ 478,000.00	$ 1,270,000.00	Rehabilitate	$ 5,000.00	$ -	$ -	$ -	$ 478,000.00	$ -	$ 478,000.00
0004	2023	11th Line	BR	73.63	N/A	23.63	N/A	$ 833,000.00	Replace	$ 1,000.00	$ -	$ -	$ -	$ -	$ -	$ -
0002	2023	10th Line	BR	73.71	N/A	23.71	$ 49,000.00	$ 895,000.00	Replace	$ 2,000.00	$ -	$ 500.00	$ -	$ -	$ -	$ -
0021	2023	12th Line	CS	73.89	N/A	17.16	N/A	$ 583,000.00	Replace	$ 1,000.00	$ -	$ 95,000.00	$ -	$ -	$ -	$ -
0044	2023	15th Line	BR	74.06	N/A	24.06	N/A	$ 580,000.00	Replace	$ -	$ -	$ -	$ -	$ -	$ -	$ -
0027	2023	East Garafraxa - Caledon Townline	CC	74.35	N/A	19.35	N/A	$ 583,000.00	Replace	$ 1,000.00	$ -	$ 1,000.00	$ -	$ -	$ -	$ -
0022	2023	East Garafraxa - Caledon Townline	CC	74.47	N/A	19.47	N/A	$ 583,000.00	Replace	$ 6,000.00	$ 5,000.00	$ 95,000.00	$ -	$ -	$ -	$ -
0019	2023	16th Line	CC	74.64	N/A	19.64	N/A	$ 770,000.00	Replace	$ 1,000.00	$ -	$ 95,000.00	$ -	$ -	$ -	$ -
0006	2023	11th Line	BR-2	74.65	14.65	24.65	$ 519,000.00	$ 4,843,000.00	Rehabilitate	$ 5,500.00	$ 10,000.00	$ -	$ -	$ -	$ -	$ -
0015	2023	13th Line	CC	74.78	N/A	19.78	N/A	$ 958,000.00	Replace	$ 1,000.00	$ -	$ 500.00	$ -	$ -	$ -	$ -
0041	2023	Sideroad 10	CS	75.00	N/A	17.78	N/A	$ 580,000.00	Replace	$ 1,500.00	$ -	$ -	$ -	$ -	$ -	$ -
0043	2023	13th Line	CS	75.00	N/A	17.78	N/A	$ 640,000.00	Replace	$ 3,000.00	$ -	$ -	$ -	$ -	$ -	$ -
0046	2023	East Garafraxa Erin Townline	CS	76.78	N/A	18.77	N/A	$ 770,000.00	Replace	$ 1,000.00	$ -	$ 1,000.00	$ -	$ -	$ -	$ -
0047	2023	Caledon East Garafraxa Townline	BR-1	80.04	N/A	30.00	N/A	$ 1,116,000.00	Replace	$ -	$ -	$ -	$ -	$ -	$ -	$ -
0007	2023	12th Line	BR-2	80.92	0.00	18.80	$ 257,500.00	$ 4,893,000.00	Replace	$ 1,000.00	$ -	$ -	$ -	$ -	$ -	$ -
0010	2023	11th Line	BR-1	87.55	27.55	37.55	N/A	$ 1,508,000.00	Rehabilitate	$ 1,000.00	$ -	$ 500.00	$ -	$ -	$ -	$ -
0009	2022	10th Line	BR-2	90.99	27.99	37.99	N/A	$ 5,648,000.00	Rehabilitate	$ 2,000.00	$ -	$ -	$ -	$ -	$ -	$ -
0023	2023	19th Line	CC	91.09	N/A	36.09	N/A	$ 708,000.00	Replace	$ 1,000.00	$ -	$ 95,000.00	$ -	$ -	$ -	$ -
0003	2023	10th Line	BR-1	97.62	3.00	42.62	$ 165,000.00	$ 1,133,000.00	Rehabilitate	$ -	$ -	$ 500.00	$ -	$ 165,000.00	$ -	$ 165,000.00
Sub Totals										**$ 46,500.00**	**$ 16,500.00**	**$ 673,000.00**	**$ -**	**$ 6,869,500.00**	**$ 1,416,000.00**	**$ 8,285,500.00**

TOWNSHIP OF EAST GARAFRAXA - REHABILITATION CAPITAL WORKS

Structure No.	Inspect. Year	Road Name	BCI	Years to Rehab	Years to Replace	Recommended Work	Construction Cost - Rehabilitation (1)	Contingency - Rehabilitation	E.A. - Rehabilitation	Engineering - Rehabilitation	Geotechnical - Rehabilitation	Contract Admin. - Rehabilitation	Capital Works Within 1 year	Capital Works 1 - 5 Years	Capital Works 6 - 10 Years	10-Year Capital Works Cost
0003	2023	10th Line	97.62	3.00	42.62	Rehabilitate	$ 115,500.00	$ 12,000.00	$ 2,500.00	$ 20,000.00	$ -	$ 15,000.00	$ -	$ 165,000.00	$ -	$ 165,000.00
0014	2023	10th Side Road	70.44	3.50	20.44	Rehabilitate	$ 382,500.00	$ 39,000.00	$ 2,500.00	$ 39,000.00	$ -	$ 15,000.00	$ -	$ 478,000.00	$ -	$ 478,000.00
0026	2023	Erin-Garafraxa	54.94	5.00	5.00	Rehabilitate	$ 246,000.00	$ 25,000.00	$ 2,500.00	$ 25,000.00	$ -	$ 15,000.00	$ -	$ 313,500.00	$ -	$ 313,500.00
0006	2023	11th Line	74.65	14.65	24.65	Rehabilitate	$ 417,500.00	$ 42,000.00	$ 2,500.00	$ 42,000.00	$ -	$ 15,000.00	$ -	$ -	$ -	$ -
0010	2023	11th Line	87.55	27.55	37.55	Rehabilitate	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -
0009	2022	10th Line	90.99	27.99	37.99	Rehabilitate	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -
Sub Totals							**$ 1,161,500.00**	**$ 118,000.00**	**$ 10,000.00**	**$ 126,000.00**	**$ -**	**$ 60,000.00**	**$ -**	**$ 956,500.00**	**$ -**	**$ 956,500.00**

(1) - Construction Cost includes cost of rehabilitation / replacement works, associated works, roadside protection, and construction staging (where applicable). See individual OSIM forms for breakdown of construction cost

TOWNSHIP OF EAST GARAFRAXA - REPLACEMENT CAPITAL WORKS

Structure No.	Inspect. Year	Road Name	BCI	Years to Rehab	Years to Replace	Recommended Work	Construction Cost - Replacement [1]	Contingency - Replacement	E.A. - Replacement	Engineering - Replacement	Geotechnical - Replacement	Contract Admin. - Replacement	Capital Works Within 1 year	Capital Works 1 - 5 Years	Capital Works 6 - 10 Years	10-Year Capital Works Cost
0005	2023	10th Line	44.10	N/A	2.10	Replace	$ 860,000.00	$ 77,000.00	$ 10,000.00	$ 77,000.00	$ 20,000.00	$ 39,000.00	$ -	$ 1,083,000.00	$ -	$ 1,083,000.00
0045	2023	Erin Garafraxa Townline	56.40	N/A	3.00	Replace	$ 560,000.00	$ 56,000.00	$ 10,000.00	$ 52,000.00	$ 20,000.00	$ 24,000.00	$ -	$ 722,000.00	$ -	$ 722,000.00
0008	2023	13th Line	51.49	0.00	4.50	Replace	$ 3,410,000.00	$ 216,000.00	$ 80,000.00	$ 216,000.00	$ 20,000.00	$ 166,000.00	$ -	$ 4,108,000.00	$ -	$ 4,108,000.00
0016	2023	East-West Garafraxa Townline	56.74	N/A	8.37	Replace	$ 560,000.00	$ 47,000.00	$ 10,000.00	$ 47,000.00	$ 20,000.00	$ 24,000.00	$ -	$ -	$ 708,000.00	$ 708,000.00
0001	2023	20th Side Road	60.30	N/A	10.10	Replace	$ 560,000.00	$ 47,000.00	$ 10,000.00	$ 47,000.00	$ 20,000.00	$ 24,000.00	$ -	$ -	$ 708,000.00	$ 708,000.00
0017	2023	13th Line	62.50	N/A	11.25	Replace	$ 510,000.00	$ 42,000.00	$ 10,000.00	$ 42,000.00	$ 20,000.00	$ 21,000.00	$ -	$ -	$ -	$ -
0031	2023	20th Side Road	64.59	N/A	12.30	Replace	$ 510,000.00	$ 42,000.00	$ 10,000.00	$ 42,000.00	$ 20,000.00	$ 21,000.00	$ -	$ -	$ -	$ -
0029	2023	East Garafraxa - Caledon Townline	67.65	N/A	14.00	Replace	$ 560,000.00	$ 47,000.00	$ 10,000.00	$ 47,000.00	$ 20,000.00	$ 24,000.00	$ -	$ -	$ -	$ -
0011	2023	20th Line	68.89	N/A	14.45	Replace	$ 810,000.00	$ 72,000.00	$ 10,000.00	$ 72,000.00	$ 20,000.00	$ 36,000.00	$ -	$ -	$ -	$ -
0021	2023	12th Line	73.89	N/A	17.16	Replace	$ 460,000.00	$ 37,000.00	$ 10,000.00	$ 37,000.00	$ 20,000.00	$ 19,000.00	$ -	$ -	$ -	$ -
0041	2023	Sideroad 10	75.00	N/A	17.78	Replace	$ 445,000.00	$ 45,000.00	$ 10,000.00	$ 40,000.00	$ 20,000.00	$ 20,000.00	$ -	$ -	$ -	$ -
0043	2023	13th Line	75.00	N/A	17.78	Replace	$ 495,000.00	$ 50,000.00	$ 10,000.00	$ 45,000.00	$ 20,000.00	$ 20,000.00	$ -	$ -	$ -	$ -
0024	2023	East Garafraxa - Caledon Townline	67.88	7.88	17.88	Replace	$ 660,000.00	$ 57,000.00	$ 10,000.00	$ 57,000.00	$ 20,000.00	$ 29,000.00	$ -	$ -	$ -	$ -
0046	2023	East Garafraxa Erin Townline	76.78	N/A	18.77	Replace	$ 610,000.00	$ 52,000.00	$ 10,000.00	$ 52,000.00	$ 20,000.00	$ 26,000.00	$ -	$ -	$ -	$ -
0007	2023	12th Line	80.92	0.00	18.80	Replace	$ 4,110,000.00	$ 251,000.00	$ 60,000.00	$ 251,000.00	$ 20,000.00	$ 201,000.00	$ -	$ -	$ -	$ -
0027	2023	East Garafraxa - Caledon Townline	74.35	N/A	19.35	Replace	$ 460,000.00	$ 37,000.00	$ 10,000.00	$ 37,000.00	$ 20,000.00	$ 19,000.00	$ -	$ -	$ -	$ -
0042	2023	Sideroad 10	69.39	N/A	19.39	Replace	$ 445,000.00	$ 45,000.00	$ 10,000.00	$ 40,000.00	$ 20,000.00	$ 20,000.00	$ -	$ -	$ -	$ -
0022	2023	East Garafraxa - Caledon Townline	74.47	N/A	19.47	Replace	$ 460,000.00	$ 37,000.00	$ 10,000.00	$ 37,000.00	$ 20,000.00	$ 19,000.00	$ -	$ -	$ -	$ -
0019	2023	16th Line	74.64	N/A	19.64	Replace	$ 610,000.00	$ 52,000.00	$ 10,000.00	$ 52,000.00	$ 20,000.00	$ 26,000.00	$ -	$ -	$ -	$ -
0015	2023	13th Line	74.78	N/A	19.78	Replace	$ 760,000.00	$ 67,000.00	$ 10,000.00	$ 67,000.00	$ 20,000.00	$ 34,000.00	$ -	$ -	$ -	$ -
0004	2023	11th Line	73.63	N/A	23.63	Replace	$ 660,000.00	$ 57,000.00	$ 10,000.00	$ 57,000.00	$ 20,000.00	$ 29,000.00	$ -	$ -	$ -	$ -
0002	2023	10th Line	73.71	N/A	23.71	Replace	$ 710,000.00	$ 62,000.00	$ 10,000.00	$ 62,000.00	$ 20,000.00	$ 31,000.00	$ -	$ -	$ -	$ -
0044	2023	15th Line	74.06	N/A	24.06	Replace	$ 445,000.00	$ 45,000.00	$ 10,000.00	$ 40,000.00	$ 20,000.00	$ 20,000.00	$ -	$ -	$ -	$ -
0047	2023	Caledon East Garafraxa Townline	80.04	N/A	30.00	Replace	$ 895,000.00	$ 90,000.00	$ 10,000.00	$ 73,000.00	$ 20,000.00	$ 28,000.00	$ -	$ -	$ -	$ -
0023	2023	19th Line	91.09	N/A	36.09	Replace	$ 560,000.00	$ 47,000.00	$ 10,000.00	$ 47,000.00	$ 20,000.00	$ 24,000.00	$ -	$ -	$ -	$ -
Sub Totals							**$ 21,125,000.00**	**$ 1,677,000.00**	**$ 370,000.00**	**$ 1,636,000.00**	**$ 500,000.00**	**$ 944,000.00**	**$ -**	**$ 5,913,000.00**	**$ 1,416,000.00**	**$ 7,329,000.00**

(1) - Construction Cost includes cost of rehabilitation / replacement works, associated works, roadside protection, and construction staging (where applicable). See individual OSIM forms for breakdown of construction cost

TOWNSHIP OF EAST GARAFRAXA - MAINTENANCE NEEDS

Structure Name	Road Name	Maintenance Need	Estimated Maintenance Costs
0001	20th Side Road	Install hazard warning signs at structure	$1,000.00
0002	10th Line	Remove overgrown vegetation around wingwalls; Install rock protection on embankments	$2,000.00
0004	11th Line	Install rock protection on embankments	$1,000.00
0005	10th Line	Install rock protection on embankments; Install hazard warning signs at structure	$3,000.00
0006	11th Line	Flush expansion joints and remove trees around wingwalls; Replace NE drain and patch spalled concrete	$5,500.00
0007	12th Line	Sweep deck wearing surface	$1,000.00
0009	10th Line	Remove vegetation around wingwalls; Reposition ceramar pads between abutment and deck	$2,000.00
0010	11th Line	Remove vegetation around wingwalls	$1,000.00
0011	20th Line	Install erosion protection at inlet and outlet; Install hazard warning signs at structure	$3,500.00
0014	10th Side Road	Install rock protection along NW and SW wingwalls	$5,000.00
0015	13th Line	Install hazard warning signs at structure	$1,000.00
0019	16th Line	Remove overgrown vegetation over wingwalls	$1,000.00
0021	12th Line	Install hazard warning signs at structure	$1,000.00
0022	East Garafraxa - Caledon Townline	Remove overgrown vegetation over inlet and oulet; Install rock protection over embankments	$6,000.00
0023	19th Line	Install hazard warning signs at structure	$1,000.00
0024	East Garafraxa - Caledon Townline	Install rock protection on embankments	$2,000.00
0026	Erin-Garafraxa	Install hazard warning signs at structure	$1,000.00
0027	East Garafraxa - Caledon Townline	Install hazard warning signs at structure	$1,000.00
0031	20th Side Road	Remove vegetation around wingwalls	$1,000.00
0041	Sideroad 10	Place rock protection NW; Install hazard warning signs at structure	$1,500.00
0042	Sideroad 10	Replace NE and reinstate NW ands SE hazard warning signs	$500.00
0043	13th Line	Place rock protection on west embankments and in stream at outlet; Install hazard warning signs at structure	$3,000.00
0045	Erin Garafraxa Townline	Replace NW hazard sign and clean dust off remainder of signs	$500.00
0046	East Garafraxa Erin Townline	Install hazard warning signs at structure	$1,000.00

Total	**$46,500.00**

TOWNSHIP OF EAST GARAFRAXA - ADDITIONAL INVESTIGATIONS REQUIRED

Priority	Structure Name	Road Name	Additional Investigations Required	Estimated Cost
Normal	0001	20th Side Road	Monitoring Crack Widths,	$0
Normal	0005	10th Line	Monitoring Crack Widths,	$0
Normal	0006	11th Line	Structure Evaluation,	$10,000
Normal	0008	13th Line	Monitoring of Deformations, Settlements and Movements,	$0
Normal	0017	13th Line	Monitoring of Deformations, Settlements and Movements,	$0
Normal	0022	East Garafraxa - Caledon Townline	Other: Hydraulic/Channel Investigation,	$5,000
Normal	0026	Erin-Garafraxa	Monitoring Crack Widths,	$0
Normal	0045	Erin Garafraxa Townline	Monitoring of Deformations, Settlements and Movements;	$1,500

Total	**$16,500.00**

TOWNSHIP OF EAST GARAFRAXA - CURRENT ROADSIDE SAFETY NEEDS

Structure Name	Road Name	CURRENT Roadside Safety Need	Estimated Cost
0001	20th Side Road	Investigate need for Guide Rail	$1,000.00
0002	10th Line	Investigate Need for Replacing with Longer Guide Rail	$500.00
0003	10th Line	Investigate Need for Replacing with Longer Guide Rail	$500.00
0005	10th Line	Investigate need to extend guide rail over culvert	$1,000.00
0010	11th Line	Investigate Need for Replacing with Longer Guide Rail	$500.00
0014	10th Side Road	Narrow structure - Install guide rail if structure widened during rehabiltation / replacement	$0.00
0015	13th Line	Investigate Need for Replacing with Longer Guide Rail	$500.00
0016	East-West Garafraxa Townline	Investigate need for Guide Rail	$1,000.00
0017	13th Line	Install Guide Rail, end treatments	$95,000.00
0019	16th Line	Install Guide Rail, end treatments	$95,000.00
0021	12th Line	Install Guide Rail, end treatments	$95,000.00
0022	East Garafraxa - Caledon Townline	Install Guide Rail, end treatments	$95,000.00
0023	19th Line	Replace guide rail, end treatments	$95,000.00
0024	East Garafraxa - Caledon Townline	Install Guide Rail, end treatments	$95,000.00
0026	Erin-Garafraxa	Investigate need for Guide Rail	$1,000.00
0027	East Garafraxa - Caledon Townline	Investigate need for Guide Rail	$1,000.00
0029	East Garafraxa - Caledon Townline	Install Guide Rail, end treatments	$95,000.00
0031	20th Side Road	Investigate Need for Replacing with Longer Guide Rail	$0.00
0046	East Garafraxa Erin Townline	Investigate need for Guide Rail	$1,000.00

Total	**$673,000.00**

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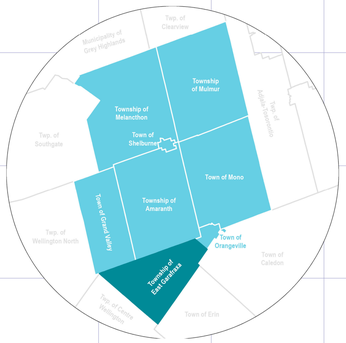
Appendix C

Structure Location Map



Sources:

1. Ministry of Natural Resources, © Queen's Printer for Ontario
2. Natural Resources Canada © Her Majesty the Queen in Right of Canada.
3. Grand River Conservation Authority

Disclaimer:

R.J. Burnside & Associates Limited and the above mentioned sources and agencies are not responsible for the accuracy of the spatial, temporal, or other aspects of the data represented on this map. It is recommended that users confirm the accuracy of the information represented.

This map is the product of a Geographic Information System (GIS). As such, the data represented on this map may be subject to updates and future reproductions may not be identical.

Bridge
Culvert
Airfield (Unofficial)
Pit (Authorized)
Communication or Meteorological Tower
Power Transmission Line
Arterial / Collector Road
Local Road
Trail
Wetland
Watershed Boundary
River, Lake, Pond
Small Watercourse
Municipal Boundary
Lot Boundary
Wooded Area
Plantation

Township of East Garafraxa

OSIM Inspections 2023

1:25,000

Kilometers

Miles

Datum: North American 1983 CSRS
Coord. System: NAD 1983 CSRS UTM Zone 17N
Projection: Transverse Mercator

Central Meridian: 81°0'0.000"W
False Easting: 500,000m
False Northing: 0m
Scale Factor: 0.99960

Project: 300044339

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Appendix D

Photo Summary Sheets

053343: Structure 1: Sideroad 20

UTM Coordinates (WGS84)	17-552560m.E 4855610m.N
Ownership	Township of East Garafraxa
Structure Type	Municipal Structure
Inspectors	Mack Chiasson, Andrew Burnside

1. 1: Barrels (North East)

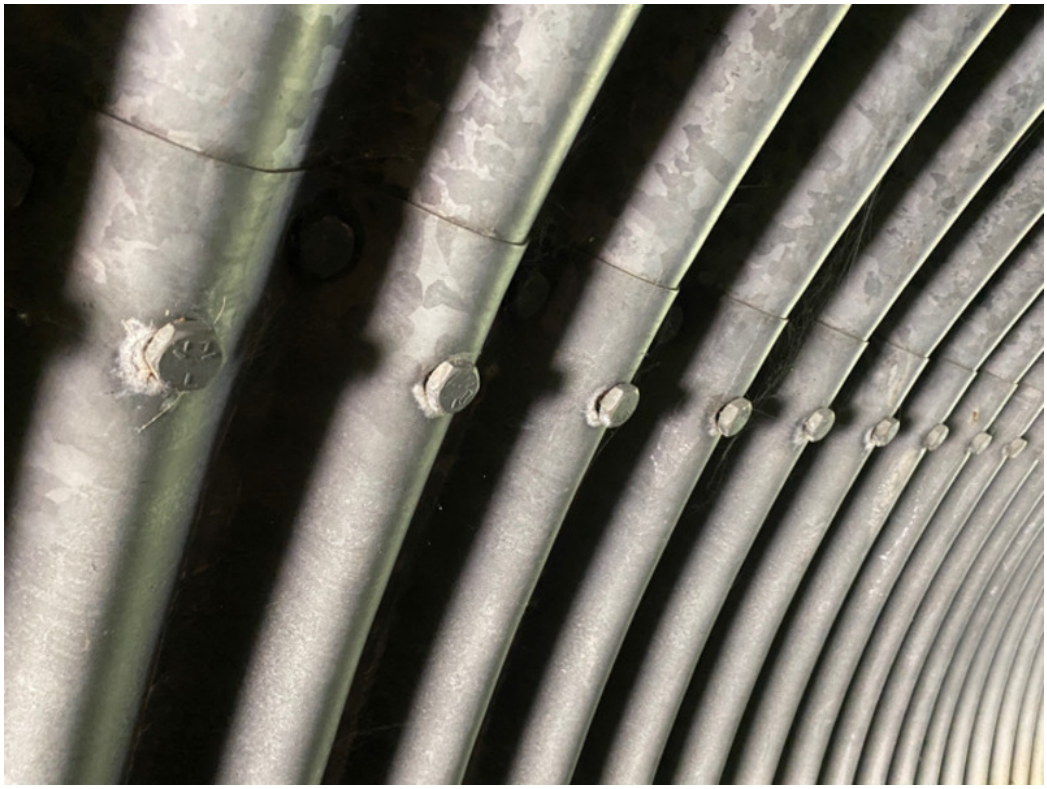
Photo

2. 1: Barrels (East)

Photo

3. 1: Barrels (West)

Photo



4. 1: Approach Wearing Surface (West)

Photo

5. 1: Approach Wearing Surface (East)

Photo

053343: Structure 2: 10th Line

UTM Coordinates (WGS84)	17-554886m.E 4854558m.N
Ownership	Township of East Garafraxa
Structure Type	Municipal Structure
Inspectors	Mack Chiasson, Andrew Burnside

1. 2: Deck Wearing Surface (East)

Photo

2. 2: Wingwalls (North East)

Photo

3. 2: Wingwalls (North West)

Photo

5. 2: Railing System (East)

Photo

7. 2: Soffit - Thin Slab - Ext (West)

Photo

8. 2: Soffit - Thin Slab - Int (South West)

Photo

053343: Structure 3: 10th Line

UTM Coordinates (WGS84)	17-555194m.E 4854263m.N
Ownership	Township of East Garafraxa
Structure Type	Municipal Structure
Inspectors	Mack Chiasson, Andrew Burnside

1. 3: Wingwalls (South West)

Photo

2. 3: Wingwalls (South West)

Photo

3. 3: Soffit - Thin Slab - Ext (West)

Photo

4. 3: Abutment Walls (North)

Photo

5. 3: Soffit - Thin Slab - Int (South)

Photo

6. 3: Railing System (South West)

Photo

9. 3: Wingwalls (North West)

Photo

11. 3: Soffit - Thin Slab - Int (South)

Photo

053343: Structure 4: Eleventh Ln

UTM Coordinates (WGS84)	17-556075m.E 4855307m.N
Ownership	Township of East Garafraxa
Structure Type	Municipal Structure
Inspectors	Mack Chiasson, Andrew Burnside

1. 4: Wingwalls (South West)

Photo

2. 4: Soffit - Thin Slab - Ext (West)

Photo

3. 4: Soffit - Thin Slab - Int (South)

Photo

4. 4: Abutment Walls (North)

Photo

5. 4: Wingwalls (North East)

Photo

7. 4: Railing System (East)

Photo

053343: Structure 5: 10th Line

UTM Coordinates (WGS84)	17-555822m.E 4853666m.N
Ownership	Township of East Garafraxa
Structure Type	Municipal Structure
Inspectors	Mack Chiasson, Andrew Burnside

1. 5: Barrels (North)

Photo

2. 5: Barrels (South West)

Photo

3. 5: Railing System (East)

Photo

6. 5: Barrels (South)

Photo

6. 5: Barrels (North)

Photo

6. 5: Barrels (South)

Photo

053343: Structure 6: Eleventh Ln

UTM Coordinates (WGS84)	17-556533m.E 4854871m.N
Ownership	Township of East Garafraxa
Structure Type	Municipal Structure
Inspectors	Mack Chiasson, Andrew Burnside

1. 6: Approach Guide Rail (All Quadrants)

Photo

2. 6: Deck Top (North)

Photo

3. 6: Seals / Sealants (North)

Photo

4. 6: Abutment Walls (South)

Photo

5. 6: Shaft / Bents (North)

Photo

6. 6: Deck Drainage (East)

Photo

7. 6: Approach Curb/Gutters (South West)

Photo

8. 6: Barrier/Parapet Walls Interior (North West)

Photo

9. 6: Approach Wearing Surface (North East)

Photo

10. 6: Approach Wearing Surface (South)

Photo

11. 6: Girders - Middle (South)

Photo

12. 6: Wingwalls (North West)

Photo

053343: Structure 7: Twelfth Line

UTM Coordinates (WGS84)	17-557568m.E 4855672m.N
Ownership	Township of East Garafraxa
Structure Type	Municipal Structure
Inspectors	Mack Chiasson, Andrew Burnside

1. 7: Approach Guide Rail (North West)

Photo

2. 7: Approach Wearing Surface (South)

Photo

3. 7: Armouring/Retaining Device (South)

Photo

4. 7: Curbs (East)

Photo

5. 7: Top Chords (South West)

Photo

6. 7: Abutment Walls (North)

Photo

7. 7: Abutment Walls (North)

Photo

8. 7: Shaft / Bents (Centre)

Photo

9. 7: Approach Wearing Surface (North East)

Photo

10. 7: End Post (North West)

Photo

11. 7: Floor Beams (South)

Photo

12. 7: Abutment Walls (South)

Photo

053343: Structure 8: 13th Line

UTM Coordinates (WGS84)	17-558465m.E 4856776m.N
Ownership	Township of East Garafraxa
Structure Type	Municipal Structure
Inspectors	Mack Chiasson, Andrew Burnside

1. 8: Seals / Sealants (West)

Photo

2. 8: Top Chords (North West)

Photo

3. 8: Top Chords (South West)

Photo

4. 8: Verticals / Diagonals (South)

Photo

5. 8: Verticals / Diagonals (South West)

Photo

6. 8: Verticals / Diagonals (North)

Photo

7. 8: Connections (North)

Photo

8. 8: Girders - Ends (West)

Photo

9. 8: Abutment Walls (South East)

Photo

10. 8: Abutment Walls (East)

Photo

2. 8: Approach Guide Rail (South West)

Photo

8. 8: Ballast Walls (North West)

Photo

13. 8: Deck Top (North)

Photo

053343: Structure 9: 10th Line

UTM Coordinates (WGS84)	17-556396m.E 4853116m.N
Ownership	Township of East Garafraxa
Structure Type	Municipal Structure
Inspectors	Mack Chiasson, Andrew Burnside

1. 9: Approach Guide Rail (South West)

Photo

2. 9: Approach Slabs (South)

Photo

3. 9: Approach Curb/Gutters (South)

Photo

4. 9: Abutment Walls (South)

Photo

5. 9: Soffit - Thin Slab - Int (North)

Photo

6. 9: Ballast Walls (All Quadrants)

Photo

7. 9: Wall (North East)

Photo

7. 9: Approach Slabs (West)

Photo

15. 9: Shaft / Bents (East)

Photo

16. 9: Girders - Middle (West)

Photo

053343: Structure 10: Eleventh Ln

UTM Coordinates (WGS84)	17-557612m.E 4853840m.N
Ownership	Township of East Garafraxa
Structure Type	Municipal Structure
Inspectors	Mack Chiasson, Andrew Burnside

1. 10: Approach Slabs (North)

Photo

2. 10: Deck Top (Centreline)

Photo

3. 10: Barrier/Parapet Walls Interior (All Quadrants)

Photo

4. 10: Abutment Walls (South)

Photo

5. 10: Soffit - Thin Slab - Int (South)

Photo

7. 10: Soffit - Thin Slab - Int (Midspan)

Photo

7. 10: Soffit - Thin Slab - Int (North)

Photo

8. 10: Wingwalls (South East)

Photo

9. 10: Approach Wearing Surface (South)

Photo

10. 10: Soffit - Thin Slab - Ext (East)

Photo

053343: Structure 11: Twelfth Line

UTM Coordinates (WGS84)	17-558693m.E 4854603m.N
Ownership	Township of East Garafraxa
Structure Type	Municipal Structure
Inspectors	Mack Chiasson, Andrew Burnside

1. 11: Approach Guide Rail (West)

Photo

2. 11: Barrels (South)

Photo

3. 11: Barrels (North)

Photo

4. 11: Barrels (North)

Photo

5. 11: Barrels (North)

Photo

6. 11: Barrels (North)

Photo

053343: Structure 14: Sideroad 10

UTM Coordinates (WGS84)	17-559848m.E 4854932m.N
Ownership	Township of East Garafraxa
Structure Type	Municipal Structure
Inspectors	Mack Chiasson, Andrew Burnside

1. 14: Railing System (North East)

Photo

2. 14: Railing System (North East)

Photo

3. 14: Wingwalls (North West)

Photo

4. 14: Soffit - Thin Slab - Int (East)

Photo

5. 14: Abutment Walls (South West)

Photo

6. 14: Girders - Middle (North)

Photo

7. 14: Approach Wearing Surface (East)

Photo

8. 14: Wingwalls (South East)

Photo

9. 14: Soffit - Thin Slab - Ext (South)

Photo

053343: Structure 15: 13th Line

UTM Coordinates (WGS84)	17-560161m.E 4855155m.N
Ownership	Township of East Garafraxa
Structure Type	Municipal Structure
Inspectors	Mack Chiasson, Andrew Burnside

1. 15: Approach Guide Rail (East)

Photo

2. 15: Inlet (North East)

Photo

1. 15: Approach Wearing Surface (West)

Photo

3. 15: Inlet (North)

Photo

5. 15: Barrels (North West)

Photo

6. 15: Barrels (North East)

Photo

7. 15: Outlet (South)

Photo

053343: Structure 16: E West Garafraxa Tline

UTM Coordinates (WGS84)	17-556392m.E 4849326m.N
Ownership	Township of East Garafraxa
Structure Type	Municipal Structure
Inspectors	Mack Chiasson, Andrew Burnside

1. 16: Outlet (West)

Photo

2. 16: Barrels (South)

Photo

3. 16: Barrels (North)

Photo

4. 16: Barrels (South)

Photo

5. 16: Barrels (North)

Photo

6. 16: Inlet (East)

Photo

7. 16: Deck Top (East)

Photo

8. 16: Outlet (North West)

Photo

053343: Structure 17: 13th Line

UTM Coordinates (WGS84)	17-560533m.E 4854801m.N
Ownership	Township of East Garafraxa
Structure Type	Municipal Structure
Inspectors	Mack Chiasson, Andrew Burnside

1. 17: Inlet (East)

Photo

2. 17: Outlet (West)

Photo

3. 17: Barrels (South West)

Photo

4. 17: Barrels (South West)

Photo

5. 17: Barrels (North)

Photo

6. 17: Approach Wearing Surface (North)

Photo

7. 17: Inlet (East)

Photo

053343: Structure 19: 16th Line

UTM Coordinates (WGS84)	17-564119m.E 4857051m.N
Ownership	Township of East Garafraxa
Structure Type	Municipal Structure
Inspectors	Mack Chiasson, Andrew Burnside

1. 19: Wingwalls (North West)

Photo

2. 19: Barrels (North)

Photo

3. 19: Outlet (West)

Photo

4. 19: Barrels (North West)

Photo

053343: Structure 21: Twelfth Line

UTM Coordinates (WGS84)	17-561551m.E 4851923m.N
Ownership	Township of East Garafraxa
Structure Type	Municipal Structure
Inspectors	Mack Chiasson, Andrew Burnside

1. 21: Approach Guide Rail (West)

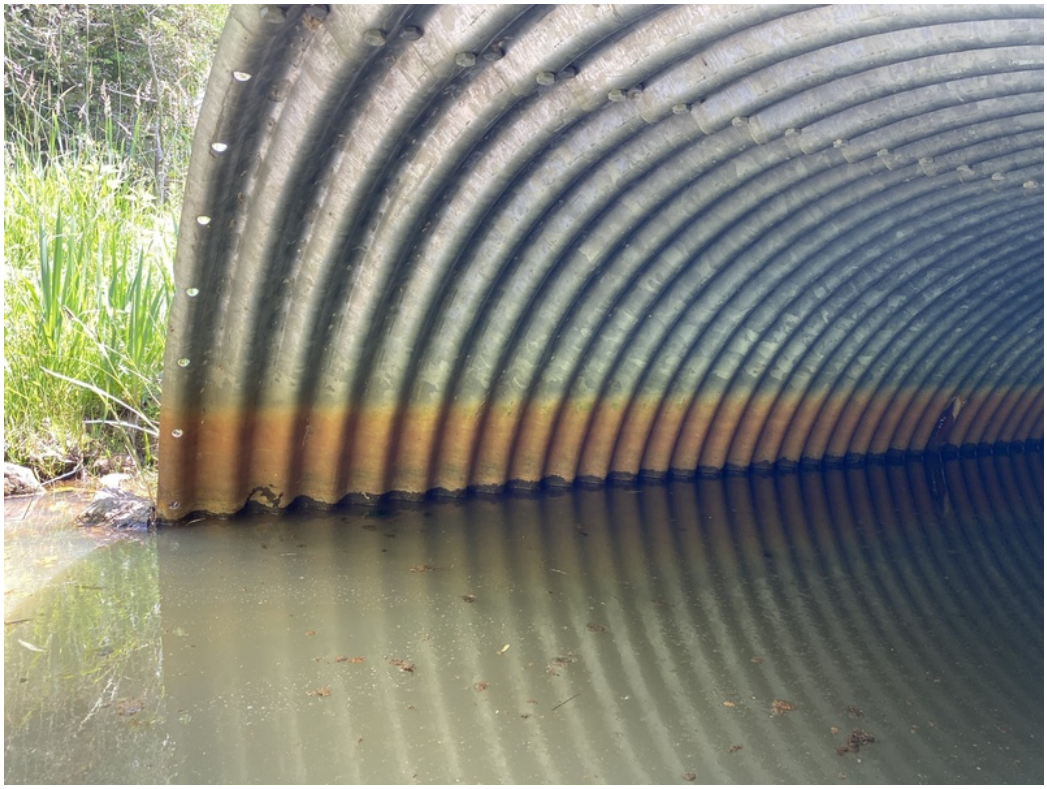
Photo

1. 21: Railing System (North)

Photo

3. 21: Barrels (North East)

Photo



3. 21: Outlet (South)

Photo

053343: Structure 22: 18th Line

UTM Coordinates (WGS84)	17-567722m.E 4857368m.N
Ownership	Township of East Garafraxa
Structure Type	Municipal Structure
Inspectors	Mack Chiasson, Andrew Burnside

1. 22: Barrels (South East)

Photo

2. 22: Barrels (North)

Photo

3. 22: Barrels (North)

Photo

4. 22: Approach Wearing Surface (North)

Photo

5. 22: Inlet (East)

Photo

053343: Structure 23: 19th Line

UTM Coordinates (WGS84)	17-568977m.E 4858022m.N
Ownership	Township of East Garafraxa
Structure Type	Municipal Structure
Inspectors	Mack Chiasson, Andrew Burnside

1. 23: Approach Guide Rail (East)

Photo

2. 23: Barrels (East)

Photo

3. 23: Barrels (North)

Photo

4. 23: Approach Wearing Surface (South)

Photo

5. 23: Outlet (South West)

Photo

6. 23: Inlet (South East)

Photo

053343: Structure 24: E Garafraxa-Caledon Tline

UTM Coordinates (WGS84)	17-569720m.E 4858429m.N
Ownership	Township of East Garafraxa
Structure Type	Municipal Structure
Inspectors	Mack Chiasson, Andrew Burnside

1. 24: Barrels (East)

Photo

2. 24: Barrels (East)

Photo

3. 24: Barrels (Soffit)

Photo

5. 24: Approach Wearing Surface (West)

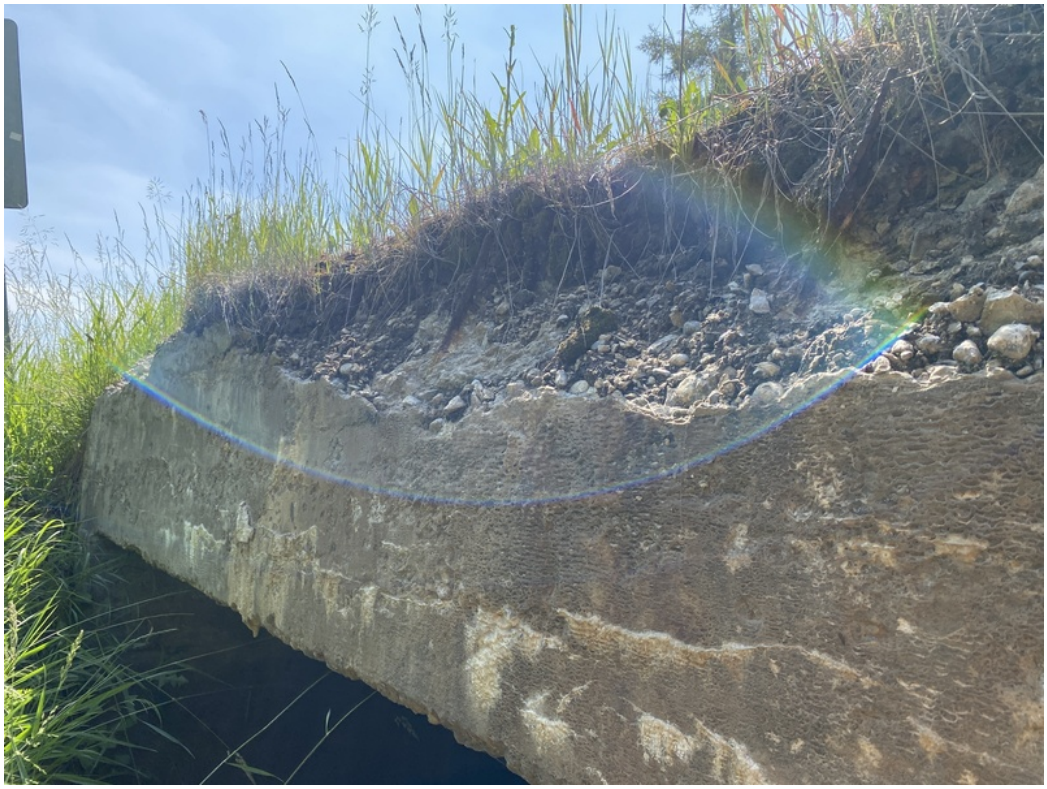
Photo

5. 24: Inlet (North)

Photo

6. 24: Outlet (South)

Photo



053343: Structure 26: Erin-East Garafraxa Tline

UTM Coordinates (WGS84)	17-566235m.E 4853169m.N
Ownership	Township of East Garafraxa
Structure Type	Municipal Structure
Inspectors	Mack Chiasson, Andrew Burnside

1. 26: Deck Wearing Surface (East)

Photo

2. 26: Barrels (South)

Photo

3. 26: Barrels (West)

Photo

4. 26: Barrels (East)

Photo

5. 26: Barrels (North)

Photo

6. 26: Barrels (North East)

Photo

7. 26: Barrels (South)

Photo

8. 26: Barrels (North)

Photo

9. 26: Inlet (North)

Photo

053343: Structure 27: Erin-East Garafraxa Tline

UTM Coordinates (WGS84)	17-566276m.E 4853222m.N
Ownership	Township of East Garafraxa
Structure Type	Municipal Structure
Inspectors	Mack Chiasson, Andrew Burnside

1. 27: Deck Wearing Surface (East)

Photo

2. 27: Inlet (North)

Photo

3. 27: Barrels (North East)

Photo

4. 27: Barrels (South)

Photo

5. 27: Outlet (South)

Photo

053343: Structure 29: Erin-East Garafraxa Tline

UTM Coordinates (WGS84)	17-560708m.E 4846185m.N
Ownership	Township of East Garafraxa
Structure Type	Municipal Structure
Inspectors	Mack Chiasson, Andrew Burnside

1. 29: Outlet (South)

Photo

2. 29: Barrels (North East)

Photo

3. 29: Barrels (Centre)

Photo

4. 29: Barrels (East)

Photo

5. 29: Deck Wearing Surface (West)

Photo

6. 29: Barrels (South)

Photo

9. 29: Inlet (North)

Photo

053343: Structure 31: Sideroad 20

UTM Coordinates (WGS84)	17-551487m.E 4854240m.N
Ownership	Township of East Garafraxa
Structure Type	Municipal Structure
Inspectors	Mack Chiasson, Andrew Burnside

1. 31: Approach Wearing Surface (North East)

Photo

2. 31: Deck Wearing Surface (East)

Photo

3. 31: Soffit - Thin Slab - Int (North East)

Photo

4. 31: Soffit - Thin Slab - Ext (South)

Photo

5. 31: Wingwalls (South West)

Photo

8. 31: Railing System (South)

Photo

9. 31: Wingwalls (North West)

Photo

10. 31: Abutment Walls (East)

Photo

053343: Structure 41: (Sideroad 10)

UTM Coordinates (WGS84)	17-556503m.E 4850740m.N
Road or Location Description	Sideroad 10

Deck Wearing Surface (Overtop of structure)

Photo

Comments | -

Barrels (Through Structure)

Photo

Comments | Surface corrosion at waterline

053343: Structure 42: (Sideroad 10)

UTM Coordinates (WGS84)	17-557097m.E 4851480m.N
Road or Location Description	Sideroad 10

Signs (All quadrants)

Photo

Comments | -

Deck Wearing Surface (Overtop of structure)

Photo

Comments | -

Curbs (South East)

Photo

Comments | -

Outlet (South East)

Photo

Comments | Hairline to narrow stained cracks

Barrels (Through Structure)

Photo

Comments | Spall with exposed corroded rebar

Barrels (Through Sturcture)

Photo

Comments | -

Inlet (North West)

Photo

Comments | Hairline to narrow stained cracks

053343: Structure 43: (13th Line)

UTM Coordinates (WGS84)	17-561197m.E 4854173m.N
Road or Location Description	13th Line

Deck Wearing Surface (Overtop of Structure)

Photo

Comments | -

Barrels (Through Culvert)

Photo

Comments | -

Barrels (Through Culvert)

Photo

Comments | -

053343: Structure 44: (15th Line)

UTM Coordinates (WGS84)	17-563954m.E 4855340m.N
Road or Location Description	15th Line

Deck Wearing Surface (Overtop of Structure)

Photo

Comments | -

Signs (All Quadrants)

Photo

Comments | -

Inlet (South West)

Photo

Comments | -

Barrels (Through Structure)

Photo

Comments | Moisture penetration in soffit

Outlet (North East)

Photo

Comments | Hairline stained cracks

053343: Structure 45: (Erin Garafraxa Townline)

UTM Coordinates (WGS84)	17-560294m.E 4845670m.N
Road or Location Description	Erin Garafraxa Townline

Signs (All Quadrants)

Photo

Comments | -

Deck Wearing Surface (Overtop of Structure)

Photo

Comments | -

Inlet (South East)

Photo

Comments | -

Barrels (Through Structure)

Photo

Comments | Spall

Barrels (Through Structure)

Photo

Comments | Spall with exposed corroded rebar in sofgit

Barrels (Through Structure)

Photo

Comments | Spall with exposed corroded rebar in soffit

053343: Structure 46: (Erin Garafraxa Townline)

UTM Coordinates (WGS84)	17-561195m.E 4846794m.N
Road or Location Description	Erin Garafraxa Townline

Deck Wearing Surface (Overtop of Structure)

Photo

Comments | -

Inlet (North West)

Photo

Comments | -

Barrels (Through Structure)

Photo

Comments | -

Outlet (South East)

Photo

Comments | -

053343: Structure 47: (Caledon East Garafraxa Townline)

UTM Coordinates (WGS84)	17-570576m.E 4859547m.N
Road or Location Description	Caledon East Garafraxa Townline

Signs (All Quadrants)

Photo

Comments | -

Approach Guide Rail (All Quadrants)

Photo

-

Comments | -

Deck Wearing Surface (Overtop of Structure)

Photo

Comments | -

Inlet (East)

Photo

Comments | -

Barrels (Through Structure)

Photo

Comments | Concrete patch repairs in soffit

Outlet (West)

Photo

Comments | -

BURNSIDE

[THE DIFFERENCE IS OUR PEOPLE]

Appendix E

OSIM Forms and Photos

Provided Digitally