Special Council Meeting
Municipality of West Grey
402813 Grey County Rd 4, Durham, ON N0G 1R0

February 11, 2025, 9 a.m.

West Grey municipal office, council chambers

This meeting shall be held in the Municipality of West Grey council chambers. Members of the public may attend in person or electronically via Zoom.
To join through your computer (or smartphone with the Zoom app) go to: https://us02web.zoom.us/j/89156262480
To phone in and listen live dial +1 647 558 0588 (long-distance charges may apply)
When prompted, enter the meeting ID: 891 5626 2480
Accessibility of documents: Documents are available in alternate formats upon request. If you require an accessible format or communication support contact the Clerk's Department by email at clerk@westgrey.com or 519-369-2200 to discuss how we can meet your needs.

Bridge & Culvert Prioritization Program

MUNICIPALITY OF West Grey

TRITON ENGINEERING SERVICES LIMITED
Consulting Engineers

Council Meeting #2

February 11, 2025

Bridge Prioritization Program Overview

Recap - Council meeting #1 September 18th, 2024: Reviewed the Bridge Prioritization program rationale and provided further details of the variables that are the product of determining the total risk of asset failure

01

103 structures in the Municipality of West Grey have been analyzed as part of this ***Bridge Prioritization Program.*** There are 114 structures total, however, 103 have been identified as part of the vehicular transportation network.

02

Structure priority is derived from the **Total Risk of Asset Failure** as well as the number of service years remaining. Total Risk of Asset Failure is the product of:

1. Total Probability of Asset Failure

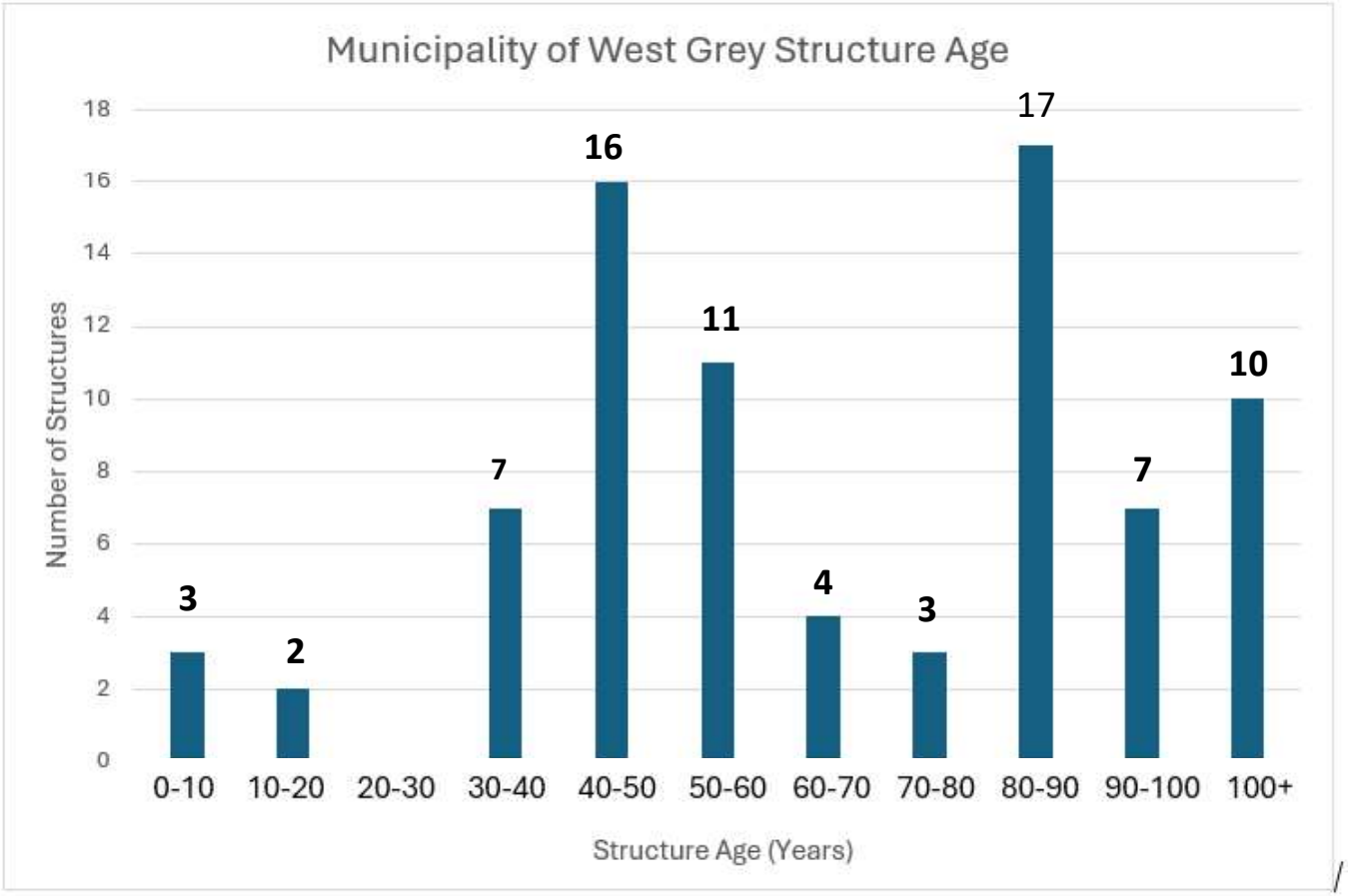
2. Total consequence of Asset Closure/Failure

03

The purpose of this program is to provide a quantitative approach to asset management to remove subjectivity as much as possible.

Existing Structures Within the Municipality of West Grey

- 37 structures are over the age of 70 years in the Municipality of West Grey, which is of concern as the average expected useful life of a bridge in Ontario ranges between 64 to 88 years. (Statistics Canada 2024)
- Recent 2024 OSIM reports have identified 25 structures that have a Bridge Condition Index (BCI) under 70 with a service life of less than 10 years and considered critical from an asset management perspective
- Using the 2024 OSIM as reference, at least 41 structures are coming due in the next 20 years for major rehabilitation and/or full replacement.



Total Risk of Asset Failure

$$Total\ Risk\ of\ Asset\ Failure = Probability\ of\ Failure * Consequence\ of\ Failure$$

- A higher numeric value for the Total Risk of Asset Failure generally indicates a higher priority in the ***Bridge Prioritization Program***

Total Probability of Failure

The sum of the following components and scored out of 5 each:

1. ADT – Average Daily Traffic from traffic counts provided by the Municipality
2. Bridge Condition Index (BCI) – Structural rating from the Ontario Structure Inspection Manual (OSIM) Report

A higher value indicates a higher probability of failure

Total Consequence of Closure/Failure

The sum of the following components and scored out of 5 each:

1. ADT – Consistent with Total Probability of Failure
2. Detour Length (km) – Distance from one side of the structure to the other without crossing
3. Emergency Response Time – Change in response time measured in minutes resulting from the closure of a structure
4. Local Access – Inconvenience of a structure closure to residents and the community

A higher value indicates greater consequence to the public as a result of closure/failure

Total Risk of Asset Failure – **Highest Risk**

- These structures have potential to significantly impact the transportation network of West Grey if they require closure or are currently closed

Structure ID	Structure Status (open/closed)	Total Probability of Failure	Total Consequence of Failure	Total Risk of Asset Failure
N-051	Closed	7.11	14.73	**104.72**
N-060	Open	6.52	15.57	**101.47**
N-058	Open	6.50	14.93	**97.02**
N-059	Open	6.44	14.79	**95.28**
B-020	Closed	6.43	14.22	**90.95**
N-054	Open	5.36	15.23	**81.66**
N-199	Open	6.26	12.14	**75.94**
N-057	Open	5.25	13.96	**73.32**
EG-001	Open	4.15	16.00	**66.40**
B-021	Open	5.45	12.15	**66.19**
B-003	Open	6.49	10.17	**66.01**
N-050	Open	5.26	11.50	**60.50**

Total Risk of Asset Failure – **Lowest Risk**

- This group of structures are either still structurally capable of performing as designed and/or will have less of an impact if they require closure, or are already closed

Structure ID	Structure Status (open/closed)	Total Probability of Failure	Total Consequence of Failure	Total Risk of Asset Failure
B-112	Open	1.02	5.37	5.48
G-126	Open	1.02	7.47	7.65
G-197	Open	1.08	9.13	9.86
B-007	Open	2.42	4.42	10.68
G-032	Open	2.29	5.70	13.05
B-113	Open	2.30	5.70	13.13
B-118	Open	2.28	6.23	14.20
N-065	Open	2.28	6.36	14.54
N-183	Open	2.33	6.43	14.98
N-068	Open	2.26	6.77	15.27
G-148	Open	2.26	6.95	15.73
G-030	Open	2.26	6.98	15.76
B-025	Closed	3.11	5.18	16.11

Years of Service Life Remaining

- These structures have the lowest remaining years of service life in the Municipality of West Grey
- 0 Years of service indicates the structure is currently closed

Structure ID	Total Probability of Failure	Total Consequence of Failure	Total Risk of Asset Failure	Years of Service
N-051	7.11	14.73	104.72	**0**
B-020	6.43	14.22	91.45	**0**
G-038	3.79	12.51	47.36	**0**
G-033	3.57	9.25	32.97	**0**
N-055	3.84	8.41	32.31	**0**
N-070	2.63	9.54	25.10	**0**
B-025	3.11	5.19	16.15	**0**
EG-001	4.15	10.23	66.40	**0**
B-003	6.50	10.23	66.43	**1 to 5**
G-132	2.91	16.00	46.56	**1 to 5**
G-037	3.12	12.60	39.26	**1 to 5**
N-188	4.30	7.92	34.02	**1 to 5**
N-184	3.66	7.94	29.05	**1 to 5**
B-001	3.63	9.09	33.01	**6 to 10**
B-011	2.63	10.69	28.05	**6 to 10**

Structure Priority List

- Derived from the highest risk for Total Probability of Asset Failure as well as estimated remaining service life from the 2024 OSIM reports
- This list will be kept up to date with structures analyzed bi-annually in collaboration with OSIM reporting
- A closed structure that isolates property from the transportation network is given highest priority

Rank	Structure ID	Discussion	Years of Service Life Remaining	Cost (2024 Dollar Value for Concrete)
1	G-038	Isolation of properties from potential flooding known to occur on this road segment. Structure is currently closed.	0	$ 2,001,000
1	G-037	Isolation of properties from potential flooding known to occur on this road segment.	1	$ 1,794,000
3	EG-001	Currently has a BCI of 37 and is recommended for replacement. Stone Hill Road culvert is on a dead-end road resulting in stranded residents if closure is required.	0	$ 184,000
4	N-051	Closed due to significant deterioration. ADT of 1018 was the highest amongst structures with less than 5 service years remaining and a high change in EMS response time.	0	$ 2,944,000
5	G-044	Lengthy detours and emergency response times would be the result of a structure closure at this location on North Line.	1	$ 2,200,000
6	B-003	High ADT of 601 with limited service life remaining. It is Currently recommended for inspection every 6 months.	1	$ 2,600,000
7	G-132	While the use is minimal, a property becomes isolated if closed.	2	$ 1,334,000
8	B-020	Although B-020 has been closed for almost 10 years, the 2016 ADT indicates this road segment has a high ADT of 953.	0	$ 3,197,000
9	N-060	This structure has a high ADT of 1196 and reported in fair to poor condition with no signs of structural distress.	8	$ 1,127,000
10	N-058	This structure has a high ADT of 1196 and reported in fair to poor condition with no signs of structural distress.	8	$ 1,725,000

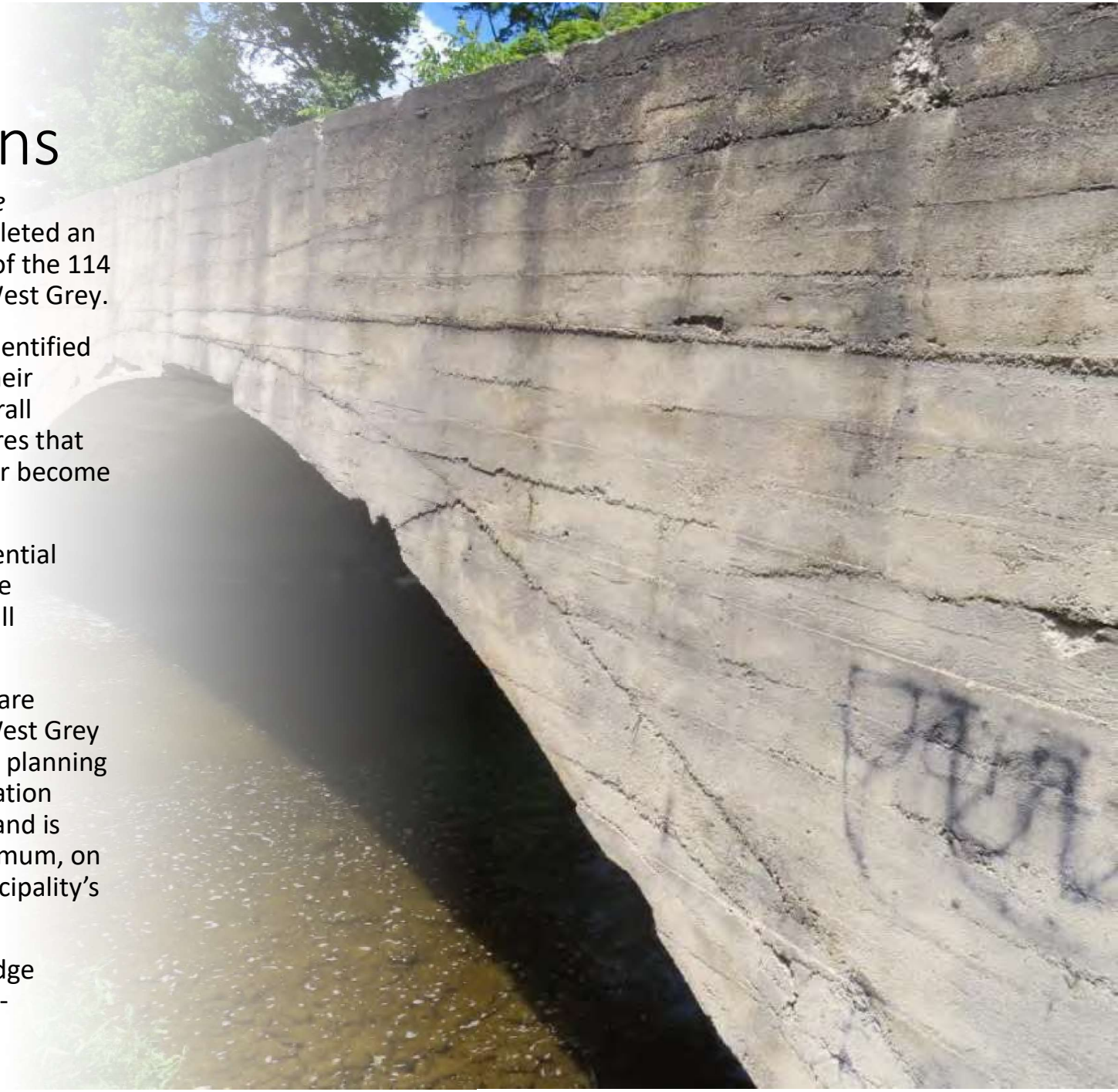
Candidate Structures for Closure

- Highlighted structures are currently closed
- Based on their Total Consequence of Closure/Failure to the transportation network within the Municipality, these structures can be considered for closure at the end of their service life
- Closure would result in a replacement capital and life cycle cost savings up to $23 million for structures listed based on typical 2024 concrete construction values

Structure ID	Total Probability of Failure	Total Consequence of Failure	Total Risk of Asset Failure	Years of Service
B-025	3.11	**5.19**	16.15	0
G-133	2.73	**6.72**	18.30	10+
B-008	3.81	**7.24**	27.59	6 to 10
N-185	2.63	**7.66**	20.15	10+
N-188	4.30	**7.92**	34.02	1 to 5
N-184	3.66	**7.94**	29.05	1 to 5
N-055	3.84	**8.41**	32.31	0
N-061	3.58	**8.81**	31.51	10+
G-033	3.57	**9.25**	32.97	0
N-070	2.63	**9.54**	25.10	0

Conclusion & Recommendations

- Through the development of this *Bridge Prioritization Program*, Triton has completed an in-depth review and evaluation of 103 of the 114 structures, within the Municipality of West Grey.
- The Bridge Prioritization Program has identified 10 structures approaching the end of their service life that are essential to the overall transportation network, and 10 structures that are proposed to either remain closed, or become closed at the end of their service life.
- These strategic closures ensure the essential structures within the community receive adequate resources to provide an overall sustainable transportation network.
- These continued structural evaluations are intended to assist the Municipality of West Grey with their structural asset management planning to be in compliance with Ontario Regulation 588/17 “Asset Management Planning” and is recommended to be updated, at a minimum, on a bi-annual basis to align with the Municipality’s bi-annual OSIM structure inspections.
- Ongoing and regular updates to the Bridge Prioritization Program will ensure a non-subjective “greater good” approach is maintained.



Questions?

Staff Report

Report To: Council

Report From: Geoff Aitken, CET – Director, Infrastructure and Public Works

Meeting Date: February 11, 2025

Subject: IPW-2025-05 – Bridge Prioritization Program

Recommendations:

That in consideration of staff report 'IPW-2025-05 – Bridge Prioritization Program', Council:

1. Approves the recommendations for Replacement/Rehabilitation as outlined in the Bridge Prioritization Program study; and
2. Accepts the recommendations for candidate structures for closure as outlined in the Bridge Prioritization Program study.

Highlights:

- West Grey has over 100 bridge and culvert structures.
- To aid in prioritizing structures, West Grey has formalized a *Bridge Prioritization Program.*
- This program has identified for replacement the top 10 structures that are vital to West Grey's transportation network, and identifies structures that, upon reaching the end of their respective service lives, are considered candidates for closure.
- The cost to replace the top 10 structures is estimated at $19.7 million.

Previous Report/Authority:

Bridge Prioritization Program

September 18, 2024-Special Council Meeting-Bridge & Culvert-Agenda & Presentation

October 3, 2024-Bridge & Culvert Prioritization Program – Public Open House

February 2025 - Municipality of West Grey-Bridge Prioritization Report-Final (Report only)

Environmental Assessments

June 6, 2024-Structure G-044 & G-033 Bridge – Public Information Centre

August 22, 2024-Environmental Study Report, Schedule B, Structure G-044

Staff Reports

IPW-2023-10 – Biannual Bridge Inspection Reports

IPW-2024-20 – Bridge N-051

IPW-2024-21 – Bridge N-055

IPW-2024-22 – Posted Speed Reduction (Bridges B-008 & G-032)

IPW-2024-24 – Bridge B-003

IPW-2024-28 – Bridge B-025

IPW-2024-29 – Bridges G-037 & G-038

IPW-2024-31 – Bridge N-060

IPW-2024-33 – Bridge N-056

Analysis:

In 2024, three significant parallel and interconnected bridge processes took place. These included: Council receiving nine staff reports about 10 bridges, six of which were closed on short notice; an environmental assessment that involved a public information center discussing the closure of one structure and replacement of another; and, as a result of the first two processes, the establishment of a West Grey Bridge Prioritization Program.

The primary focus of this report is the Bridge Prioritization Program (Program) and its report. In its simplest form the program generates a list of structures that are vital to the West Grey transportation network and prioritizes the structures for either rehabilitation or replacement. Similarly, the program identifies structures that are not as vital to the transportation network and, at the end of their respective service lives, are candidates for closure and ultimately removal. Two tables are attached to this report that identify these structures.

A decision-making matrix was developed to minimize subjective bias and is based on criteria like bridge condition index, average daily traffic, detour length, emergency response time, and local access. The probability and consequence of failure/closure was assessed to determine total risk of asset failure. While cost was noted, it did not influence probability, consequence, or total risk evaluations.

Financial Implications:

There is no financial impact because of this report. There is a Special Council meeting scheduled for March 11, 2025, to further discuss the financing of the Bridge Prioritization Program. In 2024 dollars, it is estimated that replacement of the top 10 priority structures that are vital to West Grey's transportation network would cost $19.7 million.

In the 2025 capital budget, there is $2 million for the replacement of structure G-044 and $300,000 for rehabilitation efforts of another structure (TBC).

Climate and Environmental Implications:

Some of the most significant environmental impacts occur during the demolition and construction phases of bridge work. This can include "in water works" that are subject to permits required by the Department of Fisheries and Oceans (DFO) and the local conservation authorities. The main focus areas are fish habitat, spawning grounds, and effective watershed stewardship. Unique aspects of bridge construction include geological considerations, soil load-bearing capacity, and the depth to stable bedrock.

Communication Plan:

Communication of this report is through the posting of Council meeting agendas on the West Grey website.

Consultation:

Chief Administrative Officer

Director, Legislative Services/Clerk

Director, Finance/Treasurer

Supervisor, Rural Operations

Triton Engineering

Attachments:

Structure Priority List

Candidate Structures for Closure

Recommended by:
Geoff Aitken, CET, Director, Infrastructure and Public Works

Submission approved by:
Michele Harris, Chief Administrative Officer

For more information on this report, please contact Geoff Aitken, Director, Infrastructure and Public Works at publicworks@westgrey.com or 519-369-2200 Ext. 227.

Structure Priority List

- Derived from the highest risk for Total Probability of Asset Failure as well as estimated remaining service life from the 2024 OSIM reports
- This list will be kept up to date with structures analyzed bi-annually in collaboration with OSIM reporting
- A closed structure that isolates property from the transportation network is given highest priority

Rank	Structure ID	Discussion	Years of Service Life Remaining
1	G-038	Isolation of properties from potential flooding known to occur on this road segment. Structure is currently closed.	0
1	G-037	Isolation of properties from potential flooding known to occur on this road segment.	1
3	N-051	Closed due to significant deterioration. ADT of 1018 was the highest amongst structures with less than 5 service years remaining and a high change in EMS response time.	0
4	EG-001	Currently has a BCI of 37 and is recommended for replacement. Stone Hill Road culvert is on a dead-end road resulting in stranded residents if closure is required.	0
5	G-044	Lengthy detours and emergency response times would be the result of a structure closure at this location on North Line.	1
6	B-003	High ADT of 601 with limited service life remaining. It is Currently recommended for inspection every 6 months.	1
7	G-132	While the use is minimal, a property becomes isolated if closed.	2
8	B-020	Although B-020 has been closed for almost 10 years, the 2016 ADT indicates this road segment has a high ADT of 953.	0
9	N-060	This structure has a high ADT of 1196 and reported in fair to poor condition with no signs of structural distress.	8
10	N-058	This structure has a high ADT of 1196 and reported in fair to poor condition with no signs of structural distress.	8

Candidate Structures for Closure

- Highlighted structures are currently closed
- Based on their Total Consequence of Closure/Failure to the transportation network within the Municipality, these structures can be considered for closure at the end of their service life

Structure ID	Total Probability of Failure	Total Consequence of Failure	Total Risk of Asset Failure	Years of Service
B-025	3.11	**5.19**	16.15	0
G-133	2.73	**6.72**	18.30	10+
B-008	3.81	**7.24**	27.59	6 to 10
N-185	2.63	**7.66**	20.15	10+
N-188	4.30	**7.92**	34.02	1 to 5
N-184	3.66	**7.94**	29.05	1 to 5
N-055	3.84	**8.41**	32.31	0
N-061	3.58	**8.81**	31.51	10+
G-033	3.57	**9.25**	32.97	0
N-070	2.63	**9.54**	25.10	0