



2025 Asset Management Plan

Transportation
City of Brantford, Ontario



Prepared by: Infrastructure Planning Asset Management, Public Works
Corporation of the City of Brantford, June 2025

RECORD SHEET

ROLE	NAME
WRITERS:	Sharon Anderson, P.Eng. Supervisor of Asset Management Public Works – Engineering Services
CONTRIBUTORS:	<p>Infrastructure Planning Nora Fleming, Asset Management Specialist Sarah Galloway, Supervisor of GIS Joe Gurzanski, Infrastructure Planning Technologist</p> <p>Operational Services Rob Smith, Acting Manager of Traffic Services Chris Gimmer, Traffic Operations Supervisor Paul Krystofiak, Traffic Systems Coordinator Adam Cornwell, Supervisor Operational Services Jon Black, Supervisor Operational Services</p>
REVIEWERS:	Mike Abraham, C.E.T., Manager of Infrastructure Planning
RECOMMENDED BY:	Michael Bradley, Chief Administrative Officer
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RECORD SHEET

Asset Management Document Set	Asset Group	First Issuance	Current Issuance
Strategic Asset Management Policy	All	May 2019	May 2019
Asset Management Plan Overview	Core & Non-Core Assets	June 2024	June 2025
Asset Management Plan, Core Assets	Transportation	September 2021	This Document
Asset Management Plan, Core Assets	Environmental Services	September 2021	June 2025
Asset Management Plan, Non-Core Assets	Airport Cemetery Economic Development & Tourism Facilities Fire Fleet & Transit Forestry & Horticulture Golf Housing Human Resources IT Services Library Parks & Recreation Parking Police Records & Printing Solid Waste	June 2024	June 2025
Asset Management Plan, Non-Core Assets	JNH	TBD	TBD

ASSET MANAGEMENT PLAN

TRANSPORTATION

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TRANSPORTATION INTRODUCTION

For the purposes of the Asset Management Plan, Transportation is divided into two (2) Asset Classes: Bridges & Structures and Roadway Assets both are considered core assets as defined in O. Reg 588/17.

Table 1 below outlines which Asset Types are included under each Asset Class and will be reported on in this AMP document. It is important to note that the AMP only includes assets owned by the City or Local Boards and does not include assets that are owned privately or by other organizations.

Bridges & Structures assets are managed by City staff from the Parks & Recreation and Operational Services departments. Roadway Assets are managed by City staff from the Operational Services department.

City staff from Engineering services support the capital rehabilitation and replacement of these assets.

Table 1: Asset Type Breakdown

	Asset Class	
	Bridges & Structures	Roadways
Asset Type	Bridges	Roads
	Stairways	Streetlights
	Retaining Walls (Height \geq 0.7m)	Streetlight Poles
	Retaining Walls (Height $<$ 0.7m)	Traffic Signs & Supports
	Culverts (\geq 3m span)	Signalized Intersections
	Culverts ($<$ 3m span)	Guide Rails
	Lookouts & Boardwalks	Sidewalks
	Sound Walls	Fencing
		Traffic Calming Devices
		On-road Active Transportation
		Street Furniture

1 TRANSPORTATION ASSETS

1.1 INTRODUCTION

The City of Brantford owns and maintains several assets under the Transportation asset class. The purpose of this section is to present specific information about the Transportation asset class so that we can answer the questions posed in **Section 2** of the **Asset Management Plan (AMP) Overview Document**, and includes the following:

- Transportation Assets' Data Inventory and Condition Approach;
- Summary of Transportation Assets;
- Lifecycle Activities and Cost of Transportation Assets;
- Current and Proposed Transportation Assets' Levels of Service;
- Current and Proposed Transportation Assets' Performance; and
- Conclusion.

1.2 TRANSPORTATION ASSETS' DATA INVENTORY AND CONDITION APPROACH

Information related to the City's data collection methodologies as well as data confidence level definitions are defined in the **Asset Management Plan Overview Document**.

The City of Brantford currently has three (3) approaches to establishing the inventory and condition of Transportation assets due to regulatory requirements, available resources, technologies, and budget restrictions:

- Condition assessments outsourced to consultants;
- Periodic inspection programs conducted by City staff; and
- Estimated condition based on asset specific information.

A list of all condition assessments for all core assets can be found in **Table 7** in the **Asset Management Plan Overview Document**.

The origin of the Transportation asset data for inventory, replacement cost, condition, and level of service, as well as data confidence in each are provided in **Table 2** below.

Table 2: Transportation Assets' Data Origin and Confidence Level

	Inventory			Replacement Cost			Condition			Levels of Service		
Asset Type	Inventory (incl. Quantity and Age) From	Data Confidence Level	Data Confidence Description	Replacement Cost From	Data Confidence Level	Data Confidence Description	Condition From	Data Confidence Level	Data Confidence Description	Levels of Service From	Data Confidence Level	Data Confidence Description
Bridges	2023 OSIM Report completed by Egis Group	High	Formal inventory with few unknowns.	2023 OSIM Report completed by Egis Group	High	Formal estimate completed as part of condition assessment. Adjusted by recent project costs.	2023 OSIM Report completed by Egis Group	High	Formal condition assessment with few unknowns	GIS LAGAN/CRM Condition Assessments Master Plans	High	Based on information which is formally tracked. Proposed based on formal forecast.
Stairways	2024 OSIM Report completed by Egis Group	High	Formal inventory with few unknowns.	2024 OSIM Report completed by Egis Group	High	Formal estimate completed as part of condition assessment.	2024 OSIM Report completed by Egis Group	High	Formal condition assessment with few unknowns	GIS LAGAN/CRM Condition Assessments	Medium	Based on information which is formally tracked. Proposed based on estimate.
Retaining Walls (Height >= 0.7m)	2024 OSIM Report completed by Egis Group	High	Formal inventory of retaining walls over 0.7m in height.	2024 OSIM Report completed by Egis Group	High	Formal estimate completed as part of condition assessment.	2024 OSIM Report completed by Egis Group	High	Formal condition assessment with few unknowns	GIS LAGAN/CRM Condition Assessments	Medium	Based on information which is formally tracked. Proposed based on estimate.
Retaining Walls (Height < 0.7m)	2023 Report by WSP and 2024 Report by Planmac	High	Formal inventory of retaining walls under 0.7m in height.	2023 Report by WSP and 2024 Report by Planmac	High	Formal estimate completed as part of condition assessment.	2023 Report by WSP and 2024 Report by Planmac	High	Formal condition assessment with few unknowns	GIS LAGAN/CRM Condition Assessments	Medium	Based on information which is formally tracked. Proposed based on estimate.
Culverts (span >= 3m)	2023 OSIM Report completed by Egis Group	High	Formal inventory with few unknowns.	2023 OSIM Report completed by Egis Group	High	Formal estimate completed as part of condition assessment.	2023 OSIM Report completed by Egis Group	High	Formal condition assessment with few unknowns	GIS LAGAN/CRM Condition Assessments Master Plans	High	Based on information which is formally tracked. Proposed based on formal forecast.
Culverts (span < 3m)	2022 Report by Ellis Engineering	High	Inventory is not fully complete and unknowns exist.	2022 Report by Ellis Engineering	High	Formal estimate completed as part of condition assessment.	2022 Report by Ellis Engineering	High	Formal condition assessment with few unknowns	GIS LAGAN/CRM Condition Assessments	Medium	Based on information which is formally tracked. Proposed based on estimate.
Lookouts & Boardwalks	2024 OSIM Report completed by Egis Group	Medium	Formal Inventory with some unknowns around	2024 OSIM Report completed by	High	Formal estimate completed as part of condition assessment.	2024 OSIM Report completed by	Medium	Formal condition assessment with some unknowns around	GIS Condition Assessments	Medium	Based on information which is formally tracked.

	Inventory			Replacement Cost			Condition			Levels of Service		
Asset Type	Inventory (incl. Quantity and Age) From	Data Confidence Level	Data Confidence Description	Replacement Cost From	Data Confidence Level	Data Confidence Description	Condition From	Data Confidence Level	Data Confidence Description	Levels of Service From	Data Confidence Level	Data Confidence Description
			boardwalks.	Egis Group			Egis Group		boardwalks.			Proposed based on estimate.
Sound Walls	GIS Layer, Sound Walls	Medium	Inventory incomplete with unknowns.	MTO Unit Costs	Low	MTO Draft Cost Estimating Guide for Designers 2022	Age Staff Knowledge	Low	Condition based on age	Council Direction	Low	Not Currently Tracked. Proposed based on estimate.
Roads	GIS Layer, Road Centrelines	High	GIS inventory complete.	Asset Management 2024 Unit Costs	Medium	Estimated based on internal Class D pricing.	2024 Roadway Condition Assessments completed by Stantec	High	Formal condition assessment with few unknowns	GIS LAGAN/CRM Cartegraph Condition Assessments Master Plans	High	Based on information which is formally tracked. Proposed based on formal forecast.
Streetlights	Streetlight Inventory and Condition Assessment program GIS Layer, Street Lights	High	GIS Inventory complete	2023 Report completed by TWD	High	Formal estimate by Consultant,	Streetlight Inventory and Condition Assessment program and Service Life	Medium	Formal condition assessments completed from 2019 to 2023. Lower confidence in older data.	GIS LAGAN/CRM Cartegraph Condition Assessments	High	Based on information which is formally tracked. Proposed based on work plan.
Streetlight Poles	Streetlight Inventory and Condition Assessment program GIS Layer, Poles	High	GIS Inventory complete	2023 Report completed by TWD	High	Formal estimate by Consultant,	Streetlight Inventory and Condition Assessment program and Service Life	Medium	Formal condition assessments completed from 2019 to 2023. Lower confidence in older data.	GIS LAGAN/CRM Cartegraph Condition Assessments	High	Based on information which is formally tracked. Proposed based on work plan.
Traffic Signs & Supports	2024 Inventory from SignData Software	Medium	Inventory mostly complete, with some assumptions.	2024 Inventory from SignData Software	Medium	Cost estimate based on sign inventory.	Age Staff Assessment	Medium	Informal assessment by City staff. Age used where condition not recently assessed.	SignData LAGAN/CRM	Medium	Based on information which is formally tracked. Proposed based on estimate.
Signalized Intersections	GIS Layer - Street Intersection	High	GIS Inventory complete	2024 Report completed by Arcadis	Medium	Formal estimate by Consultant.	Age 2024 Report completed by Arcadis	Medium	Formal condition assessment with few unknowns for some locations. Others based on Age	GIS LAGAN/CRM Cartegraph Condition Assessments	Medium	Based on information which is formally tracked. Proposed based on estimate.

	Inventory			Replacement Cost			Condition			Levels of Service		
Asset Type	Inventory (incl. Quantity and Age) From	Data Confidence Level	Data Confidence Description	Replacement Cost From	Data Confidence Level	Data Confidence Description	Condition From	Data Confidence Level	Data Confidence Description	Levels of Service From	Data Confidence Level	Data Confidence Description
Guide Rails	2019 Report completed by Safe Roads Engineering	High	Formal inventory with few unknowns.	2019 Report completed by Safe Roads Engineering	High	Formal estimate by Consultant.	2019 Report completed by Safe Roads Engineering	High	Formal condition assessment with few unknowns	GIS LAGAN/CRM Condition Assessments	Medium	Based on information which is formally tracked. Proposed based on estimate.
Sidewalks	GIS Layer, Sidewalk	High	GIS inventory complete.	Asset Management 2024 Unit Costs	Medium	Estimated based on internal Class D pricing.	2024 Assessment completed by Aquatech	High	Formal condition assessment with few unknowns.	GIS LAGAN/CRM Condition Assessments	Medium	Based on information which is formally tracked. Proposed based on estimate.
Fencing	Data collection is planned for 2025, to be included in future iterations of this AMP document.											
Traffic Calming Devices	GIS Layers, Traffic Calming Traffic Cameras Vehicle Detection Staff Knowledge	Medium	Incomplete inventory with some unknowns.	Traffic 2024 Unit Costs	Medium	Estimated based on internal Class D pricing.	Age Staff Knowledge	Medium	Condition based on informal assessment and age. Many assets installed within last 5 years.	GIS LAGAN/CRM	Medium	Based on information which is formally tracked. Proposed based on estimate.
On-road Active Transportation	GIS Layers	Low	Incomplete inventory with some unknowns for more recent installations.	Asset Management 2024 Unit Costs	Medium	Estimated based on past projects.	Age Staff Knowledge	Low	Condition based on informal assessment and age. Many assets installed within last 5 years.	GIS	Low	Existing gaps in inventory make it difficult to accurately assess LOS throughout City.
Street Furniture	Data collection is planned for 2026, to be included in future iterations of this AMP document.											

Per **Table 2** above, transportation assets' inventory and condition data (excluding lookouts & boardwalks, signs, sound walls, signalized intersections, traffic calming devices and on-road active transportation) is typically at a High level due to ongoing consultant inventory and condition assessments through the OSIM inspections, road condition surveys and other formal condition assessments.

Assets which have not recently had a formal condition assessment completed on them include traffic signs & supports, traffic calming devices, sound walls and on-road active transportation assets. A formal assessment of sound walls is planned for 2025. Formal assessments of the remaining assets will be identified in future capital budgets.

In addition to the formal assessments listed above, the City completes regular informal inspections on some transportation assets as part of its Road Patrol program to ensure that these assets are in compliance with the Minimum Maintenance Standards (MMS) set by the province. While these inspections do not replace a formal condition assessment, they do ensure assets remain in a functional state.

Replacement costing for most transportation assets is based on estimates provided from condition assessments. Where formal estimates have not been recently completed, or a replacement cost estimate was not a requirement of the assessment then costing is based on standard unit costs developed internally by the City for estimation purposes based on previous jobs or on staff knowledge or on costing information from the Tangible Capital Asset registry (TCA). It may also be a combination of two or more of the three listed methods, depending on the asset class.

Level of Service estimates are typically at a medium confidence level. This is due to many assets requiring an estimate for the proposed level of service targets, while the current levels of service provided are relatively well documented. The assets with higher confidence for the proposed levels of service are typically the ones that are included in the City's Transportation Master Plan. While confidence is high for the proposed levels of service for these assets, the exact timing has Low to Medium confidence.

1.2.1 SERVICE LIFE

Formal condition assessments are periodically completed on Transportation assets, but informal ones are more frequent. Where formal condition assessments have not been completed in the last five years the condition has been estimated based on the estimated service life of the assets shown below in **Table 3**. The average overall estimated service life for assets can be found in **Table 7**. Provided that assets are maintained they are expected to remain structurally sound and functional under normal conditions for the Estimated Service Lives outlined below before replacement or significant rehabilitation is required. Environmental conditions and operating practices may result in a shorter or longer useful lifetime.

Table 3: Transportation Asset's Estimated Service Life

Asset Class	Estimated Service Life
Bridges	Concrete: 75 years Steel: 75 years Masonry: 75 years Wood: 20 years Unknown: 50 years
Stairways	Concrete: 75 years Steel: 75 years Masonry: 75 years Wood: 20 years Unknown: 50 years
Retaining Walls	Concrete: 75 years Steel: 75 years Masonry: 75 years Wood: 20 years Unknown: 50 years
Culverts	Corrugated Metal Pipe: 50 years Concrete: 75 years Masonry: 75 years Polyvinyl Chloride (PVC) Pipe: 50 years Unknown: 50 years
Lookouts & Boardwalks	Concrete: 75 years Steel: 75 years Masonry: 75 years Wood: 20 years PVC Decking: 50 years Unknown: 50 years
Sound Walls	Concrete: 75 years Steel: 75 years Masonry: 75 years Wood: 20 years Other: 50 years

Asset Class	Estimated Service Life
Roads	Base: 85 years Arterial: 15 years Collector: 25 years Local - Asphalt: 35 years Local – Gravel: 20 years
Streetlights	Support Arm: 30 years Luminaire - LED: 21 years Luminaire – HPS: 7 years
Streetlight Poles	Wood: 50 years Steel: 40 years Aluminum: 50 years Composite: 60 years Concrete: 50 years
Traffic Signs & Supports	Signs: 10 years Supports: 15 years
Signalized Intersections	Signal Heads: 30 years Wood Pole: 50 years Steel Pole: 40 years Aluminum Pole: 50 years Composite Pole: 60 years Concrete Pole: 50 years
Guide Rails	3 Cable on Wood Posts: 15 years Steel Beam Guide Rail: 20 years
Sidewalks	Concrete: 80 years Brick: 80 years Asphalt: 40 years
Traffic Calming Devices	Steel Pole: 40 years Composite Pole: 60 years Sign Posts: 15 years Signal Heads: 30 years Pavement Markings – Surface: 4 years Pavement Markings – Inlaid: 8 years Speed Cushions: 15 years Speed Signs: 10 years
On-road Active Transportation	Pavement Markings – Surface: 4 years Pavement Markings – Inlaid: 8 years Rubber Curbs: 15 years Flexible Bollards: 10 years

1.2.2 BRIDGE CONDITION INDEX

Through the OSIM program, a condition rating for each bridge & structures asset (excluding short span culverts, retaining walls < 0.7m and sound walls) is calculated using a Bridge Condition Index (BCI) score as developed by the Ministry of Transportation of Ontario, and described in **Table 4**. It is important to note that the BCI does not indicate the safety of the structure but calculates the economic worth of the structure under the assumption that as structural elements deteriorate to a lower condition, the element's value decreases. This can occasionally result in a bridge or culvert with a BCI > 80 that has one key element which has deteriorated to the extent that the structure is no longer safe and requires immediate repair. The current value of the structure is calculated based on the inspector's review and rating of each element of the structure.

The BCI is calculated by the following formula:

$$BCI = \frac{\text{Current Value}}{\text{Replacement Value}}$$

Table 4: Bridge Condition Index (BCI) Description

BCI	Condition Rating	Description
>80	Excellent	For a structure with a BCI greater than 80, rehabilitation is usually not required within the next 10 years.
70 - 80	Good	For a structure with a BCI between 70 and 80, rehabilitation work is usually not required within the next five years.
60 - 70	Fair	For a structure with a BCI between 60 and 70, rehabilitation work is usually scheduled within the next 5 years. This is the ideal time to schedule major repairs from an economic perspective.
<60	Poor	For a structure with a BCI rating of less than 60, rehabilitation work is usually scheduled within approximately one year to 5 years. With lower scores typically resulting in a shorter time frame.

1.2.3 PAVEMENT CONDITION INDEX

The Pavement Condition Index (PCI) was developed using the models established in the ASTM D6433-18 specification. The index uses individual distress deduct values (DV) and aggregates these scores into a weighted PCI score.

Stantec completed the City's 2023 Road Condition Assessment (report received in 2024) and used their internal pavement management software to develop this score. The PCI scores with the associated condition rating and description is outlined below in **Table 5**.

Table 5: Pavement Condition Index (PCI) Description

PCI	Condition Rating	Remediation Description
100 - 90	Very Good	Requires routine maintenance (e.g. crack sealing, spot repairs)
89.9 - 75	Good	Requires preventative maintenance (e.g. surface treatment)
74.9 - 45	Fair	Requires resurfacing (e.g. mill and overlay)
20 - 44.9	Poor	Requires rehabilitation (e.g. full depth asphalt removal and replace base)
0 – 19.9	Very Poor	Requires Reconstruction

1.2.4 CONDITION SCORING

For the purpose of this report and standardizing condition scores across all assets in the Asset Management Plan, the Condition Rating is defined by three (3) Condition Scores as outlined in the table below. Where a BCI or PCI score is available, it has been modified to fit into this scoring system as indicated below.

Table 6: Condition Score Description

Condition Score	BCI	PCI	Condition Rating	Description
0 – 1.4	>= 70	>= 75	Good	Assets in the system or network are in working order, have few, if any, deficiencies, and will not require repairs or replacement for 10+ years. Where condition data is not available, this category applies to assets which are within the first 40% of their estimated service life.
1.5 – 2.4	60 – 69.9	45-74.9	Fair	Asset in the system or network show general signs of deterioration, some elements may have significant deficiencies, and asset will likely require repairs/removal in the next 10 years. Where condition data is not available, this category applies to assets which are within 41% - 80% of their estimated service life.
2.5 - 3	< 60	<44.9	Poor	Asset is below standard showing signs of significant deterioration, is in danger of imminent failure, and will require repair, replacement or removal within the next year. Where condition data is not available, this category applies to assets which have exceeded 80% of their estimated service life.

1.3 SUMMARY OF TRANSPORTATION ASSETS

The summary of assets for the Transportation Asset Class can be found below. The summary of assets includes: Quantity, Replacement Cost, Average Age, and Average Condition Score for each asset type in accordance with O. Reg 588/17.

1.3.1 TOTAL SUMMARY OF ASSETS

A table summarizing all Transportation assets is included in **Table 7** below. Detailed information about each asset is included in individual sections. Calculations of averages have been weighted by the overall replacement value of assets. This means that assets of higher estimated replacement value will have a stronger influence on the average than if the average was calculated based on the number of assets.

The total replacement cost for all Transportation assets is approximately \$878.7M and they are a weighted average of 36 years old which is 80% of the overall weighted average estimated service life of 45 years. Overall Transportation assets are in FAIR condition with a weighted average condition score of 1.6.

For **Table 7** an * on a column title indicates average value weighted by replacement value.

Table 7: Overall Summary of Transportation Assets

Asset	Quantity	Unit	Replacement Cost	Average Age (years)*	Average Estimated Service Life (years)*	% of Estimated Service Life*	Average Condition Score*	Average Condition Description*
Transportation Assets Total			\$879.7M	36	45	80%	1.6	FAIR
Bridges & Structures Total			\$270.6M	54	71	76%	1.5	FAIR
Bridges	46	Each	\$165.0M	65	75	87%	1.5	FAIR
Stairways	36	Each	\$2.8M	40	75	53%	1.9	FAIR
Retaining Walls (Height >= 0.7m)	33	Each	\$5.2M	27	75	36%	1.6	FAIR
Retaining Walls (Height < 0.7m)	516	Each	\$22.7M	55	70	79%	1.7	FAIR
Culverts (span >= 3m)	49	Each	\$46.2M	32	71	45%	1.2	GOOD
Culverts (span < 3m)	232	Each	\$21.4M	34	54	63%	1.6	FAIR
Lookouts & Boardwalks	14	Each	\$1.7M	28	56	50%	1.6	FAIR
Sound Walls	2.1	kms	\$5.6M	30	49	61%	1.8	FAIR
Roadway Assets Total			\$609.1M	28	33	85%	1.6	FAIR

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Asset	Quantity	Unit	Replacement Cost	Average Age (years)*	Average Estimated Service Life (years)*	% of Estimated Service Life*	Average Condition Score*	Average Condition Description*
Roads - Arterial	264.9	lane km	\$131.7M	27	15	100%	1.9	FAIR
Roads - Collector	266.5	lane km	\$112.1M	26	25	100%	1.7	FAIR
Roads – Local (Asphalt)	672.5	lane km	\$223.9M	31	35	89%	1.9	FAIR
Roads – Local (Gravel)	2.7	lane km	\$0.3M	40	20	100%	2.0	FAIR
Streetlights	11,026	Each	\$12.5M	8	17	47%	0.7	GOOD
Streetlight Poles	5,221	Each	\$22.5M	39	49	80%	0.7	GOOD
Traffic Signs & Supports	32,397	Each	\$5.1M	7	14	50%	1.4	GOOD
Signalized Intersections	147	Each	\$20.7M	29	36	81%	2.0	FAIR
Guide Rails	29	km	\$7.8M	N/A	N/A	N/A	1.9	FAIR
Sidewalks	618	km	\$70.4M	33	79	42%	0.8	GOOD
Traffic Calming	117	Each	\$0.6M	5	18	28%	0.9	GOOD
On-road Active Transportation	15.4	km	\$1.5M	3	9	33%	1.3	GOOD

1.3.2 BRIDGES & STRUCTURES

Bridges & Structures refers to assets which are located within the City right of way, City trails, City Parks or on the grounds of community centers or arenas. Bridges are structures which allow passage over an obstacle such as a river, railway, highway or trail. Stairways include stairways which form a part of a City bridge structure or stand alone stairways that may be present along a pathway or within a park.

Retaining walls are structures which are designed to resist soil pressure in the event of a large elevation difference from one side of the wall to the other. Culverts are structures which allow for the passage of water or people under an obstacle such as a road, trail, railway or driveway. Lookouts are structures, typically in City Parks or Cemeteries, which have been constructed to provide a means of easily accessing a particular view of the surrounding area. Sound walls are structures which have been designed and installed to reduce or eliminate noise from a sound source. Most City sound walls have been constructed to reduce noise from high volume or high speed roadways. Sound walls along provincial highways typically belong to the province and not the City.

The bridges & structures assets, have a total replacement cost value of \$269.6M and include:

- 13 multi-vehicular bridges supporting roadways
- 35 pedestrian bridges supporting pathways or trails
- 36 stairways
- 33 retaining walls over or equal to 0.7m in height
- 516 retaining walls under 0.7m in height
- 49 long span culverts with spans over or equal to 3m
- 232 short span culverts with spans under 3m; and
- 14 lookouts and boardwalks
- 2.1 kms of sound walls

Bridge & Structures assets are in overall FAIR condition with a weighted average condition score of 1.5. The breakdown of condition by asset subtype is shown in **Figure 1**. The average age for the City's Bridges & Structures assets is 54 years which is 76% of their weighted average estimated service life of 71 years.

AREA OF ASSETS (sq m)	REPLACEMENT COST (\$)	WEIGHTED AVG AGE (YEARS)	WEIGHTED AVG ESTIMATED SERVICE LIFE (YEARS)	WEIGHTED AVG CONDITION SCORE	WEIGHTED AVG CONDITION DESCRIPTION
50.2K	270.6M	54	71	1.5	FAIR

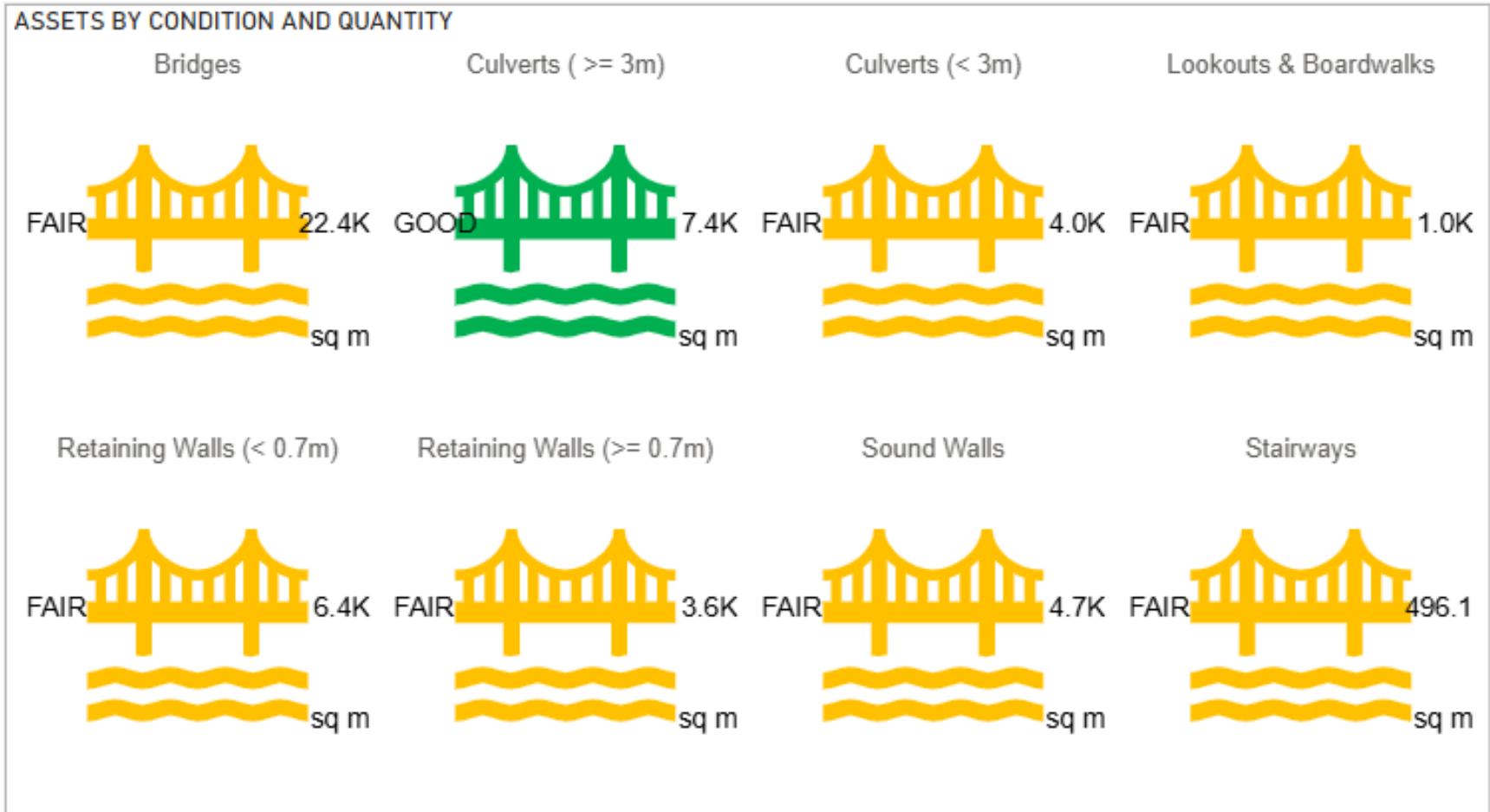


Figure 1: Bridges & Structures Asset Summary by Condition and Quantity

1.3.3 ROADWAYS

Roadways refers to assets which are located within the City right of way and support the safe movement of various transportation modes of travel including active transportation, transit and commercial and personal motor vehicles. Roads are used by various modes of transportation to traverse the City and are classified into major and minor arterial, major and minor collector and local road classes. Local roads provide access to properties and are low traffic volume corridors. Arterial roads are major corridors for higher traffic volume. Collector roads collect and distribute traffic between local and arterial roads.

Streetlights are installed on poles along the road to illuminate roadways at night. City streetlights are sometimes installed on poles owned by local utility companies and multiple streetlights can be installed on a single pole in some circumstances, therefore the pole and streetlight count for assets owned by the City are not an exact match.

Traffic signs are installed along the roadway to alert motorists and active transportation users of any road information or hazards. This document only includes signs which fall into the regulatory or warning classification identified in the Minimum Maintenance Standard O.Reg 239/02. Future plans may incorporate other signs such as information or guidance. Signs located in parks and along trails are included in the Parks & Recreation Asset Management Plan (AMP). Overhead signs in intersections are included in this document.

Signalized intersections regulate traffic flow by traffic signals which assign the right-of-way movement to different directions of traffic at different times. Non-signalized intersections such as roundabouts and those regulated by stop or yield signs are included as part of the Traffic Signs & Supports and Roads asset types.

Traffic Calming devices are physical and electronic measures installed to reduce vehicle speeds and improve safety for all road users. The devices can include speed cushions, raised crosswalks, signalized pedestrian crossings, signed pedestrian crossings, chicanes, speed signs, speed cameras and red light cameras.

Guide rails are structures which are installed along the edge of roadways to direct motorists away from off road hazards. Sidewalks are typically installed alongside roadways to accommodate pedestrians and mobility aids.

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On road active transportation are areas of the road separated by use of delineators such as rubber curbs, paint or flexible bollards for use by human powered modes of transportation such as walking or cycling. Off road active transportation assets such as multi-use paths are included in the Parks & Recreation AMP.

Fencing along and within city owned properties is included in the plans containing those properties such as the Facilities and Parks & Recreation AMPs. Inventory and condition of fencing along roadways is currently incomplete. Future iterations of the Transportation AMP will include fencing along roadways as well as street furniture.

The roadway assets, have a total replacement cost value of \$609.1M and include:

- 1206.6 lane kms of roads
- 11,026 streetlights
- 5,221 streetlight poles
- 32,937 traffic signs & supports (including 34 overhead signs)
- 147 signalized intersections
- 28.7 kms of guide rails
- 618.2 kms of sidewalks
- 117 traffic calming devices
- 15.4 kms of on-road active transportation lanes

Roadway assets are in overall FAIR condition with a weighted average condition score of 1.6, the breakdown of condition by asset subtype is shown in **Figure 2**. The average age for the City's Roadway assets is 28 years which is 85% of their weighted average estimated service life of 33 years.

NO. OF ASSET SUBTYPES	REPLACEMENT COST (\$)	WEIGHTED AVG AGE (YEARS)	WEIGHTED AVG ESTIMATED SERVICE LIFE (YEARS)	WEIGHTED AVG CONDITION RATING	WEIGHTED AVG CONDITION DESCRIPTION
12	609.1M	28	33	1.6	▲ FAIR













ASSETS BY CONDITION AND QUANTITY					
	Guide Rails		On-road Active Transportation		Roads - Arterial
FAIR	 28.7K m	GOOD	 15.4K m	FAIR	 264.9 Lane kms
	Roads - Collector		Roads - Local (Asphalt)		Roads - Local (Gravel)
FAIR	 266.5 Lane kms	FAIR	 672.5 Lane kms	FAIR	 2.7 Lane kms
	Sidewalks		Signalized Intersections		Streetlight Poles
GOOD	 618.2K m	FAIR	 147.0 Each	GOOD	 5.2K Each
	Streetlights		Traffic Calming Devices		Traffic Signs & Supports
GOOD	 11.0K Each	GOOD	 117.0 Each	GOOD	 32.9K Each

Figure 2: Roadways Asset Summary by Condition and Quantity

1.4 LIFECYCLE OF TRANSPORTATION ASSETS

The lifecycle of Transportation assets is grouped under four (4) categories which are described in this section:

- Key Lifecycle Stages of Transportation Assets;
- Lifecycle Activities;
- Risks of Lifecycle Activities; and
- 10 Year Lifecycle Costs of Transportation Assets.

1.4.1 KEY LIFECYCLE STAGES OF TRANSPORTATION ASSETS

The lifecycle of an asset refers to the following stages: Planning, Creation/Acquisition, Operations and Maintenance, Renewal/Disposal which are defined in the Main Body of the report. For transportation assets specifically our general process is as follows:

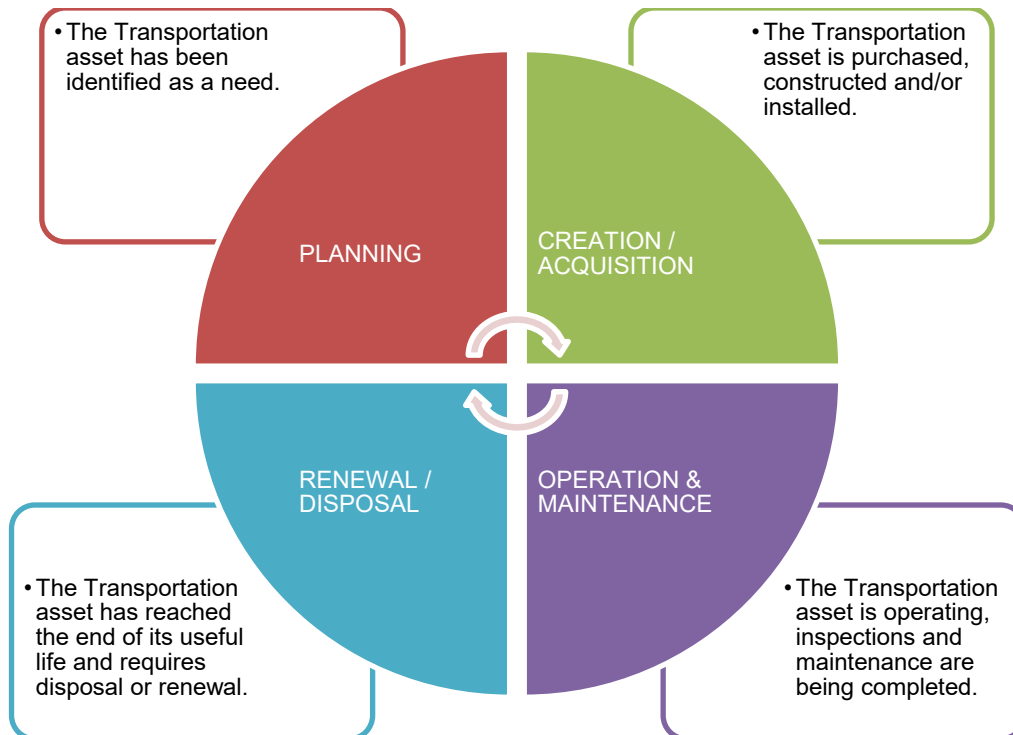


Figure 3: Lifecycle Stages of Transportation Assets

1. **Planning** – The Transportation asset has been identified as a need through the Official Plan or Transportation Master Plan, or due to the identified poor condition of an existing asset. In order to evaluate how to get the most value of the asset, this process considers: existing assets, resources, operating efficiencies, funding availability, future growth management, and the maintenance of asset. The asset is designed using all applicable codes and standards. Typically this phase also

involves planning on how to optimize the value of the assets which may include: replacing neighbouring corridor assets at the same time, improving operating and maintenance efficiencies, adding road safety features (e.g. Traffic Calming), or adding additional lanes for growth. The road asset rehabilitation decision making process is outlined in **Figure 4**.

2. **Creation / Acquisition** – The cost and requirements for the transportation asset are defined. The asset is purchased, constructed and/or installed. Extra care is taken at this stage to ensure the asset is constructed properly using all appropriate design standards and guidelines to avoid any premature repairs or replacements due to installation errors.
3. **Operation and Maintenance** – The transportation asset has been installed and is providing benefits to the community. Maintenance (Lifecycle) Activities are completed on the asset at specific time intervals as indicated in **Table 8** below to prevent premature failures of our assets. OSIM inspections, road condition assessments and minimum maintenance inspections are being completed on applicable assets. Additional monitoring and potential improvements are evaluated during this process.
4. **Renewal / Disposal** – The transportation asset has reached the end of its useful life and/or is underperforming and requires disposal or major rehabilitation. The disposal considers the effect on customers such as required detouring which are taken into account in the Planning stage thereby restarting the cycle.

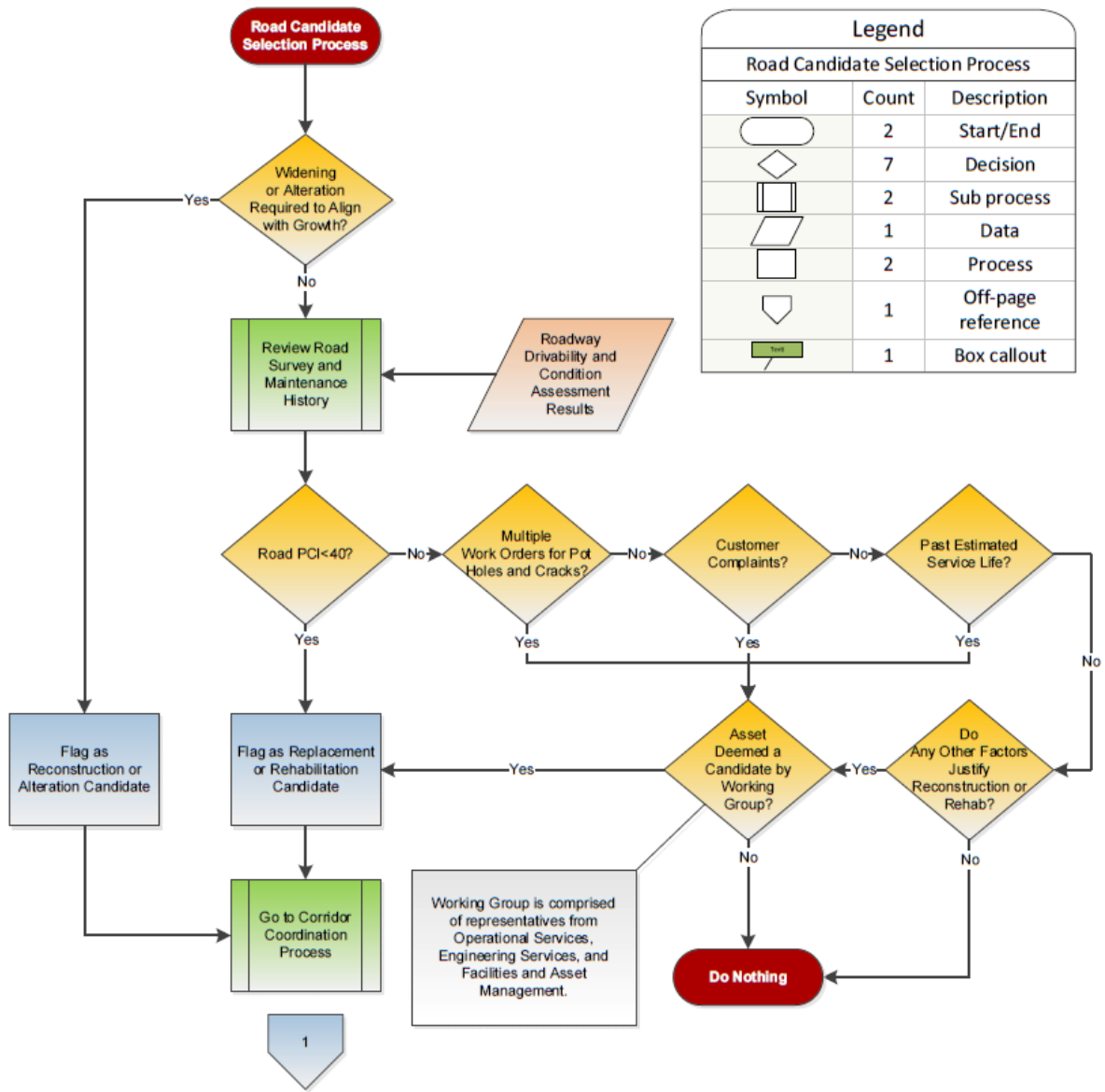


Figure 4 Road Asset Rehabilitation Decision Process

1.4.2 LIFECYCLE ACTIVITIES

A list of the planned Lifecycle Activities, annual cost, and frequency for each Transportation Asset Class can be found in **Table 8** below. These activities are currently being undertaken to maintain Transportation assets and therefore maintain the current levels of service.

Lifecycle activities occur on each of our Transportation asset classes. Bridge & culvert asset activities are dictated by O.Reg. 104/97 Standards for Bridges, last amended by O.Reg. 278/06. Typically lifecycle activities and timelines for roadway assets are dictated by O.Reg. 239/02 Minimum Maintenance Standards (MMS) for Municipal Highways.

Transportation assets are maintained by staff from Operational Services, Traffic, Parks & Recreation or by contractors. Activities are currently tracked through a combination of email, excel, the City's customer relationship management system and work order management software. Tracking has been improving through the implementation of the AIM project described in **Section 7** of the **Asset Management Plan Overview Document**. When all activities on these assets are integrated into AIM, the City will have a better idea of the frequency and cost associated with these activities.

Due to data limitations at this time, the City will maintain the lifecycle activities which have been performed in the past and activities listed will be updated as improved data becomes available. Further discussion regarding Transportation proposed Levels of Service can be found in **Section 1.5.5 Proposed Levels of Service Discussion**. Costing in **Table 8** is based predominately on the operating budget, some repair or replace activities may also receive funding from the capital budget. The variance in cost for the same lifecycle activities for different asset types is partially attributable to whether the staff cost could be determined. The City will work to standardized the inclusion of staff costs and capital costs, where applicable, in individual lifecycle activities in future iterations of the Asset Management Plan.

Table 8: Lifecycle Activities for Bridge & Culvert Assets

Asset Type	Lifecycle Activity	Annual Cost (2025 Values*)	Frequency	Completed by
Bridges	Inspection	\$700-\$1,600 per structure	Biennial or Annual	Contracted Service - Asset Management
	Graffiti Removal	Included with Roads	Ad Hoc	Operational Services Parks Services
	Cleaning	\$35,000	2x per year	Operational Services Parks Services
	Vegetation Removal	\$15,000	Program	Operational Services Parks Services
	Winter Control	Included with Roads	Seasonal	Operational Services
	Painting	Unavailable	Ad Hoc	Operational Services Parks Services
	Deck Repair	Per OSIM Recommendations	Ad Hoc	Contracted Service - Asset Management
	Joint Repair		Ad Hoc	Contracted Service - Asset Management
	Railing Repair (separate from guide rails)		Ad Hoc	Operational Services Parks Services
Concrete Repair	Ad Hoc		Contracted Service - Asset Management	
Stairways	Inspection	\$300 per stairway	Biennial	Contracted Service - Asset Management
	Winter Control	Included with Roads	Seasonal	Operational Services Parks Services
	Repair	Per OSIM Recommendations	Ad Hoc	Operational Services Parks Services
Retaining Walls	Inspection (>= 0.7m height)	\$300 per wall	Biennial	Contracted Service - Asset Management
	Inspection (<0.7m height)	\$8 per m of wall	5 years	Contracted Service -Asset Management
	Graffiti Removal	Included with Roads	Ad Hoc	Operational Services
	Repair or Replacement	Per OSIM or Condition Assessment Recommendations	Ad Hoc	Contracted Service - Asset Management
	Removal		Ad Hoc	Contracted Service - Asset Management
Culverts	Inspection (Span >= 3.0m)	\$365 to \$2,300 per culvert	Biennial	Contracted Service - Asset Management
	Inspection (Span < 3.0m)	\$300 per culvert	Periodic	Contracted Service – Asset Management
	Vegetation Removal	\$15,000	Program	Operational Services
	Winter Control	Included with Roads	Seasonal	Operational Services
	Debris/Blockage Removal	Data Unavailable	Program	Operational Services
	Repair	Per OSIM or Inspection Recommendations	Ad Hoc	Contracted Service - Asset Management
	Replacement		Ad Hoc	Contracted Service - Asset Management
	Utility Cut Restorations		Ad Hoc	Operational Services
Crack Sealing	Ad Hoc		Operational Services	
Lookouts	Inspection	\$275 to \$390 per lookout	Biennial	Contracted Service – Asset Management

Asset Type	Lifecycle Activity	Annual Cost (2025 Values*)	Frequency	Completed by
	Repair	Per OSIM or Inspection Recommendations	Ad Hoc	Operational Services Parks Services
	Replacement		Ad Hoc	Operational Services Parks Services
Soundwalls	Inspection	Data Unavailable	Biennial	Contracted Service – Asset Management
	Repair	Per OSIM or Inspection Recommendations	Ad Hoc	Operational Services
	Replacement		Ad Hoc	Operational Services
Roads	MMS Patrol (winter/summer)	\$275,000	Daily	Operational Services
	Sweeping	\$550,000	4x per year entire network	Operational Services
	Condition Assessment	\$84,000	Every 3 years	Contracted Services - Asset Management
	Line Painting	\$465,000	Annually	Contracted Service - Traffic Services
	Pothole Repair	\$130,000	Ad Hoc	Operational Services
	Crack Sealing	Under Review	Program	Contracted Service - Operational Services
	Road Cut Restoration****	\$490,000	Ad Hoc	Operational Services
	Repair or Replace	\$1,000,000	Program	Operational Services
	Graffiti Removal	\$13,000	Ad Hoc	Operational Services
	Winter Control	\$2.18 million	Seasonal	Operational Services
Streetlights & Poles***	Condition Assessment (2020)	\$35,800	Program	Asset Management
	MMS Inspection	\$20,000	Annually	Traffic Services
	Repair or Replace	\$130,000	Ad Hoc	Traffic Services
	Electricity	\$730,000	Nightly	Utility Company
Traffic Signs & Supports	Retroreflectivity & Condition Assessment	Unavailable	Under Review	Operational Services
	MMS Road Patrol	Included in Road Patrol cost above	Daily in winter/summer	Operational Services
	Road Closures	\$42,000	Ad Hoc	Traffic Services
	Repair or Replace	\$150,000	Ad Hoc	Traffic Services
Signalized Intersections	Routine Inspection (PMI/Conflict Test)	\$10,000	Biannually	Traffic Services
	Repair or Replace	\$150,000	Ad Hoc	Traffic Services or Contracted Service
	Communications	\$47,000	Constant	Utility Company
	Electricity	\$78,000	Constant	Utility Company
	Winter Control	Included with Roads	Seasonal	Operational Services
Guide Rails	MMS Road Patrol	Included with Roads	Daily in winter/summer	Operational Services
	Condition Assessment	\$50,000	Periodic	Contracted Service - Asset Management
	Repair or Replacement	\$11,000	Ad Hoc	Operational Services
Sidewalks	Condition Assessment	\$90,000	Annually	Contracted Service - Asset Management

Asset Type	Lifecycle Activity	Annual Cost (2025 Values*)	Frequency	Completed by
	Winter Control	Included with Roads	Seasonal select locations	Operational Services
	Trip Step Removal	\$75,000	Program	Contracted Service – Operational Services
	Repair or Replace	\$150,000	Program	Operational Services
	Sweeping (Downtown)	\$90,000	Weekly	Operational Services
Fencing**	Repair or Replacement	Unavailable	Ad Hoc	Operational Services
Traffic Calming Devices	Repair or Replacement	\$17,300	Ad Hoc	Operational Services Traffic Services
	New Install	\$60,000	Program	Operational Services Traffic Services
Active Transportation	Repair or Replacement	\$40,000	Ad Hoc	Traffic Services
	New Install	\$400,000	Program	Traffic Services
	Line Painting	Unavailable for dedicated bike lanes. Shared on-road markings included with Roads line painting	Ad Hoc	Traffic Services
Street Furniture	Repair or Replacement	Unavailable	Ad Hoc	Operational Services

*2025 Annual Cost is typically based on an average of the 3 year cost estimates presented in the 2025 Operating Budget.

**Fencing assets maintained by Parks & Recreation are included in the Parks & Recreation AMP document.

***Property lights and poles are included in the Facilities and Parks & Recreation AMP documents.

****Costs for restoration of road cuts are offset by permit fees charged for the service. No offset fees included in this table.

1.4.3 RISKS OF LIFECYCLE ACTIVITIES

The identified lifecycle activities in **Table 8** above are the current and proposed lifecycle activities taken on by City staff or hired contractors. Some risks with these activities include:

- **Traffic Accidents** - when performing maintenance in the vicinity of travelling vehicles, there is a risk of a traffic accident. This is mitigated by implementing a traffic control plan and wearing high visibility clothing during maintenance activities in the right of way;
- **Falling** – Some activities require working from heights and there is a risk of falling. This risk is mitigated by having maintenance personnel trained on all equipment and having fall arrest training where required.
- **Operator Error** – When operators are operating equipment, there is a risk of an operator related accident. This risk is mitigated by ensuring all operators have the required licenses and are trained on equipment.
- **Utility Impact** – When digging into soil to locate a buried asset, there is a possibility of hitting a buried utility line. This is mitigated by ensuring locates are completed prior to digging.

However, if these activities were not completed, the risks would include:

- **Safety Hazards to Environment and People** due to undetected issues posing safety risks if inspections were not completed in a timely fashion or safety risks which were not remedied promptly;
- **Long Term Operational Disruption** due to maintenance or repair activities being delayed until the scope has increased beyond the initial issue resulting in a more time consuming or costly repair;
- **Unscheduled Service Disruptions** due to sudden closure of asset (e.g. need for sudden repair of bridge or traffic signal which wasn't planned);
- **Flooding of nearby Infrastructure** due to blocked culvert which was not cleared;
- **Regulatory Non-Compliance** due to failure to maintain key systems resulting in regulatory standards which are not met;
- **Negative Reputation** due to poor or deteriorating conditions of highly visible assets such as bridges damaging the City's reputation and making it difficult to attract investment and/or residents; and
- **Increased Cost** due to reactive repairs which could have been avoided with preventative maintenance.

1.4.4 10 YEAR LIFECYCLE COSTS OF TRANSPORTATION ASSETS

Figure 5 below outlines the 10 year lifecycle costs of transportation assets. For bridges and culverts >3m lifecycle costing is mostly based on the 10-year strategic plan completed as part of the 2023/2024 OSIM, and so spikes associated with any backlogs are mostly avoided because the plan has been created based on the actual physical condition of the asset. However, since the 2023/2024 OSIM reports only provided a 10-year strategic plan, it can be seen that there are gaps in the capital forecast in 2033 and 2034.

This graph includes the lifecycle cost for the assets which support the Current Levels of Service (LOS) and the assets required to support the Proposed LOS.

Based on the information presented in **Figure 5**, the total annual average capital costs for the next 10 years needed to maintain the current LOS of these Transportation assets are \$24.9M. The total annual average capital costs for the next 10 years needed to achieve the proposed LOS are \$47.4M. The average annual Operation and Maintenance costs to maintain the current level of service are \$19.0M. The average annual additional Operation and Maintenance costs to maintain the proposed level of service are \$1.9M. To determine the total estimated operating costs in a given year, the proposed LOS operating costs should be added to the current LOS operating costs. Therefore it is recommended that the City invest \$72.3M in Transportation assets annually for capital work to maintain the current LOS and achieve the proposed LOS. It is recommended that \$20.9M be invested annually for operating costs to maintain the current LOS and achieve the proposed LOS.

It is important to note that this figure and associated costing was developed separately from other corridor assets (i.e. watermain & services, wastewater gravity pipe, maintenance holes, & services, and roadway), in reality these assets would be considered in tandem when considering a corridor section in the City in order to obtain cost efficiencies during design and construction where possible.

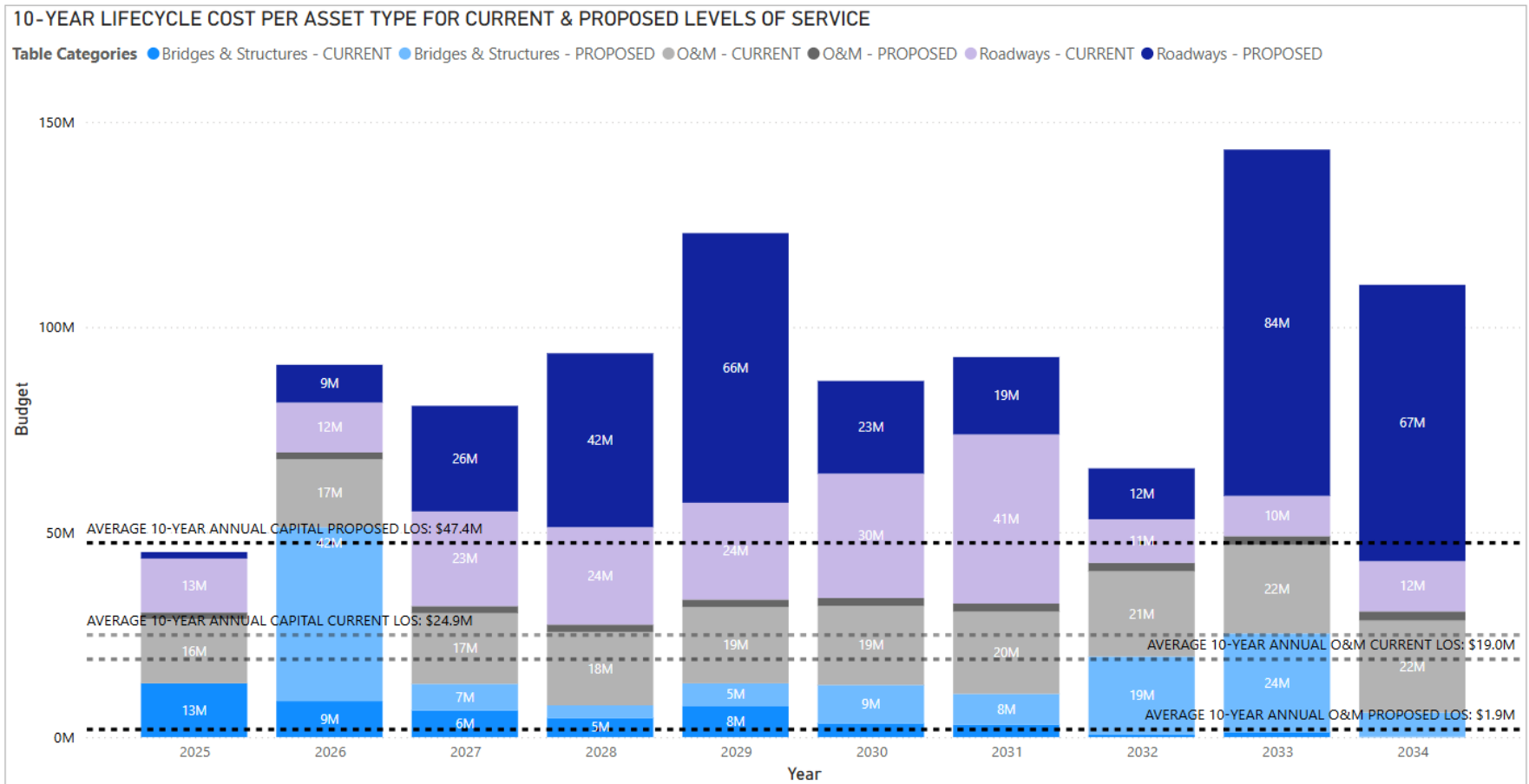


Figure 5: 10-Year Lifecycle Cost Per Transportation Asset Type for Current & Proposed Levels of Service

Notes:

1. Operation and Maintenance Costs are estimated based on the 2025 Operating Budget and are inflated by 3.8% per year.
2. For assets where no formal capital forecast was available, the replacement year is based on the estimated remaining service life of each asset or the condition assessment of each asset, as applicable.
3. Reimbursements and revenues are ignored in order to capture total cost/expenses.

Per **Figure 6** below, the existing 10-year forecast from 2025 – 2034, further explained in **Section 8.3** of the **Asset Management Plan Overview Document**, indicates that the City is currently planning to spend an average of \$42.0M on transportation assets capital work annually, and as noted above, the required 10-year average amount is \$72.3M to maintain the current LOS and achieve the proposed LOS for these assets. Therefore there is an annual funding gap of \$30.3M for Transportation assets. The impacts resulting from these funding gaps will be monitored and reported as appropriate.

The City of Brantford is currently moving to a four (4) year budget cycle and departments will complete long term planning as opposed to annual planning for projects within this time period. The Prioritization Matrix explained in **Section 9** of the **Asset Management Plan Overview Document** has also been implemented which will help departments confirm priority projects. It is anticipated that the new process for the City's 2024 budget cycle will help departments prepare and request funding in advance of significant replacement costs for assets reaching the end of their useful life.

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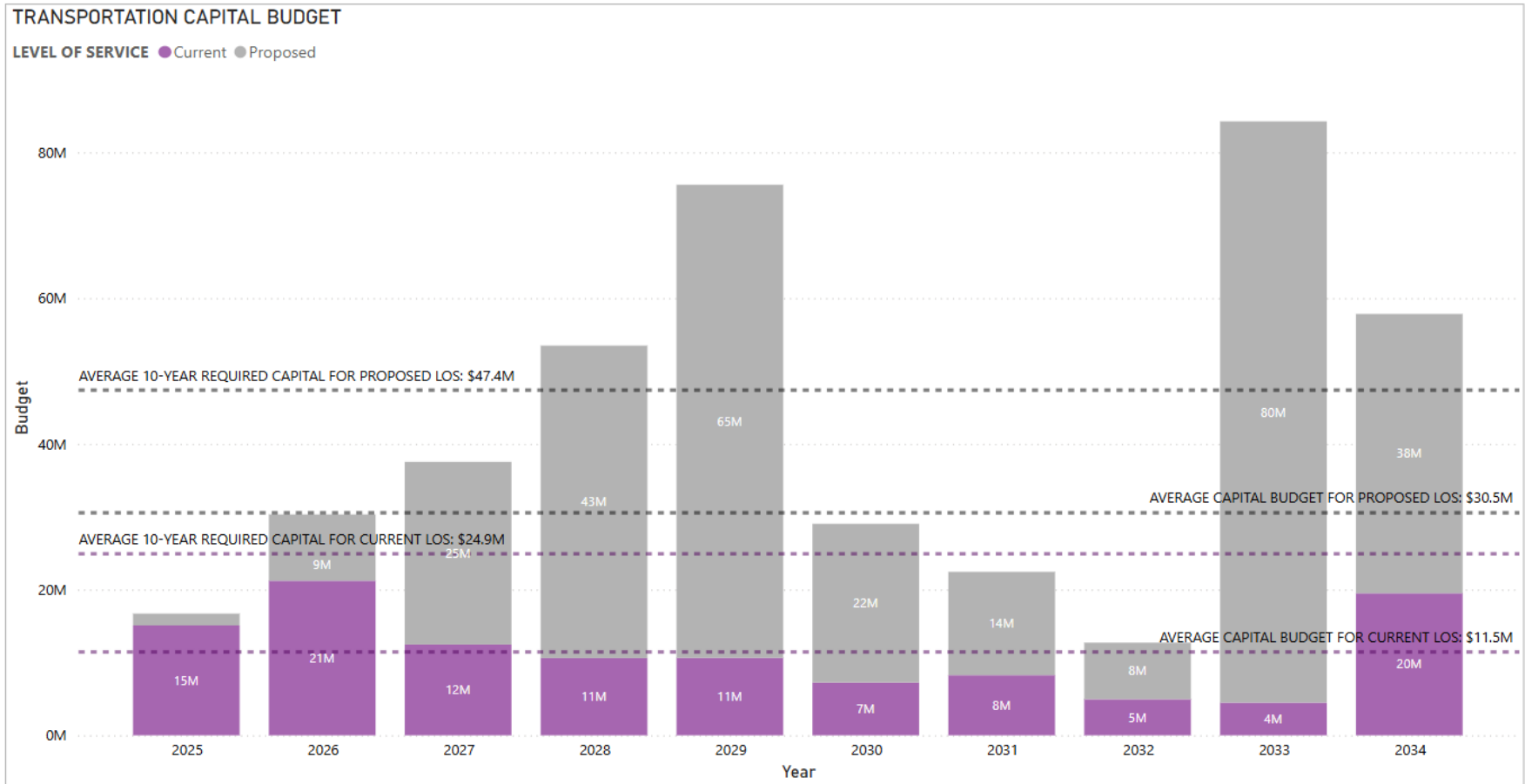


Figure 6: Existing Capital Budget Forecast from 2025 – 2034 for Transportation Assets

1.5 CURRENT & PROPOSED LEVELS OF SERVICE

1.5.1 O.REG 588/17 CUSTOMER LEVELS OF SERVICE

The customer levels of service as dictated by O. Reg 588/17 are described below.

1. *Description of Traffic Supported by Municipal Bridges*

Figure 7 illustrates the bridges by traffic type. Per the legend, the majority of bridges in the City are pedestrian bridges. The City's pedestrian bridges support the following traffic: pedestrians, cyclists, assistive devices, maintenance equipment, and other non-motor vehicles.

Municipal bridges that are not pedestrian bridges support all types of traffic including: heavy transport vehicles, motor vehicles, emergency vehicles, pedestrians, cyclists, transit etc. A small number of these bridges support motor vehicles only and do not support pedestrians or cyclists.

The City is currently anticipating a large amount of growth within the boundary expansion lands obtained from the County of Brant in 2017. The anticipated requirements for bridges and culverts is shown in **Figure 8**. The span of the culverts and bridges is currently unknown. It is possible that at some of the anticipated locations the culvert span will be under 3m. The exact timing of development is also currently unknown. The full 2051 anticipated built out area is included here as a substantial portion may be completed in the next 10 years. Depending on market conditions, it may take until the 2051 planning horizon for all anticipated new structures to be required and built. Future iterations of the AMP will recalculate the number of structures based on actual new structures built to date and the updated forecasted timing for additional structures.

2. *Description of the condition of bridges or culverts and how this would affect use of the bridges or culverts*

Figure 9 below illustrates bridges by current condition. The condition of bridges and culverts describes when bridge or culverts defects are recommended for rehabilitation (major or minor). Some examples of major rehabilitation are: deck repair/replacement, semi-integral conversion, and barrier replacement, and some examples of minor rehabilitation are: concrete patching, waterproofing, and paving operations.

Per the OSIM, bridges and culverts in Excellent or Good condition are not expected to require rehabilitation for 10+ and 5+ years respectively. These

assets are in working order and would be used accordingly. The typical structural culvert (span \geq 3m) in the City is in Good condition.

The typical bridge in the City is in Fair condition which means the asset is expected to require rehabilitation in 6 to 10 years. If a bridge or culvert is in fair condition and the recommended works were completed on the asset in the timeline dictated by the OSIM, the bridge or culvert would continue to operate until the required rehabilitation. When the required rehabilitation occurs, the bridge or road under the bridge or above or through the culvert may be temporarily closed or usage may be modified. Once the rehabilitation is completed, the bridge or culvert would be expected to return to regular working order.

Bridges or culverts in Poor condition are recommended for rehabilitation in the next 1 to 5 years or within the next year. In some cases these bridges or roads above culverts would need to be closed until the required rehabilitations or replacement occurs. There are currently four (4) bridges that are closed and one (1) which requires ongoing monitoring to remain open safely. Bridges and culverts by open status are illustrated in **Figure 11**.

OSIM condition assessments occur on each bridge, long span culvert, lookout and retaining wall over 0.7m at minimum every two (2) years. Detailed photos and descriptions of each structure can be found in the 2023/2024 OSIM Report.

Figure 10 illustrates the anticipated condition of bridges and structural culverts in 2034. It is anticipated that a number of structures currently in poor condition will be rehabilitated or replaced, while others will deteriorate in condition over time. All new locations are expected to maintain a condition ranking of Excellent no matter when they are constructed within the next 10 year time horizon due to the expected service life of these assets. Bridges and culverts by anticipated open status are shown in **Figure 12**.

3. Description, which may include maps, of the road network in the municipality and its level of connectivity:

The City of Brantford has a mature, connected road network as shown in **Figure 13**. The 403 runs West-East through the City with five (5) on/off ramps (Oak Park Rd, Paris Rd, King George Rd, Wayne Gretzky Pkwy, and Garden St).

The two (2) major arterial roads that run North-South are Wayne Gretzky Parkway which runs from Powerline Rd to Colborne St, and King George Rd which runs from Governor's Rd E and becomes a minor arterial road at St Paul Avenue. The three (3) major arterial roads that run West-East are Colborne St

which runs from Garden Ave to the City Limits, splits into Dalhousie St in the downtown core joins the Veterans Memorial Parkway before becoming Colborne St W; Powerline Road in the North which runs between the City boundaries; and Governors Rd E which was recently acquired from Brant County in the recent boundary expansion and runs from Park Rd N to Golf Rd.

The City is bisected by the Grand River which creates traffic bottlenecks at river connection points and limits efficient North-South connectivity to the 403 especially in the west side of the City. At the time of writing, to improve the south's connectivity to the 403, a project is currently being investigated to create another river crossing point in West Brant as shown as a dashed blue line in **Figure 14**.

The City is currently anticipating a large amount of growth within the boundary expansion lands obtained from the County of Brant in 2017. The anticipated requirements for the road network is shown in **Figure 14**. The exact detail around local roads is not currently known as it will be heavily influenced by developers in individual areas. The exact timing of development is also currently unknown. The full 2051 anticipated built out road network for arterial and collector roads is included here as a substantial portion may be completed in the next 10 years. Depending on market conditions, it may take until the 2051 planning horizon for all anticipated new structures to be required and built.

4. Description or images that illustrate the different levels of road class pavement condition:

The road network map coloured by PCI rating from the 2023 field assessment is shown in **Figure 15**. PCI scores were developed based on the level of rehabilitation required as described in **Table 5**. Examples of photos showing roads with different PCI scores are shown in **Figure 17**. The road network map showing the anticipated 2034 PCI rating is shown in **Figure 16**.

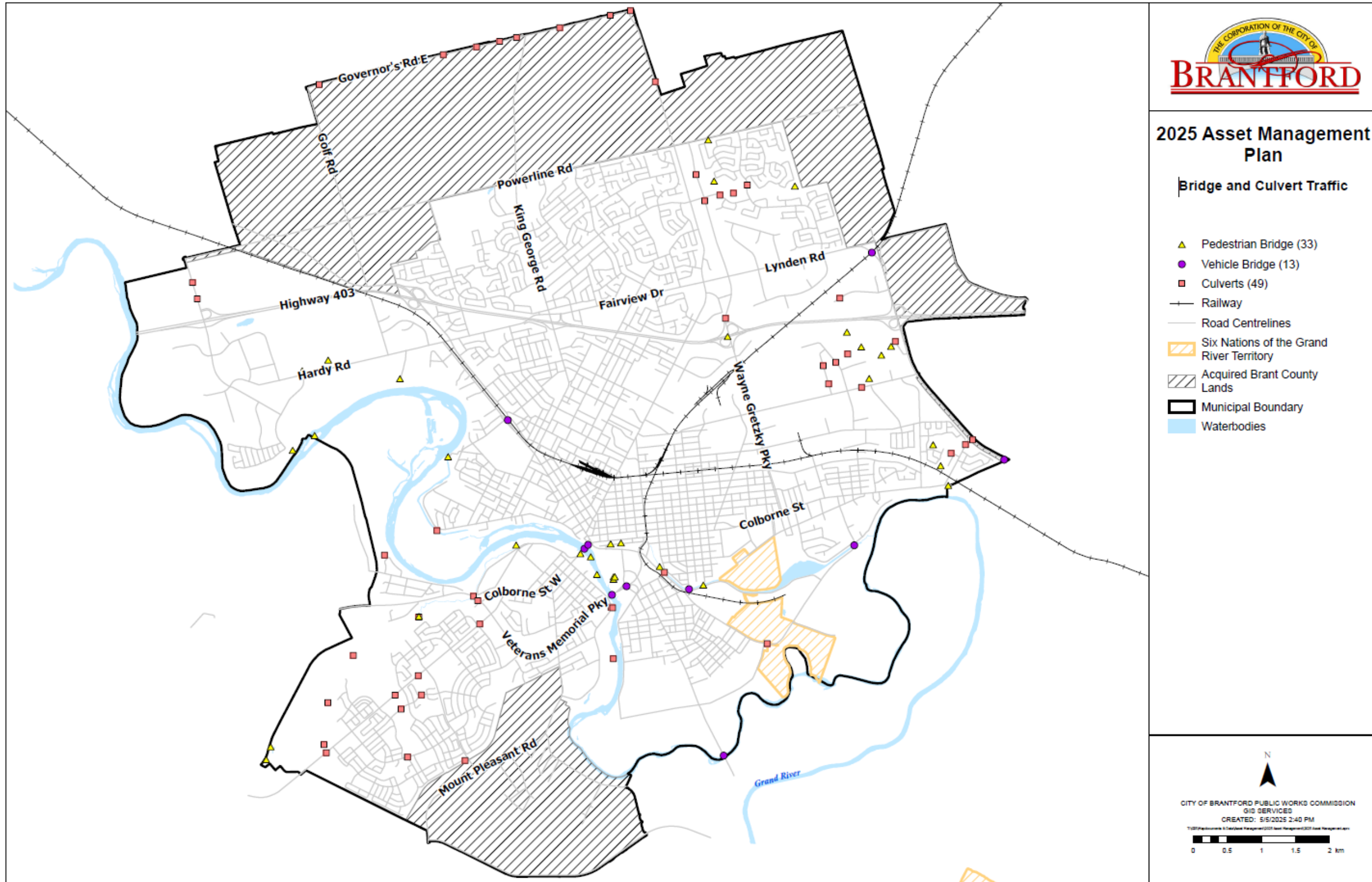


Figure 7: Bridges and Structural Culverts by Traffic Type 2025

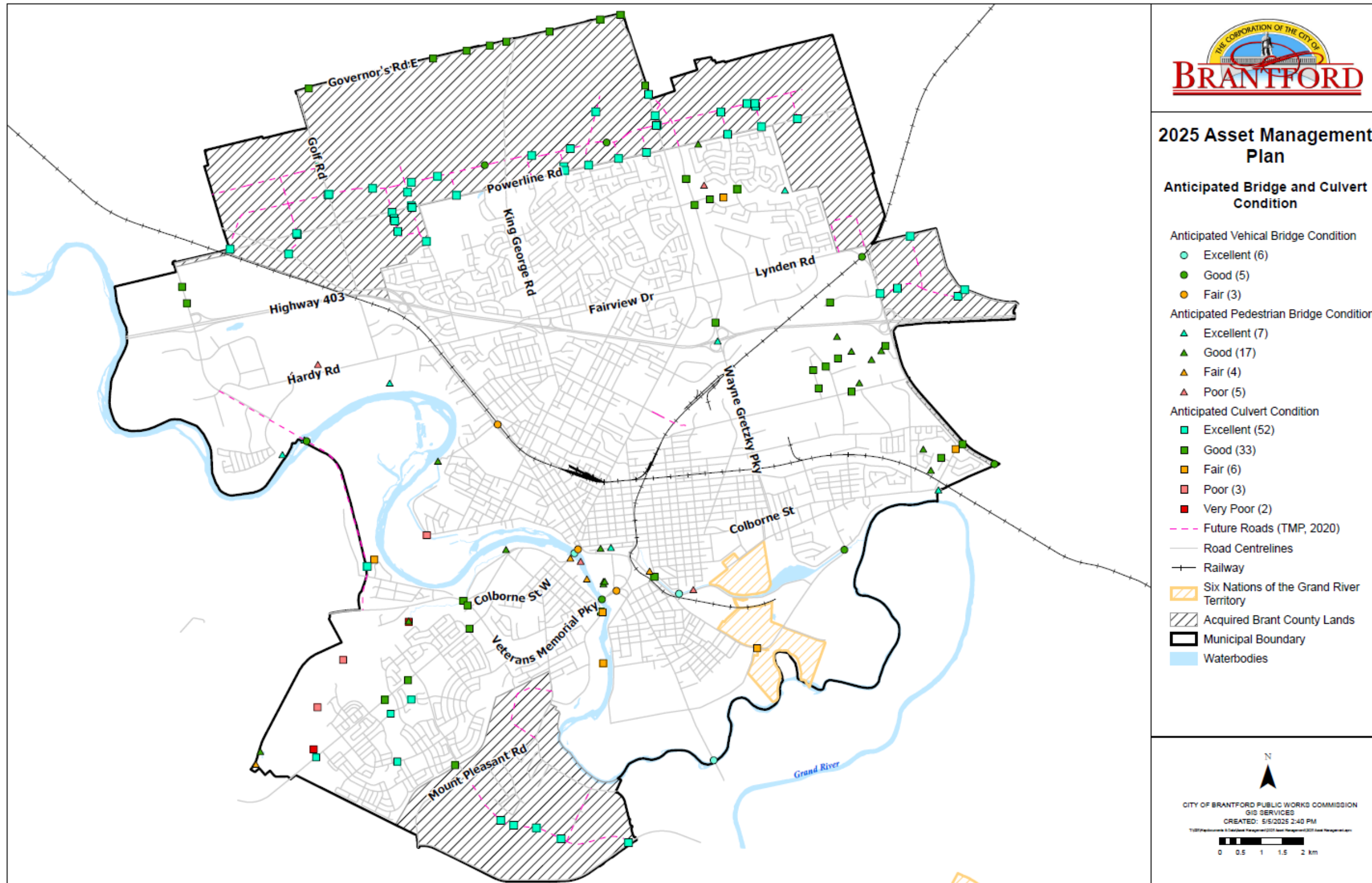


Figure 10 Bridges and Structural Culverts Anticipated Condition in 2034

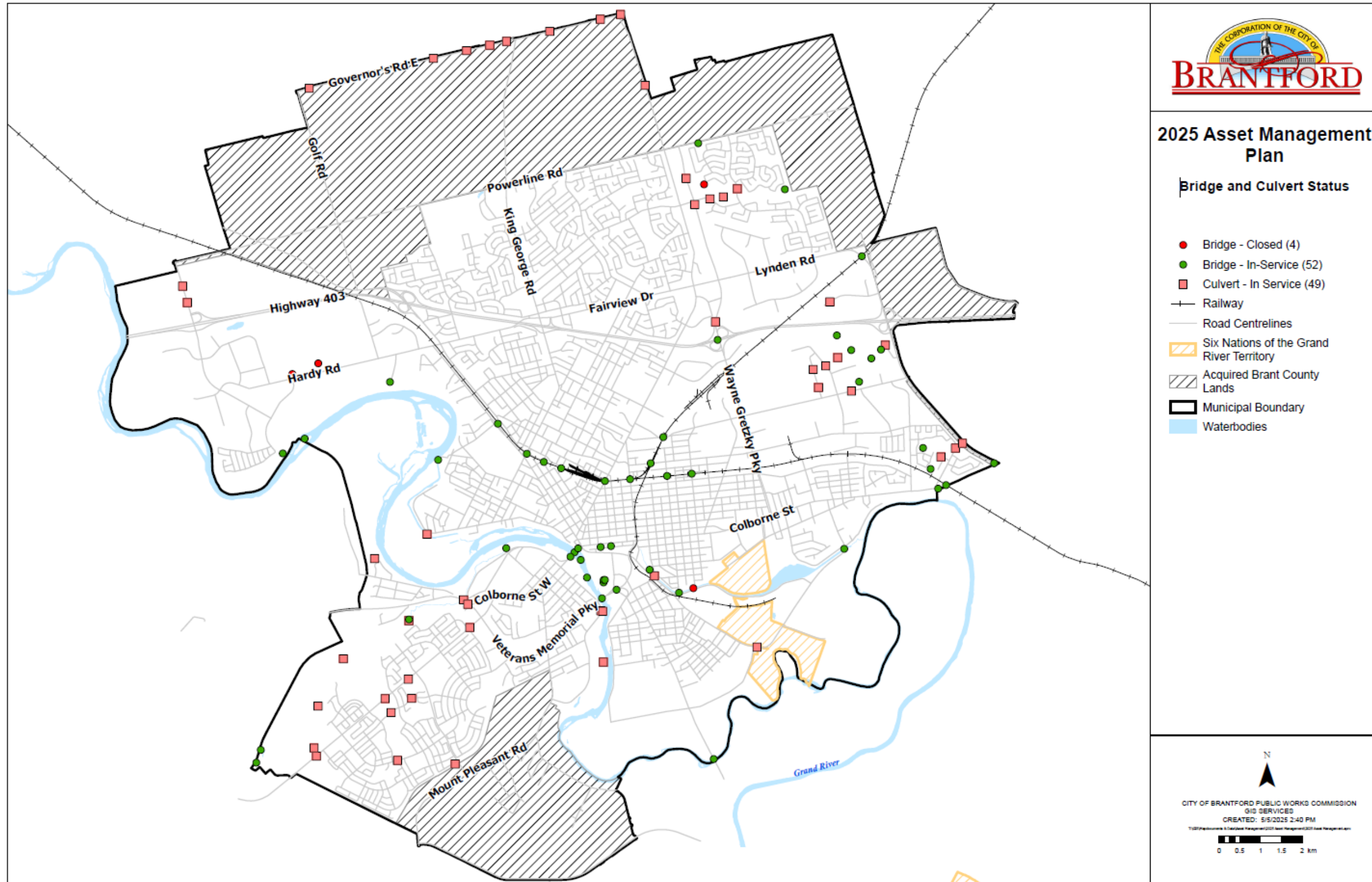


Figure 11: Bridges and Structural Culverts by Open Status 2025

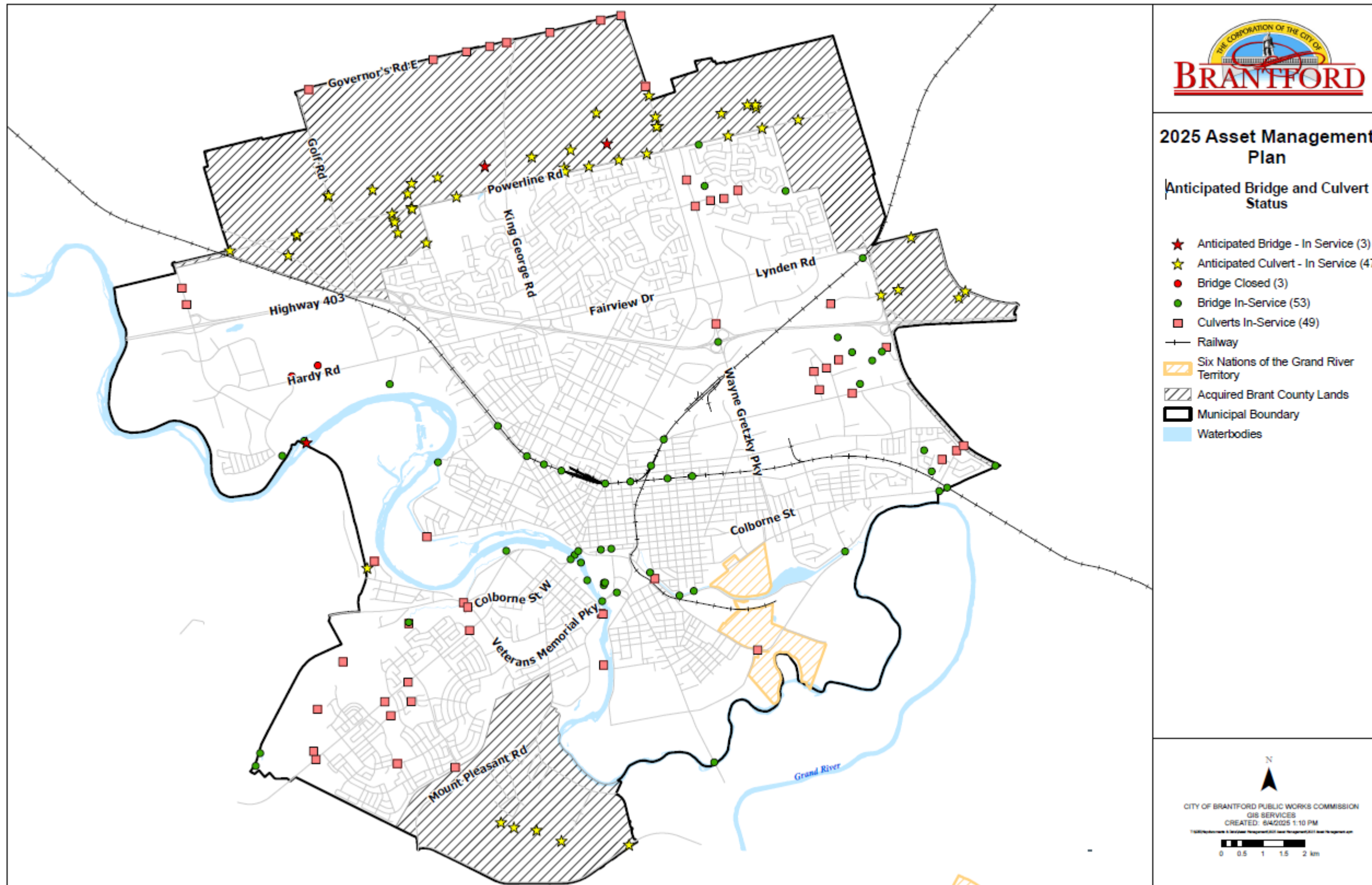
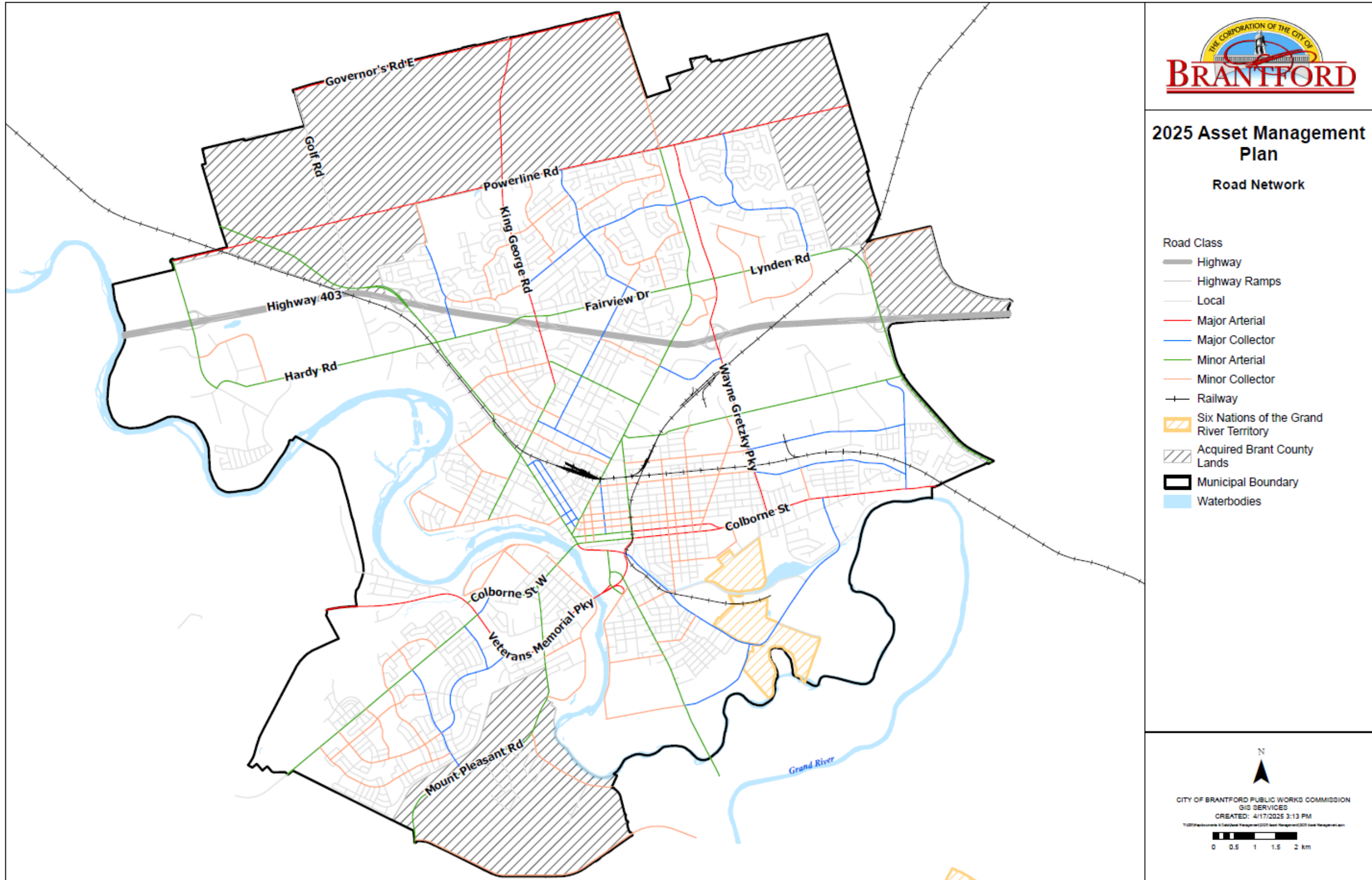


Figure 12 Bridges and Structural Culverts by Anticipated 2034 Open Status



2025 Asset Management Plan

Road Network

- Road Class
- Highway
 - Highway Ramps
 - Local
 - Major Arterial
 - Major Collector
 - Minor Arterial
 - Minor Collector
 - Railway
 - ▨ Six Nations of the Grand River Territory
 - ▨ Acquired Brant County Lands
 - ▭ Municipal Boundary
 - Waterbodies



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Figure 13 City of Brantford Road Network 2025

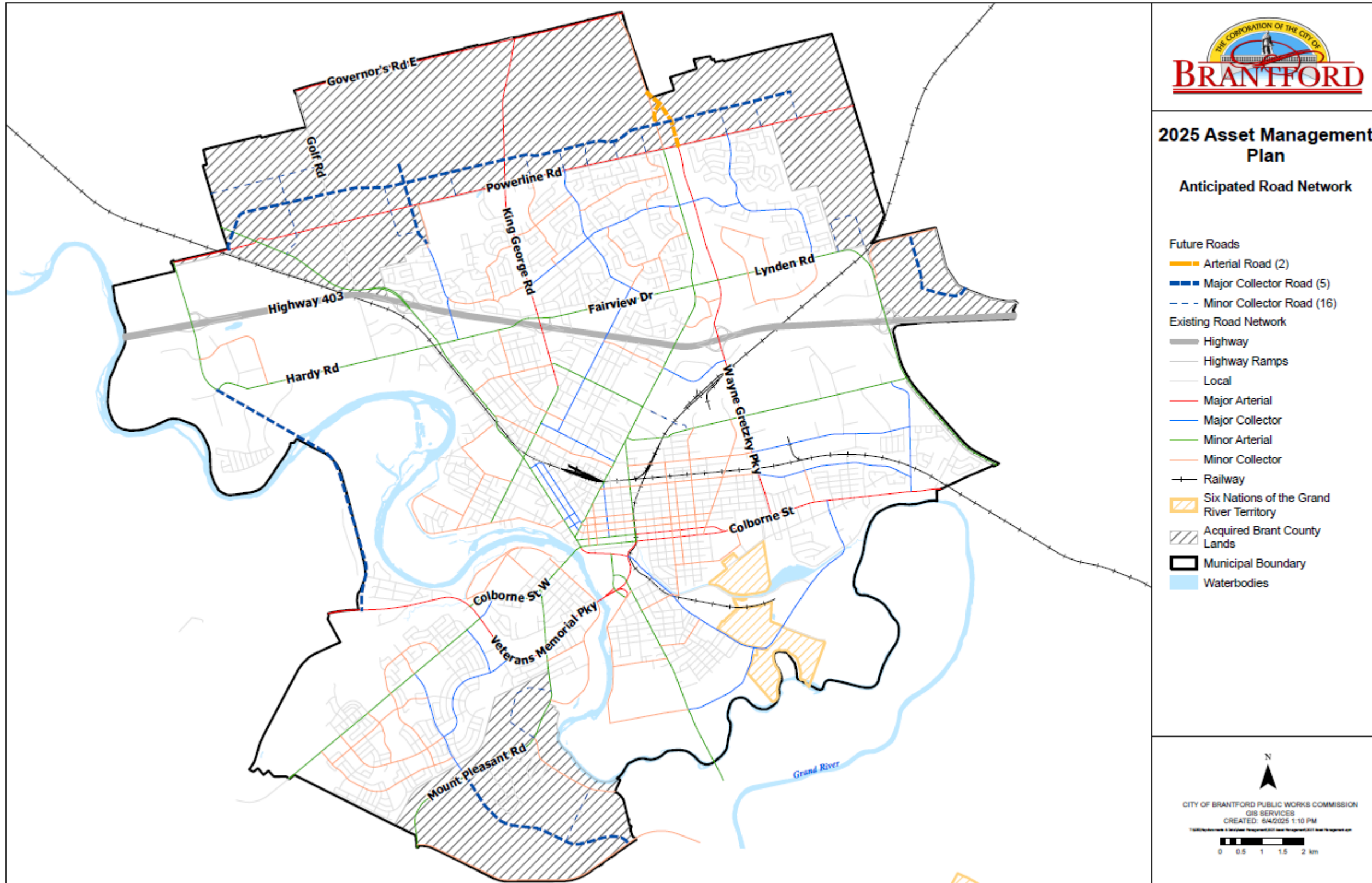


Figure 14 City of Brantford Anticipated 2034 Road Network

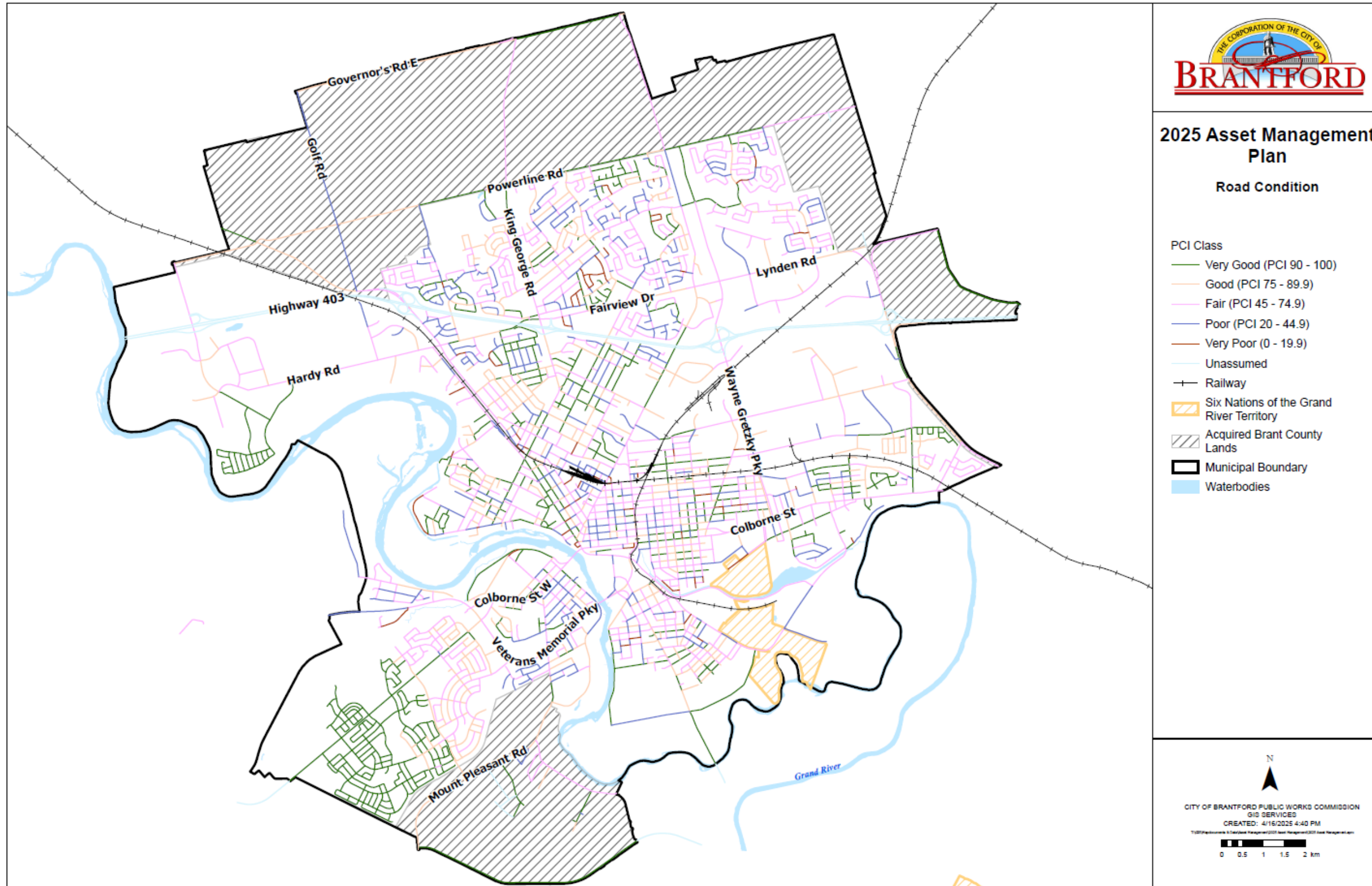


Figure 15 City of Brantford Road Network Condition 2023

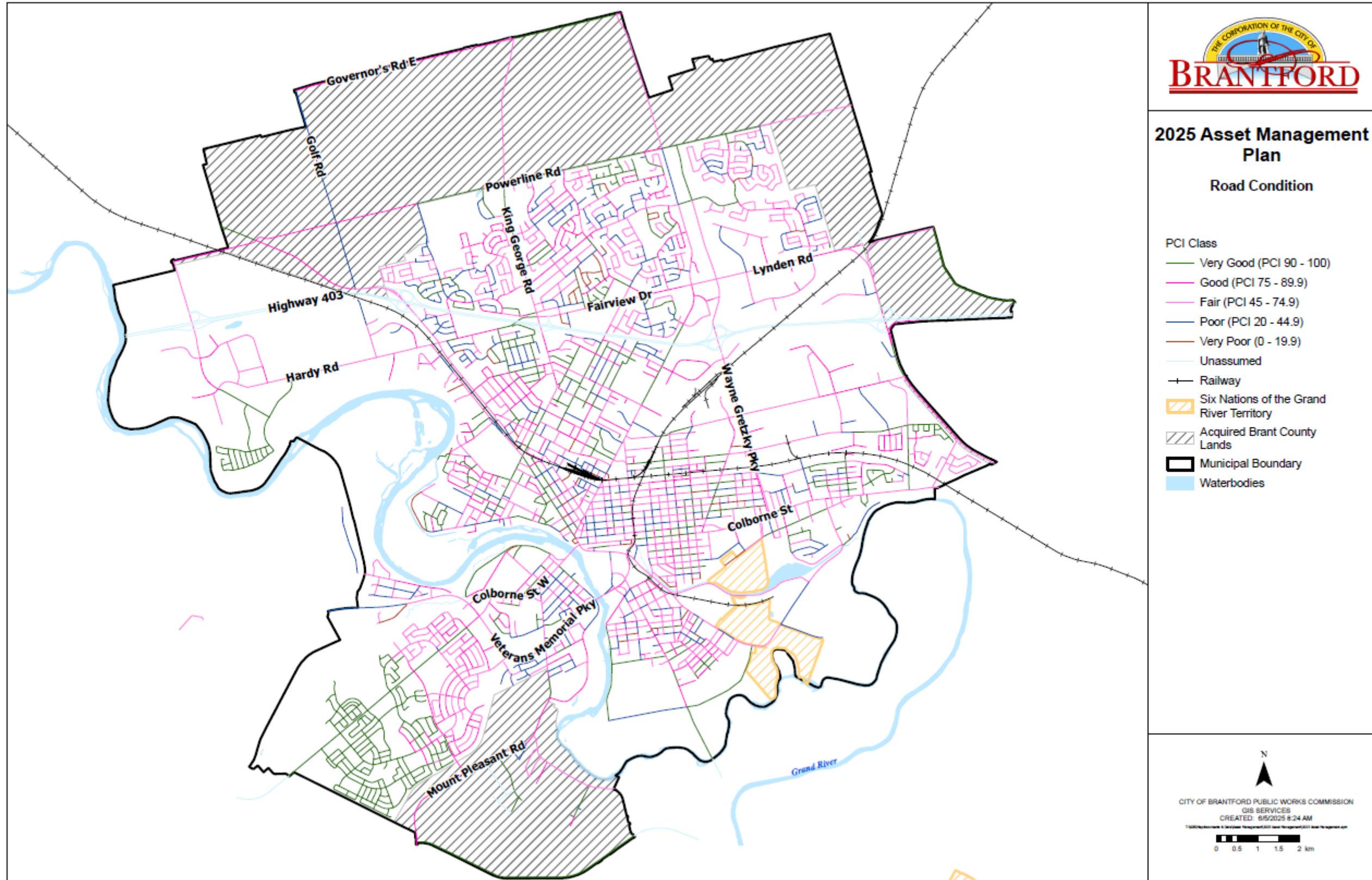


Figure 16 City of Brantford Road Network Anticipated 2034 Condition



Figure 17 PCI Rating Photo Examples

1.5.2 O.REG 588/17 TECHNICAL LEVELS OF SERVICE

The technical levels of service as dictated by O.Reg 588/17 can be found in **Table 8** below. **Table 12** contains a more detailed explanation of the contents of the LOS Option column in **Table 8**.

Table 9: O.Reg 588/17 Transportation Technical Levels of Service

			Current LOS	Proposed LOS										
Service	Service Attribute	Technical levels of service (technical metrics)	2024	2025	2026	2027	2028	2029	2030	2031	2032	2033	2034	LOS Option
Bridges and Culverts	Scope	Percentage of bridges in the municipality with loading or dimensional restrictions.	2.2% (1) of 46 bridges	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	Increase
	Quality	1. For bridges in the municipality, the average bridge condition index value.	67.8	68.7	69.6	70.5	71.4	72.3	73.2	74.1	75.0	75.9	76.8	Increase
		2. For structural (long span) culverts in the municipality, the average bridge condition index value.	68.1	67.7	68.2	68.7	69.2	69.7	70.2	70.7	71.2	71.7	72.0	Increase
Roads	Scope	Number of lane-kilometres of each of arterial roads, collector roads and local roads as a proportion of square kilometres of land area of the	253.3 km arterial of 102.46 km ² land area (2.5)	2.6	2.7	2.7	2.8	2.8	2.9	2.9	3.0	3.0	3.0	Increase
			247.7 km collector of 102.46 km ²	2.6	2.6	2.6	2.6	2.7	2.7	2.8	2.8	2.9	3.0	Increase

			Current LOS	Proposed LOS										
Service	Service Attribute	Technical levels of service (technical metrics)	2024	2025	2026	2027	2028	2029	2030	2031	2032	2033	2034	LOS Option
		municipality.	land area (2.4)											
		650.2 km local of 102.46 km ² land area (6.3)	6.7	6.7	6.7	6.7	6.7	6.7	6.7	6.8	6.8	6.9	6.9	Increase
	Quality	1. For paved roads in the municipality, the average pavement condition index value.	64	66.5	66.7	66.9	67.1	67.3	67.5	67.7	67.9	68.2	68.6	Maintain
		2. For unpaved roads in the municipality, the average surface condition (reported as PCI value).	63	48.2	48.4	48.6	48.8	49.0	49.2	49.4	49.6	49.8	50.0	Maintain

Note: Bridge and Culvert BCI and Roads PCI values in this table are averaged based on count and are not weighted based on replacement value or size.

1.5.3 MUNICIPALLY DEFINED CUSTOMER LEVELS OF SERVICE

The customer levels of service are defined in **Section 6.2** of the **Asset Management Plan Overview**. For Transportation assets, the asset specific interpretation of these levels of service is defined below in **Table 10**.

Table 10: Municipally Defined Customer Levels of Service

Customer Level of Service	Definition
Accessibility	Transportation assets should be accessible to various transportation types including, but not limited to, personal and transit vehicles, pedestrians, mobility assistive devices, and cyclists.
Quality	Transportation assets should fulfill their intended purpose, be the appropriate capacity, and be in a state of good repair.
Cost Efficiency	Transportation assets should be operated efficiently with extra care to minimize costs.
Safety	Transportation assets should be both safe to use and promote community safety, and customers should feel safe using these services.
Environmental Sustainability	Transportation assets should be operating as environmentally as possible and also be promoting sustainable lifestyles.
Reliability	Transportation assets should be available when customers need them.
Responsiveness	Transportation assets should be fixed quickly when service disruptions occur.

1.5.4 MUNICIPALLY DEFINED TECHNICAL LEVELS OF SERVICE

The technical levels of service for transportation assets have been adopted based on the above defined customer levels of service in **Table 10**. The customer levels of service with the corresponding technical levels of service and KPI metrics are defined below in **Table 11**.

The work management project, when fully deployed, will also assist the City with identifying and adding additional KPIs in future iterations because a system will be available to formally track this data.

Table 11: Level of Service (LOS) KPIs

Customer Level of Service	Technical LoS	Units	Current	Proposed										LOS Option
			2024	2025	2026	2027	2028	2029	2030	2031	2032	2033	2034	
Accessibility	Number of identified sidewalk vertical faults (trip steps)	Count	518	492	467	444	421	401	381	362	344	326	310	Maintain
	Number of winter maintenance road requests	Count	235	240	244	249	254	259	264	270	275	280	286	Maintain
	Number of winter maintenance sidewalk requests	Count	179	183	186	189	193	198	201	206	210	213	218	Maintain
	Number of winter maintenance windrow requests	Count	648	661	674	688	701	715	730	744	759	774	790	Maintain
Quality	Number of vehicular bridges with one (1) lane	# of bridges	0	0	0	0	0	0	0	0	0	0	0	Maintain
	Number of vehicular bridges that require a lane reduction	# of bridges	0	1	0	0	0	0	0	0	0	0	0	Maintain
	Bridge with equipment under height restrictions	Count	3	3	3	3	3	3	3	3	3	3	3	Maintain
	% of pavement markings repainted annually	%	100	100	100	100	100	100	100	100	100	100	100	Maintain
	Length of single lane roads	km	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	Maintain
	Total lane kms of gravel road	km	2.7	2.7	2.7	2.7	2.7	2.7	2.7	2.7	2.7	2.7	2.7	Maintain
	Replacement Value Weighted Network PCI Score	Score	67.0	67.0	67.0	67.0	67.0	67.0	67.0	67.0	67.0	67.0	67.0	Maintain
	Area of replaced sidewalk	Sq. m	4,468.6	4,500	4,500	4,500	4,500	4,500	4,500	4,500	4,500	4,500	4,500	Maintain
	New traffic signal or timing request	Count	217	221	226	230	235	240	244	249	254	259	265	Maintain
	New traffic sign request	Count	371	378	386	394	402	410	418	426	434	443	452	Maintain

Customer Level of Service	Technical LoS	Units	Current	Proposed										LOS Option
			2024	2025	2026	2027	2028	2029	2030	2031	2032	2033	2034	
Cost Efficiency	Average cost of bridge maintenance per m	\$/m	N/A*	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
	Average cost of culvert maintenance per m	\$/m	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
	Average cost of road maintenance per m	\$/m	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
	Average cost of streetlight maintenance per light	\$/count	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
	Number of overtime hours to resolve right of way issues	Hours	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Safety	Number of bridges requiring design modifications to mitigate ice jam	Count	2	2	2	1	1	1	1	1	1	1	1	Increase
	Number of bridge requests	Count	27	28	28	29	29	30	30	31	32	32	33	Maintain
	Number of retaining wall requests	Count	42	43	44	45	45	46	47	48	49	50	51	Maintain
	Road condition or damage requests	Count	885	929	976	1024	1076	1130	1186	1245	1308	1373	1442	Decrease
	Sidewalk condition requests	Count	1,475	1,504	1,535	1,565	1,597	1,629	1,661	1,695	1,728	1,763	1,798	Maintain
	Length of guide rails repaired or replaced	m	837.5	850.0	850.0	850.0	850.0	850.0	850.0	850.0	850.0	850.0	850.0	Maintain
	Number of guide rail requests	Count	43	43	45	46	47	47	48	49	50	51	52	Maintain
	New streetlight requests	Count	33	34	34	35	36	36	37	38	39	39	40	Maintain
	Number of streetlight condition requests	Count	4,963	5,062	5,163	5,267	5,372	5,479	5,589	5,701	5,815	5,931	6,050	Maintain
	Number of Pedestrian Crossings Installed City Wide	Count	53	58	58	63	63	68	68	73	73	78	78	Increase

			Current	Proposed										
Customer Level of Service	Technical LoS	Units	2024	2025	2026	2027	2028	2029	2030	2031	2032	2033	2034	LOS Option
Environmental Sustainability	Length of On-Road Delineated Bike Lanes	kms	15.4	16.4	17.4	18.4	19.4	20.4	21.4	22.4	23.4	24.4	25.4	Increase
	% of LED streetlights	%	77	85	92	100	100	100	100	100	100	100	100	Increase
	% of LED traffic signals	%	100	100	100	100	100	100	100	100	100	100	100	Maintain
	% of Solar Powered Traffic Flashers	%	95	95	95	95	95	95	95	95	95	95	95	Maintain
Reliability	Number of traffic signal requests	Count	928	947	965	985	1,004	1,025	1,045	1,066	1,087	1,109	1,131	Maintain
	Number of traffic sign requests	Count	624	636	649	662	675	689	703	717	731	746	761	Maintain
	Length of new Road added	km	1.6	0.0	2.3	9.1	8.0	10.1	10.0	12.1	14.0	29.0	25.4	Increase
	Length of new Sidewalk added	km	12.4	0.0	0.0	0.0	0.0	6.6	0.0	19.6	27.8	58.0	50.8	Maintain
	Number of new Bridges added	Count	0	0	0	0	0	1	0	1	0	1	0	Maintain
	Number of new Culverts added	Count	0	0	9	5	5	5	6	5	3	4	5	Maintain
Responsiveness	% of pothole service requests closed within 5 days	%	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
	% of sidewalk vertical fault (trip step) service requests closed within 5 days	%	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
	% of sign service requests closed within 5 days	%	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
	% of streetlight service requests closed within 5 days	%	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
	% of road debris service requests closed within 5 days	%	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A

*N/A indicates a metric where data is currently not available or too low confidence to include at this time.

1.5.5 PROPOSED FUTURE LEVEL OF SERVICE TARGETS

For the purpose of this report and the discussion surrounding proposed future levels of service targets, there are three (3) possible options defined in **Table 12** including the risks associated with those options to the long term sustainability of the municipality.

Table 12 Technical Levels of Service KPIs

Level of Service Development Options	Description	Risk Associated with Options
Decrease Level of Service	<p>Decreasing the level of service should result in cost savings in the short term.</p> <p>E.g. Roads are planned for reconstruction when their PCI falls below 10.</p>	<p>In some circumstances, decreasing the level of service may have little impact to the overall customer experience. In others, decreasing the level of service may result in a decreased level of customer satisfaction and could lead to safety concerns and possible damage to the City’s reputation.</p> <p>Decreasing the level of service too much for an extended period of time may result in higher costs for repairs or closure of certain assets over the long-term.</p>
Maintain Level of Service	<p>Maintaining the level of service should maintain costs with increases anticipated to reflect inflation or growth. Customer experience would also be anticipated to remain the same as well as the City’s reputation.</p> <p>E.g. Roads are planned for reconstruction when their PCI falls below 20.</p>	<p>If the current levels of service match customer expectation and regulatory requirement, maintaining them would typically be the recommended approach.</p> <p>However if the current levels of service do not match customer expectations or regulatory requirements, then maintaining them may not be the recommended approach. Similarly, City reputation may not match with what the City would prefer. If a low level of service is maintained for too long it may lead to health and safety concerns.</p>
Increase Level of Service	<p>Increasing the level of service should result in enhanced customer experience and City reputation.</p> <p>E.g. Roads are planned for reconstruction when their PCI falls below 50.</p>	<p>Increasing service would involve increased costs. Increasing the level of service too much, for an extended period of time, may become financially unsustainable for the City.</p>

Each of the technical levels of service have been examined to see if and/or how the proposed levels of service differ from the current levels of service. The majority will be following the maintain level of service option with an anticipated 2% increase per year. This is partially due to many of these levels of service being based on complaints submitted by the public. Large fluctuations in the number of customer complaints for these assets is not anticipated at this time. The number will be marginally impacted by the expected growth over the next 10 years, as it is anticipated that a substantial portion of the new population will be in areas with new or substantially rehabilitated infrastructure which will be providing a higher level of service than infrastructure in more established neighbourhoods. As a trend line is built up, this will be refined in future iterations of the AMP.

The one complaint-based level of service which follows the decrease level of service option and is therefore expected to result in an increased number of complaints, is the Road Condition or Damage complaints. This target is expected to decrease due to the decreasing level of re-investment in the existing road network. While the road network KPI for Replacement Value Weighted Network PCI Score is following the maintain level of service option it is mostly anticipated to do so by installing new roadways with higher PCI scores in the growth areas. Fewer resources from both a funding and staff perspective are expected to be available for the next 10 years for the repair and rehabilitation of the existing infrastructure. This is anticipated to result in an increase in the number of complaints within existing neighbourhoods.

The majority of levels of service will be following the Maintain approach over the next 10 years. In some areas this is despite the fact that the quantity of overall assets is expected to increase. For example, all metrics under the Reliability category are showing an increase in overall quantity but the level of service approach is Maintain. This is due to the next 10 years being anticipated to be a period of substantial growth in population and developed area. This will result in the need for more Transportation assets, increasing the quantity. However it is not anticipated the level of service provided by the assets will change, instead the overall area which is serviced by the assets will increase. In addition, it is anticipated that there will be a lag in the necessary operating budget increases. This will result in the City either maintaining the current Levels of Service or result in a decrease in levels of service as the same resources for maintenance are required to operate and maintain an increasing number of assets.

It is important to note that customer preferences and expectations do not always align with internal technical targets. A consideration of this section is linking the customer and technical levels of service to determine areas where different levels of service could be proposed. As previous survey results have a low level of data confidence, it is difficult to make any conclusive decisions based on this initial survey. Future iterations of the AMP will strive to improve the survey data confidence and allow for better alignment.

1.5.6 AFFORDABILITY AND ACHEIVABILITY CONFIDENCE

To determine whether the proposed levels of service are achievable and if the City can afford the proposed level of service **Table 13** has been developed to review confidence in the proposed levels of service.

Table 13 Affordability and Achievability Confidence

Customer Level of Service	Number of Technical LOS	Achievability Confidence	Achievability Description	Affordability Confidence	Affordability Description
O. Reg. 588/17 Bridges	3	High	Currently no open bridges at the City have a permanent loading or dimensional restriction. It is not anticipated that any other structures will require one at this time. The BCI targets are expected to be achievable as there are rehabilitation projects currently identified in the 10 year capital plan and new structures are anticipated to be built as part of the transportation network expansion to accommodate growth.	Medium	The load restriction is expected to be affordable. The timing of the new arterial and collector roads, and their associated structure, may be subject to change. If too many of the new roads are required within a smaller time window it is anticipated that resourcing limitations for both staff and funding will result. This would make the proposed levels of service for those assets less affordable.
O. Reg. 588/17 Roads	3	Medium	The ratios of road to land area are expected to be achievable, however the exact quantities per year may vary as it is subject to the influence of market forces for the growth areas. The PCI values are expected to be achievable as there are rehabilitation projects currently identified in the 10 year capital plan and new roads are anticipated as part of the transportation network expansion to accommodate growth. However rehabilitation projects have been delayed at the City historically in times of budget pressures, similar pressures may occur over the next 10 years.	Medium	While new and existing road projects have been included in the 10 year budget, the timing of the projects may be subject to change. If too many of the new roads are required within a smaller time window it is anticipated that resourcing limitations for both staff and funding will result. This would make the proposed levels of service for those assets less affordable. Historically at the City road rehabilitation projects have been delayed in years with insufficient budget available.
Accessibility	4	High	The number of identified trip steps is expected to decrease over the next 10 years while maintaining the current levels of service. This is due to the current level of service of actively reviewing the complete sidewalk inventory each year and identifying and addressing trip steps as they occur. Due to the environmental conditions it is unlikely this will ever be zero. The other metrics in this area relate to winter control. It is anticipated that the overall number of complaints will increase due to the increase in population however the current level of service, heavily influenced by provincial regulation, is unlikely to change within the next 10 years.	High	Both the sidewalk trip step identification and correction program and the winter control programs are funding through the operating and capital budget over the next 10 years. Due to the health and safety implications of these programs it is anticipated that any shortfalls would be prioritized by the City in order to maintain the levels of service.
Quality	10	High	The metrics in this section are all following the maintain option for levels of service. High confidence has been selected as while there may be slight variation in performance as lands to the north are developed and assume the majority are targets that are currently being achieved.	High	High confidence as the maintain approach should require few changes to existing funding in the next 10 years. The lane markings metric is the most uncertain as budgets will need to increase as the road network increases in the expansion areas in order to maintain the target of 100% repainted annually.
Cost Efficiency	5	N/A	Due to current data limitations the current and proposed levels of service in this category cannot be reported on at this time. The City's implementation of its work order system should allow for this information to be tracked in future iterations of the asset	N/A	Due to current data limitations the current and proposed levels of service in this category cannot be reported on at this time. The City's implementation of its work order system should allow for this information to be tracked in future iterations of the asset

Customer Level of Service	Number of Technical LOS	Achievability Confidence	Achievability Description	Affordability Confidence	Affordability Description
			management plan.		management plan.
Safety	10	High	Many of the metrics in this section are based on number of requests received from the public. There is a level of uncertainty as to how the number of requests varies over time however the level of service should generally be achievable. External factors to the work on the assets, such as changes to the City's request platform anticipated in 2026/2027 could result in additional requests if the process becomes more user friendly. It could also result in decreases if the new platform is better able to display existing requests as that would reduce the number of duplicates.	High	The metrics with the largest affordability challenge are the Road Condition and Damage Requests and the three related to installing or replacing infrastructure for bridges, guiderails and pedestrian crossings. Currently the applicable projects or programs are funded over the next 10 years. As they related to health and safety it is not anticipated that their funding would be decreased.
Environmental Sustainability	4	Medium	With changes in provincial legislation it is unclear at this time whether the proposed levels of service for on road bike lanes will be achievable. The other metrics in this section relate to streetlights and are either maintaining an existing level of service which has already been achieved or achieving a target which has already had the required projects approved. The streetlight metrics have a high level of confidence in their achievability.	Medium	Any required capital projects to achieve the streetlight projects have already been identified in the City's capital budget. It is possible that due to budgetary pressures some of these projects may be delayed as they are replacing existing streetlights which remain functional. While there is ongoing annual funding identified for installing bike lanes, exact locations can be subject to change.
Reliability	6	Medium	Many of the metrics in this section relate to new infrastructure which will be installed due to growth. The exact number of bridges and culverts will depend on the final alignment and location of roadways which is unknown at this time. The actual timing of growth will also impact the achievability of metrics in this section.	Medium	While new arterial and collector road projects have been identified in the Transportation Master Plan and included in the 10 year budget, local roads have not. Generally local roads are anticipated to be completed by the developers in a block area but there may be circumstances which result in the City needing to construct some local roads. The timing of the arterial and collector roads may be subject to change. If too many of the new roads are required within a smaller time window it is anticipated that resourcing limitations for both staff and funding will result. This would make the proposed levels of service for those assets less affordable.
Responsiveness	5	N/A	Due to current data limitations the current and proposed levels of service in this category cannot be reported on at this time. The City's implementation of its work order system should allow for this information to be tracked in future iterations of the asset management plan.	N/A	Due to current data limitations the current and proposed levels of service in this category cannot be reported on at this time. The City's implementation of its work order system should allow for this information to be tracked in future iterations of the asset management plan.

It is important to note that while the proposed service level change may appear affordable when viewed in the isolation of this specific plan, when it is examined in the context of the overall budget, these levels may not be achievable and may be considered unaffordable. As service level data continues to be collected, staff will also continue to review the achievability and affordability of the levels of service proposed within the future iterations of this plan.

1.5.7 LEVEL OF SERVICE LIFECYCLE COST CONSIDERATIONS

Proper considerations should be made for the most cost effective methods that can be undertaken to achieve the lowest cost possible with a chosen level of service. **Table 14** below includes the lifecycle options available and the associated risks with the chosen options.

Table 14 Lifecycle Options and Associated Risks

Lifecycle Options	Description	Risks Associated if Undertaken	Risks Associated if Not Undertaken
Planning	Consideration is made regarding the asset involving City Master plans and the needs of internal and/or external customers.	Planning activities may extend project timeline.	If planning activities were not undertaken there is a risk of missing something that was needed
Operation & Maintenance	The asset is providing benefits to the community and operation and maintenance activities (see Table 6) are completed on the asset at specific time intervals to prevent premature failures of the asset.	Completing operation & maintenance activities may mean that there is limited or no access to the asset for a period of time.	If O&M activities were not undertaken the asset would have premature failures, become unsafe and would cost the City more to repair or would have to be closed/removed.
Repair	The asset or a portion of the asset is no longer functioning appropriately, and a repair is needed.	Completing repair activities may mean that there is limited or no access to the asset for a period of time.	If repair activities were not undertaken the asset would no longer function as it should and would affect service levels. The asset would eventually deteriorate and need to be closed.
Replace	The asset has reached the end of its useful life and needs to be replaced to maintain service levels.	Replacing the asset may mean limited or no access to the asset during a period of time.	If replacement activities were not undertaken the asset would no longer function as it should and would affect service levels. The asset would need to be closed and eventually removed.
Remove	The asset has reached the end of its useful life or is no longer required to	Removing the asset may lead to a reduction in service levels.	The asset may be unsafe and could lead to health and safety concerns if not

Lifecycle Options	Description	Risks Associated if Undertaken	Risks Associated if Not Undertaken
	meet the appropriate service level and is removed.		removed.
Install New/Expand	A new asset or extension to an existing asset is purchased and installed.	Installing a new asset may lead to increase costs which could lower service levels.	If a new asset is not installed this may lead to an eventual reduction in service levels.

Note: The full lifecycle stages for these assets can be found in Section 1.4.1 and the list of specific lifecycle activity options is located in Section 1.4.2 of this AMP.

Depending on the level of service being considered, the most cost effective method that should be undertaken to achieve the lowest cost associated with the specific level of service may actually be a combination of lifecycle activities. The combination selected will be based on that specific asset and the activities that are likely to give the lowest cost while maintaining the chosen service level.

1.6 CURRENT & PROPOSED ASSET PERFORMANCE

The current and proposed asset performance for Transportation assets have been separated into three (3) categories for this section of the report:

1. Energy Performance;
2. Operating Performance; and
3. Sustainability Performance

1.6.1 CURRENT & PROPOSED ENERGY PERFORMANCE

The City of Brantford has a Corporate Climate Change Action Plan (CCAP) which provides a plan for reducing greenhouse gas (GHG) emissions emitted by the City. The goals of the CCAP are to reduce energy use, and greenhouse gas (GHG) emissions in our street lights, traffic signals and other City owned or managed assets. In addition, through the City’s Climate Lens Tool explained in **Section 10** of the **Asset Management Plan Overview Document**, the City has been working to improve our assets’ energy efficiency and reduce the associated carbon footprint.

Under the CCAP, annual emissions management data is reported, but has a reporting delay of two (2) years. **Table 15** contains data from the 2021 & 2022 Corporate and Community Greenhouse Gas Emissions Inventory.

The City is in the process of converting its streetlights to LEDs which require less electricity to operate. The information will be updated in future iterations of the AMP once it is available.

Table 15 Current & Proposed Energy Emissions of Assets*

Asset Class	Emmission Source	GHG Emissions (T of CO2e) 2018 Current	GHG Emissions (T of CO2e) 2022 Current	GHG Emissions (T of CO2e) 2025 Proposed	GHG Emissions (T of CO2e) 2034 Proposed	Change (2018 to 2034)
Streetlights & Traffic Signals	Electricity	228	133	113	96	-58%
Traffic Signals	Electricity	7	7	7	7	0%

*Based on information provided in the 2021 & 2022 Corporate and Community Greenhouse Gas Emissions Inventory

1.6.2 CURRENT & PROPOSED OPERATING PERFORMANCE

Table 16 contains criteria by which the City’s transportation assets’ operating performance can be assessed. N/A in the table below indicates a metric which is currently unavailable. The City will work to gather sufficient information to begin reporting on additional metrics in future iterations of the AMP.

Table 16 Transportation Operating Performance

Asset Type	Performance Measurement	Current Performance	Proposed Performance									
			2025	2026	2027	2028	2029	2030	2031	2032	2033	2034
Bridges	Number of Structures with Loading Restrictions	0	0	0	0	0	0	0	0	0	0	0
Bridges	Number of Structures with Width Restrictions	0	0	0	0	0	0	0	0	0	0	0
Bridges	Number of structures with height restrictions	3	3	3	3	3	3	3	3	3	3	3
Bridges	Number of structures closed to traffic in all directions	4	4	3	3	3	3	3	3	3	3	3
Bridges	Number of structures with soffits within flood levels for open water and/or ice jams	2	2	1	1	1	1	1	1	1	1	1
Culverts	Number of locations inspected monthly or prior to a predicted storm event	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Roads	Percentage of road lane kms which are gravel	0.2%	0.2%	0.2%	0.2%	0.2%	0.2%	0.2%	0.2%	0.2%	0.2%	0.2%
Roads	Number of Road Corridors with Capacity Restrictions to Accommodate Future Growth	14	14	14	13	11	10	8	7	5	4	2

1.6.3 TRANSPORTATION SUSTAINABILITY PERFORMANCE

To determine if the City is able to provide sustainable service delivery for the Transportation assets, the **Asset Sustainability Index (ASI)** is utilized. It is calculated by taking the amount the City is proposing to spend on Levels of Service (LOS) and dividing it by the amount the City is projected as needing to spend to maintain the LOS. The ASI can be calculated for the Current LOS, the Proposed LOS or the combination of the two. It can be for Capital costs, Operating & Maintenance (O&M) costs or a combination of the two.

Table 17 shows the ASI for the various scenarios and the final combined for the different asset categories. The ASI is used as a high-level assessment of whether the City is accommodating asset renewals in an optimal and cost-effective manner based on timing and relative to financial constraints. It is also an indicator of the risk the City is accepting and targeted service levels it wishes to maintain.

Table 17 Asset Sustainability Index

	Current LOS	Proposed LOS	Combined LOS
Capital Costs	46%	64%	58%
O&M Costs*	N/A	N/A	N/A
Combined Costs	-	-	58%

* Due to the way the O&M costs are derived at this time, the ASI for O&M costs has not been included in this iteration of the AMP. It is expected to be included in future iterations as the O&M data tracking on an asset class specific basis improves.

To ease understanding the ASI is reported as a percentage:

- An ASI of 100% is considered to be the best as it indicates that expenditures match what is needed to sustain levels of service. This is more efficient as it preserves infrastructure for the lowest cost over time.
- Above 100% funding should be reviewed as it suggests that the City is spending more than necessary, which may be an inefficient distribution of resources. In some circumstances this may be appropriate on a temporary basis to reduce backlogs of overdue repairs and/or replacements.
- Below 100% indicates a funding shortfall, meaning the City is not investing enough to maintain levels of service. If not addressed, this gap can lead to declines in levels of service over time.

The Transportation ASI of 58% is slightly below the Combined LOS ASI for all assets of 61%.

1.7 DISCUSSION & CONCLUSIONS

In conclusion, the City of Brantford operates and maintains many Transportation assets. These assets are in overall Fair condition with a total estimated replacement cost of approximately \$879.7M. The data confidence is High for Condition, Inventory and Replacement cost and Medium for Level of Service data.

The lifecycle stages for Transportation assets includes: Planning, Creation, Operation and Maintenance, and Disposal. During the Planning stage, the City identifies the need for the asset; during the Creation stage the asset is purchased and installed or constructed; during the Operation and Maintenance stage, the asset is operating and lifecycle activities (i.e. bridge joint cleaning) occur on each of our assets to maintain the state of good repair; and the Disposal stage is when the asset has reached the end of its useful life or is underperforming and requires disposal.

Lifecycle activities are currently typically tracked through a combination of email, excel, Avantis, SignData and Cartegraph (AIM). For more information on key database applications and work order management, please refer to **Section 4.2** and **Section 7**, respectively, in the **AMP Overview document**. As the City expands its implementation of its work order system, the frequency and costs associated with specific activities will be better represented.

It is estimated based on the average annual cost in the 10 Year Life Cycle Costing that the City should be spending an average \$72.3M annually for capital Transportation asset costs and should be spending an average of \$20.9M annually on Operating and Maintenance on these assets. The City is currently proposing to spend an average of \$42.0M annually on capital for the Transportation assets'. This results in a funding gap of \$30.3M from the forecasted capital need for Current and Proposed LOS. The City is currently proposing to spend \$19.0M annually on Operating and Maintenance resulting in a funding gap of \$1.9M.

Current and Proposed Levels of Service have been identified for Transportation assets. Generally most Levels of Service defined in O.Reg. 588/17 will be following the Increase option for the next 10 years. Most Municipally defined Levels of Service will be following the Maintain option for the next 10 years. In some areas while the option followed is considered the maintain option, the quantity of the overall assets is expected to increase. This is due to the next 10 years being anticipated to be a period of substantial growth in population and developed area. This will result in the need for more Transportation assets, increasing the quantity. However it is not anticipated the level of service provided by the assets will change, instead the overall area which is serviced by the assets will increase.

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Considered in isolation the Proposed Levels of Service have a Medium to High Confidence for Achievability and Affordability. When examined in the context of the overall budget, these levels of service may not be achievable and may be considered unaffordable.

Asset performance is separated into energy, operating and sustainability performance in the Transportation Asset Management Plan (AMP). For energy performance, currently streetlights and traffic signals are tracked as part of the Corporate Climate Change Action Plan. The City has achieved a reduction of 42% in GHG measured in T of CO₂e from 2018 to 2022. It is anticipated that a further 16% reduction will be achieved by 2034. This is mostly due to the conversion of streetlights to LED bulbs.

For Operating performance, the City has identified a number of performance measurements for three key asset types: Bridges, Culverts and Roads. Additional performance measures will be developed for future iterations of the AMP.

For Sustainability performance, the Combined Capital Level of Service Asset Sustainability Index (ASI) is 58%. This is slightly below the ASI for all assets of 61%. Increased funding or a change to levels of service will be required to achieve the target ASI of 100%.

The next iteration of this Transportation AMP document, due in 2030, will be revised to include updated and new information obtained over the next five years.