

DETAILED ASSET MANAGEMENT PLAN



Bridges & Culverts

TABLE OF CONTENTS

1.0	ASSET REPORT CARD
2.0	INTRODUCTION
2.1	Background/Purpose of Service6
2.2	Asset Hierarchy & Registry 8
2.3	Asset Condition 10
3.0	LIFECYCLE MANAGEMENT
3.1	Acquisition Plan
3.2	Operations Plan16
3.3	Maintenance Plan 18
3.4	Renewal Plan 22
3.5	Summary of Future Renewal Costs
3.6	Disposal Plan 24
3.7	Summary of Asset Forecast Costs
4.0	LEVELS OF SERVICE
4.1	Legislative Requirements
4.2	Customer Research and Expectations25
4.3	Customer Values 25
4.4	Customer Level of Service
4.5	Technical Levels of Service
5.0	FUTURE DEMAND
5.1	Demand Drivers
5.2	Demand Forecasts
5.3	Demand Impact and Demand Management Plan
5.4	Asset Programs to Meet Demand
6.0	RISK MANAGEMENT PLANNING 32
6.1	Critical Assets
6.2	Risk Assessment
6.3	Infrastructue Resilience Approach
6.4	Service & Risk Trade-Offs
7.0	CLIMATE CHANGE ADAPTATION

8.0	FINANCIAL SUMMARY	10
8.1	Financial Sustainability and Projections 4	10
8.2	Forecast Costs for Long-Term Financial Plan 4	2
8.3	Funding Strategy 4	13
8.4	Valuation Forecasts 4	13
8.5	Key Assumptions Made in Financial Forecasts 4	4
8.6	Forecast Reliability and Confidence 4	4
9.0	PLAN IMPROVEMENT AND MONITORING4	ŀ7
9.1	Accounting and Financial Data Source 4	ŀ7
9.2	Asset Management Data Source 4	17
9.3	Continuous Improvement Plan 4	ŀ7
9.4	Monitoring and Review Procedures 4	9
9.5	Performance Measures4	9
10.0	APPENDIX4	ł7



2.0 INTRODUCTION

2.1 Background / Purpose of Service

The primary purpose of the bridges and culverts is to facilitate safe, effective, and efficient transportation across the Municipality of Chatham-Kent. Bridges and culverts are structures that pass over obstacles such as a river, valley or another road. These assets connect roadways and communities and contribute to the wider benefits of the community by supporting agriculture, education, healthcare, emergency services and the economy. They cater to the diverse needs of pedestrians, cyclists, emergency vehicles, agricultural vehicles, heavy transport, and commuters.

Over the course of several decades, Chatham-Kent has acquired its bridge & culvert network assets, which vary greatly in terms of condition, design standards, construction materials, expected lifespan, and intended use. These differences primarily stem from the 1998 amalgamation that formed Chatham-Kent, bringing together Blenheim, Bothwell, Camden, the City of Chatham, the Township of Chatham, Dover, Dresden, Erie Beach, Erieau, Harwich, Highgate, Howard, Orford, Raleigh, Ridgetown, Romney, Thamesville, Tilbury East, Tilbury, Wallaceburg, Wheatley, and Zone. This consolidation resulted in a unique scenario where 21 distinct bridge & culvert networks were merged into one, despite their varying levels of service, design standards, condition, and age.

As asset management knowledge matures across Chatham-Kent, the breadth and scope of the plans will be refined to ensure they capture the full cost of delivering the bridge & culvert network. The intention is to update the plan annually to ensure data quality improves and to enable and support evidence-based decisions. This DAMP will have a ten-year planning horizon at a minimum and will connect fully to the Long-Term Financial Plan (LTFP) by 2027.

This DAMP will communicate the requirements for the sustainable delivery of services through the management of assets, program delivery, compliance with regulatory requirements, and funding required to provide the appropriate levels of service over the entire planning period. The bridge & culvert DAMP is guided by the Chatham-Kents Strategic Asset Management Policy as well as other documents such as:

- Policies and Bylaws
- Municipality of Chatham-Kent Strategic Plan 2022-2026
- 2024 2027 Multi-Year Budget
- Short-term and long-term financial plans
- Provincial Legislation

The DAMP addresses infrastructure assets specific to the bridge & culvert network, which are essential for delivering its expected level of service. The infrastructure assets included in this plan have a total replacement value of **\$1.49 Billion**.

For a comprehensive overview of the assets outlined in this DAMP, please refer to **Table 2.2.2** as it provides a detailed summary.

Key stakeholders in the preparation and implementation of this DAMP are shown in **Table 2.1**.

Key Stakeholder	Role in Asset Management Plan		
Mayor & Councillors	 Represent needs of community/shareholders, Allocate resources to meet planning objectives in providing services while managing risks, Ensure service is sustainable. 		
General Manager, IES	 Allocate resources to meet the organization's objectives in providing services while managing risks. Overall responsibility for Asset Management, provide leadership in influencing decision-making processes related to Asset Management. 		
Director of Engineering	 Allocate resources and directs activities for bridge & culvert assets including renewals and major maintenance projects Develop the Detailed Asset Management Plan and inform them of the strategies required to meet agreed upon levels of service. 		
Director of Public Works	 Allocate resources and directs activities for bridge & culvert assets including operational activities and maintenance projects Develop the Detailed Asset Management Plan and inform them of the strategies required to meet agreed upon levels of service. 		
Manager	 Reviews, updates, and manages regulatory manuals, risk register, and bridge & culvert operational matters, Be aware of levels of service and costs, Participate in consultation processes and provide feedback on service needs. 		
Community	 Be aware of levels of service and costs, Participate in consultation processes and provide feedback on service. 		

Organizational Chart

The organizational structure for service delivery from infrastructure assets for Chatham- Kent Municipal bridge & culvert is detailed below in **Figure 2.1**.

Figure 2.1: Organizational Chart



2.2 Asset Hierarchy & Registry

An asset hierarchy provides a framework for structuring data in an information system to assist in data collection, reporting, and decision-making. The hierarchy includes the asset class and components used for asset planning and financial reporting, as well as the service level hierarchy used for service planning and delivery.

An asset registry is a single data source containing an inventory of asset data, including attribute information for each asset. This attribute information includes a record of each individual asset, including condition, age, replacement cost, and asset-specific information (e.g., length, diameter, material, etc.). Currently, the bridge & culvert asset registry is structured in the form of an asset hierarchy, explained below.

The asset hierarchy provides a framework for structuring data in an information system to assist in data collection, reporting, and decision-making. Chatham-Kent is working towards establishing a functional asset hierarchy, which means the hierarchy has been established based on what the asset owner needs or wants the asset or system to do. Generally, assets and systems are organized according to their primary function. The service hierarchy is shown in **Table 2.2.1**.

Service Hierarchy	Service Level Objectives
Bridges	 Provide safe travel for vehicles, pedestrians and public transit and road surface for vehicles to travel across otherwise unpassable obstacles.
Culverts	 Channel water beneath roadways to facilitate efficient water flow while allowing traffic to pass across its deck above the waterline.
Minor Culverts	 Roadway cross culverts are designed to facilitate proper drainage by channeling water from one side of the road to the other. Driveway culverts also facilitate channeling of water along roadside ditches while allowing access to private properties.

Table 2.2.1: Asset Service Hierarchy

Asset Registry

The bridge & culvert assets covered in this plan include all bridges, culverts, access culverts, bridges and minor roadway culverts required for Chatham-Kent to deliver its bridge & culvert Service to the community and its customers. The assets included in this DAMP are shown in **Table 2.2.2**.

Table 2.2.2: Bridge and Culvert Service Assets

Asset Category	Description	Estimated Service Life in Years	Average Age in years	Average Condition	Average Remaining Service Life	Current Replacement Cost
Bridges & Culverts Greater than 3 m	767 Structures	70	40	Good	30 Years	\$983 Million
Access Bridges Less than 3 m	137 Structures	70	49	Fair	31 Years	\$58.7 Million
Culverts 2 - 3 m	331 structures	70	50	Fair	30 Years	\$102.5 Million
Access Culverts	115 Structures	60	37	Fair	23 Years	\$22.4 Million
Minor Culverts	16,504 Structures	60	Unknown	Fair	Unknown	\$319.6 Million
					Total	\$1.49 Billion

All values are shown in 2025-dollar values.

Historically, age and condition data for minor culverts has not been consistently gathered, resulting in generally low confidence levels on that data element. Staff will collect this information as new assets are put in place to improve data quality over time. Without either condition or age data it is difficult to estimate the remaining service life for minor culverts. Staff will explore the process of collecting data or estimating useful life in the future and have been identified as a continuous improvement opportunity.

The initial plan attempts to include all assets defined as bridges and culverts within this DAMP. However, it is acknowledged that as this is the first DAMP, additional assets will likely be included in the future. As assets are acquired, disposed of, discovered or considered material enough, they will also be included in future plans. Various asset parameters such as age, condition, estimated service life and replacement costs will be updated regularly to ensure the data confidence of the plan is sufficient to support evidence-based investment decisions.

2.3. Asset Condition

Condition is the preferred measurement for planning lifecycle activities to ensure assets deliver the agreed-upon levels of service and reach their expected useful life. Condition is measured using a 1 - 5 grading system, as detailed in **Table 2.3.1**. It is important that a consistent approach is used in reporting asset performance, enabling effective decision support. A finer grading system may be used at a more specific level. However, for reporting in the DAMP, results are translated to a 1 - 5 grading scale for ease of communication.

At present, bridge & culvert conditions are assessed using both formal and informal methods. In accordance with O. Reg. 472/10 Standards for Bridges, bridges with a span greater than 3 m are inspected every 2 years using the methodology outlined in the Ontario Structure Inspection Manual (OSIM). Half of the bridges are inspected every year to meet this requirement. The condition data in this plan for structures greater than 3 m is based on the 2023 and 2024 OSIMs.

Additionally, minor culverts and access structures of less than 3 m are informally reviewed to ensure oversight in lieu of formal inspections.

For certain assets, conducting condition assessments may not be cost-effective or practical; however, for many others, routine inspections are carried out to confirm that these assets remain in good working order. For assets without known condition information or inspections that were not output in a way that could be converted, the condition was assumed based on remaining service life.

The following conversion assumptions were made:

• For assets where a condition rating was completed, but no age information was available, the age is estimated based on the conditions

For assets where a condition program exists and a condition score was output, those conditions were converted to the scale below in **Table 2.3.1**

Asset conditions are measured using a 1-5 grading system, as detailed in **Table 2.3.1**. It is important that a consistent approach is used in reporting asset performance, enabling effective decision support. A finer grading system may be used at a more specific level. However, for reporting in the DAMP, results are translated to a 1-5 grading scale for ease of communication.

Table 2	.3.1: C	ondition	Grading	System
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Condition Grading	Description of Condition
1	Very Good: free of defects, only planned and/or routine maintenance required
2	Good: minor defects, increasing maintenance required plus planned maintenance
3	Fair: defects requiring regular and/or significant maintenance to reinstate service
4	Poor: significant defects, higher order cost intervention likely
5	Very Poor : physically unsound and/or beyond rehabilitation, immediate action required

The condition profile of bridge and culver assets are shown in **Figure 2.3.2**.





All figure values are shown in 2025-dollar values.

Most of the bridge & culvert assets are in either good or fair condition at the time of writing the DAMP.

Jacob Road Bridge over the Rivard Drain - Post-Construction



Regulatory Description of Bridge Condition Rating

As part of the O.Reg 588/17 Chatham-Kent must provide a separate description of the bridge & culvert conditions which includes a description of the condition and examples to help define what each rating means.



Very Poor

Severe deterioration, extensive cracking, large spalls or visible structural failure. Surface conditions show extensive damage making it potentially unsafe for use. Drainage is non-functional with major erosion. Support structures show severe distress or partial collapse, and closure is necessary. Guardrails and signage are missing, broken, or completely non-functional.



3.0 LIFECYCLE MANAGEMENT

The lifecycle management plan will detail how the bridge & culvert assets will be maintained at the agreed-upon levels of service by managing its lifecycle costs. These costs are categorized by lifecycle phases, which include **acquisition**, **operations**, **maintenance**, **renewal**, and **disposal**. At present, Chatham-Kent employs a budget-based approach to its lifecycle management; however, this approach will evolve into a comprehensive lifecycle approach as the data and organizational knowledge develop and become more suitable.

Once Chatham-Kent's acquires an asset such as a new bridge, it must be prepared to fund the remaining lifecycle costs, such as operations, maintenance and its likely inevitable renewal. These other lifecycle costs are far more significant than the initial construction or purchase cost and are often multigenerational. Since lifecycle costs are spread across multiple decades, it is essential that the Chatham-Kent approach its asset planning with a long-term view to ensure it effectively manages the assets and assists in making informed choices.

3.1 Acquisition Plan

Acquisitions are lifecycle activities that add new assets or improve an existing asset's capability or function. These acquisitions may result from growth, council priorities, donation, demand, or social or environmental needs. The costs associated with acquisitions include design, training, consulting, purchase costs, and staff time to ensure the assets are ready for service and can be considered 'fit for use'.

3.1.1 Selection Criteria

Proposed acquisition of new assets and upgrades of existing assets are identified from various sources, such as community requests, development, safety standards and legislative obligations, proposals identified by strategic plans, or partnerships with others. Potential upgrades and new works should be reviewed to verify that they are essential to the communities' needs and Council's ability to fund the assets adequately enough to maintain the desired level of service.

The priority ranking criteria are detailed in Table 3.1.1.

Table 3.1.1: Acc	uired Assets	Priority	Ranking	Criteria

Criteria	Weighting
Growth	80%
Safety	15%
Sufficient Demand	5%
Total	100%

At the time of writing of the DAMP there are no planned acquisitions currently. The long-term financial plan will accommodate expenditure on new assets and services in the capital works program, but only to the extent that funding is available. It is acknowledged that there will also be additional assets such as the assumption of subdivisions which will be included in future iterations of the DAMP.

3.2 Operations Plan

Operations include regular activities to provide services. These activities are necessary to complete the regular day-to-day operations on the bridge and culvert network. Examples of typical operational costs and activities include:

- Geotechnical Investigations These investigations are necessary for planning and designing the acquisition and renewal of bridges and culverts. They ensure that these structures are built on solid foundations tailored to the unique conditions in Chatham-Kent. These typically include substructure and groundwater assessment, provide foundational design parameters and slope stability foundations. These investigations also include excess soils testing in accordance with O.Reg. 406/19 On-Site and Excess Soils Management. On average Chatham-Kent expects to invest \$350,000 annually or \$3.5 Million dollars over the next 10 years performing geotechnical investigations.
- **Operation of Moveable Bridges** The Municipality operates its moveable bridges on the Sydenham River in Wallaceburg in response to requests from the public for the passage of marine traffic. Bridge openings are coordinated by municipal staff.
- **OSIM Inspections** The Province mandates that each municipality will conduct an inspection on each bridge greater than 3 meters every 2 years. These inspections proactively identify areas of concern to ensure public safety by monitoring structural integrity and allow each municipality to plan necessary maintenance. Each year Chatham-Kent inspects half of its bridges and then the other half the year following to ensure legislative compliance.
- **Bridge Washing** A regular bridge washing program is implemented annually which is aimed at preserving the structural integrity of bridge components. Over time bridges accumulate dirt, debris, residues from deicing agents which can promote corrosion of steel elements and deteriorate concrete components. A regular cleaning program is a necessary maintenance activity to allow the bridge to reach its intended useful life.
- Staffing Costs Staff costs from Public Works and Engineering are included in the modelling

Other costs included in operations include master planning, vehicle charges, consulting, training staff, any necessary software costs.

Summary of forecast operations costs

Forecasted operational costs are expected to vary in relation to the total value of the asset stock. When additional assets are acquired, the future costs are forecast to increase. If assets are disposed of the forecast operational costs are expected to decrease. **Figure 3.2.1.** shows the forecast operations costs relative to the proposed operations planned budget.





Figure 3.2.1: Operations Summary

Operational budget levels are insufficient to meet projected service levels over the entire 10-year planning period. In the initial years of the plan (2024 - 2027) operations are funded adequately enough that there will be no impact on service levels. For the remaining planning horizon, funding for the bridge & culvert network will be required to increase to ensure service levels are sustainable and able to complete all operational activities.

Future iterations of the DAMP will need to consider obligations to ensure that required safety and regulatory operational activities are prioritized.

Table 3.2.2: Operations Budget Trends

Year	Operational Budget
2025	\$1,236,000
2026	\$1,249,000
2027	\$1,251,000

3.3 Maintenance Plan

Maintenance should be viewed as the ongoing management of deterioration. The goal of planned maintenance is to proactively apply the appropriate interventions to assets, ensuring they achieve their intended useful life. Maintenance doesn't substantially prolong the life of an asset; they are the actions necessary to enable assets to meet their expected lifespan by restoring them to a preferred 'improved' condition.

Examples of typical maintenance activities include repairing minor cracks in concrete, repairing expansion joints, applying waterproof membranes on bridge decks, adjusting bearing positions, replacing components, and reconstructing eroded embankments. Some of the bridges that will undergo maintenance projects over the next 4 years include the following:

2025 - Planned maintenance projects that include structures on Paincourt Line (1.2 km west of Jacob Road), Town Line Road (40 m south of Maple Line)

2026 - Planned maintenance projects that include structures on Dawn Mills Road (2.1 km north of Croton Line), Mint Line (20 m west of Sinclair Road), Belle Rose Line (30 m east of Jacob Road)

2027 - Planned maintenance projects that include structures on Fifth Line (20 m west of Drake Road), Park Ave East (200 m west of Sass Road), Horton Line (200 m west of Communication Road)

Planned maintenance greatly reduces the need for reactive maintenance, which is often associated with greater risks to human safety and increased financial costs.

Summary of Forecast Maintenance Costs

Forecast maintenance costs vary with the total value of the asset stock. If additional assets are acquired, future maintenance costs are forecast to increase. If assets are disposed of the forecast operation and maintenance costs are expected to decrease. **Figure 3.3.1** below shows the forecasted maintenance costs relative to the proposed maintenance planned budget.





One consideration for maintenance is to recognize that rising costs across most if not all maintenance activities. Since 2020, prices have been rising aggressively, and careful analysis will be required to ensure that sufficient funds are put into place to ensure future maintenance activities can be completed.

Maintenance budget levels are inadequate to meet projected service levels over the entire 10-year planning period. The initial year of the plan is sufficiently funded, however for the remaining planning horizon bridges and culverts will not have sufficient budget to maintain their regular maintenance activities and will be required to either fund the level of service or will need to adjust its planned maintenance activities.

Future iterations of the DAMP will need to consider obligations to ensure that required safety and

regulatory maintenance is prioritized. Where maintenance budget allocations are such that they will result in a lesser level of service, the service consequences and service risks have been identified and are highlighted in this DAMP and service risks considered in the Risk Management Plan. Assessment and priority of reactive maintenance is undertaken by staff using experience and judgement. The trend in maintenance budgets is shown in **Table 3.3.2** below.

Year	Maintenance Budget
2025	\$5,848,000
2026	\$1,623,000
2027	\$2,219,000

3.4 Renewal Plan

Renewals are the major capital works which do not significantly alter the original service capacity provided by the asset, but restores, rehabilitates, replaces or renews an existing asset to its original service potential. Working over and above restoring an asset to its original service potential is an acquisition resulting in additional future operations and maintenance costs.

Assets requiring renewal are identified from the asset register data to project the renewal costs (replacement cost) and renewal timing (acquisition year plus updated useful life to determine the renewal year). The typical useful lives of assets used to develop projected asset renewal forecasts are shown in **Table 3.4.1.** Asset useful lives related to the bridge & culvert s was last reviewed on **May 1, 2024.**

Table 3.4.1: Useful Lives of Assets

Asset Sub-Category	Average Useful Life (Years)
Bridges > 3 m	70
Culverts 2 m - 3 m	70
Minor Culverts	60

The estimates for renewals in this DAMP are based on the asset register method.

3.4.2 Renewal ranking criteria

Asset renewal is typically undertaken to either:

- Ensure the reliability of the existing infrastructure to deliver the service it was constructed to facilitate (e.g. replacing a box culvert)
- To ensure the infrastructure is of sufficient quality to meet the service requirements (e.g. bridge decking is in suitable condition)

The bridge & culvert network prioritizes its renewals by identifying assets or asset groups that have:

- High consequence of failure
- High use and subsequent impact on users would be significant
- Higher than expected operational or maintenance costs
- Potential to reduce life cycle costs by replacing a modern equivalent asset that would provide the equivalent service

Every bridge and culvert network asset has a distinct decision point were continuing to maintenance it becomes unfeasible, financially burdensome, or legally required, and renewing it becomes the optimum choice for Chatham-Kent. For this DAMP, a bridge is identified as requiring a renewal when it requires either complete or near complete (85% of total physical structure) reconstruction is required. Other actions to repair the bridge (resurfacing, deck replacement etc.) are considered maintenance activities.

3.5 Summary of Future Renewal Costs

Over the 10-year planning horizon the bridge & culvert asset class will invest approximately **\$124.4 Million** in renewal activities which will include the following:

- 2025 \$17.7 Million planned for renewal projects that include 2 structures of Tupperville Road (400 m south of McCreary Line), 2 structures of Lindsay Road (500 m south of Brook Line and 200 m south of Claymore Line), 2 structures at the intersection of Campbell Road and 6th Concession Line, West Street (200 m east of AD Shadd Road) and AD Shadd Road (450 m south of Ninth Line).
- 2026 \$10.9 Million planned for renewal projects that include structures on Longwoods Road (800 m west of Victoria Road), Erie Street South (200 m south of Talbot Trail), Dashwheel Road (1 km north of Forbes Line), Queens Line (10 m east of Davidson Road) and Pollard Line (10 m east of Davidson Road).
- 2027 \$8.4 Million planned for renewal projects that include structures on Cedar Hedge Line (100 m west of St Clair Road), Countryview Line (200 m west of St Clair Road), Caledonia Road (100 m north of Darrell Line), Klondyke Road (200 m south of Concession Line 2) and 3rd Concession Line (350 m east of Erie Street North).

Forecast renewal costs are projected to increase over time if the asset stock increases. The forecast costs associated with renewals are shown relative to the proposed renewal budget in **Figure 3.5.1.**





The substantial forecast renewal bar for **2025** highlights a historical backlog of assets that have either significantly deteriorated or surpassed their estimated useful lives. A large backlog typically suggests that the funding for bridge and culvert asset renewals has been insufficient for an extended period. Each year, more bridge assets will need renewals, further increasing the backlog until it is resolved, or service levels are modified through disposals.

3.6 Disposal Plan

Disposal encompasses activities related to the decommissioning of assets that are not slated for renewal. These activities include the sale, demolition, environmental testing and remediation, soil and remediation, and relocation. Presently, Council does not have any plans to dispose of any bridge and culvert assets over the 10-year planning horizon. Since 2013, staff have created various bridge divestment strategies aimed at minimizing the infrastructure gap and aligning service levels with a more sustainable approach, however the recommendations from the report were not actioned when the structures were ready for renewal. Support from Council for these disposal actions is crucial for managing the infrastructure gap and ensuring that service levels remain sustainable. Any expenses or revenues generated from asset disposals will be incorporated into the long-term financial plan. Should any future disposals be identified, they will be documented in this section.

3.7 Summary of Asset Forecast Costs

The summary of the financial projections for this asset plan are shown in **Figure 3.7.1**. These projections include forecast costs for acquisition, operation, maintenance, renewal, and disposal. These forecast costs are shown relative to the proposed budget. The bars in the graphs represent the forecast costs needed to minimize the life cycle costs associated with the service provision. The proposed budget line indicates the estimate of available funding. The gap between the forecast work and the proposed budget is the basis of the discussion on achieving balance between costs, levels of service and risk to achieve the best value outcome.





With the current budget, the bridge and culvert network **does not** have enough funding for the entire 10-year planning period to maintain the current levels of service.

4.0 LEVELS OF SERVICE

Levels of service describe the value that bridge, and culvert assets provide to the community and are typically spoken about in 'measures'. Utilizing service measures allows decision makers to understand what the outcome of investments will be to allow those making choices to clearly understand how a dollar, will impact Chatham Kent's ability to deliver its services. These measures also allow Chatham Kent to communicate with the public as to the cost of the services that they receive today and will be able to afford in the future.

Service levels are measured in four ways, **legislative compliance**, **customer values**, **customer levels of service** and **technical levels of service**.

4.1 Legislative Requirements

Meeting legislative requirements should be the bare minimum level of service Chatham Kent provides. These requirements often drive many lifecycle costs and staff tasks to ensure that Chatham Kent is compliant with all legislation that range from Federal to Provincial or even Chatham Kent's own bylaws. There are many legislative requirements relating to the management of bridge & culvert assets. Legislative requirements that impact on the delivery of the service are outlined in **Table 4.1.1**.

Legislation	Requirement
O.Reg 472/10: Standards for Bridges	Mandatory standards, procedures and guidelines for design, biennial OSIM inspection, construction and rehabilitations
O.Reg. 104/97: Standards for Bridges	Prescribes that every bridge shall be kept safe and in good repair
O.Reg. 239/02: Minimum Maintenance Standards for Municipal Highways	Prescribes mandatory timelines for bridge and culver deck repair and rehabilitation
O.Reg. 239/02: Minimum Maintenance Standards for Municipal Highways	Regulation defines Technical Levels of Service and response times for winter maintenance, pothole repair etc.

Table 4.1.1: Legislative Requirements

4.2 Customer Research and Expectations

The 1st DAMP is intended to provide a snapshot of the current level of service provided by bridges and culverts. Future consultations with the public must be undertaken before the Municipality of Chatham-Kent can adopt the planned level of service. Future iterations of the bridge and culvert DAMP will involve customer consultation, focusing on service levels and associated costs. This approach aims to assist Council and stakeholders in aligning the required level of service, potential service risks, and consequences for the customers' capacity and willingness to financially support the service.

Community consultation will be undertaken to identify customer values and expected trends in the planned budget and outcomes of the consultation and the values will be addressed in the future iterations of this plan.

4.3 Customer Values

Service levels are defined in three ways: customer values, customer levels of service and technical levels of service.

Customer Values indicate:

- what aspects of the service are important to the customer
- whether they see value in what is currently provided
- the likely trend over time based on the current budget provision

Current Customer Values:

Through previous public consultations, Chatham-Kent has identified elements that customers value from its bridge and culvert assets.

- 1. Availability Ensure that engineered structures are always open
- 2. Condition Customers value a smooth ride and to ensure that bridge and culvert surfaces are free from potholes and are able to handle heavier loads for both farming and commercial customers
- **3.** Affordability The price customers pay through their taxes is reasonable for the quality of bridge & culvert assets available to the customers
- **4. Connectivity** Customers wish to be able to get to their destinations by their preferred travel mode in a reasonable distance and travel time

I.E.S. will undertake community consultation in 2025-2026 to better identify customer values for its bridge and culvert assets. This consultation will help identify expected trends in the planned budget and the values will be addressed in the future iterations of this plan.

4.4 Customer Levels of Service

The Customer Levels of Service are considered in terms of:

Condition - How good is the service... what Is the condition or quality of the service?

Function - Is it suitable for the Intended purpose ... Is it the right service?

Capacity/Use - Is the service over or underused ... do we need more/less of the service?

In **Table 4.4.1** under each of the service measure types (Condition, Function, Capacity/ Use) there is a summary of the performance measure being used, the current performance, and the expected performance based on the current budget allocation.

Table 4.4.1: Customer Level of Service Measure

Measure Type	Levels of Service	Performance Measure	Current Performance	Expected Trend Based on Planned Budget
Condition	Ensure bridge and culvert assets are open and are from fair to very good condition	Customer Survey	TBD in 2026	TBD 2026
Capacity	Ensure there are sufficient bridge and culvert assets to meet customer demands and for traffic volumes	Customer Survey	TBD in 2026	TBD in 2026
Function	Ensure bridge and culvert assets are designed appropriately to ensure they are fit for purpose	Customer Survey	TBD in 2026	TBD in 2026

Further investigation will be necessary to ensure that customer service levels are regularly measured, allowing Chatham-Kent to consider various options to meet the community's evolving needs and expectations. The goal is to consistently engage in developing baseline community measurements and to continue the process of creating trend analysis data that will guide future decisions.

4.5 Technical Levels of Service

Technical Levels of Service – To deliver the customer values and impact, the achieved customer levels of service are operational or technical measures of performance. These technical measures relate to the activities and allocation of resources to best achieve the desired customer outcomes and demonstrate effective performance.

These represent life-cycle performance measures that gauge how the I.E.S. intends to attain desired customer outcomes, showcasing effective performance, legislative compliance, and management. These metrics should illustrate the alignment of the bridge and culvert service delivery with customer value and act as potential levers to affect and influence Customer L.O.S. I.E.S. will track specific lifecycle activities to measure service performance in meeting the desired service level and to shape customer perceptions of the services received from the assets.

To deliver the customer values and impact the achieved Customer Levels of Service are operational or technical measures of performance. These technical measures relate to the activities and allocation of resources to best achieve the desired customer outcomes and demonstrate effective performance. Technical service measures are linked to the activities and annual budgets covering:

Acquisition – the activities to provide a higher level of service (e.g., widening a bridge) or a new service that did not exist previously (e.g., a new culvert).

Operation – the regular activities to provide services (e.g., bridge cleaning, removing wildlife, legislatively required inspections, lubricating bearings and joints, cleaning sediment buildup from culverts, etc.)

Maintenance – the activities necessary to retain an asset as near as practicable to an appropriate service condition. Maintenance activities enable an asset to provide service for its planned life (e.g., crack sealing, deck maintenance, waterproofing membranes, repairing damaged guardrails etc.),

Renewal – the activities that return the service capability of an asset up to that which it had originally provided (e.g., Culvert replacement, bridge replacement),

Service and asset managers plan implement and control technical service levels to influence the service outcomes. **Table 4.5.1** shows the activities expected to be provided under the current 10-year planned budget allocation, and the forecast activity requirements being recommended in this DAMP.

Table 4.5.1: Technical Level of Service

Lifecycle Activity	Level of Service Statement	Activity Measure	Current Performance	Recommended Performance
Acquisitions	Ensure newly acquired assets meet design specifications	Confirm donated assets meet current design standards and specifications and ensure they are inspected prior to acquisition	100%	100%
Operations	Ensure assets and services are legislatively compliant	# of OSIM inspection completed each year in accordance with <i>O.Reg. 472/10</i>	384 / Year	TBD in 2026
		Budget	\$165,000 /year	
Operations	Ensure assets are in safe and acceptable condition.	% of planned annual Condition Assessment Program completed	100% (2024)	100% annually
		Budget	\$350,000/year	
Operations	Ensure assets and services are legislatively compliant	Completed annual cultural heritage report for the province (2024)	100% Compliant	100% Compliant
		Budget	\$275,000 per rating	
Operations	Ensure assets and services are legislatively compliant	# of request to open moveable bridges	60 Openings / year	60 Openings / year
		Budget	\$40,000 / year	\$40,000 / year
Operations	Ensure assets are in safe and acceptable condition	# of bridges washed each year	115 structures	115 structures
		Budget	\$175,000 / year	\$175,000 / year
Maintenance	Moveable bridge maintenance program	# of bridge maintenance projects completed	2-5 projects/year	2-5 projects/year
		Budget	\$175,000 / year	
Maintenance	Debris cleanout	Public Works - # of Work orders	2 times per year on large bridges	TBD in 2026
		Budget	\$20,000 / year	
Renewal	Ensure assets are in safe and acceptable condition.	# of Minor Culverts Replaced annually	100 / year	TBD in 2026
		Budget	\$350,000 / year	

It is important to monitor the service levels regularly as circumstances can and do change. Current performance is based on existing resource provision and work efficiency. It is acknowledged changing circumstances such as technology and customer priorities will change over time.

Proposed Level of Service

O.Reg 588/17 mandates that every municipality define its proposed level of service. The chart below illustrates the existing level of service compared to the proposed level. The planned budget reflects the funds currently available, while the required budget for the proposed level indicates whether an increase in funding is necessary to achieve the desired service level.

Level of Service Statement	Current LOS	Current Budget	Proposed LOS	Required to achieve the Proposed LOS
Chatham Kent will maintain its bridges & culverts greater than 3 m in good conditions, on average over the 10-year planning horizon	Average conditions are good	\$16.5 million on average annually	Average condition is good	+ \$12 million annually
Chatham Kent will achieve its Asset Renewal Funding Ratio (ARFR) sustainability target of 60 % over the 10- year planning horizon	44 % (ARFR)	\$12.1 million on average annually (for renewal activities only)	60 % (ARFR)	+ \$8.6 million annually

5.0 FUTURE DEMAND

5.1 Demand Drivers

Drivers affecting demand include things such as population change, regulations, changes in demographics, seasonal factors, vehicle ownership rates, consumer preferences and expectations, technological changes, economic factors, agricultural practices, environmental awareness, etc.

5.2 Demand Forecasts

The present position and projections for demand drivers that may impact future service delivery and use of assets have been identified and documented.

5.3 Demand Impact and Demand Management Plan

The impact of demand drivers that may affect future service delivery and use of assets are shown in **Table 5.3.1.**

Demand for new services will be managed through a combination of managing and upgrading existing assets and providing new assets to meet demand. Demand management practices can include non-asset solutions, insuring against risks and managing failures.

Opportunities identified to date for demand management are shown in **Table 5.3.1**. Further opportunities will be developed in future revisions of this DAMP.

Demand driver	Current position	Projection 10 Years	Impact on services	Demand Management Plan
Legislative Requirements per O.Reg. 472/10: Standard for Bridges	Ontario Structure Instruction Manual (OSIM) inspections completed bi- annually	Requirements or frequency of inspections may change	Resources (staff and financial) for CK to meet legislative requirements	Consultant hired for bi- annual OSIM inspections, alternating half of the structures each year
Cultural Heritage Evaluation Reports (CHER)	Heritage Impact Assessments (HIA) completed for bridges with heritage value	Additional costs for bridge and culvert renewal projects to accommodate additional widths for active transportation facilities	Potential delays in project timelines and increased costs for compliance and preservation efforts	Engage consultants and finalize HIA reports early in bridge renewal planning to assess project scope and cost impacts

Table 5.3.1: Demand Management Plan

Demand driver	Current position	Projection 10 Years	Impact on services	Demand Management Plan
Expansion of Active Transportation Network	Discontinuities in active transportation network at structures	Increase in demand for active transportation routes throughout the Municipality	Additional costs for bridge & culvert renewal projects to accommodate additional widths for active transportation facilities	Project budgets for structures on identified active transportation routes to include additional costs
Changes to the Canadian Highway Bridge Design Code (CHBDC)	Bridge & culvert maintenance and renewal projects are designed in accordance with the CHBDC	Additional requirements related to climate change may be introduced	Additional renewal costs associated with the increase in requirements in the CHBDC	Monitor proposed changes to the CHBDC and forecast cost implications for future renewal projects and include in budgets
Species at Risk (SAR) Requirements	SAR screening and mitigation plans are carried out in accordance with legislative requirements	Requirements may increase	Additional costs and time required to complete the SAR screening process and resultant mitigation plans	Conduct environmental impact assessments early and integrate SAR considerations into the scope and cost of the project

The rise in Chatham-Kent's population may require the bridge and culvert network to expand its services and will drive the demand for additional assets and staff to support the agreed upon level of service.

This plan aims to anticipate and address future needs comprehensively. However, the current infrastructure resources are limited and may prove insufficient over the entire planning period and as such, expansion would not be recommended if sustainability cannot be achieved.

5.4 Asset Programs to meet Demand

The new assets required to meet demand may be acquired, donated or constructed. Acquiring new assets will commit the Chatham-Kent to ongoing operations, maintenance and renewal costs for the period that the service provided from the assets is required. These future costs are identified and considered in developing forecasts of future operations, maintenance and renewal costs for inclusion in the long-term financial plan.

6.0 RISK MANAGEMENT PLANNING

Risk Management is defined in ISO 31000:2018 as: Coordinated activities to direct and control with regard to risk'. The purpose of infrastructure risk management is to document the findings and recommendations resulting from the periodic identification, assessment and treatment of risks associated with providing services from infrastructure, using the fundamentals of International Standard ISO 31000:2018 Risk management – Principles and guidelines.

Chatham Kent is developing and implementing a formalized risk assessment process to identify risks associated with service delivery and to mitigate risks to tolerable levels. The assessment will identify risks that will result in:

- loss or reduction in service
- personal injury
- environmental impacts
- a 'financial shock'
- reputational impacts
- other consequences

The risk assessment process identifies credible risks, the likelihood of the risk event occurring, and the consequences should the event occur. The risk assessment will also include the development of a risk rating, evaluation of the risks and development of a risk treatment plan for those risks that are deemed to be non-acceptable.

6.1 Critical Assets

Critical assets are defined as those which have a high consequence of failure causing significant loss or reduction of service. Critical assets have been identified and along with their typical failure mode, and the impact on service delivery, are summarized in **Table 6.1.1**. Failure modes may include physical failure, collapse or essential service interruption.

Table 6.1.1 Critical Assets

Critical Asset(s)	Failure Mode	Impact
Bridges & Culverts	Degraded condition, insufficient maintenance, design flaws, overloading, erosion	Impacts on customers drive quality, increased customer complaints, road closures, reputational harm, increased maintenance or renewal costs
Minor Culverts	Inadequate capacity to handle peak flow during heavy rainfall resulting in soil erosion, sinkholes, settlement/heaving	May cause a temporary road closure, increased reactive maintenance costs, impact on customers who use impacted roadways (increased travel times)

By identifying critical assets and failure modes an organization can ensure that investigative activities, condition inspection programs, maintenance and capital expenditure plans are targeted at critical assets.

6.2 Risk Assessment

The risk management process used by Chatham Kent is an analysis and problem- solving technique designed to provide a logical process for the selection of response plans and management actions to protect the community against unacceptable risks. The process is based on the fundamentals of **International Standard ISO 31000:2018.**

The risk assessment process identifies credible risks, the likelihood of the risk event occurring, the consequences should the event occur, development of a risk rating, evaluation of the risk and development of a risk treatment plan for non-acceptable risks.

An assessment of risks associated with service delivery will identify risks that will result in loss or reduction in service, personal injury, environmental impacts, a 'financial shock', reputational impacts, or other consequences.

Critical risks are those assessed with 'Very High' (requiring immediate corrective action), and 'High' (requiring corrective action) risk ratings identified in the infrastructure risk management plan. **Table 6.2.1.** shows the initial asset registry risk assessment completed for the DAMP. Future iterations of the risk assessment will include residual risk and treatment costs of implementing the selected treatment plan. It is essential that these critical risks and expenses are reported to management and Council.

Asset Providing the Service	What can Happen	Risk Rating	Possible Cause	Existing controls
Bridges & Culverts	Deterioration of the inventory results in reduced loads or closing of structures	Medium	Aging inventory and lack of preventative maintenance and renewals,	Regular inspections resulting in maintenance and renewal actions so lifecycle activities can be prioritized
Bridges & Culverts	Structures are not adequate to handle flows because of storm events	Low- Medium	Increased flows because of higher intensity storms that were not accounted for with the original design	Hydraulic analysis is completed on structures that are being replaced and sized accordingly
Moveable Bridges	Not operable when required	Medium	Moveable bridges with old components that fail without warning Difficult to find replacements parts	Regular inspection and maintenance programs to reduce risk of sudden failures.
Unassumed Bridges & Culverts	Structure must have load restrictions or could fail	Low	Unclear ownership of structure allows it to deteriorate due to lack of maintenance or inspection	If a structure is deemed to be owned by CK it will be included in bi-annual OSIM inspections
Bridges & Culverts	The cost of maintenance and renewals is higher than expected	High	Inflation related to construction materials, fuel and wages results in additional project costs	Future budgets are prepared with conservative inflation amounts and contingencies to account for potential increases
Bridges & Culverts	The cost of maintenance and renewals is higher than expected	Medium	Lack of contractor availability results in higher than budgeted maintenance and renewal costs	Where possible, projects are tendered with two- year construction windows to allow for flexibility in construction timing

Table 6.2.1: Risks and Treatment Plans

6.3 Infrastructure Resilience Approach

The resilience of the bridge & culverts critical infrastructure is vital to the ongoing provision of services to customers. To adapt to changing conditions Chatham-Kent needs to understand its capacity to 'withstand a given level of stress or demand', and to respond to possible disruptions to ensure continuity of service.

Resilience recovery planning, financial capacity, climate change risk assessment and crisis leadership. Currently, bridge & culvert does not measure resilience in service delivery. This will be included in future iterations of the DAMP.

6.4 Service and Risk Trade-Offs

The decisions made to adopt this DAMP are based on the objective of achieving the optimum benefits from the available resources.

6.4.1 What Cannot Be Done

There are some operations and maintenance activities and capital projects that are unable to be undertaken within the next 10 years. These include:

- Increase the levels of operation, maintenance and renewal activities
- Mitigate all risks
- Ensure all reactive maintenance projects can be fully funded
- Ensure that all future renewals outside of the planning period can be completed due to the scope of the plan being limited to a 10-year planning horizon

6.4.2 Service Trade-Off

If there is forecast work (operations, maintenance, renewal, acquisition or disposal) that cannot be undertaken due to available resources, then this will result in service consequences for users. These service consequences could include:

- As the condition of the infrastructure continues to deteriorate, it will result in a lower level of service that could include temporary closures or longer-term closures.
- Limiting hours of operations if facilities fall into a poor condition
- Unable to expand the hours of operation
- Limiting future development for future customers

6.4.3 Risk Trade-Off

The operations and maintenance activities and capital projects that cannot be undertaken may sustain or create risk consequences. These risk consequences include:

• Over the long term without sufficient funding and as the condition of assets deteriorates, they may become unsafe

• If buildings and land improvement assets do not meet current standards, the Municipality could be at risk of litigation should an incident occur

These actions and expenditures are considered and included in the forecast costs, and where developed, the risk management plan.

7.0 Climate Change Adaptation

Climate change will have a significant impact on assets and the services they provide. In the context of the asset management planning process climate change can be considered as both a future demand and a risk. How climate change impacts assets will vary depending on the location and the type of services provided, as well as how staff respond to and manage those impacts.

As a minimum, I.E.S. will consider how to manage its existing bridge & culvert assets given potential climate change impacts for the region. Climate change will have a significant impact on the assets Chatham-Kent manages and the services they provide. This can include:

- Impacting asset lifecycle costs
- Affect the level of service that can be provided
- Increase demand for services
- Impact risks involved with delivery services

In the context of the asset management planning process, climate change can be both a demand and a risk. How climate change impacts on assets will vary depending on the location and the type of services provided, as well as the way in which CK responds and manages those impacts. There have been many weather and climate-related impacts on the CK community, including the following:

- Extended summer heat waves in 2017 and 2018
 Severe rainstorms of 2018 (and related flooding)
 Unseasonably wet spring and fall of 2019, which impacted crop production
- Record-breaking water levels within river systems and the Great Lakes in 2019 and early 2020 caused major erosion and flooding issues in the community. This included the closures of Erie Shore Drive, the Talbot Trail, and Rose Beach Line, etc.

Recognizing these continuing climate change impacts, Council declared a climate emergency in Chatham-Kent on July 15, 2019 and directed municipal staff to develop a climate change action plan (CCAP) to reduce CK's contribution to climate change (known as climate mitigation) and to enhance the community's resiliency to climate change (known as climate adaptation).

The Municipality of Chatham-Kent is currently in the process of completing its CCAP, which will be presented to Council and the public by the end of 2024. The CCAP actions that will be presented in the CCAP report document will be used to inform the Climate Section of the DAMPs in 2025. The CCAP actions will also be presented within the departments that will be responsible for their completion.

Based on the Climate Atlas of Canada, historical climate patterns show that CK's climate has become hotter, wetter and wilder over the last 6 decades and this trend is expected to continue in the future.

Hotter: Average annual temperatures have risen by 0.5°C and are expected to rise between 3.5°c and 5.8°c by the 2080s.

Wetter: Average annual precipitation has increased by 49.8mm (1.96in) and is expected to increase between 78mm and 127mm (5in) by the 2080s.

Wilder: Rainstorms have increased in frequency and severity and seasonal precipitation patterns have changed and this is expected to continue.

"From 1983 to 2008, insurers spent on average \$400 million yearly on catastrophic claims; since 2009, the yearly average has risen to almost \$2 billion. These "once in 100 years" events are



happening more frequently and are becoming more severe and more costly." (Statistics Canada, 2024)

Risks and opportunities identified to date are shown in Table 7.0.1.

Table 7.0.1 Managing	the Impact of	Climate Change on	Assets and S	Services

Climate Impact (Assets level or Service level)	Projected Position (in 10 years)	Potential Impact on Assets & Services	Climate Management Plan
Increase in extreme weather events i.e. storms	Increase in frequency and severity	Structures may need to be sized larger to accommodate the increased flow in the watercourse and additional erosion protection measures may be required	Assess design storm requirements and adjust as required for key transportation corridors, potential structure replacements for undersized/problematic structures.
Changes to Canadian Bridge Design Code due to climate change.		Additional requirements and changes to the design loads in the Canadian Bridge Design Code Increased maintenance and renewal cost.	Additional costs are required to meet the updated design requirements.
Increased water causing erosion and debris in drains getting stuck on structures resulting in water flow blockages, higher maintenance costs and slope failures.	Increase in frequency and severity	Water flow blockages, higher maintenance costs and slope failures.	Increased maintenance of drains/structures prone to debris accumulation, replacing structures prone to debris accumulation and higher slope/erosion protections costs.
Increased freeze/thaw cycles accelerate deterioration of surface and bridge joints	Increased frequency	Reduced useful life, increased maintenance activities and costs, reduced levels of service	Develop a renewal schedule and continue to develop proactive maintenance schedules. Continue to increase budget to ensure sufficient funds are available
Increased precipitation increases floodings of bridge structure	+45mm annually	May require temporary closures which could impact emergency service response times	Assess design storm requirements and adjust as required for key transportation corridors, potential structure replacements for undersized/problematic structures.

Climate change has become a pressing issue, impacting various elements of the bridge and culvert network. Additionally, the way in which Chatham-Kent constructs new assets should recognize that there is an opportunity to build resilience to climate change impacts. Building resilience can have the following benefits:

- Assets will withstand the impacts of climate change
- Services levels can be sustained
- Assets that can endure may lower the lifecycle cost and reduce their carbon footprint

The impact of climate change on assets is a new and complex discussion and further opportunities will be developed in future revisions of this DAMP.

8.0 FINANCIAL SUMMARY

8.1 Financial Sustainability and Projections

This section outlines the financial requirements derived from the data in the preceding sections of this DAMP. The financial forecasts will be refined through ongoing discussions about the desired service levels and asset management expertise within Chatham-Kent matures. It is crucial to align the budgeting process, the Long-Term Financial Plan, and the DAMPs to ensure that all the bridge and culvert networks' assets' needs are addressed while the municipality establishes a definitive financial strategy with measurable goals and targets.

Effective assets and financial management will enable staff to ensure its bridge and culvert services provide the appropriate level of service for the community to achieve its goals and objectives. Reporting to stakeholders on service and financial performance ensures the Municipality is transparently fulfilling its stewardship responsibilities. Long-term financial planning (LTFP) is critical to ensure the bridge & culvert networks lifecycle activities such as renewals, operations, maintenance, and acquisitions can happen at the optimal time.

8.1.1 Sustainability of service delivery

Two key indicators of sustainable service delivery are considered in the DAMP for this service area. The two indicators are the:

- Asset Renewal Funding Ratio (proposed renewal budget for the next 10 years / proposed renewal outlays for the next 10 years shown in the DAMP)
- Lifecycle Funding Ratio (proposed lifecycle budget for the next 10 years / proposed lifecycle outlays for the next 10 years shown in the DAMP)

Asset Renewal Funding Ratio (ARFR) – 40%

The Asset Renewal Funding Ratio is an important indicator and illustrates that over the next 10 years Chatham-Kent has insufficient renewals funding to address its needs for the current planning period. As the DAMP evolves the planning horizon will extend from 10 years to 20 years and at that time there may be significant renewal activities identified. Each year the bridge & culvert DAMP will be updated to acknowledge the financial realities of the available budget and how those realities will impact the current level of service set by Council.

Lower ARFR typically occurs due to:

- Chronic underinvestment
- A lack of permanent infrastructure funding from senior levels of government
- A freeze on funding allocations from senior levels of government
- Large spikes of growth throughout the years

The ARFR is a stewardship measure and is an indicator in determining

if Chatham-Kent is achieving intergenerational equity. Ensuring sufficient financial resources are allocated to renewing assets is essential to achieve sustainability. Funding the ARFR over time so the bridge & culvert network can meet its financial target is essential to ensure the service is considered sustainable.

If assets are not renewed at the appropriate time, it will inevitably require difficult trade-off choices that could include:

- A reduction of the level of service and availability of assets;
- Increased complaints and reduced customer satisfaction;
- Increased reactive maintenance and renewal costs; and
- Damage to Chatham-Kents reputation and risk of fines or legal costs

Future bridge & culvert DAMPs will align with the planned LTFP. This approach will enable staff to devise options and strategies for addressing future long-term renewal rates challenges. Chatham-Kent plans to reassess its renewal allocations after the full inventory is verified and consolidated.

Lifecycle Funding Ratio – 10-year financial planning period - (LFR)

The current 10-year Lifecycle Funding Ratio is 44%.

This DAMP identifies the forecast operations, maintenance and renewal costs required to provide an agreed, and affordable level of service to the community over a 10-year period. This provides input into 10-year financial and funding plans aimed at providing the required services in a sustainable manner. This forecast work should be compared to the proposed budget over the first 10 years of the planning period to identify any funding shortfall.

The 10-year Lifecycle Financial Ratio evaluates the planned budget against the lifecycle forecast to ensure optimal operation, maintenance, and renewal of assets, aiming to deliver a consistent level of service over the 10 -year planning period. As with the Asset Renewal Funding Ratio (ARFR), the ideal range for this ratio is between **90-110%.** A ratio below this range suggests that the funding for assets is not sufficient to fulfill the organization's commitments to risk management and service levels.

Financial Gap Analysis

Budget Projections	Financial Measure
Projected Budget (10 Years)	\$165,882,000
Forecast Costs (10 Years)	\$381,110,000
Annual Average Shortfall	\$21,522,000
Total Shortfall over 10-year planning horizon	\$209,470,000

The annual 'gap' of **\$21.5 million** indicates that I.E.S. has **44** % of the forecasted costs required in the forecasted budget to provide the services documented in this DAMP. The current gap indicates that the current level of service is unaffordable and must be addressed.

Completely funding an annual funding shortfall or funding 'gap' cannot be addressed immediately. The overall gap in funding for each of Chatham-Kent's services will require vetting, planning and resources to begin to incorporate gap management into future budgets. This gap will need to be managed over time to reduce it sustainably and limit financial shock to customers.

Options for managing the gap include:

- **Financing strategies** increased funding, grant opportunities, envelope funding for specific lifecycle activities, long-term debt utilization
- Adjustments to lifecycle activities increase/decrease maintenance or operations, increase/decrease frequency of renewals, extend estimated service life, limit acquisitions or dispose of underutilized assets
- Influence level of service Changing expectations or demand drivers

These options and others will allow the I.E.S. to ensure that the bridge and culvert networks gaps would be managed appropriately to ensure the level of service outcomes the customers desire are achieved. Providing sustainable services from infrastructure requires the management of service levels, risks, forecast outlays and financing to eventually achieve a lifecycle funding ratio (LFR) of **90-110%** over the next **30** years.

8.2 Forecast Costs (outlays) for the Long-Term Financial Plan

Table 8.2.1 shows the forecast costs (outlays) required for consideration in the 10-year long-term financial plan (LFTP). Providing services in a financially sustainable manner requires a balance between the forecast outlays required to deliver the agreed service levels with the planned budget allocations in the long-term financial plan.

Any gap between the forecast outlays and the amounts allocated in the financial plan indicates further work is required on reviewing service levels in the DAMP and/or financial projections in the LTFP. The initial DAMP only attempts to quantify the financial gap for the service and future plans will focus on the methods and strategies to manage that gap over time to achieve sustainable services and intergenerational equity.

The forecast costs needed to provide bridge and culvert services documented in this DAMP are accommodated in the proposed budget and available reserves, and hence there is no Current Gap for the 10-year planning period. Chatham-Kent will manage any 'gap' by developing this DAMP to provide guidance on future service levels and resources required to provide these services in consultation with the community.

Year	Acquisition	Operation	Maintenance	Renewal	Disposal
2024		\$1,236,000	\$5,848,000	\$133,166,000	
2025		\$1,262,000	\$5,000,000	\$48,848,800	
2026		\$1,300,000	\$5,150,000	\$11,775,000	
2027		\$1,339,000	\$5,300,000	\$11,790,000	
2028		\$1,379,000	\$5,459,000	\$11,964,000	
2029		\$1,420,000	\$5,623,000	\$25,110,000	
2030		\$1,463,000	\$5,791,000	\$17,687,000	
2031		\$1,507,000	\$5,965,000	\$11,411,000	
2032		\$1,552,00	\$6,144,000	\$10,411,000	
2033		\$1,598,000	\$6,328,000	\$28,286,000	

Table 8.2.1: Forecast Costs (outlays) for the Long-Term Financial Plan 2025 - 2034

8.3 Funding Strategy

The proposed funding for assets is outlined in the operational budget and 10-year capital budget. These operational and capital budgets determine how funding will be provided, whereas the DAMP typically communicates how and when this will be spent, along with the service and risk consequences.

Future iterations of the DAMP will provide more detailed service delivery options and alternatives to optimize limited financial resources.

8.4 Valuation Forecasts

Asset values are forecast to increase as additional assets are added into service. As projections improve and can be validated with market pricing the net valuations will increase significantly. Additional assets will add to the operations and maintenance needs in the longer term. Additional assets will also require additional costs for future renewals. Any additional assets will also be added to future depreciation forecasts. Any disposal of assets would decrease the operations and maintenance needs in the longer term and would remove the high costs of renewal obligations. At this time, it is not possible to separate the disposal costs from the renewal or maintenance costs, however this will be improved for the next iteration of the plan.

8.4.1 Asset valuations

The best estimate of the value of assets included in this DAMP are shown below. The assets are valued utilizing Current Replacement Cost (Market Prices Index). **Table 8.4.2 Asset valuation table**

Assets Valuation	Financial Value
Replacement Cost (Gross)	\$1,486,928,000
Depreciable Amount	\$1,486,928,000
Annual Depreciation Expense	\$18,539,000

8.5 Key Assumptions Made in Financial Forecasts

In compiling this DAMP, it was necessary to make some assumptions. This section details the key assumptions made in the development of this DAMP and should provide readers with an understanding of the level of confidence in the data behind the financial forecasts.

Key assumptions made in this DAMP are:

- Assumptions were made regarding the existing and planned budget for maintenance, and renewal, using professional judgement.
- Omission of select disposal assets during this budget period; small projects will have a minor impact on disposal projections.
- Budgets have been allocated based on the best available data on assets.
- An annual inflationary amount has been applied to the operational and maintenance forecast to reflect the projections that costs will increase over time. Depending on the activity the forecasted inflation ranges from 0.5% 3%.

8.6 Forecast Reliability and Confidence

The forecast costs, proposed budgets, and valuation projections in this DAMP are based on the best available data. For effective asset and financial management, it is critical that the information is current and accurate. Data confidence is classified on an **A** - **E level scale** in accordance with **Table 8.6.1**.

Table 8.6.1: Data Confidence Grading System

Confidence Grade	Description
A. Very High	Data based on sound records, procedures, investigations and analysis, were documented properly and agreed as the best method of assessment. The dataset is complete and estimated to be accurate ± 2%.
B. High	Data based on sound records, procedures, investigations and analysis, is documented properly but has minor shortcomings, for example, some of the data is old, some documentation is missing and/or reliance is placed on unconfirmed reports or some extrapolation. The dataset is complete and estimated to be accurate \pm 10%.
C. Medium	Data based on sound records, procedures, investigations and analysis which is incomplete or unsupported, or extrapolated from a limited sample for which grade A or B data are available. Dataset is substantially complete but up to 50% is extrapolated data and accuracy estimated ± 25%.
D. Low	Data is based on unconfirmed verbal reports and/or cursory inspections and analysis. Dataset may not be fully complete, and most data is estimated or extrapolated. Accuracy ± 40%.
E. Very Low	None or very little data was held.

The estimated confidence level for and reliability of data used in this DAMP is shown in **Table 8.6.2**.

Table 8.6.2: Data Confidence Assessment for Data used in DAMP

Data	Confidence Assessment	Comment
Demand drivers	High	Sufficient information to provide high quality information for demand drivers.
Growth projections	High	Growth projections are reliable. Growth will be reviewed annually to ensure staff is aware and ensure it can be properly resourced.
Acquisition forecast	High	There is sufficient data to reliably forecast the acquisitions with a high level of confidence.
Operation forecast	Medium	The financial projections are satisfactory, but additional work is needed to provide essential metrics and technical levels of service.
Renewal forecast - Asset values	High	The valuations are updated biennially by consultants and are of high quality.
Asset useful lives	Medium	Must align with TCA practices. Several assets still need additional evaluation to confirm that their useful lives are suitable for financial modeling.
Condition modeling	Medium	Major assets have a formalized methodology for condition modelling; however, the minor culverts have no condition data and are based on age and anecdotal information.
Disposal forecast	Low	Work will be required to improve models and determine if any assets should be considered for disposal.

The estimated confidence level for and reliability of data used in this DAMP is considered to be **medium-high** confidence Level.

9.0 PLAN IMPROVEMENT AND MONITORING

Status of asset management Practices *

9.1. Accounting and financial data source

This DAMP utilizes accounting and financial data. The source of the data is Chatham Kents 2025 - 2027 Multi-Year Budget (Capital & Operating)

- Internal Market Price Valuations
- AM Software Multi-Year Forecasting Models
- Council Reports
- Financial Exports from various software's and systems.
- Procurement documents

9.2. Asset management data sources

This DAMP also utilizes asset management data. The sources of the data are:

- Asset Registers
- AM Data Collection Templates
- Insurance Data
- Tangible Capital Asset Data
- OSIM Bridge inspection data Condition Data
- Inspection Logs and internal staff reports
- Subject matter expert knowledge and anecdotal Information

9.3. Continuous Improvement Plan

It is important that Chatham-Kent recognizes areas within the DAMP and within its planning processes that require future improvements to ensure effective asset management and informed decision making. The tasks listed below are essential to improving the DAMP and the Municipality's ability to make evidence based and informed decisions. These improvements span from improved lifecycle activities, improved financial planning, and plans to physically improve the assets.

The improvement plan, **Table 9.3.1**, highlights proposed improvement items that will require further discussion and analysis to determine feasibility, resource requirements and alignment to current workplans. Future iterations of this DAMP will provide updates on these improvement plans. The costs and resources to complete each of these tasks have not been included in the lifecycle models to date, and resource requirements would need to be reviewed for internal resource driven projects. The improvement plan generated from this DAMP is shown in **Table 9.3.1**.

Table 9.3.1: Continuous Improvement Plan

Task No.	Task	Responsibility	Resources Required	Timeline
1	Identify and inventory all minor culverts in the Right of Way	I.E.S.	2 summer students/quadrant x 4 years, GIS layer and support	2025 - 2030
2	Develop and update 10-year capital plan for bridge and culvert rehabilitation/replacement	I.E.S.	Within existing capacity	2025 - 2026
3	Identify, inventory and create inspection, rehabilitation and replacement program for access structures within the right-of-way	I.E.S.	Within existing capacity	2025 - 2026
4	Track work orders in alignment with asset management plans (roads, bridges & culverts) and activity type (maintenance, operations, renewal etc.)	P.W., A&QM	Within existing Capacity	2026- ongoing
5	Develop standard operating procedure to update GIS data once various lifecycle activities have been completed on an asset	A&QM, IES	Within existing capacity	2025 - 2026
6	Develop divestment strategy for bridges and culverts for inclusion in the capital budget	IES	Within existing capacity	2025 - 2026

The improvements detailed above are intended to ensure that the Chatham-Kents Bridge & culvert assets are able to achieve a sustainable service level over the next **20** - **30 years**. Some of the initiatives are required to meet legislative requirements and other initiatives are to improve services or data quality. All initiatives are intended to find financial efficiencies or are required to improve planning and lifecycle activities such as operational and maintenance activities.

Certain improvements can be accomplished within staffing capacity and should be included as work plan for staff upon Council's approval of the DAMP. Other initiatives necessitate resources beyond those allocated in the current budget. Should resources be inadequate for the identified items, the strategy is to postpone the initiative until it can be funded. Annually, the DAMP will be revised to align Continuous Improvement items with the opportunities and constraints of the budgetary provisions.

9.4 Monitoring and Review Procedures

This DAMP will be reviewed during the annual budget planning process and revised to show any material changes in service levels, risks, forecast costs and proposed budgets as a result of budget decisions. The DAMP will be reviewed and updated annually to ensure it represents the current service level, asset values, forecast operations, maintenance, renewals, acquisition and asset disposal costs and planned budgets. These forecast costs and proposed budget are essential to ensure the Long-Term Financial Plan can be completed.

The DAMP has a maximum life span of one year and will be updated annually. This plan will receive complete revision and update in 2027 to enable the Chatham Kent bridge & culvert to be prepared for the 2028 four-year budget process.

9.5 Performance Measures

The effectiveness of this DAMP can be measured in the following ways:

- The degree to which the required forecast costs are identified in this DAMP are incorporated into the long-term financial plan.
- The degree to which the 1–5-year detailed works programs, budgets, business plans and corporate structures consider the 'global' work program trends provided by the DAMP.
- The degree to which the existing and projected service levels and service consequences, risks and residual risks are incorporated into the Strategic Planning documents and associated plans.
- The Asset Renewal Funding Ratio achieves the Organizational target (this target is often 90 100%).

Appendix A - Provincially Mandated Levels of Service Information

As per O.Reg 588/17 there several mandatory levels of service required to be reported within the DAMP.

Service Attribute	Community Levels of Service	Technical Levels of Service	
Scope	Description of the traffic that is supported by municipal bridges (e.g., heavy transport vehicles, motor vehicles, emergency vehicles, pedestrians, cyclists).	Percentage of bridges in the municipality with loading or dimensional restrictions.	
Quality	 Description or images of the condition of bridges and how this would affect use of the bridges. 	• For bridges in the municipality, the average bridge condition index value.	
	 Description or images of the condition of culverts and how this would affect use of the culverts. 	 For structural culverts in the municipality, the average bridge condition index value. 	

Required Community L.O.S.

1. Description of the traffic that is supported by municipal bridges.

Municipal bridges support heavy transportation vehicles, motor vehicles, emergency vehicles, public transit, pedestrians, cyclist, farm implements.

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

These are identified in chapter 2 of this DAMP on page 13.

3. Description or images of the condition of culverts and how this would affect use of the culverts.

These images and descriptions are in Chapter 2 on page 13.

Required Technical L.O.S.

Service Attribute	Technical Level of Service	Measure
Scope	Percentage of bridges in the municipality with loading or dimensional restrictions	1%
Quality 1	For bridges in the municipality, the average bridge condition index value	Good
Quality 2	For structural culverts in the municipality, the average bridge condition index value	Good

Document Control

Rev No.	Date	Revision Details	Author	Reviewer	Approver
1	April 28, 2025	1 st Plan	Sean Hilderley	Edward Soldo	Council

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