

Advancing and Integrating Municipal Natural Asset Management through Asset Management Planning in Ontario



DECEMBER, 2019

THE MUNICIPAL NATURAL ASSETS INITIATIVE: INVESTING IN NATURE

The Municipal Natural Assets Initiative (MNAI) was launched in 2015 to refine and scale up a pioneering approach by which the value of natural asset-based solutions to municipal service delivery can be understood, measured and managed within asset management frameworks increasingly used by local governments. This approach is termed municipal natural asset management and MNAI’s goal is to make it mainstream across Canada.

MNAI is changing the way Canadian municipalities deliver everyday services, increasing the quality and resilience of infrastructure at often lower costs and reduced risk. The MNAI team provides scientific, economic and municipal expertise to support local governments in identifying, valuing and accounting for natural assets in their financial planning and asset management programs, and in developing leading-edge, sustainable and climate resilient infrastructure.

OTHER MNAI REPORTS

- 1. *What are Municipal Natural Assets? – Defining and Scoping Municipal Natural Assets*
- 2. *Advancing Municipal Natural Asset Management Through Financial Planning and Reporting: Learning from the Town of Gibsons’ Experience*
- 3. *Advancing Municipal Natural Asset Management Through Collaborative Strategies for Private Lands*
- 4. *Advancing Municipal Natural Asset Management Through Professional Planning: Twelve Action Steps*
- 5. *Advancing Municipal Natural Asset Management Through Infrastructure Funding Opportunities*

Full reports, summary reports, and many other resources are available at www.mnai.ca

ACKNOWLEDGEMENTS

MNAI acknowledges the funding and support that the Friends of the Greenbelt Foundation has provided for this report. Many thanks for input and peer review are also due to James Lane (York Region), Mike Wilson (Ontario Ministry of Infrastructure), and Donna Chiarelli, Planet A Consulting.

Prepared by: Sara Justine Wilson

TABLE OF CONTENTS

Summary4

1. Our current infrastructure challenge6

2. Municipal Natural Asset Management.....7

3. Ontario’s Regulation for Asset Management Planning for Municipal Infrastructure (O. Reg. 588/17).....9

4. Building a Municipal Asset Management System under the Requirements of O. Reg. 588/17..... 10

 Step One: Municipal asset management policy 11

 Step Two: Municipal asset management strategy (optional under O. Reg. 588/17)..... 12

 Step Three: Municipal asset management plan 13

5. Integrating Natural Asset Management into Infrastructure Asset Management under O. Reg. 588/17 18

 1: Establish Appropriate Governance for Natural Asset Management Planning 21

 2: Provide Policy Direction to Include Natural Assets in a Municipal Asset Management Policy 21

 3: Assess Current Natural Asset Management Practices and Information Gaps..... 21

 4: Integrate Natural Assets into a Municipal Asset Management Strategy..... 22

 5: Develop a Natural Assets Inventory..... 22

 6: Identify Risks..... 23

 9: Integrate Climate Change Measures into Natural Asset Management Planning 24

 10: Align Natural Asset Management Planning with Long-Term Financial Planning..... 25

 11: Implement an Integrated Approach to Asset Management Planning for Built Infrastructure and Natural Assets 25

 12: Align Natural Asset Management Planning with Ontario’s Land-use Planning..... 25

 13: Progress Measurement and Review 25

6. Case Studies: Municipal Natural Asset Management Planning 27

 Case Study #1: An Integrated Approach to Asset Management in the City of Toronto’s Corporate Asset Management Framework (July 2019)..... 27

 Case Study #2: Developing a Municipal Natural Asset Management Plan - York Region’s Green Infrastructure Asset Management Plan (2017)..... 28

7. Next Steps..... 29

Appendix A: Ontario Regulation 588/17: Asset Management Planning for Municipal Infrastructure 30

APPENDIX B: Building natural asset management planning into the Federation of Canadian Municipality’s (FCM) Asset Management Readiness Scale 41

Resources..... 49

SUMMARY

According to the 2019 Canadian Infrastructure Report Card (CIRC), much of Canada’s municipal infrastructure is aging and about one-third of it is in poor or very poor condition.¹ That means it needs attention immediately or within the next five years. Local governments are struggling to meet the need to renew aging infrastructure while also managing growth and demand for new infrastructure assets.²

To address this challenge, Canadian municipalities are beginning to adopt asset management as a strategic business process to effectively manage infrastructure over its whole life. Asset management enables municipalities to balance the full costs and risks of infrastructure in order to optimize service delivery and provide the best value to the community.

Natural assets include forests, rivers, wetlands, and green spaces. They can provide services such as water filtration, stormwater management, climate regulation, and recreational opportunities, many of which are, in a local government context, core municipal services. However, natural assets have not typically been categorized or valued as municipal assets, and there has been little guidance as to how they should be incorporated into the asset management process.

This is starting to change as a growing number of municipalities in Canada are developing natural asset inventories and implementing natural asset management projects.³ Local governments that are undertaking natural asset management initiatives provide evidence of the significant value of natural assets and the services they provide.

With the introduction of O. Reg. 588/17, *Asset Management Planning for Municipal Infrastructure*, Ontario became the first province in Canada to regulate asset management planning at the municipal level. In accordance with the regulation, municipalities are required to inventory, value, and integrate green infrastructure, including natural infrastructure and by extension natural assets, into their asset management planning wherever these assets are directly owned by the municipality or included on the municipality’s consolidated financial statements.

O. Reg. 588/17 required all municipalities in Ontario to have a strategic asset management policy in place by July 1, 2019. Policies are to include components such as the goals, policies, and plans supported by a municipality’s asset management plan; a process to consider asset management in the municipality’s budgeting and financial planning processes; principles to guide the municipality’s asset management planning; considerations around climate change and its impacts on municipal infrastructure; a process to align plans with the provincial land-use planning framework; and, a commitment to public consultation.

In addition to their strategic asset management policy, the regulation also requires all 444 Ontario municipalities to prepare an asset management plan for core infrastructure assets by July 1, 2021, and in respect of all other municipal infrastructure assets by July 1, 2023. The definition of core municipal infrastructure found in the regulation includes water, wastewater, and stormwater management assets, including green infrastructure assets, as well as roads, bridges, and culverts. The regulation defines green infrastructure as infrastructure assets consisting of natural or human-made elements that provide ecological and hydrological functions and processes. Based on this definition, municipalities should be considering natural assets when preparing their asset management plans.

1 *Monitoring the State of Canada’s Core Public Infrastructure: Canadian Infrastructure Report Card 2019*. Available at: <http://canadianinfrastructure.ca/downloads/canadian-infrastructure-report-card-2019.pdf>

2 Federation of Canadian Municipalities. 2018. *How to develop an asset management policy, strategy and governance framework: Setting up a consistent approach to asset management in your municipality*. Available at: <https://fcm.ca/Documents/programs/LAMP/how-to-develop-asset-management-policy-strategy-en.pdf>.

3 Town of Gibsons. 2017. *Advancing Municipal Natural Asset Management: The Town of Gibsons experience in financial planning & reporting*. Available at <https://mnai.ca/media/2018/01/GibsonsFinancialPlanningReport-WEB.pdf>; *Municipal Natural Assets Initiative: Town of Oakville. Full Technical Report*. <https://mnai.ca/media/2018/07/MNAI-oakville-final.pdf>; York Region. 2017. *Green Infrastructure Asset Management Plan*. Environmental Services, York Region; MNAI. 2018. *Municipal Natural Assets Initiative. Results from the First National Cohort*. Decision-Maker Summary. <https://institute.smartprosperity.ca/sites/default/files/spmnaijuly31-summaryweb.pdf>

The purpose of this report is threefold:

1. to outline the requirements specified in O. Reg. 588/17 as they relate to integrating natural assets and natural asset management into standard asset management practices;
2. to explain the strategic opportunities and advantages to municipalities and their communities in adopting natural asset management, which range from providing cost-effective services to supporting climate mitigation and adaptation; and
3. to explain how natural asset management can be integrated into standard asset management practices, through a thirteen-step framework for implementing natural asset management.

Given that the regulation came into effect in January 2018 and its requirements are being phased in over 6 years (2019-2024), municipalities are somewhat limited in their experience with the interpretation and implementation of the regulation. This includes the ways in which natural assets and climate change considerations can be integrated into planning processes in ways that meets the requirements of the regulation. As such, the process of integration is subject to revision and incremental improvement over time as Ontario municipalities gain experience implementing the requirements of the regulation at the local level. Future research could therefore be undertaken to provide further guidance on how municipalities have and can continue to align natural asset management planning with climate change adaptation and mitigation measures as well as the provincial land-use planning framework.

1. OUR CURRENT INFRASTRUCTURE CHALLENGE

Local governments across Canada are facing significant challenges with the current state of municipal infrastructure. According to the 2019 Canadian Infrastructure Report Card (CIRC), our infrastructure is at risk, with a significant proportion of municipal infrastructure in fair, poor, and very poor condition. Approximately one-third of municipal infrastructure now requires renewal or replacement.⁴

About 50 per cent of Canada’s public infrastructure is owned and maintained by local governments that are responsible for providing core services such as drinking water, wastewater and stormwater management, transportation, and recreation. Municipal governments have limited sources for revenue in Canada, and therefore struggle to meet the demands of renewing and expanding infrastructure assets.⁵ Therefore, many communities have an aging and deteriorating infrastructure asset base, with limited revenues to renew or replace those assets.

As a result of these challenges, local governments are seeking cost-effective strategies to deliver their services in more sustainable ways. Modern asset management has emerged as a structured discipline that provides a process to support sustainable service delivery.⁶ Asset management can help municipalities identify opportunities to meet service objectives. It provides local governments with a structured way of tracking investments, asset condition and performance, lifecycle costs, as well as current and projected risks to assets. Thus, asset management provides an integrated strategic approach to enable improved planning and management for both existing and new assets over their full lifecycle to maximize benefits, reduce risks, and provide satisfactory levels of service in a manner that achieves sustainable and resilient communities.⁷

4 *Monitoring the State of Canada’s Core Public Infrastructure: Canadian Infrastructure Report Card 2019*. Available at: <http://canadianinfrastructure.ca/downloads/canadian-infrastructure-report-card-2019.pdf>

5 Federation of Canadian Municipalities. 2018. *How to develop an asset management policy, strategy and governance framework: Setting up a consistent approach to asset management in your municipality*. Available at: <https://fcm.ca/Documents/programs/LAMP/how-to-develop-asset-management-policy-strategy-en.pdf>.

6 Ibid.

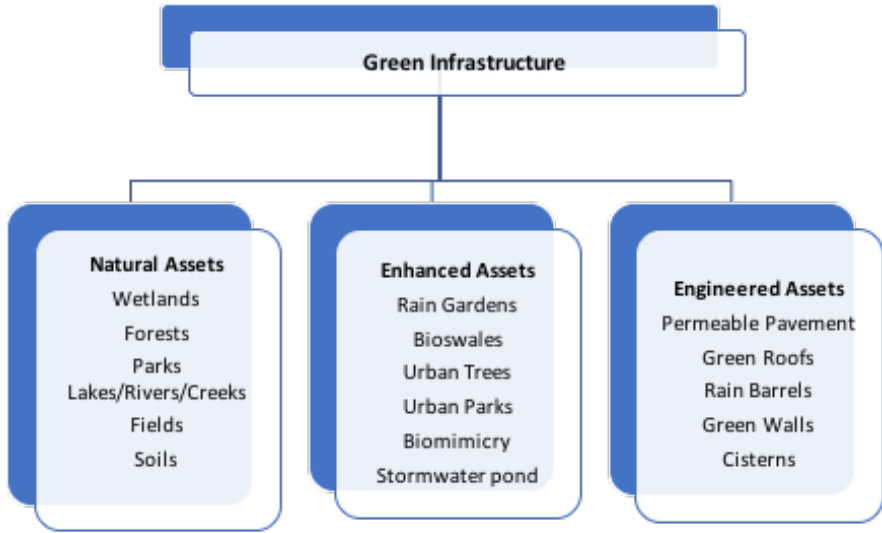
7 Canadian Network of Asset Managers. 2018. *Asset Management 101: The What, Why, and How for your Community*. CNAM. Available at: <https://cnam.ca/resources/>

2. MUNICIPAL NATURAL ASSET MANAGEMENT

Municipal natural assets refer to the stocks of natural resources or ecosystems that contribute to the provision of one or more services required for the health, well-being and long-term sustainability of a community and its residents.⁸ The terms natural asset and green infrastructure have also often been used interchangeably; however, green infrastructure refers to a broader set of assets that includes natural assets, but also includes designed and engineered elements created to mimic natural functions and processes, such as green roofs and rain gardens (Figure 1).⁹

As noted, natural assets provide services such as water filtration, stormwater management, climate regulation, and recreational opportunities, i.e. services that fall within the realm of municipal responsibilities.¹⁰

Figure 1: Green Infrastructure: Natural Assets, Enhanced Assets and Engineered Assets



Box 1: Definitions of Green Infrastructure Assets and Natural Assets (MNAI 2017)

Green Infrastructure Assets

According to The Asset Management Planning for Municipal Infrastructure Regulation (O. Reg. 588/17), green infrastructure assets are infrastructure assets consisting of natural or human-made elements that provide ecological and hydrological functions and processes including natural heritage features and systems, parklands, stormwater management systems, street trees, urban forests, natural channels, permeable surfaces, and green roofs.

Municipal Natural Assets

Municipal natural assets refer to the stocks of natural resources or ecosystems that contribute to the provision of one or more services required for the health, well-being and long-term sustainability of a community and its residents. (Municipal Natural Assets Initiative, 2017)

8 MNAI. 2017. *Defining and Scoping Municipal Natural Assets*. Available at: <https://mnai.ca/media/2018/02/finaldesignedsept18mnai.pdf>

9 Ibid.

10 MNAI. 2017. *Defining and Scoping Municipal Natural Assets*. <https://mnai.ca/media/2018/02/finaldesignedsept18mnai.pdf>

Modern asset management focuses on an integrated system to provide sustainable municipal services, rather than focusing solely on each asset.¹¹ Natural assets are a critical part of this system that can support municipalities in managing service delivery so that it is cost-effective and sustainable. Traditionally, natural assets have not been considered core municipal assets, and until recently, there has been little guidance on how to incorporate natural assets into municipal asset management planning. This is starting to change as a growing number of municipalities in Canada are developing natural asset inventories and implementing natural asset management projects, using asset management planning as an effective platform on which this work can be based.¹²

Local governments that are undertaking natural asset management initiatives provide evidence of the significant value of natural assets and the services they provide. Natural assets are cost-effective, resilient, and can deliver several municipal services more efficiently than costly engineered alternatives (Table 1).¹³ In addition, natural asset management is aligned with O Reg. 588/17’s requirement to incorporate climate change considerations into asset management. Natural assets support climate mitigation and adaptation by virtue of being low carbon assets that act as carbon sinks (reducing greenhouse gas emissions) and they build resiliency to climate change impacts (e.g. flood mitigation, erosion control).

Table 1: Municipal Water Services Provided by Natural Assets and Engineered Replacements

Municipal Water Services	Ecosystem Service	Natural Asset	Engineered Replacement
Drinking Water Supply	Aquifer Recharge	Aquifer & Source Water Area	Pipes for bringing in water supply
	Lake Recharge	Lake Watershed	Water Treatment Plant
	River Headwaters	Headwater lands	
Drinking Water Treatment		Wetlands, forests, vegetation	Water Treatment Plant
	Water Filtration	Wetlands, forests, vegetation	Water Treatment Plant
Stormwater Management	Rainwater Absorption	Wetlands, forests, vegetation	Stormwater pipes, culverts, storm drains, stormwater ponds
	Rainwater Filtration	Wetlands, forests, vegetation	
Flood Mitigation	Rainwater Absorption	Wetlands, forests, vegetation	Dams, retaining walls, embankments

11 MNAI. 2018. Municipal Natural Assets Initiative. Results from the First National Cohort. Decision-Maker Summary. <https://institute.smartprosperity.ca/sites/default/files/spmnaijuly31-summaryweb.pdf>

12 Town of Gibsons. 2017. Advancing Municipal Natural Asset Management: The Town of Gibsons experience in financial planning & reporting. Available at <https://mnai.ca/media/2018/01/GibsonsFinancialPlanningReport-WEB.pdf>; Municipal Natural Assets Initiative: Town of Oakville. Full Technical Report. <https://mnai.ca/media/2018/07/MNAI-oakville-final.pdf>; York Region. 2017. Green Infrastructure Asset Management Plan. Environmental Services, York Region; MNAI. 2018. Municipal Natural Assets Initiative. Results from the First National Cohort. Decision-Maker Summary. <https://institute.smartprosperity.ca/sites/default/files/spmnaijuly31-summaryweb.pdf>

13 Ibid.

The definition of municipal infrastructure asset found in O. Reg. 588/17 makes reference to green infrastructure, which is separately defined within the regulation, as noted above, and includes natural infrastructure (i.e. natural assets). In accordance with the regulation, municipal asset management plans must include assets that meet the definition of municipal infrastructure asset, starting with core infrastructure by July 1, 2021 and all other infrastructure by July 1, 2023. As such, municipalities should be considering what natural assets fall within the definition of municipal infrastructure assets and associated regulatory timelines.

3. ONTARIO’S REGULATION FOR ASSET MANAGEMENT PLANNING FOR MUNICIPAL INFRASTRUCTURE (O. REG. 588/17)

In 2011, the Ontario Ministry of Infrastructure (MOI) released the government’s long-term vision for infrastructure in its 10-year infrastructure plan, *Building Together*. The plan was designed to improve the government’s infrastructure planning and decision-making. This was followed by the *Infrastructure for Jobs and Prosperity Act, 2015*, which established the province’s infrastructure planning principles and policies in legislation. In 2017, the government released a second long-term plan, *Building Better Lives: Ontario’s Long-Term Infrastructure Plan*. One of the foundations of Ontario’s infrastructure planning is improved municipal asset management planning. O. Reg. 588/17 was enacted in 2017 under the *Infrastructure for Jobs and Prosperity Act, 2015*, and came into effect in January 2018.¹⁴

O. Reg. 588/17 is intended to bring greater standardization and consistency to municipal asset management planning in Ontario to help municipalities make well-informed, evidence-based investment decisions.

The regulation includes progressive requirements over three phases that began in July 2019, followed by the phasing in of additional requirements in 2021, 2023, and 2024 (see Box 2).¹⁵ For a detailed outline of the requirements under the regulation see Appendix A.

Box 2: Timelines from The Asset Management Planning for Municipal Infrastructure Regulation (O. Reg. 588/17)

July 1, 2019 – municipalities are required to prepare and publish a strategic asset management policy

July 1, 2021 – municipalities are required to develop enhanced asset management plans for their core infrastructure assets including current levels of services

July 1, 2023 – municipalities are required to develop asset management plans for all of their other infrastructure assets, including updates for core infrastructure assets, if applicable

July 1, 2024 – municipalities are required to develop asset management plans for all of their infrastructure assets, including proposed levels of service and other financial information

14 Available at: <https://www.ontario.ca/laws/regulation/r17588>
15 Ibid

4. BUILDING A MUNICIPAL ASSET MANAGEMENT SYSTEM UNDER THE REQUIREMENTS OF O. REG. 588/17

Box 3: Asset Management Definitions

Asset management is defined as an integrated approach, involving all organization departments, to effectively manage existing and new assets to deliver services to customers. The intent is to maximize benefits, reduce risks and provide satisfactory levels of service to the community in a sustainable manner – providing an optimum balance. Good asset management practices are fundamental to achieving sustainable communities.

An asset management system is a set of interrelated and interacting elements of an organization, whose elements include the asset management policy, objectives, and the processes needed to achieve those objectives. The elements of the asset management system are a set of tools, including policies, strategies, plans, businesses processes and information systems, which are integrated to ensure that the asset management activities will be delivered. (Source: ISO 55000:2014)

An asset management policy articulates the intentions and direction of an organization as formally expressed by its top management. The principles by which the organization intends to apply asset management to achieve its organizational objectives should be set out in an asset management policy. (Source: ISO 55000:2014)

An asset management strategy specifies how organizational objectives are to be translated into asset management objectives, the approach for developing asset management plans, and the role of the asset management system in supporting achievement of the asset management objectives. The approach to implementing the principles from the asset management policy, and role of the asset management system in meeting the objectives. This includes identifying the structures, roles, and responsibilities necessary to establish the system and operate it effectively (Source: ISO 55000:2014)

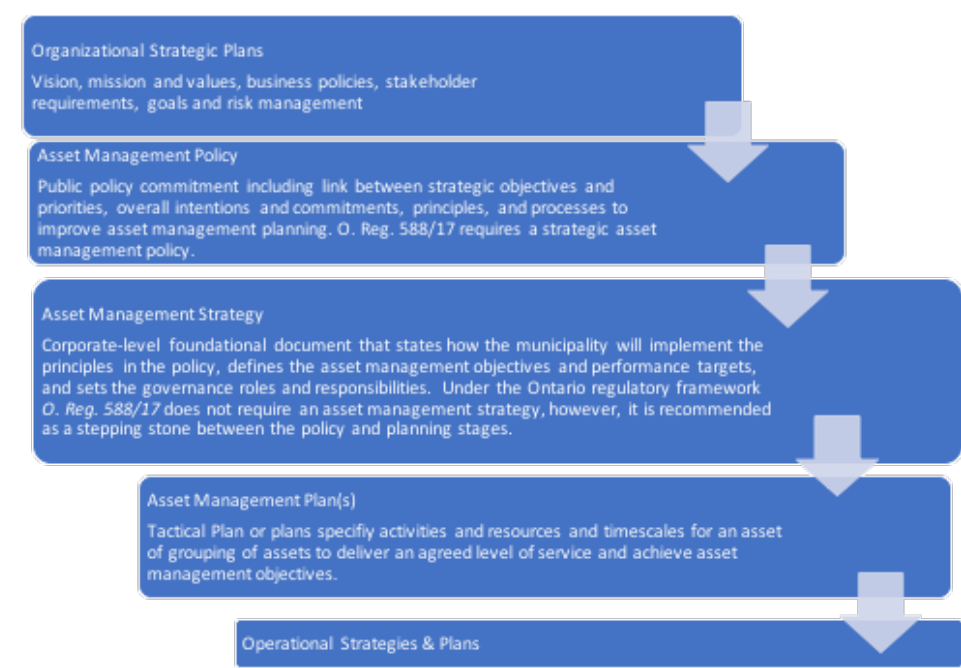
From: FCM. 2018. *How to Develop an Asset Management Policy, Strategy and Governance Framework*. Federation of Canadian Municipalities. Ottawa. Available at: <https://fcm.ca/en/resources/mamp/guidebook-how-develop-asset-management-policy-and-strategy>

Municipalities can develop a modern integrated asset management system using the municipality’s strategic plan as an initial foundation, which would be followed by an asset management policy, an asset management strategy, and an asset management plan (Figure 2).

The Federation of Canadian Municipalities (FCM) has developed several guidance documents to support municipalities in developing an asset management system, including *The Asset Management Readiness Scale*, and *How to Develop an Asset Management Policy, Strategy and Governance Framework*.¹⁶ Similarly, the Municipal Finance Officers’ Association of Ontario (MFOA) has the *Asset Management Framework: A guide to asset management for municipalities* and the *Strategic Asset Management Policy Toolkit* to support asset management policies for municipalities in Ontario.¹⁷

16 FCM. 2018. *How to Develop an Asset Management Policy, Strategy and Governance Framework*. Federation of Canadian Municipalities. Ottawa. <https://fcm.ca/en/resources/mamp/guidebook-how-develop-asset-management-policy-and-strateg>; FCM. *Asset Management Readiness Scale*. Municipal Asset Management Program. <https://fcm.ca/en/resources/mamp/tool-asset-management-readiness-scale>
17 Municipal Finance Officers’ Association of Ontario. 2018. *Asset Management Framework: A guide to asset management for municipalities*. <http://mfoa-amp.ca>; Municipal Finance Officers’ Association of Ontario. 2019. *Strategic Asset Management Policy Toolkit*. https://www.mfoa.on.ca/mfoa/MAIN/MFOA_Policy_Projects/Strategic_Asset_Management_Policy_Toolkit

Figure 2: Municipal Asset Management System¹⁸



Step One: Municipal asset management policy

A municipal asset management policy formalizes the corporate-level commitment to asset management, and identifies connections between the organization’s strategic objectives and the management of infrastructure assets. The policy sets the municipality’s principles and processes for asset management. It also scopes the municipality’s asset classes, systems, the municipal services covered by the policy, and the governance framework identifying the people responsible for implementing the policy.

The municipal asset management policy is important to ensure effective, long-term implementation of asset management practices. It sets out clear guidance for council and staff by providing consistent and integrated direction for the development of asset management strategies and planning across the organization.

O. Reg. 588/17 requires all municipalities in Ontario to prepare a strategic asset management policy that must include:¹⁹

1. Any of the municipality’s goals, policies or plans that are supported by its asset management plan.
2. The process by which the asset management plan is to be considered in the development of the municipality’s budget or of any long-term financial plans of the municipality that take into account municipal infrastructure assets.
3. The municipality’s approach to continuous improvement and adoption of appropriate practices regarding asset management planning.
4. The principles to be followed by the municipality in its asset management planning, which must include the principles set out in section 3 of the *Infrastructure for Jobs and Prosperity Act*.

18 FCM. 2018. How to develop an asset management policy, strategy and governance framework. Federation of Canadian Municipalities. Ottawa. <https://fcm.ca/en/resources/mamp/guidebook-how-develop-asset-management-policy-and-strategy>.

19 Available at: <https://www.ontario.ca/laws/regulation/r17588>

5. The municipality’s commitment to consider, as part of its asset management planning,
 - i. the actions that may be required to address the vulnerabilities that may be caused by climate change to the municipality’s infrastructure assets, in respect of such matters as: a) operations, such as increased maintenance schedules; b) levels of service; and, c) lifecycle management;
 - ii. the anticipated costs that could arise from the vulnerabilities described in subparagraph 1;
 - iii. adaptation opportunities that may be undertaken to manage the vulnerabilities described in subparagraph 1;
 - iv. mitigation approaches to climate change, such as greenhouse gas emission reduction goals and targets; and,
 - v. disaster planning and contingency funding.
6. A process to ensure that the municipality’s asset management planning is aligned with the following financial plans:
 - i. financial plans related to the municipality’s water assets including any financial plans prepared under the *Safe Drinking Water Act*, 2002; and,
 - ii. financial plans related to the municipality’s wastewater assets.
7. A process to ensure that the municipality’s asset management planning is aligned with Ontario’s land-use planning framework, including any relevant policy statements issued under subsection 3 (1) of the *Planning Act*, any provincial plans as defined in the *Planning Act*, and the municipality’s official plan.
8. An explanation of the capitalization thresholds used to determine which assets are to be included in the municipality’s asset management plan and how the thresholds compare to those in the municipality’s tangible capital asset policy, if it has one.
9. The municipality’s commitment to coordinate planning for asset management, where municipal infrastructure assets connect or are interrelated with those of its upper-tier municipality, neighbouring municipalities or jointly-owned municipal bodies.
10. The persons responsible for the municipality’s asset management planning, including the executive lead.
11. An explanation of the municipal council’s involvement in the municipality’s asset management planning.
12. The municipality’s commitment to provide opportunities for municipal residents and other interested parties to provide input into the municipality’s asset management planning.

Under O. Reg. 588/17, every municipality was required to prepare its first strategic asset management policy by July 1, 2019, and must undertake review and, if necessary, update the policy at least every five years.

Step Two: Municipal asset management strategy (optional under O. Reg. 588/17)

A municipal asset management strategy (often referred to as a strategic asset management plan), is a corporate-level document that provides guidance on how the organization plans to achieve its asset management objectives, and how it will implement the asset management principles set out in its asset management policy to deliver municipal services. O. Reg. 588/17 does not require municipalities to prepare an asset management strategy; however, it is recommended as an essential part of a municipal asset management system.²⁰

The main role of the asset management strategy is to provide direction for how the municipality will put the asset management policy into practice. The key elements of an asset management strategy include:

- scoping the municipality’s asset types or groupings, and the respective departments that should be included in the asset management system;
- describing the municipality’s context, such as population needs, current levels of service and future expectations for levels of service;
- asset management decision-making processes;
- asset management objectives and performance targets;
- asset management improvement goals;
- asset management roles and responsibilities; and,
- the barriers and risks to implementing the strategy.

The strategy can include an asset management framework and an asset management governance structure. The framework can be designed as a high-level graphic overview to illustrate the key practices, processes, tools and documents that the municipality intends to develop for its asset management system, and how the different components connect to each other. The asset management governance structure formalizes how the municipality will organize itself to make decisions about its asset management objectives, and the relationship of people, practices and processes across the organization, and the accountabilities and responsibilities guiding managers in the implementation of asset management. For further guidance and templates, refer to the FCM support documents.²¹

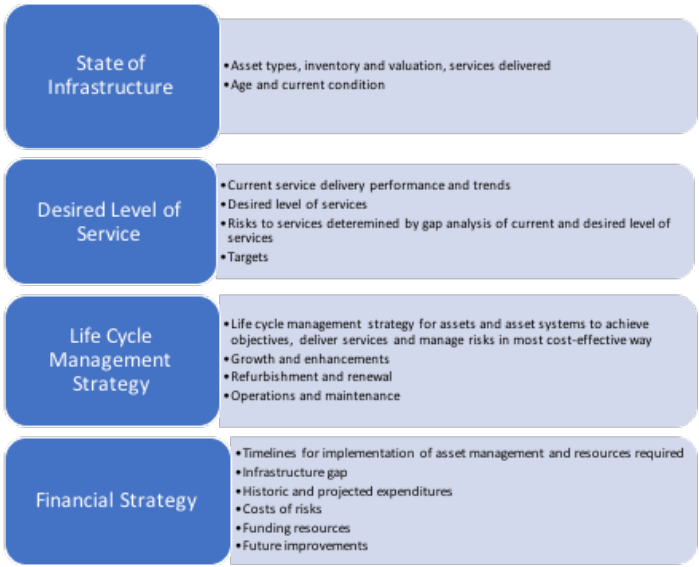
Step Three: Municipal asset management plan

A municipal asset management plan defines the state of its infrastructure assets, the current and desired levels of services, a life-cycle management strategy including the activities and the associated resources needed to deliver services, and a financial strategy to implement the plan (Figure 3). Specific activities are planned for and defined based on the principles and practices set out in the municipality’s asset management policy and strategy.

20 FCM. 2018. How to Develop an Asset Management Policy, Strategy and Governance Framework. Federation of Canadian Municipalities. Ottawa. <https://fcm.ca/en/resources/mamp/guidebook-how-develop-asset-management-policy-and-strategy>.

21 Ibid.

Figure 3: Content of a Typical Municipal Asset Management Plan



Source: Adapted from Federation of Canadian Municipalities 2019

O. Reg. 588/17 requires that all municipalities in Ontario prepare an asset management plan for core infrastructure assets by July 1, 2021, and in respect of all other municipal infrastructure assets by July 1, 2023. In accordance with the regulation, core municipal infrastructure assets include water, wastewater, and stormwater management assets, including green infrastructure assets, as well as roads, bridges, and culverts. Core infrastructure could include green infrastructure, which the regulation defines as infrastructure assets consisting of natural or human-made elements that provide ecological and hydrological functions and processes, including natural heritage features and systems, parklands, stormwater management systems, street trees, urban forests, natural channels, permeable surfaces, and green roofs.

O. Reg. 588/17 requires that municipalities provide summary-level information for each asset category in a municipal asset management plan in accordance with the phased-in schedule in O. Reg. 588/17, which must include:

1. For each asset category, the current levels of service being provided, determined in accordance with the following qualitative descriptions and technical metrics and based on data from at most, the two calendar years prior to the year of the asset management plan:
 - i. with respect to core municipal infrastructure assets, the qualitative descriptions set out in Column two and the technical metrics set out in Column three of Table 1, 2, 3, 4 or 5, as the case may be (see Appendix A); and,
 - ii. with respect to all other municipal infrastructure assets, the qualitative descriptions and technical metrics established by the municipality.

Definition of Municipal Infrastructure Assets in Ontario’s *Asset Management Planning for Municipal Infrastructure Regulation 588/17*

A “municipal infrastructure asset” means an infrastructure asset, including a green infrastructure asset, directly owned by a municipality or included on the consolidated financial statements of a municipality, but does not include an infrastructure asset that is managed by a joint municipal board. (Available at: <https://www.ontario.ca/laws/regulation/r17588>)

- 2. The current performance of each asset category, determined in accordance with the performance measures established by the municipality, and based on data from at most two calendar years prior to the year in which all information required under this section is included in the asset management plan.
- 3. For each asset category,
 - i. a summary of the assets in the category;
 - ii. the replacement cost of the assets in the category;
 - iii. the average age of the assets in the category, determined by assessing the average age of the components of the assets:
 - a. the information available on the condition of the assets in the category; and,
 - b. a description of the municipality’s approach to assessing the condition of the assets in the category, based on recognized and generally accepted good engineering practices where appropriate.
- 4. For each asset category, the lifecycle activities that would need to be undertaken to maintain the current levels of service as described in paragraph 1 (see item #1 above) for each of the 10 years following the year for which the current levels of service under paragraph 1 are determined and the costs of providing those activities based on an assessment of the following:
 - i. the full lifecycle of the assets;
 - ii. the options for which lifecycle activities could potentially be undertaken to maintain the current levels of service;
 - iii. the risks associated with the options referred to in subparagraph ii; and,
 - iv. the lifecycle activities referred to in subparagraph ii that can be undertaken for the lowest cost to maintain the current levels of service.
- 5. For municipalities with a population of less than 25,000, as reported by Statistics Canada in the most recent official census, the following:
 - i. a description of assumptions regarding future changes in population or economic activity; and,
 - ii. how the assumptions referred to in subparagraph i relate to the information required by paragraph 4.

- 6. For municipalities with a population of 25,000 or more, as reported by Statistics Canada in the most recent official census, the following:
 - i. with respect to municipalities in the Greater Golden Horseshoe growth plan area, if the population and employment forecasts for the municipality are set out in Schedule 3 or 7 to the 2017 Growth Plan, those forecasts;
 - ii. with respect to lower-tier municipalities in the Greater Golden Horseshoe growth plan area, if the population and employment forecasts for the municipality are not set out in Schedule 7 to the 2017 Growth Plan, the portion of the forecasts allocated to the lower-tier municipality in the official plan of the upper-tier municipality of which it is a part;
 - iii. with respect to upper-tier municipalities or single-tier municipalities outside the Greater Golden Horseshoe growth plan area, the population and employment forecasts for the municipality that are set out in its official plan;
 - a. with respect to lower-tier municipalities outside of the Greater Golden Horseshoe growth plan area, the population and employment forecasts for the lower-tier municipality that are set out in the official plan of the upper-tier municipality of which it is a part;
 - b. if, with respect to any municipality referred to in subparagraph iii or iv, the population and employment forecasts for the municipality cannot be determined as set out in those subparagraphs, a description of assumptions regarding future changes in population or economic activity; and,
 - c. for each of the 10 years following the year for which the current levels of service under paragraph 1 are determined, the estimated capital expenditures and significant operating costs related to the lifecycle activities required to maintain the current levels of service in order to accommodate projected increases in demand caused by growth, including estimated capital expenditures and significant operating costs related to new construction or to upgrading of existing municipal infrastructure assets.

Further, in accordance with O. Reg. 588/17, by July 1, 2024, each municipal asset management plan must include:

- 1. For each asset category, the levels of service that the municipality proposes to provide for each of the 10 years following the year in which all information required under section 5 and this section is included in the asset management plan, determined in accordance with the following qualitative descriptions and technical metrics:
 - a. with respect to core municipal infrastructure assets, the qualitative descriptions set out in Column two and the technical metrics set out in Column three of Table 1, 2, 3, 4 or 5; and,
 - b. with respect to all other municipal infrastructure assets, the qualitative descriptions and technical metrics established by the municipality.
- 2. An explanation of why the proposed levels of service under paragraph 1 are appropriate for the municipality, based on an assessment of the following:
 - a. the options for the proposed levels of service and the risks associated with those options to the long-term sustainability of the municipality;
 - b. how the proposed levels of service differ from the current levels of service set out under paragraph 1 of subsection 5 (2); and,
 - c. whether the proposed levels of service are achievable.
- 3. The proposed performance of each asset category for every year of the 10-year period referred to in paragraph 1, determined in accordance with the performance measures established by the municipality.

4. A lifecycle management and financial strategy that sets out the following information with respect to the assets in each asset category for the 10-year period referred to in paragraph 1 for the 10-year period:
- i. an identification of the lifecycle activities that would need to be undertaken to provide the proposed levels of service described in paragraph 1, based on an assessment of the following:
 - a. the full lifecycle of the assets;
 - b. the options for which lifecycle activities could potentially be undertaken to achieve the proposed levels of service;
 - c. the risk associated with the options referred to in sub-paragraph b; and,
 - d. the lifecycle activities referred to in sub-subparagraph b that can be undertaken for the lowest cost to achieve the proposed levels of service.
 - ii. an estimate of the annual costs for each of the 10 years of undertaking the lifecycle activities identified in subparagraph i, separated into capital expenditures and significant operating costs;
 - iii. an identification of the annual funding projected to be available to undertake lifecycle activities and an explanation of the options examined by the municipality to maximize the funding projected to be available;
 - iv. If, based on the funding projected to be available, the municipality identifies a funding shortfall for the lifecycle activities identified in subparagraph i:
 - e. an identification of the lifecycle activities, set out in all subparagraphs, that the municipality will undertake; and,
 - f. if applicable, an explanation of how the municipality will manage the risks associated with not undertaking any of the lifecycle activities identified in subparagraph i.
5. For municipalities with a population of less than 25,000, as reported by Statistics Canada, in the most recent official census, a discussion of how the assumptions regarding future changes in population and economic activity, informed the preparation of the lifecycle management and financial strategy referred to in paragraph 4 of this subsection.
6. For municipalities with a population of 25,000 or more, as reported by Statistics Canada in the most recent official census:
- v. the estimated capital expenditures and significant operating costs to achieve the proposed levels of service as described in paragraph 1 in order to accommodate projected increases in demand caused by population and employment growth, as set out in the forecasts or assumptions referred to in paragraph 6 of subsection 5 (2), including estimated capital expenditures and significant operating costs related to new construction or to upgrading of existing municipal infrastructure assets;
 - vi. the funding projected to be available, by source, as a result of increased population and economic activity; and,
 - vii. an overview of the risks associated with implementation of the asset management plan and any actions that would be proposed in response to those risks.
7. An explanation of any other key assumptions underlying the plan that have not previously been explained.

O. Reg. 588/17 requires that municipalities review and update their asset management plans five years after the regulation is fully phased in and at least every five years thereafter, and that every asset management plan must be endorsed by the executive lead of the municipality and approved by a resolution passed by the municipal council. In addition, O. Reg. 588/17 requires that each municipal council conduct an annual review of its asset management progress on or before July 1 of each year, beginning the year after the asset management plan is completed. This annual review must address: the municipality's progress in implementing its asset management plan; any factors impeding the municipality's ability to implement its asset management plan; and, a strategy to address the impeding factors.

5. INTEGRATING NATURAL ASSET MANAGEMENT INTO INFRASTRUCTURE ASSET MANAGEMENT UNDER O. REG. 588/17

The Town of Gibsons, B.C. was the first local government to use infrastructure and financial management concepts to improve the management of their natural assets. The town began identifying the town’s aquifer as a critical infrastructure asset for supplying residents with drinking water. They have since identified creeks, woodlands, and the foreshore as critical assets for the community, with the goal of integrating them into the asset management process. In doing so, Gibsons became the first North American municipality to recognize natural assets as municipal assets, assigning them the same status as its other infrastructure assets. Based on this pioneering work, MNAI has developed a methodology and supporting tools to help local governments inventory, value, and manage natural assets within asset management systems, and provides corresponding support and advice.²²MNAI has worked with a growing number of municipalities to scale up the Gibsons, B.C. model for integrating natural assets into asset management (see Box 4). Initially, five community pilots undertook municipal natural asset management projects. Each pilot had unique findings based on their location, level of services, and the natural assets studied. The overall conclusions were that natural assets can provide the equivalent stormwater management services as engineered built assets; and, that the results support integration of municipal natural assets into asset management planning.²³ Several studies found the replacement costs for the services provided by natural assets increased under climate change scenarios, because of factors such as increases in the magnitude and intensity of rainfall events.²⁴ For example, a larger stormwater management pond or infiltration chamber would be required to provide control for the larger inflows from the increased amounts of rainfall.²⁵

O. Reg. 588/17 requires municipalities to inventory, value, and integrate municipally-owned natural assets into municipal asset management planning where these assets meet the definition of municipal infrastructure assets as set forth in the regulation and detailed above. Municipal natural infrastructure assets that meet the regulation’s definition of water, wastewater, and stormwater management assets, must be included as core municipal assets and reported on in accordance with the regulation’s requirements by July 2021. All other municipal natural assets that meet the definition of municipal infrastructure assets need to be included in a municipality’s asset management plan by July 2023. Local governments can integrate natural assets into their asset management systems, using the following thirteen steps as a guideline (see section 4 and Appendix A for the full requirements of O. Reg. 588/17):

1. Establish the governance and decision-making frameworks for asset management such that they include representation from departments that manage natural assets, plan and manage for climate change mitigation and resilience, disaster planning, and energy use.
2. Provide policy direction to integrate municipal natural assets into infrastructure asset management in a municipal asset management policy (a strategic asset management policy under O. Reg. 588/17).
3. Assess the current asset management practices, the information available, and the data gaps for developing and implementing a natural asset management plan for the municipality’s natural assets.
4. Extend the scope of infrastructure assets to include natural assets in the municipality’s asset management strategy (if applicable).

5. Develop an inventory of the municipality’s natural assets that provides the information required for an asset management plan in accordance with O. Reg. 588/17.
6. Undertake a risk identification or assessment for natural assets identified in the natural asset inventory.
7. Undertake a valuation assessment (e.g. replacement cost) for the municipal natural assets identified in the inventory.
8. Develop one or more municipal asset management plans for the municipality’s natural assets phased-in according to the requirements and timelines of O. Reg. 588/17.
9. Establish the municipality’s commitment to consider climate change mitigation and adaptation measures in its municipal asset management policy, strategy, and planning, in accordance with the requirements of O. Reg. 588/17. Highlight the important services provided by natural assets for climate change mitigation, adaptation, and resilience.
10. Align the municipality’s natural asset management planning, as per O. Reg. 588/17, with financial plans related to the municipality’s water assets and wastewater assets.
11. Implement an integrated approach to asset management planning that includes both built infrastructure and natural assets as systems.
12. Align the municipality’s natural asset management planning with Ontario’s land-use planning framework, and the municipality’s official plan.
13. Establish a review process for measuring and reporting on indicators of progress.

22 Available at: www.mnai.ca

23 MNAI. 2018. Municipal Natural Assets Initiative: Results from the First National Cohort. Decision-Maker Summary. July 2018. Available at: <https://mnai.ca/results-from-first-national-mnai-cohort/>

24 MNAI 2018. Municipal Natural Assets Initiative: Region of Peel Pilot, Available at: https://mnai.ca/media/2018/07/MNAI_Peel-final.pdf

25 The replacement cost was used to estimate the value of natural assets. It is based on the assumption that the value of the natural assets is at least equal to the cost of replacing them with the engineered infrastructure capable of providing the same level of stormwater services.

Box 4: Natural Asset Management in Practice

Oshawa, Ontario

The City of Oshawa’s Strategic Plan identifies the need to manage and fund present and future assets, including parks and open spaces in order to ensure safe and reliable infrastructure. The City recently began work to generate a Corporate Asset Management Plan with a focus on core infrastructure assets to meet provincial legislative requirements for a strategic asset management policy. They are working with MNAI to identify and integrate natural assets into their asset management. Currently, they are creating an inventory for the Oshawa Creek watershed, a prime conveyor of stormwater to Lake Ontario. The MNAI project identified impacts on the creek areas, and operations and maintenance activities to minimize erosion, restore degraded areas. This may maximize cost savings by avoiding engineering control measures for the City.

Nanaimo, British Columbia

Nanaimo assessed the stormwater services provided by the Buttertubs Marsh Conservation Area (BMCA), a reclaimed 55-hectare wetland and floodplain adjacent to the Millstone River. They found that the BMCA provides significant flood attenuation services for downtown neighbourhoods, and the cost to replace the services with stormwater management ponds or constructed wetlands would be approximately \$4.7 million. Under climate change scenarios, the replacement values would increase to \$6.5 to \$8.2 million.

Grand Forks, British Columbia

Grand Forks assessed the mitigation benefits provided by the Kettle River Floodplain under a number of different floodplain development scenarios. Their study demonstrated the floodplain provides a minimum of \$500 to \$3,500 worth of services per hectare in flood damage reduction for downtown buildings during high flow events.

Region of Peel, Ontario

The Region of Peel assessed the stormwater quality and quantity services provided by wetlands, forests, and meadows in two watersheds. They found that the cumulative services provided by the natural assets were equivalent to mitigation of a 100-year flood, and that the value of the stormwater services was approximately \$700 million currently, with additional services worth \$64 million under climate change scenarios.

Oakville, Ontario

Oakville assessed stormwater services provided by the Maple Hurst Remnant Channel, a 240 metre plus section of a stream in an older part of the Town undergoing significant redevelopment. The results show that the channel is providing stormwater services equivalent to an engineered asset that would cost \$1.24 to \$1.44 million to replace.

West Vancouver, British Columbia

The District of West Vancouver assessed the construction costs of daylighting streams currently covered in comparison to replacement with a new culvert. They found that restoration costs to daylight and realign the creek would cost about the same as the replacement cost for the culvert (approx. \$300,000). Since then, they have inventoried and valued all natural assets in the District.

1: Establish Appropriate Governance for Natural Asset Management Planning

Establish governance that includes representation from the departments that manage built infrastructure assets and natural assets to ensure that the appropriate staff and departments are included in the municipality’s asset management planning. It is also important to include other departments relevant to the requirements of O. Reg. 588/17 such as climate change planning, land-use planning, transportation, energy use and planning, and financial planning. The governance framework and responsibilities can be formalized in the municipal asset management policy and strategy, For example, an asset management planning committee can be established to coordinate and direct the processes, planning and implementation across the municipality.

2: Provide Policy Direction to Include Natural Assets in a Municipal Asset Management Policy

The principle statements of a municipal asset management policy can provide the overarching definitions, and scope for an improved approach to asset management planning that includes natural asset management.

In alignment with the regulatory requirement to include green infrastructure that meets the definition of municipal infrastructure assets within their asset management plans, municipalities could also expressly address natural assets within their asset management policies, including their strategic asset management policy. For example, other Canadian municipalities such as the City of Edmonton, Alberta and the City of Revelstoke, British Columbia have adopted asset management policies that include natural assets within the definition of municipal infrastructure assets.

3: Assess Current Natural Asset Management Practices and Information Gaps

It is important to assess the information currently available, and the information gaps for integrating municipal natural assets into asset management planning. A first step is to review whether there is an existing inventory or reporting on the municipality’s natural asset base, and a system for storing and obtaining the data.

The FCM has developed an *Asset Management Readiness Scale* to support local governments to assess their current asset management practices to:

- understand where they are starting from;
- identify opportunities for new practices and/or formalize asset management activities into documented business practices; and,
- measure and track the progress of implementing good asset management practices.²⁶

The FCM readiness scale measures progress on asset management in five competency areas: governance and policy, people and leadership, data and information, planning and decision making and contribution to asset management practice. These areas are building blocks for improving municipal asset management planning.²⁷ Based on this, MNAI

26 FCM. *Asset Management Readiness Scale*. Municipal Asset Management Program. Available at: <https://fcm.ca/en/resources/mamp/tool-asset-management-readiness-scale>

27 Each level is broken down into three outcome areas. For each competency, natural asset management outcomes have been identified for each level across the readiness matrix. The outcomes are milestones in the process of developing an asset management system “from initial investigation of practices, to adoption, and, eventually, to full integration of asset management practices into daily routines.”

developed a guide for integrating natural assets into local government asset management processes²⁸ One of the tools in the guide provides direction on assessing the stage that a municipality is at in regard to integrating natural assets into infrastructure asset management planning using the first four competency areas of FCM's readiness scale matrix (see Appendix B).

4: Integrate Natural Assets into a Municipal Asset Management Strategy

A municipal asset management strategy is not required under O. Reg. 588/17. However, it is an important communications tool that defines how to implement the principles set out in an asset management policy. Asset management strategies generally include an asset management framework showing how the processes of the asset management system work together and interconnect; the business context and analysis for the local government's main challenges and opportunities; stakeholder needs and expectations; decision-making approach or criteria, asset management objectives and performance targets (i.e. levels of service); strategic alignment with other processes, strategies and policies; and, an improvement plan including the actions taken over short, medium and long-term.

Natural assets can be integrated into the statements, processes, and commitments of the strategy as follows:

1. Define and Integrate natural asset management planning into the municipality's asset management strategy statements;
2. Include natural asset management in the municipality's asset management framework by identifying the hierarchy of interrelationships and interdependencies for natural assets across all departments and service areas;
3. Include natural assets in the business context analysis of the municipality's main challenges;
4. Include natural assets in the setting of asset management goals and performance targets;
5. Integrate natural assets into the decision-making criteria and prioritization frameworks for infrastructure projects; and,
6. Include natural asset management in the strategic alignment framework with the municipality's processes, strategies and policies.

Asset management objectives within the strategy can guide decision-making in each service area and link asset management practices to local government strategic objectives. For example, natural assets can be integrated into:

- objectives that prioritize natural assets (over engineered assets), when they provide similar or better services with lower life-cycle costs;
- goals to meet targeted reductions in greenhouse gas emissions (GHGs), and the risks caused by the current and projected impacts of the changing climate; and,
- processes to provide opportunities for residents and other interested parties to become engaged and provide input into the municipality's asset management planning.

28 Municipal Natural Assets Initiative. 2019. Municipal Natural Assets Management: A Framework and Toolkits.

5: Develop a Natural Assets Inventory

Asset management inventories document assets owned or managed by a local government, their physical location, key services provided, known and potential risks, value, and estimate of useful life. In the case of natural assets, inventories typically require municipalities to undertake a condition assessment, risk identification, and valuation assessments.²⁹

A condition assessment process collects, organizes, and measures how well an asset is performing, and ranks it in terms of good, fair, or poor condition. For natural assets, the assessment can define the range of services provided and condition of the asset, which provides the information needed for valuation, scenario analysis, asset management and financial planning.

MNAI is currently developing and piloting detailed technical guidance for natural asset inventories.

6: Identify Risks

Once the natural asset inventory is in place, risk identification can prioritize the potential risks to natural assets and the services they provide. Potential risks or hazards (i.e., risk events) are identified as well as the likelihood of an event occurring and the associated level of impact on the provision of services (e.g. Risk = Impact x Likelihood; Table 2).

Table 2: Risk Identification Table

Natural Asset	Services	Hazards	Impact	Likelihood	Risk
Aquifer	Water Provision	Leak from gas storage tank	High	Medium	High
Wetland distant from highly populated area	Water storage	Development	High	Low	Low
Ravine in highly populated area	Stormwater absorption and flood protection	Degraded by overuse	High	High	High

7: Valuation of Natural Assets

Identifying the capital costs of built assets is fairly straightforward. In the case of natural assets, several valuation techniques have been developed, with the replacement cost approach being the most commonly used in natural asset management. This market valuation shows what the costs would be to provide a natural asset's service by an engineered replacement. This works for services that can be replaced by conventional infrastructure such as stormwater management. Other valuation tools such as damage or health costs avoided, revealed preferences, or stated preferences may be used where the service isn't easily valued through the replacement cost method (e.g. forest cover providing air pollutant reduction).

8: Develop and Implement a Municipal Natural Asset Management Plan

O. Reg. 588/17 requires an asset management plan for core municipal natural assets by July 2021, and for all other municipal natural assets by July 2023. The municipal asset management plan must include summary level information for each asset category. Given the potential regulatory requirement for municipalities to include natural assets within their asset management plans, an inventory of natural assets, including their valuation and identified risks could help municipalities meet these requirements. The specific requirements for asset management plans in accordance with O. Reg. 588/17 are detailed in Section 4 (above) and in Appendix A.

29 Municipal Natural Assets Initiative. 2019. *Municipal Natural Assets Management: A Framework and Toolkits*.

9: Integrate Climate Change Measures into Natural Asset Management Planning

The impacts of climate change mitigation and adaptation are creating opportunities and risks for the sustainable delivery of municipal services. Regional changes in the severity and frequency of extreme weather events, temperature changes, and rainfall extremes are negatively impacting municipal infrastructure systems and natural assets across Ontario. However, mitigating climate change by transitioning to low-carbon energy systems are creating opportunities for municipalities to provide clean energy, cleaner air, and new jobs.

Municipal asset management planning provides a systematic way to evaluate effective and cost-efficient measures to address climate change mitigation, adaptation, and resiliency. It provides opportunities for local governments to:

- assess strategies to reduce greenhouse gas (GHG) emissions throughout an asset’s lifecycle;
- require low-carbon design and materials, energy efficient systems, renewable energy systems, electrification of transportation, and complete communities built around public transit nodes and active transportation; and,
- prioritize investments that build resilience for infrastructure, natural assets, and communities.

O. Reg. 588/17 requires that a municipality’s asset management policy include a commitment to consider climate change as part of its asset management planning. The specific requirements are included in Section 4 (above) and in Appendix A.

Natural assets play a key role in climate change planning for mitigation, adaptation and resiliency. For example, they store carbon, mitigate storm flows, absorb flood waters, and provide protection from storm surges. They play a critical role in mitigating GHG emissions by sequestering and storing carbon. These services and values should be listed in the municipal natural asset inventory and integrated into the asset management planning.

The changing climate is increasing climate-related financial liability and disclosure risks resulting from inaction on climate change mitigation, the escalating impacts of extreme weather events and transitional policy changes. Asset management planning helps local governments manage these risks by establishing clear, documented, approved, and published levels of service that can protect against negligence claims. It also demonstrates where and how municipalities are investing in mitigation, adaptation and resilience, as well as the current state of assets and their vulnerabilities.

Langley, B.C.’s Asset Management Policy takes an integrated and systematic approach that:

Considers assets in their value context, in terms of their interrelationships and interdependencies, as opposed to optimizing of individual assets in isolation.

Implements and sustains asset management principles and practices across all departments and service areas within the organization by adopting a formal, consistent, and repeatable approach to management of its assets that will ensure services are provided in the most efficient and effective manner.

Asset Management Policy, Township of Langley, B.C.

Climate change and natural asset management

O. Reg. 588/17 requires that municipalities consider the vulnerabilities that may be caused by climate change and the mitigation approaches to reduce greenhouse gas emission goals and targets.

Natural assets play a key role in climate change planning for mitigation, adaptation and resiliency, and so it is important to identify the synergies and align natural asset management planning with climate change planning opportunities.

Further guidance and support for local governments is available through the B.C. Ministry of Municipal Affairs and Housing’s *Climate Change and Asset Management: A Sustainable Service Delivery Primer*.

10: Align Natural Asset Management Planning with Long-Term Financial Planning

To provide sustainable service delivery, asset management plans need to be integrated into an organization’s long-term financial planning. Asset management planning can identify the gaps between the long-term projected costs and the municipality’s available funding. Reconciling service levels with financial resources will enable a municipality to identify financial strategies for sustainable municipal service delivery.

O. Reg. 588/17 requires that municipalities demonstrate how their asset management planning will be considered in the development of budgets and long-term financial plans. It also requires that asset management planning is aligned with financial plans related to the municipality’s water assets and wastewater assets.

11: Implement an Integrated Approach to Asset Management Planning for Built Infrastructure and Natural Assets

Asset management planning that considers the interrelationships and interdependencies of assets and asset systems has the best outcomes for service delivery and return on investment. Asset management policies can explicitly provide an integrated, service-based approach that includes built infrastructure assets and natural assets. The Township of Langley, B.C. adopted an asset management policy that recognizes the importance of a holistic approach as opposed to optimizing individual assets in isolation.

O. Reg. 588/17 requires that the strategic asset management policy includes a process to ensure that municipal asset management planning is aligned with provincial land-use planning, growth planning, and with a municipality’s official plan.

The City of Revelstoke, B.C. has a decision-making approach in its asset management policy to include corporate, financial, business, land-use, community, environmental, social, technical and budgetary plans and perspectives.³⁰ Similarly, the City of Windsor’s 2017 *Asset Management Philosophy and Framework* recognizes asset management planning for both built and natural assets.

The City of Revelstoke, B.C., adopted an asset management policy that applies to “all infrastructure assets or asset systems (including natural assets) owned by the City and used to deliver services to the community.”

Asset Management Policy, City of Revelstoke, B.C.

12: Align Natural Asset Management Planning with Ontario’s Land-use Planning

O. Reg. 588/17 requires that a process is in place to align asset management planning with Ontario’s provincial land use planning regulatory framework and relevant policies, growth planning, and a municipality’s official plan. The specific requirements are provided in Section 4 (above) and in Appendix A.

30 Ibid.

13: Progress Measurement and Review

In accordance with O. Reg. 588/17, municipalities must review and update asset management plans at least every five years. Each plan must be endorsed by the executive lead of the municipality and approved by a resolution of the municipal council. Annual reviews must be undertaken by the municipal council on or before July 1st of each year, starting the year after completion of the asset management plan. The review must address implementation progress; identify factors impeding the municipality’s implementation of the regulatory requirements; and, include a strategy to address the impeding factors.

Asset Management BC³¹ has developed the *Service Sustainability Assessment Tool* to measure and assess sustainable service delivery. The tool’s indicators can monitor the implementation and performance of asset management planning practices. The tool is designed to report on progress measures based on the asset management planning objectives as well as outcomes identified in the municipal asset management strategy and plans.

31 Asset Management BC. Service Sustainability Assessment Tool. <https://www.assetmanagementbc.ca/resources/#toggle-id-12>

6. CASE STUDIES: MUNICIPAL NATURAL ASSET MANAGEMENT PLANNING

Case Study #1: An Integrated Approach to Asset Management in the City of Toronto’s Corporate Asset Management Framework (July 2019)

The City of Toronto developed a new corporate approach to asset management planning in 2019. It demonstrates how municipalities can move towards integrated asset management planning to guide decisions and planning across all departments. The framework is based on strategic goals and priorities and a corporate asset management policy and strategy that outline actions, resources, and accountabilities to support the development of asset management plans. The framework guides the development of consistent asset management practices across the organization positions them to align with the requirements of O. Reg. 588/17, and industry best practices.³²

The City of Toronto’s corporate asset management framework has also integrated green infrastructure into its asset management approach. The City defines green infrastructure assets as infrastructure assets “consisting of natural or human-made elements that provide ecological and hydrological functions and processes and including natural heritage features and systems, parklands, storm-water management systems, street trees, urban forests, natural channels, permeable surfaces and green roofs.”³³ The definition of green infrastructure, including natural assets, at the corporate level shows how natural assets can be integrated into strategic goals, priorities and policy. Identifying and defining green infrastructure and natural assets as infrastructure assets provides direction for departments and asset managers to integrate natural assets into their asset management planning.

Figure 4: City of Toronto’s Corporate Asset Management Framework



Source: City of Toronto Corporate Asset Management Policy. 2019

32 City of Toronto. 2019. City of Toronto Corporate Asset Management Policy. <https://www.toronto.ca/legdocs/mmis/2019/ex/bgrd/backgroundfile-133416.pdf>

33 Ibid.

Case Study #2: Developing a Municipal Natural Asset Management Plan - York Region’s Green Infrastructure Asset Management Plan (2017)

York Region is the first municipality in Ontario to develop a *Green Infrastructure Asset Management Plan*.³⁴ The plan identifies the long-term financial impacts of growth and life-cycle costs of new assets and optimizes renewal and maintenance investments across Natural Heritage and Forestry’s asset portfolios by balancing cost, risk, and levels of services to develop strategies that maximize green and natural infrastructure asset services. The plan defines green infrastructure to include natural and human-modified elements that provide ecological and hydrological functions and processes. This includes natural heritage features and systems, parklands, stormwater management systems, street trees, permeable surfaces, and green roofs.

The plan provides a roadmap for other municipalities to develop a green infrastructure and natural assets management plans. It describes the characteristics and condition of the assets, levels of expected service, actions to ensure assets are providing expected service at the lowest lifecycle cost, and financing strategies for implementation.

The purpose of York’s *Green Infrastructure Asset Management Plan* is to:

- 1. identify and value the contribution made by green infrastructure to the environmental, social, and economic wellbeing of the community and the Region’s role in the management of green infrastructure assets.
- 2. Communicate the relationship between the physical assets and the services delivered to the community.
- 3. Plan for the management of assets and provide evidence for decision making and ensure that the asset management requirements are appropriately funded, prioritized and scheduled.

York Region’s plan valued the region’s green and natural infrastructure assets at approximately \$490 million. This includes networks of protected areas, natural habitats, recreational trails, and streetscapes. They reported that approximately 98 per cent of assets are in fair, good or very good condition, and established a current maintenance and operations budget for 2017 at \$9.357 million, including \$2.667 million in reserves. They also forecasted maintenance costs for the first year and recommended \$32 million of renewal investment for existing assets over the next 10 years.

After developing their *Green Infrastructure Asset Management Plan*, York Region was able to access \$10 million in funding through Infrastructure Canada’s Disaster Mitigation and Adaptation Fund (DMAF) to mitigate extreme temperatures while reducing the impacts of flooding and erosion in the region. Importantly, the project includes planting trees and adding natural elements to increase drainage capacity to mitigate heavy rainfall events. The project is designed to protect over 1.2 million residents and save \$23.60 for every dollar invested in recovery and replacement cost.³⁵

The *Green Infrastructure Asset Management Plan* and its findings have also been integrated into York Region’s *Corporate Asset Management Plan*.³⁶ This is the Region’s first corporate-level plan, which builds upon the asset management practices implemented over the past five years. It was developed to comply with O. Reg. 588/17, and provides an inventory, and replacement costs for the Region’s assets in 13 service areas.

34 York Region. 2017. *Green Infrastructure Asset Management Plan*. York Region Environmental Services. Final Report (unpublished).

35 Available at: <https://www.canada.ca/en/office-infrastructure/news/2019/05/canada-helps-york-region-build-climate-change-resilience-through-urban-forest-restoration-and-enhancement.html>

36 York Region. 2018 *Corporate Asset Management Plan*. Available at: <https://www.york.ca/wps/wcm/connect/yorkpublic/2547467d-711b-482e-8602-0456b02bc96a/may+3+corporate+ex.pdf?MOD=AJPERES>

7. NEXT STEPS

This report provides a series of steps for integrating natural assets and climate change into municipal asset management planning.

As noted, municipalities have limited experience with the interpretation and implementation of O. Reg. 588/17, as well as how natural assets and climate change considerations will be integrated in accordance with regulatory requirements as they are phased in over time.

As such, there may be learning and updates as municipalities gain experience developing asset management planning in accordance with the regulation.

Future research could be undertaken to provide greater understanding and guidance as to how municipalities can align natural asset management planning with the provincial land-use planning and climate change planning frameworks. Another consideration is that O. Reg. 588/17 relates to assets directly owned by the municipality or included on the municipality’s consolidated financial statements. By contrast, however, MNAI has found that in general, local governments must look beyond the boundaries of public lands in order to develop an effective municipal natural asset management framework³⁷. A greater understanding of how to reconcile these imperatives could be another productive area for research.

37 See for example “Towards a collaborative strategy for municipal asset management: private lands.” February 2018. Available at MNAI.ca

APPENDIX A: ONTARIO REGULATION 588/17: ASSET MANAGEMENT PLANNING FOR MUNICIPAL INFRASTRUCTURE

ONTARIO REGULATION 588/17

made under the

INFRASTRUCTURE FOR JOBS AND PROSPERITY ACT, 2015

Made: December 13, 2017

Filed: December 27, 2017

Published on e-Laws: December 27, 2017

Printed in The Ontario Gazette: January 13, 2018

ASSET MANAGEMENT PLANNING FOR MUNICIPAL INFRASTRUCTURE

CONTENTS

Interpretation and Application	
1.	Definitions
2.	Application
Strategic Asset Management Policies	
3.	Strategic asset management policy
4.	Update of asset management policy
Asset Management Plans	
5.	Asset management plans, current levels of service
6.	Asset management plans, proposed levels of service
7.	Update of asset management plans
8.	Endorsement and approval required
9.	Annual review of asset management planning progress
10.	Public availability
Table 1	Water assets
Table 2	Wastewater assets
Table 3	Stormwater management assets
Table 4	Roads
Table 5	Bridges and culverts
Commencement	
11.	Commencement

Interpretation and Application

Definitions

1. (1) In this Regulation,

“asset category” means a category of municipal infrastructure assets that is:

- (a) an aggregate of assets described in each of clauses (a) to (e) of the definition of core municipal infrastructure asset, or
- (b) composed of any other aggregate of municipal infrastructure assets that provide the same type of service; (“catégorie de biens”)

“core municipal infrastructure asset” means any municipal infrastructure asset that is a:

- (a) water asset that relates to the collection, production, treatment, storage, supply or distribution of water,
- (b) wastewater asset that relates to the collection, transmission, treatment or disposal of wastewater, including any wastewater asset that from time to time manages stormwater,
- (c) stormwater management asset that relates to the collection, transmission, treatment, retention, infiltration, control or disposal of stormwater,
- (d) road, or
- (e) bridge or culvert; (“bien d’infrastructure municipale essentiel”)

“ecological functions” has the same meaning as in Ontario Regulation 140/02 (Oak Ridges Moraine Conservation Plan) made under the*Oak Ridges Moraine Conservation Act, 2001*; (“fonctions écologiques”)

“green infrastructure asset” means an infrastructure asset consisting of natural or human-made elements that provide ecological and hydrological functions and processes and includes natural heritage features and systems, parklands, stormwater management systems, street trees, urban forests, natural channels, permeable surfaces and green roofs; (“bien d’infrastructure verte”)

“hydrological functions” has the same meaning as in Ontario Regulation 140/02; (“fonctions hydrologiques”)

“joint municipal water board” means a joint board established in accordance with a transfer order made under the*Municipal Water and Sewage Transfer Act, 1997*; (“conseil mixte de gestion municipale des eaux”)

“lifecycle activities” means activities undertaken with respect to a municipal infrastructure asset over its service life, including constructing, maintaining, renewing, operating and decommissioning, and all engineering and design work associated with those activities; (“activités relatives au cycle de vie”)

“municipal infrastructure asset” means an infrastructure asset, including a green infrastructure asset, directly owned by a municipality or included on the consolidated financial statements of a municipality, but does not include an infrastructure asset that is managed by a joint municipal water board; (“bien d’infrastructure municipale”)

“municipality” has the same meaning as in the*Municipal Act, 2001*; (“municipalité”)

“operating costs” means the aggregate of costs, including energy costs, of operating a municipal infrastructure asset over its service life; (“frais d’exploitation”)

“service life” means the total period during which a municipal infrastructure asset is in use or is available to be

used; (“durée de vie”)

“significant operating costs” means, where the operating costs with respect to all municipal infrastructure assets within an asset category are in excess of a threshold amount set by the municipality, the total amount of those operating costs. (“frais d’exploitation importants”)

(2) In Tables 1 and 2,

“connection-days” means the number of properties connected to a municipal system that are affected by a service issue, multiplied by the number of days on which those properties are affected by the service issue. (“jours-branchements”)

(3) In Table 4,

“arterial roads” means Class 1 and Class 2 highways as determined under the Table to section 1 of Ontario Regulation 239/02 (Minimum Maintenance Standards for Municipal Highways) made under the *Municipal Act, 2001*; (“artères”)

“collector roads” means Class 3 and Class 4 highways as determined under the Table to section 1 of Ontario Regulation 239/02; (“routes collectrices”)

“lane-kilometre” means a kilometre-long segment of roadway that is a single lane in width; (“kilomètre de voie”)

“local roads” means Class 5 and Class 6 highways as determined under the Table to section 1 of Ontario Regulation 239/02. (“routes locales”)

(4) In Table 5,

“Ontario Structure Inspection Manual” means the Ontario Structure Inspection Manual (OSIM), published by the Ministry of Transportation and dated October 2000 (revised November 2003 and April 2008) and available on a Government of Ontario website; (“manuel d’inspection des structures de l’Ontario”)

“structural culvert” has the meaning set out for “culvert (structural)” in the Ontario Structure Inspection Manual. (“ponceau structurel”)

Application

2. For the purposes of section 6 of the Act, every municipality is prescribed as a broader public sector entity to which that section applies.

Strategic Asset Management Policies

Strategic asset management policy

- 3.** (1) Every municipality shall prepare a strategic asset management policy that includes the following:
- 1. Any of the municipality’s goals, policies or plans that are supported by its asset management plan.
 - 2. The process by which the asset management plan is to be considered in the development of the municipality’s budget or of any long-term financial plans of the municipality that take into account municipal infrastructure assets.
 - 3. The municipality’s approach to continuous improvement and adoption of appropriate practices regarding asset management planning.

- 4. The principles to be followed by the municipality in its asset management planning, which must include the principles set out in section 3 of the Act.
- 5. The municipality’s commitment to consider, as part of its asset management planning,
 - i. the actions that may be required to address the vulnerabilities that may be caused by climate change to the municipality’s infrastructure assets, in respect of such matters as,
 - a. operations, such as increased maintenance schedules,
 - b. levels of service, and
 - c. lifecycle management,
 - ii. the anticipated costs that could arise from the vulnerabilities described in subparagraph i,
 - iii. adaptation opportunities that may be undertaken to manage the vulnerabilities described in subparagraph i,
 - iv. mitigation approaches to climate change, such as greenhouse gas emission reduction goals and targets, and
 - v. disaster planning and contingency funding.
- 6. A process to ensure that the municipality’s asset management planning is aligned with any of the following financial plans:
 - i. Financial plans related to the municipality’s water assets including any financial plans prepared under the *Safe Drinking Water Act, 2002*.
 - ii. Financial plans related to the municipality’s wastewater assets.
- 7. A process to ensure that the municipality’s asset management planning is aligned with Ontario’s land-use planning framework, including any relevant policy statements issued under subsection 3 (1) of the *Planning Act*, any provincial plans as defined in the *Planning Act* and the municipality’s official plan.
- 8. An explanation of the capitalization thresholds used to determine which assets are to be included in the municipality’s asset management plan and how the thresholds compare to those in the municipality’s tangible capital asset policy, if it has one.
- 9. The municipality’s commitment to coordinate planning for asset management, where municipal infrastructure assets connect or are interrelated with those of its upper-tier municipality, neighbouring municipalities or jointly-owned municipal bodies.
- 10. The persons responsible for the municipality’s asset management planning, including the executive lead.
- 11. An explanation of the municipal council’s involvement in the municipality’s asset management planning.
- 12. The municipality’s commitment to provide opportunities for municipal residents and other interested parties to provide input into the municipality’s asset management planning.

(2) For the purposes of this section,

“capitalization threshold” is the value of a municipal infrastructure asset at or above which a municipality will capitalize the value of it and below which it will expense the value of it. (“seuil de capitalisation”)

Update of asset management policy

4. Every municipality shall prepare its first strategic asset management policy by July 1, 2019 and shall review and, if necessary, update it at least every five years.

Asset Management Plans

Asset management plans, current levels of service

5. (1) Every municipality shall prepare an asset management plan in respect of its core municipal infrastructure assets by July 1, 2021, and in respect of all of its other municipal infrastructure assets by July 1, 2023.

(2) A municipality’s asset management plan must include the following:

- 1. For each asset category, the current levels of service being provided, determined in accordance with the following qualitative descriptions and technical metrics and based on data from at most the two calendar years prior to the year in which all information required under this section is included in the asset management plan:
 - i. With respect to core municipal infrastructure assets, the qualitative descriptions set out in Column 2 and the technical metrics set out in Column 3 of Table 1, 2, 3, 4 or 5, as the case may be.
 - ii. With respect to all other municipal infrastructure assets, the qualitative descriptions and technical metrics established by the municipality.
- 2. The current performance of each asset category, determined in accordance with the performance measures established by the municipality, such as those that would measure energy usage and operating efficiency, and based on data from at most two calendar years prior to the year in which all information required under this section is included in the asset management plan.
- 3. For each asset category,
 - i. a summary of the assets in the category,
 - ii. the replacement cost of the assets in the category,
 - iii. the average age of the assets in the category, determined by assessing the average age of the components of the assets,
 - iv. the information available on the condition of the assets in the category, and
 - v. a description of the municipality’s approach to assessing the condition of the assets in the category, based on recognized and generally accepted good engineering practices where appropriate.
- 4. For each asset category, the lifecycle activities that would need to be undertaken to maintain the current levels of service as described in paragraph 1 for each of the 10 years following the year for which the current levels of service under paragraph 1 are determined and the costs of providing those activities based on an assessment of the following:
 - i. The full lifecycle of the assets.
 - ii. The options for which lifecycle activities could potentially be undertaken to maintain the current levels of service.
 - iii. The risks associated with the options referred to in subparagraph ii.

- iv. The lifecycle activities referred to in subparagraph ii that can be undertaken for the lowest cost to maintain the current levels of service.
- 5. For municipalities with a population of less than 25,000, as reported by Statistics Canada in the most recent official census, the following:
 - i. A description of assumptions regarding future changes in population or economic activity.
 - ii. How the assumptions referred to in subparagraph i relate to the information required by paragraph 4.
- 6. For municipalities with a population of 25,000 or more, as reported by Statistics Canada in the most recent official census, the following:
 - i. With respect to municipalities in the Greater Golden Horseshoe growth plan area, if the population and employment forecasts for the municipality are set out in Schedule 3 or 7 to the 2017 Growth Plan, those forecasts.
 - ii. With respect to lower-tier municipalities in the Greater Golden Horseshoe growth plan area, if the population and employment forecasts for the municipality are not set out in Schedule 7 to the 2017 Growth Plan, the portion of the forecasts allocated to the lower-tier municipality in the official plan of the upper-tier municipality of which it is a part.
 - iii. With respect to upper-tier municipalities or single-tier municipalities outside of the Greater Golden Horseshoe growth plan area, the population and employment forecasts for the municipality that are set out in its official plan.
 - iv. With respect to lower-tier municipalities outside of the Greater Golden Horseshoe growth plan area, the population and employment forecasts for the lower-tier municipality that are set out in the official plan of the upper-tier municipality of which it is a part.
 - v. If, with respect to any municipality referred to in subparagraph iii or iv, the population and employment forecasts for the municipality cannot be determined as set out in those subparagraphs, a description of assumptions regarding future changes in population or economic activity.
 - vi. For each of the 10 years following the year for which the current levels of service under paragraph 1 are determined, the estimated capital expenditures and significant operating costs related to the lifecycle activities required to maintain the current levels of service in order to accommodate projected increases in demand caused by growth, including estimated capital expenditures and significant operating costs related to new construction or to upgrading of existing municipal infrastructure assets.

(3) Every asset management plan must indicate how all background information and reports upon which the information required by paragraph 3 of subsection (2) is based will be made available to the public.

(4) In this section,

“2017 Growth Plan” means the Growth Plan for the Greater Golden Horseshoe, 2017 that was approved under subsection 7 (6) of the*Places to Grow Act, 2005* on May 16, 2017 and came into effect on July 1, 2017; (“Plan de croissance de 2017”)

“Greater Golden Horseshoe growth plan area” means the area designated by section 2 of Ontario Regulation 416/05 (Growth Plan Areas) made under the *Places to Grow Act, 2005*. (“zone de croissance planifiée de la région élargie du Golden Horseshoe”)

Asset management plans, proposed levels of service

6. (1) Subject to subsection (2), by July 1, 2024, every asset management plan prepared under section 5 must include the following additional information:

1. For each asset category, the levels of service that the municipality proposes to provide for each of the 10 years following the year in which all information required under section 5 and this section is included in the asset management plan, determined in accordance with the following qualitative descriptions and technical metrics:
- i. With respect to core municipal infrastructure assets, the qualitative descriptions set out in Column 2 and the technical metrics set out in Column 3 of Table 1, 2, 3, 4 or 5, as the case may be.

ii. With respect to all other municipal infrastructure assets, the qualitative descriptions and technical metrics established by the municipality.
2. An explanation of why the proposed levels of service under paragraph 1 are appropriate for the municipality, based on an assessment of the following:
- i. The options for the proposed levels of service and the risks associated with those options to the long term sustainability of the municipality.

ii. How the proposed levels of service differ from the current levels of service set out under paragraph 1 of subsection 5 (2).

iii. Whether the proposed levels of service are achievable.

iv. The municipality’s ability to afford the proposed levels of service.
3. The proposed performance of each asset category for each year of the 10-year period referred to in paragraph 1, determined in accordance with the performance measures established by the municipality, such as those that would measure energy usage and operating efficiency.
4. A lifecycle management and financial strategy that sets out the following information with respect to the assets in each asset category for the 10-year period referred to in paragraph 1:
- i. An identification of the lifecycle activities that would need to be undertaken to provide the proposed levels of service described in paragraph 1, based on an assessment of the following:

a. The full lifecycle of the assets.

b. The options for which lifecycle activities could potentially be undertaken to achieve the proposed levels of service.

c. The risks associated with the options referred to in sub-subparagraph B.

d. The lifecycle activities referred to in sub-subparagraph B that can be undertaken for the lowest cost to achieve the proposed levels of service.

ii. An estimate of the annual costs for each of the 10 years of undertaking the lifecycle activities identified in subparagraph i, separated into capital expenditures and significant operating costs.

iii. An identification of the annual funding projected to be available to undertake lifecycle activities and an explanation of the options examined by the municipality to maximize the funding projected to be available.

iv. If, based on the funding projected to be available, the municipality identifies a funding shortfall for the lifecycle activities identified in subparagraph i,

- a. an identification of the lifecycle activities, whether set out in subparagraph i or otherwise, that the municipality will undertake, and

b. if applicable, an explanation of how the municipality will manage the risks associated with not undertaking any of the lifecycle activities identified in subparagraph i.

5. For municipalities with a population of less than 25,000, as reported by Statistics Canada in the most recent official census, a discussion of how the assumptions regarding future changes in population and economic activity, set out in subparagraph 5 i of subsection 5 (2), informed the preparation of the lifecycle management and financial strategy referred to in paragraph 4 of this subsection.
6. For municipalities with a population of 25,000 or more, as reported by Statistics Canada in the most recent official census,
- i. the estimated capital expenditures and significant operating costs to achieve the proposed levels of service as described in paragraph 1 in order to accommodate projected increases in demand caused by population and employment growth, as set out in the forecasts or assumptions referred to in paragraph 6 of subsection 5 (2), including estimated capital expenditures and significant operating costs related to new construction or to upgrading of existing municipal infrastructure assets,

ii. the funding projected to be available, by source, as a result of increased population and economic activity, and

iii. an overview of the risks associated with implementation of the asset management plan and any actions that would be proposed in response to those risks.
7. An explanation of any other key assumptions underlying the plan that have not previously been explained.

(2) With respect to an asset management plan prepared under section 5 on or before July 1, 2021, if the additional information required under this section is not included before July 1, 2023, the municipality shall, before including the additional information, update the current levels of service set out under paragraph 1 of subsection 5 (2) and the current performance measures set out under paragraph 2 of subsection 5 (2) based on data from the two most recent calendar years.

Update of asset management plans

7. (1) Every municipality shall review and update its asset management plan at least five years after the year in which the plan is completed under section 6 and at least every five years thereafter.

(2) The updated asset management plan must comply with the requirements set out under paragraphs 1, 2 and 3 and subparagraphs 5 i and 6 i, ii, iii, iv and v of subsection 5 (2), subsection 5 (3) and paragraphs 1 to 7 of subsection 6 (1).

Endorsement and approval required

8. Every asset management plan prepared under section 5 or 6, or updated under section 7, must be,
- (a) endorsed by the executive lead of the municipality; and

(b) approved by a resolution passed by the municipal council.

Annual review of asset management planning progress

9. (1) Every municipal council shall conduct an annual review of its asset management progress on or before July 1 in each year, starting the year after the municipality’s asset management plan is completed under section 6.

- (2) The annual review must address,
- (a) the municipality’s progress in implementing its asset management plan;
 - (b) any factors impeding the municipality’s ability to implement its asset management plan; and
 - (c) a strategy to address the factors described in clause (b).

Public availability

10. Every municipality shall post its current strategic asset management policy and asset management plan on a website that is available to the public, and shall provide a copy of the policy and plan to any person who requests it.

WATER ASSETS

Service Attribute	Community Levels Of Service (Qualitative Descriptions)	Technical Levels Of Service (Technical Metrics)
Scope	<div>1. Description, which may include maps, of the user groups or areas of the municipality that are connected to the municipal water system.</div> <div>2. Description, which may include maps, of the user groups or areas of the municipality that have fire flow.</div>	<div>1. Percentage of properties connected to the municipal water system.</div> <div>2. Percentage of properties where fire flow is available.</div>
Reliability	Description of boil water advisories and service interruptions.	<div>1. The number of connection-days per year where a boil water advisory notice is in place compared to the total number of properties connected to the municipal water system.</div> <div>2. The number of connection-days per year due to water main breaks compared to the total number of properties connected to the municipal water system.</div>

WASTEWATER ASSETS

Service Attribute	Community Levels Of Service (Qualitative Descriptions)	Technical Levels Of Service (Technical Metrics)
Scope	Description, which may include maps, of the user groups or areas of the municipality that are connected to the municipal wastewater system.	Percentage of properties connected to the municipal wastewater system.
Reliability	<div>1. Description of how combined sewers in the municipal wastewater system are designed with overflow structures in place which allow overflow during storm events to prevent backups into homes.</div> <div>2. Description of the frequency and volume of overflows in combined sewers in the municipal wastewater system that occur in habitable areas or beaches.</div> <div>3. Description of how stormwater can get into sanitary sewers in the municipal wastewater system, causing sewage to overflow into streets or backup into homes.</div> <div>4. Description of how sanitary sewers in the municipal wastewater system are designed to be resilient to avoid events described in paragraph 3.</div> <div>5. Description of the effluent that is discharged from sewage treatment plants in the municipal wastewater system.</div>	<div>1. The number of events per year where combined sewer flow in the municipal wastewater system exceeds system capacity compared to the total number of properties connected to the municipal wastewater system.</div> <div>2. The number of connection-days per year due to wastewater backups compared to the total number of properties connected to the municipal wastewater system.</div> <div>3. The number of effluent violations per year due to wastewater discharge compared to the total number of properties connected to the municipal wastewater system.</div>

STORMWATER MANAGEMENT ASSETS

Service Attribute	Community Levels Of Service (Qualitative Descriptions)	Technical Levels Of Service (Technical Metrics)
Quality	Description, which may include maps, of the user groups or areas of the municipality that are protected from flooding, including the extent of the protection provided by the municipal stormwater management system.	<div>1. Percentage of properties in municipality resilient to a 100-year storm.</div> <div>2. Percentage of the municipal stormwater management systemresilient to a 5-year storm.</div>

ROADS

Service Attribute	Community Levels Of Service (Qualitative Descriptions)	Technical Levels Of Service (Technical Metrics)
Scope	Description, which may include maps, of the road network in the municipality and its level of connectivity.	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 municipality.
Quality	Description or images that illustrate the different levels of road class pavement condition.	<div><div>1.</div><div>For paved roads in the municipality, the average pavement condition index value.</div></div> <div><div>2.</div><div>For unpaved roads in the municipality, the average surface condition (e.g. excellent, good, fair or poor).</div></div>

BRIDGES AND CULVERTS

Service Attribute	Community Levels Of Service (Qualitative Descriptions)	Technical Levels Of Service (Technical Metrics)
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	<div><div>1.</div><div>Description or images of the condition of bridges and how this would affect use of the bridges.</div></div> <div><div>2.</div><div>Description or images of the condition of culverts and how this would affect use of the culverts.</div></div>	<div><div>1.</div><div>For bridges in the municipality, the average bridge condition index value.</div></div> <div><div>2.</div><div>For structural culverts in the municipality, the average bridge condition index value.</div></div>

Commencement

Commencement

11. This Regulation comes into force on the later of January 1, 2018 and the day it is filed.

APPENDIX B: BUILDING NATURAL ASSET MANAGEMENT PLANNING INTO THE FEDERATION OF CANADIAN MUNICIPALITY’S (FCM) ASSET MANAGEMENT READINESS SCALE

**Natural asset management outcomes are shown in blue italics.*

COMPETENCY: POLICY AND GOVERNANCE

This competency involves putting in place policies and objectives related to asset management (AM), bringing those policies to life through a strategy and framework, and then measuring and monitoring implementation over time.

Working on Level 1	Completed Level 1	Completed Level 2	Completed Level 3	Completed Level 4	Completed Level 5
We have set expectations for our AM program. We have the support we need to begin work on an AM policy.	We have drafted an AM policy and strategy and have developed a framework for our AM system.	We are using our AM policy to guide our actions. We have created a roadmap and have established performance measures.	We have a fully functional AM system. We are using performance measures to track progress and outcomes.	We are continually improving the AM system. Our AM objectives and roadmap are refined based on the evolving needs of our community.	
Policy and objectives outcome: Senior management has committed to formalizing an AM program. Senior management has recognized the role of natural assets in service delivery as part of its commitment to a formal AM program.	We have drafted an AM policy. Senior management and council have endorsed the AM policy. Our AM policy explicitly includes natural assets or the ecologic services they provide to support municipal service delivery. (or our policy incorporates our natural asset management policy as a key strategic document that will guide our AM practice)	We are starting to use AM policy objectives to guide our actions. Our policy objective(s) around natural assets are starting to guide our actions.	We are managing assets and services in accordance with AM policy and organizational objectives. We are managing natural assets in accordance with AM policy and objectives.	We are validating and refining corporate, service and AM objectives based on the evolving needs of our community.	

<p>Strategy and framework outcome: We have drafted a basic set of objectives that will guide the development of our AM system.</p> <p>We have drafted one or more AM objectives that focus on natural asset management.</p>	<p>We have completed the strategy and framework for our AM system.</p> <p>Our strategy and framework include objectives related to natural asset management and show how it will be integrated into core infrastructure management processes.</p>	<p>We have established a roadmap to guide the detailed actions surrounding our AM strategy deployment.</p> <p>Our roadmap includes ecosystem-based management activities such as identifying plans and procedures to assess the health of natural assets.</p>	<p><i>We are achieving our AM policy objectives through a fully functional AM system. Necessary workflows, documents and reporting tools are in place. We are updating our roadmap to address evolving needs.</i></p> <p>We are achieving our natural asset management objectives through our AM system. Necessary documents and reporting tools for the health of, and services provided by natural assets are in place. We are updating our natural assets management plan to address evolving needs.</p>	<p>We are following our roadmap in continually improving the AM system and in documenting the improvements.</p> <p>We are continually improving our natural asset management plan.</p>
<p>Measurement and monitoring outcome: We have defined the expected AM system benefits and outcomes.</p> <p>We have defined the expected benefits and outcomes related to our natural asset management objective(s).</p>	<p>We have documented our AM system plans and our objectives for the coming year.</p> <p>We have documented our natural asset management related plans and objectives for the coming year.</p>	<p>We have established performance measures to monitor AM system progress and its outcomes and benefits to our community.</p> <p><i>We have included common monitoring measures of the health of natural assets such as the total number of ecologically important species and pollution levels.</i></p>	<p>We are using performance measures to monitor progress and AM system outcomes and benefits.</p> <p>We are using monitoring and performance measures of the health of natural assets that support municipal service delivery.</p>	<p>We are monitoring performance and using the feedback to prioritize and</p> <p>make ongoing refinements and improvements.</p> <p>We are refining our monitoring and performance measures of the health of natural assets that support municipal service delivery.</p>

Competency: PEOPLE AND LEADERSHIP

This competency involves setting up cross-functional groups with clear accountability, and ensuring adequate resourcing and commitment from senior management and elected officials to advance asset management (AM).

Working on Level 1	Completed Level 1	Completed Level 2	Completed Level 3	Completed Level 4	Completed Level 5
	We have council support to establish a cross-functional AM team to explore AM needs and develop a plan for improving our AM system.	We have a clear mandate for our AM team, and council has approved funding for priority improvements to our AM system.	Our AM team has clear responsibility for improving our AM system. Council champions AM as a core business function.	Our AM team is responsible for guiding and supporting AM on an ongoing basis. AM system roles and responsibilities are operationalized.	Our council's commitment drives continuous improvement of the AM system. Roles and responsibilities evolve to meet ongoing needs.
	<p>Cross-functional representation outcome: We have appointed resources to investigate our community's AM requirements and to define and introduce an appropriate AM system.</p> <p>The resources we have appointed include staff from key departments such as engineering, public works, parks engineering, planning and finance to ensure a holistic and effective approach that can integrate natural asset management into the AM requirements.</p>	<p>We have formed a cross-functional AM team* to guide and oversee AM system planning and deployment.</p> <p>Our cross-functional team includes a staff person responsible for incorporating natural asset-management related needs into our AM system.</p>	<p>The AM team* works within our organization to lead, communicate and support AM improvement and change management.</p> <p>A member of the AM team leads, communicates and supports improvements to natural asset management and champions its incorporation into core AM practices.</p>	<p>Our AM team* has been made permanent and tasked with guiding and supporting the AM function across the organization on an ongoing basis.</p> <p>Our AM team has been tasked with guiding and supporting the integration of natural asset management in our AM system.</p>	<p>The AM team* guides and supports the ongoing improvement of the AM system within the organization.</p> <p>The AM team is guiding and supporting the integration of natural asset management in our AM system.</p>
	<p>Accountability outcome: Appointed resources have been mandated to investigate and assess our AM needs planning, documented by a draft terms of reference.</p> <p>The resources appointed to investigate our AM needs will include natural asset management related needs in the terms of reference.</p>	<p>Our AM team* has been made accountable for guiding AM development, with a documented mandate and terms of reference.</p> <p>Our mandate and terms of reference includes a requirement to assess AM needs related to natural asset management.</p>	<p>Our AM team* has been made accountable for AM implementation and we have added AM system roles and responsibilities to staff job descriptions.</p> <p>We have included natural asset management roles and responsibilities in staff job descriptions.</p>	<p>We have operationalized AM system roles and responsibilities across our organization.</p> <p>We have operationalized natural asset management roles and responsibilities across our organization.</p>	<p>We are documenting changes to AM system roles and responsibilities as needed to support our evolving requirements.</p> <p>The changes we are documenting include AM system roles and responsibilities needed to support evolving requirements related to natural asset management.</p>

<p>Resourcing and commitment outcome: Council is aware of the resourcing and funding dedicated to exploring AM system requirements and to proposing an AM roadmap.</p> <p>Council is aware of the resourcing and funding needed to incorporate natural asset management into the AM system requirements and roadmap.</p>	<p>Council demonstrates buy-in and support for AM and has approved funding for priority improvements.</p> <p>Council has demonstrated buy in for priority initiatives that will improve natural asset management and better incorporate it into core asset management business practices.</p>	<p>Council champions AM as a core business function and has approved funding to continue AM roadmap activities.</p> <p>Council has approved funding to improve natural asset management and better incorporate it into core AM business practices.</p>	<p>Council has approved funding for ongoing AM system monitoring and enhancement.</p> <p>Our ongoing AM system monitoring and enhancement includes monitoring and enhancement of natural assets.</p>	<p>The AM team measures and monitors progress. Council is committed to ongoing improvement of the AM system.</p> <p>The AM team measures and monitors progress related to natural asset management. Council is committed to improving this aspect of our AM system.</p>
--	--	---	---	--

Competency: DATA AND INFORMATION

This competency involves using asset data, performance data and financial data to support effective asset management (AM) planning and decision-making.

Working on Level 1	Completed Level 1	Completed Level 2	Completed Level 3	Completed Level 4	Completed Level 5
We have inventory data and financial data, aligned with minimum reporting requirements for tangible capital assets.	We have basic inventory data for major assets, including some condition and performance data. We have detailed financial data for some of our assets.	We have basic inventory data for all our assets, with some level of service information and standardized condition ratings. We have linked AM and financial information for our major assets.	We have expanded inventory data on major assets, including condition and performance information. We have basic forecasts and risk assessments for some assets. We have a long-term community financial plan in place.	We have expanded inventory data on all assets. We have performance forecasts and risk assessments in place for most assets.	

<p>Asset data outcome: We have pooled inventory data, including approximate quantities of assets within most asset groups.</p> <p>We have started to take an inventory of the natural assets in our jurisdiction that support municipal service delivery.</p>	<p>We have basic inventory data for most major assets, including information on general asset properties such as size, material, location and installation date.</p> <p>We have basic inventory data for some key natural assets, which includes the type, location, and size of the asset.</p>	<p>We have basic inventory data for all assets. We have defined life cycle investment requirements for some assets.</p> <p>We have basic inventory data for all major natural assets assumed to support municipal service delivery, which includes the type, location and size of the asset.</p>	<p>We have expanded inventory data, and have evaluated the relative risks and life cycle investment requirements associated with major assets.</p> <p>We have expanded inventory data for some major natural assets, and have assessed the risks to them and evaluated operations and maintenance requirements to ensure they support the desired level of service.</p>	<p>We have expanded inventory data and have evaluated the relative risks and life cycle investment requirements associated with most assets.</p> <p>We have expanded inventory data for most major natural assets, and have assessed the risks to them and evaluated operations and maintenance requirements to ensure they support the desired level of service.</p>
<p>Performance data outcome: We have informal or anecdotal approaches for measuring asset condition or performance. Some age information exists.</p> <p>We are aware of common or emerging approaches for measuring the condition of our natural assets, and their performance in supporting municipal service delivery.</p>	<p>We have some information on asset condition and performance for major assets collected from a variety of sources.</p> <p>We have some information on the condition and performance of at least one key natural asset, based on a combination of online data collection, field data collection, and modelling (e.g. SWMM for stormwater management performance)</p>	<p>We use standardized condition rating systems for most asset groups. Some level of service measures have been defined and data has been captured.</p> <p>We have information on the condition and performance of most major natural assets and have defined the desired level of service for them.</p>	<p>We have defined and measured levels of service for most assets. We have introduced basic needs forecasting and risk management strategies for most assets.</p> <p>We have defined the desired level of service for some major natural assets and have developed risk management strategies and adaptive management plans for them.</p>	<p>We have completed needs forecasts and risk management strategies for most assets.</p> <p>We have defined the desired level of service for most major natural assets and have developed risk management strategies and adaptive management plans for them.</p>

Financial data outcome: We have financial data on our assets, supporting minimum PS-3150 reporting requirements.	We have captured capital and operating expenditure data for some assets. We have developed a strategy to link AM and financial information.	We have captured capital and operating expenditure data for most assets. We have linked AM and financial information for all major assets.	We have calculated the cost of service delivery for all major assets. We have developed a long-term (at least 10-year) financial plan.	We understand the trade-offs between investment and the quality of the front-line services we deliver and we use this to refine our financial plans.
We do not yet have financial data that puts a value on the natural assets that support municipal service delivery.	We have captured capital and operating expenditure data for at least one key natural asset, that will support the desired level of service required by the asset.	We have captured capital and operating expenditure data for most major natural assets, that will support the desired level of service required by the asset.	We have incorporated the cost of managing some natural assets into financial planning and budgeting.	We have incorporated the cost of managing most major natural assets into our long-term financial plans. We understand the trade-offs between investments in natural asset management and the quality of services they can deliver, and we use this to refine our financial plans.
	We have completed an economic valuation of at least one key natural asset, based on the replacement cost of grey infrastructure alternatives that could provide equivalent services.	We have completed an economic valuation of most major natural assets and have integrated this information into our AM system to support long-term financial planning.		

Competency: PLANNING AND DECISION-MAKING

This competency involves **documenting and standardizing** how the organization sets asset management (AM) priorities, conducts **capital and operations and maintenance (O&M) planning**, and decides on **budgets**.

Working on Level 1	Completed Level 1	Completed Level 2	Completed Level 3	Completed Level 4	Completed Level 5
	Our asset investment plans address basic needs and respond to known problems. We evaluate priorities based on experience, council and management input and available information.	Our asset investment plans address observed short-term issues. We evaluate each need individually, and teams set priorities independently of each other, based on objectives and criteria representing the needs of their departments.	Our asset investment plans manage short-term risks and service impacts. We set priorities based on common organizational goals and objectives. We have drafted preliminary AM plans.	Our asset investment plans balance short-term service objectives (our desired level of service) with longer-term goals and risks. Planning is carried out using our AM system and kept up to date via normal business.	Our asset investment plans are integrated to address risks to both service and business goals. We have detailed AM plans for all services. We are continually improving our approach.
Documentation and Standardization outcome: Our approach to asset investment planning varies across the organization.	Our departments follow a similar but informal asset investment planning approach. We evaluate investment needs and priorities based on a mix of structured and ad-hoc practices and criteria.	We have developed a structured asset investment planning approach but application is inconsistent. We set priorities using similar criteria based on organizational goals and objectives.	We employ our structured asset investment planning approach across our core services. We set priorities using criteria which are fully aligned with our organizational goals and objectives.	We employ our structured asset investment planning approach across all services. We adapt our planning approach and criteria to align with evolving organizational goals and objectives.	
Our approach to asset investment planning does not yet include a documented approach to managing or protecting the natural assets that support municipal service delivery.	One department is responsible for conservation and protection of natural assets, which have not typically been included in asset investment planning or evaluated in relation to the municipal services they provide.	We have begun to incorporate investment plans for natural assets into our asset investment planning, in coordination with related service areas and departments.	We are incorporating investment plans for natural assets in our asset investment planning and setting priorities that ensure the conservation and protection of natural assets.	Natural assets have been formally incorporated into structured asset investment planning and their conservation, protection and management is a key organizational goal.	
Asset Investment Plans Outcome: Our asset investment plans are typically reactive and focus on addressing basic needs (e.g. growth, regulations and known problems).	Our asset investment plans are largely based on short-term asset, organizational and environmental issues. We do not have an AM plan.	Our asset investment plans are based on short-term issues and priorities. We have drafted preliminary AM plans for priority services.	Our asset investment plans are based on both short- and long-term issues and priorities. We have developed detailed AM plans for core services.	We have integrated and optimized asset investment plans. We have developed detailed AM plans for all services.	
Asset investment plans focus on addressing needs related to grey infrastructure assets. Some commitments have been made to conserve or protect major natural assets/areas, but these commitments have not yet translated into developing formal natural asset management plans.	Natural assets are not yet incorporated into our asset investment plans in any formal way. Our approach to managing natural assets is short-term and reactive.	We have developed operations and maintenance plans for some major natural assets, which are reviewed annually.	Our asset investment plans incorporate analysis from our risk assessment and adaptive management plans for key natural assets.		

<p>Budget outcome: We prepare annual capital and operating budgets which are based on historical values. We deal with new needs reactively, as they occur.</p> <p>Our annual capital and operating budgets include costs for natural assets when they exist alongside grey infrastructure assets that are being maintained (e.g. culverts, roadside ditches, etc.)</p>	<p>We prepare annual capital and operating budgets which are based on a mix of historical values and new priorities.</p> <p>We are beginning to build in capital, operating and maintenance costs for at least one major natural asset.</p>	<p>We prepare an annual capital budget which is based on a fresh reassessment of current needs. Our operating budget is based on a mix of historical values and new priorities.</p> <p>We are factoring in capital and operating costs for natural assets into our annual budgeting process for some key natural assets, based on achieving the desired level of service and new priorities.</p>	<p>We prepare annual needs-based capital and operating budgets which are based on a fresh reassessment of risks and current needs.</p> <p>We incorporate needs-based capital and operating costs for natural assets into annual budgets.</p>	<p>We prepare multi-year needs-based capital and operating budgets which are based on our short- and mid-term needs. We take a structured approach to addressing in-cycle changes.</p>
---	--	---	---	--

RESOURCES

The BC Framework for Sustainable Service Delivery, Asset Management BC

Asset Management Roadmap, Asset Management BC

The Natural Assets Primer (to be released), Asset Management BC

Asset Management Readiness Scale, Federation of Canadian Municipalities

The Building Blocks of Asset Management- A how-to guide for reaching Level 1 of FCM's Asset Management Readiness Scale, Federation of Canadian Municipalities

Starting the asset management conversation with your municipal council, Federation of Canadian Municipalities

Questions to ask before your municipality considers asset management software, Federation of Canadian Municipalities

How to develop an asset management policy, strategy and governance framework, Federation of Canadian Municipalities

Introductory guide: Building sustainable communities with asset management, Federation of Canadian Municipalities

Asset Management Toolkit, Northwest Territories Association of Communities

Asset Management Workbooks from Workshops for Elected Officials and Municipal Staff, Rural Municipalities of Alberta

AAMDC—Asset Management for Municipalities in Alberta

Asset Management BC—Sample Plans, Policies, and Strategies <https://www.assetmanagementbc.ca/resources/>

Canadian Infrastructure Report Card

<http://www.canadainfrastructure.ca/en/>

FCM—Asset Management Readiness Scale

https://fcm.ca/Documents/tools/MAMP/MAMP_Readiness_Scale_EN.pdf

Government of Alberta—Building Community Resilience Through Asset Management: A Handbook and Toolkit for Alberta Municipalities

<http://www.municipalaffairs.alberta.ca/asset-management>

Government of Alberta—Federal Gas Tax Fund Asset Management Approach

http://www.municipalaffairs.alberta.ca/documents/ms/Asset_Management_Approach.pdf

Infrastructure Asset Management Alberta (IAMA)

<http://assetmanagementab.ca/>

Municipal Asset Management Program

<https://fcm.ca/home/programs/municipal-asset-management-program/funding-mamp.htm>

Service Sustainability Assessment Tool

<https://www.assetmanagementbc.ca/resources/>

Funding for Municipalities

Federation of Canadian Municipalities (FCM) – Municipal Asset Management Program (MAMP)

Infrastructure Canada – Federal Gas Tax Fund

Infrastructure Canada – Investing in Canada Green Stream

Ontario Ministry of Infrastructure. *Building Together: Guide for Municipal Asset Management Plans*

