Integration of Natural Assets into Municipal Asset Management Plans
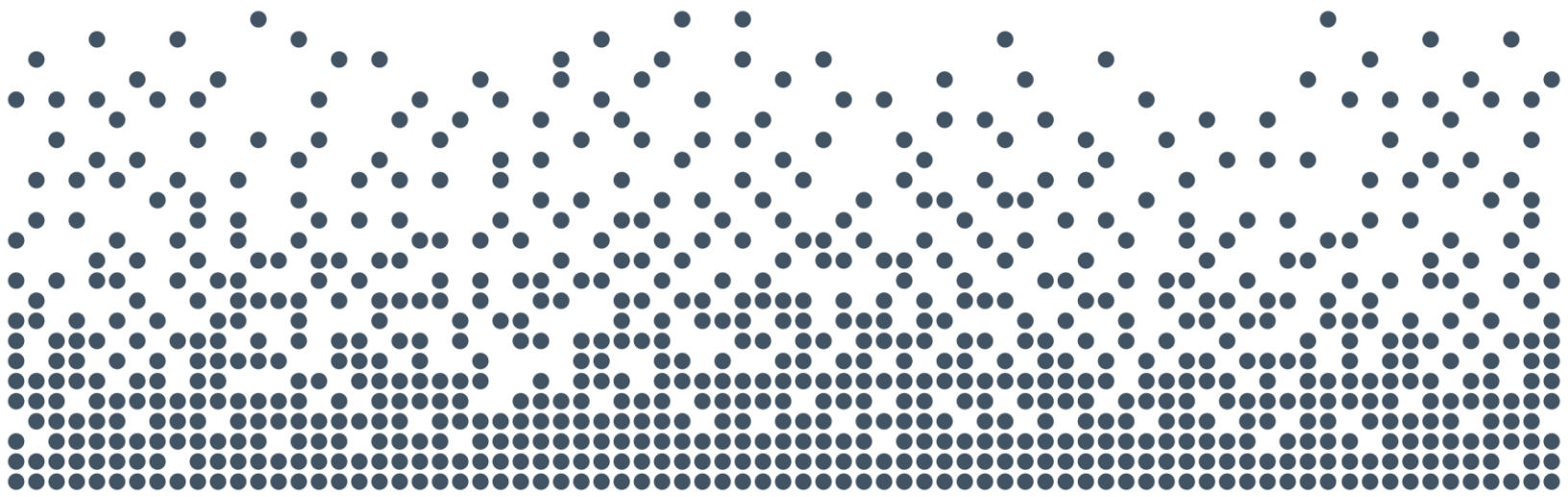
The Greenbelt Foundation

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Technical Report

Chapter 1
Introduction

1. Introduction

1.1 Study Purpose

The Greenbelt Foundation (Foundation) engaged with Watson & Associates Economists Ltd. (Watson) to undertake a study of the current state of integration of natural assets into municipal asset management plans and related decision-making processes. More specifically, this study focused on understanding how natural assets are currently being integrated into asset management plans by municipalities within the Greenbelt (Greenbelt Municipalities), what work is currently being done by Greenbelt Municipalities to manage their natural assets, what major challenges and barriers Greenbelt Municipalities have encountered in natural asset management, and to identify how the Foundation can promote further integration of natural assets into municipal asset management plans and processes.

In support of these objectives, the Foundation identified the need for a monitoring report to track the integration of natural assets into existing municipal asset management plans, strategic asset management policies, and other relevant asset management planning documents. Alongside the completion of the monitoring report, Watson also conducted interviews with asset management staff from Greenbelt Municipalities to understand the processes and protocols currently in place to manage natural assets and to identify challenges and barriers Greenbelt Municipalities have encountered in their natural asset management planning journeys. These interviews, structured as open discussions related to natural asset management, also assisted Watson in developing a series of recommendations on how the Foundation can further assist Greenbelt Municipalities improve the current state of integration of natural assets into asset management planning documents and processes.

A key deliverable for the project was a technical report with documentation of study methodology, summary statistics for the data collected, and recommendations for promoting further integration of natural assets into municipal asset management plans and processes. This deliverable was intended to be shared with participating municipalities.

A full list of the 73 Greenbelt Municipalities identified as being in-scope for this study is provided in Appendix A.

1.2 Regulatory Context

Municipal asset management planning in Ontario is governed by *Ontario Regulation 588/17: Asset Management Planning for Municipal Infrastructure* (O. Reg. 588/17) which sets requirements and parameters for the structure and content of municipal asset management plans. O. Reg. 588/17 specifically identifies natural assets as being in the scope of assets to be included in municipal asset management plans. The four relevant definitions in the regulation are:

- Municipal Infrastructure Asset: 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.
- Green Infrastructure Asset: 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.
- 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*.
- Hydrological Functions: has the same meaning as in Ontario Regulation 140/02.

Besides the definitions provided for ecological and hydrological functions, O. Reg. 588/17 does not further define or describe natural assets.

The first requirement for municipalities to achieve regulatory compliance under O. Reg. 588/17 was the development and adoption of a strategic asset management policy, required to have met Council approval by July 1, 2019. The strategic asset management policy required municipalities to specify their commitment to asset management planning, asset management best practices, and continual improvement of asset management practices and protocols.

The next requirement of O. Reg. 588/17 was the development and adoption of an asset management plan for core infrastructure assets, required to have met Council approval by July 1, 2022. Core infrastructure assets are defined in O. Reg. 588/17 as roads, bridges, structural culverts, and any asset that is related to the provision of water,

wastewater and stormwater services. These asset management plans for core infrastructure assets were required to include the following:

- Summary information on core infrastructure assets, including replacement cost, average age, and condition (including a description of the municipality's approach to assessing the condition of its core infrastructure assets).
- The current levels of service being provided by core infrastructure assets; and
- A 10-year forecast of the lifecycle activities related to core infrastructure assets that would need to be undertaken to maintain current levels of service, and the capital expenditures and significant operating costs related to those lifecycle activities.

Following the completion of an asset management plan for core infrastructure assets, municipalities are required to develop and adopt an asset management plan for non-core infrastructure assets by July 1, 2024. Non-core infrastructure assets are all other infrastructure assets owned and managed by municipalities that are not included in the definition of core infrastructure assets provided in O. Reg. 588/17 (e.g., facilities, fleet, equipment, etc.). Similar to asset management plans for core infrastructure assets, asset management plans for non-core infrastructure assets are required to include the following:

- Summary information on non-core infrastructure assets, including replacement cost, average age, and condition (including a description of the municipality's approach to assessing the condition of its non-core infrastructure assets);
- The current levels of service being provided by non-core infrastructure assets; and
- A 10-year forecast of the lifecycle activities related to non-core infrastructure assets that would need to be undertaken to maintain current levels of service, and the capital expenditures and significant operating costs related to those lifecycle activities.

Finally, O. Reg. 588/17 requires municipalities to complete a comprehensive asset management plan for all infrastructure assets by July 1, 2025 that includes the following:

- Establishment of levels of service targets (termed proposed levels of service);

- A 10-year forecast of the lifecycle activities that would need to be undertaken to achieve the proposed levels of service, and the capital expenditures and significant operating costs related to those lifecycle activities; and
- A financial strategy that supports the lifecycle activities and associated capital and significant operating expenditure forecast to achieve the proposed levels of service.

While O. Reg. 588/17 requires natural assets to be included in asset management plans by July 1, 2024, through our extensive asset management work with municipalities across Ontario we have observed that many municipalities are just beginning to gain basic awareness and understanding of their natural assets, and in many cases haven't yet started developing inventories to support natural asset management planning. It is our expectation that many municipalities will not be able to include natural assets in their asset management plans by July 1, 2024.

1.3 Key Questions

At the onset of this study, Watson developed a set of key questions related to municipal natural asset management that this study would seek to answer. These questions are structured to provide the Foundation with a basis of understanding of the current approach utilized by Greenbelt Municipalities in managing natural assets, the challenges and barriers that have prevented Greenbelt Municipalities from fully integrating natural assets into asset management planning processes, and the specific tools and aids that Greenbelt Municipalities would find helpful in their natural asset management planning journeys. These questions were formulated to aid in the development of recommendations presented in Chapter 4 of this study and the preparation of the study methodology (Chapter 2) was guided by the pursuit of attaining answers to these key questions.

What is the current state of integration of natural assets into municipal asset management plans for Greenbelt Municipalities?

This study hopes to provide an understanding of the level of maturity of Greenbelt Municipalities with respect to natural asset management planning. More specifically, this study hopes to identify which asset management planning components have been completed for natural assets by each Greenbelt Municipality.

To answer this question, Watson developed a natural asset focused survey and distributed it to Greenbelt Municipalities. This survey asked municipal staff to identify the natural asset types that existed within their municipalities (e.g. forests, wetlands, riparian areas, etc.) and provide details on what asset management planning components (e.g. completion of asset inventories, development of levels of service frameworks, identification of lifecycle management strategies, etc.) had been completed for those natural asset types. Further details on the survey are provided in Section 2.3.

To answer this question for municipalities that did not provide a response to the survey, Watson reviewed current asset management plans and other relevant asset management planning documents to assess their natural asset management planning level of maturity.

How are Greenbelt Municipalities currently managing their natural assets and what major challenges and barriers have Greenbelt Municipalities encountered in natural asset management?

Based on our understanding of asset management planning for municipalities across Ontario, it is our hypothesis that there may be several Greenbelt Municipalities that are dedicating municipal resources (staffing and budget) to the management of natural assets even if natural assets and associated lifecycle activities are not formally included as part of an asset management plan. To assess this hypothesis, this study hopes to identify if Greenbelt Municipalities are undertaking asset management activities related to their natural assets outside of their formal asset management planning processes.

This study also hopes to identify the major challenges and barriers that Greenbelt Municipalities have encountered in their natural asset management planning journeys. Our background research completed to support this project leads to us conclude that while the general asset management planning components for natural assets are the same as those for grey infrastructure, the specific methodologies employed to complete

those components differ greatly. For example, completing asset valuations for natural assets in the same manner as that for grey infrastructure (i.e. like-for-like replacement) leads to unproductive outputs as natural assets are generally not replaced like-for-like at the end of their lifecycle. It is also difficult to define what end of lifecycle means for natural assets and what expected service life values should be assigned to different natural asset types. Similarly, there exist several varying approaches to assessing the condition of natural assets, with no apparent champion methodology. This study hopes to identify these challenges to guide recommendations that are impactful.

To answer this question, Watson conducted interviews with Greenbelt Municipalities that were structured to facilitate open discussions. Further details on the interview process are provided in Section 2.4.

What aids and/or tools have Greenbelt Municipalities found helpful in advancing natural asset management and what aids and/or tools would Greenbelt Municipalities like to see developed?

As part of the interview process, Watson asked Greenbelt Municipalities to describe the aids and tools that have been utilized in progressing natural asset management planning within each respective municipality. Watson also asked Greenbelt Municipalities to identify existing knowledge gaps and areas where further support is required to fully integrate natural assets into asset management plans and related decision-making processes. In some cases, survey respondents highlighted tools and aids they are currently utilizing or have utilized in the past through the comments that accompanied their responses. Through the compilation and analysis of each of the aforementioned data points, Watson has identified some key recommendations that would meaningfully assist municipalities in advancing natural asset management planning. These key recommendations are presented in Chapter 4 of this study.

For each of the questions listed above, this study also hopes to identify any trends and/or patterns that may exist based on the size and tier of Greenbelt Municipalities.

Chapter 2
Study Methodology

2. Study Methodology

2.1 Phase 1: Pilot Interviews

Of the 73 Greenbelt Municipalities identified as being in-scope for this study, Watson had existing relationships with 12 municipalities for whom we had either completed asset management plans or assisted in their development. Watson engaged with these municipalities by conducting pilot interviews prior to requesting interviews with the remaining 61 Greenbelt Municipalities. These pilot interviews provided an opportunity to assess the initial format and structure of the interviews and to calibrate the interview questions to facilitate the open discussions we were seeking.

A total of 12 pilot interviews were conducted. The pilot interview questions are provided in Appendix B and the revised interview questions are provided in Appendix C.

Refinements to the structure of the interviews and to the interview questions were identified through these pilot interviews. These refinements were discussed with the Foundation and implemented prior to the scheduling of the remaining interviews.

2.2 Phase 2: Design and Distribution of Survey

At project outset, Watson engaged in detailed reviews of guidance materials and research documents related to natural asset management. Utilizing the information gleaned from this review in conjunction with our detailed knowledge of O. Reg. 588/17, Watson completed a review of the draft monitoring report and associated assessment rubric provided by the Foundation. This resulted in the proposal of new assessment metrics and the refinement of existing assessment metrics to strengthen the monitoring report. These amendments were discussed with the Foundation and implemented prior to their use in assessing the natural asset management level of maturity for Greenbelt Municipalities.

As mentioned earlier, based on our experience in municipal asset management in Ontario and through discussions with the Foundation, we had a reasonable expectation that there are Greenbelt Municipalities who are undertaking asset management activities related to their natural assets even if those natural assets are not formally included as part of asset management plans and related asset management documents. Completing the monitoring report based solely on a review of asset

management plans and related asset management documents would not capture these activities, which may be significant in their scope and nature.

To overcome this challenge, Watson developed an Excel-based survey for distribution to Greenbelt Municipalities. This survey, guided by the monitoring report and assessment rubric, asked Greenbelt Municipalities to:

- Identify the natural asset types that exist within their municipal boundaries;
- Identify the asset-specific information (quantities, locations, valuations, condition ratings, etc.) that currently exists for each natural asset type within their municipal boundaries;
- Identify whether current and/or proposed levels of service have been established for each natural asset type within their municipal boundaries;
- Identify whether lifecycle management strategies to maintain current levels of service and/or achieve proposed levels of service have been developed for each natural asset type within their municipal boundaries;
- Identify whether a risk management plan and risk treatment matrices that incorporate a probability of failure and consequence of failure analysis have been developed for each natural asset type within their municipal boundaries;
- Specify the extent to which the effects of climate change have been incorporated into asset management planning;
- Provide details on challenges and barriers related to natural asset management planning;
- Provide details on any changes to relevant municipal policies, long-term mechanism put in place to support natural asset management, and identify continuous improvement items related to natural asset management; and
- Provide commentary on each of the above, if any.

A total of 61 surveys were distributed. After discussions with the Foundation, we chose not to distribute the surveys to the 12 Greenbelt Municipalities that were included in the pilot interviews as sufficient information was available internally to complete the monitoring report through the asset management work we had previously completed for these municipalities. Out of the 61 surveys that were distributed, responses were received from 27 municipalities, representing a response rate of 44.3%. The completion of the monitoring report and assessment of natural asset management level of maturity for these 27 municipalities was based on the survey responses.

2.3   Phase 3: Review of AMPs, SAMPs, and related AM documents

For the 46 Greenbelt Municipalities for whom we did not have a survey response, Watson conducted detailed reviews of asset management plans, strategic asset management policies, and other relevant asset management documents. A total of 106 documents were compiled and reviewed for these 46 municipalities. The review of asset management plans focused on determining if natural assets are included within the scope of each plan (e.g. through reviewing State of Infrastructure sections, keyword searches, etc.). If so, sections with relevant content were thoroughly reviewed to inform the scoring presented in the monitoring report.

For these 46 municipalities, some criteria in the assessment rubric could not be scored due to insufficient information available to determine a score. These criteria have been identified in the assessment rubric and the monitoring report scores these criteria as an "N/A" in place of a formal numerical score.

2.4   Phase 4: Interviews with Greenbelt Municipalities

Watson conducted 30-minute interviews with Greenbelt Municipalities to accurately assess internal progress towards integrating natural assets into their asset management plans and completing asset management planning components for natural assets. These interviews also identified asset management activities that Greenbelt Municipalities may be completing that are not identified in their formal asset management planning processes. Through these interviews, we were able to identify whether Greenbelt Municipalities are undertaking asset management activities related to their natural assets and collect meaningful feedback on any factors that may be hindering Greenbelt Municipalities from fully integrating natural assets into their asset management plans and related decision-making processes. This feedback was used to inform the recommendations presented in Chapter 4.

Interviews were conducted with a total of 19 Greenbelt Municipalities (in addition to the 12 pilot interviews mentioned in section 2.1) and Watson worked with the Toronto and Region Conservation Authority (TRCA) to establish natural asset management profiles for another four Greenbelt Municipalities with whom the TRCA had close working

relationships on natural asset management. The list of questions that were addressed during the interviews are provided in Appendix C.

2.5   Phase 5: Analysis of Data and Development of Recommendations

The final phase of this study involved the compilation of survey responses, interview notes, and data gathered through our review of asset management plans, strategic asset management policies, and other relevant asset management documents to complete the monitoring report. The monitoring report assesses Greenbelt Municipalities on 28 different criteria from seven categories related to natural asset management planning, for a maximum possible score of 36 points. The monitoring report also assigns a natural asset management level of maturity rating to each Greenbelt Municipality as follows:

Table 2-1: Natural Asset Management Maturity Levels

Natural Asset Management Maturity Level	Rating Condition
0	0 points
1	1-9 points
2	10-18 points from at least 2 categories
3	19-27 points from at least 4 categories
4	28 points or more from at least 5 categories

The results of the monitoring report and information gleaned from the interviews were used to inform the recommendations that are presented in Chapter 4 of this report. These recommendations were developed with an emphasis on identifying items that would be most impactful while taking into consideration the varying needs and capacities of Greenbelt Municipalities.

Chapter 3
Study Findings

3. Study Findings

3.1 Natural Asset Management Level of Maturity

Of the 73 Greenbelt Municipalities, 24 municipalities (33%) received a score of zero out of a maximum possible score of 36. Based on survey responses and information gleaned from reviewing available asset management planning related documents, it was determined that these municipalities have not included natural assets within the scope of their current asset management planning. We also could not find any evidence that the effects of climate change have been incorporated into asset management planning related analyses for these municipalities.

Thirty Greenbelt Municipalities (41%) received a natural asset management level of maturity rating of one. Of these 30 municipalities, 12 municipalities received a score of one out of a maximum possible score of 36 as there was proof of identification of additional lifecycle management strategies to mitigate the effects of climate change or identification of challenges and barriers related to natural asset management. The average score within this group of 30 municipalities was 3.4 and three municipalities received a score of nine.

Sixteen Greenbelt Municipalities (22%) received a natural asset management level of maturity rating of two. The average score within this group was 13.4, with one municipality receiving a score of 18.

Three Greenbelt Municipalities received a natural asset management level of maturity rating of three. The average score within this group was 20.8, with one municipality receiving the highest score of 24 points.

No Greenbelt Municipality received a natural asset management level of maturity rating of four. This was largely due to the fact that, in accordance with the regulatory timelines of O. Reg. 588/17, many municipalities have not yet established proposed levels of service for their infrastructure assets and have not determined the lifecycle management strategies to be employed to achieve those proposed levels of service. The municipality with the highest rating has completed these steps for some natural assets, but they are still working on integrating all natural asset types into their plan as part of their continuous improvement process.

The overall average score for the seventy-three (73) Greenbelt Municipalities was 5.2 and the median score was one.

Table 3-1 summarizes the distribution of Greenbelt municipalities based on their natural asset management level of maturity rating.

Table 3-1: Number of Municipalities by Natural Asset Management Level of Maturity Rating

Natural Asset Management Level of Maturity Rating	Number of Greenbelt Municipalities	Percentage of Greenbelt Municipalities
0	24	33%
1	30	41%
2	16	22%
3	3	4%
4	0	0%

3.2 Summary Statistics

Table 3-2 summarizes the average, highest, and lowest scores received in each of the seven scoring categories.

Table 3-2: Average, Highest, and Lowest Scores by Scoring Category

Scoring Category	Maximum Possible Score	Highest Score	Lowest Score	Average Score
State of Local Infrastructure	8.0	6 (1 municipality)	0.0 (Several)	1.6
Levels of Service	5.0	3 (2 municipalities)	0.0 (Several)	0.7
Climate Change Measures	4.0	4 (1 municipality)	0.0 (Several)	0.5
Lifecycle Management and Financial Strategies	6.0	3 (3 municipalities)	0.0 (Several)	0.6
Risk Management Plan	5.0	5 (3 municipalities)	0.0 (Several)	0.7
Project and Policy Implementation	3.0	3 (3 municipalities)	0.0 (Several)	0.6
Continuous Updates and Improvements	5.0	4 (3 municipalities)	0.0 (Several)	0.6

The most prevalent natural asset type is streams, reaches, and creeks which exist in a total of 26 municipalities. They are followed by street trees which exist in 25 municipalities and forests, wetlands, and parks which exist in 24 municipalities. The most inventoried natural asset type is parks, followed by street trees, park trees, and forests. Those natural assets, and in that order, are also most commonly part of existing asset management plans.

The following table illustrates the integration of natural assets into asset management plans by natural asset type for the 27 Greenbelt Municipalities that provided a response to the survey:

Table 3-3: Integration of Natural Assets into AMPs by Natural Asset Type

Natural Asset Type	Number of Municipalities Where Natural Asset Type Exists	Number of Municipalities Where Natural Asset Type Has Been Inventoried	Number of Municipalities Where Natural Asset Type is Currently Part of AMP
Forests	24	11	5
Wetlands	24	9	4
Meadows	15	7	2
Prairies (Grasslands)	10	6	2
Rivers	20	6	1
Riparian Areas	18	5	2
Streams, reaches, and creeks	26	9	2
Lakes	19	5	0
Beaches	16	6	1
Bluffs	8	3	1
Parks	24	20	12
Street Trees	25	17	11
Park Trees	22	12	7
Soils	21	4	1
Aquifers	15	2	0
Coastal Shorelines	9	4	2
Agricultural Land	19	5	0

3.3 Current Natural Asset Management Practices

Aligning with our earlier hypothesis, it was discovered through the interview process that many Greenbelt Municipalities are currently engaging in the on-going management of their natural and enhanced assets even though these assets are not currently part of an asset management plan. Some of the common asset management activities are as follows:

- Care and maintenance of existing canopy cover
  - Tree pruning, trimming, and brushing to sustain the health and well-being of trees and maintain public safety;
  - Tree planting to enhance existing canopy cover;
  - Removal and replacement of damaged and diseased trees; and
  - Removal of emerald ash borer trees
- Erosion site control and restoration, including shoreline protection and restoration
- Invasive species management
- Restoration of woodlands, grasslands, and wetlands through controlled burns
- Floodplain management
  - Controlling nuisance flooding through erosion control, restoration, and natural reinforcement of creek banks

- Stormwater management
  - Naturalization of stormwater retention ponds; and
  - Restoration planting around stormwater retention ponds
- Cleanup activities (usually led by community groups and volunteers)

It was also discovered through the interview process that many Greenbelt Municipalities do not currently have sufficient staffing capacity to meet their asset management planning needs. This is especially prominent in smaller and more rural municipalities where asset management planning is usually led by Finance staff. These municipalities have a small number of full-time equivalents dedicated to asset management planning and are finding it difficult to satisfy the requirements of O. Reg. 588/17 for their grey infrastructure assets. The prevailing perspective in these municipalities is that natural asset management is a secondary, or perhaps even tertiary, responsibility which will be completed if and when staffing capacity allows.

For larger and more urban municipalities, it was discovered that while sufficient staffing capacity exists, staff are generally siloed across departments. This severely limits the sharing of data and diminishes the line of sight that departments have with each other. In these municipalities, it is not uncommon for staff dedicated to natural asset management in one department to have very limited knowledge of natural asset management practices employed by other departments, even when the sharing of this information could significantly aid in advancing natural asset management maturity. For example, a lack of consistency in tree management practices for trees located on municipally owned properties was found in one municipality, they felt this was due to the quantity of properties and the segmentation of these properties across various departments. Similarly, a lack of consistency in the content of natural asset inventories was discovered in one municipality where natural assets exist across a variety of departments.

3.4 Challenges and Barriers

Through this study, a wide array of challenges and barriers that Greenbelt Municipalities are currently facing with respect to natural asset management were identified. Some of the major challenges and barriers are summarized in this section.

Lack of financial resources

A challenge that was consistently identified by Greenbelt Municipalities was the significant lack of financial resources. Through the completion of asset management plans for core infrastructure assets under O. Reg. 588/17, municipalities have quantified the asset backlogs and annual funding gaps that exist in their core asset classes. In many cases, this process revealed that current funding levels are insufficient to maintain current levels of service for their core infrastructure assets. As such, municipalities are placing higher importance on managing and reducing funding gaps for their core infrastructure assets compared to their green infrastructure assets. Many municipalities have chosen to shift funding allotments from non-core asset classes and service areas to core asset classes to ensure that these assets are maintained up to acceptable standards. When additional funding becomes available (through increases in transfer payment allocations, grants, increases in taxation, etc.), it is usually being allocated towards core asset classes.

For instance, one municipality had proposed to develop a natural assets focused asset management plan through its budget process. However, Council chose to eliminate this project due to increased competition for resources from other asset classes.

Lack of staffing resources

As mentioned earlier, there exists a considerable lack of staffing resources within Greenbelt Municipalities that has prevented the advancement of natural asset management planning. It is not uncommon for smaller and more rural municipalities to have a total of one full-time equivalent, and sometimes even less, dedicated to asset management planning for all infrastructure assets. These municipalities are unable to dedicate any attention to the management of their natural assets with their current staffing levels. The challenge of insufficient staffing resources is also experienced by medium-sized and larger municipalities, as this challenge was consistently identified by several municipalities throughout the interview process.

Several municipalities highlighted that additional asset management focused staff were requested as part of recent budget processes. However, these requests were continually denied by Council to either dedicate additional funding to core asset classes or to mitigate tax rate increases. Compounding this issue is the fact that municipalities have recently experienced, and continue to experience, a high rate of turnover amongst

municipal staff. This often leads to significant deterioration of the existing institutional knowledge base and delays in the completion of asset management related projects.

Lack of area-specific knowledge

The vast majority of Greenbelt Municipalities who participated in the interview process highlighted the existence of substantial knowledge gaps among municipal staff with respect to natural asset management. The major areas of knowledge gaps that were identified are as follows:

- Lack of knowledge surrounding data governance models (e.g., lack of standardization of natural asset inventory components such as service life expectations, asset valuations, etc.);
- Lack of existence of best-practice guides to complete condition assessments, asset valuations, derive asset degradation curves, etc. This gap was also prevalent in larger municipalities where lack of on-the-ground condition assessments introduces loss of precision in lifecycle activity forecasts;
- Lack of knowledge on how to appropriately establish levels of service frameworks related to natural assets;
- Lack of knowledge on how to complete consequence of failure analyses for natural assets (i.e., what does asset failure mean when referencing natural assets?); and
- Lack of knowledge on how to integrate natural asset inventories into existing enterprise asset management software and geographic information systems (GIS).

Other challenges and barriers

Some other prominent challenges and barriers that were identified are as follows:

- Lack of consistent definitions of natural asset terminology;
- Lack of well-defined roles and segregation of duties between municipalities, conservation authorities, the Province, and other stakeholders;
- Perspectives of Council driven by expectations from residents to dedicate as much funding as possible for the maintenance and upgrade of core infrastructure assets such as roads;
- Weakening of environmental standards;

- Lack of appropriate guidelines from senior levels of government;
- Lack of Council support for regional approaches to asset management; and
- Lack of inclusion of natural assets in existing policies and planning documents.

It was also discovered through the interview process that some municipalities believe the role of conservation authorities in managing natural assets has been diminished through the recent implementation of new regulations and amendments to existing regulations. While this may be a prominently held belief amongst Greenbelt Municipalities, it is important to highlight that these recent regulatory changes do not directly impact or change the role of conservation authorities with respect to natural asset management. Of specific concern were the amendments to the *Conservation Authorities Act* introduced as part of the *More Homes Built Faster Act, 2022*. The amendments introduced through this act are limited in their scope and have reduced the role of conservation authorities only with respect to planning, permitting, and development review and approval processes. Some municipalities are erroneously assuming broader limitations that do not exist in these regulatory changes.

3.5 Aids and Tools

Natural asset management planning is in its infancy for the vast majority of municipalities in Ontario. Unsurprisingly, many municipalities identified further education as a vital conduit to advancing natural asset management planning. Several municipalities stated that they greatly benefited from attending workshops and training sessions related to asset management planning in the past and would like to see similar workshops and training sessions developed specifically for natural asset management. Municipalities also stated that although they have found workshops hosted by the Natural Assets Initiative to be helpful and have attempted to seek out further training on natural asset management, they have found the existence of more technical workshops and training sessions to be lacking. Many of the smaller municipalities who participated in the interview process identified the need for training sessions focused on smaller municipalities who have thus far not completed any work on natural asset management planning. These municipalities would welcome opportunities to participate in interactive training sessions and workshops where they can ask questions and engage with other municipalities who are in similar stages of their natural asset management planning journeys.

Several municipalities also identified background research and guidance documents, such as CSA W218: *Specifications for natural asset inventories*, to be important in bridging knowledge gaps and increasing the awareness and understanding of natural assets. Municipalities would welcome the development of more technical research documents and standards to describe the appropriate methodologies to complete condition assessments, natural asset valuations, establish levels of service frameworks, identify lifecycle management activities, etc.

Municipalities have also found case studies to be a helpful point of reference in identifying successes of various approaches employed by other municipalities. However, municipalities would like to see case studies to be segmented by varying degrees of specificity and technicality based on the intended audience. For example, a case study presented as a high-level overview would be an efficient way to increase awareness of Council. However, if the same case study is to be employed by staff dedicated to natural asset management, it would have to be presented in a more detailed and technical format. Consequently, municipalities have found case studies presented in a 'one-size fits all' format to be ineffective.

The Town of Blue Mountains identified a software solution named i-Tree (www.itreetools.org) to potentially assist in natural asset management. However, this software is not specifically tailored to asset management planning. The development of a software solution specifically focused on natural asset management would be helpful in advancing natural asset management levels of maturity within Greenbelt Municipalities.

Chapter 4
Recommendations

4. Recommendations

4.1 Strategic Solutions to Challenges and Barriers

Watson has developed a series of key recommendation to overcome the major barriers and challenges that municipalities are currently facing with respect to natural asset management. These recommendations are summarized in this section.

Lack of financial resources

It became evident through discussions that there exists a lack of knowledge of the various funding opportunities available to municipalities to support green infrastructure projects and initiatives related to climate change and environmental sustainability. It is recommended that a comprehensive analysis and compilation of the various annual and one-time funding opportunities that exist to support municipal projects related to natural assets and green infrastructure be conducted. Additionally, engaging in frequent and regular communication as funding applications open and application deadlines approach would be beneficial. This communication should be accompanied by a description of the funding opportunity, application requirements, funding amounts and associated funding calculations (if any), application deadlines, guidance on how to complete the application, and descriptions of best approaches to formulating responses to application questions. This can be accomplished through electronic communications and leveraging technological tools to aid in the process.

Grant application writing is often a significant hurdle for municipalities as it requires a substantial time commitment from administrative staff. Leveraging available resources to assist municipalities in completing grant applications is recommended. This may be accomplished through holding working sessions or by providing dedicated staffing resources to offer one-on-one assistance.

To garner support from Council in directing additional funding towards natural asset management, municipalities will need to demonstrate the criticality of their natural assets in a manner similar to that of their grey infrastructure assets. It is recommended to develop risk management frameworks that specify how to complete probability of failure and consequence of failure analyses for natural assets. These frameworks should also incorporate methodologies to assess the faster degradation of grey infrastructure assets due to increased dependence caused by the potential failure of

natural assets. These frameworks would assist municipalities in establishing business cases to increase municipal investment into natural asset management.

Lack of staffing resources

Lack of staffing resources has a significant impact on natural asset management as it is often the case that even municipalities with dedicated asset management staff do not have staff members well-versed in the specifics of how to manage natural assets. It is recommended to encourage municipal staff and Councils to explore regional approaches to natural asset management. This would allow municipalities without appropriate staffing capacity or knowledge to fully integrate natural assets into asset management planning by leveraging resources from neighboring municipalities where those capacities and knowledge bases exist. It is also recommended to encourage conservation authorities to become part of this regional approach as they are the natural asset knowledge leaders in many regions across Ontario.

Regional approaches have proven to be effective in other municipal service areas such as water and wastewater, waste management, planning and zoning, and fire services. Learning from the successes of those initiatives can help design and implement a regional approach to natural asset management. This would also potentially address the challenge of lack of well-defined roles and segregation of duties between municipalities, conservation authorities, the Province, and other stakeholders. As many natural assets exist across municipal boundaries, the pooling and coordination of regional resources to manage natural assets would be an efficient and effective approach. It is recommended to design and implement a regional approach on a smaller scale through municipalities and regions with close relationships and use this pilot project to establish the business case for larger regions.

Lack of area-specific knowledge

Municipalities consistently identified lack of area-specific knowledge as a key challenge in natural asset management and would welcome workshops and training sessions with a more technical focus. Several municipalities stated that the workshops and training sessions they have thus far attended have only provided surface-level information and that there exists a need for more comprehensive training that details the specifics of various methodologies related to natural asset management planning through interactive working sessions.

In recent years, technical training on asset management planning has been provided to many municipalities in Ontario through working sessions and cohort groups. There are plans to engage in more of these working sessions and cohort groups later this year, with the potential to design technical training sessions focused on natural asset management as part of that engagement.

There also exists a need for more technical guidance and research documents to assist municipalities with completing various natural asset management planning components. It is recommended to work alongside partners to develop research documents that establish champion methodologies for compiling natural asset inventories, completing asset valuations and condition assessments, establishing levels of service frameworks, and determining appropriate lifecycle management activities.

4.2 Other Recommendations

Watson has also developed a series of other key recommendations which are listed below (in no particular order):

1. Development of a natural asset focused glossary of key terms and a comprehensive listing of all natural asset types.

2. Development of standardized data governance models (e.g., standardization of the content of natural asset inventories such as service life expectations and asset valuations, standardization of metrics and benchmarks, standardization of levels of service frameworks, etc.).

3. Development of training sessions that are focused on how smaller and more rural municipalities who have thus far not completed any work on natural asset management may begin their journeys. These municipalities would appreciate practical training sessions with a technical focus on how to approach the completion of the initial components of natural asset management specific to the natural assets that exist within their municipal boundaries (i.e. understanding key natural asset management concepts, establishing natural asset inventories, valuing natural assets and setting service life expectations, developing levels of service frameworks, understanding best practices on natural asset management strategies, developing risk management frameworks, etc.).

4. Development of a roadmap focused on how smaller municipalities can gradually integrate natural assets into asset management plans.

5. Development of further opportunities for municipalities to collaborate on natural asset management through participation in forums and information sessions.

6. Development of templates and models for municipalities to easily complete asset management planning components such as asset valuations.

7. Development of information sessions and reference materials that detail how recent regulatory changes affect the roles of key stakeholders (i.e. municipalities, conversation authorities, the Province, developers, etc.) with respect to natural asset management. It was discovered through the interview process that there are common misconceptions held by Greenbelt Municipalities specific to Bill 23 (as described earlier in Section 3.4). These existing misconceptions could be addressed through the distribution of clarifying reference documents and facilitated information sessions when new regulations that may introduce further misconceptions receive royal assent.

8. Development of case studies segmented by intended audience (as described earlier in Section 3.5). It was highlighted by many Greenbelt Municipalities that while case studies are appreciated, they often lack practical value when used to inform asset management practices as they are often presented in a 'one-size-fits-all' format. For instance, if a municipality is attempting to use a case study to understand how to conduct analyses related to natural assets or to review the various lifecycle activities that need to be performed on natural assets, there would have to be sufficient technical details within the case study to inform their understanding. While such a case study would provide value to natural asset project teams in advancing their knowledge and level of maturity, the same case study would not provide appropriate value if it was to be distributed to Council to establish the importance of natural assets and/or to seek a greater allocation of municipal resources towards their management. It is recommended that case studies are developed to accompany the ones that currently exist with varying degrees of specificity and technical detail based on the intended audience. Similarly, it is also recommended that that future case studies be developed with accompanying versions that can be utilized for multiple purposes and appropriately address the varying requirements and sensitivities of different audiences.

9. Incorporation of financial and affordability metrics into natural asset management planning. The overall financial sustainability of a municipality and the ability of its residents to afford increases to taxation to fund asset management strategies are important considerations when implementing and operationalizing asset management plans. Municipalities often utilize key performance indicators and relevant metrics to determine whether a specific asset management strategy, and its subsequent impact on the level of service being provided, is financially feasible in the short, medium, and long-term. It is recommended to develop performance indicators and metrics that allow municipalities to assess the impact of natural asset management strategies on its own financial condition and that of its residents. It should be noted that the consideration of financial metrics is not unique to natural asset management and should be incorporated into asset management analyses for all asset classes. Some key areas of consideration are as follows:

- o Impact on the municipality's reserves and reserve funds (i.e. assessing potential impact on target, minimum, and projected balances, potential implementation of new reserves and/or reserve funds, restructuring of existing reserves and/or reserve funds, changes reserve and reserve fund policies and reporting requirements, etc.).

- o Effect of lifecycle management activities related to natural assets on the average annual lifecycle cost of the municipality's tangible capital assets and associated annual funding targets.

- o Potential impact of new debentures utilized to fund lifecycle management activities related to natural assets and their subsequent impact on the municipality's annual repayment limit.

- o Assessment of various time periods to achieve full lifecycle funding levels for natural assets (i.e. how long does the Municipality expect it to take to be able to allocate sufficient financial resources annually to fund all activities related to natural assets over their full lifecycles and what is the associated impact on tax bills and municipal debt if that time period was shortened or extended?).

- o Increases to the annual taxation levy requirement and associated impact on tax bills due to increased spending on natural assets.

- Comparison of the impact on tax bills due to increased spending on natural assets to the spending capacity of the municipality's residents (i.e. median household income)

Appendix A
List of Greenbelt Municipalities

List of Greenbelt Municipalities

Municipality	Tier	Region	% in the GB
Adjala-Tosorontio	Lower	Simcoe	19.50%
Ajax	Lower	Durham	0.00%
Alnwick/Haldimand	Lower	Northumberland	43.37%
Amaranth	Lower	Dufferin	1.70%
Aurora	Lower	York	0.00%
Barrie	Single	Barrie	N/A
Bradford West Gwillimbury	Lower	Simcoe	18.03%
Brampton	Lower	Peel	2.83%
Brock	Lower	Durham	99.07%
Burlington	Lower	Halton	51.29%
Caledon	Lower	Peel	80.33%
Cavan Monaghan	Lower	Peterborough	22.84%
Chatsworth	Lower	Grey	5.94%
Clarington	Lower	Durham	81.47%
Clearview	Lower	Simcoe	19.09%
Cramahe	Lower	Northumberland	7.76%
Dufferin County	Upper	Dufferin	N/A
Durham Region	Upper	Durham	N/A
East Garafraxa	Lower	Dufferin	16.04%
East Gwillimbury	Lower	York	77.07%
Erin	Lower	Wellington	45.91%
Georgian Bluffs	Lower	Grey	25.54%
Georgina	Lower	York	95.64%
Grey County	Upper	Grey	N/A
Grey Highlands	Lower	Grey	17.98%
Grimsby	Lower	Niagara	98.14%
Halton Hills	Lower	Halton	63.75%
Halton Region	Upper	Halton	N/A
Hamilton (City)	Single	Hamilton	77.22%
Hamilton (Township)	Lower	Northumberland	30.62%
Innisfil	Lower	Simcoe	0.63%
Kawartha Lakes	Single	Kawartha Lakes	3.89%
King	Lower	York	99.75%
Lincoln	Lower	Niagara	79.50%
Markham	Lower	York	27.56%
Meaford	Lower	Grey	22.96%
Milton	Lower	Halton	66.49%

Municipality	Tier	Region	% in the GB
Mississauga	Lower	Peel	0.00%
Mono	Lower	Dufferin	48.82%
Mulmur	Lower	Dufferin	34.69%
New Tecumseth	Lower	Simcoe	9.41%
Newmarket	Lower	York	46.79%
Niagara Falls	Lower	Niagara	3.84%
Niagara Region	Upper	Niagara	N/A
Niagara-on-the-Lake	Lower	Niagara	97.32%
North Dumfries	Lower	Waterloo	2.81%
Northern Bruce Peninsula	Lower	Bruce	30.15%
Northumberland County	Upper	Northumberland	N/A
Oakville	Lower	Halton	14.58%
Orangeville	Lower	Dufferin	0.00%
Orillia	Single	Orillia	N/A
Oshawa	Lower	Durham	31.75%
Owen Sound	Lower	Grey	0.00%
Peel Region	Upper	Peel	N/A
Pelham	Lower	Niagara	62.86%
Pickering	Lower	Durham	47.47%
Port Hope	Lower	Northumberland	18.61%
Puslinch	Lower	Wellington	22.92%
Richmond Hill	Lower	York	0.00%
Scugog	Lower	Durham	99.27%
Simcoe County	Upper	Simcoe	N/A
South Bruce Peninsula	Lower	Bruce	5.79%
St. Catharines	Lower	Niagara	38.86%
The Blue Mountains	Lower	Grey	51.92%
Thorold	Lower	Niagara	20.39%
Toronto	Single	Toronto	5.71%
Trent Hills	Lower	Northumberland	0.22%
Uxbridge	Lower	Durham	100.00%
Vaughan	Lower	York	28.76%
West Lincoln	Lower	Niagara	0.92%
Whitby	Lower	Durham	37.13%
Whitchurch-Stouffville	Lower	York	98.26%
York Region	Upper	York	N/A

Appendix B
Pilot Interview Questions

Greenbelt Foundation Monitoring Report: Integration of Natural Assets into Municipal Asset Management Plans

Pilot Interview Questions

1. Is natural asset management planning a strategic priority for the municipality (i.e. has Council embraced natural asset management planning in a strategic plan or made any other similar commitments)?

a. What barriers have you identified in garnering Council support for the implementation of natural asset management?

b. What supportive measures would you like Council to provide in achieving successful implementation of natural asset management?

2. What challenges have you encountered in the following with respect to natural asset management planning (see table on next page)?

a. Have you identified any strategic solutions to overcome these challenges?

3. What aids have you found helpful in facilitating natural asset management planning in your municipality? This may include templates, development of new tools (indexes, models, valuation methodologies, etc.), use of existing tools, training/development courses, peer collaboration, etc.

4. What can the Greenbelt Foundation and its partners provide to aid in achieving success in natural asset management planning for your municipality?

Asset Management Area	Lack of Staffing Resources	Lack of Financial Resources	Lack of Area Specific Knowledge	Not yet attempted	Other (please specify)
Developing an asset inventory	☐	☐	☐	☐	
Assessing condition	☐	☐	☐	☐	
Determining valuation	☐	☐	☐	☐	
Determining levels of service (current & target)	☐	☐	☐	☐	
Determining lifecycle management strategies	☐	☐	☐	☐	
Developing operational and capital financial projections	☐	☐	☐	☐	

Appendix C
Revised Interview Questions

Greenbelt Foundation Monitoring Report: Integration of Natural Assets into Municipal Asset Management Plans

Revised Interview Questions

1. Has your municipality undertaken any initiatives to support natural asset management planning?

For example, initiatives may include completing studies/plans, conducting natural asset rehabilitation projects, establishing natural asset inventories, determining condition ratings and valuation, determining levels of service and lifecycle management strategies, developing capital and/or operational plans, etc.

a. If yes, please describe the outcomes of any such initiatives.

For example, how have these initiatives helped integrate natural assets into your asset management plans and processes?

b. If no, please describe any hurdles that have prevented your municipality from undertaking these initiatives.

For example, financial and staffing resource constraints.

2. Has your municipality dedicated any municipal resources (staffing, budget, etc.) to natural assets?

This could include municipal resources dedicated to any current year and/or prior year initiatives.

a. If yes, how did administration initially demonstrate the importance of allocating municipal resources to natural assets?

b. If no, please describe any challenges you have faced or would expect to face in attempting to allocate municipal resources to natural assets.

3. Have you collaborated with any external entities on natural asset management?

For example, external entities could be conservation authorities, neighbouring municipalities, community groups, other stakeholders, etc.

a. Are there any specific successes that you would like to share or challenges that you have encountered?

4. What are some aids that you have found helpful in bridging the knowledge gap and/or reducing burden on municipal resources (staffing, budget, etc.) with respect to integrating natural assets into asset management plans and processes?

For example, aids could be templates, tools, training/development courses, peer collaboration, support from external agencies, assistance in identifying available funding opportunities, assistance in completing grant applications, etc.

a. Are there any aids that you would like to see developed to help you in your future efforts?

5. Is natural asset management planning a strategic priority for Council and administration?

For example, strategic priority could be established by Council embracing natural asset management in a strategic plan and/or administration undertaking initiatives to increase the level of natural asset management maturity.

Appendix D
FAQ Document

Greenbelt Foundation Monitoring Report: Integration of Natural Assets into Municipal Asset Management Plans

Frequently Asked Questions

What is a natural asset?

O. Reg. 588/17: Asset Management Planning for Municipal Infrastructure defines "green infrastructure asset" as:

(A)n 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.
Natural assets are a subset of green infrastructure assets. Whereas natural assets refer to the stock of natural resources and ecosystems that yield a flow of benefits to people, green infrastructure assets also include designed and engineered elements that have been created to mimic natural functions and processes in the service of human interests.

In the municipal context, natural assets are assets that are owned by the municipality and sustainably provide one or more municipal service(s). For example, a natural wetland provides water treatment and storage as a service to the community, much in the same way as an engineered asset such as a reservoir. Therefore, the management of natural assets is important in being able to provide sustainable municipal services in a cost-effective manner.
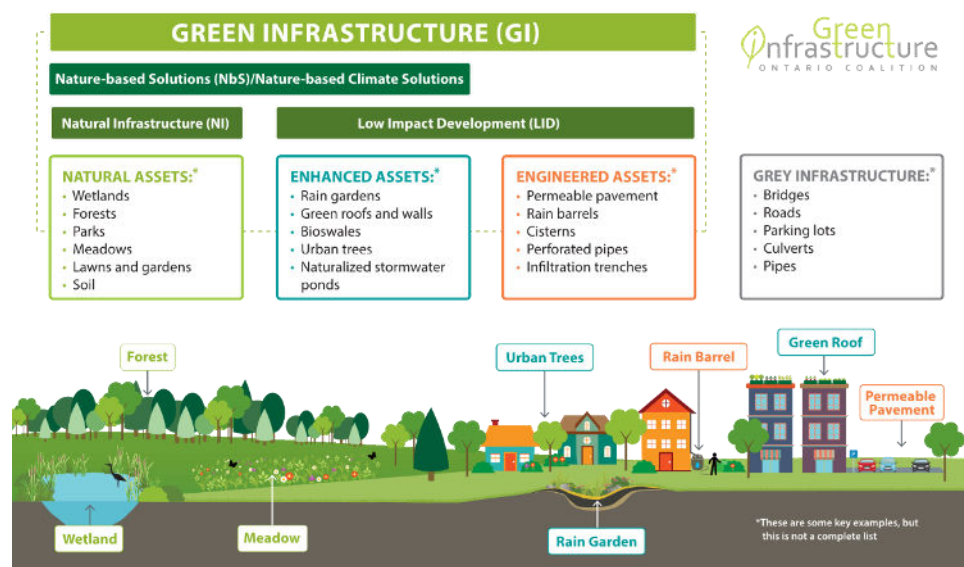
Who is the Greenbelt Foundation?

The Greenbelt Foundation stewards two million acres of protected land in Ontario's Greenbelt, supporting clean air, fresh water, climate resilience, and local food sources. In addition to its grants program which supports community and sector capacity, the Foundation undertakes evidence-based research and policy work, strategic programs and promotes the benefits of the Greenbelt through public and stakeholder engagement. By ensuring continuous, progressive investment in the Greenbelt, the Foundation nurtures a living, thriving Greenbelt for all to enjoy.

The Foundation, in collaboration with partners including Conservation Authorities, has been actively investing in municipal natural asset management since 2018. The aim is to help municipalities define, account for, and manage their natural assets as vital infrastructure, leading to enhanced climate resilience and essential services like stormwater management, recreation, flood control, and source water protection. Natural asset management can help protect and enhance the Greenbelt's natural heritage system that is essential to economic growth, climate resiliency and overall long-term well-being of residents.

Who is Watson & Associates Economists Ltd.?

Established in 1982, Watson & Associates Economists Ltd. is one of Canada's leading economic consulting firms comprised of municipal economists, planners, and accountants. With a municipal client base of more than 250 Ontario municipalities and utility commissions, and 47 school boards, many of which are long-term repeat clients, the firm is recognized as a leader in the municipal finance/local government field. In recent years, Watson has assisted more than 110 municipalities with preparation of asset management policies, municipal action plans, asset management software implementations, and preparation of comprehensive AMPs.

What is the scope of the project?

The Greenbelt Foundation has identified the need for a monitoring report that will track and help promote the integration of natural assets into municipal asset management plans. This project focuses on understanding how natural assets are currently being integrated into asset management plans by municipalities within the Greenbelt (Greenbelt Municipalities), what work is being done by Greenbelt Municipalities to improve how natural assets are managed, and to identify how the Foundation can promote further integration of natural assets into municipal asset management plans and processes. The monitoring report will be based on each municipality's asset management plan and any work they have completed to inventory, assess condition, set levels of service, define lifecycle management strategies, and develop financial strategies for their natural assets. This report will serve as a valuable tool to understand how municipalities in the Greenbelt have accounted for and plan to manage natural green infrastructure.

What data will be collected for my municipality?

The initial analysis for this project will rely on publicly available asset management related documents to assess the current state of integration of natural assets into municipal asset management plans and related decision-making processes. This will include a review of strategic asset management policies, asset management plans, and other related asset class or service area specific documents.

The second step will focus on identifying barriers and opportunities that municipalities are facing with integrating natural assets into their asset management plans and practices. We will be distributing a natural asset management focused questionnaire to Greenbelt Municipalities to aid in informing this analysis. We will also be conducting short (30 minute) interviews with a sample of municipalities to provide an opportunity for one-on-one discussions.

Who will use the data I provide?

Any non-publicly available data that is gathered in support of this project will be handled with the utmost confidentiality and will exclusively be used by the Greenbelt Foundation, the Toronto and Region Conversation Authority (TRCA), and Watson & Associates Economists Ltd. Any such data will only be used to the extent that it fulfils the objectives of this project, is within the project scope, and aids in the development of the monitoring report.

How will my data be used?

Your data will be used to analyze how your municipality is currently managing its natural assets. Specifically, this project focuses on the current state of integration of natural assets into asset management plans and related infrastructure investment decision making. Your data will also be used to gain an understanding of the challenges that your municipality is facing in its journey to integrate natural assets into planning processes.

We assure you that any information gathered will not be used as a critique of your municipality's performance, but rather will be used to determine how the Greenbelt Foundation and its partners can provide support to facilitate progress and positive outcomes in incorporating natural assets in municipal asset management.

Is my data confidential?

Yes. Any non-publicly available data that you provide will be treated with care and will not be published publicly. We prioritize the privacy and security of your information and it will not be shared with any third parties without your express written consent. The data gathered in the development of the monitoring report will be used to identify macro-level trends.

Will the monitoring report be shared with participating municipalities?

The monitoring report will not be shared with participating municipalities and will not be published publicly as it will contain confidential information for Greenbelt municipalities. However, each municipality will be given access to its own individual assessment results that were used to develop the monitoring report. Furthermore, the outcomes of the monitoring report will be shared with participating municipalities and our valued partners to highlight macro-level trends. The goal of this project is to foster collaborative learning with participating municipalities and close partners. We would like to emphasize key insights in natural asset management and showcase success stories through illustrative case studies. We believe that this approach will not only provide valuable information but also spark meaningful conversations among stakeholders.