

How Municipal Asset Management Practices Contribute to Achieving the United Nations Sustainable Development Goals

by

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ABSTRACT

Municipal asset management and infrastructure sustainability are closely aligned. The importance of sustainably managing infrastructure to deliver services has been shown through the creation of the United Nations Sustainable Development Goals in 2015. Two barriers to delivering sustainable services through municipal infrastructure include, i) inconsistencies in services delivered by local governments across the country, wherein services may be delivered at the municipal, provincial, or federal levels, with no common practice across a single region, and ii) absent measures to quantify levels of service, resulting in infrastructure owners over- or under-delivering services, in turn impacting the costs and risks associated with delivering services to the community. This research focused on a review of current legislation and services delivered at the local government level and performed an analysis to demonstrate alignment between the United Nations Sustainable Development Goals and the level of service performance measures used in municipal asset management. The relationship between the two were demonstrated through a case study, where three of the United Nations Sustainable Development Goals were mapped to the level of service objectives being used by a large sized Canadian population centre. The findings of the case study showed that using the 191 United Nations Indicators to measure the Sustainable Development Goals could become a standard method to measure the 509 level of service performance measures at the municipal level. This, in turn, would allow jurisdictions to compare service levels to peers, creating an opportunity for knowledge transfer and improvements by benchmarking their asset management program to other local governments.

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List of Abbreviations

Abbr.	Full form
AM	Municipal Asset Management
AMO	Asset Management Ontario
CNAM	Canadian Network of Asset Managers
ESL	Estimated Service Life
FCM	Federation of Canadian Municipalities
GTF	Gas Tax Fund
IIMM	International Infrastructure Management Manual
IT	Information Technology
IPWEA	Institute of Public Works Engineering Australasia
ISO	International Organization for Standardization
KPI	Key Performance Indicator
kWh	Kilowatt Hour
LOS	Levels of Service
MDGs	Millennium Development Goals
MAMP	Municipal Asset Management Program
NAMS	National Asset Management Steering Group
PSAB	Public-Sector Accounting Board
RUL	Remaining Useful Life
SDGs	Sustainable Development Goals
TCA	Tangible Capital Asset
UN	United Nations
WCCD	World Council on City Data

CHAPTER 1: INTRODUCTION

Municipal asset management (AM) is a growing area of practice in Canada and has become mandatory for infrastructure owners across the country. This began when the federal government mandated municipalities to report their Tangible Capital Asset (TCA) in order to receive their Federal Gas Tax Fund (GTF) in 2009. This exercise, developed by the Public-Sector Accounting Board (PSAB), is known as PSAB 3150 (FRAS, 2018), and was primarily used as a standard process for municipalities to inventory their infrastructure and record historical costs. Since the introduction of PSAB 3150, the federal government has mandated municipalities to advance municipal asset management with a focus on reporting levels of service, infrastructure condition, asset strategies, risk and decision-making, and financial forecasting (Government of Canada, 2021). To support this initiative, the federal government, through Infrastructure Canada, funded the Municipal Asset Management Program (MAMP), delivered through the Federation of Canadian Municipalities (FCM) beginning in 2017 and expected to end in 2024-25 (Government of Canada, 2021). While AM was gaining traction in Canada, the United Nations (UN) were in the process of redefining their Millennium Development Goals (MDGs) to develop their Sustainable Development Goals (SDGs) (WCCD, 2017).

With both the UN and the Canadian Government, the over-arching goal was clear: create a more sustainable future.

While it is easy to state this, providing a sustainable future can have a variety of definitions and is more difficult in practice. This report highlights the issues surrounding policies that

drive the decisions when building and maintaining infrastructure at the municipal level. It demonstrates that many provinces or municipal jurisdictions can choose the method they deem most appropriate to deliver services which presents several challenges when it comes to measuring, operating, and maintaining service levels.

The purpose of this report to demonstrate the relationship between level of service objectives used in AM and the UN SDGs, by examining the alignment of the performance measures, identify gaps, as well as opportunities for improvement.

1.1 Objectives

AM is critical to delivering services to communities across the country. To date, municipalities have been using different methods to determine their service performance which is difficult to measure and compare to peers. This study intends to demonstrate whether municipalities can use standard indicators to measure their performance in lieu of creating new performance measures when beginning or advancing their levels of service (LOS) program. LOS are defined by the Institute of Public Works Engineering Australasia in their International Infrastructure Management Manual 2015 as the parameters or combination of parameters that reflect social, political, economic, and environmental outcomes that the organization delivers. Thus, the researcher assumed the UN SDGs, and the data and performance measures used by the World Council on City Data (WCCD), could be used by municipalities across Canada to measure the LOS being delivered across their various asset groups. The following objectives were undertaken to complete the study.

- Demonstrate the relationship between the UN SDGs and the AM projects being performed across Canada.
- Validate the relationship between UN SDGs and LOS objectives through a case study.
- Create a database to map the relationship between the attributes used in WCCD 2017 and the LOS objectives in AM.
- Complete an analysis on the relationships between UN SDGs and AM at a municipal level.

1.2 Scope

The scope of this research was as follows:

- Identify three UN SDGs to use in the analysis.
- Review the work performed by World Council on City Data and the ISO 37120, including all 191 indicators used by the UN and ISO 37120.
- Use 509 performance measures used by one Canadian municipality in their LOS program.
- Create a method and proof of concept to understand if the AM program is contributing to the three UN SDGs through the level of service objectives.
- Using one expert (e.g., the researcher) complete the analysis where the LOS objectives and performance measures are reviewed to classify their contribution to the UN and/or ISO Indicators and classify as direct, indirect or not applicable.

- Identify gaps in the municipalities AM program (i.e., areas where the three UN SDGs do not have any LOS objectives and performance measures contributing to the SDGs).
- Highlight the results of the study through a heat map, demonstrating the municipalities contributions to the UN SDGs.
- Identify opportunities for improvement in the study, as well as opportunities for the municipality to improve their contribution to achieving the UN SDGs.

1.3 Methodology

The following activities were performed to achieve the proposed objectives:

- Conduct a country-wide scan of provincial legislation to review services municipalities are legislated to provide and willingly provide, due to community demand.
- Review the study performed by the World Council on City Data (WCCD) (2017) which demonstrates the relationship between UN SDGs and ISO 37120 Indicators
- Select a sample of the seventeen SDGs to be analyzed in the study.
- Review the International Infrastructure Management Manual (IIMM) to understand the metrics used to measure AM maturity.
- Review the Gas Tax Fund agreement that required municipalities to deliver AM plans in Canada.
- Review and identify a municipality to use as a case study for the analysis.

- Compare the ISO 37120 indicators and LOS objectives identified by the municipality in the case study.
- Create a database for each UN SDG in the analysis which classifies the relationships between the ISO 37120 Indicators and the LOS objectives.
- Report on the gaps that were identified by examining LOS objectives with the ISO 37120 Indicators from WCCD 2017.

1.4 Deliverables

To fulfill the objectives using the methodology described in 1.2, this report will produce the following deliverables.

- Rationale and assessment of how the LOS objectives and performance measures contribute to the UN SDGs and are classified as direct, indirect, or not applicable.
- The database, steps for mapping and maps of the gaps between the UN SDGs to AM
- Proof of concept application of the mapping and an example of the analysis using three SDGs
- The basis for using UN indicators to measure performance of municipal services delivered through infrastructure.

The following table summarizes the detailed objectives, methodology and deliverables of the research.

Table 1-1: Expected deliverables

	1	2	3	4
Objective	Explore the underlying basis of indicators used for the assessment of the UN SDG and practice of AM in Canada.	Develop a tool to explore the relationship between UN SDGs and AM	Demonstrate the relationship between indicators (application of the tool)	Summarize the findings for the purpose of standardizing AM performance measures
Method	<ul style="list-style-type: none"> Review WCCD documentation and ISO 37120 Conduct scan of Canadian municipal legislation Summarize experience while consulting for municipalities and local governments 	<ul style="list-style-type: none"> Secure a case study for AM performance measures Analyze the mapping of UN to WCCD Develop a database for analysis 	<ul style="list-style-type: none"> Select representative UN SDGs for municipal infrastructure Complete the analysis using the case study performance measures Generate heat maps highlighting the relationship 	<ul style="list-style-type: none"> Review the gaps in the proof-of-concept mapping. Identify constraints and limitations to the study. Highlight areas for improvement or future research.
Deliverable	<ul style="list-style-type: none"> The rationale for the assessment of indicators (direct, indirect, or not applicable) 	<ul style="list-style-type: none"> Steps for mapping the UN SDGs to AM The database to complete the analysis Maps for identifying gap 	<ul style="list-style-type: none"> Proof-of-concept application of mapping An example of the analysis for three SDGs 	<ul style="list-style-type: none"> The basis for using UN indicators to measure performance of municipal services delivered through infrastructure.

1.5 Overview

The report provides a literature review containing an overview of municipal services offered across Canada, highlighting the inconsistencies found in provincial legislation; a detailed overview of AM; and an introduction to both LOS and the work being performed by the UN to advance sustainable practices on the global scale (Chapter 2).

Following the literature review, the report highlights the method and framework used to map the UN SDGs to the LOS objectives (Chapter 3). The method and framework are demonstrated through a case study with the City of Guelph. The City of Guelph generously

provided their LOS data from 2017 following the completion of the Asset Level of Service Development project which was completed in partnership with a third-party consultant (Chapter 4).

The findings of the analysis and case study are discussed for representative UN SDGs. These findings show the relationship between the UN SDGs and LOS objectives being delivered by the City of Guelph. The gaps found in the analysis are then discussed (Chapter 5). The report concludes by highlighting the findings and comparing them to the initial objectives. The limitations and recommendations for a future study are discussed to conclude the report (Chapter 6).

CHAPTER 2: LITERATURE REVIEW

2.1 Municipal Services

When discussing services managed by the public sector that are provided to communities across Canada, the Federation of Canadian Municipalities (FCM) estimates that municipalities build and maintain 60 percent of the core public infrastructure in Canada (FCM, 2020). Sahely et al. (2005) determined that there is no consistency across the country in outlining who is responsible for maintaining infrastructure at the municipal level. This appears to still be the case as each province has a legislative act that states how municipalities should be structured and which services they need to provide; in some cases, and, often dependent on the service type, these acts are prescriptive. However, most of the services provided at the municipal or local government level are determined by the municipality. After reviewing the acts of the ten provinces across the country, it was evident that each province has slightly differing Acts that govern municipal services. Inconsistency in the acts leads to services being offered, managed, and assessed differently. For example, condition assessments may not be completed, may be done based on age, may be performed using a unique condition assessment framework developed by the municipality, or may have adopted a national or international standard. This leads to problems in assessing the current state of infrastructure and benchmarking or comparing the state of infrastructure nationally (Sahely et al., 2005). As an example, according to the New Brunswick Local Governance Act, local governments must provide services based on the type of local government they are (i.e., regional commission, rural community, urban centre, etc.). According to the Act, “The purposes of a local government are to provide

services, facilities or things the council considers necessary or desirable for all or part of the local government” (Bill 44 Local Governance Act, Part 2). Additionally, local governments have the capacity to enter into an agreement to provide services, utilities and facilities to persons outside the territorial limits of the local government. Specifically, in New Brunswick, a rural community or regional municipality must provide animal control, police protection and solid waste collection and disposal services (Local Governance Act, 2018). In addition to these services, local governments in New Brunswick have the option to provide electricity, gas, water and wastewater services but are not obligated to. At the provincial level, the Minister must provide Local Service Districts animal control, dangerous or unsightly premises enforcement, emergency measures, fire protection, land use planning, rescue, police protection and solid waste collection and disposal services (Local Governance Act, 2018). In addition to the services listed above, the Local Governance Act references several other Acts, including the Electricity Act, Gas Distribution Act, etc. when delivering services. This can be difficult for municipal infrastructure planning as there are no prescriptive statements used which would state the services required to be delivered, how the services are delivered, who will manage and maintain them, and how the state of service or infrastructure should be reported. Furthermore, the Acts discuss services that are often offered at the provincial and federal level, making this more confusing for infrastructure managers across local governments.

Like New Brunswick, the other provinces have legislated the services that municipalities are required to offer their communities. For example, Nova Scotia is required to offer similar services through a combination of methods and references several Acts throughout

their Municipal Government Act (1998). Prince Edward Island has a Municipal Government Act, which states that a municipality must provide fire protection, municipal planning, and emergency measures planning (Municipal Government Act, 2019).

While most municipalities across Canada are legislated to provide the same services as in New Brunswick, the Ontario Municipal Act (2001) describes municipalities in different tiers and discusses additional items such as childcare. According to Asset Management Ontario (2020), municipalities in Ontario are typically responsible for providing the services listed in Table 2-1. While this list is long, municipalities are not legislated to provide these services, but rather have the authority to create by-laws and offer these services to their communities.

Table 2-1: Services offered by select municipalities in Ontario (AMO, 2020)

Airports	Library services	Public health
Ambulance	Long-term care and senior housing	Sidewalks
Animal control	Maintenance of local road network	Snow removal
Arts and culture	Parks and recreation	Social services
Childcare	Public transit	Social housing
Economic development	Community development	Storm sewers
Fire services	Police services	Tax collection
Solid waste collection and recycling	Property assessment	Water and sewage
Electric utilities	Provincial offences administration	

Many jurisdictions allude to the importance of providing welfare and health services, and some mention long-term care facilities for seniors, but only British Columbia specifically states the importance of providing healthcare (i.e., hospitals) and welfare (i.e., accommodations for aged, infirm, and disabled, social planning, etc.) (Municipal Act,

1996). With this broad range of services, often offered at different levels of government, depending on the province, it is difficult to objectively determine the effectiveness of a municipality measuring services. Additionally, it becomes increasingly important to understand the services they offer and the level of service they should be providing, while accounting for cost to the local government and risk if the service is not delivered adequately. Table 2-2 demonstrates services mentioned in the varying Local Government Acts across the country, using British Columbia, Ontario, and New Brunswick as an example. It demonstrates an example of the difficulties in benchmarking LOS for local governments and comparing to their peers as it shows differences in services offered, and at which level of government. Provinces are essentially provided with the means to create their own standards, resulting in variability from province to province.

Table 2-2: Example of who is responsible for delivering the services across three provinces

Services	Provinces		
	British Columbia	Ontario	New Brunswick
Administration of justice	Non-municipal	Non-municipal	Municipal
Childcare	Municipal	Municipal	Mix
Education	Non-municipal	Non-municipal	Non-municipal
Hospitals	Mix	Non-municipal	Non-municipal
Natural resources and environment	Mix	Non-municipal	Non-municipal
Social services	Mix	Mix	Mix
Public health	Municipal	Municipal	Mix
Social housing	Municipal	Municipal	Non-municipal

It is recognized that the three levels of government provide many more services than the eight listed in Table 2-2. This table is meant to demonstrate the variety of services offered by the public sector, and the varying levels of governments delivering the services.

The research conducted demonstrates the relationship between UN Indicators and ISO 37120 Indicators for the UN SDGs and LOS objectives and performance measures for delivering **municipal services**. This research does not account for services delivered provincially or federally which, as demonstrated in Table 2-2, is a limitation. A holistic study should be conducted which accounts for all services offered publicly and attempts to map the relationship to the UN SDGs.

2.2 Municipal Level of Service Overview

According to the International Infrastructure Management Manual (2015), LOS are “key business drivers and influence all asset management decisions”. LOS are the outcomes a municipality delivers and are directly related to the asset management objectives set by the municipality. As discussed in Section 2.1, Canadian municipalities are legislated by provincial jurisdictions to provide several services to their citizens, depending on the municipality (e.g., village, town, and city). When establishing LOS, the municipality must identify and document its services to begin assessing metrics related to delivering the service. In an asset management plan, municipalities create LOS statements that describe the outputs the municipality intends to deliver to customers and other stakeholders; and therefore, must be written in terms the end-user can understand and relate to (IIMM, 2015). These statements are the avenue to translate the corporate objectives to the detailed technical and operational objectives as depicted in Figure 2-1: Hierarchy of Objectives (IIMM, 2015).

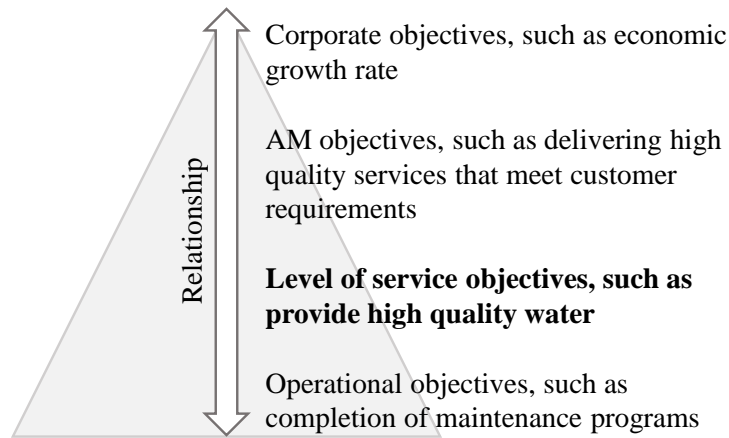


Figure 2-1: Hierarchy of Objectives (IIMM, 2015)

Ultimately, corporate objectives often found in municipal strategic plans will guide the AM objectives and operational objectives, with LOS being the key translator between the three. An integral aspect of asset management planning is matching the LOS provided with the expectations of the customer, while attempting to balance the costs of delivering the service to the required performance measures and risks to the municipality if the service is not delivered (e.g., potable water to a hospital versus potable water to a water park). The cost/performance/risk relationship is demonstrated throughout ISO 55000 (2014) and is important to all asset management planning. Upon establishing the LOS statements, municipalities create performance measures and begin to measure their performance. Measuring their performance could be achieved by reviewing existing data, completing data collection projects, consultation with stakeholders, etc. Understanding the needs of the community helps municipalities define their level of service objectives, create asset management strategies to measure performance, and track how their service is performing against their targets or benchmarks identified. By measuring the performance metrics of the communities' services, municipalities can begin linking cost to service performance

(e.g., by increasing cost by X, the service delivered is increased by Y) and service risk (e.g., by replacing an asset (increasing cost) with new, the risk of a service failing (e.g., likelihood of failure) goes down) back to infrastructure and understand the total cost of delivering services (IIMM, 2015). Furthermore, the identified targets and LOS objectives help define the operational objectives, which provide input to maintenance programs, as well as asset management strategies and treatments, in turn, delivering the overall asset management and corporate objectives (as shown in the relationship in Figure 2-1).

2.3 United Nations Sustainable Development Goals

In 2000, the UN established the Millennium Development Goals (MDGs) with clear and concise targets to be met by 2015. According to the UN, the focus of the MDGs was to improve the lives of the world's poorest people (WCCD, 2017). Throughout the 15-year period (2000 to 2015), the MDGs brought public awareness, dedication, and mobilization to combat poverty but lacked the standardized and accurate data to measure performance against the established goals. Additionally, the MDGs did not explicitly state the role cities (municipalities) have in monitoring and achieving the MDGs.

Post 2015, the UN understood and appreciated the role the MDGs played in combatting poverty from 2000 to 2015 but determined that the MDGs should encompass more than poverty. This understanding led to the creation of the UN SDGs, including the importance of fighting climate change and environmental challenges (WCCD, 2017). Table 2-3 shows the SDGs developed by the UN in 2015. For each of the goals, the UN has identified targets and indicators to help achieve the goals by 2030.

Table 2-3: Sustainable Development Goals (WCCD, 2017)

Goal	Definition
1 No Poverty	‘End poverty in all its forms everywhere’
2 Zero Hunger	‘End hunger, achieve food security and improved nutrition and promote sustainable agriculture’
3 Good Health and Well-Being	‘Ensure healthy lives and promote well-being for all at all ages’
4 Quality Education	‘Ensure inclusive and equitable quality education and promote lifelong learning opportunities for all’
5 Gender Equality	‘Achieve gender equity and empower all women and girls’
6 Clean Water and Sanitation	‘Ensure availability and sustainable management of water and sanitation for all’
7 Affordable and Clean Energy	‘Ensure access to affordable, reliable, sustainable and modern energy for all.
8 Decent Work and Economic Growth	‘Promote sustained, inclusive economic growth, full and productive employment for all’
9 Industry, Innovation and Infrastructure	‘Build resilient infrastructure, promote inclusive and sustainable industrialization and foster innovation
10 Reduced Inequalities	‘Reduce inequality within and among countries’
11 Sustainable Cities and Communities	‘Make cities and human settlements inclusive, safe, resilient and sustainable’
12 Responsible Consumption and Production	‘Ensure sustainable consumption and production patterns’
13 Climate Action	‘Take urgent action to combat climate change and its impacts’
14 Life Below Water	‘Conserve and sustainably use the oceans, seas, and marine resources for sustainable development’
15 Life on Land	‘Protect, restore and promote sustainable use of terrestrial ecosystems, sustainably manage forest, combat desertification, and halt and reverse land degradation and halt biodiversity loss’
16 Peace, Justice and Strong Institutions	‘Promote peaceful and inclusive societies for sustainable development, provide access to justice for all, and build effective, accountable, and inclusive institutions at all levels’
17 Partnership for the Goals	‘Strengthen the means of implementation and revitalize the Global Partnership for Sustainable Development’

In addition to the seventeen goals, the UN developed 169 targets. In 2017, these targets, and the associated UN Indicators to measure them, were mapped to the 100 ISO 37120:2018 – Sustainable development of communities – Indicators for city services and quality of life indicators by a team of researchers at the World Council on City Data

(WCCD) and their sister organization, the Global Cities Institute at the John H. Daniels Faculty of Architecture, Landscape and Design at the University of Toronto (WCCD, 2017). The example shown in Table 2-4 is from UN SDG 9 – Industry, Innovation, and Infrastructure. This example demonstrates the overlap between the UN indicator, ISO 37120 indicator and LOS objectives used in asset management.

Table 2-4: Example of mapping UN Indicator, ISO 37120 Indicator and LOS Objective

UN indicator	ISO 37120 indicator	LOS objective
Proportion of the rural population who live within 2 km of an all-season road.	Kilometres of high-capacity public transport system per 100,000 population.	Providing an efficient transportation network for all modes

The assessment shown in Table 2-4 was performed using LOS objectives provided by the City of Guelph. The full analysis, along with the mapping of the UN Indicators, ISO 37120 Indicators and 509 performance measures are discussed in CHAPTER 5:

CHAPTER 3: COMPARING ASSET MANAGEMENT AND UNITED NATIONS SUSTAINABLE DEVELOPMENT GOALS

The LOS objectives discussed in asset management, and objectives outlined in the UN SDGs, are often related in the context of services provided by municipal infrastructure. Figure 2-1: Hierarchy of Objectives (IIMM, 2015) demonstrates the relationship from the corporate objectives to operations objectives, with level of service objectives acting as a translator between the organizations' corporate objectives and how infrastructure is operated and maintained to achieve the corporate objectives. Similarly, the work performed by WCCD there is a line of sight between the UN SDGs, the UN objectives, and the ISO 37120:2018 – Sustainable cities and communities – Indicators for city services and quality of life (WCCD, 2017).

The following Section discusses each of the objectives in greater detail with emphasis on level of service objectives and the study performed by the WCCD. The Chapter further describes the research performed and demonstrates an example of mapping LOS and UN SDGs.

3.1 Levels of Services objectives used in practice

The relationship from corporate objectives to operational objectives is demonstrated in asset management practice. To create these objectives, municipalities undergo various processes ensuring the municipality is considering the demands of their stakeholders at the forefront. Once the objectives have been identified at all four levels of the AM hierarchy (corporate, asset management, LOS, and operations), there are a variety of measures,

indicators or targets considered, to benchmark and track how the municipality is meeting its objectives.

For the purposes of this research, the focus was on the LOS objectives. To understand and create the LOS objectives, it is important for a municipality to benchmark the current service being provided and identify customer and technical measures and targets to measure against their benchmark (IIMM, 2015). For municipalities, these are often created through stakeholder workshops with staff, customer surveys and/or focus groups.

Throughout Canada, municipalities are at different phases in their LOS practice. Meaning they could be at the beginning, and simply aware of the services they provide, or they could be actively using LOS, performance measures, targets and KPIs in all decisions made in the municipality. These differing maturity levels are described in the IIMM 2015 and shown in Figure 3-1.



Figure 3-1: Level of Service AM Maturity Index (IIMM, 2015)

From this example, a municipality measures between “Basic” and “Core” when metrics such as performance measures, service attributes and performance targets begin being reported. These LOS criteria are defined for each service provided by the municipality and linked to assets delivering a service (e.g., physical, engineering, natural, etc.). While measuring LOS is not vital to service delivery, it is an important step for municipalities to deliver services sustainably. This can be done by understanding the LOS they can afford, while balancing risk to the organization. The development of service levels includes identifying user groups (e.g., cyclists) and mapping the LOS objectives to service attributes, performance measures, performance targets and key performance indicators. This is done by understanding the needs and wants of the user-group and specifying this

desired service in an objective. Once the user-group is understood, it is possible to identify a metric to measure the service to satisfy the user-group. Figure 3-2: Process for creating level of service metrics (IIMM, 2015) demonstrates the relationship between these metrics.

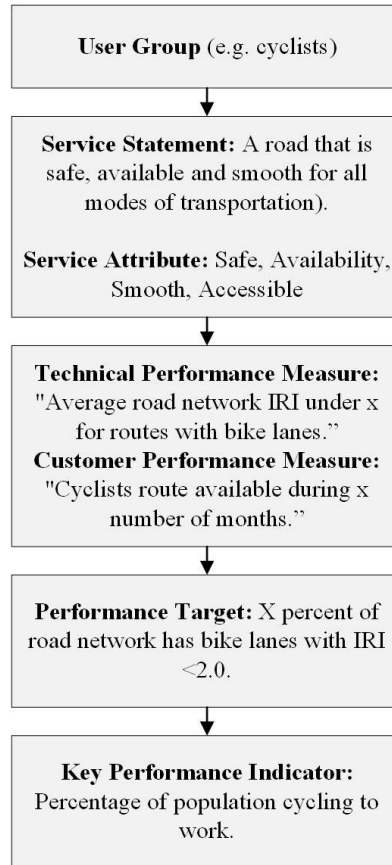


Figure 3-2: Process for creating level of service metrics (IIMM, 2015)

These LOS attributes can then be related to the UN SDGs by mapping the common key performance indicators (KPIs) to the ISO 37120 indicators identified for the UN SDGs.

3.2 The World Council on City Data

In 2017, the World Council on City Data (WCCD) undertook a study mapping the UN SDGs, UN Targets and UN Indicators to the ISO 37120 Indicators, ISO 37120 targets and data collected by ISO 37120 certified cities (WCCD, 2017). This study

was performed by mapping the SDGs to the ISO 37120 target, and then using the associated indicator and data provided by the municipalities to recognize how the municipality is contributing to the UN SDGs. This study was performed with 46 municipalities worldwide (all ISO 37120 certified) with the 17 SDGs and over 100 UN Targets and was able to demonstrate how each of the 46 municipalities contribute to the UN SDGs. Using data from the cities, WCCD was able to score the cities against the targets. The work performed by WCCD 2017 for the three goals, 1) No Poverty, 2) Industry, Innovation and Infrastructure, and 3) Sustainable Cities and Communities being used in this research are shown in World Council on City Data. (2017). WCCD City Data for the United Nations Sustainable Development Goals 2017. Toronto.

APPENDIX A – WCCD . This demonstrates how the UN Targets are supported by WCCD Indicators and ISO 37120 Certified City Data. While this study was important to understand and benchmark how cities around the world compare to the targets outlined by the UN; it does not demonstrate how asset management, and the management of infrastructure and community services influence the targets outlined by the UN (and vice versa).

3.3 Mapping Indicators

The research undertaken involves the completion of a review of LOS AM objectives for the purpose of mapping the UN targets for the SD Goals through the ISO 37120 indicators. This includes reviewing the LOS objectives for all services that municipalities are required to deliver. Figure 3-3: Mapping UN SDGs to LOS demonstrates the conceptual relationship between LOS objectives and UN SDGs.

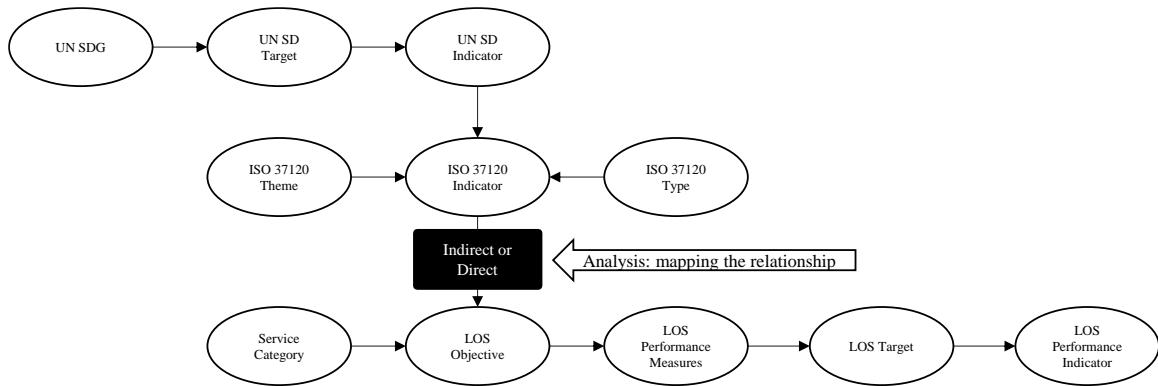


Figure 3-3: Mapping UN SDGs to LOS Objectives

Following the mapping of the UN targets to the LOS objectives, a gap analysis was performed to understand where certain LOS objectives might be omitted from the UN SDGs and vice versa.

To understand the relationship between the UN SDGs and LOS objectives, two analyses were performed: i) a review of under 20 publicly available asset management plans in Canada was conducted; and ii) a review of UN SDGs. These reviews were then compared through a case study process involving one of the Canadian municipalities.

The review of Canadian AM plans was performed over five years of researching AM plans while the researcher was employed as a consultant. These reviews were completed for the following reasons:

- Responding to requests for proposals from municipalities across Canada, primarily small and medium sized population centres, but including some large population centres and provincial jurisdictions. (2015 – present).
- Creating methodologies and authoring or co-authoring best practice documents for eight municipalities across Canada (2015 – present).

- Co-authoring eight AM plans for municipalities across Canada (2015 – present).
- Working on a national steering committee for the Canadian Network of Asset Managers with representatives from the Institute of Asset Management (IAM), NAMS Canada, Institute of Public Works Engineering Australasia (IPWEA), Asset Management Ontario (AMO), Asset Management British Columbia (AMBC), among others to develop the Asset Management Competency Framework for the Federation of Canadian Municipalities (2019 – 2020).
- Working within a project team that spanned several continents in order to deliver asset management projects at the municipal, provincial, federal and crown corporation level (2015 – 2019).
- Working with a team of five to help develop the New Brunswick Department of Environment and Local Government’s Guide to Asset Management Planning for Local Governments (Phase 1) (2016 – 2017).

During the review of Canadian municipal asset management plans, LOS objectives and performance measures were compiled. These were initially categorized by population centres defined by Statistics Canada: i) small population centre (under 30,000); ii) medium population centre (30,000 to 99,999); or iii) large population centre (greater than 99,999) as it was assumed that the larger population centres would be more advanced in AM maturity (IIMM, 2015). This review found that AM maturity relating to levels of service was independent of population size (e.g., some small and medium population centres were more advanced than large population centres reviewed). However, it was found that some

municipalities were more mature in areas where prescriptive requirements were required by their provincial jurisdiction. Therefore, it was more important to analyze maturity using the data provided, and by understanding the current activities performed in the municipality.

The review of the UN SDGs included a review of each of the seventeen goals, the 191 UN Targets and Indicators, and the work performed by the World Council on City Data (WCCD) to connect the UN Targets and Indicators for the Goals to the WCCD Indicators (or ISO 37120 Certified Data). This review was performed to identify which goals should be the primary focus of the research. After reviewing the 2017 report published by WCCD, it was evident that the Localizing Goal 9 – Industry, Innovation and Infrastructure, as well as Localizing Goal 11 – Sustainable Cities and Communities would be required for this study. Both are specific goals that are interconnected to the services offered by municipalities and managed by their infrastructure managers. In addition to both Localizing Goal 9 – Industry, Innovation and Infrastructure and Localizing Goal 11 – Sustainable Cities and Communities, the research included a review that was primarily humanity oriented. For this part of the review, Localizing Goal 1 – No Poverty was selected as many of the targets and indicators are not directly impacted by good stewardship of public infrastructure management. It is expected that the findings from mapping Localizing Goal 1 – No Poverty to the LOS objectives will lead to gaps in the performance measures being measured at the municipal level to sustainably deliver services. This is expectation is a result of the ISO themes commonly used in measuring Localizing Goal 1 – No Poverty

by WCCD (2017). Many of these themes (shelter, education, health) are typically services offered by provincial or federal governments in Canada, and not at the municipal level.

It is important to note that during this exercise, it was discovered that LOS objectives and their associated performance measures used by municipalities often vary, as there is no clear standard. Thus, a case study was performed with a municipality considered ‘intermediate’ on the Level of Service Maturity Index shown in Figure 3-1: Level of Service AM Maturity Index (IIMM, 2015)

3.3.1 Analysis of Indicators

To perform the analysis, a database was created where each of Goal 1 – No Poverty, Goal 9 – Industry, Innovation and Infrastructure, and Goal 11 – Sustainable Cities and Communities would be assessed with each of the LOS objectives to map the relationship between the UN Indicators and the LOS objectives. To conduct the assessment, each level of service customer and technical performance measure (509 in total) were analyzed and subjectively compared to the UN and ISO Indicators by identifying a common theme in the performance measure and comparing it to both the UN and ISO Indicators. This analysis was performed to create three categories between the performance measures and ISO indicator: direct, indirect or no alignment.

This analysis was performed with the intent of minimizing subjectivity. It was done by identifying existing definitions used for keywords in the UN and ISO Indicators and analyzing (e.g., reviewing all 509 unique performance measures and comparing them to all UN and ISO Indicators) the level of service performance measure to assess the relationship

of the keyword of each UN and ISO indicator. Despite this, subjectivity in the analysis could only be reduced and not eliminated. Table 3-1 is an example ISO 37120 Indicator mapped to the LOS Performance Measure in order to demonstrate the three types of relationships: direct, indirect or no relationship. As the first step in the review, the ISO Indicators, and definitions used by ISO, were investigated to understand the ISO 37120 Indicator. The following example shows the analysis performed for Localized Goal 1 – No Poverty.

ISO 37120 Indicator: Percentage of the city population living in slums.

Based on this indicator, it was imperative to understand how slums were identified. From this, it was found that the ISO37120 took the definition of a slum household from the UN-HABITAT (2005) definition, which defines a slum household as a group of individuals living under the same roof in an urban area who lack one or more of the following:

1. “Durable housing of a permanent nature that protects against extreme climate conditions.
2. Sufficient living space, which means not more than three people sharing the same room.
3. Easy access to safe water in sufficient amounts at an affordable price.
4. Access to adequate sanitation in the form of a private or public toilet shared by a reasonable number of people.
5. Security of tenure that prevents forced evictions.”

An example of the analysis is now shown in Table 3-1: Example of the Analysis Performed after assessing the ISO 37120 Indicator and the definition of slum.

Table 3-1: Example of the Analysis Performed

No.	ISO 37120 Indicator	LOS Performance Measure	Relationship
1	Percentage of city population living in slums	Percentage of community with acceptable risk of experiencing adverse water quality	Direct
2	Percentage of city population living in slums	Percentage of customers that are within the target travel time to a park	Indirect
3	Proportion of population living below the national poverty line, by sex and age	N/A	N/A

The example analysis in Table 3-1 demonstrates a direct, indirect and no relationship (or N/A) for the same ISO 37120 Indicator. In the case of a direct relationship, the municipality in the case study hopes to provide the whole community with quality potable water, which is a direct measure to prevent people living in slums. The second LOS performance measure is an indirect relationship to living in a slum as a maintained park would not be found in a slum as meaning that the municipality may avoid having any slums by meeting their performance measure for park travel time. That said, park travel time does not directly combat the creation of a slum. Finally, the third example is related to population living below the national poverty line, by sex and age. This ISO 37120 indicator is not a performance measure at the municipal level, and, in Canada, could be a type of measure used by the federal government when making decisions related to minimum wage, wage subsidies, affordable housing, etc. The third example demonstrates one of two conclusions: i) there is a gap in the municipalities LOS performance measures, or ii) the municipality is not responsible for delivering a service to meet this ISO Indicator.

CHAPTER 4: CASE STUDY – THREE LEVEL COMPARISONS

4.1 Subject of study

To conduct this case study, there were several characteristics considered to determine the local government to use in the case study.

- Public availability of LOS asset management documents
- The maturity level of the municipality
- The municipality’s willingness to participate.

The optimal case study subject would be willing to share all data related to their LOS frameworks, at a minimum, be considered between basic and core (e.g., Levels of service and performance measures in place covering a range of service attributes) in the IIMM 2015 LOS maturity framework and be interested in advancing their LOS by mapping them to the UN SDGs. The result of reviewing AM documents across Canada led to identifying **Guelph, Ontario** as the subject for the study.

The City of Guelph (“the City”) is located in southwestern Ontario and was originally founded on April 23, 1827. Since its inception in 1827, the City has grown to over 130,000 in population (Statistics Canada, 2016) and offers a large variety of municipal services to the community. For the purpose of municipal asset management, the City has classified their service offerings into nineteen (19) service categories and has developed LOS frameworks for sixteen (16) of the service categories (Table 4-1).

Table 4-1: Service categories with LOS frameworks

1. Culture, Tourism and Community Investment	6. Paramedic Services	11. Roads and Right-of-Way
2. Facilities Management	7. Parking	12. Solid Waste
3. Fire Rescue	8. Parks, Forestry and Open Spaces	13. Stormwater
4. Fleet	9. Police	14. Transit
5. Information Technology (IT)	10. Recreation	15. Wastewater
		16. Water

The City provided the following documents from their Asset Levels of Service Development project:

- a. Technical Memorandum #1: International Best Practice Review;
- b. Technical Memorandum #2: Levels of Service Framework Development;
- c. Technical Memorandum #3: Final Report;
- d. Technical Memorandum #4: Cost of Levels of Service and Predictive Modelling;
- e. Public Engagement Strategy;
- f. Service Categorization Memorandum;
- g. Service Area Asset Portfolios; and
- h. Service Level Agreements.

In addition to the Assets Levels of Service Development reports listed above, the City provided a Microsoft Excel database which contained the following information.

- 1) Key service attribute,
- 2) The level of service statement,
- 3) Customer performance measures,

- 4) Technical performance measures,
- 5) Current performance (where available),
- 6) Target performance for all sixteen service categories, and
- 7) Consolidated list of performance measures by service category.

While the city was able to provide information on their performance measures, it is important to note that the city had only identified the performance measures they intend to use but had not identified *how to* or *when to* (e.g., frequency) measure performance. This is important as, according to IIMM 2015 maturity index, the city would be considered *core*. Despite this, at the time of confirming the city as the subject, and the city providing their data for the study, they were continuing their LOS project and as a result would be considered *advanced* at the conclusion of the project. Nevertheless, for the purposes of the case study, knowing how or when to measure performance is not required.

4.2 Maturity of Asset Management

The City began developing its Asset LOS Frameworks to support its Corporate Asset Management Program in 2018 (hereinafter “LOS-AM project”). The focus of the LOS-AM project was to establish a relationship between the LOS being provided by infrastructure systems and the city’s operating and capital expenditures. An external consultant was hired to complete the project, which was divided into three phases and had supplemental deliverables throughout the phases: i) international best practice review; ii) LOS framework development; and iii) cost of LOS and predictive modelling.

During the creation of the framework, it was determined that sixteen of the nineteen service categories would be in scope for the project. The three that were excluded were: i) contaminated site remediation; ii) provincial offences administration; and iii) library. These three services were **excluded** as the service offerings were not primarily supported by infrastructure assets.

To create the LOS frameworks, a service statement was first developed for each service category and then key service attributes were established. An example from the Roads and Right-of-Ways service category is shown in Table 4-2.

Table 4-2: Service Statement and Key Service Attribute Example (Guelph, 2018)

Service Category	Roads and Right-of-Ways
Service Statement	Efficiently providing operational and accessible roads and right-of-ways at the appropriate quality that support drivers, cyclists, and pedestrians.
Key Service Attribute	Cost Efficiency

In total, the LOS-AM project identified 12 key service attributes and, of the key service attributes, the most common amongst the frameworks reviewed include cost efficiency, safety, accessibility, quality, reliability, and environmental stewardship. From the best practice review, it was noted that many frameworks did not use asset condition data to measure performance. However, for Guelph, it was decided to use asset condition data as a measure for reliability, which was important, as this data is readily available. An additional caveat related to the framework was that the attributes on environmental consciousness/sustainability were focused on meeting environmental regulations and improving energy efficiency and there was no reference to climate change adaptation or greenhouse gas emissions. There were additional performance measures used (under the

environmental stewardship key service attribute) which measure greenhouse gas emissions, chemicals or materials used to deliver services, waste of potable water, etc.

Based on the focus of this project, a review of public LOS asset management documents, and discussions with industry practitioners, the City of Guelph appeared to be one of the more advanced municipalities in Canada in relation to measuring and documenting levels of service. The City is continuing its LOS-AM project and its journey of becoming an advanced municipality as measured in the IIMM 2015, whereas many Canadian municipalities have only begun to document their LOS requirements. For this reason, the AM-LOS project and the City of Guelph was an ideal subject for the case study.

4.3 Mapping the City's level of service objectives to UN SDGs

For the case study, the City's 509 unique customer and technical performance measures were reviewed against the ISO 37120 indicators and compared to the UN SD Indicators. From the LOS-AM project documents provided by the city; it was found that LOS performance is primarily measured on the condition of the assets due to asset condition information being readily available. While this is common in AM, it may not be best practice or ideal for some asset classes. For example, with the asset parks, another measure that could be used is % of playgrounds with accessible structures. In this example, condition is not the primary measure. Furthermore, there were several performance measures highlighted that did not yet have a benchmark and current performance being measured. Using the performance measures with the most mature data for measurement, assessment examples are provided.

4.3.1 Example 1: No Poverty – Shelter

The first example of mapping is the UN SDG Goal 1 – No Poverty. The analysis begins with a revision of the UN SDG, the UN SD Target, and the UN SD Indicator. These are shown in Table 4-3.

Table 4-3: Example of Goal 1 - No Poverty (WCCD, 2017)

United Nations Sustainable Development Goal 1	No Poverty
United Nations Sustainable Development Target 1.4	By 2030, ensure that all men and women, in particular the poor and the vulnerable, have equal rights to economic resources, as well as access to basic services, ownership and control over land and other forms of property, inheritance, natural resources, appropriate new technology and financial services, including microfinance.
United Nations Sustainable Development Indicator 1.4.1	Proportion of population living in households with access to basic services.

Using this information provided by the UN, WCCD linked the ISO 37120 Indicator, ISO Indicator Type (core or supporting) and ISO Indicator Theme, shown in Table 4-4 to the UN SDG.

Table 4-4: Example of ISO Indicators (WCCD, 2017)

ISO 37120 Indicator	15.1 Percentage of city population living in slums
ISO 37120 Indicator Type	Core
ISO 37120 Indicator Theme	Shelter

After reviewing the work analysis performed by WCCD, shown in Table 4-3 and Table 4-4, the researcher analyzed all performance measures used by the City of Guelph to measure LOS performance. The performance measures were analyzed to map their relationship to the ISO 37120 Indicator. An example of the City of Guelph data is shown in Table 4-5. This example is from Guelph’s parks, forestry, and open spaces service category.

Table 4-5: Example of City of Guelph LOS Data (Guelph, 2018)

LOS Performance Indicator	Accessibility
LOS Objective	Providing parks within a reasonable proximity to every residential household.
LOS Performance Measure	<p>Customer:</p> <p>1) % of customers that are within the target travel time to a park</p> <p>2) % of customers that are within the target travel time to a trail network</p>
LOS Targets	<p>Technical:</p> <p>1) % of properties within 600 m of a park</p> <p>Customer:</p> <p>1) TBD</p> <p>2) 99.10%</p> <p>Technical:</p> <p>1) TBD</p>

Using the data from the UN, ISO 37120, and the City of Guelph, the analysis could now be performed. A complete example demonstrating the relationship from the ISO 37120 Indicator to the LOS performance measures is shown in Table 4-6. In this example, all three LOS performance measures had an indirect relationship to the ISO 37120 Indicator, as shown in the column “Relationship”.

Table 4-6: Mapping the United Nations Sustainable Development Goals, ISO 37120, and Level of Service (WCCD, 2017 & Parks, Forestry, and Open Spaces, 2018)

ISO 37120 Indicator	Indicator Type	ISO 37120 Themes (Targets)	LOS Performance Indicator	LOS Objective	LOS Performance Measures	Relationship	LOS Targets
15.1 Percentage of city population living in slums	Core	Shelter	Accessible (proximity to parks)	Providing parks within a reasonable proximity to every residential household.	Customer: 1) % of customers that are within the target travel time to a park	I	TBD
					2) % of customers that are within the target travel time to a trail network	I	99.10%
					Technical: 1) % of properties within 600 m of a park	I	TBD

4.3.2 Example 2: Industry, Innovation & Infrastructure – Transportation

The second example of mapping is the UN SDG Goal 9 – Industry, Innovation & Infrastructure. The analysis begins with a revision of the UN SDG, the UN SD Target, and the UN SD Indicator. These are shown in Table 4-7.

Table 4-7: Example of Goal 9 - Industry, Innovation & Infrastructure (WCCD, 2017)

United Nations Sustainable Development Goal 9	Industry, Innovation & Infrastructure
United Nations Sustainable Development Target 9.1	Develop quality, reliable, sustainable, and resilient infrastructure, including regional and trans-border infrastructure, to support economic development and human well-being, with a focus on affordable and equitable access for all.
United Nations Sustainable Development Indicator 9.1.1	Proportion of the rural population who live within 2 km of an all-season road.

Using this information provided by the UN, WCCD linked the ISO 37120 Indicator, ISO Indicator Type (core or supporting) and ISO Indicator Theme, shown in Table 4-8, to the UN SDG.

Table 4-8: Example of ISO Indicators (WCCD, 2017)

ISO 37120 Indicator	8.1 Kilometres of high-capacity public transport system per 100,000 population
ISO 37120 Indicator Type	Core
ISO 37120 Indicator Theme	Transportation

After reviewing the analysis performed by WCCD, shown in Table 4-7 and Table 4-8, the researcher analyzed all performance measures used by the City of Guelph to measure LOS performance. The performance measures were analyzed to map their relationship to the ISO 37120 Indicator. An example of the City of Guelph data is shown in Table 4-9. This example is from Guelph’s roads and right-of-ways service category.

Table 4-9: Example of City of Guelph LOS Data (Guelph, 2018)

LOS Performance Indicator	Cost Efficient
LOS Objective	Providing an efficient transportation network for all modes
LOS Performance Measure	<p>Customer:</p> <ol style="list-style-type: none"> 1) Cost to provide service (\$/household) 2) Average asset renewal rate (# years) <p>Technical:</p> <ol style="list-style-type: none"> 1) Annual operating budget 2) Average annual capital expenditure for roads and right-of-ways 3) 10-year average road linear asset renewal budget as a % of replacement value 4) 10-year average road traffic asset renewal budget as a % of replacement value
LOS Targets	<p>Customer:</p> <ol style="list-style-type: none"> 1) TBD 2) TBD <p>Technical:</p> <ol style="list-style-type: none"> 1) TBD 2) TBD 3) 2% to 3% 4) TBD

Using the data from the UN, ISO 37120, and the City of Guelph, the analysis could now be performed. A complete example demonstrating the relationship from the ISO 37120 Indicator to the LOS performance measures is shown in Table 4-10. In this example, all six LOS performance measures had an indirect relationship to the ISO 37120 Indicator, as shown in the column “Relationship”.

Table 4-10: Mapping the United Nations Sustainable Development Goals, ISO 37120, and Level of Service (WCCD, 2017 & Roads and Right-of-Ways Level of Service Framework, 2018)

ISO 37120 Indicator	Indicator Type	ISO 37120 Themes (Targets)	LOS Performance Indicator	LOS Objective	LOS Performance Measures	Relationship	LOS Targets
8.1 Kilometres of high-capacity public transport system per 100,000 population	Core	Transportation	Cost Efficient	Providing an efficient transportation network for all modes	Customer:		Customer:
					3) Cost to provide service (\$/household)	I	1) TBD
					4) Average asset renewal rate (# years)	I	2) TBD
					Technical:		Technical:
					5) Annual operating budget	I	1) TBD
					6) Average annual capital expenditure for roads and right-of-ways	I	2) TBD
					7) 10-year average road linear asset renewal budget as a % of replacement value	I	3) 2% to 3%
					8) 10-year average road traffic asset renewal budget as a % of replacement value	I	4) TBD

4.3.3 Example 3: Sustainable Cities and Communities – Transportation

The third example of mapping is the UN SDG Goal 11 – Sustainable Cities and Communities. The analysis begins with a revision of the UN SDG, the UN SD Target, and the UN SD Indicator. These are shown in Table 4-11.

Table 4-11: Example of Goal 11 - Sustainable Cities and Communities (WCCD, 2017)

United Nations Sustainable Development Goal 11	Sustainable Cities and Communities
United Nations Sustainable Development Target 11.2	By 2030, provide access to safe, affordable, accessible, and sustainable transport systems for all, improving road safety, notably by expanding public transport, with special attention to the needs of those in vulnerable situations, women, children, persons with disabilities and older persons.
United Nations Sustainable Development Indicator 11.2.1	Proportion of population that has convenient access to public transport, by sex, age, and persons with disabilities.

Using this information provided by the UN, WCCD linked the ISO 37120 Indicator, ISO Indicator Type (core or supporting) and ISO Indicator Theme, shown in Table 4-12 to Table 4-14, to the UN SDG.

Table 4-12: Example of ISO Indicators (WCCD, 2017)

ISO 37120 Indicator	18.1 Kilometres of high-capacity public transport system per 100,000 population
ISO 37120 Indicator Type	Core
ISO 37120 Indicator Theme	Transportation

After reviewing the analysis performed by WCCD, shown in Table 4-12, the researcher analyzed all performance measures used by the City of Guelph to measure LOS performance. The performance measures were analyzed to map their relationship to the ISO 37120 Indicator. An example of the City of Guelph data is shown in Table 4-14. This example is from Guelph’s transit service category.

Table 4-13: Example of City of Guelph LOS Data (Guelph, 2018)

LOS Performance Indicator	Cost efficient
LOS Objective	Providing a transit service in an efficient manner
LOS Performance Measure	Customer: 1) Average asset renewal rate (# of years) Technical: 1) # of service kilometres
LOS Targets	Customer: 1) 21 Technical: 1) TBD

Using the data from the UN, ISO 37120, and the City of Guelph, the analysis could now be performed. A complete example demonstrating the relationship from the ISO 37120 Indicator to the LOS performance measures is shown in Table 4-14. In this example, both of the LOS performance measures had a direct relationship to the ISO 37120 Indicator, as shown in the column “Relationship”.

Table 4-14: Mapping the United Nations Sustainable Development Goals, ISO 37120, and Level of Service (WCCD, 2017 & Transit level of Service Framework, 2018)

ISO 37120 Indicator	Indicator Type	ISO 37120 Themes (Targets)	LOS Performance Indicator	LOS Objective	LOS Performance Measures	Relationship	LOS Targets
18.1 Kilometres of high-capacity public transport system per 100,000 population	Core	Transportation	Cost efficient	Providing a transit service in an efficient manner	Customer: 1) Average asset renewal rate (# of years) Technical: 1) # of service kilometres	D D	Customer: 1) 21 Technical: 1) TBD

CHAPTER 5: RESULTS AND FINDINGS

Prior to reviewing the results and findings of the analysis, it is important to highlight and reiterate the analysis that was performed. The study focused on mapping three UN SDGs to the LOS objectives and performance measures used in AM. The intent of the study was to review the LOS objectives that had a direct or indirect impact to the ISO 37120 Indicators used by WCCD 2017 (shown in Figure 3-3). This approach is now considered “approach 1”. During the review, it became apparent that there were other previous mapping exercises undertaken upon which to base our analysis. This resulted in three different approaches to draw on, depending on the coverage of the previous exercise. During the review of the WCCD findings it was found that WCCD created their own WCCD Indicators to map to UN SD Indicators or that there were gaps in mapping WCCD or ISO 37120 Indicators to UN SD Indicators. As a result, the analysis was modified as follows: approach 2 is now defined as the WCCD Indicators being mapped to the LOS objectives and approach 3 is where no WCCD or ISO 37120 Indicators were mapped to the UN SD Indicator, so a direct mapping from UN SD Indicator to LOS objective was performed. Figure 5-1 demonstrates this change with approach 2 in red and approach 3 in blue.

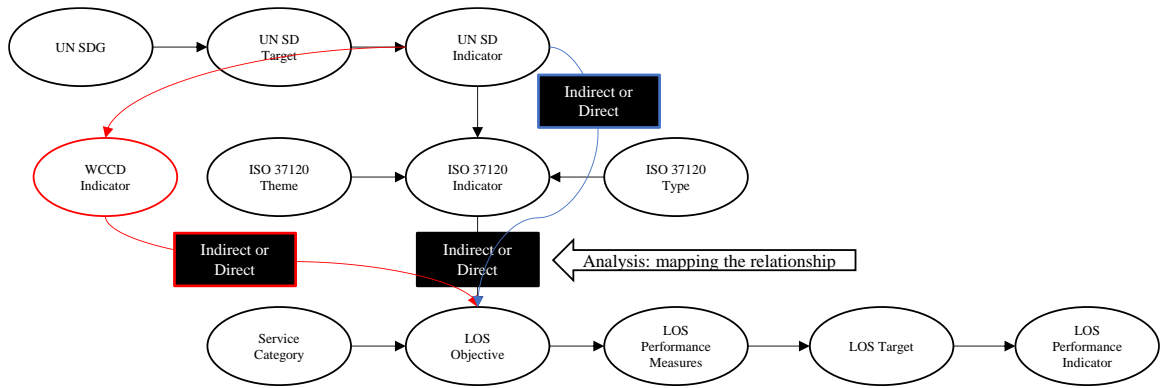


Figure 5-1: Mapping UN SDGs to LOS objectives

From the analysis, the three goals: No Poverty; Industry, Innovation & Infrastructure; and Sustainable Cities and Communities all had clear gaps. The full analysis can be found in APPENDIX C – with heat maps demonstrating the mapping shown in sections 5.1, 5.2 and 5.3 respectively. Table 5-1 shows the service categories that contribute to the three goals used for the case study. Meaning, if the cell has a checkmark, there is at least one LOS objective used by the City of Guelph contributing to the UN SDG.

Table 5-1: Gaps in linking LOS objectives to UN SDGs

UN SDG	Service categories															
	Culture, tourism and community investment	Facilities management	Fire rescue	Fleet	Information technology	Paramedic services	Parking	Parks, forestry and open spaces	Police	Recreation	Roads and right-of-ways	Solid waste	Stormwater	Transit	Wastewater	Water
No poverty	✓	✗	✓	✗	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
Industry, innovation & infrastructure	✓	✓	✗	✓	✗	✗	✗	✓	✓	✓	✓	✓	✓	✓	✓	✓
Sustainable cities and communities	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓

From Table 5-1, the service categories that do not contribute to No Poverty are Facilities Management and Fleet. Meanwhile the Industry, Innovation & Infrastructure does not contribute to Information Technology, Fire Rescue, Paramedic Services, and Parking.

While Paramedic Services may not be surprising, as this is a service typically offered provincially, the Fire Rescue services are delivered by almost all local governments nationally, and require infrastructure to do so, making this gap surprising. Finally, the City of Guelph has at least one LOS objective that contributes to Sustainable Cities and Communities SDG.

While the City of Guelph’s LOS objectives contribute to the three UN SDGs used in this case study, a deeper investigation into the analysis demonstrates further gaps. This deep dive analysis is shown using a heat map where the five relationships are colour coded with, i) blue as technical-direct; ii) yellow as customer-direct; iii) orange as technical-indirect; iv) green as customer-indirect and v) the number “0” with a white background if no relationship is present. The heat map colours are shown in Table 5-2: Heat map legend.

Table 5-2: Heat map legend

		Performance Measure Type	
		Technical	Customer
Relationship	Direct		
	Indirect		

It was important to distinguish between technical and customer performance measures in the analysis as, in Guelph’s case, many customer performance measures were not being measured. Additionally, the customer performance measures are often the relatable measures that are shown publicly as they are easily understood by the general public.

In addition to the legend, a few other items should be noted: i) the heat maps were created where ISO 37120 Themes are on the y-axis and the City of Guelph's Asset Management Service Categories on the x-axis; ii) in some instances, the ISO 37120 Themes were not mapped to any UN Indicators by WCCD. If this is the case, the heat map will state, "No ISO 37120 Indicator in this theme matches the UN Indicators"; and iii) there are rare occasions where WCCD did not map a UN Indicator to an ISO 37120 Indicator, but there was a link between the UN Indicator and the LOS performance measure. If this was the case, the heat map will be shown under the category "N/A" on the y-axis.

5.1 No Poverty – Analysis

Goal 1 – No Poverty has fourteen UN SD Indicators that were assessed and linked to service categories used by the City of Guelph. Of the fourteen UN SD Indicators, only four could be linked to service categories used by the City of Guelph including,

- i. Proportion of population living in households with access to basic services (1.4.1)
- ii. Proportion of total adult population with secure tenure rights to land, with legally recognized documentation and who perceive their rights to land as secure, by sex and by type of tenure (1.4.2)
- iii. Number of deaths, missing persons and persons affected by disaster per 100,000 people (1.5.1)
- iv. Proportion of resources allocated by the government directly to poverty reduction programmes (1.A.1)

These four indicators were linked to the LOS objectives and performance measures and assessed for an indirect or direct relationship to the UN SDG. From this analysis, it was found that **18** technical or customer performance measures (both technical and customer) had a direct impact on the No Poverty goal, while the remaining **38** support it indirectly. In total, there were only **56** technical and customer performance measures used by Guelph with a relationship to the No Poverty UN SDG.

Of the performance measures with a link to the No Poverty, Recreation, Stormwater, Solid Waste and Water were found to be the only service categories with a direct link. Further to the initial findings, it was found that, as of 2018, the City of Guelph was not measuring the current performance of any of the performance measures that had a direct link to the UN SDGs. It is also important to note that many of the LOS objectives that have been linked to the UN SD Indicators are repetitive. This means that the City of Guelph may use the same LOS Objective for their “Police” and “Fire Rescue” AM Service Category. Of the 44 LOS objectives with a link to the UN SD indicator, only 25 are unique. Table 5-2 is a heat map demonstrating the overall analysis performed for No Poverty but are being measured in several different ways from both a technical and customer performance measure. The number provided in the cell demonstrates the number of performance measures being used by the City of Guelph in the respective Asset Management Service Category that contributes to the ISO 31720 Theme. The complete analysis using a heat map is shown in Table 5-3. This analysis can conclude that the City of Guelph’s Solid Waste category contributes strongly to the No Poverty SDG. Furthermore, it is surprising that the

City does not have an LOS objective in the wastewater and water categories that contributes to the ISO 37120 theme for the No Poverty SDG.

Table 5-3: Goal 1 - No Poverty heat map

City of Guelph's Asset Management Service Categories

	Culture, tourism and community investment (32)		Facilities management (22)		Fire rescue (14)		Fleet (33)		Information Technology (28)		Paramedic services (17)		Parking (43)		Parks, forestry and open spaces (46)		Police (26)		Recreation (37)		Roads and right-of-ways (46)		Solid waste (39)		Stormwater (28)		Transit (40)		Wastewater (28)		Water (30)	
	T (23)	C (9)	T (14)	C (8)	T (11)	C (3)	T (28)	C (5)	T (22)	C (6)	T (13)	C (4)	T (35)	C (8)	T (34)	C (12)	T (17)	C (9)	T (28)	C (9)	T (34)	C (12)	T (32)	C (7)	T (23)	C (5)	T (32)	C (8)	T (23)	C (5)	T (22)	C (8)
Economy (3)	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Education (6)	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Energy (1)	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Environment (0)	No ISO 37120 Indicator in this theme matches the UN Indicators																															
Finance (3)	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Fire and emergency response (1)	1	0	0	0	1	0	0	0	1	0	1	0	1	0	4	0	1	0	1	0	1	0	1	0	1	0	1	0	2	0	1	0
Governance (0)	No ISO 37120 Indicator in this theme matches the UN Indicators																															
Health (4)	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Recreation (0)	No ISO 37120 Indicator in this theme matches the UN Indicators																															
Safety (0)	No ISO 37120 Indicator in this theme matches the UN Indicators																															
Shelter (2)	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	2	0	0	0	0	0	0	0	0	0	0	0	0	3
Solid waste (1)	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	3	2	0	0	0	0	0	0	0
Telecommunication and innovation (0)	No ISO 37120 Indicator in this theme matches the UN Indicators																															
Transportation (0)	No ISO 37120 Indicator in this theme matches the UN Indicators																															
Urban planning (0)	No ISO 37120 Indicator in this theme matches the UN Indicators																															
Wastewater (2)	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Water and sanitation (3)	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
N/A	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0

Note:

(1) Blue = Technical-Direct, Yellow = Customer-Direct, Orange = Technical-Indirect, Green = Customer-Indirect

(2) Number value in cells = number of Guelph's LOS performance measures that contribute to the ISO 37120 Themes.

5.2 Industry, Innovation & Infrastructure – Analysis

Goal 9 – Industry, Innovation & Infrastructure has twelve UN SD Indicators that were assessed and linked to service categories used by the City of Guelph. Of the twelve UN SD Indicators, only three could be linked to the service categories used by the City of Guelph including,

- i. Proportion of the rural population who live within 2 km of an all-season road (9.1.1)
- ii. Passenger and freight volumes, by mode of transport (9.1.2)
- iii. CO2 emission per unit of value added (9.4.1)

These three indicators were linked to the LOS objectives and performance measures and assessed for an indirect or direct effect on the UN SDG. From this analysis, it was found that **77** technical or customer performance measures had a direct relationship to the Industry, Innovation & Infrastructure goal, while another **50** had an indirect relationship. Of the performance measures with a link to the SDG, Solid Waste, Information Technology, Paramedic Services, Parking, Parks, Forestry and Open Spaces, Police, Recreation, Roads and Right-of-Ways, Stormwater, Solid Waste and Water were found to be the service categories with a direct link to Industry, Innovation & Infrastructure.

From the direct links between LOS objectives and UN SDGs, 32 were under the ISO 37120 theme “Finance”. These services are currently being measured using the average annual expenditure for each of the service categories. Beyond the average annual expenditure performance measure, the only performance measures that are being measured and have a direct relationship to the UN SDGs are, i) % residential waste diversion (solid waste); and

ii) annual energy consumption per person (kWh/person) (facilities management). As of 2018, many of the performance measures were not being measured by the City of Guelph. In contrast to the No Poverty analysis, it is interesting to note that Finance, Environment and Energy are linked to Goal 9 – Industry, Innovation & Infrastructure. This was primarily due to the indicators focused on capital spending, electrical energy use or greenhouse gas emissions being measured by ISO 37120.

Similar to section 5.1, a heat map like what was shown in Table 5-2, was used to demonstrate the analysis. The complete analysis for Industry, Innovation & Infrastructure can be found in Table 5-4.

Table 5-4: Goal 9 – Industry, Innovation & Infrastructure heat map

City of Guelph's Asset Management Service Categories

	Culture, tourism and community investment (32)		Facilities management (22)		Fire rescue (14)		Fleet (33)		Information Technology (28)		Paramedic services (17)		Parking (43)		Parks, forestry and open spaces (46)		Police (26)		Recreation (37)		Roads and right-of-ways (46)		Solid waste (39)		Stormwater (28)		Transit (40)		Wastewater (28)		Water (30)	
	T (23)	C (9)	T (14)	C (8)	T (11)	C (3)	T (28)	C (5)	T (22)	C (6)	T (13)	C (4)	T (35)	C (8)	T (34)	C (12)	T (17)	C (9)	T (28)	C (9)	T (34)	C (12)	T (32)	C (7)	T (23)	C (5)	T (32)	C (8)	T (23)	C (5)	T (22)	C (8)
Economy (2)	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Education (1)	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Energy (4)	3	0	1	1	0	0	3	2	0	0	0	0	0	0	0	0	0	0	2	1	0	0	0	0	0	0	0	0	0	0	0	0
Environment (1)	0	0	1	1	0	0	3	2	0	0	0	0	0	0	0	0	0	0	2	1	2	2	5	3	0	0	0	6	2	1	0	0
Finance (2)	0	0	0	0	0	0	0	0	2	0	2	0	2	0	8	0	2	0	2	0	2	0	2	0	2	0	2	0	4	0	2	0
Fire and emergency response (0)	No ISO 37120 Indicator in this theme matches the UN Indicators																															
Governance (0)	No ISO 37120 Indicator in this theme matches the UN Indicators																															
Health (0)	No ISO 37120 Indicator in this theme matches the UN Indicators																															
Recreation (0)	No ISO 37120 Indicator in this theme matches the UN Indicators																															
Safety (0)	No ISO 37120 Indicator in this theme matches the UN Indicators																															
Shelter (0)	No ISO 37120 Indicator in this theme matches the UN Indicators																															
Solid waste (2)	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0
Telecommunication and innovation (2)	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Transportation (3)	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Urban planning (0)	No ISO 37120 Indicator in this theme matches the UN Indicators																															
Wastewater (0)	No ISO 37120 Indicator in this theme matches the UN Indicators																															
Water and sanitation (0)	No ISO 37120 Indicator in this theme matches the UN Indicators																															
N/A	No ISO 37120 Indicator in this theme matches the UN Indicators																															

Note:

- (1) Blue = Technical-Direct, Yellow = Customer-Direct, Orange = Technical-Indirect, Green = Customer-Indirect
- (2) Number value in cells = number of Guelph's LOS performance measures that contribute to the ISO 37120 Themes.

5.3 Sustainable Cities and Communities – Analysis

From the three UN SDGs considered for this study, it was assumed that the Sustainable Cities and Communities goal would have many direct relationships to the City of Guelph's performance measures. As indicated in Table 5-1, all the service categories had links to the UN SDGs and UN Indicators. This assumption proved true as the analysis found that ten of the fifteen UN Indicators are linked to the LOS objective.

- i) Proportion of urban population living in slums, informal settlements, or inadequate housing (11.1.1)
- ii) Proportion of population that has convenient access to public transport, by sex, age, and persons with disabilities (11.2.1)
- iii) Total expenditure (public and private) per capita spent on the preservation, protection, and conservation of all cultural and natural heritage, by type of heritage (cultural, natural, mixed and World Heritage Centre designation), level of government (national, regional and local/municipal), type of expenditure (donations in kind, private non-profit sector and sponsorship) (operating expenditure/investment) and type of private funding (11.4.1)
- iv) Number of deaths, missing persons and directly affected persons attributed to disasters per 100,000 population (11.5.1)
- v) Proportion of urban solid waste regularly collected and with adequate final discharge out of total urban solid waste generated, by cities (11.6.1)
- vi) Annual mean levels of fine particulate matter (e.g. PM2.5 and PM10) in cities (population weighted) (11.6.2)

- vii) Average share of the built-up area of cities that is open space for public use for all, by sex, age, and persons with disabilities (11.7.1)
- viii) Proportion of persons victim of physical or sexual harassment, by sex, age, disability status and place of occurrence, in the previous 12 months (11.7.2)
- ix) Number of countries that adopt and implement national disaster risk reduction strategies in line with the Sendai Framework for Disaster Risk Reduction 2015–2030 (11.b.1)
- x) Proportion of local governments that adopt and implement local disaster risk reduction strategies in line with national disaster risk reduction strategies (11.b.2)

From this analysis, there were **189** technical or customer performance measures used by Guelph with a direct impact to the UN Goal and **150** technical or customer performance measures that had an indirect relationship. Of the performance measures with a link to the UN SDG, Culture, Tourism and Community Investment, Facilities Management, Fire Rescue, Fleet, Paramedic Services, Police, Recreation, Roads and ROWs, Solid Waste, Transit Wastewater and Water were found to be the service categories with a *direct* link which equates to twelve of the sixteen service categories having direct ties to the UN SD Targets found under Sustainable Cities and Communities.

The ISO 37120 Targets that had a direct link to LOS Objectives under the Sustainable Cities and Communities UN SDG include: Energy, Environment, Fire and Emergency Response, Safety, Shelter, Solid Waste, Transportation, and Water and Sanitation. These links are all demonstrated through the heat map, as shown in Table 5-5.

Table 5-5: Goal 11 – Sustainable Cities and Communities heat map

City of Guelph's Asset Management Service Categories

	Culture, tourism and community investment (32)		Facilities management (22)		Fire rescue (14)		Fleet (33)		Information Technology (28)		Paramedic services (17)		Parking (43)		Parks, forestry and open spaces (46)		Police (26)		Recreation (37)		Roads and right-of-ways (46)		Solid waste (39)		Stormwater (28)		Transit (40)		Wastewater (28)		Water (30)			
	T (23)	C (9)	T (14)	C (8)	T (11)	C (3)	T (28)	C (5)	T (22)	C (6)	T (13)	C (4)	T (35)	C (8)	T (34)	C (12)	T (17)	C (9)	T (28)	C (9)	T (34)	C (12)	T (32)	C (7)	T (23)	C (5)	T (32)	C (8)	T (23)	C (5)	T (22)	C (8)		
Economy (0)	No ISO 37120 Indicator in this theme matches the UN Indicators																																	
Education (4)	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Energy (7)	2	1	2	2	0	0	6	4	0	0	0	0	0	0	0	0	0	0	4	2	2	2	5	3	0	0	5	1	2	1	0	0		
Environment (5)	0	0	2	2	0	0	6	4	0	0	0	0	0	0	2	2	0	0	4	2	4	4	10	6	0	0	10	2	4	2	0	0		
Finance (1)	0	0	0	0	0	0	0	0	1	0	1	0	1	0	4	0	1	0	1	0	1	0	1	0	1	0	1	0	2	0	1	0		
Fire and emergency response (3)	0	0	0	0	4	2	0	0	0	0	0	2	0	0	0	0	2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0		
Governance (3)	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0		
Health (3)	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0		
Recreation (2)	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	4	1	0	0	0	0	0	0	0	0	0	0	0			
Safety (1)	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0		
Shelter (3)	0	0	0	0	0	0	0	0	0	0	0	0	0	0	2	2	0	0	2	0	0	0	0	0	0	0	0	0	0	0	0	3		
Solid waste (3)	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	3	3	0	0	0	0	0	0	0	0		
Telecommunication and innovation (0)	No ISO 37120 Indicator in this theme matches the UN Indicators																																	
Transportation (4)	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	11	2	0	0	0			
Urban planning (4)	0	0	0	0	0	0	0	0	0	0	0	0	0	0	5	5	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0		
Wastewater (5)	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	2	2	0	0			
Water and sanitation (7)	0	0	1	1	0	0	0	0	0	0	0	0	0	0	0	0	0	1	1	0	0	0	0	0	0	0	0	0	0	0	13	5		
N/A	2	2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	18	2		

Note:

- (1) Blue = Technical-Direct, Yellow = Customer-Direct, Orange = Technical-Indirect, Green = Customer-Indirect
- (2) Number value in cells = number of Guelph's LOS performance measures that contribute to the ISO 37120 Themes.

5.4 Discussion

Canadian municipalities that have only begun their asset management journey, are not considered ‘advanced’ in their LOS maturity (as defined by IIMM 2015) and are in the process of incorporating LOS into their decision-making. The analysis performed provides an opportunity for municipalities to align their LOS objectives with the ISO 37120 Indicators, along with the UN SDGs from the beginning – without limiting themselves strictly to the ISO 37120 indicators.

Using the City of Guelph as an example, the City may modify their performance measures, or additional performance measures, to align directly with the ISO 37120 indicators used to measure their service performance.

When considering the analysis performed for the case study, it is important to note that the assessment could have been done from the perspective of the LOS objectives. Meaning that the performance measures and LOS objective could have been revised and then analyzed against the ISO 37210 indicators. This method would have led to similar results; however, the gaps would have identified the ISO 37120 indicators along with the UN SDGs. The primary reason for not approaching the case study this way is because the UN SDGs and associated ISO 37120 indicators measure the services being offered to communities internationally. An ideal outcome to such a study would be finding that ISO 37120 indicators could be used as the standard measurement of LOS performance at municipalities across Canada without jeopardizing the services being offered. This would

lead to better methods to collect data and a standardized approach to assess service delivery both in Canada and internationally.

After agreeing to this standard of measurement, municipalities (or organizations managing infrastructure) could begin to use the ISO 37120 Indicators as a basis for measuring themselves and then collecting the appropriate data that is considered ISO certified.

The findings of the study led to some gaps in the current ways services are measured. Presently, it is assumed that many cities do not have an efficient way or have not identified an optimal method to measure service performance, which was evident from the amount of performance measures that had no current data. Furthermore, there are several UN SDGs that have no overlap with the service categories, which are an opportunity for Guelph to improve their infrastructure planning. The UN SDGs are meant to be used internationally, meaning that they have a broad range of indicators to help measure performance and should be used in developing countries as well as well-developed countries like Canada. Using the IIMM 2015 standard for measuring maturity, the City of Guelph is one of the more advanced municipalities when it comes to asset management, and they even had gaps when comparing to the ISO 37120 indicators.

Additionally, the literature review and results of the analysis demonstrate potential fragmentation in the way services are delivered and which jurisdictions are responsible for delivering services in Canada. Although this study does not go into detail on the services delivered at the provincial or federal level, it is evident that several UN SDGs will not be successfully achieved solely through municipal services, under the current structure in Canada. In Canada, provinces are responsible for healthcare, education, energy, among

other services. In order to efficiently deliver services to communities across the country, it is important to include the provincial and federal governments in a future analysis. This will help understand if the three levels of government need have gaps in their performance measures of the services they offer. It may also demonstrate a need to improve the system and collaboration across the three levels of government to measure service performance and to inform sustainable investment decisions.

CHAPTER 6: CONCLUSIONS

The growth of AM in Canada over the last decade along with the development of the UN SDGs in 2015 motivated this study. Furthermore, the lack of standards used in identifying LOS objectives and specifying performance measures for services delivered by municipalities presented an opportunity for identifying existing standards (ISO 37120) to measure these services. After reviewing services that municipalities are legislated to deliver, reviewing how Statistics Canada classifies municipal size (e.g., small, medium, and large) and reviewing the IIMM 2015 to measure LOS maturity, it was determined that a large and advanced municipality that delivers much more than the legislated services would be an ideal candidate for the case study. Additionally, the three goals identified for the case study were selected subjectively with an assumption that Goal 1 – No Poverty would have minimal overlap with the LOS objectives, while Goal 9 – Industry, Innovation & Infrastructure and Goal 11 – Sustainable Cities and Communities would have significant overlap with the LOS objectives.

The LOS objectives from the City of Guelph were compared to the UN SDGs to understand their contribution to the City’s LOS objectives, as well as the gaps in the UN SDGs that were selected for the case study.

6.1 Conclusions

From the literature review and development of mapping LOS objectives to UN SDGs, it is evident that the majority of services delivered by the public sector are delivered at the municipal level. Furthermore, it is evident that there is no clear standard or national

legislation that states the services that need to be offered by municipalities, but that the municipalities have the authority to deliver the services as they see fit and as the stakeholders demand the service.

In addition to the inconsistency in service responsibility, it was found that municipalities in Canada have an opportunity to measure their contributions to the UN SDGs or potentially better contribute to the achievement of the SDGs. This could be done by considering the UN SDGs, Targets, and Indicators as well as the ISO 37120 Indicators and Themes when either creating or adapting their LOS objectives. After LOS objectives have been created in alignment with ISO 37120 and the UN SDGs, municipalities can advance their AM planning from a sustainable development lens. As noted in Figure 2-1: Hierarchy of Objectives (IIMM, 2015), the LOS objectives guide decision-making regarding management of municipal infrastructure, directly impacting lifecycle strategies, asset treatments, condition assessments, operational and maintenance planning, corporate and strategic objectives, and eventually long-term financial planning. Assuming municipalities are pursuing sustainable development goals in their AM practice, using the UN SDGs allows municipalities to participate in WCCD benchmarking, which would be beneficial in comparing their practice to similar municipalities. In turn, guiding municipalities towards a more sustainable future.

This research focused on delivering four primary objectives: i) explore the history of the UN SDGs, AM in Canada and any potential consistencies or overlap between the two; ii) Develop a tool to understand how municipal AM may contribute to achieving the UN SDGs; iii) Demonstrate the relationship between indicators (application of the tool); and

iv) Summarize the findings for the purpose of demonstrating that municipalities are contributing to the UN SDGs through their AM programs. Based on the methods used and analysis performed through a proof-of-concept using the City of Guelph as a case study and three of the UN SDGs, all four objectives were met. Through the case study, there was direct relationship found between the UN SDGs and LOS objectives. In addition, Goal 1 – No Poverty, proved to have the largest gaps found in the analysis, which proves the original assumption since many of the ISO 37120 themes in Goal 1 – No Poverty are not services offered at the municipal level. Additionally, the UN SDGs are meant to be universally applied in all countries whereas the MDGs were only meant for developing countries. Although it was expected that the indicators would show favourable results for developed countries and Canadian municipalities, they were still applicable for the Canadian municipalities reviewed and then used in the case study.

Despite the universal applicability of the UN SDGs, and the continuing development of AM practice in Canada, it was found that municipal AM contributes to the UN SDGs. This is demonstrated through matching the LOS objectives to the UN SDGs, Targets, Indicators, and associated Themes. This *may* demonstrate an opportunity for ISO 37120 Indicators to be used as the performance measure without negatively impacting service. Using this method to measure services presents an opportunity for Canadian municipalities to collect data to the ISO 37120 certification and benchmark their service levels to their peers both nationally and internationally.

6.2 Limitations

The following limitations of the research are acknowledged:

- The research performed examined the data from one municipality with the municipality being “large” as defined by Statistics Canada, 2021.
- The study only reviewed three goals of the seventeen UN SDGs and it would be important to conduct a similar study with all seventeen UN SDGs.
- The case study was limited by the project being conducted by the consultant with the City of Guelph. The LOS project undertaken had some general assumptions and omitted certain service categories which may have resulted in different conclusions.
- While the author attempted to minimize subjectivity, the analysis performed included reviewing the UN SDGs and associated indicators and comparing them to the LOS objectives. Definitions were found for key words, however, stating a direct or indirect relationship can also present more subjectivity.
- The data provided by the City of Guelph was from 2018 and their asset management maturity is continually being developed as the City continues to measure and monitor service performance.
- The study did not consider services that are offered outside of the municipal jurisdiction, which may result in flawed results as municipalities are not mandated to offer certain services to the public (e.g., healthcare, paramedic services, education, etc.)

6.3 Recommendations

The following recommendations are made for future work building on the work performed in this study and considering the limitations identified.

- Municipalities do not solely offer all the services that communities require, and governments provide. A future study should include the three levels of government: federal, provincial, and municipal and group the ISO 37120 themes according to the level of government. This will result in a holistic examination and better understanding of the gaps in services offered.
- If not considering all three levels of government, a future gap assessment should be performed by first filtering the ISO 37120 themes to only include the services offered at the municipal level. This will result in a smaller but more accurate and refined study that demonstrates the true gaps in municipal services being offered.
- The case study and analysis performed relied on a subjective approach that included the knowledge of the researcher based on professional experience delivering asset management plans at the future level. A future recommendation may include a steering committee or group for consultation when performing the analysis and linking the UN SDGs to the LOS objectives, leading to a more balanced and objective analysis.
- After taking one of the first two bullets into consideration, a future study should consider the following recommendations.
 - all seventeen UN SDGs for analysis as this will give a more holistic view to the gaps in services being offered or gaps in UN SDGs and Indicators being measured universally.

- more than one municipality to examine the gaps from a large / advanced municipality compared to a small and less advanced municipality. This may result in gaps that were not found in this study or show that many small municipalities rely on federal and provincial government support to help deliver their services.
 - reviewing data outside of the AM data provided by municipalities. At the time of receiving the data from the City of Guelph, municipalities were rarely including natural assets or climate considerations in their AM frameworks and associated LOS objectives. This may lead to a reduction in gaps found in this study as municipal organizations are beginning to take a holistic approach that considers climate resilience and the services offered by natural assets in their AM planning.
 - review the corporate, AM and operational Objectives. From section 2.1, the LOS objectives are shown to be the key translator between AM and operational objectives, but assuming the LOS objectives are successfully doing this may lead to gaps in the assessment performed.
- The City of Guelph should consider the UN SDGs and ISO Indicators when reviewing their LOS objectives.
 - The City of Guelph should consider comparing their data to the ISO 37120 standard, and periodically review their contribution to the UN SDGs.

- The City of Guelph should conduct a similar analysis for all seventeen UN SDGs to improve their AM Program.

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APPENDIX A – WCCD DATA

Appendix A-1 – Goal 1 – No Poverty – UN Targets, UN Indicators, WCCD Indicators and ISO 37120 Certified City Data (WCCD, 2017)

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UN Targets		UN Indicators	WCCD Indicators ISO 37120 Certified City Data
1.1	By 2030, eradicate extreme poverty for all people everywhere, currently measured as people living on less than \$1.25 a day	1.1.1 Proportion of population below the international poverty line, by sex, age, employment status and geographical location (urban/rural)	<p>Number of homeless per 100 000 population (supporting indicator)</p> <p>Percentage of city population living in slums (core indicator)</p> <p>Persons per unit</p> <p>Percentage of households that exist without registered legal titles</p> <p>Percentage of city population with potable water supply service</p> <p>Percentage of city population with sustainable access to an improved water source</p> <p>Total domestic water consumption per capita (litres/day)</p> <p>Percentage of population with access to improved sanitation</p>

Average annual hours of water service interruption per household

Percentage of city population served by wastewater collection

Percentage of the city's wastewater that has received no treatment

Percentage of the city's wastewater receiving primary treatment

Percentage of the city's wastewater receiving secondary treatment

Percentage of the city's wastewater receiving tertiary treatment

Percentage of city population with authorized electrical service

Total electrical energy use per capita (kWh/year)

Number of nursing and midwifery personnel per 100,000 population

Number of physicians per 100,000 population

Number of in-patient hospital beds per 100,000 population

Response time for emergency response services from initial call

			<p>Response time for fire department from initial call</p> <p>Response time for police department from initial call</p> <p>Percentage of students completing primary education: survival rate</p> <p>Percentage of students completing secondary education: survival rate</p> <p>Percentage of female school-aged population enrolled in schools</p> <p>Percentage of male school-aged population enrolled in schools</p>
1.2	By 2030, reduce at least by half the proportion of men, women and children of all ages living in poverty in all its dimensions according to national definitions	1.2.1 Proportion of population living below the national poverty line, by sex and age	Percentage of city population living in poverty (national definitions) [See technical note 1]
1.3	Implement nationally appropriate social protection systems and measures for all, including floors, and by 2030 achieve substantial coverage of the poor and the vulnerable	1.3.1 Proportion of population covered by social protection floors/systems, by sex, distinguishing children, unemployed persons, older persons, persons with disabilities, pregnant women, newborns, work injury victims and the poor and the vulnerable	
1.4	By 2030, ensure that all men and women, in particular the poor and the vulnerable, have	1.4.1 Proportion of population living in households with access to basic services	Percentage of city population living in slums

	<p>equal rights to economic resources, as well as access to basic services, ownership and control over land and other forms of property, inheritance, natural resources, appropriate new technology and financial services, including microfinance</p>	<p>1.4.2 Proportion of total adult population with secure tenure rights to land, with legally recognized documentation and who perceive their rights to land as secure, by sex and by type of tenure</p>	<p>Percentage of households that exist without registered legal titles</p> <p>Youth unemployment rate</p> <p>Percentage of city population with potable water supply service</p> <p>Percentage of population with access to improved sanitation</p>
			<p>Percentage of city population with authorized electrical service</p> <p>Percentage of city population with regular solid waste collection (residential)</p> <p>Percentage of city population served by wastewater collection</p> <p>Percentage of the city's wastewater that has received no treatment</p>
1.5	<p>By 2030, build the resilience of the poor and those in vulnerable situations and reduce their exposure and vulnerability to climate-related extreme events and other economic, social, and environmental shocks and disasters</p>	<p>1.5.1 Number of deaths, missing persons and persons affected by disasters per 100,000 people</p>	<p>Number of natural disaster related deaths per 100,000 population</p>

		<p>1.5.2 Direct economic loss attributed to disasters in relation to global gross domestic product (GDP)</p> <p>1.5.3 Number of countries that adopt and implement national disaster risk reduction strategies in line with the Sendai Framework for Disaster Risk Reduction 2015-2030</p>	
		1.5.4 Proportion of local governments that adopt and implement local disaster risk reduction strategies in line with national disaster risk reduction strategies	
1.a	<p>Ensure significant mobilization of resources from a variety of sources, including through enhanced development cooperation, in order to provide adequate and predictable means for developing countries, in particular least developed countries, to implement programmes and policies to end poverty in all its dimensions</p>	<p>1.a.1 Proportion of domestically generated resources allocated by the government directly to poverty reduction programmes</p> <p>1.a.2 Proportion of total government spending on essential services (education, health and social protection)</p> <p>1.a.3 Sum of total grants and non-debt-creating inflows directly allocated to poverty reduction programmes as a proportion of GDP</p>	<p>Gross capital budget per capita (USD)</p> <p>Own-source revenue as a percentage of total revenues</p> <p>Tax collected as percentage of tax billed</p> <p>Percentage of students completing primary education: survival rate</p>

			<p>Percentage of students completing secondary education: survival rate</p> <p>Primary education student/teacher ratio</p> <p>Number of nursing and midwifery personnel per 100,000 population</p> <p>Number of physicians per 100,000 population</p>
1.b	Create sound policy frameworks at the national, regional and international levels, based on pro-poor and gender-sensitive development strategies, to support accelerated investment in poverty eradication actions	1.b.1 Proportion of government recurrent and capital spending to sectors that disproportionately benefit women, the poor and vulnerable groups	<p>Number of nursing and midwifery personnel per 100,000 population</p> <p>Number of physicians per 100,000 population</p> <p>Percentage of students completing primary education: survival rate</p> <hr/> <p>Percentage of students completing secondary education: survival rate</p> <p>Primary education student/teacher ratio</p>

Appendix A-2 – Goal 9 – Industry, Innovation and Infrastructure – UN Targets, UN Indicators, WCCD Indicators and ISO

37120 Certified City Data (WCCD, 2017)

UN Targets		UN Indicators	WCCD Indicators ISO 37120 Certified City Data
9.1	Develop quality, reliable, sustainable and resilient infrastructure , including regional and trans-border infrastructure, to support economic development and human well-being, with a focus on affordable and equitable access for all	<p>9.1.1 Proportion of the rural population who live within 2 km of an all-season road</p> <p>9.1.2 Passenger and freight volumes, by mode of transport</p>	<p>Kilometres of high capacity public transport system per 100,000 population</p> <p>Kilometres of light passenger public transport system per 100,000 population</p> <p>Commercial air connectivity (number of non-stop commercial air destinations)</p> <p>Percentage of city population with authorized electrical service</p> <p>Average number of electrical interruptions per customer per year</p> <p>Average length of electrical interruptions (in hours)</p> <p>Total collected municipal solid waste per capita</p> <p>Percentage of the city's hazardous waste that is recycled</p> <p>Capital spending as a percentage of total expenditures</p>

UN Targets		UN Indicators	WCCD Indicators ISO 37120 Certified City Data
			Gross capital budget per capita (USD)
9.2	Promote inclusive and sustainable industrialization and, by 2030, significantly raise industry's share of employment and gross domestic product, in line with national circumstances, and double its share in least developed countries	9.2.1 Manufacturing value added as a proportion of GDP and per capita 9.2.2 Manufacturing employment as a proportion of total employment	Number of businesses per 100,000 population
9.3	Increase the access of small-scale industrial and other enterprises, in particular in developing countries, to financial services, including affordable credit, and their integration into value chains and markets	9.3.1 Proportion of small-scale industries in total industry value added 9.3.2 Proportion of small-scale industries with a loan or line of credit	
9.4	By 2030, upgrade infrastructure and retrofit industries to make them sustainable, with increased resource-use efficiency and greater adoption of clean and environmentally sound technologies and industrial processes, with all countries taking action in accordance with their respective capabilities	9.4.1 CO ₂ emission per unit of value added	Percentage of total energy derived from renewable sources, as a share of the city's total energy consumption Total electrical energy use per capita (kWh/year) Greenhouse gas emissions measured in tonnes per capita

UN Targets		UN Indicators	WCCD Indicators ISO 37120 Certified City Data
9.5	Enhance scientific research , upgrade the technological capabilities of industrial sectors in all countries, in particular developing countries, including, by 2030, encouraging innovation and substantially increasing the number of research and development workers per 1 million people and public and private research and development spending	9.5.1 Research and development expenditure as a proportion of GDP 9.5.2 Researchers (in full-time equivalent) per million inhabitants	Number of higher education degrees per 100,000 population Number of new patents per 100,000 population per year
9.a	Facilitate sustainable and resilient infrastructure development in developing countries through enhanced financial, technological and technical support to African countries, least developed countries, landlocked developing countries and small island developing States	9.a.1 Total official international support (official development assistance plus other official flows) to infrastructure	
9.b	Support domestic technology development, research and innovation in developing countries, including by ensuring a conducive policy environment for, inter alia, industrial diversification and value addition to commodities	9.b.1 Proportion of medium and high-tech industry value added in total value added	
9.c	Significantly increase access to information and communications technology and strive to	9.c.1 Proportion of population covered by a mobile network, by technology	Number of internet connections per 100,000 population

UN Targets	UN Indicators	WCCD Indicators ISO 37120 Certified City Data
	provide universal and affordable access to the Internet in least developed countries by 2020	Number of cell phone connections per 100,000 population

Appendix A-3 – Goal 11 – Sustainable Cities and Communities – UN Targets, UN Indicators, WCCD Indicators and ISO 37120

Certified City Data (WCCD, 2017)

UN Targets		UN Indicators	WCCD Indicators ISO 37120 Certified City Data
11.1	By 2030, ensure access for all to adequate, safe and affordable housing and basic services and upgrade slums.	11.1.1 Proportion of urban population living in slums, informal settlements or inadequate housing	Number of homeless per 100 000 population (supporting indicator) Percentage of city population living in slums (core indicator) Persons per unit Percentage of households that exist without registered legal titles Percentage of city population with potable water supply service Percentage of city population with sustainable access to an improved water source Total domestic water consumption per capita (litres/day) Percentage of population with access to improved sanitation

UN Targets	UN Indicators	WCCD Indicators ISO 37120 Certified City Data
		<p>Average annual hours of water service interruption per household</p> <p>Percentage of city population served by wastewater collection</p> <p>Percentage of the city's wastewater that has received no treatment</p> <p>Percentage of the city's wastewater receiving primary treatment</p> <p>Percentage of the city's wastewater receiving secondary treatment</p> <p>Percentage of the city's wastewater receiving tertiary treatment</p> <p>Percentage of city population with authorized electrical service</p> <p>Total electrical energy use per capita (kWh/year)</p> <p>Number of nursing and midwifery personnel per 100,000 population</p> <p>Number of physicians per 100,000 population</p> <p>Number of in-patient hospital beds per 100,000 population</p>

UN Targets		UN Indicators	WCCD Indicators ISO 37120 Certified City Data
			<p>Response time for emergency response services from initial call</p> <p>Response time for fire department from initial call</p> <p>Response time for police department from initial call</p> <p>Percentage of students completing primary education: survival rate</p> <p>Percentage of students completing secondary education: survival rate</p> <p>Percentage of female school-aged population enrolled in schools</p> <p>Percentage of male school-aged population enrolled in schools</p>
11.2	By 2030, provide access to safe, affordable, accessible and sustainable transport systems for all, improving road safety, notably by expanding public transport , with special attention to the needs of those in vulnerable situations, women, children, persons with disabilities and older persons.	11.2.1 Proportion of population that has convenient access to public transport, by sex, age and persons with disabilities	<p>Percentage of commuters using a travel mode other than a personal vehicle</p> <p>Annual numbers of public transport trips per capita</p>

UN Targets		UN Indicators	WCCD Indicators ISO 37120 Certified City Data
			<p>Kilometres of high capacity public transport system per 100,000 population</p> <p>Kilometres of light passenger public transport system per 100,000 population</p>
11.3	By 2030, enhance inclusive and sustainable urbanization and capacity for participatory, integrated and sustainable human settlement planning and management in all countries	<p>11.3.1 Ratio of land consumption rate to population growth rate</p> <p>11.3.2 Proportion of cities with a direct participation structure of civil society in urban planning and management that operate regularly and democratically</p>	<p>Population density (per square kilometre)</p> <p>Dwelling density (per square kilometre)</p> <p>Jobs/housing ratio</p> <p>Green area (hectares) per 100,000 population</p> <p>Climate type</p> <p>Land area (square kilometres)</p> <p>Income distribution (Gini Coefficient)</p> <p>Gross capital budget per capita (USD)</p> <p>Voter participation in last municipal election (as a percentage of eligible voters)</p>

UN Targets		UN Indicators	WCCD Indicators ISO 37120 Certified City Data
			<p>Number of registered voters as a percentage of the voting age population</p> <p>Citizens' representation: number of local officials elected to office per 100,000 population</p>
11.4	Strengthen efforts to protect and safeguard the world's cultural and natural heritage	11.4.1 Total expenditure (public and private) per capita spent on the preservation, protection and conservation of all cultural and natural heritage, by type of heritage (cultural, natural, mixed and World Heritage Centre designation), level of government (national, regional and local/municipal), type of expenditure (operating expenditure/investment) and type of private funding (donations in kind, private non-profit sector and sponsorship)	
11.5	By 2030, significantly reduce the number of deaths and the number of people affected and substantially decrease the direct economic loss relative to global gross domestic product caused by disasters , including water-related disasters, with a focus on protecting the poor and people in vulnerable situations.	11.5.1 Number of deaths, missing persons and directly affected persons attributed to disasters per 100,000 population	Number of disaster related deaths per 100,000 population

UN Targets	UN Indicators	WCCD Indicators	ISO 37120 Certified City Data
		11.5.2 Direct economic loss in relation to global GDP, damage to critical infrastructure and number of disruptions to basic services, attributed to disasters	
11.6	By 2030, reduce the adverse per capita environmental impacts of cities , including by paying special attention to air quality, municipal and other waste management	<p>11.6.1 Proportion of urban solid waste regularly collected and with adequate final discharge out of total urban solid waste generated, by cities</p> <p>11.6.2 Annual mean levels of fine particulate matter (e.g. PM2.5 and PM10) in cities (population weighted)</p>	<p>Fine particulate matter (PM2.5) concentration</p> <p>Particulate matter (PM10) concentration</p> <p>Nitrogen dioxide (NO₂) concentration</p> <p>Sulphur dioxide (SO₂) concentration</p> <p>Ozone (O₃) concentration</p> <p>Greenhouse gas emissions measured in tonnes per capita</p> <p>Energy consumption of public buildings per year (KWh/m²)</p> <p>Percentage of city population with regular solid waste collection (residential)</p>

UN Targets		UN Indicators	WCCD Indicators ISO 37120 Certified City Data
			Total collected municipal solid waste per capita Percentage of the city's solid waste that is recycled
11.7	By 2030, provide universal access to safe, inclusive and accessible, green and public spaces , in particular for women and children, older persons and persons with disabilities	11.7.1 Average share of the built-up area of cities that is open space for public use for all, by sex, age and persons with disabilities 11.7.2 Proportion of persons victim of physical or sexual harassment, by sex, age, disability status and place of occurrence, in the previous 12 months	Green area (hectares) per 100,000 population Square kilometres of public outdoor recreation space per capita Square kilometres of public indoor recreation space per capita
11.a	Support positive economic, social and environmental links between urban, peri-urban and rural areas by strengthening national and regional development planning	11.a.1 Proportion of population living in cities that implement urban and regional development plans integrating population projections and resource needs, by size of city	

UN Targets	UN Indicators	WCCD Indicators	ISO 37120 Certified City Data
11.b	<p>By 2020, substantially increase the number of cities and human settlements adopting and implementing integrated policies and plans towards inclusion, resource efficiency, mitigation and adaptation to climate change, resilience to disasters, and develop and implement, in line with the Sendai Framework for Disaster Risk Reduction 2015-2030, holistic disaster risk management at all levels</p>	<p>11.b.1 Number of countries that adopt and implement national disaster risk reduction strategies in line with the Sendai Framework for Disaster Risk Reduction 2015-2030.</p> <p>11.b.2 Proportion of local governments that adopt and implement local disaster risk reduction strategies</p>	<p>Greenhouse gas emissions measured in tonnes per capita</p> <hr/> <p>Percentage of total energy derived from renewable sources, as a share of the city's total energy consumption</p> <p>Total electrical energy use per capita (kWh/year)</p> <p>Total residential electrical energy use per capita (kWh/year)</p> <p>Total water consumption per capita (litres/day)</p> <p>Percentage of water loss (unaccounted for water)</p> <p>Population density (per square kilometre)</p>

UN Targets		UN Indicators	WCCD Indicators ISO 37120 Certified City Data
			<p>Number of disaster related deaths per 100,000 population</p> <p>Average annual hours of water service interruptions per household</p> <p>Average number of electrical interruptions per customer per year</p> <p>Average length of electrical interruptions (in hours)</p>
11.c	Support least developed countries , including through financial and technical assistance, in building sustainable and resilient buildings utilizing local materials	11.c.1 Proportion of financial support to the least developed countries that is allocated to the construction and retrofitting of sustainable, resilient and resource-efficient buildings utilizing local materials	

APPENDIX B – CITY OF GUELPH’S PERFORMANCE MEASURES

Service	Key Service Attribute	Focus	No.	Performance Measure
Culture, Tourism and CI	Cost Efficient	Customer	1	Cost to provide service (\$/household)
Culture, Tourism and CI	Cost Efficient	Technical	2	Annual operating budget for culture, tourism and community investment assets
Culture, Tourism and CI	Cost Efficient	Technical	3	Average annual capital expenditure for culture, tourism and community investment assets
Culture, Tourism and CI	Cost Efficient	Customer	4	Average arts and culture asset renewal rate (# years)
Culture, Tourism and CI	Cost Efficient	Technical	5	10 Year average culture, tourism and community investment community centre asset renewal budget as a % of replacement value
Culture, Tourism and CI	Safe	Customer	6	% of arts and culture facilities that are safe
Culture, Tourism and CI	Safe	Technical	7	# of outstanding safety improvements required at facilities
Culture, Tourism and CI	Safe	Technical	8	# of asset-related incidents in arts and culture facilities
Culture, Tourism and CI	Safe	Technical	9	% of facilities that meet security standards
Culture, Tourism and CI	Safe	Technical	10	% of amenities that meet safety objectives/legislative targets
Culture, Tourism and CI	Accessible	Customer	11	% of buildings that are FADM compliant where technically feasible
Culture, Tourism and CI	Accessible	Technical	12	% of arts and culture facilities that are FADM compliant where technically feasible

Service	Key Service Attribute	Focus	No.	Performance Measure
Culture, Tourism and CI	Accessible	Customer	13	# of arts and culture facilities and amenities
Culture, Tourism and CI	Accessible	Technical	14	# of arts and culture centres (#/1000 residents)
Culture, Tourism and CI	Quality	Customer	15	% of arts and culture facilities in poor or very poor condition
Culture, Tourism and CI	Quality	Technical	16	% of arts and culture facilities in poor or very poor condition
Culture, Tourism and CI	Quality	Customer	17	% of residents satisfied with arts and culture facilities
Culture, Tourism and CI	Quality	Technical	18	% of arts and culture assets that meet the target standard
Culture, Tourism and CI	Quality	Technical	19	% of arts and culture facilities with the appropriate amount of seating
Culture, Tourism and CI	Quality	Technical	20	% of arts and culture facilities with the appropriate amount of washroom facilities
Culture, Tourism and CI	Quality	Technical	21	% of arts and culture facilities with the appropriate amount of usable/rentable space
Culture, Tourism and CI	Quality	Technical	22	% of arts and culture facilities with the appropriate amount of common space
Culture, Tourism and CI	Quality	Technical	23	% of arts and culture facilities with the appropriate amount of storage
Culture, Tourism and CI	Quality	Technical	24	Hours of facility downtime due to asset failure

Service	Key Service Attribute	Focus	No.	Performance Measure
Culture, Tourism and CI	Quality	Technical	25	Hours of facility uptime
Culture, Tourism and CI	Quality	Technical	26	# of weeks of unplanned closures
Culture, Tourism and CI	Quality	Technical	27	# of weeks of planned closures
Culture, Tourism and CI	Environmental Stewardship	Customer	28	Annual energy consumption per square foot
Culture, Tourism and CI	Environmental Stewardship	Technical	29	Annual electricity consumption per square foot
Culture, Tourism and CI	Environmental Stewardship	Technical	30	Annual natural gas consumption per square foot
Culture, Tourism and CI	Environmental Stewardship	Customer	31	Annual water consumption
Culture, Tourism and CI	Environmental Stewardship	Technical	32	Annual water consumption
Facilities Management	Cost Efficient	Customer	33	Cost to provide service (\$/sqft)
Facilities Management	Cost Efficient	Technical	34	Annual operating budget for facilities management
Facilities Management	Cost Efficient	Customer	35	Average facilities renewal rate (# years)
Facilities Management	Cost Efficient	Technical	36	10 Year forecast average facility asset renewal budget as a % of replacement value

Service	Key Service Attribute	Focus	No.	Performance Measure
Facilities Management	Safe	Customer	37	# of incidents in facilities/100 sqft
Facilities Management	Safe	Technical	38	# of outstanding safety improvements required at facilities/100 sqft
Facilities Management	Safe	Technical	39	% of facilities that meet security standards
Facilities Management	Accessible	Customer	40	% of buildings that are FADM compliant
Facilities Management	Accessible	Technical	41	# of washrooms that are FADM compliant
Facilities Management	Accessible	Technical	42	# of building entrances that are FADM compliant
Facilities Management	Quality	Customer	43	% of facility assets in poor or very poor condition
Facilities Management	Quality	Technical	44	FCI of facilities
Facilities Management	Quality	Technical	45	% of facility systems above target SCI
Facilities Management	Quality	Technical	46	% of facilities above target FCI
Facilities Management	Quality	Customer	47	% of facilities at or above the target design standard
Facilities Management	Quality	Technical	48	% of facilities that meet the target design standard

Service	Key Service Attribute	Focus	No.	Performance Measure
Facilities Management	Environmental Stewardship	Customer	49	Annual energy consumption per person (kWhe/person)
Facilities Management	Environmental Stewardship	Technical	50	Annual energy consumption per person (kWhe/person)
Facilities Management	Environmental Stewardship	Customer	51	Annual water consumption per person
Facilities Management	Environmental Stewardship	Technical	52	Annual water consumption per square foot
Facilities Management	Environmental Stewardship	Technical	53	Volume of rainwater harvested
Facilities Management	Environmental Stewardship	Technical	54	% of facilities that meet LEED silver design standards
Fire Rescue	Cost Effective	Customer	55	Cost to provide service (\$/household)
Fire Rescue	Cost Effective	Technical	56	Annual operating budget for fire rescue services
Fire Rescue	Cost Effective	Technical	57	Average annual capital expenditure for fire rescue services
Fire Rescue	Cost Effective	Customer	58	Average fire rescue asset renewal rate (# years)
Fire Rescue	Cost Effective	Technical	59	10 Year average fire rescue services equipment asset renewal budget as a % of replacement value
Fire Rescue	Cost Effective	Technical	60	10 Year average fire rescue services fleet asset renewal budget as a % of replacement value
Fire Rescue	Cost Effective	Technical	61	10 Year average fire rescue services radios/telephones asset renewal budget as a % of replacement value
Fire Rescue	Cost Effective	Technical	62	10 Year average fire rescue services facility asset renewal budget as a % of replacement value
Fire Rescue	Reliable	Customer	63	Readiness to respond to all types of emergencies
Fire Rescue	Reliable	Technical	64	# of fire apparatus/vehicles

Service	Key Service Attribute	Focus	No.	Performance Measure
Fire Rescue	Reliable	Technical	65	% of apparatus/vehicles in poor or very poor condition
Fire Rescue	Reliable	Technical	66	% of fire facility assets in poor or very poor condition
Fire Rescue	Reliable	Technical	67	% of time when equipment is available and operating properly
Fire Rescue	Reliable	Technical	68	% of facilities meeting needs in x years
Fleet	Cost Efficient	Customer	69	Annual cost to provide service (\$)
Fleet	Cost Efficient	Technical	70	Annual operating budget for fleet services
Fleet	Cost Efficient	Technical	71	Cost per hr (\$/hr)
Fleet	Cost Efficient	Technical	72	Cost per km (\$/km)
Fleet	Cost Efficient	Technical	73	Average replacement cost per heavy equipment
Fleet	Cost Efficient	Technical	74	Average replacement cost per medium equipment
Fleet	Cost Efficient	Technical	75	Average replacement cost per small equipment
Fleet	Cost Efficient	Technical	76	Average replacement cost per emergency equipment
Fleet	Cost Efficient	Technical	77	Average replacement cost per heavy vehicle
Fleet	Cost Efficient	Technical	78	Average replacement cost per medium vehicle
Fleet	Cost Efficient	Technical	79	Average replacement cost per light vehicle
Fleet	Cost Efficient	Customer	80	Average asset renewal rate (# years)
Fleet	Cost Efficient	Technical	81	10 Year average fleet asset renewal budget as a % of replacement value
Fleet	Quality	Customer	82	% of fleet assets that meet the quality targets
Fleet	Quality	Technical	83	% of vehicles that meet or exceed the target design standard
Fleet	Quality	Technical	84	# of complaints due to uncleanliness or appearance of vehicles
Fleet	Quality	Technical	85	# of complaints due to physical condition of vehicles
Fleet	Reliable	Customer	86	% of fleet assets that meet the expectations of the user group
Fleet	Reliable	Technical	87	% of vehicles that past their useful life
Fleet	Reliable	Technical	88	% of corporate equipment past their useful life

Service	Key Service Attribute	Focus	No.	Performance Measure
Fleet	Reliable	Technical	89	Spare ratio of heavy equipment
Fleet	Reliable	Technical	90	Spare ratio of medium equipment
Fleet	Reliable	Technical	91	Spare ratio of small equipment
Fleet	Reliable	Technical	92	Spare ratio of emergency equipment
Fleet	Reliable	Technical	93	Spare ratio of heavy vehicle
Fleet	Reliable	Technical	94	Spare ratio of medium vehicle
Fleet	Reliable	Technical	95	Spare ratio of light vehicle
Fleet	Reliable	Technical	96	% of maintenance that is reactive vs. preventative
Fleet	Environmental Stewardship	Customer	97	Annual greenhouse gas emissions
Fleet	Environmental Stewardship	Technical	98	% of equipment past their estimated service life
Fleet	Environmental Stewardship	Technical	99	Total fuel consumption of medium vehicles per year (miles/gallon)
Fleet	Environmental Stewardship	Technical	100	Total fuel consumption of light vehicles per year (miles/gallon)
Fleet	Environmental Stewardship	Technical	101	# of vehicles with higher fuel consumption due to age
Information Technology	Cost Efficient	Customer	102	Cost to provide service (\$/employee)
Information Technology	Cost Efficient	Technical	103	Annual operating budget for IT
Information Technology	Cost Efficient	Technical	104	Average annual capital expenditure for IT

Service	Key Service Attribute	Focus	No.	Performance Measure
Information Technology	Cost Efficient	Technical	105	Cost of firewalls
Information Technology	Cost Efficient	Technical	106	Cost of monitoring software (\$/year)
Information Technology	Cost Efficient	Customer	107	Average IT hardware asset renewal rate (# years)
Information Technology	Cost Efficient	Technical	108	10 Year average IT asset renewal budget as a % of replacement value
Information Technology	Quality	Customer	109	% of IT assets that meet the target quality level
Information Technology	Quality	Technical	110	% of server assets past their estimated service life
Information Technology	Quality	Technical	111	% of network infrastructure assets past their estimated service life
Information Technology	Quality	Technical	112	% of desktop assets past their estimated service life
Information Technology	Quality	Technical	113	% of client services assets past their estimated service life
Information Technology	Quality	Technical	114	% of corporate/enterprise applications that are considered obsolete
Information Technology	Quality	Technical	115	% of infrastructure software that is considered obsolete
Information Technology	Quality	Technical	116	% of endpoint assets that are considered obsolete

Service	Key Service Attribute	Focus	No.	Performance Measure
Information Technology	Quality	Technical	117	% of software that is considered obsolete
Information Technology	Quality	Technical	118	% of server assets that is considered obsolete
Information Technology	Quality	Technical	119	% of network infrastructure that is considered obsolete
Information Technology	Quality	Technical	120	% of desktop assets that is considered obsolete
Information Technology	Quality	Technical	121	% of client services assets that is considered obsolete
Information Technology	Quantity	Customer	122	% of projects that are being achieved
Information Technology	Quantity	Technical	123	# of outstanding IT requests (hardware)
Information Technology	Quantity	Technical	124	% of City with sufficient network infrastructure
Information Technology	Quantity	Technical	125	% funded through 5 year network infrastructure plan
Information Technology	Security	Customer	126	# of threats
Information Technology	Security	Technical	127	% of mitigated threats
Information Technology	Accessible	Customer	128	% of IT assets that are FADM/AODA compliant

Service	Key Service Attribute	Focus	No.	Performance Measure
Information Technology	Accessible	Technical	129	% of IT assets that are FADM/AODA compliant
Paramedic Services	Cost Effective	Customer	130	Cost to provide service (\$/household)
Paramedic Services	Cost Effective	Technical	131	Annual operating budget for paramedic services
Paramedic Services	Cost Effective	Technical	132	Average annual capital expenditure for paramedic services
Paramedic Services	Cost Effective	Technical	133	Cost to provide service (\$/km ²)
Paramedic Services	Cost Effective	Technical	134	Cost to provide service (\$/call)
Paramedic Services	Cost Effective	Technical	135	Cost to provide service (\$/person)
Paramedic Services	Cost Effective	Customer	136	Average asset renewal rate (# years)
Paramedic Services	Cost Effective	Technical	137	10 Year average paramedic services fleet asset renewal budget as a % of replacement value
Paramedic Services	Cost Effective	Technical	138	10 Year average paramedic services equipment asset renewal budget as a % of replacement value
Paramedic Services	Cost Effective	Technical	139	10 Year average paramedic services facility asset renewal budget as a % of replacement value
Paramedic Services	Reliable	Customer	140	% of paramedic asset needs that are being achieved

Service	Key Service Attribute	Focus	No.	Performance Measure
Paramedic Services	Reliable	Technical	141	% of time when equipment is available and operating properly
Paramedic Services	Reliable	Technical	142	% of paramedic facilities meeting needs
Paramedic Services	Reliable	Customer	143	% of time when response times are achieved
Paramedic Services	Reliable	Technical	144	# of vehicles
Paramedic Services	Reliable	Technical	145	% of vehicles beyond service life
Paramedic Services	Reliable	Technical	146	% of paramedic facilities in poor or very poor condition
Parking	Cost Efficient	Customer	147	Cost per space (\$/space)
Parking	Cost Efficient	Technical	148	Annual operating budget for parking
Parking	Cost Efficient	Technical	149	Average annual capital expenditure for parking
Parking	Cost Efficient	Customer	150	Revenue per parking space (\$/parking space)
Parking	Cost Efficient	Technical	151	Average annual revenue for parking
Parking	Cost Efficient	Technical	152	Average annual workday revenue for parking
Parking	Cost Efficient	Technical	153	Average annual after hour revenue for parking
Parking	Cost Efficient	Customer	154	Average parking asset renewal rate (# years)
Parking	Cost Efficient	Technical	155	10 Year forecast average parking asset renewal budget as a % of replacement value
Parking	Quality	Customer	156	% of parking spaces at or above the target condition

Service	Key Service Attribute	Focus	No.	Performance Measure
Parking	Quality	Technical	157	% of surface parking lots in poor or very poor condition
Parking	Quality	Technical	158	% of parking structure in poor or very poor condition
Parking	Quality	Technical	159	% of payment terminals above the target condition
Parking	Quality	Customer	160	% of parking spaces above the target design standards
Parking	Quality	Technical	161	% of surface parking lots above the target quality level
Parking	Quality	Technical	162	% of parking structure above the target quality level
Parking	Quality	Technical	163	% of gating equipment above the target quality level
Parking	Quality	Technical	164	% of payment terminals above the target quality level
Parking	Accessible	Customer	165	# of parking spaces
Parking	Accessible	Technical	166	# of electric vehicle charging spaces
Parking	Accessible	Technical	167	# of carpool spaces
Parking	Accessible	Technical	168	# of car share spaces
Parking	Accessible	Technical	169	# of bicycle parking spaces
Parking	Accessible	Technical	170	# of mobility spaces
Parking	Accessible	Technical	171	# of accessible spaces
Parking	Accessible	Technical	172	# of parking spaces in each parking lot
Parking	Accessible	Technical	173	# of parking spaces in each parking structure
Parking	Accessible	Technical	174	# of on-street parking spaces
Parking	Accessible	Technical	175	% of parking lots and structures that have the minimum number of spaces
Parking	Accessible	Technical	176	Occupancy rate of parking spaces
Parking	Accessible	Technical	177	Vehicle turnover rate (vehicles/time)
Parking	Accessible	Technical	178	# of people on permit wait list
Parking	Accessible	Technical	179	Average time to be on the waitlist for permits

Service	Key Service Attribute	Focus	No.	Performance Measure
Parking	Accessible	Technical	180	Amount of time to provide x% of people on the waitlist with permits
Parking	Accessible	Customer	181	% of spaces that are FADM/AODA compliant
Parking	Accessible	Technical	182	% of off-street payment terminals that are FADM/AODA compliant
Parking	Accessible	Technical	183	% of on-street payment terminals that are FADM/AODA compliant
Parking	Reliable	Customer	184	% of time when payment terminals are operating
Parking	Reliable	Technical	185	% of time when parking meters are operating
Parking	Reliable	Technical	186	% of time when kiosks are operating
Parking	Reliable	Technical	187	% of time when parking gates are operating
Parking	Reliable	Technical	188	Lost revenue due to inoperative payment terminals
Parking	Reliable	Technical	189	% of closed spaces
Parks, Forestry and Open Spaces	Cost Efficient	Customer	190	Cost to provide parks, forestry, open spaces, and trails (\$/household)
Parks, Forestry and Open Spaces	Cost Efficient	Technical	191	Annual operating budget for parks
Parks, Forestry and Open Spaces	Cost Efficient	Technical	192	Average annual capital expenditure for parks
Parks, Forestry and Open Spaces	Cost Efficient	Technical	193	Annual operating budget for forestry

Service	Key Service Attribute	Focus	No.	Performance Measure
Parks, Forestry and Open Spaces	Cost Efficient	Technical	194	Average annual capital expenditure for forestry
Parks, Forestry and Open Spaces	Cost Efficient	Technical	195	Annual operating budget for open spaces
Parks, Forestry and Open Spaces	Cost Efficient	Technical	196	Average annual capital expenditure for open spaces
Parks, Forestry and Open Spaces	Cost Efficient	Technical	197	Annual operating budget for trails
Parks, Forestry and Open Spaces	Cost Efficient	Technical	198	Average annual capital expenditure for trails
Parks, Forestry and Open Spaces	Cost Efficient	Customer	199	Average parks, forestry, open spaces and trails renewal rate (# years)
Parks, Forestry and Open Spaces	Cost Efficient	Technical	200	Parks asset renewal budget as a % of replacement value
Parks, Forestry and Open Spaces	Cost Efficient	Technical	201	10 Year forecast average parks asset renewal budget as a % of replacement value
Parks, Forestry and Open Spaces	Cost Efficient	Technical	202	Forestry asset renewal budget as a % of replacement value

Service	Key Service Attribute	Focus	No.	Performance Measure
Parks, Forestry and Open Spaces	Cost Efficient	Technical	203	10 Year forecast average forestry asset renewal budget as a % of replacement value
Parks, Forestry and Open Spaces	Cost Efficient	Technical	204	Open spaces asset renewal budget as a % of replacement value
Parks, Forestry and Open Spaces	Cost Efficient	Technical	205	10 Year forecast average open spaces asset renewal budget as a % of replacement value
Parks, Forestry and Open Spaces	Cost Efficient	Technical	206	Trails asset renewal budget as a % of replacement value
Parks, Forestry and Open Spaces	Cost Efficient	Technical	207	10 Year forecast average trails asset renewal budget as a % of replacement value
Parks, Forestry and Open Spaces	Quality	Customer	208	% of parks, forestry, open spaces and trails in poor or very poor condition
Parks, Forestry and Open Spaces	Quality	Technical	209	% of park amenities in poor or very poor condition
Parks, Forestry and Open Spaces	Quality	Technical	210	% of trees in poor or very poor condition
Parks, Forestry and Open Spaces	Quality	Technical	211	% of open spaces amenities in poor or very poor condition

Service	Key Service Attribute	Focus	No.	Performance Measure
Parks, Forestry and Open Spaces	Quality	Technical	212	% of trails in poor or very poor condition
Parks, Forestry and Open Spaces	Quality	Customer	213	% of parks, open spaces and trails at or above the target design standard
Parks, Forestry and Open Spaces	Quality	Technical	214	% of parks that meet the target design standard
Parks, Forestry and Open Spaces	Quality	Technical	215	% of open spaces that meet the target design standard
Parks, Forestry and Open Spaces	Quality	Technical	216	% of trails that meet the target design standard
Parks, Forestry and Open Spaces	Quality	Customer	217	% of parks and open spaces that have the right number/type of amenities
Parks, Forestry and Open Spaces	Quality	Technical	218	% of parks that have the right number and type of amenities
Parks, Forestry and Open Spaces	Quality	Technical	219	% of Right-of-Ways that have the right number and type of trees
Parks, Forestry and Open Spaces	Accessible	Customer	220	% of customers that are within the target travel time to a park

Service	Key Service Attribute	Focus	No.	Performance Measure
Parks, Forestry and Open Spaces	Accessible	Technical	221	% of properties within 600 m of a park
Parks, Forestry and Open Spaces	Accessible	Customer	222	% of customers that are within the target travel time to a trail network
Parks, Forestry and Open Spaces	Accessible	Technical	223	% of properties within 600 m of a trail
Parks, Forestry and Open Spaces	Accessible	Customer	224	% of amenities that are FADM/AODA compliant
Parks, Forestry and Open Spaces	Accessible	Technical	225	% of amenities that are FADM/AODA compliant
Parks, Forestry and Open Spaces	Livable Community	Customer	226	# of safety incidents in parks
Parks, Forestry and Open Spaces	Livable Community	Technical	227	Monthly safety Inspections
Parks, Forestry and Open Spaces	Livable Community	Technical	228	# of injuries in parks
Parks, Forestry and Open Spaces	Livable Community	Technical	229	% of amenities that meet safety objectives

Service	Key Service Attribute	Focus	No.	Performance Measure
Parks, Forestry and Open Spaces	Livable Community	Customer	230	% of residents satisfied with the parks and open spaces
Parks, Forestry and Open Spaces	Livable Community	Technical	231	% of trees at risk of dying prematurely
Parks, Forestry and Open Spaces	Livable Community	Customer	232	% of trees by condition rating
Parks, Forestry and Open Spaces	Livable Community	Technical	233	% of trees by condition rating
Parks, Forestry and Open Spaces	Livable Community	Customer	234	% of canopy coverage
Parks, Forestry and Open Spaces	Livable Community	Technical	235	Total canopy area of City owned trees
Police	Cost Effective	Customer	236	Cost to provide service (\$/household)
Police	Cost Effective	Technical	237	Annual operating budget for police services
Police	Cost Effective	Technical	238	Average annual capital expenditure for police services
Police	Cost Effective	Customer	239	Officers/capita
Police	Cost Effective	Technical	240	Officers/population
Police	Cost Effective	Customer	241	Average facility asset renewal rate (# years)
Police	Cost Effective	Technical	242	10 Year average facility asset renewal budget as a % of replacement value

Service	Key Service Attribute	Focus	No.	Performance Measure
Police	Cost Effective	Customer	243	Average fleet asset renewal rate (# years)
Police	Cost Effective	Technical	244	10 Year average fleet asset renewal budget as a % of replacement value
Police	Cost Effective	Customer	245	Average IT asset renewal rate (# years)
Police	Cost Effective	Technical	246	10 Year average IT asset renewal budget as a % of replacement value
Police	Cost Effective	Customer	247	Average equipment renewal rate (# years)
Police	Cost Effective	Technical	248	10 Year average equipment renewal budget as a % of replacement value
Police	Cost Effective	Customer	249	Maintenance Costs
Police	Cost Effective	Technical	250	Facility maintenance costs
Police	Cost Effective	Technical	251	Fleet asset maintenance costs
Police	Cost Effective	Technical	252	IT asset maintenance costs
Police	Cost Effective	Technical	253	Miscellaneous maintenance costs
Police	Reliable	Customer	254	% of police asset needs that are being achieved
Police	Reliable	Technical	255	# of police vehicles
Police	Reliable	Technical	256	% of vehicles beyond service life
Police	Reliable	Technical	257	% of IT assets above target condition level
Police	Reliable	Technical	258	% of equipment in poor condition
Police	Reliable	Technical	259	% of police stations in poor or very poor condition
Police	Environmental Stewardship	Customer	260	Annual fuel consumption

Service	Key Service Attribute	Focus	No.	Performance Measure
Police	Environmental Stewardship	Technical	261	Annual fuel consumption
Recreation	Cost Efficient	Customer	262	Cost to provide service (\$/household)
Recreation	Cost Efficient	Technical	263	Annual operating budget for recreation assets
Recreation	Cost Efficient	Technical	264	Average annual capital expenditure for recreation assets
Recreation	Cost Efficient	Customer	265	Average recreation asset renewal rate (# years)
Recreation	Cost Efficient	Technical	266	10 Year average recreation asset renewal budget as a % of replacement value
Recreation	Safe	Customer	267	% of community recreation facilities that are safe
Recreation	Safe	Technical	268	# of outstanding safety improvements required at facilities
Recreation	Safe	Technical	269	# of incidents in community recreation facilities
Recreation	Safe	Technical	270	% of facilities that meet security standards
Recreation	Safe	Technical	271	% of amenities that meet safety objectives/legislative targets
Recreation	Accessible	Customer	272	% of buildings that are FADM/AODA compliant where technically feasible
Recreation	Accessible	Technical	273	% of recreation facilities that are FADM/AODA compliant where technically feasible
Recreation	Accessible	Customer	274	# of facilities and amenities
Recreation	Accessible	Technical	275	# of community recreation centres (#/1000 residents)
Recreation	Accessible	Technical	276	# of indoor aquatic facilities
Recreation	Accessible	Technical	277	# of ice surfaces
Recreation	Quality	Customer	278	% of community recreation facilities in poor or very poor condition
Recreation	Quality	Technical	279	% of community recreation facilities in poor or very poor condition

Service	Key Service Attribute	Focus	No.	Performance Measure
Recreation	Quality	Customer	280	% of facilities at or above the target standard
Recreation	Quality	Technical	281	% of residents satisfied with community recreation facilities
Recreation	Quality	Technical	282	% of community recreation facilities that meet the target standard
Recreation	Quality	Technical	283	% of community recreation facilities with the appropriate amount of seating
Recreation	Quality	Technical	284	% of community recreation facilities with the appropriate amount of change room space
Recreation	Quality	Technical	285	% of community recreation facilities with the appropriate amount of washroom facilities
Recreation	Quality	Technical	286	% of community recreation facilities with the appropriate amount of community rooms
Recreation	Quality	Technical	287	% of community recreation facilities with the appropriate amount of usable/rentable space
Recreation	Quality	Technical	288	% of community recreation facilities with the appropriate amount of common space
Recreation	Quality	Technical	289	% of community recreation facilities with the appropriate amount of storage
Recreation	Quality	Technical	290	Hours of facility downtime due to asset failure
Recreation	Quality	Technical	291	Hours of facility uptime
Recreation	Quality	Technical	292	# of weeks of unplanned closures
Recreation	Quality	Technical	293	# of weeks of planned closures
Recreation	Environmental Stewardship	Customer	294	Annual energy consumption per square foot
Recreation	Environmental Stewardship	Technical	295	Annual electricity consumption per square foot

Service	Key Service Attribute	Focus	No.	Performance Measure
Recreation	Environmental Stewardship	Technical	296	Annual natural gas consumption per square foot
Recreation	Environmental Stewardship	Customer	297	Annual water consumption
Recreation	Environmental Stewardship	Technical	298	Annual water consumption
Roads and ROWs	Cost Efficient	Customer	299	Cost to provide service (\$/household)
Roads and ROWs	Cost Efficient	Technical	300	Annual operating budget
Roads and ROWs	Cost Efficient	Technical	301	Average annual capital expenditure for roads and right-of-ways
Roads and ROWs	Cost Efficient	Customer	302	Average asset renewal rate (# years)
Roads and ROWs	Cost Efficient	Technical	303	10 Year average road linear asset renewal budget as a % of replacement value
Roads and ROWs	Cost Efficient	Technical	304	10 Year average road traffic asset renewal budget as a % of replacement value
Roads and ROWs	Reasonable Traffic Flow/Movement	Customer	305	% of residents satisfied with the traffic flow
Roads and ROWs	Reasonable Traffic Flow/Movement	Technical	306	Length of roads with volume to capacity ratio above target

Service	Key Service Attribute	Focus	No.	Performance Measure
Roads and ROWs	Reasonable Traffic Flow/Movement	Technical	307	# of intersections where peak traffic queues (worse of am and pm hours) are below target
Roads and ROWs	Reasonable Traffic Flow/Movement	Technical	308	Travel times (E-W and N-S) do not exceed 30 mins in normal traffic conditions
Roads and ROWs	Reasonable Traffic Flow/Movement	Technical	309	# of complaints about traffic flow
Roads and ROWs	Operational	Customer	310	# of vehicle, cyclist, and pedestrian incidents (complaints)
Roads and ROWs	Operational	Technical	311	% of bridges and structures in poor or very poor condition
Roads and ROWs	Operational	Technical	312	% of sidewalks in poor or very poor condition
Roads and ROWs	Operational	Technical	313	% of roads/paved area in poor or very poor condition
Roads and ROWs	Operational	Technical	314	% of road signs in poor condition
Roads and ROWs	Operational	Technical	315	% of gravel roads above the target condition
Roads and ROWs	Operational	Technical	316	# of locations with inadequate traffic signals

Service	Key Service Attribute	Focus	No.	Performance Measure
Roads and ROWs	Operational	Technical	317	# of complaints of unsafe roads
Roads and ROWs	Operational	Technical	318	% of time when MMS are achieved as per O. Reg 239/02
Roads and ROWs	Operational	Technical	319	# of cyclist complaints of catchbasin covers not conducive to cyclists
Roads and ROWs	Operational	Technical	320	% of roads with necessary half load limit signage
Roads and ROWs	Operational	Customer	321	Complete Streets (streets that have amenities for all road users: bus, bike, ped, vehicle)
Roads and ROWs	Operational	Technical	322	km of roadways that include amenities for all modes (car, bike, ped, bus)
Roads and ROWs	Operational	Customer	323	Bus prioritization
Roads and ROWs	Operational	Technical	324	# of intersections that prioritize transit service
Roads and ROWs	Operational	Customer	325	Operational cost per resident per year
Roads and ROWs	Operational	Technical	326	# of complaints about leaf/debris/snow obstructions in cycling facilities, on sidewalks
Roads and ROWs	Quality	Customer	327	% of right-of-ways that meet the target quality level
Roads and ROWs	Quality	Technical	328	% of roads/paved area that meet the target quality level
Roads and ROWs	Quality	Technical	329	% of gravel roads that meet the target quality level
Roads and ROWs	Quality	Technical	330	% of sidewalks that meet the target quality level

Service	Key Service Attribute	Focus	No.	Performance Measure
Roads and ROWs	Quality	Technical	331	% of cycling facilities that meet the target quality level
Roads and ROWs	Quality	Technical	332	% of bridges that meet the target quality level
Roads and ROWs	Accessible	Customer	333	% of transportation network that is FADM/AODA compliant
Roads and ROWs	Accessible	Technical	334	% of sidewalks that are FADM/AODA compliant
Roads and ROWs	Accessible	Technical	335	% of pedestrian crossings that are FADM/AODA compliant
Roads and ROWs	Accessible	Technical	336	% of traffic signals with APS
Roads and ROWs	Accessible	Customer	337	# of vehicle trips, # of cycling trips, # of pedestrian trips
Roads and ROWs	Accessible	Technical	338	% of cycling routes completed
Roads and ROWs	Accessible	Technical	339	% of active transportation routes completed
Roads and ROWs	Accessible	Technical	340	Length of missing sidewalk segments
Roads and ROWs	Environmental Stewardship	Customer	341	% of streetlights that are energy efficient
Roads and ROWs	Environmental Stewardship	Technical	342	% of streetlights with LED or low energy fixtures
Roads and ROWs	Environmental Stewardship	Customer	343	Volume of salt applied to road/lane km

Service	Key Service Attribute	Focus	No.	Performance Measure
Roads and ROWs	Environmental Stewardship	Technical	344	Volume of salt applied to road/lane km
Solid Waste	Cost Efficient	Customer	345	Cost to provide service (\$/serviced household)
Solid Waste	Cost Efficient	Technical	346	Annual operating budget for solid waste services
Solid Waste	Cost Efficient	Technical	347	Average annual capital expenditure for solid waste services
Solid Waste	Cost Efficient	Technical	348	Revenue generated from sale of raw materials
Solid Waste	Cost Efficient	Customer	349	Average asset renewal rate (# years)
Solid Waste	Cost Efficient	Technical	350	10 Year forecast average solid waste fleet asset renewal budget as a % of replacement value
Solid Waste	Cost Efficient	Technical	351	10 Year forecast average solid waste facility asset renewal budget as a % of replacement value
Solid Waste	Reliable	Customer	352	% of community satisfied with solid waste collection services
Solid Waste	Reliable	Technical	353	% of solid waste infrastructure assets in poor or very poor condition
Solid Waste	Reliable	Technical	354	% of collection vehicles in poor or very poor condition
Solid Waste	Reliable	Technical	355	% of bins past life span
Solid Waste	Reliable	Technical	356	% of process equipment past useful life
Solid Waste	Reliable	Technical	357	% of time the transfer stations queues exceed the target
Solid Waste	Reliable	Technical	358	Wait time at scale
Solid Waste	Reliable	Technical	359	Wait time to tip
Solid Waste	Reliable	Technical	360	% of customers that are within the target travel time to a drop-off depot
Solid Waste	Reliable	Technical	361	# of collection vehicles
Solid Waste	Reliable	Technical	362	# of missed collections
Solid Waste	Reliable	Technical	363	Spare ratio

Service	Key Service Attribute	Focus	No.	Performance Measure
Solid Waste	Reliable	Technical	364	Transfer station hauling frequency
Solid Waste	Reliable	Technical	365	% of time compactor is operating
Solid Waste	Reliable	Technical	366	Downtime of MRF
Solid Waste	Reliable	Technical	367	# of days collection vehicles are out of service due to repairs
Solid Waste	Reliable	Technical	368	# of serviced customers
Solid Waste	Reliable	Technical	369	% of equipment at facilities that meets H&S standards
Solid Waste	Environmental Stewardship	Customer	370	% of facilities operating within ECA requirements
Solid Waste	Environmental Stewardship	Technical	371	% of facilities operating within ECA requirements
Solid Waste	Environmental Stewardship	Customer	372	% overall (site) waste diversion
Solid Waste	Environmental Stewardship	Technical	373	% of time overall site diversion rate target is met
Solid Waste	Environmental Stewardship	Technical	374	# of education activities completed
Solid Waste	Environmental Stewardship	Customer	375	% residential waste diversion
Solid Waste	Environmental Stewardship	Technical	376	Public drop off diversion rate target is met
Solid Waste	Environmental Stewardship	Technical	377	Transfer station diversion rate target is met
Solid Waste	Environmental Stewardship	Technical	378	MRF diversion rate target is met

Service	Key Service Attribute	Focus	No.	Performance Measure
Solid Waste	Environmental Stewardship	Customer	379	GHG emissions
Solid Waste	Environmental Stewardship	Technical	380	Fuel consumption of vehicles
Solid Waste	Environmental Stewardship	Technical	381	Energy consumption at MRF
Solid Waste	Environmental Stewardship	Technical	382	Energy produced at closed landfill
Solid Waste	Environmental Stewardship	Technical	383	# of resources recovered
Stormwater	Cost Efficient	Customer	384	Annual cost to provide service (\$/household)
Stormwater	Cost Efficient	Technical	385	Annual operating budget for stormwater
Stormwater	Cost Efficient	Technical	386	Average annual capital expenditure for stormwater
Stormwater	Cost Efficient	Customer	387	Average stormwater asset renewal rate (# years)
Stormwater	Cost Efficient	Technical	388	10 Year average stormwater linear asset renewal budget as a % of replacement value
Stormwater	Cost Efficient	Technical	389	10 Year average stormwater management pond asset renewal budget as a % of replacement value
Stormwater	Reliable	Customer	390	# of locations in the City prone to flooding during wet weather events
Stormwater	Reliable	Technical	391	% of major system with insufficient capacity to convey flows of a 100-year wet weather event
Stormwater	Reliable	Technical	392	% of minor system with insufficient capacity to convey flows of a 5-year wet weather event

Service	Key Service Attribute	Focus	No.	Performance Measure
Stormwater	Reliable	Technical	393	# of complaints of flooding during a wet weather event
Stormwater	Reliable	Technical	394	% of major system with adequate resiliency to accommodate the impacts of climate change
Stormwater	Reliable	Technical	395	% of minor system with adequate resiliency to accommodate the impacts of climate change
Stormwater	Reliable	Technical	396	% of city area surcharged
Stormwater	Reliable	Technical	397	% of storm sewers in poor or very poor condition
Stormwater	Reliable	Technical	398	% of other stormwater assets in poor or very poor condition
Stormwater	Reliable	Technical	399	# of critical roads where flooding exceeds 100 mm during a Regulatory storm
Stormwater	Reliable	Technical	400	# of properties at risk of being flooded during a target wet weather event
Stormwater	Reliable	Technical	401	% of network inspected within last 5 years
Stormwater	Reliable	Technical	402	% of OGS maintained annually
Stormwater	Reliable	Customer	403	% of community with stormwater quantity control
Stormwater	Reliable	Technical	404	% of runoff quantity control
Stormwater	Environmental Stewardship	Customer	405	% of community with stormwater quality control
Stormwater	Environmental Stewardship	Technical	406	% of times where water quality objectives are achieved
Stormwater	Environmental Stewardship	Technical	407	# of SWM ponds that have exceeded their target dredging frequency
Stormwater	Environmental Stewardship	Technical	408	# of SWM ponds where effluent water quality exceeds objective
Stormwater	Environmental Stewardship	Technical	409	% of community with stormwater quality treatment control

Service	Key Service Attribute	Focus	No.	Performance Measure
Stormwater	Environmental Stewardship	Technical	410	#/type of LID technologies implemented
Stormwater	Environmental Stewardship	Technical	411	Volume of stormwater runoff reduced via credit and rebate program
Transit	Cost Efficient	Customer	412	Cost per km (\$/km)
Transit	Cost Efficient	Technical	413	Annual operating budget for transit services
Transit	Cost Efficient	Technical	414	Average annual capital expenditure for transit services
Transit	Cost Efficient	Technical	415	Revenue to operating cost ratio
Transit	Cost Efficient	Technical	416	Revenue to capital cost ratio
Transit	Cost Efficient	Technical	417	# of service kilometres
Transit	Cost Efficient	Customer	418	Average asset renewal rate (# years)
Transit	Cost Efficient	Technical	419	10 Year average transit equipment asset renewal budget as a % of replacement value
Transit	Cost Efficient	Technical	420	10 Year average transit facility asset renewal budget as a % of replacement value
Transit	Cost Efficient	Technical	421	10 Year average transit fleet asset renewal budget as a % of replacement value
Transit	Cost Efficient	Technical	422	10 Year average transit terminal asset renewal budget as a % of replacement value
Transit	Quality	Customer	423	% of transit assets that meet the quality targets
Transit	Quality	Technical	424	# of buses that meet the target quality
Transit	Quality	Technical	425	# of bus stops that meet the target quality
Transit	Quality	Technical	426	% of bus stops with adequate amenities
Transit	Accessible	Customer	427	% of transit fleet that are FADM/AODA compliant
Transit	Accessible	Technical	428	% of buses that are FADM/AODA compliant
Transit	Accessible	Technical	429	% of bus stops that are FADM/AODA compliant

Service	Key Service Attribute	Focus	No.	Performance Measure
Transit	Accessible	Customer	430	Annual ridership volume
Transit	Accessible	Technical	431	% of residents within 300 m to a bus stop
Transit	Accessible	Technical	432	Average bus stop spacing
Transit	Accessible	Technical	433	% of bus routes below the target loading per hour
Transit	Accessible	Technical	434	# of service hours per year
Transit	Convenient	Customer	435	% of customers satisfied with the transit system
Transit	Convenient	Technical	436	% of bus routes with priority lanes
Transit	Convenient	Technical	437	% of bus routes with transit priority signals
Transit	Convenient	Technical	438	% of bus stops with electronic displays
Transit	Reliable	Customer	439	% of buses that are on time
Transit	Reliable	Technical	440	% of buses in poor or very poor condition
Transit	Reliable	Technical	441	# of buses based on service hours
Transit	Reliable	Technical	442	% of buses with adequate volume
Transit	Reliable	Technical	443	% of supporting assets and software that have exceeded their target condition
Transit	Reliable	Technical	444	# of lost hours of service due to not having enough buses
Transit	Reliable	Technical	445	Spare ratio
Transit	Environmental Stewardship	Customer	446	Annual greenhouse gas emissions
Transit	Environmental Stewardship	Technical	447	Total fuel consumption of buses per year
Transit	Environmental Stewardship	Technical	448	# of buses with higher fuel consumption due to age
Transit	Environmental Stewardship	Technical	449	Total energy consumption per year

Service	Key Service Attribute	Focus	No.	Performance Measure
Transit	Environmental Stewardship	Technical	450	Net fuel consumption/rider
Transit	Environmental Stewardship	Technical	451	Greenhouse gas emission reduction/rider
Wastewater	Cost Efficient	Customer	452	Cost to provide service (\$/household)
Wastewater	Cost Efficient	Technical	453	Annual operating budget and capital budget for wastewater
Wastewater	Cost Efficient	Technical	454	Annual operating and maintenance cost/km of sewer
Wastewater	Cost Efficient	Technical	455	Average annual capital expenditure for wastewater
Wastewater	Cost Efficient	Technical	456	Annual treatment cost (\$/ML)
Wastewater	Cost Efficient	Customer	457	Average wastewater asset renewal rate (# years)
Wastewater	Cost Efficient	Technical	458	10 Year average wastewater linear asset renewal budget as a % of replacement value
Wastewater	Cost Efficient	Technical	459	10 Year average wastewater facility asset renewal budget as a % of replacement value
Wastewater	Reliable	Customer	460	# of customers that experience a service interruption
Wastewater	Reliable	Technical	461	# of customers that experience basement flooding caused by a wet weather event
Wastewater	Reliable	Technical	462	km of sewers in poor or very poor condition
Wastewater	Reliable	Technical	463	% of sewers in poor or very poor condition
Wastewater	Reliable	Technical	464	% of wastewater facility assets in poor or very poor condition
Wastewater	Reliable	Technical	465	% of the system surcharged within 1.8 m of the ground elevation during a 25-year wet weather event
Wastewater	Reliable	Technical	466	% of the system with adequate resiliency to accommodate the impacts of climate change
Wastewater	Reliable	Technical	467	# of sewage pumping stations with standby power

Service	Key Service Attribute	Focus	No.	Performance Measure
Wastewater	Reliable	Technical	468	Current rated capacity of treatment plant
Wastewater	Reliable	Technical	469	# of sewers with operational issues likely to cause service interruptions
Wastewater	Reliable	Technical	470	% of preventative maintenance activities completed on schedule
Wastewater	Reliable	Technical	471	# of locations with FOG issues or prone to blockages
Wastewater	Environmental Stewardship	Customer	472	% of wastewater flows that meet environmental objectives when discharged
Wastewater	Environmental Stewardship	Technical	473	# of overflow occurrences
Wastewater	Environmental Stewardship	Technical	474	Total volume of untreated wastewater discharged into the natural environment via treatment plant bypass
Wastewater	Environmental Stewardship	Technical	475	Total volume of untreated wastewater discharged into the natural environment via pumping station overflows
Wastewater	Environmental Stewardship	Technical	476	% compliance with all applicable regulatory requirements
Wastewater	Environmental Stewardship	Customer	477	Energy consumption/ML of wastewater treated
Wastewater	Environmental Stewardship	Technical	478	Energy consumption/ML from collection
Wastewater	Environmental Stewardship	Technical	479	Energy consumption/ML from treatment
Water	Cost Efficient	Customer	480	Annual cost to provide service (\$/household)
Water	Cost Efficient	Technical	481	Annual operating budget for water services

Service	Key Service Attribute	Focus	No.	Performance Measure
Water	Cost Efficient	Technical	482	Average annual capital expenditure for water services
Water	Cost Efficient	Customer	483	Average water service asset renewal rate (# years)
Water	Cost Efficient	Technical	484	10 Year average water linear asset renewal budget as a % of replacement value
Water	Cost Efficient	Technical	485	10 Year average water facility asset renewal budget as a % of replacement value
Water	Safe	Customer	486	% of community with sufficient fire flow protection
Water	Safe	Technical	487	# of WMs attributed to causing a fire flow deficiency
Water	Safe	Customer	488	% of community with acceptable risk of experiencing adverse water quality
Water	Safe	Technical	489	% compliance with all applicable water quality regulations
Water	Safe	Technical	490	# of confirmed adverse water quality tests
Water	Quality	Customer	491	# of complaints due to rusty/discoloured water
Water	Quality	Technical	492	% of system serviced by sources that provide substandard water
Water	Quality	Technical	493	% of system that is unlined CI/DI
Water	Quality	Customer	494	# of complaints due to low pressure
Water	Quality	Technical	495	% of system with low pressure
Water	Reliable	Customer	496	% of customers where service is interrupted above target frequency
Water	Reliable	Technical	497	# of connection-days where service is interrupted due to water main breaks
Water	Reliable	Technical	498	# of WM breaks
Water	Reliable	Technical	499	# of watermains above target break rate
Water	Reliable	Technical	500	# of watermains prone to frozen water services

Service	Key Service Attribute	Focus	No.	Performance Measure
Water	Reliable	Technical	501	% of watermains in poor or very poor condition
Water	Reliable	Technical	502	% of facility assets in poor or very poor condition
Water	Reliable	Technical	503	% of critical assets below target condition
Water	Reliable	Technical	504	% of non-critical assets below target condition
Water	Reliable	Technical	505	# of days with suitable water tower volume
Water	Reliable	Technical	506	# of unplanned failures resulting in service interruption/reduction
Water	Environmental Stewardship	Customer	507	Water consumption L/cap/day
Water	Environmental Stewardship	Technical	508	Infrastructure Leakage Index (ILI)
Water	Environmental Stewardship	Technical	509	Energy consumption days per ML supplied

APPENDIX C – ANALYSIS DATABASE

Appendix C-1 – Goal 1 – No Poverty

UNSD Target Number	UNSD Target	UNSD Indicator Number	UNSD Indicator	ISO 37120 Indicator	ISO 37120 Indicator Number	ISO 37120 Indicator Type	ISO 37120 Theme (Target)	Service Type	LOS Objective	PM Type	LOS Performance Measures	Direct (D) or Indirect (I)	LOS Targets	LOS Performance Indicator
1.1	By 2030, eradicate extreme poverty for all people everywhere, currently measured as people living on less than \$1.25 a day	1.1.1	Proportion of population below the international poverty line, by sex, age, employment status and geographical location (urban/rural)					N/A	N/A	N/A	N/A	N/A	N/A	N/A
1.2	By 2030, reduce at least by half the proportion of men, women and children of all ages living in poverty in all its dimensions according to national definitions	1.2.1	Proportion of population living below the national poverty line, by sex and age	Percentage of city population living in poverty	5.3	core	economy	N/A	N/A	N/A	N/A	N/A	N/A	N/A
		1.2.2	Proportion of men, women and children of all ages living in poverty in all its dimensions according to national definitions					N/A	N/A	N/A	N/A	N/A	N/A	N/A

UNSD Target Number	UNSD Target	UNSD Indicator Number	UNSD Indicator	ISO 37120 Indicator	ISO 37120 Indicator Number	ISO 37120 Indicator Type	ISO 37120 Theme (Target)	Service Type	LOS Objective	PM Type	LOS Performance Measures	Direct (D) or Indirect (I)	LOS Targets	LOS Performance Indicator
1.3	Implement nationally appropriate social protection systems and measures for all, including floors, and by 2030 achieve substantial coverage of the poor and the vulnerable	1.3.1	Proportion of population covered by social protection floors/systems, by sex, distinguishing children, unemployed persons, older persons, persons with disabilities, pregnant women, newborns, work-injury victims and the poor and the vulnerable					N/A	N/A	N/A	N/A	N/A	N/A	N/A
1.4	By 2030, ensure that all men and women, in particular the poor and the vulnerable, have equal rights to economic resources, as well as access to basic services, ownership and control over land and other forms of property, inheritance, natural resources, appropriate new technology and financial services, including microfinance	1.4.1	Proportion of population living in households with access to basic services	Percentage of city population living in slums	15.1	core	shelter	Parks, Forestry and Open Spaces	Providing parks within a reasonable proximity to every residential household.	Customer	% of customers that are within the target travel time to a park	I	TBD	Accessibility

UNSD Target Number	UNSD Target	UNSD Indicator Number	UNSD Indicator	ISO 37120 Indicator	ISO 37120 Indicator Number	ISO 37120 Indicator Type	ISO 37120 Theme (Target)	Service Type	LOS Objective	PM Type	LOS Performance Measures	Direct (D) or Indirect (I)	LOS Targets	LOS Performance Indicator
								Parks, Forestry and Open Spaces	Providing parks within a reasonable proximity to every residential household.	Technical	% of properties within 600 m of a park	I	TBD	Accessibility
								Parks, Forestry and Open Spaces	Providing trails within a reasonable proximity to every residential household	Customer	% of customers that are within the target travel time to a trail network	I	99.10%	Accessibility
								Parks, Forestry and Open Spaces	Providing trails within a reasonable proximity to every residential household	Technical	% of properties within 600 m of a trail	I	TBD	Accessibility
								Recreation	Providing safe community recreation facilities	Customer	% of community recreation facilities that are safe	I	TBD	Safe
								Recreation	Providing safe community recreation facilities	Technical	# of outstanding safety improvements required at facilities	I	TBD	Safe
								Recreation	Providing safe community recreation facilities	Technical	# of incidents in community recreation facilities	I	TBD	Safe
								Recreation	Providing safe community recreation facilities	Technical	% of facilities that meet security standards	D	TBD	Safe
								Recreation	Providing safe community recreation facilities	Technical	% of amenities that meet safety objectives/legislative targets	D	TBD	Safe

UNSD Target Number	UNSD Target	UNSD Indicator Number	UNSD Indicator	ISO 37120 Indicator	ISO 37120 Indicator Number	ISO 37120 Indicator Type	ISO 37120 Theme (Target)	Service Type	LOS Objective	PM Type	LOS Performance Measures	Direct (D) or Indirect (I)	LOS Targets	LOS Performance Indicator
				Percentage of city population with potable water supply service	21.1	core	water and sanitation	N/A	N/A	N/A	N/A	N/A	N/A	N/A
				Percentage of city population with sustainable access to an improved water source	21.2	core	water and sanitation	N/A	N/A	N/A	N/A	N/A	N/A	N/A
				Percentage of city population with access to improved sanitation	21.3	core	water and sanitation	N/A	N/A	N/A	N/A	N/A	N/A	N/A
				Percentage of city population with authorized electrical service	7.2	core	energy	N/A	N/A	N/A	N/A	N/A	N/A	N/A
				Percentage of city population with regular solid waste collection (residential)	16.1	core	solid waste	Solid Waste	Providing a solid waste service in a cost efficient manner	Customer	Cost to provide service (\$/serviced household)	D	TBD	Cost Efficient
								Solid Waste	Providing a solid waste service in a cost efficient manner	Customer	Average asset renewal rate (# years)	I	TBD	Cost Efficient
								Solid Waste	Providing reliable solid waste collection services	Customer	% of community satisfied with solid waste collection services	D	TBD	Reliability
								Solid Waste	Providing reliable solid waste collection services	Technical	% of customers that are within the target travel time to a drop-off depot	I	TBD	Reliability

UNSD Target Number	UNSD Target	UNSD Indicator Number	UNSD Indicator	ISO 37120 Indicator	ISO 37120 Indicator Number	ISO 37120 Indicator Type	ISO 37120 Theme (Target)	Service Type	LOS Objective	PM Type	LOS Performance Measures	Direct (D) or Indirect (I)	LOS Targets	LOS Performance Indicator
1.5	By 2030, build the resilience of the poor and those in vulnerable situations and reduce their exposure and vulnerability to climate-related extreme events and other economic, social and environmental shocks and disasters	1.5.1	Number of deaths, missing persons and persons affected by disaster per 100,000 people	Number of natural disaster related deaths per 100,000 population	10.3	core	fire and emergency response	Fire Rescure	Providing the appropriate amount of rescue services and ensuring firefighters are well prepared	Customer	Readiness to respond to all types of emergencies	I	TBD	Reliability
								Paramedic Services	Providing effective paramedic services	Customer	Cost to provide service (\$/household)	I	\$107	Cost Effective
								Paramedic Services	Providing effective paramedic services	Customer	Average asset renewal rate (# years)	I	17	Cost Effective
								Paramedic Services	Providing the appropriate amount of paramedic assets to ensure reliable service	Customer	% of paramedic asset needs that are being achieved	I	TBD	Reliability
								Paramedic Services	Providing the appropriate amount of paramedic assets to ensure reliable service	Customer	% of time when response times are achieved	I	TBD	Reliability

UNSD Target Number	UNSD Target	UNSD Indicator Number	UNSD Indicator	ISO 37120 Indicator	ISO 37120 Indicator Number	ISO 37120 Indicator Type	ISO 37120 Theme (Target)	Service Type	LOS Objective	PM Type	LOS Performance Measures	Direct (D) or Indirect (I)	LOS Targets	LOS Performance Indicator
								Police	Providing the appropriate amount of police assets to ensure reliable service	Customer	% of police asset needs that are being achieved	I	TBD	Reliability
								Stormwater	Providing stormwater services with minimal impact to the community	Customer	# of locations in the City prone to flooding during wet weather events	D	TBD	Reliability
								Stormwater	Providing stormwater services with minimal impact to the community	Customer	% of community with stormwater quantity control	D	TBD	Reliability
								Stormwater	Providing stormwater services with minimal impact to the community	Technical	% of major system with adequate resiliency to accommodate the impacts of climate change	D	TBD	Reliability
								Stormwater	Providing stormwater services with minimal impact to the community	Technical	% of minor system with adequate resiliency to accommodate the impacts of climate change	D	TBD	Reliability
								Stormwater	Providing stormwater services with minimal impact to the community	Technical	% of city area surcharged	D	TBD	Reliability
								Stormwater	Providing stormwater services with minimal impact to the community	Technical	# of critical roads where flooding exceeds 100 mm during a Regulatory storm	D	TBD	Reliability

UNSD Target Number	UNSD Target	UNSD Indicator Number	UNSD Indicator	ISO 37120 Indicator	ISO 37120 Indicator Number	ISO 37120 Indicator Type	ISO 37120 Theme (Target)	Service Type	LOS Objective	PM Type	LOS Performance Measures	Direct (D) or Indirect (I)	LOS Targets	LOS Performance Indicator
								Stormwater	Providing stormwater services with minimal impact to the community	Technical	# of properties at risk of being flooded during a target wet weather event	D	TBD	Reliability
								Stormwater	Providing stormwater services that protect the environment	Customer	% of community with stormwater quantity control	D	TBD	Environmental Stewardship
		1.5.2	Direct disaster economic loss in relation to global gross domestic product (GDP) ^a					N/A	N/A	N/A	N/A	N/A	N/A	N/A
		1.5.3	Number of countries with national and local disaster risk reduction strategies					N/A	N/A	N/A	N/A	N/A	N/A	N/A
		1.5.4	Proportion of local governments that adopt and implement local disaster risk reduction strategies in line with national disaster risk reduction strategies					N/A	N/A	N/A	N/A	N/A	N/A	N/A

UNSD Target Number	UNSD Target	UNSD Indicator Number	UNSD Indicator	ISO 37120 Indicator	ISO 37120 Indicator Number	ISO 37120 Indicator Type	ISO 37120 Theme (Target)	Service Type	LOS Objective	PM Type	LOS Performance Measures	Direct (D) or Indirect (I)	LOS Targets	LOS Performance Indicator
1.A	Ensure significant mobilization of resources from a variety of sources, including through enhanced development cooperation, in order to provide adequate and predictable means for developing countries, in particular least developed countries, to implement programmes and policies to end poverty in all its dimensions	1.A.1	Proportion of resources allocated by the government directly to poverty reduction programmes	Gross capital budget per capita (USD)	9.2	supporting	finance	Culture, Tourism and Community Investment	Providing culture, tourism and community investment services in an efficient manner	Technical	Average annual capital expenditure for culture, tourism and community investment assets	I	329,400 (2017 \$)	Cost Efficient
								Fire Rescue	Providing effective fire rescue services	Technical	Average annual capital expenditure for fire rescue services	I	1,573,000 (2017 \$)	Cost Effective
								Information Technology	Providing IT services in a cost efficient manner	Technical	Average annual capital expenditure for IT	I	2,630,000 (2017 \$)	Cost Efficient
								Paramedic Services	Providing effective paramedic services	Technical	Average annual capital expenditure for paramedic services	I	488,000 (2017 \$)	Cost Effective
								Parking	Providing parking services in an efficient manner	Technical	Average annual capital expenditure for parking	I	1,451,000 (2017 \$)	Cost Efficient

UNSD Target Number	UNSD Target	UNSD Indicator Number	UNSD Indicator	ISO 37120 Indicator	ISO 37120 Indicator Number	ISO 37120 Indicator Type	ISO 37120 Theme (Target)	Service Type	LOS Objective	PM Type	LOS Performance Measures	Direct (D) or Indirect (I)	LOS Targets	LOS Performance Indicator
								Parks, Forestry and Open Spaces	Providing parks, forestry, open spaces and trails in an efficient manner	Technical	Average annual capital expenditure for parks	I	3,953,048 (2017 \$)	Cost Efficient
								Parks, Forestry and Open Spaces	Providing parks, forestry, open spaces and trails in an efficient manner	Technical	Average annual capital expenditure for forestry	I	30,000 (2017 \$)	Cost Efficient
								Parks, Forestry and Open Spaces	Providing parks, forestry, open spaces and trails in an efficient manner	Technical	Average annual capital expenditure for open spaces	I	0 (2017 \$)	Cost Efficient
								Parks, Forestry and Open Spaces	Providing parks, forestry, open spaces and trails in an efficient manner	Technical	Average annual capital expenditure for trails	I	30,000 (2017 \$)	Cost Efficient
								Police	Providing cost effective police services	Technical	Average annual capital expenditure for police services	I	1,096,100 (2017 \$)	Cost Effective
								Recreation	Providing recreation services in an efficient manner	Technical	Average annual capital expenditure for recreation assets	I	1,325,000 (2017 \$)	Cost Efficient
								Roads and ROWs	Providing an efficient transportation network for all modes	Technical	Average annual capital expenditure for roads and right-of-ways	I	8,544,210 (2017 \$)	Cost Efficient
								Solid Waste	Providing a solid waste service in a cost efficient manner	Technical	Average annual capital expenditure for solid waste services	I	2,484,500 (2017 \$)	Cost Efficient

UNSD Target Number	UNSD Target	UNSD Indicator Number	UNSD Indicator	ISO 37120 Indicator	ISO 37120 Indicator Number	ISO 37120 Indicator Type	ISO 37120 Theme (Target)	Service Type	LOS Objective	PM Type	LOS Performance Measures	Direct (D) or Indirect (I)	LOS Targets	LOS Performance Indicator
				Percentage of students completing primary education: survival rate	6.2	core	education	N/A	N/A	N/A	N/A	N/A	N/A	N/A
				Percentage of students completing secondary education: survival rate	6.3	core	education	N/A	N/A	N/A	N/A	N/A	N/A	N/A
				Primary education student/teacher ratio	6.4	core	education	N/A	N/A	N/A	N/A	N/A	N/A	N/A

Appendix C-2 – Goal 9 – Industry, Innovation and Infrastructure

UNSD Target Number	UNSD Target	UNSD Indicator Number	UNSD Indicator	ISO 37120 Indicator	ISO 37120 Indicator Number	ISO 37120 Indicator Type	ISO 37120 Theme (Target)	Service Type	LOS Objective	PM Type	LOS Performance Measures	Direct (D) or Indirect (I)	LOS Targets	LOS Performance Indicator
9.1	Develop quality, reliable, sustainable and resilient infrastructure, including regional and trans-border infrastructure, to support economic development and human well-being, with a focus on affordable and equitable access for all.	9.1.1	Proportion of the rural population who live within 2 km of an all-season road	Kilometres of high capacity public transport system per 100,000 population	18.1	core	Transportation	Roads and ROWs	Providing an efficient transportation network for all modes	Customer	Cost to provide service (\$/household)	I	TBD	Cost Efficient
		9.1.2	Passenger and freight volumes, by mode of transport				Transportation	Roads and ROWs	Providing an efficient transportation network for all modes	Technical	Annual operating budget	I	TBD	Cost Efficient
							Transportation	Roads and ROWs	Providing an efficient transportation network for all modes	Technical	Average annual capital expenditure for roads and right-of-ways	I	TBD	Cost Efficient
							Transportation	Roads and ROWs	Providing an efficient transportation network for all modes	Customer	Average asset renewal rate (# years)	I	TBD	Cost Efficient
							Transportation	Roads and ROWs	Providing an efficient transportation network for all modes	Technical	10-year average road linear asset renewal budget as a % of replacement value	I	2.0% to 3.0%	Cost Efficient
							Transportation	Roads and ROWs	Providing an efficient transportation network for all modes	Technical	10-year average road traffic asset renewal budget as a % of replacement value	I	TBD	Cost Efficient

UNSD Target Number	UNSD Target	UNSD Indicator Number	UNSD Indicator	ISO 37120 Indicator	ISO 37120 Indicator Number	ISO 37120 Indicator Type	ISO 37120 Theme (Target)	Service Type	LOS Objective	PM Type	LOS Performance Measures	Direct (D) or Indirect (I)	LOS Targets	LOS Performance Indicator
				Average number of electrical interruptions per customer per year				N/A	N/A	N/A	N/A	N/A	N/A	N/A
				Average length of electrical interruptions (in hours)	7.7	supporting	Energy	N/A	N/A	N/A	N/A	N/A	N/A	N/A
				Total collected municipal solid waste per capita	16.2	core	Solid Waste	Solid Waste	Providing a solid waste service in a cost efficient manner	Customer	Annual cost to provide service (\$/household)	I	TBD	Cost Efficient
								Solid Waste	Providing a solid waste service in a cost efficient manner	Technical	Annual operating budget for solid waste services	I	TBD	Cost Efficient
								Solid Waste	Providing a solid waste service in a cost efficient manner	Technical	Average annual capital expenditure for solid waste services	I	TBD	Cost Efficient
								Solid Waste	Providing a solid waste service in a cost efficient manner	Technical	Revenue generated from sale of raw materials	I	TBD	Cost Efficient
								Solid Waste	Providing a solid waste service in a cost efficient manner	Customer	Average asset renewal rate (# years)	I	TBD	Cost Efficient
								Solid Waste	Providing a solid waste service in a cost efficient manner	Technical	10 year forecast average solid waste fleet asset renewal budget as a % of replacement value	I	TBD	Cost Efficient
								Solid Waste	Providing a solid waste service in a cost efficient manner	Technical	10 year forecast average solid waste facility asset renewal budget as a % of replacement value	I	1.7% to 2.5%	Cost Efficient

UNSD Target Number	UNSD Target	UNSD Indicator Number	UNSD Indicator	ISO 37120 Indicator	ISO 37120 Indicator Number	ISO 37120 Indicator Type	ISO 37120 Theme (Target)	Service Type	LOS Objective	PM Type	LOS Performance Measures	Direct (D) or Indirect (I)	LOS Targets	LOS Performance Indicator
								Solid Waste	Providing reliable solid waste collection services	Customer	% of community satisfied with solid waste collection services	D	TBD	Cost Efficient
								Solid Waste	Providing reliable solid waste collection services	Technical	% of solid waste infrastructure assets in poor or very poor condition	I	TBD	Cost Efficient
								Solid Waste	Providing reliable solid waste collection services	Technical	% of collection vehicles in poor or very poor condition	I	TBD	Cost Efficient
								Solid Waste	Providing reliable solid waste collection services	Technical	% of bins past life span	I	TBD	Cost Efficient
								Solid Waste	Providing reliable solid waste collection services	Technical	% of process equipment past useful life	I	TBD	Cost Efficient
								Solid Waste	Providing reliable solid waste collection services	Technical	% of time the transfer stations queues exceed the target	I	TBD	Cost Efficient
								Solid Waste	Providing reliable solid waste collection services	Technical	Wait time at scale	I	TBD	Cost Efficient
								Solid Waste	Providing reliable solid waste collection services	Technical	Wait time to tip	I	TBD	Cost Efficient
								Solid Waste	Providing reliable solid waste collection services	Technical	% of customers that are within the target travel time to a drop-off depot	I	TBD	Cost Efficient
								Solid Waste	Providing reliable solid waste collection services	Technical	# of collection vehicles	I	TBD	Cost Efficient
								Solid Waste	Providing reliable solid waste collection services	Technical	# of missed collections	I	TBD	Cost Efficient
								Solid Waste	Providing reliable solid waste collection services	Technical	Spare ratio	I	TBD	Cost Efficient

UNSD Target Number	UNSD Target	UNSD Indicator Number	UNSD Indicator	ISO 37120 Indicator	ISO 37120 Indicator Number	ISO 37120 Indicator Type	ISO 37120 Theme (Target)	Service Type	LOS Objective	PM Type	LOS Performance Measures	Direct (D) or Indirect (I)	LOS Targets	LOS Performance Indicator
								Solid Waste	Providing reliable solid waste collection services	Technical	Transfer station hauling frequency	I	TBD	Cost Efficient
								Solid Waste	Providing reliable solid waste collection services	Technical	% of time compactor is operating	I	TBD	Cost Efficient
								Solid Waste	Providing reliable solid waste collection services	Technical	Downtime of MRF	I	TBD	Cost Efficient
								Solid Waste	Providing reliable solid waste collection services	Technical	# of days collection vehicles are out of service due to repairs	I	TBD	Cost Efficient
								Solid Waste	Providing reliable solid waste collection services	Technical	# of serviced customers	I	TBD	Cost Efficient
								Solid Waste	Providing reliable solid waste collection services	Technical	% of equipment at facilities that meets H&S standards	I	TBD	Cost Efficient
				Percentage of the city's hazardous waste that is recycled	16.1	supporting	Solid Waste	Solid Waste	Providing solid waste services that have minimal impacts on the environment	Technical	# of resources recovered	I	TBD	Environmental Stewardship
								Solid Waste	Providing solid waste services that have minimal impacts on the environment	Customer	GHG Emissions	I	TBD	Environmental Stewardship
				Capital spending as a percentage of total expenditures	9.2	supporting	Finance	Information Technology	Providing IT services in a cost efficient manner	Technical	Average annual capital expenditure for IT	D	2,630,000 (2017 \$)	Cost Efficient
								Paramedic Services	Providing effective paramedic services	Technical	Average annual capital expenditure for paramedic services	D	488,000 (2017 \$)	Cost Effective

UNSD Target Number	UNSD Target	UNSD Indicator Number	UNSD Indicator	ISO 37120 Indicator	ISO 37120 Indicator Number	ISO 37120 Indicator Type	ISO 37120 Theme (Target)	Service Type	LOS Objective	PM Type	LOS Performance Measures	Direct (D) or Indirect (I)	LOS Targets	LOS Performance Indicator
								Parking	Providing parking services in an efficient manner	Technical	Average annual capital expenditure for parking	D	1,451,000 (2017 \$)	Cost Efficient
								Parks, Forestry and Open Spaces	Providing parks, forestry, open spaces and trails in an efficient manner	Technical	Average annual capital expenditure for parks	D	3,953,048 (2017 \$)	Cost Efficient
								Parks, Forestry and Open Spaces	Providing parks, forestry, open spaces and trails in an efficient manner	Technical	Average annual capital expenditure for forestry	D	30,000 (2017 \$)	Cost Efficient
								Parks, Forestry and Open Spaces	Providing parks, forestry, open spaces and trails in an efficient manner	Technical	Average annual capital expenditure for open spaces	D	0 (2017 \$)	Cost Efficient
								Parks, Forestry and Open Spaces	Providing parks, forestry, open spaces and trails in an efficient manner	Technical	Average annual capital expenditure for trails	D	30,000 (2017 \$)	Cost Efficient
								Police	Providing cost effective police services	Technical	Average annual capital expenditure for police services	D	1,096,100 (2017 \$)	Cost Effective
								Recreation	Providing recreation services in an efficient manner	Technical	Average annual capital expenditure for recreation assets	D	1,325,000 (2017 \$)	Cost Efficient
								Roads and ROWs	Providing an efficient transportation network for all modes	Technical	Average annual capital expenditure for roads and right-of-ways	D	8,544,210 (2017 \$)	Cost Efficient
								Solid Waste	Providing a solid waste service in a cost efficient manner	Technical	Average annual capital expenditure for solid waste services	D	2,484,500 (2017 \$)	Cost Efficient

UNSD Target Number	UNSD Target	UNSD Indicator Number	UNSD Indicator	ISO 37120 Indicator	ISO 37120 Indicator Number	ISO 37120 Indicator Type	ISO 37120 Theme (Target)	Service Type	LOS Objective	PM Type	LOS Performance Measures	Direct (D) or Indirect (I)	LOS Targets	LOS Performance Indicator
								Stormwater	Providing stormwater services in an efficient manner	Technical	Average annual capital expenditure for stormwater	D	3,995,518 (2017 \$)	Cost Efficient
								Transit	Providing a transit service in an efficient manner	Technical	Average annual capital expenditure for transit services	D	3,610,800 (2017 \$)	Cost Efficient
								Wastewater	Providing wastewater services in an efficient manner	Technical	Annual operating budget and capital budget for wastewater	D	36,247,436 (2017 \$)	Cost Efficient
								Wastewater	Providing wastewater services in an efficient manner	Technical	Average annual capital expenditure for wastewater	D	50,739 (2017 \$)	Cost Efficient
								Water	Providing water services in an efficient manner	Technical	Average annual capital expenditure for water services	D	17,318,938 (2017 \$)	Cost Efficient
				Gross capital budget per capita (USD)			Finance	Information Technology	Providing IT services in a cost efficient manner	Technical	Average annual capital expenditure for IT	D	2,630,000 (2017 \$)	Cost Efficient
								Paramedic Services	Providing effective paramedic services	Technical	Average annual capital expenditure for paramedic services	D	488,000 (2017 \$)	Cost Effective
								Parking	Providing parking services in an efficient manner	Technical	Average annual capital expenditure for parking	D	1,451,000 (2017 \$)	Cost Efficient
								Parks, Forestry and Open Spaces	Providing parks, forestry, open spaces and trails in an efficient manner	Technical	Average annual capital expenditure for parks	D	3,953,048 (2017 \$)	Cost Efficient
								Parks, Forestry and Open Spaces	Providing parks, forestry, open spaces and trails in an efficient manner	Technical	Average annual capital expenditure for forestry	D	30,000 (2017 \$)	Cost Efficient

UNSD Target Number	UNSD Target	UNSD Indicator Number	UNSD Indicator	ISO 37120 Indicator	ISO 37120 Indicator Number	ISO 37120 Indicator Type	ISO 37120 Theme (Target)	Service Type	LOS Objective	PM Type	LOS Performance Measures	Direct (D) or Indirect (I)	LOS Targets	LOS Performance Indicator
								Parks, Forestry and Open Spaces	Providing parks, forestry, open spaces and trails in an efficient manner	Technical	Average annual capital expenditure for open spaces	D	0 (2017 \$)	Cost Efficient
								Parks, Forestry and Open Spaces	Providing parks, forestry, open spaces and trails in an efficient manner	Technical	Average annual capital expenditure for trails	D	30,000 (2017 \$)	Cost Efficient
								Police	Providing cost effective police services	Technical	Average annual capital expenditure for police services	D	1,096,100 (2017 \$)	Cost Effective
								Recreation	Providing recreation services in an efficient manner	Technical	Average annual capital expenditure for recreation assets	D	1,325,000 (2017 \$)	Cost Efficient
								Roads and ROWs	Providing an efficient transportation network for all modes	Technical	Average annual capital expenditure for roads and right-of-ways	D	8,544,210 (2017 \$)	Cost Efficient
								Solid Waste	Providing a solid waste service in a cost efficient manner	Technical	Average annual capital expenditure for solid waste services	D	2,484,500 (2017 \$)	Cost Efficient
								Stormwater	Providing stormwater services in an efficient manner	Technical	Average annual capital expenditure for stormwater	D	3,995,518 (2017 \$)	Cost Efficient
								Transit	Providing a transit service in an efficient manner	Technical	Average annual capital expenditure for transit services	D	3,610,800 (2017 \$)	Cost Efficient
								Wastewater	Providing wastewater services in an efficient manner	Technical	Annual operating budget and capital budget for wastewater	D	36,247,436 (2017 \$)	Cost Efficient

UNSD Target Number	UNSD Target	UNSD Indicator Number	UNSD Indicator	ISO 37120 Indicator	ISO 37120 Indicator Number	ISO 37120 Indicator Type	ISO 37120 Theme (Target)	Service Type	LOS Objective	PM Type	LOS Performance Measures	Direct (D) or Indirect (I)	LOS Targets	LOS Performance Indicator
9.3	Increase the access of small-scale industrial and other enterprises, in particular in developing countries, to financial services, including affordable credit, and their integration into value chains and markets	9.3.1	Proportion of small-scale industries in total industry value added	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
		9.3.2	Proportion of small-scale industries with a loan or line of credit	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
9.4	By 2030, upgrade infrastructure and retrofit industries to make them sustainable, with increased resource-use efficiency and greater adoption of clean and environmentally sound technologies and industrial processes, with all countries taking action in accordance with their respective capabilities	9.4.1	CO2 emission per unit of value added	Percentage of total energy derived from renewable sources, as a share of the city's total energy consumption	7.4	core	Energy	N/A	N/A	N/A	N/A	N/A	N/A	N/A
			Total electrical energy use per capita (kWh/year)		7.5	supporting	Energy	Facilities Management	Providing facilities that are energy efficient	Customer	Annual energy consumption per person (kWh _e /person)	D	636 kWh _e /person	Environmental Stewardship

UNSD Target Number	UNSD Target	UNSD Indicator Number	UNSD Indicator	ISO 37120 Indicator	ISO 37120 Indicator Number	ISO 37120 Indicator Type	ISO 37120 Theme (Target)	Service Type	LOS Objective	PM Type	LOS Performance Measures	Direct (D) or Indirect (I)	LOS Targets	LOS Performance Indicator
								Facilities Management	Providing facilities that are energy efficient	Technical	Annual energy consumption per person (kWh _e /person)	D	636 kWh _e /person	Environmental Stewardship
								Culture, Tourism and Community Investment	Providing arts and culture facilities that are environmentally conscious	Customer	Annual energy consumption per square foot	D	TBD	Environmental Stewardship
								Culture, Tourism and Community Investment	Providing arts and culture facilities that are environmentally conscious	Technical	Annual electricity consumption per square foot	D	TBD	Environmental Stewardship
								Culture, Tourism and Community Investment	Providing arts and culture facilities that are environmentally conscious	Technical	Annual natural gas consumption per square foot	D	TBD	Environmental Stewardship
								Fleet	Providing vehicles & equipment with minimal greenhouse gas emissions	Customer	Annual greenhouse gas emissions	D	TBD	Environmental Stewardship
								Fleet	Providing vehicles & equipment with minimal greenhouse gas emissions	Technical	% of equipment past their estimated service life	I	TBD	Environmental Stewardship
								Fleet	Providing vehicles & equipment with minimal greenhouse gas emissions		Total fuel consumption of medium vehicles per year (miles/gallon)	D	TBD	Environmental Stewardship
								Fleet	Providing vehicles & equipment with minimal greenhouse gas emissions		Total fuel consumption of light vehicles per year (miles/gallon)	D	TBD	Environmental Stewardship

UNSD Target Number	UNSD Target	UNSD Indicator Number	UNSD Indicator	ISO 37120 Indicator	ISO 37120 Indicator Number	ISO 37120 Indicator Type	ISO 37120 Theme (Target)	Service Type	LOS Objective	PM Type	LOS Performance Measures	Direct (D) or Indirect (I)	LOS Targets	LOS Performance Indicator
								Fleet	Providing vehicles & equipment with minimal greenhouse gas emissions		# of vehicles with higher fuel consumption due to age	I	TBD	Environmental Stewardship
								Parks, Forestry and Open Spaces	Providing livable parks and open spaces	Customer	% of canopy coverage	I	40% by 2031	Livable Community
								Parks, Forestry and Open Spaces	Providing livable parks and open spaces	Technical	Total canopy area of City owned trees	I	TBD	Livable Community
								Fleet	Providing environmentally conscious vehicles & equipment	Customer	Annual fuel consumption	D	TBD	Environmental Stewardship
								Fleet	Providing environmentally conscious vehicles & equipment	Technical	Annual fuel consumption	D	TBD	Environmental Stewardship
								Recreation	Providing community recreation facilities that are environmentally conscious	Customer	Annual energy consumption per square foot	D	TBD	Environmental Stewardship
								Recreation	Providing community recreation facilities that are environmentally conscious	Technical	Annual electricity consumption per square foot	D	TBD	Environmental Stewardship
								Recreation	Providing community recreation facilities that are environmentally conscious	Technical	Annual natural gas consumption per square foot	D	TBD	Environmental Stewardship

UNSD Target Number	UNSD Target	UNSD Indicator Number	UNSD Indicator	ISO 37120 Indicator	ISO 37120 Indicator Number	ISO 37120 Indicator Type	ISO 37120 Theme (Target)	Service Type	LOS Objective	PM Type	LOS Performance Measures	Direct (D) or Indirect (I)	LOS Targets	LOS Performance Indicator
				Greenhouse gas emissions measured in tonnes per capita	8.3	core	Environment	Fleet	Providing vehicles & equipment with minimal greenhouse gas emissions	Customer	Annual greenhouse gas emissions	D	TBD	Environmental Stewardship
								Fleet	Providing vehicles & equipment with minimal greenhouse gas emissions	Technical	% of equipment past their estimated service life	I	TBD	Environmental Stewardship
								Fleet	Providing vehicles & equipment with minimal greenhouse gas emissions	Technical	Total fuel consumption of medium vehicles per year (miles/gallon)	D	TBD	Environmental Stewardship
								Fleet	Providing vehicles & equipment with minimal greenhouse gas emissions	Technical	Total fuel consumption of light vehicles per year (miles/gallon)	D	TBD	Environmental Stewardship
								Fleet	Providing vehicles & equipment with minimal greenhouse gas emissions	Technical	# of vehicles with higher fuel consumption due to age	I	TBD	Environmental Stewardship
								Parks, Forestry and Open Spaces	Providing livable parks and open spaces	Customer	% of canopy coverage	I	40% by 2031	Livable Community
								Parks, Forestry and Open Spaces	Providing livable parks and open spaces	Technical	Total canopy area of City owned trees	I	TBD	Livable Community
								Fleet	Providing environmentally conscious vehicles & equipment	Customer	Annual fuel consumption	D	TBD	Environmental Stewardship
								Fleet	Providing environmentally conscious vehicles & equipment	Technical	Annual fuel consumption	D	TBD	Environmental Stewardship

UNSD Target Number	UNSD Target	UNSD Indicator Number	UNSD Indicator	ISO 37120 Indicator	ISO 37120 Indicator Number	ISO 37120 Indicator Type	ISO 37120 Theme (Target)	Service Type	LOS Objective	PM Type	LOS Performance Measures	Direct (D) or Indirect (I)	LOS Targets	LOS Performance Indicator
								Recreation	Providing community recreation facilities that are environmentally conscious	Customer	Annual energy consumption per square foot	D	TBD	Environmental Stewardship
								Recreation	Providing community recreation facilities that are environmentally conscious	Technical	Annual electricity consumption per square foot	D	TBD	Environmental Stewardship
								Recreation	Providing community recreation facilities that are environmentally conscious	Technical	Annual natural gas consumption per square foot	D	TBD	Environmental Stewardship
								Roads and ROWs	Providing a transportation network that is environmentally conscious	Customer	% of streetlights that are energy efficient	D	TBD	Environmental Stewardship
								Roads and ROWs	Providing a transportation network that is environmentally conscious	Technical	% of streetlights with LED or low energy fixtures	D	TBD	Environmental Stewardship
								Roads and ROWs	Providing a transportation network that is environmentally conscious	Customer	Volume of salt applied to road/lane km	D	TBD	Environmental Stewardship
								Roads and ROWs	Providing a transportation network that is environmentally conscious	Technical	Volume of salt applied to road/lane km	D	TBD	Environmental Stewardship
								Solid Waste	Providing solid waste services that have minimal impacts on the environment	Customer	% overall (site) waste diversion	D	TBD	Environmental Stewardship

UNSD Target Number	UNSD Target	UNSD Indicator Number	UNSD Indicator	ISO 37120 Indicator	ISO 37120 Indicator Number	ISO 37120 Indicator Type	ISO 37120 Theme (Target)	Service Type	LOS Objective	PM Type	LOS Performance Measures	Direct (D) or Indirect (I)	LOS Targets	LOS Performance Indicator
								Solid Waste	Providing solid waste services that have minimal impacts on the environment	Technical	% of time overall site diversion rate target is met	D	TBD	Environmental Stewardship
								Solid Waste	Providing solid waste services that have minimal impacts on the environment	Technical	# of education activities completed	I	TBD	Environmental Stewardship
								Solid Waste	Providing solid waste services that have minimal impacts on the environment	Customer	% residential waste diversion	D	70% by 2021	Environmental Stewardship
								Solid Waste	Providing solid waste services that have minimal impacts on the environment	Technical	Public drop off diversion rate target is met	I	TBD	Environmental Stewardship
								Solid Waste	Providing solid waste services that have minimal impacts on the environment	Technical	Transfer station diversion rate target is met	I	TBD	Environmental Stewardship
								Solid Waste	Providing solid waste services that have minimal impacts on the environment	Technical	MRF diversion rate target is met	I	TBD	Environmental Stewardship
								Solid Waste	Providing solid waste services that have minimal impacts on the environment	Customer	GHG emissions	D	TBD	Environmental Stewardship
								Solid Waste	Providing solid waste services that have minimal impacts on the environment	Technical	Fuel consumption of vehicles	D	TBD	Environmental Stewardship

UNSD Target Number	UNSD Target	UNSD Indicator Number	UNSD Indicator	ISO 37120 Indicator	ISO 37120 Indicator Number	ISO 37120 Indicator Type	ISO 37120 Theme (Target)	Service Type	LOS Objective	PM Type	LOS Performance Measures	Direct (D) or Indirect (I)	LOS Targets	LOS Performance Indicator
								Solid Waste	Providing solid waste services that have minimal impacts on the environment	Technical	Energy consumption at MRF	D	TBD	Environmental Stewardship
								Solid Waste	Providing solid waste services that have minimal impacts on the environment	Technical	Energy produced at closed landfill	D	TBD	Environmental Stewardship
								Solid Waste	Providing solid waste services that have minimal impacts on the environment	Technical	# of resources recovered	D	TBD	Environmental Stewardship
								Transit	Providing a transit system with minimal greenhouse gas emissions	Customer	Annual greenhouse gas emissions	D	TBD	Environmental Stewardship
								Transit	Providing a transit system with minimal greenhouse gas emissions	Customer	Total fuel consumption of buses per year	D	TBD	Environmental Stewardship
								Transit	Providing a transit system with minimal greenhouse gas emissions	Customer	# of buses with higher fuel consumption due to age	D	TBD	Environmental Stewardship
								Transit	Providing a transit system with minimal greenhouse gas emissions	Customer	Total energy consumption per year	D	TBD	Environmental Stewardship
								Transit	Providing a transit system with minimal greenhouse gas emissions	Customer	Net fuel consumption/rider	D	TBD	Environmental Stewardship
								Transit	Providing a transit system with minimal greenhouse gas emissions	Customer	Greenhouse gas emission reduction/rider	D	TBD	Environmental Stewardship

UNSD Target Number	UNSD Target	UNSD Indicator Number	UNSD Indicator	ISO 37120 Indicator	ISO 37120 Indicator Number	ISO 37120 Indicator Type	ISO 37120 Theme (Target)	Service Type	LOS Objective	PM Type	LOS Performance Measures	Direct (D) or Indirect (I)	LOS Targets	LOS Performance Indicator
								Facilities Management	Providing facilities that are energy efficient	Customer	Annual energy consumption per person (kWh/person)	D	645 kWh/person	Environmental Stewardship
								Facilities Management	Providing facilities that are energy efficient	Technical	Annual energy consumption per person (kWh/person)	D	645 kWh/person	Environmental Stewardship
								Wastewater	Providing wastewater services that have minimal impacts on the environment	Customer	Energy consumption/ML of wastewater treated	D	TBD	
								Wastewater	Providing wastewater services that have minimal impacts on the environment	Technical	Energy consumption/ML from collection	D	TBD	
								Wastewater	Providing wastewater services that have minimal impacts on the environment	Technical	Energy consumption/ML from treatment	D	TBD	

UNSD Target Number	UNSD Target	UNSD Indicator Number	UNSD Indicator	ISO 37120 Indicator	ISO 37120 Indicator Number	ISO 37120 Indicator Type	ISO 37120 Theme (Target)	Service Type	LOS Objective	PM Type	LOS Performance Measures	Direct (D) or Indirect (I)	LOS Targets	LOS Performance Indicator
9.c	Significantly increase access to information and communications technology and strive to provide universal and affordable access to the Internet in least developed countries by 2020	9.c.1	Proportion of population covered by a mobile network, by technology	Number of internet connections per 100,000 population	17.1	core	Telecommunications	N/A	N/A	N/A	N/A	N/A	N/A	N/A
				Number of cell phone connections per 100,000 population	17.2	core	Telecommunications	N/A	N/A	N/A	N/A	N/A	N/A	N/A

Appendix C-3 – Goal 11 – Sustainable Cities and Communities

UNSD Target Number	UNSD Target	UNSD Indicator Number	UNSD Indicator	ISO 37120 Indicator	ISO 37120 Indicator Number	ISO 37120 Indicator Type	ISO 37120 Theme (Target)	Service Type	LOS Objective	PM Type	LOS Performance Measures	Direct (D) or Indirect (I)	LOS Targets	LOS Performance Indicator
11.1	By 2030, ensure access for all to adequate, safe and affordable housing and basic services and upgrade slums	11.1.1	Proportion of urban population living in slums, informal settlements or inadequate housing	Number of homeless per 100,000 population	15.2	supporting	Shelter	N/A	N/A	N/A	N/A	N/A	N/A	N/A
				Percentage of city population living in slums	15.1	core	Shelter	Parks, Forestry and Open Spaces	Providing parks within a reasonable proximity to every residential household.	Customer	% of customers that are within the target travel time to a park	I	TBD	Accessibility
							Shelter	Parks, Forestry and Open Spaces	Providing parks within a reasonable proximity to every residential household.	Technical	% of properties within 600 m of a park	I	TBD	Accessibility
							Shelter	Parks, Forestry and Open Spaces	Providing trails within a reasonable proximity to every residential household	Customer	% of customers that are within the target travel time to a trail network	I	99.10%	Accessibility
							Shelter	Parks, Forestry and Open Spaces	Providing trails within a reasonable proximity to every residential household	Technical	% of properties within 600 m of a trail	I	TBD	Accessibility

UNSD Target Number	UNSD Target	UNSD Indicator Number	UNSD Indicator	ISO 37120 Indicator	ISO 37120 Indicator Number	ISO 37120 Indicator Type	ISO 37120 Theme (Target)	Service Type	LOS Objective	PM Type	LOS Performance Measures	Direct (D) or Indirect (I)	LOS Targets	LOS Performance Indicator
							Shelter	Recreation	Providing safe community recreation facilities	Customer	% of community recreation facilities that are safe	I	TBD	Safe
							Shelter	Recreation	Providing safe community recreation facilities	Technical	# of outstanding safety improvements required at facilities	I	TBD	Safe
							Shelter	Recreation	Providing safe community recreation facilities	Technical	# of incidents in community recreation facilities	I	TBD	Safe
							Shelter	Recreation	Providing safe community recreation facilities	Technical	% of facilities that meet security standards	D	TBD	Safe
							Shelter	Recreation	Providing safe community recreation facilities	Technical	% of amenities that meet safety objectives/legislative targets	D	TBD	Safe
							Shelter	Transit	Providing a transit system that serves the needs of the community	Customer	Annual ridership volume	I	TBD	Accessibility
							Shelter	Transit	Providing a transit system that serves the needs of the community	Technical	% of residents within 300 m to a bus stop	I	TBD	Accessibility
							Shelter	Transit	Providing a transit system that is easy and convenient to use	Customer	% of customers satisfied with the transit system	I	TBD	Convenient
							Shelter	Water	Water system provides safe potable drinking water	Customer	% of community with acceptable risk of experiencing adverse water quality	D	TBD	Safe
							Shelter	Water	Providing high quality water to residents	Customer	# of complaints due to rusty/dicoloured water	D	TBD	Quality
							Shelter	Water	Providing high quality water to residents	Customer	# of complaints due to low pressure	D	TBD	Quality

UNSD Target Number	UNSD Target	UNSD Indicator Number	UNSD Indicator	ISO 37120 Indicator	ISO 37120 Indicator Number	ISO 37120 Indicator Type	ISO 37120 Theme (Target)	Service Type	LOS Objective	PM Type	LOS Performance Measures	Direct (D) or Indirect (I)	LOS Targets	LOS Performance Indicator
				Areal size of informal settlements as a percentage of city area	19.3	supporting	Urban planning	N/A	N/A	N/A	N/A	N/A	N/A	N/A
				Persons per unit			Urban planning	N/A	N/A	N/A	N/A	N/A	N/A	N/A
				Percentage of households that exist without registered legal titles	15.3	supporting	Shelter	N/A	N/A	N/A	N/A	N/A	N/A	N/A
				Percentage of city population with potable water supply service	21.1	core	Water and sanitation	N/A	N/A	N/A	N/A	N/A	N/A	N/A
				Percentage of population with access to improved sanitation	21.2	core	Water and sanitation	N/A	N/A	N/A	N/A	N/A	N/A	N/A
				Total domestic water consumption per capita (litres/day)	21.4	core	Water and sanitation	Water	Providing a water service that is environmentally conscious	Customer	Water consumption L/cap/day	D	TBD	Environmental Stewardship
							Water and sanitation	Water	Providing a water service that is environmentally conscious	Technical	Infrastructure Leakage Index (ILI)	I	TBD	Environmental Stewardship
							Water and sanitation	Water	Providing a water service that is environmentally conscious	Technical	Energy consumption days per ML supplied	I	TBD	Environmental Stewardship
				Percentage of population with access to improved sanitation	21.3	core	Water and sanitation	Wastewater	Providing wastewater services with minimal interruptions	Customer	# of customers that experience a service interruption	I	TBD	Reliability

UNSD Target Number	UNSD Target	UNSD Indicator Number	UNSD Indicator	ISO 37120 Indicator	ISO 37120 Indicator Number	ISO 37120 Indicator Type	ISO 37120 Theme (Target)	Service Type	LOS Objective	PM Type	LOS Performance Measures	Direct (D) or Indirect (I)	LOS Targets	LOS Performance Indicator
				Percentage of the city's wastewater receiving secondary treatment	20.4	core	Wastewater	N/A	N/A	N/A	N/A	N/A	N/A	N/A
				Percentage of the city's wastewater receiving tertiary treatment	20.5	core	Wastewater	N/A	N/A	N/A	N/A	N/A	N/A	N/A
				Percentage of city population with authorized electrical service	7.2	core	Energy	N/A	N/A	N/A	N/A	N/A	N/A	N/A
				Total residential electrical energy use per capita (kWh/year)	7.1	core	Energy	N/A	N/A	N/A	N/A	N/A	N/A	N/A
				Number of nursing and midwifery personnel per 100,000 population	12.5	supporting	Health	N/A	N/A	N/A	N/A	N/A	N/A	N/A
				Number of physicians per 100,000 population	12.3	core	Health	N/A	N/A	N/A	N/A	N/A	N/A	N/A
				Number of in-patient hospital beds per 100,000 population	12.2	core	Health	N/A	N/A	N/A	N/A	N/A	N/A	N/A
				Response time for emergency response services from initial call	10.5	supporting	Fire and emergency response	Fire Rescue	Providing the appropriate amount of rescue services and ensuring firefighters are well prepared	Customer	Readiness to respond to all types of emergencies	D	TBD	Reliability

UNSD Target Number	UNSD Target	UNSD Indicator Number	UNSD Indicator	ISO 37120 Indicator	ISO 37120 Indicator Number	ISO 37120 Indicator Type	ISO 37120 Theme (Target)	Service Type	LOS Objective	PM Type	LOS Performance Measures	Direct (D) or Indirect (I)	LOS Targets	LOS Performance Indicator
							Fire and emergency response	Fire Rescue	Providing the appropriate amount of rescue services and ensuring firefighters are well prepared	Technical	# of fire apparatus/vehicles	D	TBD	Reliability
							Fire and emergency response	Fire Rescue	Providing the appropriate amount of rescue services and ensuring firefighters are well prepared	Technical	% of apparatus/vehicles in poor or very poor condition	I	TBD	Reliability
							Fire and emergency response	Fire Rescue	Providing the appropriate amount of rescue services and ensuring firefighters are well prepared	Technical	% of fire facility assets in poor or very poor condition	I	TBD	Reliability
							Fire and emergency response	Fire Rescue	Providing the appropriate amount of rescue services and ensuring firefighters are well prepared	Technical	% of time when equipment is available and operating properly	D	TBD	Reliability
							Fire and emergency response	Fire Rescue	Providing the appropriate amount of rescue services and ensuring firefighters are well prepared	Technical	% of facilities meeting needs in x years	I	TBD	Reliability
				Response time for fire department from initial call	10.6	supporting	Fire and emergency response	Fire Rescue	Providing the appropriate amount of rescue services and ensuring firefighters are well prepared	Customer	Readiness to respond to all types of emergencies	D	TBD	Reliability

UNSD Target Number	UNSD Target	UNSD Indicator Number	UNSD Indicator	ISO 37120 Indicator	ISO 37120 Indicator Number	ISO 37120 Indicator Type	ISO 37120 Theme (Target)	Service Type	LOS Objective	PM Type	LOS Performance Measures	Direct (D) or Indirect (I)	LOS Targets	LOS Performance Indicator
							Fire and emergency response	Fire Rescue	Providing the appropriate amount of rescue services and ensuring firefighters are well prepared	Technical	# of fire apparatus/vehicles	D	TBD	Reliability
							Fire and emergency response	Fire Rescue	Providing the appropriate amount of rescue services and ensuring firefighters are well prepared	Technical	% of apparatus/vehicles in poor or very poor condition	I	TBD	Reliability
							Fire and emergency response	Fire Rescue	Providing the appropriate amount of rescue services and ensuring firefighters are well prepared	Technical	% of fire facility assets in poor or very poor condition	I	TBD	Reliability
							Fire and emergency response	Fire Rescue	Providing the appropriate amount of rescue services and ensuring firefighters are well prepared	Technical	% of time when equipment is available and operating properly	D	TBD	Reliability
							Fire and emergency response	Fire Rescue	Providing the appropriate amount of rescue services and ensuring firefighters are well prepared	Technical	% of facilities meeting needs in x years	I	TBD	Reliability
				Response time for police department from initial call	14.4	supporting	Safety	Police	Providing the appropriate amount of police assets to ensure reliable service	Technical	# of police vehicles	D	TBD	Cost effective
							Safety	Police	Providing cost effective police services	Technical	Officers per population	I	TBD	Reliability

UNSD Target Number	UNSD Target	UNSD Indicator Number	UNSD Indicator	ISO 37120 Indicator	ISO 37120 Indicator Number	ISO 37120 Indicator Type	ISO 37120 Theme (Target)	Service Type	LOS Objective	PM Type	LOS Performance Measures	Direct (D) or Indirect (I)	LOS Targets	LOS Performance Indicator
				Percentage of students completing primary education: survival rate	6.2	core	Education	N/A	N/A	N/A	N/A	N/A	N/A	N/A
				Percentage of students completing secondary education: survival rate	6.3	core	Education	N/A	N/A	N/A	N/A	N/A	N/A	N/A
				Percentage of female school-aged population enrolled in schools	6.1	core	Education	N/A	N/A	N/A	N/A	N/A	N/A	N/A
				Percentage of male school-aged population enrolled in schools	6.5	supporting	Education	N/A	N/A	N/A	N/A	N/A	N/A	N/A

UNSD Target Number	UNSD Target	UNSD Indicator Number	UNSD Indicator	ISO 37120 Indicator	ISO 37120 Indicator Number	ISO 37120 Indicator Type	ISO 37120 Theme (Target)	Service Type	LOS Objective	PM Type	LOS Performance Measures	Direct (D) or Indirect (I)	LOS Targets	LOS Performance Indicator
11.2	By 2030, provide access to safe, affordable, accessible, and sustainable transport systems for all, improving road safety, notably by expanding public transport, with special attention to the needs of those in vulnerable situations, women, children, persons with disabilities and older persons	11.2.1	Proportion of population that has convenient access to public transport, by sex, age and persons with disabilities	Percentage of commuters using a travel mode other than a personal vehicle	18.5	supporting	Transportation	Transit	Providing a transit service in an efficient manner	Technical	Average annual capital expenditure for transit services	I	3,610,800 (2017 \$)	Cost Efficient
							Transportation	Transit	Providing a transit system with minimal greenhouse gas emissions	Technical	Net fuel consumption/rider	D	TBD	Environmental Stewardship
							Transportation	Transit	Providing a transit system with minimal greenhouse gas emissions	Technical	Greenhouse gas emission reduction/rider	D	TBD	Environmental Stewardship
							Transportation	Transit	Providing a transit service that is FADM/AODA compliant	Customer	% of transit fleet that are FADM/AODA compliant	I	TBD	Accessibility
							Transportation	Transit	Providing a transit service that is FADM/AODA compliant	Technical	% of buses that are FADM/AODA compliant	I	TBD	Accessibility

UNSD Target Number	UNSD Target	UNSD Indicator Number	UNSD Indicator	ISO 37120 Indicator	ISO 37120 Indicator Number	ISO 37120 Indicator Type	ISO 37120 Theme (Target)	Service Type	LOS Objective	PM Type	LOS Performance Measures	Direct (D) or Indirect (I)	LOS Targets	LOS Performance Indicator
							Transportation	Transit	Providing a transit service that is FADM/AODA compliant	Technical	% of bus stops that are FADM/AODA compliant	I	TBD	Accessibility
							Transportation	Transit	Providing a transit system that serves the needs of the community	Customer	Annual ridership volume	D	TBD	Accessibility
							Transportation	Transit	Providing a transit system that serves the needs of the community	Technical	% of residents within 300 m to a bus stop	D	0.86	Accessibility
							Transportation	Transit	Providing a transit system that serves the needs of the community	Technical	Average bus stop spacing	D	215 m	Accessibility
							Transportation	Transit	Providing a transit system that serves the needs of the community	Technical	% of bus routes below the target loading per hour	D	TBD	Accessibility
							Transportation	Transit	Providing a transit system that serves the needs of the community	Technical	# of service hours per year	D	TBD	Accessibility
							Transportation	Transit	Providing a transit system with minimal delays and interruptions	Technical	# of buses based on service hours	I	TBD	Reliability
							Transportation	Transit	Providing a transit system with minimal delays and interruptions	Technical	% of buses with adequate volume	D	TBD	Reliability
							Transportation	Transit	Providing a transit system with minimal delays and interruptions	Technical	# of lost hours of service due to not having enough buses	I	TBD	Reliability

UNSD Target Number	UNSD Target	UNSD Indicator Number	UNSD Indicator	ISO 37120 Indicator	ISO 37120 Indicator Number	ISO 37120 Indicator Type	ISO 37120 Theme (Target)	Service Type	LOS Objective	PM Type	LOS Performance Measures	Direct (D) or Indirect (I)	LOS Targets	LOS Performance Indicator
				Annual numbers of public transport trips per capita	18.3	core	Transportation	Transit	Providing a transit system with minimal greenhouse gas emissions	Technical	Total fuel consumption of buses per year	D	TBD	Environmental Stewardship
							Transportation	Transit	Providing a transit system with minimal greenhouse gas emissions	Technical	# of buses with higher fuel consumption due to age	I	TBD	Environmental Stewardship
							Transportation	Transit	Providing a transit system with minimal greenhouse gas emissions	Technical	Total energy consumption per year	I	TBD	Environmental Stewardship
				Kilometres of high capacity public transport system per 100,000 population	18.1	core	Transportation	Transit	Providing a transit system that is easy and convenient to use	Technical	% of bus routes with priority lanes	D	TBD	Convenient
							Transportation	Transit	Providing a transit system that is easy and convenient to use	Technical	% of bus routes with transit priority signals	D	TBD	Convenient
							Transportation	Transit	Providing a transit service in an efficient manner	Technical	# of service kilometres	D	TBD	Cost Efficient
							Transportation	Transit	Providing a transit service in an efficient manner	Customer	Average asset renewal rate (# years)	D	21	Cost Efficient
							Transportation	Roads and ROWs	Providing an operational road network that is safe for drivers, pedestrians and cyclists	Technical	# of intersections that prioritize transit service	I	TBD	Operational
							Transportation	Roads and ROWs	Providing an operational road network that is safe for drivers, pedestrians and cyclists	Technical	km of roadways that include amenities for all modes (car, bike, ped, bus)	I	km of arterial and collector "complete street"	Operational

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				Dwelling density (per square kilometre)			N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
				Jobs/housing ratio	19.4	supporting	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
				Green area (hectares) per 100,000 population	19.1	core	Urban planning	N/A	N/A	N/A	N/A	N/A	N/A	N/A
				Climate type			N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
				Land area (square kilometres)			N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
				Income distribution (Gini Coefficient)			N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
				Gross capital budget per capita (USD)			Finance	Information Technology	Providing IT services in a cost-efficient manner	Technical	Average annual capital expenditure for IT	D	2,630,000 (2017 \$)	Cost Efficient
							Finance	Paramedic Services	Providing effective paramedic services	Technical	Average annual capital expenditure for paramedic services	D	488,000 (2017 \$)	Cost Effective
							Finance	Parking	Providing parking services in an efficient manner	Technical	Average annual capital expenditure for parking	D	1,451,000 (2017 \$)	Cost Efficient
							Finance	Parks, Forestry and Open Spaces	Providing parks, forestry, open spaces and trails in an efficient manner	Technical	Average annual capital expenditure for parks	D	3,953,048 (2017 \$)	Cost Efficient
							Finance	Parks, Forestry and Open Spaces	Providing parks, forestry, open spaces and trails in an efficient manner	Technical	Average annual capital expenditure for forestry	D	30,000 (2017 \$)	Cost Efficient

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							Finance	Parks, Forestry and Open Spaces	Providing parks, forestry, open spaces and trails in an efficient manner	Technical	Average annual capital expenditure for open spaces	D	0 (2017 \$)	Cost Efficient
							Finance	Parks, Forestry and Open Spaces	Providing parks, forestry, open spaces and trails in an efficient manner	Technical	Average annual capital expenditure for trails	D	30,000 (2017 \$)	Cost Efficient
							Finance	Police	Providing cost effective police services	Technical	Average annual capital expenditure for police services	D	1,096,100 (2017 \$)	Cost Effective
							Finance	Recreation	Providing recreation services in an efficient manner	Technical	Average annual capital expenditure for recreation assets	D	1,325,000 (2017 \$)	Cost Efficient
							Finance	Roads and ROWs	Providing an efficient transportation network for all modes	Technical	Average annual capital expenditure for roads and right-of-ways	D	8,544,210 (2017 \$)	Cost Efficient
							Finance	Solid Waste	Providing a solid waste service in a cost-efficient manner	Technical	Average annual capital expenditure for solid waste services	D	2,484,500 (2017 \$)	Cost Efficient
							Finance	Stormwater	Providing stormwater services in an efficient manner	Technical	Average annual capital expenditure for stormwater	D	3,995,518 (2017 \$)	Cost Efficient
							Finance	Transit	Providing a transit service in an efficient manner	Technical	Average annual capital expenditure for transit services	D	3,610,800 (2017 \$)	Cost Efficient
							Finance	Wastewater	Providing wastewater services in an efficient manner	Technical	Annual operating budget and capital budget for wastewater	D	36,247,436 (2017 \$)	Cost Efficient

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							Finance	Wastewater	Providing wastewater services in an efficient manner	Technical	Average annual capital expenditure for wastewater	D	50,739 (2017 \$)	Cost Efficient
							Finance	Water	Providing water services in an efficient manner	Technical	Average annual capital expenditure for water services	D	17,318,938 (2017 \$)	Cost Efficient
		11.3.2	Proportion of cities with a direct participation structure of civil society in urban planning and management that operate regularly and democratically	Voter participation in last municipal election (as a percentage of eligible voters)			Governance	N/A	N/A	N/A	N/A	N/A	N/A	N/A
				Number of registered voters as a percentage of the voting age population			Governance	N/A	N/A	N/A	N/A	N/A	N/A	N/A
				Citizens' representation: number of local officials elected to office per 100,000 population			Governance	N/A	N/A	N/A	N/A	N/A	N/A	N/A
11.4	Strengthen efforts to protect and safeguard the world's cultural and natural heritage	11.4.1	Total expenditure (public and private) per capita spent on the preservation, protection and conservation of all cultural and natural heritage, by type of heritage (cultural, natural, mixed and World Heritage Centre designation), level of government (national, regional and local/municipal), type of expenditure	N/A	N/A	N/A	N/A	Culture, Tourism and Community Investment	Providing culture, tourism and community investment services in an efficient manner	Customer	Cost to provide service (\$/household)	D	112 (2017 \$)	Cost Efficient
				N/A	N/A	N/A	N/A	Culture, Tourism and Community Investment	Providing culture, tourism and community investment services in an efficient manner	Customer	Average arts and culture asset renewal rate (# years)	D	261	Cost Efficient

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			(donations in kind, private non-profit sector and sponsorship) (operating expenditure/investment) and type of private funding	N/A	N/A	N/A	N/A	Culture, Tourism and Community Investment	Providing culture, tourism and community investment services in an efficient manner	Technical	Annual operating budget for culture, tourism and community investment assets	D	5,957,824 (2017 \$)	Cost Efficient
				N/A	N/A	N/A	N/A	Culture, Tourism and Community Investment	Providing culture, tourism and community investment services in an efficient manner	Technical	Average annual capital expenditure for culture, tourism and community investment assets	D	329,400 (2017 \$)	Cost Efficient
11.5	By 2030, significantly reduce the number of deaths and the number of people affected and substantially decrease the direct economic losses relative to global gross domestic product caused by disasters, including water-related disasters, with a focus on protecting the poor and people in vulnerable situations	11.5.1	Number of deaths, missing persons and directly affected persons attributed to disasters per 100,000 population	Number of natural disaster related deaths per 100,000 population			Fire and emergency response	Fire Recue	Providing the appropriate amount of rescue services and ensuring firefighters are well prepared	Customer	Readiness to respond to all types of emergencies	I	TBD	Reliability
							Fire and emergency response	Fire Recue	Providing the appropriate amount of rescue services and ensuring firefighters are well prepared	Technical	# of fire apparatus/vehicles	I	TBD	Reliability
							Fire and emergency response	Fire Recue	Providing the appropriate amount of rescue services and ensuring firefighters are well prepared	Technical	% of apparatus/vehicles in poor or very poor condition	I	TBD	Reliability
							Fire and emergency response	Fire Recue	Providing the appropriate amount of rescue services and ensuring firefighters are well prepared	Technical	% of time when equipment is available and operating properly	I	TBD	Reliability

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							Fire and emergency response	Fire Recue	Providing the appropriate amount of rescue services and ensuring firefighters are well prepared	Technical	% of facilities meeting needs in x years	I	TBD	Reliability
							Fire and emergency response	Paramedic Services	Providing the appropriate amount of paramedic assets to ensure reliable service	Technical	% of time when equipment is available and operating properly	I	TBD	Reliability
							Fire and emergency response	Paramedic Services	Providing the appropriate amount of paramedic assets to ensure reliable service	Technical	% of paramedic facilities meeting needs	I	TBD	Reliability
							Fire and emergency response	Paramedic Services	Providing the appropriate amount of paramedic assets to ensure reliable service	Technical	# of vehicles	I	23	Reliability
							Fire and emergency response	Paramedic Services	Providing the appropriate amount of paramedic assets to ensure reliable service	Technical	# of vehicles	I	23	Reliability
							Fire and emergency response	Paramedic Services	Providing the appropriate amount of paramedic assets to ensure reliable service	Customer	% of time when response times are achieved	D	TBD	Reliability
							Fire and emergency response	Police	Providing cost effective police services	Customer	Officers per capita	I	TBD	Cost effective
							Fire and emergency response	Police	Providing cost effective police services	Technical	Officers per population	D	TBD	Cost effective

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							Fire and emergency response	Police	Providing the appropriate amount of police assets to ensure reliable service	Technical	# of police vehicles	I	80	Reliability
							Fire and emergency response	Police	Providing the appropriate amount of police assets to ensure reliable service	Technical	% of vehicles beyond service life	I	47%	Reliability
		11.5.2	Direct economic loss in relation to global GDP, damage to critical infrastructure and number of disruptions to basic services, attributed to disasters				N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
11.6	By 2030, reduce the adverse per capita environmental impact of cities, including by paying special attention to air quality and municipal and other waste management	11.6.1	Proportion of urban solid waste regularly collected and with adequate final discharge out of total urban solid waste generated, by cities	Percentage of city population with regular solid waste collection (residential)	16.1	core	Solid waste	Solid Waste	Providing a solid waste service in a cost efficient manner	Customer	Cost to provide service (\$/serviced household)	D	TBD	Cost Efficient
							Solid waste	Solid Waste	Providing a solid waste service in a cost efficient manner	Customer	Average asset renewal rate (# years)	I	TBD	Cost Efficient
							Solid waste	Solid Waste	Providing reliable solid waste collection services	Customer	% of community satisfied with solid waste collection services	D	TBD	Reliability
							Solid waste	Solid Waste	Providing reliable solid waste collection services	Technical	% of customers that are within the target travel time to a drop-off depot	I	TBD	Reliability

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							Solid waste	Solid Waste	Providing reliable solid waste collection services	Technical	# of missed collections	D	TBD	Reliability
							Solid waste	Solid Waste	Providing reliable solid waste collection services	Technical	# of days collection vehicles are out of service due to repairs	D	TBD	Reliability
							Solid waste	Solid Waste	Providing reliable solid waste collection services	Technical	# of serviced customers	D	TBD	Reliability
							Solid waste	Solid Waste	Providing solid waste services that have minimal impacts on the environment	Customer	% overall (site) waste diversion	I	TBD	Environmental Stewardship
							Solid waste	Solid Waste	Providing solid waste services that have minimal impacts on the environment	Customer	% residential waste diversion	I	70% by 2021	Environmental Stewardship
				Total collected municipal solid waste per capita	16.2	core	Solid waste	Solid Waste	Providing a solid waste service in a cost efficient manner	Customer	Annual cost to provide service (\$/household)	I	TBD	Cost Efficient
							Solid waste	Solid Waste	Providing a solid waste service in a cost efficient manner	Technical	Annual operating budget for solid waste services	I	TBD	Cost Efficient
							Solid waste	Solid Waste	Providing a solid waste service in a cost efficient manner	Technical	Average annual capital expenditure for solid waste services	I	TBD	Cost Efficient
							Solid waste	Solid Waste	Providing a solid waste service in a cost efficient manner	Technical	Revenue generated from sale of raw materials	I	TBD	Cost Efficient

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							Solid waste	Solid Waste	Providing a solid waste service in a cost efficient manner	Customer	Average asset renewal rate (# years)	I	TBD	Cost Efficient
							Solid waste	Solid Waste	Providing a solid waste service in a cost efficient manner	Technical	10 year forecast average solid waste fleet asset renewal budget as a % of replacement value	I	TBD	Cost Efficient
							Solid waste	Solid Waste	Providing a solid waste service in a cost efficient manner	Technical	10 year forecast average solid waste facility asset renewal budget as a % of replacement value	I	1.7% to 2.5%	Cost Efficient
							Solid waste	Solid Waste	Providing reliable solid waste collection services	Customer	% of community satisfied with solid waste collection services	D	TBD	Cost Efficient
							Solid waste	Solid Waste	Providing reliable solid waste collection services	Technical	% of solid waste infrastructure assets in poor or very poor condition	I	TBD	Cost Efficient
							Solid waste	Solid Waste	Providing reliable solid waste collection services	Technical	% of collection vehicles in poor or very poor condition	I	TBD	Cost Efficient
							Solid waste	Solid Waste	Providing reliable solid waste collection services	Technical	% of bins past life span	I	TBD	Cost Efficient
							Solid waste	Solid Waste	Providing reliable solid waste collection services	Technical	% of process equipment past useful life	I	TBD	Cost Efficient
							Solid waste	Solid Waste	Providing reliable solid waste collection services	Technical	% of time the transfer stations queues exceed the target	I	TBD	Cost Efficient
							Solid waste	Solid Waste	Providing reliable solid waste collection services	Technical	Wait time at scale	I	TBD	Cost Efficient
							Solid waste	Solid Waste	Providing reliable solid waste collection services	Technical	Wait time to tip	I	TBD	Cost Efficient

UNSD Target Number	UNSD Target	UNSD Indicator Number	UNSD Indicator	ISO 37120 Indicator	ISO 37120 Indicator Number	ISO 37120 Indicator Type	ISO 37120 Theme (Target)	Service Type	LOS Objective	PM Type	LOS Performance Measures	Direct (D) or Indirect (I)	LOS Targets	LOS Performance Indicator
							Solid waste	Solid Waste	Providing reliable solid waste collection services	Technical	% of customers that are within the target travel time to a drop-off depot	I	TBD	Cost Efficient
							Solid waste	Solid Waste	Providing reliable solid waste collection services	Technical	# of collection vehicles	I	TBD	Cost Efficient
							Solid waste	Solid Waste	Providing reliable solid waste collection services	Technical	# of missed collections	I	TBD	Cost Efficient
							Solid waste	Solid Waste	Providing reliable solid waste collection services	Technical	Spare ratio	I	TBD	Cost Efficient
							Solid waste	Solid Waste	Providing reliable solid waste collection services	Technical	Transfer station hauling frequency	I	TBD	Cost Efficient
							Solid waste	Solid Waste	Providing reliable solid waste collection services	Technical	% of time compactor is operating	I	TBD	Cost Efficient
							Solid waste	Solid Waste	Providing reliable solid waste collection services	Technical	Downtime of MRF	I	TBD	Cost Efficient
							Solid waste	Solid Waste	Providing reliable solid waste collection services	Technical	# of days collection vehicles are out of service due to repairs	I	TBD	Cost Efficient
							Solid waste	Solid Waste	Providing reliable solid waste collection services	Technical	# of serviced customers	I	TBD	Cost Efficient
							Solid waste	Solid Waste	Providing reliable solid waste collection services	Technical	% of equipment at facilities that meets H&S standards	I	TBD	Cost Efficient
				Percentage of the city's solid waste that is recycled	16.3	core	Solid waste	Solid Waste	Providing solid waste services that have minimal impacts on the environment	Technical	# of resources recovered	I	TBD	Environmental Stewardship

UNSD Target Number	UNSD Target	UNSD Indicator Number	UNSD Indicator	ISO 37120 Indicator	ISO 37120 Indicator Number	ISO 37120 Indicator Type	ISO 37120 Theme (Target)	Service Type	LOS Objective	PM Type	LOS Performance Measures	Direct (D) or Indirect (I)	LOS Targets	LOS Performance Indicator
							Solid waste	Solid Waste	Providing solid waste services that have minimal impacts on the environment	Customer	GHG Emissions	I	TBD	Environmental Stewardship
		11.6.2	Annual mean levels of fine particulate matter (e.g. PM2.5 and PM10) in cities (population weighted)	Fine particulate matter (PM2.5) concentration	8.1	core	Environment	N/A	N/A	N/A	N/A	N/A	N/A	N/A
				Particulate matter (PM10) concentration	8.2	core	Environment	N/A	N/A	N/A	N/A	N/A	N/A	N/A
				Nitrogen dioxide (NO2) concentration	8.4	supporting	Environment	N/A	N/A	N/A	N/A	N/A	N/A	N/A
				Ozone (O3) concentration	8.6	supporting	Environment	N/A	N/A	N/A	N/A	N/A	N/A	N/A
				Greenhouse gas emissions measured in tonnes per capita	8.3	core	Environment	Facilities Management	Providing facilities that are energy efficient	Technical	Annual energy consumption per person (kWh/person)	D	645 kWh/person	Environmental Stewardship
							Environment	Facilities Management	Providing facilities that are energy efficient	Customer	Annual energy consumption per person (kWh/person)	D	645 kWh/person	Environmental Stewardship
							Environment	Fleet	Providing vehicles & equipment with minimal greenhouse gas emissions	Customer	Annual greenhouse gas emissions	D	TBD	Environmental Stewardship
							Environment	Fleet	Providing vehicles & equipment with minimal greenhouse gas emissions	Technical	% of equipment past their estimated service life	I	TBD	Environmental Stewardship
							Environment	Fleet	Providing vehicles & equipment with minimal greenhouse gas emissions	Technical	Total fuel consumption of medium vehicles per year (miles/gallon)	D	TBD	Environmental Stewardship

UNSD Target Number	UNSD Target	UNSD Indicator Number	UNSD Indicator	ISO 37120 Indicator	ISO 37120 Indicator Number	ISO 37120 Indicator Type	ISO 37120 Theme (Target)	Service Type	LOS Objective	PM Type	LOS Performance Measures	Direct (D) or Indirect (I)	LOS Targets	LOS Performance Indicator
							Environment	Fleet	Providing vehicles & equipment with minimal greenhouse gas emissions	Technical	Total fuel consumption of light vehicles per year (miles/gallon)	D	TBD	Environmental Stewardship
							Environment	Fleet	Providing vehicles & equipment with minimal greenhouse gas emissions	Technical	# of vehicles with higher fuel consumption due to age	I	TBD	Environmental Stewardship
							Environment	Parks, Forestry and Open Spaces	Providing livable parks and open spaces	Customer	% of canopy coverage	I	40% by 2031	Livable Community
							Environment	Parks, Forestry and Open Spaces	Providing livable parks and open spaces	Technical	Total canopy area of City owned trees	I	TBD	Livable Community
							Environment	Fleet	Providing environmentally conscious vehicles & equipment	Customer	Annual fuel consumption	D	TBD	Environmental Stewardship
							Environment	Fleet	Providing environmentally conscious vehicles & equipment	Technical	Annual fuel consumption	D	TBD	Environmental Stewardship
							Environment	Recreation	Providing community recreation facilities that are environmentally conscious	Customer	Annual energy consumption per square foot	D	TBD	Environmental Stewardship
							Environment	Recreation	Providing community recreation facilities that are environmentally conscious	Technical	Annual electricity consumption per square foot	D	TBD	Environmental Stewardship

UNSD Target Number	UNSD Target	UNSD Indicator Number	UNSD Indicator	ISO 37120 Indicator	ISO 37120 Indicator Number	ISO 37120 Indicator Type	ISO 37120 Theme (Target)	Service Type	LOS Objective	PM Type	LOS Performance Measures	Direct (D) or Indirect (I)	LOS Targets	LOS Performance Indicator
							Environment	Recreation	Providing community recreation facilities that are environmentally conscious	Technical	Annual natural gas consumption per square foot	D	TBD	Environmental Stewardship
							Environment	Roads and ROWs	Providing a transportation network that is environmentally conscious	Customer	% of streetlights that are energy efficient	D	TBD	Environmental Stewardship
							Environment	Roads and ROWs	Providing a transportation network that is environmentally conscious	Technical	% of streetlights with LED or low energy fixtures	D	TBD	Environmental Stewardship
							Environment	Roads and ROWs	Providing a transportation network that is environmentally conscious	Customer	Volume of salt applied to road/lane km	D	TBD	Environmental Stewardship
							Environment	Roads and ROWs	Providing a transportation network that is environmentally conscious	Technical	Volume of salt applied to road/lane km	D	TBD	Environmental Stewardship
							Environment	Solid Waste	Providing solid waste services that have minimal impacts on the environment	Customer	% overall (site) waste diversion	D	TBD	Environmental Stewardship
							Environment	Solid Waste	Providing solid waste services that have minimal impacts on the environment	Technical	% of time overall site diversion rate target is met	D	TBD	Environmental Stewardship
							Environment	Solid Waste	Providing solid waste services that have minimal impacts on the environment	Technical	# of education activities completed	I	TBD	Environmental Stewardship

UNSD Target Number	UNSD Target	UNSD Indicator Number	UNSD Indicator	ISO 37120 Indicator	ISO 37120 Indicator Number	ISO 37120 Indicator Type	ISO 37120 Theme (Target)	Service Type	LOS Objective	PM Type	LOS Performance Measures	Direct (D) or Indirect (I)	LOS Targets	LOS Performance Indicator
							Environment	Solid Waste	Providing solid waste services that have minimal impacts on the environment	Customer	% residential waste diversion	D	70% by 2021	Environmental Stewardship
							Environment	Solid Waste	Providing solid waste services that have minimal impacts on the environment	Technical	Public drop off diversion rate target is met	I	TBD	Environmental Stewardship
							Environment	Solid Waste	Providing solid waste services that have minimal impacts on the environment	Technical	Transfer station diversion rate target is met	I	TBD	Environmental Stewardship
							Environment	Solid Waste	Providing solid waste services that have minimal impacts on the environment	Technical	MRF diversion rate target is met	I	TBD	Environmental Stewardship
							Environment	Solid Waste	Providing solid waste services that have minimal impacts on the environment	Customer	GHG emissions	D	TBD	Environmental Stewardship
							Environment	Solid Waste	Providing solid waste services that have minimal impacts on the environment	Technical	Fuel consumption of vehicles	D	TBD	Environmental Stewardship
							Environment	Solid Waste	Providing solid waste services that have minimal impacts on the environment	Technical	Energy consumption at MRF	D	TBD	Environmental Stewardship
							Environment	Solid Waste	Providing solid waste services that have minimal impacts on the environment	Technical	Energy produced at closed landfill	D	TBD	Environmental Stewardship

UNSD Target Number	UNSD Target	UNSD Indicator Number	UNSD Indicator	ISO 37120 Indicator	ISO 37120 Indicator Number	ISO 37120 Indicator Type	ISO 37120 Theme (Target)	Service Type	LOS Objective	PM Type	LOS Performance Measures	Direct (D) or Indirect (I)	LOS Targets	LOS Performance Indicator
							Environment	Solid Waste	Providing solid waste services that have minimal impacts on the environment	Technical	# of resources recovered	D	TBD	Environmental Stewardship
							Environment	Transit	Providing a transit system with minimal greenhouse gas emissions	Customer	Annual greenhouse gas emissions	D	TBD	Environmental Stewardship
							Environment	Transit	Providing a transit system with minimal greenhouse gas emissions	Technical	Total fuel consumption of buses per year	D	TBD	Environmental Stewardship
							Environment	Transit	Providing a transit system with minimal greenhouse gas emissions	Technical	# of buses with higher fuel consumption due to age	D	TBD	Environmental Stewardship
							Environment	Transit	Providing a transit system with minimal greenhouse gas emissions	Technical	Total energy consumption per year	D	TBD	Environmental Stewardship
							Environment	Transit	Providing a transit system with minimal greenhouse gas emissions	Technical	Net fuel consumption/rider	D	TBD	Environmental Stewardship
							Environment	Transit	Providing a transit system with minimal greenhouse gas emissions	Technical	Greenhouse gas emission reduction/rider	D	TBD	Environmental Stewardship
							Environment	Wastewater	Providing wastewater services that have minimal impacts on the environment	Customer	Energy consumption/ML of wastewater treated	D	TBD	Environmental Stewardship
							Environment	Wastewater	Providing wastewater services that have minimal impacts on the environment	Technical	Energy consumption/ML from collection	D	TBD	Environmental Stewardship

UNSD Target Number	UNSD Target	UNSD Indicator Number	UNSD Indicator	ISO 37120 Indicator	ISO 37120 Indicator Number	ISO 37120 Indicator Type	ISO 37120 Theme (Target)	Service Type	LOS Objective	PM Type	LOS Performance Measures	Direct (D) or Indirect (I)	LOS Targets	LOS Performance Indicator
							Environment	Wastewater	Providing wastewater services that have minimal impacts on the environment	Technical	Energy consumption/ML from treatment	D	TBD	Environmental Stewardship
				Energy consumption of public buildings per year (kWh/m2)	7.3	core	Energy	Facilities Management	Providing facilities that are energy efficient	Technical	Annual energy consumption per person (kWh/person)	D	645 kWh/person	Environmental Stewardship
							Energy	Facilities Management	Providing facilities that are energy efficient	Customer	Annual energy consumption per person (kWh/person)	D	645 kWh/person	Environmental Stewardship
							Energy	Fleet	Providing vehicles & equipment with minimal greenhouse gas emissions	Customer	Annual greenhouse gas emissions	D	TBD	Environmental Stewardship
							Energy	Fleet	Providing vehicles & equipment with minimal greenhouse gas emissions	Technical	% of equipment past their estimated service life	I	TBD	Environmental Stewardship
							Energy	Fleet	Providing vehicles & equipment with minimal greenhouse gas emissions	Technical	Total fuel consumption of medium vehicles per year (miles/gallon)	D	TBD	Environmental Stewardship
							Energy	Fleet	Providing vehicles & equipment with minimal greenhouse gas emissions	Technical	Total fuel consumption of light vehicles per year (miles/gallon)	D	TBD	Environmental Stewardship
							Energy	Fleet	Providing vehicles & equipment with minimal greenhouse gas emissions	Technical	# of vehicles with higher fuel consumption due to age	I	TBD	Environmental Stewardship

UNSD Target Number	UNSD Target	UNSD Indicator Number	UNSD Indicator	ISO 37120 Indicator	ISO 37120 Indicator Number	ISO 37120 Indicator Type	ISO 37120 Theme (Target)	Service Type	LOS Objective	PM Type	LOS Performance Measures	Direct (D) or Indirect (I)	LOS Targets	LOS Performance Indicator
							Energy	Parks, Forestry and Open Spaces	Providing livable parks and open spaces	Customer	% of canopy coverage	I	40% by 2031	Livable Community
							Energy	Parks, Forestry and Open Spaces	Providing livable parks and open spaces	Technical	Total canopy area of City owned trees	I	TBD	Livable Community
							Energy	Fleet	Providing environmentally conscious vehicles & equipment	Customer	Annual fuel consumption	D	TBD	Environmental Stewardship
							Energy	Fleet	Providing environmentally conscious vehicles & equipment	Technical	Annual fuel consumption	D	TBD	Environmental Stewardship
							Energy	Recreation	Providing community recreation facilities that are environmentally conscious	Customer	Annual energy consumption per square foot	D	TBD	Environmental Stewardship
							Energy	Recreation	Providing community recreation facilities that are environmentally conscious	Technical	Annual electricity consumption per square foot	D	TBD	Environmental Stewardship
							Energy	Recreation	Providing community recreation facilities that are environmentally conscious	Technical	Annual natural gas consumption per square foot	D	TBD	Environmental Stewardship
							Energy	Roads and ROWs	Providing a transportation network that is environmentally conscious	Customer	% of streetlights that are energy efficient	D	TBD	Environmental Stewardship
							Energy	Roads and ROWs	Providing a transportation network that is environmentally conscious	Technical	% of streetlights with LED or low energy fixtures	D	TBD	Environmental Stewardship

UNSD Target Number	UNSD Target	UNSD Indicator Number	UNSD Indicator	ISO 37120 Indicator	ISO 37120 Indicator Number	ISO 37120 Indicator Type	ISO 37120 Theme (Target)	Service Type	LOS Objective	PM Type	LOS Performance Measures	Direct (D) or Indirect (I)	LOS Targets	LOS Performance Indicator
							Energy	Roads and ROWs	Providing a transportation network that is environmentally conscious	Customer	Volume of salt applied to road/lane km	D	TBD	Environmental Stewardship
							Energy	Roads and ROWs	Providing a transportation network that is environmentally conscious	Technical	Volume of salt applied to road/lane km	D	TBD	Environmental Stewardship
							Energy	Solid Waste	Providing solid waste services that have minimal impacts on the environment	Customer	% overall (site) waste diversion	D	TBD	Environmental Stewardship
							Energy	Solid Waste	Providing solid waste services that have minimal impacts on the environment	Technical	% of time overall site diversion rate target is met	D	TBD	Environmental Stewardship
							Energy	Solid Waste	Providing solid waste services that have minimal impacts on the environment	Technical	# of education activities completed	I	TBD	Environmental Stewardship
							Energy	Solid Waste	Providing solid waste services that have minimal impacts on the environment	Customer	% residential waste diversion	D	70% by 2021	Environmental Stewardship
							Energy	Solid Waste	Providing solid waste services that have minimal impacts on the environment	Technical	Public drop off diversion rate target is met	I	TBD	Environmental Stewardship
							Energy	Solid Waste	Providing solid waste services that have minimal impacts on the environment	Technical	Transfer station diversion rate target is met	I	TBD	Environmental Stewardship

UNSD Target Number	UNSD Target	UNSD Indicator Number	UNSD Indicator	ISO 37120 Indicator	ISO 37120 Indicator Number	ISO 37120 Indicator Type	ISO 37120 Theme (Target)	Service Type	LOS Objective	PM Type	LOS Performance Measures	Direct (D) or Indirect (I)	LOS Targets	LOS Performance Indicator
							Energy	Solid Waste	Providing solid waste services that have minimal impacts on the environment	Technical	MRF diversion rate target is met	I	TBD	Environmental Stewardship
							Energy	Solid Waste	Providing solid waste services that have minimal impacts on the environment	Customer	GHG emissions	D	TBD	Environmental Stewardship
							Energy	Solid Waste	Providing solid waste services that have minimal impacts on the environment	Technical	Fuel consumption of vehicles	D	TBD	Environmental Stewardship
							Energy	Solid Waste	Providing solid waste services that have minimal impacts on the environment	Technical	Energy consumption at MRF	D	TBD	Environmental Stewardship
							Energy	Solid Waste	Providing solid waste services that have minimal impacts on the environment	Technical	Energy produced at closed landfill	D	TBD	Environmental Stewardship
							Energy	Solid Waste	Providing solid waste services that have minimal impacts on the environment	Technical	# of resources recovered	D	TBD	Environmental Stewardship
							Energy	Transit	Providing a transit system with minimal greenhouse gas emissions	Customer	Annual greenhouse gas emissions	D	TBD	Environmental Stewardship
							Energy	Transit	Providing a transit system with minimal greenhouse gas emissions	Technical	Total fuel consumption of buses per year	D	TBD	Environmental Stewardship

UNSD Target Number	UNSD Target	UNSD Indicator Number	UNSD Indicator	ISO 37120 Indicator	ISO 37120 Indicator Number	ISO 37120 Indicator Type	ISO 37120 Theme (Target)	Service Type	LOS Objective	PM Type	LOS Performance Measures	Direct (D) or Indirect (I)	LOS Targets	LOS Performance Indicator
							Energy	Transit	Providing a transit system with minimal greenhouse gas emissions	Technical	# of buses with higher fuel consumption due to age	D	TBD	Environmental Stewardship
							Energy	Transit	Providing a transit system with minimal greenhouse gas emissions	Technical	Total energy consumption per year	D	TBD	Environmental Stewardship
							Energy	Transit	Providing a transit system with minimal greenhouse gas emissions	Technical	Net fuel consumption/rider	D	TBD	Environmental Stewardship
							Energy	Transit	Providing a transit system with minimal greenhouse gas emissions	Technical	Greenhouse gas emission reduction/rider	D	TBD	Environmental Stewardship

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Publications:

Searle, B., Rankin, J., and Sanchez-Castillo, X. 2019. How Good Asset Management Practices will Contribute to Achieving the United Nations Sustainable Development Goals. Published in the proceedings of the 2019 CSCE Annual Conference, Canadian Society for Civil Engineering, Laval, PQ, June 2, 2019.

Conference Presentations:

Searle, B., Rankin, J., and Sanchez-Castillo, X. 2021. How Good Asset Management Practices will Contribute to Achieving the United Nations Sustainable Development Goals. Published in the proceedings of the 2021 Atlantic Asset Management Conference, AIM Network, Dartmouth, NS, November 30 – December 1, 2021.

Searle, B., Rankin, J., and Sanchez-Castillo, X. 2019. How Good Asset Management Practices will Contribute to Achieving the United Nations Sustainable Development Goals. Published in the proceedings of the 2019 CSCE Annual Conference, Canadian Society for Civil Engineering, Laval, PQ, May 31 – June 3, 2019.