City of Toronto

Streetlighting Infrastructure Investment Report

April 1, 2026

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1. Executive Summary

a. Basis for the LED Conversion & Infrastructure Renewal Strategy

In the Toronto City Council Meeting on April 7 – 8, 2021, in response to a recommendation of the City Manager, Toronto City Council requested that Toronto Hydro prepare a Climate Action Plan. Within that request, Toronto City Council requested Toronto Hydro examine the merits of a streetlight LED conversion. Over the past decade or more, most large and mid-size cities across North America have completed similar initiatives to reduce energy consumption in the interest of cost savings and greenhouse gas (GHG) reductions.

Toronto Hydro submitted its Climate Action Plan to the City Manager on September 30, 2021. At its meeting on July 19 – 21, 2022, Toronto City Council approved in principle a citywide LED conversion initiative and requested a more detailed report examining the costs and benefits of such an initiative. Based on a recommendation by Transportation Services, prepared in consultation with and supported by Toronto Hydro, Toronto City Council also requested that the report also address the incremental requirement for streetlight system infrastructure renewal (EX 34.9 Item 7 adopted July 19, 2022).

This report, the Streetlighting Infrastructure Investment Report, is an updated version of the Toronto Hydro report provided to Transportation Services in November 2023. It aligns with the City Staff proposal adopted by City Council as part of the City budget approved on February 10, 2026.

This Report reflects an optimized streetlighting infrastructure investment approach based on the public interest outcomes achievable within the available budget allocation. This optimization is the result of extensive discussions throughout 2025 led by the City Manager, City CFO, Toronto Hydro CEO, and Toronto Hydro CFO, as well as a working group of leaders and staff from both organizations. As points of reference, this Report provides comparison funding and outcomes associated with the a) inadequate status quo, b) an accelerated option that reflects the full needs of the system and which would be required to comprehensively address the LED conversion and state of good repair over the next 10 years and c) the recommended approach that injects significant investment in streetlighting infrastructure while balancing the City's financial constraints. While City budget pressures preclude the accelerated option, significant, critical improvements will result from the recommended option. These beneficial outcomes of the investment in the LED conversion and infrastructure are outlined in detail.

Please note this report does not include an analysis of the condition or funding recommendations for the expressway assets on the Gardiner Expressway or Don Valley Parkway, as these assets are in transition (per the New Toronto Deal provincial upload commitment).

b. Highlights from the Streetlighting Infrastructure Investment Report

Streetlighting is an integral part of any municipality and is a large, highly visible part of everyday life for residents and visitors to the City of Toronto. It is a contributor to road safety, while also playing a role in reducing crime and protecting vulnerable road users. Migrating from conventional lighting technology and upgrading to LED can also reduce energy use by over 50% with resultant utility savings and greenhouse gas reductions. The overwhelming majority of municipalities in North America have implemented LED retrofits.

However, an LED retrofit program must build upon the past experiences to avoid potential issues, including following City of Toronto Public Health Guidelines and other industry standards.

Although widespread LED replacements are an ideal option for getting to an optimal energy usage state and realizing operating and maintenance savings, the decision on the pace of replacement must weigh the current economic climate to determine the optimal solution for the City of Toronto. It is also important that the solution address underlying infrastructure issues with the streetlight asset base to avoid adding new luminaire technology to a vulnerable system with the risk of reduced service levels due to increase in unplanted failures in the vulnerable infrastructure. The proposed solution should also allow for an opportunity to address lighting levels and specific safety concerns in all neighbourhoods as these technologies are rolled out.

c. The Need for Infrastructure Renewal

With an aging asset base that has a large percentage of assets at end-of-life, the streetlight portfolio faces a number of challenges in its current state:

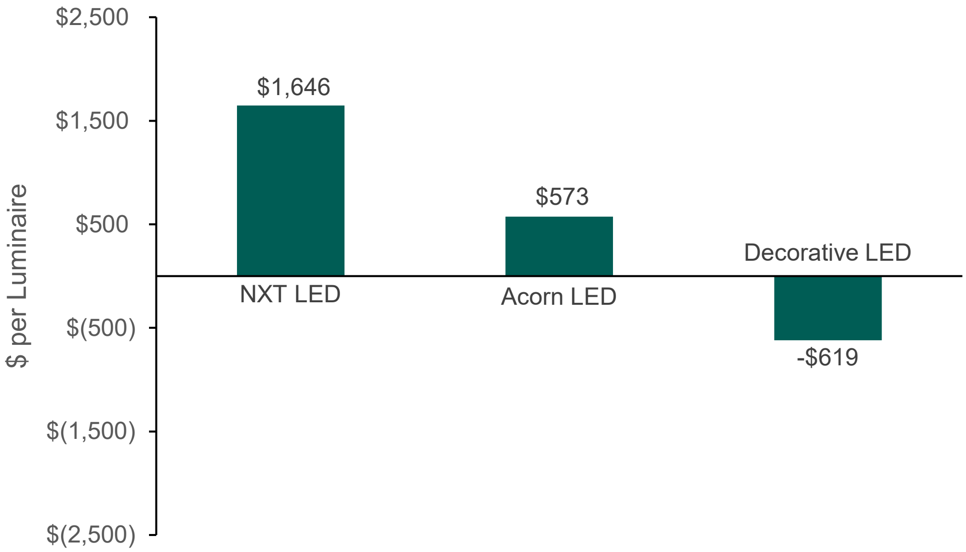
1. **Technological Change** – Most manufacturers have discontinued the production of conventional high-pressure sodium (HPS) and metal halide (MH) luminaires. In addition, the availability of conventional lamps is rapidly declining as these product lines begin to phase out. This shift has already had a significant operational impact on Toronto Hydro. As of 2023, the majority of luminaire replacements can no longer be completed using conventional technology and instead require conversion to LED, resulting in approximately 6,000 LED luminaire replacements per year. Similarly, Toronto Hydro replaces approximately 17,000 lamps annually, including 5,000 metal halide lamps that are increasingly difficult to source. Although these replacements are necessary to maintain system functionality, they introduce noticeable differences in product life**. The accelerated and unplanned conversion to LED—driven by the discontinuation of HPS and MH products—also creates upward pressure on costs compared to traditional like for like replacements. This trend will challenge Toronto Hydro's ability to maintain current service levels under the existing funding model.**

2. **Asset Condition** – The current level of funding is no longer sufficient to maintain the asset in a reasonable state of repair. Approximately 33% of streetlighting infrastructure in the City of Toronto is past useful life, which is considerably higher than the approximately 25% assets past useful life (APUL) of the Toronto Hydro distribution system. More concerning is that the current funding trajectory will result in 40% of the streetlight assets being past useful life at contract-end in 2035. Specific areas of concern with the current state of the asset base include:
   - **Underground Cables** – The underground cables that supply streetlights are predominantly of direct buried construction. The direct buried cables have over 11,000 faults replaced with overhead "jumpers," which are meant to be temporary. At the current state, approximately 86% of the underground cable is past useful life and poses a growing reliability problem.

d. The Net Benefit of LEDs

For conventional luminaires (Acorn and Cobra Head) the conversion to LED luminaires, with controls, results in a significant utility and operating cost benefit to the City over the luminaires lifetime. However, for decorative luminaires, the higher cost of replacement is not offset by the savings streams. As explained in detail in the report, the phaseout of non-LED alternatives will require the replacement of all luminaire types either in a planned or reactive approach.

Figure 1: Net Benefit of Installing LEDs by Type (20-year total)



The benefits of LED luminaires are beyond just the energy and operational savings, but include better lighting quality, and when coupled with controls, the ability to more effectively manage the resource for better reliability and safety.

e. Options Analysis

Two options are presented in contrast to the existing, status quo, contract funding: the Proposed Streetlighting Infrastructure Investment Framework and the Accelerated Streetlighting Infrastructure Investment Framework. They represent different approaches to replacing existing streetlights with LED technology, as detailed in more depth in the Options Analysis section of this Report. Critically, the funding provided under the status quo represents a level of investment that is insufficient to deal with the decline in asset condition and maintain current service levels. This information is summarized in Table 1 (refer to section 5 for a detailed description of the options).

For each option, the average increase in required annual funding provided compared to Contract Amount (Status Quo) is shown, as is, the net annual average increase. The net annual average considers any benefits from estimated electricity savings that will occur due to the retrofit. These analyses are completed using the current cost structures and best estimates of work involved and extend to the end of the contract term of the Street and Expressway Lighting Service Agreement (Services Agreement), which is in effect until the end of 2035[1].

The Average Annual Incremental Cost is the total of the operating and capital requirements, whereas the Net Annual Incremental Cost accounts for the additional electricity savings with the assumption operating and maintenance savings are reinvested in the infrastructure. For example, the Accelerated Streetlighting Infrastructure Investment Framework would require $490M in incremental funding (i.e., gross cost) to the end of contract, but the net cost to the City of Toronto would be $432M because of savings derived from this approach.

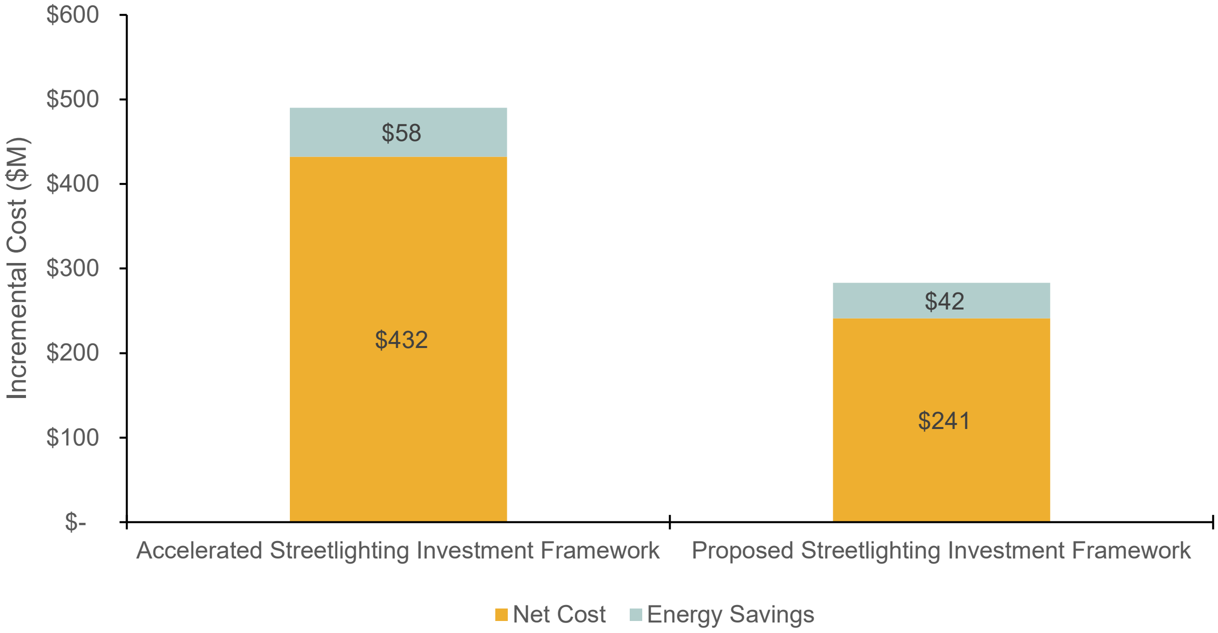
Table 1: Total Costs to Contract-End in 2035 and Asset Outcomes*

Investment Approach	Total Required Expenditure: 2026 – 2035*** ($M)	Average Annual Incremental Cost ($M)	Net Annual Incremental Cost ($M)	LED Conversion Rate (%)	UG** APUL at End of Term (%)	System APUL at End of Term (%)
Contract Amount (Status Quo)	$294.08	$-	$-	38	91	40
Accelerated Streetlighting Infrastructure Investment Framework	$784.24	$49.02	$43.20	100	0	11
Proposed Streetlighting Infrastructure Investment Framework	$577.14	$28.31	$24.10	100	56	23

* includes $42M of Special Services funding in all options.
** Underground distribution
*** Includes effective HST rate of 1.76%

[1] Street and Expressway Lighting Service Agreement, Article 8.1 - Term

Figure 2: Incremental Cost of LED and Infrastructure Options versus Current Services Agreement Until Contract-End



f. Recommendation

The Proposed Streetlighting Infrastructure Investment Framework will result in a complete conversion to LED technology, with integral lighting controllers, spread over the 10 years. There is also significant investment in underground infrastructure which will make significant progress towards modernising the system. However, there will be additional investment in infrastructure post 2035, as is reflected by the total costs set out in the Accelerated Streetlighting Infrastructure Investment Framework, which would be the optimal investment path if there were no funding constraints.

This investment will reduce City of Toronto operating costs, reduce GHG emissions, and improve lighting conditions for the benefit of pedestrians, motor vehicles, cyclists and neighbourhoods more generally as a safety enhancement and crime deterrent. The LED conversion will result in optimal energy savings and operating and maintenance savings post contract.

By sharp contrast, as noted in detail in this Report, current funding levels are no longer sustainable and are already resulting in a less reliable system with increased risks to road users. Any approach implemented would need to consider the current economic climate at the City of Toronto and create a framework to accommodate additional spending on streetlighting that addresses different policy objectives, including improved road safety, lower crime and better social equity. Ultimately, the option taken will depend on the financial ability of the City to fund the refurbishment of these critical assets.

2. Background

Toronto Hydro acquired the streetlight assets from the City of Toronto as of 2006. Included with the Asset Purchase Agreement (APA), Toronto Hydro and the City of Toronto entered into a 30-year Services Agreement that requires Toronto Hydro to provide a variety of services to the City, including but not limited to:

- Operate and maintain the streetlighting system in a reasonable state of repair;
- Maintain lighting levels for existing systems at the same level as when the assets were acquired;
- Ensure new assets installed meet RP-8 illumination standards; and
- Meet defined service levels for reactive outages.

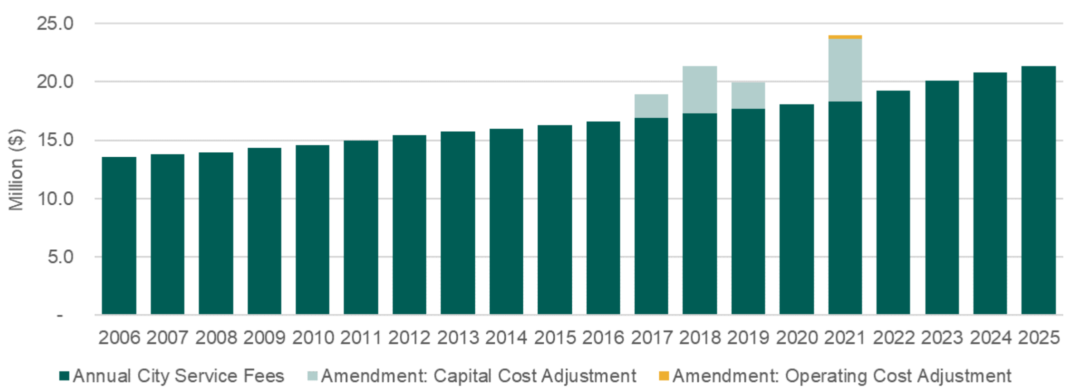
As compensation for these services, the contract provides an annual service fee to Toronto Hydro. This fee allows for annual and perioidic escalations, including changes in:

- CPI and labour rates (annually);
- Number of assets owned and maintained and material changes relating to the streetlighting system (every 5 years); and
- True-up of capital spending patterns (every 5 years).

Additionally, the City of Toronto can fund additional work via a Special Services provision that allows for Toronto Hydro to carry out the design and construction of projects that are above and beyond the required provisions of the Services Agreement for an additional fee. This includes providing a service at a standard that is greater than the standards prescribed, providing a service that is outside of the prescribed scope of the Services Agreement, undertaking a spot improvement greater than the defined cap amount, or undertaking capital replacements in excess of the capital project's cap amount.

The contract includes spending limits and a retroactive 5-year true-up/true-down process around capital spending. There are also provisions for transferring the asset back to the City at contract-end and resolving contract disputes.

Figure 3: Annual Service Fees Paid by the City of Toronto (2006 to 2025)



3. LED Conversion

a. Introduction

The vast majority of municipalities in Ontario, as well as most large cities across Canada, in the United States, and international comparators, have converted to LED technology and completed the conversion as a specific initiative. The drivers for these projects are typically cost savings, due to much lower energy usage, and reduced maintenance requirements. The LED technology lends itself to incorporating control technology as well, which not only enhances the electricity savings, but also creates a network to incorporate Smart City sensors and other emerging technologies.

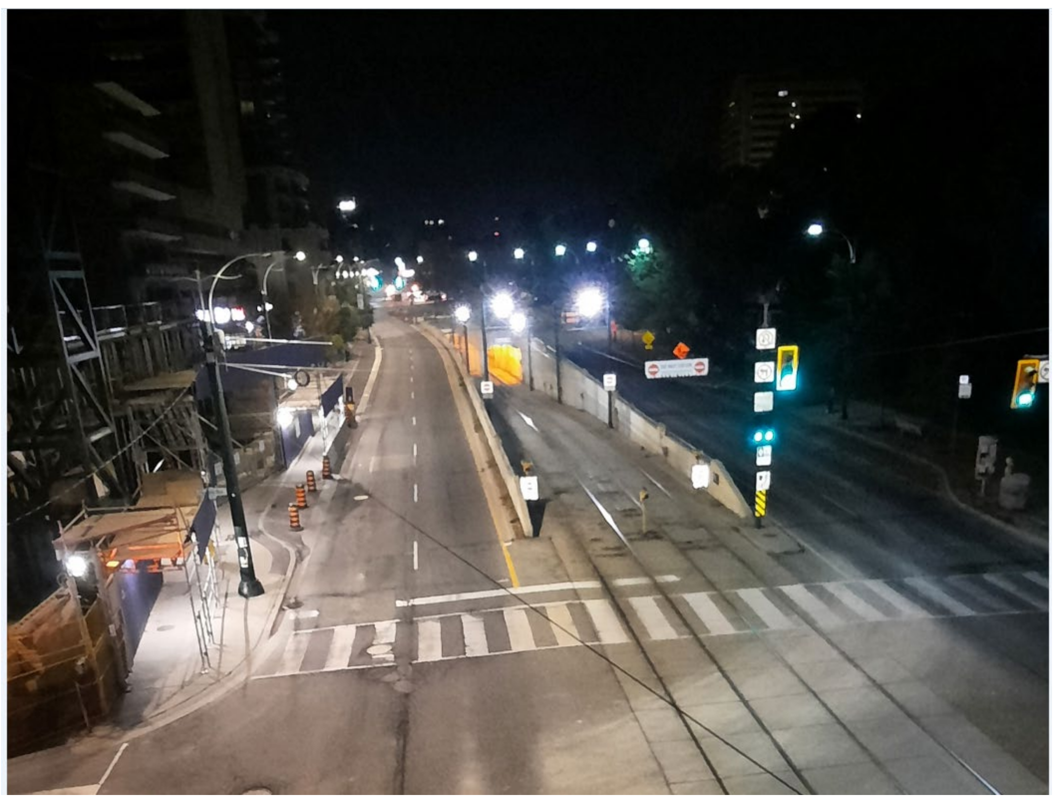
LED conversions are also being driven by technological changes, as most lighting manufacturers have phased out or in the near-term will phase out non-LED offerings. This change has already started to impact Toronto Hydro as the main two types of luminaires utilized (Acorn and Cobrahead) are no longer being produced using conventional technologies. These two types of luminaires represent the majority of the streetlights in the City of Toronto, with approximately 109,900 Cobrahead, 33,500 Acorn and 15,900 LED luminaires currently in-service. Toronto Hydro has been replacing conventional HPS Cobrahead luminaires with LED equivalents as of Q3 2023. This follows a similar transition that occurred with the Acorn luminaires that have been replaced on failure as of 2022. In addition, MH lamps are becoming restricted in supply with the replacement option being of reduced life and the LED replacement lamps being of considerably higher cost. It is expected similar constraints will face HPS lamps in the near future, putting greater pressures on maintenance spending.

With these technology changes, Toronto Hydro will be deploying approximately 4,000 to 5,000 LED luminaires on an annual basis to replace failed conventional luminaires, 1,000 to 1,500 LED luminaires for capital projects and 100 to 500 through other third-party development projects. For lamps, there are approximately 5,000 MH lamp replacements and 12,000 HPS lamp replacements annually. However, in the case where the LED luminaires or lamps are deployed reactively there will be a noticeable contrast between the existing luminaires that are HPS with a yellowish hue and the LED equivalents which produce a clearer soft-white hue, inevitably being noticeable to many residents (refer to Figure 4 and 5). This approach is not commonly used, and customer acceptance of reactive LED conversions is expected to result in an increase in escalations.

Figure 4: Contrast Between High-Pressure Sodium (HPS) and LED Luminaires

City of Toronto - Lakeshore & Islington Area Before (left) and After (right) LED Conversion.

Figure 5: Contrast Between Mercury Vapour (MV) and LED Luminaires



LED Light installation on Spadina Ave (Left) versus legacy Mercury Vapour technology (Right).

b. Benefits

There are a number of strong benefits of LED conversions that have led to the large majority of municipalities in North America adopting LED technology. The key benefits are listed below:

i. Operating Cost Savings

a. Electricity and Greenhouse Gas Reduction

Conversion of conventional street light bulbs to LED technology provides a significant reduction in energy consumption and reduction in greenhouse gases. Primarily, a conversion to LED bulbs generates an approximately 40% to 60% reduction in energy usage from the conversion alone with estimated savings of up to another 20% with the deployment of adaptive controls.

This reduction in energy, by extension, leads to a corresponding reduction in the City's Municipal GHG emissions (depending on the percent of total energy used by the lighting system initially) and contributes to the City of Toronto's emission reduction goals.

b. Operating and Maintenance Savings

Beyond the energy and emissions reductions, conversions also lead to decreased lifetime maintenance cost, as the LED luminaires have a 2 to 4 times longer lifespan compared to conventional lights (i.e., an approximate increase from 2 – 6 years to 12 – 20 years).[2] This results in significant operational savings as service calls are reduced significantly. The lifetime is further substantiated by most manufacturers offering a 10-year replacement warranty and reporting rated life values of upward of 100,000 hours. Many municipalities have installed the technology and in Ontario, Ottawa is reporting maintenance savings of 50% with Brampton reporting savings of 80%.[3,4] Although Toronto Hydro has not installed LED luminaires in substantial numbers, of the approximately 16,000 installed to date, there have been only 47 luminaire failures due to manufacturing issues and these failures were covered by warranty.

c. Savings Analysis

To help contextualize the economic benefits and associated cost of implementing an LED upgrade, the impact of the conversions is shown on per unit basis as the pace of investment is dependent on funding availability. The utility savings stem from the reduction in transmission, distribution and commodity cost reductions. The total distribution cost reduction is based on the rates that are in effect from 2025 – 2029 and then remain constant throughout the remaining contract term, as the streetlighting consumption sits in a unique rate class. Estimates of utility savings are based on current rates escalated at 3% per year.

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[2] www.saveonenergy.ca/-/media/Files/SaveOnEnergy/Industry/LightSaversLEDResults2017.ashx
[3] LightSavers Canada – City of Ottawa's Full-scale Smart LED Streetlight Conversion
[4] LightSavers Canada – City of Mississauga's Full-scale Smart LED Streetlight Conversion

The City of Toronto streetlighting system commonly uses High-Intensity Discharge (HID) lamps, including HPS lamps for Cobra Head luminaires and MH lamps for Acorn luminaires. There is also a wide variety of decorative lighting used throughout the city. The unit cost and savings achieved through the replacement of conventional lighting technology to LED have been modelled to account for both electricity cost savings and maintenance savings.

The following figures present a comparison of the average cost versus 20-year savings resulting from the conversion of luminaires. The comparison includes the conversion from (i) HPS Cobra Head to NXT LED luminaires, (ii) MH Acorn to Acorn LED luminaires, and (iii) Decorative HID to Decorative LED luminaires. It is important to note that the costs and savings presented are averages for all luminaire types and may vary depending on the specific wattage of the luminaire.

The figures further demonstrate that the benefits of converting to LED lighting (with the exception of decorative luminaires), particularly when combined with an adaptive control system, outweigh the average cost of implementation. It is worth noting that this cost-savings comparison does not consider the additional benefits of using LEDs, such as environmental and public safety improvements.

Figure 6: Unit Luminaire Cost and Savings – Cobra Head Luminaire Conversion

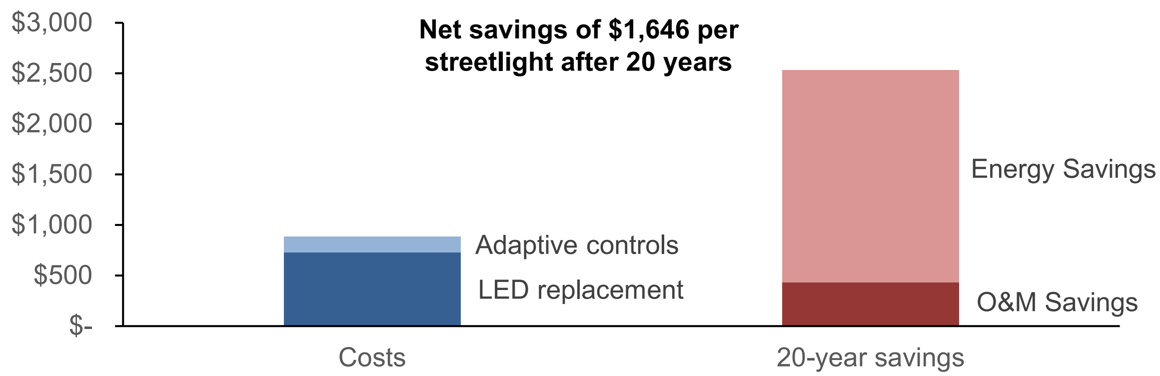


Figure 7: Unit Luminaire Cost and Savings – Acorn Luminaire Conversion

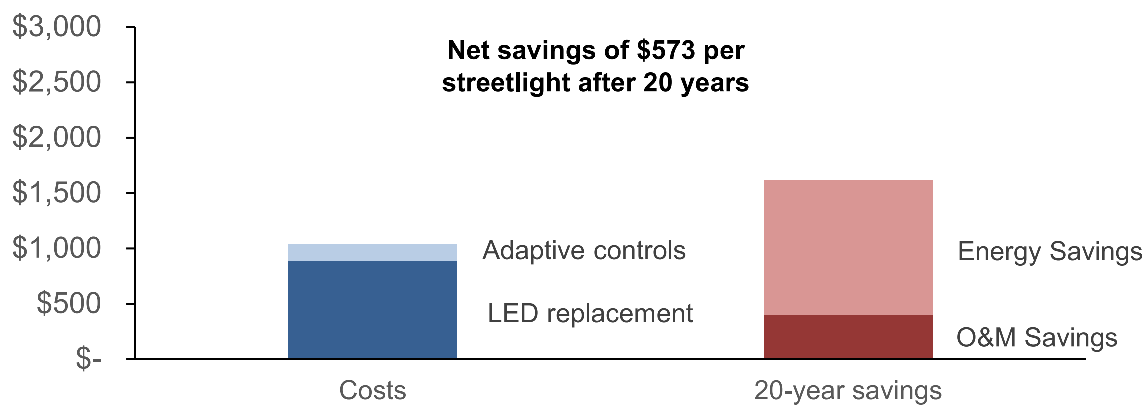
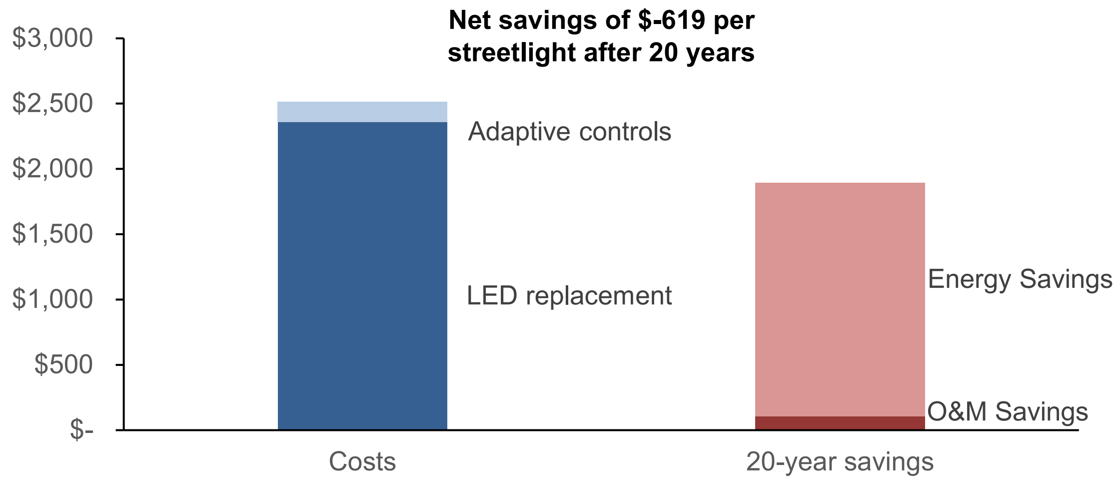


Figure 8: Unit Luminaire Cost and Savings – Decorative Luminaire Conversion



ii. Safety

LED streetlighting conversions, when combined with light level upgrades, have the potential to lead to improved pedestrian safety and automobile accident reduction, on account of illumination improvements over traditional bulbs. For example, in Vancouver, LED streetlights installed at 125 signal-controlled intersections are credited for reducing collisions at these intersections by 21% and reducing traffic-related fatalities and injuries involving pedestrians by 65%.[5] These LED streetlight improvements at high-collision intersections measurably contributed towards Vancouver's zero traffic-related fatalities goal. Another study in Rome, indicated that LED illuminated intersections significantly reduce the speed of cars approaching the intersection.[6] Although this comparison does not directly apply to Toronto, as the intersections will always be illuminated, it does provide some potential control options for intersections to increase light levels as vehicles approach.

Other areas where streetlight controls on LEDs will improve safety are:

- Immediate notification of light failures via the control system, improving the ability to deploy crews and make repairs more quickly,
- Control strategies using integrated sensors to help create contrast when roads are being used, and
- Better quality lighting, which improves driver, cyclist and pedestrian vision.

iii. Crime

A number of studies have been conducted to determine if improved lighting has an impact on crime rates. One of the more comprehensive study reviews conducted by the College of Policing in the UK indicated that across the 13 studies reviewed, both violent and property crime was reduced by an average

[5] www.dailyhive.com/vancouver/vancouver-street-lighting-improvements
[6] www.researchgate.net/publication/340546674_The_Effect_of_a_LED_Lighting_Crosswalk_on_Pedestrian_Safety_Some_Experimental_Results

of 21% in areas with improved streetlighting compared to areas without.[7] Another meta study concluded that streetlighting continues to be an effective intervention in preventing crime in public places and it was found that streetlighting led to a significant 14% decrease in crime in experimental areas compared to similar control areas.[8]

c. Historic Issues with LED Deployments

In the early days of LED technology deployments, the conversion projects prompted a number of concerns. With the benefit of experience and technology enhancements, these historic issues rarely, if ever, resurface. In the interest of completeness and to help dispel any legacy familiarity with those historic issues, they are addressed below.

i. Health Impacts

Much of the controversy was caused by the early deployment of high kelvin values (4000K and 5000K luminaires), which represent a significant contrast to the yellow colour of HPS lamps that typically have a colour temperature of 2000K. Colour temperature is a measure of the warmth or coolness of a light source, so low temperatures such as 2000K provide a warmer yellow source, whereas higher temperatures such as 4000K are a colder blue output. In many of the early deployments, the luminaires were then replaced with lower temperature options. Alternatively, some jurisdictions used a hybrid approach with the lower temperature luminaires (3000K) were deployed in residential areas/local roads and the higher temperature luminaires (4000K+) were used on major roads.

The widespread deployment of LED lighting, both interior uses (home/office) and for streetlighting applications, raised concerns in the medical community, as the technology was in its infancy. An American Medical Association (AMA) study from 2016 suggests heightened health impacts due to the higher emission of short-wavelength blue light with LED luminaires versus an equivalent High-Pressure Sodium luminaire. The health impacts are mostly related to disruption of sleep patterns. Of note, the older Acorn luminaires used in the City of Toronto, which have been utilized for decades, use a Metal Halide light source with a 4000K colour temperature and have blue light emissions higher than both the Cobra head LED and the Acorn LED luminaire currently approved for use by Toronto Hydro, both of which are rated at 3000K.

The AMA provided recommendations, that were supported by Toronto Public Health (Health Impacts of LED Lighting – Briefing Note October 3, 2016) with an excerpt below:

> "The City of Toronto to install LED streetlights with a colour temperature rating of 3000K or less with options for dimming lights during non-peak times and shielding to reduce glare."

[7] www.bra.se/download/18.161d181f17db3c8d91d955/1640101988731/2022_Effectiveness_of_Street_Lighting_in_Preventing_Crime_in_Public_Places.pdf

[8] www.bra.se/download/18.161d181f17db3c8d91d955/1640101988731/2022_Effectiveness_of_Street_Lighting_in_Preventing_Crime_in_Public_Places.pdf

The luminaires specified by Toronto Hydro meet the above-noted requirements and there is flexibility to use the dimming capabilities to address specific customer needs through the use of adaptive control system technology.

ii. Resolution of Quality Concerns

There have been some high-profile LED product failures that have garnered media attention in areas across North America. For example, the City of Detroit's Public Lighting Authority had issues with their vendor due to the vendor's selection of a new experimental type of LED module, which subsequently failed in mass quantities when deployed. This situation was ultimately settled out of court between the two parties.[9] Other issues regarding lights of a different vendor turning to a purple hue are also well documented.[10]

These issues have not been experienced by Toronto Hydro or our suppliers. This is due to the multi-level process that involves a rigorous review and selection of vendors and products, where all components have been through a thorough technical specification review by Toronto Hydro's Engineering & Standards department. Toronto Hydro also monitors asset failures, and should an unexpected failure arise, the root cause is identified, and corrective action taken with suppliers in a prompt manner.

Since introducing LED streetlights in Toronto, there have been extremely low failure rates with only 47 failures out of the approximately 16,000 deployed. The manufacturers provided annual failure rates of 0.12% based on their experience with the luminaire designs deployed. It must also be noted that the luminaires are warrantied for 10 years, which indicates the maturity of the product design and fabrication, and most manufacturers are now suggesting lifetimes of 30 years.

d. Application of RP8-Standards

The applicable design criteria for municipal lighting that is used by Toronto Hydro and the majority of municipalities across North America is Recommended Practice-8 (RP-8): Lighting Roadway and Parking Facilities as developed by the Illumination Engineering Society of North America (IESNA). RP-8 considers the roadway type (minor, major, arterial, highway, etc.) and the potential for pedestrians (high, medium, or low) to determine the appropriate lighting level required for a particular roadway or intersection. Toronto Hydro is responsible for roadway lighting but expressly considers pedestrian safety as a primary factor when determining roadway illumination levels.

The RP-8 lighting guideline is a level of lighting municipalities strive to achieve when existing infrastructure is rebuilt and/or new lighting assets are assumed from third-party projects (i.e., new subdivisions, City or transit infrastructure projects, etc.). Given that the vast majority of the existing streetlighting system was constructed more than two decades ago and inherited in its state in 2006, it is estimated that over 80% of the city would not meet present day RP-8 lighting standards.

[9] www.detroitnews.com/story/news/local/detroit-city/2019/12/10/detroit-settlement-defective-led-streetlights-duggan/4182291002/

[10] www.nightskysantafe.org/blog/nationwide-failure-of-ael-streetlights/ and https://vancouverisland.ctvnews.ca/malahat-highway-s-purple-lights-to-be-replaced-province-1.5946306

Complying with RP-8 criteria often requires adding additional poles, cable or other supporting infrastructure, resulting in substantial capital rebuild expenditures. In most cases, the most effective use of funding would be to focus on high pedestrian conflict areas and major/minor arterial roads and intersections where better lighting is more significant to public safety. In addition, there are often complaints in residential areas when lighting is increased to RP-8 standards as the shift from conventional lighting to LED can be stark. There may also be future changes to the RP-8 lighting standards to allow lower levels for LED lights because of their better lighting quality.

The option of completely upgrading to RP-8 system-wide is a useful goal, but the higher light levels are prone to complaints in residential neighborhoods. To limit complaints of excessive lighting on local residential streets and effectively use funding to address areas of greater risk to pedestrian safety, the proposed application would involve upgrading to present day RP-8 standard on all arterial roads/intersections and matching current lighting levels on local and collector roads.

e. Jurisdictional Scan

Using online sources and a directed survey, Toronto Hydro observed that the majority of large cities in North America and Europe have completed LED conversions, of which in most cases the conversion also included implementation of a streetlight control system.

Table 2: Major City LED Conversions

Country/Region	City	% Converted	Year Started	Include Streetlight Control System
United States	Houston	80%*	2014	
	Los Angeles	98%**	2009	X
	Chicago	100%	2017	X
	New York	100%	2013	X
	San Diego	75%*	2013	X
	Portland	100%	2012	X
Canada	Vancouver	100%	2019	X
	Edmonton	80%**	2017	
	Calgary	100%	2011	
Ontario	Brampton	100%	2017	
	Burlington	100%	2019	
	Mississauga	100%	2012	X
	Oakville	100%	N/A	X
	Oshawa	100%	2016	
	Ottawa	100%	2016	X
	Richmond Hill	100%	2016	X
	Vaughan	100%	2019	X
	Waterloo	100%	N/A	X
International	Madrid	100%	2015	X
	London (city)	100%	2017	X
	Amsterdam	100%	N/A	X
	Paris	100%	2012	X
	Rome	100%	2017	X

**as of 2021; ** as of 2022*

Similarly, a survey of Ontario municipalities, excluding Toronto, with a population greater than 10,000 showed that 75% of the municipalities had completed, or are in process of completing, a LED conversion.[11] Of the municipalities listed, 93% of the 9.7 million residents are serviced by LED streetlighting. In addition, the largest 314 cities (over 100,000 residents) in the US are all in the process of, or have already, converted to LEDs.[12]

The rationale for switching to LED technology was predominantly based on the payback due to reduced operating costs for both electricity and maintenance. Other considerations included creating a platform for Smart City initiatives and reducing greenhouse gas emissions. The improved visual environment was also considered as improving safety for road users and reducing crime in some jurisdictions.

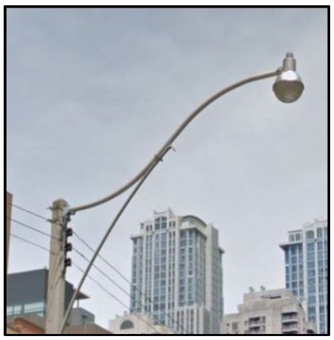
[11] LIGHT EMITTING DIODE ("LED") PRELIMINARY RESEARCH, Grant Thornton, October 2022
[12] www.smartcitiesworld.net/news/news/interest-in-smart-street-lighting-triples-in-us-cities-5243

4. Infrastructure Renewal

a. Introduction

The streetlight asset base in the City of Toronto is one of the largest in North America and includes over 173,100 luminaires that are predominantly either conventional cobra head luminaires (109,900), acorn luminaires (36,500), or LED luminaires (15,900). Other categories include decorative (10,500), wall-packs (3,300) and miscellaneous types that make up the remainder of the luminaire asset base. To note there are approximately 100 different types of decorative luminaires deployed. There are ongoing efforts with the City of Toronto to rationalize the number of luminaire types deployed via the creation of a standard lighting palette.

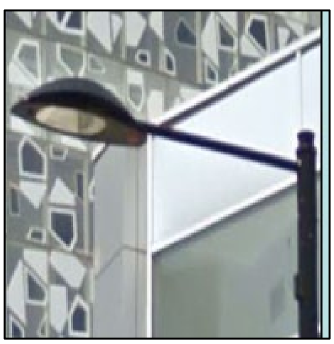
Figure 9: Typical Luminaire Types



Acorn

Cobra Head

Decorative Victorian



Decorative Capella

Wall-Pack

Expressway High-Mast

The asset base, by major categories, is summarized in Table 3 below. The existing asset base, by replacement value, is 33% past useful life. In contrast, the Toronto Hydro distribution asset base currently sits at approximately 25% of the asset base beyond useful life. Of greater concern is the that assets in certain categories are overwhelmingly beyond useful life. These and other asset categories are set out in Table 3 below.

Table 3: Summary of Streetlight Asset Base (March, 2025)

Asset Type	Quantity*	Percent Past Useful Life	Average Age (Years)	Life Expectancy (Years)	Estimated Replacement Value ($M)
Luminaires	173,100 units	28%	18	23	$148
Brackets	169,100 units	2%	18	50	$79
Poles	56,900 units	23%	35	50	$269
Overhead conductors	1,016 km	6%	32	64	$20
Concrete-encased cables	200 km	3%	12	50	$121
Direct-buried ducts	533 km	11%	23	50	$226
Direct-buried cables	**728 km**	**86%**	**37**	**22**	**$309**
Relays	3,600 units	32%	38	40	$2
Handwells	19,630 units	7%	19	55	$88
Distribution assemblies	**50 units**	**67%**	**30**	**20**	**$2**
TOTAL PERCENTAGE PAST USEFUL LIFE:		**33%**[13]	**TOTAL REPLACEMENT VALUE:**		**$1,264**

*Quantity of assets are based on available records

b. Current State of the Asset Base

Capital upgrades ensure functionally obsolete assets as well as assets that have failed or have an imminent risk of failure due to age or condition are replaced. At current funding levels, 40% of the asset base will be beyond useful life at the end of the SEL Agreement service contract in 2035 (refer to Table 4, below). A summary of investment requirements, based on asset age, for streetlight assets is as follows:

[13] Based on asset replacement value – this calculation is determined by the proportion of assets in the system that are operating at or beyond their useful life

i. Underground Cables

Underground cables are the single greatest contributor to outages and asset failures. There are currently approximately 728 kilometres of direct-buried cable and 733 kilometres of direct-buried cable in duct or concrete-encased cables in the underground system. Direct-buried installations are the highest failure risk. It is expected that this asset population will be a significant source of failure and driver of reliability concerns as the cables continue to age. Approximately 86% of direct-buried cables have reached or passed their useful life as of 2025. Investing at current funding levels, an estimated 91% will be at or beyond useful life at the end of the current contract.

Direct-buried cables are a legacy type of construction where cables are laid directly in underground trenches without a protective barrier. These cables are susceptible to outages due to direct exposure to environmental conditions. Moisture is the most destructive element that affects direct-buried cables. Water ingress into the cable insulation in the presence of an electrical field causes microscopic tears called “water treeing.” Over time, continued moisture penetration and the presence of electrical stresses causes these water trees to become electrical trees (whereby the tears become carbonized and can conduct electricity). This causes the cable to internally short circuit and fail.

Three alternatives to replacing underground direct-buried cables were considered: direct-buried cable, overhead cable, and direct-buried cable in duct. Direct-buried cable would not be an effective alternative due to risk of failure from environmental conditions and an expected life of 22 years. Overhead cables would also not be effective due to environmental susceptibility and potential negative effects on neighbourhood aesthetics. Direct-buried cable in duct would be the most effective alternative, as it eliminates risk of failure and increases public safety and reliability with an expected life of 50 years.

ii. Luminaires

Light source options have diversified greatly since Toronto Hydro acquired ownership of the streetlighting portfolio in 2006. Perhaps most notable is the proliferation of LED technology, which is now in most cases the only option available. In addition to this, most major manufacturers now focus exclusively on LED streetlight products. Adapting to incorporate newer technologies like LEDs is critical to the long-term health and success of our streetlighting system.

iii. Poles

Pole failures can lead to extensive and prolonged service disruptions, as well as pose extreme safety risks for various stakeholders. Poles are frequently exposed to severe weather conditions, and may become vulnerable to internal rot, decay, infestation and concrete spalling. These conditions, combined with the fact that approximately 20% of poles are beyond their useful life, make these poles more susceptible to failure. Recent high-profile failures of base-mounted poles also indicate the need for proactive replacements.

iv. Relays

A relay is used to control (turn on and off) a group of lights. Relays are typically installed between the transformer and first light in the group and can be pole-mounted or installed in a pad-mounted transformer enclosure or in a transformer vault. Although approximately 32% of relays are beyond their useful life, they pose reliability risks. When the master relay fails, it causes a large number of lights to go dark. Toronto Hydro's replacement strategy is to replace relays (where feasible) with individually controlled luminaires, by photocells.

Table 4: Major Assets Past Useful Life – Existing Services Agreement Funding

Major Asset Category	Current Assets Past Useful Life (2025)	Estimated Assets Past Useful Life (2035)
Luminaires	28%	46%
Poles	23%	26%
Overhead conductors	6%	8%
Underground direct buried cables	**86%**	**91%**
Relays	32%	55%
TOTAL (ALL ASSETS)	**33%**	**40%**

c. Assets in Critical State

One of the critical areas of concern are the underground assets, where over 86% of the underground streetlight cable is past useful life and represents over $267 million in replacement value. Due to the systemic funding limitations of the Services Agreement, there are now over 11,000 "jumpers" (temporary overhead cable installed in lieu of fixing faulted underground cables) across the City of Toronto.

Figure 10: Examples of Critical Asset Failures

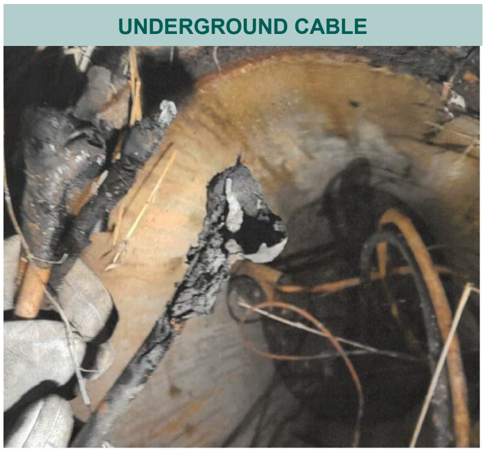


Figure 11: Overhead Cable Jumper Locations (December 2025)

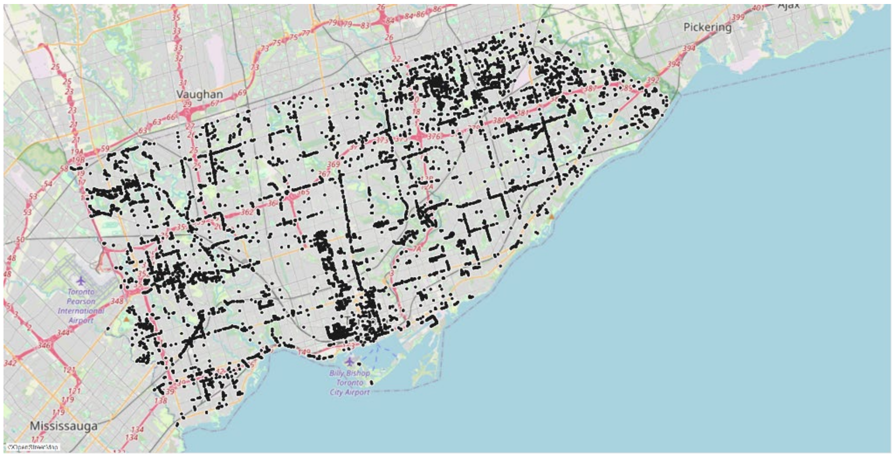
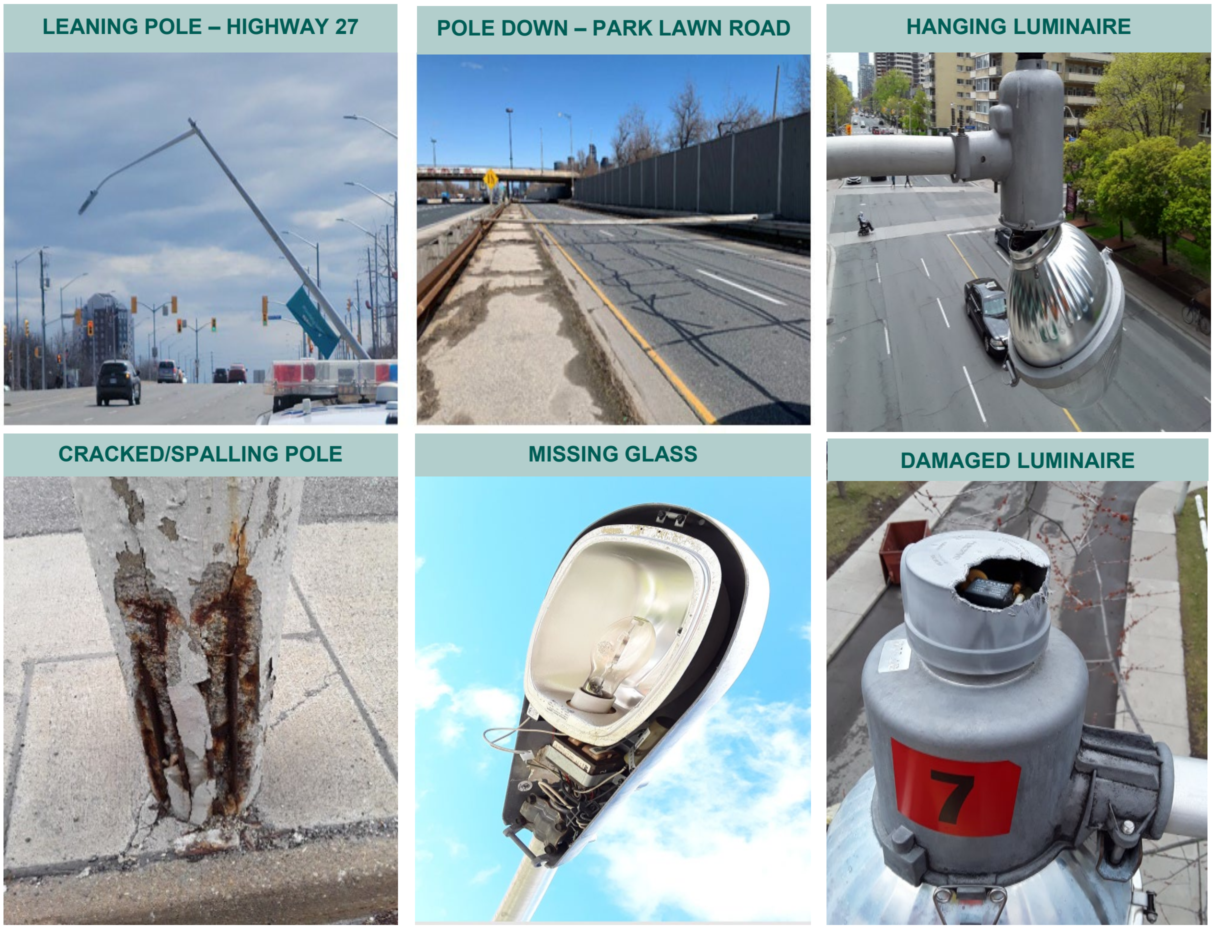


Figure 12: Typical Overhead Jumper Location (Etobicoke)

d. Risk to Asset Integrity

In addition to integrity of the infrastructure, recent asset failures have highlighted additional areas of concern around public safety and reliability. As the backlog of streetlight assets past useful life increases, extreme weather events like high winds bring heightened risk of leaning, toppled streetlight poles, and an overall rise in reactive/ “band-aid” solutions. These issues are a challenge to identify proactively without funding for a detailed and regular asset condition review.

Figure 13: Recent Streetlight Asset Failures



If replacements for the streetlight asset base are not supported by additional funding, the City of Toronto, Toronto Hydro and the general public will be greatly affected by several critical risk factors, including:

1. ***Safety***
    - Increased risk to vulnerable road users (cars, trucks, cyclists, etc.) and pedestrians;
    - Increased risk of damage to third-party property, plant, and equipment;
    - Increased reactive service outage volumes and customer complaints, making it difficult to address issues within contractual service levels, timelines and budgets;
    - Increased requests for additional lighting (also referred to as Spot Improvements) with limited ability to execute upgrades; and
    - Long lead times are needed to procure certain lamps and other speciality materials resulting in longer outages.

2. ***Reliability***
    - Inability to execute preventative and predicative maintenance programs;

- Failure to complete planned capital projects due to funding limitations leading to “band-aid” fixes of the streetlighting system (i.e., underground cable faults or “jumpers”); and
- Large percentage of assets at or near end of useful life leading to a higher probability of asset failures.

3. ***Operating & Maintenance Costs***
    - Increased litigation exposure due to non-functioning lights/temporary repairs; and
    - Rising costs of material and labour limiting ability to fund replacement of a larger pool of assets.

e. Planning Considerations

The capital planning process takes into consideration asset demographics (i.e., number of assets, age and specific characteristics of assets), available condition demographics, historical reliability statistics and available budget. These datapoints inform program pacing and prioritization decisions throughout the planning process. Key metrics used in planning include:

1. **Percentage of asset past useful life (APUL):** To assess the age demographics of the streetlighting system, the proportion of assets across the system that are operating at or beyond useful life are examined.
2. **Asset condition demographics:** As a proxy for an asset condition demographic and to complement data on the number of assets past useful life, results from the 2017 Asset Inventory Count (AIC) and Asset Condition Assessment (ACA) study were considered in establishing planning scenarios.
3. **Historical reliability statistics:** Information from systems such as the Streetlight Activity Management System (SAMS), which stores historical reliability data, provide additional insight and help identify areas experiencing reliability issues, which may be caused by asset deterioration or legacy design-related issues.
4. **Functional obsolescence:** Some assets and/or installations are no longer aligned with Toronto Hydro’s processes and practices so that it can no longer be maintained (e.g., lack of vendor support or obsolescence of material) or used as intended to support the streetlight system’s operations. These limitations are considered to help focus on viable solutions.
5. **Existing budget:** Financial considerations help to determine the amount of proactive capital projects that can be executed and the pace at which they can be completed.

f. Benefits

Having the streetlight asset base in a state of good repair can bring several benefits, such as improving safety, increasing reliability, saving costs and extending the lifespan of the asset base. The following further explain these benefits:

1. **Improved safety:** By investing in replacing assets that are operating at or beyond their useful life, as well as functionally obsolete assets, the likelihood of accidents or incidents due to equipment failures or malfunctions can be

reduced. This investment in maintenance and repairs can significantly improve the safety of the system.

2. **Increased reliability:** When the streetlight system is well-maintained, it is less likely to experience unexpected failures or "light-outs." This improves the reliability of the system and ensures that it performs as intended. Operating the asset base at a state of good repair ensures that the asset base is well-maintained.
3. **Cost savings:** Regular maintenance and repairs can help identify issues before they become major problems, which can save money in the long run. A well-maintained streetlight asset base is also less likely to require costly emergency repairs or replacements. By investing in regular maintenance and repairs, costs associated with asset failures can be reduced and premature replacements prevented.
4. **Longer lifespan:** Regular proactive maintenance and repairs can extend the life of assets, reducing the need for premature replacement and saving resources.

g. Cost

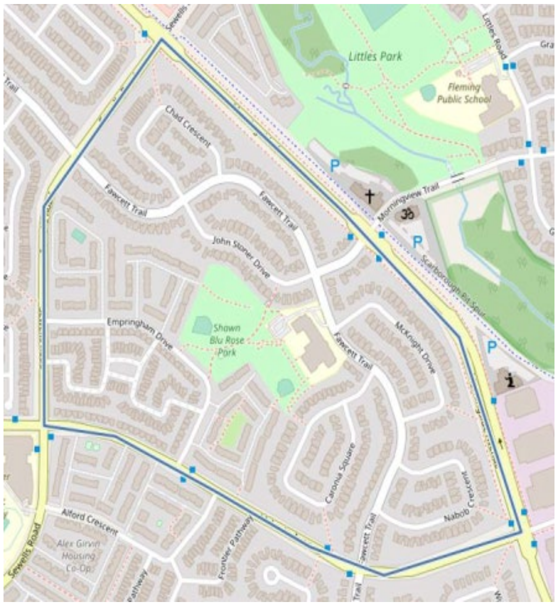
The cost of upgrading the infrastructure requires extensive modelling of the asset base. At the most expensive extreme there are over $400 million in unfunded repairs, but it is unrealistic to aim for an asset base that has no assets past useful life. To provide some benchmarks and context for the infrastructure upgrades required the following sections provide information on sample projects and neighbourhoods in most need.

i. Example Projects

The examples below illustrate recent capital replacement and rebuild projects, including project objective, scope of work and total cost. The largest cost driver in these projects is the amount of underground cable replacement required and the number of additional poles required to support lighting upgrades. For example, the first project involved extensive underground replacement and pole replacements and thus is proportionately more expensive than the other projects.

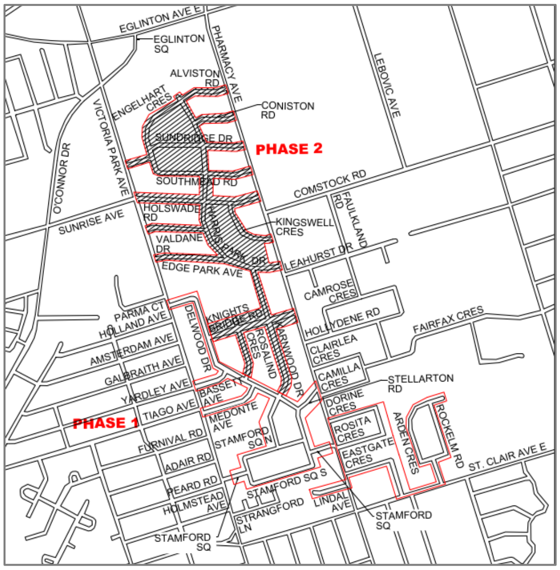
1. Complete Area Rebuild

Scope Boundary	McLevin Ave., Morningside Ave., Sewells Rd.
Ward	25 (Scarborough-Rough Park)
Project Objective	Underground Duct & Cable, Pole, Streetlight Bracket & Luminaire Replacement (RP-8 Upgrade)
Execution Year	2020
Project Cost ($M)	$1.79
Assets Installed	117 Poles, 117 LED Luminaires, 117 Brackets; 4.8km Cable/Duct



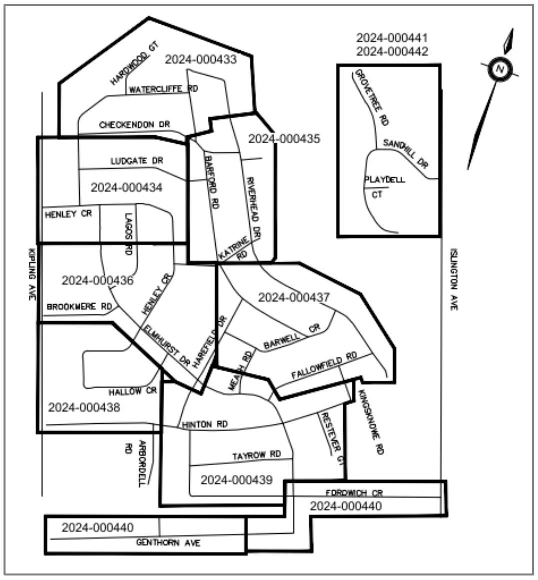
2. LED Conversion & Upgrade to RP8 Standard

Scope Boundary	Victoria Park, St. Clair, Pharmacy, Eglinton (Phase 1 & 2)
Ward	20 (Scarborough Southwest)
Project Objective	Streetlight Bracket & Luminaire Replacement (RP-8 Upgrade)
Execution Year	2024
Project Cost ($M)	$0.264
Assets Installed	251 LED Luminaires, 251 Control Nodes, 5 Brackets, 1 Pole



3. LED Conversion + Upgrade to RP8 Standard

Scope Boundary	Kipling, West Humber River, Islington, Rexdale (Phase 1 & 2)
Ward	1 (Etobicoke North)
Project Objective	Streetlight Bracket & Luminaire Replacement (RP-8 Upgrade)
Execution Year	2024
Project Cost ($M)	$0.896
Assets Installed	814 LED Luminaires, 814 Control Nodes, 279 Brackets, 26 Poles



h. Neighbourhood and Ward Breakdown

The map below provides a ranking based on proportion of assets past useful life in each neighbourhood and key community impact drivers (crime, safety and traffic congestion), while the Table 5 that follows provides the funding required for infrastructure upgrades and renewal. Most of the neighbourhoods with asset issues are in the Etobicoke and Scarborough areas of the City of Toronto. This is largely a function of the amount of direct buried cable used in these areas.

Figure 14: Neighbourhood Ranking

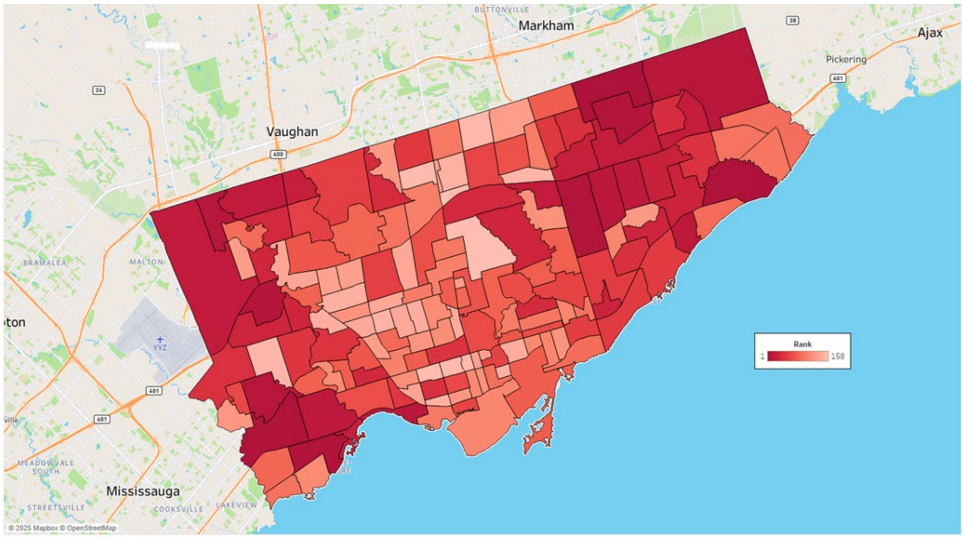


Table 5: Top 20 Neighbourhoods based on APUL rank and community impact statistics (includes effective HST rate of 1.76%)

Neighbourhood Name	Ward Name	Combined Rank	APUL	Capital Upgrade Cost ($M) – Underground Distribution	Capital Upgrade Cost ($M) – Non-Underground Assets	Total Cost ($M)
Milliken (130)	**Scarborough-Agincourt (22); Scarborough North (23)**	**1**	74%	$25.2	$3.0	$28.2
West Hill (136)	**Scarborough-Guildwood (24); Scarborough-Rouge Park (25)**	**2**	62%	$4.2	$1.9	$6.1
Etobicoke City Centre (159)	**Etobicoke-Lakeshore (03)**	**3**	51%	$1.7	$2.3	$4.0
Mimico-Queensway (160)	**Etobicoke-Lakeshore (03)**	**4**	53%	$0.8	$1.4	$2.3
Wexford/Maryvale (119)	**Scarborough Centre (21)**	**5**	49%	$2.2	$0.2	$2.4
Agincourt North (129)	**Scarborough North (23)**	**6**	82%	$24.0	$3.4	$27.3
Kingsview Village-The Westway (6)	**Etobicoke North (01); Etobicoke Centre (02)**	**7**	61%	$0.1	$0.9	$1.0
Islington (158)	**Etobicoke Centre (02); Etobicoke-Lakeshore (03)**	**9**	59%	$1.2	$0.8	$2.0
Mount Olive-Silverstone-Jamestown (2)	**Etobicoke North (01)**	**9**	60%	$3.1	$1.9	$5.0
Morningside Heights (144)	**Scarborough North (23); Scarborough-Rouge Park (25)**	**10**	61%	$25.9	$-	$25.9
Dorset Park (126)	**Scarborough Centre (21)**	**11**	52%	$3.6	$0.2	$3.8
South Parkdale (85)	**Etobicoke-Lakeshore (03); Parkdale-High Park (04); Spadina-Fort York (10)**	**12**	44%	$0.5	$2.0	$2.5
Stonegate-Queensway (16)	**Etobicoke-Lakeshore (03)**	**14**	49%	$0.0	$0.9	$1.0
Scarborough Village (139)	**Scarborough Southwest (20); Scarborough-Guildwood (24)**	**14**	75%	$1.5	$1.1	$2.7
Bendale-Glen Andrew (156)	**Scarborough Centre (21); Scarborough North (23)**	**15**	57%	$3.6	$0.3	$3.9
West Humber-Clairville (1)	**Etobicoke North (01); Etobicoke Centre (02)**	**17**	39%	$5.0	$0.5	$5.5
Humber Summit (21)	**Humber River-Black Creek (07)**	**17**	42%	$0.1	$0.5	$0.6
Fenside-Parkwoods (150)	**Don Valley East (16)**	**18**	46%	$0.0	$1.1	$1.1

Agincourt South-Malvern West (128)	**Scarborough-Agincourt (22); Scarborough North (23)**	**19**	42%	$6.6	$-	$6.6
Malvern East (146)	**Scarborough North (23); Scarborough-Rouge Park (25)**	**20**	72%	$18.0	$3.2	$21.2
Total				**$127.5**	**$25.6**	**$153.1**

The capital upgrade cost assumes all assets are upgraded in each neighbourhood. This approach is not optimal as some assets could potentially be prioritized for later investments and potentially will add 30 – 50% in costs.

i. Jurisdictional Scan

Toronto Hydro conducted a survey of 10 utilities and municipalities in Ontario to gather insights on streetlight asset management practices in other jurisdictions. To note, most of the survey respondents are municipally owned.

The survey revealed that a majority of the respondents do not adhere to any regulations, standards, frameworks or policies in the development of their asset management strategy. Of the remaining half, 40% use guidelines provided by their local municipality or province. Out of the 10 respondents, 5 have a documented asset management strategy in place and 4 are in the process of developing one. Respondents have different approaches to replacing assets, with some replacing them reactively, proactively or at scheduled intervals. Most respondents adopt a "run to failure" approach for asset replacement. All respondents have inspection and maintenance programs in place for their assets, but with varying frequency and methods. Respondents' asset management strategies affect their decision making and planning, considering the age and condition of assets. Most respondents have performed or are in the process of performing an Asset Condition Assessment (ACA) on their assets. However, only a few respondents have formalized processes for risk assessment related to asset management. Refer to Appendix 4 in the Streetlighting LED Conversion Strategy (Original Report) for the survey results.

5. Options Analysis

a. Introduction

After a diligent review of effective asset management strategies, jurisdictional scans of other municipalities and evaluating the current state of the streetlight asset base in the City of Toronto, the following section outlines different approaches to the asset needs.

A number of different scenarios were considered to present a consolidated view of potential approaches to completing an LED/infrastructure upgrade. The following alternatives are considered.

i. **Contract Amount:** This status quo point of reference represents spending to the current Services Agreement limit and thus includes only reactive repairs. There is no planned capital spending in this scenario.

ii. Accelerated Streetlighting Infrastructure Investment Framework: This investment option involves accelerated spending to bring the system to a state of good repair in addition to an upfront citywide LED retrofit project. This option assumes that both conventional and decorative luminaires will be retrofitted, while high-mast renewal has been excluded. Included are integral lighting controllers as well as their ongoing operational costs, but no additional sensors are included. This investment option prioritizes Community Impact and establishes a target APUL of 25% for all non-underground assets. It also provides the necessary funding to replace all defective underground distribution infrastructure.

iii. Proposed Streetlighting Infrastructure Investment Framework: This investment option analyses the impact of the proposed funding on the streetlight system. This investment is provided to support enhanced infrastructure and full LED conversion with integral lighting controls, but no additional sensors. To note this investment option prioritizes Community Impact, and addresses some of the underground distribution issues, but there be a continued need for investment post-2035.

b. Scenario Options

Developing various scenario projections required a multi-tiered approach and results of the 2017 Asset Inventory Count/Asset Condition Assessment Study were then further used as a reasonableness check to affirm that the projections reflect the actual state of the decaying asset base.

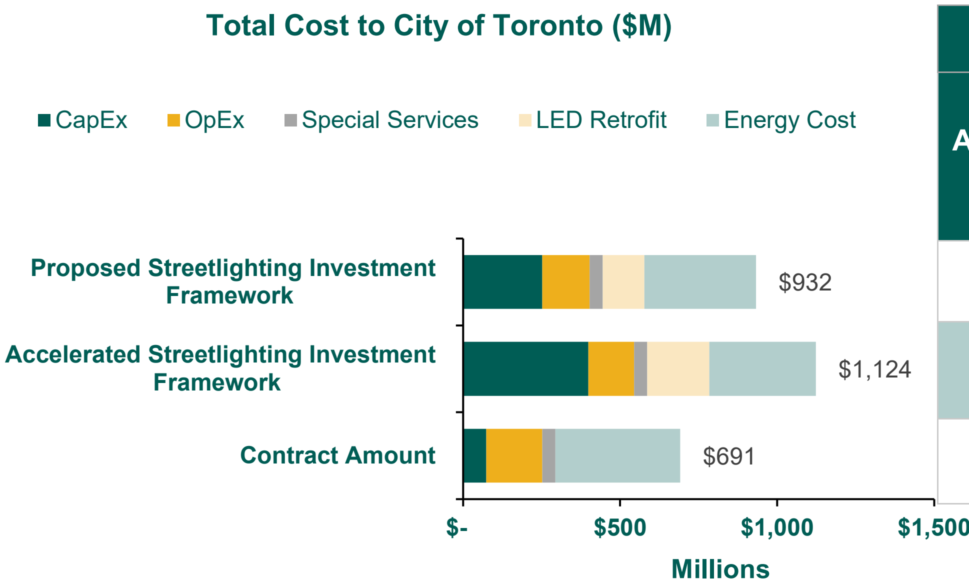
Projections were done factoring inputs from:

- Toronto Hydro’s Geospatial Information System (GIS);
- Vendor Pricing;
- Streetlight Outage Management Systems;
- Enterprise Resource Planning System (SAP); and
- Community Impact Drivers, such as, crime rates, safety and traffic congestion.

Using historical trends and updated labour and material costs, the Operating and Maintenance requirement was forecasted based on anticipated volume of identified streetlight outages. The capital program financial requirement is based on asset failure analysis simulation that has been used to assess reliability for power system planning and operations.

These models include predictions, estimates or information that might be considered forward-looking. While these forward-looking estimates represent our current judgment on what the future holds, they are subject to risks and uncertainties that could cause actual results to differ. The results of the modelling are shown in Figure 13.

Figure 13: Cost & Performance Indicators to End of Services Agreement (2035)



End of Term		
APUL (%)	Percentage of LED Luminaire (%)	Repair Backlog ($M)
23	100	305
11	100	148
40	38	519

To note, the costs in the scenarios presented exclude impacts to the Schedule I Capital Spending Cap Amount. It is assumed that Schedule I will be amended or removed from the contract.

Table 9 provides a snapshot of how each investment option is expected to affect key metrics like total greenhouse gas and electricity savings. Savings and costs are relative to the Contract Amount (status quo). To note, the electricity savings consider the growing percentage of LED luminaires that will be deployed under the existing funding framework due to the phaseout of existing technologies. In addition, it is assumed that operational and maintenance savings are reinvested into the portfolio to address capital shortfalls, putting less pressure on the need for incremental funding. Please refer to Appendix 2 for annual spending profiles.

Table 9: Performance Indicators by Scenarios to End of Services Agreement (2035)

Investment Option	Total Carbon Emissions (TCO2e)	Total Energy Savings ($M)	Total O&M Savings ($M)	Total Savings ($M)
Contract Amount (Status Quo)	25,287	-	-	-
Accelerated Streetlighting Infrastructure Investment Framework	16,888 (34%)	58.13	32.93	91.06
Proposed Streetlighting Infrastructure Investment Framework	**19,222 (25%)**	**42.07**	**27.82**	**69.89**

Each option has not only cost and savings outcomes, but there are also some qualitative considerations as outlined in Table 10.

Table 10: Scenario Analysis - Benefits, Risks, and Challenges

Investment Option	Benefits	Risks & Challenges
Accelerated Streetlighting Infrastructure Investment Framework	- A planned approach to both the LED retrofit and state of good repair - Significantly increases the reliability of the system - Mitigates critical safety and reliability impacts - Achieves the lowest operating cost profile for the asset sooner	- Requires significant funding over the 10 years
Proposed Streetlighting Infrastructure Investment Framework	- A planned approach to the LED retrofit and SOGR - Significant progress will be made on upgrading priority areas	- Will require investment post-2035 to continue the renewal efforts - Achieves operating cost savings later in the project term

The total cost of the various options until contract end in 2035 is noted below. Included are also the average annual incremental cost and the net increase in comparison to the Contract Amount point of reference. The net increase represents the impact of electricity savings whereas the annual average solely looks at service fee funding as a direct output of the Services Agreement. All options assume that the resultant Operating and Maintenance program savings are used to fund capital upgrades. Please note the costs are developed using the current cost structures and best estimates of work involved.

Table 11: Total Costs (Includes effective HST rate of 1.76%)

Investment Option	CAPEX ($M)	Special Service ($M)	OPEX ($M)	LED Retrofit ($M)	Total Cost ($M)	Average Annual vs. Contact Amount ($M)	Net Annual vs. Contract Amount ($M)
Contract Amount (Status Quo)	$73.72	$42.00	$178.35	$-	$294.08	$-	$-
Accelerated Streetlighting Infrastructure Investment Framework	$398.58	$42.00	$145.42	$198.24	$784.24	$49.02	$43.20
Proposed Streetlighting Infrastructure Investment Framework	$251.78	$42.00	$150.53	$132.83	$577.14	$28.31	$24.10

6. Recommendations

The City of Toronto and Toronto Hydro share responsibility for ensuring that Torontonians are served with a streetlight system that makes city roads safer for vehicles, cyclists, pedestrians, and others. Similar to other municipal infrastructure, the streetlighting system has received insufficient funding for many years. As a result, the quality of lighting and the state of the equipment is poor and continues to deteriorate. By comparison, Toronto has one of the most antiquated and deficient streetlight systems among large and mid-size cities in Ontario and across North America.

Toronto City Council requested that Toronto Hydro consider a Streetlighting LED Conversion as part of a suite of potential climate action initiatives, however, as addressed in this Report, the most urgent streetlighting funding need is to renew the system to a state of good repair. Until that is achieved, Torontonians are at heightened risk of public safety harms associated with “lights out”, falling poles, and other hazards. Moreover, paying for new LED lights only to have the lights flicker or fail due to deficient wiring, or to have the poles fall due to deteriorated materials, would be and be seen to be an inefficient use of scarce public funds.

If the funding constraints of today were not present, the best option would be the Accelerated Streetlighting Infrastructure Investment Framework. It would bring the streetlighting infrastructure into a state of good repair comparable to the target range for other municipal infrastructure. However, the through good faith discussions with the City Manager, City CFO, and other City Staff, it is clear that present financial constraints at the City preclude the $784M cost of that option. Toronto Hydro recognizes that the City faces significant financial pressures, including competing demands for renewal and modernization funding to remediate other deficient infrastructure. Toronto Hydro also recognizes that these pressing needs come at a time when the City also faces significant revenue shortfalls related to the COVID-19 pandemic and otherwise.

Recognizing it is the City that must perform the difficult task of balancing competing priorities, City Staff recommends the Proposed Streetlighting Infrastructure Investment Framework, and Toronto Hydro supports that recommendation, given the City’s financial circumstances. Toronto Hydro will work with the City to effectively complete the LED conversion and related infrastructure upgrades based on the budgeted incremental funding of $283M, for a total of $577M. This will make significant progress towards renewing the streetlight system, but will leave significant work post 2035 on the base infrastructure.

The renewal efforts will prioritise areas where infrastructure is worst, and also where the social and other policy benefits of good lighting is most important (e.g., areas of high crime, corridors with high pedestrian and vehicle conflicts). Toronto Hydro and Transportation Services have begun the work (reflected in this report) to identify priority neighbourhoods, and that work should continue and inform asset plans going forward. Toronto Hydro and Transportation Services have also identified other situations where the risk of failure is particularly hazardous, which are other important candidates for accelerated renewal initiatives. In conjunction with the renewal efforts there will be areas where infrastructure renewal needs are less urgent that will be retrofitted to LED technology.

The costing assumes RP-8 standards will be achieved on arterial roads with collector and local roads matching or exceed existing lighting conditions. If there are particularly poorly lit minor roads, they will be assessed on a case-by-case basis.

Failure to complete the investment in the streetlighting infrastructure and LED conversion will result in a seriously degraded system that will require costly accelerated investment post the expiry of the Services Agreement in 2035. The impact of operating a system with significant distribution assets almost all well beyond their useful lives is unknown, but at some point, there will be extensive failures leading to degraded service and harm to public safety.

Toronto Hydro appreciates the strong working relationship between its Streetlighting Operations team and City Transportation Services. This collaboration is a critical element in working to renew the streetlighting infrastructure, convert the lighting to LEDs, and modernize it with beneficial technologies.

Appendices

Appendix 1: Definitions

Abbreviation	Definition
ACA	Asset Condition Assessment
AIC	Asset Inventory Count
AMA	American Medical Association
APA	Asset Purchase Agreement
APUL	Assets Past Useful Life
BIA	Business Improvement Area
CTS	City Transportation Services
GHG	Green House Gas
GIS	Geospatial Information System
HID	High-Intensity Discharge
HPS	High-Pressure Sodium
ISO	International Standards Organization
KPI	Key Performance Indicator
LED	Light Emitting Diode
MH	Metal Halide
RP8	Recommended Practice Eight
SAMS	Streetlight Activity Management System
SEL	Street and Expressway Lighting
SLA	Service Level Agreement
SOGR	State of Good Repair
THESI	Toronto Hydro Energy Services Inc.

Appendix 2: Annual Cost Breakdown (includes effective HST rate of 1.76%)

Contract Amount: Cash Flow Schedule ($ millions)											
Year	**2026**	**2027**	**2028**	**2029**	**2030**	**2031**	**2032**	**2033**	**2034**	**2035**	**Total**
Service Fee	$ 22.0	$ 22.6	$ 23.3	$ 24.0	$ 24.7	$ 25.5	$ 26.3	$ 27.0	$ 27.9	$ 28.7	$ 252.1
LED and SOGR Upgrades	$ .0	$ .0	$ .0	$ .0	$ .0	$ .0	$ .0	$ .0	$ .0	$ .0	$ .0
Special Services	$ 4.2	$ 4.2	$ 4.2	$ 4.2	$ 4.2	$ 4.2	$ 4.2	$ 4.2	$ 4.2	$ 4.2	$ 42.0
Total	$ 26.2	$ 26.8	$ 27.5	$ 28.2	$ 28.9	$ 29.7	$ 30.5	$ 31.2	$ 32.1	$ 32.9	$ 294.1

Proposed Streetlighting Infrastructure Investment Framework: Cash Flow Schedule ($ millions)											
Year	**2026**	**2027**	**2028**	**2029**	**2030**	**2031**	**2032**	**2033**	**2034**	**2035**	**Total**
Service Fee	$ 22.0	$ 22.6	$ 23.3	$ 24.0	$ 24.7	$ 25.5	$ 26.3	$ 27.0	$ 27.9	$ 28.7	$ 252.1
LED and SOGR Upgrades	$ 33.8	$ 47.2	$ 46.5	$ 40.8	$ 26.1	$ 25.3	$ 19.5	$ 18.8	$ 13.0	$ 12.1	$ 283.1
Special Services	$ 4.2	$ 4.2	$ 4.2	$ 4.2	$ 4.2	$ 4.2	$ 4.2	$ 4.2	$ 4.2	$ 4.2	$ 42.0
Total	$ 60.0	$ 74.0	$ 74.0	$ 69.0	$ 55.0	$ 55.0	$ 50.0	$ 50.0	$ 45.0	$ 45.0	$ 577.1

Accelerated Streetlighting Infrastructure Investment Framework: Cash Flow Schedule ($ millions)											
Year	**2026**	**2027**	**2028**	**2029**	**2030**	**2031**	**2032**	**2033**	**2034**	**2035**	**Total**
Service Fee	$ 22.0	$ 22.6	$ 23.3	$ 24.0	$ 24.7	$ 25.5	$ 26.3	$ 27.0	$ 27.9	$ 28.7	$ 252.1
LED and SOGR Upgrades	$ 30.0	$ 85.2	$ 85.2	$ 85.2	$ 85.2	$ 22.5	$ 23.2	$ 23.8	$ 24.5	$ 25.2	$ 490.2
Special Services	$ 4.2	$ 4.2	$ 4.2	$ 4.2	$ 4.2	$ 4.2	$ 4.2	$ 4.2	$ 4.2	$ 4.2	$ 42.0
Total	$ 56.2	$ 112.1	$ 112.7	$ 113.4	$ 114.2	$ 52.2	$ 53.6	$ 55.1	$ 56.6	$ 58.1	$ 784.2