



P.O. Box 1749
Halifax, Nova Scotia
B3J 3A5 Canada

Item No. 13.1.1
Community Planning and Economic Development Standing Committee
December 12, 2024

TO: Mayor Savage and Members of Halifax Regional Council
SUBMITTED BY: Cathie O'Toole, Chief Administrative Officer
DATE: August 28, 2024
SUBJECT: Park Lighting Strategy

ORIGIN

June 8, 2021 Regional Council motion (Item No. 11.7.1):

MOVED by Councillor Austin, seconded by Councillor Mancini

THAT Halifax Regional Council request a staff report on developing a park lighting strategy. The strategy should consider the need for policy changes around park usage, conditions/criteria in which lighting is needed, and a capital program for park upgrades.

MOTION PUT AND PASSED UNANIMOUSLY

August 23, 2022 Regional Council motion (Item No. 15.1.7):

MOVED by Councillor Austin, seconded by Councillor Cuttell

THAT Halifax Regional Council direct the Chief Administrative Officer to prepare a staff report and park lighting strategy to guide the design and implementation of walkway, facility, and decorative/placemaking lighting, pursuant to the scope of work as outlined within the staff report dated August 5, 2022.

MOTION PUT AND PASSED UNANIMOUSLY

2023/24 Parks & Recreation Business Plan

EXECUTIVE SUMMARY

In 2021, Regional Council identified issues with the lighting of parks and public spaces and need for a lighting strategy. These issues included nighttime safety and the use of facilities. In August 2022, a scoping document for such a strategy was presented and approved by Regional Council. This staff report introduces and provides context for the Park Lighting Strategy (Strategy) that has been developed and is found in Attachment A.

Building upon the August 2022 scoping document, the Strategy is primarily concerned with park pathways, facilities such as sport courts, and placemaking installations such as public art. Community and stakeholder engagement helped to identify the evolving role of parks beyond daylight hours. Supported by this engagement and lighting best practices, the Strategy emphasizes how purposeful lighting designs can minimize environmental impact while addressing concerns such as safety, nighttime usability, and overall park experience.

A defining approach within the Strategy is to integrate park lighting as a standard capital component for pathway, facility, and placemaking projects. To deliver on these projects, lighting priorities and phased approaches will be brought forward in future business plans. In addition to the guidance for capital planning, policy changes are also identified to support park lighting and associated nighttime use. For example, potential amendments to Parks By-law 600 could extend operating hours under specific circumstances. Additionally, adjustments to the Municipal Design Guidelines would better connect walkway lighting with the broader municipal interest for safe pedestrian environments. Looking ahead, future park lighting designs will be shaped by the 'Green Book' standard, enhancing consistency and appropriateness across various contexts.

RECOMMENDATION

It is recommended that Halifax Regional Council adopt the Park Lighting Strategy as set out in Attachment A, as a guiding document for the planning of pathway, facility, and placemaking lighting, and direct the Chief Administrative Officer to incorporate the identification and prioritization of the lighting of such features into future budgets and business plans.

BACKGROUND

Park lighting has historically been considered an enhanced level of park service determined on a project-by-project basis. However, park lighting is increasingly viewed as important for accessibility, visibility, safety, active living, and social interaction, among other values.

Although parks are typically associated with daytime activities, their usage extends into the evening, particularly as daylight diminishes in the shoulder and winter seasons. This raises the issue of lighting for consideration. Regional Council's interest in the development of a Park Lighting Strategy stems from ongoing requests from the public. Specifically, requests have cited unsafe experiences, reported crime, concerns regarding accessibility, and interest in the ability to be active in parks in the evening hours. To address Regional Council's interest and the current lack of a formal process for evaluating the installation of lighting within parks, a Strategy has been developed to enhance park safety, security, and overall park experience.

DISCUSSION

Artificial nighttime lighting has become an expected component of our society and has made positive contributions on nighttime quality of life. Due to the prevalence of inappropriately applied light and increasing alterations to natural environment and human cycles, a thoughtful and measured approach to the installation of fixtures in public spaces is recommended.

With over 900 municipal parks in a variety of settlement patterns, it would not be feasible or responsible to light all park environments. By way of the Strategy, a replicable process for evaluating and prioritizing lighting in parks has been set out, along with specific guidance for lighting over three park lighting scenarios:

1. Park Pathways

There are approximately 206,300 m of pathways within parks and open spaces, including multi-use pathways (MUPs) that are part of the core active transportation network. Lighting can make some of these pathways safer and may be essential in circumstances where there are limited alternatives in travelling between community destinations.

2. Park Facilities

Although not an exhaustive list, there are 152 full basketball courts, 109 tennis courts, 34 gazebos, 15 pump tracks, and 11 ball hockey/box lacrosse courts, among many other facilities that may have lighting

requirements to be visible after dark. The use of park facilities could be enhanced with lighting during the summer months until a park's closed hours, and in shoulder and winter seasons when daylight is limited.

3. Park Placemaking

As a sample of placemaking features, the municipality maintains approximately 200 pieces of public art and cultural assets, 7 fountains, and more than 40 park plazas. Often operating as an added level of light and soft transitional lighting in parks, placemaking lighting can contribute to the pedestrian comfort, visibility, and sense of place.

Plan Approach

As informed by public and stakeholder engagement, lighting policy precedents, and lighting literature, overall lighting guidance for parks includes:

1. All new pathway, facility, and placemaking projects are to consider lighting

In pursuit of park safety, security, accessibility, and encouragement of healthy living, lighting for new pathways and facilities would be expected on a go forward basis. An emphasis would be placed on placemaking lighting in consideration of its circumstance and purpose. The goal is not lighting at any cost, the specifics of a lighting design should be influenced by a project's impact to park programming, budgets, neighbours, and the natural environment, among other criteria presented within this section.

2. Existing pathways, facilities, and placemaking features are to be evaluated as needed

A priority is to be placed on existing pathways, relative to safety and security issues. Lighting would be brought forward for consideration when:

- staff add projects into the business plan and budget;
- there are overlapping projects between teams and business units warranting lighting integration;
- there are external partnerships and funding.

As with any plan or policy update, there will be a gap in service delivery, standards, and quality until upgrades bring infrastructure to the same standard. Appendix D within the Strategy highlights a preliminary list of candidate spaces that should be considered for lighting over time, but which require further evaluation to determine suitability and budget (timing) priority.

3. Park lighting should be high quality

To ensure quality, lighting should:

- be purposeful and will minimize waste;
- only be used and directed where it is needed and at minimum required levels;
- consider the impacts to human and environmental health; and
- be controlled by schedules.

4. Emerging technologies are to be evaluated for their suitability within parks

The use of emerging lighting technologies should consider sustainability, user experience, safety, security, and long-term cost-effectiveness. Energy-efficient solutions, like LED lighting, are already helping to minimize environmental impact and operational costs without compromising visibility.

The municipality is beginning to pilot solar lighting in parks and will explore additional installations. As they are available, smart lighting systems that offer programmability and adaptive controls should continue to be explored.

5. A site analysis is a critical step ahead of developing an individual park lighting plan

A site analysis helps to understand:

- how a park is used, when it is used, intensity of use, and by whom;
- how the space transitions from day to night;
- key amenities and features within a park and illumination needs;

- the proximity of neighbours to a park and the impact lighting may have on people;
- the environmental context and sensitive landscape features to be protected; and
- areas of concern in the park, such as known and recorded areas of antisocial behaviour, potential hazards and physical transitions, and areas with poor visibility.

6. Park safety assessments help to understand the nuances of space and those who experience them
The municipality's Community Safety Office collaborates with community volunteers and facilitates Women's Safety Assessments (WSA). The WSA aims to reduce barriers for women and vulnerable persons, so they can equitably access quality of life services, including parks. Research demonstrates that by involving women and gender diverse people in the process of identifying safety concerns and potential solutions, public spaces are made safer for everyone.

Future Business Planning Considerations

As park lighting becomes a standard capital component for all upcoming pathway, facility, and placemaking projects, implementing the Strategy entails the development of lighting priorities in future business plans. The capacity to deliver projects will inform a phased approach to lighting implementation.

In addition to the guidance for capital planning and individual lighting projects highlighted in the Strategy, the following policy changes are identified to support park lighting and associated nighttime use.

- Policy Change for Park Use
Currently, the Parks By-law (By-Law P-600, *Respecting Municipal Parks*), defines the open hours of most parks to be from 5:00 a.m. to 10:00 p.m. At their June 8, 2021 meeting, Regional Council directed staff to consider changes to the Parks By-law to permit park usage after 10:00 p.m. in certain circumstances.

No uniform change to park hours is called for with the program for increased facility lighting. Rather, the focus is on extending usage after dark, especially during shoulder seasons and the winter. There may be certain situations where it is desirable to extend the use of a facility beyond 10:00 p.m. but these special situations would consider factors such as compatibility with surrounding uses.

As part of the next regular update to the Parks By-law or through the current powers of the Executive Director; clarifications are to be made to ensure that lighted pathway usage is clearly permitted within parks, beyond their open hours.

- Policy Change for Better Alignment
The Municipal Design Guidelines has clear design criteria for walkway width, grades, access, drainage, and vehicle barriers to ensure pedestrian access. However, when it comes to lighting, the document is informed by approaches for vehicular roadway lighting. A maximum distance of 75 metres between lighting fixtures is specified, which too great of distance and conflicts with the precautionary approach recommended within this Strategy. Minor changes to the Municipal Design Guidelines would allow for better alignment with the broader municipal interest in creating safe and comfortable pedestrian environments.
- Alignment with Approved Plans & Projects
Although the principles of balancing park use after dark while mitigating nighttime human and environmental impacts are similar, the associated strategy does not address playing field lighting. The recently approved Playing Field Strategy (PFS) already provides direction to prioritize field lighting on all-weather sport fields; directs most lighting to regional hubs; focuses lighting investment primarily on ball diamonds; ensures the long-term feasibility of lighting infrastructure; aims to minimize light pollution; and ensures that automated systems are integrated with facility scheduling. Work is underway through direction in the PFS to complete field lighting assessments on existing ball diamond sites to determine age, condition, regional distribution, and needs prior to considering new sites.

There is the matter of pathways and parking lots that service facilities outside the scope of the present Strategy (e.g., playing fields, pools, community centres, libraries etc.); the best practices and guidelines presented within the Strategy are readily applicable and can be applied when municipal parks interface with purpose-built facilities.

- Development of Green Book Standard
The Strategy outlines tools to consider the appropriateness of lighting within a variety of contexts. Lighting specifications and design details will be included in a larger forthcoming initiative known as the 'Green Book'. The 'Green Book' project is referenced in the 2023/24 and 2024/25 Business Plan.

FINANCIAL IMPLICATIONS

There are no immediate financial implications to Regional Council's approval of the Strategy. Park lighting has additional capital and operating costs which would be outlined in annual business and budget plans for individual projects. Funding opportunities for emerging and effective technology will be reviewed as lighting projects advance to planning, design, and construction stages. Examples of recent project costs are identified in Attachment B. The approval of the Strategy provides the municipality with guidance over the types of projects that should include lighting. The Strategy is a means through which lighting can be considered, prioritized, and integrated into projects. Such integration results in design and construction efficiencies as the installation of lighting following the completion of a park facility project typically has substantially higher costs.

RISK CONSIDERATION

The primary risk in not adopting the Strategy would be the absence of guidance for lighting decisions within municipal parks.

COMMUNITY ENGAGEMENT

An online engagement program was hosted through 'Shape Your City Halifax' which was open to the public from May 15 until June 18, 2023. Paper surveys were hosted at all branches of the Halifax Public Library and project information was shared through HRM Community Developers. The engagement program was completed by approximately 1000 individuals.

Staff also engaged the Women's, Accessibility, and Youth Advisory committees to gauge the lived experiences and specific needs of diverse residents. Internal and external stakeholders were also engaged to understand the how lighting impacts site programming, operations, and site safety.

ENVIRONMENTAL IMPLICATIONS

There are no environmental implications tied to the recommendation within this report, however, new lighting infrastructure will gradually increase municipal electrical consumption. As efficient technology (i.e., efficient fixtures and bulbs, solar, etc.) becomes available, the suitability of lighting infrastructure can be weighed against budgets and performance. The Strategy outlines guidelines to reduce the impact of lighting on the natural environment (Attachment A).

ALTERNATIVES

Regional Council could choose to:

1. Request changes to the Park Lighting Strategy as presented. This may require additional review, possible community consultation, and a separate staff report.
2. Decline to adopt the proposed Park Lighting Strategy. This will delay a plan to guide future business planning decisions.

LEGISLATIVE AUTHORITY

Halifax Regional Municipality Charter, SNS 2008 c 39:

Section 7A The purposes of the Municipality are to...(b) provide services, facilities and other things that, in the opinion of the Council, are necessary or desirable for all or part of the Municipality; and (c) develop and maintain safe and viable communities.

Section 79A (1) Subject to subsections (2) to (4), the Municipality may only spend money for municipal purposes if (a) the expenditure is included in the Municipality's operating budget or capital budget or is otherwise authorized by the Municipality.

ATTACHMENTS

Attachment A Park Lighting Strategy
Attachment B Recent Park Facility Lighting Costs

A copy of this report can be obtained online at halifax.ca or by contacting the Office of the Municipal Clerk at 902.490.4210.

Report Prepared by: Stephen Cushing, Landscape Architect, Policy & Planning 902.292.1565

HALIFAX

Park Lighting Strategy

September 2024



Acknowledgments

With Thanks To The Following Contributors:

Stephen Cushing - Project Lead, Parks & Recreation, Policy & Planning

Halifax Regional Municipality

Adam Cornick - Parks & Recreation, Parks

Amy Brierley - Community Safety

Caroline Hemstock - Community Safety

Chris Poole - Parks & Recreation, Parks

David MacIsaac - HRM Public Works, Active Transportation

Dawn Neil - HRM Public Works, Active Transportation

Diane Levandier - Parks & Recreation, Recreation Programming

Jeff Spares - Parks & Recreation, Parks Capital

Kellie McIvor - Parks & Recreation, Culture & Community

Kelly Barry - Parks & Recreation, Asset Control & Service Delivery

Kelly Gaulton - Parks & Recreation, Parks Capital

Lindsay Cory - Parks & Recreation, Culture & Community

Lindsay Mullin - Community Safety

Phillip Wright - Parks & Recreation, Asset Control & Service Delivery

Richard Harvey - Parks & Recreation, Policy & Planning

Tanya Lambert - Halifax Regional Police, Community Relations Crime Prevention

External Contributors and Subject Matter Experts

Graziella Grbac- Village on Main - Community Improvement District

Jonathan Goldson - Downtown Halifax Business Commission

Kimberly Dossett - Downtown Halifax Business Commission

Karen McKendry - Ecology Action Centre

Karla Nicholson - Quinpool Road Mainstreet District Association

Michelle Champriss - Sackville Business Association

Porters Lake Business Association

Sue Abbott - Birds Canada

Tim Rissesco - Downtown Dartmouth Business Commission

TJ Maguire - Build Nova Scotia

Wayne Comeau - Illuminating Engineering Society - Atlantic Chapter Member

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Executive Summary

The municipality has over 900 parks in a variety of settlement patterns making them important centres of recreation and connection within communities. While park use may be thought of as a daytime activity, use occurs during nighttime periods. This brings the matter of lighting into consideration. More specifically, in a northern winter climate with reduced daylight hours for a portion of the year, residents are increasingly requesting opportunities for lighted park access. To address the current lack of a formal process for evaluating the installation of lighting within parks, the purpose of the Park Lighting Strategy (the Strategy) is to enhance the safety, security, and overall park experience.

By invoking the precautionary principle, a balance is sought between providing adequate illumination for park users while minimizing light pollution, energy consumption, and human and environmental impact. A controlled and restrained approach to lighting reassures the public that visible and accessible passage within parks is possible.

In Canada, municipal guidelines for park lighting are not widespread. A variety of park lighting circumstances were reviewed, some as part of an overall consideration of public realm lighting and others that have guidelines specific to the lighting of pathways. These documents become frameworks for park lighting improvements that address the safety of park users and overall night-time experiences.

In developing this Strategy, public and stakeholder engagement was undertaken and has provided valuable insight into personal experiences and opportunities for lighting in parks. The interest in safety and security while socializing and moving through park space was seen as a priority. However, lighting was not suggested at any cost with several responses highlighting the need for efficient and responsible lighting that reduces the impact on human health and the natural environment.

Three broad park scenarios are addressed in the Strategy for the consideration of park lighting:

1. **Park Pathways:** there are approximately 206,300 m of pathways within municipal parks and open spaces, including multi-use pathways (MUPs) that are part of the core active

transportation network. Lighting can make some of these pathways safer and may be essential in circumstances where there are limited alternatives in traveling between community destinations.

2. **Park Facilities:** although not an exhaustive list, there are 34 gazebos, 152 full basketball courts, 109 tennis courts, 15 pump tracks, and 11 ball hockey/box lacrosse courts, among many other facilities that may have lighting requirements to be visible after dark. The use of these types of park facilities could be enhanced with lighting during the summer months until a park's closed hours, and in shoulder and winter seasons when daylight is limited.
3. **Park Placemaking:** as a sample of placemaking features, the municipality maintains approximately 200 pieces of public art and cultural assets, 7 fountains, and more than 40 park plazas. Often operating as an added level of light and soft transitional lighting in parks, placemaking lighting can contribute to pedestrian comfort, visibility, and sense of place while highlighting such important features.

As informed by public and stakeholder engagement, lighting policy precedents, and lighting literature, overall lighting guidance for parks includes the following:

- In pursuit of park safety, security, accessibility, and encouragement of healthy living, all new pathway, facility, and placemaking projects are to consider lighting as a possible project component on a go-forward basis. Although, the goal is not lighting at any cost, the specifics of a lighting design should be influenced by a project's impact to park programming, budgets, neighbours, and the natural environment, among others.
- This strategy calls for the consideration of existing spaces and places for lighting as they are recapitalized, or as special requests are made. As with any plan or policy update, there will be a gap in service delivery, standards, and quality until upgrades bring infrastructure to the same standard.

- While meeting individual park needs, park lighting should be purposeful and minimize waste, to be used and directed where it is needed and at minimum required levels, consider the impacts to human and environmental health, and be controlled by schedules.
- The use of emerging lighting technologies will allow for the consideration of sustainability, user experience, safety, and long-term cost-effectiveness. Energy-efficient solutions, like LED lighting, are already helping to minimize environmental impact and operational costs without compromising visibility. The municipality is beginning to pilot solar lighting in parks and will continue to explore additional installations and fixtures. As they are available, smart lighting systems that offer programmability, and adaptive controls should be explored.
- Before lighting, a full understanding of site is necessary. A site analysis involves an assessment of the physical, environmental, and social conditions of a park to determine how lighting can enhance the park's functionality, safety, and aesthetics. From a safety and security perspective, the Women's Safety Assessment (WSA) is one tool that aims to reduce barriers for women, gender diverse people, and other underrepresented residents, so they can equitably access quality of life services, including parks. As a result, public spaces are made safer for everyone.

Future business plan considerations include the alignment of policy and plans to better accommodate the safe nighttime use of parks:

- Policy Change for Park Use
Most parks are open from 5:00 a.m. to 10:00 p.m. No uniform change to park hours is called for with the program for increased facility lighting. Rather, the focus has been to extend use after dark, especially during shoulder seasons and the winter. There may be certain situations where it is desirable to extend the use of a facility beyond 10:00 p.m., but these special situations would consider factors such as compatibility with surrounding uses. It is the intention, however, to plan for the installation of the lighting of pathways that serve as the primary connection between destinations.

As part of the next regular update to the Parks By-law (P-600) or through the current authority of the Executive Director, clarifications are to be made to ensure that pathway usage within parks beyond their opening hours are clearly permitted for those pathways that serve as the primary route between destinations.

- Policy Change for Better Alignment
The Municipal Design Guidelines document has clear design criteria for walkway width, grades, access, drainage, and vehicle barriers to ensure pedestrian access. However, when it comes to lighting, the document is informed by approaches for vehicular roadway lighting. A maximum distance of 75 metres between lighting fixtures is specified, which too great of distance and conflicts with the precautionary approach recommended within this Strategy. Minor changes to the Municipal Design Guidelines document would allow for better alignment with the broader municipal interest in creating safe and comfortable pedestrian environments.
- Development of a Green Book Standard
This Strategy outlines some of the broad level tools needed to consider the appropriateness of lighting within a variety of contexts. A more detailed approach that considers lighting specifications and design details will be included in a larger forthcoming initiative known as the 'Green Book'.

The approval of the Strategy does not approve capital or operational funding for lighting. Future expenditures will be considered in subsequent budget years during the business planning process. It should be noted that lighting infrastructure can be costly on a large scale and therefore, it is anticipated that a phased approach based on identified priorities will be necessary.

Definitions

Crime Prevention Through Environmental Design (CPTED): is an approach to designing physical environments to reduce crime and increase safety.

Colour Temperature: light color temperature is a way of measuring the color appearance of light emitted by a light source. It is expressed in units of Kelvin (K) and is visible to the human eye on a scale of low temperature (i.e., warm) to high colour temperature (i.e., cool).

Electrical can (box): metal box or housing that contains electrical connections. Below ground servicing for lighting originates from these boxes.

Facility: any structure or amenity within a park that provides a service or convenience to visitors.

Foot candle: an imperial unit of measurement for the amount of light or illuminance hitting a surface.

GIS: Geographic Information System (GIS) is a computer-based system designed to capture, store, manipulate, analyze, and present spatial or geographic data.

Glare: when a light system overloads the human visual system.

LED: light-emitting diode light (LED) is a type of light that uses a semiconductor device to emit light when an electrical current is passed through it. Unlike traditional incandescent bulbs that produce light by heating a filament, LEDs are energy-efficient and long-lasting.

Light Pollution: the ineffective use of light resulting in over illumination, glare, light trespass, and sky glow.

Light trespass: when a nearby light source intrudes onto an adjacent property or window.

Lumens: the total amount of light visible to the human eye from a light source.

Lux: is a metric measure of illuminance, the total amount of light that falls on a surface. 1 lux = 1 Lumen (where distance is in meters)

Over illumination: lighting over and above what is required to see people and objects properly.

Park Lighting Strategy: the deliberate planning of a lighting system for a park network with the aim of improving safety, security, and overall user experience.

Pathway: a pedestrian walkway or trail that connects different areas within the municipality. These pathways can be designed for recreational use or as a means of transportation. Surface materials, grades, and finishes will vary depending on the location.

Placemaking: typically, low level lighting that can contribute to the illumination of social space and create a unique outdoor space identity for a community.

Sky glow: stray light from multiple lighting sources that illuminate the sky above lighting sources.

Women's Safety Assessment (WSA): is an inclusive community-driven public space auditing tool used to assess the safety needs of a diverse range of users.

1.0 Introduction

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Halifax Regional Municipality (HRM) is enriched by an extensive network of parks and open spaces. The municipality strives to protect and enhance these areas, ensuring they benefit both present and future generations while balancing a variety of park uses. While park use may be thought of as a daytime activity, use occurs during evening periods as daylight in shoulder and winter seasons lessens. This brings the matter of lighting into consideration. More specifically, in a northern winter climate with reduced daylight hours for a portion of the year, residents are increasingly requesting opportunities for lighted park access.

On June 8, 2021, Regional Council requested a staff report on the possible development of a park lighting strategy. During deliberations, ongoing requests from the public were raised, including residents who have described unsafe experiences after dark, anti-social behaviour discouragement, determinations about which park facilities might be considered for lighting, whether the Parks By-law (By-Law P-600, *Respecting Municipal Parks*) should reflect the use of park spaces after dark, and how lighting might be funded and prioritized into the future.

The creation of the Strategy was supported by a scoping report presented to Regional Council on August 5, 2022. Subsequently, the Strategy was included in the Parks & Recreation Business Plan for 2023/24 and 2024/25.

1.1 The Need For A Strategy

The entirety of this document constitutes the Park Lighting Strategy (the Strategy), encompassing deliberate planning for lighting in parks with the overarching goal of enhancing safety, security, and the overall park experience. The goal of the Strategy is to outline a framework for the establishment of park lighting that serves the needs of park users, while minimizing light pollution, energy consumption, and human and environmental impact.

By way of the Strategy, a replicable process for evaluating and prioritizing lighting in parks has been set out. Additionally, the public and Regional Council are provided with a reasonable expectation of the kinds of spaces that might be lit, along with specific guidance for lighting over three park lighting scenarios (i.e., pathways, facilities, and placemaking). Each lighting scenario is highlighted with specific lighting suitability criteria, park lighting characteristics, and situational examples.

The scope of the Strategy is limited to pathways, facilities, and placemaking lighting within municipal parks and applies to all communities within the municipality. Facilities that are purpose built to include lighting (e.g., Multi District and Recreation Facilities/buildings, all-weather turf, ball diamonds, and natural turf fields) are not included within the scope of the Strategy as there are other plans to guide their management.

1.2 Changing Lighting Needs

For millennia, humans have relied on views of the night sky to establish a sense of place in the world. Today, individuals are increasingly more mobile and the lines between work and life are becoming blurred. Our lives are more flexible, and it is often in public outdoor space where people commute and socialize, even after dark. This trend became especially pronounced in Canada during the Covid-19 pandemic where both appreciation for park spaces and park visitations significantly increased.

In HRM, reduced day length during shoulder seasons and winter means that individuals rely on pedestrian lighting after dark. As a result, artificial nighttime lighting has become an expected component of our society to provide for safety, security, and aesthetic quality.

However, the prevalence of artificial light is causing one of the most rapidly increasing alterations to the natural environment. This phenomenon is known as light pollution and can have adverse

effects on plant, animal, and human cycles. Approximately two-thirds of the world population and more than 80 per cent of Canadians live in areas where the night sky is obscured by brightness above what the night adapted eye can see (i.e., artificial sky brightness greater than 10% of the natural night sky brightness above 45° of elevation). In more central areas of the municipality, light pollution literature indicates that there is notable sky glow, skyline discoloration, and only a marginally visible Milky Way.

Despite the above, lighting does not always have to be seen as negatively impacting municipalities. It is the aggregate of inappropriately designed and installed lighting that degrades the nighttime environment.

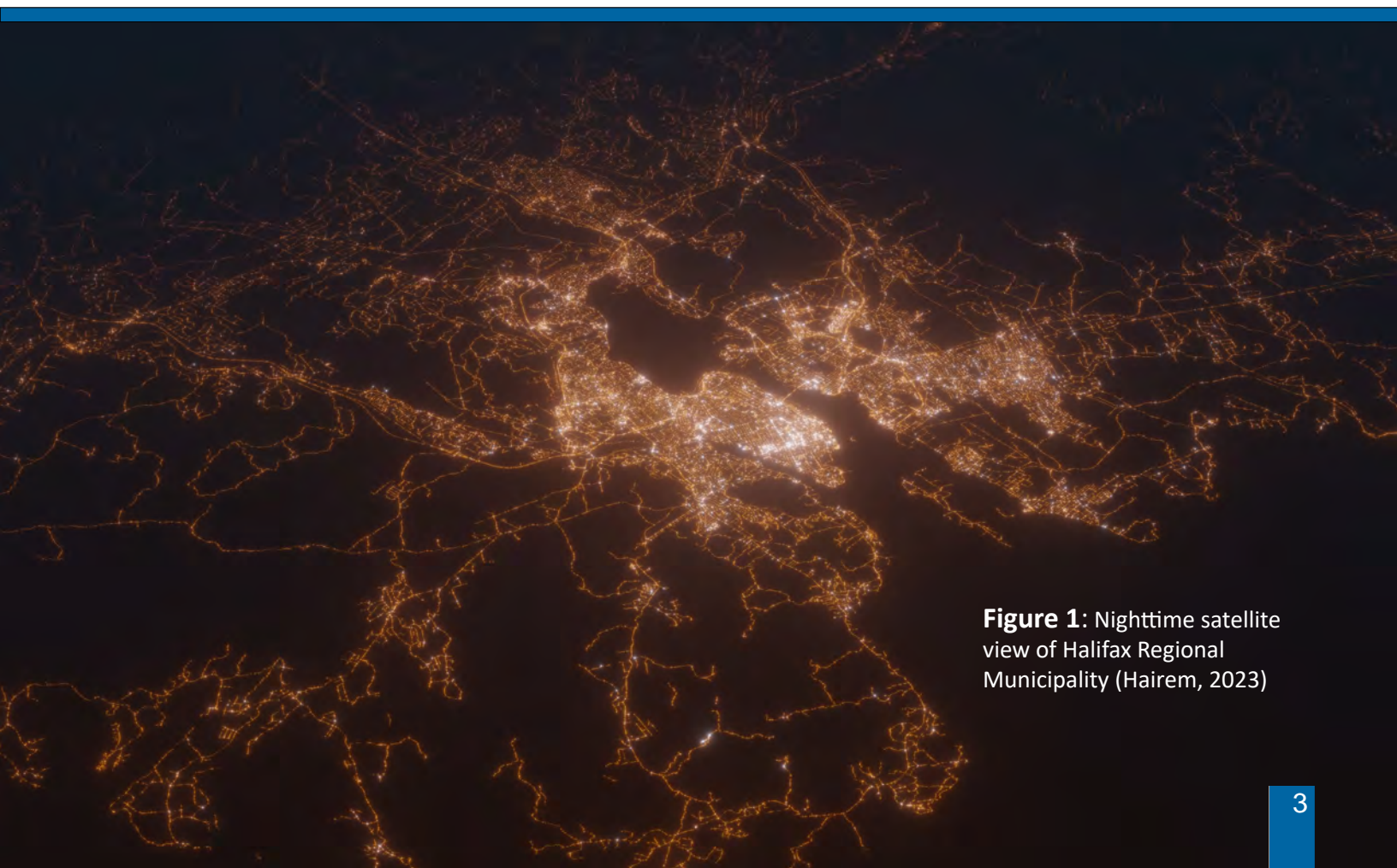


Figure 1: Nighttime satellite view of Halifax Regional Municipality (Hairem, 2023)

1.3 Understanding Illumination

Illumination refers to the amount of light that falls on a surface or object. It is typically measured in lux or foot-candles, which are units of measurement that describe the intensity of light. The amount and quality of illumination required in a particular park setting will depend on several factors, such as the activity being performed; the age, visual acuity, and accessibility needs of the user of the space; and the colour and reflectivity of the surfaces in the area. As a benchmark, direct full sun is in the range of 32,000 – 130,000 lux, a full moon is 0.25-0.5 lux, an illuminated sports field is in the range of 500-1000 lux, and typical path lighting is often in the range of 5-10 lux.

Another measure of lighting is colour temperature, which is the colour appearance of light emitted by a light source expressed in units of Kelvin (K). Colour temperature is visible to the human eye on a scale of low or warm temperature (i.e., lower than 3000 K) to high or cool colour temperature (i.e., higher than 4000 K).

There is often a situation of extremes in outdoor public spaces after dark where areas are under lit,

inappropriately lit, or over lit. As a form of light pollution, over illumination is the lighting over and above what is required to see people and objects properly. Ironically, more light can make spaces unsafe by reducing visibility by park users by increasing glare. Glare occurs when a light system overloads the human visual system. Human sensitivity to glare increases with age.

Other forms of wasted light include light trespass, and sky glow. Light trespass is when a nearby light source intrudes onto an adjacent property or window. Although light trespass in some instances may be unavoidable, caution should be exercised when relying on blue light emitted by LED technologies. More susceptible to light reflection and scatter, the blue light spectrum can impact human sleep patterns and restfulness. Sky glow is the stray light from multiple lighting sources that illuminate the sky above lighting sources. Although one fixture is generally not considered sky glow, the collection of poorly selected fixtures (i.e., brightness, direction of light) will contribute to this pollution. Concerns have been raised over sky glow and the impacts on the navigability of birds and other wildlife and the inability for people to adequately observe the night sky.

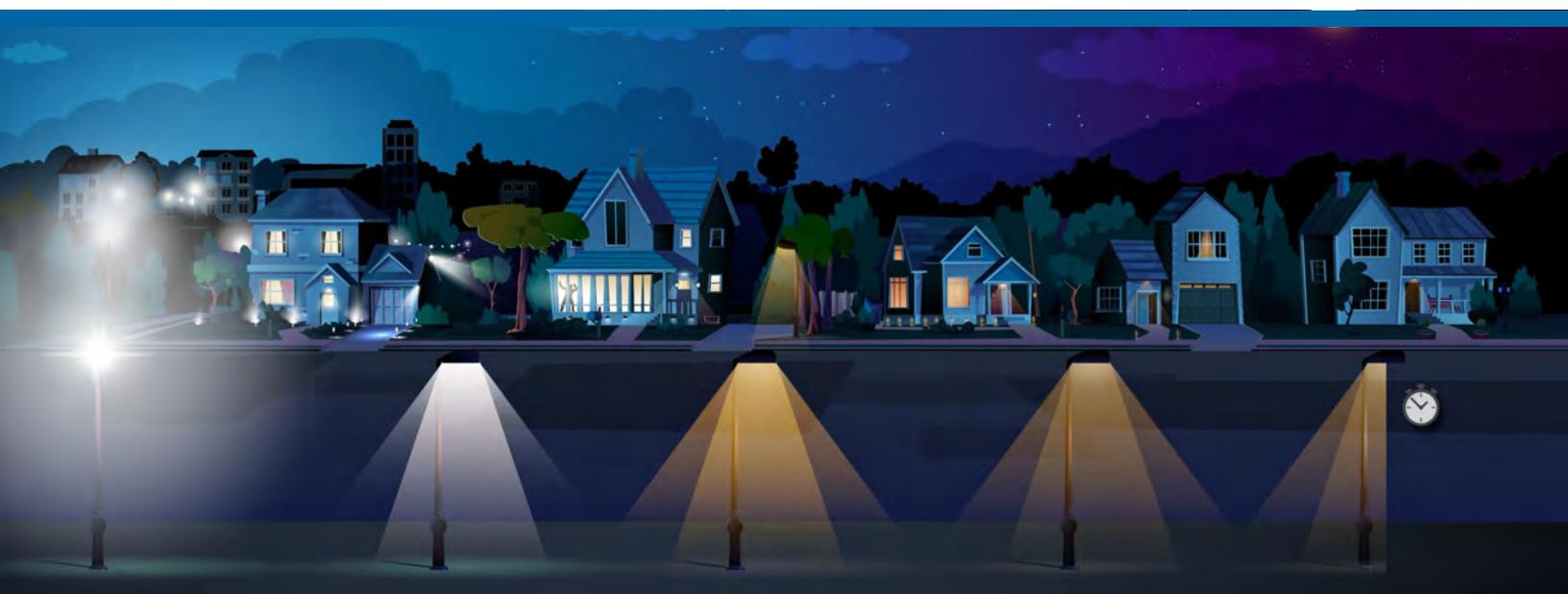


Figure 3: From left to right, this illustration demonstrates public space lighting that is the worst to the best. Overly bright, unshielded, and blue spectrum lighting ought to make way for downward directed, shielded, warm spectrum lighting. Timers or other dimming controls can further reduce light pollution (McDonald Observatory, 2023).

2.0 A Precautionary Approach To Illumination

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As a concept, the precautionary principle suggests that in situations where the potential harm from an action or technology is uncertain, precautionary measures should be taken to avoid or minimize potential harm. In the context of park lighting, this means taking a thoughtful and measured approach to the installation of fixtures in public spaces. The goal is to minimize the potential harm that may arise from excessive light pollution, glare, or other adverse effects.

As a joint effort in 2020, the Illuminating Engineering Society (IES) and the International Dark Sky Association (IDA) developed five principles for responsible outdoor lighting;

1. All lighting should be useful and have a purpose.
2. Lighting should be targeted and only be directed where it is needed.
3. Lighting levels should be no higher than necessary.
4. Lighting should be controlled and only used when it is useful.
5. Warm colour lighting should be used when possible.

The following section integrates these principles and expands on them to provide an overview of lighting approaches and how the impacts of lighting can be mitigated.

2.1 Safety & Security

The primary reasons for lighting in the public realm are often safety and security with the intention of protecting people and assets. However, safety and security are not the same thing. Security lighting is often tied to crime prevention, whereas safety lighting is used to highlight the visibility of users and potential hazards.

While lighting is often mentioned as an important tool to decrease crime, planning literature lacks clear evidence supporting the idea. The tendency to employ bright flood lighting as a reactionary measure to enhance safety in dark spaces is misguided. However, well-planned lighting is known to improve visibility in public spaces and may discourage antisocial behaviour. Lighting a space after dark, both for function and aesthetics, also changes the social use and activation of spaces, strengthening informal control and sense of ownership, which may reduce patterns of crime.

The perception of safety and security influence the decisions one may make when entering or avoiding a park space after dark. This is especially true among women and vulnerable individuals. Adequate lighting may provide personal confidence in the ability to use and travel through a park without the fear of entrapment.

Park lighting can create visual cues and landmarks that help people navigate and orient themselves within a space. This can be especially helpful for people with visual impairments. Proper lighting can also improve the visibility of signage, information kiosks, and other important features of the space, making them easier to locate and read.

There are a number of lighting best practices that may contribute to improved park visibility, including:

- Consider the experiences and perspectives of a diversity of individuals before making lighting infrastructure decisions.
- The comfort and safety of users can reasonably be accommodated using the minimum amount of lighting possible unless the site-specific special area or sport use precludes dimmed illumination.

- Favour the use of human-scaled lighting (e.g., no higher than 4.5m in pedestrian zones).
- Lighting should be discouraged in places that are visually and physically inaccessible after dark.
- Lighting can be used to highlight hazards such as uneven surfaces, surface textures, and space transitions.
- Prioritize lighting on frequented pathways between community destinations (e.g., work/commercial areas, transit, retail, school, etc.).
- The physical organization of space and placement of facilities can sometimes be more useful than lighting to improve visibility.

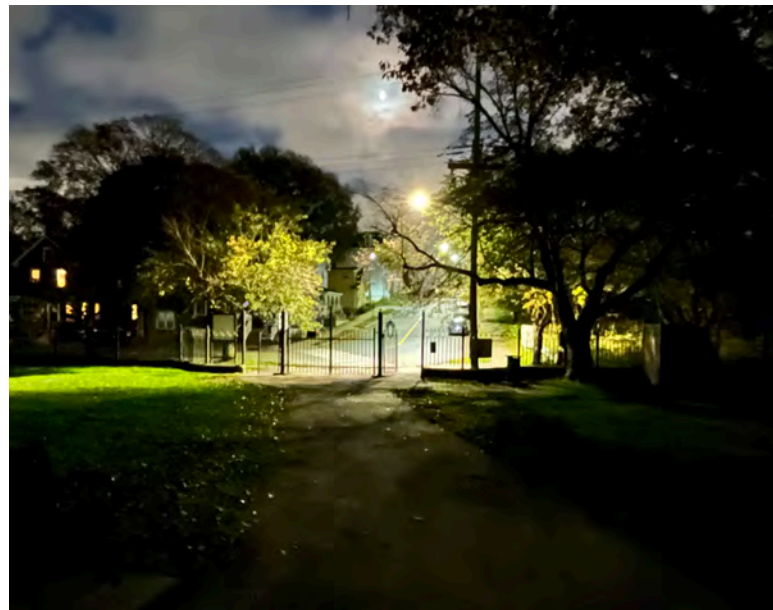


Figure 4: This existing pathway in the Dartmouth Common has no lighting other than spill-over lighting from the street (Cushing, 2023). There may be a perception of crime or entrapment without clear sightlines. Uneven surfaces, textures, and transitions are hidden and may impact one's use of this space after dark.

2.2 Accessibility & Equity

Regional Council has approved an Accessibility Strategy, which aims to improve accessibility and representation for individuals with disabilities. The Accessibility Strategy builds upon the municipality's Diversity & Inclusion Framework and Nova Scotia's Accessibility Act. Although not explicitly stated, park lighting would fall within the Built Environment category of the plan with the following actions:

- Use Rick Hansen gold certification and Canadian Standards Association (CSA) B651-18 standards for future infrastructure in the Halifax region (e.g., Rick Hansen curb cuts, public washrooms, CSA standards for accessible parking spaces).
- Adopt Rick Hansen gold certification and CSA B651-18 standards for current infrastructure, including street infrastructure, owned by HRM.
- Develop review system to audit buildings, public facilities, recreational parks/playgrounds, and trails to assess when repairs or upgrades are needed to maintain accessibility.
- Ensure that all signage, walkways, and equipment for beaches, parks, playgrounds, and recreational facilities are accessible for individuals with disabilities.

Expanding on the above, there are several internal and external planning tools that will help to inform lighting direction.

The Rick Hansen Foundation Accessibility Certification (RHFAC)

The RHFAC is a program that rates the accessibility of buildings and public spaces based on their level of barrier-free design. It was created by the Rick Hansen Foundation, a Canadian organization that aims to improve the lives of people with disabilities through access and inclusion. The RHFAC assesses lighting using several factors, including the quantity, quality, and distribution of light. Proper lighting is critical for ensuring that people with vision impairments can safely navigate a space. In addition, proper lighting can also help reduce the risk of falls and improve the overall safety of a space.

The Canadian National Institute for the Blind (CNIB) Clearing our Path

The CNIB Foundation's 'Clearing our Path' document provides guidance for the design of new built environment elements to meet the needs of people impacted by blindness. Specific to outdoor lighting, the following is noted:

- Lighting types, styles, and placement can be used to support wayfinding and orientation.
- Lighting is essential to highlight space, elevation transitions, and signage.
- Generally speaking, as people age, the human eye requires more light to function.
- Tools to avoid light pollution should be employed. Glare and reflection can result in visual confusion and is a prominent issue within public space for those experiencing blindness. A lack of ability to find one's direction through an over or under lit space is also an issue.

Beyond the conditions for physical accessibility, there is a consideration of equitable distribution of lighting and the specific site needs of a diversity of park users. For example, when planning for lighting in future business plans and budgets, projects should consider those who are at a higher risk of being exposed to unsafe situations, who disproportionately rely on parks for their daily movement through communities, and who do not have access to a vehicle.

Gender Based Analysis Plus (GBA+) toolkit

Gender inequality is a complex issue facing women, gender diverse, and non-binary people throughout the region. It is the result of systemic discrimination, inequitable distribution of household and caregiving responsibilities, as well as policies, practices, and attitudes rooted in colonialism and patriarchy. The municipal Gender Based Analysis Plus (GBA+) toolkit responds to the needs of residents with diverse identities beyond gender. The GBA+ toolkit is an intersectional and evidence-based process, used by all levels of government, to assess how diverse groups of women, men and non-binary people may experience policies, programs and initiatives. Intersectionality is embedded into the GBA+ framework to help us understand human beings as shaped by the interactions of different social

locations (e.g., 'race'/ethnicity, Indigeneity, gender, class, sexuality, geography, age, disability/ability, migration status, religion, etc.).

The GBA+ toolkit has been considered in the development of this Strategy in several ways:

- Representatives from diverse communities were engaged early in the project to understand the barriers to using park spaces after dark and understand specific lighting needs.
- The Women's Safety Assessment (WSA) has been included within this Strategy as the preferred safety evaluation tool to assess a space before lighting is considered. The WSA encourages women and people from marginalized communities to participate in decision-making processes for the planning of open spaces.
- Staff feedback from The Office of Diversity and Inclusion and African Nova Scotian Affairs Integration Office (ANSAIO) and the Community Safety Office has been valuable in framing how parks can serve those that are traditionally underrepresented in policy and place.

Some additional lighting best practices that may contribute to improving park accessibility include:

- Where possible, orient light fixtures downward to avoid glare and trespass.
- Avoid the creation of shadows through the correct placement, fixture design, and spacing. Shadows can hide important features, views, and create optical illusions.
- Establish a consistent height, type, and level of lighting to provide useful directional cues. This can help people impacted by blindness to differentiate between spaces (e.g., lit pathways vs a roadway).
- Prioritize lighting on frequented pathways between community services (e.g., work/commercial areas, transit, retail, school, etc).
- Consider the illumination of conflict zones (e.g., pathway intersections, park entrances/exits).
- Lighting should be discouraged in places that are visually and physically inaccessible after dark.
- Coordinate lighting between municipal facilities (i.e., buildings) and parks to ensure transitions are adequately visible.

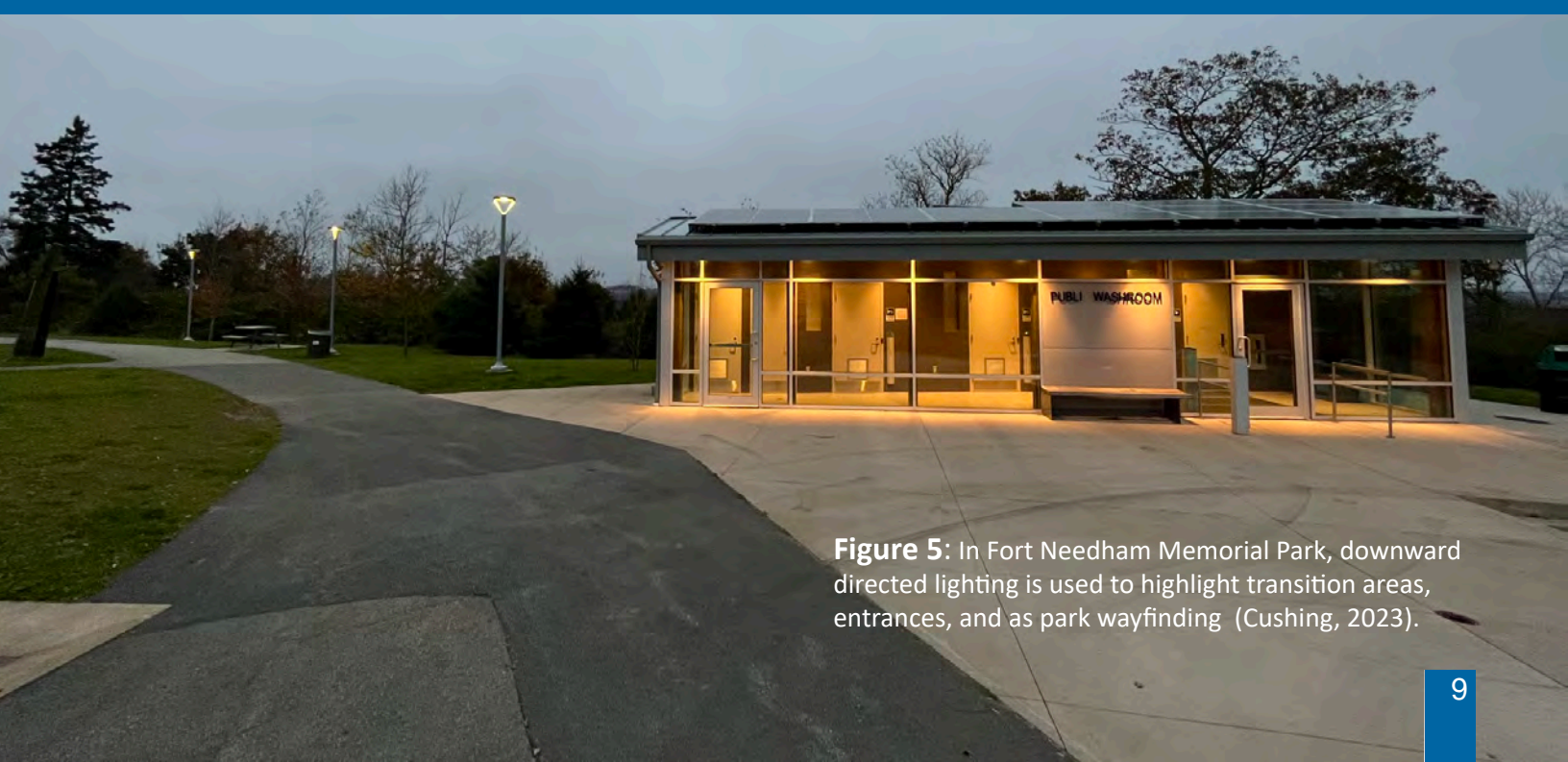


Figure 5: In Fort Needham Memorial Park, downward directed lighting is used to highlight transition areas, entrances, and as park wayfinding (Cushing, 2023).

2.3 Site Sustainability & Ecology

Through the HalifACT climate action plan, the municipality has made commitments to reduce greenhouse gas emissions and adapt to a changing climate. Part of this commitment includes achieving net-zero municipal operations by 2030.

An ecosystem is a complex relationship between organisms and their surrounding environment, which can be negatively changed by artificial lighting. The long-term impacts of light on plants and animals are still being understood. However, environmental literature indicates that nocturnal mammals are susceptible to artificial light due to exposure to predators and disrupted feeding patterns in typically dark environments. In response, animals may abandon established foraging grounds, affecting competition for food and mating in new environments. Some animals, like insects, may be drawn toward light sources until the point of exhaustion while some animals (e.g., bats) are repelled by lighting. Changing migration patterns of birds, spawning patterns of fish, or nocturnal patterns of insects and mammals are additional implications.

Excessive lighting around plants can impact natural processes for regulating growth patterns, resisting the spread of damage from insect and disease, and the ability to properly detect the beginning or end of a growing season.

There is an opportunity to balance the need for nighttime safety, convenience, and passageway with the need to preserve the darkness of the nighttime sky. Lighting tools can be employed to reduce unnecessary lighting. For example:

- Limit lighting within natural areas (e.g., forested wilderness areas, riparian areas, coastal lands) unless it is required for safe passage.
- If lighting is required within or along natural edges, consider warm amber tones (less than 2700k) to reduce the impact on flora and fauna.
- As a standard, LED lights are much more energy-efficient and lasting than traditional incandescent or fluorescent bulbs.

- Where possible, orient light fixtures downward.
- Favour the use of full cut-off light fixtures.
- Where water is present, avoid light directed toward water.
- Consider the use of motion-activated lighting or dimming controls to reduce energy consumption and impact on natural habitat.
- Consider the use of passive light (i.e., solar lighting, reflective materials and high contrast tones).
- Consider 'Dark Sky' approved fixtures to reduce light trespass and sky glow.



Figure 6: The City of Lille, France, is implementing ecological LED lighting parks with amber colour temperature (i.e., 2,200K - 2,700K). Motion detection sensors increase illuminance levels with the arrival of pedestrians, cyclists and cars, and return to ecological mode when there is no traffic (Schröder, 2023).

2.4 Human Health

Our circadian rhythm cycle is the dominant mechanism for regulating our biological clocks and the timely release of the hormone melatonin. This cycle is defined by active wakefulness and restful sleep. In humans and many other mammals, our circadian rhythm is synchronized to the 24-hour cycle of light and darkness by light detectors located in the eye. Our eyes are particularly sensitive to blue light, to the point where exposure during nighttime resting hours has been shown to disrupt the circadian rhythm and suppress the production of the restorative hormone melatonin. Melatonin suppression is implicated in certain types of cancers. Consequently, the precautionary principle suggests that the colour temperature (above 3,000k), outward and upward lighting direction, and light trespass into sleeping areas are of concern.

Colour temperature measures the colour appearance of light emitted by a light source. It is expressed in units of Kelvin (K) and is visible to the human eye on a scale of low or warm temperature (i.e., lower than 3000 k) to high or cool colour temperature (i.e., above 3000 k).

Across North America, there has been a movement to retrofit municipal lighting to higher temperature LED fixtures (i.e., above 4,000k) to improve energy efficiency, dimmability, and lifespan. However, research over the last 10 years has revealed concerns related to the brightness of cool white light, the impact on the character of neighbourhoods, and potential adverse impacts on human health when presenting above 3,000k. Colour temperature should not be evaluated in isolation, and must also consider including overall lighting levels, intensity, and light trespass.

Exposure to outdoor environments, even after dark, has been shown to improve mental health and reduce stress levels. By providing adequate lighting in parks, people can enjoy the benefits of being outdoors while also feeling safe and secure. Considering the above challenges with lighting impacts to human health, controlled and measured park lighting can encourage people to be active and use parks until their closure, and pathways without hourly restrictions.



Figure 7: The City of Lille, France, has implemented a 'nocturnal corridor' using an amber colour temperature (i.e., 2,200K - 2,700K). This limits disruption to wildlife while still allowing for evening and early morning recreation (Schröder, 2023).

2.4 Human Enjoyment

Lighting can enhance the functionality and beauty of natural and architectural features within parks, making them more visible, enjoyable, and attractive at night.

Social spaces and park landmarks play a valuable role in the nighttime context by becoming important destinations in the evening hours. Lighting contributes to place by providing wayfinding, spatially orienting park users, and creating a sense of understanding of a particular place.

Different spaces, activities, and uses require site-specific solutions for illumination to ensure human enjoyment. A professional lighting plan ensures specific site needs are accommodated, including installations that:

- contribute to high quality and artistic value;
- become partial solutions for difficult public spaces like tunnels, bridges, or blank walls;
- favour warm white tones rather than cool blue tones;
- highlight the culture and commemorative elements of a place;
- are sympathetic to human scale;
- allow for experimentation and creativity;
- illuminate the larger site surrounding and leading to art or social spaces;
- facilitate high-quality temporary lighting and special event projects; and
- protect the health of trees and other plant life will (e.g., no permanent tree mounted fixtures or wrapped trunks).

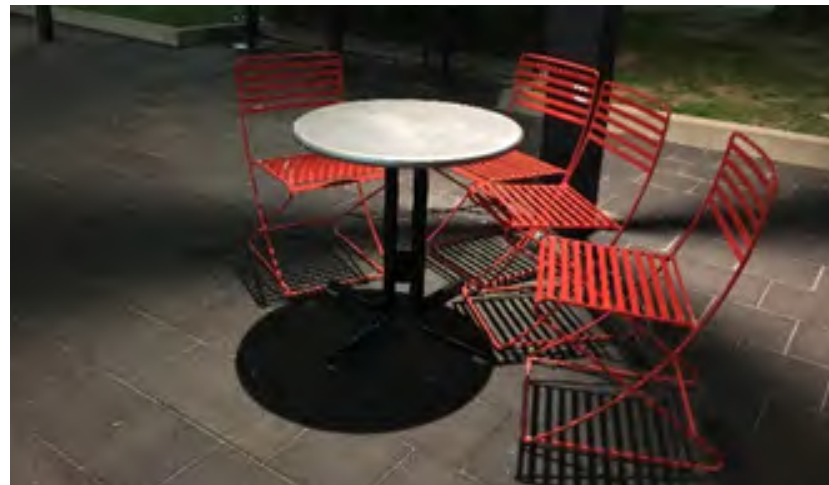


Figure 8: Something as basic as downward facing lighting over a seating area can promote social activity in the evening hours, like this seating space at the Halifax Central Library (Cushing, 2018).

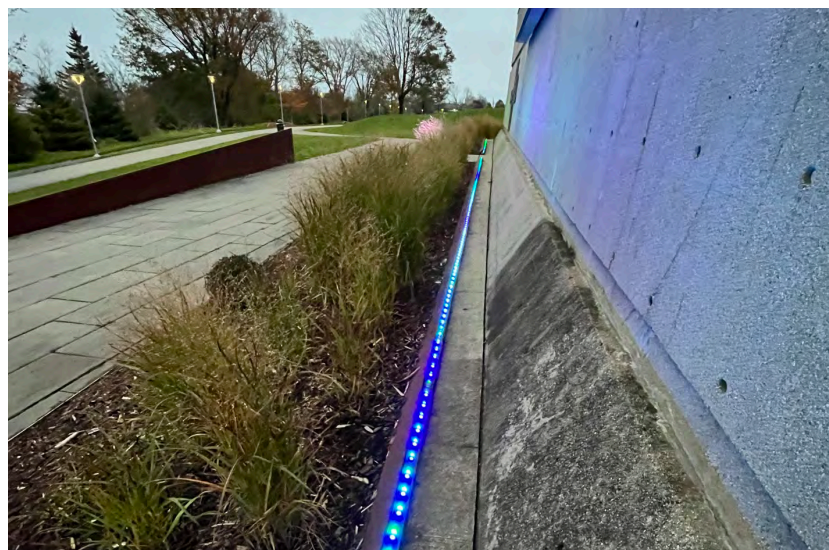


Figure 9: Soft LED strip lighting on the face of the Memorial Bell Tower in Fort Needham Memorial Park is one way to highlight the history of place for enjoyment after dark (Cushing, 2023).

3.0 Park Data

3.0 Park Data

Part of a sound park asset management program is having accurately collected data. Developing a robust database of the style, condition, and location of lights, and electrical connections (i.e., electrical boxes or housing) contributes to lighting that is well-informed, efficient, and effective in meeting the park user needs. Because lighting in parks has been considered on a project-by-project basis, the distribution of park lighting infrastructure across the municipality is disproportionate and the data set is incomplete. As of 2023, park asset data includes 16 electrical cans and 855 lighting features (i.e., poles with fixtures) in both parks and in rights-of-way that illuminate portions of parks. It is difficult to calculate the length of pathway or area of parkland that is currently illuminated due to the varied nature of existing lighting infrastructure.

Given the densities of residential populations and park parcels, and the reliance on parks and pathways for community connectivity, centralized areas of the municipality have a higher concentration of lighting infrastructure (Figure 10). However, even in centralized areas, the distribution and quality of lighting varies by community and park.

Recently, a phone based GIS collection application has been initiated by staff that will result in the collection and updating of existing lighting data from park sites. Staff also regularly input lighting infrastructure data (e.g., light location, pole material, condition, location of electrical cans) into GIS records as lighting infrastructure is maintained and as new park lighting projects are completed.

As part of the development of this Strategy, staff have been collaborating to ensure the best possible data is being collected. Although it will take some time before an accurate picture of lighting data can be presented, some additional lighting information that will soon be collected for decision-making purposes includes:

- Lighting structure (i.e., pole type, height, bollard, wall-mount, ground mounted uplight, string light, etc.).
- Luminaire type (i.e., flood light, cobra head, ornamental type).
- Fixture type (i.e., LED, Metal Halide, High Pressure Sodium, etc.).
- Power source (i.e., buried conduit, overhead wires).

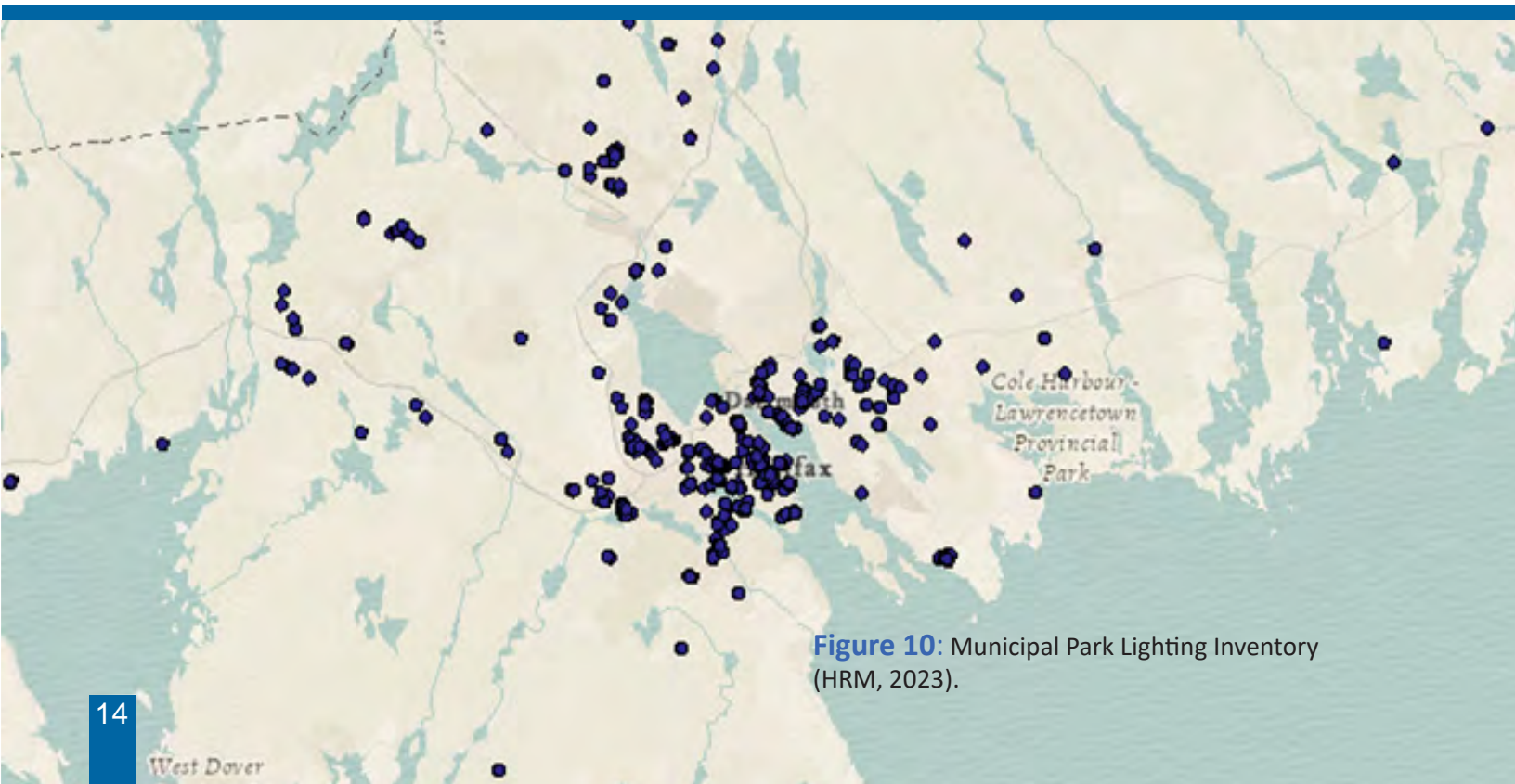


Figure 10: Municipal Park Lighting Inventory (HRM, 2023).

3.1 Park Lighting Categories

The three types of park scenarios being addressed in this Strategy are outlined with additional context as follows:

Pathways in Parks Between Destinations

There are many situations where pathways through parks are the most direct and sometimes, the only reasonable (i.e., essential) connection to transit, shopping, school, work, health care, and recreation, among other destinations. Illumination can make travel routes more comfortable, safe, and may be essential in circumstances where there are limited alternatives in traveling between destinations.

Although there are some undocumented, unmaintained, and informal pathways within the municipality's parks and open spaces, a review of park data identifies that there are approximately:

- 206,300 m of pathways within parks and open spaces;
- 57 900 m of pathways are paved (i.e., asphalt, concrete, or pavers);
- 100,600 m of pathways have a crusher dust or gravel surface;
- 18,600 m of pathways have a natural surface;
- 1,850 m of pathways have a wood/boardwalk surface;
- 27,350 m of pathways have no surface data available; and
- 58,100 m of park pathways are plowed during the winter months.

There are also multi-use pathways (MUPs) that run through parks that are part of the core active transportation (AT) network. Like other connections in parks, there are regular requests for lighting that could make MUPs safer for those walking, rolling, and cycling and could help with navigation and wayfinding. In total, there are more than 72,250 m of AT pathways as identified within park asset data (included in the total length of pathways presented above). Although many of these pathways operate as recreational and leisure routes, approximately 25,000m are considered to be essential community connections (i.e., part of

the core AT network) that might be considered for lighting.

Park lighting suitability criteria found in section 6.0 provides guidance on lighting suitability.



Figure 11: Park pathway lighting in Fort Needham Memorial Park is downward directed, evenly spaced, and connects destinations without gaps in lighting coverage (Cushing, 2023).

Park Facilities

The use of municipal park facilities could be enhanced with lighting during the summer months until a park's closed hours, and in shoulder and winter seasons in the morning and into the evening. Amenities such as skate parks, sport courts, pavilions, gazebos, and parking lots are examples of facilities that could be lit to maintain visibility after dark.

Within the municipality, built structures (e.g., community facilities, washrooms, etc) within parks are designed to the Nova Scotia Building Code and best practices. However, how a facility relates to and connects to a park is an important consideration for the planning of lighting.

During the winter months, there are some facilities that may traditionally be closed for the season (e.g., sport courts, etc.). Given the long and mild shoulder seasons and variable winter conditions often experienced within the municipality, there may be an opportunity to keep select sport courts open and usable with defined controls for the timing of lighting and appropriate standards to shield lighting from adjoining non-park properties. Another consideration for the lighting of facilities is whether it provides safe access between facilities without gaps in lighting that create blind spots, or blind spots that may occur when facility lights are turned off after use.

As of 2023 the municipality maintains:

- 34 gazebo/ bandstand /pavilions
- 22 pergolas
- 152 full basketball courts
- 19 half basketball courts
- 98 non-standard basketball courts
- 10 gaga pits
- 8 horseshoe pits
- 3 multi-use courts
- 14 pickleball courts
- 109 tennis courts
- 11 ball hockey/box lacrosse courts
- 15 pump tracks
- 13 skate parks
- 18 outdoor gyms
- 9 volleyball courts
- 4 running tracks

A program to light playgrounds across the municipality is not recommended due to the number of facilities and the limited after dark use that is realistic given the age of the primary users. However, there are several situations where other adjacent facilities and pathways are lit and additional lighting for a playground may be possible given the proximity to an electrical source.

Park lighting suitability criteria found in section 6.0 provides guidance on lighting suitability.

Figure 12: The tennis court lighting in Colby Village Recreation Centre Park is typical of older flood lighting technology without shielding or lighting controls to prevent light trespass (Cushing, 2023).



Placemaking Lighting

Placemaking illumination can operate as ambient and supplemental lighting to make park spaces more comfortable and social until park closure. Lighting can improve outdoor experiences while highlighting features such as fountain lighting, tree lighting, monument and art illumination, overhead string lighting, and plaza lighting. Inspiration can be drawn from private and public projects in our region for how lighting can make for a safe and unique nighttime environment even when few conventional light fixtures are present. Examples include public art and architectural lighting at Queen’s Marque and multi-coloured lighting of the Fort Needham Park Bell monument.

As stakeholders in the development of the Strategy, Business Improvement Districts (BIDs), with oversight from Parks & Recreation (Parks) and Public Works (Urban Forestry), have been leading lighting installations in several communities. Seven out of the nine BIDs in the region implement seasonal lighting displays. A summary of stakeholder engagement is presented in section 5.0. However, some challenges have surfaced in the absence of placemaking lighting guidelines, including:

- inadequate electrical infrastructure;
- site safety issues (e.g., trip hazards, blocked sightlines);
- lack of capital and operational funding;
- design and installation consistency;
- light pollution issues (e.g., glare); and
- risks to tree assets (e.g., lights fastened to trees, wrapped trunks).

Placemaking lighting inventories are difficult to capture as social spaces are not always defined in park data, and lighting installations can often be temporary in nature. Although many assets within the region are without lighting, the municipality maintains approximately:

- 200 pieces of public art or cultural assets;
- 7 fountains; and
- 40 park plazas.

Park lighting suitability criteria found in section 6.0 provides guidance on lighting suitability.

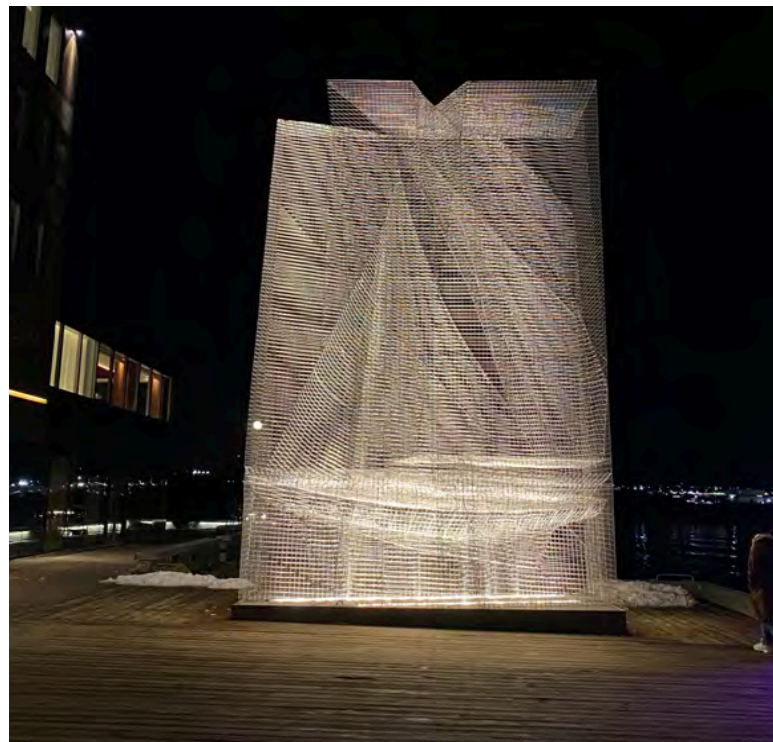


Figure 13: Although not under municipal management, the Queens Marque development on the Halifax Waterfront provides examples of lighted public art and warm-toned highlights throughout the public space (Cushing, 2021).



Figure 14: The Halifax Public Gardens holiday display is a temporary installation that allows the public to interact with a park space after dark and to experience plant material and spaces in a new way (Cushing, 2021).

4.0 Lighting Policy Precedents

4.0 Lighting Policy Precedents

While lighting within parks is commonplace, comprehensive guidelines for park lighting are not widespread. Examples of guiding documents from other Canadian municipalities are highlighted in this section. These documents address a variety of park lighting circumstances, some as part of an overall consideration of public realm lighting and others having guidelines specific to the lighting of pathways. Regardless of the different approaches, these guiding documents become frameworks for park lighting improvements that may address the safety of park users and overall night-time experiences.

Four different jurisdictions were reviewed, including:

1. The City of Toronto
2. The City of Calgary
3. The City of Ottawa
4. The National Capital Commission

4.1 City Of Toronto

City of Toronto Best Practices Effective Lighting Plan, 2017

The City of Toronto's Best Practices Effective Lighting Plan provides guidelines and recommendations for outdoor lighting in Toronto. The plan focuses on improving safety, security, and quality of life within the urban core while reducing light pollution, energy consumption, and interference with human and nocturnal animal health.

Although not exclusively directed at park spaces, the plan has several recommendations for sustainable, efficient, and responsible lighting practices, including warm colour temperatures, shielded fixtures that direct light downward and minimize light spillage, motion sensors and timers to control lighting, using low-wattage bulbs, and avoiding over lighting.

While the plan addresses lighting in the commercial and residential realm, it also

emphasizes the importance of community engagement and education. The City of Toronto encourages residents and businesses to take an active role in promoting responsible outdoor lighting practices.

City of Toronto Multi-use Trail Guidelines, 2015

The City of Toronto's Multi-use Trail Guidelines aims to improve and enhance the multi-use trail network within the city. The guidelines provide a framework for the design, construction, operation, and maintenance of multi-use trails; with the goal of creating a safe, comfortable, and accessible environment for all users, not exclusive to cyclists.

Lighting is promoted to increase trail use by extending the usable hours and user comfort. Trail condition and context is evaluated independently before a decision is made to light it. Professionally designed lighting is recommended for multi-use trails, except where lighting would impact sensitive wildlife activities, invite trail users into dangerous situations, or conflict with special site requirements (e.g., hydro corridors).

Where lighting is not included for a trail's full length, consideration is given to light entrances, exits and any intersections. Guidelines stipulate that trails should not be partially lit, as they create dangerous experience. Complete, lighted sections of the trail should have a defined entrance and exit.

4.2 City Of Calgary

City of Calgary, Calgary Parks Lighting Plan, 2017

The 2017 Calgary Parks Lighting Plan is a brief operational strategy developed by the city's Parks Department to guide the installation and maintenance of outdoor lighting in city parks. The goals of the lighting plan are to:

1. Make consistent, informed, and sustainable decisions regarding the installation and management of parks and pathway lighting;
2. Preserve the environment and wildlife

connectivity, and inherent beauty that dark spaces can provide; and

3. Increase the use, enjoyment, safety and sustainability of parks and pathways in Calgary.

The Parks Lighting Plan includes a series of key messages, including:

- providing park lighting only in exceptional circumstances;
- use minimum lighting when needed;
- site safety should explore other site solutions;
- lighting will not be approved near natural areas; and
- lighting evaluations will be based on safety, use of park, commuter traffic, and community support.

A major operational process laid out in the Plan includes a series of evaluation worksheets (i.e., public safety and crime, extended recreational use, extended commuter use, public safety and collisions, and community alignment) to use in the evaluation of space. The worksheets are used to evaluate whether there is a business case for park lighting.

4.3 City Of Ottawa

Park Pathway Lighting Policy, 2003

Unlike other municipal park lighting strategies, the City of Ottawa defines their lighting program through a policy statement (ACS2003-PEO-IDP-0011) and process rather than a functional plan. It is the City of Ottawa's policy to light park pathway systems where community and program needs require pathway usage in the evening and where pathway users can be assured of a reasonable expectation of safety and reduced risk. The city recognizes that proper lighting promotes the evening use of park facilities, so that lighting is only considered where the evening use does not conflict with adjacent uses or applicable by-laws.

There are three functional parts to the Park Lighting Policy:

1. **Characteristic of park lighting** including, light sources, light quality and quantity, light and pole placement, site design.
2. **Evaluation Criteria** have been developed to determine the appropriateness and feasibility of new park pathway lighting projects. Criteria include site safety, park analysis, transportation needs, impact to neighbours, impact to environment, and feasibility among other factors.
3. **Pathway lighting requests** will be evaluated annually to determine implementation priorities. New project requests will be prioritized based on the number of evaluation criteria that were met.

4.4 National Capital Commission

Capital Illumination Plan, 2017

The National Capital Commission (NCC) has developed a 10-year guiding plan to direct the lighting of urban spaces in the National Capital Region in Ottawa, Ontario. The plan is not a regulatory framework, but a series of guidelines that are considered for each unique circumstance. Although a different administrative unit, the City of Ottawa is closely tied to the NCC and this Capital Illumination Plan, especially in the coordination of lighting across jurisdictions.

The NCC plan equally considers safety, security and placemaking. Given how quickly lighting technology advances, this plan recognizes the importance of innovation and sustainability in capital planning. Considering the impacts of lighting on human and natural environments, the need for lighting is balanced with the need for darkness and reduced lighting. It is intended that this plan be an operational tool to guide the management of existing lighting infrastructure, prioritization of lighting projects, design of new lighting projects, and lighting project planning with joint government partners.

The NCC has developed a three-step lighting evaluation process:

1. What to Light?

Whether or not a site should be illuminated should consider the site's contribution to safety or visual comfort, heritage, historical, cultural, environmental, architectural and/or social value.

2. Lighting for Whom?

Questions to ask include: Who are the users of the site? Should it be visible from near or from far? When should it be visible? What type of environment is to be created and how will it be enjoyed?

3. How to Light?

The site context is evaluated to determine context, scale, relationship, surrounding uses, key architectural details or landscape features to be emphasized among other features. Lighting that employs curfew modes are preferred (i.e., activation at sunset, reduction in intensity after midnight).

A full description of lighting guidance from each jurisdiction is found in Appendix B.

5.0 Public Engagement

5.0 Public Engagement

The purpose of the public engagement program was to gain an understanding about:

- how the public views the idea of lighting within parks after dark;
- how individuals currently use parks within the evening hours;
- how lighting might change one's park experience; and
- where lighting needs improvement.

Due to the geographical scope of the project and the interest from many communities within the municipality. An online engagement program was determined to be the best way in which to obtain public input and was organized through 'Shape Your City Halifax' which was open to the public from May 15 until June 18, 2023. As the understanding that not all communities have access to reliable internet, engagement was also made possible with paper surveys at all branches of the Halifax Public Library and by information dissemination through HRM's Community Developers. In total, the engagement program was completed by approximately 1000 participants.

Respondents were invited to contribute qualitative and quantitative survey responses that included map-based questions to allow for the identification of individual parks, pathways, and facilities.

To gain an understanding of the lived experience and specific needs of a diversity of residents, staff engaged the Women's, Accessibility, and Youth Advisory committees.

Stakeholders including various municipal business units and outside organizations such as business improvement districts were engaged to understand how lighting impacts park design and programming, site use, site safety, operations, and facility development.

This section includes engagement highlights. A full summary is contained in Appendix C.

5.1 Nighttime Park Use

Questions about existing and desired nighttime park use and lighting conditions were posed to the public through the survey. The following was noted:

- Almost 60% of all respondents said that they do not use parks after dark because of safety and accessibility concerns.
- Approximately 29% of respondents said that they tolerate dark park spaces given a lack of other reasonably lit options.
- Respondents resoundingly indicated (78%) that they would be more willing to use park facilities and social spaces after dark if lighting was provided. Respondents similarly responded (77%), that lighting in winter and shoulder seasons would further improve their ability to use a park space. Respondents decidedly support the lighting of pathways; 91% of respondents indicated that they would more likely to take a pathway through a park if it were lit.
- Despite an interest in improved lighting, caution was expressed by several respondents with 21% suggesting that lighting would not be appropriate in locations where flora and fauna may be negatively impacted, 17% of respondents had concerns about how light trespass may affect neighbours. Protecting nighttime sky observation was described by 15% of respondents as important.
- Approximately 7% of respondents would like to see lighting restricted to main travel ways and park entrances.
- Slightly more than 17% of respondents identified how lighting can be made more effective, safer, and less impactful on human health (e.g., downward directed, consistent coverage, shielded, warmer colour temperature, reduced glare).
- Some respondents (14%) talked about the importance of lighting efficiency (e.g. solar, LEDs) with ability to control lighting levels and hours (e.g. dimmers, sensors, timers etc.).

|| As a parent...we often talk about how hard it is in winter in the hours after daycare to be outside because of the dark...not all of us have backyards... There is also a interpersonal safety element, felt particularly keenly by || moms.

|| While lighting is needed in priority areas (e.g., transportation pathways) within a park for park user safety and to enhance park use, HRM's lighting strategy must also integrate human and ecosystem health priorities. ||

|| I often find lighting levels too sparse. It's not a matter of illumination from lighting that exists. Large gaps leave poorly lit areas and can cast long shadows that make discerning the walking path difficult. ||

|| I find many of the parks and paths in HRM are extremely dark and unusable at night. ||

5.2 Identification of Places

In addition to the formal online survey, respondents were invited to spatially identify park spaces on a series of maps. Three mapping questions were available with a focus on park pathways, park facilities, and park placemaking. Respondents were asked to identify good and bad examples of lighting, thinking about brightness, darkness, glare or reflection, gaps, visibility, light quality, coverage, beauty/aesthetics, etc.

The following was noted:

- Given the blurred lines between private and public lands, not all pins were placed on parkland and not all pins were on public property.
 - Several respondents took the mapping exercise as an opportunity to comment on themes outside of the scope of this Strategy. For example, maintenance, access, and facility wants/needs.
 - Although opportunities for facility and placemaking lighting were sought, the responses for these lighting categories were limited with the focus being pathway connections.
- The most frequently mentioned park pathways requiring lighting include the Mainland Common, Halifax Common, Dartmouth Common, Sullivans Pond Park, Point Pleasant Park, Eastern Passage Common, and the Cole Harbour Common.

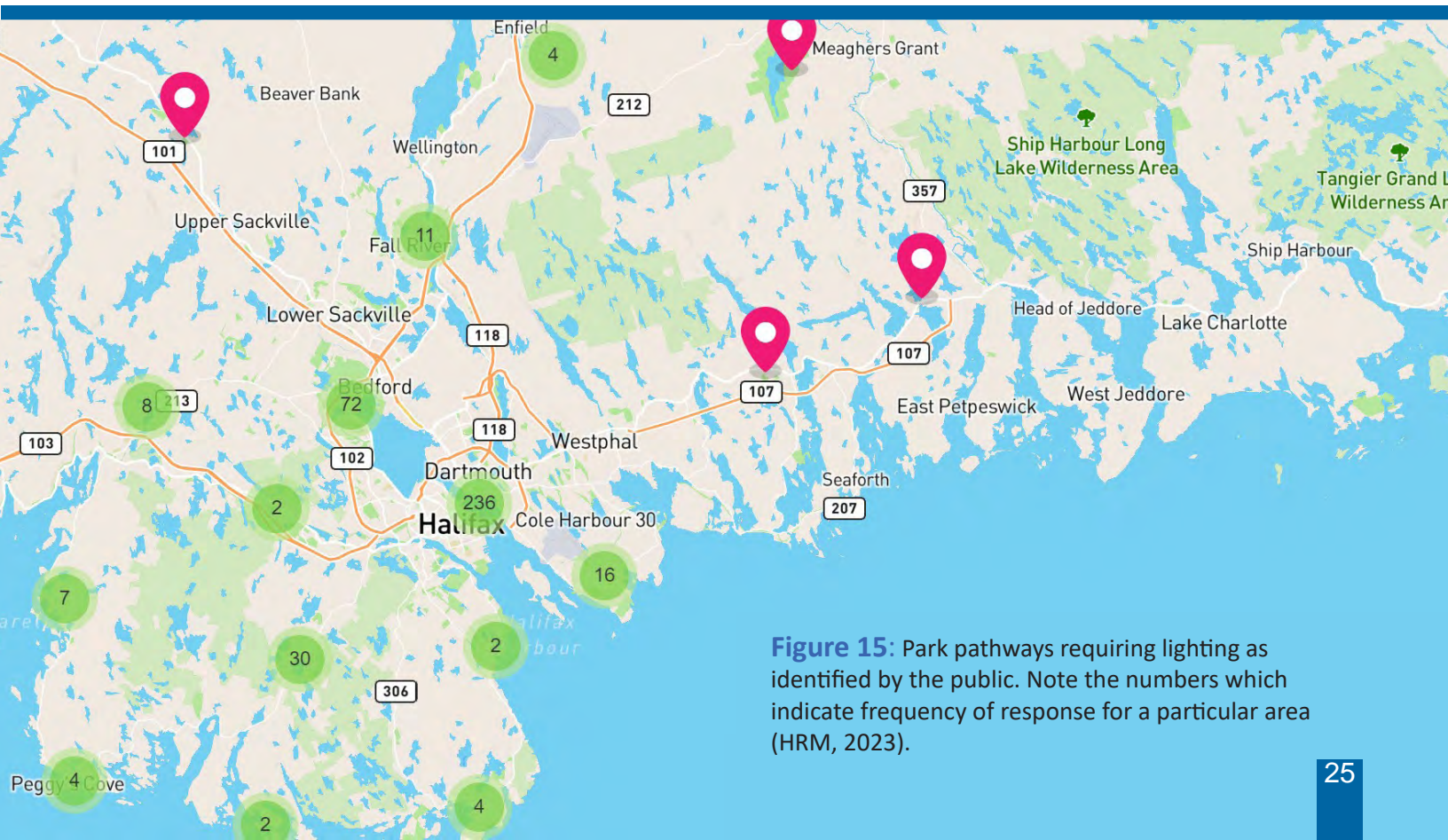


Figure 15: Park pathways requiring lighting as identified by the public. Note the numbers which indicate frequency of response for a particular area (HRM, 2023).

5.3 Advisory Committee Feedback

A presentation about the Strategy's origin and scope of work was presented to three advisory committees. Questions were posed to members about safety and security, accessibility, the look and feel of parks after dark, examples of lighting, and how spaces should be prioritized for lighting.

Women's Advisory

- A lack of lighting sends the message that women are not welcomed outdoors after dark.
- Personal experiences, especially the fear of violence in public spaces, have informed park lighting requests (e.g., non-blinding, comforting, non-intrusive, consistent, layered, defined beginning and end without gaps).
- Shubie Park, Dartmouth Common, and Point Pleasant Park were provided as examples of locations where lighting is poor. Spaces with direct connections to commercial, transit, and residences should be prioritized.
- Lighting should have an equitable lens that considers those who reside in affordable housing and in areas that rely heavily on pathways and transit.
- If not lighting a whole park, consider lighting short lengths of pathway for evening use without disturbing wildlife.
- 'Seeing and being seen' is key.
- Features like motion sensing could be used to reduce energy and impact.

Accessibility Advisory

- At its heart, open space planning should keep gendered, gender diverse, and marginalized persons in mind when planning spaces.
- Lighting should highlight the physical surfaces of pathways and the transitions to consider those with mobility and vision related disabilities.
- Lower level lighting is more effective at highlighting pathway surfaces, transitions, entrances (e.g., Peggy's Cove viewing deck).
- Pathways that connect residents to transit and daily services should be considered.
- Consideration to light pollution and trespass

onto neighbours.

- Rick Hansen Certification should be explored as a guide for accessibility and lighting (e.g., light levels, contrasts, materials).
- Vandalism and maintenance should be a factor with light design.
- The shift to LED fixtures has changed the kind of light coverage that is emitted. Light spacing, lighting levels, and colour temperature should be considered.
- The accessibility of pathway grades and surfaces should take priority over lighting.
- Rural areas should be a consideration for lighting, especially for youth socialization.

Youth Advisory

- Preservation of views to the night sky and renewable source of lighting energy were described as important. Youth of today will be around longer and will be the ones to receive the brunt of lighting impacts.
- Motion sensor lights should be explored along pathways to avoid lighting when no one is using a space.
- Without lighting, some spaces do not feel safe for everyone (e.g., women, gender diverse people). It was questioned if lighting gives the illusion of safety over actual safety. One member expressed that its not a lack of light that makes them feel unsafe, its other people in a space that may approach them.
- Lighting in a space was expressed as less of a concern than unjust police enforcement.
- A review of police reports could generate a list of spaces that might benefit from lighting; however, this does have limits if crimes are underreported in some communities.

5.4 Stakeholder Feedback

Business Improvement Districts

There are nine Business Improvement Districts (BIDs) in the municipality (Downtown Dartmouth Business Commission, Sackville Business Association, Village on Main, Downtown Halifax Business Commission, Quinpool Road Mainstreet District Association, North End Business Association Spring Garden Road Business Association, Porters Lake Business Association, Spryfield Business Commission).

All nine BIDs were invited to contribute their thoughts on their experiences and efforts to placemaking lighting, the issues experienced with project logistics and funding, and opportunities for improved experiences within the public realm and lighting planning processes.

Six of the nine BIDs participated in interviews, resulting in the following key observations:

- Placemaking lighting projects led by BIDs contribute to the identity of place.
- Some BIDs want to activate spaces with lighting, but parks may be nonexistent in some districts.
- BIDs often have extensive networks, capacity to complete work, and access to some funding, but maintenance costs can be prohibitive.
- Additional municipal support and funding would permit an expanded scale and impact with placemaking lighting.
- BIDs continue to field requests related to safety, security, and accessibility that could partially be resolved through lighting, but much of these solutions fall beyond their mandated responsibilities.
- There is an interest to expand efforts that include seasonal and placemaking lighting if there were allowances to do so.
- Electrical capacity for permanent and seasonal lighting is often limited.
- Including BIDs into capital planning process would help identify where placemaking lighting could improve park user experiences.
- The approval process for placemaking lighting should be streamlined for consistency.



Figure 16: Seasonal lighting display at Ferry Terminal Park facilitated by Downtown Dartmouth Business Commission (Cushing 2022).



Figure 17: Placemaking art, string lighting, and BID contributed facade lighting contribute to the public realm at Granville Mall, facilitated by the Downtown Halifax Business Commission (DHBC) (DHBC, 2022).

Build Nova Scotia

As a way to learn from another public organization, Build Nova Scotia (BNS), a Provincial Crown Corporation, was engaged to learn about lighting opportunities and challenges faced by its design and planning team. From a land management perspective, public open space development and programming is a component of BNS's work that is relevant to this Strategy. Some lessons learned include:

- An ongoing component of work is demonstrating that the development of public space, including lighting, is a benefit to community through the activation of public space.
- Public space accessibility is top of mind with CSA standards for accessibility in pedestrian travel routes being one lens.
- A lighting design for each space is important. This considers the design of fixtures, colour temperature, contrast, smooth transitions, avoiding under lit gaps, and the use of motion sensors.
- Temporary lighting interventions can provide usable space, while saving on costs. Poles with string lighting rather than luminaires is a cost-effective alternative.
- Offering plugs and power hookups on existing poles are useful for users in enabling additional lighting and power that may be needed seasonally.
- BNS considers the planning of spaces to be multipurpose, including having an electrical box that has capacity for a wide variety of events and seasonal lighting displays.
- Interactive lighting (e.g. colours, patterns, stories, music) is becoming easier in spaces due to newer technologies. This can go a long way with how people interact with space and each other.
- The identification of spaces that ought to be lit and places where lighting should be avoided. For example, dark sky reserves are important spaces to experience the night sky.
- Being so close to the ocean, lighting is vulnerable to salt water and fog. Inspections and ongoing maintenance are part of a regular lighting program.



Figure 18: Under the management of Build Nova Scotia, the Peggy's Cove Viewing Platform was designed with downward directed ground level lighting to improve access and reduce sky glow (Omar Ghandi Architects, 2023).

Halifax Regional Centre for Education

The Municipality and the Halifax Regional Centre for Education (HRCE) work together on capital and operational planning through a joint service exchange agreement (SEA). The SEA is a formal agreement that was established to address reciprocal usage of facilities and resources of both parties. The exchange of programs and services also ensures cooperation and a clear understanding of the expectations of both parties. The HRCE is aware of efforts to better plan for lighting within parks, and in some circumstances, pathways that lead to schools. Formal lighting projects that impact both parties should increasingly be brought forward to the SEA Committee for review on how site safety, security, and operations will be impacted.

6.0 Plan Approach

6.0 Plan Approach

The following section provides overall guidance for park lighting. Park pathways, facilities, and placemaking lighting are highlighted with specific lighting suitability criteria, park lighting characteristics, and situational examples.

6.1 Overall Lighting Guidance

All new park pathway, facility, and placemaking projects are to consider lighting.

In pursuit of safety, security, accessibility, and encouragement of healthy living, lighting for new pathways and facilities would be expected on a go forward basis. An emphasis would be placed on placemaking lighting in consideration of its circumstance and purpose. Although, the goal is not lighting at any cost. Lighting should be influenced by a project's impact to park programming, budgets, neighbours, and the natural environment, among other criteria presented within this section.

Existing pathways, facilities, and placemaking features are to be evaluated as needed.

A priority is to be placed on existing pathways, relative to safety and security issues. Lighting would be brought forward for consideration when:

- staff add new and recapitalization projects into the business plan and budget;
- there are overlapping projects between teams and business units warranting lighting integration; or
- there are external partnerships and funding.

As with any plan or policy update, there will be a gap in service delivery, standards, and quality until upgrades bring infrastructure to the same standard. Appendix D highlights a preliminary list of candidate spaces that should be considered for lighting over time, but require further evaluation to determine suitability and annual priority.

Park lighting will be high quality.

Park lighting should be purposeful and minimize waste, used and directed where it is needed and at minimum required levels, consider the impacts

to human and environmental health, and be controlled by timers.

Emerging lighting technologies are to be evaluated for their suitability within parks.

The use of emerging lighting technologies should consider sustainability, user experience, safety, security, and long-term cost-effectiveness. Energy-efficient solutions, like LED lighting, are already helping to minimize environmental impact and operational costs without compromising visibility. The municipality is beginning to pilot solar lighting in parks and will explore additional installations. As they are available, smart lighting systems that offer programmability and adaptive controls should continue to be explored.

A site analysis is a critical step ahead of developing an individual park lighting plan.

A site analysis helps to understand:

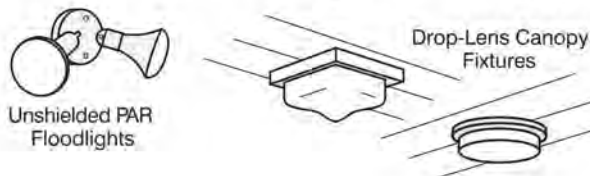
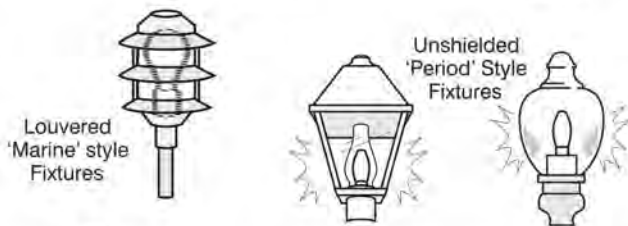
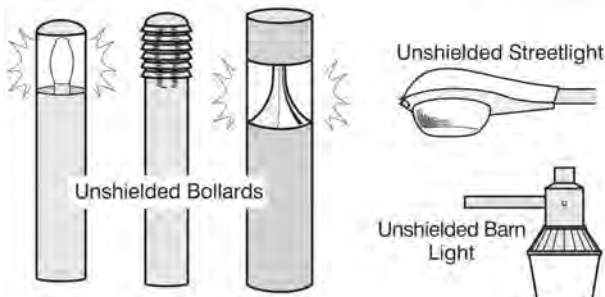
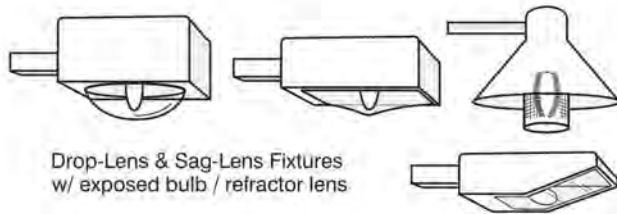
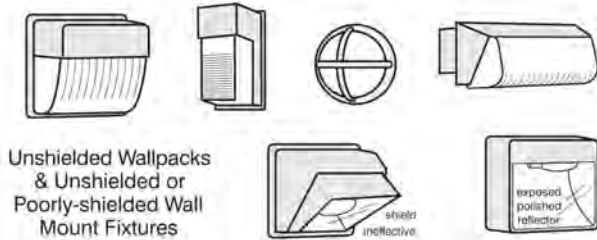
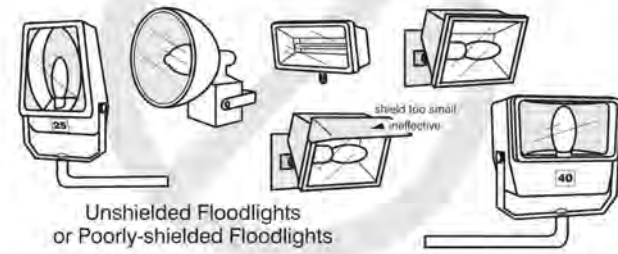
- how a park is used, when it is used, intensity of use, and by whom;
- how the space transitions from day to night.
- key amenities and features within a park and illumination needs;
- the proximity of neighbours to a park and the impact lighting may have on people;
- the environmental context and sensitive landscape features to be protected; and
- areas of concern in the park, such as known and recorded areas of antisocial behaviour, potential hazards and physical transitions, and areas with poor visibility.

A park safety assessment will help to understand the nuances of space and those who experience them.

The municipality's Community Safety Office facilitates Women's Safety Assessments (WSA). The WSA aims to reduce barriers for women, gender diverse people, and other underrepresented residents, so they can equitably access public space. Integrating WSA results or initiating a WSA with major lighting projects would improve park safety and security for all users. A more fulsome description of the tool is found in Appendix E.

Unacceptable / Discouraged

Fixtures that produce glare and light trespass



Acceptable

Fixtures that shield the light source to minimize glare and light trespass and to facilitate better vision at night

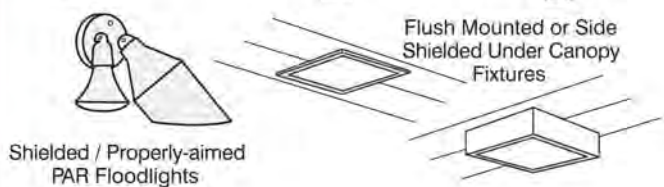
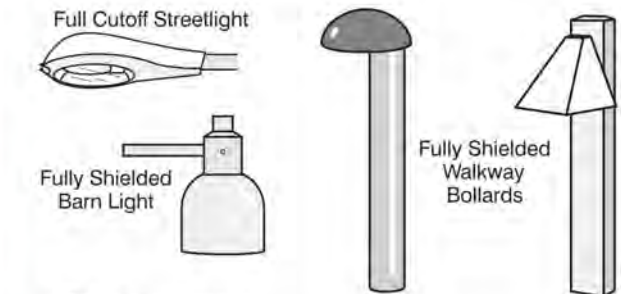
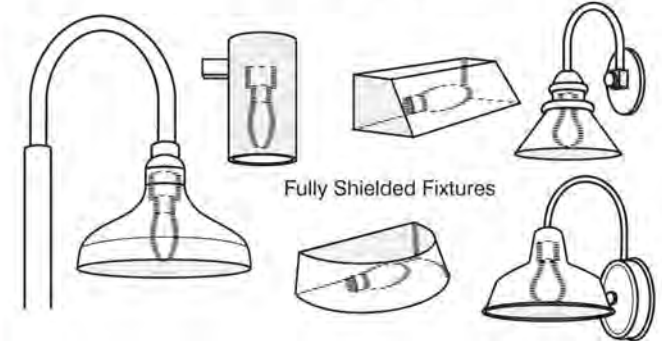
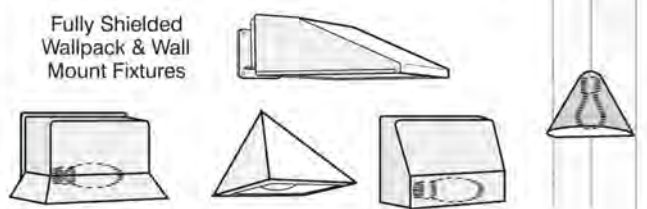
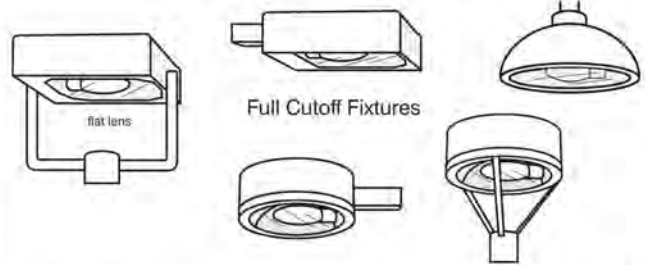


Figure 19: As overall guidance, the above lighting illustrations are examples of discouraged and acceptable exterior light fixtures (Crelin, 2005). Those lights on the right are preferred over the left because of lighting controls that prevent the outward and upward spread of light.

6.2 Planning For Park Pathways

In this section, park pathways are featured as a lighting scenario. Planning considerations for new and existing pathways, lighting prioritization, lighting characteristics, lighting suitability, and a park lighting example are highlighted.

New Pathways

All new pathway projects are to consider lighting as a possible project component. Pathways should be evaluated for their ability to connect communities without being disruptive to human and environmental health, among other conditions outlined in the park lighting suitability criteria.

Existing Pathways and Prioritization

Given the sheer number of the municipal pathways, it was not feasible to undertake a detailed inventory and assessment within the scope of this Strategy. Consequently, a desktop mapping assessment was conducted to identify park pathways that are considered essential community connections between neighbourhoods, schools, businesses, transit, and recreation centres, among other important community services. More than 40,000 linear meters of pathways without lighting or with incomplete lighting were identified. Non-essential pathways and those used exclusively for recreation were not considered within this assessment. For example, the Dartmouth Common has over 3000m of formalized pathways. It may only be reasonable to light a third of these pathways that are direct community connection routes.

An initial list of pathways for further detailed assessment is presented in Figure 22 and Appendix D and have been filtered through the following conditions:

- Pathways identified to be essential community connections (as described above).
- Pathways that are understood to be heavily used.
- Pathway lighting already approved by Regional Council as identified in park plans.
- Pathways identified by the public by way of the park lighting strategy survey.

- Pathways identified by the public by way of 311 correspondence and direct communication between public, Councillors, and staff.

The priority list is long and may be some time before many of these spaces are considered. The list may be cross-referenced with prospective capital projects to find logical compatibilities.

Further refinement will still be required using the park lighting suitability criteria to determine annual priorities for pathway lighting.



Figure 20: A newly completed pathway in Northbrook Park in Dartmouth included the installation of park lighting (Austin, 2023). There are advantages to coordinating lighting infrastructure with park construction to save later disturbances.

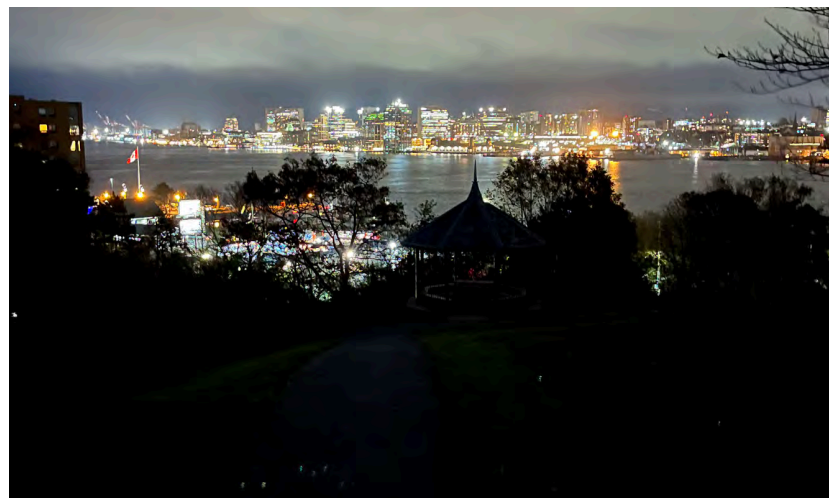


Figure 21: Certain pathways in the Dartmouth Common are connections between destinations, but as shown in the image are poorly illuminated, making them suitable candidate sites for lighting (Cushing, 2023).

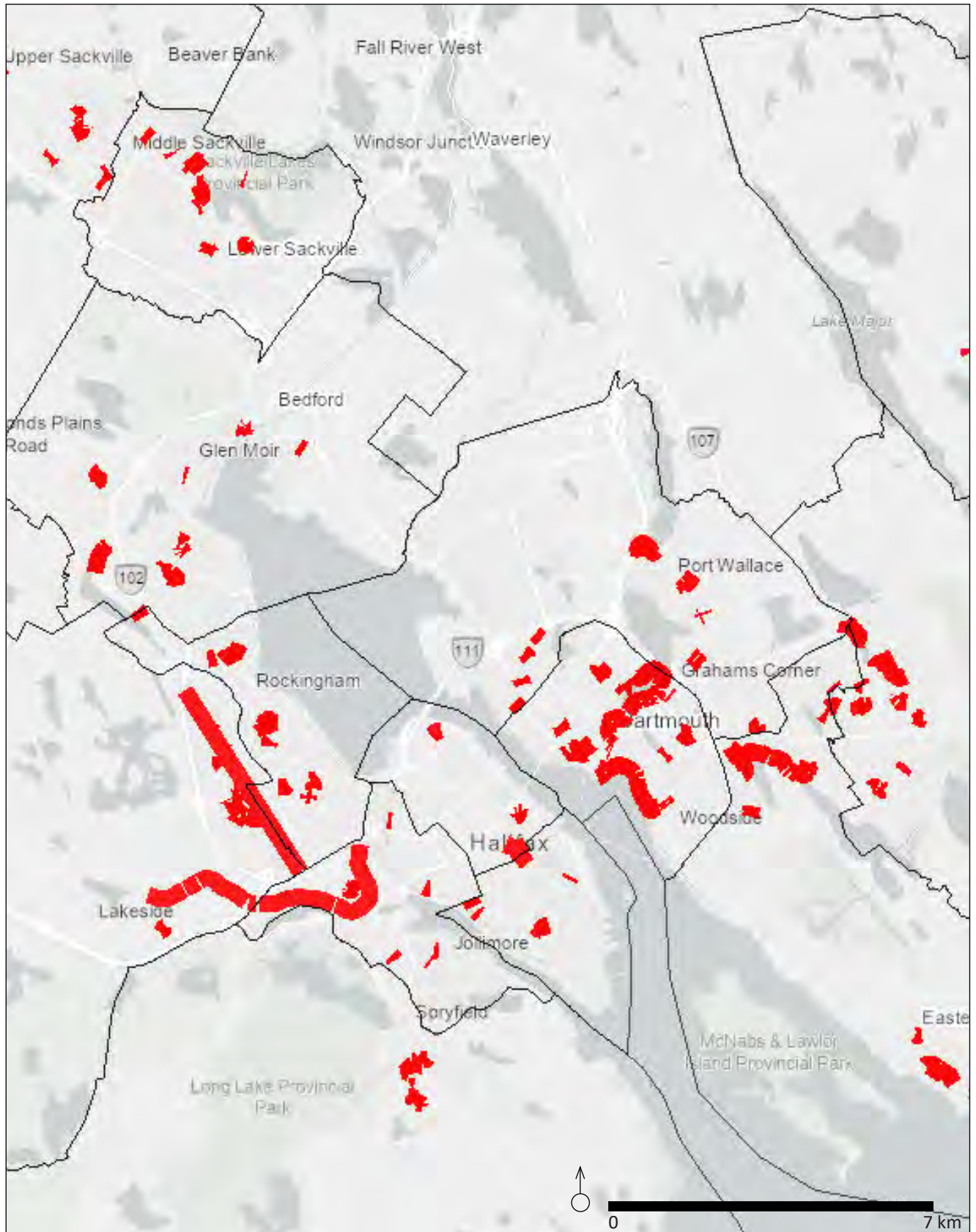


Figure 22: Existing park pathways to be considered for lighting as budgets and capacity allows. Although not limited to these pathways, they provide a starting point for planning.

Province of Nova Scotia, Esri Canada, Esri, HERE, Garmin, SafeGraph, METINASA, USGS, NRCan, Parks Canada

Park Pathway Lighting Characteristics

The following points summarize lighting best practices for park pathways.

Light Quality

Colour temperature

- Avoid the blue spectrum of light. Use lighting that is 3000k or less for all pedestrian zones and multi-use pathways (Figure 23).
- Use lighting in the range of 2400-2700k for natural areas, if needed at all.

Lighting levels

- The average illuminance on park pathways should not exceed 5 lux.
- The average illuminance on park pathways in natural areas should not exceed 2-5 lux.
- Lighting within parks should not raise the illuminance level at property lines by more than 1 lux.

Light Direction and Coverage

- Downward directed and shielded lighting (i.e. full cut-off) is preferred to reduce glare and sky glow, but also to highlight pathway surfaces and transitions.
- Lighting should be uniform in height, type, spacing, and levels to avoid gaps and shadows. In general, several fixtures with low lighting levels and even coverage are better than few lights with higher lighting levels spaced further apart.
- Pedestrian-scaled lighting (no higher than 4.5m) helps to focus light where it is needed, closer to the ground.
- Prioritize lighting on frequented pathways between community services (e.g., work/commercial areas, transit, retail, school, etc.).
- Avoid lighting in visually and physically inaccessible areas.
- Coordinate varying standards for lighting between municipal facilities (i.e., buildings) and parks to avoid gaps in access.
- Where lighting levels are mandated (e.g. lighting levels at building entrances), efforts should be taken to shield and contain lighting, and transition to lower lighting levels in parks.

Lighting Controls

- Use dimmers, motion sensors, and timers, tailored to a specific site. After peak pathway travel hours, light levels can be dimmed (as low as 2 lux) to reduce lighting impacts.

Lighting Efficiency

- LEDs help to reduce energy use and allow for reduced illuminance without compromising visibility.
- Solar lighting will be explored as technology and fixture availability permits.

Finish and Ornamentation

- Some inspiration can be drawn from surrounding lighting infrastructure, but lighting should:
 - be serviced by underground conduit rather than overhead wires.
 - be ornamental in finish to add to the design of place.
 - be supported by metal poles, not wooden



Figure 23: Sunlight color temperature changes at various times from sunrise to sunset (Wei-Yen & Han-Chang, 2021). Optimal park lighting replicates nature's warm colour range (no more than 3000k) to reduce impact on humans and wildlife.

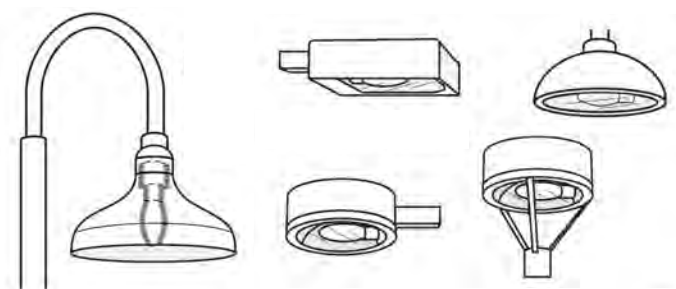


Figure 24: Examples of downward directed pathway lighting models (Crelin, 2005). There are many branded variations on shielded lighting that would be acceptable as standards and bollards.

Park Pathway Lighting Suitability

The following park lighting suitability criteria are to be used when determining a project's suitability for lighting, but also when weighing annual priorities for new and existing pathway lighting.

- 1. Park use:** The pathway, facility, or space is a well-used and important community connection, destination, or gathering point. Lighting would extend this use.
- 2. Accessibility:** The pathway grade and surfacing through a park or leading to a facility are accessible or can be corrected to be accessible. Lighting would highlight transition within the park. The entire length of pathway can be lighted between access points.
- 3. Equity:** Lighting considers those who are at a higher risk to be exposed to unsafe situations and who disproportionately rely on pathways for daily movement.
- 4. Location:** There are no pathways nearby offering the same lighted experience. There is no need to duplicate lighting on an adjacent pathway if pedestrian lighting connecting destinations already exists.
- 5. Layout:** The park includes other facilities that are also lighted or have the possibility for being lit together.
- 6. Feasibility:** The investment into park lighting is reasonable given the access to power, location, the amount of lighting needed, and annual budgets.
- 7. Wayfinding:** Lighting of the pathway would improve the overall circulation and wayfinding. Entrance signage is made visible with lighting.
- 8. Maintenance:** The pathway through a park or leading to facilities is currently winter maintained or can be winter maintained.
- 9. Security:** The pathway is visible and has defined entrances and exits. The pathway has a documented history of security issues or requests citing concerns (e.g., WSA results, 311

calls). Lighting would improve visibility.

- 10. Plan Alignment:** There is park planning or capital work happening with potential electrical/lighting integration.
- 11. Neighbouring Use:** Adjacent neighbours will not be negatively impacted by pathway lighting, or measures (e.g., buffers, shields, timers, etc.) can be put in place to mitigate impacts to neighbours.
- 12. Special Events:** The space is used, or has the potential to be used, for special events in the evening hours. Lighting would improve the overall site functionality.
- 13. Environment:** Lighting will not interrupt flora and fauna in sensitive natural areas, or measures (e.g., amber light, shields, timers, etc.) can be put in place to mitigate impacts. Installation practices are planned in a way that reduces the impact on trees or other vegetation (e.g., limit long-term wraps on trunks, prevent permanent fixtures mounted directly onto trees).

Park Pathway Lighting Example: Sullivan's Pond Park Multi-Use Pathway

Sullivan's Pond Park is a prominent park that is located on the northern edge of downtown Dartmouth. The park is part of a linear network of parks and waterways that make up the Shubenacadie Canal Waterway. Sullivan's Pond Park was one of the most mentioned parks by the public during the engagement program as being desirable for lighting and is one of the parks that inspired the Regional Council motion for park lighting. More specifically, it was cited that gaps in lighting within the park create areas of entrapment and there is unease about entering the park without being able to see pathway surfaces or other park users.

Using the park as a case study, its existing linear pathway and entrances were reviewed. The pathway is approximately 500m in length, and while portions of it are lit, there are observed gaps and entryways that are not necessarily visually prominent. Differing from the surrounding roadway lighting, a more pedestrian-scaled (i.e., 4.5m in height) level of infrastructure with closer spacing (i.e., 15m) would offer a consistent lighted experience without gaps.

Using the lighting suitability criteria as described in previous chapters, the following is noted:

- 1. Park use:** The pathway is well-used and is an important community connection, destination, and gathering point. Lighting would extend this use.
- 2. Accessibility:** The pathway grade and surfacing through a park are accessible. Lighting would highlight transition within the park. The entire length of pathway can be lighted between access points.
- 3. Equity:** The pathway is part of the Trans Canada Trail network, part of the core AT network, and is a pathways used by pedestrians for daily movement.
- 4. Location:** There are no pathways nearby offering the same lighted experience. Adjacent sidewalks are separated by grade and are



Figure 25: Sullivan's Pond Park context (HRM, 2022; EagleView Technology Corporation, 2024).

lighted for vehicular use and not pedestrian use.

5. **Layout:** The park includes other features (e.g., gazebo, placemaking lighting) that have the possibility for better coordination and enhancement.
6. **Feasibility:** Parts of the park already have electrical service. Additional capacity may be required to complete pathway lighting. The cost of lighting infrastructure can be significant and would have to be balanced with other annual priorities.
7. **Wayfinding:** Lighting of the pathway would improve the overall circulation and wayfinding. Entrance signage can be made visible with lighting.
8. **Maintenance:** The pathway through the park is currently winter maintained. The pathway is paved and has few maintenance requirements.
9. **Security:** The pathway has defined entrances and exits and lighting would improve visibility. Several requests for lighting have been documented.
10. **Plan Alignment:** There is capital and operational work happening with potential for lighting integration.
11. **Neighbouring Use:** Adjacent neighbours would be minimally impacted by pathway lighting if measures (e.g., buffers, shields, timers, etc.) can be put in place to mitigate impacts.
12. **Special Events:** The space is used for special events and lighting would improve the overall site functionality.
13. **Environment:** Impacts to flora and fauna would be mitigated through planned measures (e.g., downward directed fixtures, timers, 3000k or less colour temperature, etc.). Installation practices could be planned in a way that reduces excavation impact on tree roots.

In combination with the above considerations, a detailed park lighting plan from a certified professional would consider specific site requirements (e.g., intended use, user expectation,

placement of lights, uniformity, electrical source, user experience) and incorporate the results of a site evaluation (i.e., site analysis, safety assessment), as introduced in section 6.0.



Figure 26: Although not a formal lighting design, these visuals communicate how pedestrian pathway and placemaking lighting could look within Sullivan's Pond Park (Cushing, 2023).

6.3 Planning For Park Facilities

In this section, park facilities are featured as a lighting scenario. Planning considerations for new and existing facilities, lighting prioritization, lighting characteristics, lighting suitability, and a park lighting example are highlighted.

New Facilities

All new projects that plan for facilities are to consider lighting as a possible project component. Facilities should be evaluated for their ability to extend play and socialization after dark, especially during the winter and shoulder seasons. Increased opportunity should be weighed against disruption to adjacent neighbours and environmental health, among other conditions outlined in the park lighting suitability criteria.

Existing Facilities and Prioritization

A desktop assessment was conducted to identify existing park facilities that might be considered for lighting. Due to the number of existing facilities to consider, this exercise only considers sport courts (Figure 27, Appendix D). However, the same prioritization process could be used to identify other existing facilities such as pump tracks, gazebos, or skate parks.

A preliminary list of sport courts have been filtered through the following conditions:

- Courts that are understood to be well used.
- Courts that are in locations that can be considered to be physically and visually accessible.
- Courts that are collocated with complimentary uses.
- Courts that can reasonably be lit without disruption to adjacent uses.

The number of unlit sport courts (and other facilities) is long and it may be some time before many of these spaces are considered for lighting. The list may be cross-referenced with prospective capital projects to find logical compatibilities. Further refinement of each space will still be required using the park lighting suitability criteria to determine annual priorities for facility lighting.

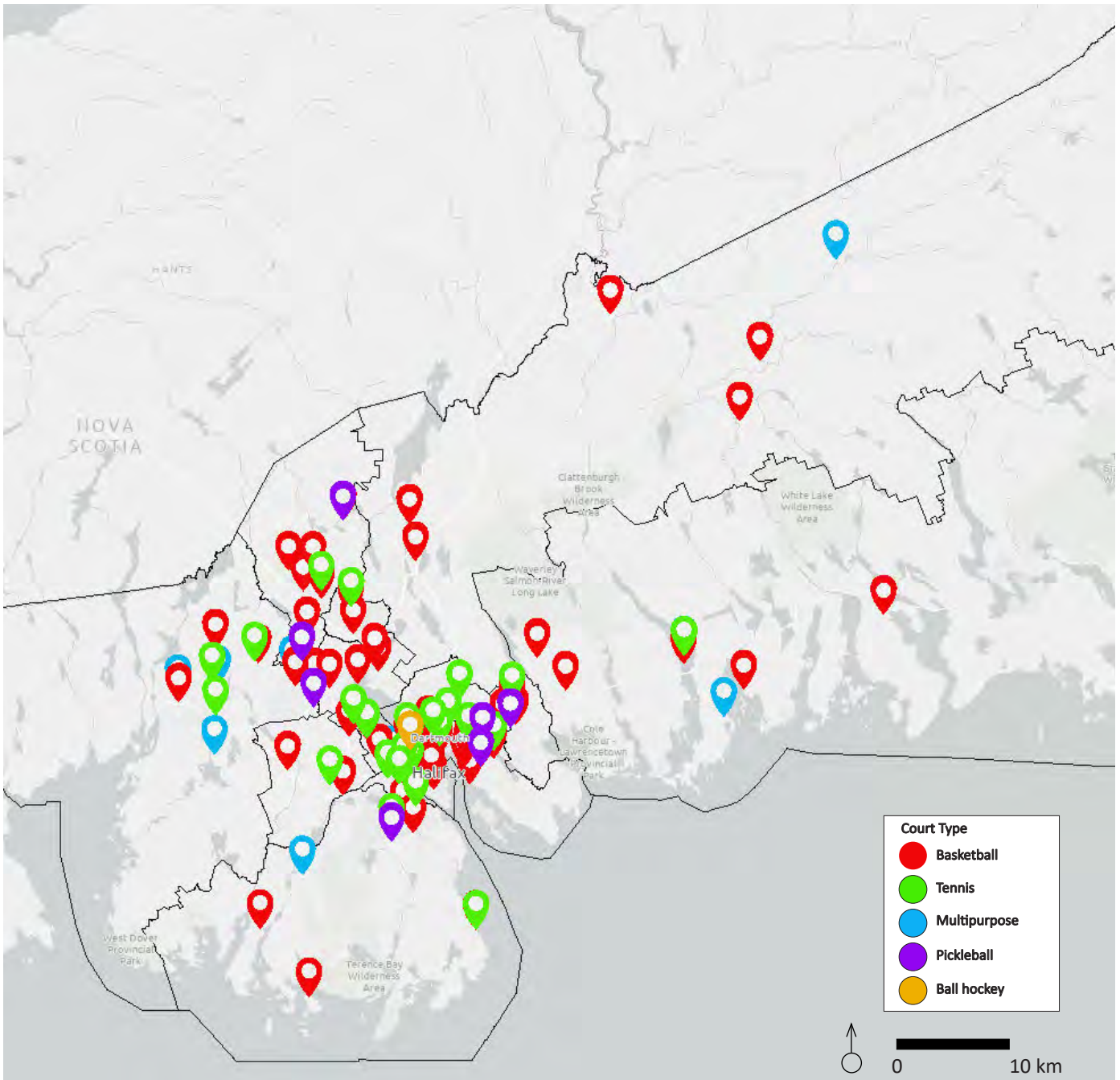


Figure 27 : Existing sport courts that could be considered for lighting. Although not limited to these facilities, they provide a starting point for planning.

Province of Nova Scotia, Esri Canada, Esri, HERE, Garmin, SafeGraph, MET/NASA, USGS, NRCan, Parks Canada

Park Facility Lighting Characteristics

Although a broad category, the following points summarize lighting best practices for park facilities.

Light Quality

Colour temperature

- Use lighting that is 3000k or less for all pedestrian zones
- Use lighting that is no higher than 5700k for sport uses. Allowances may be made for specialized competitive facilities.

Lighting levels

- The average illuminance on park parking lots should not exceed 10 lux.
- The average illuminance for most recreational sports should not exceed the 500-1000 lux range.
- In high illuminance areas, apply lighting transitions to step down to connecting pathways and parking (5-10 lux).
- Lighting within parks should not raise the illuminance level at property lines by more than 1 lux.

Light Direction and Coverage

- Downward directed and shielded lighting (i.e. full cut-off) is preferred to reduce glare and sky glow (Figure 29).
- Lighting should be uniform to avoid gaps. In general, several fixtures with low lighting levels and even coverage are better than few lights with higher lighting levels spaced further apart.
- Pedestrian-scaled lighting (up to 4.5m in height) helps to focus light where it is needed. Exceptions in heights are permitted for sport lighting.
- Avoid lighting in visually and physically inaccessible areas.

Lighting Controls

- Use dimmers, motion sensors, and timers, tailored to a specific site. For example, after peak hours, light levels can be dimmed. User controlled lighting and/or a defined curfew is preferred for sport lighting.

Lighting Efficiency

- LEDs help to reduce energy use and allow for

reduced illuminance without compromising visibility.

- Solar lighting will be explored as technology and fixture availability permits.

Finish and Ornamentation

- Some inspiration can be drawn from surrounding lighting infrastructure, but lighting should:
 - be serviced by underground conduit rather than overhead wires.
 - be ornamental in finish to add to the design of place.
 - be supported by metal poles, not wooden poles, unless a specific height and lighting configuration precludes metal poles.

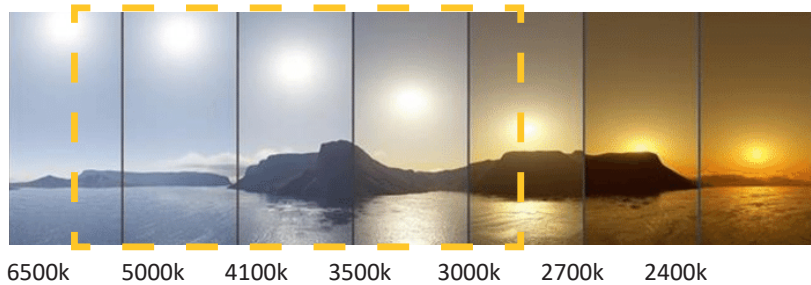


Figure 28: Sunlight color temperature changes at various times from sunrise to sunset (Wei-Yen & Han-Chang, 2021). Optimal park lighting replicates nature's warm colour range to reduce impact on humans and wildlife.



Figure 29: Lighting for sport uses can be intrusive within communities. This image illustrates the difference between shielded and unshielded sport lighting (Flagstaff Dark Skies Coalition, 2014).

Park Facility Lighting Suitability

The following park lighting suitability criteria are to be used when determining a project's suitability for lighting, but also when weighing annual priorities for new and existing facility lighting.

- 1. Park use:** the facility is well-used and is an important community destination and gathering point. Lighting would extend this use.
- 2. Accessibility:** the pathway grade and surfacing through a park and leading to a facility are accessible or can be corrected to be accessible. Lighting transitions between highly lit facilities (i.e., competitive sports) towards connecting pathways and parking lots can be accommodated.
- 3. Equity:** lighting considers the fair and equitable access to park facilities.
- 4. Location:** there are no parks nearby offering the same lighted experience. There may not be a need to duplicate lighted experiences in close proximity to each other.
- 5. Layout:** the park includes other facilities that are also lighted or have the possibility for being lit together.
- 6. Feasibility:** the investment into facilities is reasonable given the access to power, location, and amount of lighting needed.
- 7. Maintenance:** the pathway through a park leading to facilities is currently winter maintained or can be winter maintained.
- 8. Security:** lighting would improve facility visibility. Visually inaccessible facilities will not be considered for lighting.
- 9. Plan Alignment:** there is park planning or capital work happening with potential electrical/lighting integration.
- 10. Neighbouring Use:** adjacent neighbours would not be negatively impacted by facility lighting, or measures (e.g., buffers, shields, timers, etc.) can be put in place to mitigate impacts to neighbours.
- 11. Special Events:** the space is used, or has the potential to be used, for special events in the evening hours. Lighting would improve the overall site functionality.
- 12. Environment:** lighting should not interrupt flora and fauna in sensitive natural areas, or measures (e.g., amber light, shields, timers, etc.) can be put in place to mitigate impacts. Installation practices are able to be planned in a way that reduces the impact on trees or other vegetation (e.g., no permanent fixtures mounted directly onto trees, excavation would not severely damage trees).

Park Facility Lighting Example: Oxford School Park

Centrally located on the Halifax peninsula, Oxford School Park is an urban school property within a medium to high density residential context. Two basketball courts are integrated into the school site and are surrounded by municipal roads and sidewalks on three sides. These courts were identified through a preliminary scan of facilities that might be suitable for lighting (Appendix D).

The primary purpose for the addition of lighting is to extend the functionality of the courts until the park's closed hours. What is envisioned in this example (Figure 30) is consistent court coverage with approximately four to six downward directed sport lights to avoid shadows and gaps. The addition of lighting will also make users of the park and courts more visible after dark.

Using the lighting suitability criteria as a case for lighting, the following is noted:

- 1. Park use:** the facility is well-used and is an important community destination or gathering point. Lighting would extend this use until the park's closed hours and during shoulder seasons.
- 2. Accessibility:** The pathway grade and surfacing through leading to the courts are accessible. Additional lighting may be required to highlight transitions to the ROW along Chebucto Road.
- 3. Equity:** The courts are located in a walkable location within close access to several bus routes. Access is open to all users.
- 4. Location:** There are no parks nearby offering the same lighted experience.
- 5. Layout:** The park includes an adjacent playground that could be evaluated for lighting at the same time as the sport courts.
- 6. Feasibility:** The investment into facilities is reasonable given the relatively small footprint of required lighting and the proximity to electrical service.

- 7. Maintenance:** Perimeter sidewalks around the



Figure 30: Oxford School Park context (HRM, 2022; EagleView Technology Corporation, 2024).

courts are maintained by the municipality with interior access maintained by HRCE.

- 8. **Security:** Although the courts are set close to the public road, lighting would improve facility visibility.
- 9. **Plan Alignment:** There is no known park planning or capital work happening that could offer the potential for coordination.
- 10. **Neighbouring Use:** The surrounding roadways act as a buffer, and adjacent neighbours would be minimally impacted by facility lighting as long as measures (e.g., buffers, shields, timers, etc.) are implemented to mitigate impacts.
- 11. **Special Events:** The space is used for small tournaments and community-organized play. Lighting could improve site functionality for events.
- 12. **Environment:** Lighting controls (e.g., shields, timers, etc.) would be considered as to minimize light pollution. There would be no intention to light the courts after the park's closed hours. Installation practices would be planned to minimize impact the surrounding tree roots.

In combination with the above considerations, a detailed park lighting plan from a certified professional would consider specific site requirements (e.g., intended use, user expectation, placement of lights, uniformity, electrical source, user experience) and would also incorporate the results of a site evaluation (i.e., site analysis, safety assessment), as introduced in section 6.0.



Figure 31: Although not a formal lighting design, this visual communicates how downward directed sport court lighting could look at Oxford School Park (Cushing, 2023).

6.4 Planning for Park Placemaking

In this section, park placemaking situations are featured as a lighting scenario. Planning considerations for new and existing facilities, lighting characteristics, lighting suitability, and a park lighting example are highlighted.

New Placemaking

All new park planning projects that include a placemaking element are to consider lighting as a possible project component. This planning may involve the coordination of electrical servicing with other capital projects. Increased opportunity should be weighed against disruption to adjacent neighbours and environmental health, among other conditions outlined in the park lighting suitability criteria.

Existing Placemaking

A prioritization exercise was not conducted for placemaking features as the inventory is too varied. There are hundreds of situations that would fall into this category from public art, to fountains, to plazas, to seasonal light installations.

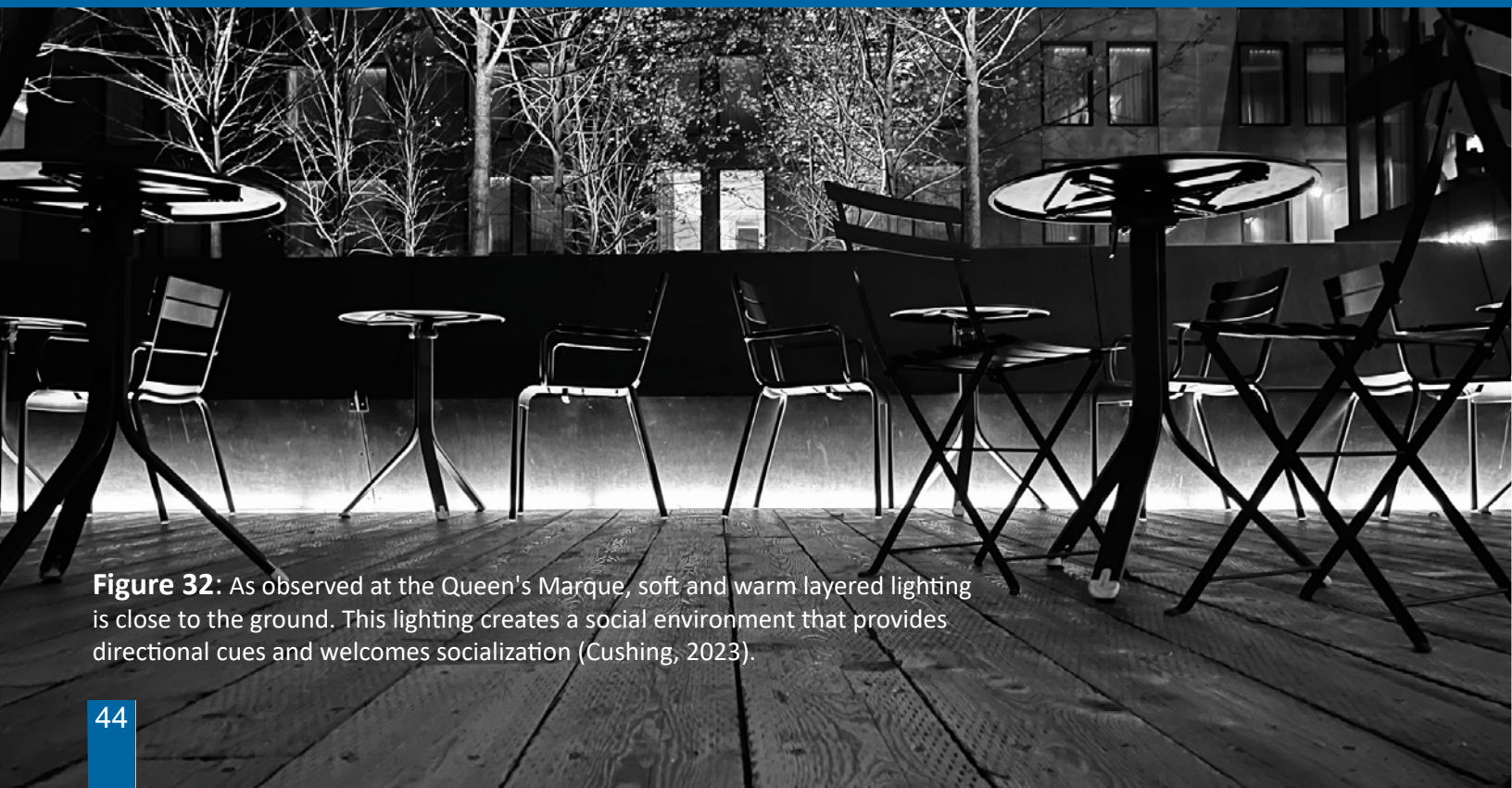


Figure 32: As observed at the Queen's Marque, soft and warm layered lighting is close to the ground. This lighting creates a social environment that provides directional cues and welcomes socialization (Cushing, 2023).

Park Placemaking Lighting Characteristics

The following points summarize lighting best practices for placemaking lighting:

Light Quality

Colour temperature

- Varies by the subject and place, but warm tones are preferred.

Lighting levels

- The average illuminance on park pathways should not exceed 5 lux.
- Lighting within parks should not raise the illuminance level at property lines by more than 1 lux.
- Illumination of public art and social spaces vary by the piece and place, but should employ the minimum amount of light required.
- Lighting in plazas will vary (1-20 lux), but layered lighting to highlight spaces, travel ways, and transitions is encouraged.

Light Direction and Coverage

- Downward directed and shielded lighting (i.e. full cut-off) is preferred to reduce glare and sky glow.
- Lighting should be sympathetic to human scale.
- Uplighting strips and spotlights should only highlight a particular subject and not be wasted into the sky.
- Avoid lighting in visually and physically inaccessible areas.

Lighting Controls

- Depending on context, use dimmers and timers, tailored to a specific site. For example, after peak park use lighting can be dimmed to reduce lighting impacts.

Lighting Efficiency

- LEDs help to reduce energy use and allow for reduced illuminance without compromising visibility.
- Solar lighting will be explored as technology and fixture availability permits.

Finish and Ornamentation

- Lighting should:
 - be serviced by underground conduit rather than overhead wires, unless the temporary nature of the installation limits this application.
 - be ornamental in finish to add to the design of place.
 - be mounted or supported in an aesthetic manner as to not detract from the lighting or be overly intrusive during the daytime.
 - not compromise the health of trees and other plants (e.g., no permanent tree mounted fixtures or wrapped trunks).
 - contribute to high quality and artistic value.
 - become partial solutions for difficult public spaces like tunnels, bridges, or blank walls.
 - highlight the culture and commemorative elements of a place.
 - protect the health of trees and other plant life will (e.g., no permanent tree mounted fixtures or wrapped trunks).

Park Placemaking Lighting Suitability

The following park lighting suitability criteria are to be used when determining a project's suitability for lighting.

1. **Park use:** the park is well-used and is an important community destination or gathering point. Lighting would extend this use.
2. **Accessibility:** the pathway grade and surfacing through a park or leading to an area of placemaking are accessible or can be corrected to be accessible.
3. **Equity:** lighting considers the fair and equitable access to parks and placemaking features.
4. **Location:** the lighted park features becomes a destination within a particular park or community.
5. **Layout:** the park includes pathways or facilities that are lighted or have the possibility for being lit together with a placemaking feature.
6. **Feasibility:** the investment into lighting is reasonable given the access to power, location, and amount of lighting needed.
7. **Maintenance:** the pathway through a park leading to a placemaking feature is currently winter maintained or can be winter maintained.
8. **Security:** lighting would improve overall visibility and park user comfort. Visually inaccessible placemaking features will not be considered for lighting.
9. **Plan Alignment:** there is park planning, capital, or operational work happening in the park with potential electrical/lighting integration.
10. **Neighbouring Use:** adjacent neighbours would not be negatively impacted by lighting, or measures (e.g., buffers, shields, timers, etc.) can be put in place to mitigate impacts to neighbours.
11. **Special Events:** the space is used, or has the potential to be used, for special events in the

evening hours. Lighting would improve the overall site functionality.

12. **Environment:** lighting should not interrupt flora and fauna in sensitive natural areas, or measures (e.g., amber light, shields, timers, etc.) can be put in place to mitigate impacts. Installation practices are planned in a way that reduces the impact on trees or other vegetation (e.g., no permanent fixtures mounted directly onto trees, tree wraps are limited, excavation should not severely damage trees).

Other Suitability Considerations

In addition to the above 12 lighting suitability criteria, there are other considerations unique to placemaking lighting that help to add meaning to a particular place and create a destination after dark. For example,

- **Purpose:** the lighted feature has purpose in as an interpretive element in a larger story.
- **Social value:** lighting contributes to the story of a particular place, highlighting a historical, cultural, or architectural feature.
- **Natural value:** lighting highlights natural assets of significance, such as tree form and canopy or conveys a story about the local environment.
- **Pride in place:** lighting should provide beauty and encapsulate community pride and sense of belonging experienced by park visitors.
- **User experience:** the lighting design anticipates how park users will interact with the feature from near and far and how the environment will be changed with light.

Park Placemaking Lighting Example: Eastern Passage Common

The Eastern Passage Common is the largest park in the community of Eastern Passage and the home of several collocated park facilities. A park plan for the park was approved by Regional Council in 2020 and is used to guide park upgrades. Public art was identified through the park planning process as a feature to be considered within the detailed design process.

What is envisioned in this example (Figure 33) is a centrally located public art installation that incorporates lighting and that would contribute to the overall character of the park.

Using the lighting suitability criteria to integrate placemaking lighting into the park, the following is noted:

1. **Park use:** the park is well-used and is an important community destination and gathering point. Lighting would extend and improve the quality of this use.
2. **Accessibility:** the pathway grades and surfacing through the park are being designed to be accessible.
3. **Equity:** positioned within a central location in the park, the placemaking lighting would be accessible to all members of the community.
4. **Location:** the proposed public art and park pavilion would be lit to encourage use and to be a destination after dark.
5. **Layout:** the park includes pathways and facilities that are being planned to be lit together to enhance the lighted experience of the entire park, and the placemaking feature.
6. **Feasibility:** the investment into placemaking lighting is minimal considering the larger lighting investment proposed within the park.
7. **Maintenance:** the pathway through a park leading to a placemaking feature is currently winter maintained. It is proposed that the pathway network be paved to reduce the maintenance need over time. Lighting would be

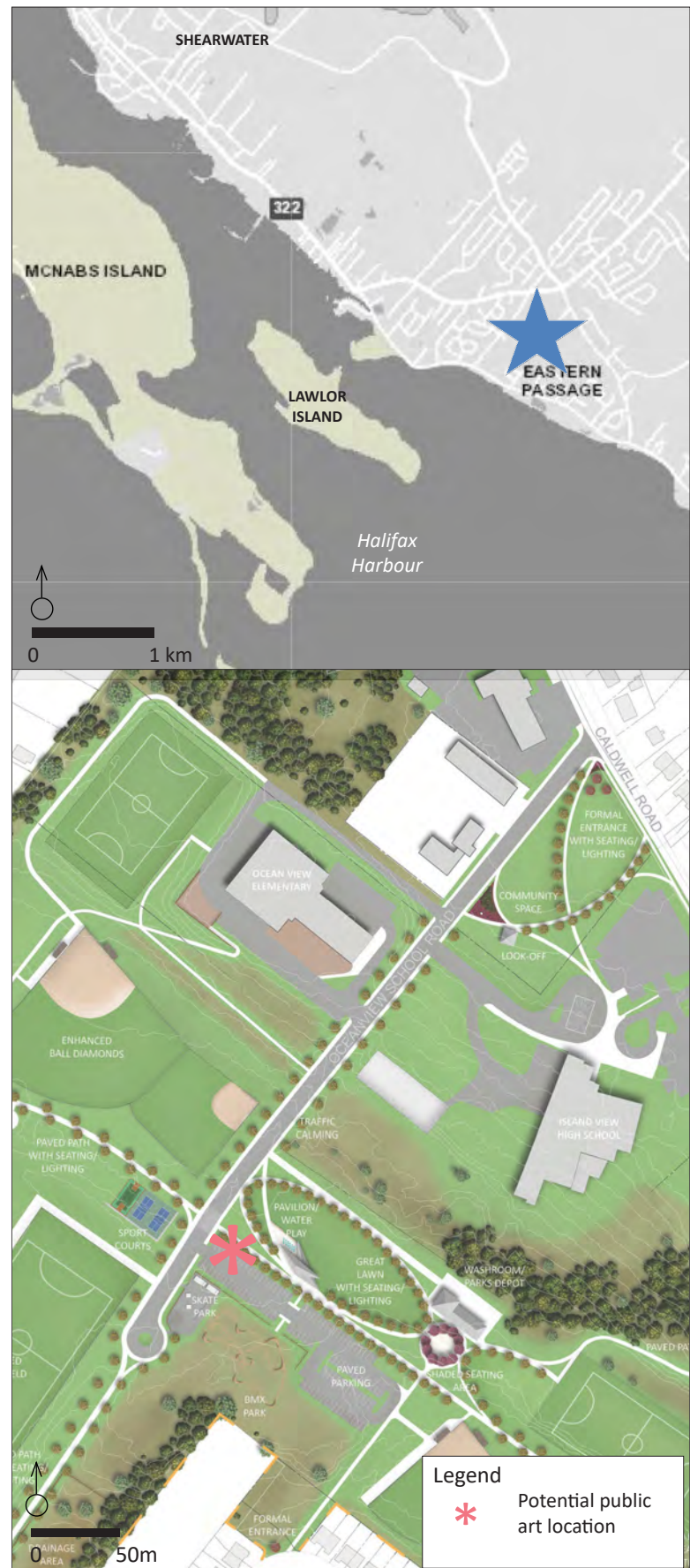


Figure 33: Eastern Passage Common context within the community and the approved park plan. (HRM, 2020; 2022).

planned with staff responsible for public art to understand lighting maintenance needs.

8. **Security:** lighting would improve overall visibility and the ambient light would contribute to user comfort. All lighted features will be in central, well-traveled locations.
9. **Plan Alignment:** there is capital work happening in the park with potential electrical/lighting integration.
10. **Neighbouring Use:** adjacent neighbours will not be negatively impacted by lighting as measures (e.g., buffers, shields, timers, etc.) can be put in place to mitigate impacts.
11. **Special Events:** the park is used for special events within the community. Lighting and access to power would improve the overall site functionality.
12. **Environment:** lighting impacts to flora and fauna would be mitigated by shielded lighting with timer controls. Installation practices would be planned in a way that reduces the impact on trees and other vegetation (e.g., no permanent fixtures mounted directly onto trees, tree wraps are limited, excavation would not severely damage trees).

Other Suitability Considerations

The placemaking features for the Eastern Passage Common have not been finalized, but are to take into account the following considerations to guide their design.

- **Purpose:** the lighted feature has purpose in as an interpretive element in a larger story.
- **Social value:** lighting contributes to the story of a particular place, highlighting a historical, cultural, or architectural feature.
- **Natural value:** lighting highlights natural assets of significance, such as tree form and canopy or conveys a story about the local environment.
- **Pride in place:** lighting should provide beauty and encapsulate community pride and sense of belonging experienced by park visitors.

- **User experience:** the lighting design anticipates how park users will interact with the feature from near and far and how the environment will be changed with light.

In combination with the above considerations, a detailed park lighting plan from a certified professional would consider specific site requirements (e.g., intended use, user expectation, placement of lights, uniformity, electrical source, user experience) and would also incorporate the results of a site evaluation (i.e., site analysis, safety assessment), as introduced in section 6.0.



Figure 34: Although not a formal lighting design, this visual communicates how placemaking lighting at the proposed park pavilion and through public art could create an element of interest and whimsy for park users. The placemaking features would be designed to be reflective of the local community (Cushing, 2023).

6.5 Future Business Planning Considerations

As outlined earlier in this section, park lighting is to be evaluated in several situations, including the following:

- on all new pathway, facility, and placemaking projects;
- when specific requests are made by Regional Council;
- as staff bring forward prospective projects for existing under-lit park spaces;
- as staff bring forward recapitalization projects; and
- through integrated projects with other business units and partners.

Future expenditures from the focus areas identified above would be considered in subsequent budget years during the business planning process.

Annually, the majority of the Parks & Recreation budget goes towards state-of-good-repair projects. As a result, there are competing priorities for new park infrastructure. It should be noted that lighting and electrical infrastructure can be costly on a large scale and therefore, it is anticipated that a phased approach based on identified priorities will be necessary.

In addition to the guidance for capital planning and individual lighting projects highlighted in this Strategy, the following policy changes are identified to support park lighting and associated night-time use.

Policy Change for Park Use

Currently, the Parks By-law (By-Law P-600, *Respecting Municipal Parks*) defines the open hours of most parks to be from 5:00 a.m. to 10:00 p.m. Regional Council has directed staff to consider changes to the Parks By-law to permit park usage after 10:00 p.m. in certain circumstances.

No uniform change to this is called for with the program for increased facility lighting. Rather, the focus is on extending usage after dark, especially during shoulder seasons and the winter. There may be certain situations where it is desirable to extend

the use of a facility beyond 10:00 p.m. but these special situations would consider factors such as compatibility with surrounding uses. It is the intention, however, to plan for the installation of the lighting of pathways that serve as the primary connection between destinations.

As part of the next regular update to the Parks By-law or through the current powers of the Executive Director, clarifications are to be made to ensure that pathway usage within parks beyond their opening hours are clearly permitted for those pathways that serve as the primary route between destinations.

Policy Change for Better Alignment

The Municipal Design Guidelines has clear design criteria for walkway width, grades, access, drainage, and vehicle barriers to ensure pedestrian access. However, when it comes to lighting, the document is informed by approaches for vehicular roadway lighting. A maximum distance of 75 metres between lighting fixtures is specified, which is too great of a distance and conflicts with the precautionary approach recommended within this Strategy. Minor changes to the Municipal Design Guidelines would allow for better alignment with the broader municipal interest in creating safe and comfortable pedestrian environments.

Development of a Green Book Standard

This Strategy outlines tools to consider the appropriateness of lighting within a variety of contexts. Lighting specifications and design details will be included in a larger forthcoming initiative known as the 'Green Book'.

Appendix A: References

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Appendix B: Lighting Policy Precedents

Lighting Policy Precedents

While lighting within parks is commonplace, comprehensive guidelines for park lighting are not widespread. Examples of guiding documents from other Canadian municipalities are highlighted in this section. These documents address a variety of park lighting circumstances, some as part of an overall consideration of public realm lighting, as is the case within the City of Toronto and the National Capital Commission, with the Cities of Calgary and Ottawa having guidelines specific to the lighting of pathways. Regardless of the different approaches, these types of guiding documents become frameworks for park lighting improvements that may address the safety of park users and overall night-time experiences.

City Of Toronto

City of Toronto Best Practices Effective Lighting Plan, 2017

The City of Toronto Best Practices Effective Lighting Plan is a document that provides guidelines and recommendations for outdoor lighting in Toronto. The plan focuses on safety and security and improved urban quality of life while reducing light pollution, energy consumption, and interference with human and nocturnal animal health.

Although not exclusively directed at park spaces, the plan has several recommendations for sustainable, efficient, and responsible lighting practices, including shielded fixtures that direct light downward and minimize light spillage, motion sensors and timers to control lighting, using low-wattage bulbs, and avoiding over lighting.

The plan oversees lighting in the commercial and residential realm. The plan also emphasizes the importance of community engagement and education. The City of Toronto encourages residents and businesses to take an active role in promoting responsible outdoor lighting practices.

Some key lessons identified in the plan include:

- Although artificial lighting has had a positive impact on city life, it has resulted in negative effects where it has been poorly designed or improperly installed.
- The city becomes safer when more people use public spaces at night. Well-designed public lighting creates an inviting environment for the use of public spaces.
- When laying out a lighting design, avoid poorly placed lights that create blind-spots for potential observers and that miss critical areas.
- Avoid overly bright security lighting.
- Use shielded or cut-off luminaires to control glare.
- Use an appropriate colour temperature to the context of its application (i.e., maximum 3000K in residential areas including mixed-use areas with residences)
- Architectural form should be complemented by using light wisely for place-making and to design a more welcoming pedestrian environment that will be monitored over time.
- Place lighting along pathways and other pedestrian-use areas at proper heights.
- Manage sports lighting installations for minimum impact on the lighting of the surrounding park.
- It is important to use the absolute minimum of lighting in natural heritage areas.
- Only light areas where it is needed.
- For effective lighting design, all new developments and major upgrades to existing designs can be accompanied by a lighting plan.

Ineffective Lighting Fixtures

Ineffective lighting fixtures create skyglow, light trespass and/or glare.



Figure B1: Ineffective Lighting Fixtures that create skyglow, light trespass, and glare (City of Toronto, 2017).

Effective Lighting Fixtures

Lighting used to illuminate the pathways and surrounding site of a building should be efficient while providing enough illumination to make the site safe and secure at night.



Figure B2: Effective Lighting Fixtures that cast downward light to illuminate pathways while reducing light trespass and glare (City of Toronto, 2017).

City of Toronto Multi-use Trail Guidelines, 2015

The City of Toronto Multi-use Trail Guidelines is a plan that aims to improve and enhance the multi-use trail network within the city. The guidelines provide a framework for the design, construction, operation, and maintenance of multi-use trails, with the goal of creating a safe, comfortable, and accessible environment for all users, not exclusive to cyclists.

The Design Principles section outlines the overarching principles that guide the design of multi-use trails, such as safety, accessibility, connectivity, and sustainability. The Design Details section provides specific guidance on the design elements of multi-use trails, such as widths, gradients, sightlines, lighting, and signage.

Lighting is promoted to increase trail utility by extending the usable hours and user comfort. Trail condition and context is evaluated independently before a decision is made to light it. Professionally designed lighting is recommended for multi-use trails, except where lighting would impact sensitive wildlife activities, invite trail users into dangerous situations, or conflict with special site requirements (e.g., hydro corridors).

Where lighting is not included for a trail full length, consideration is given to light the entrances, exits and any intersections. Trails should not be partially lit, and complete lighted sections of trail with a defined entrance and exit should be defined. Partially lit trails create dangerous situations where users are expecting a lighted experience between access points.

The plan provides several trail lighting design considerations:

- Pole-and-arm mountings are preferred over bollard-style lighting. Bollards are more easily vandalized.
- Light poles must be positioned outside of required clearance areas and consistently on one side of the trail.
- A finished height of 4.5 m for luminaires allows for adequate vertical clearance and prevents vandalism.

- Luminaires should be a full cut-off in their design to providing adequate illumination and reduce the spillage of light away from the trail surface.
- Light poles will usually be spaced at approximately 25 m apart (depending on lighting spread).
- LED fixtures should be used where possible to maximize energy efficiency. The lighting life span should be long-lasting and provide good colour rendering.
- Energy-saving approaches such as timers, motion sensors, and user-activated lights should be considered depending on the context.
- Electrical cabinets should be located where they can be easily accessed by maintenance vehicles with access doors facing the trail and with adequate clearance.
- All trail lighting requires professional lighting and electrical with certification by the Electrical Safety Authority (ESA).
- Where trails are not lit, this should be made clear on park signage.

Park and Pathway Open Hours:

The City of Toronto permits park use after dark until 12:01 a.m. and parks are closed until 5:30 a.m. No distinction is made in policy that separates pathway and trail hours as separate from general park hours. However, some of the city's parks and trails are open 24 hours a day, including the Martin Goodman Trail, the Don Valley Trail, and the Humber River Trail.

City Of Calgary

City of Calgary, Calgary Parks Lighting Plan, 2017

The 2017 Calgary Parks Lighting Plan is a brief operational strategy developed by the City's Parks Department to guide the installation and maintenance of outdoor lighting in city parks. The goals of the lighting plan are to:

1. Make consistent, informed, and sustainable decisions regarding the installation and management of parks and pathway lighting.
2. Preserve the environment and wildlife connectivity, and inherent beauty that dark spaces can provide.
3. Increase the use, enjoyment, safety and sustainability of parks and pathways in Calgary.

The Plan includes a series of key messages, including:

- It is Calgary's intention to provide park lighting only in exceptional circumstances.
- Minimal lighting allows for the preservation of the environment, as well as being fiscally responsible.
- Site safety can explore other options in addition to lighting to address concerns.
- Lighting near natural areas is particularly disruptive and should be avoided.
- Calgary Parks staff will carry out a site evaluation based on safety, use of park, commuter traffic, and community support.
- Staff will not approve lighting when:
 - When the project is within 50m of a natural or environmentally sensitive area.
 - When other options can be used to address concerns
 - When the project is solely for aesthetic purposes
 - When funding is not available

A major operational process laid out in the Plan includes a series of evaluation worksheets (i.e., Public Safety– Crime, Extended Recreational Use, Extended Commuter Use, Public Safety— Collisions, and Community Alignment) to use in the evaluation of space. The worksheets (Figure B3) are used to establish a business case for park lighting. For a lighting project to be accepted,

the completed worksheets must demonstrate a need and that lighting is the best management intervention given the context. A rejected lighting request may also use the documentation in the worksheets to move forward with alternative space solutions.

Park and Pathway Open Hours:

The City of Calgary permits park use after dark until 11:00 p.m. and parks are closed until 5:00 a.m. The City's Parks Bylaw, outlines the general park hours and exceptions to the hours. All park pathways are open 24 hours a day and certain facilities like a prominent skate park in Shaw Millennium Park is open 24 hours a day.

Calgary  **Calgary Parks Lighting Evaluation Worksheet**

COMMUTER ROUTES		
Factor	Existing Concerns	Actions to Take
Alternate Routes	There are no lit commuter pathways, cycling routes or regional pathways within 3km. Alternatively, the pathway is the only connection between critical destinations, such as a transit stop or a building entrance.	Confirm with Calgary Parks GIS data that there are no lit pathways that are reasonable alternatives within 3km of the pathway.
Notes:		
Intensity of Pathway Use	The pathway is a very busy cycling commuter route from May to August. Evening use in the remaining months is desirable.	Complete a cyclist count between 5pm and 8pm to determine the number of users if intensity of use is unknown.
Notes:		
Visibility	The pathway travels through an underpass or tunnel, reducing visibility during the day as well as after dark.	Perform a site visit to the area during the day and after dark to determine the visibility around the area.
Notes:		
Alternative Options	If there are alternative solutions to lighting or negative impacts of lighting are expected to result, do not light.	Consult with park and pathway maintenance staff to determine if there are other opportunities for increasing awareness of user traffic and physical barriers in the area without lighting. See if there is an alternate pathway or street that may be used safely.
Notes:		

Figure B3: sample lighting evaluation worksheet (one of seven) meant to evaluate the suitability of a park space for lighting (City of Calgary, 2017).

Park Pathway Lighting Policy, 2003

Different than other municipal park lighting strategies, the City of Ottawa defines their lighting program through a policy statement (Policy: ACS2003-PEO-IDP-0011) and process rather than a functional plan. It is the policy of the City of Ottawa to light park pathway systems where community and program needs require pathway usage in the evening; where pathway users can be assured of a reasonable expectation of safety and reduced risk. The City recognizes that lighting promotes the evening use of park facilities, so lighting is only considered where the evening use does not conflict with adjacent uses or applicable by-laws.

The objective of park lighting is not to duplicate or replace existing lighted evening routes such as sidewalks in the road right-of-way. Where park pathways are well-traveled routes to recreation facilities, transit, and shopping, among other destinations, the lighting and pathways are to be built and maintained at a standard sufficient to ensure safe access. Park pathway lighting is not a solitary solution to crime, it is one tool to be used in combination of a full site evaluation. Designing lighting for the pedestrian in mind (i.e., style and scale) is important for the usability and comfort of park facilities. Park pathway lighting will be noticeably different from road rights-of-way lighting designed for vehicles.

There are three functional parts to the Park Lighting Policy:

1. Characteristic of Park Lighting

The following characteristics apply to all new park lighting installations that are approved through the Park Pathway Lighting Policy:

- **Light Source:** An appropriate light source will be tailored to the needs of each specific park pathway. Several factors will be evaluated, including selecting between High Pressure Sodium, Metal Halide and other types of

light sources based on the need for visibility, glare reduction, landscape and architectural aesthetics, colour rendition, efficient operation and differentiation from road corridors.

- **Photometrics:** The quality and quantity of light will meet the Illumination Engineering Society (IES) standards for park pathways. Specifically, the light source will be of sufficient design to ensure a minimum 5-LUX coverage along the entire length of the pathway and a uniformity level ratio of 5:1. All park pathway lighting projects are to use light fixtures with curvilinear cut-off lenses.
- **Pole Type and Location:** Wherever possible, light poles are to be placed 1.5 m off the edge of the pathway. Light poles are to be durable and have very little flexibility. All poles will be dark natural colours to blend in with the landscape and will be finished to protect from graffiti and withstand maintenance needs.
- **Power Supply:** When feasible, a City-owned, secondary power supply with independent shut off and supplementary hook-ups is recommended. A park electrical power kiosk will be located on parkland near the lit pathway.
- **Park Site Design Requirements:** Where new pathway lighting is to be installed, a minimum 2m width (2.4 – 3.0 meter when winter maintained), hard surfaced path with wheelchair accessible slopes is recommended. Applications may vary since it is not the intention of this policy to replace existing pathway systems that are in satisfactory condition but do not have sufficient width.

2. Evaluation Criteria

To determine the appropriateness and feasibility of new park pathway lighting projects the following evaluation has been developed:

- **Safety of Users:** Staff will perform a Crime Prevention Through Environmental Design (CPTED) audit of the park to confirm the viability of keeping the park pathways accessible for evening use. Interviews with local community policing officers, park users, and park neighbours is recommended.
- **Analysis of Park Facilities:** Staff will evaluate

park program elements, their location in the park, and analysis of the effects of new lighting on these facilities. Staff will evaluate if lighting or other design changes in the park are required. For example, lighting a playground may be less suitable than moving the facility to a location with natural surveillance.

- **Alternative Transportation Needs:** Staff will evaluate the pathway's role in the movement pattern of the community (to and from city facilities, transit, retail, etc.).
- **Impact on Neighbours:** An informal impact assessment of the effects of new lights on park neighbours will be conducted. This policy addresses the need to use fixture types that are best suited to reducing light trespass onto adjacent properties.
- **Impact on Park Environment:** New lighting projects that require significant change to the natural landscape character of the park are discouraged. For example, if the installation of lighting requires significant tree removal for infrastructure or pathway visibility such issues are to be identified and discussed with the city Forester and the local community.
- **Feasibility:** A cost-benefit analysis of a capital construction project for new park pathway lights will be conducted. Identification of potential sources for metered hydro service is required.
- **User Profile:** Pathway lighting generally creates an expectation of safety for the pathway users. The physical characteristics of the pathway surfacing, maintenance level, expected user types and expected times of use are to be evaluated. Lighting timing is to be confirmed with risk management and operating departments.
- **Threat Analysis:** If the proposed pathway lighting project is linked to identified personal security problems for users, the project cannot occur without the concurrent implementation of additional security devices (such as video cameras) as determined and funded by Corporate Security. In addition, acceptable measures for enforcement of by-laws and added security patrol to curb potential criminal activity must also be in place.

3. Lighting Prioritization

All park pathway lighting requests are to be evaluated annually to determine implementation priorities. New project requests often exceed approved capital budgets and, as a result, the City has developed a system of prioritization:

- **First Priority:** Projects that meet all evaluation criteria and whose projected costs are within the approved capital budget.
- **Second Priority:** Projects that meet at least four of the evaluation criteria and are on pathways that receive winter maintenance. Second priority projects must have a completed CPTED audit with a recommendation in favour of new park pathway lights.
- **Third Priority:** Projects that meet three or fewer of the evaluation criteria, and where a CPTED audit of the park pathway system has determined that new pathway lights may create a false sense of security for pathway users.

Park and Pathway Open Hours:

The City of Ottawa permits park use after dark until 11:00 p.m. and parks are closed until 5:00 a.m. No distinction is made in policy that separated pathway and trail hours as separate from general park hours.

National Capital Commission

Capital Illumination Plan, 2017

The National Capital Commission (NCC) has developed a 10-year guiding plan to direct the lighting of urban spaces in the National Capital Region in Ottawa, Ontario. The plan is not a regulatory framework but a series of guidelines that are considered for each unique circumstance. Although a different administrative unit, the City of Ottawa is closely tied to the NCC and this Capital Illumination Plan, especially in the coordination of lighting across jurisdictions.

Although typically concerned with safety and security, this plan equally considers how lighting contributes to place, a story, aesthetics, and urban wayfinding. Given how quickly lighting technology advances, this plan recognizes the importance of innovation and sustainability in capital planning. Considering the impacts of lighting on human and natural environments, this plan also attempts to balance the need for lighting with the need for darkness and reduced lighting.

It is intended that the plan be an operational tool to guide the management of existing lighting infrastructure, prioritization of lighting projects, design of new lighting projects, and lighting project planning with joint government partners.

The NCC has developed a three-step lighting evaluation process:

1. What to Light?

Whether or not a site should be illuminated should consider:

- Contribution to safety or visual comfort.
- Contribution to heritage, historical, cultural, architectural and/ or social value. The illumination should contribute to beautifying the Capital and to the pride and sense of belonging experienced by residents and visitors.
- Communicative value. Each illumination has meaning; as such, the choice of sites to illuminate must support strategic directions

with regard to the development and image of the Capital.

- The environmental sensitivity of the site.

2. Lighting for Whom?

- Who are the users of the site?
- Should it be visible from near or from far?
- When should it be visible?
- What type of environment is to be created and how will it be enjoyed?

3. How to Light?

- The site context should be evaluated. Where is the site located? How does it relate to the Capital's history? What is its scale? How does it relate to public space? What is its surrounding illumination setting? What are the characteristics of its natural environment?
- The architectural and landscape features of the site should be understood. Does it have a heritage designation? Does it form part of a cultural landscape? What era is it from? What are the key architectural details or landscape features that should be emphasized? How do its materials react to light?
- The use of the site should be understood. A dialogue with the site owner or manager will reveal its uses and user traffic and provide valuable information about the area and its special points of interest.
- Favour the following curfew modes:
 - For pathways, main accesses and areas where 24-hour use is anticipated: "permanent functional lighting" mode (i.e., activation at sunset, 50% reduction in intensity after midnight).
 - For other pathways: "illumination lighting" mode (i.e., activation at sunset, low intensity lighting after midnight).

Other useful materials with the Illumination Plan include design guidelines for various urban and park situations around the Capital District, curfew parameters for the control of lighting after peak hours, and dark zone areas for spaces that should remain dark at nighttime.

Park and Pathway Open Hours:

Rather than limit the hours of access to public spaces and pathways, the Capital Illumination Plan planning process evaluates expected usage and plans lighting accordingly. The lighting plan highlights different lighting zones with corresponding guidelines.

The following guidance is provided for spaces that anticipate 24 hour access and those that may have reduces usage after peak hours:

Table B1: Curfew Lighting Parameters (NCC, 2017).

Mode	Description and Potential Uses	Recommended Parameters
Permanent Functional Lighting	Functional lighting requiring activation for the entire night (e.g., streets, major pathways, public places, health and safety services and so on).	<ul style="list-style-type: none"> • Activation at sunset. • 50% reduction in intensity from midnight to 5 a.m.
Illumination Lighting	Illumination to enhance the night-time landscape (e.g. buildings, commemorative monuments, public art and so on).	<ul style="list-style-type: none"> • Activation at sunset. • Lower intensity and reduced amount of lighting, if not total deactivation, starting between midnight and 2am (based on location and use). • Night mode on a case by case basis: after midnight light levels lowered or deactivated.
Dark Zone Lighting	Lighting dedicated to areas identified as dark zones	<ul style="list-style-type: none"> • Activation at sunset. • Lower intensity and reduced amount of lighting, if not total deactivation, at 10pm.

Appendix C: Public Engagement Results

Public Engagement

This section outlines in greater detail the results of the public engagement program.

PARTICIPANT DEMOGRAPHICS

The engagement program was completed by approximately 1000 participants with the following composition:

- The response rates were fairly evenly split between demographic age categories with the exception being youth participants (under the age of 24) making up only 2.9% of total participants compared to 15-22.5% within other categories (Figure C1).
- More than half of all respondents identify as a CIS woman (54.3%), Just over 30% of respondents identify as a CIS man. 8.8% chose not to answer the question about gender. 3.3% identified as a gender not listed in the available options. 1.9% identify as non-binary, gender fluid, gender non-conforming, or genderqueer (Figure C2).
- Approximately 3% of respondents identify as being Indigenous and 1.7% identify as being African Nova Scotian.
- One in five respondents identified themselves or members of their household as having a disability (i.e., any degree of physical or visual disability, mental impairment, intellectual disability, neurodivergence, learning disability, mental disorder, or workplace injury).
- Although a few survey responses came in from outside of the municipality, the majority of respondents reside within HRM. Some notable observations (Figure C3):
 - the highest response area is the B2W family of neighbourhoods (i.e., postal code for Dartmouth, Forest Hills, Russell Lake West, Sunset Acres, Woodlawn, Woodside).
 - response rates in the Regional Centre account for almost 40% of all responses.
 - a pocket of responses from B3Z, B3T (i.e., postal codes for Tantallon and Prospect family of neighbourhoods) are notably higher than their surrounding communities.
 - there was limited response from residents on the Eastern Shore.

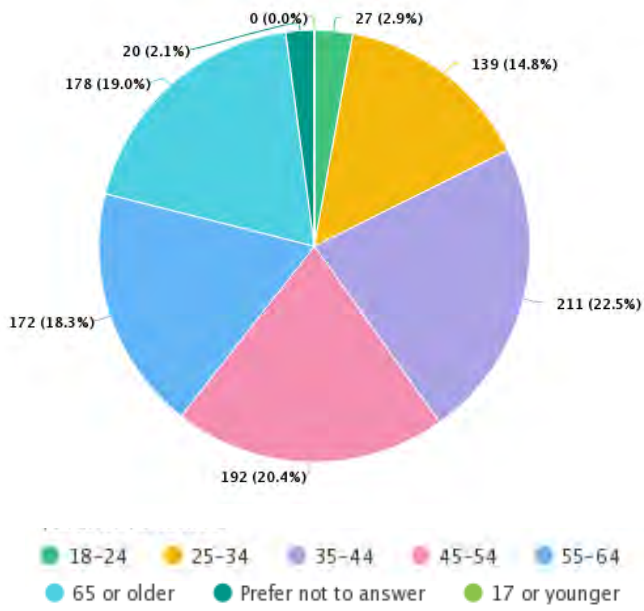


Figure C1: Age breakdown of engagement respondents.

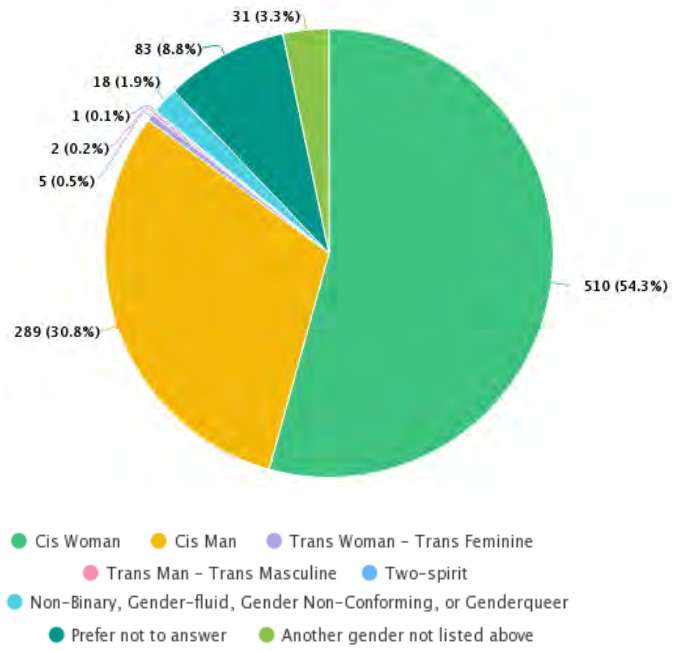


Figure C2: Gender identity.

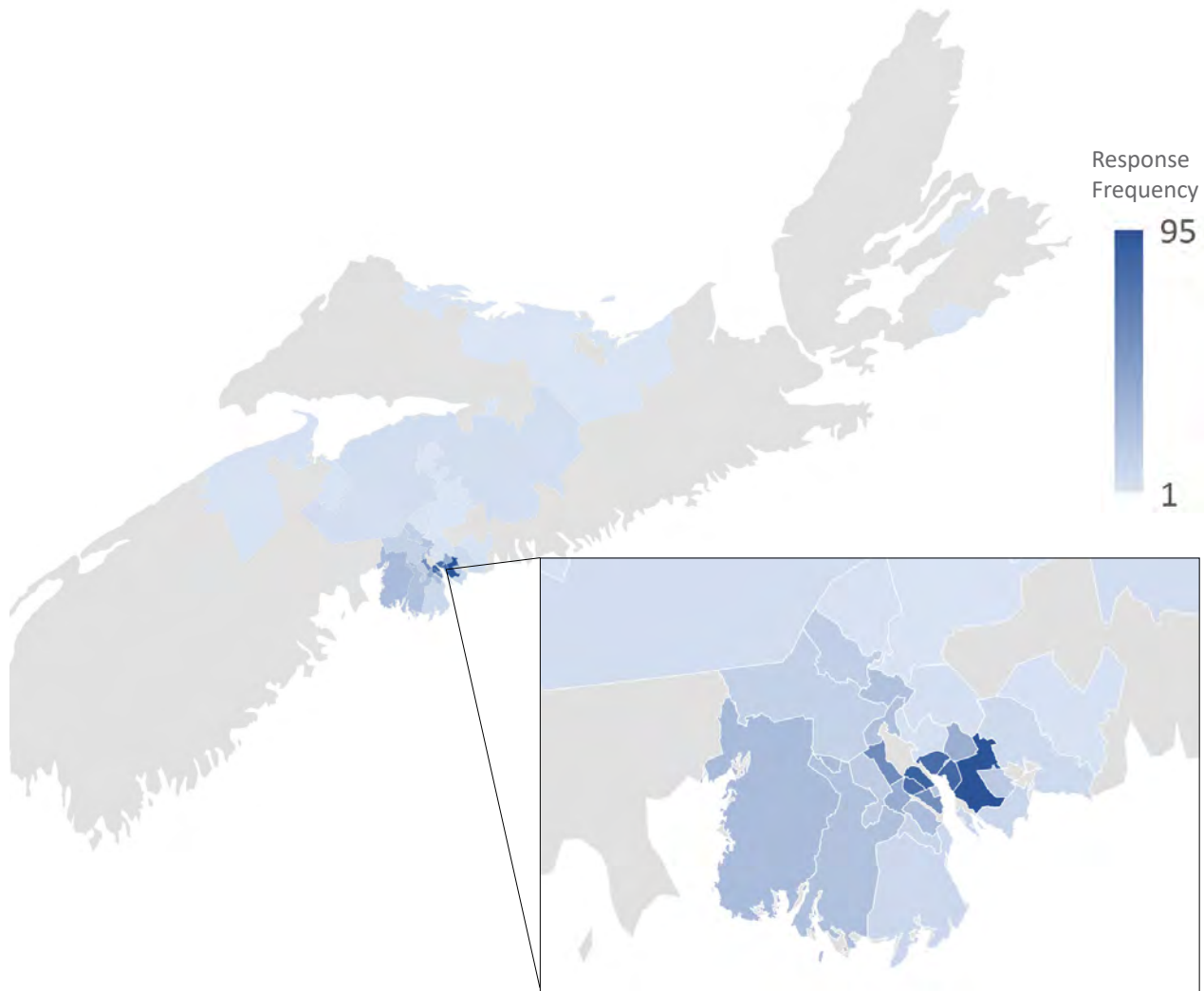


Figure C3 : Geographic distribution of survey respondents.

PARTICIPANT RESPONSES

A series of questions were posed to survey respondents to gauge preferences for lighting within parks.

In a resounding way, respondents indicated (78%) that they would be more willing to use park facilities and social spaces after dark if lighting was provided (Figure C4). With a similar response (77%), respondents indicated that lighting in winter and shoulder seasons would further improve their ability to use a park space (Figure C5). Respondents more decidedly support the lighting of pathways with 91% of respondents indicating that they would more likely to take a pathway through a park if it were lit (Figure C6).

The following lens may help to understand how different communities view lighting:

- Amongst respondents who identify as African Nova Scotian, 82% said that they would be more willing to use a park if facilities and social spaces were lit, 82% were more likely to use park facilities in the winter and shoulder seasons, 88% of respondents said that lighting would influence their decision to take a particular pathway.
- Amongst respondents who identify as Indigenous respondents, 81% said that they would be more willing to use a park if facilities and social spaces were lit, 85% were more likely to use park facilities in the winter and shoulder seasons, 89% of respondents said that lighting would influence their decision to take a particular pathway.
- Amongst respondents who identify as having a disability, 80% said that they would be more willing to use a park if facilities and social spaces were lit, 78% were more likely to use park facilities in the winter and shoulder seasons, 97% of respondents said that lighting would influence their decision to take a particular pathway.
- Amongst respondents who identify as gender-diverse or trans, 76% said that they would be more willing to use a park if facilities and social spaces were lit, 76% were more likely to use park facilities in the winter and shoulder seasons, 80% of respondents said that lighting would influence their decision to take a particular pathway.
- Amongst women, 82% said that they would be more willing to use a park if facilities and social spaces were lit, 83% were more likely to use park facilities in the winter and shoulder seasons, 92% of respondents said that lighting would influence their decision to take a particular pathway.

Q: Would you be more likely to use park facilities and social spaces if lighting was extended until a park's closed hours?

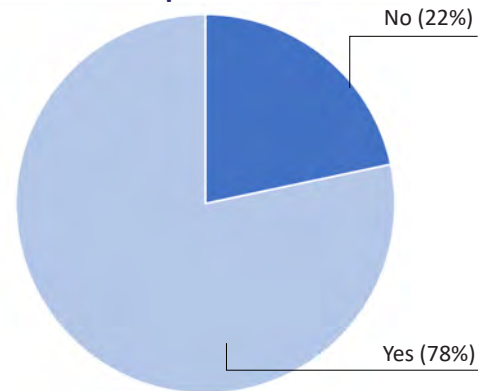


Figure C4: Survey response to likelihood of use of facilities and social spaces with lighting.

Q: Would you be more likely to use park facilities in the winter or during shoulder seasons if there was lighting?

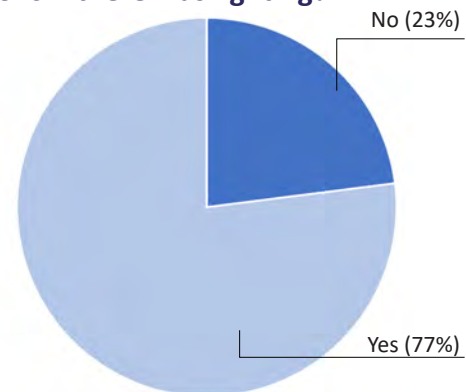


Figure C5: Survey response to likelihood of use of lighted facilities in the winter and during shoulder seasons.

Q: Would the presence of lighting influence your decision to take a particular pathway?

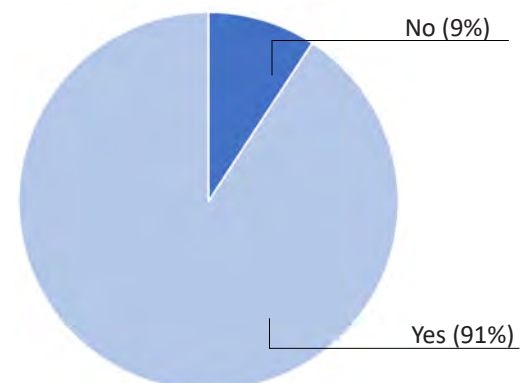


Figure C6: Survey response to likelihood of use of pathways if lighting was present.

PARTICIPANT RESPONSES

Q: Generally speaking, how would you describe your experience using park spaces in the evening hours?

Survey respondents provided many descriptions for how they use park spaces in the evening hours from walking dogs, to sport use, to socialization, but most responses centred on the movement of people through park spaces. How survey respondents feel while in park spaces after dark were also shared (Figure C7).

Almost 60% of all respondents said that they do not use parks after dark because of safety and accessibility concerns (i.e., fear, poor visibility, poor sightlines, undetectable surfaces, visible crime). Although 13% of those respondents clarified that they may use park spaces until dusk, until a lack of lighting makes it difficult to do so. Some respondents (5%) will only use park spaces after dark if others accompany them or if the park is busy with other users. Approximately 29% of respondents said that they tolerate dark park spaces given a lack of other reasonable options (i.e., to walk a dog, to get to work, etc), but many saying that they proceed with caution. Some respondents (5%) made clear that they have no expectation for park lighting and have a preference for keeping spaces dark to reduce pollution and to see the night sky. Approximately 2% of respondents explicitly stated that park spaces are already sufficiently lit.

Some additional commentary on park experience includes:

|| I often find lighting levels too sparse. It's not a matter of illumination from lighting that exists. Large gaps leave poorly lit areas and can cast long shadows that make discerning the walking path difficult. ||

|| I find many of the parks and paths in HRM are extremely dark and unusable at night. ||



Figure C7: Park experiences after dark as described by respondents. Responses scaled by frequency of mention.

- || Generally good, we typically try to make sure to have a light source with us if we are out in near dusk. ||
- || Would use parks more with kids at night if there was just enough ambient low lighting to be able to see walkways. ||

PARTICIPANT RESPONSES

Q: Are there situations in parks where lighting may not be desired?

The interest for safety and security while moving through space was seen as a priority with almost 30% of survey respondents indicating that there are no situations where lighting may not be desired, "No, if the sun sets and the parks/ walkways are still open it is necessary to have a light source." However, lighting was not suggested at any cost with many recommendations suggested for the appropriate use of lighting levels, "It's a balance between safety and natural ambiance. I wouldn't want to see parks lit up like it's daytime, but intermittent light or dim areas would be good."

Caution was recommended by several respondents with 21% suggesting that lighting would not be appropriate in locations where flora and fauna may be negatively impacted. Natural or wilderness areas, including forested and shoreline environments were given as examples, "Artificial light has negative impacts on numerous animal patterns, migrations, and behaviour. We must not take this lightly or add to the numerous challenges that birds, insects, and animal species are already facing."

Approximately 17% of respondents had concerns about how park lighting may affect those who live in close proximity to a light source. Lighting was not favoured if light trespass and lighting colour on the blue spectrum negatively affected sleep patterns or overall human health.

Nighttime sky observation was described by 15% of respondents as an important consideration when planning for lighting, "Yes. Sometimes I like to lay down in the park and stargaze. Lighting would take away this experience by removing the dark."

Given the accounts of several respondents with poor nighttime experiences in parks when it comes to lighting, there is hesitation to roll out more lighting that perpetuates these issues, "Bright lighting is very problematic. If I can't see beyond a path/sidewalk due to overly bright conditions, I feel less safe than dimly lit routes which allow me to

see where I'm going, yet still have sufficient dark-adapted vision to observe the area around me."

Approximately 7% of respondents would like to see lighting restricted to main travel ways and park entrances, 5% of respondents do not want to see lighting if it encourages gathering, loitering, or socializing after dark. Lighting interference with views (e.g., look-offs, waterfronts, special events, fireworks, concerts, outdoor movies) was cited by 3% of respondents. A little less than 3% of respondents see lighting as unimportant during a park's closed hours.

While lighting is needed in priority areas (e.g., transportation pathways) within a park for park user safety and to enhance park use, HRM's lighting strategy must also integrate human and ecosystem health priorities.

Because lighting is needed mainly for pedestrian pathways, a number of suburban and rural parks may not need lighting at all (and if it's not needed, it should not be installed).

PARTICIPANT RESPONSES

Q: Please add any additional information about park lighting that you feel is important

When asked to contribute additional thoughts about lighting in parks, this was seen as an opportunity to expand on previous points, but in some cases, offer solutions to issues related to lighting. Overall, 23% of responses maintain that lighting is a positive feature that contributes to park safety and security. For example, being able to see where you are going, to see others, and to be seen by others within a space.

However, caution was expressed within several responses with participants calling for more responsible lighting, "...we should be talking about how much light is needed and what kind of light. I'm very concerned about what the WHO says about light pollution's serious human health and environmental impacts. We can promote safety/usability of parks and the health benefits of a darker night..."

Slightly more than 17% of responses identified how lighting can be made more effective and safer (e.g., downward directed, consistent coverage, shielded, warmer colour temperature, reduced glare) and to reduce the impact on human health. "Lighting that is not white light, but a softer light would be more accessible for people experiencing brain / eye related disabilities." To expand that further, another 14% of respondents talked about the importance of lighting efficiency (e.g. solar, LEDs) with ability to control lighting levels and hours (e.g. dimmers, sensors, timers etc.). The idea of reducing the impact of lighting on sensitive natural areas was further developed by almost 10% of responses. Respondents highlighted the need to consider keeping natural spaces dark for wildlife, plant life, and enjoyment of the natural world.

Access to active play in the evening hours (e.g., playgrounds, sport courts, bike and skate parks) was described in 6% of responses. One respondent described their personal challenge, "As a parent... we often talk about how hard it is in winter in the hours after daycare to be outside because of the

dark. We don't feel comfortable going to the playground because we don't want our kids to trip and fall, not all of us have backyards, and they aren't as exciting as playgrounds or offer the variety of things to do. There is also a interpersonal safety element, felt particularly keenly by moms."

In terms of where to prioritize lighting, 14% of responses described the need to focus resources at park entrances, on primary active transportation routes, en route to transit areas, and along essential community connections, "If a park is identified as a cycling, walking or otherwise active transportation route, then it should be lit. In the winter months when it gets dark by late afternoon and does not get light until later in the morning, people need to get to school, work, and around town safely. Lighting is an important safety feature in this regard."

Aesthetic improvements to parks through seasonal lighting, public art, spot lighting on features were seen (in 4% of responses) as a way to instill a sense of pride and to make spaces safer by making them more social, "The lighting doesn't always have to be blatantly for safety, you could install lighting in a decorative way along paths, near plant features, or even make an artistic installation using lights. This way you benefit from making the space lit but without the utilitarian look of a giant street light post every 20m."

Some other highlights:

- 3.5% of responses described lighting as an unnecessary municipal expense compared to other more pressing initiatives.
- 2% of responses were specific to dog users who describe lighted access to parks as important.
- 2% of responses focused on the need to consider maintenance to allow for uninterrupted lighted access (e.g., burnt out bulbs, vandalism)

The above percentages add up to be more than 100% as many responses had multiple themes and values embedded within them.

Appendix D: Lighting Prioritization

Table D1: Park pathways identified as candidate sites for park lighting. Not presented in order of importance.

Park Pathways	PID	Estimated Length of Pathway (m)	Notes
Regional Centre - Districts 5, 6 (partial), 7, 8, 9 (partial)			
North Woodside Community Centre Park (from building, across Halifax Water land, to Woodside Area Park).	00240424, 41146838, 41146820	275	Coordination required with Halifax Water.
Woodside Area Park to Old Ferry Road including Killam lands.	41127051, 00130484, 00114124, 41173816	945	Coordination required with Killam Properties.
Dartmouth Harbourfront Trail from Old Ferry Road to Kings Wharf Place (Build NS lands)	00114132, 40832859, 00097550, 00114306, 00114272, 00130419, 40763476	737	Coordination required with Build NS.
Ferry Terminal Park from Portland Street steps to Kings Wharf Place.	00130278, 40937864, 41022658, 00108498, 00108571, 00109090, 41423161, 40513632	335	
Harbourfront Trail from NSCC to Woodside Ferry Terminal	00241687, 41297011	900	Coordination required with Build NS.
Arnold Whitworth Park (Marvin Street to Renfrew Street)	00246926, 40078107, 00247163	125	
Maynard Lake Park (Lakefront Road to Portland Street)	00220210	150	
Brownlow Park (Bow Street entrance to Opal Ridge Drive entrance)	40130411, 40130049	325	
Martins Park (Parking lot to Dundas Street Bridge)	40763476, 00130419	230	
Starr Park (Ochterloney to Pleasant Streets and Irishtown Road to Pleasant Street)	00230920	150	
Dartmouth Common (Thistle to Dhalia Streets, King Street to Thistle parking lot, King Street to Alderney Drive, Bicentennial School to Thistle Bikeway spine, Zatzmasn Sportsplex crosswalk on Thistle to Thistle Bikeway spine, Wyse to Windmill Roads)	00109561, 00045831	1546	
Mount Hermon Cemetery/Green Road Park	00082628	280	
Farrell Street Park (Farrell Street to Wyse Road)	40175838	200	
Brule Street Park (Primrose Street to Brule Street)	00037085, 41325598	170	
Jason McCullough Memorial Park (between Pinecrest Dr and Joseph Young St)	40439200, 00056713	170	
John MacNeil Elementary School Park (Between Leeman Dr and Highfield Park Dr)	00062596, 00611863	180	Coordination required with HRCE

Table D1 (continued): Park pathways identified as candidate sites for park lighting.
Not presented in order of importance.

Park Pathways	PID	Estimated Length of Pathway (m)	Notes
Regional Centre - Districts 5, 6 (partial), 7, 8, 9 (partial)			
Maybank Park/Crichton Park Elementary School Park (Lyngby Ave to Mic Mac Boulevard)	40402117	350	Coordination required with HRCE
Birch Cove Park (Oakdale Cres to Lakeside Terr)	94953	125	
Brookdale Crescent Park (from Brookdale Cres to Grahams Grove Park, including Provincial Land and over Halifax Water easement across private land)	40173544, 00100511, 00209361, 00209361	1085	
Grahams Grove Park (AT trail section)	209692	125	
Henry Findlay Park (from Lion's Beach across pedestrian bridge to Hawthorne St)	00094466, 00094375, 00094474	165	
Findlay Community Centre Park (between Hawthorne St and Elliot St.).	00235010	115	
Sullivan's Pond Park (along the AT path from Hawthorne St to Ochterloney St.)	00112094, 00112078, 00243428,	450	
Gorsebrook Park	00054932	550	Direction from a park plan approved by Regional Council.
Connrose Park	00069302	235	
Grafton Street Park	00076943	70	
Upper Flynn Park	00025981	125	
St Andrews Community Centre Park (Connecting St. Andrews Ave and PID 00258921)	40823999	100	
Merv Sullivan Park (from Glebe St to Novalea Dr)	0029512, 40928236	230	
George Dixon Community Centre Park (From Artz Street to the Centre and housing to the south)	127712	125	
Lake Banook Regional Park (Grahams Grove Park to Lion's Beach. Some coordination in the ROW required)	40941338, 00094359, 40941320, 00636290, 00094334, 40941726	700	Coordination required in the road ROW.
District 2			
North Preston Community Centre Park (from Cain Street, and Simmonds Road).	40454662	85	
Lake Echo Community Centre Park	40164329	250	Direction from a park plan approved by Regional Council.
District 3			
Eastern Passage Common	00373597	1150	
Smeltbrook Park	41174749, 40783383	520	
Eastern Passage Educational Centre	40856478	350	Coordination required with HRCE
Between Kerri Lea Lane and Briarwood Drive	41307083	100	
Summerfield Way Park	41045121	275	
Portland Estates School Park	41031295	700	Coordination required with HRCE

Table D1 (continued): Park pathways identified as candidate sites for park lighting.
Not presented in order of importance.

Park Pathways	PID	Estimated Length of Pathway (m)	Notes
District 3			
The Birches Park	40581720	350	
Russell Lake Park	40432668, 40685430, 40685901, 40685620, 41177148	1925	
Baker Drive Park	4137592, 41375916, 41207796	260	
Bell Brook Park	41045139	250	
Roblea Drive Park	00194266	115	
Bel Ayr Elementary School Park	263095, (40398653 ROW)	125	
District 4			
Cole Harbour Common	633495, 00633206, 40552721, 40141632	1275	
Forrest Hills Greenway Park (Havelock and Nestor Crescent to Forest Hills Parkway)	40203325	200	
Cranberry Lake Park (Flying Cloud Drive to Main Street; Langdon Drive to Main Street)	364901, 40080590, 00261792, ROW (40947194, 40947632)	800	Requires coordination within the road ROW.
Settle Lake Park (Roslyn Drive to Glenalva Court, La Pierre Crescent to Poplar Drive, Poplar Drive to Dorothea Drive)	407239, 40417297	420	
Sir Robert Borden Junior High School Park (from Ellerslie Crescent and Savona Court)	00398891, 40113920	400	Coordination required with HRCE
George Bissett Elementary School Park (from Fieldwood Circle and Asley Drive)	40205536, 40205601	200	Coordination required with HRCE
Cadwell Road Elementary School Park (from Flagstone Drive and Deerbrooke Drive)	00404079	280	Coordination required with HRCE
Colby Village Recreation Centre Park (between Colby Drive and Crestwood Place)	40316747	140	
District 6			
Landrace Park (Landrace Crescent to Cathy Cross and to Portland Street)	00217018, 00215525	275	
Ian Forsyth Elementary School Park (Gourok Avenue to Glenco Drive and through from Culrain Crescent)	249474, 00185231	125	Coordination required with HRCE
Mary Lawson Park (Basil Avenue to Valleyford Avenue)	41106956	125	
Ira Settle Park (Valleyford Avenue to First Street)	190298	165	
Robert Drive Park (Main Street to Robert Drive)	618744	65	
Shubie Park (John Brenton Drive to Wright Avenue)	40174468, 00258814	750	
PO2 Craig Blake Memorial Park from Appian Way to Appian Way	40427783	425	

Table D1 (continued): Park pathways identified as candidate sites for park lighting.
Not presented in order of importance.

Park Pathways	PID	Estimated Length of Pathway (m)	Notes
District 9			
Edward Drillio Park, Springvale Elementary School Park	40179517, 40179723, 40830911	350	Coordination required with HRCE
Chebucto Heights Elementary School Park (from Abbey Road).	00274381	115	Coordination required with HRCE
John W. MacLeod Park (from Colindale Street)	00264937	80	
Fleming Tower Park (from McLennan Street)	00272302	60	
Chain of Lakes Trail Park (spanning Districts 9 & 12)	00339705, 00339705, 00339705, 00339705, 41363615, 41363615	6,400	
District 10			
Hemlock Ravine Park (from the parking area to Downing Street and Ravine Park Crescent)	00287268,	700	
Grosvenor-Wentworth Park Elementary School Park (from Armstrong Court)	00319962	125	Coordination required with HRCE
Hogan Court Park (to connect to future Sub Area 10 AT Path)	41400383	220	
Tremont Plateau Park (from Nightengale Drive to Eliza Ritchie Crescent, from Pioneer Avenue, from Amberwood Court, from Trailwood Place)	40337446	850	
DJ Butler Park (from Nightengale Drive to Meadowlark Crescent)	00316950	145	
Northcliffe Recreation Centre Park (from Hazelholm Drive to Dunbrack Street)	00330647	280	
Duc d'Anville School Park (from Lacewood Drive)	00296160, 00296392	200	Coordination required with HRCE
Clayton Park Junior High School Park (from Plateau Crescent)	00296095, 00296137,	100	Coordination required with HRCE
Plateau Crescent Park (from Douthill Drive, Woodward Crescent, and Tangmere Court)	00296632	425	
District 11			
Captain William Spry Centre (from Tartan Avenue, Thornhill Drive, Kidston Road to Tartan Ave)	327478	450	
MacIntosh Run Regional Park	41274507, 40428914	175	
Elizabeth Sunderland School Park	307454	175	
Open Space 41395575/Hilden Drive Park (connecting Hilden Drive Park with Cranberry Court and Aburn Avenue)	41395575, 41395567	150	

Table D1 (continued): Park pathways identified as candidate sites for park lighting.
Not presented in order of importance.

Park Pathways	PID	Estimated Length of Pathway (m)	Notes
District 12			
Ridgecliffe Middle School Park (from Beech Tree Run)	40856502	230	Coordination required with HRCE
Mainland Common (bus terminal to Canada Games Centre, Lacewood Drive to Keshen Goodman Library, Thomas Raddall and Regency Park Drive to Halifax West High School, Thomas Raddall Drive to West Ridge Drive)	40796005, 41334723, 41089624	1200	
Greenwood Heights Park (from Yoon Court to Eisner Street)	40528820	140	Coordination required with HRCE
Mainland Common Linear Park	41245341, 41245325, 40541690	4,250	
Park West School Park	40867400, 40774077	125	Coordination required with HRCE
Turnmill Drive Park (from Huxley Close to Park West School)	40524753	180	Coordination required with HRCE
Linear Park (Remmington Court to Scotch Pine Terrace, Beechwood Terrace to Gorsebud Close)	40343485, 00641373	350	
District 13			
Kingswood Elementary School Park (from Kenwood Avenue)	457556	275	Coordination required with HRCE
Uplands Park (Crestfield Drive and Belmont Avenue to Hammond's Plains Road)	486951	350	
District 14			
Sackville Heights Junior High School (from Sackville Drive)	40101750	150	Coordination required with HRCE
Sackville Heights Elementary School Park (from Sackville Drive)	457093	100	Coordination required with HRCE
Millwood Elementary School Park (from Millwood Common Park)	40354276	125	Coordination required with HRCE
Millwood Common Park (from Millwood Dr. and High Rigger Crescent)	40272288, 40423881	225	
Millwood High School Park (from Sawyer Crescent)	40450579	160	Coordination required with HRCE
Harry R Hamilton Elementary School Park (from Hamilton Drive)	40296535	100	Coordination required with HRCE

Table D1 (continued): Park pathways identified as candidate sites for park lighting.
Not presented in order of importance.

Park Pathways	PID	Estimated Length of Pathway (m)	Notes
District 15			
Ecole Du Grand Portage Park (from Riverside Drive)	40013435	75	Coordination required with HRCE
Nordic Crescent Park (from Nordic Crescent to Metropolitan Avenue Park)	00364919	75	
Leslie Thomas Junior High School Park (from Metropolitan Avenue Park to the school and to Nictaux Drive)	00362459	350	Coordination required with HRCE
Metropolitan Ave Park (from Lennox Drive towards Leslie Thomas Junior High School)	00362467	131	
Kinsman Park (from the Community Centre, along Kingfisher Way to Sackville High School Park).	00359968, 41350000	460	
First Lake Regional Park	00362210	800	
Sackville High School Park (from Kingfisher Way)	00359950	150	
Sackville Sports Stadium Park (from Glendale Drive and from Sackville High School Park)	40503013	150	
AJ Smeltzer Junior High School Park (from Kaye Street, Tilley Court, and Prince Street)	00359984	215	Coordination required with HRCE
Caudle ParkElementary School Park (from Pope Crescent and Chandler Drive)	00359034	225	Coordination required with HRCE
District 16			
Stonington Park (from Innovation Drive to Hollyhock Way).	41302456	375	
Abbingtion Avenue/Amesbury Gate Community Parks (from Abbingtion Avenue, Innsbrooke Way, Crownridge Drive, to Larry Uteck Drive)	41402488, 41403692	750	
Larry Uteck Boulevard Community Park (from Sedgwick Place to William Borrett Terrace and Larry Uteck Drive to William Borrett Terrace and Windridge Lane)	41357278	700	
Bedford South School Park (from Oceanview Drive and from Southgate Drive)	40873226	360	Coordination required with HRCE
Dr. Gerald J LeBrun Memorial Centre Park (from Basinview Drive)	00428334	70	
Sunnyside Elementary School Park (from Elgin Ln.)	40110447	150	Coordination required with HRCE
Fish Hatchery Park (between Shore Dr. and the Bedford Highway).	40106874	271	

Table D2: Park facilities identified as candidate sites for park lighting.
Not presented in order of importance.

Park Facilities	PID	Facility Type	Total	Notes
District 1				
Musquodoboit Rural High School Park	00539072	Multipurpose	1	
Carrolls Corner Community Centre Park	00522771	Full basketball	1	
Elderbank Park	00572156	Full basketball	1	
Meaghers Grant Park	00570440	Full basketball	1	
Schwarzwald Park	40708091	Full basketball	1	
Wellington Fire Hall Park	40542078	Full basketball	1	
District 2				
Grand Desert Park	40224115	Multipurpose	1	
North Preston Community Centre	40454662	Full basketball	1	
East Preston Park	40188807	Full basketball	1	
Porters Lake Community Centre	41377870	Full basketball, multipurpose, tennis	4	
Nathan Smith Recreation Centre	00618603	Full basketball	1	
Head Of Jeddore Park	40791907	Full basketball	1	
District 3				
Baker Drive Community Park	41375924	Full basketball, pickleball	2	
Brompton Road Park	40179152	Full basketball	1	
South Woodside Elementary School	00227595	Full basketball	1	Coordination required with HRCE
The Birches Park	40581720	Full basketball, tennis	3	
District 4				
Humber Park	00621136	Full basketball, tennis	2	
Cranberry Lake Park	00364901	Full basketball, pickleball	3	
Sunset Acres Park	00652800	Full basketball, half basketball	2	
District 5				
Green Road Park- Demetreous Beals Basketball Courts	00082628	Full basketball	2	
Dartmouth Common	00045831	Full basketball, tennis	3	
Brownlow Park	40130411	Full basketball, tennis	3	
Clement Street Park	40288409	Full basketball	1	
Arnold Whitworth Park	00247155	Full basketball, half basketball	3	
Crichton Park Elementary School Park	40402117	Tennis	2	
Northbrook Park	00070250	Tennis	2	
District 6				
John Martin Junior High School Park	00056556	Half basketball	1	
Farrell Street Park	00096255	Full basketball	1	
Mount Edward Road Park	40843583	Full basketball	1	
Morash Park	00211631	Pickleball	5	
Shubie Park	00258285	Tennis	1	
Landrace Crescent Park	00217018	Full basketball, half basketball	2	

Table D2 (continued): Park facilities identified as candidate sites for park lighting.
Not presented in order of importance.

Park Facilities	PID	Facility Type	Total	Notes
District 7				
Gorsebrook Park	00053405	Full basketball	1	Coordination required with HRCE
Citadel High School	00136309	Full basketball	1	Coordination required with HRCE
District 8				
Oxford School Park	00133348	Full basketball	2	Coordination required with HRCE
George Dixon Centre Park	00127712	Full basketball	2	Existing lighting is insufficient
Tremont Plateau Park	40337446	Full basketball, tennis	4	
Merv Sullivan Park	00029512	Full basketball, tennis	2	
Joseph Howe Elementary School Park	00169664	Full basketball	1	Coordination required with HRCE
Highland Park Junior High School Park	00131847	Full basketball, tennis, ball hockey	5	Coordination required with HRCE
Ardmore Park	00116970	Full basketball	1	
District 9				
Chocolate Lake Park	00250399	Full basketball, tennis	2	
Edward Drillio Park	40179723	Tennis	1	
Westmount Elementary School Park	00017046	Tennis	2	
Ashburn Park	00198614	Multipurpose	1	
Larry O'connell Park	00006502	Tennis, pickleball	2	
Cunard Junior High School Park	00310623	Tennis	1	Coordination required with HRCE
District 10				
Clayton Park Junion High School Park	00296137	Full basketball	2	Coordination required with HRCE
Tremont Plateau Park	40337446	Full basketball, Tennis	4	
Rockingham Elementary School Park	00292623	Half basketball	1	Coordination required with HRCE
Glenbourne Park	40774184	Full basketball	1	
Grosvenor-Wentworth Park	00319962	Tennis	2	
District 11				
Western Common	41253923	Multipurpose	1	
Central Spryfield Elementary School Park	00333377	Full basketball	1	Coordination required with HRCE
Portuguese Cove Park	00389460	Full basketball, tennis	2	
Atlantic Memorial Elementary School Park	40237075	Full basketball	1	Coordination required with HRCE
Roache's Pond Park	40095267	Full basketball	1	
Terence Bay Elementary School Park	00386201	Full basketball	1	
Graves Oakley Memorial Park	00282889	Full basketball tennis, pickleball	3	

Table D2 (continued): Park facilities identified as candidate sites for park lighting.
Not presented in order of importance.

Park Facilities	PID	Facility Type	Total	Notes
District 12				
Beechville Lakeside Timberlea Recreation Park	40025603	Multipurpose, tennis	2	Tennis, basketball, pickleball, ball hockey
Glengarry Estates Park	40737280	Full basketball	1	
Ridgecliff Middle School Park	40856502	Full basketball	1	
District 13				
Upper Hammonds Plains Recreation Centre Park	00644955	Full basketball	1	
Kingswood Drive Park	40593188	Full basketball	1	
Uplands Park	00486951	Multipurpose	1	
Madeline Symonds Middle School Park	41013970	Full basketball	1	Coordination required with HRCE
Winslow Drive Park	40841363	Full basketball, multipurpose	2	
Glen Arbour Way Park	40806879	Half basketball	1	
Greenhill Road Park	00457879	Multipurpose	1	
Big Hubley Lake Drive Park	40492399	Multipurpose	1	
Sylvania Terrace Park	40540726	Tennis	1	
Buckingham Drive Park	40443269	Tennis	2	
Eisenhauer Park	41027160	Tennis	2	
Brookline Drive Park	41505009	Pickleball	4	
District 14				
Laurie Lively Park	41103136	Full basketball	1	
Millwood Common Park	40423857	Full basketball, tennis	3	
Wallace Lucas Community Centre	40203200	Full basketball	1	
Beaver Bank Kinsac Park	00500199	Half basketball, pickleball	3	
Harry R. Hamilton Elementary School Park	40296535	Full basketball	1	
Springfield Lake Recreation Park	40707788	Full basketball	1	
Viscount Run Park	41191768	Full basketball, pickleball	3	
District 15				
A. J. Smeltzer Junior High School Park	00359984	Full basketball	1	Coordination required with HRCE
Sackville Sports Stadium Park	40503013	Full basketball	1	
Metropolitan Avenue Park	00362467	Tennis	2	
District 16				
Nicholas Meaghers Park	40115917	Full basketball		
Bedford Lions Park	00431031	Full basketball	1	
Charles P. Allen High School Park	41340324	Full basketball	1	Coordination required with HRCE
Ridgevale Drive Park 2	40628604	Full basketball	1	
Pierre Gingras Memorial Park	40593717	Full basketball	1	

Appendix E: Women's Safety Assessment

Women's Safety Assessment

Although closely tied to the site analysis stage, a separate process to evaluate park safety is recommended to understand the nuances of space and those who experience it. The Municipality's Community Safety Office collaborates with volunteers and facilitates Women's Safety Assessments (WSA). The WSA aims to reduce barriers for women, gender diverse people, and other underrepresented residents, so they can equitably access quality of life services, including parks.

The WSA originated in Toronto in 1989, as a participatory action tool to build safer communities. It builds on the best practices of Crime Prevention Through Environmental Design (CPTED) and incorporates culturally competent, community focused, and gender-based approaches. Research demonstrates that by involving women and non-binary people in the process of identifying safety concerns in public spaces and working with them to develop potential solutions, public spaces are made safer for everyone.

WSAs are different than other safety audits, as they recognize women, girls, and non-binary people's daily lived experiences. These perspectives are gathered through the WSA tool, providing insight into how safety in space is perceived and identifying built, social, and natural features that could be modified to improve safety.

The tool is based on the premise that the safer, more accessible, and enjoyable a space feels, the more people will use it, and the safer it will become due to increases in natural surveillance and community stewardship. The tool has been adapted for use all over the globe and endorsed by leading organizations such as 'UN Women'.

There are seven Principles of Design that are evaluated under the WSA by participants:

- **Principle 1:** Know Where You Are and Where You Are Going (i.e., signage, signals, orientation).
- **Principle 2:** See and Be Seen (i.e., visibility,

lighting, hiding places)

- **Principle 3:** Hear and be Heard (i.e., rush hour, peak circulation, social use of space, proximity of others)
- **Principle 4:** Being Able to Escape and Get Help (i.e., informal and formal surveillance, access to emergency services, multiple route options)
- **Principle 5:** A Clean and Welcoming Environment (i.e., design, maintenance, management, organization of space)
- **Principle 6:** Working Together (i.e., community participation, grassroots involvement, partnerships).
- **Principle 7:** Inclusion and Accessibility (i.e., universal accessibility, flexible space, barriers to access).

Insights and proposed actions are derived from the evaluation of these principles within the physical space. Lighting in combination with a variety of other park space interventions have previously resulted from the WSA.

The logistics of delivering the WSA will vary depending on the project, staff capacity, volunteer availability, and the scale of the space to be evaluated. Collaboration will continue with the Community Safety Office.



Figure E1: WSA participants walking through Morash Park in Dartmouth as part of an overall nighttime safety evaluation (HRM, 2022)

Recent Park Facility Lighting Costs

Park and Facility	Details	Cost
Silver's Hill Park – Pathway Lighting	<ul style="list-style-type: none"> • Six decorative hardwired lights. • Project included the installation of light poles, fixtures, concrete bases, electrical conduit, and a photocell sensor. 	<u>Construction Cost</u> <ul style="list-style-type: none"> • Approximately \$120,000
		<u>Operational Cost</u> <ul style="list-style-type: none"> • Approximate annual electrical cost is \$1,250. • Approximate annual maintenance cost for fixtures is \$600.
Northbrook Park – Pathway Lighting & Outlets	<ul style="list-style-type: none"> • Eleven decorative hardwired lights. • Project included the installation of light poles, fixtures, concrete bases, electrical conduit, and an electrical meter. • Poles include power outlets for public use. 	<u>Construction Cost</u> <ul style="list-style-type: none"> • Approximately \$170,000
		<u>Operational Cost</u> <ul style="list-style-type: none"> • Approximate annual electrical cost is \$2,000. • Approximate annual maintenance cost for fixtures and power outlets is \$2,000.
Admiral Harry DeWolf Park - Plaza Lighting	<ul style="list-style-type: none"> • Two decorative solar lights. • Project planning includes the installation of light poles, fixtures, and concrete bases. 	<u>Construction Cost</u> <ul style="list-style-type: none"> • Approximately \$20,000
		<u>Operational Cost</u> <ul style="list-style-type: none"> • No electrical costs. • Battery replacement on a 10-year cycle, approximately \$2,000. • Approximate annual maintenance cost for fixtures is \$200.
Cole Harbour Common – Sport Court Lighting	<ul style="list-style-type: none"> • Four sport court lights illuminate three pickleball and three tennis courts • Project included the installation of four wooden poles and fixtures. 	<u>Construction Cost</u> <ul style="list-style-type: none"> • Approximately \$230,000
		<u>Operational Cost</u> <ul style="list-style-type: none"> • Approximate annual electrical cost is \$2,500. • Approximate annual maintenance cost for fixtures is \$1,000.