KITCHENER

Trails & Lighting

Part of the City of Kitchener's Parks Master Plan

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Content

Acknowledgement

Places & Spaces is focused on the park service provided to the Kitchener community. Parks and open spaces are integral to communities, providing spaces where people play, explore, and build connections with the environment and with others.

The City is uniquely positioned to provide, care for, maintain, and secure public access to parks and open spaces for all members of its communities. The City of Kitchener recognizes that these public spaces are planned and built on land that is the traditional territory of the Chonnonton, Anishinaabe and Haudenosaunee Peoples. We recognize our responsibility to serve as stewards for the land and honour the original caretakers who came before us. Our community is enriched by the enduring knowledge and deep-rooted traditions of the diverse First Nations, Métis, and Inuit in Kitchener today. The significance of this land to Indigenous communities is respected, and we value the role that parks and open spaces can play in Reconciliation.

The City of Kitchener acts as a steward for almost 2,000 hectares of land as part of a parks and open space system. Through the implementation of Places & Spaces, we will work to better understand and address community needs and the barriers preventing use of these spaces, so that all community members in Kitchener might feel welcome, safe, and able to use our parks and open spaces.

Introduction

This section focuses on the background information and specific details that inform the context for the recommendations made for this topic.

Background

There are many reasons to use and enjoy park spaces: to play, exercise, interact with others, relax, or simply to be outside. The trails that lead into and through each park are an important consideration of park use. Trails connect parks, provide access to them, and are often a place for activity through running, biking, walking, and more.

This topic focuses on trails used within parks that do not form part of a larger transportation network. It establishes a standard for park access, trail surfaces, and park lighting.

Photo by Scott McQuarrie

Historical development

Considering the long history of park spaces in Kitchener, improving accessibility to and within those spaces is relatively new. Victoria Park was developed in 1896 and most other parks were created between the 1950s and 1980s.

When park trails were built during this time, they were often made of stonedust: a crushed and compacted limestone, and were a width of between 1.8 and 2.4 meters (six and eight feet). Stonedust trails only last as long as they are maintained. Aside from stonedust, surfaces were paved using tar and chip methods as a low-cost alternative to asphalt. These paved surface needed less maintenance but had a shorter lifespan than asphalt. Many Kitchener parks that have not been renovated over the past 20 years have one of these two surfaces.

It wasn't until the Accessibility for Ontarians with Disabilities Act (AODA) was passed in 2005 that rules guided the accessibility of parks today.

The majority of parks in Kitchener were developed during a time without the formal requirement of a trail through and connecting to park amenities. The result of which is now most parks consist of a playground or seating area surrounded by turf with little to no trail access. Any existing trails were typically built in larger park facilities. Today these are critical components to provide access into and through open spaces.

Trail lighting has a similar history in park spaces. Sportsfield lighting in parks dates back to the 1960s, but general park lighting has only been installed as needed, outside of the City Wide, Signature or Feature parks like Victoria Park.

Cycling & Trails Master Plan

The Cycling and Trails Master Plan (CTMP) was approved in 2020 as an update to the City's 2010 Cycling Master Plan and 2012 Multi-use Pathways and Trails Master Plan. The goal of the CTMP is to provide connected networks of on-street cycling routes and off-street trails.

Off-street trails in the CTMP rely almost exclusively on public park spaces. These routes will be created based on active transportation needs in Kitchener. Where CTMP trails overlap with routes within parks, the standards of the Cycling and Trails Master Plan apply. For example, Cherry Park has the Transit-Hub connection trail, a major route between the Iron Horse Trail and the future Regional Transit Hub. The trail is paved and lit , which is above and beyond the traditional Neighbourhood park classification standards.

Trail surface types

Trails within park spaces can be constructed of several materials. For local parks, the choices narrow to a select few: stonedust (crushed limestone), asphalt, and concrete. Other materials may be considered under special circumstances, such as re-enforced turf or permeable pavements. These other materials make up only a small portion of total trails in Kitchener. Environmental impacts such as emissions from the install, maintenance, and disposal of infrastructure materials (referred to as embodied carbon) must also be coordinated.

Category	Stonedust	Asphalt	Concrete
Cost - installation	Lowest	Mid	Highest
Cost - maintenance	Highest	Mid	Lowest
Plowed	No	Yes	Yes
Lifespan	Seasonal	15-20 years	20-40 years
Contents	100% aggregates (quarried limestone)	95% aggregates 5% asphaltic cement (petroleum by-product)	84% aggregates 10% cement 5% fly ash 1% water *(Class C2 concrete used as most often used for trail surfaces)*
Embodied carbon ($kgCO_2e$/tonne)^	10-15	40-75	78-100*
Suitable uses	Natural areas, environmentally sensitive areas, floodplains	General trail use, sloped accesses, access to park amenities, winter clearing eligible trails	Park entry transitions, narrowed trails, greater stability needs, areas inaccessible for asphalt installation

Table 1. Description of trail surface types and their required costs, maintenance, environmental impact and suitable uses

^Values estimated based on the material components and intended only to compare trail materials selections.

*Cement accounts for the majority of embodied carbon at approximately 680 to 900 $kgCO_2e$/tonne of cement used.

Current lighting approach

Kitchener parks, sportsfields, sports courts, skateparks, and high-traffic trails are typically lit to extend their use beyond day time hours.

Other less busy park spaces and trails within them are typically not. There is no standard that requires new or renovated Kitchener parks to include lighting for pedestrians.

Where no standards exist, some existing City plans and strategies mention lighting:

Development Manual (2021):
The Development Manual is a series of requirements that all development in the city must adhere to. For the purposes of this Parks Master Plan , the Development Manual guides park construction methods that developers must follow. Walkway lighting is described as an opportunity for cost-sharing between the City and developers.

Cycling and Trails Master Plan (CTMP, 2020):
Action 1D-2 (p. 28) refers to developing and implementing a strategy for lighting on trails based on traffic, land use context (for example, within residential or industrial zoning), and trail classification. This is reflected as a Key Performance Indicator within the Safety section of the CTMP as well.

One of the unique considerations of lighting in parks, compared to most other infrastructure, is continual energy costs. Any general-purpose pedestrian light in a public park runs for 3,900 hours each year on average. A typical LED pedestrian lamp uses 44 watts at mostly off-peak usage hours.

One lamp in the landscape, then, costs about $14 each year in energy use, with LED lamps lasting up to 100,000 hours. Managing energy consumption and replacement costs for hundreds to thousands of potential lamps across the park network is a critical consideration of new standards.

There are environmental factors as well. Similar to a human circadian rhythm, wildlife depend on the darkness of night to regulate sleep-wake cycles.

There is mounting scientific evidence documenting the impact of artificial light on the ecology of the night. Parks Canada (Guidelines and Specifications for Outdoor Lighting at Parks Canada, 2016) outlines these impacts including increased predation risks, foraging activities, and insect reproduction patterns.

Walter Bean Grand River Trail

Work on the Walter Bean Grand River Trail was started in 1999 and has been made possible through many partnerships with community organizations. It is a widely recognized trail system within and beyond Kitchener's city limits.

The 2010 Parks Strategic Plan identified several gaps, two of which have been developed including the Grand River Bridge (2010) and Chicopee-Vale slope stabilization (2011). The partnership with Bingemans in 2013 further strengthened the vision for the riverside trail.

Three gaps identified in the 2010 Parks Strategic Plan remain, including:

1. Bridgeport North (Carisbrook Drive)
2. Forwell Quarry
3. Freeport Floodplains

The Walter Bean Grand River Trail has significant gaps that require on-road detours from the river until these gaps are resolved.

Some sections of the trail have been subject to continuous seasonal and severe weather damage which have made these sections suitable for hiking only. The trail surface can no longer support cycling.

Trail edges continue to be maintained through summer flail mowing and annual invasive species control for Giant Hogweed continues through these sections.

One such section along Deer Ridge Golf Club, has been officially designated for hiking only since 2014. This section of the Walter Bean trail is approximately three kilometres between the private golf course and Grand River. The lands are owned by the Grand River Conservation Authority at the time of writing this master plan and range in width from nine to 50 meters. Maintaining access to the Grand River along this section has been challenging as storm events and ice buildup continually erode natural material.

Data Sources

Photo by Scott McQuarrie

This section highlights the relevant sources of information and research used to develop recommendations for this topic. A total of 12 data sources, including engagement, have informed the Parks Master Plan recommendations. For more detailed information on each data source, please refer to the Places booklet.

Legislation

Equitable engagement

Engagement with the broader community

Engagement with City of Kitchener departments

Engagement with partner organizations

Comparative analysis

External research

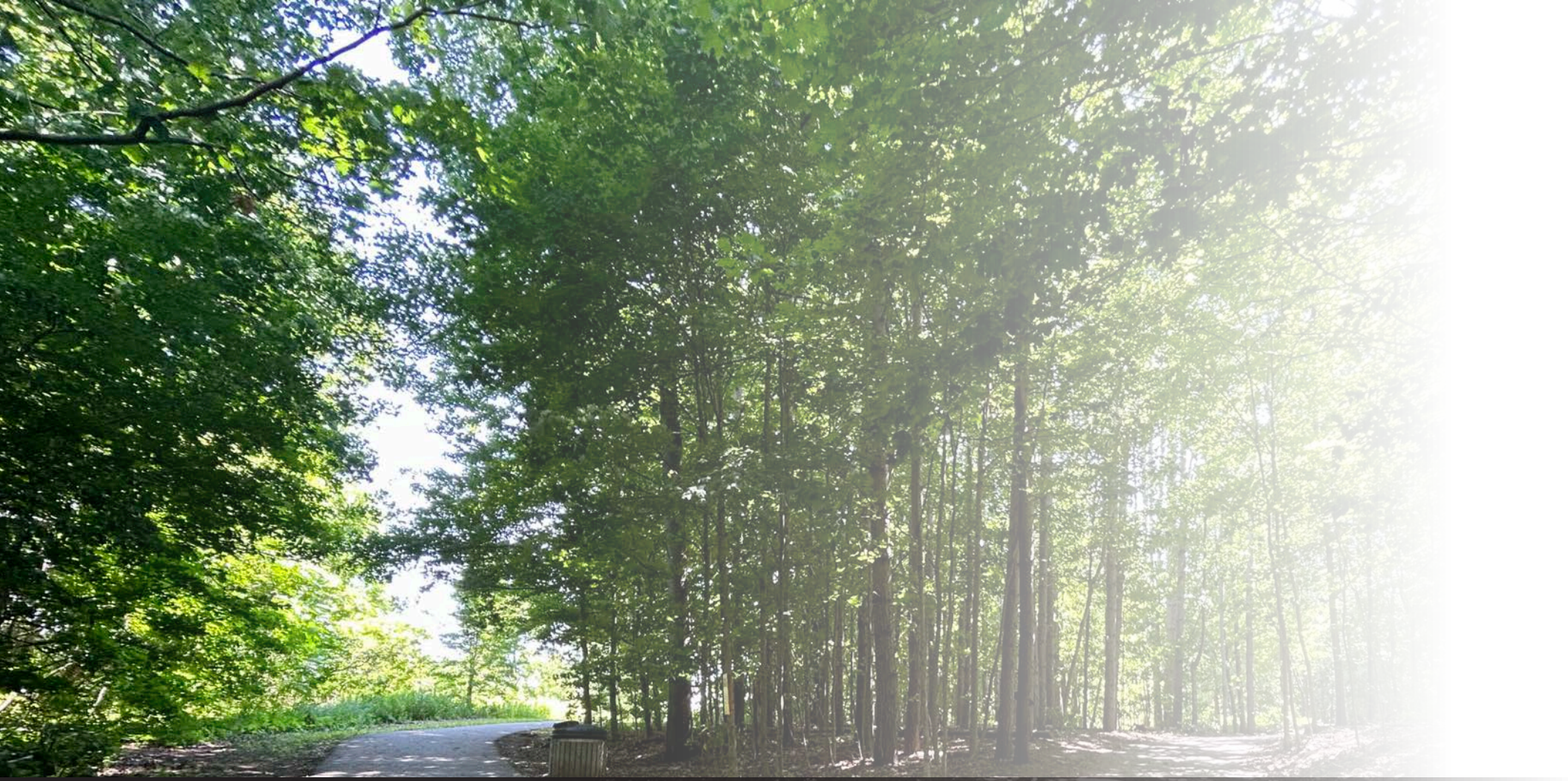
Policy

City of Kitchener strategies

Region of Waterloo strategies

Best practices

City of Kitchener staff experience



Findings

Several themes emerged across topic areas, engagement audiences, and data collection methods. The following section reflects major themes that cut across several datasets from engagement methods. Findings relevant to more than one theme are reflected in each. For more detailed information on the overall engagement effort, please refer to the Places booklet.

Accessibility

Barriers to accessing parks and trails include a lack of trail lighting, inaccessible trail slopes, and poor trail maintenance (e.g., winter snow and ice removal, uneven pavement, cracks, etc.) Gravel trails were highlighted as an explanation for difficulties getting to larger parks.

Environmental Sustainability

Concern for the sustainability of pavement solutions emerged from engagement data. Those engaged desired trails and maintenance solutions that have a minimal impact on the environment. This includes environmental impacts on surrounding trees and natural areas from materials, installation, and winter maintenance such as de-icing.

Inclusion

Lighting emerged in two data sets as factors that prevent use or elicit not feeling welcome or safe in park spaces. More lighting is suggested to make it easier to enjoy in winter months and appear welcoming during evening and night time hours.

Lighting parks provides access to residents who may not be able to visit them during daytime hours or during the winter months when daylight hours are decreased.

> *"Nice lighting (that doesn't cause night pollution) would be a help as well on trails and keep the paths safer. As well I work 9-5 so by the time I'm home it's dark and the trails we would walk during the summer are dark and not very inviting or safe feeling."*

Safety

Lighting parks is a critical component of safety in public spaces. Park goers equate the feeling of safety with well-lit parks and access points, and they often requested more of it in our parks. Lighting alone does not guarantee safety, and lighting parks should be paired with Crime Prevention Through Environmental Design (CPTED) principles to contribute to park safety.

Recommendations

This section summarizes the recommendations specific to this topic that are informed by the broad and local context, data sources, and findings. Each recommendation begins with a number representing the order in which its implementation is prioritized. For a comprehensive list of all recommendations made for this master plan update and the implementation framework, please refer to the Places booklet.

Walter Bean Trail support

Support the pursuit of a continuous Walter Bean Grand River Trail and complete the feasibility report of the entire corridor to determine the long-term viability of the trail.

The City has been committed to developing the Walter Bean Trail since 1999. To achieve the objectives of a continuous trail and connection to the Grand River a decision must be made about the section along the Deer Ridge Golf Club. Options include re-constructing in the same location, re-locating and re-enforcing sections of the existing trail, or bypassing this river section to maintain trail continuity.

This decision may be faced in other trail sections as climate change contributes to more frequent and severe storms. Criteria to support decision-making should include cost implications such as purchasing land, construction, and maintenance costs as well as other considerations such as input from First Nations rights holders, user experience, and risk assessment. A feasibility study must be completed of the entire trail corridor to assess the long-term viability of the original Walter Bean Grand River Trail corridor vision. The City's responsibility is to balance the desire to be near and access the water with the sustainability of those efforts.

08: Park lighting standards

Establish park lighting criteria and policies to determine park eligibility and standards for pedestrian lighting.

Criteria for city-wide implementation

Some parks currently have lit facilities but no other source of lighting on the route to the facility. Sportsfields, courts, and skateparks may be lit but with no pedestrian or parking lot lighting to guide people to them; there is currently no guiding city policy or requirement to do so.

Not every park location can or should be lit. A balance must be struck between wide-spread implementation of lighting and lighting spaces as needed. This balance is necessary to maintain a sustainable long-term energy consumption, costs and inventory management of all-year outdoor lighting infrastructure.

Lighting should only be considered applying all of the following criteria to each park.

Lighting criteria

Destination and location based
Lighting locations must provide direct access to and from major public destinations such as community centres, schools, libraries, shopping centres, and transit connections.

Anticipated development
Lighting within a park may be considered when surrounding development is anticipated to significantly increase the demand and use of the local park or trail connection.

Amenity based
Lighting in a park may be provided to serve as a pedestrian connection to and from lit outdoor park facilities like sportsfields, courts or skateparks.

Surveillance
Adequate natural surveillance, or the ability to see in and out of an area, must be present in order for lighting to have a positive impact on public safety. When natural surveillance is not feasible, the public should not be encouraged to enter into any park or naturalized area through lighting trails or park amenity areas.

Natural surveillance is a core strategy of Crime Prevention Through Environmental Design (CPTED); A site design approach that uses the built environment to promote natural surveillance by the community to minimize the need for traditional security measures..

Context

Adjacent land uses and impacts must be assessed prior to installation of lighting. This includes the light itself, the activity that it is extending into the night hours, and how it impacts the surrounding area.

Environment

Parks adjacent to or included in naturalized areas will be excluded from consideration for lighting.

Park classification

All City, Feature, and Signature classified parks will be considered for internal park lighting, provided the above criteria can be met. There are 15 parks within these classifications; only three of which currently have comprehensive park lighting. These parks are defined by their programming and serve higher intensity recreational uses and activities.

Acknowledgement of risk

Lighting will not inherently reduce crime and increase safety. Parks Canada reporting suggests there is little evidence to support the claim that more lighting equals greater safety (Guidelines and Specifications for Outdoor Lighting at Parks Canada, 2016). Based on the engagement data from Kitchener residents and park goers, there is a greater comfort to using trails that are lit. A standard to include lighting in parks is warranted, however it must be acknowledged that lighting will not reduce criminal activity by itself. Other environmental factors such as context and natural surveillance play an equally important role.

Best practices

In combination with lighting criteria and CPTED principles, the following guidelines to lighting in parks can be applied moving forward; (with the understanding that lighting is not synonymous with safety).

Lighting standards:

- Target illumination range – 0.8 to 1.5 average footcandles;
- Target colour rendition index value (CRI) – 80;
- Maximum colour temperature 3000K, target 2700K with exception of sportsfield or other performance lighting.

Timing & efficient use:

- Limited to park hours of operation according to the current Parks By-Law (6 a.m. to 11 p.m. currently) with exception made for community facilities that are open beyond these hours;
- Centrally controlled via photometric cells;

Environmental:

- Provide lighting only when necessary;
- Illuminate at minimum practical levels;
- Impact as small an area as possible and is practical;
- Shorten illumination time as much as is practical;
- Colouring of light to be as low-frequency as is practical (red-shift or "warmer" colours);
- *DarkSky compliant and use LED fixtures or the latest high-efficiency lighting solutions.

**DarkSky is a third party advocacy group with the goal to reduce light pollution and promote responsible outdoor lighting that is beautiful, healthy, and functional.*

Trails and park lighting are inherently linked to accessibility and safety within a park space; they are well appreciated and desired assets within the community. As parks continue to be built and renovated, a consistent and strategic approach to pavement and lighting will be employed under the guidelines proposed within this document.

18: Trail surfaces in parks

Establish that all new and renovated park developments include stable, firm surfaces of asphalt or concrete, unless otherwise required to be stonedust for environmental reasons.

Whether it be cost, environmental, or user preference considerations (e.g., preferring stonedust for running comfort, or asphalt for smooth surface), there is often a choice made at the design level to use a loose material like compacted stone, or paved surface like asphalt as the primary surface type.

All renovated parks and their access points will standardize to asphalt or concrete pavement wherever possible. Paved trails allow all parks to be eligible for winter maintenance and plowing, and provide a consistent, firm, and stable surface throughout the seasons improving accessibility.

Asphalt is often the best economic choice for a stable, accessible trail. Mitigations can be made to reduce embodied carbon by including recycled asphalt product (RAP) in the mix design, saving 27 kilograms CO_2e per tonne of RAP used. Ontario Provincial Standard Specifications allow up to 15% RAP. For park applications, 15% RAP is recommended to be standardized.

Shifting to asphalt or concrete will result in changes to seasonal maintenance and a shift in operating procedures. Seasonal maintenance of stonedust trails include annual spring grooming whereas concrete and asphalt trail maintenance would include seals and topcoats for surface cracks and potential saw cutting of heaving joints when necessary. Paved trail surfaces also carry different environmental impacts from winter maintenance and deicing procedures.

A paved trail surface standard is consistent with the current Development Manual requiring all new parks to use asphalt as the surface material for interior trails.

Development considerations

Accessible trails have been required in park renovations since 2005. All parks will continue to include new and resurfaced trails as a critical connective, recreational and accessible component regardless of its classification.

There are specific requirements that will be considered for all new and retrofit trail installations:

- Maintain the existing maximum trail slope standard of 5% established in the CTMP and Development Manual.
- Full-scale park renovations must include paved trail access through and into the park.
- All amenities must include an accessible connection to and from park access points.
- Drop curb access in each park to and from a roadway must be achieved so long as safe pedestrian or cyclist entry into the right-of-way can be achieved.

Recommendations summary

Walter Bean trail support

Support the pursuit of a continuous Walter Bean Grand River Trail and complete the feasibility report of the entire corridor to determine the long-term viability of the trail.

08: Park lighting standards

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