# A Pathway for Dieppe to Become a Living City

LIVING CITIES Canada

How Dieppe can accelerate equitable, abundant, and thriving green infrastructure.

Green Communities CANADA

ALLIANCE DU BASSIN VERSANT PETITCODIAC WATERSHED ALLIANCE

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# Introduction

This document was created to illustrate a pathway for how Dieppe can become a Living City: a place with equitable, abundant and thriving green infrastructure. It is based on the **Framework for Living Cities** – a document that shows how cities across North America and Europe have successfully implemented green infrastructure (GI), and synthesizes key strategies and actions to help other cities do this, too. Based on an extensive scan of academic research, grey literature, and case studies, the *Framework for Living Cities* presents a number of practical strategies that local governments have used to integrate GI into city-building in ways that: (1) prioritize equity, (2) support abundant implementation across the landscape, and (3) ensure GI is thriving and delivering its full range of benefits. It also points practitioners to resources and tools to help them integrate these strategies into their own policy and operational contexts.

This document, a Living Cities Policy Pathway for Dieppe, applies the strategies laid out in the Framework to the policy and operational context of the City of Dieppe. It:

1. assesses how much progress the City of Dieppe has made toward implementing equitable, abundant, and thriving GI, and
2. provides an overview of recommendations that Dieppe can take to continue to make progress on green infrastructure.

The information contained here and the recommendations made in this Pathway is based on a review of existing policies and programs in Dieppe that relate to GI. We also interviewed nine individuals, four of whom work for the City of Dieppe.

## What is a Living City?

Living Cities are places where green infrastructure–parks and green spaces; green stormwater facilities like bioswales, rain gardens, and permeable pavements[1]; urban forests and natural heritage systems; wetlands and meadows; green roofs and walls–is **equitable, abundant, and thriving.**

As cities grow and develop, we lose natural land cover to hardened surfaces like roads, buildings, and compacted soils. As a result, urbanized areas are less able to infiltrate rainwater and snowmelt, generating excess runoff that can result in increased flooding. When the land is less able to hold onto moisture, it also is less able to regulate temperature, since evapotranspiration has a cooling effect. Hard engineered surfaces like asphalt and concrete reflect heat back into the surrounding areas, compounding this problem. This is why cities are often warmer than the surrounding countryside during hot summer days– from 2 to 8°C warmer.[2]

Both flooding and heat waves are becoming more common as climate change takes hold, and the loss of natural land cover makes cities even more vulnerable to these weather extremes. Green infrastructure (GI)–both naturally existing GI and constructed GI–is critical to making cities more resilient to climate change. And, unlike grey infrastructure–engineered systems like stormwater sewers that serve a single purpose–GI also delivers a number of other social, economic, and environmental co-benefits, as shown on the following page.


[1] Also called Low Impact Development, or LIDs

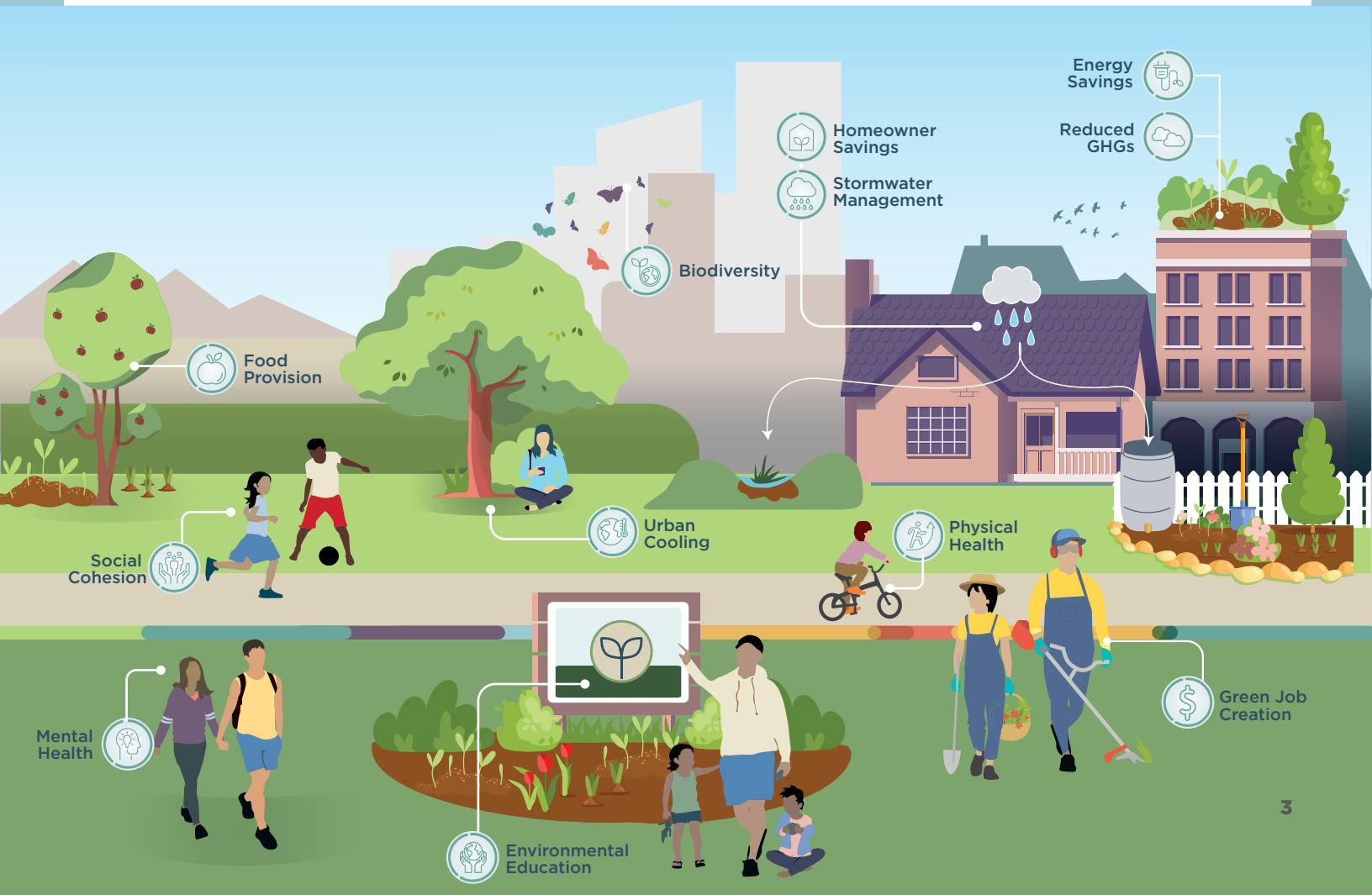
[2] Heisler, G. M., & Brazel, A. J. (2010). The urban physical environment: Temperature and urban heat islands. Urban ecosystem ecology, 55, 29-56.

There is ample research that speaks to the multiple benefits of green infrastructure. There are also many cities around the world that have successfully implemented GI to provide municipal services and solve a number of other problems. But despite the strong case for GI, it remains limited in implementation and poorly integrated into land-use planning and decision-making in most municipalities in Canada. A number of policy, technical, financial, and social barriers inhibit its uptake and success and prevent most Canadians from reaping the benefits of GI where we live. For the full benefits of GI to be felt in Canadian cities, it must be equitably implemented, abundant throughout the landscape, and thriving.

Living Cities are places where this is happening, or that are committed to making this happen. Living Cities are implementing or have plans to implement evidence-based approaches to mainstream GI and transform their communities into healthy, livable, vibrant places to live.

**These are communities that are committed to:**

1. Involving communities and prioritizing GI for environmental equity and reconciliation;
2. Setting requirements and standards in policies, plans, and bylaws for GI;
3. Laying the groundwork for systemic integration of GI throughout city operations;
4. Growing support for GI among members of the public and key stakeholders;
5. Ensuring GI can thrive over the long term by building partnerships and finding champions to maintain and steward GI.



## Why We Need GI in Dieppe

If Dieppe were to commit to implementing equitable, abundant, and thriving green infrastructure, it would become an even more vibrant, beautiful, sustainable, and healthy place to live. It would also help to shield residents from some of the worst impacts of climate change, especially those residents who are disproportionately impacted. Below, we detail some challenges facing Dieppe and how GI could help to address these.

### Rapid Land-Use Change

Dieppe  is the fourth largest city in New Brunswick with a population of 28,114 reported in 2021 [3]. Alongside the cities of Moncton and Riverview, Dieppe is part of the Greater Moncton Area (GMA), located along the southeastern portion of the Petitcodiac River, and at the head of the Bay of Fundy. The city has seen significant population growth recently, quadrupling in less than 30 years [4]. As a result, Dieppe has undergone fast land-use change to meet housing and other infrastructural demands for the city's quickly growing population. Residential land use accounts for about half of the land area in the downtown area of Dieppe, and around two-thirds of the land committed to residential use is low density [5]. Low-density housing can engender more sustainability challenges than mid- or high-density housing. It requires a greater land area, converting more greenfield and naturalized areas into built environments, resulting in the loss of green infrastructure and the multitude of benefits it offers. It often leads to higher levels of motor vehicle travel contributing to increased emissions, and offers a reduced housing supply compared to higher density options [6]. Dieppe has a vast number of naturalized areas and undeveloped green spaces, and it is not too late to gain a greater understanding of the amenities and advantages that these natural assets provide to residents, as well as to plan to protect these vital assets.

[3] Statistics Canada.2022. Table 98-10-0002-03  Population and dwelling counts: Canada, provinces and territories, census divisions and census subdivisions (municipalities) DOI: https://doi.org/10.25318/9810000201-engIbid

[4] Ibid

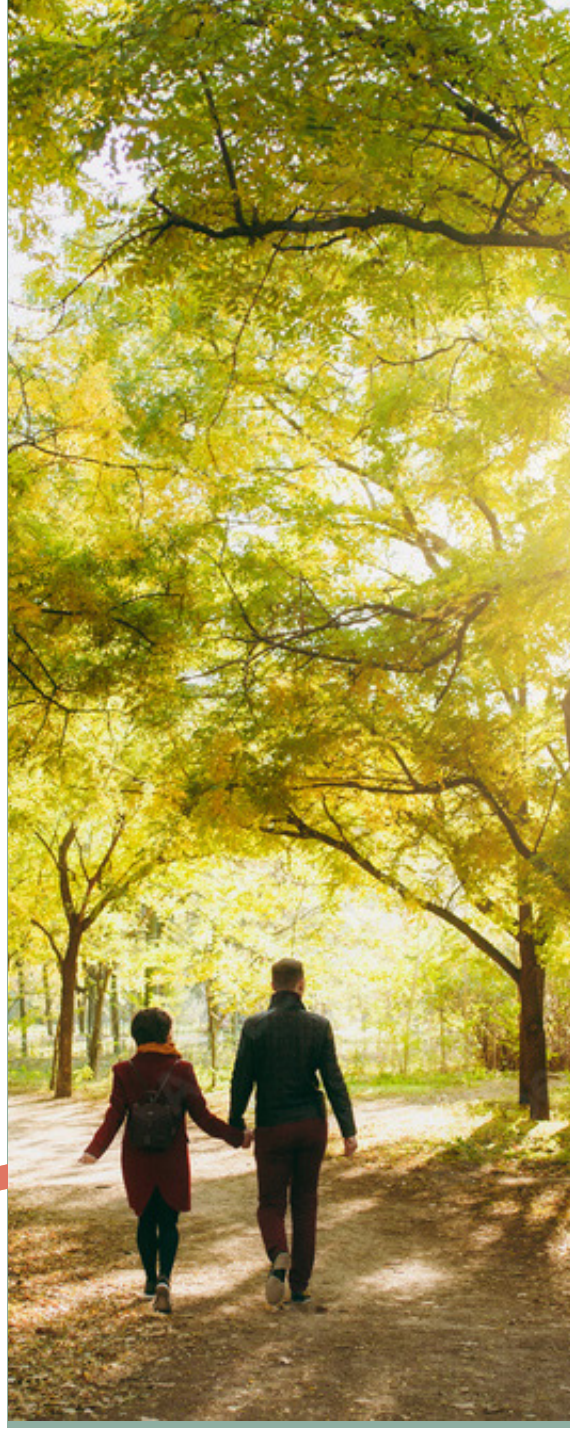
[5] WSP Canada Inc. 2017. City of Dieppe: Downtown Master Plan. https://www.dieppe.ca/en/explorer-et-samuser/resources/Plan-directeur-du-centre-ville.pdf

[6] OECD.2018. Policy Highlights - Rethinking Urban Sprawl: Moving Towards Sustainable Cities. https://www.oecd.org/environment/tools-evaluation/Policy-Highlights-Rethinking-Urban-Sprawl.pdf

## Weather and Climate-Related Concerns

Extreme heat is hazardous to human health. A growing number of studies around the world are noting a link between morbidity and heat waves, especially in urbanized areas. From 2021-2050 in the GMA, the mean annual temperature is anticipated to increase to 7.5 °C at current emission rates, an increase of 2°C from the recent past [7]. The number of Very Hot Days (+ 30 °C) are also expected to increase, with approximately 10 days more per year reaching these temperatures.[8]

The Bay of Fundy is considered to have the highest tides in the world, and sea level rise caused by climate change is a huge risk for this region. The GMA has been routinely experiencing higher occurrences of extreme precipitation events, as well as instances of coastal and inland flooding.[9] Dieppe's Climate Change Adaptation Plan was published in 2014. Using comparative risk analysis, it was determined that floods and storm surges resulting from tropical storms and hurricanes were the greatest risk to the municipality.[10] It is not uncommon for the city to experience service interruptions to infrastructure and stormwater management systems during periods of heavy rainfall.[11] Storm surges and high tides have also caused damage to properties and infrastructure along the river banks.



[7] Climate Atlas of Canada. 2023. Climate Report -Moncton. Retrieved from https://climateatlas.ca/report_v2/grid50k/021102

[8] Ibid

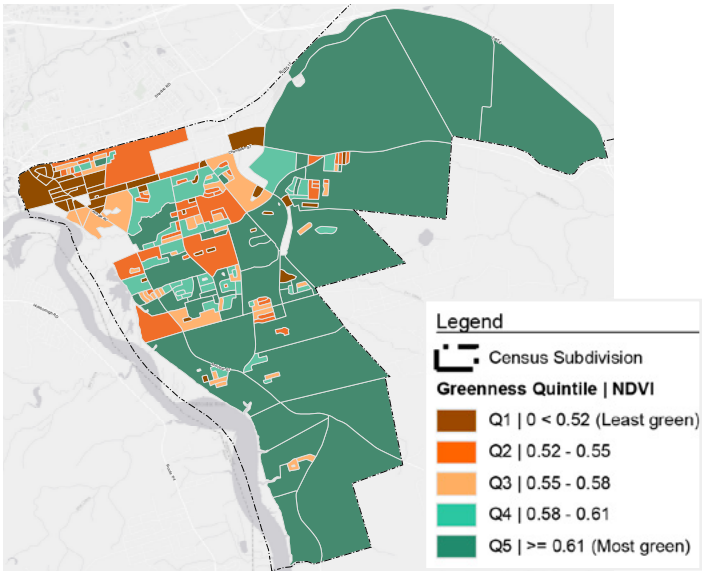
[9] Amec Foster Wheeler Environment & Infrastructure. 2015. Approach For Flood Protection In Response To Climate Change. https://www.dieppe.ca/en/vivre-ici/resources/Approach-for-flood-protection-in-response-to-climate-change.pdf

[10] City of Dieppe. 2014. Climate Change Adaptation Plan. https://www.dieppe.ca/en/vivre-ici/resources/Climat-change-adaptation-plan.pdf

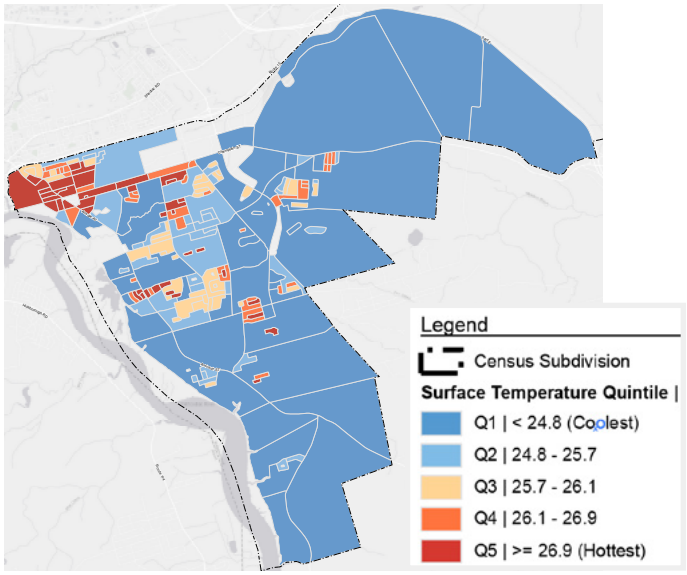
[11] Natural Resources Canada. 2012. Adapting to Climate Change: Infrastructure at Risk Dieppe. https://publications.gc.ca/collections/collection_2017/rncan-nrcan/M174-15-2012-1-eng.pdf

## Social Challenges: Inequitable Distribution of GI and Climate Risks

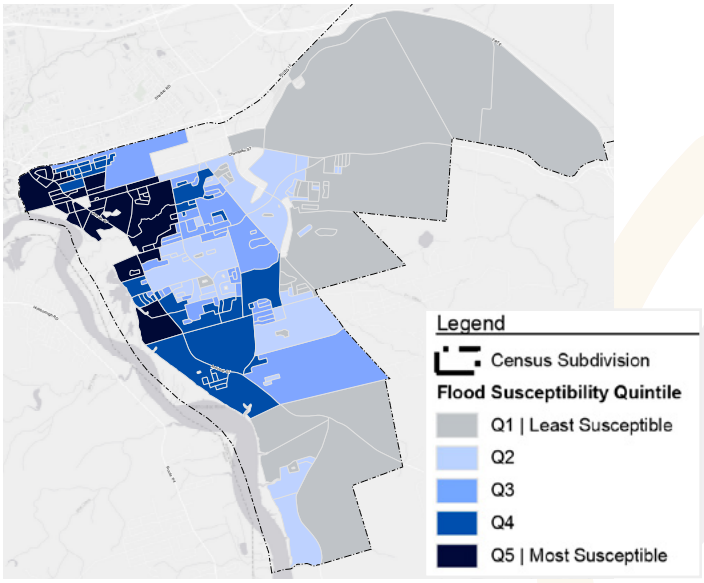
Green infrastructure is not evenly distributed in Dieppe, and the burden of climate risks are not shared equally among the population. In particular, the downtown area and some surrounding neighbourhoods are sparsely vegetated. These same neighbourhoods are more likely to be exposed to higher land surface temperatures, and are at higher risk of flooding. The westside of Dieppe, close to the river, is also at high risk for flooding. Some of these neighbourhoods–particularly those that are or adjacent to the downtown area–also have a higher proportion of low-income residents and racialized residents than the rest of the city.




Greenness in Dieppe




Average Surface Temperatures in Dieppe




Flood Susceptibility in Dieppe

## Work That Has Been Done

Dieppe is a relatively small city, and although it has grown and developed substantially in recent years, the city is constrained in the amount of resources available to advance GI. Regardless, Dieppe has made progress in several areas, such as recent work to map natural assets and green space. This work can provide a foundation for further asset management planning that considers GI.

In 2010, the Government of Canada funded a collaboration between the cities of Dieppe, Moncton and Riverview to participate in the Regional Adaptation Collaborative (RAC) program to assess the flood risk of the Petitcodiac River due to a changing climate. Following this, the City of Dieppe Climate Change Adaptation (CCA) committee was formed in 2014 to identify the risks facing the city and develop future adaptation strategies. The resulting *Climate Change Adaptation Plan* was published in 2014, and focuses mainly on resulting riverine flood risks due to a changing climate. Dieppe has also partnered with local community champions such as the Petitcodiac Watershed Alliance (PWA) and Garden Cities to implement GI in small-scale demonstration projects such as No-Mow May. In spring of 2021, the PWA worked with Dieppe and other neighbouring communities including Moncton and Riverview to encourage communities to adopt a No-Mow policy, or reduce mowing lawns and other public greenways to help pollinator species. The Cities agreed to suspend the by-law enforcement of length of lawns on municipal and private properties during this month. The City of Dieppe created their own campaign to support the movement in 2022, called 'Dandelion Madness' and provided promotion and education to residents.

The city has expressed a consideration and commitment to 'eco-responsibility' through the following various strategic documents and plans which lay the foundation to support future GI implementation:

- **Strategic Plan 2020-2024.** The most recent document that outlines the long-term vision and priorities for Dieppe's development. The plan was developed based on consultations with community stakeholders and residents.The plan identifies the long term vision of Dieppe "to shine as an inclusive and modern francophone city that … provides first-class services and infrastructures in harmony with the environment." [12] as well as a vision "To be a welcoming, dynamic and ecologically responsible city" [13]

- **Sustainable Development Plan.** Formally known as the Green Municipal Plan, was adopted on March 10, 2014. This plan outlines a long-term vision and addresses 3 key spheres of sustainable development: community living, the economy and the environment. This plan also identifies 10 priority areas, with several that intersect with GI: Natural Areas, Climate Change, Industry, Innovation And Infrastructure, and Governance, Partnerships And Municipal Initiatives. The Sustainable Development plan makes reference to a future action plan, however it is not clear if this work has been completed.

[12] City of Dieppe. 2020. Strategic Plan 2020-2024. https://www.dieppe.ca/en/hotel-de-ville/resources/Plan-strat%C3%A9gique.pdf

[13] Ibid

- **Municipal Development Plan Z-9.** The Municipal Development Plan (MDP) is the long-term, strategic document that guides the growth and development of Dieppe. The plan sets policies and proposals that will guide and support development from social, economic, physical and environmental perspectives.

- **Asset Management Policy.** The Asset Management Policy, which was enacted in 2021, applies to all physical assets of the municipality, such as infrastructure, but also differs from the conventional municipal asset management procedure in that it includes the ecological services supplied by natural assets that support the city. The document highlights the strategic direction for future asset management, and defines several action items to achieve the objectives of the policy, one of which is to "strive, wherever possible, to go beyond minimal legislated solutions to improve municipal assets' resilience to social, environmental and economic changes." [14]

Several other plans and policies that relate to and can help to support the integration of green infrastructure into functional city-building and decision-making include:

- **Climate Change Adaptation Plan.** The City of Dieppe Climate Change Adaptation (CCA) committee was formed in 2014 to identify the risks facing the city and develop future adaptation strategies. Using comparative risk analysis, it was determined that floods and storm surges resulting from tropical storms and hurricanes were the greatest risk to the municipality. The document also evaluated the factors that contribute to changes in the water levels of the Petitcodiac River. The CCA committee identified several recommendations to continue climate adaptation work, including the development of an action plan (which has not yet been drafted or implemented).

- **Parks and Trails Master Plan.** The Parks and Trails Master Plan is the main policy document guiding the current and future  development of green space throughout the city of Dieppe.The Parks and Trails Master Plan has established a goal of having all residents to have access to a park or trail within a walking distance of no more than 800m.

- **Tree Code.** The Tree Code is the set of rules and policies to be followed by the Urban Forestry department, in application of the by-law. Expanding the urban forest has been indicated as a priority for the City in recent years. In early 2022, the city hired a consultant to propose three new strategies to increase the tree canopy within city limits, with the intention of improving the regulatory framework that governs tree management on private properties. The strategies that were identified included amendments to the current Tree Code, such as requiring a permit for cutting down trees over 10cm in diameter, requiring a tree survey prior to issuing construction permits and requiring permits to protect trees of interest located near construction sites.

[14] City of Dieppe. 2021. Policy Fin-01 Asset Management Policy. https://www.dieppe.ca/en/hotel-de-ville/resources/Politiques/Policy-FIN-01-(2021)---Asset-Management.pdf

## Challenges and Gaps

While Dieppe has made some progress toward implementing equitable, abundant and thriving GI, there are significant gaps and challenges. For example, taking an equitable approach to GI not only includes spatial analysis and mapping to determine under-natured or at-risk areas, but understanding the distribution of challenges that individuals from vulnerable groups may also face that can impact their ability to address these risks. To make GI abundant, it needs to be well-integrated into land-use planning and decision-making. A lack of actionable items or targets to advance these missions, values and goals means that GI is not an explicit policy priority, and opportunities to protect existing GI and create new GI may be overlooked.

In order for Dieppe to have thriving GI, it needs to not only be implemented, but well-maintained so that it functions well over time. Properly planning, maintaining and monitoring will ensure it delivers its full range of benefits. The most apparent gap to thriving GI in Dieppe is the lack of monitoring and tracking. Although GI is present in Dieppe, there is no apparent operations or maintenance plan that identifies financial needs, staffing resources or standard protocols.  The Natural Asset Inventory will include an assessment of the condition of the current GI, however it is important to track progress relative to certain indicators or targets to see where there are opportunities for improvement.

## Living Cities Assessment: How Are We Doing?

This table offers an assessment of how Dieppe has or is working toward implementing evidence-based strategies that support equitable, abundant, and thriving green infrastructure. The strategies are taken from the Pathways to Living Cities Framework–and are based on extensive research and case studies from across North America and Europe.

The more "grey" is the shade, the more Dieppe is at the start of its journey; the more "green" is the shade, the more Dieppe has made progress on the strategies to advance the respective pillars of equity, abundance, and thriving. The table below provides a high-level summary of the progress Dieppe has made and some notable gaps. A more comprehensive assessment is **available here**.

# Equitable

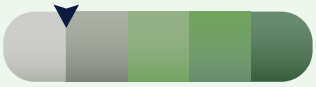
Not everyone has the same access to GI and its benefits. Research has shown that neighbourhoods with higher proportions of marginalized residents–e.g. low-income people, BIPOC groups, etc.--tend to have less GI compared to other neighbourhoods. Living Cities actively work to address this inequity by prioritizing GI in areas of high environmental and social need. Six key strategies can help to achieve this, broken down into two overarching categories, as detailed below.

### Prioritize GI for Environmental Equity

**What does this mean?**

1. Identify under-natured areas;
2. Understand the distribution of social and environmental challenges in these neighbourhoods;
3. Engage people in GI planning and decision-making;
4. Employ policy tools to enhance accessibility and avoid displacement.

### How is Dieppe doing?



**Work Done:** Mapping of natural and enhanced assets, as well as flood risk assessments through Climate Adaptation planning have occurred. Dieppe has partnered with community organizations to implement GI in small demonstration projects.

**Gaps:** Aside from flood risk, Dieppe has not mapped other climate risks. It is not explicitly considering underserved communities in its Climate Adaptation planning, or how social needs and vulnerabilities intersect with climate risks.

**Advance Reconciliation with GI**

**How is Dieppe doing?**

**What does this mean?**

1. Support Indigenous-led green infrastructure;
2. Build municipal-indigenous partnerships to advance GI.

**Gaps:** This is an identified gap, Dieppe does not have any clear Indigenous partnerships related to GI.

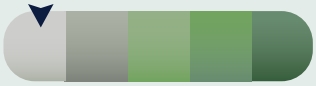
Prioritizing relationship building between Dieppe and Indigenous communities is needed.

# Abundant

GI is most effective at delivering services and its multiple co-benefits when it is implemented widely across the landscape: a few street trees provide some stormwater management and cooling benefits; an urban forest provides much more. Living Cities work to make GI "the new normal", using it as an infrastructural default whenever and wherever possible. Eight key strategies to do this are listed below, in three overarching categories.

**Set Requirements and Standards for GI**

**How is Dieppe doing?**



**What does this mean?**

1. Provide a public mandate for GI through policy instruments;
2. Align GI implementation with other strategic priorities (e.g. public health, climate change adaptation).

**Work Done:** Several policies and strategic documents such as the Municipal Development, Sustainable Development and Strategic Plans share a goal of protecting and improving the natural environment, with development to be guided by a sustainable perspective.

**Gaps:** Dieppe has supportive programs and goals, but lacks policies and plans that support its integration into planning and place-making. No specific or measurable GI goals, targets, or incentives exist. GI is not a policy priority.

## Lay the Groundwork for Systemic Integration

### What does this mean?

1. Build knowledge and technical capacity among practitioners involved in urban development;
2. Use valuation approaches and asset management to integrate GI into city-wide decision-making;
3. Introduce and expanding funding mechanisms (e.g. stormwater fees);
4. Collect and improving GI data and monitoring;

### How is Dieppe doing?

**Work Done:** Dieppe has several programs and policies that make reference to broadly supporting GI implementation.

Dieppe's Asset Management policy includes both infrastructure assets and ecological services provided by natural assets that serve the city. The upcoming Natural Asset Inventory is a valuable step to advancing green asset management. The plans to use valuation approaches to manage green assets will provide rationale for including GI in future decision-making.

Dieppe has also begun to develop various incentives (e.g. homeowner rebates to plant mature trees) to encourage urban forestry and expand the tree canopy in the City, however no funding mechanisms or incentives exist for green stormwater infrastructure.

**Gaps:** Although the MDP has a policy that council will adopt a set of incentives to encourage promotion of ecological projects, the status of this is not clear.

## Grow Support for GI

### What does this mean?

1. Seek support from higher levels of government;
2. Facilitate community-based action.

### How is Dieppe doing?

**Work Done:** While Dieppe has made some partnerships with local community champions and neighboring cities to advance GI implementation, there is opportunity to formalize partnerships with organizations such as PWA, leading to more education and outreach opportunities.

Other than tree planting incentives, the City has not played an active role in encouraging GI on private property.

Dieppe has been successful in receiving funding previously from FCM and the Government of Canada for Climate Change Adaptation and GHG emission reduction related initiatives.

# Thriving

If GI is not properly protected, planned for, designed, constructed, maintained, and monitored, it will not be able to deliver its full range of benefits (or, the benefits it provides will not be given due consideration in city decision-making processes, and opportunities to implement GI may be missed). Living Cities work to ensure GI can thrive over the long term by setting GI up for success. Three key strategies can help accomplish this, as detailed below.

## Create GI that Flourishes over the Long Term

**What does this mean?**

1. Build partnerships and finding champions to bring GI goals and operations into alignment;
2. Pick indicators and monitoring over time to understand how GI is delivering services;
3. Support and adequately funding GI maintenance and operations.

## How is Dieppe doing?

**Work Done:** Dieppe has partnered with Petitcodiac Watershed Alliance and Garden Cities to facilitate community based GI implementation and education.

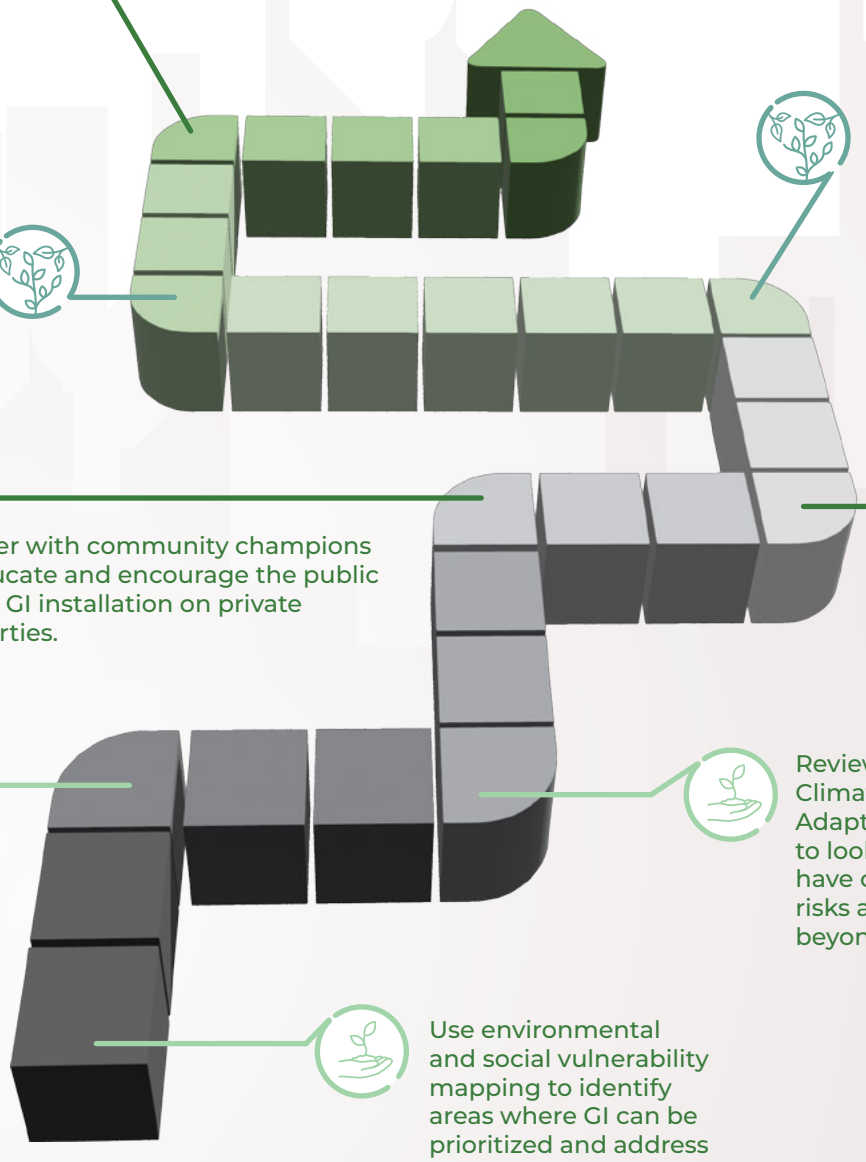
Monitoring of green space and tree canopy has occurred, with plans to monitor other types of GI in future Asset Management planning.

**Gaps:** No operations or maintenance plan for GI is in place, lacking information about financial needs and staffing resources; standard protocols.

## Summary of Key Recommendations Along Pathway

The graphic below provides some key short, medium, and long-term actions that Dieppe can take to embed equitable, abundant, and thriving green infrastructure into its city-building strategy.

For a more fulsome and detailed list of recommendations, **see the full assessment**.



Build understanding of operations and maintenance needs for GI assets to deliver services effectively.

Develop a dedicated GI policy or plan that includes measurable targets and action items.

Create dedicated positions for GI at municipal level to support implementation, strategy, adaptation, and integration.

Expand on the natural asset inventory, track performance using indicators, and publicly report for accountability.

Partner with community champions to educate and encourage the public about GI installation on private properties.

Utilize the Dieppe Dialogue platform to gain local knowledge of climate risks and under-natured areas.

Review and update the Climate Change Adaptation Policy (2024) to look at changes that have occurred, examining risks and vulnerabilities beyond flooding.

Use environmental and social vulnerability mapping to identify areas where GI can be prioritized and address multiple needs.