



# 3.8.

## Implementing the *Tree Policy of Montréal* – Maintenance Component

March 10, 2022

**2021 ANNUAL REPORT**

Auditor General of the Ville de Montréal

### 3.8. Implementing the *Tree Policy of Montréal*—Maintenance Component

## Implementing the *Tree Policy of Montréal* – Maintenance Component

### Background

By providing benefits to the ecosystem, trees contribute directly to the quality of the living environment and to fighting the effects of climate change. Adopted in 2005, the *Tree Policy of Montréal* (the Policy) of the Ville de Montréal (the City) establishes 11 actions aimed at ensuring the maintenance and development of Montréal's urban forest. At the time, costs were estimated at \$700M for an inventory of nearly 1.2 million trees (2012). For maintenance purposes, an overview of the inventory and condition of public trees was to have been established by the boroughs for their local urban forest and the Service des grands parcs, du Mont-Royal et des sports (SGPMRS) for the City as a whole. The overview was to have supported the boroughs in drawing up tree plans as a foundation for the management of public trees. It was also expected that maintenance programs would be developed in accordance with the inventory and with guidelines set out in the tree plans. All of these tools were to enable the management of public trees, including maintenance supported by quality information in a long-term perspective to ensure the maintenance and development of Montréal's urban forest now and in the future.

### Purpose of the Audit

To ensure that the City has implemented actions to maintain public trees as stipulated in the *Tree Policy of Montréal*.

### Results

The City has not ensured implementation of the actions to maintain public trees set out in its Policy. The boroughs and the SGPMRS do not have a full understanding of the composition and condition of the public trees under their responsibility. Tree plans and maintenance programs have not been developed, which has led to inconsistent maintenance practices that compromise the life expectancy of trees. The resource estimate required for the maintenance of public trees has not been determined, and no amounts are specifically budgeted for this activity. Finally, no follow-up to implementation of the Policy has taken place since it was adopted in 2005, which means that the City is not aware of progress made relative to the stipulated actions or of issues concerning the maintenance and development of its arboreal heritage.

## Main Findings

### Overall Picture of Public Trees

- The boroughs do not feel that they have a full picture of the inventory of trees under their responsibility or of the trees' condition.
- Data about tree mortality and reasons for the loss of arboreal assets are neither documented nor followed up.
- The intervention history is not systematically documented.
- Tools used by the boroughs to manage public trees are not integrated, which limits the ability of the City to maintain an overall picture of its trees.

### Tree Plans and Maintenance Programs

- The tree plans required by the Policy and the resulting tree maintenance programs have not been developed by the boroughs.
- The SGPMRS does not systematically produce tree maintenance programs to follow up its projects to develop parks and public squares.
- The City has not adopted a management framework setting out maintenance standards for the City's public trees that the boroughs could have used.
- Maintenance practices are inconsistent across the City, and maintenance activities are not fully implemented.

### Budget for the Maintenance of All Public Trees

- An estimate of the resources (human, material and financial) required to conduct all maintenance interventions on public trees has not been prepared.
- Specific budgets have not been allocated for public tree maintenance.
- The financial implications of planting new trees have not been estimated in advance and reflected in the maintenance budget.

### Follow-up to Implementation of the Actions in the *Tree Policy of Montréal*

- No mechanism has been put in place to follow up implementation of the Policy nor has any follow-up taken place since it was adopted in 2005.
- In 2013, the Commission sur l'eau, l'environnement, le développement durable et les grands parcs recommended that the City update its Policy, but this has not yet happened.

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*In addition to these results, we have made various recommendations to the business units, which are presented in the following pages. The business units were given the opportunity to agree to the recommendations.*

## List of Acronyms

<b>\$M</b>	Millions of dollars
<b>ANJ</b>	Anjou borough
<b>CHD</b>	chest height diameter
<b>City</b>	Ville de Montréal
<b>Commission</b>	Commission sur l'eau, l'environnement, le développement durable et les grands parcs
<b>GDV</b>	Système de gestion des végétaux
<b>Guide</b>	<i>Guide to drafting a tree plan</i>
<b>MN</b>	Montréal-Nord borough
<b>Policy</b>	<i>Tree Policy of Montréal</i>
<b>RDP-PAT</b>	Rivière-des-Prairies– Pointe-aux-Trembles borough
<b>RLPP</b>	Rosemont–La Petite-Patrie borough
<b>SGPMRS</b>	Service des grands parcs, du Mont-Royal et des sports
<b>SLA</b>	Saint-Laurent borough
<b>SLE</b>	Saint-Léonard borough
<b>SO</b>	Le Sud-Ouest borough
<b>VM</b>	Ville-Marie borough

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# 1. Background

## 1.1. Trees of the Ville de Montréal

### Urban Trees

Trees benefit the population through numerous contributions to the ecosystem:<sup>1</sup> they retain carbon dioxide, filter pollution, absorb rainwater, stabilize the ground, refresh the surrounding air, reduce heat islands, shape the landscape, improve the living environment, raise property values and generate energy savings. According to the international tree recognition program *Tree Cities of the World*, trees return three to five times their investment cost in benefits of all types for cities. These acknowledged benefits, including to human health (physical and psychological), make the arboreal heritage an important asset, especially in the context of this century's climate change challenges.<sup>2</sup>

The useful life expectancy of urban trees can be decades in length. However, urban spaces are a relatively hostile environment for the development of trees: atmospheric pollution, limited amounts of soil, contamination from de-icing salt and other substances, and damage caused by humans (e.g., while clearing snow or due to inconsiderate public behaviour). To these harmful factors must be added uncertainties associated with climate change (e.g., drought, storms and freezing rain) that impact the health and longevity of trees and increase the risk of trees causing personal injury or property damage when they fall. Finally, the threat of pest infestations and epidemics is also a risk to maintaining trees in good health. One has only to think of Dutch elm disease<sup>3</sup> or, more recently, the ongoing fight against the emerald ash borer<sup>4</sup> and poplar canker.<sup>5</sup>

<sup>1</sup> Ecosystem: the complex of a community of organisms and its environment functioning as an ecological unit.

<sup>2</sup> 2020–2030 Climate Plan: *“Increasing the number of trees in Montréal is therefore one of the most significant actions to be taken to better adapt to climate hazards.”*

<sup>3</sup> A disease of elm trees that first appeared in the 1950s and decimated virtually the entire American elm population (35,000) in Montréal.

<sup>4</sup> The ash borer first appeared in Montréal in 2011, resulting in the treatment of 163,432 ash trees and the felling of another 81,400 between 2012 and 2019 (at a cost of \$27M).

<sup>5</sup> The poplar canker fungus, which is not only contagious but can be transmitted from one tree to another by wind or rain forced the City, in winter 2021, to cut down a row of poplars near the Quai de l’Horloge that were a symbolic part of the landscape in the Old Port of Montréal.

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Given these conditions, regular, planned human intervention is critical to maintaining and protecting urban trees in order to maximize their contribution to the ecosystem, as reflected in the *Montréal Charter of Rights and Responsibilities*:

*“To foster the enjoyment by citizens of their rights in matters of environment and sustainable development, Montréal is committed to [...] fostering the protection and enhancement of natural environments and the urban forest.”<sup>6</sup>*

#### **The Urban Forest of the Ville de Montréal**

In 2012, the number of trees of all species growing on the public domain of the Ville de Montréal (the City) was estimated to be 1.2 million<sup>7</sup> (see Graph 1). Public trees are those growing along public roads (street trees), in parks, public spaces and squares (non-street trees), or in natural habitats (woodlots). By contrast, private domain trees are those growing on lots belonging to citizens, industries, businesses or institutions (e.g., universities and hospitals). In addition to its value to the ecosystem, the urban forest is estimated to be worth hundreds of millions of dollars (\$M).<sup>8</sup> Each new tree costs the City about \$1,100<sup>9</sup> for its purchase, planting and maintenance during the first three years of life. This cost increases every year.

#### **GRAPH 1**

#### **Distribution of Public Trees in 2012 by Location**



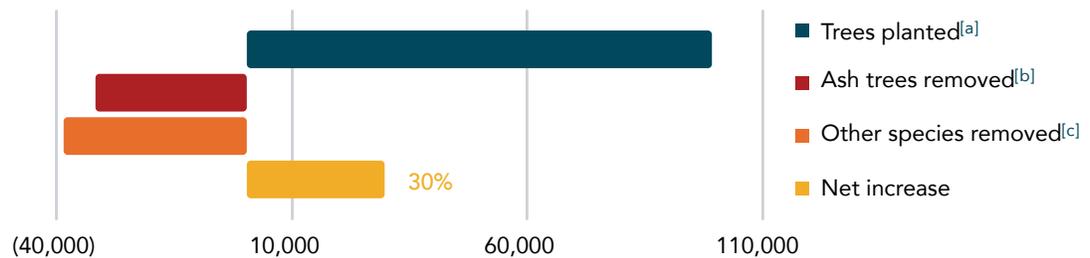
Source: Graph produced by the Bureau du vérificateur général (BVG) based on a study of the forest canopy (2012).

- <sup>6</sup> *Montréal Charter of Rights and responsibilities*, article 24. Adopted in 2005 by city council and officially in effect as of January 1, 2006, it was the result of a citizens’ consensus obtained at the Montréal Summit in 2002.
- <sup>7</sup> Based on the most recent study of the forest canopy (2012) produced by the Service des grands parcs, du Mont-Royal et des sports (SGPMRS).
- <sup>8</sup> The value of the urban forest was estimated at nearly \$700M in 2005.
- <sup>9</sup> The cost per tree is estimated by the SGPMRS based on the average amount of the contracts awarded for planting and maintenance. The cost was determined to be \$1,000/tree in 2020 and \$1,100/tree in 2021. That amount is expected to rise to \$1,656/tree in 2022.

Over the years, the City has invested in planting public trees, for instance in the context of replacing and removing ash trees and strengthening the canopy.<sup>10</sup> According to the 2012–2020 report on the urban forest, of nearly 100,000 tree plantings compiled by the SGPMRS, 32% were lost through removing ash trees and 38% through felling trees of all other species combined. The net increase of the urban forest was therefore 30,146 public trees.

## GRAPH 2

### Evolution of the Urban Forest, Excluding Woodlots, between 2012 and 2020 (Number of Trees)



**[a]** Trees planted by the SGPMRS and the boroughs in developed areas (Programme de renforcement de la canopée, Programme de remplacement des frênes and Programmes réguliers de plantation des arrondissements).

**[b]** Ash trees removed.

**[c]** Removal of trees of all species other than ash that were declining, weakened or damaged.

Source: Portrait produced by the BVG based on the report of the Plan de la forêt urbaine – Synthèse 2020 by the SGPMRS.

Note: The 2012–2020 report on the urban forest is prepared on the basis of information available from the SGPMRS or provided by the boroughs. Some tree removals and plantings may not be included in the report.

The urban forest accumulates a growing functional value over the years as new trees grow and generate benefits over an extended period of time. It is generally estimated that it takes a newly planted tree between 20 and 30 years to recuperate the canopy lost when a mature tree is removed,<sup>11</sup> which explains the importance of efforts to maintain and protect trees.

## 1.2. Urban Forest Management Roles and Responsibilities

### Local Urban Forestry

The boroughs are responsible for operations related to the planting and maintenance of trees on their respective territories, as well as for tree removal operations. This responsibility falls under that part of the “local road system”

<sup>10</sup> The goal of the 2012–2021 Montréal Canopy Action Plan is to increase the canopy rate from 20% to 25% by 2025, including by planting 75,000 public trees on the City’s territory.

<sup>11</sup> Source: SGPMRS, 2012–2019 Report of the Plan de gestion de la forêt urbaine of the Ville de Montréal.

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for which the boroughs are responsible. Nevertheless, the delegation of authority allows the SGPMRS to also plant trees on a borough's territory. The goal is to increase the number of trees planted by the boroughs through implementation of the Montréal Canopy Action Plan. Following a three-year maintenance period included in SGPMRS planting contracts with private firms, responsibility for managing the young trees is transferred to the borough concerned.

Other central services may also plant trees as part of development projects such as road improvements. In these cases, the service is responsible for transferring the inventory of new trees to the borough concerned to ensure their maintenance.

#### **Major Parks and Public Spaces**

Developing parks and public spaces under the jurisdiction of the urban agglomeration council or city council (e.g., Parc Angrignon, Parc Maisonneuve and Parc du Mont-Royal) is the responsibility of the SGPMRS, whose mission includes protecting, restoring and enhancing natural environments, the urban forest and public spaces (4 metropolitan parks, 10 nature parks, 9 urban parks and 3 natural spaces).

Maintenance management for trees located in those areas is delegated to the boroughs. For example, tree maintenance in Angrignon, Maisonneuve and Mont-Royal parks is delegated, respectively, to Le Sud-Ouest (SO), Rosemont—La Petite-Patrie (RLPP) and Ville-Marie (VM) boroughs. However, development projects in those parks remain the responsibility of the SGPMRS.

#### **The *Tree Policy of Montréal***

As confirmation of the importance of trees, in 2005<sup>12</sup> the City adopted the *Tree Policy of Montréal* (the Policy). With a specific objective to “...establish rules and practices relating to the protection, management and appropriate maintenance of the urban forest,” the Policy sets out 11 actions. A summary of the Policy is presented in Appendix 5.2. With regard to maintenance, actions 1, 2 and 5 of the Policy define specific expectations placed on the boroughs and the SGPMRS.

According to the Policy, maintaining a regularly updated inventory of trees is:

*“...essential for formulating action strategies such as plans to remove dead or dangerous trees, replace trees having been felled, as well as devising maintenance programs, planning maintenance resources.”*

This is the cornerstone of sound management of the City's urban forest. To this end, the boroughs (action 2), in collaboration with the SGPMRS, were to prepare within three years of the Policy's adoption, i.e., by 2008, a detailed inventory

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<sup>12</sup> The Policy was adopted on June 28, 2005, by city council as a follow-up to the 2002 Montréal Summit.

of public trees (except for woodlots) under their jurisdiction, with a priority placed on street trees. The inventories were to be compiled on a computer platform developed by the SGPMRS.

The boroughs were also to have drawn up a tree plan (action 1) within five years following adoption of the Policy, i.e., by 2010. A tree plan is a management framework tool for all interventions related to public trees. To support the boroughs in this work, the SGPMRS was to have first produced a *Guide to drafting a tree plan* (Guide).

Finally, the boroughs and the SGPMRS were to have drawn up the following maintenance programs (action 5) for trees situated in public domains:

- Maintenance, irrigation and follow-up program for young street trees for a period of four years after planting;<sup>13</sup>
- Maintenance program for mature street trees to ensure their health and longevity;<sup>14</sup>
- Tree maintenance program right from the planning and design of new parks and public squares.<sup>15</sup>

## 2. Purpose and Scope of the Audit

Under the provisions of the *Cities and Towns Act* (CTA), we completed a performance audit mission of the optimization of resources involved in those sections of the *Tree Policy of Montréal* pertaining to the maintenance of public trees. We performed this mission in accordance with the *Canadian Standard on Assurance Engagement* (CSAE) 3001, described in the *CPA Canada Handbook – Certification*.

The purpose of the audit was to ensure that the City has implemented public tree maintenance actions set out in the Policy.

The role of the Auditor General of the Ville de Montréal is to provide a conclusion regarding the objectives of the audit. To do so, we collected a sufficient amount of relevant evidence on which to base our conclusion and to obtain a reasonable level of assurance. Our assessment is based on criteria we have deemed valid for the purposes of this audit. They are presented in Appendix 5.1.

The Auditor General of the Ville de Montréal applies *Canadian Standard on Quality Control* (CSQC) 1 from the *CPA Canada Handbook – Certification* and, accordingly, maintains a comprehensive system of quality control, including

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- <sup>13</sup> Newly planted street trees: irrigation, maintenance of structural integrity, fertilization, monitoring of support stakes, formation pruning, etc. (the Policy, page 23).
  - <sup>14</sup> Mature street trees: maintenance of structural integrity, trimming, irrigation, protection against injury, etc. (the Policy, page 23).
  - <sup>15</sup> Book of specifications including the concept underpinning site landscape design, spatial distribution of plant volume, frequency of intervention required upon completion, etc. (the Policy, page 23).

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documented policies and procedures regarding compliance with ethical requirements, professional standards and applicable legal and regulatory requirements. In addition, it complies with the independence and other ethical requirements of the *Code of ethics of chartered professional accountants*, which are founded on fundamental principles of integrity, professional competence and due diligence, confidentiality and professional conduct.

Our audit work covered the period from January 1, 2017, to September 30, 2021. However, for certain aspects, data from before and after this period was also taken into consideration. Our work consisted in conducting interviews with employees, reviewing various documents and conducting surveys that we deemed appropriate to gather the necessary evidence. For the most part, these took place between the months of June 2020 and November 2021. We also took into account information that was sent to us up to March 7, 2022.

The audit involved primarily the following business units:

- The Direction générale;
- The Service des affaires juridiques (Direction des affaires civiles);
- The Service des grands parcs, du Mont-Royal et des sports (SGPMRS) (Direction de la gestion des grands parcs et des milieux naturels and Direction de l'aménagement des parcs et des espaces publics);
- The Service du greffe (Division de la gestion documentaire et des archives);
- Anjou borough (ANJ) (Direction des travaux publics);
- Montréal-Nord borough (MN) (Direction des travaux publics);
- Rivière-des-Prairies–Pointe-aux-Trembles borough (RDP–PAT) (Direction du développement du territoire et études techniques and Direction des travaux publics);
- Rosemont–La Petite-Patrie borough (RLPP) (Direction des travaux publics);
- Saint-Laurent borough (SLA) (Direction des travaux publics);
- Saint-Léonard borough (SLE) (Direction des travaux publics);
- Le Sud-Ouest borough (SO) (Direction des travaux publics);
- Ville-Marie borough (VM) (Direction des travaux publics).

A survey was also conducted of the City's 11 other boroughs concerning the existence of a tree inventory, a tree plan, maintenance programs as well as the nature and extent of budgets and resources available for the maintenance of borough trees. Nine boroughs responded.

Upon completing our audit, we submitted a draft audit report to the managers concerned in each audited business unit and to the City's Direction Générale for discussion purposes. The final report was then forwarded to the management of all the business units concerned as well as to the City's Direction générale

to obtain an action plan and timelines for implementing the recommendations concerning them. A copy of the final report was also forwarded to the deputy director-general of the Service aux citoyens and to the deputy director-general of Mobilité et attractivité and, for information purposes, to the directors of boroughs not directly concerned by our audit work to enable them to implement the recommendations where the situation warrants it.

## 3. Audit Results

### 3.1. Incomplete Public Tree Inventories an Obstacle to Overall Management of the Ville de Montréal Urban Forest

Tree maintenance activities have a direct impact on the growth and health of trees. Knowledge about the composition and condition of the urban forest, and regular updating of that knowledge, is an essential foundation for the effective and efficient management of interventions to protect and develop the urban forest<sup>16</sup> on the local (borough) and global (City) levels. Whether for planning and following up interventions (planting and maintenance), documenting interventions performed on each tree, locating threatened species for targeted interventions, or preparing portraits and analyses of the progress and condition of trees, a unified and georeferenced computerized inventory is a necessity. According to the Policy, the inventory should make it possible to determine the composition (e.g., species, location, age and size) and quality (e.g., health, replacement value, intervention history and complaints) of each borough's arboreal heritage, as well as globally for the City.

#### 3.1.1. Available Data About Public Trees Incomplete and Out of Date

As stipulated in action 2 of the Policy, the detailed inventory of public trees (except for woodlots) was to have been completed by the boroughs in 2008 with the collaboration of the SGPMRS. A comparison of data (e.g., species, chest height diameter (CHD), and planting date) on trees listed in the borough systems and data about trees planted in recent years indicates discrepancies. While a majority of the audited boroughs were able to provide us with an inventory of public trees on their territory, physical corroboration of those trees on the ground was not possible. We therefore surveyed the audited boroughs to gain an understanding of their assessment of how complete the portrait of their urban forest actually is (see Table 1). It is clear that data in the public tree inventory is incomplete, the condition of the vast majority of trees is unknown, the intervention history is not systematically documented, and information about tree mortality and the reason for the loss of arboreal assets is neither documented nor followed up. The following subsections address in detail these aspects of the situation with respect to public trees in the audited boroughs.

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<sup>16</sup> The Policy, page 21.

**TABLE 1**

**The Boroughs' Assessment of the Level of Completeness of Data on Public Trees<sup>17</sup>**

Borough	Public tree Inventory			Data about public trees		
	Street	Non-street	Parks and spaces <sup>[a]</sup>	Condition	Intervention history	Tree mortality
Anjou	●	●	n/a	●	●	●
Montréal-Nord	●	●	n/a	●	●	●
Rivière-des-Prairies–Pointe-aux-Trembles	●	●	n/a	●	●	●
Rosemont–La Petite-Patrie	●	●	●	●	●	●
Saint-Laurent	●	●	n/a	●	●	●
Saint-Léonard	●	●	n/a	●	●	●
Sud-Ouest	●	●	●	●	●	●
Ville-Marie	●	●	●	●	●	●
Surveyed <sup>[b]</sup>	●	●	●	●	●	n/a

<sup>[a]</sup> Trees situated in parks and spaces under the responsibility of the SGPMRS for which maintenance has been delegated to the boroughs.

<sup>[b]</sup> Average for the nine unaudited boroughs that responded to the survey.

Source: Compilation produced by the BVG based on the boroughs' assessment of the level of completeness of data about public trees under their responsibility.

**Legend:**

**Inventory**

- Relatively complete (>90%)
- Partially complete (75%–90%)
- Partially complete (<75%)

**Data: Condition, intervention history and tree mortality**

- Relatively complete
- Partially complete
- Incomplete
- No data

<sup>17</sup> With respect to a complete (100%) inventory, the term “relatively complete” is used when inventory data is deemed by the borough to be more than 90% complete and the missing data specifically pertains to recent tree plantings and removals (ongoing or recently completed) that are not yet reflected in the inventory system.

## Inventory of Public Trees Incomplete

Only 50% of the audited boroughs have relatively complete knowledge about the public trees on their territory (see Graph 3), and that is only in recent years. Here are some examples:

- The RLPP borough completed a tree inventory report for street trees in 2014 and for non-street trees in 2021;
- The SLA borough began the tree inventory in 2012 and completed it in 2016;
- The SLE borough completed the inventory in 2018;
- The ANJ borough does not have an inventory of public trees on its territory other than a list of trees planted since 2020.

### GRAPH 3

## Tree Inventory Completeness by Borough



The three audited boroughs<sup>18</sup> with delegated responsibility for the maintenance of public trees situated in parks or public spaces under the jurisdiction of the SGPMRS do not have a complete and current inventory (see Table 1). Given the lack of a complete inventory in each borough, the SGPMRS does not have an overall picture of public trees (excluding woodlots) located in its parks and public spaces or for the City's territory as a whole.

Moreover, recorded data about the CHD of trees in the inventory is not up to date. In most cases (the boroughs of MN, RDP-PAT, RLPP, SO and VM), for example, tree diameters were measured several years ago. Having current information about this measure is required to determine the type of care to provide in accordance with a tree's maturity.

## Lack of Mechanisms to Integrate all Tree Plantings and Removals into the Public Tree Inventory

A majority of the boroughs with an inventory update it to reflect tree plantings and removals conducted by the business units responsible for their part of the urban forest and by the SGPMRS (Division forêt urbaine) as part of the Programme canopée. However, tree plantings and removals performed as part of development projects by other borough units or certain central services are not systematically communicated to the unit responsible for the urban forest for the purpose

<sup>18</sup> The three audited boroughs are: SO for Angrignon park, RLPP for Maisonneuve park and VM for Mont-Royal park and several public spaces (e.g., Viger square).

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of adjusting the inventory and planning interventions accordingly. The number of plantings concerned may be considerable, depending on the projects under way. In the case of the RLPP borough, about 187 new trees are planted annually, while the number is estimated at several dozen for the VM borough and about 225 for the VM borough. The other boroughs were not able to quantify the number of plantings that go under the radar. These unrecorded tree plantings and removals amplify the incomplete nature of the inventory.

In the circumstances, a lack of understanding of the location and species of trees comprising the arboreal heritage of each borough is a problem in and of itself, since the situation:

- Compromises efforts to take responsibility for their maintenance (e.g., organizing routes for watering and pruning young trees);
- Limits analyses that can be made of the urban forest's composition, which is essential for:
  - identifying the location and choice of species for new plantings as part of a species diversification strategy;<sup>19</sup>
  - developing proactive intervention strategies in response to infestations and epidemics.

#### Poorly Documented Data on the Condition of Trees

The health status of the City's public trees is poorly understood. With the exception of the SLA borough, which reports and updates health data through cyclical inspections (in parallel with a five-year trimming schedule), the other audited boroughs do not have any mechanism to systematically evaluate and document tree health (see Graph 4). They inspect trees on an unplanned ad hoc basis, usually when processing citizen requests or following snow-loading operations to identify damaged street trees (as is the case with the VM borough) without integrating the information into the tree record.

GRAPH 4

#### Knowledge about the Condition of Trees



<sup>19</sup> "A lacking diversity of species of trees can increase the risk of major infestations and epidemics," the Policy, page 15.

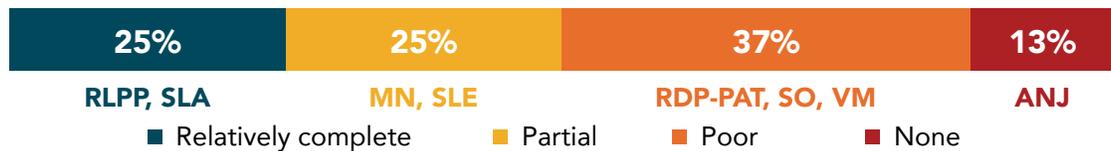
A lack of knowledge about the condition of trees makes it impossible to develop an intervention plan that takes into account the specific care needed to preserve them. It also compromises the assessment and adequate allocation of resources and limits the ability to develop an accurate picture, for instance in the context of efforts by the City to prepare an annual report on the status of all its assets,<sup>20</sup> which include street trees.

### Intervention History Not Systematically Documented

Generally speaking, the intervention history is not systematically integrated into a management system. Planning and monitoring of some operations takes place in spreadsheet programs outside the management system. Only two of the audited boroughs (25%) have a relatively complete history of interventions on their public trees (see Graph 5).

#### GRAPH 5

### Documentation of the Intervention History

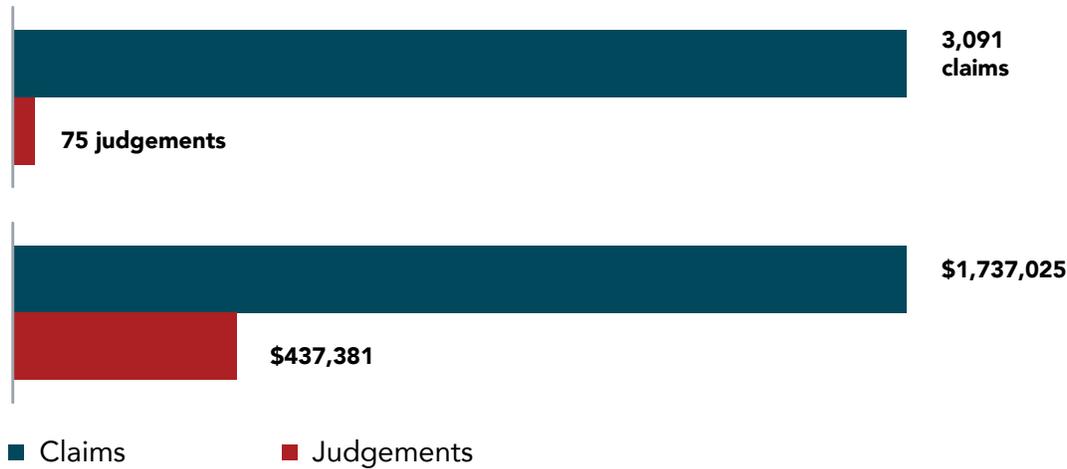


A lack of information about the intervention history limits operational planning and follow-up, and does not allow for either performance analysis (e.g., analysis of the failure of previous plantings or the tree care provided) or the identification of opportunities to optimize maintenance operations. Furthermore, it impedes the production of reports about the interventions performed and makes it impossible to demonstrate conclusively, in legal terms, what public tree inspection and maintenance measures have been implemented to prevent the risk of personal injury and property damage in the context of due diligence. In this regard, the City was obliged to spend nearly \$2.2M (from 2017 to 2021) as a result of claims and legal actions pursuant to incidents of personal injury or damage to a residence or vehicle caused by falling trees in cases where the City could not prove due diligence (see Graph 6).

<sup>20</sup> The directive *Connaissance de l'état des actifs* (C-OG-BPPI-D-18-001), which came into effect on November 30, 2018, is intended to ensure that the City has optimal knowledge of the condition and value of its assets (including street trees) in order to plan routine and periodic maintenance, as well as rehabilitation, for the purpose of maintaining an adequate level of services for citizens.

**GRAPH 6**

**Complaints and Judgements between January 2017 and October 2021 Related to Falling Branches that Caused Personal Injury or Property Damage on the Territory of the Ville de Montréal**



Source: Graph produced by the BVG based on information provided by the Service des affaires juridiques.

Note: “Claims” refers to cases processed by the City’s Bureau des réclamations, while “judgements” are cases where legal action was initiated.

**Tree Mortality Undocumented and not Analyzed**

Information about tree mortality and the underlying reason for the loss is not documented and followed up by the boroughs. While employees involved in managing the urban forest have tacit knowledge of maintenance deficiencies and the associated risk to tree longevity and survival, such management information and data are neither documented nor followed up.

**GRAPH 7**

**Tree Mortality Documentation and Follow-up**



In general, the SGPMRS estimates the three-year tree survival rate to be 94.6% (from 2017 to 2019) compared with a target of 95%. This portrait is based solely on plantings by the SGPMRS as part of the Programme Canopée. As a result, mortality data about the City’s public trees is incomplete and does not include reasons explaining the loss of these trees (see Graph 7).

Considering that only 30% of tree planting efforts have actually resulted in growth of the urban forest (see Graph 2), the failure to understand the root cause of a significant loss of arboreal assets represents a loss of income for the boroughs. This information would have allowed for corrective measures to be applied to current practices in order to promote tree maintenance and development. Indeed, this was the case in the VM borough, which responded to repeated injuries to trees by imposing penalties on delinquent snow-removal contractors and establishing a pilot project using a new type of bicycle rack to protect vulnerable trees.

To summarize, in contrast with expectations of the Policy, the information available from the boroughs about public trees is incomplete, not current, and even inexistent. The City therefore lacks knowledge about the composition and condition of public trees, which is an obstacle to overall management of the City's urban forest.

### 3.1.1.A. Recommendation

We recommend that the boroughs of Anjou, Montréal-Nord, Rivière-des-Prairies–Pointe-aux-Trembles, Rosemont–La Petite-Patrie, Saint-Léonard, Saint-Laurent, Le Sud-Ouest and Ville-Marie put in place a mechanism to ensure that tree plantings and removals conducted on their territory, as part of projects undertaken by any of the Ville de Montréal's business units, be integrated into the inventory of public trees in order to maintain a complete picture of their urban forest and to enable complete planning of maintenance interventions.

### 3.1.1.B. Recommendation

We recommend that the boroughs of Anjou, Montréal-Nord, Rivière-des-Prairies–Pointe-aux-Trembles, Rosemont–La Petite-Patrie, Saint-Léonard, Saint-Laurent, Le Sud-Ouest and Ville-Marie complete and maintain a full inventory of public trees under their responsibility (except for woodlots), including their condition, intervention history and cause of death, and the removal of trees, in order to have a complete picture of their urban forest and enable optimal planning and follow-up of maintenance and protective interventions.

## 3.1.2. Proliferation of Unintegrated Systems and Tools for Managing Public Tree Inventory and Maintenance Operations

The système corporatif de gestion des végétaux (GDV) developed by the City was launched in 1991. Since then, the system has undergone many developments, and several modules have been added. However, already by 2013, the GDV was considered obsolete due to its limited features and problems with keeping it current. For instance, it does not offer the ability to follow up maintenance lists and does not include a mobile application to update data and interventions in real time. In addition, no IT support has been available for the system since 2009.

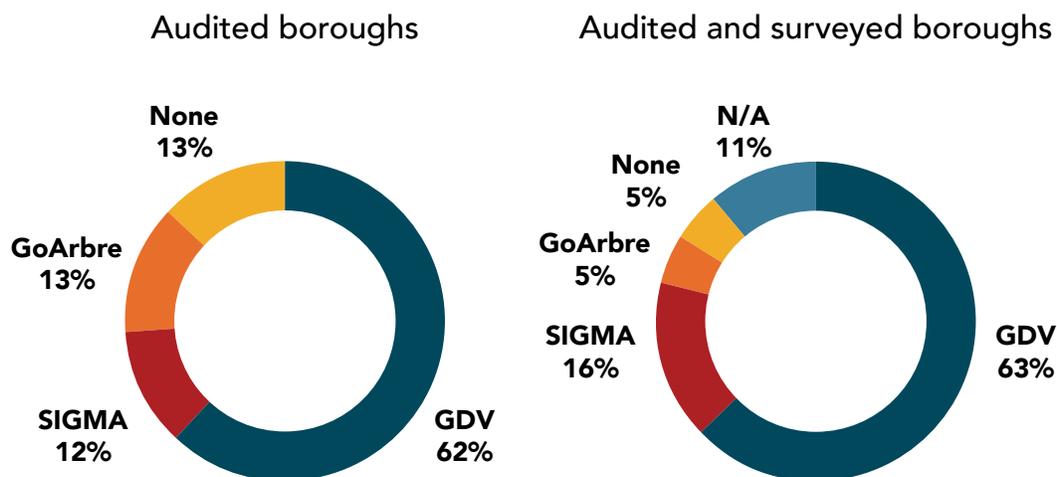
### 3.8. Implementing the *Tree Policy of Montréal*—Maintenance Component

These irritants led the SLA borough, which used the GDV up until 2019, to migrate to the internally developed *Système GoArbre* platform. Three of the City's other boroughs use the SIGMA system.<sup>21</sup>

For this reason, management of the City's inventory of public trees is spread over several unintegrated systems (see Graph 8).

**GRAPH 8**

#### **Tools and Systems Used to Manage the Public Tree Inventory of the Ville de Montréal**



Source: Graph produced by the BVG based on information provided by the boroughs and the SGPMRS.

According to action 2 of the Policy, the SGPMRS was responsible for developing a platform for generating an overall picture of the City's trees by 2008. At the present time, the SGPMRS does not have a unified overall picture of the composition and condition of the City's urban forest, nor can it provide complete program reports to the municipal administration without collecting and manually consolidating a large volume of data from the 19 boroughs.

Add to that the many spreadsheets used in parallel to plan and follow up maintenance operations by all the audited boroughs. Even among boroughs that use GDV, some have introduced parallel systems for specific functions. For example:

- In 2020, the RLPP borough implemented an application to follow up the watering of young trees;
- In 2021, Le SO borough implemented a commercial application (ArcGIS) for the overall management of planting and maintenance operations. The borough continues to use the GDV but only for the inventory, which is entered manually;

<sup>21</sup> SIGMA is used by the boroughs of Lachine, Montréal-Nord and Outremont.

- The SGPMRS also uses the ArcGIS application to follow up tree plantings and maintenance for the first three years.

Other boroughs are following suit, with plans to implement new systems (MN and ANJ) or parallel tools (VM).

None of the tools and systems used to manage public trees (inventory and maintenance) are integrated, nor are they used optimally and globally, in part because the naming conventions used for inventory data and tree location identification are not standardized. The multitude of systems makes consolidating the picture of the City's public trees more complex. In addition to this lack of synergy, using parallel systems for the same activity (e.g., for licencing and maintenance) drives costs higher. Here are some examples of the costs faced by specific boroughs:

- RLPP: \$40,000 to implement a system for following up watering, \$15,000 in annual fees and expenses related to the involvement of internal resources;
- SO: \$10,500 to implement a system for tree life-cycle management, \$50,600 in annual fees and expenses related to the involvement of internal resources;
- SLA: development and implementation of the GoArbre system by internal borough resources.

It is clear that the City does not have a single dedicated platform for the inventory of public trees as required by action 2 of the Policy. This situation is not conducive to a long-term perspective of the entire arboreal asset (e.g., establishing common performance indicators pertaining to maintenance management and tree protection, and structuring interventions on problematic trees both locally and globally).

### 3.1.2.A. Recommendation

We recommend that the Direction générale entrust a business unit with responsibility for integrating all inventory information about the Ville de Montréal's public arboreal assets into a single management tool also capable of managing and documenting interventions, in order to provide a complete picture and enable overall management of the Ville de Montréal's public trees.

## 3.2. Lack of Tree Maintenance Standards and Programs Results in a Disparity of Practices across the Ville de Montréal

Tree maintenance activities have a direct impact on the condition of the urban forest and, therefore, on the benefits it generates, including to the ecosystem. Generally speaking, regular maintenance serves to prevent broken limbs, ensure optimal growth and prolong the life expectancy of trees in order to maximize systemic benefits. Regular maintenance also reduces the personal safety and property damage risks for citizens that otherwise result.

### 3.8. Implementing the *Tree Policy of Montréal*—Maintenance Component

The frequency of maintenance activities is determined by tree age (young or mature) and location (street or park). A summary description of the main maintenance activities and the consequences of failing to perform them is presented in Appendix 5.3. Benefits associated with good tree maintenance include:

- Sufficient watering of young trees to ensure growth and reduce the risk of mortality;
- Shape pruning of young trees reduces the need for subsequent trimming that can leave larger wounds on the tree and reduce life expectancy;
- Regular systematic trimming of mature trees reduces the risk of personal injury to citizens due to uncorrected structural faults leading to broken branches.

To provide a management framework for public tree interventions (e.g., planting and maintenance), the Policy prescribes that the boroughs develop tree plans that provide for maintenance programs.

#### 3.2.1. No Tree Plans or Maintenance Programs 15 Years after the Adoption of the *Tree Policy of Montréal*

##### **Inexistent Tree Plans and Maintenance Frameworks**

According to the Policy, prior to the boroughs creating their tree plans,<sup>22</sup> the SGPMRS was to have published a Guide to support them in developing their plan. Work on the Guide began in 2015 but was abandoned until a draft Guide was prepared in 2019, only to be suspended in December 2020. At the time of our audit, therefore, which was 10 years after the deadline, the boroughs still had no Guide for developing their tree plan.

For this reason, the City's business units have no frame of reference to underpin maintenance practices (e.g., the type of work, methodology and frequency), even though the Policy mandated the SGPMRS to establish an overall vision for public tree management.

Despite the absence of a Guide, the SLA and SLE<sup>23</sup> boroughs developed documents consistent with the tree plan stipulated in the Policy and based on knowledge of the urban forest and overall priorities in terms of planting, maintenance and communication. However, these are the only two cases that were brought to our attention, while the other audited boroughs do not have a similar plan.

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<sup>22</sup> The tree plan concerns firstly public tree management and provides a frame of reference for development projects and maintenance operations on the urban forest. It is also intended to increase the quantity and quality of trees in order to strengthen their environmental role, develop resilience against disruptions and maximize the many benefits to the ecosystem.

<sup>23</sup> The SLA borough developed an urban forest plan in 2009. In response to the Policy's actions, the plan addresses a number of concerns: maintain, protect, showcase and increase the density of the tree canopy. However, the plan has not been updated since it first appeared. The SLE borough developed a plan to manage the public arboreal heritage in June 2019. This plan specifies actions to improve and maintain the condition of the urban forest and protect young trees, including actions recommended for tree maintenance.

A comparison of the two boroughs' plans reveals differences. Regarding maintenance, for example, the SLA borough plan mentions the need to review existing tree techniques (for newly planted and growing trees), whereas the SLE borough plan addresses only certain aspects of trimming and bracing activities. If these boroughs had had access to the Guide the SGPMRS was supposed to produce, the content of their tree plans would probably have been better standardized and more complete.

The lack of a frame of reference governing management of the urban forest (tree plan) is an obstacle to a standardized vision, planning and optimal management of public trees across the City.

### **No Maintenance Programs**

In the interests of maintaining the arboreal heritage in good condition, the Policy prescribes establishing the following maintenance programs:

- A maintenance program for newly planted street trees;
- A maintenance program for mature street trees;
- A maintenance program for new parks and public squares.

These programs have not been put in place by the audited boroughs. The SGPMRS, which undertakes development projects in parks and public spaces, does not systematically produce the maintenance programs specified in the Policy. Out of several dozen projects carried out since 2017, only three prescribe maintenance activities for newly planted trees, including a reference to a non-existent regular maintenance program of the City.

### **3.2.2. Disparity in Tree Maintenance Practices and Limited Implementation of Activities Critical to Good Growth**

In the absence of guidelines setting out the fundamentals of effective, standardized methods for maintaining urban trees, practices in the boroughs are determined by local priorities and implemented according to the resources (human, material and financial) available. The result is a disparity in practices and limited implementation of certain maintenance activities critical to optimal growth and tree survival (e.g., watering and shape pruning).

A comparison of 14 maintenance activities verified in the boroughs (see Table 2) shows that they are not practised everywhere nor fully implemented.

**TABLE 2**

**Number of Audited Boroughs by Level of Implementation of Public Tree Maintenance Activities**

Maintenance Activity	Number of boroughs performing the maintenance activity	Number of boroughs by implementation level of the maintenance activity
<b>Planned Maintenance</b>		
Watering	8	4 High, 3 Partial, 1 Low
Shape pruning	7	1 High, 2 Partial, 4 Low
Saucer maintenance	8	6 High, 2 Partial
Monitoring – support stakes and straps	7	5 High, 1 Low, 1 Not available
Protection (injury)	7	2 High, 3 Partial, 2 Not available
Monitoring – pit protection	5	3 High, 1 Partial, 1 Low
Regular trimming	4	2 High, 2 Low
Systematic inspection	6	1 High, 2 Partial, 2 Low, 1 Not available
Structural maintenance	7	1 High, 3 Partial, 3 Low
<b>Occasional Maintenance</b>		
Occasional trimming	8	4 High, 4 Low
Bracing	7	1 High, 2 Partial, 3 Low, 1 Not available
Phytosanitary treatment	5	2 High, 3 Partial
Removal	8	5 High, 1 Partial, 1 Low, 1 Not available

Young trees

Mature trees

Mature trees

Source: Picture produced by the BVG based on information collected.

Legend: Level of maintenance activities.

■ High ■ Partial ■ Low ■ Not available

Some of the maintenance activities identified are reactive rather than preventive, which would reduce the number of urgent interventions. For example:

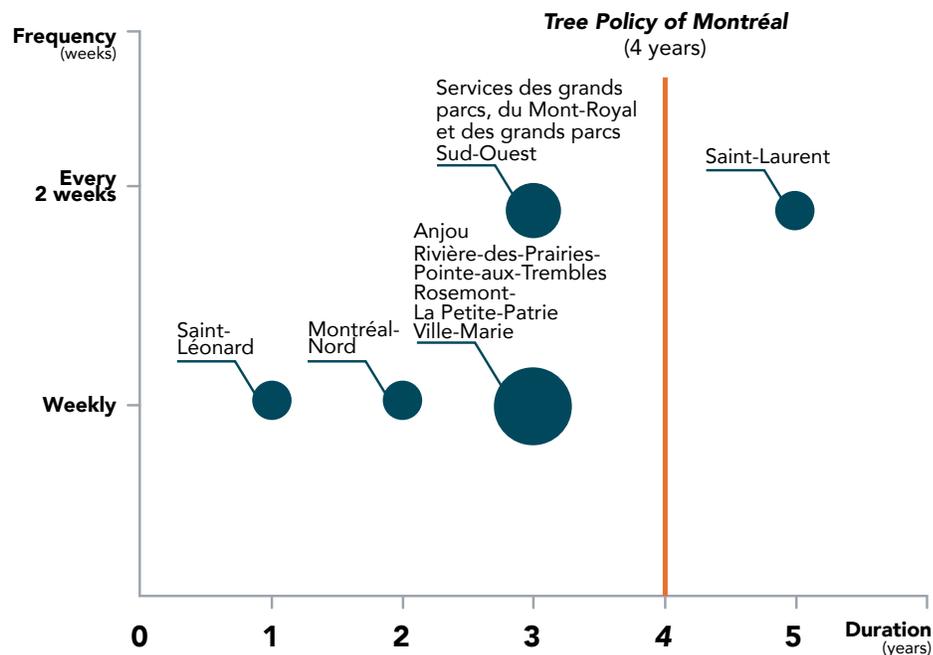
- Shape pruning, which, according to the Policy, should be performed regularly for four years following planting to correct the structure of certain trees, occurs infrequently or not at all in six of the audited boroughs (75%). The result is a greater risk of poor structural development, broken limbs, and more extensive wounds during subsequent trimming;

- Regular trimming, which should be done systematically following a five-year cycle, is practised by only four boroughs, two of which ensure full implementation. Trimming generally occurs only occasionally in the audited boroughs, depending on the urgency of the need or in response to a citizen complaint, to which some boroughs are slow in responding (ANJ, MN, RDP–PAT and RLPP);
- Systematic inspection to determine the condition of trees and inform interventions required is conducted only in the SLA borough. In the other boroughs, weakened trees may not be identified and treated;
- Watering, which is critical to the survival of young trees, is not fully implemented, resulting in a greater risk of mortality.

More specifically with respect to watering, in addition to being incompletely implemented by half the audited boroughs, there is disagreement among the boroughs concerning the period during which young trees should be watered (see Graph 9). The watering period practised by the boroughs and the SGPMRS is generally less than the four years prescribed in the Policy, which does not, however, spell out the frequency other than saying that it should be regular and as needed depending on the situation (e.g., during heatwaves, which create hydric stress on trees of all ages).

**GRAPH 9**

### Comparison of the Duration and Frequency of Watering of Young Trees (Following Planting) for the Audited Boroughs and the Service des grands parcs, du Mont-Royal et des sports



Source: Graph produced by the BVG based on information collected.

### 3.8. Implementing the *Tree Policy of Montréal*—Maintenance Component

Current practices put the normal growth of young trees at risk and can result in wilting, which represents a loss of both investment and benefits to the ecosystem.

Moreover, the MN borough estimates the annual tree mortality rate to be 20% since 2015 due to the lack of a watering program that was not introduced until 2017. The estimated rate in 2021 for the same borough is 15% of young trees, primarily due to insufficient watering, especially during the periods of excessive heat in July 2021. High mortality rates were also experienced for trees planted as part of the *Un enfant, un arbre* program,<sup>24</sup> with 60% of trees planted in the public domain lost due to a lack of sufficient watering.

In short, current practices put the life expectancy of public trees at risk. Furthermore, they result in additional maintenance work due to climate incidents, premature tree removals and costs for the replacement of trees that die or are removed before they have reached maturity. In due course, this can result in the loss of ecosystem benefits from trees for the community and an increase in complaints and maintenance requests filed by citizens.

Considering the expected benefits of trees and the scale of efforts required to dispose of mature trees, appropriate and sufficient maintenance is required across the City's entire territory. This standardization of public tree maintenance inevitably necessitates the introduction of a City-wide management framework stipulating optimal maintenance practices.

#### 3.2.A. Recommendation

We recommend that the Service des grands parcs, du Mont-Royal et des sports produce and distribute to the boroughs a *Guide to drafting a tree plan* that specifically sets standards for maintenance activities and the protection of public trees, and that it support the boroughs in their efforts to prepare and approve local plans in order to promote sustainable practices in the management of the urban forest across the Ville de Montréal.

#### 3.2.B. Recommendation

We recommend that the boroughs of Anjou, Montréal-Nord, Rivière-des-Prairies–Pointe-aux-Trembles, Rosemont–La Petite-Patrie, Saint-Léonard, Saint-Laurent, Le Sud-Ouest and Ville-Marie, in collaboration with the Service des grands parcs, du Mont-Royal et des sports, establish tree plans in order to promote management practices for borough trees that are carefully studied, well-managed and sustainable.

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<sup>24</sup> The *Un enfant, un arbre* program was established in 2013 by the Ville de Montréal. In addition to offering parents and their children a unique souvenir, this initiative by participating boroughs serves to preserve and foster a quality environment. Parents who register their child can opt for planting a tree on public or private property.

### 3.2.C. Recommendation

We recommend that the boroughs of Anjou, Montréal-Nord, Rivière-des-Prairies–Pointe-aux-Trembles, Rosemont–La Petite-Patrie, Saint-Léonard, Saint-Laurent, Le Sud-Ouest and Ville-Marie, in collaboration with the Service des grands parcs, du Mont-Royal et des sports, establish programs to maintain and protect the public trees under their responsibility in compliance with standards that will have been previously defined, and ensure that their implementation is followed up in order to promote optimal practices and informed decision-making when prioritizing interventions and allocating resources to maintain and develop the urban forest.

### 3.2.D. Recommendation

We recommend that the Service des grands parcs, du Mont-Royal et des sports establish programs for the boroughs to maintain parks and public spaces in compliance with standards that will have been previously defined in order to promote optimal practices and the development of new plantings.

## 3.3. Lack of Resources and Dedicated Recurring Budgets for Maintenance

Resources required to plant, develop and ensure the sustainability of the urban forest must be considered a public investment strategy because of the benefits generated. This is how the Côte-des-Neiges–Notre-Dame-de-Grâce borough mentions in its 2011 Plan de la foresterie urbaine that investing in:

*“...l’entretien des arbres existants permet de préserver nos investissements antérieurs et devrait avoir priorité quant à l’ajout de nouveaux arbres si l’on ne dispose pas des ressources requises à leur entretien et leur survie.”*

The number of trees targeted by maintenance programs determines the financial resources that need to be budgeted for that purpose. Not knowing either the number of public trees on a borough’s territory or the specific volume and different types of maintenance that need to be performed annually makes it difficult to establish the budget required for maintenance work.

### **No Estimate of Resources Required to Maintain Public Trees**

At the present time, the cost for maintaining all public trees is not known. Estimates have been established for some maintenance activities (e.g., labour costs for trimming in the SLA borough), but these are limited to the number of workers required and do not take into consideration other costs related to the activity, such as equipment and rolling stock.

### 3.8. Implementing the *Tree Policy of Montréal*—Maintenance Component

Furthermore, additional requirements for maintaining new plantings are not systematically evaluated. The boroughs take over responsibility for the maintenance of trees planted by the SGPMRS or as part of development projects without estimating and budgeting for the additional resources required.

#### **No Dedicated Budget Specifically for Maintaining Public Trees**

The boroughs' annual planting and maintenance budgets are allocated globally for horticulture (flowers, shrubs and perennial plants) and trees. The amounts are not broken down to show the costs associated with tree maintenance. This does not allow for maintenance costs and subsequent budget estimates to be followed up based on the changing inventory and its condition. For this reason, it is to be expected that, in order to properly maintain public trees, whose numbers tend to increase, a borough will have to make choices and reduce expenses in other horticultural sectors.

#### **Issues Around Resource Adequacy for Public Tree Management**

Although the boroughs are not in a position to measure actual maintenance costs for public trees under their responsibility, they consider that the current capacity, in terms of human and financial resources, is an issue impacting tree maintenance and development. Here are two examples:

- Lack of tank trucks for watering young trees;
- Resources required to sufficiently and properly water newly planted trees and conduct cyclical trimming.

The boroughs are therefore obliged to deal with intervention needs that exceed the human and material resources available. This is reflected in the low rate of performance of overall maintenance activity as previously noted in section 3.2.2.

Efforts already approved or planned to increase the City's canopy will require additional maintenance expenditures. The context of limited resources means that operational priorities must be established to ensure adequate management of the urban forest. Maintenance costs need to be determined in advance based on the composition and condition of public trees, as well as on maintenance standards and programs. This calls for prioritizing interventions and establishing an annual budget that takes into account the evolving number and condition of trees in the urban forest in order to ensure its maintenance and development.

#### **3.3.A. Recommendation**

We recommend that the boroughs of Anjou, Montréal-Nord, Rivière-des-Prairies–Pointe-aux-Trembles, Rosemont–La Petite-Patrie, Saint-Léonard, Saint-Laurent, Le Sud-Ouest and Ville-Marie include in their budget specific allocations for the maintenance of public trees in order to ensure their maintenance and development.

### 3.4. No Implementation Follow-Up for the Tree Policy of Montréal

The municipal administration has primary responsibility for implementing the Policy, which requires it to put in place the necessary tools to adequately protect and manage the City's rich arboreal heritage. Although responsibility is assigned and timelines established for some Policy actions (1 and 2), the audited boroughs and the SGPMRS all report not being held accountable in that regard. In the absence of follow-up mechanisms, the City can neither evaluate overall implementation of the Policy nor take the necessary corrective measures to fulfill its engagements.

It should be emphasized that the SGPMRS participated in preparing the only policy implementation report (*Bilan de la mise en œuvre de la politique 2005-2007*), presented by the *Commission sur l'eau, l'environnement, le développement durable et les grands parcs* (the Commission). The report already underscored obvious delays in implementing Policy actions<sup>25</sup> only two years after it came into effect. The delays observed at that time were confirmed by our audit work and still hold true 16 years after adoption of the Policy. The various report recommendations (e.g., having the City set up incentive programs to support the boroughs in developing georeferenced inventories of street trees and tree maps) were not followed up by the City.

In 2013, the Commission issued recommendations to the executive committee in its report on the Montréal Canopy Action Plan project specifically aimed at updating the Policy for 2017. Following that, the executive committee mandated the SGPMRS to proceed, in collaboration with the boroughs, with updating the Policy.<sup>26</sup> Moreover, since maintenance was a key factor to the success of the planting program, an analysis of the tree maintenance management programs was to have been part of the update. None of the above have yet taken place.

Since 2020, the SGPMRS has installed a dashboard to monitor progress in achieving growth targets for the urban forest,<sup>27</sup> showing the number of plantings on the public and private domains, the survival rate of trees planted and a canopy index. This follow-up, however, does not indicate the status of implementation of Policy actions.

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<sup>25</sup> Delays in implementing Policy actions include: The Guide intended to support the boroughs in drawing up their tree plan was never produced by the SGPMRS (Action 1). Only one borough had a current inventory (Action 1). Maintenance programs had not been established and maintenance practices were non-compliant (new trees were watered for an average of two years, well below the four years stipulated in the Policy, and borough interventions most often took place on an ad hoc basis or in response to citizen requests (Action 5)).

<sup>26</sup> Executive committee resolution CE13 1511 dated September 18, 2013, following up the Commission's report on the Montréal Canopy Action Plan project.

<sup>27</sup> Report on the overall increase in the urban forest based on tree plantings and removals done as part of the Programme de renforcement de la canopée et de la lutte contre l'Agrile du frêne (see Graph 2).

### 3.8. Implementing the *Tree Policy of Montréal*—Maintenance Component

Consequently, the City has no knowledge of the progress achieved in implementing Policy actions, nor of issues pertaining to the condition of the urban forest, a situation that is not conducive to introducing corrective actions.

Considering that between 2017 and 2020, the SGPMRS and the boroughs spent \$57.3M<sup>28</sup> on planting and removing trees of the urban forest, follow-up to Policy implementation, and more specifically activities needed to maintain the newly planted trees covered by that investment, is required.

#### 3.4.A. Recommendation

We recommend that the Direction générale assign responsibility to someone for providing regular reports on progress in implementing the *Tree Policy of Montréal* actions in order to allow for informed decision-making in the management and development of the urban forest and in prioritizing actions in the *Tree Policy of Montréal* that are to be implemented.

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<sup>28</sup> Source: The 2012–2020 SGPMRS report on the urban forest.

## 4. Conclusion

At the current time, the picture of the urban forest of the Ville de Montréal (the City) is neither complete nor centralized. In the absence of established standards, maintenance practices are inconsistent and incomplete for essential tree maintenance and development activities. This has an impact on the comprehensive planning of interventions and the allocation of recurring and specific resources dedicated to the management of public trees. A lack of follow-up to the implementation of actions in the *Tree Policy of Montréal* (the Policy) does not allow the City to be aware of issues pertaining to the urban forest, including those related to maintenance. For these reasons, we conclude that the City has not implemented actions in the Policy concerning the maintenance of public trees.

The City has developed various strategies<sup>29</sup> in the context of sustainable development and adapting to climate change in which the urban forest plays an important role. The Policy reflects all these priorities. Considering that only 30% of planting efforts between 2012 and 2020 actually contributed to growing the urban forest, it is even more in the general interest to ensure the protection and development of the arboreal heritage. This presupposes knowledge about the condition of all public trees, the preparation of tree plans and maintenance programs to ensure optimal overall management of interventions, and, finally, budgets dedicated specifically to the maintenance of public trees.

More specifically, the following are our major findings with respect to the evaluation criteria:

### **Evaluation Criterion – Preparation of Detailed Inventories of Public Trees in the Boroughs and by the Service des grands parcs, du Mont-Royal et des sports**

A large proportion of the audited boroughs consider that they do not have a complete current picture of the trees under their responsibility, since:

- The inventory of public trees is incomplete and their condition is not known;
- The history of maintenance interventions on public trees is not systematically documented;
- Tree deaths and their cause are neither documented nor followed up.

The proliferation of systems to manage the inventory and maintenance of trees across the City exacerbates the dispersion of data, which is an obstacle to developing a complete picture of the urban forest and optimal overall management of the City's public trees.

<sup>29</sup> The Sustainable Montréal 2016–2020 plan, whose objective was to improve green infrastructure (increase the canopy from 20% to 25% by 2025) and reduce greenhouse gases by 80% by 2050. The actions in this plan are continued in the 2020–2030 Climate Plan, with the objective of planting 320,000 trees by the City.

### **Evaluation Criterion—Maintenance Standards, Tree Plans and Maintenance Programs**

The tree plans and maintenance programs stipulated in the Policy had not been put in place at the time of our audit work.

Add to this a lack of standards, which makes it impossible to guide and evaluate the management of public tree maintenance.

Maintenance practices are inconsistent across the City, especially in the case of activities critical to tree maintenance and development (e.g., watering young trees).

Maintenance activities, including some that are critical to the optimal growth and survival of trees (e.g., watering, shape pruning and cyclical trimming) are, for the most part, not fully carried out.

### **Evaluation Criterion—Recurring Budget Allocations Dedicated to Maintenance Activities**

No evaluation of the resources (human and material) required annually to ensure the maintenance of public trees is conducted by the boroughs. This is also the case for newly planted trees, which require additional resources.

Budget funds are not specifically allocated for the maintenance of public trees, but rather more generally for horticultural and arboreal planting and maintenance.

Insufficient resources for maintenance activities overall, together with an increase in planting objectives, constitutes an issue for the boroughs.

There is no specific follow-up of funds dedicated to public tree management. This situation impedes efforts to estimate and allocate the resources required annually to maintain and develop trees, in accordance with the progress and condition of the inventory, and to prioritize interventions in the context of limited resources.

### **Evaluation Criterion—Follow-up to the Implementation of Actions in the *Tree Policy of Montréal***

Since it was adopted in 2005, no follow-up has been done by the City to evaluate implementation of the actions set out in the Policy. Only the *Commission sur l'eau, l'environnement, le développement durable et les grands parcs* produced a 2005–2007 report on the Policy, which indicated a delay in implementation of the prescribed actions. The various recommendations in that report were not followed up. Furthermore, in 2013 the Commission recommended an update to the Policy and an analysis of maintenance programs, which has still not been done.

The City has no knowledge about the fulfillment of engagements contained in the Policy, for instance with respect to maintenance, or of the condition of the urban forest and issues pertaining to its maintenance and development.

## 5. Appendices

### 5.1. Objective and Evaluation Criteria

#### Objective

To ensure that the Ville de Montréal (the City) has implemented the actions to maintain public trees as set out in the *Tree Policy of Montréal* (the Policy).

#### Evaluation Criteria

- The boroughs and the Service des grands parcs, du Mont-Royal et des sports have developed, in accordance with the Policy, a detailed inventory of public trees under their responsibility, excluding woodlots.
- Tree plans and maintenance programs have been developed in accordance with the Policy, based on standards established across the City.
- Recurring budget allocations are dedicated to tree maintenance activities.
- Actions stipulated in the Policy concerning the maintenance of public trees are followed up.

## 5.2. Summary of the *Tree Policy of Montréal*

### Vision

Grant trees their rightful place at the heart of Montréal’s cityscape, making the City a greener, more pleasant, healthier place to live.

### Objectives

- Develop and provide the tools necessary for defining a long-term vision.
- Establish rules and practices relating to the protection, management and appropriate maintenance of the urban forest, while supporting applied research in the field.
- Increase the number of trees planted based on the principle of planting the right tree in the right location with a view to augmenting the island’s arboreal reserve.
- Step up information, publication and awareness initiatives with a view to involving everyone – citizens, municipal employees, institutional and association partners, large land owners, etc. – in the effort to protect Montréal’s arboreal heritage.

### Actions

**Action 2:** Each Montréal borough shall complete a detailed inventory of public trees under borough jurisdiction, woodlots excluded.

**Action 1:** Each Montréal borough shall draw up, in conjunction with the Service des grands parcs du Mont-Royal et des sports, a **Tree Plan**, which shall give rise (within 5 years) to the following programs:

- Planting program (new and replacement plantings);
- **Maintenance program (trimming, fertilization and phytosanitary treatment);**
- Communications program (awareness and education).

**Action 5:** The Ville de Montréal and the boroughs shall draw up maintenance programs for trees situated in the public domain with a view to maintaining Montréal’s arboreal heritage in good health, including the following:

- **Maintenance program for newly planted street trees;**
- **Maintenance program for mature street trees;**
- **Maintenance program for new parks and public squares.**

## 5.2. Summary of the *Tree Policy of Montréal* (continued)

- Action 3:** The City and the boroughs shall conduct new planting operations pursuant to various pre-established criteria with a view to ensuring the sustainability of the island's arboreal heritage.
- Action 4:** The Ville de Montréal and the boroughs shall seek above all to preserve and protect the island's arboreal heritage. When faced with the issue of felling trees, the City and the boroughs shall favour alternate solutions such as the relocation of the trees, or effecting changes to a development project in conjunction with the developer. As felling may be unavoidable in certain instances, internal rules shall be drawn up to provide for the proper supervision of felling operations and planting of an equivalent number of trees.
- Action 6:** The boroughs shall, if they have not already done so, adopt or amend urban planning rules relating to the felling of private trees.
- Action 7:** The boroughs shall institute measures to protect trees during construction work.
- Action 8:** The boroughs shall incorporate into their urban planning regulations the provisions set out in the supplement to the Master Plan.
- Action 9:** The Ville de Montréal shall draw up a municipal program designed to recognize and protect the island's noteworthy trees.
- Action 10:** The Ville de Montréal shall pursue development of its program of applied research into safeguarding and enhancement of Montréal's arboreal heritage.
- Action 11:** The Ville de Montréal shall increase information and awareness activities with a view to securing the commitment of everyone to the cause of the development and protection of the island's arboreal heritage.

Source: Figure produced by the Bureau du vérificateur général based on information available in the *Tree Policy of Montréal*.

### 5.3. Summary Description of the Main Activities for Maintaining Trees and the Consequences of Failing to Perform Them

	Maintenance Activity Description	Consequence if not Performed
	<b>Planned Maintenance</b>	
<b>Young trees</b>	<b>Watering:</b> Frequent watering and sufficient irrigation, especially in a tree's first years of life, are critical to healthy development.	Hydric stress and poor tree health. Failure or limited ability of young trees to continue normal growth, resulting in death or withering and the need for replacement.
	<b>Shape pruning:</b> Required during the first five years and should begin at the time of planting; intended to enhance the tree's natural shape and ensure good branch location.	<ul style="list-style-type: none"> <li>• Poor structural development, making the tree fragile.</li> <li>• Increased risk of broken branches.</li> <li>• Risk of larger wounds during later trimming.</li> </ul>
	<b>Saucer maintenance:</b> Intended to maintain water at the foot of the tree to ensure access by the roots, keep the roots clear and prevent weeds from invading.	<ul style="list-style-type: none"> <li>• Water prevented from reaching the roots.</li> <li>• More weeds creating competition for the available water.</li> </ul>
	<b>Monitoring—stakes and straps:</b> A stake can be useful for supporting a tree for up to two years following planting to ensure straight growth and prevent vandalism.	Not removing the support creates a risk of injury or possibly strangulation by the strap or the stake itself.
<b>Mature trees</b>	<b>Protection (injury):</b> Put in place to protect against damage from mowing and other tools.	<ul style="list-style-type: none"> <li>• Injury to the tree that can lead to withering.</li> <li>• Reduced life expectancy.</li> </ul>
	<b>Monitoring—pit protection:</b> Grate to protect the pit, ensure that the tree is well anchored and provide the tree with access to water and minerals. Protective grates need to be monitored for adjustment or removal as the tree grows.	If the grate is not adjusted or removed, there is a risk of injury or possible strangulation at the base of the trunk.
	<p><b>Regular trimming:</b> Removing branches serves several purposes: sanitation, raising the crown, access to light, rebalancing the dripline, structural reorganization and clearing.</p> <p>A systematic approach serves to optimize the use of resources by organizing trimming in an overall, structured manner.</p>	<ul style="list-style-type: none"> <li>• Increased risk of personal injury and property damage.</li> <li>• Structural problems leading to branches breaking or the tree falling.</li> </ul>
	<b>Systematic inspection:</b> Regular, systematic visits to identify issues as they develop in order to provide treatment in a timely manner as required.	<ul style="list-style-type: none"> <li>• Uncorrected structural problems.</li> <li>• Pests and severe disease.</li> <li>• Increased maintenance costs (curative rather than preventive interventions).</li> </ul>

### 5.3. Summary Description of the Main Activities for Maintaining Trees and the Consequences of Failing to Perform Them (continued)

Maintenance Activity Description	Consequence if not Performed
<b>Occasional Maintenance</b>	
<p><b>Occasional trimming:</b> To rectify a specific problem (e.g., clear branches from a roof, road signs or a lighting cone).</p>	<p>The situation could potentially become unsafe.</p>
<p><b>Bracing:</b> Support system for a tree showing signs of injury or to save a weakened branch still in good health.</p>	<ul style="list-style-type: none"> <li>• Safety risk to citizens and property.</li> <li>• The condition of the tree could worsen leading to premature trimming or removal.</li> </ul>
<p><b>Phytosanitary treatment:</b> Antiparasitic treatments to prevent, eliminate or mitigate diseases affecting trees and to protect against pests.</p>	<ul style="list-style-type: none"> <li>• Tree mortality.</li> <li>• Complaints by citizens: various inconveniences (e.g., sticky patches on cars, leaf colouration, leaves falling prematurely).</li> <li>• Pest infestation.</li> </ul>
<p><b>Removal:</b> Required when a tree is dead, severely withered, infested or suffering from a disease at an advanced and irreversible stage or showing major structural deficiency, thus making it susceptible to branches breaking or the tree falling.</p>	<ul style="list-style-type: none"> <li>• Risk to property assets and infrastructure.</li> <li>• Risk to citizen safety.</li> </ul>

Mature trees

Source: Table produced by the Bureau du vérificateur général based on maintenance practices current around the City.

