

# **A GREENER EDMONTON:**

A Vision for  
Restorative Actions  
on our Urban  
Landscape

July 31, 2024

## City of Edmonton Land Acknowledgment

*The City of Edmonton acknowledges the traditional land on which we reside, is in Treaty Six Territory. We would like to thank the diverse Indigenous Peoples whose ancestors' footsteps have marked this territory for centuries, such as nêhiyaw (Nay-hee-yow), Dene (Deh-neyh), Anishinaabe (Ah-nish-in-ah-bay), Nakota Isga (Na-koh-tah ee-ska), and Niitsitapi (Nit-si-tahp-ee) peoples. We also acknowledge this as the Métis' (May-tea) homeland and the home of one of the largest communities of Inuit south of the 60th parallel. It is a welcoming place for all peoples who come from around the world to share Edmonton as a home. Together we call upon all of our collective, honoured traditions and spirits to work in building a great city for today and future generations.*

*We are guided by Wahigicobi, an Iethka Nakoda word gifted to the Indigenous Framework that means kinship, as well as other Indigenous concepts of kinship such as wâhkôhtowin (nêhiyaw/Cree) and ilagiingniq (Inuktun). Through the guidance of Wahigicobi, the Indigenous Framework, we recognize our interconnectedness with Mother Earth and all beings. Our work and relationships must be based on mutual respect and honor. This commitment includes land stewardship and restorative activities such as naturalization, restoration, and reclamation, incorporating plant species that have been present on this land since time immemorial.*

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# 1 INTRODUCTION



Edmonton's public open spaces contribute greatly to the wellbeing of its residents and to the ecosystems in which we all live. The City has always adopted an ecologically-based approach to management of these spaces, from the North Saskatchewan River Valley, to its many parks and natural areas. As directed by the City Plan, and recommended in the Breathe Green Network Strategy, Edmonton is redoubling its efforts to improve the ecological functioning of its open spaces. A shift towards a more natural landscape provides more opportunities for people to experience nature throughout the city, while creating a more sustainable green network with reduced maintenance requirements.

In alignment with international best practices, the City is updating its approach to recovering natural ecosystems, providing more clarity and consistency to its restorative activities. These activities include naturalization, reclamation, or restoration (as described in the City's Design and Construction Standards), as well as others such as reducing impacts or various levels of recovery of the native ecosystem through ecological restoration. This updated approach has been developed to align with the City's guiding values as outlined in Edmonton's City Plan, and will encourage more thoughtful and deliberate decisions for where, when and how restorative activities are carried out. In particular, this initiative contributes to the Live, Thrive, Access, and Preserve values. These efforts will contribute to multiple objectives including an overall move towards city-wide climate adaptation and resilience of the City's green network. Edmonton's network of open space is a key contributor to the Breathe thematic functions of Ecology, Celebration, and Wellness for the city and its residents.

As directed by the Breathe Strategy, the overarching goal is to increase the overall ecological functionality of the network, while ensuring that open spaces remain

important destinations for recreational activities and community gatherings. Improving natural function when planning, designing and maintaining open spaces will create more livable and sustainable communities, reducing maintenance costs while providing more benefit to those around them.

The purpose of this Plan is to provide direction on restorative activities on public land in Edmonton, including where and how these activities will occur.

This Plan will replace the 1994 Naturalization Master Plan, but also describe how the City can expand restorative activities to include other tactics on a continuum from reducing impacts to full recovery of an ecosystem. Additionally, this Plan will encourage restorative activities involving tree planting where suitable in order to support to the achievement of the City's goal of planting two million new trees and the Urban Forest Asset Management Plan 20 per cent canopy cover target.

The diverse habitats of the Central Parkland Natural subregion, in which Edmonton is found, depend on a wide range of native or well-adapted species and conditions in which to thrive. Since they require both capital and operational investments, restorative efforts must be evaluated through the lenses of ecology, climate mitigation and social equity in order to ensure that limited resources are directed towards areas that will benefit the most from improved natural spaces. This Plan provides the City with a consistent framework to guide restorative activities in the long term as well as focus additional capital investments through 2030 into areas of the City which will provide the greatest opportunity to achieve canopy cover and other ecological targets. This work also supports the City of Edmonton Indigenous Framework, striving to build a shared responsibility for the respectful stewardship of the lands we inhabit together.

# 1.1 Plan and policy context

This Plan and updated approach to restorative activities was created in alignment with the direction outlined in the following City of Edmonton documents:

<p><b>ConnectEdmonton:</b> Edmonton's strategic plan provides goals and indicators to direct and monitor transformational changes over the next 10 years</p>	<p>Guiding principle: <b>Connect</b></p> <ul style="list-style-type: none"> <li>+ We create as a community to connect people to what matters to them</li> <li>+ We care about the impact of our actions on our social, economic, cultural, spiritual and environmental systems</li> <li>+ We serve those here today and those who come after us</li> </ul> <p>Four <b>strategic goals</b>, including:</p> <ul style="list-style-type: none"> <li>+ <b>Climate Resilience:</b> Edmonton is a city transitioning to a low carbon future, has clean air and water and is adapting to a changing climate</li> </ul>
<p><b>The City Plan:</b> Municipal development and transportation master plan (approved in 2020)</p>	<p><b>Greener As We Grow targets:</b> Two million new urban trees planted</p> <p><b>Strategic measures:</b></p> <ul style="list-style-type: none"> <li>+ Urban forest</li> <li>+ Green area per 100,000 population</li> </ul>
<p><b>Breathe:</b> Edmonton's Green Network Strategy</p>	<ul style="list-style-type: none"> <li>+ Sets the direction for the sustainable care and expansion of open spaces</li> <li>+ An approach that ensures every neighbourhood will be supported by an integrated, multifunctional system of green and open spaces</li> </ul>
<p><b>Urban Forest Management Plan (UFMP):</b> A 10-year plan outlining strategies for sustainably managing and enhancing all trees within Edmonton's city limits</p>	<p>The <b>guiding principles</b> of this plan include:</p> <ul style="list-style-type: none"> <li>+ Promote a healthy and sustainable urban forest</li> <li>+ Engage the community in protecting and managing the urban forest</li> <li>+ Think globally and regionally; plan and act locally</li> <li>+ Use best practices, innovation, science, information, and technology</li> </ul> <p><b>Objectives</b> include:</p> <ul style="list-style-type: none"> <li>+ Effectively manage, monitor, sustain and ensure the health and growth of Edmonton's Urban forest</li> <li>+ Grow the urban forest canopy cover to 20 per cent</li> </ul>
<p><b>Urban Forest Asset Management Plan (UFAMP):</b> Outlines the anticipated programs and costs associated with managing Edmonton's urban forest over the next 50 years</p>	<p><b>Goals</b> include:</p> <ul style="list-style-type: none"> <li>+ Develop a diverse and sustainable urban forest, including reaching the 20 per cent canopy goal as outlined in the Urban Forest Management Plan</li> <li>+ Support and enhance the environment by sustaining healthy and resilient ecosystems</li> </ul> <p>Intent to <b>provide</b>:</p> <ul style="list-style-type: none"> <li>+ Protection, preservation and connectivity of the urban forest to promote health and wellness of people, and native flora and fauna</li> <li>+ A forest with diverse native species to improve resilience to climate change</li> <li>+ Improved air and water quality</li> <li>+ Cost effective service provision</li> </ul>

<p><b>Climate Resilience Policy (C627):</b> Provide clear and consistent governance and accountabilities for achieving a climate resilient community</p>	<p><b>Commitments</b> include:</p> <ul style="list-style-type: none"> <li>+ Carbon Capture and Nature Based Solutions – Promoting a nature-based solutions approach to climate resilience by implementing and promoting actions that protect, sustainably manage, and restore natural and modified ecosystems</li> </ul>
<p><b>City Wide Natural Area Management Plan:</b> Presents the objectives and strategies for managing and restoring the natural areas owned by the City</p>	<ul style="list-style-type: none"> <li>+ Identified naturalization as a tactic to enhance plant community structure and species diversity, and increase density and ground cover to reduce invasive species establishment in natural area understory</li> <li>+ Restoration efforts for natural areas directed by Greener As We Grow will be conducted in alignment with this plan</li> </ul>
<p><b>Natural Connections Strategic Plan:</b> Focuses on strengthening connections to work cooperatively to protect and sustain Edmonton's natural systems</p>	<ul style="list-style-type: none"> <li>+ Focuses on strengthening connections between natural areas, in the form of diverse, functional biological corridors that support critical natural processes and the movement of wildlife</li> </ul>
<p><b>Ribbon of Green:</b> Provides strategic direction to guide the protection and responsible use of Edmonton's River Valley and Ravine System</p>	<ul style="list-style-type: none"> <li>+ Provides direction to the acquisition, management, programming, and development of publicly owned land</li> <li>+ Helps support and sustain an interconnected System that meets the needs of the environment while providing diverse recreational and cultural experiences for those who work, play and/or live in Edmonton</li> </ul>
<p><b>Natural Area Systems Policy (C531):</b> governs the City's conservation planning and management</p>	<p><b>Purpose</b> of the policy is to:</p> <ul style="list-style-type: none"> <li>+ Conserve, protect, and restore biodiversity throughout Edmonton recognizing the urban context that we work within</li> </ul>
<p><b>Climate Resilient Edmonton – Adaptation Strategy and Action Plan:</b> Developed to help us respond to the impacts of climate change and protect the community, infrastructure and services</p>	<ul style="list-style-type: none"> <li>+ Outlines how the City of Edmonton will plan and invest resources to increase our communities' climate resilience, minimize the exposure of people and assets to the impacts of climate change, and take advantage of new opportunities as they arise</li> </ul>
<p><b>The City of Edmonton Indigenous Framework</b> – Wahigicicobi (Wah-hee-gee-chee-cho-bee)</p>	<ul style="list-style-type: none"> <li>+ As the City works on its journey through truth and reconciliation and building stronger relationships with Indigenous Peoples in Edmonton, the work done on restoring landscapes in Edmonton should be done in alignment with the Indigenous Framework Vision: "As City of Edmonton employees, we are encouraged and supported to demonstrate leadership in building quality relationships with Indigenous Peoples as we honour and strive to understand Indigenous experiences, histories, and cultures."</li> </ul>

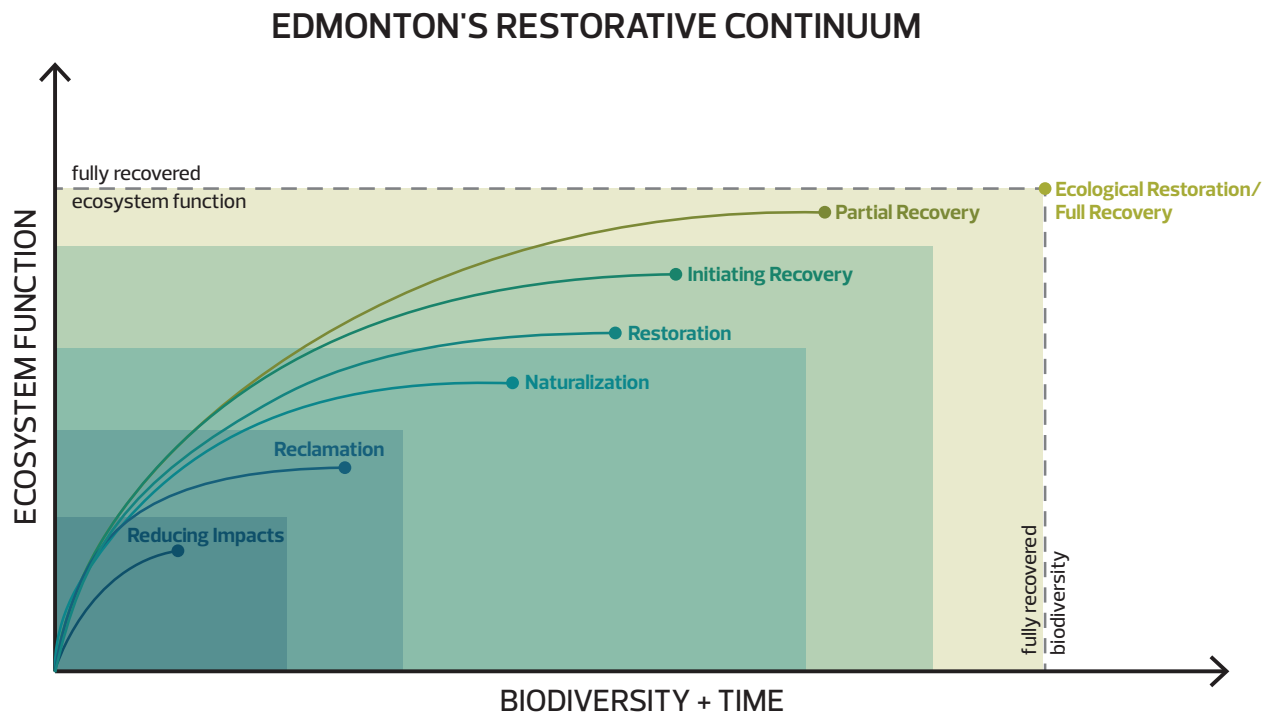


## 1.2 Key terms and definitions

The process of ecological restoration as outlined by the Society for Ecological Restoration (SER) International Standards includes a wide variety of factors and tactics that have been known under a variety of terms. There is value in using such terms, so that Edmonton can discuss restoration and restorative activities with a larger audience and with better understanding of intent and purpose.

Restorative activities may include naturalization, reclamation or restoration as per the City of Edmonton Design and Construction Standards (2022 Volume 5: Landscaping), as well as reducing impacts, initiating recovery, partial recovery or full recovery of the native ecosystem (ecological restoration). Projects involving these restorative activities may fall anywhere on Edmonton's Restorative Continuum (Figure 1).

This Plan and Edmonton's Restorative Continuum adapts internationally accepted language when referring to activities on the SER Restorative Continuum (Figure 2).



**Figure 1:** Edmonton's Restorative Continuum (adapted from SER standards). The ranges of restorative activities on the continuum includes "Reclamation", "Naturalization" and "Restoration" as defined by the City of Edmonton Design and Construction Standards (2022 Vol.5: Landscaping).

## 1.2.1 SER International Standards for Ecological Restoration (SER standards)

The SER standards outline a solutions-based approach for the recovery of degraded ecosystems and habitats, improving function and biodiversity for the benefit of ecological, social, and economic systems globally.

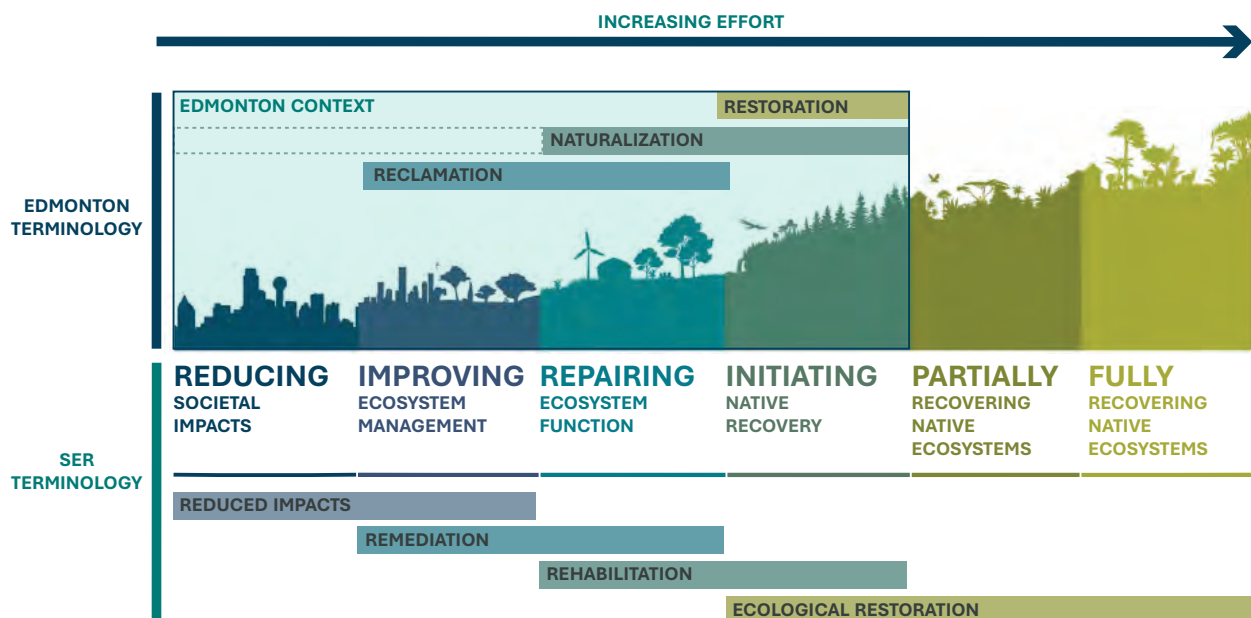
### SER Restorative Continuum

*“A spectrum of activities that directly or indirectly support or attain at least some recovery of ecosystem attributes that have been lost or impaired. There are four major categories of restorative activities that are not mutually exclusive: Reduce Societal Impacts, Remediation, Rehabilitation, and Ecological Restoration. Reduce Social Impacts, Remediation, and Rehabilitation are restorative in that they help reduce ongoing degradation but are “allied” to, and often used in conjunction with, Ecological Restoration as part of broader frameworks promoting sustainability.” (SER 2019)*

### Why are we adapting the SER standards for Edmonton?

The City of Edmonton has identified key nature-based solutions for mitigating the impacts of climate change, including the expansion of the urban forest, reduced energy costs and disturbances from operational activities, and the improved function of natural areas. The SER standards provide a globally applicable, tested and peer-reviewed approach to restorative activities that offer a wide range of tools that can be adapted for the needs of Edmonton. In order to qualify as “restorative,” the practice should lead to a “net-positive effect on environmental conditions” (SER 2019). The SER standards place different categories of restorative activities on a continuum which represents the range in the level of “recovery” possible in different contexts.

Edmonton's Design and Construction Standards currently defines three subgroups of “habitat restoration” (“Reclamation”, “Restoration” and



**Figure 2:** Restorative Continuum comparing SER terminology and Edmonton's terminology from the Design and Construction Standards (2022 Vol.5: Landscaping).

“Naturalization”) to describe the City’s approach to the regeneration of degraded sites. Edmonton’s terminology does not directly align with the SER terminology.

**This Plan adapts the SER standards to the Edmonton urban context to preserve the SER best practices, principles and process, but simplifies the language for better understanding and communication.**

In the SER standards, “Reclamation” is a subcategory of “Rehabilitation,” while “Restoration” is most equivalent to “Ecological Restoration,” and “Naturalization” is not explicitly defined in the SER standards. As the SER standards define Rehabilitation and Ecological Restoration, “Naturalization” would be grouped within these categories, having some similarities to other more detailed approaches to Ecological Restoration as discussed in the SER standards.

Restorative activities typically require greater investment up front in order to ensure self-sustaining plant communities and reduced investment over time. Utilizing the restorative process outlined by the SER standards can help Edmonton achieve higher levels of recovery that move beyond simply reducing impacts and remediation. This process will contribute to the functioning of the broader ecological network and a more resilient future.

Edmonton’s historical approach to naturalization has often been more passive and akin to reducing impacts with existing vegetation on maintained turf sites, whereby the City ceases mowing and allows it to grow freely. Or, the City may otherwise treat weeds and/or plant extremely high densities of trees and shrubs. The issue with this limited set of activities is that they are not a ‘one size fits all’ solution; context is important. In some circumstances, a site

may benefit from some level of surface disturbance to encourage the ingress of trees, shrubs and plants from an adjacent natural area. In others, sites may require weed control coupled with site preparation and planting or seeding, for example.

## 1.2.2 Benefits of restorative activities

Policies requiring improvement in the ecological functioning of open spaces were included in the Breathe Green Network Strategy, which called on the City to *“Develop a strategy to identify and coordinate opportunities for the restoration of the City’s ecological network. This work should employ the techniques of sustainable site planning and naturalization as well as restoration work...to support ecological network connectivity and function, including restoration of habitat for resident and dispersing/transient species.”*

To this end, The City Plan’s “Greener As We Grow” Big Move guides the City towards preserving and protecting the environment through good design and conscious development decisions. By conducting restorative activities on underused sites, adopting restorative design practices, becoming more energy efficient and enhancing urban biodiversity, Edmonton’s physical growth and population expansion are not detrimental but instead act as a catalyst to sustainability and resilience. By designing for people and the environment, a greener city is a place where everyone has access to natural spaces and can enjoy the benefits of living a healthier and better connected outdoor life.

The benefits of the restorative activities along the “Restorative Continuum” vary based on the context of the site, and the level of recovery that can be reasonably

achieved. These efforts will benefit the ecology, community and economy of Edmonton over short and long term time frames. Over the short term, local function of spaces is improved, providing benefit to adjacent landowners and equity-seeking communities. Targeted efforts will improve the well-being of Edmontonians, creating more appealing recreational spaces, increasing natural

function to reduce the impacts of climate change and place disturbed areas on a trajectory of improvement. Over time, these improvements will provide better connections between existing natural areas, reduce costly operational efforts and foster appreciation for nature throughout the city's communities.

**Key benefits over the short and long term include:**

	<b>Environmental</b>	<b>Social</b>	<b>Economic</b>
<b>Short Term</b>	Improves degraded landscapes and addresses loss of biodiversity and ecosystem services (UN Principles for Ecosystem Restoration, 2021).	Promotes inclusivity and participatory governance, especially from underrepresented groups (UN Principles for Ecosystem Restoration, 2021).	Projects often require significant labour and construction, creating job opportunities and local economic benefit.
<b>Long Term</b>	Creates habitats, improves air, soil and water quality, wildlife connectivity, and is essential for climate change mitigation (UN Principles for Ecosystem Restoration, 2021).	Supports community building, neighbourhood resiliency and increases awareness of environmental initiatives (UN Principles for Ecosystem Restoration, 2021).	Aesthetic enhancement to the City can help increase nearby property values and economic development opportunities.  Over time, the regeneration of natural ecosystems leads to lower maintenance and operating costs.



# **2 HISTORICAL APPROACH TO RESTORATIVE ACTIVITIES IN EDMONTON**

“Naturalization” has been commonly used to transition manicured landscapes into a more natural state in Edmonton since the early 1990s, and more and more parks and open spaces are being intentionally designed with naturalized spaces and native plant species. However, there has not been as much focus, knowledge, or available resources for restorative projects that would move open spaces to more fully functioning ecosystems that provide a range of ecosystem services with enhanced biodiversity. This Plan incorporates an updated approach or process for restorative activities to improve site selection, assessment, prescription, treatments and monitoring.

Edmonton's historical approach is derived from the Roadways and Parks Naturalization Master Plan (1994) which was intended to identify and prioritize roadway buffers and parks for naturalization to meet a goal of planting 500,000 plants from 1994 to 1998. The workflow followed the process of site selection via suitability criteria and site prioritization, followed by strategies for implementation. First, a site was evaluated by four suitability criteria. If a site was deemed suitable, the type of naturalization was then determined. The Plan evaluated 52 roadway sites and 27 park sites to determine priority areas for planting over a five-year period.

More recently, the Urban Forest Management Plan, published in 2012, and the Root for Trees Program Strategy, published in 2013, led to substantial growth in the size and scope of naturalization planting projects and partnerships. The 2012 Urban Forest Management Plan first called for 20 per cent forest canopy cover in Edmonton, while the 2013 Tree Program Strategy – brought various naturalization planting events and initiatives under one umbrella.

From 2016 to 2023, various communications and public engagement campaigns focused on naturalization have been implemented. In 2023, an internal review was completed to assess and improve the internal planning, design, implementation and maintenance processes for typical turf-conversion type naturalization projects. The new internal processes put in place for those projects align with this Plan.



## 2.1 Developing this plan through engagement

### 2.1.1 Engagement approach

Engagement was conducted from 2022 to 2023, examining potential impacts, preferences and concerns around growing Edmonton's urban forest canopy on public land, by both "naturalization" and "tree planting" (boulevard and open space trees).

- + In May 2022, Phase 1 public engagement was undertaken and included a city-wide survey to help the City of Edmonton better understand how green spaces are used, as well the level of support for boulevard and open space tree planting. A What We Heard report summarizing the first phase of engagement is available on Engaged Edmonton.
- + An Engaged Edmonton page was launched in October 2022 as a way for Edmontonians to provide ongoing feedback on naturalization and tree planting experiences. An online comment

box was available to share general thoughts and perspectives on the City's naturalization and boulevard and open space tree planting activities. The comment box received 28 responses and was closed on May 5, 2023, when the second phase of engagement opened.

- + In May 2023, during the second phase of engagement, the public had the opportunity to provide feedback through an online meeting, interactive mapping tool on Engaged Edmonton, online and intercept survey, and at 12 in-person pop-up events. A What We Heard report summarizing the second phase of engagement is available on [edmonton.ca](https://edmonton.ca).
- + The online interactive mapping tool allowed participants to indicate locations within their neighbourhoods where they are comfortable with naturalization and boulevard and open space tree planting. A total of 22 participants placed 44 pins on the map.
- + Stakeholder opportunities to give feedback included an online survey and two meetings (online and in person). The online survey was distributed to 364 stakeholders, receiving 15 responses from community leagues,

developers, community and recreation, researchers/academics, business and active transportation groups. The two meetings were attended by representatives of Environmental Observatory Lab, Edmonton Mountain Bike Alliance, a researcher with a focus on environmental justice for minority groups such as refugees and newcomers, Edmonton River Valley Conservation Coalition (ERVCC), Edmonton Native Plant Society, Woodhaven-Edgemont HOA, Academic/Researcher, Partner in Parks volunteer.

- + The City received 431 responses between the online survey and intercept surveys.
- + City staff were also invited to the following four stakeholder initiated events to gather feedback on naturalization and tree planting: Greater Windermere Community League board meeting, Terwillegar Homeowners Association pop-up event, Joint Use Agreement – Land Management committee meeting (school boards) and the Integrated Pest Management (IPM) Advisory group meeting.

### 2.1.2 What we heard

Results of the overall engagement included the following key findings or themes:

- + Respondents/stakeholders are largely supportive of new naturalization areas and more boulevard and open space tree planting.
- + Respondents/stakeholders use public/open spaces for a wide variety of purposes, including dog walking, sledding, community gardening, sporting and other casual recreational activities, including passive enjoyment and viewing of

stormwater management spaces.

- + Most respondents and stakeholders indicated that spaces and recreational activities will be positively impacted by naturalization and tree planting, while others cited concerns that naturalization and tree planting would reduce play space for children and for sports.
- + Stakeholders encouraged the City to continue local level engagement to understand neighborhood priorities and use of land and consider population vulnerabilities that have low equity on green spaces.
- + Consideration by the City for future school expansion plans, tree replacement and maintenance, safety risks, weed control and partnership explorations.
- + The public wants the City to consider the aesthetics of neighbourhoods, safety and security, accessibility to public spaces, pest management, tree protection and maintenance, diversity of native trees and plants and also an integrated approach to naturalization and tree planting.
- + There is a desire for communication and progress updates on neighborhood naturalization and tree planting projects through a variety of channels, including the most preferred methods of posters/signage in high traffic areas, and emails and text messages (from homeowners associations, Councillors' offices, community leagues).

Feedback collected from engagement was considered in the development of this Plan and the overall restorative approach, as well as to help inform and improve the City's regular communications, engagement and education work for restorative and tree planting projects.



# **3 EDMONTON'S NEW APPROACH TO RESTORATIVE ACTIVITIES**

The following section outlines the new approach and process for restorative activities that is being adopted by the City of Edmonton, and how this approach is linked to specific goals and targets for the urban forest through 2030.

The critical path of the new restorative process is understanding the current conditions of the site, determining an appropriate target condition, prescribing how and when those targets will be achieved, and monitoring for those achievements.

A high-level overview of Edmonton's new planning and implementation process for restorative projects can be found in Figure 3. Restorative projects should be designed knowing the existing conditions of the site and what is achievable to increase biodiversity and ecological function, particularly as Edmonton's climate shifts to be warmer and drier in the coming years. This knowledge will be used to develop project (site) level goals and objectives related to larger City goals, and measurable targets that will be used to determine project success and inform future designs. The process includes the selection of potential sites for a project, desktop and on-site assessments, development of restorative goals and objectives, planning and design, implementation and establishment including monitoring to ensure success.



# 1 Choose a site



Selection of potential project site(s).

# 2 Understand the site



## Desktop assessment:

Drawing on what we already know to understand if a site is a suitable candidate to continue.



## On-site assessment:

The chance to get into the field to verify what we think we know, and learn more.

# 4 Identify goals and objectives



## Identify opportunities and challenges:



An opportunity for the City to discuss its intentions for the site, and learn from those who might be impacted by the restorative efforts.

# 3 Identify goals and objectives



Understand the site and its surroundings, to develop a trajectory of where we can go and what challenges need to be overcome. Drawing on the site assessment, inventory, and reference model, City staff will develop realistic goals and objectives for what the project will achieve.

# 5 Develop a plan



A concept for the site will be developed to understand what is to be done and how the site will function following restorative activities.

The restorative plan will detail the specific strategy the City recommends to achieve the project goals and objectives in accordance with the concept plan.

# 6 Establish the new plant community



The implementation of the plan typically includes site treatments that may pose challenges to surrounding residents, the same as any other City construction. Regular updates will help to communicate how the project is going, any necessary changes to the project timeline, and any mitigation measures that the City is implementing while construction takes place.



Following construction, the establishment period is a critical time where newly planted vegetation is most sensitive to disturbance, and where public activities may remain limited within the site. Ongoing communication will be used to describe the process, highlight any necessary restrictions, and ensure that nearby residents understand the benefits to come!



By identifying quality issues, and any unexpected developments (such as invasive species, vandalism, or other concerns that will impact the viability of the restorative work), the City can ensure that its restorative plan has been followed, and that the site is on a path to target recovery.

Figure 3: The restorative process

## 3.1 Restorative potential

A key first step is to identify the full set of sites that could be considered for restorative activities city-wide. To refine the inventory of potential sites, they are characterized to identify where restorative efforts would bring the most benefit. Once the inventory is complete, sites are selected at a project level and proceed through the remainder of the restorative process in Figure 3.

### Identify where there is restorative potential on City-owned lands

Mapping and analysis guides the identification of sites across the city on City-owned or City-maintained lands that have potential for restorative activities. Potential sites were:

- + Identified from a broad set of publicly-owned open spaces (in alignment with the Breathe Green Network Strategy categories).
- + Individually scored and prioritized based on a set of socioeconomic and ecological factors, and then aggregated by administrative boundaries (districts, wards or neighborhoods) to focus restorative activities across the city in equity-seeking areas and those which would benefit most from improved ecological function.
- + Checked against a set of considerations (such as steep slopes, playgrounds, dog parks, sports field, trails, ownership, cultural significance site etc.) that provide valuable information in the decision making and design stages.

A spatial model was built to identify sites for tree planting and restorative activities within City-maintained lands.

- + Nearly 4,000 hectares of land were identified as potential sites for restorative activities and boulevard and open space tree planting.
- + Potential sites account for a setback from constraints including existing trails, park amenities, building rooflines, sports fields and waterbodies.
- + Additionally, the potential sites excluded any areas which were designated as school board sites, golf courses, ski hills, community league licensed areas and developed land.
- + Where appropriate, an additional buffered setback was established for features whose function would be compromised by restorative efforts too close to these features (such as bridges, buildings, or playgrounds that should not have trees and other natural features located immediately adjacent).
- + Any overlap between the constraints and the City-owned areas were removed.
- + The remaining City-owned land became the potential sites which are then further prioritized as detailed below.
- + Figure 4 shows the potential sites identified across the city's 15 planning districts.

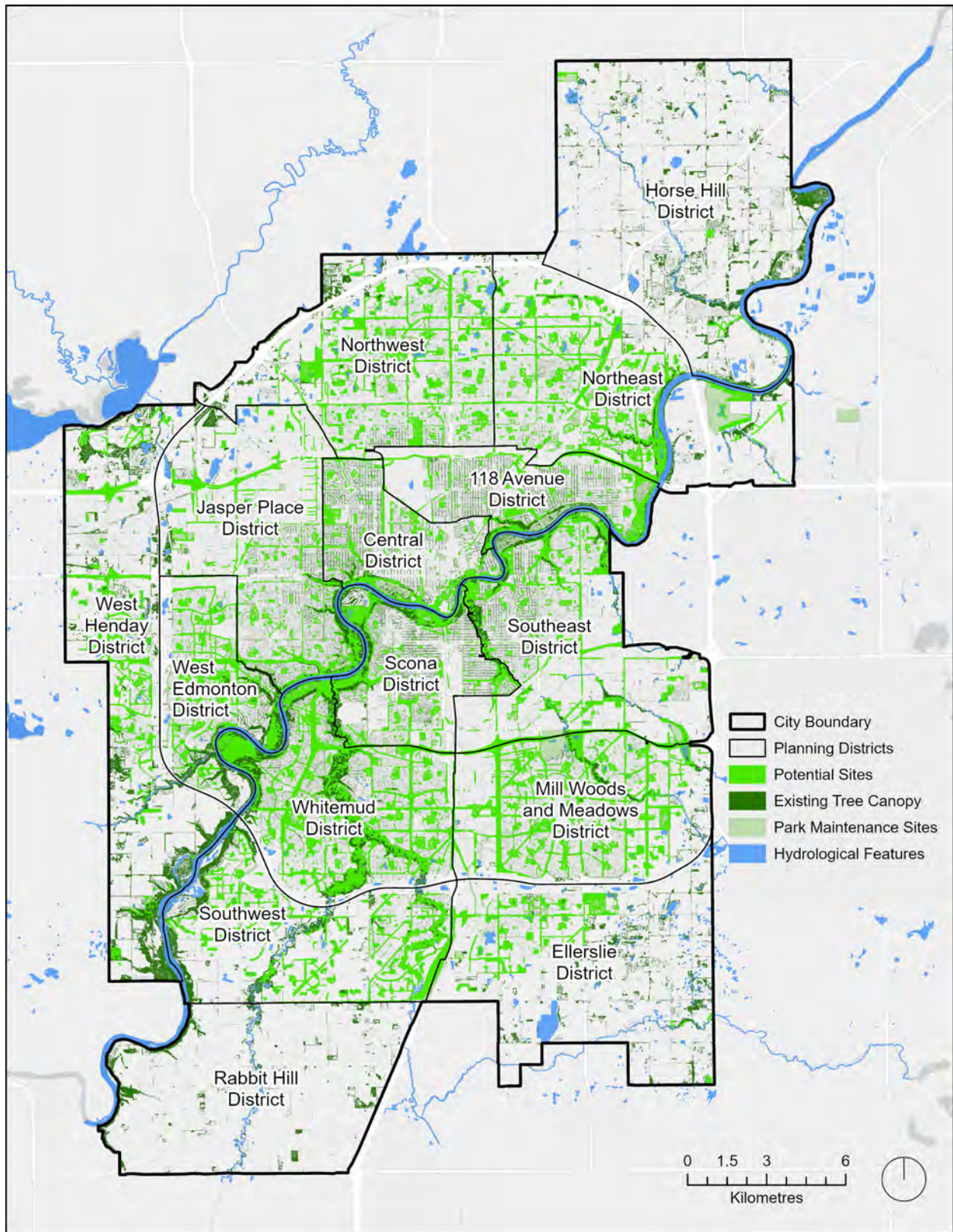


Figure 4: Potential sites for restorative activities across the 15 planning districts in Edmonton.

## 3.2 Identifying and prioritizing potential sites

### Prioritizing options based on social and ecological criteria

With nearly 4,000 hectares of City-maintained public land available in Edmonton for restorative activities and boulevard and open space tree planting, there was a need to prioritize this work through 2030 for resourcing purposes. This will allow the City to initially focus on high-impact areas where there is greater need to address environmental and social factors, and to have the best opportunity to meet the City's specific restorative (naturalization), tree planting and canopy targets as determined

by Council, the City Plan and the Urban Forest Asset Management Plan (UFAMP). The potential sites (for both restorative activities and boulevard and open space tree planting) generated by the site selection model were analyzed for priority based on a set of sociodemographic and ecological factors. Note that potential sites are categorized for restorative activities, boulevard and open space planting, or both, and the categories are not part of the prioritization criteria.

### Social/ Equity Criteria

Several equity-based factors were used to identify communities in need of additional support through the provision of natural spaces and increased urban tree canopy, including the following:

<b>Heat islands</b>	Areas which had an average land surface temperature above 30 °C were considered heat islands. The area of the heat island that is within the buffer was calculated for each potential site.
<b>Total population</b>	Population within the catchment or the buffer is calculated using the population density values from Statistics Canada Dissemination Blocks and Dissemination Areas. Priority was given to areas with higher overall population where restorative work or tree planting would have a greater impact.
<b>Total population under 14 years of age</b>	See total population; population under the age of 14 is an equity factor that accounts for youth as a vulnerable population.
<b>Total population over 65 years of age</b>	See total population; population over the age of 65 is an equity factor that accounts for seniors as a vulnerable population.

## Ecological criteria

In addition to the social/equity factors above, several ecological factors were considered for prioritization of the potential sites. To be in alignment with the City's existing ecological network terms of reference, 100 metre buffers were placed around the potential sites to identify areas where restorative activities or tree planting can help improve the quality or quantity of the ecological factors below.

Based on the approach outlined above, each potential site had a score assigned based on these social/equity and ecological criteria. The site scores were added and then aggregated to a district level to establish district priority (Figure 5). The top five priority districts include Northwest, Northeast, West Edmonton, Mill Woods and Meadows, and Whitemud. As new city-wide data becomes available, additional criteria may be considered in prioritizing the potential sites.

<b>Tree Canopy</b>	The existing tree canopy layer combines the City's tree canopy and park trees. The amount of tree canopy that was captured in the buffer giving priority to areas with less existing tree canopy coverage.
<b>Wildlife connectivity improvement</b>	Areas identified through work on the Environmental Sensitivity Project (reference) that highlight potential wildlife connectivity areas where restorative efforts can help to improve wildlife connectivity by expanding and maintaining the health of important wildlife connections through the city.
<b>Natural land cover types</b>	Identified Natural, Naturally Wooded and Naturally Non-Wooded land class types. Sites that were adjacent to natural land cover types were given higher priority for environmental restoration as the nearby natural areas suggest a viable community structure and enable opportunities for passive regeneration of those communities.
<b>Flood hazard areas</b>	Identified flood hazard areas through the provincial flood mapping. Flood hazard areas cannot be developed due to risks associated with frequent flooding and are often interchangeable with riparian areas. Healthy riparian areas provide numerous ecosystem functions, including improving water quality, tempering impacts of large flood events and providing important habitat and movement corridors for wildlife.

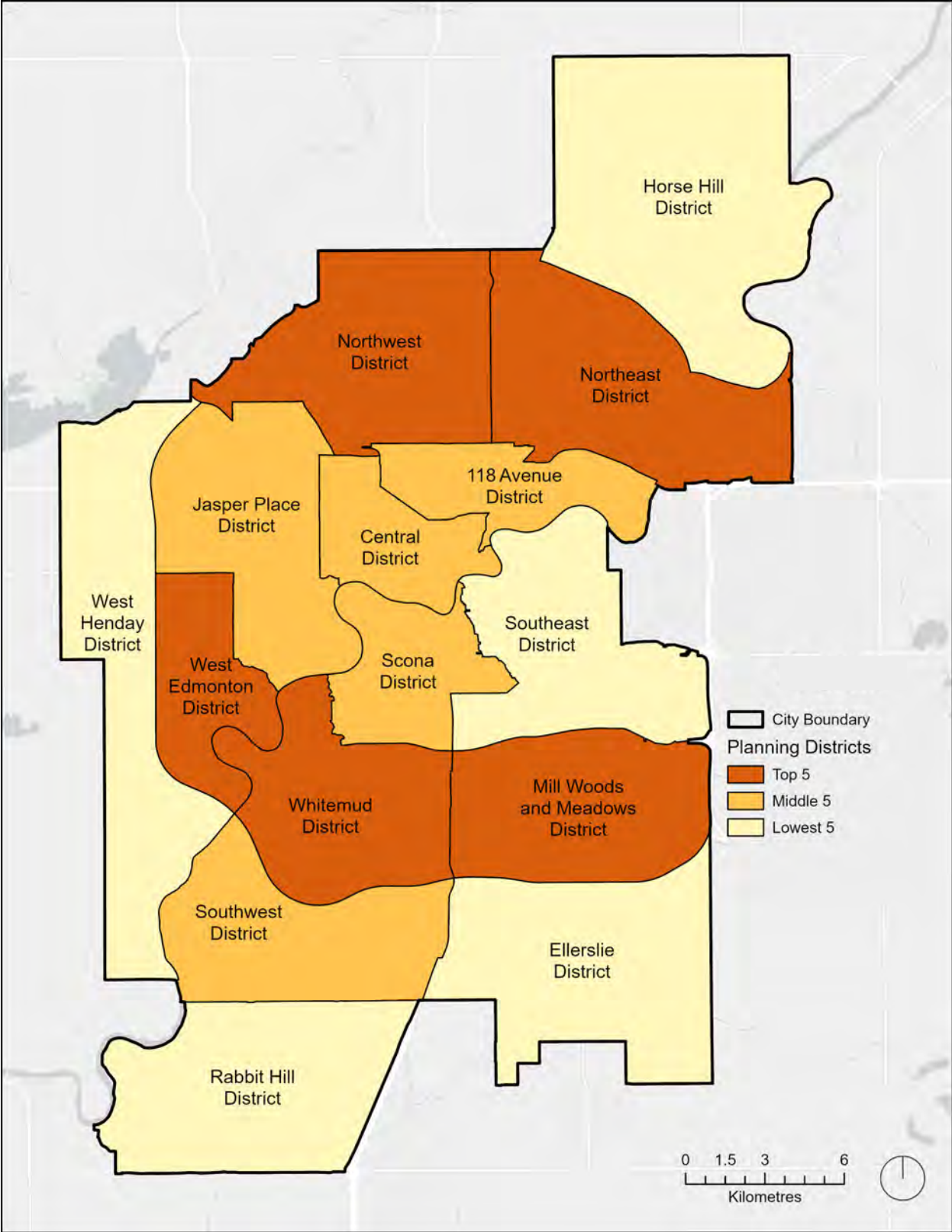


Figure 5: Prioritization of districts for initial restorative activities and tree planting through 2030.



## 3.3 The restorative process

Since the writing of the 1994 Naturalization Master Plan, more sophisticated methods have been developed and adopted across municipalities, and these have been used to inform an updated approach to restoration for the City of Edmonton. **A review of current best practices employed in other jurisdictions was completed** in order to expand work from the historical focus of naturalization to include other restorative activities on the Restorative Continuum.

The following sections describe the best practices, focusing on six key phases of restorative projects: Site selection, planning and design, implementation, establishment and maintenance/after care, measurements and performance evaluation, and operations and management.

### Site selection and assessment

Site selection continues from the potential sites identified and prioritized through the city-wide mapping and modeling exercise, and proceeds with a desktop assessment and analysis of a selected site at the project level, with consideration for:

- + Site prioritization score/value
- + Degree of disturbance and previous land uses that could inhibit plant community establishment
- + Size and complexity of site relative to available budgets to carry out the project
- + Safe and feasible access to carry out, establishment and maintenance requirements
- + Topography and hydrology
- + Connectivity to surrounding sites
- + Visual and physical improvement potential

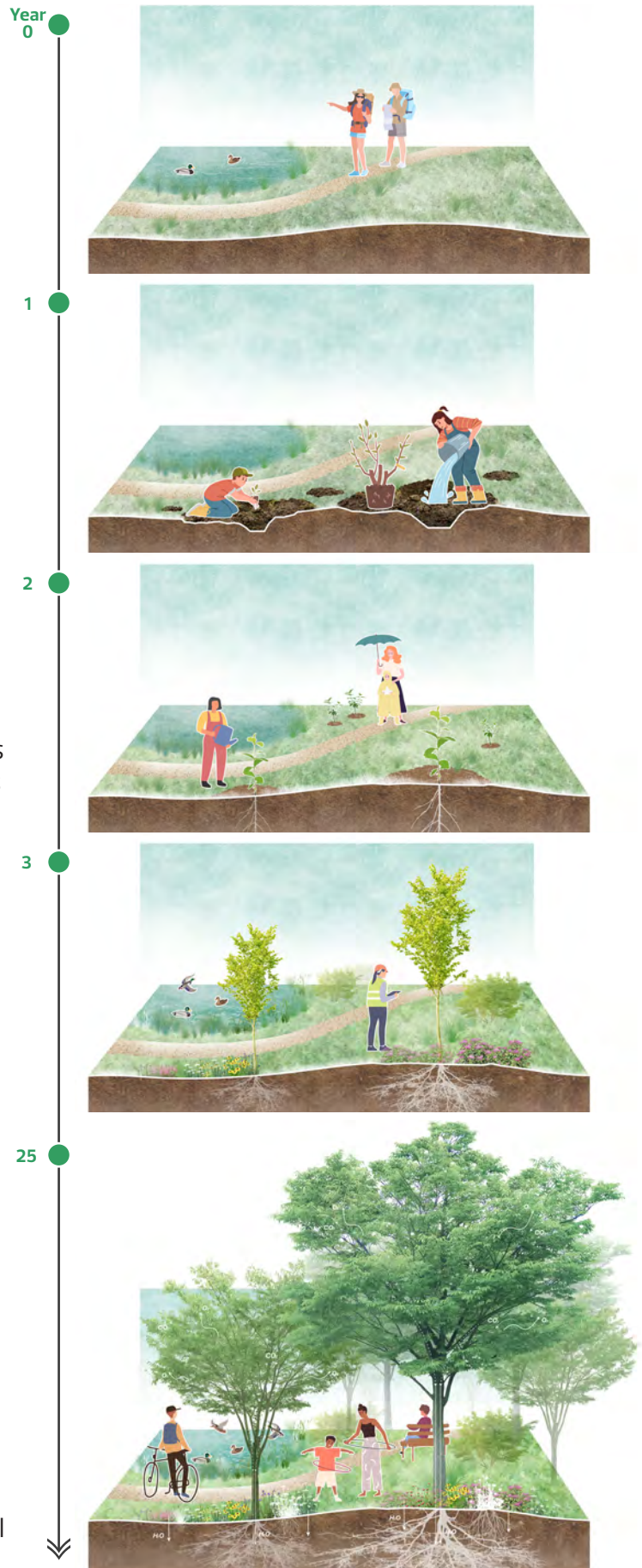


Figure 6: An example of restorative project adjacent to a water feature.

- + Existing recreational uses (sportsfields, trails, playgrounds, etc.)
- + Current land use and programming considerations like viewsheds
- + Culturally significant species and land uses
- + Existing infrastructure and utilities
- + Pedestrian and vehicular use, flow, and conflicts
- + Park/open space user preferences and public perceptions
- + Local and regional context that considers conservation and sustainability priorities, and current and future management of nearby natural areas, habitats, wildlife corridors and productive landscapes
- + Sequencing logistics

Ultimate site selection from the inventory of potential restorative sites depends on project priorities.

### Planning and design

Planning for a restorative project involves taking the results of the desktop assessment and site analysis to gain an understanding of the local context and how various site features and pressures will influence the potential outcomes. The SER standards were used as a framework for planning and design, as they provide the most comprehensive guidance. This initial assessment includes a baseline inventory to document the causes, intensity and extent of site degradation, where applicable. It can also help identify an appropriate reference ecosystem for a given site to develop a reference model which defines the targets to be met with restorative activities. Following the planning process, a draft plan should be developed to guide restorative activities.

### Key considerations for planning and design of restorative projects include:

- + The design should be developed from an analysis of the site's assessments, and based in context – both locally and regionally
- + A feasibility assessment should be conducted to outline project constraints, assumptions, and risks
- + Clearly stated treatment prescriptions for each distinct restorative area within a site, describing what, where, and who will undertake treatments, along with the priority
- + Identifying the relative capacity of the biota on site or external to the site to determine the recovery strategy
- + Assess current and anticipated effects of climate change on species and genotypes with respect to likely future viability
- + Introduce and increase native species, preferably using locally sourced stock to maintain regional gene pools, though considerations may be made for selecting otherwise well-adapted species for climate resiliency
- + Modifying or informing long term management with site specific concerns and management goals
- + Secure plant materials by committing to nursery and seed suppliers as early in the process as possible to ensure the project can be executed
- + Use buffers to ensure adequate separation is provided between environmentally sensitive areas and restorative sites and intensive land uses, recreational and/or other human programming
- + Determine the vision, targets, goals and objectives that are clear and measurable

Engagement and communication should occur throughout the planning and

design process with key touch points to ensure the inclusion of land or water owners or managers, industry interests, neighbors, and local community and Indigenous stakeholders in the planning process. Education and training of staff is important to ensure effective, committed, and documented, long-term monitoring is achieved throughout the lifetime of a restorative project. Engagement and education of the public are also important during the design stages of the project – educational programs and/or interpretive signage that inform the community about the City's intentions can increase support for projects, minimize undesirable disturbance and vandalism.

### Implementation

Restorative projects should work with existing vegetation and site conditions to increase project success. Where appropriate and possible, invasive species that threaten biodiversity should be controlled, and regulated weeds must be managed according to legislated requirements. Where possible, new plants should be native to the Edmonton region or central Alberta, or

otherwise well-suited and adapted species that could directly compete with invasive species and reduce their spread. Successful projects begin with proper site preparation, which may include soil preparation, vegetation management, (e.g. weed control, long-term seeding program to convert agronomic turf to native grassland, etc.), sourcing plant materials, and or managing human movement through a site. The City is updating its methodologies, techniques and processes with current best practices in association with this Plan. Examples of theoretical restorative project progressions are represented in Figures 6 and 7.

### Establishment and maintenance

Regular adaptive and preventative management leads to successful restorative efforts. This should include intensive maintenance (i.e. establishment) plans during the first two years following construction, followed by five, seven and/or 10-year planning cycles for maintenance programs to tackle short- and long-term project goals. Project sites should be monitored for invasive plants for several years post disturbance, particularly in areas



with imported topsoil, high visibility and pests or weeds. Maintenance can involve, but is not limited to, adequate watering, strategic mowing, prescribed burns and invasive species control, mulching, public stewardship and risk management. Establishment and maintenance plans will be created for each project to reflect the goals and objectives of the project, as well as operational capacity and resourcing.

### Measurement and performance evaluation

Restorative sites should be monitored to evaluate the performance of interventions in achieving targets. To effectively monitor the success of a project, the project goals and objectives and targets must be specific and measurable. Performance measures are dependent on the project, site conditions and derived from the project goals. Monitoring plans should be simple, cost-effective, reliable and objective to be easily understood and effectively executed by project teams. A common method that is simple and effective is a report card style evaluation along with a recovery wheel which can be used to track progress through time relative to a baseline or target condition.

### Operations and management

A key consideration of ongoing management is anticipate future site needs (adaptive management) to ensure adequate resources and time are budgeted. A management strategy should describe the actions needed to eliminate, mitigate and/or adapt to causal problems. The frequency of inspection should be identified and tracked alongside results to inform an adaptive management approach. Management plans or strategies are living documents, which should be regularly reviewed and adapted to changing conditions.

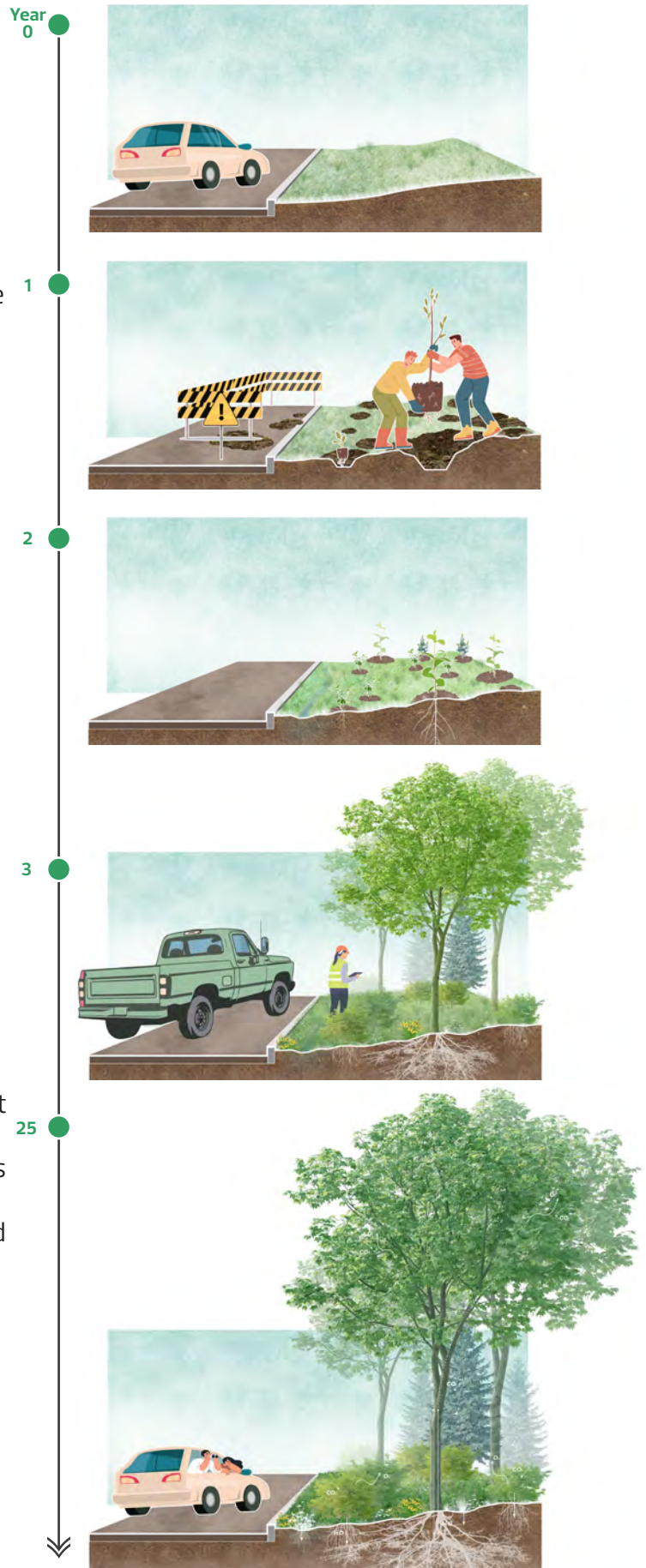


Figure 7: An example of restorative project adjacent to a roadway

# 4 SUMMARY





Edmonton has a new approach and process for restorative activities across the City, adapted to the Edmonton urban context from the Society for Ecological Restoration (SER) International Standards for Ecological Restoration. This process will guide each project with best practices for every stage, from site selection and assessment through prescriptions, treatment and monitoring and including using public engagement to inform the site design and potential concerns or impacts. The restorative process critically involves setting project- or site level objectives and targets, and monitoring for successful achievement and any needed interventions.

To facilitate the efficient use of limited resources for restorative activities and to help achieve additional City tree-planting and urban forest canopy targets (through 2030), Edmonton has developed a clear and defensible method for internal City use which identifies potential sites on public land City-wide, and prioritizes them based on a number of factors related to equity, climate mitigation and ecological function. On this basis, the City has identified key opportunities for restorative efforts through 2030 focusing on the Northwest, Northeast, West Edmonton, Mill Woods and Meadows and Whitemud planning districts.

# 5 GLOSSARY



## Assisted Regeneration

An approach to restoration that focuses on actively triggering any natural regeneration capacity of biota remaining on site or nearby as distinct from reintroducing the biota to the site or leaving a site to regenerate. While this approach is typically applied to sites of low to intermediate degradation, even some very highly degraded sites have proven capable of assisted regeneration given appropriate treatment and sufficient time frames. Interventions include removal of pest organisms, reapplying ecological disturbance regimes and installation of resources to prompt colonization. (SER 2019)

## Baseline inventory

An assessment of current biotic and abiotic elements of a site prior to ecological restoration, including its compositional, structural and functional attributes. The inventory should be included in the planning stage, along with the development of reference models, to inform planning (restoration goals, objectives and prescriptions). (SER 2019)

## Biodiversity

The variability among living organisms from all sources including, inter alia, terrestrial, marine and other aquatic ecosystems and the ecological complexes of which they are part; this includes diversity within species, between species and of ecosystems. (SER 2019)

## Degradation (of an ecosystem)

A deleterious impact to an ecosystem that results in the loss of biodiversity and reduced composition (biodiversity), structure, and function, and generally leads to a reduction in the flow of ecosystem services. (SER 2019)

## Ecosystem

Assemblage of biotic and abiotic components in water bodies or on land in which the components interact to form complex food webs, nutrient cycles and energy flows. The term ecosystem is used to describe an ecological assemblage of any size or scale. (SER 2019)

## Ecosystem services (ecological services)

The direct and indirect contributions of ecosystems to human wellbeing. They include the production of clean soil, water and air, the moderation of climate and disease, nutrient cycling and pollination, the provisioning of a range of goods useful to humans and potential for the satisfaction of aesthetic, recreation and other human values. These are commonly referred to as supporting, regulation, provisioning, and cultural services. Restoration goals may specifically refer to the reinstatement of particular ecosystem services or amelioration of the quality and flow of one or more services. (SER 2019)

## Function (of an ecosystem)

The interactions and relationships between biotic and abiotic elements, including processes such as primary production, decomposition, nutrient cycling and transpiration and properties such as competition and resilience. Function is what a natural feature (e.g. a wetland) does in ecological terms without reference to any monetary or social values. (Edmonton's City-Wide Natural Area Management Plan 2014; SER 2019)



## Habitat restoration

The process of assisting the recovery of an ecosystem or habitat that has been degraded, damaged, or destroyed. This is achieved through deliberate actions to improve the site's physical, chemical, and/or biological characteristics, thereby promoting the recovery of its natural state. *(Adapted from Calgary Habitat Restoration Project Framework 2014; SER 2019; Parks Canada 2008)*

## Management (of an ecosystem)

A broad categorization that can include maintenance and repair of ecosystems (including restoration). *(SER 2019)*

## Natural area

An area of land or water that is dominated by native vegetation in naturally occurring patterns. Such areas could include grasslands, forests, wetlands, peatlands, or riparian areas. Areas such as groomed parks, sports fields, and school yards are not natural areas. *(City of Edmonton 2007)*

## Natural regeneration (or recovery)

Germination, birth, or other recruitment of biota including plants, animals and microbiota, that does not involve human intervention, whether arising from colonization, dispersal, or in situ processes. Natural regeneration relies only on increases in individuals following removal of causes of degradation, as distinct from an assisted regeneration approach. It is an approach to Ecological Restoration. *(SER 2019)*

## Naturalization

A type of environmental restoration; the deliberate reintroduction of species that are native to a given area or are well adapted to the climate circumstance; activities that are intended to improve and enhance the natural environment and reduce the

required operational maintenance. The biodiversity and ecosystem function of a naturalized ecosystem is lower compared to a reference habitat but higher compared to a reclaimed ecosystem. *(City of Edmonton Design and Construction Standards, 2022 Volume 5: Landscaping)*

## Natural region / subregion

Natural Regions are the largest ecological classification unit in Alberta and allow for the geographic classification of the province based on ecological criteria. Each Natural Region is further categorized into Natural Subregions. *(Natural Regions Committee 2006)*

## Nature-based solutions

Actions to protect, sustainably manage, and restore natural or modified ecosystems, that address societal challenges effectively and adaptively, simultaneously providing human wellbeing and diversity benefits. *(SER 2019)*

## Reclamation

A type of habitat restoration that aims to stabilize disturbed lands to an ecologically productive use. A reclaimed ecosystem initially has less biodiversity and ecosystem function compared to a reference habitat, and the least compared to other types of habitat restoration. *(City of Edmonton Design and Construction Standards, 2022 Volume 5: Landscaping)*

## Recovery

The process by which an ecosystem regains its composition, structure and function relative to the levels identified for the reference ecosystem. In restoration, recovery usually is assisted by restoration activities—and recovery can be described as partial or full. *(SER 2019)*

## Reference habitat

The target ecosystem for restoration of a degraded habitat; the reference habitat may be described from historic or contemporary data sources, or may be physically represented by undisturbed, similar native habitat appropriate for the site conditions of the degraded habitat, and which may be adjacent to the project site or elsewhere in the Natural Region/ Subregion. The reference habitat may include multiple sites and sources of information, where appropriate, for a particular habitat restoration project. *(City of Edmonton Design and Construction Standards, 2022 Volume 5: Landscaping, as amended)*

## Reference model

A model that indicates the expected condition that the restoration site would have been in had it not been degraded (with respect to flora, fauna and other biota, abiotic elements, functions, processes, and successional states). This condition is not the historic condition, but rather reflects background and predicted changes in environmental conditions. *(SER 2019)*

## Rehabilitation (similar to reclamation)

Restoring ecosystem functioning to degraded ecosystems where the goal is renewed and ongoing provision of ecosystem services rather than the biodiversity and integrity of a reference model; rehabilitation is a level of restoration on the Restorative Continuum that allows the ecosystem to follow a natural successional trajectory to a level similar to, but lower than, the reference model. *(Adapted*

*from SER 2019)*

## Remediation

A management activity, such as the removal or detoxification of contaminants or excess nutrients from soil and water, that aims to remove sources of degradation. *(SER 2019)*

## Restoration

A type of habitat restoration; the process of fully re-establishing a target level of ecosystem function and biodiversity to a degraded habitat, as defined by the reference habitat. This includes species composition and vegetation community structure. *(City of Edmonton Design and Construction Standards, 2022 Volume 5: Landscaping)*

## Restorative project

Any organized effort undertaken to achieve a target level of recovery within the restorative continuum, from the planning stage through implementation and monitoring. A project may require multiple agreements or funding cycles. *(Adapted from SER 2019)*

## Restorative activities

Any action, intervention or treatment intended to promote the recovery of an ecosystem or component of an ecosystem (e.g., soil, invasive species removal, habitat creation, species reintroductions/ reinforcements, etc.) to attain specific

project goals. *(Adapted from SER 2019)*

### **Restorative continuum**

A spectrum of activities that directly or indirectly support or attain at least some recovery of ecosystem attributes that have been lost or impaired. There are four major categories of restorative activities that are not mutually exclusive: Reduce Societal Impacts, Remediation, Rehabilitation, and Ecological Restoration. Reduce Social Impacts, Remediation, and Rehabilitation are restorative in that they help reduce ongoing degradation but are “allied” to, and often used in conjunction with, Ecological Restoration as part of broader frameworks promoting sustainability. *(SER 2019)*

### **Site**

Discrete area or location. Can occur at different scales but is generally at the patch or property scale. *(SER 2019)*

### **Target**

The specific outcomes sought at the end of the project, such as native ecosystems to be restored, social outcomes, economic benefits. *(Adapted from SER 2019)*

### **Trajectory (ecological)**

A course or pathway of an ecosystem's condition (i.e. structure and function) over time. It may entail degradation, stasis, adaptation to changing environmental conditions, or response to ecological restoration – ideally leading to recovery of

lost integrity and resilience. *(SER 2019)*

### **Urban forest**

Includes all trees and shrubs located on private and city-owned lands within Edmonton's boundaries, whether designed and planted or naturally occurring. Trees found in parks, natural/ naturalized areas, the river valley, ravines, roadways, private yards, roof tops, commercial and industrial lands are all part of the urban forest. *(City of Edmonton Urban Forest Management Plan 2021)*

