

Daylighting the Downstream Reach of Mill Creek - Technical Feasibility Study

Recommendation:

That the July 5, 2017, Sustainable Development report CR_4529, be received for information.

Report Summary

Administration has completed a technical engineering study to assess the feasibility of restoring connectivity between Mill Creek and the North Saskatchewan River. The conclusions of the study, potential conceptual options for daylighting, and potential next steps are discussed in this report. Though daylighting Mill Creek has been found to be technically feasible, additional work is needed to develop a daylighting design and master plan for the area, refine cost estimates and projected capital costs, and explore opportunities for funding partnerships.

Previous Council/Committee Action

At the November 10, 2015, Executive Committee meeting, the following motion was passed:

That Administration prepare a unfunded service package of \$250,000 on a one-time basis for feasibility studies for Reach B and return to the November 27, 2015, City Council Budget meeting.

Report

At the November 27, 2015, City Council Budget meeting, City Council approved a service package for \$250,000 to conduct a feasibility study to examine the restoration potential of the downstream reach of Mill Creek.

Mill Creek is a tributary to the North Saskatchewan River and a prominent feature of Edmonton's River Valley and Ravine System. In the 1960s and 1970s, the downstream reach of Mill Creek was diverted into a tunnel to facilitate the development of a freeway system north of Connors Road. As a result of past modifications, Mill Creek no longer flows directly to the North Saskatchewan River by surface flow, but instead flows underground to discharge at a point upstream of the original discharge point. The alterations to the creek within the city have resulted in the loss of terrestrial and aquatic ecosystem functions, reduced recreational opportunities, and diminished watershed health.

In 2015, the possibility of re-establishing a natural channel within, or “daylighting,” portions of Mill Creek, was brought forward to Transportation Committee by members of the public and community organizations interested in restoring the environmental, recreational, and economic benefits that had been lost along impacted sections of the creek. Planning and design of the Valley Line LRT in the vicinity of Mill Creek generated interest in exploring opportunities to integrate planning, design, and implementation of restoration efforts with LRT construction.

On August 18, 2015, Executive Committee directed Administration to define the elements and scope of a technical study to assess the feasibility of daylighting the downstream reach (94 Avenue to the North Saskatchewan River) of Mill Creek. On November 27, 2015, City Council approved a service package for \$250,000 to complete this work. This report summarizes the key findings of the technical feasibility study and potential next steps should Council wish to advance this work.

Purpose of the Technical Feasibility Study

"Daylighting" is the term used to describe the process of re-establishing creeks and streams that have been altered to concrete channels or diverted to pipes. Daylighting Mill Creek would re-establish a vital link in Edmonton's terrestrial and aquatic ecological network, while improving the safety and efficiency of the local transportation network. Additional benefits of daylighting the downstream portion of Mill Creek include water quality improvements in the North Saskatchewan River, creation of critical fish and wildlife habitat, and community revitalization and recreational benefits (Attachment 1). Studies of daylighting on other jurisdictions have also demonstrated that properties adjacent to daylighting projects often see an increase in property value, nearby businesses benefit by creating open space for people to enjoy, and recreational opportunities are presented through the development of greenways and trail networks.

The purpose of the feasibility study was to assess technical constraints and opportunities associated with reconnecting the downstream reach of Mill Creek to the North Saskatchewan River. The study included a technical assessment of existing conditions, identification of constraints imposed by existing infrastructure such as roadways and utilities, development of conceptual options for redevelopment, and provision of cost estimates for the conceptual options presented. Technical assessment included consideration of environmental, drainage, geotechnical, transportation, and recreational elements, and facilitated the identification and review of opportunities and constraints.

Key Study Findings

The key finding of the technical feasibility study is that it is technically feasible to daylight the downstream reach of Mill Creek and establish hydrological and ecological connectivity between the creek and the North Saskatchewan River. A number of potential conceptual options for daylighting and redevelopment of the area immediately adjacent to a newly created creek channel are possible. The existing

roadway network, consisting of numerous ramps to and from Connors Road and 98 Avenue, is the most significant constraint to the development of a creek corridor that offers ecological connectivity, active transportation connections, and recreational opportunities.

Potential benefits include the creation of enhanced open space integrated with nearby amenities and destinations, creation of aquatic and terrestrial wildlife habitat, and improvements to pedestrian and cycling connections throughout the area (Attachment 1). Existing constraints include roadway and drainage utility conflicts, grading requirements, and potential soil contamination east of the study area (Attachment 1). However, it is likely that existing constraints can be managed and mitigated to enable daylighting work to proceed.

Members of the general public and stakeholders expressed strong support for re-establishing a natural ravine and creek that would support biodiversity and ecological health, as well as cultural and recreational opportunities for interacting with nature. Conceptual daylighting options were developed with three distinct functional focuses (Ecology, Trail Connectivity, and Destination Park) to provide the stakeholders and the general public with a framework for informed discussion and feedback.

Conceptual Daylighting Options

Based on the technical assessment and with consideration given to outcomes of stakeholder and public engagement, three conceptual options were evaluated representing three different visions for daylighting: Ecology, Trail Connectivity, and Destination Park (Attachment 2). They present three potential focuses for daylighting, and serve as an early framework for the development and refinement of a detailed concept plan for the area.

The three conceptual options build on a shared vision of the City of Edmonton and Province of Alberta to enhance aquatic habitat along the North Saskatchewan River within the city limits. Potential creek alignment, trail locations, roadway network modifications, and extent of vegetation and habitat creation were considered as part of conceptual option development.

Though the three options differ in terms of their primary focus or objective, there are a number of similarities or shared features among them. All three options:

- provide an appropriate level of natural habitat and connectivity between Mill Creek and the North Saskatchewan River for fish, wildlife, and people
- provide opportunities for visitors to learn about and interact with the natural environment through interpretive signage and boardwalks or trails near the water
- create or maintain trail connections between Mill Creek Ravine and the James MacDonald Bridge, the Low Level Bridge, the Valley Line LRT Muttart Stop, Henrietta Muir Edwards Park, the Valley Line LRT bridge

(Tawatinâ Bridge), and amenities on the north side of the North Saskatchewan River such as Louise McKinney Park and Mechanized River Valley Access

- require changes to the existing roadway network in order to create space for the creek, natural habitat, and people.

Illustrations and additional details regarding each conceptual option are presented in Attachment 2.

Estimated Costs

An opinion of the estimated costs of daylighting was developed as part of the technical feasibility study. Estimated costs range from approximately \$80 to \$130 million for the three conceptual options. Concept 2 (Trail Connectivity Focus) reflects the lowest overall project costs at \$80 million, followed by Concept 1 (Ecology Focus) at \$110 million and Concept 3 (Destination Park Focus) at \$130 million. These costs include professional fees (engineering and environmental) and construction costs with a 50% contingency. A breakdown of probable costs for major construction components (e.g., bridges, roadways, general site works, amenities, etc.) is included within the technical feasibility study overview report (Attachment 3).

Utilizing the base information provided in the cost estimates developed for the three conceptual options that have been presented, Administration has derived an additional cost estimate for a base option that provides a surface water connection only. The cost of restoring to a base level surface connectivity only is estimated to be approximately \$50 million, including a 50% contingency and professional fees. This estimate requires additional refinement and verification compared to the costs of the three conceptual options presented, and is subject to change.

While restoring a surface connection is a required step of daylighting and may be completed as part of the first phase of daylighting, this work alone would not provide additional functionality compared to existing conditions in Mill Creek. In order to realize additional potential benefits of daylighting, such as improved water quality, creation of fish habitat, creation of trail connections to the Muttart LRT Stop and other local destinations, improved ecological connectivity, or recreational opportunities, an additional investment of between \$30 to \$80 million would be required.

Cost estimates developed as part of the technical feasibility study are intended to inform the strategic direction for the next phases of work related to the project. The costs are to be used for comparative purposes only; further refinement of the plans and cost estimates is needed to confirm costs prior to use for budgeting purposes. Should Council wish to pursue further conceptual planning, this work would be led by Integrated Infrastructure Services and follow the Project Development and Delivery Model.

Project Funding and Partnership Opportunities

Concurrently with the development of the technical feasibility study, Administration completed a preliminary evaluation of potential provincial and federal funding and partnership opportunities. As part of this work, Administration assessed potential funding sources, such as green infrastructure grants, as well as future opportunities to develop intergovernmental partnerships and funding models.

Alberta Environment and Parks has indicated that restoring the connectivity of Mill Creek to the North Saskatchewan River is a local watershed priority. They have recommended that the City and the provincial government work collaboratively to examine the feasibility of restoring the ecological function of the creek. Recent correspondence has reaffirmed the provincial government's interest in partnering with the City, providing both technical expertise and, potentially, financial resources. In addition to provincial and City interest in improving the ecological integrity of Mill Creek, there is mounting interest from the public to restore Mill Creek to a more natural state. Programs and funding from Environment Canada and Fisheries and Oceans Canada may also be available to support this work. Representatives of Fisheries and Oceans Canada have expressed support for the project and confirmed the eligibility of the project for a number of federal funding opportunities.

It is estimated that there are approximately 5-7 million dollars available from a variety of federal and provincial grants, contingent upon successful competition by the City. In the absence of an approved concept or master plan, which would typically be submitted as part of the application process, it is not possible to confirm the level of funding available to the City at this time.

As existing grant opportunities could only support a portion of the estimated construction costs, additional work is needed to engage with other levels of government, potential partners, and stakeholders to explore opportunities for financial support and partnerships outside of existing grants, if any. Though provincial and federal representatives were active participants contributing to the development of the technical feasibility study, additional engagement at all three levels of government is required to explore cost-sharing opportunities and confirm funding mechanisms.

The management and control of the city's creek systems will continue to reside with the City following the September 1, 2017, transfer of the Drainage utility to EPCOR. Should any changes be contemplated to the downstream reach of Mill Creek, including modifications to stormwater outfalls, EPCOR would become a key stakeholder in any further work.

Policy

The Way We Grow, Edmonton's Municipal Development Plan:

- 7.1.1: Protect, preserve and enhance a system of conserved natural areas within a functioning and interconnected ecological corridor.

- 7.1.2: Restore ecologically degraded and/or damaged ecological systems and linkages to protect, expand and enhance biodiversity.
- 7.2.1: Protect, manage and integrate natural wetlands into new and existing developments as key assets in Edmonton ecological network.
- 7.3.2: Protect, preserve, promote and improve the North Saskatchewan River Valley and Ravine System as an accessible year round place for recreation and activity for people of all ages.
- 7.4.2: Expand and enhance Edmonton's inventory of parks and open spaces for the ecological, health, recreation and educational benefits they provide.
- 7.5.2: Protect, maintain and continually enhance the water quality of the North Saskatchewan Watershed.

The Way We Green, Edmonton's Environmental Strategic Plan:

- 3.3.16: [The City of Edmonton] ensures biodiversity corridors are appropriate for all scales of development (neighbourhood to regional) and that infrastructure developments provide appropriate wildlife passage.
- 3.4.3: [The City of Edmonton] finds synergies to reconnect Edmonton's natural systems to increase functional ecological connectivity in the North Saskatchewan River Valley and Ravine System as well as associated tablelands with capital construction projects.

Attachment 4 outlines additional plans and policies that support this project.

Corporate Outcomes

This report supports the following corporate outcomes:

- "The City of Edmonton has sustainable and accessible infrastructure," as daylighting integrates public access and connections to Edmonton's River Valley and Ravine System via the Valley Line LRT and a coordinated network of multi-use trails throughout the city.
- "The City of Edmonton's operations are environmentally sustainable," as the project identifies ways to minimize adverse environmental impacts associated with drainage infrastructure, contributes to active modes of transportation, and enhances ecological connectivity through Edmonton's River Valley and Ravine System.
- "Edmonton is an environmentally sustainable and resilient city," as daylighting reconnects Edmonton's natural systems to increase functional ecological connectivity in the North Saskatchewan River Valley and Ravine System.

Risk Assessment

See Attachment 5.

Public, Stakeholder, and Indigenous Engagement

Over the course of the technical feasibility study, Administration undertook early engagement with the general public, stakeholders, and Indigenous communities. The goals of engagement efforts were to inform members of these groups about the project, to gather feedback and input that would help shape conceptual daylighting options, and to gather feedback on the three conceptual daylighting options that were developed. An overview of the engagement process and a summary of results are provided in Attachment 6.

Public and Stakeholder Engagement

The general public and stakeholders were engaged through workshops, public open house events, and an online survey. A majority (approximately 83 percent) of the 823 responses received through the online survey indicated support for daylighting the downstream reach of Mill Creek. Feedback received through the online survey was consistent with that received at public open house events. As part of the online survey, respondents were given the choice of supporting none, one, or more than one of the conceptual daylighting options. The majority (87 percent) of respondents were most supportive of the Ecology Focus option. Many (65 percent) also supported the Trail Connectivity Focus option, and almost half of respondents (42 percent) supported the Destination Park Focus. Online survey results suggest that respondents value elements of each conceptual option, and that the final design should include elements of all three options. A Park Master Plan would allow for validation of early engagement results and provide direction for an optimal design and plan for the area.

In general, Edmontonians expressed strong support for re-establishing a natural ravine and creek that would support biodiversity and ecological health, as well as for well-connected trails, basic amenities such as public washrooms, and integration with the Valley Line LRT Muttart Stop. A summary of the feedback heard through the public engagement process is provided in Attachment 7.

Indigenous Engagement

The City of Edmonton acknowledges the significant contributions of the First Nations and Métis people to our city's past, present, and future. Recognizing the shared interests of the City of Edmonton and Indigenous communities, as well as the City of Edmonton's commitment to respectful engagements, ongoing dialogue, and cooperative efforts around shared interests and issues, Administration engaged directly with First Nations and Métis communities during development of the technical feasibility study. Early engagement was undertaken to inform Indigenous communities of the project, understand traditional and current Indigenous connections to or uses in the Mill Creek area, collect feedback on the daylighting project and vision, and develop an approach to further Indigenous engagement and consultation should the project proceed beyond the feasibility stage.

A number of themes emerged during early discussions about the project with Indigenous communities. These themes included the importance of protecting water quality in the North Saskatchewan River watershed, recognizing Indigenous heritage, protecting opportunities for traditional use, and incorporating traditional knowledge regarding land use and the ecology of the area into project planning, design, and construction. Indigenous communities expressed an interest in the continuation of engagement and participation in the project through site visits, meetings, and environmental monitoring, and exploration of opportunities for partnerships or employment as part of future project stages.

Budget/Financial Implications

The technical feasibility study has confirmed that it is technically feasible to daylight Mill Creek and that a variety of conceptual options available to guide future planning and design work. Should City Council wish to continue work on this project, a master plan leading to the development of a preferred concept design and refined cost estimates for daylighting Mill Creek should be completed. The current estimate to complete the master plan for the area is \$1.8 million, for which a capital profile would be brought forward as part of the Fall Capital Budget Adjustment.

Master plan work will allow for a systematic analysis of the three conceptual options presented in the feasibility study and their individual building blocks, resulting in a preferred concept plan. Master plan work will build on the technical information collected as part of the feasibility study. Additional geotechnical, drainage, environmental, and transportation work will provide the City with a better understanding of implementation and funding requirements. As part of master plan work, Administration will outline an engagement strategy to support intergovernmental partnerships and funding mechanisms outside of existing grant opportunities.

Daylighting of Mill Creek would be planned as an integrated component of a larger central river valley activation strategy. Master plan work would ensure that programming opportunities and connections created by the project would be considered in conjunction with other capital projects and initiatives in the area, such as the Valley Line LRT, Gallagher Park Master Plan, programming of Rafter's Landing, and river access. Should water quality drainage improvements and erosion mitigation projects planned for Mill Creek move forward, opportunities to complete the Mill Creek Daylighting project in conjunction with other network projects would be examined. Master plan work would also be integrated with lifecycle planning of transportation infrastructure in order to reduce costs associated with roadway and bridge construction.

Potential Next Steps

Should City Council wish to advance work toward the daylighting of Mill Creek, the following next steps are recommended for consideration:

- a. Prepare a service package to create a Park Master Plan and concept

design for an ecological destination park that describes parks programming, funding requirements, and connectivity to other river valley parks and the Valley Line LRT, with incremental milestones that allow for a sequential transformation of the study area.

- b. Utilize the Park Master Plan and concept design to inform and guide an incremental implementation strategy over a 30 year time horizon to create an ecological destination park (a hybrid of all three options) through life cycle infrastructure replacements and improvements to the drainage and transportation networks.
- c. Consider a Park Master Plan for an ecological destination park as an integrated component of a larger central river valley activation strategy that incorporates parks with other functions. These functions include celebration- and wellness-related park functions.
- d. Establish a high level working group that includes all three orders of government (municipal, provincial, and federal) to identify cost-sharing opportunities and funding mechanisms.
- e. Convene a citizens advisory group with a city-wide perspective to advise on the development of the parks program, integration with adjacent communities, and mitigation of construction impacts on local residents, commuters, and visitors to the area.

Metrics, Targets, and Outcomes

See Attachment 8.

Attachments

1. Summary of Daylighting Benefits, Opportunities, and Constraints
2. Conceptual Options for Daylighting Mill Creek
3. Daylighting the Downstream Reach of Mill Creek Project Overview Final Report
4. Plan and Policy Alignment
5. Risk Assessment
6. Summary of Public, Stakeholder, and Indigenous Engagement
7. Engagement Summary Report
8. Metrics, Targets, and Outcomes

Others Reviewing this Report

- T. Burge, Chief Financial Officer and Deputy City Manager, Financial and Corporate Services
- A. Laughlin, Deputy City Manager, Integrated Infrastructure Services
- R. Smyth, Deputy City Manager, Citizen Services
- C. Campbell, Deputy City Manager, Communications and Engagement
- D. Jones, Deputy City Manager, City Operations