

**Transportation Report to
SPC on Transportation and Transit
2018 October 04**

**ISC: UNRESTRICTED
TT2018-1089**

Green Line Update

EXECUTIVE SUMMARY

This report constitutes the Green Line update for 2018 Q3. The primary activity for 2018 Q3 has been undertaking a constructability review, focused on delivering the Stage 1 project from 16 Avenue North to 126 Avenue Southeast. The goal of the constructability review has been to maintain the Council approved program objectives while balancing quality and planning for the safest work methods. The constructability review is nearing completion, with the intent of finalizing a Stage 1 reference concept design that will be moved into procurement.

Concurrently with the constructability review, enabling works have been underway focused on improving project readiness. Enabling works include land acquisition, clearing the right-of-way including relocation of two existing land fills, demolition of buildings, and utility relocation.

Preparation for the upcoming procurement is also underway with the development of light rail vehicle specifications, and technical project requirements. The procurement strategy will be revisited following finalization of the constructability review prior to proceeding to the market.

In 2018 April, The Government of Canada Treasury Board provided final approval for the Green Line Stage 1. The Federal government has signed an Integrated Bilateral Agreement (IBA) with Alberta, providing Alberta with the right to negotiate, on behalf of both Governments, an Ultimate Recipient Agreement (URA) with The City. This URA will cover terms & conditions for both the Federal \$1.53 billion as well as the Provincial \$1.53 billion of funding. Negotiations between the Province and the City are on-going, and the URA is expected to be in final form for execution in the next two months.

A summary of the funding approved and still requiring approval are:

- \$360.6 million - Enabling Works and Right of way preparation – Approved and Funded;
- \$4.65 billion - Stage 1 Project – Pending Finalization of URA and Final Council Approval;
- \$23.7 million/year until 2044 - Green Line debt servicing – Approved and Funded; and
- \$40 million/year (2016-dollar net operating costs) - not yet Approved or Funded.

The constructability review has identified a number of opportunities that will increase the cost certainty, mitigate risk, and reduce the construction impact of the project. One of the largest opportunities is utilizing a large single bore tunnel versus a more conventional double-bore tunnel configuration. Details regarding the opportunities identified will be presented to Committee at the 2018 Q4 project update.

ADMINISTRATION RECOMMENDATION:

That the SPC on Transportation and Transit recommend that Council receive this report for information.

PREVIOUS COUNCIL DIRECTION/POLICY

At the 2018 May 28 Regular Meeting of Council, Green Line Director Introduction (Verbal), C2018-0649. A PowerPoint presentation entitled "Green Line Introduction," dated 2018 May 28, with respect to Report C2018-0649, was distributed. Moved by Councillor Keating Seconded by Councillor Gondek that Council receive the Verbal Report for information. Green Line Committed to quarterly updates.

**Transportation Report to
SPC on Transportation and Transit
2018 October 04**

**ISC: UNRESTRICTED
TT2018-1089**

Green Line Update

At the 2018 March 19 Combined Meeting of Council, Report PFC2018-0207 (Green Line Light Rail Transit Project Delivery Model Recommendation) was approved as follows:

1. Approve Design-Build-Finance (“DBF”) as the delivery model for the Green Line LRT project from 16 Avenue North to 126 Avenue Southeast;
2. Authorize the General Manager, Transportation, to negotiate all funding agreements with the federal and provincial governments and the General Manager, Transportation, and the City Clerk to execute the funding agreements and any other agreements necessary to advance the procurement process. The General Manager, Transportation and the City Solicitor will also sign off on the funding agreements as to content and form, respectively;
3. Direct that Attachment 4 and the Closed Meeting discussions remain confidential pursuant to section 23, 24, 25 and 27 of the *Freedom of Information and Protection of Privacy (FOIP) Act* (Alberta) until the agreements for the Project considered in this Report are awarded and financial close is achieved, with the exception of information Administration needs to share with funding partners, which will be shared in confidence; and
4. Direct Administration to report back no later than Q4 2018 to the Priorities and Finance Committee of Council with the recommended budgets for approval including financing and confirmation of funding from the other orders of government for the Project.

At the 2017 June 26 Regular Meeting of Council, Report TT2017-0534 (Green Line LRT Alignment and Stations: 160 Avenue N to Seton) was approved as follows:

1. Adopt the recommended alignment and station locations for the Green Line Light Rail Transit (LRT) long-term vision from 160 Avenue N to Seton as per Attachment 1 and 3; and
2. Adopt the recommended Green Line Urban Integration (GLUI) for the full Green Line LRT from 160 Avenue N to Seton as per Attachment 2;
3. Direct Administration to report back no later than Q1 2018 with a Stage 1: 16 Avenue N to 126 Avenue SE project update including a recommended contracting strategy and future staging approach; and
4. Direct Administration to bring this report forward to the 2017 June 26 Regular Meeting of Council along with the associated reports from the SPC on Community and Protective Services (CPS2017-0469) and the SPC on Planning and Urban Development (PUD2017-0471).

Council provided the following direction to Administration at the 2017 May 15 Strategic Meeting of Council:

1. Proceed with Stage 1 Project based on: 16 Avenue N (Crescent Heights) to 126 Avenue SE (Shepard) subject to Council’s final approval of the alignment, station locations and transit-oriented development concept plans based on the Class 3 capital estimate of \$4.65 billion construction cost contingent on securing funding as per #2 and #3 below;
2. Prepare the required business case(s) for submission to the Government of Canada to support a request of \$1.53 billion plus financing to support the Stage 1 Project;
3. Prepare the required business case(s) for submission to the Government of Alberta to support a request of \$1.56 billion plus financing to support the Stage 1 Project;
4. Request the Mayor to work with administration in the beginning making the case for funding of the rest of the line, beginning as soon as possible;

**Transportation Report to
SPC on Transportation and Transit
2018 October 04**

**ISC: UNRESTRICTED
TT2018-1089**

Green Line Update

5. Direct Administration to bring a revised financial strategy, pending confirmation of federal and provincial funding, and including capital, financing and operating cost models, to Council as part of the 2018 Business Plan and Budget deliberations; and
6. Direct that Attachment 2 and Distribution #3 remain confidential pursuant to Sections 24(1)(a), 24(1)(b) and 25(1)(b) of the Freedom of Information and Protection of Privacy Act, until the Green Line construction has been completed.

MOTION ARISING, at the 2017 May 15 Strategic Meeting of Council moved by Councillor Chu, Seconded by Councillor Keating, that with respect to Report C2017-0467, Council direct Administration to:

1. Develop timeline scenarios for building the remainder of the Green Line showing the construction timelines assuming funding is secured for stations north of 16 Avenue N and south of 126 Ave SE;
2. Seek funding options so that the remainder of the line can be constructed without interruption once the opening day scenario is completed;
3. Continue land acquisition of Centre Street North properties on an opportunity basis and develop funding options, in advance of construction; and
4. Host open houses to provide residents and businesses who are not part of the opening day scenario with information regarding the completion of the Green Line including land acquisition.

BACKGROUND

Following the approval of the Green Line long-term vision and Council direction to proceed with the Stage 1: 16 Avenue N to 126 Avenue SE project at the 2017 June 26 Regular Meeting of Council, Administration has transitioned from the planning phase to the project execution phase. The initial step in the execution phase has been developing a constructability review of the entire alignment and a new detailed CAPEX cost estimation for the Council approved Stage 1: 16 Avenue N to 126 Avenue SE project scope.

INVESTIGATION: ALTERNATIVES AND ANALYSIS

Design Update

Administration is nearing completion of a constructability review, which has entailed an extensive review and value-engineering exercise. The constructability review identifies, confirms and validates the construction means and methods; mitigates and reduces risk through engineering and design; and evolves until the optimum design that achieves project objectives is determined. The review must confirm that the project meets operational requirements, and that problems that may cause costly construction changes are identified and mitigated early in the process. The end outcome of the review is to ensure that the project is biddable, buildable, and cost-effective.

The constructability review has identified critical construction risks, and the value engineering review is identifying opportunities for efficiencies and to manage the scope within the approved funding. To identify value engineering opportunities, a concerted effort was made to challenge stated project constraints and assumptions. The intent is to identify the highest value project by optimizing the trade-off between quality and cost.

**Transportation Report to
SPC on Transportation and Transit
2018 October 04**

**ISC: UNRESTRICTED
TT2018-1089**

Green Line Update

The following process was undertaken for the review:

- Guidelines to enhance the probability of a cost-efficient buildable project were established for engineers, designers and planners;
- Key engineering, design, and procurement deliverables that are assumed to have the greatest bearing on the ability to construct the project were outlined;
- Construction means, and methods scenarios based on engineering, design and planning assumptions were built to improve safety, quality, cost and schedule; and
- Execution risks and opportunities were identified, and various solutions were developed.

The significant design elements under review have focused on the highest risk areas, specifically the downtown tunnel segment. The initial design concept focused on a double-bore tunnel, while the constructability review has focused on a single-bore tunnel. The objective of the single-bore tunnel is to optimize station construction impacts and costs while maintaining the customer experience, functionality and aesthetics. The single-bore tunnel increases the horizontal curve geometry which will result in minor changes to the horizontal alignment which is currently being evaluated. Additionally, the station configurations will be different between the double-bore and single bore tunnel and administration is currently evaluating the impacts of the single-bore stations.

Cost Estimate and Schedule Update

This constructability review will improve the quality of our procurement package. It is producing project cost estimates and schedule documents that have a higher level of certainty than previous versions. The cost estimate was stressed tested by using a bottom-up approach where labour, material, equipment, and productivity rates were established at a task level for every construction component.

Administration remains focused on delivering the Stage 1 project within the approved funding, but additional work needs to be completed to establish that the project can be delivered at an increased level of certainty.

Inflight Work Update

Concurrently with the constructability review, enabling works has been underway focused on improving project readiness. Enabling works include land acquisition, clearing the right-of-way including relocation of two existing land fills, demolition of buildings, and utility relocation. Attachment 1 outlines some of the inflight work completed to date and currently underway.

Next Steps

Critical imminent milestones:

- Completion of constructability review for Stage 1 that meets Council objectives within approved funding
- Completion of Project Execution Plan informed by constructability review
- Review of procurement strategy
- Finalization and release to market of procurement documents

Upcoming Green Line Reports to Committee and Council

The following reports are scheduled to come to Committee and Council to provide additional updates on the Green Line project:

**Transportation Report to
SPC on Transportation and Transit
2018 October 04**

**ISC: UNRESTRICTED
TT2018-1089**

Green Line Update

- 2018 October 10 – SPC on Utilities & Corporate Services - Update on Stage 1 Green Line Property Acquisitions
- 2018 Q4 – SPC on Community and Protective Services - City Shaping Update
- 2018 Q4 – SPC on Transportation and Transit – Green Line Update
- 2018 Q4 – SPC on Priorities and Finance - Recommended capital budgets for approval including financing and confirmation of funding from the other orders of government for the Project.
- 2019 Q1 – SPC on Planning and Urban Development - TOD update

Strategic Alignment

Social, Environmental, Economic (External)

Stakeholder Engagement, Research and Communication

Engagement for Green Line has been ongoing and has focused on the following:

- Station area stakeholders “Green Line in My Community” - input on station area aesthetics and the preliminary station architecture was gathered;
- Lessons learned from other jurisdictions; and
- Interdepartmental design workshops were conducted.

Input from all stakeholders has been critical to the reference concept design and cost estimate reviews.

Strategic Alignment

Social, Environmental, Economic (External)

The project aligns with social, environmental and economic priorities of The City and the priorities of the provincial and federal governments. Green Line is designed to improve quality of life by providing people with options on how to move, work, live, and play, and allows more affordable access to essential community services.

As part of its alignment with environmental priorities, the Environmental Management Program (EMP) focuses on realization of greenhouse gas (GhG) reduction benefits. The Green Line Project is tasked with satisfying City of Calgary, and Federal and Provincial funding partner requirements that include: climate resilience reporting; environmental assessments; First Nations consultation; application of the Envision management system; and the provision of technical environmental requirements and guidelines to satisfy the procurement process.

Financial Capacity

Current and Future Operating Budget:

Current operating expenditures for the Project are capitalized as incurred and are funded by a combination of the Enabling Works Budget of \$360.6 million, and previously approved Council funding of \$1.56 billion, depending on the nature of the expenditure (refer to Capital Budget section below for additional detail).

On 2017 May 15, and 2017 Nov 27, a preliminary estimate was provided to Council for the initial full year net operating costs of Green Line. This estimate is \$40 million/year, in 2016 dollars. This estimate will be updated once the major construction contract has been awarded and the construction schedule is set. Operating costs at revenue service are not currently funded.

**Transportation Report to
SPC on Transportation and Transit
2018 October 04**

**ISC: UNRESTRICTED
TT2018-1089**

Green Line Update

In addition to operating costs post service commencement, the Project will incur debt servicing costs related to any portion of the funding that is received after Project completion. On 2017 Nov 27, an updated estimate of projected interest expense was presented to Council. Council approved the allocation of \$23.7 million/year until 2044 toward Green Line debt servicing. Actual debt servicing will be dependent on a combination of interest rates, timing of expenditures and any potential change in the funding schedule.

Current and Future Capital Budget:

In April 2018, the Government of Canada Treasury Board provided final approval for Green Line to be an eligible project under Canada's Investing in Canada Infrastructure Program (ICIP). The Federal government also signed an Integrated Bilateral Agreement (IBA) with Alberta. This IBA provides Alberta with the right to negotiate, on behalf of both Governments, an Ultimate Recipient Agreement (URA) with The City. This URA will cover terms & conditions for both the Federal \$1.53 billion as well as the Provincial \$1.53 billion of funding.

Negotiations between the Province and the Green Line Project are on-going, and the URA is expected to be in final form for execution in the next two months. This funding, in combination with the previously approved City funding, will support the Project's \$4.65 Stage 1 expenditure.

The Project had earlier received funding for its Enabling Works projects, which are related to preparing the right-of-way for the Project's major construction. The Enabling Works budget is \$360.6 million, and is provided by funding programs from the three orders of government that is separate from the main Project's funding (Federal Public Transit Infrastructure Fund (PTIF) 1 = \$111 million, Provincial 50% PTIF match = \$55.5, Provincial Green Trip = \$92.4 million, City 50% match of PTIF 1 & Green Trip = \$101.7 million)

The full Project Capital Budget will be brought forth for Council approval after the Ultimate Recipient Agreement is finalized with the Province.

Risk Assessment

The Green Line Program risks are being tracked and actioned. The following risks are assessed as top priority:

1. Timeline
 - Resolution of all design decisions and conclusion of the design is key to completing the constructability review and preparing and releasing to market the procurement documents, all of which can impact ultimate project timelines and costs.
2. Land Acquisition
 - Resolution of land impacts is critical to ensure timely access for construction. A land acquisition dashboard has been developed to track and manage each property file.
3. Stakeholders
 - In anticipation of the management of community and business impacts during construction, Administration is developing a strategy that includes lessons learned from previous projects and other jurisdictions.
4. Procurement
 - The procurement strategy will be revisited following finalization of the constructability review prior to proceeding to the market. If a change in the procurement strategy is recommended from the currently approved strategy a report will be taken to the SPC on Priorities and Finance Committee.

Transportation Report to
SPC on Transportation and Transit
2018 October 04

ISC: UNRESTRICTED
TT2018-1089

Green Line Update

- Administration is working to implement opportunities to engage the private sector in discussions around the best methods to build the Green Line. This must be considerate of following a fair, open, and transparent procurement process.
- Administration has identified a need to accelerate the relocation of existing utilities. An innovative approach to the relocation of utilities is required due to the extensive number of utilities to be relocated and the potential impact to the main construction project.

REASON(S) FOR RECOMMENDATION(S):

This report is the first in a series of ongoing quarterly updates that will be provided to the Transportation and Transit Committee to update Committee and Council as to the progress of the Green Line project. The focus of 2018 Q3 has been a constructability review which has identified a number of opportunities that will increase the cost certainty, mitigate risk, and reduce the construction impact of the project.

ATTACHMENT(S)

1. Attachment 1 – Green Line LRT Stage 1 Inflight Work Summary

.