

GREEN LINE PROGRAM UPDATE

EXECUTIVE SUMMARY

This report provides a general update for the Green Line program and a specific update on the alignment for the segment from 2 Street and 10 Avenue Southwest (Beltline) to the Inglewood/Ramsay station.

A Beltline to Inglewood/Ramsay alignment recommendation was expected to be concluded by 2017 March, however, a number of constraints and considerations were identified during the evaluation of the options requiring further analysis. This report summarizes the previously considered alignments, the evaluation of each option, and their impact on program-wide considerations.

The four options presented within this report are considered the most feasible; best meeting the technical and financial constraints, and future area development. Further narrowing of these four options to advance the underground alignment options in the Beltline west of Macleod Trail SE best addresses the evaluation framework, while allowing the options east of Macleod Trail SE. to be further refined in light of recent stakeholder discussions. A refinement of the options east of Macleod Trail SE allows Administration to address concerns and to ensure the recommendation brought forward has identified all possible option variants.

This report is accompanied by similar reports to the SPC on Community and Protective Services (CPS2017-0270) and the SPC on Planning and Urban Development (PUD2017-0249). The intentional linking of reports to Committees of Council highlights the integrated nature of the Green Line program.

ADMINISTRATION RECOMMENDATIONS:

That the SPC on Transportation and Transit recommends that Council:

1. Receive this report for information;
2. Direct Administration to proceed with additional design and investigation of the underground alignment option in the Beltline to Macleod Trail SE while continuing to evaluate options, not limited to the two surface options from Macleod Trail SE to Inglewood/Ramsay Station, and to continue to collaborate with key area stakeholders to consider various objectives;
3. Direct Administration to report back with a final Beltline to Inglewood/Ramsay alignment and station locations recommendation no later than 2017 June; and
4. Forward this report to the 2017 April 10 Combined Meeting of Council together with the associated reports of the SPC on Planning and Urban Development and the SPC on Community and Protective Services.

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**RECOMMENDATION OF THE SPC ON TRANSPORTATION AND TRANSIT, DATED
2017 MARCH 15:**

That Council:

1. Receive this report for information;
2. Direct Administration to proceed with additional design and investigation of the underground alignment option in the Beltline to Macleod Trail SE while continuing to evaluate options, not limited to the two surface options from Macleod Trail SE to Inglewood/Ramsay Station, and to continue to collaborate with key area stakeholders to consider various objectives; and
3. Direct Administration to report back with a final Beltline to Inglewood/Ramsay alignment and station locations recommendation no later than 2017 June.

PREVIOUS COUNCIL DIRECTION/POLICY

At the 2016 October 03 Regular Meeting of Council, Report TT2016-0705 (Green Line Quarterly Update and Centre City Recommendation) was approved as follows:

ADOPT, Moved by Councillor Keating, Seconded by Councillor Farrell, that the SPC on Transportation and Transit Recommendations 1, 3, and 4 contained in Report TT2016-0705 be adopted, as follows:

“That Council:

1. Receive this quarterly report for information;
3. Direct Administration to report back with a Green Line quarterly update at the 2016 December SPC on Transportation and Transit;
4. Direct that Attachment 2 remain confidential pursuant to Section 24(1)(g) and 25 (1)(c)(ii) of the Freedom of Information and Protection of Privacy Act until all Green Line contracts and legal agreements are signed; and

ADOPT, AS AMENDED, Moved by Councillor Keating, Seconded by Councillor Farrell, that the SPC on Transportation and Transit Recommendation 2 contained in Report TT2016-0705 be adopted, as amended, as follows:

That Council:

2. Approve the recommended underground alignment (Option D) for the Bow River crossing connecting downtown from north of 16 Avenue North to 10 Avenue South (Attachment 1) in principle;

ADOPT, Moved by Councillor Keating, Seconded by Councillor Farrell, that the SPC on Transportation and Transit Recommendation contained in Report TT2016-0705 be adopted, as follows:

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That Council:

5. Direct Administration to continue to investigate an underground alignment option for 12 Avenue South, include this option in public engagement conversations, and continue to co-ordinate with area stakeholders to ensure the Green Line is integrated with future developments.”

At the 2016 December 19 Regular Meeting of Council, Report TT2016-0927 (Green Line Quarterly Update and Beltline Alignment) was approved as follows:

ADOPT, Moved by Councillor Keating, Seconded by Councillor Pootmans, that the SPC on Transportation and Transit Recommendations contained in Report TT2016-0927 be adopted, as follows:

That Council:

1. Receive this Quarterly Report for Information; and
2. Direct Administration to further refine the two 12 Avenue South alignment options in the Beltline and report back to the 2017 March SPC on Transportation and Transit with a recommended Beltline alignment.

BACKGROUND

It is expected that Calgary will double its population within the next 60 years, reaching a population of over two million people. Based on trends prevailing over the past 20 years, Calgarians continue to value greater choices when deciding where to live, work and play, as well as how to move around Calgary. The Green Line will play a significant role in adapting to this growth and a long-term vision is required to help guide The City's largest investment in infrastructure. This long-term vision is a Calgary-designed solution that invests in transit, people, places and programs that, when implemented, will make Calgary a more attractive, accessible and vibrant City.

Over the course of the past year, the public, stakeholders and Council have contributed to the development of the long-term vision for the Green Line. The City's long-term vision will be delivered through a strategy developed by Administration that involves a four-layered planning approach. The four-layered approach to the Green Line program, shown in Attachment 1, is a planning and communication tool to illustrate the complexity and interdependence of the work. The four layers illustrate transportation (Layers 1 and 2), planning (Layer 3) and city-shaping (Layer 4) work required to create more accessible, complete and vibrant communities.

Success in delivering the complete Green Line long-term vision (Layers 1, 2, 3, 4) will be measured over an extended period of time, potentially decades from now. Attachment 2 shows the priority sites where transit-oriented development and city-shaping initiatives have begun, laying the groundwork for the long-term vision. With the development of a long-term vision nearing completion, Administration is now shifting its focus to the implementation of the initial construction stages of the LRT and associated transit infrastructure within the realities of available funding.

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Funding commitments for the transit infrastructure component of the Green Line and the associated financing terms continue to be unknown from the Government of Canada and the Province of Alberta.

INVESTIGATION: ALTERNATIVES AND ANALYSIS

Guided by the long-term vision, Administration continues to advance planning, design, and cost estimation for all segments of the Green Line. Attachment 3 provides an update on the North, Centre City – Downtown, and Southeast segments. Establishing the functional alignment and station locations from 160 Avenue North to Seton is key to informing the decision on construction stages, planning for future project extensions, and supporting funding requests.

The final alignment section under evaluation is from Beltline to Inglewood/Ramsay. In 2016 December, Administration recommended proceeding with additional evaluation and design refinement on the 12 Avenue South configurations (surface and tunnel). The evaluation of the options included identifying constraints and opportunities, preparing functional level designs, cost estimates, and risk assessments for each of the options. The evaluation includes input from the public and key area stakeholders, as well as consideration of City policies complemented the technical analysis.

One of the key considerations for the Beltline to Inglewood/Ramsay alignment recommendations is coordination with the various planning initiatives in these communities. Coordination amongst these communities includes working closely with other City projects in the area including traffic and parking solutions as part of the 9 Avenue SE and 12 Street SE bridge projects, the 25 Avenue S LRT Grade Separation Study, the Inglewood and Ramsay Area Redevelopment Plans (ARP), the 9 Avenue SE Streetscapes project, and Calgary Municipal Land Corporation's (CMLC) Rivers District Masterplan.

Through public engagement and ongoing stakeholder discussions Administration is aware of the following concerns as well as the factors that have changed since the development of the original options in 2016 September:

- Beltline stakeholders: concern that a surface option between 2 Street SW and 4 Street SE will induce changes to traffic, impact the vibrancy of the public realm, and have implications on access/circulation to development sites.
- Victoria Park stakeholders: concern that a 12 Avenue S surface option would impede access and egress of Stampede Park operations, limits a potential new arena, and could impact development potential.
- Ramsay community: opposition to a surface option parallel to MacDonald Avenue SE is seen to divide the community and displaces neighbours. The community does not see any benefit to this option at this time. The 8 Street SE closure and potential 7 Street SE closure are also of concern. Additional concerns relate to safety, emergency access/egress, loss of community character, and the uncertainty of the many ongoing projects on the community.
- Victoria Park emerged as a high priority as an area of investment focus by Council to create a culture and entertainment district.

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- Calgary Municipal Lands Corporation (CMLC) initiated the Rivers District Masterplan process to create a holistic and comprehensive plan for the future of Victoria Park (including the culture and entertainment district).

Administration is committed to evaluating the options and identifying how to best address the concerns identified while integrating the LRT into the various communities to provide better travel connections and new community spaces.

Analysis of Options

Administration identified an alignment option paralleling MacDonald Avenue SE in 2016 September. The MacDonald Avenue SE option was removed from further evaluation at that time while constraints in the Victoria Park area were further investigated. Since 2016 September the Green Line team has investigated approximately 20 variants to connect the Green Line between the Beltline 12 Avenue S corridor and Inglewood/Ramsay Station. Associated with these variants are a wide range of costs, technical considerations, land requirements, risk, operational implications, and environmental considerations.

The 12 Avenue South corridor was the focus of further investigation to refine the surface and tunnel configurations. Advancement of the design and additional investigation has revealed new information relating to:

- transit operations around the Victoria Park Transit Centre;
- underground obstructions;
- traffic operations in the area;
- LRT travel times;
- cost estimates;
- planning activities in Victoria Park; and
- economic analysis.

Conceptual maps and a summary of the findings related to the 12 Avenue SW options are presented in Attachment 4.

The following two options presented in Attachment 4 include a surface alignment around the north side of the Victoria Park Transit Centre:

- 12 Avenue SW Surface Option 1: Around Victoria Park Transit Centre
- 12 Avenue SW Tunnel Option 1: Around Victoria Park Transit Centre

A surface alignment around the north side of the transit centre is technically feasible. The requirement to maintain the transit centre for operations until the facility is relocated at an undetermined future date, maintain the viability of prime redevelopment sites, and protect for future transportation network connections constrains the LRT alignment options in the area. A surface alignment around the south side of the transit centre and on 7 Street SE is also technically feasible, but was not carried forward due to concerns/risks relating to the floodway.

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Administration investigated an option that is fully tunneled from the Beltline connecting to the previously-approved southeast alignment north of the Inglewood/Ramsay Station. This option is technically feasible. There are several additional costs including constructing a second underground station, tunneling under the Elbow River as well as uncertainty due to limited knowledge of soil conditions. The benefits of extended tunneling would include less surface impact to adjacent developments and faster travel times for LRT customers. This longer tunnel option has not been carried forward due to the additional costs and a conceptual map of the option is not included with Attachment 4.

The following two options presented in Attachment 4 include a surface alignment along MacDonald Ave SE.:

- 12 Avenue SW Surface Option 2: Surface To MacDonald Avenue SE
- 12 Avenue SW Tunnel Option 2: Surface To MacDonald Avenue SE

The MacDonald Ave SE option was recently re-introduced as a technically feasible option. This option does not have community support due to the impacts it would have on the community's character, existing homes and access. From a technical standpoint, this option remains within the program's capital cost estimate targets, provides additional flexibility in station location (between 4 Street SE and 6 Street SE), reduces transportation network barriers, supports redevelopment options for land in Victoria Park, and preserves LRT and bus operations.

The alignment options presented herein, specifically the options north of the Victoria Park Transit Centre and along MacDonald Ave SE, between Macleod Trail SE and Inglewood/Ramsay Station, will be further refined. Potential adjustments include tunnel portal placement, station location placement, and adjustments to alignment curves that may improve some of the challenges identified. Beyond evaluating the options based on cost, operations, land and environmental impacts the following key criteria were considered critical for the long term viability of the area (see Attachment 5):

Traffic and Travel Time Analysis

The transportation network was analysed between 4 Street SW and 6 Street SE and from 9 Avenue S to 17 Avenue S. A detailed simulation of area traffic operations was conducted with:

- Existing development and traffic volumes
- Future development and expected traffic volumes (this acts as a proxy for the tunnel LRT option); and
- Future development and expected traffic volumes, plus surface LRT on 12 Avenue S.

The surface and tunnel options were compared. Overall travel times and travel time delays for people on transit and people in vehicles were calculated.

The Beltline represents the busiest segment of the Green Line with 40% to 50% of all Green Line riders expected to travel through the Beltline. The analysis indicates:

- Travel times for the tunnel option are approximately 50% of what is forecast with the surface option. This means travel savings of approximately 5 min per passenger for approximately 45,000 Calgarians on opening day.

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- The tunnel option produces societal benefits (primarily time savings) of almost \$380 million over 30 years.

Area Development Activity

A summary of active applications for multi-family and large scale developments is shown on the map titled Beltline to Inglewood/Ramsay Alignment: Area development activity in Attachment 5. Discussions are on-going with development industry partners who have intent to redevelop sites in the Beltline.

This data indicates a higher concentration of active permit applications along 12 Avenue corridor further supporting the alignment recommendation.

Station Walkshed Analysis

Each station was evaluated based on the accessibility to key city-shaping destinations and community services that are critical to the long-term vision of Green Line. These destinations and the respective station walksheds are shown on the map titled Beltline to Inglewood/Ramsay Alignment: Station walkshed analysis in Attachment 5.

Stakeholder Feedback

Based on public and stakeholder engagement, common themes and community feedback were compared and are summarized on the map titled Beltline to Inglewood/Ramsay Alignment: What we heard in Attachment 5. Although the stakeholder objectives for the three communities (Beltline, Victoria Park, and Ramsay) are varied there is support to advance the underground alignment between 2 Street and 10 Avenue SW to Macleod Trail SE. The options east of Macleod Trail SE does not have community consensus and therefore further collaboration with the community stakeholders is critical to refining the remaining options to one that best meets the long-term vision for Green Line and The City.

A preliminary high-level engagement schedule to refine the options, further understand challenges, identify opportunities, and to determine a way forward is included in Attachment 6.

Cost Estimates

Cost estimates for the Beltline to Inglewood/Ramsay options continue to be refined as design progresses. The current opinion of probable costs is based on a Class 5 estimate (-50% to +100%) and does not include land costs. Land requirements and costs are currently being reviewed.

12 Ave S Beltline to Inglewood/Ramsay Construction Cost Estimates	
Surface: Around Victoria Park Transit Centre	\$470 million
Surface: MacDonald Ave SE	\$480 million
Tunnel: Around Victoria Park Transit Centre	\$550 million
Tunnel: MacDonald Ave SE	\$600 million

Beltline Alignment Recommendation

Administration's recommendation of the underground alignment between 2 Street and 10 Avenue SW to Macleod Trail SE eliminates the surface options west of Macleod Trail SE. This

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allows Administration to focus on the remaining options east of Macleod Trail SE to better address stakeholder concerns, operational targets, and to best accommodate future development of this area.

Program Schedule

As previously identified in the 2016 December report to Council (TT2016-0927) the risk of delays to the targeted start of construction of the Green Line LRT is increasing, see Attachment 7. In addition, although Administration continues to advance design and public engagement to report back by 2017 June with the full Green Line LRT alignment and station recommendations, transit oriented development (TOD) concept planning, city-shaping framework, and capital cost estimates, the uncertainty of funding commitments places Administration's efforts at risk.

Determining the first stage for construction and a contracting strategy is dependent on a long-term vision and on the funding and associated financing terms being known. Administration is currently re-evaluating the schedule which will include the potential delays to the start of construction of the Green Line and opening day (revenue service).

Project Delivery

Administration is currently evaluating the options for contracting including delivery of detailed design, construction, operations and maintenance. A recommendation is dependent on the confirmation of available funding and resulting project scope.

City-shaping and City-wide policies

Refer to Administration's report to Council (CPS2017-0270 Green Line City-Shaping Update report).

Stakeholder Engagement, Research and Communication

Public engagement for the vision phase is nearing completion. Events planned for 2017 include engagement on the functional designs for Centre City and North segments, Green Line Urban Integration (how the Green Line fits into existing communities), and station area workshops for the Centre City stations.

Engagement for Beltline to Inglewood/Ramsay includes additional working sessions in the community of Ramsay to attempt to resolve outstanding issues related to Green Line. Sessions will be planned between March and June to keep all stakeholders engaged and informed.

Strategic Alignment

The Green Line vision is in accordance with Council's priorities and align with the Government of Alberta's and Government of Canada's strategic objectives.

Social, Environmental, Economic (External)

The Green Line program will result in city-shaping outcomes which include social, environmental, and economic benefits for generations to come.

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Social

As a city-shaping initiative, Green Line supports mixed-use and mixed income communities to reach community aspirations for vitality, sustainability and affordability. Mixed-use neighbourhoods are the places where people live, work, play, shop and learn. Mixed income communities are financially accessible to all Calgarians. A major benefit of increasing access to rapid transit is the overall lowering of transportation costs, and the fundamental link between cost and affordability of housing, especially lower income households. Consideration for multi-generational communities and the places where residents can transition through all stages of life ensure a long-term, sustainable and resilient plan.

Environmental

The City of Calgary has committed to reducing greenhouse gases (GHG) from its corporate operations, through energy efficiency and conservation programs and a shift to using lower carbon and renewable energy sources. Green Line presents opportunities to lead Calgary into the next phase of environmental sustainability and accountability through direct reductions in GHGs through the use of renewable energy, emission gains with fewer internal combustion engines in use, facilitating densification around transit villages and building The City's civic facilities to LEED standards.

Economic

Investing in Calgary's future results in economic resiliency through job creation, Gross Domestic Product (GDP) growth, with direct benefits resulting from construction, operations and maintenance, increased property values, increased income tax revenue, savings for households, productivity gains, and contribution to economic diversification. The Green Line will contribute to the economy in Calgary and within Alberta in many ways.

Financial Capacity

Current and Future Operating Budget:

Impact on the future operating budget is dependent on which staging option is ultimately constructed. Some options will require more funds to operate and maintain. Operating cost estimates will be refined in subsequent phases of this project and presented in 2017 June.

Current and Future Capital Budget:

The current City of Calgary Green Line funding of \$520 million over 10 years is being used to continue land acquisition and project design in order to be ready for construction using any delivery model option.

The GreenTRIP and Public Transit Infrastructure Fund (PTIF) Phase 1 funding announcement was received 2016 December. The funding will help prepare the Green Line right-of-way for construction with items such as utilities and land preparation, environmental remediation and land acquisition.

Risk Assessment

The Green Line program has many risks that are being tracked and actioned. The following risks are associated with the Beltline to Inglewood/Ramsay alignment segment:

Funding

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- Staging options that meet the available funding will be provided as additional funding program information becomes available.
- An alignment decision in the Beltline to Inglewood/Ramsay segment is a key part of the funding and staging discussion.

Timeline

- Resolving all alignment decisions is key to a planned June 2017 project milestone. If key milestones as identified in Attachment 6 are not reached, Administration will be challenged to meet funding application submissions and deliver the necessary work to continue to target a planned Q2 2020 construction start date.
- There is also a risk that the competing initiatives in Victoria Park may not align within the timelines identified. There are many ongoing projects in the Victoria Park area, including the focus on the culture and entertainment district, Rivers District Masterplan, and potential new arena. The Green Line team is working closely to ensure these projects are coordinated and support The City's long-term goals. The alignment recommendation will need to consider the ultimate potential build-out of this area including mobility, accessibility, and attractiveness.

Land Acquisition

- Administration continues to review each of the proposed design options in order to identify properties that will be required in all scenarios either for construction or strategic acquisition purposes.

Stakeholders

- Stakeholder concerns in the community of Ramsay is a risk to the program. Lack of local community support for the MacDonald Ave SE option may delay the alignment decision. A balance between the long-term citywide benefit of the Green Line, and the local impacts to communities must be found.

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REASONS FOR RECOMMENDATIONS:

The data presented in this report supports Administration's recommendation to proceed with additional design and investigation of the underground alignment in the Beltline to Macleod Trail SE. Proceeding with the underground alignment option in principle, allows Administration to focus on the technical analysis and stakeholder engagement where required.

ATTACHMENTS

1. Green Line: Transforming Communities Through Transit (Layers Overview)
2. Green Line: Current Transit Oriented Development (TOD) and City Shaping Initiatives
3. Green Line Program Update: North, Centre City – Downtown, and Southeast Segments
4. Beltline to Inglewood/Ramsay Alignment: Options Summary
5. Beltline to Inglewood/Ramsay Alignment: Key community criteria
6. Beltline to Inglewood/Ramsay Alignment: Where we've been and where we're going
7. Green Line: Program Milestones (Level 1 Schedule)