



Segment 2 Functional Plan | Green Line LRT

May 2021



Executive summary

The segment 2 alignment concept was approved by Council in June 2020. This document outlines the updated functional plan for segment 2 alignment and station locations extending from the connection with segment 1 at Inglewood/Ramsay to 16 Avenue N. and Centre Street N.

The Segment 2 Functional Plan includes, refined alignment and station locations, preliminary utility relocation design and additional site investigations, consultation and analysis. The final inform phase of engagement for the Functional Plan was completed in April 2021. Additionally, engagement was conducted for the Bow River Bridge, Streetscape, Access Management and North Central Mobility studies relating to Segment 2B.

Area specific planning and design criteria established during the development of the Segment 2 Concept Plan (June 2020) guided the development of the Segment 2 Functional Plan. Option evaluation criteria applied across the entire alignment include passenger experience, future development potential, design and engineering criteria and overall project cost, schedule and risk. Work will continue with developers and landowners towards integrating entrances to underground stations into adjacent developments, both existing and future.

The preliminary utility relocation design addresses conflicts with the alignment and considers line relocation on a case by case basis. The Green Line team has completed a series of investigations to identify existing utility infrastructure in areas of conflict. Additional site investigations, consultation and analysis completed include Phase 1 Environmental, Fish Habitat, Aquatic Habitat and Biophysical Impact Assessments; Noise and Vibration Analyses; and geotechnical investigations.

The next phase of the project will include production of a Reference Concept Design (RCD) and Technical Performance Requirements (TPR) which will form part of the procurement documents for the Design-Build-Finance (DBF) contractor. Throughout this time work will continue on utility relocation planning and design, stakeholder engagement and station integration work with developers.



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Alignment and stations



Functional planning for segment 2 of the Green Line stage 1, which includes segments 2A and 2B, has been completed. The functional plan is a progression of the concept plan approved by Council in June 2020 which outlined the updated alignment and general station locations.

The segment 2 alignment includes:

- Surface running LRT from the connection with segment 1 in Ramsay to the portal within the Calgary Transit Victoria Park lands;
- a bridge over the Elbow River;
- 2.5 km of tunnel in the downtown and Beltline including cross passages for emergency egress;
- underground stations at 4 Street S.E., Centre Street S., 7 Avenue S.W. and 2 Avenue S.W.;
- a bridge over the Bow River;
- surface-running LRT on Centre Street N. between McHugh Bluffs and 16 Avenue N.;
- at-grade stations at 9 Avenue N. and 16 Avenue N. and
- utility buildings at 9 Avenue N. and 16 Avenue N.

Functional planning builds on the conceptual design and the established design objectives developed from key internal and external stakeholder interests and public feedback received during engagement sessions, community meetings and stakeholder workshops.

The design objectives established in conceptual planning are included on each page that highlights one of three sections of the alignment:

- Ramsay, Victoria Park and Beltline
- Downtown
- Centre Street N

An overview of the segment 2 alignment is shown in the following figure.

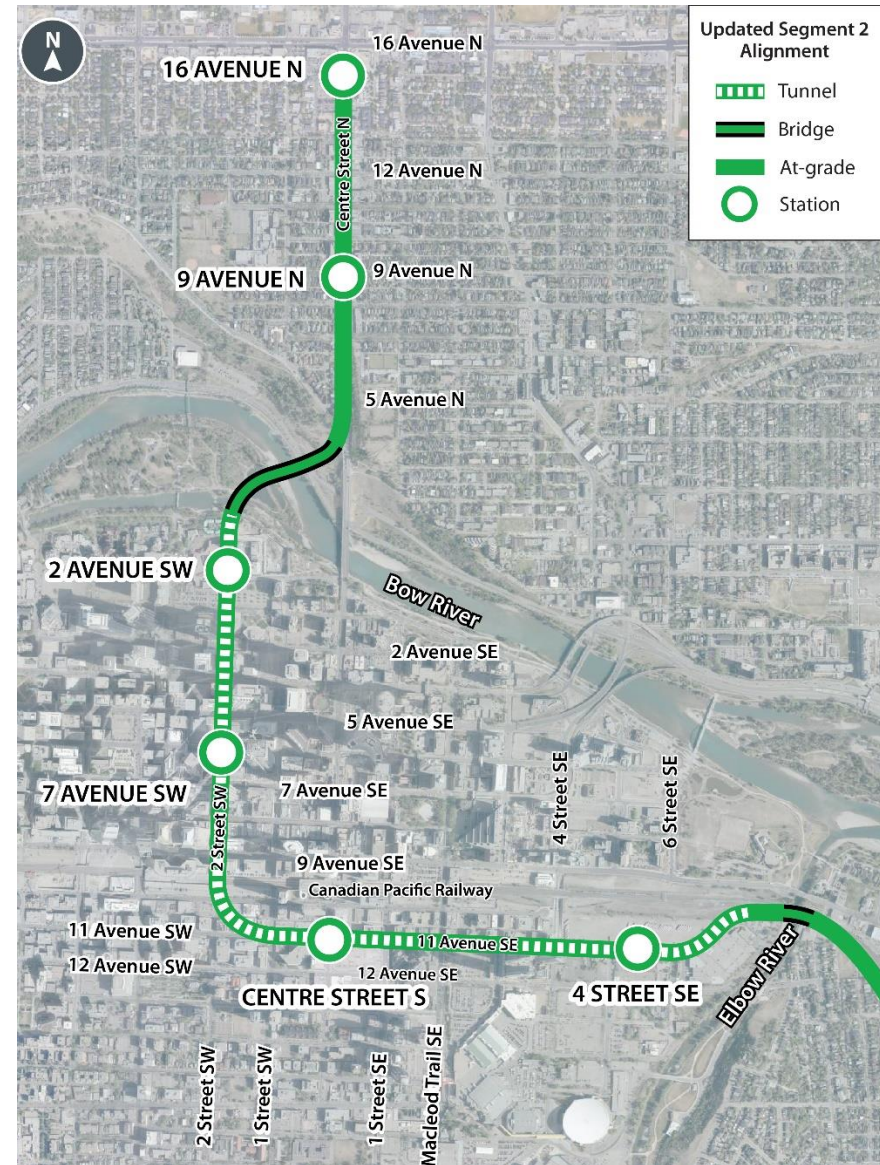


Figure 1. Segment 2 alignment and station locations



The Green Line team developed and evaluated options for different components of the alignment. These options were evaluated against a set of criteria considering city shaping, passenger experience, design and engineering criteria and overall project cost, schedule and risk. Criteria considered in review of potential station locations are outlined in table 1.

Table 1. Option evaluation criteria

| | | | |
|---|--|---|--|
| Risk | Qualitative assessment based on risk assessment | Schedule | Quantitative assessment based on previous schedule estimates if available, if not qualitative assessment based on professional judgement |
| Capital cost | Quantitative assessment of construction cost estimates for each option | Property requirements | Qualitative assessment of ease of acquiring property required for construction. Considers strata/easements, purchasing, expropriation potential etc. |
| Public Impacts during construction | Qualitative assessment based on the scope of construction activities. Considers items such as pedestrian welfare, noise, vibration, dust, etc. | Operation of LRT | Qualitative assessment of LRT run times/speeds, headways based on preliminary models |
| Station location | Assessment of station location in relation to catchment area | Operational expenses | Lifecycle operating costs including maintenance |
| Redevelopment/ potential impacts to future development | Qualitative assessment of future property development potential, ease in which sites could accommodate residential and commercial development, alignment with Transit Oriented Development (TOD), property integration opportunities | Passenger experience and comfort | Assessment of factors such as station depth, time to platform, passenger comfort related to alignment |



Ramsay, Victoria Park & Beltline

Segment 2 begins north of Inglewood/Ramsay station, follows the CP (Canadian Pacific) Rail tracks, and crosses the Elbow River south of the two existing CP Rail bridges. West of the bridge and north of the Victoria Park Transit Centre, a portal transitions the alignment from above grade to an underground alignment running east-west along 11 Avenue S.

Along 11 Avenue S., two underground stations will be built, 4 Street S.E. station and Centre Street S. station. After Centre Street S. station, the tunnel transitions via a curve to a north-south alignment along 2 Street S.W.

The Green Line team is coordinating with local developers, the Calgary Municipal Land Corporation (CMLC), the Calgary Stampede and the Victoria Park Transit Centre to maximize development potential and minimize impact. The location of the portal will be optimized with respect to maximizing future development potential of this site and providing safe and effective operation for the LRT. Green Line team will work with area stakeholders to minimize disruption during construction. The underground alignment through the Beltline maintains the current, at-grade transportation network.

Since the publishing of the June 2020 concept plan, various curve radii were evaluated in terms of technical feasibility, train operations, constructability, impact to existing buildings, risk, and capital costs. The established curve radius avoids conflicts with underground obstructions, reduces the number of affected property owners and remains within suitable constructability parameters for tunnel boring.

Ramsay, Victoria Park and Beltline planning and design objectives

- ✓ Minimize impacts to mobility network
- ✓ Locate stations to support the vision of the Rivers District master plan
- ✓ Minimize impacts to Victoria Park Transit Centre operations
- ✓ Minimize impacts to Stampede Park and existing residential and commercial properties
- ✓ Explore opportunities for station integration
- ✓ Enable future development opportunities and unlock density potential



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




-  Roadway
-  Public Realm
-  LRT Alignment - Surface
-  LRT Alignment - Underground
-  LRT Alignment - Bridge
-  LRT Portal Trench
-  Station Platform



Figure 2. Ramsay, Victoria Park and Beltline alignment and station locations



Elbow River Bridge

The Elbow River bridge will be located south of two existing CP Rail bridges and the 9 Avenue S.E. bridge currently under construction. Due to its close proximity to the pedestrian crossing at the 9 Avenue S.E. bridge and the Elbow River traverse bridge, the Green Line bridge will not include pedestrian access across the river.

Below the bridge, the multi-use pathway on the westside of the Elbow River will be widened and the pathway on the eastside will be maintained. This will provide pedestrian connectivity from the community of Ramsay to the community of Inglewood as the 7 Street S.E. access to 9 Avenue S.E. will be closed.

The bridge will be designed to a 1:100-year flood level and follow a curved horizontal alignment adjacent to the CP Rail line. Both a single span across both the river and pathway and a two-span option, with a pier between the pathway and the river, were reviewed. It is recommended to proceed with a two-span bridge as the preferred option. This option provides three meters of vertical clearance between the multi-use pathway and the bridge structure on the westside and is also considered the more economical structure.

To provide a safe and comfortable pathway experience under the bridge CCTV cameras, call boxes and lighting will be included. Options to enhance the pathway experience could also include architectural treatment to the pier or openings in the pier to provide views to the river. Stakeholders will be engaged on the opportunity to incorporate a feature design element such as artistic cladding on the bridge-face.

Retaining walls will be used on either side of the river to support the alignment as it leads up to the river crossing.

Elbow River Bridge planning objectives

- ✓ Provide a simple LRT bridge that does not compete with adjacent bridges
- ✓ Provide a safe and comfortable pathway experience under and around the bridge
- ✓ Incorporate principles within the City of Calgary Downtown Underpass Urban Design Guidelines
- ✓ Provide opportunities to incorporate City Shaping or Public Gardens elements into the design



Figure 3. Conceptual rendering of the Green Line LRT Bridge over the Elbow River



4 Street S.E. station

The 4 Street S.E. station will connect directly into the future north east corner of the Rivers District being planned by the Calgary Municipal Land Corporation (CMLC). The 4 Street S.E. station will service planned housing for 8,000 new residents, a new event centre, an expanded BMO Centre and the Calgary Stampede. Active mode connections near the station include the Elbow River Pathways, parks, the 12 Avenue Cycle Track, Elbow and Bow River Pathways.

In 2028, within a 10-minute walking distance of the station (800 m), the station will service 6,700 people and 14,400 jobs. In 2048, the population is forecasted to increase to 16,800 people and 19,100 jobs. Ridership at this station in 2028 is forecasted at 1,800 passengers per day. In 2048, based on build out of the Green Line from Seton to 144 Avenue N., ridership is forecasted to increase to 6,800 passengers per day.

Feedback received via engagement from area stakeholders is for this station to be located on 11 Avenue S. between 4 Street S.E. and 5 Street S.E. to align with the location of the new Event Centre. This was evaluated in conjunction with the criteria of city shaping, passenger experience, operational parameters, cost, schedule and risk.

Based on operational parameters, cost and passenger experience, the station is located between 5 Street S.E. and 6 Street S.E. A set of cross-over tracks, which allows the LRT to move from one set of tracks to the other, must be west of the 4 Street S.E. station for effective and efficient operation of the LRT. Locating the station and cross-over tracks further west increases capital cost and negatively affects passenger experience. If the station is located further west, the depth of the station would increase. The method of construction to accommodate a deeper station is more expensive and disruptive to the surrounding area. A deeper station also increases the travel time for passengers to enter and exit from the platform. Further investigation of this area will be conducted in the next phase of design to further optimize this station location.

The Green Line team is working with adjacent landowners and stakeholders to locate station entrances in alignment with the expected pedestrian traffic movement in the area and integrate the entrances into future developments.



Figure 4. 4 Street S.E. station



Centre Street S. Station

Centre Street S. station is an underground station with a centre-loaded platform and a concourse level above. The station is located on 11 Avenue S.W. straddling Centre Street S.

In 2028, within a 10-minute walking distance of the station (800 m), the station will service 10,300 people and 18,500 jobs. In 2048, the population is forecasted to increase to 13,300 people and 21,000 jobs. Ridership at this station in 2028 is forecasted at 3,400 passengers per day. In 2048, based on build out of the Green Line from Seton to 144 Avenue N., ridership is forecasted to increase to 6,000 passengers per day.

The station is surrounded by the downtown business district, hotels, the Calgary Tower, Glenbow Museum and the Beltline neighbourhood; which includes a mix of office, commercial and residential uses.

The positioning of the station is influenced by balancing competing priorities of locating the station to the west to better capture ridership from the residential area, reducing conflict with utilities and associated risk and expense, positioning the station in an optimal location for operations with respect to the curve into the downtown core and consideration of potential locations for station entrances and an emergency exit building.

The Green Line team is working with adjacent landowners to integrate station entrances into existing or future developments.



Figure 5. Centre Street S. station



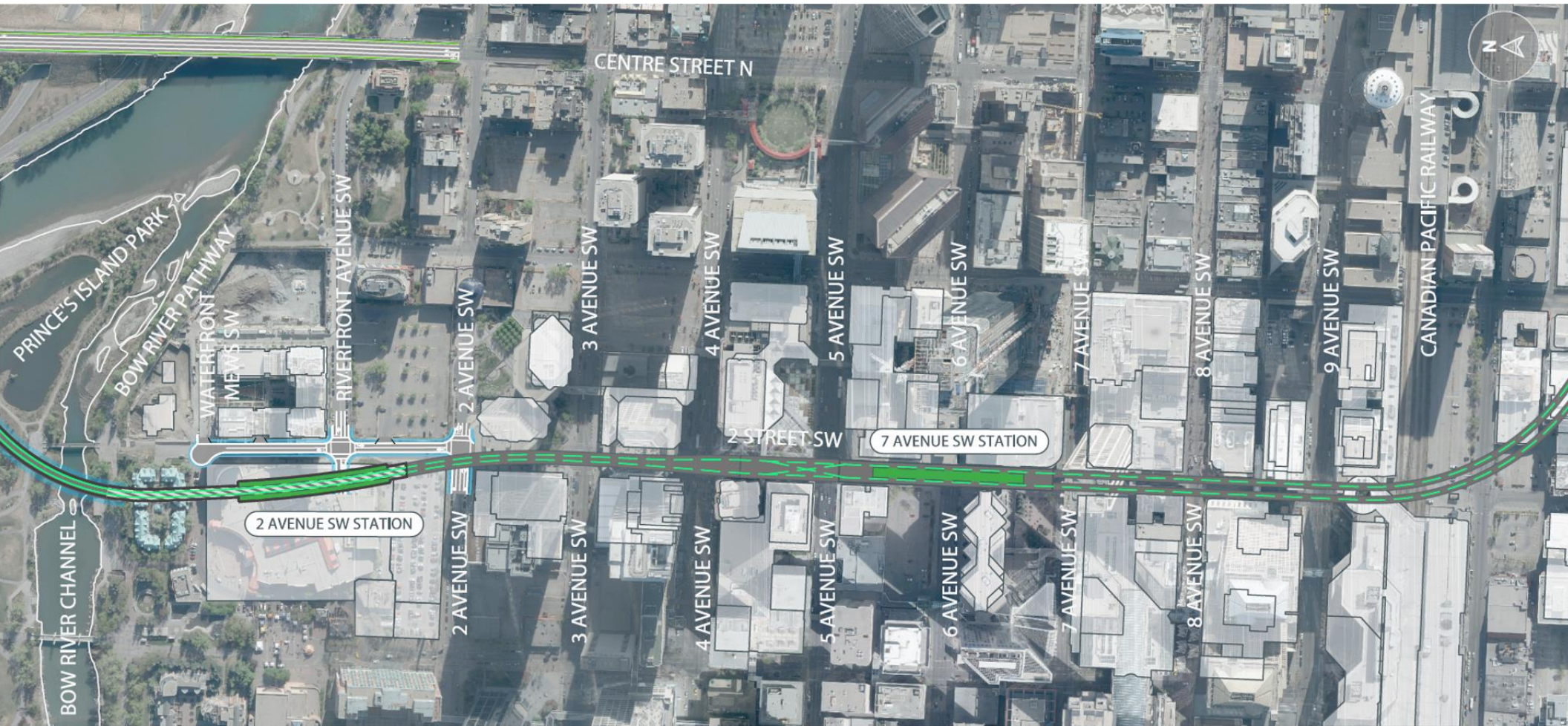
Downtown

The Green Line alignment curves from the Beltline on 11 Avenue S.W. to 2 Street S.W. under the CP Rail corridor and the existing Red and Blue Line LRT to an underground station at 7 Avenue S.W. The alignment continues under 2 Street S.W. until 2 Avenue S.W. where it curves to the 2 Avenue S.W. station between Waterfront Mews S.W. and Riverfront Avenue S.W. From this point, the alignment moves north via a portal north of the 2 Avenue S.W. station and a bridge over the Bow River.

A revised streetscape of 2 Avenue S.W. will be undertaken in the next phase of planning and design.

Downtown planning and design objectives

- ✓ Integrate LRT infrastructure with adjacent development and public realm
- ✓ Provide continued functionality, aesthetic and experience of the Eau Claire Promenade
- ✓ Support continued vibrancy of cultural, social, and commercial activities
- ✓ Minimize impacts to existing residential and commercial properties
- ✓ Enable adjacent future development potential
- ✓ Minimize impacts to the mobility network



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



-  Roadway
-  Public Realm
-  LRT Alignment - Surface
-  LRT Alignment - Underground
-  LRT Alignment - Bridge
-  LRT Portal Trench
-  Station Platform



Figure 6. Eau Claire and Downtown alignment and station locations

ISC-RESTRICTED



7 Avenue S.W. station

7 Avenue S.W. station will be a centre loaded station, located underground just north of 7 Avenue S.W. in the centre of downtown Calgary. 7 Avenue S.W. station is directly adjacent to high-rise, high-density commercial and residential uses, and provides connections to key attractions including Stephen Avenue Mall, the Devonian Gardens, Telus Convention Centre, Glenbow Museum, Arts Commons and Olympic Plaza.

The station is a key transfer hub between the existing Red and Blue LRT lines, MAX Yellow and MAX Purple bus services. To facilitate passenger transfers, the station is located as close to 7 Avenue S.W. as possible while still minimizing impact to the existing Red and Blue LRT lines during Green Line construction.

The station will be the busiest station along the Green Line as a result of being a key transfer station and its proximity to the high number of housing and jobs. In 2028, within a 10-minute walking distance of the station (800 m), the station will service 8,600 people and 95,900 jobs. In 2048, the population is forecasted to increase to 11,300 people and 108,400 jobs. Ridership at this station in 2028 is forecasted at 22,600 passengers per day. In 2048, based on build out of the Green Line from Seton to 144 Avenue N., ridership is forecasted to increase to 45,000 passengers per day.

Station entrances have the potential to be within the 2 Street S.W. right-of-way or integrated into adjacent developments. The Green Line team continues to work with landowners on the incorporation of station entrances into adjacent development. Should the station entrances be located in the road ROW, modifications to 2 Street S.W. will be required to allow for station entrances, and access to properties in this area.

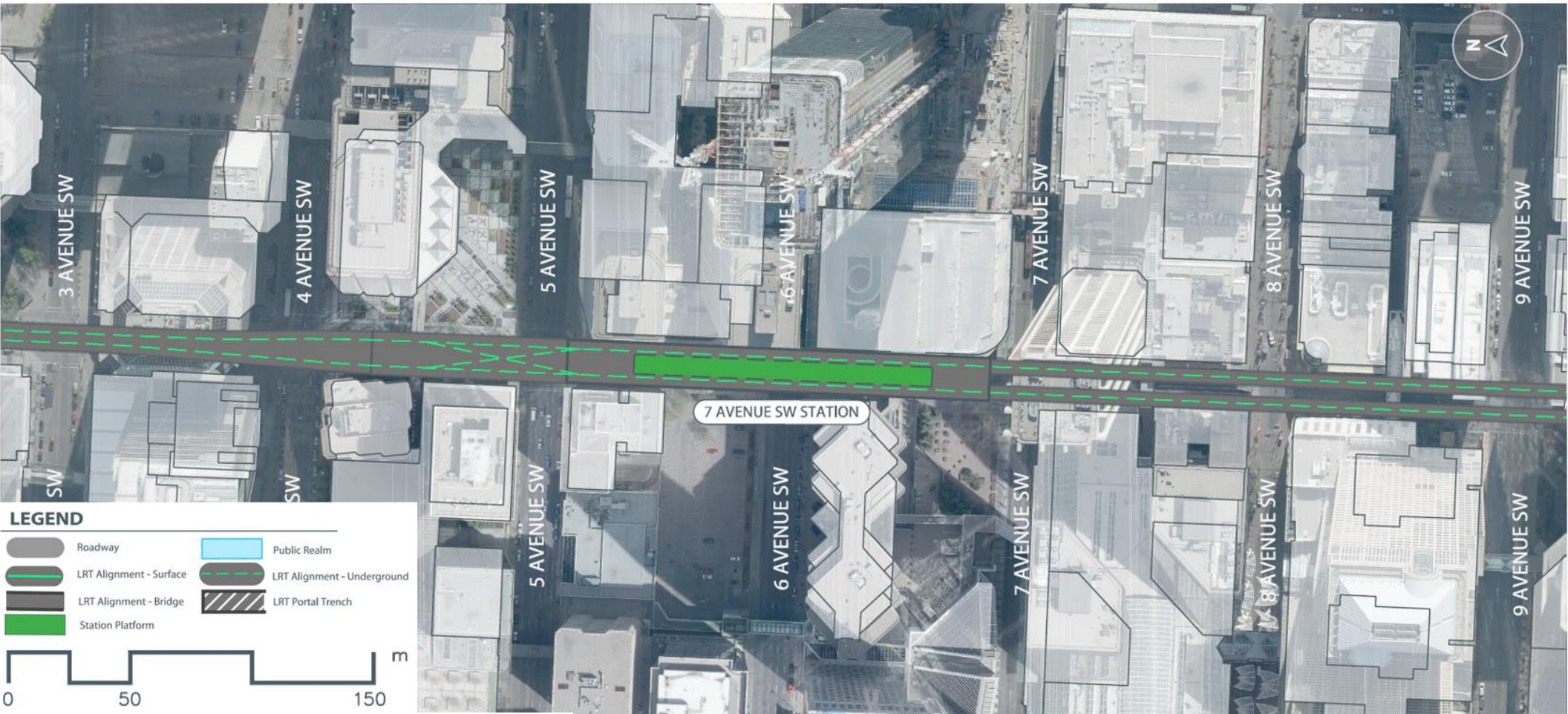


Figure 7. 7 Avenue S.W. station



2 Avenue S.W. station

The alignment progresses north on 2 Street S.W. and curves toward the west positioning 2 Avenue S.W. station underground on the west side of 2 Street S.W. between Waterfront Mews S.W. and Riverfront Avenue S.W.

2 Avenue S.W. station will connect Calgarians to the vibrant Prince's Island Park, Chinatown and historic Eau Claire. In 2028, ridership is forecasted at 6,500 passengers per day. In 2048, based on build out of the Green Line from Seton to 144 Avenue N., ridership is forecasted to increase to 10,900 passengers per day.

In 2028, within a 10-minute walking distance of the station (800 m), the station will service 5,800 people and 25,800 jobs. In 2048, the population is forecasted to increase to 9,200 people and 29,000 jobs.

Using the new central library integration as inspiration, this station will be fully integrated into the future development of the Eau Claire Market site.

The station configuration at this location is a side-loaded platform. This allows for the LRT tracks to be closer together as the alignment progresses from the station, out of the portal and on to the Bow River bridge reducing infrastructure costs.

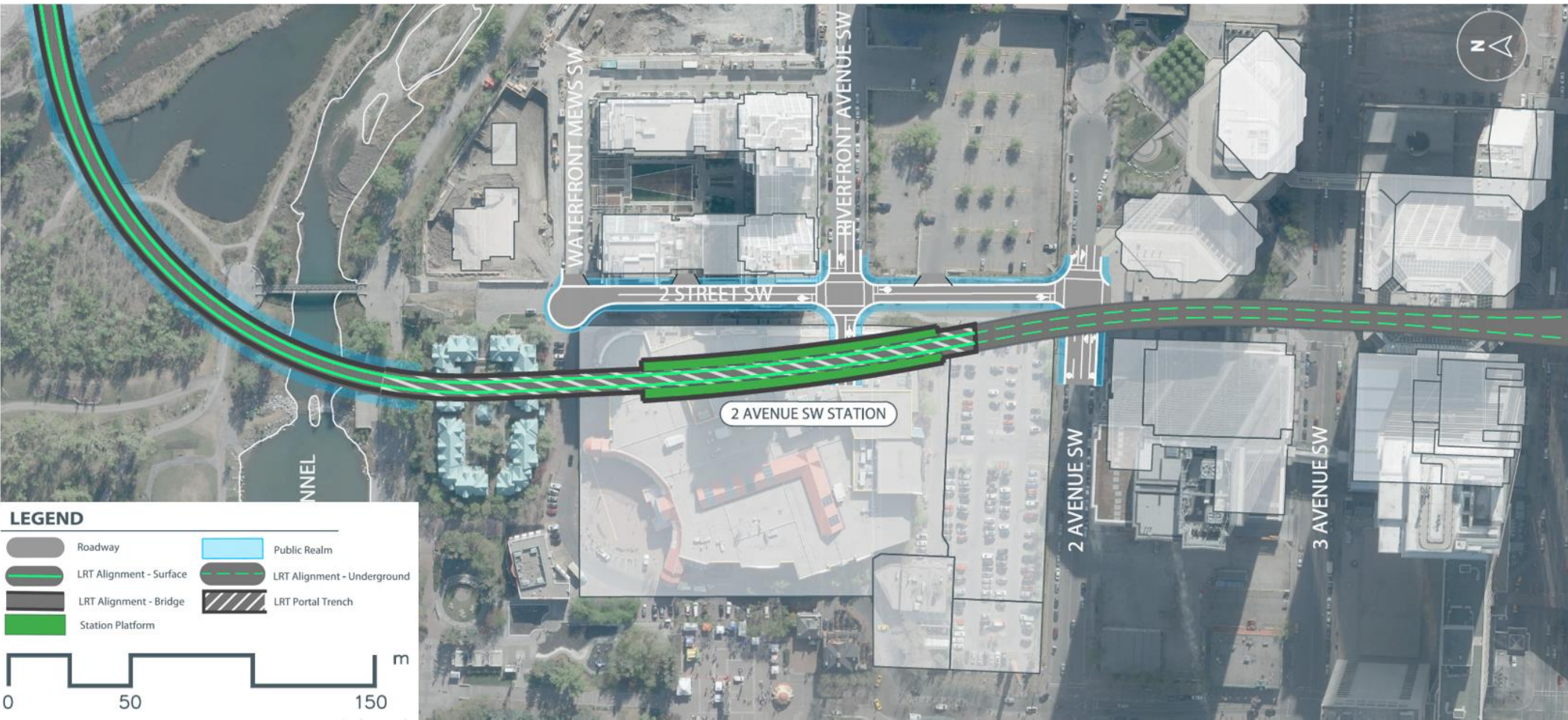


Figure 8. 2 Avenue S.W. station



Eau Claire landing

The intersection of the Eau Claire Promenade, the bridge and the portal will provide a unique public realm opportunity. This will create a prominent public **space in Calgary's downtown.**

Concept plans for this interface are currently being developed. The intention is for the multi-use pathway to shift south into a plaza area, traverse over the Green Line portal and then reconnect to the existing pathway system adjacent to the Bow River.

There are design opportunities for this area including: coffee shops, public gathering spaces, gardens, outdoor markets, open theatre and public art displays.

This part of the project is still in the early stages of design and will be coordinated with several stakeholders as well as the Bow River Pathway project.



Figure 9. Conceptual rendering of Eau Claire landing, aerial view looking southeast



Figure 10. Conceptual rendering of Eau Claire landing, street view looking north from 2 Street S.W.



Bow River crossing

A new bridge will be built for the Green Line LRT to cross the Bow River.

Planning and design of the bridge considered LRT operating requirements, **walking and wheeling requirements, Prince's Island Park** users, views, pathway connections, environmental impacts, local context, construction risk and cost.

Bridge type was narrowed down to three potential forms: a viaduct with consistent pier spacing including a pier in the river, a tied arch (arch structure above the bridge deck) with no pier in the river and a true arch (arch structure below the bridge deck) with no pier in the river. These potential forms were shared with stakeholders including the public.

The viaduct option was eliminated based on the feedback received. Further consideration will be given to the two other bridge forms as the project moves into the next phase of design with the continued objective of balancing planning and design objectives with technical requirements and project cost, schedule and risk.

A multi-use pathway has been included on either side of the bridge to enhance connectivity for pedestrians and cyclists.

The bridge is designed to meet 1:100 flood resiliency.

Bow river crossing, planning and design objectives

- ✓ Provide continued functionality and experience of the river **pathway and Prince's Island Park**
- ✓ Minimize impacts to views
- ✓ Incorporate flexibility for thoughtful bridge architecture options
- ✓ Minimize environmental impacts
- ✓ Mitigate construction impact to users of **Prince's Island Park and surrounding area**
- ✓ Consider strengthened connectivity for people who walk and bike



Figure 11. Bow River LRT Bridge alignment



Figure 12. Bow River LRT Bridge structure option, arch above bridge deck



Figure 13. Bow River LRT Bridge structure option, arch below bridge deck



Centre Street N.

On Centre Street N, Green Line extends from north of the Bow River to 16 Avenue N. Two stations will be built on the corridor, one at 9 Avenue N. and one at 16 Avenue N. Centre Street will function as an Urban Boulevard modified to prioritize the LRT running at-grade and a high-quality pedestrian experience, while maintaining vehicle access for local residents and businesses.

To meet the planning and design objectives of facilitating reliable, efficient and safe LRT, BRT and local bus operations the LRT and roadway cross-section were reviewed with various City departments. Several options for lane configuration, overhead contact system pole locations and curb styles were evaluated through the functional planning process. In the established cross-section, the Green Line LRT runs in the middle of Centre Street on embedded tracks with a concrete running surface. A mountable curb will allow emergency vehicles to drive along and across the LRT corridor if needed. Traction power for the LRT will be delivered via poles located between the northbound and southbound tracks. BRT will run in the traffic lane. A single lane of traffic in each direction (northbound and southbound) will be accommodated to facilitate vehicle access to community residents and businesses.

Wider sidewalks have been provided where possible to accommodate pedestrian traffic and allow for incorporation of trees and furniture to create an improved pedestrian experience. A plaza area on the east side of Centre Street between 7 Avenue N.E. and 8 Avenue N.E. will accommodate ticket vending machines, bicycle and scooter parking and landscaping opportunities. Signalized intersections between 7 Avenue N.E. and 16 Avenue N.E. will increase from two to five, improving connectivity and increasing safety for pedestrians.

On-street parking on Centre Street N between 7 Avenue N.E. and 16 Avenue N.E. will not be provided. Motorists can access businesses and the community through right turns, which will be permitted at every intersection, and through left turns, which will be permitted at signalized left turn bays at 7 Avenue N., 9 Avenue N., 10 Avenue N. and 12 Avenue N.

Centre Street N. planning and design objectives

- ✓ Provide an urban realm that prioritizes pedestrian experience along the corridor
- ✓ Ensure pedestrian connectivity across the corridor
- ✓ Facilitate reliable, efficient, and safe LRT, BRT, and local bus operations
- ✓ Manage vehicle access for local residents and businesses
- ✓ Minimize impacts to existing properties and businesses
- ✓ Maximize future development opportunities, prioritizing Transit Oriented Development

The LRT and roadway profile will be refined in the next development phase to accommodate overland drainage and intersection grading and refine property impacts.

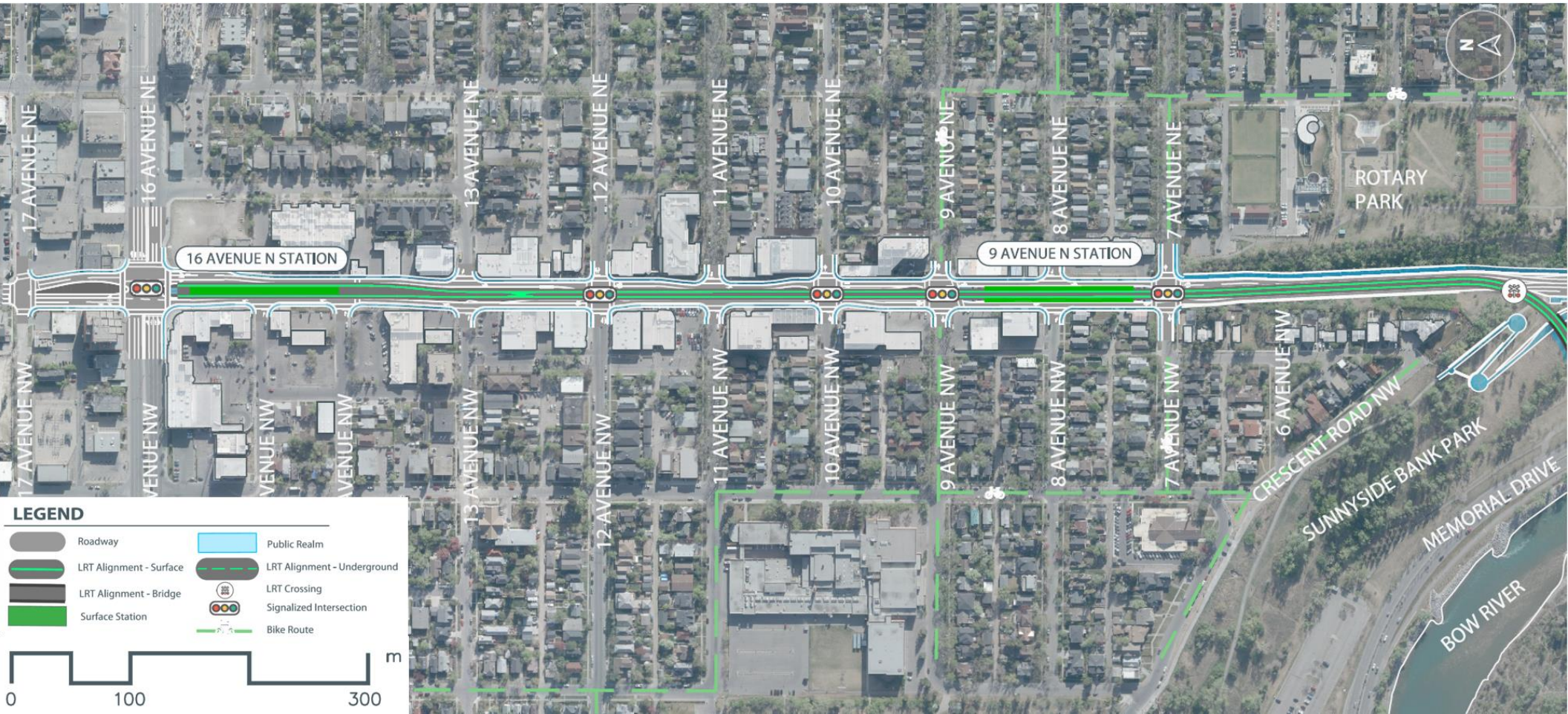


Figure 14. Centre Street N. alignment and station locations



9 Avenue N. station

The 9 Avenue N station is located at the most southern part of the Centre Street commercial corridor, located 1.0 km outside of downtown. It will provide additional transit connectivity to the commercial activity along Centre Street and further encourage development and renewal along the corridor. Placement of the station meets planning and design criteria by increasing TOD opportunities along the corridor and provides conditions that will encourage an increase of overall ridership in the area. The station is located in close proximity to Rotary Park, a popular local park that is home to passive and active recreation as well as the City of Calgary Emergency Operations Center.

The 9 Avenue N. station will be an at-grade station with side-loaded platforms located in the middle of the road right of way between 9 Avenue and 7 Avenue N. There will be a crosswalk at both avenues to access the station, leading passengers up a small ramp to the platform. Similar to the 16 Avenue N. station, ticket vending machines will be placed on the sidewalk to ensure clear and safe access off the platform and to prevent bottlenecks on the platform ramps.

In 2028, within a 10-minute walking distance of the station (800 m), the station will service 6,600 people and 4,300 jobs. In 2048, the population is forecasted to increase to 10,400 people and 5,100 jobs. Ridership at this station in 2028 is forecasted at 2,100 passengers per day. In 2048, based on build out of the Green Line from Seton to 144 Avenue N., ridership is forecasted to increase to 3,300 passengers per day.

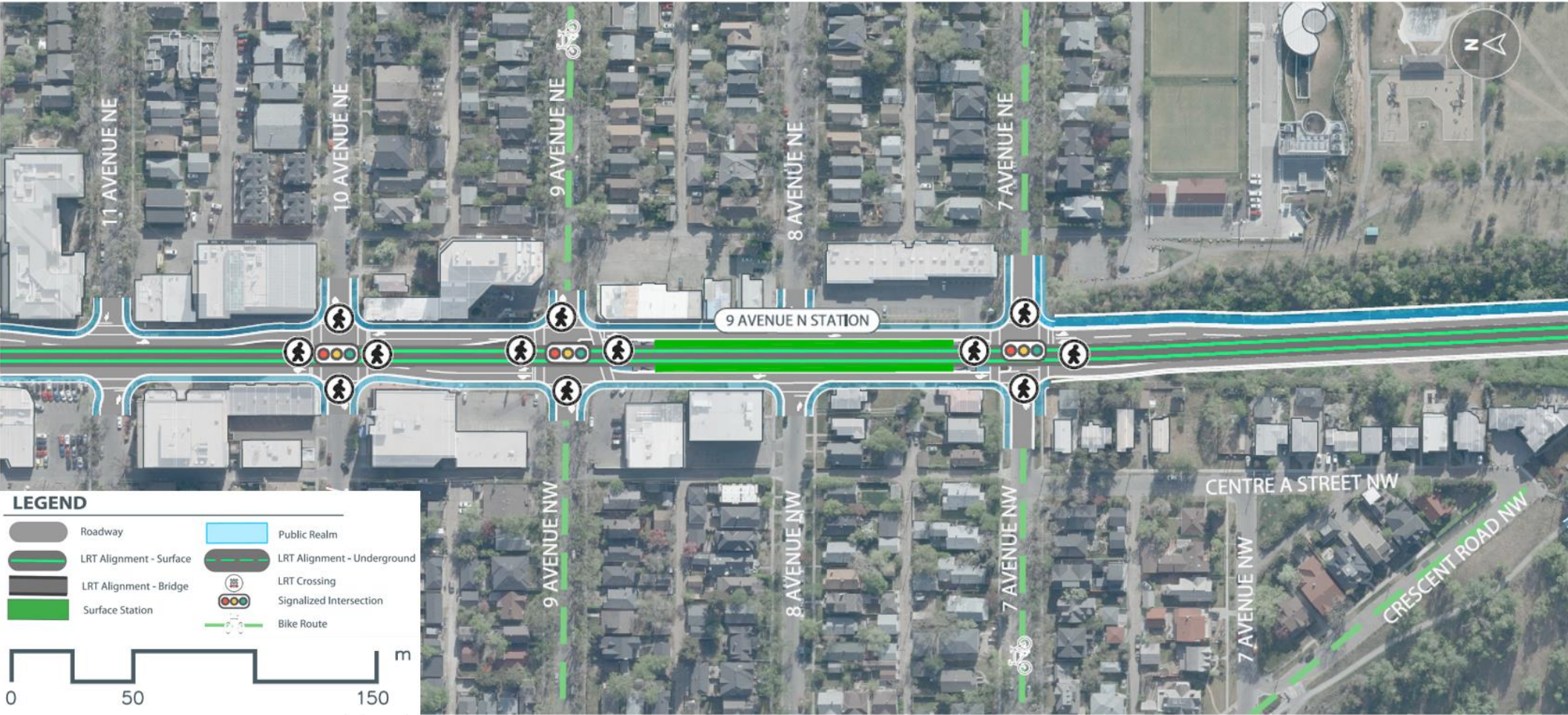


Figure 15. 9 Avenue N. station



16 Avenue N. station

16 Avenue N. station will operate as an interim terminus for the stage 1 alignment until future expansion north of 16 Avenue N. occurs. The 16 Avenue N. station is an important transit node as it connects Green Line with the MAX Orange line running east/west along 16 Avenue N. In addition, the station is at the intersection of two important commercial corridors, 16 Avenue N. and the Centre Street Main Street Corridor.

The station will be a centre-loaded platform located in the middle of the road right of way (ROW). Ticket vending machines will be located off-platform. The north end of the station can be accessed at the 16 Avenue intersection and the south end of the station at 14 Avenue N.W. via crosswalks leading passengers up a small ramp to the platform.

In 2028, within a 10-minute walking distance of the station (800 m), the station will service 7,600 people and 3,800 jobs. In 2048, the population is forecasted to increase 12,600 people 4,700 jobs. Ridership at this station in 2028 is forecasted at 4,400 passengers per day. In 2048, based on build out of the Green Line from Seton to 144 Avenue N., ridership is forecasted to increase to 7,400 passengers per day.

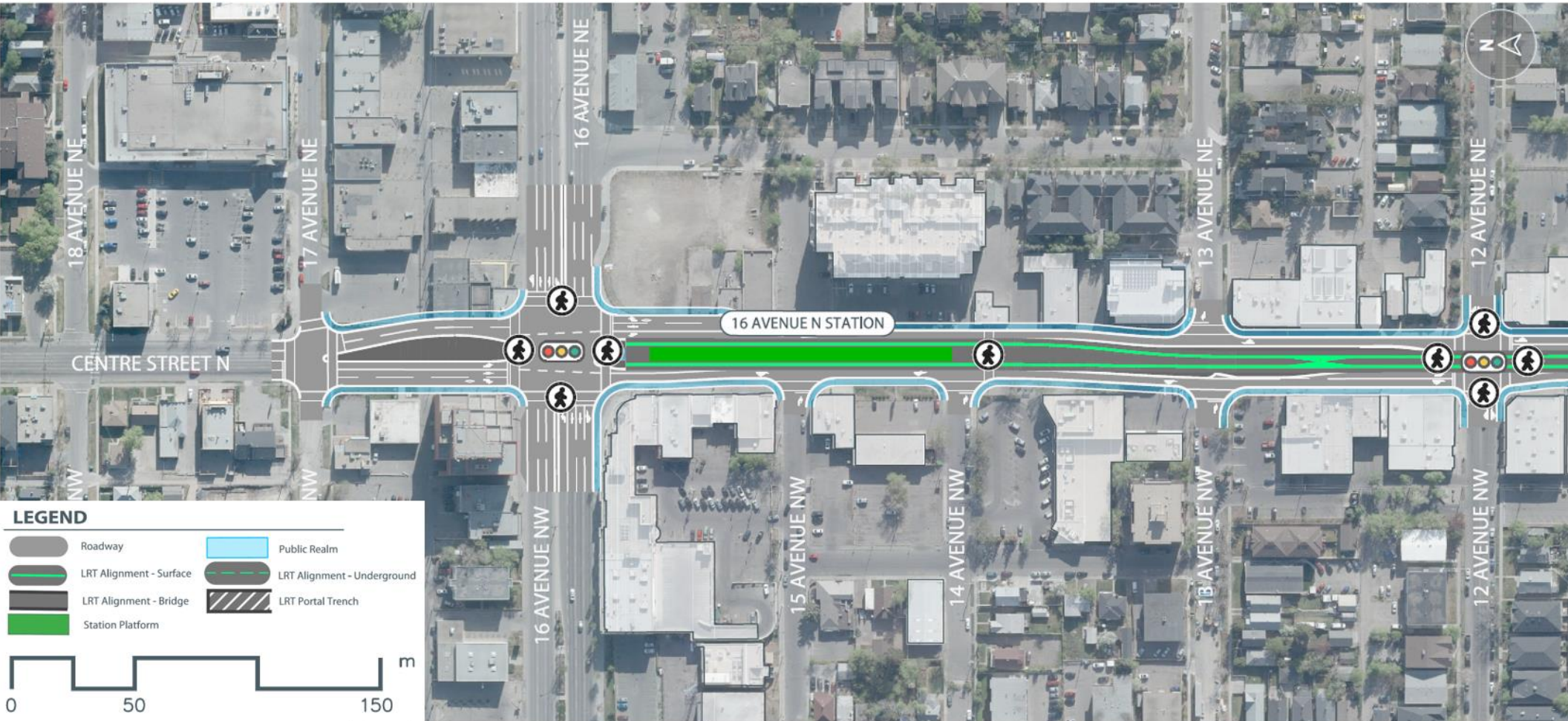


Figure 16. 16 Avenue N. station



Public engagement

The project has engaged with Calgarians on segment 2 of the Green Line LRT since 2011. Planning and design criteria were established for each of the geographic regions during the development of the Segment 2 Concept Plan approved by Council in June 2020. These criteria guided the development of the Segment 2 Functional Plan.

Communication with various stakeholders including adjacent landowners, Community Associations and Business Improvement Areas has continued during the Functional Planning process. The final inform phase for the Segment 2 Functional Plan was completed in April 2021.

The Green Line team has performed integrated communications and engagement on related projects, including the North Central Mobility Study, North Central BRT Study, Crescent Heights Mobility Study and Streetscape Master Plan for Centre Street North, and the Bow River Bridge Plan.

From October 2020 through April 2021, over 46 public sessions and stakeholder meetings were held, and 13 online surveys were conducted. In total, more than 60,000 people were made aware of the project through communication campaigns, while 18,000 participants were connected with through engagement opportunities (online portal and sessions) and an additional 1,600 ideas and contributions were received across all phases.



Station integration

The Green Line team is actively working with developers and landowners to explore integrating underground station platform locations and station entrances into adjacent existing and future developments.

Integrated stations can benefit The City, developments and transit users. Integrating stations into existing or future developments can help lower the cost of land acquisition and construction costs for The City. For developments, integrating stations into a building may help attract or retain tenants and may attract new customers to support retail tenants. Transit users can benefit from integrated stations through an improved transit rider experience that provides seamless connection from the LRT into an individual development and the broader +15 network.

Station integration is a program based on objectives of TOD. TOD integrates compact, walkable, pedestrian-oriented areas with a diverse mix of uses and incomes and at densities that support transit ridership. This approach ensures that people can access alternative modes of transportation and transit services quickly and conveniently from the places they live, work, shop and play.



Figure 17. Station integration concept



Utility relocation

The Green Line team has completed a series of investigations, including confirmation of utility asset records and field investigations to identify unknown utilities throughout the corridor. Utility design for segment 2 has advanced to 30% completion.

Within segment 2 of the Green Line, the existing utilities impact the tunnel alignment, station design, locations and construction sequencing and methodologies. They also pose **a high risk to the project's schedule and cost.** Utilities that conflict with the infrastructure will be relocated prior to construction. The relocation will also ensure ongoing utility maintenance will not impact LRT operations,

Utilities present include City owned storm, sanitary, fibre optic and streetlight; privately owned shallow utilities (gas lines, telecom, power and heating pipelines) and overhead transmission lines. Each conflict is considered on a case-by-case basis with an ultimate recommendation of relocation or protecting-in-place. Work will be managed through a Construction Management contract that will **work in tandem with the City's Green Line team.**



Additional site investigations, consultation and analysis

Environmental stewardship

Several environmental technical investigations were started or completed during the functional planning stage, including noise and vibration modeling, and hydrotechnical analyses such as stormwater and environmental management assessments.

A Draft Modified Phase 1 Environmental Site Assessment (ESA) has been completed for the 11 Avenue S. portion of the segment 2 alignment as a supplement to the previous Phase 1 ESA completed for the Green Line North by Stantec in 2019. The 11 Avenue S. portion of the alignment was the focus of the Draft Modified Phase 1 ESA since the Beltline portion of the alignment is the only section that has substantially changed from an ESA perspective since 2019. Assessments will continue as required. Tree survey work will commence in 2021. Archeological and Heritage Resource work for segment 2 is ongoing.

Fish Habitat, Aquatic Habitat and Biophysical Impact Assessments

Fisheries and Aquatic Habitat Assessment work for both the Bow River and Elbow River Bridge were completed in October 2020. The Preliminary Biophysical Impact Assessments have also been completed for both bridges. Additional Preliminary Biophysical Impact Assessment work will continue into the spring and summer of 2021.

Noise & Vibration Analysis

Preliminary noise surveys have been conducted, and comparative and confirmatory studies are recommended post construction to determine if noise attenuation measures may be required along the alignment. Specific Vibration mitigations have been identified as required at specific areas of the alignment.

Envision sustainability certification

This project uses the Envision program which is a framework for planning and evaluating the social, environmental and economic benefits of all types and sizes of infrastructure projects. Information gathering work commenced on segment 1 prior to Functional Design planning and is now being applied to segment 2. This work will continue for the life of the project toward a Gold certification award at the end of Green Line construction.

Geotechnical Investigation

Field work for the geotechnical investigation has been completed. The final report will be completed in May 2021.

First Nations consultation

First Nations consultation has been conducted for parts of segment 1 and the Maintenance and Storage Facility for Green Line Light Rail Vehicles (LRVs). Additional consultation for the Bow and Elbow River Bridges may be required to satisfy any required Federal and Provincial permits, licenses and approvals processes. In addition, once further project details are defined, and bridge designs and locations have been identified, additional First Nations consultation will be conducted.



Next steps

From the functional plan, the Green Line team will develop a Reference Concept Design and Technical Performance Requirements, which will form part of the procurement documents for the Design-Build-Finance contractor.

In conjunction with the Construction Manager, the team will complete the design for utility relocation, determine and put in place the required traffic mitigation measures and commence the relocation of utilities.

Planning and design work will continue between the Green Line team and developers on integrating station entrances into private development.

Land acquisition in support of segment 2 will commence.

Green Line will continue to engage stakeholders as it moves from planning to procurement to construction phases. The Business Support Program, launched in 2020, will help businesses prepare for and manage the potential impacts of Green Line construction.