Calgary

Green Line

Update on Funding, Staging and Delivery

December 2015
Revision1.0

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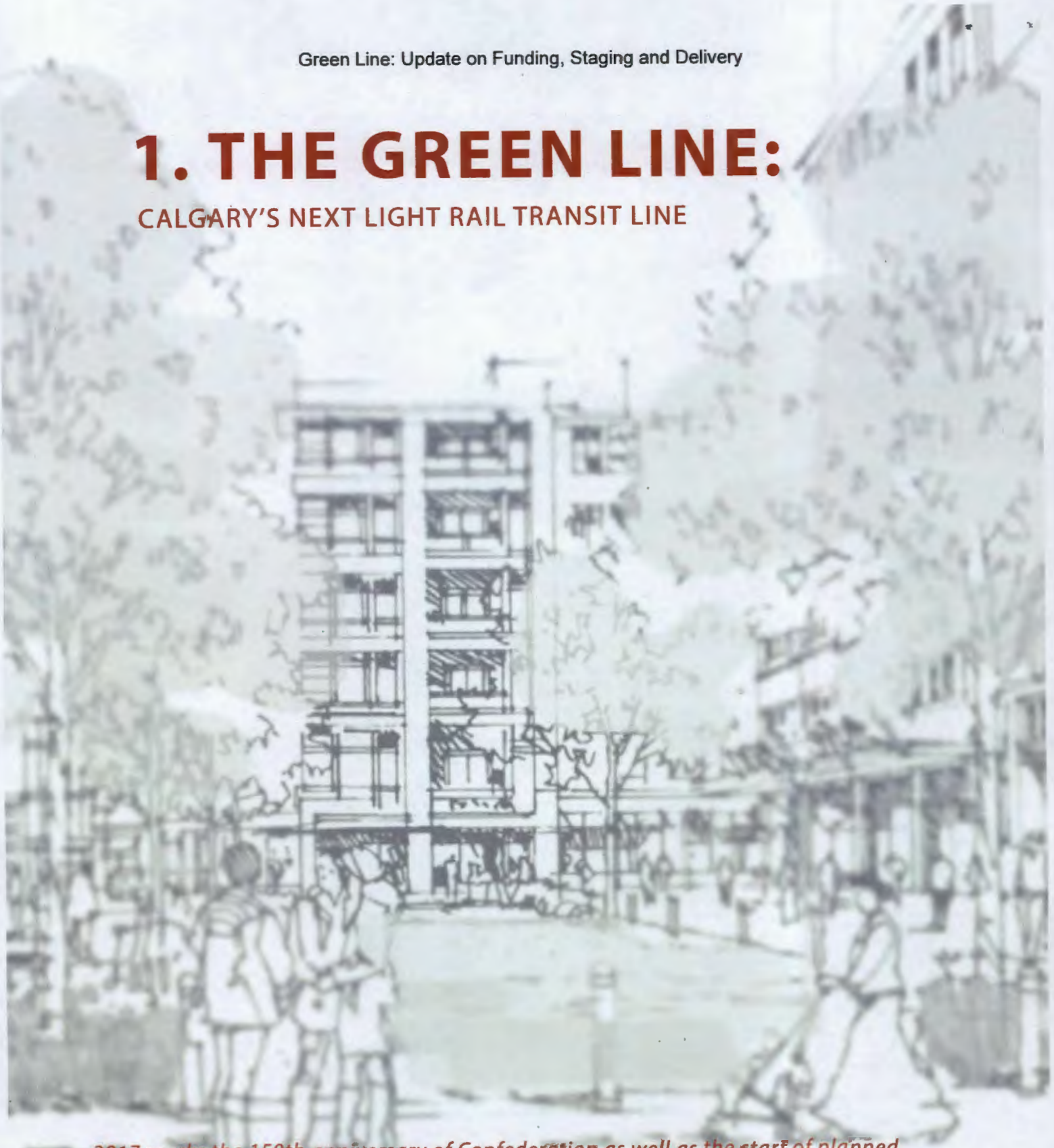
1. THE GREEN LINE:

CALGARY'S NEXT LIGHT RAIL TRANSIT LINE



2017 marks the 150th anniversary of Confederation as well as the start of planned construction for Calgary's next LRT line. A key building block of this nation was connecting Canadians by rail. The Green Line project is the opportunity to again strategically build rail infrastructure to connect Calgarians and continue to build our city.

THE GREEN LINE: CALGARY'S NEXT LRT LINE

The Green Line is Calgary's next light rail transit (LRT) line, and the highest public transit infrastructure priority for The City. In 2015 July, the Government of Canada announced $1.53 billion from the Public Transit Fund will be awarded to the Green Line project, contingent on The City's application. This is the single largest public infrastructure investment in Alberta's history. The funding represents a potential one-third contribution to the full build-out of LRT between North Pointe and Seton, estimated to cost between $4 billion and $5 billion. This report provides an overview of the potential funding, staging and delivery of this project.

In 1981, the first LRT line was opened, revolutionizing transportation in Calgary. The system has rapidly expanded to become the backbone of the regional transit network with 58 route-kilometres of track and 45 stations. Today, on the average weekday, over 320,000 passengers are carried on the existing CTrain network, making it the most successful LRT system in North America.

The Green Line is a top infrastructure priority in Calgary. It will form the spine of multiple neighbourhoods across Calgary and connect the downtown with residential communities in north and southeast Calgary, but also provides direct connections to the new South Health Campus, new recreation centres, major employment centres, the new $168 million National Music Centre, the new $245 million Central Library, Stampede Park, and several business revitalization zones. The Green Line will also integrate with future rail connection to the Calgary International Airport, which is in the midst of a $2 billion expansion.

KEY INFORMATION

Recommended staging: Seton to North Pointe

Capital costs: $4.5 to $5.0 billion (full line)

Target opening day: 2024 (dependent on funding)

Current confirmed funding:

- $520 million from City of Calgary between 2015 and 2024
- $1.53 billion from Government of Canada, pending application approval and matching City and Provincial funds

Capital funding includes:

- 28 stations / 40+ km track
- Low-floor vehicles
- Bus terminals and park and ride lots
- Maintenance and storage facilities

Ridership projections:

- Increase of 40,000 new transit trips in 2024 (in comparison to if there were no Green Line in 2024)
- Decrease of 12,000 vehicle hours travelled every weekday due to reduced congestion and less auto trips (private vehicles plus bus hours)
- Average weekday ridership upon opening (2024) of 90,000

Funding considerations:

If cash flows are over a 30-year period financing will be required. Depending on the length of the borrowing period and the interest rates assumed, the net present value of the combined funds will only fund a portion of the entire project. One funding scenario estimates projected funding and cash flows over 30 years to have a present value of ~ $3.0 billion which would fund only an initial stage of the project

Projected operating costs in 2024:

	RIDERSHIP	NET OPERATING (MILLIONS)
North Pointe to Seton (40KM)	128,000	$5 to $27*
96 Ave to McKenzie Towne (31KM)	119,000	$11 to $33*
Beddington to Shepard (26 KM)	114,000	$16 to $38*

1. Additional operating hours are required now and prior to LRT to meet population growth and ensure coverage and adequate service intensity in the SE communities
2. Lower net operating costs are seen with more LRT infrastructure being built

*Costs are dependent on a number of factors including: additional operating cost investments prior to LRT, actual ridership, vehicle characteristics, operating speeds, and staging of the infrastructure.

Population and jobs in corridor

	2014		2023		2039	
LRT CATCHMENT	POPULATION	JOBS	POPULATION	JOBS	POPULATION	JOBS
North Central	166,000	40,000	185,000	52,000	233,000	77,000
Southeast	120,000	100,000	180,000	125,000	230,000	158,000

2. MOBILITY STRATEGY

MOBILITY STRATEGY

Green Line LRT strongly supports a number of Council and City policy statements as outlined below.

COUNCIL OR CITY POLICY	SUPPORTED DIRECTION - GREEN LINE LRT
imagineCalgary 2007	• By 2036, we reduce the annual private vehicle kilometres travelled per capita by 20 per cent. • T2 By 2016, we increase the residential population within walking distance (600 metres) of LRT stations and major transit nodes by 100 per cent. • T3 By 2016, we increase the number of jobs within walking distance (600 metres) of LRT stations and major transit nodes by 35 per cent. • T4 By 2036, there is a 50 per cent reduction from 1990 levels in the pollution (greenhouse gases) associated with automobiles. • T5 By 2036, we increase peak period transit, walking and cycling and carpool travel to downtown by 50 per cent, 40 per cent and 20 per cent respectively. • T6 By 2036, 100 per cent of public transit services (buses, CTrains and facilities) are accessible to people with disabilities. • T7 By 2036, transit trips per capita increase 40 per cent over 2006 levels
Municipal Development Plan (MDP) 2009	Adopted by Council in 2009, provides direction for long term city growth • More compact city • Cultivates walking, cycling and transit • Creating a prosperous economy • Creating great communities • Greening the city.
Calgary Transportation Plan (CTP) 2009	**Transportation Goal #1:** Align transportation planning and infrastructure investment with city and regional land use directions and implementation strategies **Transportation Goal #3:** Provide affordable mobility and universal access for all. **Transportation Goal #4:** Enable public transit, walking and cycling as the preferred mobility choices for more people. **Transportation Goal #6:** Advance environmental sustainability **Transportation Goal #7:** Ensure transportation infrastructure is well managed.
Corporate Growth Management	Promoting the goals and objectives of the MDP with regards to developing communities with complete services sooner, and reach the overall goals of population growth in the developed and developing areas.
Council Priorities (Action Plan 2015 - 2018)	• a city that moves • a prosperous city • a healthy and green city • a city of inspiring neighbourhoods • a well-run city

MOBILITY STRATEGY

COUNCIL OR CITY POLICY	SUPPORTED DIRECTION - GREEN LINE LRT
Fair Calgary (CSPS019) 2012	Fair Calgary will be the overarching policy and framework for the "social" of the Triple Bottom Line Policy (LUP003, EM003, CS003) and from that perspective will: 1. "Incorporate sustainable development principles by considering and addressing the social, economic, environmental and smart growth impacts of all its decisions and actions, with regard to planning, policy, strategies, services, operations, approvals, and all other City business." (TBL Policy, 2005 September 12) 2. "Protect and enhance the economic, social and environmental well-being of present and future generations of Calgarians." (TBL Policy, 2005 September 12)
Environmental Policy (UEP001)	• Develop and implement strategies to mitigate impacts promote conservation and minimize consumption of natural resources including land, energy and water • Enable citizens to reduce their environmental impact and contribute to the imagineCALGARY urban sustainability plan • Engage, innovate, and partner with other organizations and orders of government on programs and legislative initiatives to improve the environment.
Transit Oriented Development Policy Guidelines	The City of Calgary has made significant public investment and long range policy commitments to optimizing the use of public transportation infrastructure, increasing mobility choices of Calgarians, and creating vibrant, diverse neighbourhoods. The Transit Oriented Development (TOD) Policy Guidelines provide direction for increasing transit ridership and ensuring that LRT station areas are attractive to local residents and city-wide transit users in order to optimize these commitments. The intent of this policy is to: • **to reaffirm the importance** of LRT system and stations as city-wide assets and the need to optimize the use of this investment through supportive land use policies • to establish broad, city-wide **policies and guidelines** for the future intensification and development of lands in the vicinity of Transit Stations • to **create certainty** in Transit Station areas for local communities, landowners and developers by clarifying the City's objectives for land use and development around Stations • to provide **a framework for evaluating** land use, development permit, and/or subdivision applications in Transit Station areas • to **direct policy development** of station area plans for new and existing Transit Station areas, and the preparation of, or amendments to, Area Redevelopment Plans and Area Structure Plans.

COUNCIL OR CITY POLICY	SUPPORTED DIRECTION - GREEN LINE LRT
Area Plans or Area Redevelopment Plans	Several (ASP/ARPs) were developed taking into considerations the future construction of the Green Line. These communities include: ASPs • Seton • Mahogany • Douglas Glen • Arbour Lake • McKenzie Towne • Quarry Park • Prestwick • New Brighton ARPs • East Village • Easu Claire • Beltline • Inglewood • Ramsay • Crescent Heights
CTP Alignment with Calgary Metropolitan Plan 2014	Key Sustainability Principles and Key Directions for Land Use Mobility applicable to the Green Line: • Create walkable environments • Foster distinctive, attractive communities with a strong sense of place • Provide a variety of transportation options • Mix land uses • Strategically direct and manage redevelopment opportunities within existing areas • Support compact development • Connect people, goods and services locally, regionally and globally. • Provide transportation services in a safe, effective, affordable and efficient manner that ensures reasonable accessibility to all areas of the city for all citizens
Triple Bottom Line Policy	The City of Calgary will use the Triple Bottom Line to: 1. Incorporate sustainable development principles by considering and addressing the social, economic, environmental and smart growth impacts of all its decisions and actions, with regard to planning, policy, strategies, services, operations, approvals, and all other City business; 2. Protect and enhance the economic, social and environmental well-being of present and future generations of Calgarians.

MOBILITY STRATEGY

COUNCIL OR CITY POLICY	SUPPORTED DIRECTION - GREEN LINE LRT
Calgary Economic Development Strategy – November 2014	• Community Energy • Build Calgary as a model city for sustainable development and affordable living. • Direct future growth in a way that fosters more compact and efficient use of land, creates complete communities, allows for greater mobility choices and enhances vitality and character in local neighbourhoods. • Build and promote Calgary as a city to live a creative, active life. Develop an integrated, multi-modal transportation system that supports a prosperous and competitive economy. • Maintain automobile and commercial goods vehicle mobility while increasing emphasis on alternative modes of transportation • Provide safe and accessible public transit service
Long-Range Financial Plan 2011	Five main financial goals, including: • **Flexibility**: being able to respond to changing circumstances, which may relate to economic, social, environmental or political conditions. • **Efficiency:** using public funds in ways that provide the highest level of needed services possible within the amount of funding available. • **Sufficiency:** having sufficient resources to support the delivery of services for which The City of Calgary bears responsibility. • **Integration:** ensuring the financial constraints under which The City operates are fully considered when engaging in policy-making and decision-making. • **Credibility:** achieving financial performance in a way that maintains and enhances public confidence in the municipal corporation. The five financial goals are further supported through eight strategy areas. These strategies, which will spur actions to both change City approaches and maintain current beneficial practices, include: • Ensuring adequate funding. • Achieving diverse sources of funding. • Managing expenditures. • Providing for contingencies. • Using debt strategically. • Operating with prudent foresight. • Maintaining sufficient cash flow. • Promoting and enabling integration.

OTHER PROJECTS

The Green Line project team continues to coordinate with several City departments and business units and has been supported throughout the process. Key projects from other departments include: East Village, Main Streets, Pedestrian Strategy, Bonnybrook Wastewater Treatment Plant expansion, 12 Street S.E. bridge replacement, Ninth Avenue S.E. bridge replacement, Centre Street Major Road Rehabilitation, Inglewood Sanitary Trunk, Seton Recreation Facility, Glenmore Trail/Ogden Road S.E. Interchange, and the Highfield Landfill Remediation. Coordination with the Office of Land Servicing and Housing (OLSH) has focused on maximizing the TOD potential of City-owned lands in alignment with the citywide TOD strategy.

Rendering of the Green Line in the Southeast

(image source: http://newsroom.calgary.ca/news/harper-government-invests-to-get-calgary-moving)

CONTRIBUTIONS TO GREENHOUSE GAS EMISSION TARGETS

The City of Calgary has committed to reducing greenhouse gases (GHGs) from its corporate operations, through energy efficiency and conservation programs and a shift to using lower carbon and renewable energy sources. The City also has a community GHG reduction plan with a broader aim of enabling Calgary citizens and businesses to reduce emissions, primarily from choices they make in transportation and heating homes and buildings city-wide. The City's targets are for 20% reduction in GHG emissions from a 2005 baseline by 2020, and an 80% reduction by 2050.

Corporately, The City is on track to meet this target through various investments and initiatives it has undertaken and notably through its renewable energy certificate (REC) supply contract with Enmax, which extends to 2026. However, energy consumption in Calgary continues to increase in step with population growth, urban expansion, and the resulting extension of services and travel distances such that GHG emissions for the broader community are moving away from targets.

MOBILITY STRATEGY

To address those challenges, The City through its community leadership, strategic planning and policy (e.g. MDP/CTP) is expanding and enhancing public transit service, enabling transit-oriented development and other strategic intensification to promote higher urban densities and accessibility to the primary transit network, and increasing transportation choices with investments in pedestrian and cycling infrastructure. Just as the western extension of the Blue Line (West LRT) has facilitated a large increase in transit ridership, upon completion of the Green Line we anticipate over 30,000 daily transit trips that would otherwise travel by single-occupancy vehicles. Accordingly, the shifts in travel mode and also land use made possible by the Green Line are key to community-wide GHG emissions reduction. The emission reduction associated with these estimates will be incorporated into the Business Case for submission to the Provincial and Federal governments.

Through the Calgary Climate Change Accord and most recently reflected in the Canadian Big City Mayor's Climate Change Action statement (Big City Mayors' Caucus, Federation of Canadian Municipalities, 2015), Calgary has committed to support binding GHG emissions reductions targets at the international , national and city level that are to be achieved in Canada collaboratively through a national climate change strategy. With the partnership and financial support of provincial and senior governments, the Green Line figures prominently in Calgary's development and implementation of its municipal climate action plan.

GREENTRIP FUNDING

The predesign for a portion of the Green Line was funded through regional transit funding application for the Calgary Region in its 2011 "Regional GreenTRIP Proposal". The Calgary Regional Partnership (CRP) developed a single comprehensive regional GreenTRIP program proposal to the Government of Alberta. It builds on long term Regional Transit Plan and is integrated with the Calgary Metropolitan Plan (CMP). CRP GreenTRIP program initiatives include regional and local transit projects to build ridership, reduce greenhouse gas emissions and meet transit objectives in Airdrie, Canmore, Bow Valley (Banff and Canmore) and Calgary. The work conducted by The City of Calgary between 2012 and 2015 was funded two-thirds by GreenTRIP and one-third through the City's Green Line fund.

TOWARDS INTEGRATED REGIONAL MOBILITY

The Green Line is identified as part of the 2009 Calgary Regional Transit Plan, created through the CRP, as identified in the 2009 November 20 Regional Transit Plan. Aside from the key regional destinations highlighted elsewhere in this report, the following transit hubs are key connections as part of the regional transportation strategy:

- Airdrie ICE (North Pointe/Keystone/Centre Street stations)
- Calgary Regional Partnership On-It service (Seton/Hospital stations, Inglewood-Ramsay station, etc.)
- Regional commuter rail on CP corridors (4 Street SE station and 7 Avenue/2 Street SW station)
- Provincial high speed rail (4 Street SE station and connection at 96 Avenue N station)
- Potential integration with Airport Rail Connection (96 Avenue N station)
- Other Calgary Transit rapid transit corridors (Red Line, Blue Line, North Crosstown, South Crosstown, 17 Avenue SE Transitway, Southwest Transitway, other future corridors) and other Primary Transit Service corridors with future 10 minute frequency, 15 hours a day, 7 days a week (Routes 72/73, 2, 3, etc.)


FUTURE CALGARY REGIONAL TRANSIT PLAN
Draft - February 3, 2009
Crossfield
Beiseker
Irricana
Airdrie
Balzac
Cochrane
HWY 1
CALGARY
Chestermere
De Winton
Okotoks
Black Diamond
Turner Valley
Aldersyde
High River
Longview
Nanton
Existing LRT
Future LRT
Future LRT Station
Compact Urban Node
Industrial Development
AECOM
Scale 1:350000
1 Millimeter = 0.35 Kilometers
0 5 10 15 20 25 Kilometers

MOBILITY STRATEGY

ECONOMIC DIVERSIFICATION

The City and its partners are diligently working to advance Calgary's economic diversification and growth, and to strengthen Calgary's position as a location of choice for investment and business development. A recent amendment to a report to the 2015 October 07 Standing Policy Committee (SPC) on Planning and Urban Development, Green Line Southeast Transit Oriented Development Plan PUD2015-0765, supports this strategy by focusing attention on the Green Line corridor. The approved amendment is as follows:

> 3. Direct Administration to conduct a scoping report, and report to Council through the SPC on Transportation and Transit no later than 2015 December 11, on amending the TOD Policy Implementation Document contained in Report PUD2015-0765 (Attachment 2), by the addition of a Section 1 "Policy Tasks", Subsection F, as follows:
>
> > "F. That the economic development and diversification potential of the green line Transit Oriented Development (TOD) be investigated. And further, that this analysis includes an assessment of opportunities to attract high potential business sectors as identified by the Calgary Economic Development strategy of November 2014 and be continental in scope"

Administration sees this work as an outgrowth of imagineCalgary targets aligned with Economic Well-Being:

"Calgary is a city with a vibrant, resilient, environmentally sound and sustainable economy that fosters opportunity for individual economic well-being."

Target 34	By 2036, research and development intensity, both public and private, increases to five per cent of Calgary's gross domestic product.
Target 35	By 2036, the number of environmentally sustainable and commercially viable value-added products and technologies produced in Calgary increases by 100 per cent.
Target 36	By 2036, Calgary's non-oil-related industries grow by 50 per cent.
Target 37	By 2036, Calgary is ranked as the most favourable Canadian city in which to establish businesses that support sustainability practices.
Target 38	By 2036, tourist visitations and expenditures grow by 90 per cent.
Target 39	By 2036, alternative ways to measure economic well-being are commonly used to support sustainability principles in decision-making."

It also furthers the Action P2 included in Action Plan 2015-2018: "Advance purposeful economic diversification and growth."

The Green Line represents a unique opportunity to achieve these economic targets. The Green Line has the following unique attributes that make it a candidate for special focus on economic diversification:

- Sites along the alignment that are City-owned;
- Investment in site remediation by The City, with lessons learned and potential technology advancements that will make remediation of nearby sites easier;
- Pre-planned land use concepts, a result of comprehensive transit-oriented development planning in 2015-2016;
- Investment in LRT infrastructure and operation, offering a new means of high-quality, low-cost mobility to prospective employers and employees;
- A new form of sustainable transportation in Southeast and North Central Calgary, enabling sustainable travel to/from businesses and the possibility of new Leadership in Energy and Environmental Design (LEED) qualification points for new/renovated buildings;
- Sites within walking distance of transportation corridor that are attractive to knowledge-driven industries and their employees;
- Sites in proximity to existing residential and commercial communities enhancing the 'complete community' feeling of the development;
- Sites in proximity to existing suburban office clusters facilitating the attraction of additional businesses; and
- Sites that offer the opportunity to retrofit/upgrade existing buildings – some of which have heritage value/character.

This work aligns with roles at The City as follows:

Planning, Development and Assessment (PDA) is responsible for defining and implementing the growth of the city by developing plans, policies and services that support land use and development throughout Calgary and in the Calgary region. PDA assesses all city properties and businesses to support The City's financial sustainability. Its work supports the achievement of the goals of the Municipal Development Plan.

Corporate Economics assists The City of Calgary in the decision making process by providing services in the area of economic forecasting, information provision, policy analysis and consulting.

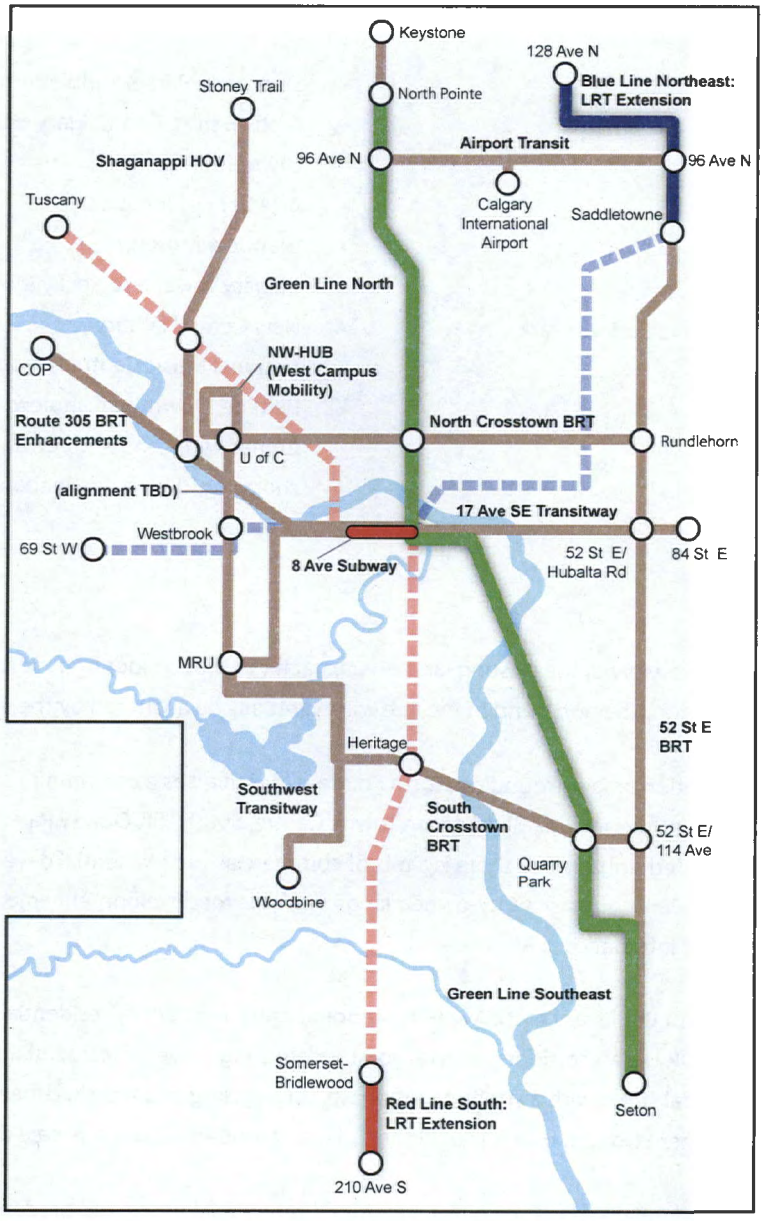
This work also aligns with Calgary Economic Development's role as the stewards of the Economic Strategy which sets forth the broad goals of shared prosperity, sustainable development and strong communities and specifically addresses economic diversification, the development of compact, walkable communities and an integrated, multi-modal transportation system that supports a prosperous and competitive economy. Calgary Economic Development is currently reorganizing and placing an increased emphasis on real estate development with the transit nodes along the Southeast leg of the Green Line as a focal point.

3. GREEN LINE CORRIDOR

GREEN LINE CORRIDOR

The Green Line is firmly embedded in Calgary's plan for the future. The Calgary Transportation Plan (2009), RouteAhead, a 30-Year Strategic Plan for Transit in Calgary (2013), and the Calgary Regional Transit Plan (2009) all include the Green Line as the next LRT line to be built in Calgary. A map showing the Green Line in the context of the RouteAhead plan is included below.

RouteAhead 30-year Rapid Transit Network



Legend

- Terminus/Connection
- Existing Red Line LRT
- Existing Blue Line LRT
- Proposed Green Line LRT
- Proposed Red Line LRT
- Proposed Blue Line LRT
- Proposed Transitway/BRT/Other Technology

GREEN LINE CORRIDOR

The Green Line is designed to link key destinations in Calgary. The easy and frequent Route 300 connection at 96 Avenue N station, along with the opportunity to integrate the Green Line with a future Airport Rail Connection, will bring these key visitor destinations within easier reach for visitors to Alberta.

COMMUTER/EMPLOYMENT DESTINATIONS ON THE ALIGNMENT INCLUDE:

- Centre City
- Southeast Industrial
- Quarry Park
- South Health Campus
- Greenview Industrial
- Airport
- City-owned lands at Aurora Business Park, South Hill and others

KEY VISITOR DESTINATIONS ON THE ALIGNMENT INCLUDE:

- Stampede Park & Saddledome
- Festival sites: Fort Calgary, East Village and Olympic Plaza
- Arts Central theatres
- Glenbow Museum
- Calgary Tower and Rocky Mountaineer rail station
- New Central Library
- National Music Centre (Studio Bell)
- Beltline, Downtown, Inglewood/Ramsay, Chinatown, Centre Street, and many other shopping/dining destinations

CHARACTER AREAS

The following is a high-level overview of the existing land use character in the corridor from north to south starting at North Pointe and ending at Seton. The north end of the line will eventually be anchored by the Keystone area.

Beginning at the north, the station area surrounding North Pointe is identified as a community activity centre in the MDP, one of several on the corridor (others include Beddington Towne Centre, South Hill, Quarry Park, Shepard/130 Avenue S). Between North Pointe and Beddington Trail there is a mix of commercial and residential development in a suburban environment. Aurora Business Park consists of City-owned lands available for development adjacent to 96 Avenue N, with excellent access to the Calgary International Airport.

Centre Street south of McKnight Boulevard to 32 Ave N is predominantly low density residential. The street is designated as an urban corridor in the MDP. Urban corridors are to accommodate a high level of residential and employment intensification on a multi-modal street with a strong focus on walking, cycling and transit. Urban corridors emphasize a walkable pedestrian environment fronted by a mix of higher intensity residential and business uses.

Centre Street has a mix of residential and commercial properties. Commercial properties predominate along Centre Street south of 32 Avenue N, with some residential single- and multi-family properties in neighbouring communities. North of 32 Avenue N residential properties predominate, with some commercial enterprises at busier intersections, such as 40 Avenue N and McKnight Boulevard.

GREEN LINE CORRIDOR

The Centre City is bound by the Bow and Elbow Rivers to the north and east and 17 Avenue South and 14 Street West. This segment includes Downtown, East Village, Stampede Park, East Victoria Crossing, Victoria Crossing Centre, Connaught Centre, West Connaught, West End, Eau Claire and Chinatown. Public transit is critical to getting people to and from the restaurants, shopping, festivals, sports events, cultural venues, homes, jobs and services that make Calgary's Centre City a livable, thriving and caring core. The downtown core is the anchor of the Green Line transit service.

The Southeast leg of the Green Line corridor includes the established inner-city communities of Inglewood, Ramsay, Lynnwood/Millican and Ogden. It includes commercial/industrial areas near 26 Avenue S.E., and the neighbouring Highfield industrial area.

The Green Line corridor includes major commercial/community activity centres such as South Hill, Quarry Park, Douglas Glen, and Shepard. While there are pockets of residential developments in this seven kilometre stretch, this area is predominantly an employment centre for thousands of Calgarians.

The last ten kilometres of the corridor serves the rapidly growing communities in suburban southeast Calgary. The communities in southeast Calgary have seen the largest growth in the city. The South Health Campus is located in the community of Seton. The hospital employs over 2,500 people and provides essential services to Calgarians and the region.

Overall the corridor includes a mix of high density established development, vacant lands and areas ready to renew. Green Line will help determine the potential of the redevelopment.

East Village redevelopment

(image source: https://findcalgary.files.wordpress.com/2011/08/bosa-eastvillage.jpg)

GREEN LINE CORRIDOR

POPULATION AND JOB GROWTH

The detailed information and interpretations below are estimates based on forecasts. These forecasts are The City's population and job (employment) assumptions from Geodemographics in Planning, Development & Assessment, and are also the basis for travel demand forecasts in the Regional Transportation Model (RTM) used by Forecasting in Transportation Planning at The City. Horizons used in this analysis are based on the snapshots in time used by Geodemographics and Forecasting. It is more important to look at the population than the specific year.

The catchment areas highlighted in the exhibits in this section are established based on transit planning principles and reflect the reach of the BRT/LRT system through walking, cycling, feeder bus networks and park and ride/pick-up/drop-off in nearby communities. The catchment areas take into account (i.e. do not duplicate) the reach of the Red Line and Blue Line into communities. The same catchment areas are used throughout the analysis in this report.

The tables below summarize the growth in population and jobs on the two legs of the Green Line (detailed population and job forecasts are shown in tables in Appendix 1).

POPULATION GROWTH SUMMARY

In 2023 there is forecast to be a similar population in the North Central and Southeast catchment areas due to the rapid growth in the Southeast, resulting in balanced transit demand in the long term.

Table 3.1 - Population Growth

YEAR	NORTH CENTRAL POPULATION (GREEN + RED + BLUE + YELLOW)	SOUTHEAST POPULATION (GREEN + RED + BLUE)	NC GROWTH SINCE 1999	SE GROWTH SINCE 1999
1999	111,000	52,000	0%	0%
2004	126,000	63,000	13%	21%
2014	165,000	120,000	48%	131%
2023	186,000	180,000	67%	245%
2039	232,000	230,000	109%	343%
2076	347,000	314,000	211%	502%

JOB GROWTH SUMMARY

Table 3.2 below illustrates the growth in jobs on both legs of the Green Line – excluding Downtown.

Employment growth is expected along both corridors; however there is a 2:1 ratio between the Southeast and North Central job forecasts. There are forecast to be over 125,000 jobs in 2023 in Southeast Calgary. As a result, many of the stations in the Southeast will act as a commuter destination.

Table 3.2 - Employment Growth

YEAR	NORTH CENTRAL JOBS (GREEN + RED + BLUE + YELLOW)	SOUTHEAST JOBS (GREEN + RED + BLUE)	NC GROWTH SINCE 2014	SE GROWTH SINCE 2014
2014	40,000	100,000	0%	0%
2023	52,000	125,000	30%	25%
2039	77,000	158,000	93%	58%
2076	108,000	211,000	176%	111%

Conclusions that can be drawn from this information include:

- The largest changes in population and jobs are experienced in the far-flung suburban catchments of Seton and Keystone in the long term.
- Population and Job added numbers are the sum of the various catchment areas to account for the extension of the LRT lines in staging scenarios. For example, in the scenario where LRT is extended as far south as Shepard, only 40,000 population are in the Green Catchment area in 2023 (north of Shepard). If LRT is extended further south (i.e. if red and blue catchment areas are included) the catchment area grows to 155,000 in 2023. This shows the value in extending the line to reach the location of the bulk of the population growth. The same applies to the North segments, however to a lesser degree.

GREEN LINE CORRIDOR

Exhibit 3.1 - Catchment Areas

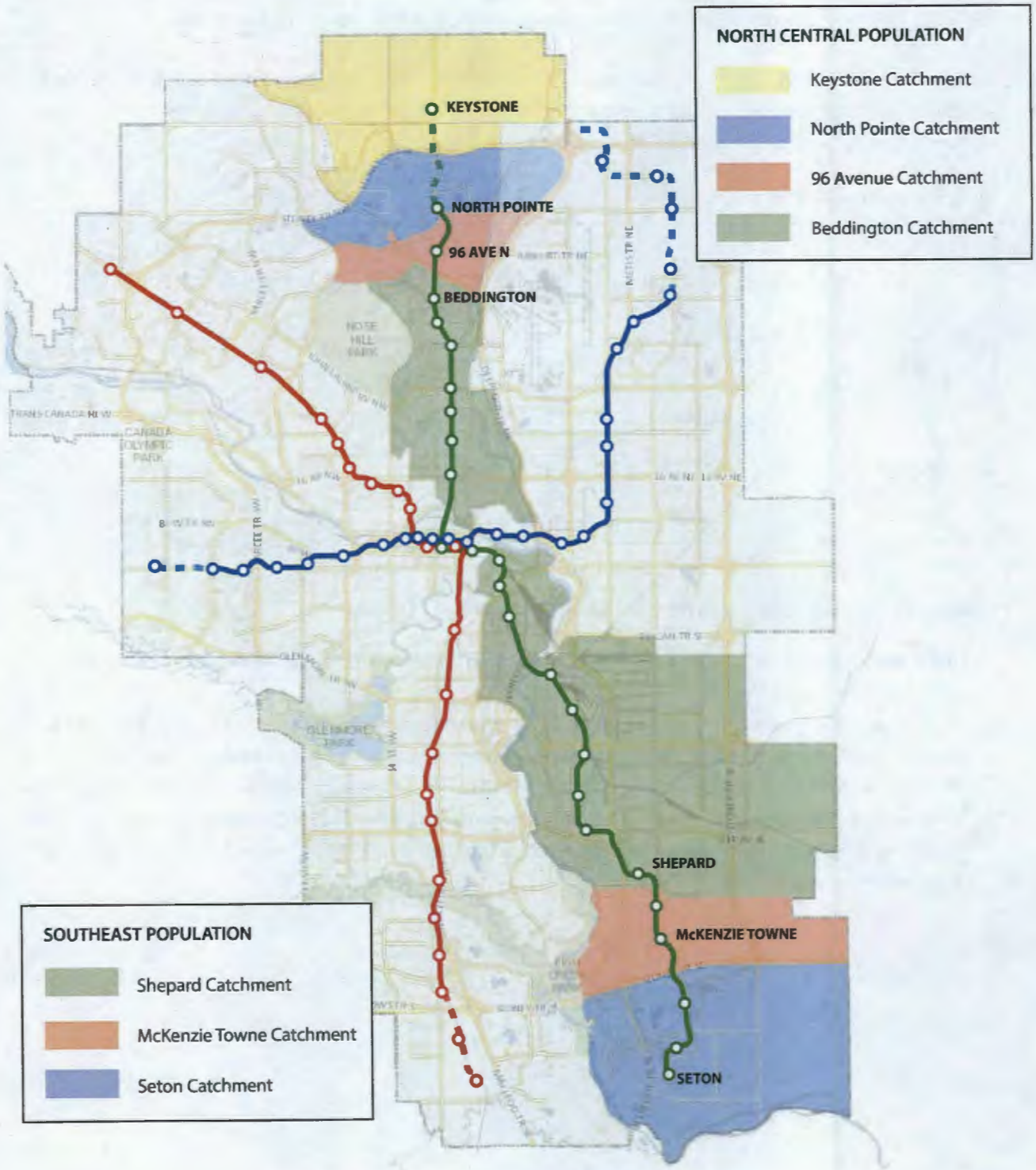
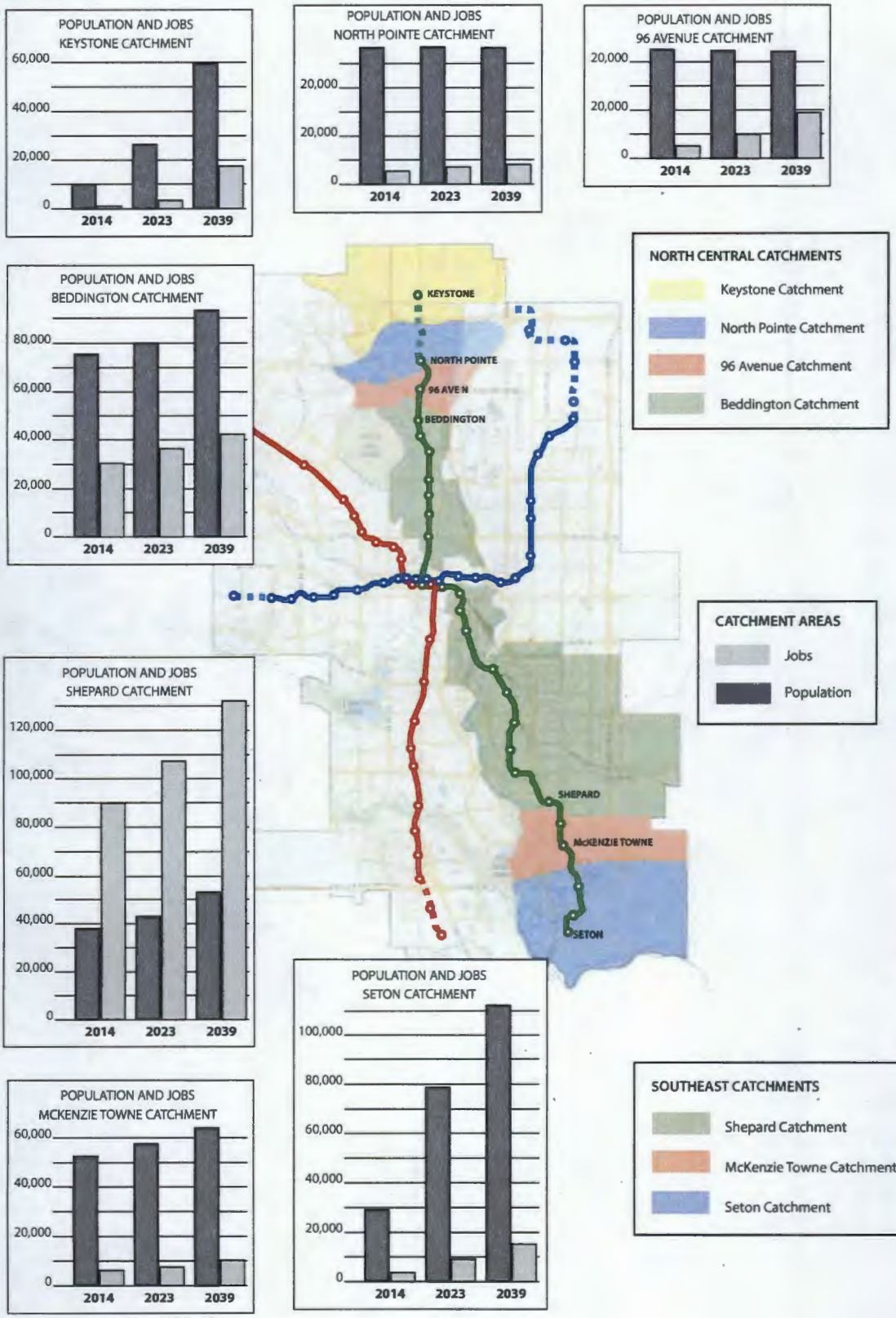
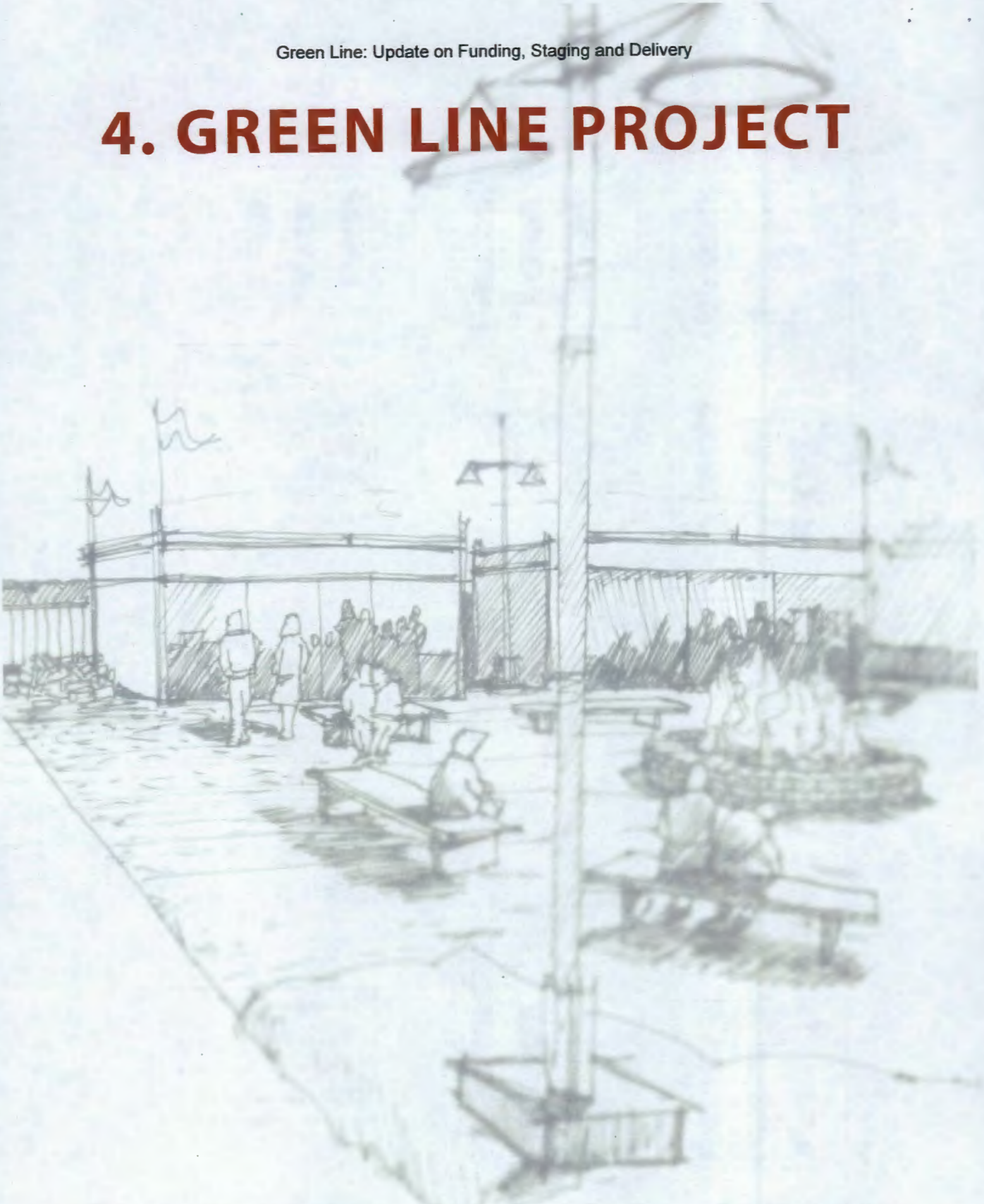


Exhibit 3.2 - Catchment Area Growth



4. GREEN LINE PROJECT



The Green Line LRT project includes the following elements:

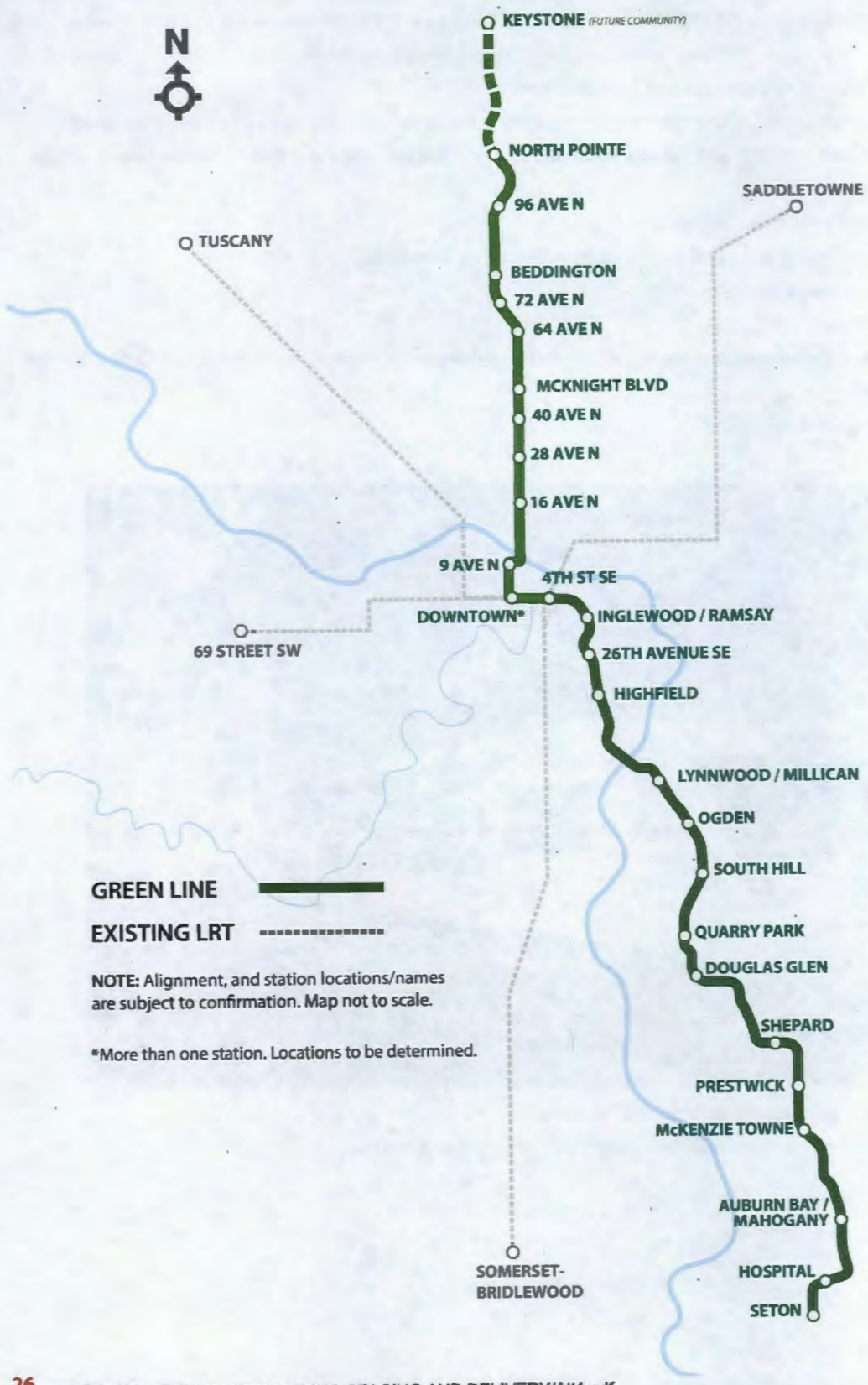
- 28 stations - stations will have all the amenities of the current CTrain system; canopies, heated shelters, ticket vending machines, real-time information displays, communication screens, integrated public art. In addition, platforms will offer improved LRT accessibility through low-floor boarding.
- Modern low-floor vehicles - all customer doors entering/exiting the vehicle will be low-floor (i.e. approximately 300mm curb height) rather than high-floor (approximately 900mm height, as in the current CTrain network), similar to Portland MAX system.
- Pedestrian and cycling connection network
- Feeder bus network with bus stops and major bus terminals at key locations
- Park and ride lots at strategic locations
- Maintenance and storage facility
- Operations Control Centre integration (the Green Line will be integrated with new CTrain Operations Control Centre at Westbrook Centre)
- Traction Power, signals and communications

Siemens S70 low-floor cars, Portland MAX system

(Image source: https://commons.wikimedia.org/wiki/File:MAX_Type_4_cars_crossing_185th.JPG)

GREEN LINE PROJECT

Exhibit 4.1 - Alignment and Stations



GREEN LINE PROJECT

The Green Line alignment and station locations have been developed through a series of comprehensive reports that provide a detailed overview of the line. At the time of this report (December 2015), work continues on the central and north segments of the Green Line.

TT2014-0916 NORTH CENTRAL LRT ROUTE PLANNING STUDY RECOMMENDATIONS

This report recommended Centre Street North as the route for the Green Line North. The Centre Street route represents the optimal route to improve mobility for Calgarians by providing rapid transit service in a high ridership corridor, support redevelopment along the route, and assist in achieving The City's long term transportation and land use goals. This report provided the findings and recommendations of the extensive route planning study.

TT2015-0149 NORTH CENTRAL LRT – CENTRE CITY OPTIONS

This follow-up report provided information on the options that were investigated for connecting the North Central LRT and Southeast LRT in the Centre City from approximately 24 Avenue N to 10 Avenue S. The four options presented were:

- Option A: use the existing Centre Street bridge and build at-grade;
- Option B: new bridge west of the Centre Street bridge;
- Option C: new bridge west of the Centre Street bridge and remaining elevated through the Centre City; and
- Option D: tunnel from 24 Avenue N to 10 Avenue S.

TT2015-0678 GREEN LINE SOUTHEAST ALIGNMENT AND STATIONS

This report presented the recommended alignment and station locations for the southeast leg of the Green Line from Fourth Street/10 Avenue S.E. to the community of Seton.

PUD2015-0765 GREEN LINE SOUTHEAST TRANSIT ORIENTED DEVELOPMENT PLAN

This report presented the Transit Oriented Development (TOD) study along the southeast leg of the Green Line from Fourth Street/10 Avenue S.E. to the community of Seton. The integration of TOD planning with the engineering predesign informed the recommended alignment and station locations. A number of viable TOD sites were identified for short- to mid-term development and represent prime locations to provide mixed-use development that is supported by the high quality multi-mode transportation system planned for Green Line.

STATUS OF PROJECTS

Bus Rapid Transit (BRT) routes (high frequency, limited stop bus service that offers many of the advantages of train service but is more flexible and cost effective to build) were implemented in the Green Line corridor to address growth in transit demand and build ridership:

- Route 301 – North – began operating in 2004
- Route 302 – South East – began operating in 2009
- Route 300 – Airport / Centre City – began operating in 2012.

GREEN LINE PROJECT

WORK DONE TO DATE ON GREEN LINE SOUTHEAST

Functional planning studies for the Southeast Light Rail Transit (LRT) were initiated in 1983 to establish alignment and station locations, and were completed in 2012. The Council-approved alignment guided subsequent land use reviews and right-of-way purchases along the corridor.

A series of scoping and staging studies were undertaken from 2011 to 2014, validating previously completed work and identifying service options. In the absence of sufficient funding for LRT, options were developed including a staging plan for implementation using Bus Rapid Transit (BRT) on opening day.

In 2012 December the Southeast Transitway Staging Update (TT2012-0754) report was approved. Related reports have been presented to Council specifically addressing TOD planning status updates (PUD2014-0675), work plan and cost benefit analysis summaries for the Green Line (TT2014-0676 and TT2014-0690), and detail work plans and options for advancement of construction and staged openings (TT2014-0918).

Due to capital funding constraints and a need to both improve transit service to Southeast Calgary and to address growing demand and capacity constraints in North Calgary, The City made an application to the Federal Building Canada Fund in 2014 for construction of a transitway (dedicated lanes for buses, with high capacity stations with all the amenities of LRT stations). The Federal Public Transit Fund, aimed at projects like the Green Line LRT, was announced as part of the 2015 May Federal budget. If an application is made by The City, funding from the Public Transit Fund would supersede any funding that we might have anticipated receiving through the Building Canada Fund (at least according to preliminary information released by the Government of Canada).

WORK DONE TO DATE ON GREEN LINE NORTH (NORTH CENTRAL LRT)

The North Central LRT was initially planned as a spur line from the Blue Line off the Northeast LRT at Deerfoot Trail/ Nose Creek. As area development progressed, right of way has been set aside and functional planning work has been conducted in the Harvest Hills Boulevard corridor between 96 Avenue N and Stoney Trail. The completion of the MDP/ CTP and an analysis of the interaction of LRT in the Centre City led to a review of the Deerfoot Trail/Nose Creek alignment for the North Central LRT. A review of alignments was conducted between 2011 and 2014 as described below.

In 2011, Administration engaged the communities in the North Central corridor to explore alternative alignments. There was overwhelming support to investigating Centre Street, Edmonton Trail and Nose Creek Valley as possible routes for the North Central LRT. In response to the public support and issues identified with the Nose Creek Valley alignment (limited access, limited redevelopment potential, travel time, etc), Administration requested Council approval in 2012 to undertake the North Central LRT Route Planning Study.

In 2013 Council approved RouteAhead, a 30-year strategic plan for transit in Calgary. The RouteAhead plan included the Green Line as LRT from North Pointe in North Central Calgary (and Keystone in the long term) to Seton in the Southeast. RouteAhead emphasized the need for short-term Transitway improvements, in the absence of sufficient funding for LRT as well as a means to compliment the Red, Green and Blue lines.

At the 2015 January 12 Meeting of Council, the North Central LRT Route Planning Study Recommendations (TT2014-0916) report was adopted unanimously. This report confirmed Centre Street North/Harvest Hills Boulevard as the alignment for the northern leg of the Green Line. The report identified station locations that will be refined, and confirmed, in the functional planning study.

At the 2015 March 09 Combined Meeting of Council, the North Central LRT – Centre City Options report (TT2015-0149) was adopted on the consent agenda. The report directed "Administration to investigate each of the four options [for the Centre City] in further detail to refine our understanding of various factors including; construction costs and quality of operations and return to the SPC on Transportation and Transit in Q4 2015." Administration's response to this direction is discussed below.

Administration initiated Functional Planning for the North segment (4 Street SE/10 Avenue S to Keystone). This scope of work includes the following:

- Selection of the preferred horizontal and vertical alignment in the Centre City. This work will require extensive knowledge/experience in rail tunnel design/construction, geotechnical investigation, elevated guideway design/ construction, and at-grade guideway design/construction in constrained sites. Refer to Appendix A, North Central LRT – Centre City Options (TT2015-0149) for additional information on the four vertical alignment options. This task is the highest priority and will be the primary focus in 2015/2016 for the project team.
    - Construction and lifecycle costs from the North Central LRT Corridor Study for the Centre City options will be refined and presented to SPC on Transportation and Transit in 2015 December
    - Renderings and videos of each of the Centre City options will also be required for the committee meeting
    - Preliminary data on the Centre City options will be shared at the committee meeting
- Life safety and air quality requirements associated with possible tunnel under Bow River
- Lifecycle and operating costs of each of the Centre City options, and the full corridor to 160 Ave N
- Functional planning of the Green Line North LRT from 4 Street SE to 160 Ave N (Keystone)
- TOD planning study, including visioning workshops, and a NCI CharretteSystem™ charrette (or approved equivalent) for 3-5 selected locations (see below)
- Geotechnical investigation
- Hydrotechnical investigation
- Biophysical impact assessment
- Environmental site assessment
- Heritage resource assessment

GREEN LINE PROJECT

- Construction phasing of the Green Line North LRT from 4 Street SE to 160 Ave N (Keystone), including the associated urban boulevard as identified in the Municipal Development Plan
- Investigation of a rail-based (e.g.: automated people mover) connection from Green Line North to Calgary International Airport and Blue Line (Northeast LRT). Functional planning will be undertaken for the connection between facilities on Green Line North at approximately 96 Ave N, but not for the full corridor along 96 Ave NE
- Investigation of a location for an LRT storage and maintenance facility for Green Line North, and a concept site plan
- Development of a concept for a network of transit priority measures (including, but not limited to, transit-only lanes, contra-flow lanes, queue jumps, traffic control devices, and advanced traffic management) in the Centre City to provide priority for the RouteAhead rapid transit network services (Green Line (e.g.: possible surface route and at-grade crossings), Southwest Transitway, 17 Avenue SE Transitway), and existing Calgary Transit services. Council-approved concept for contra-flow transit-only lanes on 4 Street SW to be included
- Investigation of a modern streetcar system to connect the Centre City and communities on the north bank of the Bow River
- Extensive, and exciting, public engagement program on all aspects of the project including land use and mobility elements

It is anticipated that the Functional Planning will be complete in late 2016. Subsequently, predesign for the North segment will begin (significant elements of the predesign are being completed as part of functional planning where possible). The predesign is anticipated to take 6 months to complete. Predesign would progress to a point suitable methods such P3 or Design-Build

CENTRE CITY OPTIONS

A report to the SPC on Transportation and Transit (TT2015-0905) outlines the evaluation criteria for Centre City Options on the Green Line. It is anticipated that this evaluation will lead to a recommended option in 2016. In the event this takes longer (perhaps due to stakeholder engagement or technical data collection) the overall Green Line project will not be held up. There are opportunities for land acquisition and enabling projects (remediation and right of way preparation, for example) that can be conducted in 2017. There is value, however, in maintaining the momentum of stakeholder engagement and avoiding turnover in staff (in stakeholder groups and in the project teams) by avoiding a protracted schedule for functional planning. Administration's recommendations reflect this approach.

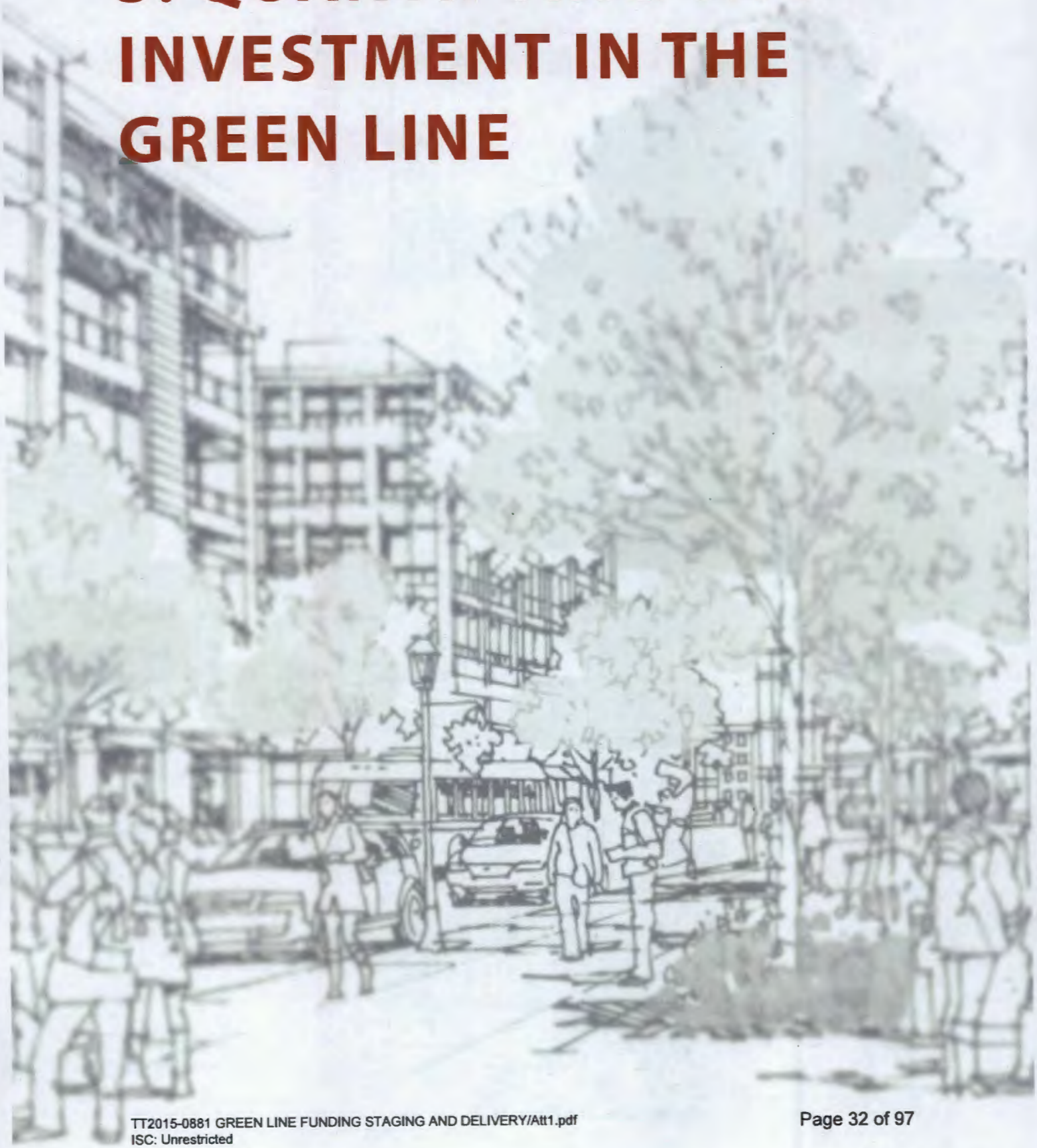
HIGH LEVEL TIMELINE

A timeline identifying the anticipated completion and next steps is shown below.

GREEN LINE PROJECT

Exhibit 4.2 - Project Timeline

5. QUANTIFYING THE INVESTMENT IN THE GREEN LINE

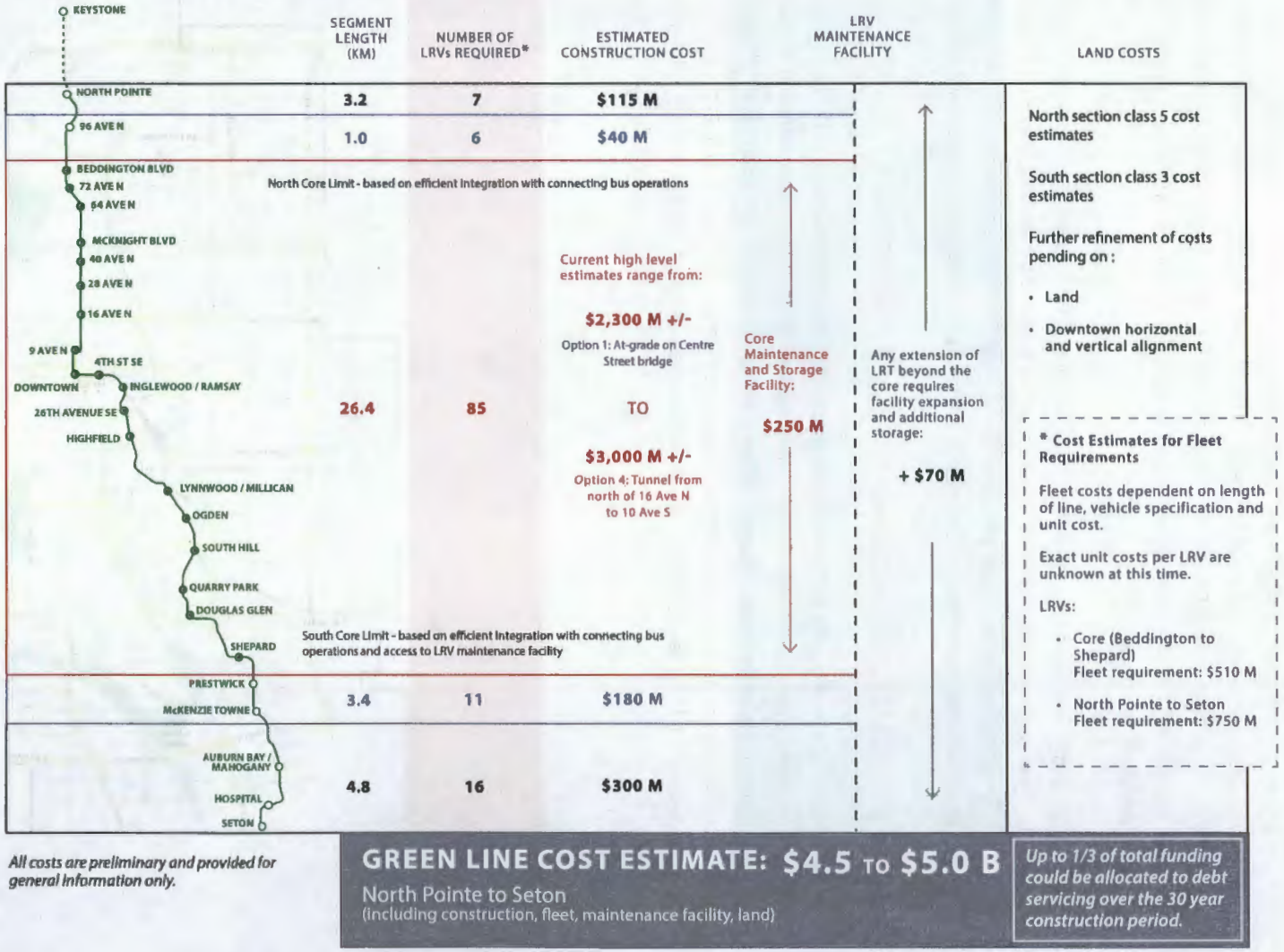


QUANTIFYING THE INVESTMENT IN THE GREEN LINE

CAPITAL COST ESTIMATES

The exhibit that follows identifies the capital cost associated with build out of the Green Line between North Pointe and Seton. Future extensions are possible to the future communities of Keystone and to the city of Airdrie.

Exhibit 5.1 - Segments and Required Funding



All costs are preliminary and provided for general information only.

GREEN LINE COST ESTIMATE: $4.5 TO $5.0 B

North Pointe to Seton
(including construction, fleet, maintenance facility, land)

Up to 1/3 of total funding could be allocated to debt servicing over the 30 year construction period.

QUANTIFYING THE INVESTMENT IN THE GREEN LINE

GROWTH AND TRANSIT SERVICE INVESTMENT

The population and job growth in the Green Line corridor has necessitated investments in new bus based service, infrastructure improvements, and operating cost investments. BRT has been operating in the North corridor since 2004 and in the South corridor since 2009. Service improvements such as park and ride lots, heated shelters, transit-only lanes, lanes that are shared with other high-occupancy vehicles, and transit signal priority at signalized intersections have been implemented along the corridor.

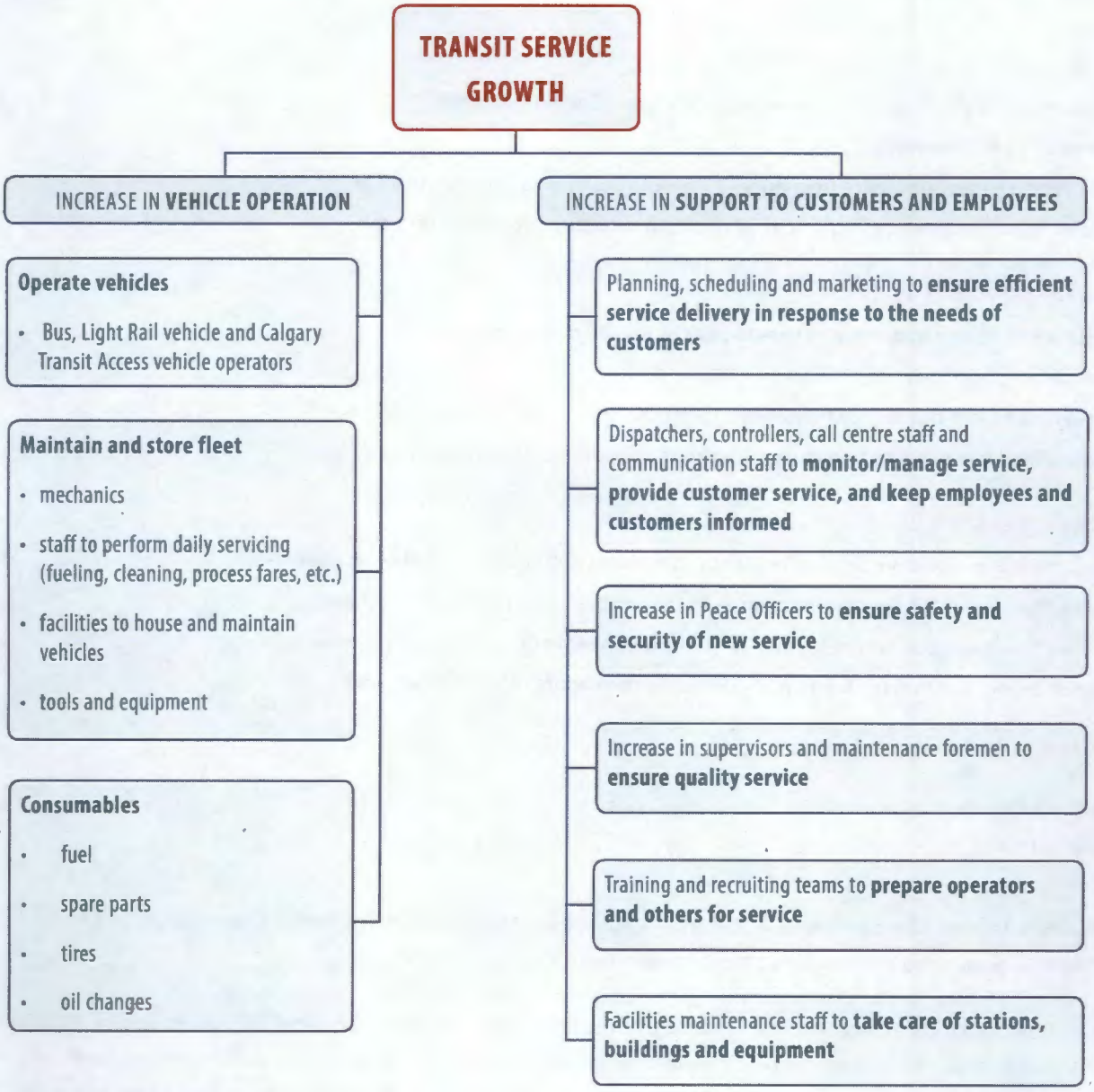
The rapid growth in Southeast Calgary has led to a lower level of transit service provision (in part due to other factors, such as the significant investments in road infrastructure in the same region: free-flow interchanges on Deerfoot Trail and the recent completion of the southeast portion of Stoney Trail.) This is one of the reasons to consider both the "Business as Usual" and "Southeast Transit Service Catch Up" scenarios as the basis for comparison with the Green Line LRT scenario.

COSTS ASSOCIATED WITH TRANSIT SERVICE GROWTH

Improvements to service quality and quantity require operating cost investments to be made annually. Unpredictable increases in service hours can make it difficult to hire and train staff and to ensure sufficient fleet and facilities are available to meet service demands. Unpredictable increases also result in significant levels of overtime. High overtime becomes necessary due to the time lag between approval of service hours and recruiting, hiring and training of staff to deliver the service. Adding service hours requires support services as shown in the figure below, resulting in additional pressures.

QUANTIFYING THE INVESTMENT IN THE GREEN LINE

Exhibit 5.2



QUANTIFYING THE INVESTMENT IN THE GREEN LINE

TRANSIT SERVICE LEVELS ASSUMED FOR COSTING EXERCISE:

2024 LRT SERVICE:

Green Line LRT service frequency - 5 minute peak hours / 10 minute off peak

Accompanying bus network:

North Central Feeder bus service frequency - 15 minute peak hours / 30 minute off peak

Southeast Feeder bus service frequency - 20 minute peak hours / 40 minute off peak

2024 TRANSITWAY SERVICE:

Green Line bus service frequency - 5 minute peak hours / 10 minute off peak

Accompanying bus network:

North Central Feeder bus service frequency - 15 minute peak hours / 30 minute off peak

Southeast Feeder bus service frequency - 20 minute peak hours / 40 minute off peak

2015 BUS SERVICE:

North Central Green Line Bus Service frequency - 5 minute peak hours / 10 minute off peak

North Central Feeder Bus Average frequency - 15 minute peak hours / 30 minute off peak

Southeast Green Line Bus Service frequency - 10 minute peak hours / 30 minute off peak

Southeast Feeder Bus Average frequency - 25 minute peak hours / 40 minute off peak

OPERATING COST/HOUR (2015 DOLLARS):

- LRT = $394/HR
- Bus=$110/HR

1. Business as Usual Alternative as Base Scenario – assume transit service hours assigned to Green Line Service Area continue as included in the current 2015-2018 Business Plan

2. Southeast Catch-Up as Base Scenario– assume that the Southeast receives an additional $22 million (approx 200,000 additional service hours) over the next 9 years to bring the Southeast transit hours up to the City average service hours per capita. Using this approach, by 2024 the service hours in the North and Southeast would be approximately the same.

The Southeast sector of the City has the least amount of transit service in the City today. This is due to the rapid growth of the Southeast over the past 10 years and a lack of corresponding new service. The Southeast is also anticipated to grow by more population than any other sector over the next 10 years (approximately 20,000 more residents) which will result in an even greater deficit of transit service. As a result, the "Southeast Catch-Up" scenario was created as a scenario for comparison/analysis.

QUANTIFYING THE INVESTMENT IN THE GREEN LINE

OPERATING COST NET OF REVENUE

As outlined in this report, there are different impacts of different segments due to ridership uncertainty. These have an impact on the operating cost required as part of the LRT operating plan. This can influence the selection of a construction stage.

The operating costs are impacted to a lesser extent by the average travel time assumptions for bus and train. In the North travel times can vary significantly between an at grade option and a tunnel option. In the SE, less variables exist and operational cost estimates are more refined. As work progresses to define the North functional plan, operating cost estimates can be improved.

Two Key Points:

1. Additional operating hours are required now and prior to LRT to meet population growth and ensure coverage and adequate service intensity in the SE communities.

2. The 40 km LRT investment will result in lower annual net operating costs than a staged shorter LRT investment due to higher ridership and shorter travel distances for feeder buses to terminal stations.

Table 8.1 - Operating Cost Net of Revenue (2024)

	RIDERSHIP	OPERATING NET COSTS (MILLIONS)
North Pointe to Seton (40KM)	128,000	$5 to $27*
96 Ave to McKenzie Towne (31KM)	119,000	$11 to $33*
Beddington to Shepard (26 KM)	114,000	$16 to $38*

*Costs are dependent on a number of factors including: additional operating cost investments prior to LRT, actual ridership, vehicle characteristics, operating speeds, and staging of the infrastructure.

As ridership continues to grow additional revenue will offset these operating costs. All costs are based on 2015 dollars.

QUANTIFYING THE INVESTMENT IN THE GREEN LINE

FEEDER SERVICE

- The shorter the length of the Green Line LRT, the greater distances the feeder bus service from each community needs to travel to the terminal stations at each end of the line. This results in a significant amount of feeder service leaving the communities they are serving and traveling long distances.
- In some cases, this means providing many duplications of service where it is not necessary or not productive, often on roads that are not particularly transit-friendly.
- In other cases, Feeder routes will serve one or more additional communities en route to the station which results in slow, circuitous travel for customers wanting to access the LRT.
- The feeder service is also impacted in communities if the service's primary focus is on the terminal station, and not on providing connections to other communities in the area. An example of this loss of transit service in the Southeast is with a LRT terminal station at Shepard, if you live in Rangeview, you may not have direct service to the Seton area (the closest place to access your daily needs). When the main focus is on the terminal at Shepard, the feeder service would go all the way north to Shepard and you would have to catch a second bus south to the activity centre in Seton.
- As a side note, with the shorter length of the Green Line LRT the number of population that is dependent on feeder service goes up immensely in 2024. In the Beddington to Shepard Scenario, the population living with in 800m of a LRT station beyond the terminus stations is approximately 50,000 people (the five stations south of Shepard, and the two stations north of Beddington) which means to take the LRT they are now required to drive, possibly bike or take feeder service versus walk to the station.)

MAINTENANCE FACILITY SUMMARY

Seven sites were evaluated as part of the Green Line work. Locations are listed in geographical order from north to south.

- Aurora Business Park (City owned land south of 96 Avenue N – not considered for full maintenance facility due to Office of Land Servicing and Housing development plans/potential, but under review for light storage/facility combined with station facilities)
- CP Alyth Yards
- Highfield Lands (Private Land next to CN Right-of-Way)
- CP Ogden facilities
- Douglas Glen (Viterra 1)
- Shepard (Viterra 2): North - South Orientation
- Shepard (Viterra 2 / Telsec Land): East - West Orientation
- A facility on a landfill site near to Ogden was also considered initially but excluded early in the process due to the high geotechnical risk.
- Several other sites underwent preliminary analysis but were eliminated if they did not meet fundamental needs such as parcel size or connection to the Green Line corridor.

FLEET REQUIREMENTS FOR MAINTENANCE AND STORAGE

The total length of the Green Line used for the purposes of estimating ultimate fleet size is 46.2 km, extending from Keystone Hills (north limit) to Seton (south limit). The following are the two recommended ultimate fleet size options (which are dependent the type of light rail vehicle (LRV) ultimately procured and the length of the vehicle):

- 135 x 30m LRV's
- 90 x 45m LRV's

It is assumed that storage for the entire Green Line fleet can be accommodated at one main facility. An option for smaller storage and cleaning facility towards the farthest terminus from the main maintenance facility is under investigation. In the event of staged line construction an interim-sized facility could be constructed (Oliver Bowen Maintenance Facility at McKnight-Westwinds station was built in phases applying a similar approach).

Analysis was conducted early in 2015 in advance of the staging analysis in this report. The discussion and table below is a representative example for the purposes of illustrating the analysis that would be completed for any future staging. If, hypothetically, an interim stage is approximately 25 km, the following fleet options would be required in the interim stage (which are dependent on choice of LRV length):

- 75 x 30m LRV's
- 53 x 45m LRV's

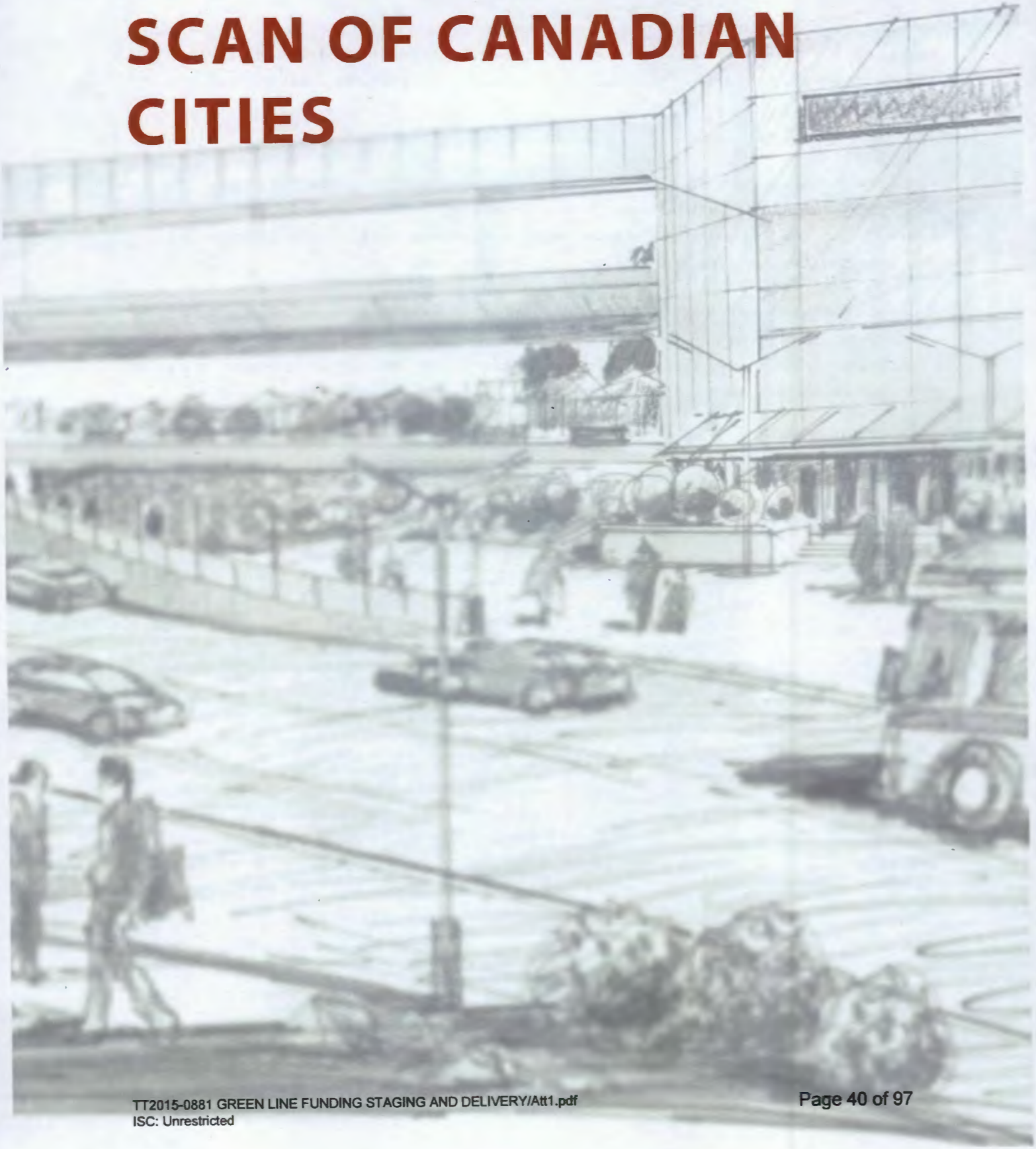
Table 5.1 that follows illustrates alternatives considered by Administration:

Table 5.1

SITE DESCRIPTION	STORAGE CAPACITY (30M LRV'S)	DISTANCE FROM DOUGLAS GLEN (KM)	MAINTENANCE FACILITY AREA (ACRES)	ESTIMATED CAPITAL COST (MILLIONS)
CP Ogden	84	4.4	52	600
Douglas Glen - Viterra 1 (elevated)	135	0.5	65	690
Douglas Glen - Viterra 1 (at-grade)	135	0.5	65	745
Shepard - Viterra 2 (north-south)	132	3.0	62	390
Shepard - Viterra 2 (east-west)	135	3.0	61	320

An initial phase of the Shepard – Viterra 2 (east-west) facility can be constructed initially for $250 million; that will accommodate the initial fleet requirements. An extension of the storage facility can be completed in the future.

6. FINDINGS FROM A SCAN OF CANADIAN CITIES



FINDINGS FROM A SCAN OF CANADIAN CITIES

FUNDING SOURCES FOR OTHER CANADIAN RAPID TRANSIT PROJECTS

Shown below are sample projects that are underway using a combination of municipal, provincial and federal funds. There are a number of public transit projects underway or proposed that are similar in scope to the Green Line. These include:

OTTAWA CONFEDERATION LRT LINE

Budget:

- $2.13 billion. Highway 417 widening ($226 million); BRT-LRT transition ($63 million); and project contingency ($100 million).
- The City has other operating-related payment obligations under the Project Agreement, both during the construction term and the maintenance and service term.

Municipal Funding:

- $900 million from The City property taxes and other sources

Other Funding:

- $192 million (up to) from the Federal Gas Tax Fund
- $600 million from the Building Canada Fund
- $600 million from Ministry of Transportation of Ontario (MTO) for LRT
- $206 million from Ministry of Transportation of Ontario for Highway Works (BRT Detour/Added Lanes Highway 417)

EDMONTON VALLEY LINE LRT

Budget:

- $1.8 billion for the13.1 km first phase Mill Woods to 102 Street, including Maintenance and Operations Facility

Municipal Funding:

- $800 million from The City in tax-supported debt

Other Funding:

- The Province of Alberta is contributing $600 million: approximately $300 million from Green Trip funding, $150 million in the form of an interest-free loan, and $150 million to match federal New Building Canada Plan funding.
- The Government of Canada is contributing $400 million: $250 million in PPP Canada funding, and $150 million from the New Building Canada Plan fund.

FINDINGS FROM A SCAN OF CANADIAN CITIES

VANCOUVER EVERGREEN LINE

Budget:

- $1.4 billion

Municipal Funding:

- Translink is the regional transportation authority in the greater Vancouver region. Translink funding sources for their contribution include:
- TransLink is contributing $400 million and will operate the Evergreen Line when it's complete.
- Taxation revenue:
  - Property taxes: TransLink assesses property tax on the net taxable value of land and improvements within the 21 municipalities that make up its service area. Under the legislation, this increases by three per cent each year to keep pace with inflation.
  - Fuel taxes: When people fill up their cars in TransLink's service region, 17 cents of every litre sold goes to TransLink.
  - Parking tax: When someone pays for parking in this region – such as at a downtown parkade or a pay parking lot at the university – a tax is included that goes to TransLink.
- Power levy: This is a levy that is added to the hydro bill of residences in Metro Vancouver. It works out to be about $1.90 each month (the maximum).

User fees:

- Transit fares: Every time you pay to use the transit system, TransLink collects that revenue.
- Bridge tolls: TransLink can collect tolls to recover the costs related to a specific project or major crossing.

Other funding:

- The Province is contributing $583 million and will also oversee construction of the project. The Government of Canada is contributing up to $417 million.

WINNIPEG SOUTHWEST BRT TRANSITWAY

Budget:

- $587 million
- Southwest Transitway (Stage 2) and the Pembina Highway Underpass project.
- The project includes extending Winnipeg's Bus Rapid Transit system by 7.6 kilometres, adding 10 transit stations, 2 park-and-ride facilities, 2 transitway bridges, an overpass, an underpass and a tunnel.)

Municipal Funding:

- $225 million (through property tax, tax increment financing (used in Stage 1, might be used in Stage 2) and gas tax funding)

Other Funding:

- $137.3 million from the Federal Government
- $225 million from the Province of Manitoba (The Province also traditionally will fund 50 per cent of the net operating costs of the rapid transit system through its existing 50-50 transit funding agreement.)

FINDINGS FROM A SCAN OF CANADIAN CITIES

The experience of other municipalities facing similar issues to Calgary are relevant to the selection of a preferred option:

OTTAWA TRANSITWAY/CONFEDERATION LINE LRT

Ottawa first installed its BRT system in 1983 and has built up its system over time to include 35.4 km of dedicated BRT Transitway and 57 stations. As of Dec 31 2013, the Transitway network has a weekday passenger volume of 220,000.

Ottawa currently has reliability and transit capacity concerns in the downtown area due to the high volumes of bus traffic. In response, Ottawa is transitioning a section of its Transitway system to the 12.5 km Confederation LRT Line, including a 2.5 km tunnel in the downtown. The cost of the project is currently estimated at $2.1 Billion. The project is funded and construction is underway. The Confederation Line is set to open in 2018.

Construction of the Confederation Line requires closure of sections of the BRT Transitway for conversion to light rail. During construction, bus service normally on the Transitway is being moved to parallel corridors. Ottawa has committed to customers that service standards will be maintained during the construction period (same frequency) although the travel times will be longer. Longer bus travel time along the parallel corridors increases operating costs to provide the same capacity. The more buses that are required, the more operating and maintenance staff are required. This extra level of service has led to the Council approval of $63 million in extra funding for operating costs and $11 million in extra capital for buses during the detour period (2015-2018), along with early construction of additional lanes to handle the bus traffic on the parallel Highway 417 corridor.

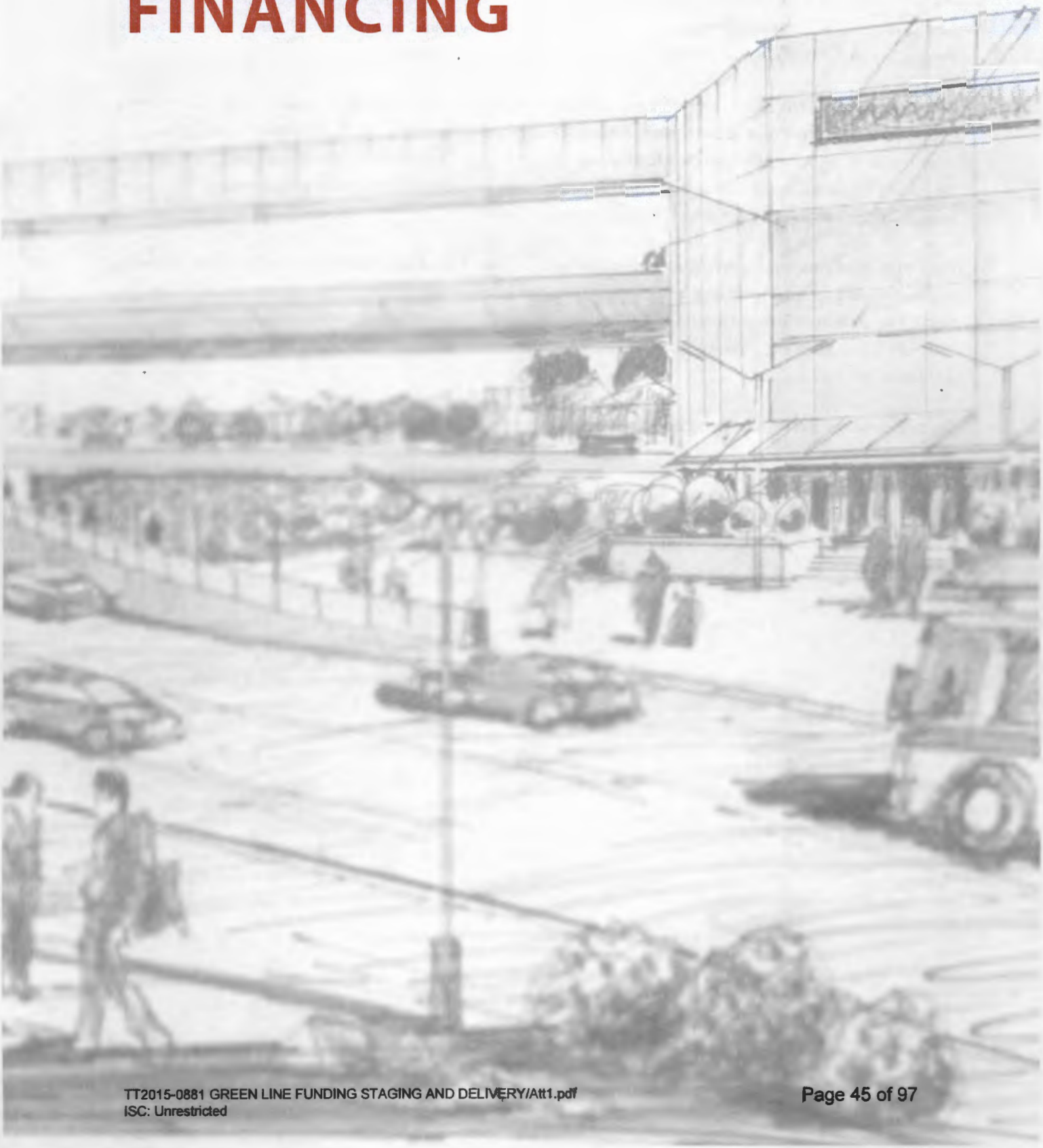
VANCOUVER ROUTE 99 B-LINE BRT/RAIL CONVERSION

Broadway is one of the Vancouver region's busiest transit corridors and features major population, job and institutional centres. The B-Line BRT (Route 99) serves the corridor and has an average weekday ridership of 60,000 passengers per day, making it one of the busiest bus routes in North America. The other routes along the corridor serve 40,000 a day, making the total ridership for the Broadway corridor approximately 100,000 per day.

Existing transit services don't provide sufficient capacity or service reliability to the major regional destinations and economic hubs within the Broadway Corridor. Due to roadway capacity constraints, the problem cannot be solved by using more buses. Currently the Route 99 B line operates at a 1.5 to 3 min frequency in peak times.

TransLink includes conversion of the facility to rail as part of the region's long-term transit plans. The City of Vancouver has proposed a 12.4 km mainly tunnelled extension of the Millennium SkyTrain Line route from VCC-Clark to UBC via Great Northern Way, Broadway, 10 Avenue, and University Boulevard. The cost of the project is currently projected at $3 Billion and is currently unfunded. The City of Vancouver (not TransLink) states that "rapid transit for the Broadway Corridor as the City's number one transportation priority, and one of the most significant infrastructure investments for the region's future".

7. FUNDING AND FINANCING



FUNDING AND FINANCING

FUNDING OPTIONS

The $520 million of municipal funds and the promise of up to $1.53 billion from the Federal government only allow a portion of the necessary infrastructure on the Green Line to be built. Administration reviewed funding options to address the gap. The analysis below builds on the findings of work completed in 2013-2014.

On 2013 December 09, The City held a workshop with targeted stakeholders to identify innovative funding and financing tools that would enable construction of the Southeast Transitway and Green Line LRT. The resulting report discusses tools used by other North American cities to fund major transit projects, and preliminary feedback from stakeholders. On January 31, 2014, City Administration recommended to Council more research on these tools to determine if any are appropriate to fund major infrastructure projects in Calgary.

City Council subsequently directed Administration to "evaluate the full range of 27 potential funding or revenue sharing mechanisms, or other methods, using best practice evaluation criteria, to identify which mechanisms are best suited to fund the future transition to the Green Line LRT, and the remainder of the unfunded list in Investing in Mobility..." This work is now complete, and a report on the study was presented to the Standing Policy Committee on Transportation and Transit on May 20, 2015.

The tables and exhibits in the next pages offer a discussion of how some of these funding mechanisms apply in the current context.

FOOTNOTES

The full report is available here: http://www.calgary.ca/Transportation/TP/Documents/Planning/Investing%20in%20Mobility/IIM-consultant-report-2015.PDF

APPLICATION OF REVENUE TOOLS TO FUND GREEN LINE

Table 7.1

PRIMARILY CAPITAL (BUT SOME POSSIBLE AS OPERATING):	
Property Tax	• Direct City control • 1% increase results in approximately $20 million/year ongoing revenue stream • Vacated Provincial tax room of $52 million/year committed to Green Line until 2024. $ 52 million/year beyond 10 years currently uncommitted and suitable as source of funding (with no increase to property tax).
Fuel Tax	• 1 cent / litre generates approximately $ 20 to 25 million/year • Revenue may fall over time with higher-efficiency vehicles and less fuel consumption • Provincially controlled, minimal implementation costs • Direct link to road costs (i.e. more appropriate as source for highway/Roads funding)
Use of Reserves	• As of 2014 (PFC2015-0509) there are 16 operating reserves totalling $543 million ($443 million in the Fiscal Stability Reserve) • There are 17 capital reserves totalling $894 million; these are either fully committed or have substantial commitments against them. • Could also include proceeds of associated land sales going directly to Green Line (proceeds currently go into revolving fund for land purchases)
Road Tolls	• Difficult and costly to implement and may encounter resistance because facilities are free today • Modest revenue potential in relation to funding of Green Line, but significant contribution to operating costs • Direct link
Personal Income Tax/ Sales Tax	• High revenue potential • Difficult to implement • Many competing demands

FUNDING AND FINANCING

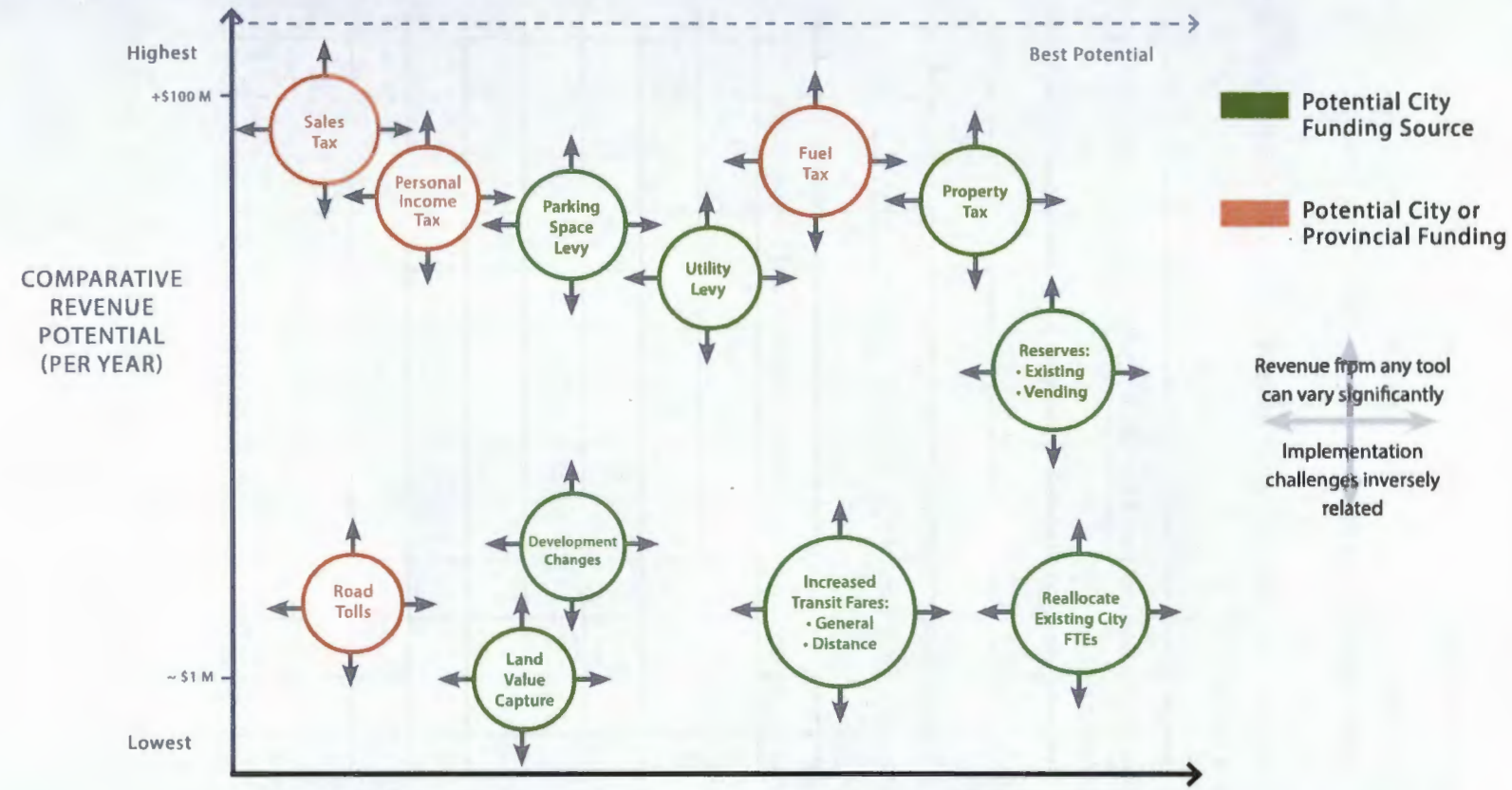
PRIMARILY OPERATING (BUT SOME POSSIBLE AS CAPITAL):	
Parking	• Revenues come from fees for reserved parking and offset operating costs • Different rates could be directed to offset capital costs • Generally costs of providing parking are much higher than revenue that can be generated (land, structure and maintenance costs) – report on Park and Ride Policy in 2016 will outline costs.
Transit Fares	• Could be applied in many different forms; across the board, Green Line specific, or distance based fares, removal of free fare zone, etc • Increasing fares may decrease ridership • Fare increases are generally been used for general service throughout the city
Naming Rights/Sponsorship	• Some applications to date (e.g. Enerplus advertising at 3 Street SW platform) • Review of sponsorship by third party consultant uncovered potential for additional revenue • Highly dependent on local/national economy
Reallocation of existing City resources or internal charges to capital	• Completely within City control • Would be attractive option if implementation can be achieved with minimal front line service cuts (e.g. shift development review staff to Green Line reviews/operations) • 1% charge to capital project = $40 million available for capital on operating costs
Vehicle Registration Fee	• Applications in U.S. (e.g. Arizona) • Equitable (can be based on value of vehicle) • Direct link to road costs (i.e. more appropriate as source for highway/Roads funding)

OTHER POTENTIAL REVENUE SOURCES - MINOR

The following funding tools have been reviewed, but generally do not provide substantial revenue potential. Many of these tools may have other primarily goals, such as equity, sustainability, etc, but would be a minor contribution to capital OR are already being applied (e.g. development charges, reviewed as part of Build Calgary) and thus offer no new source of revenue:

- Bicycle Tax/Licensing
- Car rental levy
- Hotel tax
- Crowd funding
- Development Charges
- Land Value Capture

Exhibit 7.1 - Revenue Potential of Green Line Funding Tools



Most Challenging

- Requires participation of federal government
- Requires change to Provincial legislation
- Low public acceptance
- No direct link to Green Line
- High cost to implement
- Dependence on market or economy

Least Challenging

- Fully within City's authority
- Direct Link to Green Line
- General acceptance by public
- Implementation processes in place

Revenue projections initially based on information from TT2015-0413 - AECOM Report: Comprehensive Analysis of Shortlisted Funding Mechanisms

FUNDING AND FINANCING

Based on this analysis the most appropriate means of funding the capital cost of the Green Line is:

- Dedication of the ongoing $52 million per year in property tax (which creates no new tax increase to Calgarians); and
- Collaboration with The Province of Alberta on matching funding in alignment with the Transportation Strategy for Alberta.

The following operating funding mechanisms will be investigated further to partially offset the operating cost increase required as part of the Green Line operating plan:

- Parking charges at the park and ride lots
- Reserved parking rates (in conjunction with a review of the Park and Ride Policy costing of amount of parking provided versus feeder bus networks);
- Fares (in conjunction with review of Calgary Transit's fares in advance of future business plans and budgets closer to implementation);
- Naming rights/sponsorship

Note: The capital cost analysis that follows is predicated on an allocation of tax room to the Green Line fund for another 20 years (30 years total) and Provincial funding to match the $1.53 billion in Federal funding.

The funds available for capital construction are impacted by several factors when evaluating a scenario where the line is paid off over time. The primary factors are; amount financed, repayment period, and the interest rate.

FINANCING CONSIDERATIONS – FOR DISCUSSION PURPOSES

1. OPTIMAL ESTIMATED CONSTRUCTION COST - NORTH POINTE TO SETON IN MILLIONS (PRELIMINARY, 2015 AUGUST):

2015	2016	2017	2018	2019	2020	2021	2022	2023	2024	TOTAL
$20.00	$225.00	$382.00	$617.00	$907.00	$907.00	$897.00	$717.00	$277.00	$51.00	$5,000.00

Assumes construction costs equal $5 billion, which does not factor interest expense, which could be up to 1/3 of cost.

2. ASSUMED FUNDING SOURCES:

a) Federal Public Transportation Fund - $51 million per year for 30 years commencing 2020, for a total of $1.53 billion;
b) City of Calgary $52 million per year from 2015 to 2024 currently approved, extension for a further 20 years to be considered by Council, for a total of $1.56 billion; and
c) Province of Alberta - $51 million per year (average) requested from 2016 to 2045, for a total of $1.53 billion.

Total funding sources equal $4.62 billion over time. For analytical purposes, the present value of $154 million per year ($51M + $52M + $51M = $154M) over 30 years discounted at 3% is $3.02 billion.

3. FINANCING SCENARIOS:

As the timing of the funding sources does not align with the construction cash flow requirements, financing pending receipt of funding is required. For our analysis we have assumed in years in which there is a cash flow deficit, 20 year debt will be taken our via the Alberta Capital Finance Authority. (NTD – interest rate assumptions)

a) Based on the funding sources identified, how large a project can be funded? $3.25 billion
b) How much additional funding per year would enable a $5 billion project? $82 million per year for 30 years, or approximately $27.3 million additional from all three orders of government.
c) How much additional up-front investment would enable a $5 billion project to be fully funded based on the funding sources identified in 1) above? $1.7 billion.

4. IMPACT ON MUNICIPAL GOVERNMENT ACT DEBT LIMITS:

If the City of Calgary was required to carry the full project finance risk, the amount would likely result in the total debt amount to the City exceeding policy limits.

5. POTENTIAL TO FINANCE UP TO $1 BILLION FROM INTERNAL SOURCES (INVESTMENTS / RESERVES)

If we choose to finance internally initially and then choose to refinance with Alberta Capital Financing Authority (ACFA) debt, we may incur higher borrowing costs, due to current rates being at all time lows. ACFA offeres excellent, competitve rates, they may not be able to find counter parties to finance the full amount. In future years based on historical rates, we may incur higher borrowing rates. A potential solution would be to internally fund a conservative amount and to fund for a shorter term.

FUNDING AND FINANCING

OTHER CONSIDERATIONS

Financial reporting implications for internal loans

- All debt model scenarios assume equal one-third contributions from each order of government (The City, the Government of Alberta, and the Government of Canada)
- Potential Transaction Structure to Minimize Debt Limit Impact
- Ask Province to grant an exemption, or incorporate via City Charter
- Credit Rating implications
- Private ownership models
- Private sector involvement
- Each scenario assumes debt is drawn/paid back over 30 years, look at shorter periods to reduce borrowing costs
- Uses today's interest rate levels, with a small adjustment for long-term borrowing rates to potentially rise a bit between now & next year
- The Federal contribution is limited to 33% of total project cost, as per current BuildCanada Fund guidelines
- An equal one-third Provincial calculation is assumed, though no specific funding source is known at this time

$3.5 BILLION PROJECT CONSTRUCTION COSTS;

- This level of debt is within the City's two debt limits (total debt, and debt servicing);
- To service this level of debt would need equal contributions of $53 million/year from each of the three Government (total of $159 million per year)
- The City's current contribution of $52 million per year is essentially adequate for the first ten years but would require Council's approval to extend this contribution to 30 years

$5.0 BILLION PROJECT CONSTRUCTION COSTS;

- This level of debt would see the Council imposed total debt limit (80% of MGA limit) exceeded; however, The City would still be inside the debt servicing limit; (The amount that exceeds the Council debt limit varies, depends on assumptions for other City debt funded projects over the next 30 years)
- To service this level of debt would need equal contributions of $88.7 million from each level of government (total of $266.1 million per year)
- The City's current contribution of $52 million per year would (1) have to be extended from 10 to 30 years, and (2) an additional $36.7 million per year for each of the 30 years would need to be identified and sourced;

CONCLUSIONS

- Modelling the impact on the City's debt limits is highly dependent on the assumptions for other debt financed capital projects.
- The $5 billion level, with some finer detail modelling, may work within the City's debt limits, and may be a reasonable target share of the Fed Transit fund's annual cashflow

SCOPE RISK

In terms of funding and eligibility and project budgets, one of the key risks is expansion of the scope beyond core infrastructure. Given the size, complexity and number of stakeholders involved in this project, defining and managing project scope will be a critical risk element.

From the Corporate Project Management Framework, 'Project risk is the possibility an event will occur which will impact the achievement of project objectives or deliverables.' The main question we are trying to answer is: What can affect the outcome of my project deliverables.

The challenge for the project team will be to define what parts of 'city building' are part of the Green Line project and what are funded through other sources, whether public or private. The project should been as a catalyst, not a source to fund many associated undertakings. A compromise would be added elements which can unlock or leverage other investments.

DEBT AND DEBT SERVICING

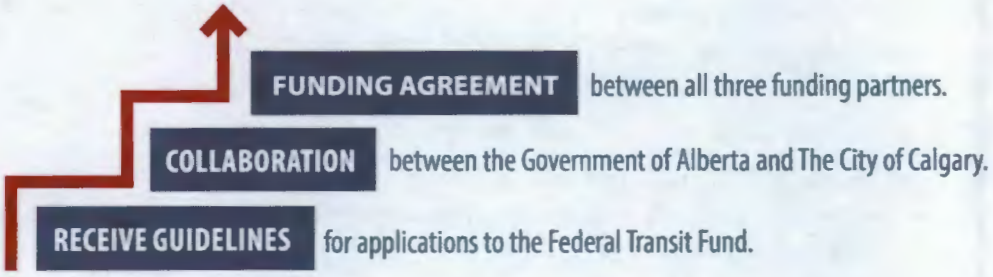
The City's debt limit under the Municipal Government Act (MGA) is a factor that limits our ability to shoulder the full burden of debt associated with short-term construction of the LRT project. MGA amendments that result in changes to the debt ceiling for Edmonton and Calgary address a number of issues; however, the amount of debt incurred as part of the Green Line LRT project could potentially impact The City's credit rating and/or limit The City's ability to deliver other projects. Incurring debt solely at the municipal level leaves The City subject to the ebb and flow of cash flows will limit The City's ability to deliver other projects.

Administration recommends exploring the Federal government's ability to shoulder the burden of debt, in whole or in part, as part of the Public Transit Fund. The Liberal Party platform for the 2015 Federal election included reference to an "Infrastructure Bank" and additional funding in earlier years than the initial rollout of the Public Transit Fund included. This promises to reduce the debt burden on The City; however, no conclusions can be drawn until further work on Federal and Provincial funding guidelines have been completed

FUNDING AND FINANCING

STEPS TOWARDS A GREEN LINE FUNDING AGREEMENT

The exhibit below illustrates the next steps in finding funds for Green Line construction.



IMPLICATIONS TO FUTURE OPERATING BUDGETS

A series of scenarios have been developed to project the operating costs associated with several construction phasing options. Operating costs associated with the preferred option (North Pointe to Seton) are as follows. (Detailed analysis is included in Appendix 3.)

- Estimated operating cost increase from current levels: $43.8 million gross, $25.8 million, taking into account projected revenue
- Estimated operation cost increase relative to 2024 assuming service levels have already caught up with growth: $21.8 million gross, $3.8 million net operating, taking into account projected revenue

New anticipated revenue in both scenarios is $18 million. With an additional 200,000 hrs of transit service invested in the SE over the next 8 years there would be an increase in ridership prior to the LRT.

SHORT TERM

In the short term (10 years) the impact of the project will be generally limited to the capital cost. There will be impacts to The City in terms of review of Green Line deliverables and related development inquiries/files will require an investment of operating funds/resources by several City business units. It is expected that this will be offset over time by tax revenue from redevelopment; nevertheless in the short term the impact will need to be incorporated into the 2016 and forward work plans of several business units. It is not known at this time whether this will coincide with a downturn in other development-related activity, in which case the new Green Line workload may be able to be absorbed by existing development associated staff.

MEDIUM TERM

In 10-20 years there will be impacts to the capital and operating budgets of The City. The Green Line will require an investment in operating funding upon commencement of service. The line will nearly double the length of The City's LRT network, and will require additional staff (peace officers, station cleaners, service designers, track maintainers, etc.), and maintenance/storage facilities. There will be downward pressure on Calgary Transit's cost recovery, depending on the level of ridership (fare revenue) and innovation in revenue generation.

LONG TERM

In the long term, the implications for the capital and operating budget are positive for two main reasons:

- LRT is more efficient for carrying the number of people in these corridors than bus based service.
- The Green Line enables growth in the Centre City, Urban Corridors, and Activity Centres as highlighted in the MDP. The MDP outcomes as highlighted in IBI Group report "The Implications of Alternative Growth Patterns on Infrastructure Costs", will result in lower operating and capital costs to The City over time relative to business as usual. Build Calgary research has identified the importance of intensification and use of land within The City to increase the non-residential tax base, offsetting the need for future property tax increases to maintain existing levels of service.
- During the 20-30 year period The City will continue to pay down the capital debt. The amount of annual repayment will decrease in terms of the overall City budget.
- The operating costs of the LRT will be relatively consistent and stable after the medium term period.

As a result, in the long term there will be a positive effect on Calgary Transit's operating cost recovery (subject to fare revenue and other sources of revenue).

FOOTNOTES

See more: http://www.reconnectingamerica.org/resource-center/browse-research/2009/implications-of-alternative-growth-patterns-on-infrastructure-costs/

8. STAGING OPTIONS

STAGING OPTIONS

The financial analysis in this report indicates it is unlikely the full construction costs to build Green Line from Seton to North Pointe will be available, A staging plan needs to be developed. This section discusses various approaches towards completion of the Green Line.

BRT/TRANSITWAY STAGE

The North Central corridor is approaching the capacity limits of BRT. Route 3 (Sandstone/Elbow Drive) and Route 301 (BRT North) have very frequent service with articulated buses. Route 3 alone currently operates at Primary Transit Network levels of service (10 minute frequency, 15 hours a day, 7 days a week) due to demand on this corridor and on 4 Street SW/ Elbow Drive.

Bus service along Centre Street N (Routes 3 and 301) accounts for 44% of all bus overloads citywide in the period 2012 to 2014 (1,340 overloaded buses – passengers cannot physically get on board due to crowding - out of a total of 3,015 citywide).

If BRT technology were to be the first stage of the Green Line, one of the elements required in established communities/ Centre City would be sufficient road and sidewalk space for efficient operations and passenger boarding and alighting (which is spread out over a longer length than when a larger LRT vehicle is used. Lanes would be required for loading and unloading, as well as passing and maneuvering downtown).

For BRT to handle the projected passenger volumes of LRT on opening day (2024), the BRT system would be required to handle in the AM peak hour:

- Approximately 5,000 to 10,000 BRT passengers (entering from both the N and SE legs of the transitway) per hour per peak direction
- Translating into approximately 80 to 100 articulated buses
- Two to six block faces used for the downtown BRT boarding and alighting (depending on length, location, overall bus dwell times)
- Up to four lanes (two lanes each direction) dedicated to downtown BRT operations, one lane for bus stops, an adjacent lane to allow smooth, uninterrupted flow of buses back into the travel stream
- Additional reduction in auto mobility due to potential removal of some auto turns to avoid conflicts with the bus operation.

BRT Operations in Downtown Ottawa

(image source: https://en.wikipedia.org/wiki/Ottawa_Rapid_Transit#/media/File:Slater_Looking_East_1.JPG)

STAGING OPTIONS

Construction of the Green Line from North Pointe to Seton can be done in a program of projects. The Red and Blue Lines were constructed over extended periods of time in both small and large projects. Alternatively, a single contract could be reached with the construction stretched over a defined period of time. The single stage option discussion that follows is predicated on the completion of the LRT line as a single project.

STAGING DUE TO MAGNITUDE OF CONSTRUCTION

Industry research needs to be conducted to identify single-procurement projects and understand the pros and cons of delivering through a single procurement on a scale similar to the $4-5 billion Green Line LRT. Preliminary findings suggest:

- There are many public transit construction programs (with separate procurements/individual projects) that exceed $4 billion in scope, which may include individual projects completed/underway that include more than $4 billion in a single scope. Examples include:
  - Red Line Metro (Los Angeles, California) – US$4.5 billion (1986 – 2000)
  - Fastracks (Denver, Colorado) - US$6.5 billion (2006-2016)
  - Crossrail (London, UK) – £15.9 billion (2010-2018)
  - Eglinton Crosstown (Toronto, Ontario) - $5.3B (2010-2020)

- Several Canadian projects have been completed (or are underway) with a capital cost of in the range of $2 billion. Examples include:
  - Canada Line (Vancouver) - $2 billion (2005-2009)
  - Toronto-York Spadina Subway Extension - $2.6 billion (2007-2017)
  - Valley Line LRT (Edmonton) - $1.8 billion (2016-2020)
  - Ottawa Confederation Line - $2.1 billion (2013-2018)

LAND ACQUISITION TIMELINES

The scale of the Green Line will carry with it a commensurate volume of land assembly. Based on Administration's experience with land acquisition for recent capital projects, there is potential for unforeseen escalation in project costs if an aggressive schedule is pursued that does not allow for sufficient time for negotiation with directly and indirectly-affected landowners. Two-to-three years is estimated to be required for land acquisition where required for right-of-way assembly in advance of construction. Any single project/procurement will require lead time for land acquisition along its entire length.

STAGING RECOMMENDATIONS

Three alternatives have been evaluated to approach the funding uncertainty and different planning/design phases in the North and Southeast segments:

1. *Focus on the full extents of the Green Line as a single procurement for construction within the next 10 years.* Administration would continue to conduct functional planning, initiate enabling projects (e.g. utility relocation, right of way preparation) and await the feedback of the Federal and Provincial governments. Under this approach we move ahead on the larger program, leveraging the funding we have in hand. This is Administration's recommendation.

2. *Build now with funding immediately available to The City rather than awaiting feedback from the Federal and Provincial governments.* Rather than awaiting feedback on funding proposals, Administration would move ahead with design and construction where we can to address the urgent need to improve capacity, speed and reliability of service. This is not recommended due to the operating cost implications, the opportunity to leverage funding for greater purposes and potential inefficiencies with future procurement methods such as P3's.

3. *Pursue a staged approach.* Recognizing part of the Green Line corridor is shovel-ready while other parts are still at the functional planning stage, The City would seek commitment from the Federal and Provincial governments to fund a staged approach. The City would build a maximum affordable extent of Green Line now, and plan for future extensions. While not the preferred alternative, this approach has merit as a mitigating strategy for the risk of protracted timelines associated with Green Line North functional planning.

There are other non-quantifiable considerations influencing the selection of the preferred options.

- A significant factor influencing Administration's recommendations is the availability of funding and the application window from the Federal and Provincial governments. Council played a leading role in a strategy that has resulted in this funding being available. They had the foresight to direct the creation of RouteAhead, a 30-year Strategic Plan for Transit In Calgary, they directed the significant step of re-aligning the North Central LRT to create a truly integrated North-South corridor, they lobbied hard for funding (Canadian Urban Transit Association, Federation of Canadian Municipalities, political Big City Mayors, citiesmatter.ca, etc), leading to a promise of funding from the Federal government. It's an opportune time to capitalize on this investment of time and effort, and the pipeline will fill quickly with other candidate projects from across Canada.

- The business case for the project will be stronger (and thus Federal and Provincial funding is more likely) if this is a staged as a city-wide LRT projects

The remainder of this report (funding and delivery) is predicated on the preferred option of constructing LRT in a single project between North Pointe and Seton.

9. RETURN ON INVESTMENT

RETURN ON INVESTMENT

The return to The City in general will be realized by several key results. The primary result will be transitway ridership, reduced congestion by shifting from auto trips, increased land development investment along the corridor, and net new investment in Calgary.

TRANSIT DEMAND

Several means of estimating future transit demand were applied to identify the need for LRT and the potential value of an interim BRT/Transitway stage.

- Past forecasts were used, including the 2012 SETWAY staging report, the 2013 RouteAhead and Investing in Mobility estimates, a 2014 report to Council on the Building Canada Fund application, and material developed in response to Federal inquiries (Building Canada Fund and Public Transit Fund).
- A new Regional Transportation Model (RTM) run was conducted in October 2015 for the 2023 population/ employment horizon (the forecast scenario is identified as 2024 – the anticipated completion date for construction – even though the population/employment horizon is 2023). The horizons available from Geodemographics/ Forecasting are 2023, 2029, 2039 and 2076. Only the 2023/2024 RTM forecast could be prepared in time for this analysis; other horizons will be modelled in 2016. (Details regarding this forecast are included in Appendix 2.)
- Sketch planning techniques were used to compare population, employment, and travel to work survey data on other LRT lines with the Green Line corridor. This approach was used to estimate the transit demand on the Green Line using population and job forecasts for 2029, 2039 and 2076. (Detailed methodology is included in Appendix 3.)

Opening day ridership in 2024 on the full extents of the Green Line LRT is estimated to be 90,000 average weekday passengers.

RETURN ON INVESTMENT

This transit ridership estimate was multiplied by Calgary Transit's current average fare per trip ($1.61) then multiplied by 310 to convert daily to yearly revenue. The daily to yearly ratio allows for lower ridership on weekends and holidays based on historical CT data.

RESULT	2024 BASE	2024 GREEN LINE LRT
Revenue	$45.9 million	$63.9 million

As discussed above, Regional Transportation Model runs for other scenarios and time horizons will be available later in 2016. In the meantime, it is possible to estimate ridership for different staging scenarios (i.e. different LRT extents) by other methods. The extents in the tables that follow are the same as those shown in the capital cost exhibit.

In order to forecast ridership for other extents, the forecasted ridership from the Green Line LRT (North Pointe to Seton) scenario was multiplied by percentages based off census ridership projections. An informed decision can be made by considering the impact of this project on Calgary Transit's operating cost recovery (also referred to as operating revenue/ operating cost ratio). The ratio is calculated by dividing revenue generated from the operation of transit service (including fares, advertising revenue, fines/penalties) by the total costs of operation.

Capital funding, whether from government grants or municipal property tax, becomes "investment" not ongoing cost of operating, and is thus not included in operating costs. The use millrate revenue to fund a tangible capital asset makes that spending capital in nature.

RouteAhead, a 30-year Strategic Plan for Transit in Calgary, included the following policy directions with respect to the revenue cost ratio

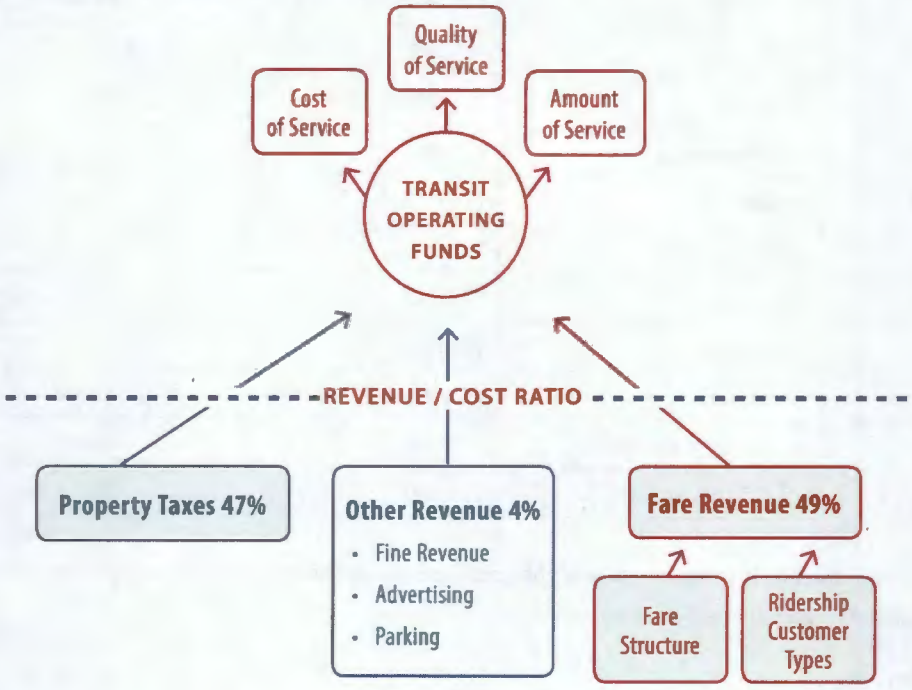
> "Retain the current revenue/cost ratio range of 50/50 to 55/45 for the next business plan & budget. Calgary Transit will be able to move forward with strategies resulting in improvements and growth in service hours with certainty regarding financial constraints," and
>
> "Develop a long-range fare and funding strategy, in consultation with stakeholders, customers and citizens, including potential options for cost-sharing between users and non-users to address the cost of different service improvements. The strategy will include revenue/cost ratio target ranges."

RETURN ON INVESTMENT

Transportation currently uses the revenue/cost ratio as follows:

- To determine the appropriate mix of revenues required to generate sufficient operating funds that will meet the system operating needs;
- To communicate to Council and the public the impacts of changes to service, investment, revenues and fares in the framework identified in the figure below; and
- To benchmark against other agencies and our past performance

Figure 9 .1 - Revenue/Cost Framework (2015 Situation)



REVENUE / COST RATIO The Revenue/ Cost (R/C) ratio is the relationship between the elements that influence the amount of Transit Operating Funds (or budget).

Key drivers that influence the amount of funding required to operate transit services are:

- **Costs of service:** Labour and materials expenses necessary to provide service
- **Quality of service:** Investments in customer technology, safety initiatives, reliability projects, security programs, and cleanliness efforts
- **Amount of Service:** Refers to coverage, capacity, span and frequency of service

Calgary Transit operating funds are generated from three sources:

- **Property taxes: Includes other sources of municipal revenue**
- **Fare revenue: Fares paid by transit customers**
- **Other revenue: Includes advertising, parking fees and fines**

RETURN ON INVESTMENT

Table 5 illustrates how the various staging scenarios have different revenue based on the projected ridership. The variation in the total revenue on the Green Line is fairly modest from a low of $56.9 million to a high of $64.4 million per year.

Table 9.1

SOUTHEAST LRT TO	NORTH CENTRAL LRT TO	PROJECTED RIDERSHIP (2023)	PROJECTED REVENUE (MILLIONS)
Shepard	Beddington	114,000	$56.9
Shepard	96 Avenue	115,000	$57.4
Shepard	North Pointe	119,000	$59.4
Shepard	Keystone	120,000	$59.9
McKenzie Towne	Beddington	118,000	$58.9
McKenzie Towne	96 Avenue	119,000	$59.4
McKenzie Towne	North Pointe	123,000	$61.4
McKenzie Towne	Keystone	124,000	$61.9
Seton	Beddington	123,000	$61.4
Seton	96 Avenue	124,000	$61.9
SE LRT to Seton	NC LRT to North Pointe	128,000	$63.9
SE LRT to Seton	NC LRT to Keystone	129,000	$64.4

Opportunities exist to influence the revenue side of the equation and deserve further exploration as part of Calgary Transit's overall business plan reviews. These include:

- Adjustments to fares
- Revenue from sponsorship, naming rights and advertising
- Revenue from parking including daily fees and reserve stall fees

10. CURRENT ENVIRONMENT

FOR INVESTMENT IN PUBLIC TRANSIT

CURRENT ENVIRONMENT FOR INVESTMENT IN PUBLIC TRANSIT

This section includes an overview of related projects at the Provincial and Federal levels. Investing in the Green Line has a significant impact on the outcomes of these projects.

INVESTMENT IN PUBLIC TRANSIT

The Government of Alberta and the Government of Canada have played significant roles in the LRT development and expansion in Calgary.

The tables below identify the buildout of Calgary's LRT network and the role of the Provincial and Federal Government in funding.

Table 10.1

YEAR	LRT COMPONENT	LENGTH OF TRACK	PROVINCIAL FUNDING	FEDERAL FUNDING
1981	Opening of South LRT to Anderson	12.9 km	Yes	
1985	NE LRT to Whitehorn	9.8 km	Yes	
1987	NW LRT to University	5.6 km	Yes	
1990	NW extension to Brentwood	1.0 km	Yes	
2001	S extension to Fish Creek-Lacombe	3.4 km	Yes	Yes
2003	NW extension to Dalhousie Station	3.0 km	Yes	Yes
2004	S extension to Somerset-Bridlewood	3.0 km	Yes	Yes
2007	NE extension to McKnight-Westwinds	2.7 km	Yes	Yes
2009	NW extension to Crowfoot	4.1 km	Yes	Yes
2012	NE extension to Saddletowne	2.9 km	Yes	Yes
2012	West LRT opened to 69 St	8.2 km	Yes	
2014	NW LRT extension to Tuscany	2.0 km	Yes	Yes*

* Gas Tax Fund

CURRENT ENVIRONMENT FOR INVESTMENT IN PUBLIC TRANSIT

Table 10.2

ERA	LRT EXPANSION PROJECTS	FUNDING SOURCES
1980's-1990's	7 Avenue Transitway and South LRT to Anderson (1981) Northeast LRT to Whitehorn (1985) Northwest LRT to University (1987) Northwest LRT extension to Brentwood (1990)	Total: $515 million • City: $271.5 million • Province: $243.5 million 40% Provincial grant funding
2000's to present	South LRT extensions • to Fish Creek-Lacombe • to Somerset-Bridlewood Northeast LRT extensions • to McKnight-Westwinds • to Saddletowne Northwest LRT extensions • to Dalhousie • to Crowfoot • to Tuscany (fall 2014) West LRT to 69 Street SW	Total: $1.9 billion • City: $102 million • Province: $1,657 million • Federal: $102 million - Gas Tax Fund • Developer/private funding: $61 million 86% Provincial grant funding

IMPACT ON ALBERTA'S TRANSPORTATION NETWORK

Moving forward, LRT expansion promises to play a key role in the Long-Term Transportation Strategy for Alberta.

The Vision expressed by the Province is as follows: "An integrated, cost-efficient, multi-modal transportation system that is safe, affordable, and accessible to all Albertans."

Goals within the strategy document that relate to the Green Line include the following:

- **Recommended Goal 3: Connected Communities**
  - Advocate for a national transit strategy.
  - Work with municipalities to promote and/or improve public transit.
- **Recommended Goal 6: Environmental Stewardship**
  - Implement and promote the use of environmentally friendly transportation demand management tools, such as carpooling, telecommuting and public transit.
- **Recommended Goal 7: Long-Term Sustainability**
  - Work with partners to integrate land-use and transportation plans.

CURRENT ENVIRONMENT FOR INVESTMENT IN PUBLIC TRANSIT

One of the most significant roles the Green Line plays as part of an integrated Provincial transportation strategy in Calgary is offsetting the growing travel demand in the Deerfoot Trail/QE II Highway/North-South Trade Corridor, as highlighted in the figure below.

Deerfoot Trail, the major north-south goods movement route through Calgary, and part of the North/South Trade Corridor, runs parallel to the Green Line, and will benefit from the relief offered by high-capacity public transit, particularly in peak periods. Without the Green Line, additional improvements to Deerfoot Trail will be required beyond the operational improvements that would otherwise be considered as part of Provincial transportation plans. Provincial plans to return Deerfoot to The City means those improvements may fall to municipal tax payers.

By offsetting the need for roadway expansion, the project will improve air quality and reduce greenhouse gas emissions. The project directly reduces the number of single-occupant vehicle trips through increased transit ridership.

The Green Line also plays a role in connecting trip generators of regional significance. These include improved access to:

- South Health Campus and other medical facilities throughout Calgary;
- Post-secondary institutions throughout Calgary;
- Museums, cultural, sports and special event venues supportive of Tourism Alberta objectives;
- Calgary International Airport; and
- High-speed rail stations preliminarily planned by The Province in downtown Calgary and at Airport Trail.

The Green Line will improve mobility, particularly for people with disabilities, throughout the Calgary Region, particularly those travelling from Airdrie, High River, Okotoks, Chestermere, Langdon, Rockyview County and the Municipal District of Foothills, among other municipalities.

The Green Line will also offer affordable mobility for youth, students, seniors and residents with lower economic means.

Transit-oriented development plans can maximize economic development and employment diversification. A scope of work for this is identified in the recommendations/next steps at the conclusion of this report.

CURRENT ENVIRONMENT FOR INVESTMENT IN PUBLIC TRANSIT

SPECIFICS REGARDING THE FEDERAL PUBLIC TRANSIT FUND

The City of Calgary has yet to see guidelines for the Public Transit Fund, apart from what was highlighted in our PFC presentation from the Prime Ministers address in mid-June. However, we did receive inquiries that attempted to clarify the intent of our BCF application. Infrastructure Canada was seeking clarity on whether the Green Line would be a proposed project under the Public Transit Fund. We've provided Council's direction as an indication of what we might eventually submit.

Below is information gathered from press releases from the Government of Canada and the Liberal Party of Canada. These offer some insight into what the future guidelines might entail.

> "Governments at all levels have been investing in public transit projects that will further modernize our transit systems. Since 2006, the Government has provided unprecedented support for public transit, committing close to $5 billion for public transit projects across the country that have been identified as priorities by municipalities, provinces and territories. In addition, $3 billion of the funding under the Gas Tax Fund has been used by municipalities for public transit projects since 2006. All provinces, territories and municipalities can access funding under the New Building Canada Plan for their public transit priority projects. - *See more at: http://actionplan.gc.ca/en/initiative/new-public-transit-fund#sthash.qUqgjoVb.dpuf*

From Prime Minister Harper's website in 2015 June:

> "Announced in Economic Action Plan 2015, the new PTF will provide significant permanent support for large-scale public transit projects to address traffic congestion, reduce travel time for goods and people, and support economic growth in Canada's largest cities. The PTF also frees up funds under the New Building Canada Plan and the P3 Canada Fund that might have been used up by large-scale transit projects. This will ensure that more funding under the Plan is available for infrastructure projects in municipalities across Canada, including smaller-scale transit projects in smaller communities. - *See more at: http://pm.gc.ca/eng/news/2015/06/18/pm-announces-further-details-new-public-transit-fund#sthash.dqpuOn2g.dpuf*
>
> In order to be eligible for support under the PTF, projects must have a minimum of $1 billion in total estimated eligible costs. Federal contributions under the fund will be up to one-third of the total eligible costs and lever the expertise, ingenuity and financing of the private sector and alternative funding mechanisms. - *See more at: http://pm.gc.ca/eng/news/2015/06/18/pm-announces-further-details-new-public-transit-fund#sthash.dqpuOn2g.dpuf*

CURRENT ENVIRONMENT FOR INVESTMENT IN PUBLIC TRANSIT

From the website of PPP Canada Inc.:

> "The Prime Minister's announcement of new government funding for transit puts Canada on the fast track. Projects over $1 billion will be eligible for funding from the Public Transit Fund and the Federal Government contribution will increase.
>
> "The new Public Transit Fund is a game-changing announcement that will invest in world class public transit in our cities," stated Mark Romoff, President and CEO of The Canadian Council for Public-Private Partnerships.
>
> The Public Transit Fund will allow provinces, territories and smaller communities to access more funds from the existing Building Canada Fund. In particular, the announcement to invest up to $2.6 billion in Toronto's Smart Track plan will free up money for other key projects across Ontario. The Federal Government is also increasing its portion of project funding under the P3 Canada Fund from 25% to 33%."

From a release on www.liberal.ca dated 2015 September 16:

> **Liberals to invest in flood mitigation and public transit in Calgary**
>
> September 16, 2015
>
> CALGARY, AB – As part of an historic investment in infrastructure, a Liberal government will provide funding for flood mitigation and public transit in Calgary, said the Leader of the Liberal Party of Canada, Justin Trudeau, today at an event at the Simmons Building in the downtown East Village.
>
> "Here in Calgary, and across the country, we need to invest in our infrastructure now – to create jobs, grow our economy, and make sure that families and businesses can prosper," said Mr. Trudeau. "A Liberal government will provide crucial and significant funding to help Calgary with the costs of flood mitigation, and will continue the $1.5 billion in funding for the C-Train Green Line which will expand service to the nearly 300,000 people who live along its corridor."

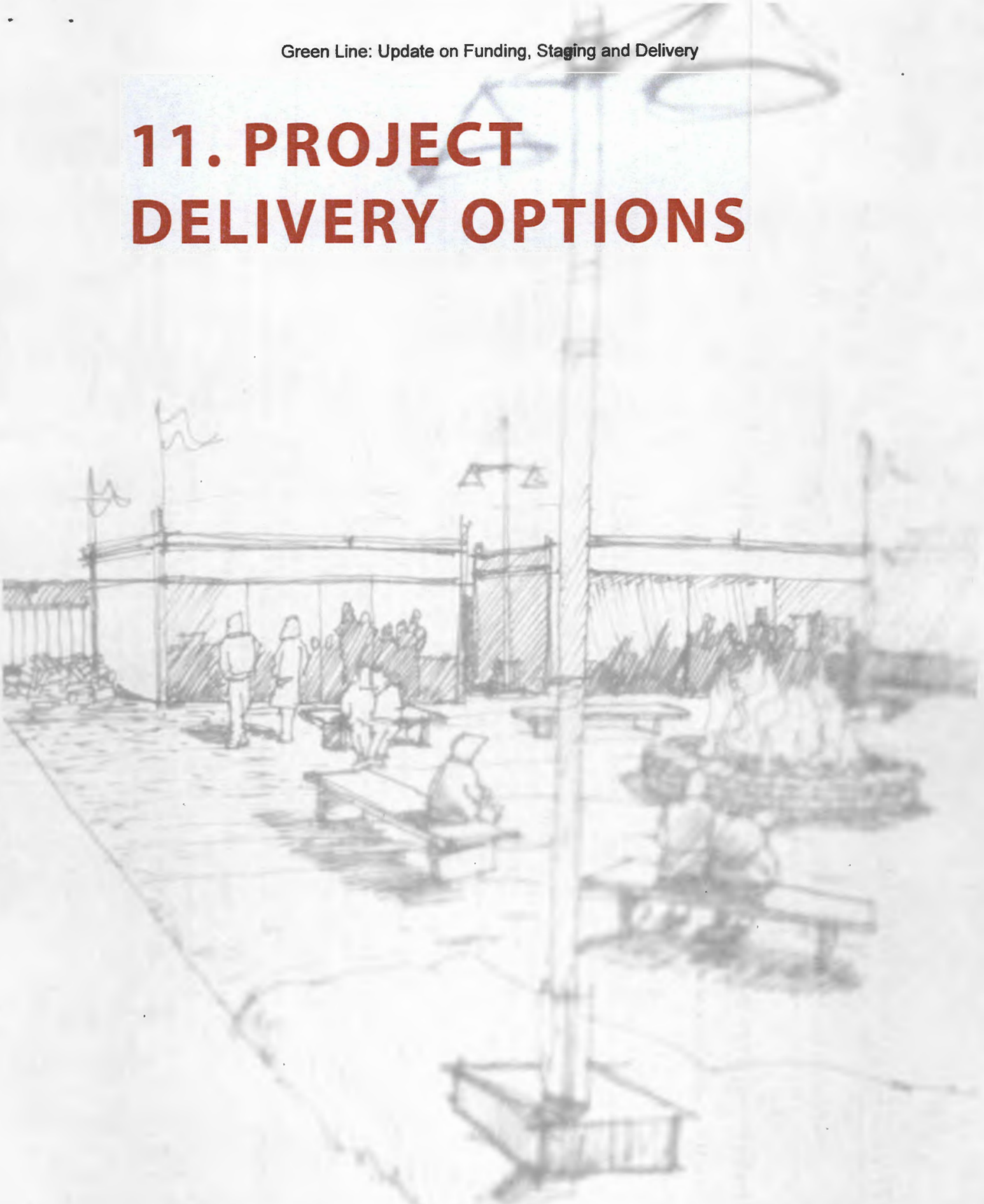
The 2015 Citizen Satisfaction Survey confirms transportation and transit as the key issue with Calgarians.

36% Infrastructure, traffic & roads

21% Transit

12% Crime, safety & policing

11. PROJECT DELIVERY OPTIONS



PROJECT DELIVERY OPTIONS

As outlined in Staging Recommendations in this report, the desired staging of the Green Line is an LRT project between North Pointe and Seton in the next decade. This will result in a number of projects being delivered under the Green Line program.

PROJECT DELIVERY METHODOLOGY

Table 11.1 - Delivery Methods and Comparing Potential

PROCUREMENT TYPE	DESCRIPTION/RECENT LRT APPLICATIONS	ADVANTAGES WITH RESPECT TO GREEN LINE	DISADVANTAGES WITH RESPECT TO GREEN LINE
Traditional / Design-Bid-Build	• Flexible approach • Private sector is involved at multiple levels • Used by City on NW and NE LRT extensions	• Owner control of built product. • Flexibility to respond to changing conditions and citizen concerns • Less up front time and resource spent on projecting future operation details/risks	• Requires completed design before bidding to secure best pricing. • Most likely to increase scope and cost
Design / Build	• Good fit when time is of the essence • Typically used for fixed delivery date and fixed fee • Private sector is involved at multiple levels • Used by City on West LRT	• Can accelerate project delivery schedule for critical path components / infrastructure. • Potential for good value based design decisions • Reduces construction risk	• Higher cost to Owner as proponent will factor risk into price in order to meet cost and schedule. • Owner involvement is still required throughout the project to ensure the final product is what the Owner wanted (including many City Business Units)
Hybrid	• Tactical approach by element or stage • Owner can select from elements of Traditional and Design/Build for different parts of a project • Can include Construction Manager at Risk and other tactical approaches • Private sector is involved at multiple levels • Used by City on 7 Avenue	• Allows Owner to maximize benefit of innovation and incremental funding to improve long term project implementation without long term borrowing of capital. • Owner can apply a variety of procurement types to various project components to maximize advantage for the Owner.	• Depends on the type of procurement selected. Careful management is required to deliver individual components of a larger project. Exposes project to more inflation risk.
Public Private Partnership (P3)	• Includes range of private sector involvement in Design, Build, Finance, Maintenance, and/or Operation • Typically the private sector is engaged in a bundled contract for the life of the asset. • Occasionally favoured by a project's funding partners (P3 Canada Fund, Infrastructure Ontario, PartnershipsBC, etc.)	• Public sector can introduce new infrastructure with certainty of future operating condition and costs (maintenance/life-cycle repair will be priced in) • Might show a positive value for money versus traditional delivery methods (cost savings) • Can produce innovation where scope outcome is not specified (both advantage and disadvantage) • Contract connects ongoing operations and/or maintenance payments to the quality of the original construction • Reduce risk to buyer of escalated price during construction	• Long term operating costs are potentially higher than if a flexible approach was taken • Less control of quality of project deliverables where quality is difficult to quantify • Can result in unforeseen innovation where scope/outcome is not specified (both advantage and disadvantage) • Complex upfront work with high levels of expertise brought to bear by the contracting proponents • Increased time to contract, higher overhead costs to build

PROJECT DELIVERY OPTIONS

Council and Administration policies require that a P3 delivery model be considered for any project exceeding $100 million.

PUBLIC-PRIVATE PARTNERSHIPS

The following is a summary of The City's P3 Policy, CFO011; effective since 2008 December 15.

A P3 is a contractual agreement between a public authority and a private entity for the provision of infrastructure and/or services in which:

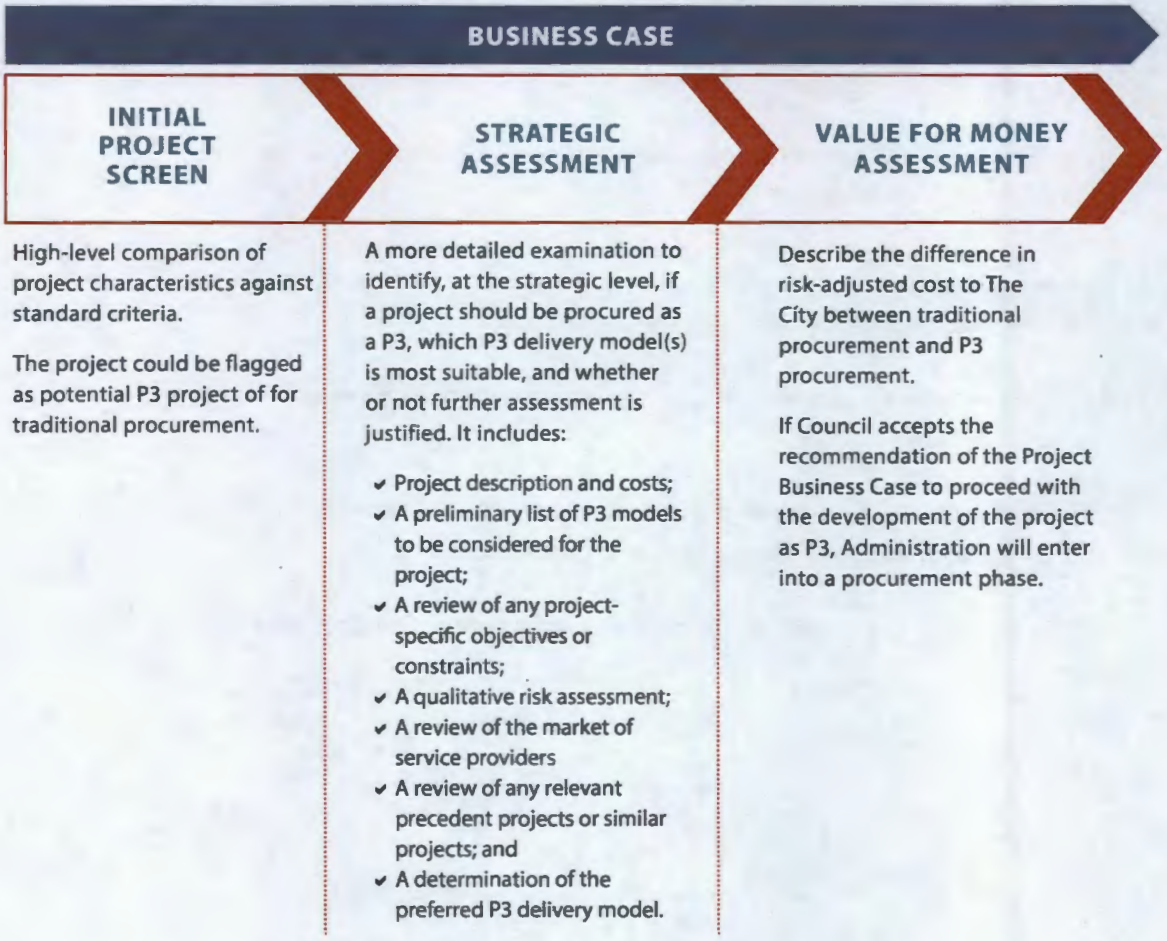
1. The private sector participant assumes the responsibility for financing part or all of the project; and/or
2. The City seeks to transfer risks that it would normally assume, based on the private sector participant's ability to better manage those risks; and/or
3. The arrangement extends beyond the initial capital construction of the project.

FOOTNOTES

See more: http://www.calgary.ca/CA/city-clerks/Documents/Council-policy-library/cfo011-Public-Private-Partnerships-(P3)-Policy.pdf and http://publicaccess.calgary.ca/lldm01/livelink.exe?func=ccpa.general&msgID=ZsKTyKgcTD&msgAction=Download).

PROJECT DELIVERY OPTIONS

The exhibit below identifies the steps in the evaluation of whether a project would be valuable to deliver through a P3.



In summary, each of these procurement methods are being considered for the Green Line. However, it is premature to make an assessment of the preferred method without better project definition. The Council-approved P3 model involves several steps of evaluation, including a Value for Money study. This study would be undertaken to assess whether a P3 procurement model would deliver positive value versus a traditional delivery method. Such an evaluation should not commence prior to completion of the full scope of functional planning, which is anticipated to be complete in late 2016. The decision to invest the significant resources required to evaluate the project as a potential P3 may be made nearer to that time.

In the absence of sufficient capital and operating fund certainty at this time, it is recommended that a flexible approach be designed that allows for the following concerns to be addressed:

- Number of enabling projects required that will not be part of the LRT system procurement
- Condition of urban realm during and after construction
- Population growth, particularly in Southeast Calgary, and influence of operating assumptions on the predictability costs

PROJECT DELIVERY OPTIONS

GOVERNANCE STRUCTURE

A project governance and organization structure has been established to deliver functional planning and predesign projects under the Green Line program to date. These have served The City to date. However, moving forward, the implementation of design and construction projects will require enhancements to governance and organizational structure as outlined below.

ASPECT OF PROJECT	CURRENT SITUATION	FUTURE SITUATION (2016 ONWARD, SUBJECT TO COUNCIL APPROVAL OF RECOMMENDATIONS)
Scope and scale is growing significantly	Conducting functional planning (North) and Predesign (Southeast) of LRT facilities, including comprehensive TOD planning.	Much broader scope, including full predesign, land acquisition, enabling projects (e.g. demolitions, remediation), selection of procurement method, detailed design and construction of 40km of LRT and related projects. Requires strategic project leadership with experience on similar scale of projects.
Funding partners' roles are evolving	Received $8 million contribution from Government of Alberta under GreenTRIP grant program.	Anticipated $1.53 billion from Government of Canada, anticipated participation from Government of Alberta, and possible negotiation with private sector funding partners.
Innovative funding and financing could lead to larger roles in coordination with private sector	Efforts are focused on soliciting advice on how best to configure station areas to enable TOD and negotiations for contributions are handled through CPAG process.	More opportunities will be sought to leverage public investment (e.g. sponsorship of line/stations, funding agreements for adjacent mobility improvements).
Evaluation of procurement alternatives and selection of preferred alternative for LRT project and enabling projects.	Currently engaged in overview of range of alternatives while in functional planning phase. City of Calgary has limited P3 experience.	A range of procurement options will be evaluated in great detail to ensure value for money and appropriate risk transfer. A business case and project charter must be developed once there is more certainty associated with the Green Line North alignment. This will require project leadership with expertise and experience with a similar range of procurement options on similar scope/scale of projects.

PROJECT DELIVERY OPTIONS

Roles and responsibilities of the participants in project delivery will change as the project evolves from planning into detailed design/construction. The following are some of the key roles and how they might evolve:

- City Council: the governing body of the corporation and the custodian of its powers, both legislative and administrative. The Municipal Government Act (MGA) provides that council can only exercise the powers of a municipal corporation in the proper form, by either bylaw or resolution. Council will continue to have the final say with respect to funding of this project.

- Standing Policy Committee of Council (or other Committee): The Standing Policy Committee on Transportation and Transit has served as part of oversight for similar projects in the past (e.g. West LRT). The public is permitted to speak to the various land use issues at a Regular Public Hearing, however, do not normally address Council at Regular Meetings as the opportunity for input is provided at Council's Standing Policy Committee, or other Committee, meetings. The breadth of the work on Green Line will see reports coming through Transportation and Transit, Planning and Urban Development, Land and Asset, as well as Priorities and Finance.

- Project Steering Committee: a decision-making body made up of City staff at high levels to provide direction on the program/projects. The team or a designated subset of the team must be available for nimble decision-making. It would include the Project Sponsor(s).

- Government of Canada and Government of Alberta: if a funding agreement is reached with other governments, links will be required at the "steering committee" level as well as at the "project staff" level.

- Program Director (Project Executive Officer): This person is accountability for project coordination and oversight of various projects within the Green Line Program. Provides day-to-day decisions where required. As the project evolves in scope in 2016-2017, expertise in delivery of program of projects, different procurement methods, and large scale projects ($2 billion - $5 billion) will be required.

- Project Manager(s): This person is accountable for delivery of individual projects (including the LRT project). Expertise in delivery of major projects ($100 million to $1 billion) is required.

- Advisory Committee: a new body envisioned to be an advisory body external to The City that provides "big picture" advice to the Program Director and Steering Committee. Administration is reviewing what perspectives are desirable to include (business, academic, customer, accessibility, etc.).

- Community Advisory Group: an advisory body made up of representatives from affected businesses and residential communities that provide advice to the project manager at the functional planning/predesign phase. This typically transitions into smaller teams – Community Consultation Committees – in the design phase.

- Community Consultation Committee: a community group specific to a station area that provides community input at the design phase and during Transit Service Plan development.

PROJECT DELIVERY OPTIONS

- Transit Service Plan Committees: community leaders and customers that provide input on transit service plans for individual/groups of communities. Engagement is led by Calgary Transit, and is focused on the transition of the bus network to deliver customer-focused service in an efficient manner.

- Developer Advisory Group: validates The City's station area land use concepts by commenting on market interest and feasibility of implementation.

- Technical Advisory Committee – an internal city team that provides technical direction/advice to the Project Manager. This is a critical role given the commitments required of business units are greater than past projects (e.g. five times the length of West LRT).

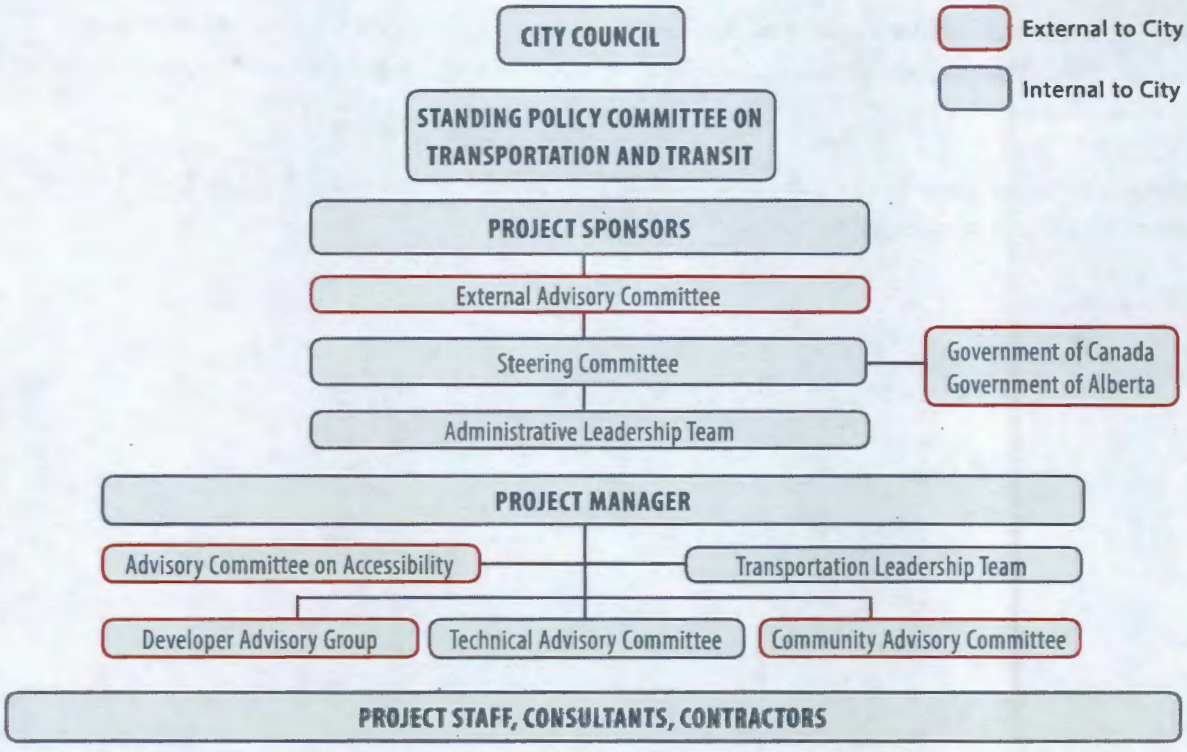
- Other City of Calgary committees will be consulted as part of decision-making and building synergy with related projects/initiatives during project delivery.

PROJECT DELIVERY OPTIONS

GOVERNANCE AUTHORITY

The following building blocks will be used in a review of governance and staffing to identify a preferred organizational structure for the project as it evolves from planning into design and construction.

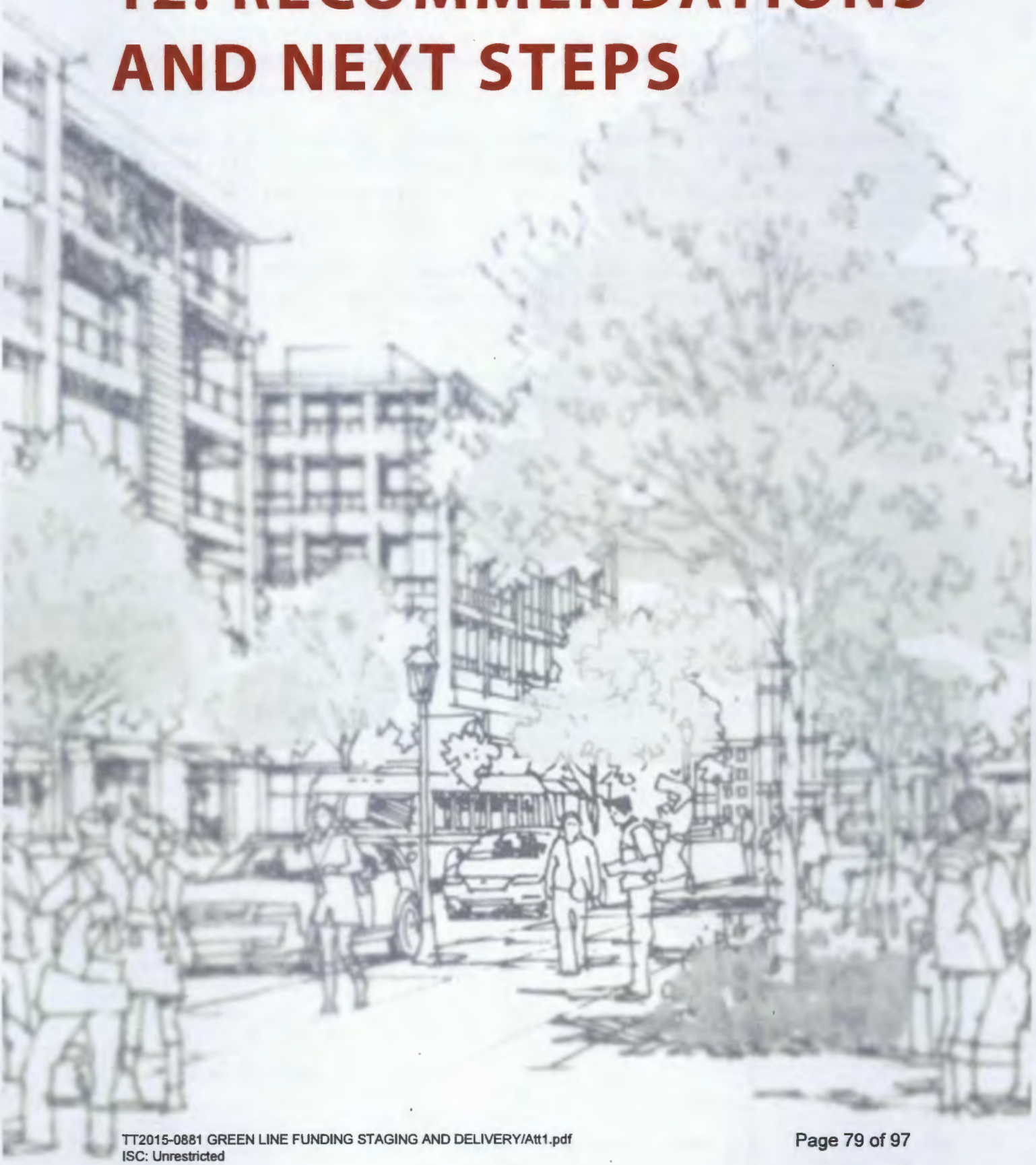
Exhibit 11.1



Administration's recommendation is to continue with a city-led project administered through Transportation Infrastructure, but await funding guidelines to see what elements identified in the preceding discussion are required. A project of magnitude warrants a Director level oversight at a minimum.

A further recommendation, including an organizational chart and governance roles and responsibilities list, will be brought to the SPC on Transportation and Transit in 2016 assuming more information has been received from the Government of Canada at that point.

12. RECOMMENDATIONS AND NEXT STEPS



RECOMMENDATIONS AND NEXT STEPS

Council directed the investigation of a delivery model that would see The City construct LRT on the Green Line without the interim step of a bus-based transitway. The conclusion of the analysis is that the Government of Canada's Public Transit Fund offers levels of funding that support the construction of LRT, either in stages or as a single procurement. It is impractical to pursue a short-term exclusively transitway strategy in light of this funding becoming available.

The Green Line North functional planning project team will report back to the SPC on Transportation and Transit in 2016 with a recommendation for the downtown routing of Green Line. The final recommendations of this phase of work will come to the SPC on Transportation and Transit in late 2016. Upon approval of the recommendations, The City will begin the preliminary design phase for the North segment in late 2016/early 2017.

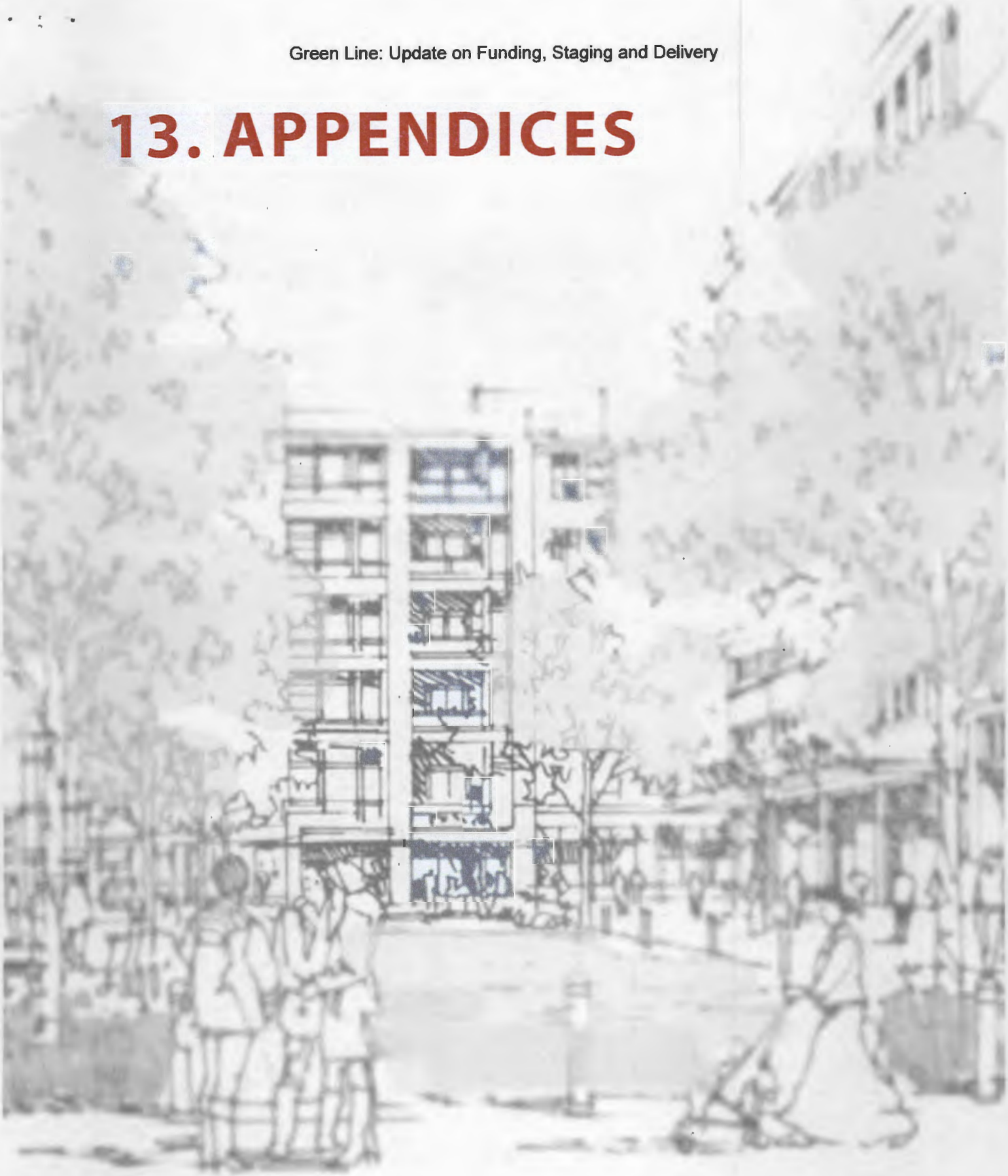
It is critical that global promotion of economic diversification opportunities be initiated to leverage this historic investment in transit infrastructure and TOD planning, so it is recommended that the joint efforts of The City and Calgary Economic Development begin immediately, as outlined in Appendix 4.

These will be addressed through the development of an **appropriate project organizational design, governance structure, project charter, schedule, and draft business case details.** These will be presented to Council in 2016.

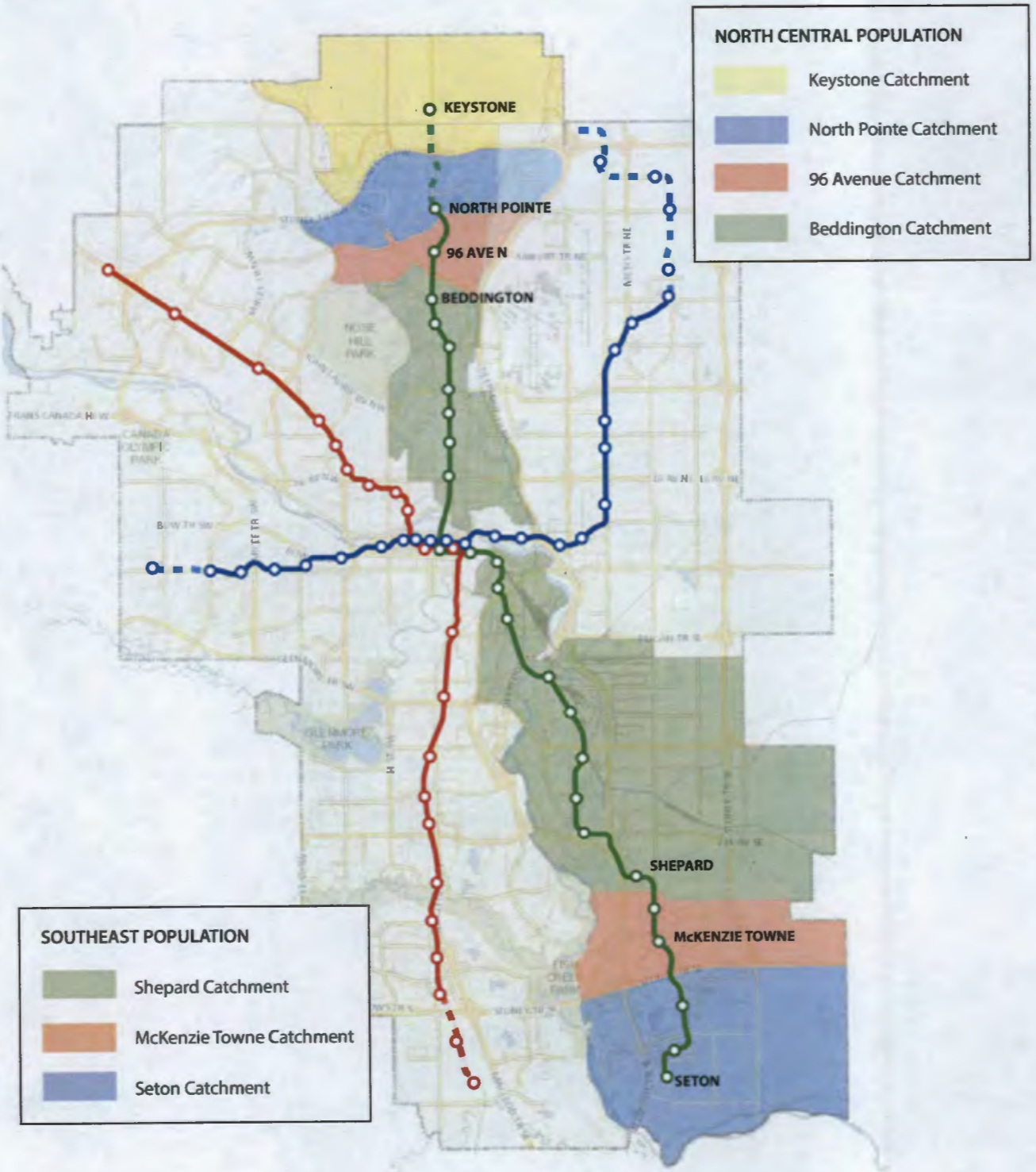
Key points:

1. Funding is sufficient for a substantial portion of Green Line
2. Interim bus way core section is not optimal as conversion costs and impacts are high
3. Secure maximum Federal and Provincial Funds
4. Take a phased approach with plans
5. Complete north functional and central option evaluations
6. Governance

13. APPENDICES



APPENDIX 1


NORTH CENTRAL POPULATION
Keystone Catchment
North Pointe Catchment
96 Avenue Catchment
Beddington Catchment
KEYSTONE
NORTH POINTE
96 AVE N
BEDDINGTON
SHEPARD
McKENZIE TOWNE
SETON
SOUTHEAST POPULATION
Shepard Catchment
McKenzie Towne Catchment
Seton Catchment

NORTH CENTRAL CATCHMENT POPULATION

NC POPULATION CATCHMENTS	2014	2018	2023	2028	2033	2039	2076
Beddington Catchment (Green)	76,000	78,000	80,000	84,000	88,000	94,000	150,000
96 Avenue Catchment (Red)	23,000	23,000	22,000	22,000	22,000	22,000	25,000
North Pointe Catchment (Blue)	57,000	57,000	57,000	57,000	57,000	57,000	58,000
Keystone Catchment (Yellow)	10,000	18,000	26,000	38,000	50,000	60,000	114,000

NORTH CENTRAL CUMULATIVE POPULATION

NC POPULATION CATCHMENTS	2014	2018	2023	2028	2033	2039	2076
Population South of Beddington Catchment (Green)	76,000	78,000	80,000	84,000	88,000	94,000	150,000
Population South of 96 Avenue Catchment (Green + Red)	99,000	101,000	102,000	106,000	110,000	116,000	175,000
Population South of North Pointe Catchment (Green + Red + Blue)	156,000	158,000	159,000	163,000	167,000	173,000	233,000
Population South of Keystone Catchment (Green + Red + Blue + Yellow)	166,000	176,000	185,000	201,000	217,000	233,000	347,000

CHANGES OVER TIME OF POPULATION AS A % OF CUMULATIVE POPULATION

NC POPULATION CATCHMENTS	2014	2018	2023	2028	2033	2039	2076
Population South of Beddington Catchment (Green)	46%	45%	43%	42%	41%	40%	43%
Population South of 96 Avenue Catchment (Green + Red)	60%	57%	55%	53%	51%	50%	51%
Population South of North Pointe Catchment (Green + Red + Blue)	94%	90%	86%	81%	77%	74%	67%
Population South of Keystone Catchment (Green + Red + Blue + Yellow)	100%	100%	100%	100%	100%	100%	100%

APPENDIX 1

NORTH CENTRAL CATCHMENT JOBS

NC JOBS	2014	2018	2023	2028	2033	2039	2076
Beddington Catchment (Green)	31,000	34,000	37,000	38,000	39,000	43,000	54,000
96 Avenue Catchment (Red)	3,000	3,000	5,000	6,000	8,000	9,000	11,000
North Pointe Catchment (Blue)	5,000	6,000	7,000	7,000	8,000	8,000	10,000
Keystone Catchment (Yellow)	1,000	1,000	3,000	6,000	9,000	17,000	33,000

NORTH CENTRAL CUMULATIVE JOBS

NC POPULATION CATCHMENTS	2014	2018	2023	2028	2033	2039	2076
Jobs South of Beddington Catchment (Green)	31,000	34,000	37,000	38,000	39,000	43,000	54,000
Jobs South of 96 Avenue Catchment (Green + Red)	34,000	37,000	42,000	44,000	47,000	52,000	65,000
Jobs South of North Pointe Catchment (Green + Red + Blue)	39,000	43,000	49,000	51,000	55,000	60,000	75,000
Jobs South of Keystone Catchment (Green + Red + Blue + Yellow)	40,000	44,000	52,000	57,000	64,000	77,000	108,000

CHANGES OVER TIME OF JOBS AS A % OF CUMULATIVE JOBS

NC POPULATION CATCHMENTS	2014	2018	2023	2028	2033	2039	2076
Jobs South of Beddington Catchment (Green)	78%	77%	71%	67%	61%	56%	50%
Jobs South of 96 Avenue Catchment (Green + Red)	85%	84%	81%	77%	73%	68%	60%
Jobs South of North Pointe Catchment (Green + Red + Blue)	98%	98%	94%	89%	86%	78%	69%
Jobs South of Keystone Catchment (Green + Red + Blue + Yellow)	100%	100%	100%	100%	100%	100%	100%

SOUTHEAST CATCHMENT POPULATION

SE POPULATION CATCHMENTS	2014	2018	2023	2028	2033	2039	2076
Shepard Catchment (Green)	38,000	40,000	43,000	45,000	49,000	53,000	88,000
McKenzie Towne Catchment (Red)	53,000	57,000	58,000	60,000	62,000	64,000	74,000
Seton Catchment (Blue)	29,000	58,000	79,000	92,000	102,000	113,000	152,000

SOUTHEAST CUMULATIVE POPULATION

SE POPULATION CATCHMENTS	2014	2018	2023	2028	2033	2039	2076
Population North of Shepard Catchment (Green)	38,000	40,000	43,000	45,000	49,000	53,000	88,000
Population North of McKenzie Towne Catchment (Green + Red)	91,000	97,000	101,000	105,000	111,000	117,000	162,000
Population North of Seton Catchment (Green + Red + Blue)	120,000	155,000	180,000	197,000	213,000	230,000	314,000

CHANGES OVER TIME OF POPULATION AS A % OF CUMULATIVE POPULATION

SE POPULATION CATCHMENTS	2014	2018	2023	2028	2033	2039	2076
Population North of Shepard Catchment (Green)	32%	26%	24%	23%	23%	23%	28%
Population North of McKenzie Towne Catchment (Green + Red)	76%	63%	56%	53%	52%	51%	51%
Population North of Seton Catchment (Green + Red + Blue)	100%	100%	100%	100%	100%	100%	100%

APPENDIX 1

SOUTHEAST CATCHMENT JOBS

SE JOB CATCHMENTS	2014	2018	2023	2028	2033	2039	2076
Shepard Catchment (Green)	90,000	99,000	108,000	114,000	122,000	133,000	170,000
McKenzie Towne Catchment (Red)	6,000	6,000	8,000	8,000	9,000	10,000	12,000
Seton Catchment (Blue)	4,000	6,000	9,000	11,000	12,000	15,000	29,000

SOUTHEAST CUMULATIVE JOBS

SE JOB CATCHMENTS	2014	2018	2023	2028	2033	2039	2076
Jobs North of Shepard Catchment (Green)	90,000	99,000	108,000	114,000	122,000	133,000	170,000
Jobs North of McKenzie Towne Catchment (Green + Red)	96,000	105,000	116,000	122,000	131,000	143,000	182,000
Jobs North of Seton Catchment (Green + Red + Blue)	100,000	111,000	125,000	133,000	143,000	158,000	211,000

CHANGES OVER TIME OF JOBS AS A % OF CUMULATIVE JOBS

SE JOB CATCHMENTS	2014	2018	2023	2028	2033	2039	2076
Jobs North of Shepard Catchment(Green)	90%	89%	86%	86%	85%	84%	81%
Jobs North of McKenzie Towne Catchment (Green + Red)	96%	95%	93%	92%	92%	91%	86%
Jobs North of Seton Catchment (Green + Red + Blue)	100%	100%	100%	100%	100%	100%	100%

APPENDIX 2

In order to estimate transit ridership, Administration uses the RTM in order to explore different scenarios. Due to short time lines, only 2 modelling scenarios could be explored: 2024 LRT to Seton and North Pointe and a "build nothing" model run where no additional transit infrastructure built. In order to calculate the 11 other LRT scenarios e.g. LRT to Shepard and North Pointe, transportation had to estimate how ridership would be impacted with The LRT terminus's at different locations.

METHODOLOGY

Using the 2011 and 2014 census data, Transportation analyzed how the West LRT impacted transit ridership levels. The data shows that there is a spatial relationship between transit ridership and a communities proximity to LRT. Simply put, the closer you are to LRT the more likely you are to use it. This assumption holds true in other quadrants of the City.

These distance based assumptions were used to help calculate the % differences in riderships for different LRT terminus locations. For example, if the LRT terminus was located in Seton, it would be more attractive for people living in Seton than it would be if the terminus was located in Shepard.

APPENDIX 2

Transit ridership to work in the NW and SW

2011

2014

Areas were created to represent different levels of ridership at each location. If the LRT terminated at Shepard, all of the tier 1 communities would get a 5% ridership bump to their existing ridership, the tier 1A communities would receive a 7% ridership bump due to being adjacent to the stations. The other tier 2 and 3 communities received a 3% bump. The levels of increase were determined by analyzing the existing LRT census data and by looking at how the West LRT changed transit ridership over time. If the line was extended to McKenzie Towne, the tier 1A and 2A communities would receive a 5% bump and the tier 11 and 22 communities would receive a 7% bump, while the tier 3 and 3A communities would remain at 3%.

This ridership % was then multiplied by the projected population in the area for 2023. This number is representative of the expected transit ridership to work levels for the various communities.

As an example, these numbers showed that given the above methodology, a transit terminus in Shepard would attract 83% of the amount of transit to work ridership that a transit terminus at Seton would.

APPENDIX 2

Then, using the RTM results from the Seton to North Pointe * the % differences between the ridership to work scenarios, we can estimate how total ridership may differ between various LRT terminus's. For example, if transit ridership was predicted at 100,000 in the SE for the Seton terminus scenario model run, than we would estimate it would be 83,000 (83%) for the Shepard Scenario. This methodology operates using the assumption that transit ridership to work is representative of overall transit ridership.

Future RTM runs will replace the estimates that use this methodology.

RIDERSHIP AND REVENUE FORECASTS

An update to the Regional Transportation Model is underway, and the first forecast using the updated model is a Green Line 2024 forecast (other horizons, including 2029, 2039 and 2076 will be created in 2016 as updated networks for roadways and transit are created and model runs are conducted/reviewed). Two Regional Transportation Model runs were conducted in the 2024 Scenario:

a. Green Line LRT between North Pointe and Seton

b. Base, or "No Build" scenario (i.e. BRT operating in the corridors with no new infrastructure)

RESULT		2024 BASE	2024 GREEN LINE LRT
City Wide	Total network vehicle kilometres travelled	55,634,636	55,164,443
	Total network vehicle hours travelled	962,176	950,203
	Total trips (all modes of travel)	7,493,098	7,493,904
	Total transit trips	312,000	350,000
Total transit trips in the Green Line Southeast corridor (bus and LRT)		32,000	52,000
Total transit trips in the Green Line North Central corridor (bus and LRT)		61,000	76,000
Total Transit Trips in the Green Line Corridor (bus and LRT)		93,000	128,000
Total Green Line LRT Trips only north of downtown		N/A	50,000
Total Green Line LRT Trips only south of downtown		N/A	40,000
Total Green Line LRT Trips only		N/A	90,000

APPENDIX 3

					SCENARIO 1		SCENARIO 2	
SE Terminus	NC Terminus	Projected Ridership in Catchment (2024)	Revenue Rounded (Millions)	New Revenue (Millions)	Operating Cost BAU (Millions)	Operating Net Cost BAU (Millions)	Operating Cost CU (Millions)	Operating Net Cost CU (Millions)
SE LRT to Shepard	NC LRT to Beddington	114,000	56.9	11.0	48.1	37.1	26.1	15.1
SE LRT to Shepard	NC LRT to 96 Avenue	115,000	57.4	11.5	47.6	36.1	25.6	14.1
SE LRT to Shepard	NC LRT to North Pointe	119,000	59.4	13.5	47.0	33.5	25.0	11.5
SE LRT to McKenzie Towne	NC LRT to Beddington	118,000	58.9	13.0	46.5	33.5	24.5	11.5
SE LRT to McKenzie Towne	NC LRT to 96 Avenue	119,000	59.4	13.5	46.0	32.5	24.0	10.5
SE LRT to McKenzie Towne	NC LRT to North Pointe	123,000	61.4	15.5	45.4	29.9	23.4	7.9
SE LRT to Seton	NC LRT to Beddington	123,000	61.4	15.5	44.9	29.4	22.9	7.4
SE LRT to Seton	NC LRT to 96 Avenue	124,000	61.9	16.0	44.4	28.4	22.4	6.4
SE LRT to Seton	NC LRT to North Pointe	128,000	63.9	18.0	43.8	25.8	21.8	3.8
BASE - No Transitway	BASE - No Transitway	92,000	45.9	0				

Ridership and cost estimates preliminary and best used for comparative analysis only.
Further refinement required pending as more project details are confirmed.

HIGH-LEVEL PLANNING ESTIMATES FOR VALIDATION

An alternative approach to estimating future demand is to follow current trendlines to estimate future ridership. The following projections are based on GeoDemographic data shown previously and the 2011 and 2014 Civic Census data for "travel to work". (The City Census includes "Mode of Transportation to Work Data Collection". Starting in 2011, data on the mode of transportation to work for one working individual in the household will be collected on a triennial basis.)

The following is a projection of transit demand using these data sets for the 2039 horizon:

- The population of the Southeast catchment area will increase from 120,000 in 2014 to 230,000 in 2039, an increase of 92%;
- The population of the North Central catchment area will increase from 170,000 in 2014 to 230,000 in 2039, an increase of 35%;
- Based on the 2014 Civic Census, 12,500 (10%) of people in the Southeast catchment and 26,300 (16%) of people in the North Central catchment area use transit to travel to work;
- Assuming these "travel to work" percentages stayed the same, the Southeast catchment area would experience a 92% increase in people (24,000 more) using transit to travel to work; Similarly the North Central catchment area would experience a 41% increase in people (37,000 more) using transit to travel to work.

Based on Calgary's experience with the implementation of the Blue Line extension to 69 Street (West LRT), a significant change in travel behaviour is expected due to the attractiveness of LRT. For example:

- From 2011 to 2014, the West LRT catchment area grew in population from 96,000 to 105,400, an increase of 9%,
- From the 2011 Civic Census, 14,800 (15%) of people in the West LRT catchment area used transit to travel to work; and
- From the 2014 Civic Census, 23,300 (22%) of people in the West LRT catchment area used transit to travel to work.

If the Green Line corridors experienced a change in travel behaviour like these changes resulting from the introduction of West LRT, then the following can be estimated:

- We would have 39,000 (v.s 12,500 in 2014) people taking transit to work in the SE corridor in 2039 (212% increase from current levels) and 53,500 (v.s 26,300 in 2014) people taking transit to work in the NC corridor in 2039 (an increase of 103%).

The North Central corridor is already at capacity and the population is estimated to grow by an additional 40% by the year 2039. Even if the population were to have the same travel behaviour i.e. the same propensity to take transit) as they do today, the entire corridor will not be able to be served efficiently with buses.

APPENDIX 3

SE TERMINUS	NC TERMINUS	PROJECTED RIDERSHIP (2024)	REVENUE ROUNDED (MILLIONS)
SE LRT to Shepard	NC LRT to Beddington	114,000	$56.9
SE LRT to Shepard	NC LRT to 96 Avenue	115,000	$57.4
SE LRT to Shepard	NC LRT to North Pointe	119,000	$59.4
SE LRT to Shepard	NC LRT to Keystone	120,000	$59.9
SE LRT to McKenzie Towne	NC LRT to Beddington	118,000	$58.9
SE LRT to McKenzie Towne	NC LRT to 96 Avenue	119,000	$59.4
SE LRT to McKenzie Towne	NC LRT to North Pointe	123,000	$61.4
SE LRT to McKenzie Towne	NC LRT to Keystone	124,000	$61.9
SE LRT to Seton	NC LRT to Beddington	123,000	$61.4
SE LRT to Seton	NC LRT to 96 Avenue	124,000	$61.9
SE LRT to Seton	NC LRT to North Pointe	128,000	$63.9
SE LRT to Seton	NC LRT to Keystone	129,000	$64.4
BASE - No Transitway	BASE - No Transitway	92,000	$45.9
*Transitway Douglas Glen	Transitway Beddington	100,000	$49.9

**More uncertainty regarding the Transitway scenario*

APPENDIX 3

In order to forecast ridership for other extents, the forecasted ridership from the Green Line LRT (North Pointe to Seton) scenario was multiplied by percentages based off census ridership projections.

SCENARIO (DIFFERENT STAGING OF LRT/EXTENTS)	PERCENTAGE OF GREEN LINE LRT SCENARIO
SOUTHEAST Downtown to Shepard	83%
SOUTHEAST Downtown to McKenzie Towne	90%
SOUTHEAST Downtown to Seton	100%
NORTH CENTRAL Downtown to Beddington	93%
NORTH CENTRAL Downtown to 96 Ave	95%
NORTH CENTRAL Downtown to North Pointe	100%
NORTH CENTRAL Downtown to Keystone	102%

APPENDIX 4

SCOPE OF WORK FOR ECONOMIC DIVERSIFICATION STRATEGY

The following scope of work will guide the initial work by the aforementioned parties on economic diversification as it relates to the Green Line:

1. Update project benefits to reflect Economic Diversification opportunities/benefits

2. Identify long-term economic multipliers from the project, including but not limited to:
   - Time savings for travellers to existing buildings/businesses
   - Access to low-cost mobility for employees/employers

3. Project new employment and housing starts influenced by the Green Line

4. Review the economic diversification results from construction of LRT projects in Calgary and in other regions (Dallas, Denver, Portland, Vancouver, others) to identify the qualitative and quantitative attributes that led to success. Identify sectors that see particular gains associated with LRT (i.e. what industries seek out transit-oriented development on sites similar to Green Line typologies) . Assess why the business case for LRT/TOD was successful for sectors to invest in and whether these factors can be incorporated into the Green Line TOD.

5. Identify the sectors The City and Calgary Economic Development should target in a focused strategy

6. Review of alignment with outcomes from Build Calgary strategy

7. Review of alignment with The City of Calgary 2013-2022 Industrial Land Strategy (Office of Land Servicing and Housing strategy for City-owned lands)

8. Review of alignment with Government of Alberta's new department of Economic Development and Trade

9. Preliminary identification of focus sites along the Green Line alignment that lend themselves to further study in support of economic diversification, including identification of key opportunities and constraints and implementation timeline

10. Development of joint strategy and work plan for Promotion of Green Line Economic Diversification.

It is anticipated that this work (Tasks 1-9) would be conducted in Q1-Q2 2016 with a goal of implementing a promotional strategy in late 2016/early 2017.