Environmental Scan

Integrated Regional Transportation Master Plan (IRTMP)

May 14, 2020

Version: Final Approved

Prepared for:

Edmonton Metropolitan Region Board

Regional Action. Global Opportunity.

List of acronyms and abbreviations used in this report.

Acronym	What It Means
AARP	Association of American Retired Persons
ACTF	Alberta Community Transit Fund
ACP	Area Concept Plan
APTA	American Public Transit Association
AT	Alberta Transportation
AV	Autonomous vehicle
BMTG	Basic Municipal Transportation Grant
CDOT	Colorado Department of Transportation
CMA	Census Metropolitan Area
CRB	Capital Region Board
CV	Connected vehicle
DDC	Drone Delivery Canada
DRCOG	Denver Regional Council of Governments
EIA	Edmonton International Airport
EMRB	Edmonton Metropolitan Region Board
EV	Electric vehicle
FTN	Frequent transit network
GGH	Greater Golden Horseshoe
GTF	Gas Tax Fund
GreenTRIP	Green Transit Incentive Program
HLCOO	High Load Corridor and Oversize / Overweight
HOV	High Occupancy Vehicle
ICIP	Investing in Canada Infrastructure Program
IRTMP	Integrated Regional Transportation Master Plan
LRT	Light Rail Transit
MSI	Municipal Sustainability Initiative
MSP	Master Servicing Plan
MRSP	Metropolitan Region Servicing Plan
MVRTP	Metro Vision Regional Transportation Plan
NBCF	New Building Canada Fund
NHS	National Household Survey
PPUDO	Passenger Pick-Up and Drop-Off
PTIF	Public Transit Infrastructure Fund
RAMP	Regional Agricultural Master Plan
RTD	Regional Transportation District
RTSC	Regional Transit Service Commission
SAE	Society of Automotive Engineers
SISB	Shared Investment for Shared Benefit
SOV	Single occupancy vehicle
STIP	Strategic Transportation Infrastructure Program
TfL	Transport for London
TMP	Transportation Master Plan
TOD	Transit Oriented Development
UAV	Unmanned aerial vehicles
UGV	Unmanned ground vehicles
V2E	Vehicle to everything
V2I	Vehicle to infrastructure
V2V	Vehicle to vehicle
VMT	Vehicle miles travelled
VKT	Vehicle kilometres traveled

Executive Summary

The Environmental Scan is the first of many reports in the development of the Edmonton Metropolitan Region Board's (EMRB) Integrated Regional Transportation Plan (IRTMP). The report provides an overview of existing conditions in the Edmonton Metropolitan Region and looks outside of the Region's boundaries for best practices and emerging technologies related to regional transportation. The Environmental Scan sets the context for the IRTMP development - a way of understanding where the Region is now, and where it might be heading.

The Environmental Scan begins by summarizing the overarching framework for the IRTMP update established in the 2016 Growth Plan. The Environmental Scan provides a summary of the **Growth Plan's Guiding Principles**, **Transportation System Objectives**, and interrelated **Policy Areas**.

The Environmental Scan also reviews related **regional, provincial, and municipal plans, studies and other initiatives**. Where there are any inconsistencies between plans and the Growth Plan Transportation Systems, they are noted for consideration in developing the business as usual or base case scenario.

Funding for transportation is an important and enabling implementation mechanism in the Region. Understanding current and potential sources of funding is important in the development and, ultimately, implementation of the IRTMP.

A **best practice review of regional transportation plans** was conducted and includes six regions from across North America and Europe: the Denver Region, Metro Vancouver, Metro Portland, the Twin Cities, the Greater Golden Horseshoe, and Greater London. The most salient and relevant aspects of each case study is summarized below to provide insight into best practices and inform the development of the IRTMP.

Emerging trends and technologies are likely to have impacts on land use and how people and goods move around the Region. The trends highlighted in this report generally relate to demographics and employment, and how those may shift in the future. Emerging technologies are defined and discussed in this section. While some technologies are already present and evolving, many are yet to be fully realized.

The final section of the report summarizes **ten major takeaways** that will help inform the scenario development, prioritization, policy, and plan development process. The takeaways integrate lessons learned from regional best practices, emerging trends and technologies and discussions with the IRTMP Task Force and Working Group.

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1 Introduction

1.1 Purpose of IRTMP

In 2017, the Government of Alberta approved the Edmonton Metropolitan Region Growth Plan (Growth Plan), which charted a bold new strategic direction for planning and managing growth. The implementation of the Growth Plan identified the need to undertake an update of the Integrated Regional Transportation Master Plan (IRTMP) to align with the new direction of the Growth Plan. The development of an updated IRTMP will also include a comprehensive review of the existing transportation project prioritization system employed in developing the annual Regional Transportation Priorities Report. An evolved prioritization process will deliver the first Regional Transportation Priorities Report in time to inform the 2021 Provincial Capital Budget Cycle.

1.2 Purpose of Environmental Scan

The Environmental Scan is a snapshot in time and sets the context for the IRTMP development, a way of understanding where the Edmonton Metropolitan Region (Region) is now, and where it might be heading. The Environmental Scan includes a review of the Growth Plan components that will influence and be influenced by the IRTMP. As an implementation mechanism of the Growth Plan, it is essential that the IRTMP policies, projects, and programs align with the Region's growth aspirations. To also understand the context of current plans and other initiatives, the Environmental Scan will also include a review and summary of other provincial, regional, and local plans and strategies.

Leading into where the Region might be heading, the Environmental Scan documents the initial risk and opportunity review, developed in collaboration members of the IRTMP Working Group and Task Force. Funding for transportation projects is often a key opportunity or constraint, so the Environmental Scan also includes a review of existing and emerging funding program requirements. The Environmental Scan will also include a look at other regional transportation plans, compiling a series of lessons learned. Finally, the Environmental Scan includes a summary of emerging issues and technologies.

The findings of the Environmental Scan will mainly inform the regional transportation scenarios and policy framework.

2 Growth Plan

The Growth Plan sets a path for planning growth across the Region in a responsible manner that sustains and advances regional prosperity and well-being. The Plan recognizes the Region's diverse rural and urban context, while focusing on the Region's strengths and competitive advantages.

Over the past 40 years, the Region's urban development footprint has tripled from 22,260 hectares to 69,930 hectares. This pattern of development contributes to traffic congestion and increasing commute times. The Growth Plan places an emphasis on responsible growth through minimizing the expansion of the urban footprint; integrating land use and infrastructure decisions; building resilient, adaptable and complete communities; ensuring the Region's transportation systems are interconnected and enabling economic prosperity; protecting the environment and encouraging the growth of the agricultural sector.

The Growth Plan is the departure point for IRTMP.

2.1 Policy Framework

The Edmonton Metropolitan Regional Structure provides a framework for managing employment and population growth in the Region. The regional structure consists of three policy tiers: the rural area, metropolitan area and metropolitan core. These tiers reflect and respond to the diversity of communities within the region and provide a mechanism for defining policies and targets to address unique growth challenges for different segments of the Region.

The Growth Plan includes six interrelated regional policy areas, which support the Edmonton Metropolitan Regional Structure to 2044:

1. Economic Competitiveness and Employment;
2. Natural Living Systems;
3. Communities and Housing;
4. Integration of Land Use and Infrastructure;
5. Transportation Systems; and
6. Agriculture.

2.1.1 Guiding Principles

The Growth Plan has seven guiding principles that shape the policy framework and policy areas. The provision of transportation infrastructure and services will be consistent with and supportive of the guiding principles, objectives and policies in the Growth Plan:

1. **Collaborate and coordinate as a Region to manage growth responsibly.** We will work together to create a Region that is well managed and financially sustainable with a shared commitment to growing responsibly and achieving long term prosperity.
2. **Promote global economic competitiveness and regional prosperity.** We will foster a diverse and innovative economy that builds upon our existing infrastructure and employment areas to achieve sustained economic growth and prosperity.
3. **Recognize and celebrate the diversity of communities and promote an excellent quality of life across the Region.** In planning for growth, we will recognize and respond to the different contexts and scales of communities and provide a variety of housing choices with easy access to transportation, employment, parks and open spaces, and community and cultural amenities.
4. **Achieve compact growth that optimizes infrastructure investment**. We will make the most efficient use of our infrastructure investments by prioritizing growth where infrastructure exists and optimizing use of new and planned infrastructure.
5. **Ensure effective regional mobility**. Recognizing the link between efficient movement of people and goods and regional prosperity, we will work towards a multi-modal and integrated regional transportation system.
6. **Ensure the wise management of prime agricultural resources.** In the context of metropolitan growth, we will ensure the wise management of prime agricultural resources to continue a thriving agricultural sector.
7. **Protect natural living systems and environmental assets**. We will practice wise environmental stewardship and promote the health of the regional ecosystem, watersheds, and environmentally sensitive areas.

2.1.2 Transportation Systems Objectives

The objectives under the fifth guiding principle, “Ensure effective regional mobility” are the departure point for developing the IRTMP.

- Develop a regional transportation system to support and enhance growth and regional and global connectivity.
- Encourage a mode shift to transit, high occupancy vehicles, and active transportation modes as viable and attractive alternatives to private automobile travel, appropriate to the scale of the community.
- Coordinate and integrate land use and transportation facilities and services to support the efficient and safe movement of people, goods, and services in both urban and rural areas.
- Support the Edmonton International Airport as northern Alberta’s primary air gateway to the world.

- Ensure effective coordination of regional transportation policies and initiatives between all jurisdictions.

2.2 Policy Areas

Along with the guiding principles, each policy area includes objectives and policies that help achieve the regional vision of the Growth Plan. Most policy areas include objectives that relate to integrating transportation to support outcomes. This demonstrates that moving people, services, and goods via the transportation system, is integral to achieving economic competitiveness, protecting environmental assets, promoting an excellent quality of life, achieving compact growth, and ensuring wise management of agricultural resources. Policies relevant to planning and management of the transportation network are presented in Appendix A and summarized below. The IRTMP will be consistent with policies relating to transportation in the Growth Plan.

2.2.1 Policy Area 1: Economic Competitiveness

- Locate employment near multi-modal transportation options.
- Develop the Region as a hub and gateway to Northern Alberta and the world.
- Plan for multi-modal transportation access to Downtown Edmonton, urban centres, Transit Oriented Development (TOD) centres, rural centres and sub-regional centres.
- Improve road, rail and air infrastructure for efficient goods movement.

2.2.2 Policy Area 2: Natural Living Systems

- Plan development to promote clean air, land and water and address climate change impacts.
- Minimize and mitigate the impacts of regional growth on natural living systems.

2.2.3 Policy Area 3: Communities & Housing

- Support active transportation in greenfield areas.
- Provide highest density and diversity of housing near existing or planned transit corridors or stations.
- Prioritize locating affordable housing within 800 m of major transit stations.

2.2.4 Policy Area 4: Integration of Land Use & Infrastructure

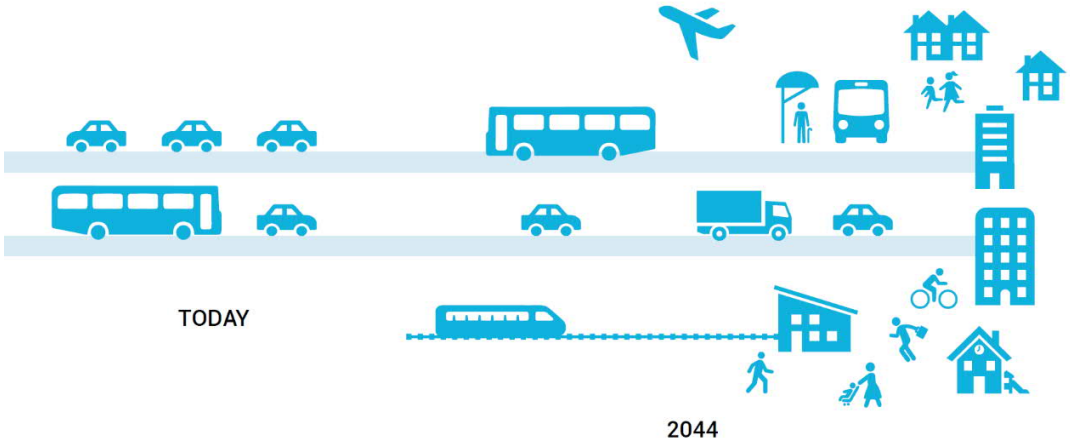
- Promote compact forms for non-residential uses to reduce automobile dependency and enhance connectivity.
- Direct intensification to TOD centres and along transit corridors.
- Plan for job growth and employment intensification along existing or planned transit corridors.
- Provide a mix of housing forms near existing or planned multi-modal transportation access.

- Provide multi-modal transportation options to connect the metropolitan area and urban centres.

2.2.5 Policy Area 5: Transportation Systems

This policy area focuses on planning and developing an integrated regional transportation system, while facilitating a mode shift away from the car to transit, cycling, walking, and other alternatives (as illustrated in Figure 1). As the Region grows, it is essential to coordinate and align transportation planning with land use decisions to optimize investment and achieve the policy outcomes of the Growth Plan. All policies related to transportation systems are included in Appendix A.

Figure 1. A multi-modal and integrated regional transportation system. Source: EMRB Growth Plan (2016)



2.2.6 Policy Area 6: Agriculture

- Minimize the fragmentation and conversion of prime agricultural lands for non-agricultural uses.
- Promote diversification and value-added agriculture production and plan infrastructure to support the agricultural sector and regional food system.

2.3 Future Studies and Initiatives

The Growth Plan identifies future studies and initiatives that are necessary to implement key policies of the Plan by policy area. The Growth Plan identifies the update to the IRTMP as a future initiative to advance transportation policies. The IRTMP should reflect the vision, guiding principles, objectives, and policies of the Growth Plan and define the key elements of the Region's multi-modal transportation system to support the mobility and accessibility needs of its people and its economy. The Growth Plan also states that the EMRB should identify regional transportation priorities annually to ensure they are supported by policies and funding from provincial and federal governments.

2.4 Monitoring and Evaluation

In 2017, EMRB published 'Growth Plan: Monitoring and Reporting Indicators' to track progress in achieving goals of the Growth Plan. To assess the efficacy of the Transportation Systems policy area, the following indicators may include but are not limited to:

- Commuting mode split in the region.
- Median commute time.

A monitoring framework could also include other measures. Examples include measures focusing on environmental factors (such as emissions) and social impacts (such as safety related to fatalities or injuries) considerations.

2.5 Key Takeaways

Coordinated growth and transportation infrastructure, shaped by the Growth Plan's guiding principles, will lead to increased economic competitiveness, more efficient use of land to protect natural living systems, and increased transportation options to access employment and other services. The IRTMP will be the key mechanism to implement the Growth Plan policies and provide direction on transportation priorities for the Region. The following are the highlights of the Growth Plan as it relates to the IRTMP.

1. **Economic competitiveness relies on an efficient regional transportation system.** Robust, effective and resilient transportation systems are often cited as key contributors to a region's economic success and competitiveness. The Growth Plan policies enhance the movement of goods and services across the Region and to national and international markets, contributing to global economic competitiveness and prosperity.
2. **Growth of the Region will require a robust and coordinated transportation network**. Transportation infrastructure is one of the most substantial investments needed to support growth and the economic competitiveness of the Region. As the Region grows, it is essential to coordinate and align transportation planning with land use decisions to optimize investment and achieve the policy outcomes of the Growth Plan.
3. **Integrating land use and transportation is key to managing growth and infrastructure.** There is a strong link between transportation, land use patterns, socio-economic factors, and travel behaviour. Compact, higher-density development will help support viable multi-modal transportation options, facilitate a mode shift away from the private automobile, and foster the creation of complete communities.
4. **Modal shift away from the car is a key outcome of the Growth Plan.** Responsible growth supported by multi-modal transportation will achieve a mode shift away from the car to transit, cycling, walking and other alternatives, appropriate to the size and scale of the community.

3 Related Plans, Studies, or Other Initiatives

This section summarizes member municipality plans, studies or initiatives as they relate to regional transportation. Where there are any inconsistencies between local plans and the Growth Plan Transportation Systems, they are noted for consideration in developing the business as usual or base case scenario. Additionally, other related regional initiatives, such as stakeholder plans or studies, are summarized and implications for the IRTMP discussed.

3.1 Regional Plans, Studies and Initiatives

3.1.1 Integrated Regional Transportation Master Plan (2011)

The first IRTMP was approved in 2011, following the Land Use Plan (2009) and Intermunicipal Transit Network Plan (2009). Policies contained in the first IRTMP surround four Land Use Plan thematic areas:

1. Integration with the Capital Region's Growth Plan
2. Increased Transportation Choices
3. Reduction of Environmental Degradation
4. Effective Coordination of Infrastructure Between All Jurisdictions

The recommended transportation system is presented in layers: roads, over-dimensional corridors, transit facilities, and rail facilities.

- The regional road network is made up of a series of new and existing arterials, expressways, and freeways.
- Over-dimensional corridors include existing high load corridors, potential high load corridors, and long combination routes.
- Transit facilities include existing light rail transit (LRT) corridors, LRT extensions, regional bus service, lifeline bus service, transit priority corridors and Heartland private service.
- Air transportation is under the jurisdiction of the Edmonton Regional Airports Authority but the four airports (Edmonton International, City Centre/Blatchford, Villeneuve, and Cooking Lake) are all deemed as regionally significant. It is important to note that the Blatchford airport is now closed and the Cooking Lake airport is no longer part of the ERAA.
- Rail transportation is identified as passenger and heavy rail services. VIA Rail operates passenger service between Edmonton and Vancouver. Heavy rail operators in the Region include Canadian National and Canadian Pacific whose trackage connects to major continental ports outside of the Region. The plan identifies existing and future rail infrastructure in the Region.

The 2011 IRTMP identifies 10-year road and transit investment priorities broken up by sub-regional areas: central, west/northwest, south, east/northeast, and north/northeast.

3.1.2 Annual Regional Priorities Process

Following the IRMTP, the EMRB supported the development of a shorter-term prioritization of the 10-year roadway and transit project list in 2013. The intent of an annual regional priority list is to foster coordination of regional transportation initiatives between municipalities and to influence the Provincial Three-Year Capital Plan towards better alignment with the Region's needs and priorities. The first transportation priorities report was completed in 2014.

The current regional priority process involves:

- Reviewing and updating the Roadway (Schedule 10A of the Growth Plan) and Transit (Schedule 10B) project lists.
- Defining the evaluation criteria.
- Determine weighting of the evaluation criteria.
- Scoring each project.
- Determining project priority.
- Adjusting project scoring.
- Prioritizing regional projects by project status.

Following Provincial approval of the Growth Plan in 2017, the evaluation criteria and weighting were updated in 2018 to align with the Growth Plan. The Board approved the Regional Transportation Priorities Evaluation Criteria Update and 2018 Regional Transportation priorities reports in June 2018. A comprehensive update of the IRTMP will trigger a thorough review and reconsideration of all aspects of the prioritization process.

3.1.3 High Occupancy Vehicle (HOV) / Transit Priority Study

The HOV / Transit Priority Study was released in 2016. It follows the Capital Region Growth Plan and companion Intermunicipal Transit Network Plan, in which transit priority measures were identified to expedite and optimize transit service operations in the Edmonton area. The study focuses on six 10-year priority corridors contained in the IRTMP.

Of the six corridors, Highway 2 (the QE II from 65 Ave. in Leduc to Century Park LRT Station via 23 Ave. NW) emerged as the strongest candidate for a pilot project of Park & Ride lots at key locations and median HOV lanes in each direction.

Findings and recommendations in this study will feed into scenario development of the IRTMP, in consideration with recent recommendations from the Regional Transit Services Commission (RTSC).

3.1.4 Metropolitan Region Servicing Plan (MRSP)

This MRSP provides direction to achieve enhanced municipal collaboration and service coordination in regionally significant municipal service areas. Roads and transit are identified as additional service areas. For roads, the MSRP recommends continuing the current approach, which is the IRTMP and Regional Transportation Priorities processes. For transit, the MSRP recommends the Regional Transit Services Commission to address longer-term transit servicing needs.

3.1.5 Transportation Needs Assessment of Seniors and Persons with Disability

Released in 2016, the study found that seniors and persons with disabilities have unmet transportation needs across the Region. The results indicate that that although persons with disabilities have, on average, greater unmet transportation needs than seniors, the societal and economic burden of having unmet transportation needs is far greater for seniors given the difference in proportion of these two segments of the population in our communities.

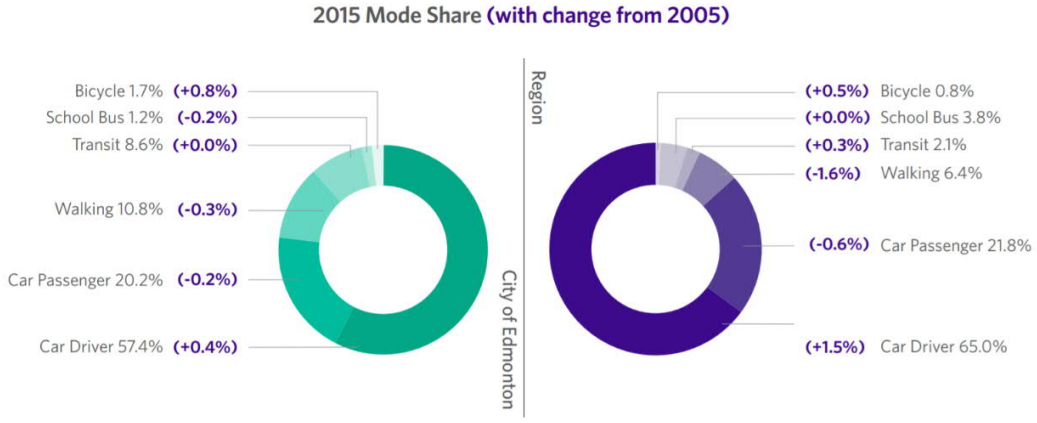
The study notes that planning and policy decisions related to the transportation service provision for seniors will be inadequate if those decisions are based simply on population statistics of seniors in the target area. Rather, population statistics on health and disability, and, if available, the percentage of seniors in the community who do not drive, can facilitate planning and policy decisions that can facilitate transportation mobility for this growing segment of the population.

3.1.6 Regional Household Survey

The City of Edmonton led a household survey to understand travel patterns in the Region. The survey is conducted every 10 years with the most recent in 2015. The survey found that while the population increased and the number of daily trips increased, the average number of trips per person and per household decreased between 1994 and 2015. The decrease in the number of trips per person and household is likely supported by the expansion and build-out of the outer areas of the City of Edmonton and surrounding municipalities.

A breakdown of mode shares in the City of Edmonton compared to the Region as a whole is shown in Figure 2. Transit mode share is much higher in Edmonton at 8.6% compared to the Region at 2.1%. School bus travel is higher in the Region at 3.8% compared to 1.2% in Edmonton. Walking is higher in Edmonton at 10.8% as compared to 6.4% in the Region. Bicycling is higher in Edmonton at 1.7% as compared to the Region at 0.8%. Car (either as a passenger or as the driver) is relatively consistent.

Figure 2. 2015 Mode Share.



Source: 2015 Edmonton and Region Household Travel Survey Overview

3.2 Other Related Regional Plans

As described in the Growth Plan, other Regional related transportation and transit plans not yet mentioned that remain in effect include:

- Transit Service Standards for Intermunicipal Transit (2010)
- Integrated Regional Transportation Systems Study (2011)
- 30 Year Transit Service Plan (2011)
- Regional Fare Strategy and Implementation Plan (2013)
- Capital Region Specialized Transportation Needs Assessment Pilot Project and Report (2015 and 2016)
- Regional Cost Sharing Formula: Regional Transit, Growth Plan Addendum (2009)

3.3 Member Muncipality Plans

A review of member municipality plans revealed that regional links shown in either local Muncipal Development Plans (MDPs) or Transportation Master Plans (TMPs) generally align with the Transportation Systems (Schedule 10A, 10B, and 10C) shown in the Growth Plan.

Some TMPs have not been updated since the Growth Plan was approved, and many are in the process of being updated or developed at this time. Several municipalities have also engaged in transportation studies, such as Devon's *Multi-Modal Transportation Study* (2013) or the *Tri-Municipal Regional Transit Plan* (2018) for Stony Plain, Spruce Grove and Parkland County.

Some of the key differences between the Growth Plan Transportation Systems and local transportation plans are summarized in Table 1. A more detailed discussion is included in Appendix B.

Table 1. Summary of Local Plan Differences

Municipality and Plan(s)	Growth Plan Transportation System Differences
City of Edmonton *Draft City Plan* (2019)	The draft City Plan Transit Network differs from the Growth Plan in the following ways: • City Plan's network is largely transit vehicle technology agnostic; rather, the system is distinguished between Citywide and District wide networks. Detailed analysis of technology type and exact alignments will be determined through a future body of work to follow the City Plan. All approved LRT lines were modelled. Central LRT and its extension into Sherwood Park was not, as demand could be served in other ways. • Growth Plan Highway 16/Yellowhead Trail Transit Priority Corridor is not shown in the draft City Plan. Instead, Highway 16A emerges as a higher demand corridor. According to the City Plan team, analysis showed good demand and connectivity between west Edmonton (including West Edmonton Mall as a major transit node in the City Plan land use concept), Enoch, and Stony Plain. • Township Road 628 / Whitemud Drive, part of the District Transit Network, is not shown in the Growth Plan. • Capital Line LRT extension to Edmonton International Airport (EIA) – Capital Line is shown as terminating at Desrochers/Allard Station in draft City Plan and airport connection shown via Highway 2. The City Plan team found that the extension caused capacity issues; a separate airport connection was found to be the best way to serve demand between downtown and EIA via the QE II.
Leduc *Transportation Master Plan* (2018)	• The TMP discusses a West Transit corridor, extending from EIA to connect along 74th Street, which is not included in the Growth Plan. • Regional trail segments, based on Trans Canada Trail, differ slightly to what is shown in the Growth Plan.

Municipality and Plan(s)	Growth Plan Transportation System Differences
Leduc County *Municipal Development Plan* (2019)	• The TMP shows proposed Trans Canada Trail which is not fully reflected in the Growth Plan.
Morinville *Municipal Development Plan* (2017)	• The MDP shows Cardiff Road to 100 Avenue as a potential eastern alternative truck route, which is not shown in the Growth Plan. • That MDP discussed the potential to convert a decomissioned rail line into a regional trail, which is not shown in the Growth Plan.
St. Albert *Transportation Master Plan* (2015)	• The TMP shows an extension of Fowler Way to the northeast into Sturgeon County, which is not shown in the Growth Plan.
Parkland County, Spruce Grove and Stoney Plain *Tri-Municipal Regional Transit Plan* (2018)	• The Plan shows a regional connector route running along 16A west of Century Road which is not shown in the Growth Plan.
Spruce Grove *Transportation Master Plan* (2012)	• Shows potential new trails along Highway 16A east of the city, Pioneer Road, and Highway 628, all three of which are not reflected in the Growth Plan.
Strathcona County *Municipal Development Plan* (2019 consolidation)	• Northeast river crossing included in Growth Plan not shown in MDP. • Existing and potential transit routes shown are aligned with the Growth Plan, but the Strathcona County MDP does not specifically show the Park & Ride sites. The existing Park & Ride site (Ordze Transit Centre) is missing on the Growth Plan map. • The existing Commuter Bus route is shown as terminating on Highway 16 while the Growth Plan shows the route turning north to a Park & Ride site (Location 'D'). It is suggested to remove this one, since the MDP does not show any Park & Ride sites and only shows a concept line to serve Bremner. The County has completed a more detailed statutory plan for this area called the Bremner and LEA Area Concept Plan (ACP) Bylaw 3-2019. Approval of this Statutory Plan and the corresponding MDP amendments under Bylaw 2-2019 were approved by the EMRB in 2019. In the ACP, there is a Park & Ride located off of Range Road 224 and Highway 16 in the "business park" and another transit station located off of Township Road 534 and Range Road 224 in the "town centre". In keeping with the Growth Plan, the ACP identifies an express transit route that connects the two transit stations along Rane Road 224 and out to Highway 16.

3.4 Edmonton International Airport

The Edmonton International Airport (EIA) updates its master plan every 10 years to guide the development of the airport facilities and services over a 25-year time frame. The current plan, the *EIA Master Plan 2010-2035* discusses several groundside transportation improvements.

Roads

Road improvements identified in the plan include upgrades to five interchanges on Highway QE II, Highway 19 and the 65th Avenue roadway surrounding EIA. Interchange improvements are rationalized based on growth in passenger traffic, by commercial developments north of the passenger terminal area, Port Alberta developments that will support intermodal cargo logistics, and the development of a Business Aviation Park on the lands north of the new runway. This aligns with regional roads identified in the Growth Plan.

Transit

The Master Plan has protected an alignment within the airport property for a dedicated transit right of way. The airport anticipates a progression from scheduled bus service, to bus rapid transit, to light rail transit. Scheduled bus services are likely to use QEII and Airport Road; while BRT may use the transportation utility corridor (TUC) for travel around the airport and also Highway 19's interchange and QEII's interchange to connect to neighbouring communities. The Plan suggests that light rail may be facilitated through an extension of Edmonton's Capital Line, and there is the possibility of high-speed rail between Calgary and Edmonton. The alignment of the LRT extension in the Growth Plan shows the LRT tracks running through the north runway. The current EIA plan (2010 to 2035) does not provide details except the location of possible tracking and stations near Airport Road west of the QE II (see Figure 3).

Figure 3. Preferred Rail Corridors. Source: EIA Master Plan 2010-2035

EIA Vicinity

The strategic location of the EIA along a major trade corridor (QEII) and proximity to rail has spurred intermunicipal and interagency partnerships to collaboratively prepare for future development around the airport.

The City of Leduc and Leduc County initiated the Alberta Aerotropolis Viability Study, to better understand development south of the EIA. The study identified four priority development focused around a logistics hub.

The EIA and Leduc County are partnering on the Airport City initiative, which focuses on the lands immediately east of the airport and west of the QEII. The area is building out and includes a mix of industrial, retail, and commercial uses.

Port Alberta is a joint venture between the Edmonton Economic Development Corporation and the EIA, providing transportation, logistics and supply chain solutions. The Port has access to both CN and CP rail lines, Highway 16 and QE II (a CANAMEX Trade Corridor). It is a designated foreign trade zone. The Port is centered on the Cargo Village area at the airport and supports dedicated air cargo routes to Asia, Europe and the rest of North America. While no specific plans were reviewed for Port Alberta, a Van Horne Institute paper provides some insight into the growing potential of inland ports.[1] The prominence of inland ports has risen over the last decade as land values around older major seaports has risen, development pressures restricted expansion, and traffic issues worsened. Further investigation is required around Port Alberta to inform the IRTMP.

[1] Van Horner Institute *Western Canada's Rapidly Expanding Inland Ports: Accelerating Regional Economic Growth.* https://www.joc.com/sites/default/files/u45421/Whitepapers/JOC_Edit/WesternCanadaRapidlyExpand.pdf

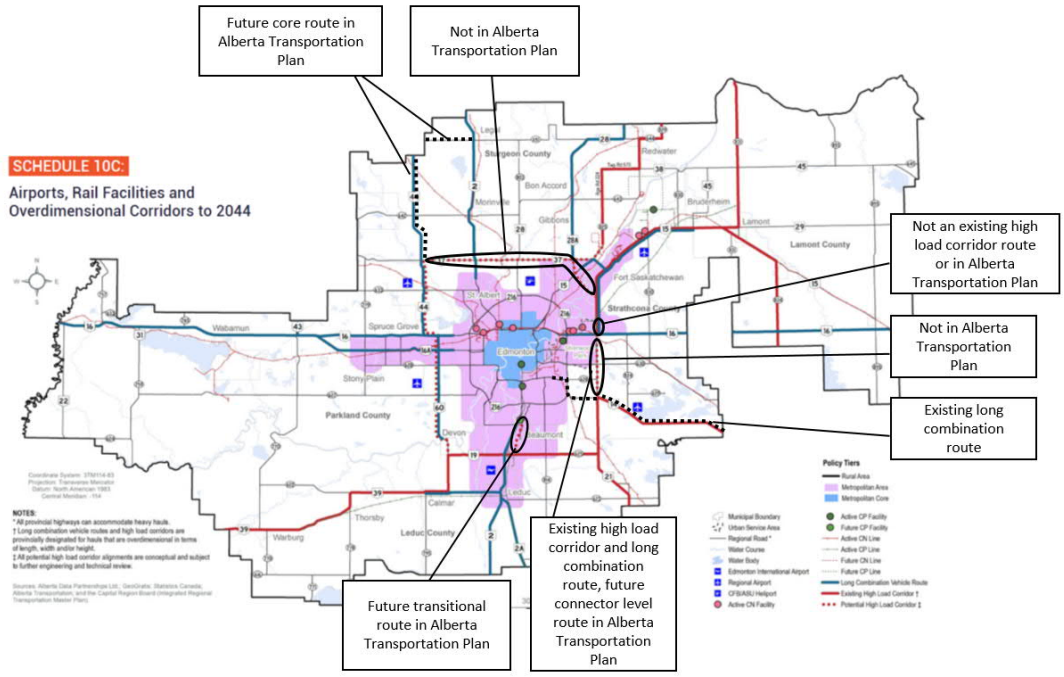
Other Airports

As discussed in Section 3.1.1, the Edmonton Regional Airports Authority (ERAA) manages the EIA and Villeneuve Airports. Until recently, the Cooking Lake Airport was part of the ERAA. Further discussions are required to understand future airport plans supporting ground transportation needs.

3.5 Alberta Transportation

Alberta Transportation (AT) commissioned a planning study to review the existing High Load Corridor network and develop a long-term, future High Load Corridor for Oversize and Over-weight loads in the province. The 'High Load Corridor Network for Over-Size and Over-Weight Loads in Alberta' report was approved by AT in 2018 and the existing High Load Corridor network is defined in legislation. If and when new routes are needed the regulations/routes will require updating in the longer term. The recommended HLC network for Oversize and Overweight loads is similar to what is shown in Schedule 10C of the Growth Plan, but there are a number of differences, and they are indicated in the figure below.

Figure 4. AT HLCOO Recommended Network (top), Growth Plan Schedule 10C (bottom)

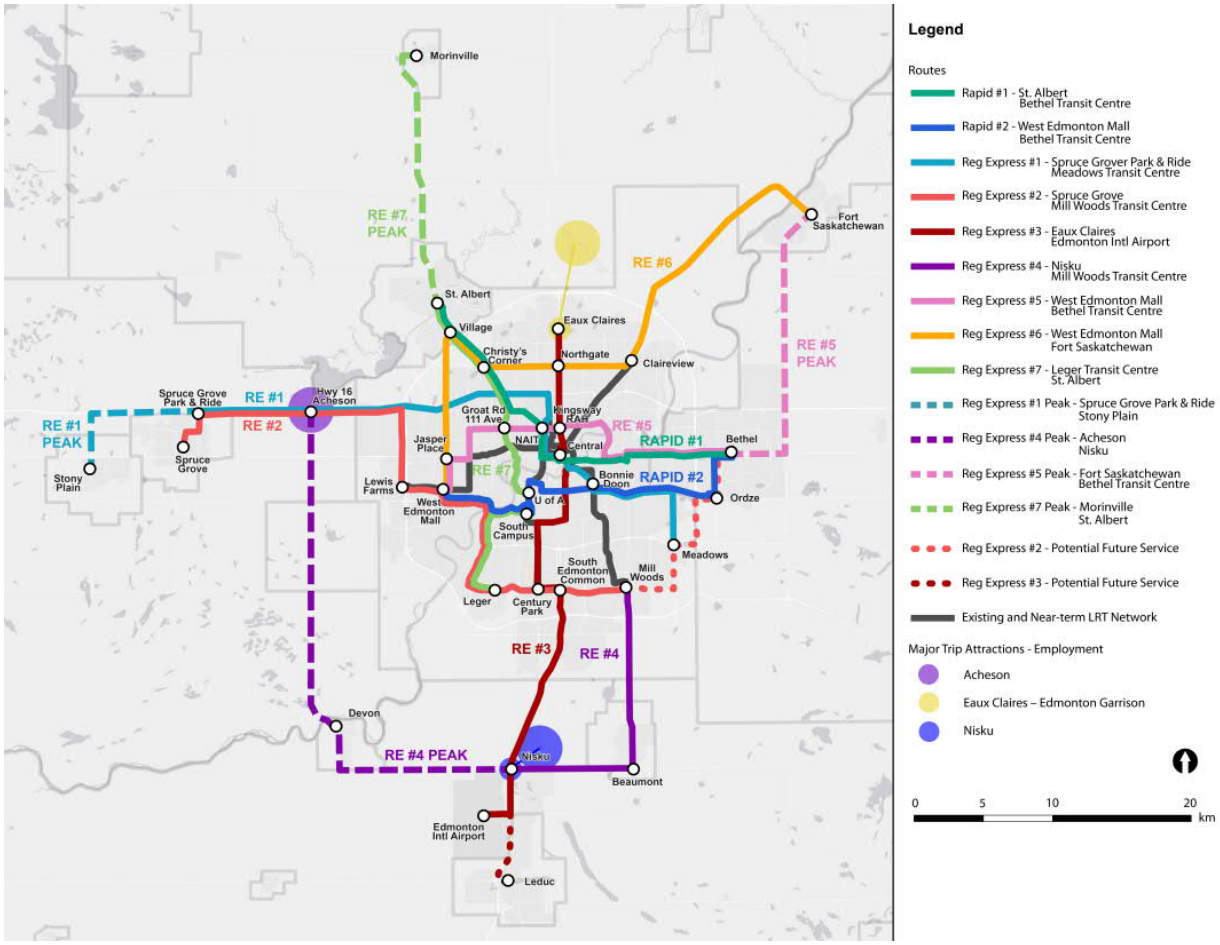


3.6 Regional Transit Service Commission

Through an independent process, thirteen municipalities in the Region are exploring the possibility of delivering integrated regional transit services through a Regional Transit Service Commission. The Commission would plan a regional transit network and deliver seamless transit service across municipal borders.

On January 22, 2020, the *Accelerating Transit in the Edmonton Metropolitan Region: Building a Regional Transit Services Commission* report was released[2]. The report provides a conceptual regional transit network as shown in Figure 5, based on draft service level guidelines. The regional network is made up of two rapid transit routes, seven all-day express routes, and four peak period express routes. Two potential peak period express services are also identified.

Figure 5. RTSC conceptual transit services design



Rapid Transit Routes

The conceptual network includes two rapid transit routes:

- Rapid Route #1: provides a direct connection between St. Albert Transit Centres, Downtown Edmonton, and Strathcona County's Bethel Transit Centre
- Rapid Route #2: connects West Edmonton Mall, South Campus, the University of Alberta, Bonnie Doon Transit Centre, as well as Strathcona County's Ordze and Bethel Transit Centres along a major demand corridor in south-central Edmonton

According to the report, the rapid transit routes are designed to be "supportive of the City of Edmonton's LRT network and avoid direct competition with established lines". Transit priority

[2] https://www.edmonton.ca/documents/PDF/Accelerating_Transit_in_Edmonton_Metropolitan_Region.pdf

measures in the form of capital improvements (such as queue jumps, dedicated lanes, transit signal priority) may be required to increase the speed and reliability of rapid transit services. Potential capital improvements should be planned in a collaborative manner across the Region along with input from the RTSC to support an integrated approach.

Regional Express Routes

These routes connect longer distance trips throughout the Region. A basic level of all-day service is recommended with peak extension service during peak hours to support developing ridership markets in strategic areas. The conceptual transit network includes seven routes, three of which have peak hour extensions:

- Regional Express Route #1: Direct Downtown Edmonton and NAIT service that connects Stony Plain, Spruce Grove and the growing Southeast quadrant of Edmonton.
- Regional Express Route #2: South Edmonton crosstown connector service between Mill Woods and West Edmonton Mall with an extension to Spruce Grove.
- Regional Express Route #3: North / South transit spine that connects Eaux Claires Transit Centre to Downtown Edmonton, and ultimately to the Edmonton International Airport.
- Regional Express Route #4: Regional circulator service that connects Beaumont and Leduc County with a peak extension to Devon, and to provide developmental service to Parkland County.
- Regional Express Route #5: Inner Edmonton crosstown service connecting West Edmonton Mall to NAIT, and then direct service to Strathcona County with an extension to Fort Saskatchewan.
- Regional Express Route #6: Outer Edmonton crosstown service from West Edmonton Mall to St. Albert, Northgate, Clareview, and Fort Saskatchewan.
- Regional Express Route #7: Radial University service from Southwest Edmonton along Terwillegar Drive and then to St. Albert, with a peak extension to Morinville.

According to the report, Regional Express Routes #1, #3, and #7 provide radial or downtown focused services with routing from outer communities into the Central area of Edmonton, including the University of Alberta Campus and Downtown.

Regional Express Routes #2, #4, #5, and #6 provide regional crosstown or circulator services that connect major regional locations in patterns that do not directly access central Edmonton. These routes are expected to have a higher number of stops to provide some service to communities and activity centers along the corridors. Specifically, a future extension for Regional Express Route #2 continuing east of Mill Woods Transit Centre to Strathcona County has been identified as a service of interest until enough crosstown service hours in southeast Edmonton exists.

Timeline for Service Delivery

The RTSC report established an implementation plan that spans seven years, from 2020 to 2026. The plan recommends a gradual roll-out of regional service from July 1, 2022 to December 2023. When the regional services roll-out under the RTSC is completed by the end of 2023, the focus shifts to assessing and improving service delivery in preparation for assuming operations of ETS local services.

RTSC and the IRTMP

The IRTMP may still play an important role in planning and coordinating for longer-term regional transit, especially in the case for member municipalities not part of the RTSC. For example, Strathcona County Council has decided to not join the RTSC.

4 Existing and Emerging Funding Program Requirements

Funding for transportation is an important and enabling implementation mechanism in the Region. Understanding current and potential sources of funding is therefore important in the IRTMP.

4.1 Current Transportation Funding Practice

Current transportation funding sources can be classified into three broad categories with respect to the level of government that collects the underlying revenues: provincial, federal, and municipal. Funds are derived primarily from the general tax revenues, gas taxes, property taxes, and to a smaller extent, from user fees.

4.1.1 Provincial Funding

Provincial funding is available in the form of:

- grant funds allocations to municipalities that can be used for a wide range of projects and funding needs,
- one-time provincial grant programs for specific categories of projects, and
- contributions to federal grant programs that require cost-sharing.

Municipal Sustainability Initiative (MSI)

The Municipal Sustainability Initiative (MSI)[3] is the provincial grant program to support municipalities for their infrastructure needs. Municipalities determine projects and activities to be funded by MSI based on local priorities within the general criteria set out in the program guidelines. Eligible projects include roads, bridges, public transit facilities, water and wastewater systems, recreation and sport facilities, and other local priorities. Funding can be used for new capital projects, capital renewal projects, as well as operations.

Municipalities have been allocated $9.8 billion since the MSI program launched in 2007, and for 2019, MSI is estimated to provide $671 million in funding. Part of this funding includes the former Basic Municipal Transportation Grant (BMTG) program.

MSI funding is distributed to municipalities after legislative approval of the program budget, submission of sufficient project applications, and submission and/or certification of Statement of Funding and Expenditures. Partly, the allocations are determined based on the municipal status (road length and population), and for Edmonton and Calgary based on litres of taxable road-use gasoline and diesel fuel sold in the province.

Allocations of funding vary from year to year. Funding received over the last five years and projections for 2020 and 2021 are shown in the table below.[4]

[3] https://www.alberta.ca/municipal-sustainability-initiative.aspx?utm_source=redirector
[4] https://open.alberta.ca/publications/municipal-sustainability-initiative-allocations

Table 2: MSI Funding Allocations to Current Edmonton Metropolitan Region Municipalities, Millions of Dollars

	2015	2016	2017	2018	2019	2020	2021
Total MSI Funding	$263.8	$357.8	$590.1	$184.9	$188.4	$283.9	$264.5

Source: Alberta Open Government, https://open.alberta.ca/publications/municipal-sustainability-initiative-allocations (accessed January 2020).

The MSI funding in the Edmonton Metropolitan Region has been used for a wide range of infrastructure projects; both transportation and non-transportation infrastructure.

The MSI funding is set to expire in 2021. In November 2018, the Province introduced a bill and a new fiscal framework for Calgary and Edmonton as a replacement of the MSI funding. The new fiscal framework for the two cities assumed a funding of $500 million for 2022 to be split between them. In future years, this amount would increase based on provincial revenues and fuel sales. Starting in 2027, a further $400 million would be provided annually for long-term transit projects through the carbon tax (and through the Alberta Community Transit Fund).

However, the provincial government recently reduced the MSI replacement funding for Calgary and Edmonton to $455 million. The cutting of the carbon tax also effectively cancelled the second funding element that was based on that tax.[5]

Green Transit Incentive Program (GreenTRIP)

GreenTRIP was officially launched in 2008 as a one-time capital funding for new and expanded public transit throughout Alberta. In 2016, the GreenTRIP criteria were expanded and aligned with the newly announced federal Public Transit Infrastructure Fund (PTIF). The expanded criteria also allowed municipalities to apply for funding for a broader range of transit projects. As of March 2018, the $2 billion in funding for GreenTRIP has been allocated.

GreenTRIP was “project-specific” funding requiring submission of an application for a proposed project with a prescribed set of project documentation and a separate project funding agreement for approved projects. Among required criteria, there was a local municipality cost-sharing requirement in the amount of at least 33.5%. The final-call approved projects were announced in December 2016.

In the Edmonton Metropolitan Region, GreenTRIP has contributed toward major transportation project costs such as the north extension of Edmonton's light rail transit system (North LRT to NAIT project), as well as fleet purchases.

Alberta Community Transit Fund (ACTF)

The Alberta Community Transit Fund (ACTF) was established by the Province in August 2018 as a replacement of the GreenTRIP program. Through a grant system, it was going to provide Alberta municipalities with $215 million in transit funding over five years. In the first three years, $115 million of that funding was to come from Alberta’s Climate Leadership Plan (the former carbon tax.) The ACTF was cancelled by the provincial government in October 2019.

[5] https://edmontonjournal.com/news/politics/alberta-budget-2019-municipal-funding

Strategic Transportation Infrastructure Program (STIP)

The Strategic Transportation Infrastructure Program (STIP) provides funding to municipalities under four funding streams:

- Community Airport Program,
- Local Road Bridge Program,
- Resource Road Program, and
- Local Municipal Initiatives Program (for other transportation infrastructure projects).

The program goals are to:

- improve accessibility and the movement of goods and people,
- increase the capacity of municipal transportation infrastructure to support economic growth,
- enhance safety and efficiency, and
- extend the service life of key transportation infrastructure.

Program funding is determined each budget cycle. Typically, co-funding from local municipalities or private sector stakeholders is also required. In 2019, program awards amounted to $1.7 million under the Community Airports Program, $18.4 million under the Local Road Bridge Program, $5.6 million under the Resource Road Program, and $3.9 million under the Local Municipal Initiatives Program.

There were no awards for EMRB-based projects.

Contributions to Federal Funding Programs

Under the cost-sharing agreements with the federal government, the provincial government may be required to provide contributions to the federal funding programs, including programs for transportation infrastructure. For example, under the recent federal Investing in Canada Infrastructure Program, the Government of Alberta was required to contribute minimum 33.33% of eligible costs.[6] Similarly, provincial and local cost-sharing were also required under the 2014 New Building Canada Fund.[7] It should be noted that the Government of Alberta has instructed Alberta municipalities that their ICIP will come from municipalities' MSI funding, further constraining municipal finances.

4.1.2 Federal Funding

Federal funding consists primarily of:

- moneys redistributed to provinces and municipalities from gas taxes collected by the federal government, and
- grant investment programs for specific categories of projects.

The Gas Tax Fund program is now a well-established, permanent program of the Canadian federal government. The programs offered within the second category of funding, amounts of funds available, program details, and eligibility criteria may vary from program to program,

[6] https://www.infrastructure.gc.ca/prog/agreements-ententes/2018/2018-ab-eng.html
[7] https://www.infrastructure.gc.ca/plan/nrp-pnr-prog-eng.html

and provincial/local sharing of project costs may be required. Key facts about the gas tax funding and recent federal investment grant programs are outlined in the following sections.

Federal Gas Tax Fund (GTF)

GTF funding is provided to provinces and territories from the federal government, which in turn flow this funding to municipalities.

The funding is intended to cover capital costs only and may not be used for maintenance costs, operating costs, debt reduction, or replacement of existing municipal infrastructure expenditures. Municipalities determine projects and activities to be funded by the GTF based on local priorities, within the general qualification criteria set out in the program guidelines. GTF funding can be pooled and banked.

The annual program budget for the GTF is subject to Canada advising Alberta of the yearly provincial funding. GTF funding allocations for municipalities are calculated on a per capita basis, according to the prior year's Municipal Affairs Population List.

2019 GTF allocations for individual municipalities were calculated by applying the GTF funding formula to the regular funding of $244 million and to the additional funding of $229.5 million. The resulting GTF funding for EMRB municipalities for 2019 and allocations from earlier years are shown in the table below.

Table 3: Federal Gas Tax Fund Allocations to Current Edmonton Region Municipalities, Millions of Dollars

Municipality	2019
Beaumont	$7.7
Edmonton	$105.4
Fort Saskatchewan	$3.0
Leduc	$3.7
Spruce Grove	$4.0
St. Albert	$7.5
Devon	$0.7
Morinville	$1.1
Stony Plain	$1.9
Leduc County	$1.6
Parkland County	$3.6
Sturgeon County	$2.3
Strathcona County	$11.1
TOTAL	$153.6

Source: Alberta Open Government; https://open.alberta.ca/publications/gas-tax-fund-allocations (accessed January 2020).

Investing in Canada Infrastructure Program

Through the federal government's Investing in Canada Infrastructure Program (ICIP), Alberta is receiving $3.65 billion over 10 years (2018-28). Funding is available for projects under four streams:

- public transit infrastructure,

- green infrastructure,
- rural and northern communities infrastructure, and
- community, culture, and recreation infrastructure.

The projects funded under the program will be cost-shared with the Alberta government, municipalities, and other partners.[8]

The first funding stream is entirely dedicated to transportation with the primary objective to support new construction of local public transit. However, other programs also envision funding for roads and transportation-related projects.

Under the public transit infrastructure component, Alberta is receiving $2.1 billion for public transit over 10 years (2018-28). As mentioned above, the primary objective of this program is to support new construction of local public transit with restrictions to rehabilitation projects (a cap of 15% of total funding at the national level).[9] Alberta Transportation will administer transit funding as part of this agreement with the federal government.

Communities that have an existing transit authority are eligible and can apply for funding to improve or expand public transportation. The federal government will cost share up to 50% of eligible costs depending on project category.

Through the Investing in Canada Infrastructure Plan, the Government of Canada is providing approximately $948 million for the Valley Line West LRT, adding to the approximately $1.04 billion funding commitment from the Government of Alberta in November 2018.[10]

New Building Canada Fund (NBCF)

NBCF is a federal program of investing in infrastructure projects that support economic growth job creation and productivity. The federal government works with provinces, territories, municipalities and the private sector to provide funds to economically-focused projects. The latest release of funds was announced in 2014 and it has now been fully allocated.[11] It had three components:

- National Infrastructure Components,
- Provincial-Territorial Infrastructure Component, and
- Small Communities Fund.[12]

The City of Edmonton received from NBCF $150 million for the LRT Valley Line as well as funding for rehabilitation of the Yellowhead Trail.

4.1.3 Municipal / Local Funding

Property Taxes

Property taxes are the main source of revenues in many municipalities. Property taxes are typically intended for funding operating expenditures.

[8] https://www.alberta.ca/investing-canada-infrastructure-program.aspx
[9] https://www.alberta.ca/ICIP-public-transit.aspx
[10] https://www.edmonton.ca/projects_plans/transit/valley-line-lrt-mill-woods-to-lewis-farms.aspx
[11] https://www.infrastructure.gc.ca/plan/nbcf-nfcc-eng.html
[12] http://www.infrastructure.alberta.ca/3951.htm

Local Improvement Levies

These charges are used to fund local neighborhood projects considered more beneficial to local property owners or local area. Transportation-related examples include alley reconstruction, installation of alley lighting, sidewalk reconstruction, decorative street lighting upgrades, and curb crossing installation. Projects may be initiated by property owners or by the municipality. These charges are collected by the municipality with the regular property taxes on top of municipal and education taxes, and appear as a separate line item on the tax bill.

The City of Edmonton is also using an infrastructure financing instrument called the Community Revitalization Levy (CRL), similar to the concept of "tax increment" financing. Part of tax revenues from a CRL-designated area are allocated to fund the area's municipal development projects and infrastructure improvements. When tax revenues within a CRL increase as a result of new economic growth and development in the area, the taxes arising from these increased values are allocated to paying the costs of improvements.[13]

Developer Capital Contributions

These contributions are funds contributed by developers or partners to specific infrastructure projects which may include roads. Developer contributions represent a rather small amount in the total capital revenues.

User Fees / Transit Fares, Parking Revenues

User fees and sales of goods and services is a significant component of the overall revenue in many municipalities. Transit fares and parking are examples of a transportation-related user fees. User fees and their impact vary dramatically between member municipalities.

Off-Site Levies / Development Charges

Under authority of Alberta's Municipal Government Act (and City of Edmonton Charter in case of the City of Edmonton), a municipality is permitted to impose charges called "offsite levies" against new developments proposed by private developers to cover the incremental capital costs of new or expanded municipal infrastructure including roads and highway interchanges.

This revenue mechanism reflects a view that growth should pay for costs related to its own growth, including required municipal infrastructure and facilities that benefit it in some way. The levies are imposed at the time of subdivision or development permit, and approved by the council through the adoption of a bylaw which specifies the details of the calculation methodology and the amount of the levy.

This method is used by number of municipalities in Alberta, including the City of Edmonton (called the Arterial Road Assessment). It appears that this source of funds is not widely used in all EMRB municipalities.

The MGA also enables neighbouring municipalities to collaborate with one another to impose intermunicipal off-site levies.

[13] https://www.edmonton.ca/residential_neighbourhoods/property_tax_assessment/crl.aspx

4.2 Other Sources of Transportation Funding

Below is an overview of other possible sources of funding for transportation infrastructure. Some of these sources are used in other jurisdictions in Canada or internationally, while others are mainly concepts discussed extensively at the academic and transportation planning level.

These sources could be classified as local/municipal in terms of governments and agencies that collect and manage the revenues. The key premise of most measures is to raise funds from users and parties that directly benefit from a specific transportation project or a broad transportation infrastructure program. Some measures may be originally intended as a congestion management tool, while others as a more sustainable alternative to gas taxes in the environment of increasing fuel efficiency and adoption of electric vehicles.

4.2.1 Tolls

Tolls are a fee-for-service for using road infrastructure such as a major road, highway, or bridge. They are intended for a specific infrastructure project, rather than the entire municipal road network. Tolls for the entire road network may not be realistic or even feasible for several reasons, including details of monitoring and administration. This mechanism should be seen as a supplementary source of funding for infrastructure facilities that may have higher construction and maintenance costs than the rest of the municipal road infrastructure.

Tolls are typically used to cover all operations and maintenance costs and life-cycle capital costs of the infrastructure in question. Toll rates often depend on the type of vehicle (cars, trucks, and busses), and sometimes they also differ by the time of day. The rate structured by the type of vehicle reflects the differential impacts and costs imposed by various vehicle categories on the facility. Tolls on infrastructure such as bridges and tunnels are typically fixed rates, but on roads they may also depend on the distance driven.

Tolling is often proposed for entirely new infrastructure projects such as a new bridge or in conjunction with major improvement and rehabilitation projects. In this application tolls are a means to collect revenues to recover project costs. Thus, tolls are most suitable for infrastructure projects with a large volume of traffic relatively insensitive to the amount of toll.

Tolls are used relatively infrequently in Canada. Identified examples of tolled facilities are below.

- Bridges:
    - Municipal bridges: A. Murray MacKay Bridge in Halifax, Angus L. Macdonald Bridge in Halifax;
    - Bridges along border with the United States, including: Ambassador Bridge in Windsor, Blue Water Bridge in Sarnia, Fort Frances – International Falls International Bridge in Fort Frances, Ogdensburg-Prescott International Bridge; and
    - Other bridges: Confederation Bridge connecting to Prince Edward Island, Deh Cho Bridge in Yellowknife (only for trucks traveling northbound).
- Tunnels: Windsor-Detroit Tunnel.
- Highways:
    - Ontario Highway 407 Express,

- Ontario Highway 407 West,
- Ontario Highway 418,
- Ontario Highway 412,
- Nova Scotia Cobequid Pass Highway 104, and
- Quebec Autoroute 30.

Tolls are unpopular among the general public, particularly in situations when the public feels there are no practical alternatives to the tolled facility. As a result of political pressures, starting in September 2017 the Government of British Columbia cancelled tolls on the Port Mann Bridge and Golden Ears Bridge in Vancouver.[14] Toll charges on the Coquihalla Highway 5 were removed in 2008 after the capital costs of the facility were fully paid off from the toll revenues.[15]

4.2.2 Congestion Charges

In its variation as congestion pricing or cordon pricing, tolls are charged on motorist entering a certain urban area, usually highly congested central business district (downtown core). They are intended primarily as a traffic management tool that reduces the number of private vehicles in a specific area. Transit buses are usually exempted from those charges, and there may be exemptions or discounts for local residents. The revenues are used to help recover costs of the road infrastructure, or to improve transit services. There are some successful applications of congestion pricing overseas, with the most notable example in London, England. In Canada congestion pricing is not currently used.

4.2.3 VKT Charges (Distance-Based Pricing)

Another variation of tolls that has been proposed in the policy research literature is the distance-based vehicle charge for the use of the road network. In its essence, this is a tax on a vehicle that depends on the kilometres driven. In its proposed design, this revenue instrument would replace (or supplement) fuel taxes and fixed vehicle registration charges.

Some form of this tax is used in many European countries in relation to trucks, most notably in Germany, Switzerland, and Austria. New Zealand applies this tax to diesel fuel vehicles as diesel fuel in New Zealand is not assessed a sales tax at gas stations.[16] There have also been several pilot projects in the US to test the operational details of such tax. Oregon has recently implemented legislation that allows owners of highly fuel efficient or electric vehicles to opt for road user charges instead of fuel taxes at the pump or increased vehicle registration fees.[17] Other than these instances, there is not broad application of this revenue instrument.

4.2.4 Value Capture Tools

Value capture refers to a type of public financing where increases in private property value generated by public investments are fully or in part recouped or “captured” through increased property/land taxes, development charges, or rents on developments that takes place on

[14] https://vancouversun.com/news/local-news/four-months-after-bridge-tolls-removed-drivers-owe-millions-in-unpaid-bills
[15] https://www.cbc.ca/news/canada/british-columbia/coquihalla-highway-tolls-dropped-says-b-c-premier-1.727989
[16] https://www.aa.co.nz/cars/owning-a-car/licensing-safety-fees/road-user-charges/paying-road-user-charges-ruc/
[17] https://www.ttnews.com/articles/oregon-gov-kate-brown-expands-road-usage-charge-program

lands benefiting from the public investment. This instrument is still mainly a concept discussed extensively at the academic level.[18]

4.2.5 Local or Regional Sales Tax

The concept of a municipal/regional sales tax is similar in nature to the federal or provincial sales tax: local governments (municipalities or regions) have the authority to levy local taxes on sales of goods and services to raise revenues for certain local programs or projects. In Canada, municipal sales taxes are not practiced. In 2015, TransLink proposed 0.5% sales tax in Metro Vancouver to fund major infrastructure projects under the regional transportation plan. However, the proposal was defeated in a referendum.

Local sales taxes, in addition to state sales taxes, are used in several jurisdictions in the US. For example, in California the state sales tax rate is 7.25%. This rate is made up of a base rate of 6%, plus California adds a mandatory local rate of 1.25% that goes directly to the city and county, with 0.25% specifically dedicated for funding transportation in the county. Depending on local sales tax jurisdictions, there may be an additional local tax in the amount of 0.15% to 3% for a total sales tax ranging between 7.25% and 10.25%. Food and prescription drugs are exempt from sales tax.[19]

4.2.6 Other Local/Regional Taxes

Local Gas Tax

In Metro Vancouver, TransLink has the authority to impose local surcharges on fuel prices to raise revenue for transportation funding. As of June 2019, this tax amounts to 18.5 cents/litre. There is a similar fuel tax for funding local transportation in Victoria. The tax amounts to 5.5 cents/litre. At the same time however, the provincial fuel tax in Metro Vancouver is lower than elsewhere in the province: 1.75 cents/litre as opposed to 7.75 cents per litre in the rest of the province.[20]

Local Parking Tax

In Metro Vancouver, TransLink also charges a tax on parking fee payments, including fees for hourly parking as well as monthly or annual parking. As of July 2019, this tax amounts to 24%.

4.2.7 Public-Private Partnerships

Public-Private Partnerships are often referred to as an alternative form of service delivery that involves a formal collaborative arrangement between the public and private sector. Generally, there are three models: build-operate-transfer, company-owned-government-operated, and government-owned-company-operated. The Valley Line, the Anthony Henday and Ottawa's Confederation Line are products of public-private partnerships, a way to manage risk on a major infrastructure project.

[18] For a review of the literature on the issue see Jeffery J. Smith and Thomas A. Gihring, and Todd Litman (2011), "Financing Transit Systems Through Value Capture. An Annotated Bibliography", Victoria Transport Policy Institute.
[19] https://www.cdtfa.ca.gov/taxes-and-fees/sut-rates-description.htm , https://www.cdtfa.ca.gov/taxes-and-fees/sales-use-tax-rates.htm
[20] https://www2.gov.bc.ca/assets/gov/taxes/sales-taxes/publications/mft-ct-005-tax-rates-fuels.pdf

5 Regional Transportation Best Practices

In order to benefit from lessons learned in regional transportation plans, a best practice review was conducted across North America and Europe. Six case studies were reviewed and detailed. This section provides a summary of these case studies examining how other metropolitan regions plan for integrated transportation. The most salient and relevant aspects of each case study is summarized below to provide insight into best practices and inform the development of the IRTMP.

Where possible, the case studies highlight specific areas of interest to the Edmonton Metropolitan Region, including: issues related to integration of land use policies, addressing emerging trends or technologies, increasing transportation choices, reducing environmental degradation, supporting the movement of goods and commodities, increasing access to employment centres, and effective coordination of infrastructure between all jurisdictions.

The case studies include the following six North American Regions: Denver, Metro Portland, Twin Cities, Metro Vancouver, and Greater Golden Horseshoe. One international case study is included, covering Greater London. Each case study is distilled and summarized describing:

- Key Facts: Highlights key facts related to the Plan, including the population and member municipalities' planning horizons, population projections and key drivers for the plan.
- Governance Model, Mandate and Scope: Summarizes the type of governance model, and provides an overview of the regional agency's mandate, scope and funding mechanisms.
- Plan Priorities and Key Objectives: Includes a summary of the key issues the plan is seeking to address and the Vision and Objectives for the transportation network.
- Plan Implementation and Relationship with Municipalities: Explains how the Plan is implemented, and where applicable the regional authority's relationship with local municipalities.
- Innovative Approaches and Relevance to the Edmonton Metropolitan Region: Highlights key interest areas relevant and applicable to the Edmonton Metropolitan Region Integrated Transportation Master Plan.

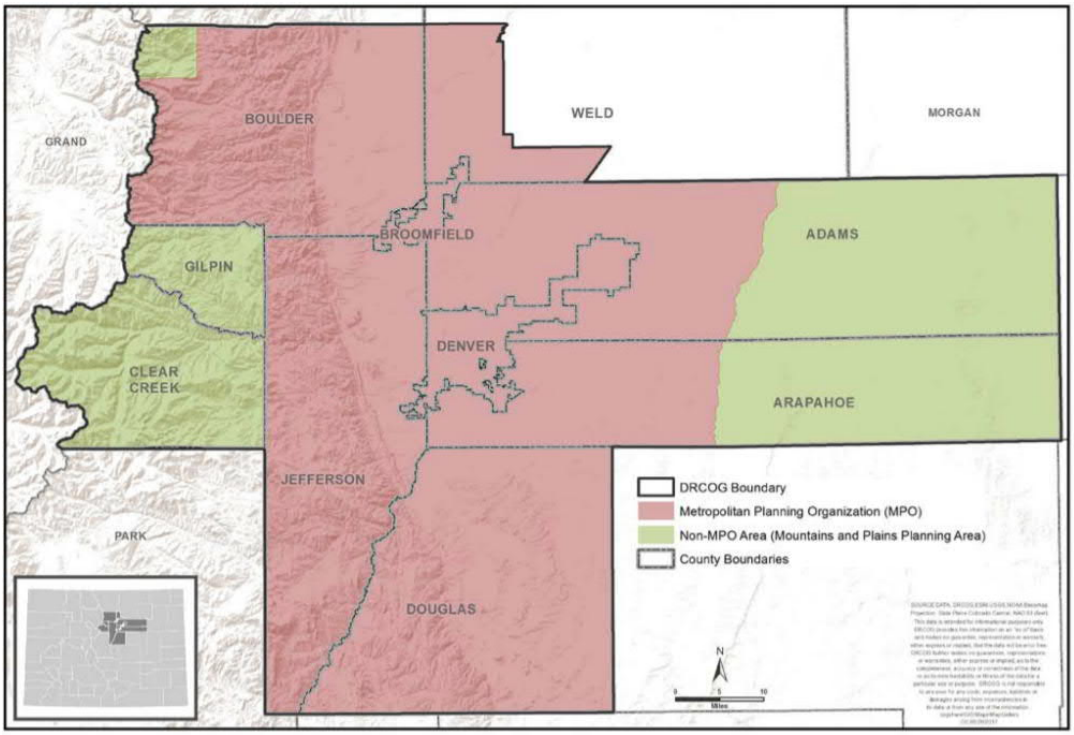
5.1 Case Study 1: Denver Regional Council of Governments (DRCOG) | Metrovision Regional Transportation Plan (Adopted 2015, amended 2019)

Key Facts

- Population: 2.9 million people, 7 counties, 48 municipalities
- Population projections: 4.3 million people by 2040
- Planning horizon: 25-year plan to 2040
- Key drivers: population and employment growth; low density development; automobile dependency; aging population; transportation system capacity; road safety

- Key areas of interest: transportation demand management, human transportation services

Figure 6. Overview of DRCOG Region. Source: 2040 Metro Vision Regional Transportation Plan



Governance Model, Mandate, and Scope

Governance model and mandate:

- DRCOG is the designated metropolitan planning organization for the Denver region. DRCOG is a voluntary organization that comprises local government, representatives of different transportation modes, and state agency officials.
- DRCOG is responsible for overall regional transportation, growth and development planning. They are federally mandated to develop a long-range regional transportation plan that addresses key federal requirements.
- The development of the *Metro Vision Regional Transportation Plan (MVRTP*) creates a framework for regional cooperation in transportation planning; federal funding is channeled through DRCOG to local transportation projects.

Scope: The *MVRTP* guides development of Denver region's multimodal transportation system and prioritizes funding for transportation facilities, improvements, and services for the Denver region. The plan addresses major roadway and rapid transit projects, maintenance and operations, bus service expansion, and facilities for cycling and walking.

Plan Priorities and Key Objectives

The plan sets the following targets:

- reduce the proportion of trips to work by single occupancy vehicles (SOV) to 65% by 2040,

- reduce the regional per capita vehicle miles travelled (VMT) by 10% from the 2010 baseline,
- number of traffic fatalities will be fewer than 100 annually,
- urban centers will accommodate 25% of new housing and 50% of new employment between by 2040,
- increase the rate of construction of alternative transportation facilities, and
- reduce the annual per capital greenhouse gas emissions from the transportation sector by 60% from 2010 levels by 2040.

The goals will be achieved by implementing the following 14 transportation policies:

1. Assure existing and future transportation facilities are maintained and preserved.
2. Provide increased transit service and facilities that can accommodate an increasing share of daily travel, encourage transit-oriented development, and provide mobility options.
3. Provide a sustainable roadway system that enables safe and efficient travel by automobiles, trucks, buses and bicycles.
4. Make the best use of existing and future transportation facilities through management and operations.
5. Reserve adequate rights-of-way in newly developing and redeveloping areas for pedestrian, bicycle, transit, and roadway facilities.
6. Improve and maintain efficient transportation access by all modes to downtown Denver.
7. Develop and maintain a safe transportation system for all users.
8. Develop and maintain a transportation system that provides increased security for all users.
9. Provide robust bicycle and pedestrian accessibility throughout the region.
10. Provide efficient interconnections of the transportation system within modes, among different modes, and between the metropolitan area and the rest of the state and nation.
11. Design new developments within communities to allow the efficient movement of pedestrians, bicyclists, buses and motor vehicles within, to, and through the area.
12. Implement transportation system components that support Metro Vision’s urban growth boundary/area, urban centers, open space, and associated concepts.
13. Provide a transportation system that considers the needs of and impacts on minority, low-income, elderly, and disabled persons.
14. Develop and maintain a sustainable transportation system that protects and enhances air quality, energy efficiency, and the overall environment.

Plan Implementation and Relationship with Municipalities

- MVRTP supports the Metro Vision plan, which is an advisory document. The MVRTP sets out voluntary strategic initiatives for regional and local governments to implement.
- Projects and strategies from the Metro Vision RTP will be implemented by many agencies, including the Colorado Department of Transportation (CDOT), the Regional Transportation District (RTD), DRCOG, and local governments.
- CDOT is responsible for state highways and statewide multimodal transportation efforts.
- RTDs are responsible for public transportation within their jurisdictions.
- DRCOG approves financial plans and vehicle technology for RTD rapid transit projects.
- Projects identified in DRCOG's short-range Transportation Improvement Programs will be federally funded over a four-year period.

Innovative Approaches and Relevance to Edmonton Metropolitan Region

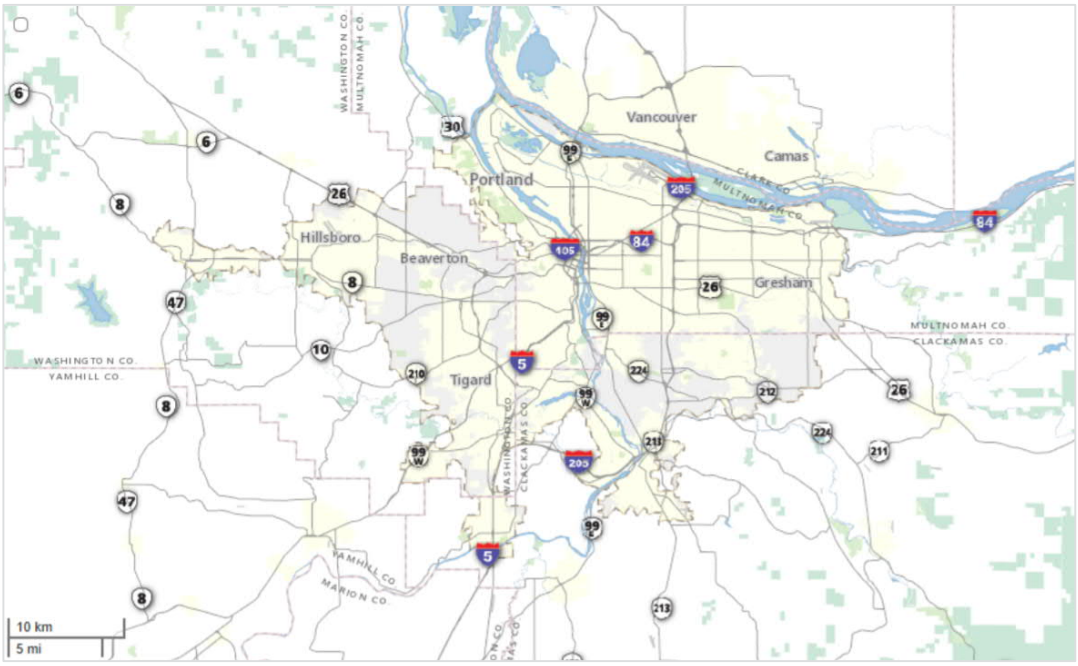
- **DRCOG leads coordination of human service transportation services**, which are delivered across the region through several agencies. These are essential services for older adults, individuals with disabilities, and persons with low-income in areas where there is limited or no fixed route services.
- The RTP **recognizes lack of transportation** for treatment and screening as a key **challenge to mitigating chronic disease**. The RTP includes policies to improve access to healthcare services by **creating partnerships between health and transportation providers.**
- Similar to the Edmonton Metropolitan Region, the Denver region must operate, maintain and expand the transportation system with limited funding. **DRCOG produces two plans: an unconstrained plan ($154 billion) and a constrained plan ($106 billion)**, which can be funded through expected available revenue.
- Although the regional land use plan, Metro Vision, is voluntary guidance, **the MVRTP provides detailed strategic initiatives to help local governments achieve transportation outcomes of Metro Vision.**
- **Denver region has a robust transportation demand management program**. DRCOG's Way to Go TDM program oversees local TDM service providers. TDM services include promotional campaigns, employer outreach, vanpool programs, and a guaranteed ride home program.
    - For example, Denver's transportation demand management program includes carpooling to ski resorts, and an interregional bus service that provides trips to Broncos games and other destinations on weekends.
- **DRCOG launched a pilot regional trip planner**, GODenver, which overlays multiple services, including transit and parking, to facilitate smart trip planning.
- **DRCOG is working towards deploying a connected vehicle environment** (including on-site field devices, communications infrastructure, and backend data management services) to allow for the deployment of connected vehicles. The priority for these applications will be related to safety and mobility.

5.2 Case Study 2: Metro Portland (Metro) | 2018 Regional Transportation Plan

Key Facts

- Population: 1.5 million, 3 counties, and 24 municipalities
- Population projections: 2 million by 2040
- Planning horizon: 20-year plan to 2040
- Key drivers: population growth; climate change; technology; housing affordability; accessibility
- Key areas of interest: transportation equity; road design guidelines; equitable implementation of emerging technologies

Figure 7. Portland-Vancouver Metropolitan Region. Source: 2018 Regional Transportation Plan



Governance Model, Mandate, and Scope

- Metro is a metropolitan planning organization (MPO) designated by Congress and the State of Oregon for the Oregon portion of the Portland-Vancouver urbanized area.
- The RTP identifies the region's most urgent transportation needs and priorities that can be implemented with funding and revenues expected over the next 25 years.
- Metro is responsible for coordinating development of the RTP and programming federal transportation dollars in cooperation with the region's transportation providers.

Plan Priorities and Key Objectives

- Vision: In 2040, everyone in the Portland metropolitan region will share in a prosperous, equitable economy and exceptional quality of life sustained by a safe, reliable, healthy, and affordable transportation system with travel options.
- The plan has 11 goals. Each goal has associated objectives for implementing the goal, and performance measures to track progress toward the goal. The 11 goals are:
    - The greater Portland region is a great and affordable place to live, work and play where people can easily and safely reach jobs, schools, shopping, services, and recreational opportunities from their home by walking, biking, transit, shared trip, or driving.
    - People have access to jobs, goods and services and businesses have access to workers, goods and markets in a diverse, inclusive, innovative, sustainable, and strong economy that equitably benefits all the people and businesses of the greater Portland region.
    - People throughout the region have safe, convenient, healthy and affordable options that connect them to jobs, school services, and community places, supportive active living, and reduce transportation-related pollution.
    - The transportation system is managed and optimized to ease congestion, and people and businesses are able to safely, reliably and efficiently reach their destinations by a variety of travel options.
    - People's lives are saved, crashes are avoided, and people and goods are safe and secure when traveling in the region.
    - The greater Portland region's biological, water, historic, and cultural resources are protected and preserved.
    - People enjoy safe, comfortable and convenient travel options that support active living and increased physical activity, and transportation-related pollution that negatively impacts public health are minimized.
    - The health and prosperity of people living in the greater Portland region are improved and the impacts of climate change are minimized as a result of reducing transportation-related greenhouse gas emissions.
    - The transportation-related disparities and barriers experienced by historically marginalized communities, particularly communities of color, are eliminated.
    - Regional transportation planning and investment decisions provide the best return on public investments.
    - Regional transportation decisions are open and transparent and distribute the benefits and burdens of investments in an equitable manner.

Innovative Approaches and Relevance to Edmonton Metropolitan Region

- The RTP must be consistent with the Oregon Transportation Plan, and local plans must be consistent with the RTP.
- Local projects and programs must be in the RTP's Financially Constrained RTP in order to be eligible for federal and state funding.

- Metro provides some flexible funding based on projects that achieve the RTP's vision and goals.
- The Plan first **identifies challenges to achieving the goals of the RTP**, and then **selects priority projects that can address these challenges**. Regional partners submit projects that can address these challenges, and Portland Metro divides the projects into three funding scenarios.
- Working in a constrained funding environment, Metro and its partners collaboratively identified projects that addressed regional needs and challenges. The **constrained budget** only includes projects that **can be built by 2040. Metro analyzed three funding scenarios using an outcomes-based framework to help inform the plan's project priorities.** Metro published the proposed projects in an interactive map and then consulted with all partners and stakeholders on the results of the analysis.
- The plan analyzes the location of fatal and severe injury crashes to focus safety interventions on sections of roadway where the most collisions occur. **The plan also overlays the high injury corridors and intersections with census data to implement policies and actions that focus on the communities that are most affected by traffic fatalities and injuries.** In greater Portland, the majority of pedestrian deaths and severe injuries occur in areas with higher concentrations of people of colour, people with low incomes and English language learners. It could be valuable to the EMRB to assess how the transportation system performs for different socioeconomic segments of the population.
- **The RTP includes policies to prioritize racial and transportation equity in regional transportation planning and decision-making** to reduce transportation-related disparities and barriers faced by communities of colour and other historically marginalized communities.
- **The RTP includes opportunities and threats of emerging technologies and the potential effect on achieving regional transportation goals.** The plan recognizes that some communities do not have equal access to emerging technologies, and technologies like ride-hailing has the potential to reduce the effectiveness of transit systems. The Emerging Technology Strategy includes policies and actions to address technology-related issues and ensure that emerging technologies can support regional goals.
- In the EMRB, it can be expected that non-automobile mode shares will vary, given differing opportunities to expand transit and cycling facilities. **The Metro RTP provides different mode share targets for different sections of the region, recognizing the impact of land use on transit propensity.**
- The plan includes a **Regional Freight Strategy**, which proposes a program **to effectively communicate freight issues**, and the importance of freight to residents and the region's economic well-being. The strategy also **protects critical freight corridors and access to industrial land uses** through land use planning and design.
- The plan also **aims to eliminate fatalities and serious injuries caused by freight vehicle crashes** by improving roadway and freight operational safety.
- **Portland Metro has a unique approach to managing and improving the motor vehicle roadway network.** Instead of assessing the roadways based on bottlenecks or levels of congestions, the **policies assess network connectivity, local geographic fit,**

relationship to existing communities and future development, and protection of natural environments.

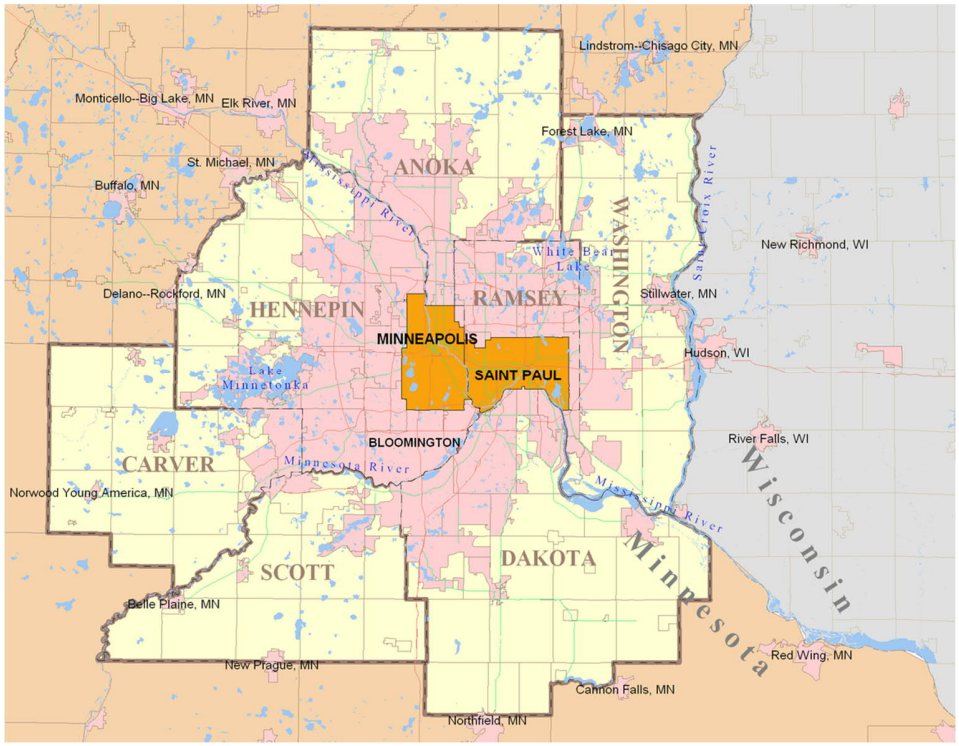
- The Plan identifies **densely populated neighbourhoods, near busy roads and highways, as having the highest concentration of air toxics**. The Region has a separate strategy, the Climate Smart Strategy, to **reduce greenhouse gas emissions from cars and small trucks by 2035** through local and regional land use and transportation plans.

5.3 Case Study 3: Twin Cities Metro Region (Metropolitan Council) | Thrive MSP 2040 – Transportation Policy Plan (2018)

Key Facts

- Population: 3.1 million, seven counties, 17 geographic districts
- Population projections: 3.7 million
- Planning horizon: 30-year plan to 2040
- Key areas of interest: performance measures; shared goals between regional development and transportation polices; dispersed employment concentrations
- Key drivers: inadequate financial resources to address infrastructure needs; extreme weather impacts; environmental degradation; highway congestion; racial disparities; and aging population.

Figure 8. Twin Cities Metro Map. Souce: Davumaya



Governance Model, Mandate and Scope

- The Metropolitan Council is responsible for preparing a comprehensive development guide for the seven-county metropolitan area, which includes the overarching vision and regional plan, Thrive MSP 2040, and the associated plans for wastewater, transportation, housing and regional parks.
- The development guide for the metropolitan area comprises policy statements, goals, standards, programs and maps for the orderly and optimal development of the region.

Plan Priorities and Key Objectives

Goals

- Take care of the existing transportation system.
- Provide a safe and secure regional transportation system for all users.
- Provide a multimodal transportation system that offers practical and affordable options to allow all users, regardless of their social or economic background, to get to the places they need to go.
- Direct transportation investments to support regional job concentrations.
- Advance equity and contribute to communities' livability through the regional transportation system.
- Leverage transportation investments to guide land use.

Outcomes

- The Transportation Policy Plan identifies goals, strategies, and investments for the regional transportation system that work towards the desired outcomes found in Thrive MSP 2040, the region's development guide. Each transportation goal notes the outcomes addressed.
- The five outcomes for the *Thrive MSP 2040* are stewardship, prosperity, equity, livability and sustainability.

Plan Implementation and Relationship with Municipalities

- Implementation requires partnerships with local governments, residents, businesses, philanthropy, and the non-profit sector.
- Local governments reference the policy directions in *Thrive MSP 2040* to create consistent, compatible, and coordinated local comprehensive plans that fit within the regional policy framework and help ensure efficient and cost-effective regional infrastructure.
- The Council reviews local comprehensive plans and can require a community to modify its local plan to assure conformity with *Thrive MSP 2040* policies.
- Federal grants fund improvements to surface transport, innovative transportation products, and major transit rapid investments.

Innovative Approaches and Relevance to the Edmonton Metropolitan Region

- **Whenever a new transportation project is implemented**, regardless of the project lead, the Metropolitan Council **monitors the impact of the investment on the overall transportation network.**

- The Plan identifies strategic employment clusters and **prioritizes multimodal transportation that increases access to these regional job concentrations**. As of 2011 there were 42 job concentrations; these concentrations are contiguous areas that have at least 7,000 jobs at a density of at least 10 jobs per acre.

- Each goal has performance measures to determine if the strategy is working. **Performance measures to assess land use and transportation coordination** include: the amount of industrial land near river/rail access; percentage of projected population and job growth near high-frequency transit service; and inclusion of transit supportive policies in local comprehensive plans.

- The Plan includes **short-term performance targets to understand** whether transportation investments are **trending towards achieving the target**. The Region is required to report on performance measures on a regular basis, and if the trends are not meeting the desired expectations, **federal funds may need to be re-directed to address the problem**.

- The plan recognizes **the role of regional trail systems and other off-street trails in promoting walking and cycling for transportation** in urban and suburban areas. The plan also includes a **regional bicycle transportation network that connects regional destinations** and local bicycle networks.

- **The plan focuses regional growth in areas that support a full range of multimodal travel**, by supporting higher densities around transit stations, planning for long-term needs of freight, and including cycling and pedestrian facilities in comprehensive plans.

- The plan **considers the impacts of transportation policy on underrepresented groups**. Specific strategies and investments serve to create benefits or mitigate impacts on historically underrepresented populations, including communities of color, low-income populations, people with disabilities and people with limited English proficiency. The plan includes a chapter on equity and environmental justice.

- **Congestion Management Process Plan develops performance measures to evaluate levels of congestion** in order to refine regional strategies to reduce vehicles miles traveled, identify programs and services to support access to jobs, and increase connections between areas with high concentrations of jobs and low-income households.

- **The plan identifies e-commerce as a recent trend that is eroding the efficiency of freight movements in urban areas**. The plan provides suggested strategies for local governments to manage last-mile deliveries in urban areas like curbside management, freight loading zones, off-peak hour deliveries, and policies to incentivize the use of green technologies.

- **The plan also identifies railroads as a viable alternative to truck freight**, and encourages adequate road access to accommodate trucks between intermodal rail terminals.

5.4 Case Study 4: Metro Vancouver | Transport 2040 (2008)

Key Facts

- Population: 2.4 million, 21 municipalities, one electoral area, and one treaty First Nation
- Population projection: 3.4 million by 2040
- Planning horizon: 30-year plan to 2040
- Key drivers: decentralized development; climate change; increasing congestion; competitive economy
- Key areas of interest: coordinating of land use and transit investments; frequent transit network; road user prioritization

Governance Model, Mandate, and Scope

- TransLink comprises a Board of Directors, a Mayors' Council, and a Commissioner.
- TransLink is responsible for transit, major roads, and regional cycling.

Figure 9. Metro Vancouver. Source: MetroVancouver.org

Plan Priorities and Key Objectives

Transport 2040 has 6 goals and strategies associated with each goal.

1. Greenhouse gas emissions from transportation are aggressively reduced, in support of federal, provincial, and regional targets.

2. Most trips are by transit, walking, and cycling.
3. The majority of jobs and housing in the region are located along the Frequent Transit Network.
4. Traveling in the region is safe, secure, and accessible for everyone.
5. Economic growth and efficient goods movement are facilitated through effective management of the transportation network.
6. Funding for TransLink is stable, sufficient, appropriate, and influences transportation choices.

Plan Implementation and Relationship with Municipalities

- TransLink's funding sources include revenues from the farebox, property taxes, and fuel tax.
- *Transport 2040* is implemented through 10-Year Plans that identify funding and other resource requirements to implement projects and services.
- Local municipalities and Metro Vancouver are responsible for ensuring land use decisions support public transit and active transportation.

Innovative Approaches and Relevance to Edmonton Metropolitan Region

- Recognizing the need to optimize the existing public transit network, TransLink **developed a Frequent Transit Network (FTN) that includes the bus network**. The plan considers improving cycling and pedestrian facilities along the FTN, rather than focusing only on station areas.
- The plan identifies strategic road projects that are necessary for facilitating goods movement.
- The plan prioritizes buses, trucks, and other high priority vehicles on the road network to optimize capacity.
- *Transport 2040* recognizes that land use planning that supports compact, complete communities is the most effective way to reduce vehicle use.
- **TransLink's Transport 2040 and Metro Vancouver's Regional Growth Strategy were developed in parallel to ensure that transportation and land use were complementary.** Regional growth should be concentrated in Downtown Vancouver, regional city centres, and along a frequent transit network. Similarly transit investments are supportive of the region's growth patterns, identifying the need for transit infrastructure between city centres and Downtown Vancouver.
- Metro Vancouver is a major hub for container traffic as a gateway to the Asia-Pacific. **The plan prioritizes truck access to key gateway facilities like Port Metro Vancouver, Vancouver International Airport and U.S. border crossings.**
- *Transport 2040* recommends making better use of rail and marine for goods movement.
- The plan also supports funding that relates to usage of the road system and can influence travel behaviour, which includes fuel taxes, vehicle levies, congestion pricing.

- The existing transportation network should implement critical incident processes to reduce delays and congestion on the road and transit networks.
- The plan proposes substantial investments in transit by investing in new rail and bus infrastructure within the Frequent Transit Network, and coordinating transit investment with land use development plans to promote high density and mixed-use areas near transit.
- The plan identifies strategies to make cycling more appealing through increased safety, ease of use and value. Strategies related to supporting cycling and walking include cycling and transit integration, and expanding facilities and service that makes active transportation competitive with auto convenience.
- The plan strives to protect air quality and recognizes the link between sustainability, public health and transportation planning. Vancouver's *Transportation 2040* supports the goals of TransLink's *Transport 2040* by including targets to have greater than 50% mode share of active and transit trips, reducing dependence on fossil fuels, and by framing walking and cycling a solution to the growing obesity trend.

5.5 Case Study 5: Greater Toronto | Greater Golden Horseshoe Transportation Plan (in development)

Key Facts

- Population: 9 million
- Population projections: Approximately 14.5 million
- Planning horizon: 30-year plan to 2051
- Key drivers: changing employment trends; congestion; goods movement; emerging technologies; future-readiness; resiliency
- Key areas of interest: emerging technologies; Indigenous engagement; thought leader interviews

Figure 10. GGH. Source: Government of Ontario

Governance Model, Mandate, and Scope

- The Ontario Ministry of Transportation is developing a long-range transportation plan for the Greater Golden Horseshoe (GGH). It will look out to 2051 and beyond and ensure that the transportation system of the future supports continued prosperity and quality of life, and is responsive to current and future environmental, economic and social needs.
- The GGH Transportation Plan will include the Goals and Objectives and recommended transportation systems and policies. The Plan will provide a strategic network that reduces congestion, supports economic growth and job creation, a system that is resilient, and can adapt to climate change and other major shifts in the global context.

Plan Priorities and Key Objectives

The GGH Transportation Plan is still in development therefore plan priorities and key objectives have not been finalized. However, the following nine Goals have been identified for the Plan:

- Safe and Healthy: A transportation system that supports active, safe, and healthy living.
- Smart and Secure: A transportation system that uses data and technology to promote and enable efficient travel while protecting privacy.
- Economically Responsible: A transportation system that optimizes resources and applies cost effective solutions.
- Environmentally Sustainable: A transportation system that protects our environment and minimizes environmental impact.
- Resilient Network: A transportation system that can adapt to future change.
- Connected: A transportation system that offers fast, frequent, and reliable options to move people and goods.
- Equitable: A transportation system that is affordable, accessible, and inclusive to all users.
- Integrated: A transportation system that supports complete communities and coordinates transportation with jobs, services, and housing.
- Prosperous: A transportation system that supports economic growth and the efficient movement of people and goods.

Plan Implementation and Relationship with Municipalities

- As the Plan is still in development, the exact mechanism of implementation has not been determined.
- It is anticipated that as a provincial plan, agency plans (Metrolinx's Regional Transportation Plan), and municipal transportation master plans will be updated to be consistent with the GGH Transportation Plan.

Relevance to the Edmonton Metropolitan Region

- As the Plan is still in development, this section relates to innovative approaches in the development of the Plan, rather than in the Plan itself.
- A strategic foresight process was undertaken at the beginning of the project as part of the work to ensure a resilient transportation network, consisting of:
    - Thought leader interviews with experts from a variety of fields to get their insights on how the world will change over the next 50 years.
    - A Horizon Scan, which looked at trends and signals of change.
    - Two foresight workshops, which brought the project team, thought leaders, and municipal representatives together to discuss trends and signals of change and alternative futures.
    - Five extreme and very different stretch futures, which were designed based on the thought leader interviews, Horizon Scan and foresight workshops as resiliency tests

to see how the region's transportation system would perform under different long-term population forecasts and growth patterns.

- Lessons from the strategic foresight process were used to inform the network options and land use variants tested in the later phases of the project.
- A series of "disruptors" that could impact transportation over the next 30 years were identified for additional study:
  - Automated and connected vehicles,
  - Digitalization of the supply chain, especially e-commerce,
  - Smart ports/smart shipping,
  - Near-sourcing of manufacturing,
  - Job automation, and
  - Drones.
- For the most impactful of the disruptors – connected and automated vehicles – a dedicated stream of work was undertaken to understand the current research, test scenarios and make policy recommendations.
- The Indigenous engagement process for the project viewed Indigenous engagement as an opportunity for collaboration and relationship building to ensure that Indigenous values and interests were represented in the plan, rather than as a standard "Duty to Consult" (as per the constitution) process.

5.6 Case Study 6: Greater London, UK | Mayor's Transport Strategy (2018)

Key Facts

- Population: 8.7 million, 32 London boroughs and the Corporation of the City of London
- Population projections: 10.8 million in 2041
- Planning horizon: 25-year plan to 2041
- Key drivers: growing population; congestion; transportation equity; public health
- Key areas of interest: complete streets; focusing growth near public transport; funding strategies

Figure 11. Greater London. Source: Maproom

Governance Model, Mandate, and Scope

- Governance model: The Mayor of London sets the overall vision for Greater London by defining strategies for a range of issues, including transport, in *The London Plan*. The Mayor of London is only one actor in the transport system, which includes the rail industry, the Port of London Authority, national government and other stakeholders. Therefore, the Mayor of London is only able to use Transport for London (TfL) and boroughs' local plans as policy levers for achieving policies in *The Mayor's Transport Strategy*.
- Scope: Although *The Mayor's Transport Strategy* is only directly responsible for projects that can be delivered by TfL, the Strategy still addresses all modes of transport in London, as well as Good Growth (coordinating land use and transportation), transportation demand management, Heathrow Airport, and climate change resiliency.

Plan Priorities and Key Objectives

Vision: The success of London's future transport system relies upon reducing Londoners' dependency on cars in favour of increased walking, cycling and public transport use.

Key Themes of the strategy

- Each key theme is related to increasing active transportation and reducing car dependency.

- Healthy streets and healthy people: creating streets that encourage walking, cycling and public transport.
- A good public transport system: public transport is the most efficient way for people to travel over distances that are too long to walk or cycling.
- New homes and jobs: Planning the city around walking, cycling and public transport use will ensure London grows in a way that benefits everyone.

Key objectives for 2041

- Increase the public transport and active transportation mode share from 63% to 80%.
- All Londoners do at least 20 minutes of active travel they need to stay healthy each day.
- Eliminate all deaths and serious injuries from road collisions from London's streets.
- Maintain low crime and fear of crime on London's streets and transport system through environmental design and integrated policing.
- Reduce overall traffic levels by 10-15%.
- Reduce emissions, particularly diesel emissions, through vehicle retrofits, electrification, road charging, and parking levies.
- Seek to make London's transport network zero emission by 2050.
- Enhance London's natural and built environment.
- Ensure that London's transport is resilient to impacts of severe weather and climate change.

Plan Implementation and Relationship with Municipalities

- TfL is funded through a combination of sources including government grants, borrowing against future revenue, fare revenues, non-fare sources, contributions from the London boroughs and the private sector (e.g., development funding for associated transport projects).
- TfL will partly deliver the strategies within this document through its business plans. A large part of TfL's future capital spend is expected to be used to deliver the aims of the Healthy Streets Approach.
- Several policies within the Strategy require borough-level intervention because they manage and operate London's roads. London boroughs incorporate the strategy into their local transport plans (Local Implementation Plans). Priorities that are required to be addressed in LIPs include:
    - Contributing to increasing public transport and active transportation mode share to 80%.
    - Applying the Healthy Streets Approach at the local level.
    - Improving street environments and introducing traffic reduction strategies.
    - Providing good public transport experience within the borough.
    - Using transport principles of Good Growth to guide development of new homes and jobs.

- Some strategies also require partnership with national government and rail agencies.

Relevance to the Edmonton Metropolitan Region

- The plan recognizes streets as the foundational building block of the transportation network.
- The strategy recognizes how the varied areas of London will require tailored approaches to address the transportation system. The vision describes how the future of transport will look in different parts of the region (e.g., Central, Inner, and Outer London). For example, in Central and Inner London many trips are short enough to walk or cycle, but in Outer London there needs to be significant public transport improvements to reduce car dependency.
- To achieve the goal of providing more transportation choices in the EMRB, it will be necessary to consider the experience on Regional roads and highways. ***The Mayor's Transport Strategy*** **considers streets as paramount to providing attractive public transport options and creating places people want to live and businesses can thrive.** The Healthy Streets Approach provides a framework with ten evidence-based indicators to assess the experience of being on London Streets. The Healthy Streets Indicators include:
  - People feel relaxed,
  - Clean air,
  - Pedestrians from all walks of life,
  - Easy to cross,
  - Shade and shelter,
  - Places to stop and rest,
  - Not too noisy,
  - People choose to walk, cycle and use public transport,
  - People feel safe, and
  - Things to do and see.
- The EMRB will require additional funding to successfully deliver the policies within the IRTMP. The Strategy proposes a new approach to funding and delivering the transport network. This includes road user charging (where appropriate), land value capture, and the devolution of financial powers to local level agencies like the Mayor, the Greater London Authority and TfL. They also plan to seek additional taxes or financial powers to create fairer ways of funding and delivering transport projects.
- The EMRB Growth Plan prioritizes directing population growth to areas with transportation capacity, like light rail transit station areas. **The Mayor's Transport Strategy prioritizes Good Growth, where new housing is located in areas where people have options other than driving to complete trips.** The first step is locating high-density, mixed-use places near existing or planned public transport. The second step is to ensure that these mixed-use places facilitate active travel and embed efficient freight servicing. For high-density developments that are further out, rapid transit, improved bus, and cycling links can be used to improve accessibility.

- The plan recognizes **that freight traffic will continue to grow without action. The plan sets a goal to reduce lorries and vans entering central London** in the morning peak by 10% by 2026. New development proposals will have to provide Construction Logistics Plans and Delivery and Servicing Plans that **aim to use non-road vehicle modes for goods movement**. The plan seeks to establish a network of micromobility distribution services and facilities served by zero emission vehicles of walking and cycling deliveries. The plan also seeks to develop an online tool to simplify the regulatory environment for heavy goods vehicles operating in London. The plan identifies a potential shift of freight movement from road to water.
- The Mayor and Transport for London will **support car share programs by reallocating parking to allow car clubs to expand, promoting membership initiatives, and analyzing new car share models. This will allow more Londoners to give up their personal vehicles**, but still have access to a car for infrequent trips.
- The Mayor and Transport for London will manage new technologies by evaluating new transport services using the Healthy Streets Approach.
- **The bus network is seen as flexible and adaptive** to the changing character of different parts of London. The plan proposes redistributing buses to outer London as the rail network is upgraded in Central London. **Bus services will be focused on streets where bus priority can be provided.**
- **The Mayor aims for all taxis and Private Hire Vehicles to be zero emission capable by 2033, and buses would be zero emission by 2037.**

5.7 Key Takeaways

The case studies illustrate how different geographies respond and coordinate on regional transportation planning. Many cities, regardless of size or locale, are facing the same challenges related to congestion, consolidating employment opportunities, climate change, equity, efficient goods movement, and promoting compact development. Below is a summary of lessons learned from the case studies that are applicable to the Region.

Land use

- Prioritize transportation connections (transit and road) to areas identified as employment nodes or population centres (Portland, Twin Cities, Vancouver).
- Differentiate mode share and transportation targets for subareas (London, Portland).
- Focus on the role and design of the street network in the overall transportation system and creating complete communities (London).

Public Transit

- Develop a frequent transit network that connects regional centres and employment concentrations (Vancouver, Twin Cities).

Active Transportation

- Prioritize cycling and pedestrian facilities in regional centres and along transit corridors (London, Vancouver).

Road and Congestion Management

- Evaluate road network investments based on network connectivity rather than congestion (Portland).
- Assess transportation impact of new developments through TDM measures to encourage non-auto mode shares (Denver).
- Optimize capacity of highway systems by prioritizing goods movement (heavy trucks) and public transit (buses) (Vancouver, Twin Cities, GGH).
- Evaluate the impact of new transportation investments on the overall transportation network to ensure trends are meeting desired expectations (Twin Cities).

Goods Movement

- Explore opportunities to use non-road modes of transport for goods movement (Vancouver, London).
- Consider future forward goods movement network based on AV, multi-truck platoons and drones (GGH).

Trends and Future Forward

- Identify opportunities and threats of emerging technologies to achieving regional transportation objectives (Portland, GGH).
- Consider all modes in the transportation network including increasing importance of airport districts/centres (GGH, London).
- Growing climate uncertainty will result in the need to plan more resilient infrastructure (Portland, GGH).
- Consider the impact of transportation programs and policies on diverse populations and evolving demographics, especially underrepresented or marginalized groups (Portland, Twin Cities).
- Consider developing a plan that takes into account different funding scenarios (Portland, Denver)

Project Prioritization

- Consider employing an outcomes-based framework to inform the plan project priorities (Portland).
- Consider funding in constrained and unconstrained scenarios (Denver).
- Consider publishing proposed projects on an interactive map to communicate and consult with project partners and stakeholders (Portland).

Monitoring and Reporting

- Consider monitoring project implementation, regardless of lead and develop a way to monitor impact of the investment (Twin Cities).
- Consider a performance measure for each plan goal (Twin Cities).

6 Transportation Trends and Emerging Technologies

Emerging trends and technologies may have impacts to land use and how people and goods move around the Edmonton Metropolitan Region. The trends highlighted in this report generally relate to demographics and employment, and how those may shift in the future. Emerging technologies are defined and discussed in this section. While some technologies are already present and evolving, many are yet to be fully realized.

6.1 Demographic Trends

The Edmonton Metropolitan Region's growth has surpassed the national growth rate for more than seven years. Between 2006 and 2011, the metropolitan area grew by over 12%, well above the national growth rate of 6%[21]. By 2044, the population is anticipated to grow by almost a million people, from 1.3 million in 2014 to 2.2 million in 2044[22].

The Edmonton metropolitan area (specifically the Census Metropolitan Area or CMA) continues to be one of the youngest regions in Canada. Over the last 20 years, 18% of the total population have been children (age 0 to 14). In 2016, those of working age (age 15 to 64) made up almost 70% of the CMA population. Seniors (65 and over) make up 12% of the CMA's population, which is lower than the national average of 17%.

6.1.1 Migration and Immigration

Interprovincial migration and immigration are two major sources of population growth in Alberta. It is estimated that by 2046:

- 47% of the population growth will be due to international migration,
- 33% will be due to natural increase, and
- 20% will be because of interprovincial migration.

Edmonton and Calgary are expected to receive 80% of that population increase because most people who internationally migrate to Alberta tend to take up residence in urban areas due to the higher accessibility of jobs, residences, transportation options, and amenities.

6.1.2 Increasing Proportion of Seniors

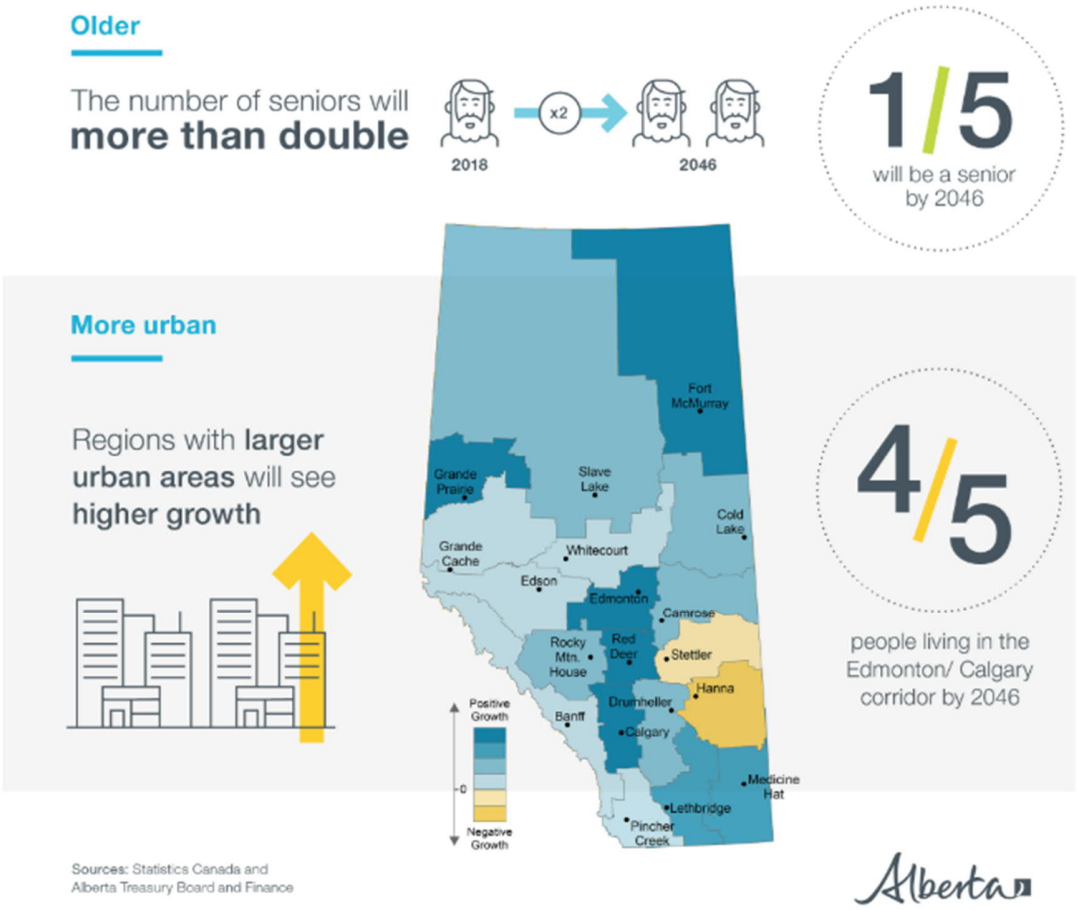
While the proportion of children and those of working age has remained relatively constant over the last 20 years in the Edmonton metropolitan area, the proportion of seniors has steadily increased, from 9.8% in 1996 to 12.3% in 2016. According to the Government of Canada, around one in seven Canadians was a senior in 2012 and by 2030 the number will jump to nearly one in four[23].

Healthier lifestyles are allowing seniors to live independently in their own homes longer. The growing senior cohort has increased demand for transportation services for non-emergency medical appointments. It is estimated that up to 30 percent of all patients skip medical

[21] Statistics Canada, Census Data.
[22] Edmonton Metropolitan Region Growth Plan (2016).
[23] Government of Canada, *Seniors Action Report* (2014).

appointments, citing transportation as a key reason[24]. Transportation companies like RoundTrip, Circulation and Uber Health are starting to fill this transportation service gap, enabling health care organizations or family members to arrange rides on behalf of others. The medical industry has also responded, sending aides, nurses and even doctors to patient's homes for mainly non-emergency appointments instead of having patients come to a clinic or hospital.

Figure 12. Increases in Senior Population in Alberta by 2046. Source: Government of Alberta



6.1.3 Generational Trends

Boomers

The Baby Boomer generation (those born between 1946 and 1964) will make up an increasing share of the senior population in the coming decades. Boomers may have grown up using public transit but came of age during the heyday of the private automobile. Decades later, Boomers still embrace car culture. According to research published by the Association of American Retired Persons (AARP), 78% said Boomers see driving as a key to independence[25]. While enthusiastic about new car technology, Boomers may not fully embrace the idea of connected and autonomous vehicles.

[24] Morrisey, Janet. *Companies Respond to an Urgent Health Care Need: Transportation.* New York Times. August 9, 2019.
[25] Wharton School University of Pennsylvania. *Demographic Shifts: Shaping the Future of Car Ownership*. February 2017.

What may be surprising is that Boomers are participating in the migration to urban centres, despite common assumptions that Millennials will dominate the urban landscape in the coming years. Recent studies suggest that Boomers are also locating there.

The Baby Boomer generation also grew up in a time where new technologies were becoming a reality and widely adopted. Similar to Millennials, adapting to new technology is less of a challenge to this demographic as compared to previous generations.

Generation X

Generation X (Gen X), those born between the 1965 and 1979. This generation is often referred to as the middle child of the generational cohorts as Gen X is often overshadowed by Boomer and Millennials. This cohort accounts for roughly 15% of North America's population. Similar to the Boomer generation, Gen X was taught to strive for a suburban lifestyle and to discover the freedom of their first car; however, as oil prices skyrocketed and the housing market crashed, the Generation's priorities shifted[26].

Similar to the Boomers, Generation X has dedicated the majority of their lives to their children. As their children grow and attend post-secondary, Gen X continue to support them and help them in their early adult life journey. Generation X is also tasked with taking care of aging parents. The dedication of Generation X to family to their children is admirable, but has led them down a complicated financial path.

About a quarter of this generation does not have children. A report by the American Public Transit Association found that childless Generation Xers were beginning to invest in properties in urban areas.[27] The renewed health in cities, combined with increased feelings of security and an abundance of entertainment has led to many of this generation to move to urban areas.

Millennials

The Millennial generation generally include those born between 1980 and 1994, and are sometimes referred to as Generation Y. Millennials are Boomer's children and have surpassed Boomers to become the largest generation in North American history. Millennials have come of age during globalization and the widespread adoption of personal computing. Compared to previous generations, Millennials are also facing lower employment levels, smaller incomes, and more debt.

A study by the American Public Transit Association (APTA) found that, unlike previous generations, Millennials are more multi-modal and choose the best transportation mode (driving, transit, bike or walk) based on the trip they are planning to take[28]. Millennials have a lower rate of car ownership than previous generations at their age. Experts point to the fact that Millennials have grown up in the sharing economy and appear to be more comfortable with mass transit, car-sharing, and ride-haling than previous generations[29].

A 2014 TransitCentre survey of 11,842 respondents in 46 metropolitan across the United States found that the generational divide over transit that many observers have noted over the past few years is real: people under 30 are far more likely to ride public transportation and

[26] Mark More (2015), What to Know Your Riders? Meet Gen X.
[27] American Public Transit Association (2015), Understanding Recent Ridership Changes: Trends and Adaptations
[28] American Public Transportation Authority / APTA (2013), *Millennials and Mobility: Understanding the Millennial Mindset.*
[29] Wharton School University of Pennsylvania (2017), *Demographic Shifts: Shaping the Future of Car Ownership.*

to express positive feelings about it than older people, regardless of what part of the country they live in or what kind of neighborhood they grew up in[30].

"The Millennial generation seems to be defying its sheltered, suburban upbringing by delaying the acquisition of a driver's license and choosing transit. Meanwhile, Baby Boomers, who grew up using transit and were encouraged to do so, are defying their upbringing by avoiding transit now." – TransitCentre Who's On Board 2014 Mobility Survey

Similar to Boomers, Millennials may defy conventional expectations. Until recently, automakers had feared the loss of the Boomer market, and saw Millennials as far less interested in driving or owning cars as their parents. Recent research has shown some surprising trends. A working paper posted by the National Bureau of Economic Research found that Millennials may just be late to owning cars. The study found that older Millennials, those born in the early 1980s, were just as likely to own cars as compared to their Boomer cohort and are likely to drive more[31]. Whether this trend continues as the Millennial cohort ages, is yet to be seen.

While Millennials are living in cities more than previous generations, a 2016 report by the National Association of Realtors shows an increasing share of Millennials purchasing single-family homes in suburbia[32]. Whether Millennials continue to buy cars and move to the suburbs or gravitate, along with their parents, to urban centres and use alternative modes of mobility, remains to be seen.

Generation Z

Generation Z, those generally born between 1995 and 2015 are often referred to as the iGeneration. Gen Z is anticipated to be the largest group of consumers worldwide by 2020. They already make up 32 percent of the global population, more than Millennials[33]. Many in this generation grew up playing on their parent's (Gen X's) smartphones or tablets.

This generation is used to being hyper connected and online communication is the preferred method. On average, this generation spends three hours a day on their devices. Generation Z is expected to drive cultural change in part due to an inherent comfort with connected technology, it is not scary or intimidating to them, and they welcome rapid change as the norm. The true tipping point will be when Gen Z arrives at a life stage when their consumer spending behaviors (and ability to spend) match values synonymous with mobility culture.

According to a study by Allison+Partners, Gen Z consumers view cars more like appliances and nearly 56% agree a car represents essentially no more than a means of transportation[34]. Some 70% of Gen Z consumers do not have their driver's licenses and 30% of this group has

[30] Transit Centre (2014), Who's On Board: 2014 Mobility Attitudes Survey.
[31] Knittel, Chris and Elizabeth Murphy (2019), NBER Working Paper "Generational Trends in Vehicle Ownership and Use: Are Millennial Any Different?" National Bureau of Economic Research.
[32] National Association of Realtors (2016) 2016 Home Buyers and Sellers Generational Trends Report.
[33] Whimore, Geoff (2019) How Generation Z is Changin Travel for Older Generations. Forbes.
[34] Allison+Partners (2019) How the Birth of Mobility Culture and The Rise Of New Consumer Values Will Redefine Our Journey from Here to There.

no intention or desire to get one. In fact, Gen Z survey respondents actually ranked alternate reality, VR and smart homes higher in interest than autonomous vehicles.[35]

However, those who make up Gen Z do see autonomous vehicles as an eventual reality. Some 60% of those we surveyed believe they will use autonomous vehicles by 2029.

Gen Z has shown an early willingness to invest money and loyalty in brands that demonstrate an ability to align marketing with these new values synonymous with mobility culture. The latest example is in Madrid, with more than 5,000 electric scooters – the largest fleet globally – available for on-demand use as a means to reduce traffic, noise, emissions pollution, and parking issues. Younger Spaniards flock to these options, with companies increasing the size of the fleet more than fivefold in the past year[36].

Inverse to this lack of interest in driving comes the acceptance of autonomous technologies. With its high trust level of technology, Gen Z will fuel the adoption of autonomous vehicles.

The combination of autonomous transportation with “we” values core to mobility culture suggests a reimagined way to use time while on the road. Data shows nearly half of Gen Z consumers (45.5%) are comfortable with shared ride experiences in an autonomous vehicle[37].

Marcu Gamo, former strategist for Toyota and Lexus in the United States, asserts that the new mobility culture calls into question the commute and opens new options for city planning and commute patterns. He found that almost two-thirds of Gen Z consumers would be willing to accept a longer commute in a self-driving vehicle. While the single driver commuter experience is generally perceived as bad, unhealthy, and stressful, the “we” commute of mobility culture could be a positive and healthy experience similar to today’s train commutes. He writes, “the birth of mobility culture and the rise of “we” values suggest future journeys will not be quiet and alone, but ambient rides that are shared with others”.[38]

6.2 Economic and Employment Trends

The Growth Plan estimates that by 2044 almost half a million jobs will be added to the Metropolitan area. The nature and concentration of jobs may evolve over the next 25 years due to trends like automation and the digital economy.

6.2.1 Job Automation

Job automation involves the use of technology such as robotics and artificial intelligence as a substitution for human labour for work tasks and processes. Over the last century, machines have replaced workers in many tasks, but on balance, technology has created more jobs than it has displaced[39]. To date, most automation has replaced job tasks that are repetitive, simple and generally physical in nature. New technology is introducing the ability for activities that include cognitive capabilities to be automated, which can potentially change the daily work activities of almost everyone.

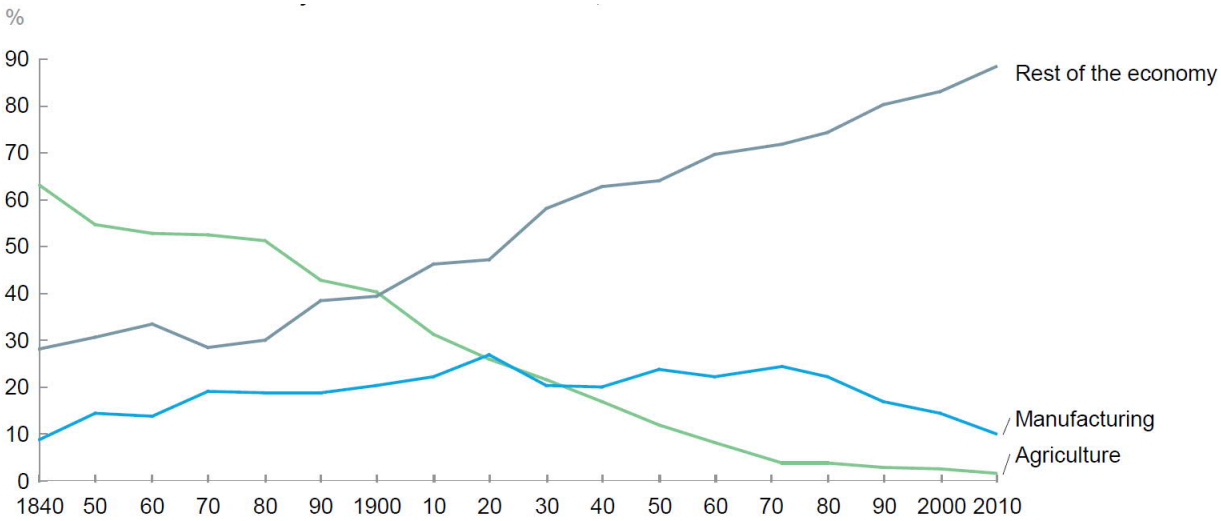
[35] Allison+Partners (2019) How the Birth of Mobility Culture and The Rise Of New Consumer Values Will Redefine Our Journey from Here to There.
[36] Gualtieri, Thomas (2019) Madrid is Trying Out E-Scooters in Its Quest to Beat Traffic, Bloomberg.
[37] Allison+Partners (2019) How the Birth of Mobility Culture and The Rise Of New Consumer Values Will Redefine Our Journey from Here to There.
[38] *Gamos, Marcus (2019) How Gen Z Impacts Urban Mobility*
[39] Frey, C B and E Rahbari (2016), *Technology at Work: How the Digital Revolution is Reshaping the Global Workforce* via VoxEU.org.

A report by McKinsey Global Institute suggests that fewer than 5% of occupations consist of activities that are 100% automatable[40], meaning complete loss of significant job sectors due to automation is unlikely. Rather, many activities and tasks required to undertake a job will be automated. However, there have been suggestions that artificial intelligence in particular may be a differentiator from past automation and could result in different outcomes; many futurists believe that machines will eventually replace most jobs in the current economy[41].

Figure 13 shows how the labour force has changed in the United States over the last century. The changes have been similar in Canada. The McKinsey Global Institute research provides a number of key conclusions:

- Automation can enable productivity growth at the individual business level and at the level of entire economies. McKinsey estimated that automation could raise productivity growth globally by as much as 0.8-1.4% annually.
- Less than 5% of occupations are currently candidates for full automation, but almost every occupation has partial automation potential with about half of all work tasks subject to potential automation with adaptation of currently demonstrated technologies.
- The pace and extent of automation will vary across different jobs. Early automation is expected in predictable physical activities in manufacturing and retail trade, and in collecting and processing data. Some forms of automation will tend to raise the productivity of high-skill workers while reducing the demand for lower skill workers.
- It will take several decades for the effects of automation to fully impact current work activities, but at an individual worker or company level, the effects may be very fast.

Figure 13. U.S. Distribution of Labour Force by Sector



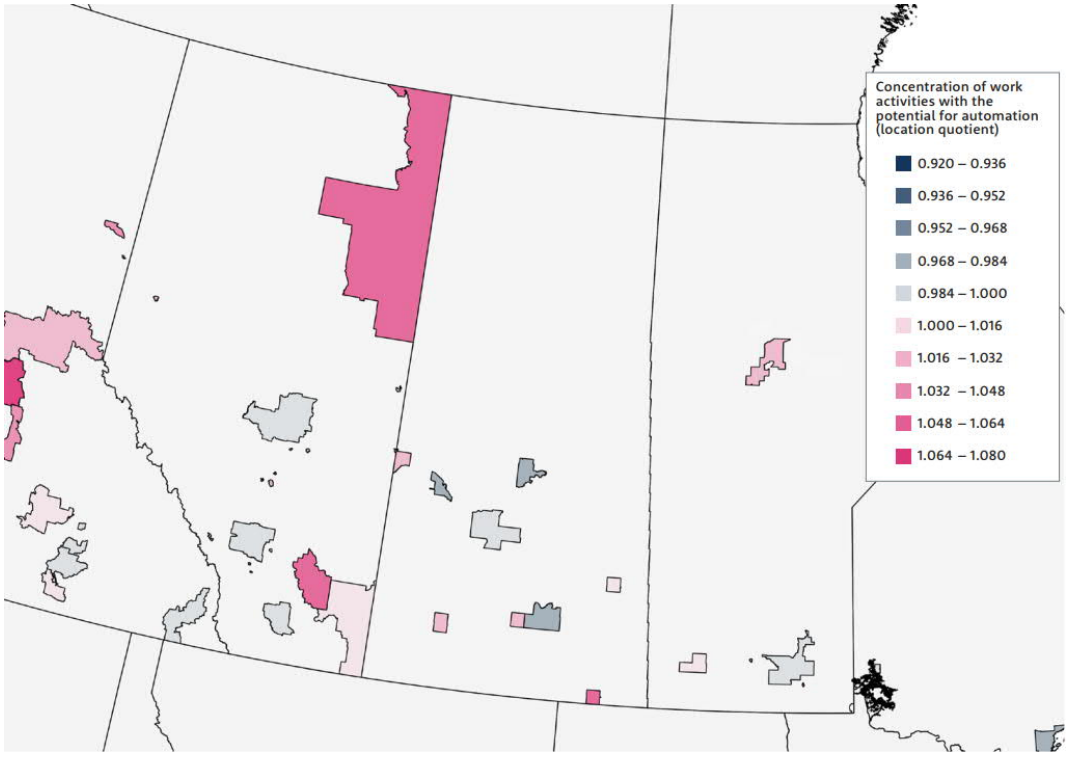
Source: Stanley Lebergott, "Labor force and employment 1800–1960," in *Output, employment, and productivity in the United States after 1800*, Dorothy S. Brady, ed., NBER, 1966; World Data Bank, World Bank Group; FRED: Economic Research, Federal Reserve Bank of St. Louis; Mack Ott, "The growing share of services in the US economy—degeneration or evolution?" *Federal Reserve Bank of St. Louis Review*, June/July 1987; as cited in the McKinsey Global Institute *A Future That Works: Automation, Employment, and Productivity (2017)*

The Brookfield Institute applied the McKinsey methodology to the Canadian context and determined that 42% of Canadian jobs would be affected by automation in the next two

[40] McKinsey Global Institute (2017). *A Future That Works: Automation, Employment and Productivity.*
[41] Andrew McAfee (2015). *The Second Machine Age Is Approaching. Here's How We Can Prepare*, Huffington Post.

decades[42]. Figure 14 shows the concentration of work activities susceptible to automation by census area and census metropolitan area in Alberta. In this figure, a location quotient above one indicates a higher concentration of work activities with the potential to be automated, compared to the Canadian average. A number of centres, such as Wood Buffalo, specializing in manufacturing, mining, quarrying, or oil and gas extraction, appear most at risk. Metropolitan regions, such as the Edmonton Metropolitan Region, are not highly susceptible to automation due to average employment in highly specialized industries, with a low potential for automation, such as professional, scientific, and technical services.

Figure 14. Susceptibility to Automation (Based on 2011 NHS). Source: Brookfield Institute. Automation Across the Nation (2017)



Land Use Effects of Automation

Technology has historically had an effect on urban form, from industrialization, electrification, the introduction of cars, telephones and the internet. Most have contributed to increased urbanization and movement away from rural areas and small towns as people seek to access jobs. The next wave of automation and digitization is expected to have a similar effect. Jobs of the future will be increasingly dependent on technology, particularly communication technology. Implementation of new technology has historically happened first in urban areas, giving larger urban centres a competitive advantage in attracting new employment. As always, there will be exceptions where smaller communities are willing to take a risk and become early technology adopters as has been the case in recent decades with municipal investment in fibre optic and other data communication technology.

[42] Brookfield Institute (2016), *The Talented Mr. Robot: The impact of automation on Canada's Workforce.*

Transportation Effects of Automation

The automation of jobs is expected to have varying effects, with some causing increases in travel demand and other, decreases. Some of the expected effects on travel are described below.

- **Agriculture and Industry -** As jobs on farms, plants, factories, warehouses and restaurants are automated the number of employees and trips to the facilities will decline, but the production and economic output of the facilities may remain. This could lead to productive industrial areas with lower employment and travel demands than today.
- **Jobs at low risk of automation -** Many of the jobs that are most susceptible to automation involve shift work or do not follow a typical weekday "9 to 5" workday. The jobs least susceptible to automation are more likely to follow the standard workday. As a higher proportion of employment shifts to standard work hours, it could lead to a higher demand for commuting during traditional peak periods.
- **Telecommuting** - It can be argued that a higher focus on communication technology to guide automated systems could result in more telecommuting and other forms of remote work. Recent trends have shown that while remote working has continued to grow, it has not led to a major shift to telecommuting as was predicted by some in the past[43]. When combined with other factors, there may be some increase in the proportion of remote work.
- **Deliveries and goods movement optimization** - Theoretically, optimization should be able to reduce the total amount of goods movement activity. It is more likely however that the optimization effects will be offset by the demand for raw materials being spread over a wider area to support smaller scale manufacturing and by trends such as online shopping that will increase the demand for delivery of finished products to consumers. The increased ability for customization and personalization of products could further increase demand for product delivery.

6.2.2 E-Commerce and Supply Chain Digitization

E-commerce – that is, online purchasing – is growing quickly for both consumer (personal) and business purchases. One result is that purchasers expect deliveries to be made quickly to specific addresses at specific times. Another result is that distribution centres and fulfillment centres have proliferated in order to support these expectations. Rapid growth in e-commerce purchasing has also generated significantly increased demands for deliveries in both residential and non-residential areas, including outside traditional business hours.

E-commerce has resulted in several related changes in the supply chain, which together can be characterized as the *digitization* of the supply chain[44]. These changes arise from the rapid expansion in computing and communications capabilities over the past two decades that have greatly extended connectivity across all links in the supply chain.

Online purchasing still represents a small proportion of retail purchases in Canada, but it is projected to grow from 6.5% in 2016 and 10.0% in 2019[45]. Growth in e-commerce is starting

[43] IBM Software, Challenging the modern myths of remote working.
[44] Krieger, David (2019). *Digitization of the Supply Chain* for the GGH Transportation Master Plan.
[45] eMarketer.com (2019) *Canada Ecommerce 2019.*

to occur in sectors such as apparel, groceries and restaurant food, and expansion into other areas is likely.

Land Use Effects of Digitization

With a 25% to 50% e-commerce penetration rate, it is likely that the number of distribution centres (DCs) will increase. Large-scale distribution and fulfillment centres will require networks of smaller DCs strategically located closer to purchasers, especially in urban areas. Mega DCs will be located at key intermodal nodes (inland ports, airports, intermodal rail terminals, and pipeline terminals) and at major highway interchanges. It is reasonable to expect that a hierarchical network of distribution centres will serve the EMRB. While specific locations for these DCs are unknown, they could be located near today's shopping centres or town / city commercial centres.

Transportation Effects of Digitization

With an increase in DCs, there is likely an increase in delivery activity. Without regulation, deliveries will be pervasive throughout the Edmonton Metropolitan Region in all areas throughout the day and across the week. The number of small single quantity shipments will grow, in addition to the conventional large-scale quantity shipments.

Deliveries are expected to be made by small- or medium-sized trucks, rather than by large trucks, meaning there will be an increase the number of vehicle trips to move the same quantity of goods. For truck trips to and from residential and non-residential uses (other than DCs), truck trips are expected to be re-distributed outside the daytime hours (AM peak, midday and PM peak) into the evening and overnight hours.

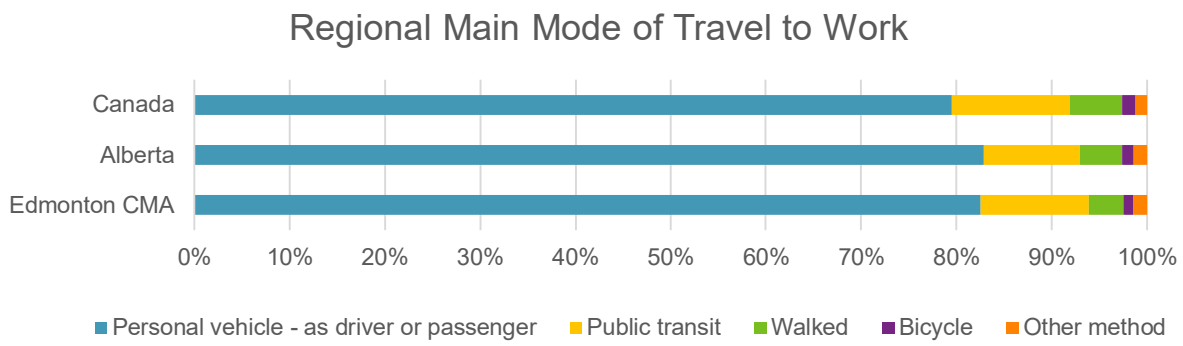
6.3 Commuting Trends

The 2016 Census, particularly the Journey to Work data, provides a picture of commute modes, durations, and destinations in the EMRB.

6.3.1 Commute Modes

According to the 2016 Census, the main mode of commuting in the Edmonton CMA is by car, whether driving along or as a passenger at 83% of all work trips. This is generally comparable to the provincial average (83%) and slightly higher than the national average (78%), as shown in Figure 15. Those who use transit to get to work in the Edmonton CMA is 11%, which is slightly higher than the provincial average (10%) and slightly lower than the national average (12%). Around 4% of people walked to work, which is the same as the provincial average and lower than the national average of 6%. Cycling and other modes are consistent with provincial and national averages of 1% each. With this mode split, there is an opportunity to shift a number of work trips to other modes regionally, particularly to transit.

Figure 15. Commuting to Work. Source: Statistics Canada, 2016 Census, Journey to Work Data

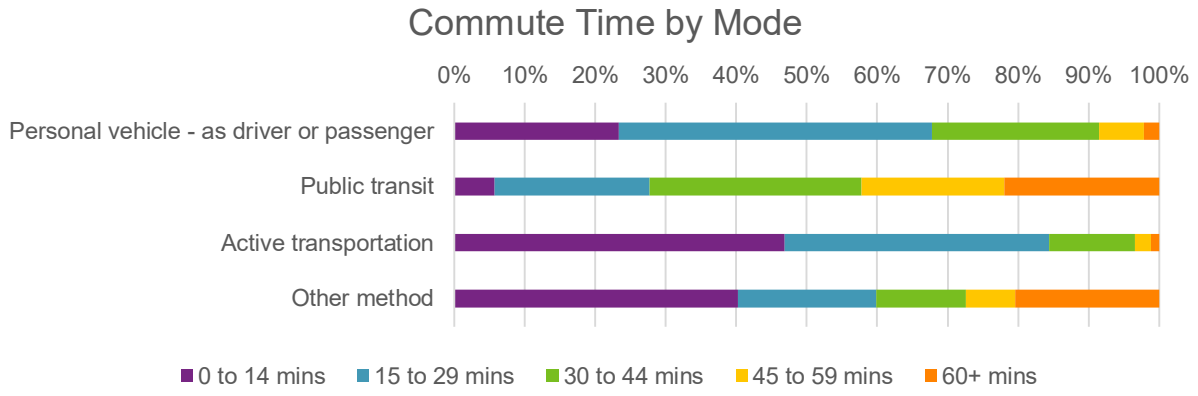


6.3.2 Commute Durations

The average commute time in the Edmonton CMA is 25.9 minutes, which is slightly higher than the provincial average commute time of 25.0 minutes, and slightly lower than the national average commute time of 26.5 minutes. Considering the size of the region and location of key employment areas, longer commute times are not surprising.

By mode, most car trips to work are anywhere between 0 and 44 minutes. For public transit users, trips to work are generally longer, with few short trips and the majority being anywhere from 15 to 60 minutes or more. Those who use active transportation to get to work (walk or bike), the majority of trips are shorter, at 0 to 29 minutes.

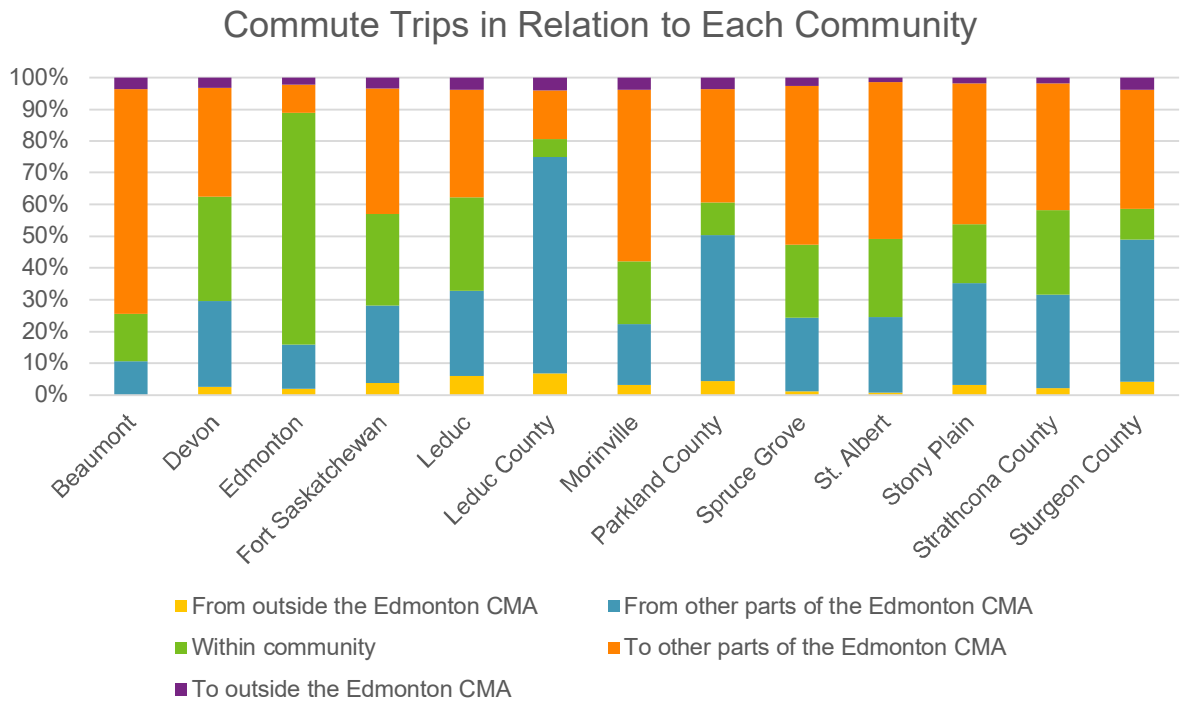
Figure 16. Commute times by Mode in the Region. Source: Statistics Canada, 2016 Journey to Work



6.3.3 Commute Destinations

When looking at the flows of commuters in the EMRB, the 2016 Census shows that 63% (343,330 of 543,785 total trips) are internal to Edmonton, meaning that those trips are made by people who live and work in Edmonton. Communities like Beaumont, Morinville, Spruce Grove, St. Albert, and Stony Plain have a higher percentage of commuters working outside of their municipal boundaries. Leduc County, Parkland County, and Sturgeon County have a higher percentage of people commuting into the municipality.

Figure 17. Commute Destinations by EMRB municipalities. Source: Statistics Canada, 2016 Census - Journey to Work



6.4 Emerging Technologies

6.4.1 Shared Mobility

Shared Mobility is an all-encompassing term for the different manifestations of the shared use of a transportation mode such as a car (e.g. UberX, Lyft, car2go), a bicycle or a scooter (e.g. Lime or Bird). Shared mobility goes by many terms and is also referred to as Mobility or Transportation-as-a-Service (MaaS/TaaS) when it aggregates multiple transport modes (cars, buses, trains, etc.) into one medium (typically an “app”).

Car-sharing vs. Ride-sharing

While both car-sharing and ride-sharing involve the shared use of a vehicle, there is an important distinction between them. Car-sharing consists of sequential trips made by different passengers; a passenger must complete their trip before the next passenger can use the vehicle. Car-sharing involves individuals using the same vehicle at different time periods with different intended destinations. Current examples of car-sharing include car-rental services such as Car2Go and Pogo (which currently operates in a limited area of Edmonton), as well as ride-sourcing services such as UberX and UberSelect, which service one passenger trip at a time and are currently available in many part of the Edmonton Metropolitan Region.

Ride-sharing, on the other hand, involves pooling[46] multiple passengers with similar origins, destinations and departure times on the same ride. Passengers can also be dropped off at locations along the route to the furthest destination. Ride-sharing involves individuals sharing

[46] Note: the definition of “car pool” is limited to not-for-profit ride-sharing and does not contemplate for-profit ride-sourcing, carpooling or vanpooling services.

the journey and is typically viewed to be more efficient and cost-effective in terms of vehicle and fleet utilization. Current examples of ride-sharing include UberPOOL or Lyft Line. There are no ride-sharing services currently available in the Region, but Edmonton Transit has previously considered partnerships with ride-sharing companies to deliver on-demand transit.

6.4.2 Connected Vehicles

"Connected vehicle" (CV) technology frequently appears in tandem with mentions of automated vehicle (AV) technology, and holds many parallels to the timing, attention, and expected disruption of AVs. CVs are those vehicles with the ability to communicate with each other (vehicle-to-vehicle or V2V) and/or with infrastructure (vehicle-to-infrastructure or V2I). Many in the industry believe that AVs must be connected in order to speed the deployment and facilitate the full benefits of driverless technology[47].

Vehicle to Vehicle (V2V) Technology - V2V communication enables vehicles to wirelessly exchange information about their speed, location, and heading. Vehicles equipped with V2V capability can use messages from surrounding vehicles to determine potential collision threats as they develop[48]. In addition to its safety benefits, a large benefit of V2V is improving traffic flows by synchronizing speed and optimizing lane usage between all vehicles, including the potential to create platooning of vehicles[49]. Platooning is expected to decrease automobile emissions, increase fuel economy, and to increase road throughput through higher vehicle densities.

Vehicle to Infrastructure (V2I) Technology - V2I communication enables the wireless exchange of critical safety and operational data between vehicles and road infrastructure (such as barriers, bridges, signs, and traffic signals), and is intended primarily to enable safety applications that are designed to avoid or mitigate vehicle crashes.

Vehicle to Everything (V2X) Technology - The definition of V2E encompasses V2V and V2I technology, but it also allows vehicles to communicate with pedestrians, cyclists, or to be connected to network systems or "grids", allowing increased optimization and improved safety of the whole transportation system.

6.4.3 Vehicle Electrification

Electric vehicles (EVs) refer to a wide range of vehicles that include hybrid-electric, plug-in electric, or battery electric fueling technologies. Many agree that EV technology is expected to significantly reduce energy consumption and greenhouse gas emissions (Wolfram & Lutsey, 2016). EVs currently suffer from some operational drawbacks including a distance-traveling capacity limited to the size and durability of the batteries. This limits the EV to short-range travel and can make the process of finding charging stations a matter of constant anxiety for potential consumers. However, in the coming decades the technological limitations of driving range and battery performance are expected to be resolved.

[47] Eno Center for Transportation. (2017). *Adopting and Adapting: States and Automated Vehicle Policy*. Washington, DC: Eno Center for Transportation.
[48] NHTSA. (2018, July). *vehicle-to-vehicle-communication*. Retrieved from National Highway Traffic Safety Administration : https://www.nhtsa.gov/technology-innovation/vehicle-vehicle-communication.
[49] Sun, Y., Olaru, D., Smith, B., Greaves, S., & Collins, A. (2016). *Road to autonomous vehicles in Australia: A Comparative literature review*. The University of Western Australia.

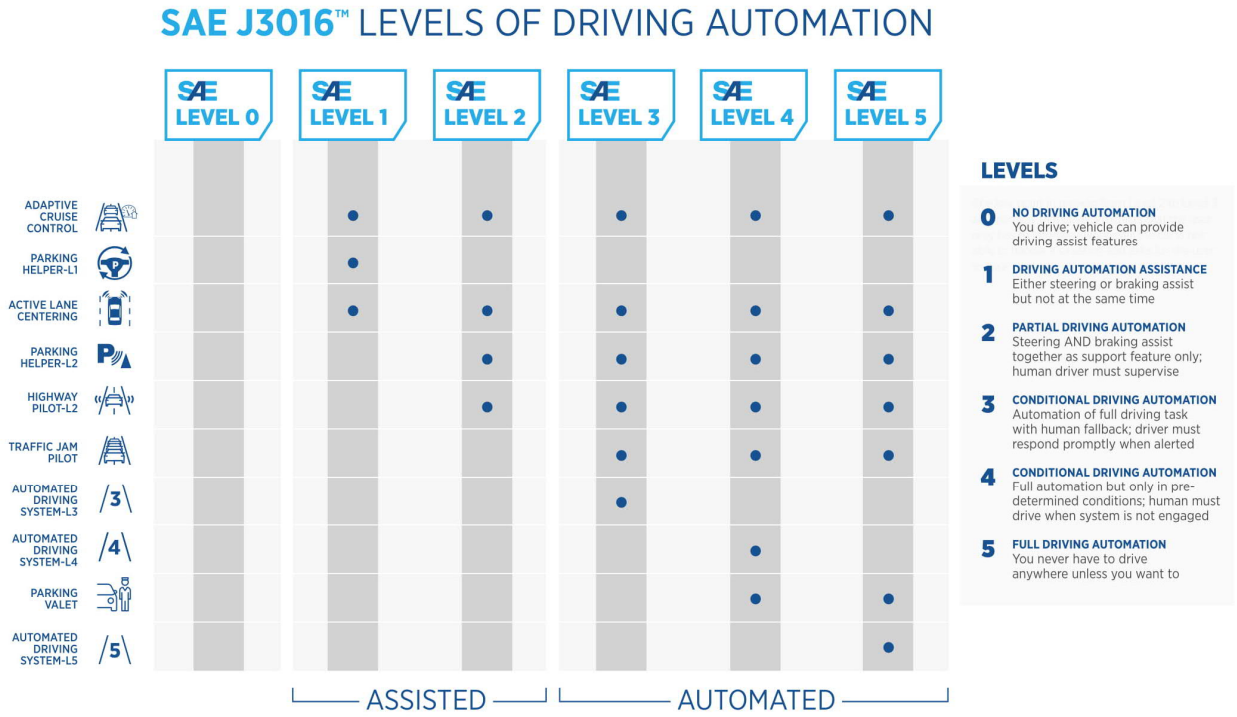
6.4.4 Automated Vehicles

Automated vehicles (AVs) use technology to automate aspects of the driving system by either operating various features or the entire vehicle. While many vehicles on the road today contain some automated feature such as adaptive cruise control or self-parking capabilities, companies around the world are working to build fully-automated or self-driving vehicles that require no driver and can effectively function in every situation.

It is important to note that there are varying degrees of automation. The Society of Automotive Engineers (SAE) International created J3016 – a set of common definitions for automated driving (see Figure 18) that identifies six levels of AV automation ranging from 0 or "No Automation" to 5 or "Full Automation":

- **SAE Level 0:** No Automation – A human is required to perform all driving tasks.
- **SAE Level 1:** Driver Assistance – A human driver is required to perform all driving tasks; however, some aspects may be supported by driver assistance technologies such as staying in a lane or accelerating/decelerating.
- **SAE Level 2:** Partial Automation – The vehicle can manage some specific sets of tasks such as steering and accelerating under some circumstances, but the driver is required to monitor the environment and perform all other functions.
- **SAE Level 3:** Conditional Automation – The vehicle can manage all aspects of driving; however, the driver could be asked to take control at any time.
- **SAE Level 4:** High Automation – Self driving is possible under most but not all conditions.
- **SAE Level 5:** Full Automation – Self driving is possible under all conditions.

Figure 18. The six levels of vehicle automation (SAE International, 2018)



Considering the Growth Plan and IRTMP planning horizon of 2044, the use of the term "AV" in this document typically refers to vehicles with automation levels 4 and 5 (unless otherwise noted), as it is assumed, for the purposes of this analysis, that:

- Lower automation (levels 0-2) would not be significantly different in terms of their impact on travel choices and behaviour than today's manually operated vehicles, as they require a human driver to remain behind the wheel.
- Level 3 is a special case in which a driver is not needed for standard operations, but must be present and available to take control if the vehicle encounters any irregular conditions.
- Higher levels of automation (levels 4 and 5) will be technologically feasible within the IRTMP horizon, but their related level of market penetration is uncertain.

Many automakers are planning to introduce Level 4 vehicles to the market in the next five years or so[50]. There is a wide range of predictions regarding the expected degree and timing of AV market penetration, ranging from mid-2020s to 2050s. Though it will be unlikely that a homogenous AV fleet will be achieved within the IRTMP horizon, many experts agree that half of the fleet could be automated.

6.4.5 Drones

Drones are unmanned aerial vehicles (UAVs) that are used to deliver parcels to consumers and businesses. Several distributors have tested the technical viability of UAVs. Related technologies, such as unmanned ground vehicles (UGVs), also are now being tested for deliveries. UAVs and UGVs have the ability to deliver purchases very quickly using the most direct routing possible, unencumbered by the road network configuration, congestion, or topographical obstacles.

It is unclear if UVAs and/or UGVs will be widely adopted in the future and what impact they may have on the built environment. David Kriger[51] outlines several factors that are impeding the broad uptake of drones, including:

- Regulations – Transport Canada refines who can operate a drone and where it can be flown.
- Pricing – there is a premium to quick deliveries that not all purchasers are willing to pay.
- Carrying capacity – current commercial drones have limited capacity to move anything but relatively small packages.
- Distance – most drones have short flight times, especially in cold conditions, limiting distances traveled.
- Landing space – drones require around 2 m^2 space, clear of any obstacles and not all destinations have this space.

It may be reasonable to expect that many of these impediments may be addressed by 2044. The key unknown is the cost relative to other means of delivery in the future. It can be assumed that the unit costs associated with developing, purchasing and operating UAVs or

[50] Walker, A. (2018, October 4). *Are self-driving cars safe for our cities?* Retrieved from Curbed: https://www.curbed.com/2016/9/21/12991696/driverless-cars-safety-pros-cons.
[51] Kriger, David. *Impact of Emerging Technologies – Drones* for the GGH Transportation Plan (2018).

UGVs, the associated licensing, training, and the control systems (software, etc.) will drop over time.

EIA and Drone Delivery Canada

EIA and Drone Delivery Canada (DDC) announced that the organizations entered into an agreement and will work towards making Edmonton's airport into a hub for drone cargo deliveries in western and northern Canada.[52] As customers and routes are identified, and routes are approved by the regulatory authorities, DDC will deploy its DroneSpot takeoff and landing zones as well as additional drone flight infrastructure on EIA sites, and deploy its Sparrow cargo drone, with a capacity of up to 10lbs. The first route will be on a defined flight route within EIA's site.

Figure 19. DDC 'Sparrow' drone. Source: EIA

6.4.6 What Does Emerging Technology Mean for the Region?

Land Use

Automated driving will give occupants the freedom to undertake different activities while travelling, which is highly likely to increase people's willingness to commute farther, thus encouraging sprawl and leading to a number of negative consequences such as congestion and higher car dependence. In contrast, AVs also have potential to reduce parking space requirements in dense urban cores, particularly under shared AV scenarios in which cars would serve many customers and would not need to park for a large portion of the day. This freed-up parking space can potentially be used for human occupancy (e.g. parks, public spaces, etc.) and improving city liveability. However, it is commonly agreed that there will still be a need for designated delivery zones and Passenger Pick-Up and Drop-Off (PPUDO) space in lieu of parking space.

UAV and/or UGV adoption may make it cost-effective for people to live and work in rural areas or in small rural communities. UAVs may also promote the proliferation of small manufacturers, who manufacture and assemble custom products at a scale that is consistent with small, low-volume shipments (both incoming raw materials and outgoing finished products). This is also consistent with the broader observation by some that automation will lead to smaller factories.

Travel Demand and Transit Use

It is generally agreed that mass AV uptake will lead to increases in trip lengths, trip rates and VKT; these increases are positively correlated with higher AV market penetration. However, the extent of these impacts is expected to vary with different AV use scenarios (or ownership models), AV pricing schemes, and AV policies and regulations. It is envisioned that shared AVs working in conjunction with a robust transit network (e.g. as first/last mile feeders) have

[52] https://flyeia.com/corporate/media/news/eia-pioneering-drone-cargo-delivery/

the least potential for increasing travel demand and VKT, and may even lead to VKT decreases with appropriate AV pricing and integration with the transit system.

Road Capacity Impacts

It is generally agreed that mass AV uptake (>50%) will lead to increases in roadway capacity, particularly on high speed roads like freeways. However, the literature predicts a wide range of potential freeway capacity increases depending on the level of AV penetration and connectivity, assumptions for AV driving behaviour (e.g. conservative vs. aggressive), and whether AVs are segregated or operate in "mixed traffic". Predictions of capacity increases on urban roads also vary and are somewhat tied to parking supply reductions and policies for how to use this freed space. V2I/V2E communication is also expected to reduce delays at signalized intersections, further increasing urban road capacity.

Safety

AVs impact on road safety is one of the major predicted benefits of vehicle automation and is also an important factor in the public acceptability of AVs. There is consensus that level 4 and 5 AVs will be able to improve road safety, however, there is some debate as to the extent of expected improvements; many studies highlight AVs' potential to greatly reduce or completely eliminate the number of collisions, while others take a more moderate view and caution against overly optimistic predictions. Many agree that AVs' safety benefits would not be realized unless they make up a significant portion of vehicles on the road (>50%), and that CV technology such as V2V and V2I will be integral to maximizing AVs' safety benefits.

Freight and Commercial Goods Movement

Freight transport will continue to play a significant role in our lives and the Region's prosperity. As with the movement of people, autonomous vehicles offer several potential benefits. For example, in terms of GHG emissions, Transport Canada found that freight vehicle emissions could reduce 4.5%-21% due to platooning (Gaudet, 2014).

The greater efficiency in terms of utilization and road capacity increases resulting from automation will facilitate the development of mega distribution centres, which may be further away from the regional population centres but are expected to be close to intermodal hubs. Overall trip lengths and volumes (driven by cost reductions from automated truck efficiencies) would be likely to increase as a result.

In the near term, platooning may be an achievable application of technology to improve freight operation and safety. Research suggests that automated truck driving would be easily implemented on highways for long haul applications. In the U.S., 70% of all cooperative platooning pilot programs so far have been on interstate four-lane divided highways due to the controlled access and uniformity. Corridors between known freight generators are good candidates for cooperative truck platooning, in the case of the Edmonton Metropolitan Region - the gateways, ports, airports, and intermodal facilities.

Widespread UAV and/or UGV adoption may increase the number and frequency of commercial vehicle delivery trips, but curtail the distance made, reflecting the use of UAV for last kilometre deliveries. For example, a delivery truck today might make 20 stops over a 75 kilometre route, taking up a full day, but the use of drones 'launched' from the vehicle could allow the truck to serve the same 20 stops (some directly, some with the drone) on a 45 kilometre route, and then run a second itinerary over the course of the day.

7 Looking Ahead: Future Transportation in Metro Edmonton

Over the past ten years, the EMRB has successfully adopted and implemented several plans, including the current IRTMP. While not without challenges, there have been many lessons learned over the last decade and the EMRB municipalities have demonstrated that a spirit of collaboration exists within the Region.

This section highlights some of the key factors for successful IRTMP implementation. These factors were generated based the findings from the Environmental Scan as well as experience and input of member municipality representatives. Each of these factors include several risks and opportunities to be considered in the IRTMP development and implementation.

Achieving Consensus

It is possible for plans to be adopted without consensus, but successful implementation is unlikely without it. All of the plans reviewed in the case studies enjoyed strong consensus among the partner or member municipalities. In some cases, including most of the examples in the United States, federal and state funding is typically tied to the regional transportation plan, thus there is strong motivation to reach consensus. While the situation in Alberta is different, past experience has shown that regional consensus on priorities can influence funding decisions from senior levels of government, highlighting the importance of involving Alberta Transportation in the regional transportation planning process.

Building on Current Initiatives

The IRTMP is positioned to support regional intiatives like the RTSC and the proposed regional transit network. Mode shift to transit can be achieved, at least in part, by attractive regional transit services. Attractivness to most transit riders means frequent, predictable, and reliable service that offers competitive travel times as compared to other modes. Identifying how the IRTMP will support attractive and efficient regional transit service will likely be a key component of the plan, whether in the form of policies and/or capital projects to prioritize transit through congested areas of the region. Other transportation related initiatives may include othe EMRB initiatives like the Regional Agricultural Master Plan (RAMP) and Shared Investment for Shared Benefit (SISB) dialogs. The IRTMP process will need to liase with these intiatives to find where there may be crossover or synergies.

Reflecting the Diversity in the Region

The Edmonton Metropolitan Region consists of diverse communities in terms of size, scale and contexts. Different geographic areas in the Region have varying regional roles and distinct opportunities. A one-size-fits-all solution is not appropriate for a diverse region. The IRTMP should build on the tiered policy approach of the Growth Plan, as a mechanism to tailor policies solutions to different contexts that address unique growth challenges in the Region.

Identifying Responsibility

The highlighted case studies were generally clear about regional versus local responsibilities. For example, in Metro Vancouver, there is a designated regional transportation network along with provincial, regional and local responsibilities for transportation infrastructure and services. Another example can be found in the London Transport Strategy identifies objectives and policies in the regional transportation strategy that are required to be included in local jurisdictional plans as well as TfL's business plans. There is a clear hierarchy from policy objectives to implementation.

A lack of clarity in this regard can lead to a perception that the IRTMP is an unnecessary layer of bureaucracy, rather than a plan that reinforces shared values and regional alignment. The EMRB and member municipalities have developed a strong commitment to open communication in developing various plans. Continuation of this commitment will be a critical factor in establishing consensus.

Acceptance of Change

The EMRGP speaks to a bold new direction. The bold direction entrenched in the Growth Plan will need to be reflected in the implementing plans, including the IRTMP. The Thrive MSP 2040 (Twin Cities) plan includes performance measures that specifically assess land use and transportation coordination. Similar metrics in the EMR connecting transportation to the Growth Plan will help to demonstrate the benefits of change in the region.

Change is difficult, and acceptance of a plan for change requires a balance between dreaming big and being realistic. A plan that is not bold enough and doesn't vary from the way things have always been done is unlikely to be supportive of the EMRGP's bold direction, and thus is unlikely to create a change or be responsive to other external influences of change, such as trends and technology. The Greater Golden Horseshoe Transportation Plan has used various methods to define multiple possible futures and potential responses. Much of the experience the GGH can be directly applied to the Edmonton Region.

A plan that does not embrace change creates a risk of complacency that can impact the Region's ability to be economically competitive. A plan for change has greater chance of gaining consensus when benefits of change can be illustrated through examples of similar success elsewhere. The IRTMP will need to provide sufficient flexilibilty to allow it to adapt to changing trends and technologies. This can be achieved in part by identifying a concise, focused and manageable set of project priorties so that funding is achievable and so that the prioritized projects can be refined and adapted to reflect the changing environment.

Uncertainty around Future Employment Areas

There is also the risk that development will not roll out in the way desired in the Growth Plan – this may be especially the case for employment areas and perhaps less so for residential development. To support economic growth and vibrancy in the region, especially in identified employment areas, the transportation network will need to be responsive in order to adequately provide multi-modal transportation options to existing and future employment clusters. Routine monitoring and evaluation is also important to track progress towards achieving the objectives and policies in the Growth Plan. This will help to identify any issues before they seriously inhibit the region's ability to provide strong transportation connections to areas of employment.

Dedicating Resources

While the larger member municipalities in the region have the ability to dedicate resources to developing and implementing the IRTMP, the ability to participate is a strain on some smaller members, who may also not have the technical expertise to participate in the same way as others. This can extend beyond technical issues. For example, it may be difficult for some municipalities to involve and engage residents and stakeholders in the IRTMP development. There are opportunities for the EMRB to support some functions (e.g., communication bulletins), while also recognizing that the EMRB has limited staff resources.

The spirit of collaboration that exists within the Region has led to municipal representatives working closely together at the staff and political levels to support all members. Continued support and collaboration among members will help to mitigate the potential risks associated with an imbalance and lack of resources.

Availability of Funding

The previous IRTMP was developed in an era when provincial funding, in particular, was plentiful. The prioritization reports were an important outcome to help inform the provincial government on regional transportation funding opportunities.

The current economic environment will require a different expectation around the Province's ability to fund projects. As previously discussed, a constrained funding environment suggests that smaller, more manageable-sized projects will have a greater ability to be funded. However, funding constraints suggest the IRTMP will need to approach prioritization differently than in the past. Value for money, the potential to develop strategic funding partnerships and new approaches for paying for infrastructure will play a greater role in this edition of the IRTMP than in the past.

Given the uncertainties around long-term funding, it may be necessary to take an approach similar to the Denver Region, where there is a 'financially-constrained' scenario. Projects are required to be included in the 'financially-constrained' scenario to be eligible for state funding, creating a clear distinction between "need to have" and "nice to have" projects.

Ensuring Future Readiness

Imagining the future is often a challenge and the further out, the fuzzier the future becomes. This is where scenario planning will be useful in understanding uncertainty. Scenario planning can help shift the conversation from what we *think* will happen, to what *could* happen. Learning from case studies like GGH, scenario analysis can aid in the identification of policies and actions that ensure emerging technologies support Growth Plan objectives. The IRTMP process will involve a scenario phase that will test potential solutions and strategies against the regional structure set out the Growth Plan.

Appendix A

Summary of Policies Related to Transportation from the Growth Plan

Summary of Policies Related to Transportation from the Growth Plan

Policy Area 1: Economic Competitiveness and Employment		
Guiding Principle	Promote global economic competitiveness and regional prosperity.	
Objectives	Promote global economic competitiveness and diversification of the regional economy.	• Develop the Region as a hub and gateway to Northern Alberta and Canada. • Coordinate sustained investment in infrastructure and planning for the efficient movement of goods, services and people.
	Promote job growth and the competitiveness of the Region's employment base.	• Plan for and promote intensification and increase employee density in areas with multi-modal transportation access in the metropolitan core and metropolitan area. • Direct higher density commercial, institutional and office uses to corridors with multi-modal transportation access within urban communities, including centres.
	Enhance competitiveness through the efficient movement of people, goods and services to, from and within the Region.	• Movement of people, goods, and services to, from and within the Region will be enhanced by improving air, road and rail connectivity. • The Edmonton International Airport is recognized as a regionally significant economic engine and transportation asset.
	Promote the livability and prosperity of the Region and plan for the needs of a changing population and workforce.	• Downtown Edmonton, urban centres, TOD centres, rural centres, and sub-regional centres will be planned and developed with multi-modal transportation access.
Policy Area 2: Natural Living Systems		
Guiding Principle	Protect natural living systems and environmental assets.	
Objectives	Plan development to promote clean air, land and water and address climate change impacts.	• New development and infrastructure in greenfield areas and built-up urban areas will incorporate low-impact development and green building practices. • Improving ambient air quality in the Region will be pursued through the use of local community programs, statutory plans, and non-statutory plans. • Promote investment in climate adaptation tools and initiatives to address climate change risks and ensure resilience.
	Minimize and mitigate the impacts of regional growth on natural living systems.	• Plans for regional infrastructure shall require environmental and technical studies that incorporate an ecological network approach; consider the maintenance and restoration of wildlife passageways; and identify required conservation buffers. • Development adjacent to provincially recognized and protected natural living systems will protect for and incorporate conservation buffers and linkages; and incorporate ecological design features to mitigate and minimize potential adverse impacts.

Policy Area 3: Communities and Housing		
Guiding Principle	Recognize and celebrate the diversity of communities and promote and excellent quality of life across the Region.	
Objectives	3.1. Plan and develop complete communities within each policy tier to accommodate people's daily needs for living at all ages.	• Greenfield areas will incorporate an interconnected street network to support active transportation. • Higher density uses will occur along existing and planned transit corridors and at major transit stations.
	3.2 Plan for and promote a range of housing options.	• The greatest density and diversity of housing will be directed to areas with existing or planned regional infrastructure, transit, and amenities.
	3.3. Plan for and promote market affordable and non-market housing to address core housing need.	• Priorities will be established for the location of market and non-market affordable housing within TOD centres and within 800 metres of a major transit station.
Policy Area 4: Integration of Land Use and Infrastructure		
Guiding Principle	Achieve compact growth that optimizes infrastructure investment.	
Objectives	4.1. Establish a compact and contiguous development pattern to accommodate employment and population growth.	• Non-residential uses in built-up urban areas and greenfield areas will be planned and developed in a compact form to reduce auto dependency and enhance connectivity.
	4.2 Enable growth within built-up urban areas to optimize existing infrastructure and minimize the expansion of the development footprint.	• Intensification will be directed to TOD centres and along transit corridors. • Job growth and intensification of major and local employment areas will be planned for and promoted along existing and planned transit corridors.
	4.3 Plan and develop greenfield areas in an orderly and phased manner to contribute to complete communities.	• Greenfield areas shall incorporate an interconnected street network and open space network to support active transportation and transit viability, where applicable. • Provide for a mix of housing forms and housing options close to existing and planned multi-modal transportation access.
	4.5. Plan for and develop mixed use areas and higher density centres as areas to concentrate growth of people and jobs.	• Development in the metropolitan area and urban centres will provide connections between local and intermunicipal transit and promote multi-modal transportation options including transit and active transportation. • Optimize investment in existing and planned transit service and infrastructure, and support integration of regional transit services. • TOD centres will be identified around major transit stations to accommodate growth through increased densities, and provide transit connectivity and active transportation opportunities.

Policy Area 5: Transportation Systems		
Guiding Principle	Ensure effective regional mobility.	
Objectives	5.1 Develop a regional transportation system to support and enhance growth and regional and global connectivity.	• Deliver viable multi-modal transportation choices for urban and rural residents and businesses • Ensure that regional transportation corridors provide connections to major employment areas. • Link the Region with local and extra-regional markets in Canada and abroad. • Provide an efficient system of regional truck routes for efficient goods movement. • Improve existing infrastructure before investing in new infrastructure. • Consider tolls within the metropolitan area to incentivize a greater diversity of travel choices. • Consider and support car sharing schemes. • Adopt traffic management and intelligent transportation measures.
	5.2 Encourage a mode shift to transit, high occupancy vehicles and active transportation modes as viable and attractive alternatives to private automobile travel, appropriate to the scale of the community.	• Provide transit facilities to connect residents with major job destinations, post-secondary institutions, health centres, major cultural entertainment venues, and the Edmonton International Airport. • Integrate transit facilities and servicing with other modes including walking, cycling, and driving. • Increase the overall appeal of transit services. • Develop a regional transit fare system to facilitate trips across municipal borders. • Pursue alternative governance and cost-sharing models to provide region wide transit services. • Encourage car sharing and carpooling in rural areas. Also provide lifeline transportation and specialized transportation services to connect outlying communities to regional services and amenities. • Integrate Park & Ride facilities and/or TOD at major transit stations to encourage convenient access to transit. • Provide dedicated bus lanes and/or other transit priority measures to isolate transit vehicles from traffic congestion. • Provide higher order transit with the highest level of service in the metropolitan core. Provide a bus service with similar levels of service in areas that are not served by LRT. • Enhance speed and reliability of local and regional transit services. • Consider traffic demand management measures to complement investments in transportation infrastructure. • Provide non-motorized linkages to transit services, adjacent neighbourhoods, and employment and recreational destinations.
	5.3 Coordinate and integrate land use and transportation facilities and services to support the efficient and safe movement of people, goods and services in both urban and rural areas.	• Residential, commercial, institutional and industrial uses will optimize the use of transportation infrastructure to ensure efficient, convenient and safe movement of people and goods. • Development and related parking regulations will be managed with transit service, routing, and alignment planning to foster a mode shift towards transit and active transportation modes. • The provision of transportation infrastructure and services will be consistent with the guiding principles, objectives and policies of this Plan. • Goods movement routes will be periodically reviewed and refined.

	5.4 Support the Edmonton International Airport as northern Alberta's primary air gateway to the world.	• Provide higher order transit service to the Edmonton International Airport. • Ensure an effective network of roadways and access including built-in redundancy and alternates to the QE2 Highway. • Provide transit preferential features to ensure efficient transit access to airport. • Regional and municipal land use plans shall comply with Airport Vicinity Protection Area Regulation (AVPA). • Pursue adequate transportation access to other regionally significant small-scale airports.
	5.5. Ensure effective coordination of regional transportation policies and initiatives between all jurisdictions.	• Transportation improvements will reflect a commitment to the vision, guiding principles, objectives, and policies of this Growth Plan. • Ensure individual transportation plans and related actions are integrated and coordinated. • Jointly advocate for policies, funding and actions by other levels of government.
Policy Area 6: Agriculture		
Guiding Principle	Ensure the wise management of prime agricultural resources.	
Objectives	6.1 Identify and conserve an adequate supply of prime agricultural lands to provide a secure local food source for future generations.	• Conserve lands identified as prime agricultural lands in the metropolitan area for as long as possible, recognizing these lands will urbanize over time.
	6.2 Minimize the fragmentation and conversion of prime agricultural lands for non-agricultural uses.	• Minimize the conversion of prime agricultural lands when planning alignments for and developing multi-use corridors. • Provide mitigation measures to protect prime agricultural lands and existing agricultural operations on lands surrounding multi-use corridors. • Prepare an agricultural impact assessment when a new area structure plan proposes development in an area that contains prime agricultural land as identified in Schedule 11.
	6.3 Promote diversification and value-added agriculture production and plan infrastructure to support the agricultural sector and regional food system.	• Support manufacturing, packaging, shipping and distribution to wholesalers, agri-tourism, farmers' markets, and urban agriculture. • Maintain and improve transportation access and facilities to sustain the regional food system, attract new opportunities and maximize investment to grow and diversify the sector.

Appendix B: Member Municipality Plan Summary

Member Municipality Plan Summary

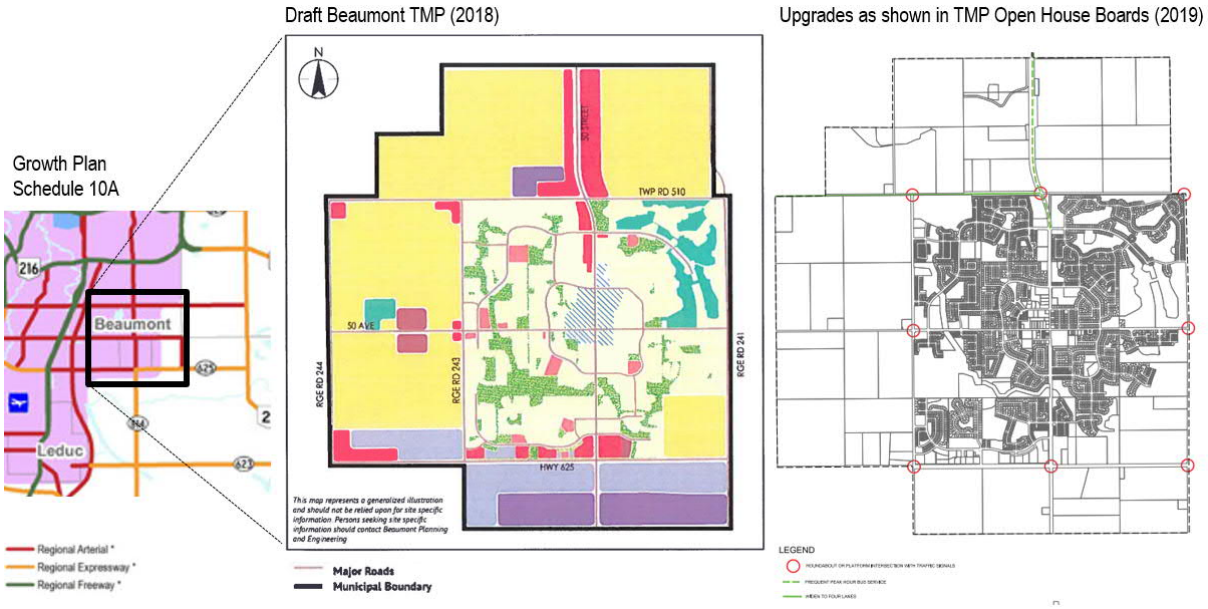
This section provides a brief review of local transportation plans, particularly the regional links identified in these plans. This section will also highlight any relevant discrepancies between municipal planning documents and the EMRB (Edmonton Metropolitan Region Board) Growth Plan in relation to major roads, transit services and routes, and trails.

Beaumont

Beaumont's Transportation Master Plan (TMP) is currently being finalized, and a draft plan is expected to be released in early 2020. The draft TMP is generally consistent with the Growth Plan. The arterials presented in the draft TMP align with the regional arterials and expressways shown in the Growth Plan (see Figure 20 below).

Recent open house boards show several intersection improvements (signals, roundabouts or other treatments) along Township Road 510, 50 Avenue, and Highway 625. Boards also show a widening of Township 510 from 50 Avenue to the Leduc County border. A frequent peak hour bus service connecting north along 50 Street is consistent with Schedule 10B - Regional Transit and Trails in the Growth Plan.

Figure 20. Growth Plan Regional Roads to 2044 (left), Draft TMP map (middle), and Open House Board (right)



Source: Growth Plan and City of Beaumont

Devon

The Town of Devon produced a Multi Modal Transportation Study in 2013 and a Municipal Development Plan in 2017. The Municipal Development plan features a significant realignment of Highway 650 and 19 which is reflected in Schedule 10A of the Growth Plan. No relevant discrepancies were identified in terms of trails.

As for transit, Devon does not have a planned regional bus service in the Growth Plan. However, this is consistent with the Multi-Modal Transportation Study which focused on private vehicle transportation, road safety and active transportation. Devon currently operates a door-to-door community bus.

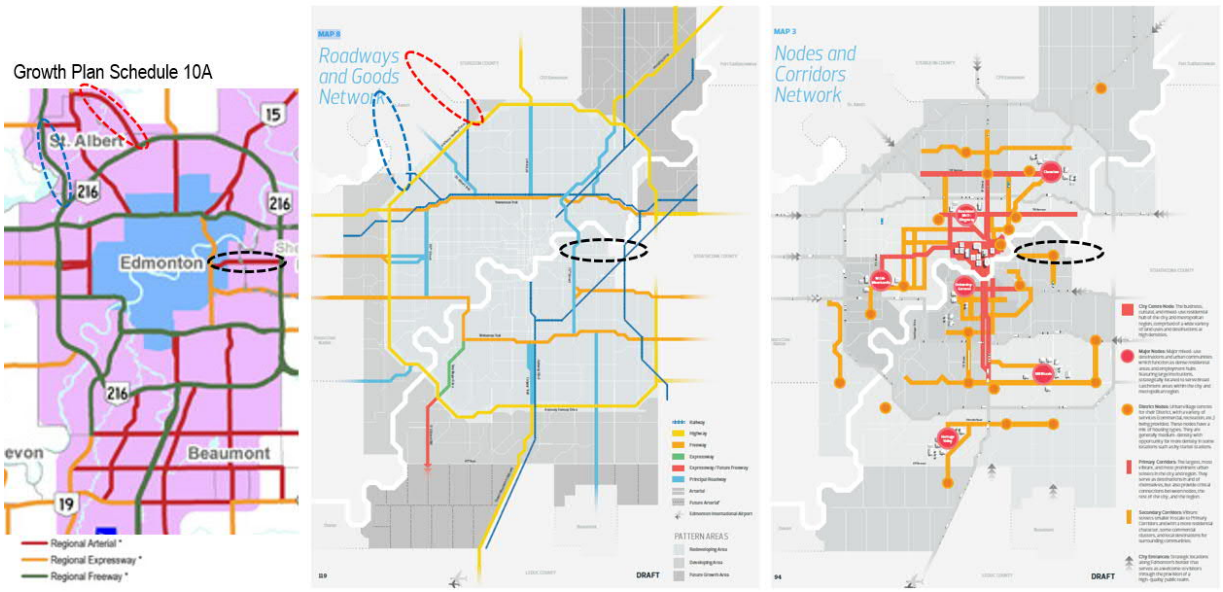
Edmonton

The City of Edmonton's Transportation Master Plan dates back to 2009[53]. The City of Edmonton has since published a draft City Plan titled 'One Million More'[54]. The City Plan, once approved, will replace the current MDP and TMP.

The draft City Plan identifies a Roadways and Goods Network, which generally aligns with Schedule 10A from the Growth Plan. As shown in Figure 21, the City Plan Roadways and Goods Network differs from the Growth Plan in that it does not include the following arterials:

- 98 Avenue/101 Avenue/Baseline Road on the east side. Instead, 98 Avenue is shown as Secondary Corridor on the Nodes and Corridors Network – described as a "vibrant street smaller in scale".
- The extension of 127 Street into Sturgeon County.
- Ray Gibbon Drive connection from St. Albert.

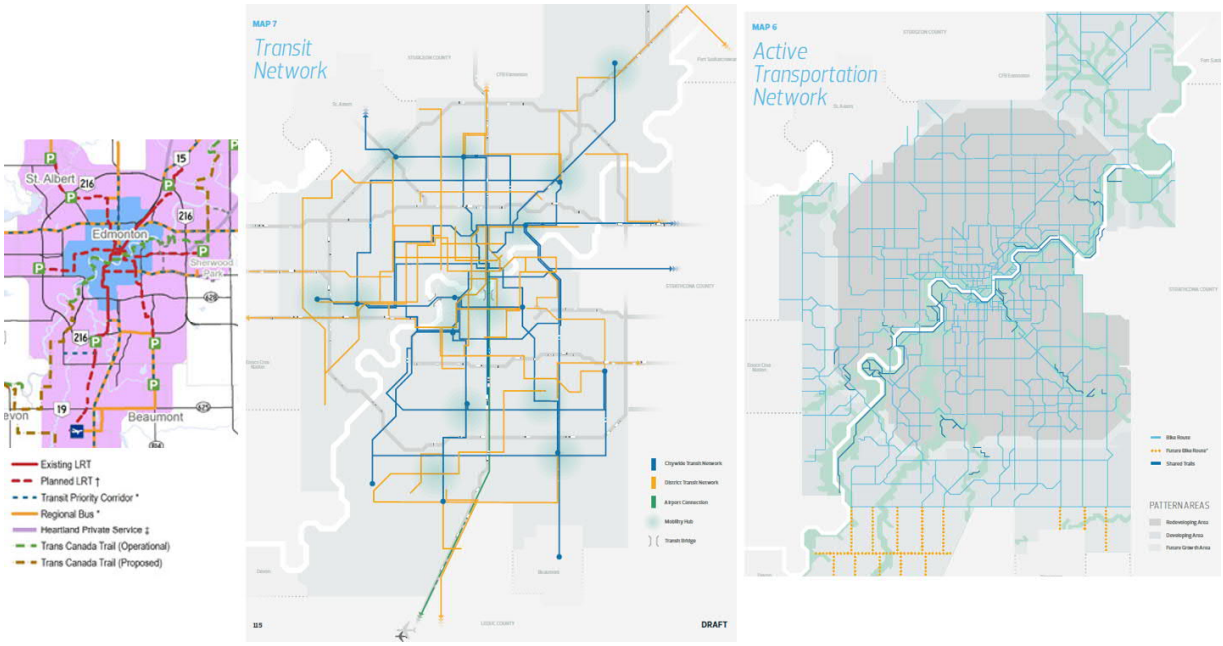
Figure 21. Growth Plan Schedule 10A (left), City Plan Roads and Goods Network (middle) and Nodes and Corridors Network (right)



The City of Edmonton provided their *City Plan Mass Transit Scenario Analysis* technical memo featuring an evaluation of three mass transit options. The 'business as planned' scenario features LRT extensions which match Schedule 10B of the Growth Plan. The other scenarios feature BRT routes and hypothetical commuter rail services which are not featured in Schedule 10B of the Growth Plan. As shown in Figure 22, the draft City Plan shows a city-wide transit network, a district transit network, airport connection, transit bridges and mobility hubs.

[53] https://www.edmonton.ca/city_government/documents/land_sales/TransportationMasterPlan.pdf
[54] https://www.edmonton.ca/pdfviewer.aspx?database=true&pdf=https://www.edmonton.ca/city_government/documents/Draft_City_Plan_FINAL.pdf

Figure 22. Growth Plan Schedule 10B (left), City Plan Transit Network (middle) and Active Transportation Network (right)



Many Mobility Hub locations align with Park & Ride locations from the Growth Plan. The City Plan does not identify the transit mode (bus, light rail or other) whereas the Growth Plan identifies LRT, regional bus, and transit priority corridors. Transit network differences between the Growth Plan Schedule 10B and the City Plan Transit Network are summarized in the following table:

Table 4. Key Differences between transit networks in the Growth Plan and Draft City Plan

Transit Corridor	Growth Plan	Draft City Plan
Highway 16 / Yellowhead Trail	Transit Priority Corridor	Not shown
Highway 16A	Not shown	Shown as part of the District Transit Network
Township Road 628 / Whitemud Dr	Not shown	Portions shown as part of the District Transit Network
Capital Line LRT to Edmonton International Airport	Shown Capital Line extension to Airport as “Planned”	Airport connection shown via Highway 2 from Downtown and Capital Line terminating at the Desrochers/Allard LRT Station

A city-wide network of bike routes is provided in the draft City Plan. Additionally, a Shared Trail system is shown following the length of the North Saskatchewan River, primarily on the south side of the river. The active transportation network in the City Plan aligns with the Trans Canada Trail (operational and proposed) in Schedule 10B of the Growth Plan.

Fort Saskatchewan

Fort Saskatchewan has a relatively recent Transportation Master Plan (TMP), published in 2018. Fort Saskatchewan’s TMP includes the following significant road upgrades[55]:

[55] See Page 48-49 of Fort Saskatchewan’s TMP.

- Upgrade of Veterans Way (84th Street to 112th Street) to six lanes (Highway 21) – identified as a Regional Arterial road in Schedule 10A.
- Upgrade of Highway 15 at bridge and intersection with 99th Avenue - identified as a Regional Expressway in Schedule 10A.
- Upgrade Range Rd 224 - identified as a Regional Expressway in Schedule 10A.

It also features an 'Industrial Bypass' with a new bridge over the river. The alignment appears to vary slightly compared to the Growth Plan but the TMP does note that the bypass is shown "on RR223 for modelling purposes; its actual alignment may differ depending on [further] study and could be as far east as RR222" and shown in Figure 23.

Figure 23. Derived from Figure 6.14 of TMP showing A) TMP model alignment of industrial bypass and B) Growth Plan alignment.

Figure 6.14: 30 Year Road Network Improvements (in blue)

Fort Saskatchewan's TMP includes chapters on active transportation and transit. The alignment of regional trails in Exhibit 4.1 (following the river) matches Schedule 10B of the Growth Plan. The Regional Trail running along the North Saskatchewan in the Growth Plan is reflected in the TMP.

Leduc

The City of Leduc's Transportation Master Plan (TMP) was completed in 2018[56]. The TMP and Growth Plan regional road networks are consistent. Leduc's proposed West Transit Corridor (page 5-3 of TPM) is not reflected as an extension of planned LRT in Schedule 10B.

The TMP discusses a West Transit corridor, extending from the EIA station to connect to 74 Street (see Figure 24). This extension is not included in Schedule 10B of the Growth Plan.

Regional trails shown in the TMP are drawn from the Great Canadian Trail intiative (see Figure 24). Only a small segment of this trail is shown on the Scheudle 10B of the Growth Plan.

[56] https://www.leduc.ca/sites/default/files/FINAL%20CoLeduc%20TMP%20-%20Oct%208%202018.pdf

Figure 24. Proposed West Transit Corridor (left) and Great Trail map (right).

Exhibit 5-2: Ultimate Great Canadian Trail Map (2018)

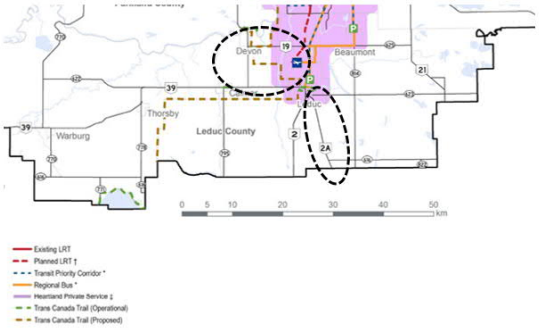
Source: City of Leduc Transportation Master Plan (2018)

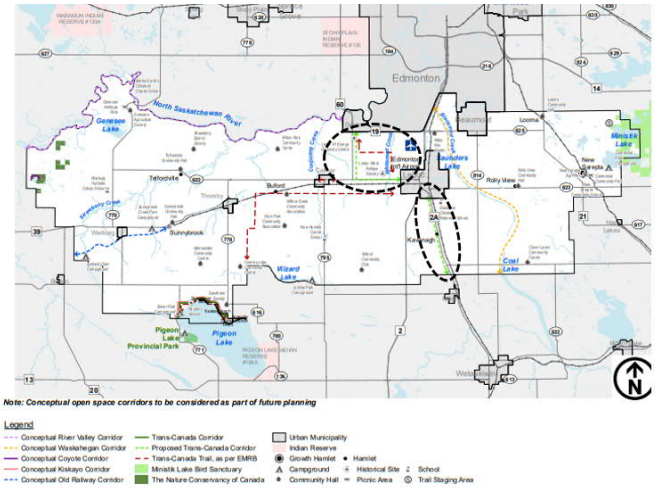
Leduc County

Leduc County adopted a Municipal Development Plan in 2019. The MDP states a policy to prepare a Transportation Master Plan. The previous TMP was prepared in 2001. The MDP Transportation Infrastructure Map aligns with Schedule 10A and 10C in the Growth Plan.

Leduc County's MDP refers to policies to develop active transportation infrastructure in the Nisku area and to consider incorporation of abandoned railway corridors into "an open space system". The TMP highlights proposed Trans Canada Trail corridors not included in the Growth Plan, such as along Highway 60 from Devon to Highway 39 (50th Avenue in Leduc). A Trans Canada Trail connection is also shown following Highway 24A. Both links are shown in Figure 25.

Figure 25. Differences in Trans Canada Trail Links as shown in Schedule 10B (left) and Leduc County Open Space Corridors TMP Map (right)





Other than supporting regional higher order transit initiatives, transit policies include expanding service within Nisku Area, but no specific additional regional services are mentioned.

Morinville

Morinville approved a Municipal Development Plan in 2017. Page 65 of the Morinville's MDP refers to their high priority to upgrade "East Boundary Road to arterial standard from Cardiff Road to 100 Avenue" (as located in Figure 26). It is noteworthy that this does not feature as a road of regional importance in the Growth Plan, yet the town sees it as having a "potential role as a link in an eastern alternative truck route".

Page 63 of the Municipal Development Plan refers to a need to develop a trails master plan for the town. Page 62 refers to the potential decommissioning of one of the rail lines through the town which may present a regional trails opportunity. This rail line is represented in Schedule 10C as a Rail Facility (see map below). References to transit refer to the proposed light rail extension to St. Albert and regional bus to Morinville. This is compatible with Schedule 10B of the Growth Plan.

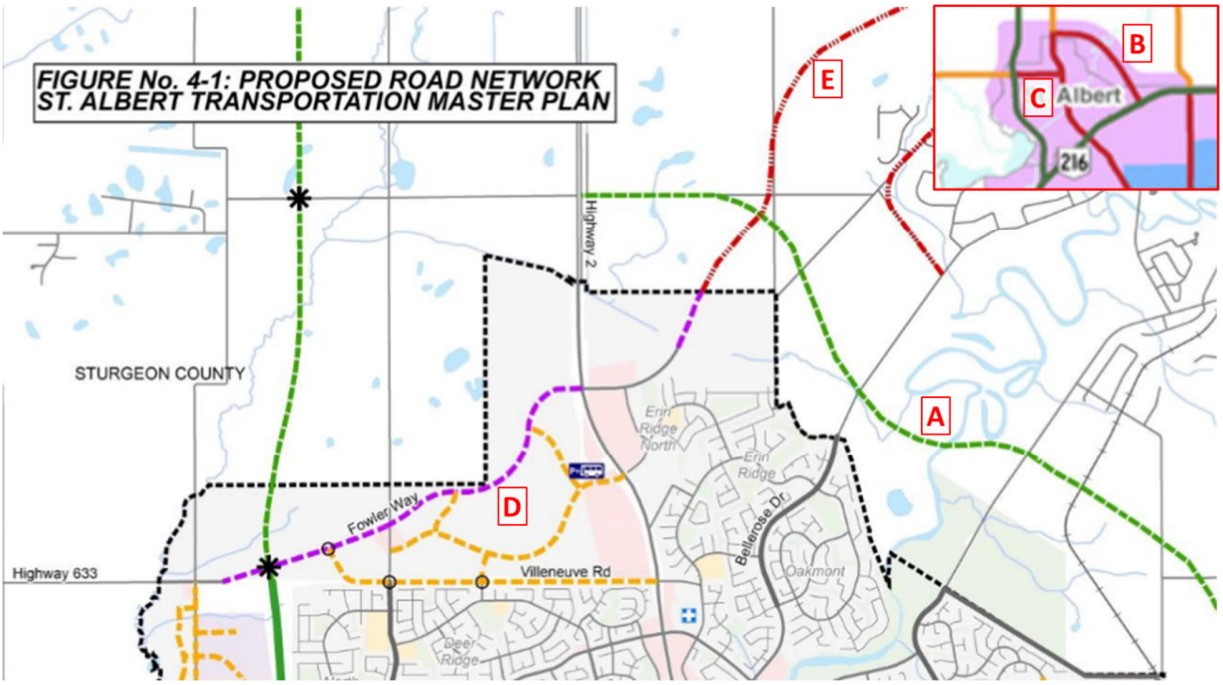
Figure 26. Location of Cardiff Road upgrade and planned decommissioned railway

St. Albert

The City of St. Albert produced their latest Transportation Master Plan in 2015.

Figure 4-1 in the City of St. Albert's TMP shows a widening and extension north of Ray Gibbon Drive which is comparable to the alignment of the planned 'Regional Freeway' in Schedule 10A of the Growth Plan. Both documents show a new road between Edmonton's ring road (Anthony Henday Drive) and Highway 2. There is a slight discrepancy in the alignment (see 'A' and 'B' on the map below). While the Growth Plan identifies the 'Villeneuve Road' alignment as a future link between Highway 2 and Ray Gibbon Drive ('C' on the map below), the City of St. Albert's TMP shows Fowler Way ('D' on the map below), including an extension into Sturgeon County ('E' on the map below).

Figure 27. Derived from Figure 4-1 of the City of Albert's TMP, insert from the Growth Plan



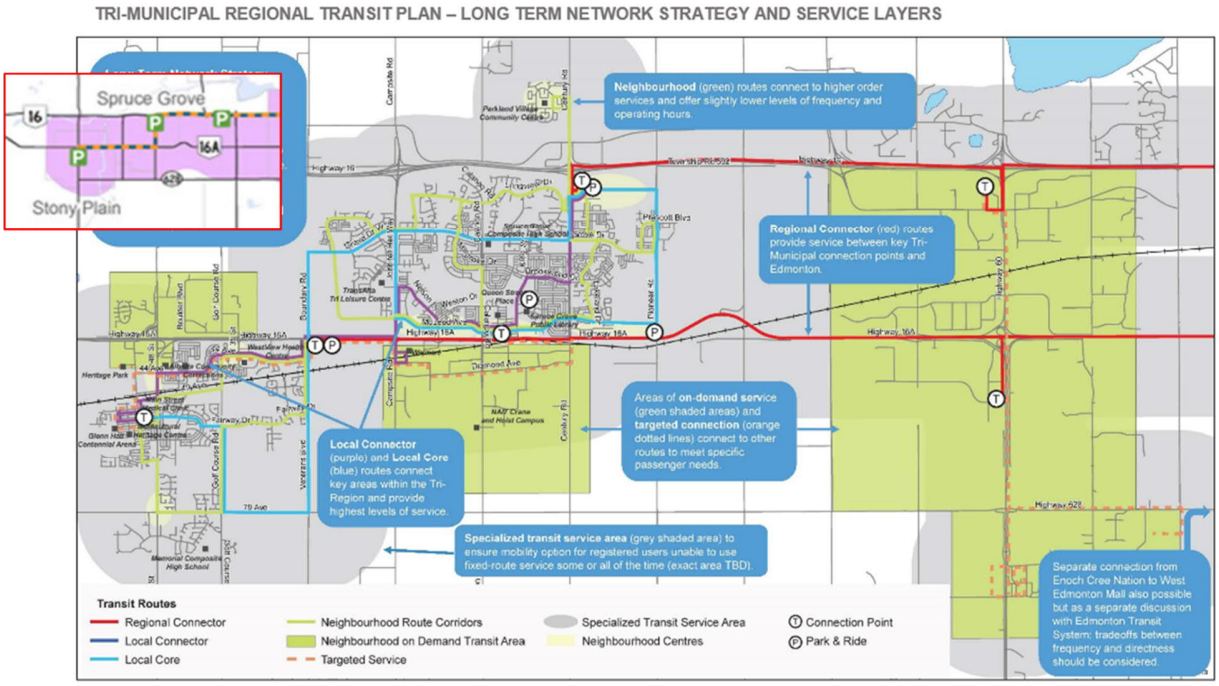
The TMP transit network shows LRT following St. Albert Trail, which is comparable to the Growth Plan's Schedule 10B. Schedule 10B does not, however, reflect the parallel active transportation infrastructure shown in Figure 4-9 of the TMP.

Parkland County

Parkland County's Municipal Development Plan was approved in 2017. Generally, the major road network in the TMP is comparable with the Growth Plan regional road network in Schedule 10A.

The City of Spruce Grove, the Town of Stony Plain and Parkland County produced a 'Tri-Municipal Regional Transit Plan' in 2018. Figure 28 shows the Growth Plan transit priority corridors running along sections of Highway 16A west of Century Road, Century Road and Highway 16 east of Century Road. The Trip Municipal Regional Transit Plan shows two Regional Connector routes, one following Highway 16A and the other following Highway 16.

Figure 28. Page 7 of the Tri-Municipal Regional Transit Plan with two regional connector routes versus insert from the Growth Plan with one regional connector route.



Spruce Grove

The City of Spruce Grove produced a Transportation Master Plan (TMP) in 2012. No relevant discrepancies were identified in terms of roads & trunk routes within the City of Spruce Grove.

For transit alignment, please refer to the transit route discussion for Parkland County.

Spruce Grove's existing and planned paved trails follow the highway network. Figure 5.5 of the TMP shows potential new trails following Highway 16A east of the city, Pioneer Road and Highway 628. These are not reflected in the Growth Plan.

Stony Plain

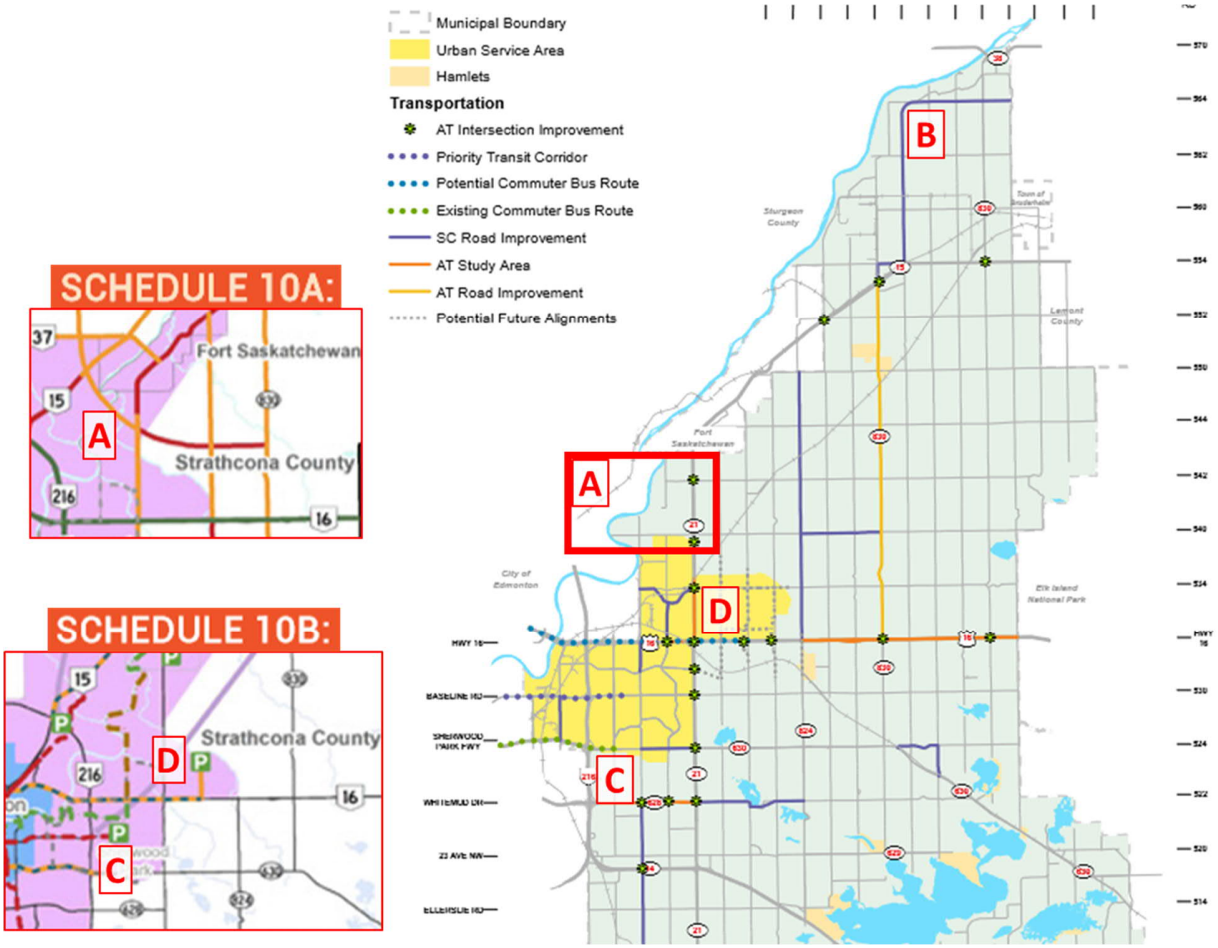
The Town of Stony Plain prepared a Municipal Development Plan in 2013. No relevant discrepancies were identified in terms of roads & trunk routes. The town is also included in Tri-Municipal Regional Transit Plan of 2018 (see Parkland County).

Strathcona County

Strathcona County consolidated their Municipal Development Plan in September 2019. Transportation concepts within the MDP do not contradict the Growth Plan but it is worth noting that:

- The planned road (industrial bypass) shown in the Growth Plan and in Fort Saskatchewan documents *is not shown* in the Strathcona County MDP (Area 'A' on the map below).
- Road improvements shown on the Strathcona County MDP map (e.g. location 'B') may or may not be of regional significance.
- Existing and potential transit routes shown are aligned with the Growth Plan, but the Strathcona County MDP does not specifically show the Park & Ride sites. The existing Park & Ride site (Ordze Transit Centre) is missing on the Growth Plan map.
- The existing Commuter Bus route is shown as terminating on Highway 16, while the Growth Plan shows the route turning north to a Park & Ride site (Location 'D'). It is suggested to remove this one, since the MDP does not show any Park & Ride sites and only shows a concept line to serve Bremner. The County has completed a more detailed statutory plan for this area called the Bremner and LEA Area Concept Plan Bylaw 3-2019. Approval of this Stat Plan and the corresponding MDP amendments under bylaw 2-2019 were approved by the EMRB in 2019. In the ACP, there is a Park & Ride located off of RR 224 and HWY 16 in the "business park" and another transit station located off of 534 and RR 224 in the "town centre". In keeping with the growth plan, the ACP identifies an express transit route that connects the two transit stations along 224 and out to HWY 16.

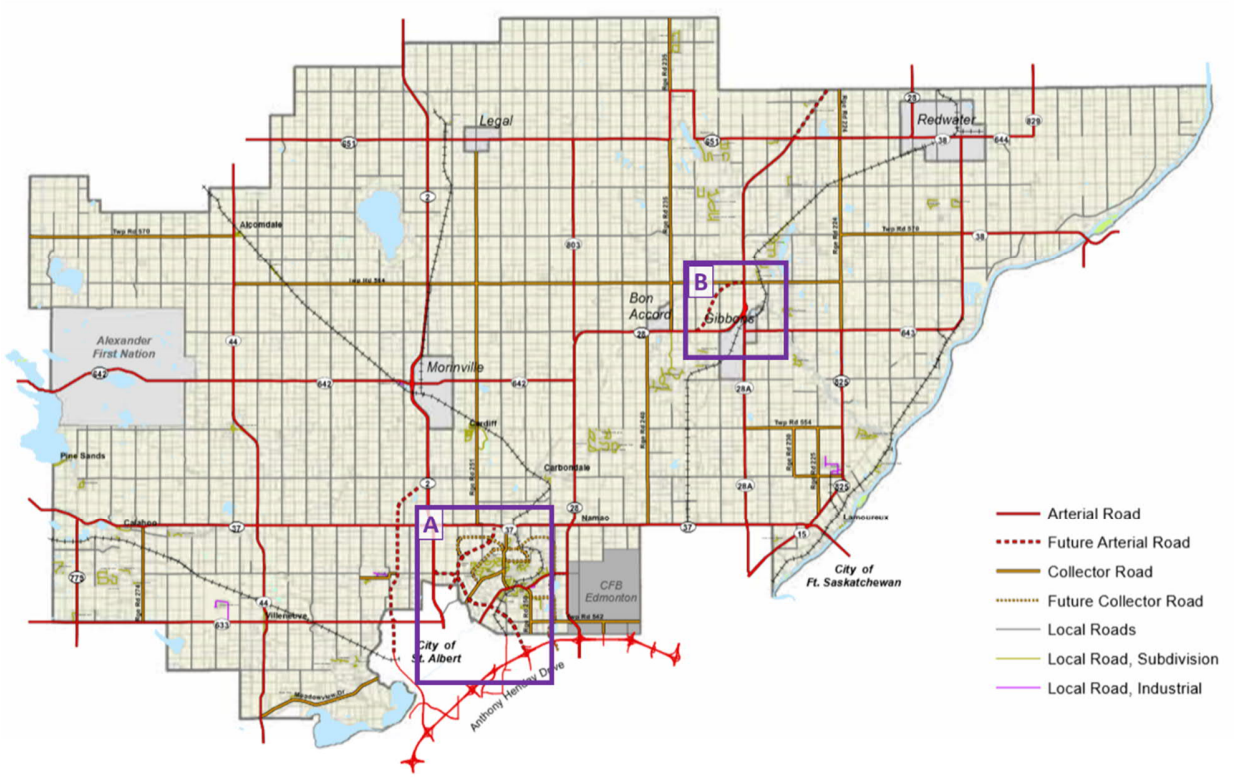
Figure 29. Annotated Extract of Map 8 from MDP with inserts from Growth Plan.



Sturgeon County

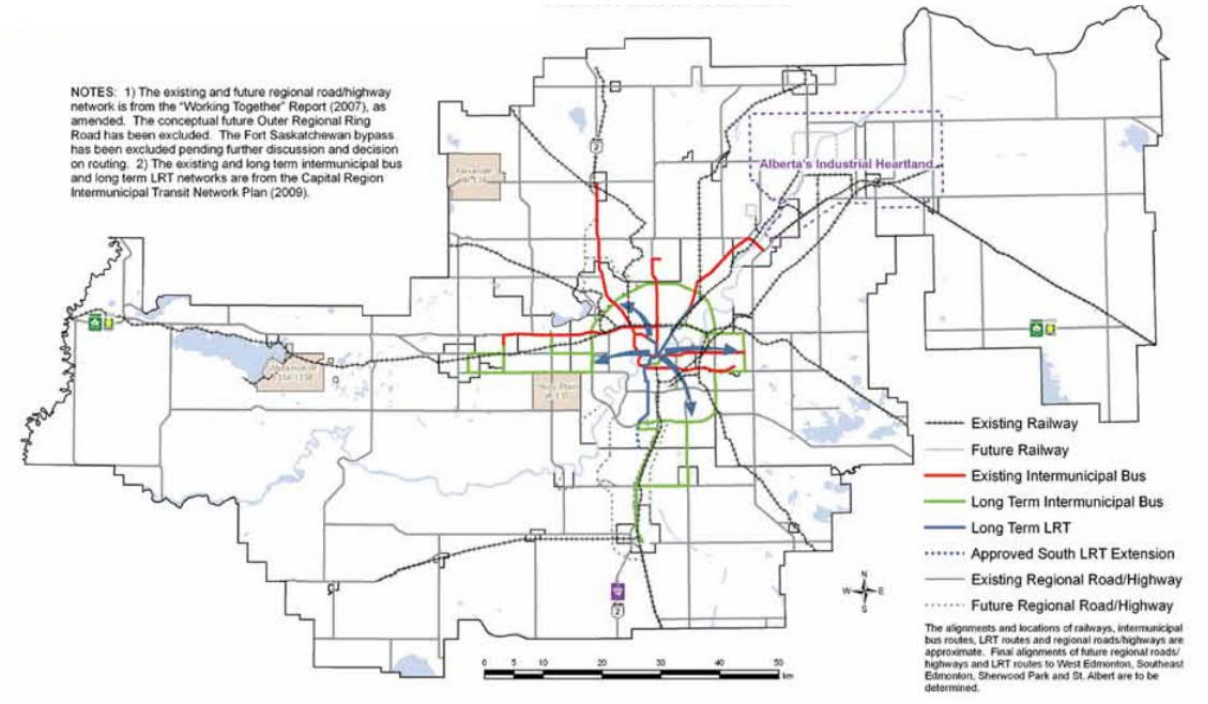
Sturgeon County produced a Municipal Development Plan in 2014. The MDP features two future arterial roads which are not shown in Schedule 10A of the Growth Plan. This includes a new road from the City of St. Albert to Highway 37 (Box 'A' on map below) and a new road near Gibbons between Highway 28 and Township Road 564 (Box 'B' on the map below). While the road network near the City of St. Albert does not match the Growth Plan, it should be noted that it does match the City of St. Albert's own Transportation Master Plan produced in 2015.

Figure 30. Annotated version of Appendix A-3 (Map 17 form MDP)



Long-term intermunicipal bus services shown within Sturgeon County MDP are generally consistent with the Growth Plan. The main difference, as shown on Figure 31, are long-term intermunicipal routes, particularly one(s) along the Henday that connect into Strathcona County and Leduc and Leduc County.

Figure 31. Appendix A-3 (Map 18 form MDP) showing regional transit



Summary of Policies Related to Transportation from the Growth Plan
Integrated Regional Transportation Master Plan (IRTMP)