McElhanney

CANADA BEST MANAGED COMPANIES

Grande Prairie Transportation Master Plan

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Prepared by McElhanney

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GRANDE prairie

Prepared for City of Grande Prairie

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Appendices

In 2009, the City of Grande Prairie commissioned a formal Transportation Master Plan (TMP) that made a series of short-term to long-term recommendations for transportation investments within the city. Since then, Grande Prairie has experienced significant population growth and now requires an updated TMP to reflect the transportation needs of the growing community. The population is now expected to reach up to 120,000 within the foreseeable future.

Project Objectives

The objectives of the Transportation Master Plan were as follows:

1. Develop a clear picture of future needs, based on population growth within and outside the city.
2. Involve the community with a comprehensive, multi-staged engagement program.
3. Invest in mobility to ensure all transportation modes remain safe, convenient, and effective.
4. Support goods movement, which is critical to the local economy.
5. Provide tools for implementation, including a prioritized list of improvements, recommendations for policy and program initiatives, and a transportation model for future network evaluation.

Community Engagement

There were four phases of community engagement:

- Pre-Engagement (December 2017): to determine how the community wants to be engaged. This was conducted as a survey, with over 300 respondents. The majority of respondents preferred to engage online through surveys and the City's website.
- Phase 1 (January 2018): to confirm existing conditions, and community objectives for improvement. This phase was conducted as another survey (with almost 300 respondents), and an Open House (with approximately 40 attendees). The top transportation concerns were listed as (a) road congestion/capacity; (b) sidewalks and trail connections; and (c) road safety. In March 2018, the public engagement was supplemented with individual meetings with stakeholders representing other agencies, government authorities, and road user groups.
- Phase 2 (June 2018): to discuss how the community objectives can be achieved. This phase involved another online survey (with 295 respondents) and a second Open House (with 20 attendees). Despite the relatively small proportion of the population participating, the input was meaningful, and helped guide the priorities for each transportation category studied.
- Phase 3 (July 2019): to present draft findings and explain next steps. This phase presented the draft findings to City Council, the Chamber of Commerce, the stakeholders, and the public.

EMME Transportation Model

To evaluate the Grande Prairie road network, an EMME transportation demand model was developed using the existing land use and population, as taken from the 2016 Census data. The city was divided into 277 zones of trip generation and attraction, and calibrated to the Weekday PM Peak Hour using trip data collected by tracking the progression of cell phones through the system.

The resulting base year model confirmed the existing roads with various levels of traffic congestion. With the addition of further community development (as estimated by the City of Grande Prairie), the EMME model was projected to the 70,000, 90,000 and 120,000 population horizons. Each modeled scenario identified where congestion was expected to reach unacceptable levels (defined as having a volume exceeding 80% of the available road capacity), and what capacity improvements would address that congestion. These improvements included new road links, increased capacity on existing links, and a list of candidate intersections for signalization, roundabouts, and/or laning/geometric upgrades. The recommended improvements for the three population horizons are illustrated in ***Figure ES-1***. The total estimated costs and system benefits from each phase of improvements are listed in the table below.

Population Horizon	Total Estimated Improvement Costs*	Total Increase in Lane-KM	Change in Network VKT**	Change in Network VHT***	Change in Heavily Congested Lane-KM
70,000	$12.0 Million	3%	+1%	-3%	-100%
90,000	$93.7 Million	7%	+1%	-5%	-100%
120,000	$97.9 Million	6%	0%	-12%	-89%

* *All costs provided in 2020 Canadian Dollars.*

** *Vehicle-Kilometres Travelled - the total distance travelled by all users in the system during the PM Peak Hour.*

*** *Vehicle-Hours Travelled – the total travel time spent by all users in the system during the PM Peak Hour.*

The EMME analysis also demonstrated that Grande Prairie is generally limited to its one-mile grid system. As the primary arterial network was developed along the district lot boundaries, the major route choices are typically provided only every 1,600 metres. The result is that the options to resolve traffic congestion are limited to capacity improvements on these major roads. From a system perspective, this increases travel times/distances, increases conflicts from heavier traffic volumes, and reduces network reliability as may be needed for maintenance and emergency responses. Therefore, the City should develop the half-mile (800 metre) road grid within the city core as opportunities permit, and especially in developing areas.

Rail Crossings

Existing at-grade rail crossings in Grande Prairie are frequent concerns for motorists, especially over the north-south rail lines. Grade-separated crossings would resolve these concerns, but would have significant construction costs, and could impact the road and access connections in the vicinity. An overpass at 84th Avenue on the east side of the city would provide significant benefits to the road network, but would not be feasible without the relocation of the rail yard (which is estimated to cost in the order of $40 Million, based on planning-level analysis). However, the benefits would include (a) reduced traffic volumes, conflicts, and delays at 68th Avenue and 100th Avenue; (b) elimination of the need to stack rail cars across 100th Avenue; (c) improved system reliability, especially with respect to emergency response; and (d) the reduction in the need to construct other rail overpasses in the area.

Safety

Although a formal analysis of road safety in Grande Prairie was outside the scope of the Transportation Master Plan, the City's list of the Top 30 collision-prone locations was included for reference. This analysis should be expanded and refined to prioritize the top intersections, and identify appropriate counter-measures to improve road safety. Furthermore, in partnership with other road authorities, safety professionals, and emergency service representatives, the City could develop and adopt a Road Safety Action Plan for Grande Prairie, and set meaningful safety targets for the city, such as "Vision Zero".

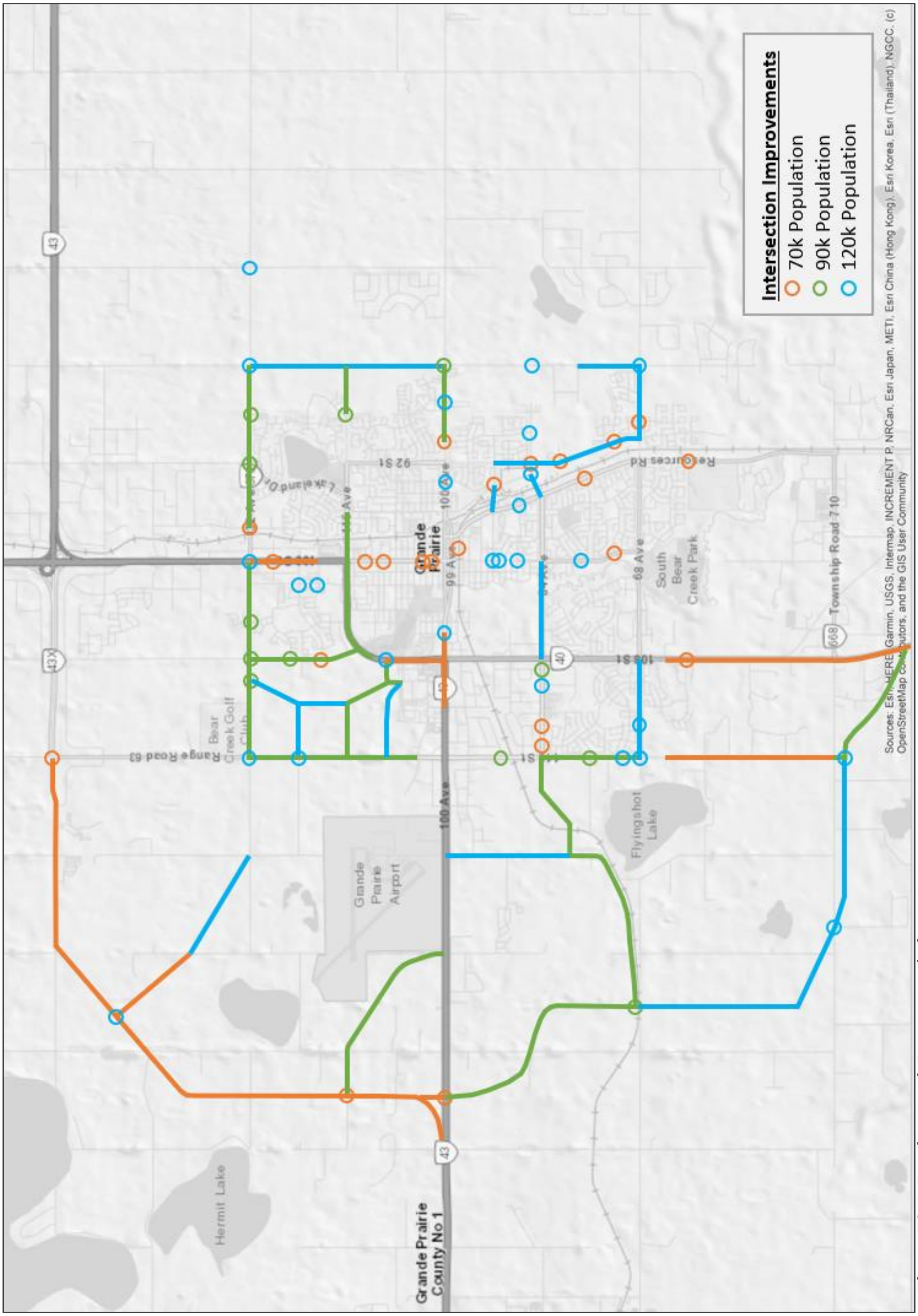

Figure ES-1: Road Network Recommendations

Active Transportation

Pedestrian pathways, cycle routes, and the transit system all provide the public with healthy, alternatives to the private automobile. If implemented strategically, the active transportation and transit systems can shift the commuters' travel choices to more sustainable modes (thereby reducing traffic demand, infrastructure costs, and air pollution), while concurrently ensuring that those unable to drive have equitable access to employment, shopping, and services.

Using the previous active transportation and transit studies as a basis, the Transportation Master Plan included a planning-level evaluation of these systems from the context of the overall system. In addition to a number of priority improvements, the following system recommendations were provided:

Active Transportation	a) Establish an urban framework and design guidelines b) Establish active transportation zones for the city c) Reduce gaps in the pathway network d) Provide supporting guidance (e.g. wayfinding) and amenities e) Accommodate winter users f) Design sustainable / low-impact infrastructure g) Integrate planning and development h) Improve the communications systems.
Transit System	a) Implement the service guidelines from the City's 2017 Transit Master Plan. b) Improve the connectivity between transit routes, and with the pathway network c) Install priority measures to improve bus flow through congested intersections d) Ensure new developments, roads and other initiatives support the transit system

Truck and Dangerous Goods Routes

The existing designated truck and dangerous goods routes were evaluated and discussed with the local trucking community. The study recommended the removal of a number of existing routes (e.g. Downtown), and the addition of new routes (e.g. 116th Street, 84th Avenue).

Program and Policy Initiatives

To complement the list of improvements to transportation infrastructure, the following program and policy initiatives were recommended for consideration:

1. Implement Transportation Demand Management initiatives befitting the Northern Alberta context to offset the need for road upgrades.
2. Improve the transit service, routes, and schedules to attract ridership for longer trips.
3. Continue to densify and infill the existing city area, and discourage sprawl development.
4. Let developers reduce their parking requirements in exchange for trail or transit accommodation.
5. Revisit the parking policy, especially in the Downtown area.

Conclusion

The Grande Prairie Transportation Master Plan provides a planning level review of all aspects of the transportation system, and recommends a prioritized list of improvements for infrastructure, as well as program and policy initiatives, to ensure the transportation system develops safely and strategically with the expected city growth. The successful implementation of the Plan will depend on coordination with other agencies and key stakeholders. The EMME model should be updated within five years in order to revisit the recommendations, and confirm the priorities for future capital plans.

MODULE 1

Introduction

- Study introduction
- Project history/background
- Project objectives
- Summary of relevant plans, studies, reports

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1-1. Introduction and Project Background

The City of Grande Prairie is a cultural, economic and industrial hub for northwestern Alberta (Figure 1-1). With a population of approximately 65,000 in 2016 (the base year of analysis), Grande Prairie also serves the surrounding region which has a population four times that of the City. Between 2011 and 2016, the population of Grande Prairie increased by 13%, making it one of the fastest growing communities in North America. It is also one of the youngest communities, with an average resident age of 31 years.

Mobility plays a key role in everyday activities such as transporting goods, commuting to work, travelling to and from school or appointments, and connecting with social and recreational activities. The transportation system provides the foundational links that support the community of Grande Prairie, affecting quality of life, cost of living, and public health. For these reasons, the City of Grande Prairie closely studies, plans, designs and constructs critical upgrades to the transportation system as and where required.

Figure 1-1: Grande Prairie, Alberta
Source: GoogleEarth (2019)

In 2009, the City of Grande Prairie completed a formal Transportation Master Plan (TMP) that made a series of short-term to long-term recommendations for transportation investments within the city. Since then, Grande Prairie has experienced significant population growth and now requires an updated TMP to reflect the transportation needs of the growing community. As discussed in Module 3, the population is now expected to reach up to 120,000 within the foreseeable future.

With continuing pressure on the transportation system from growth within the city and from the other communities in the adjacent county, a comprehensive update to the TMP is warranted to ensure the system remains safe, accessible, and viable through the coming years. This TMP will develop a plan that prioritizes recommended improvements and initiatives to address how people and goods move through and within Grande Prairie.

While the primary focus of the Transportation Master Plan is on the road network, the study also addresses the active transportation and transit systems to provide for all modes of travel in the city.

1-2. Transportation Master Plan Objectives

This Transportation Master Plan process weaves several technical streams of analysis and stakeholder engagement to develop a plan that will guide transportation infrastructure investments today and into the future. The following are the key project objectives:

1-2.1. OBJECTIVE 1: DEVELOP A CLEAR PICTURE OF FUTURE NEEDS

Grande Prairie has surged in population by 13 percent since the last Transportation Master Plan, and the City has plans to annex another 6,000 hectares of land for further development. Given this propensity for growth, future transportation needs must be confirmed so the City may proactively plan for the investments, strategies and policies required to positively guide community growth. The Transportation Master Plan process must focus on developing a city-wide transportation model that captures transportation demands—current and future—to assess network needs and assist the City with ongoing transportation decision-making.

1-2.2. OBJECTIVE 2: INVOLVE THE COMMUNITY

The successful delivery of a transportation planning initiative is often just as reliant on community endorsement as it is on sound technical recommendations. Without sufficient support from the community, the most beneficial initiative may never receive funding or approval. As such, community involvement is a critical element for project success. The Transportation Master Plan therefore must have a comprehensive and collaborative engagement strategy to involve the community in all aspects of planning process, including early input to drive analysis of issues, as well as the testing of ideas to identify key priorities for the community.

1-2.3. OBJECTIVE 3: INVEST IN MOBILITY

Transportation investments are shaped by growth demands and community culture. Growth bolsters the economy, but also increases the amount and nature of travel demand. Whether it's travelling to school, work or other activities, safe and desirable options are needed so that people of all ages and abilities may move around the city. The Plan must therefore align a variety of mobility options with the recommended road network improvements to ensure the transportation system continues to function for all users.

1-2.4. OBJECTIVE 4: SUPPORT GOODS MOVEMENT

Regional commerce and industry depend on safe and efficient transportation within and through Grande Prairie. Goods movement can be delayed by traffic congestion and rail crossings, affecting reliability of the transportation network and increasing cost of transport. The Plan must therefore be based on an understanding of potential changes in goods movement patterns resulting from industry growth and community expansion, and plan for the necessary infrastructure investments and policy updates to support these changes.

1-2.5. OBJECTIVE 5: PROVIDE TOOLS FOR IMPLEMENTATION

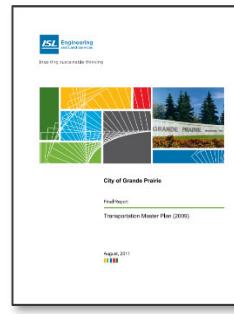
This Transportation Master Plan must provide a vision to guide infrastructure investments and initiatives as Grande Prairie grows, but the City will need the right tools to fully understand implications, define initiatives and adapt the vision, as-needed, to pro-actively guide community growth. The Transportation Master Plan provides three tools in this regard: (a) the EMME transportation model, which can be updated as required to test future changes to the transportation system; (b) a prioritized list of infrastructure projects for use in the Capital Plan; and (c) high-level recommendations concerning the policies, processes, and bylaws that support the transportation system.

1-3. Relevant Background Literature

The Transportation Master Plan is based on the existing foundational plans and directives that are driving current and ongoing City, county, and provincial initiatives, as outlined below.

1-3.1. 2009 TRANSPORTATION MASTER PLAN

The City's previous Transportation Master Plan primarily focused on the transportation network within city limits, and also considered regional connections to the county and provincial road networks. The study identified the following key recommendations, several of which have been implemented by the City:

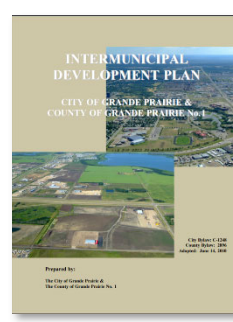


- 5-Year and 10-Year Capital Plans: A series of recommended roadway improvements and traffic signal installations were identified for implementation by 2019.
- Long-Term Road Network Investments: Long-term road network plans identified in the Municipal and Intermunicipal Development Plans were tested based on city-wide transportation modelling, and modifications recommended based on anticipated development patterns.
- Active Transportation: Measures were identified to improve walking and cycling in the city, such as adoption of Complete Streets design principles, development of funding programs to address infrastructure gaps, and Land Use Bylaw amendments targeting walkable building connections and bicycle parking.
- Transit: A series of transit-supportive measures were recommended, such as Land Use Bylaw incentives, transit priority infrastructure and improved passenger amenities connecting to services.
- Trucking: Staged truck routes were developed to streamline truck routes Downtown and address future trucking needs alongside community expansion.

1-3.2. HIGHWAY RING ROAD DESIGNS

Alberta Transportation commissioned designs for the northwest ring road (under construction during the development of the Transportation Master Plan), and the southwest ring road (2010). The former was officially opened in September 2019 (after the study analysis was completed), and is now officially designated as Highway 43. These ring road designs provided guidance on the future highway alignments, and the major connections expected thereto.

1-3.3. INTERMUNICIPAL DEVELOPMENT PLAN



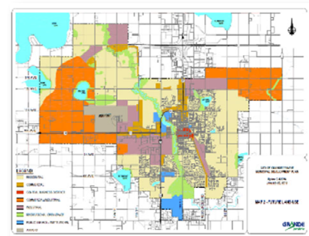
The Intermunicipal Development Plan covers issues of joint interest between the City of Grande Prairie and the County of Grande Prairie No.1. The Plan identified 30-year short-term and 50-year long-term annexation areas to accommodate the City's future growth. The Plan also identified a half-mile wide Referral Area around the outer annexation boundary to ensure that both Grande Prairie and Clairmont are advised of proposed development that may be of mutual interest. This document provides proposed ring road concepts and requires that the region develop a regional transportation system.

1-3.4. GRANDE PRAIRIE POPULATION AND EMPLOYMENT FORECAST (2012 TO 2061)

Based on the 2013 forecasts, the Grande Prairie population is predicted to reach 90,000 by 2036 and nearly 120,000 by 2060 as a base growth scenario. The high growth scenario predicts a population of 175,000 by 2060. The population growth rates were based on 1.75 to 3.5 percent growth in the oil and gas sector (a significant driver in the region), which has declined since the publishing of this study. However, despite the downturn, more recent population forecasts predict populations of 90,000 within 10 years and 120,000 within 20 years.

1-3.5. MUNICIPAL DEVELOPMENT PLAN

The Grande Prairie Municipal Development Plan (Bylaw C-1237, 2010) identified several key goals pertinent to this Transportation Master Plan, including:



- Develop healthy, walkable, safe neighborhoods.
- Integrate and connect to the city-wide multi-use trail system by linking residential neighbourhoods with municipal, school, and environmental reserves; public utility lots; and other planned pathways.
- Develop a city-wide, barrier free commuter system that links key destinations

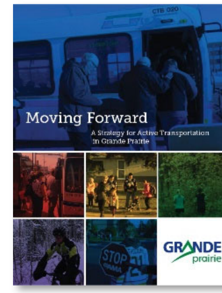
1-3.6. 2017 TRANSIT MASTER PLAN

The Transit Master Plan completed in 2017 established objectives over the next ten years to accomplish an increase in ridership, higher cost recovery, improved amenities and an expanded fleet of buses. The Plan identified four locations for future transit hubs including: Prairie Mall, Eastlink Centre, Westgate/Gateway Area and Downtown. With the Transit Master Plan recently completed, the 2019 Transportation Master Plan will not revisit the transit system recommendations. However, the Transportation Master Plan will consider the results of the Transit Master Plan, and identify opportunities to further implement transit-supportive measures across the system.

1-3.7. HIGHWAY 43 CONDITION ASSESSMENT REPORT

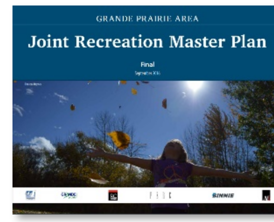
In 2017, Alberta Transportation commissioned a study to assess the existing condition of Highway 43 within the city limits of Grande Prairie (i.e. between 124 Street and 140 Avenue) in order to recommend a work plan for potential corridor improvements prior to the transfer of responsibility for the provincial highway to the City. The study focused on the pavement condition, intersection geometry, traffic control, drainage, lighting and structures.

1-3.8. ACTIVE TRANSPORTATION



Several documents make up the guidance on Active Transportation in Grande Prairie including:

- *Moving Forward – A Strategy for Active Transportation in Grande Prairie (2014)*
- Alberta Health Services – *Walkable Alberta, Grande Prairie Community Report (2012)*
- *Grande Prairie Area – Joint Recreation Master Plan (2016)*



These strategic documents emphasized the community's desire to reduce the local reliance on the private automobile, and to increase the attractiveness and integrity of the active transportation network and transit system. There is a strong focus on removing physical barriers to achieve accessibility and connectivity to key destinations for all system users.

1-3.9. OTHER STUDIES AND FUNCTIONAL DESIGNS

Additional traffic studies, Area Structure Plans (ASPs), transportation plans, and functional designs from the last 20 years were also considered and incorporated as necessary into the analysis and recommendations of the Transportation Master Plan. Although some of these pre-dated the last Transportation Master Plan in 2009, they were still considered as references where needed. A complete list of the Transportation Master Plan resources is included in Module 10, and the lists of the network link and intersection improvement recommendations from all relevant background resources are summarized in Appendix A – Summary of Previous Study Recommendations.

1-4. Transportation Master Plan Outline

The Transportation Master Plan for Grande Prairie comprises the following ten modules and appendices:

Table 1- 1: Transportation Master Plan Outline

No.	Module	Contents
1.	**Introduction**	1. Introduction and Project Background 2. Transportation Master Plan Objectives 3. Relevant Background Literature
2.	**Community Engagement**	1. Pre-Engagement Survey 2. Phase 1 Engagement 3. Phase 2 Engagement 4. Phase 3 Engagement
3.	**Traffic Forecasting**	1. EMME Model Introduction 2. Model Framework 3. Traffic Forecasts
4.	**Road Network Analysis**	1. Regulatory Background 2. Existing Road Network and Cross Sections 3. EMME Road Network Analysis 4. Intersection Improvements 5. Railway Issues and Opportunities
5.	**Safety Analysis**	1. Road Safety in Grande Prairie 2. Safety-Priority Intersections 3. Recommendations
6.	**Active Transportation and Transit**	1. Pedestrian Network 2. Cycle/Trail Network 3. Barrier-Free Considerations 4. Transit System
7.	**Trucking Goods Movement**	1. Truck Routes 2. Summary of Issues
8.	**Improvement Options and Evaluation**	1. Road Network Improvements 2. Rail Crossing Improvements 3. Active Transportation Improvements
9.	**Implementation Plan**	1. Recommended Infrastructure Improvements 2. Program and Policy Initiatives 3. Further Study
10.	**Closure**	1. Disclaimers 2. Team Signatures 3. List of Resources
	Appendices	A. Summary of Previous Study Recommendations B. Project Engagement Plan C. Project Engagement Results D. EMME Transportation Model E. Unit Costs for Improvements

Grande Prairie Transportation Master Plan

MODULE 2

Community Engagement

- Stakeholder consultation
- Public Open House
- Survey results
- Summary of Issues

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2-1. Introduction

As the Grande Prairie Transportation Master Plan is ultimately a document that will guide the development of plans and policies for public investment in transportation infrastructure over the coming years, a critical component of the study is active engagement of residents and stakeholders. This engagement not only provided opportunities for input into the study considerations and direction, but also was expected to increase the level of endorsement the public and stakeholders have for the study findings and recommendations.

This module summarizes the strategy, methodology, and results of the comprehensive public and stakeholder engagement performed for the Transportation Master Plan.

2-1.1. ENGAGEMENT GOALS AND OBJECTIVES

The primary goal of the community engagement is to facilitate the development of a new Transportation Master Plan that aligns with the community's vision, values, and priorities for mobility and infrastructure investment, such that the study outcomes and recommendations have a strong level of endorsement from the public and stakeholders. To achieve this, the following objectives for engagement were identified:

1. **Accessible**: Project information must be easily accessible to the population at large.
2. **Meaningful**: Engagement should foster meaningful discussion so input is valuable to technical analysis, and the resulting technical recommendations are checked to determine how well they reflect the community's input.
3. **Broad and Diverse**: Engagement should be broad and diverse, including a range of stakeholder groups.
4. **Responsive**: Engagement should be responsive to evolving stakeholder needs as the project unfolds, adapting approaches as per ongoing feedback.

The complete strategy for the community engagement supporting the development of the Transportation Master Plan is outlined in detail in ***Appendix B: Project Engagement Plan***.

2-1.2. ENGAGEMENT PROCESS

The Community Engagement for the Transportation Master Plan was divided into four key activities:

1. **Pre-Engagement Survey**: **How do you want to get involved?** To identify the community's preferences for engagement, a brief survey was conducted. The results of the survey, and the principles of the International Association for Public Participation (IAP2), guided the development of the Project Engagement Plan (PEP; ***Appendix B***). This plan was then used as the basis for the subsequent engagement activities.

2. **Phase 1**: **Where do we want to go?** The first phase of engagement sought input on the key issues to be addressed in the Transportation Master Plan, as well as the key principles to guide the plan development. This included a formal Open House (***Figure 2-1***) and stakeholder survey.

3. **Phase 2**: **How do we get there?** The second phase of engagement tested and prioritized the ideas that were developed with feedback from the first phase of engagement.

4. **Phase 3**: **What happens next?** The third phase of engagement presented the draft findings of the Transportation Master Plan, showing how the earlier input was incorporated, and explained the next steps toward project completion. This phase also provided an opportunity for participants to suggest adjustments to the recommendations prior to the final report delivery.

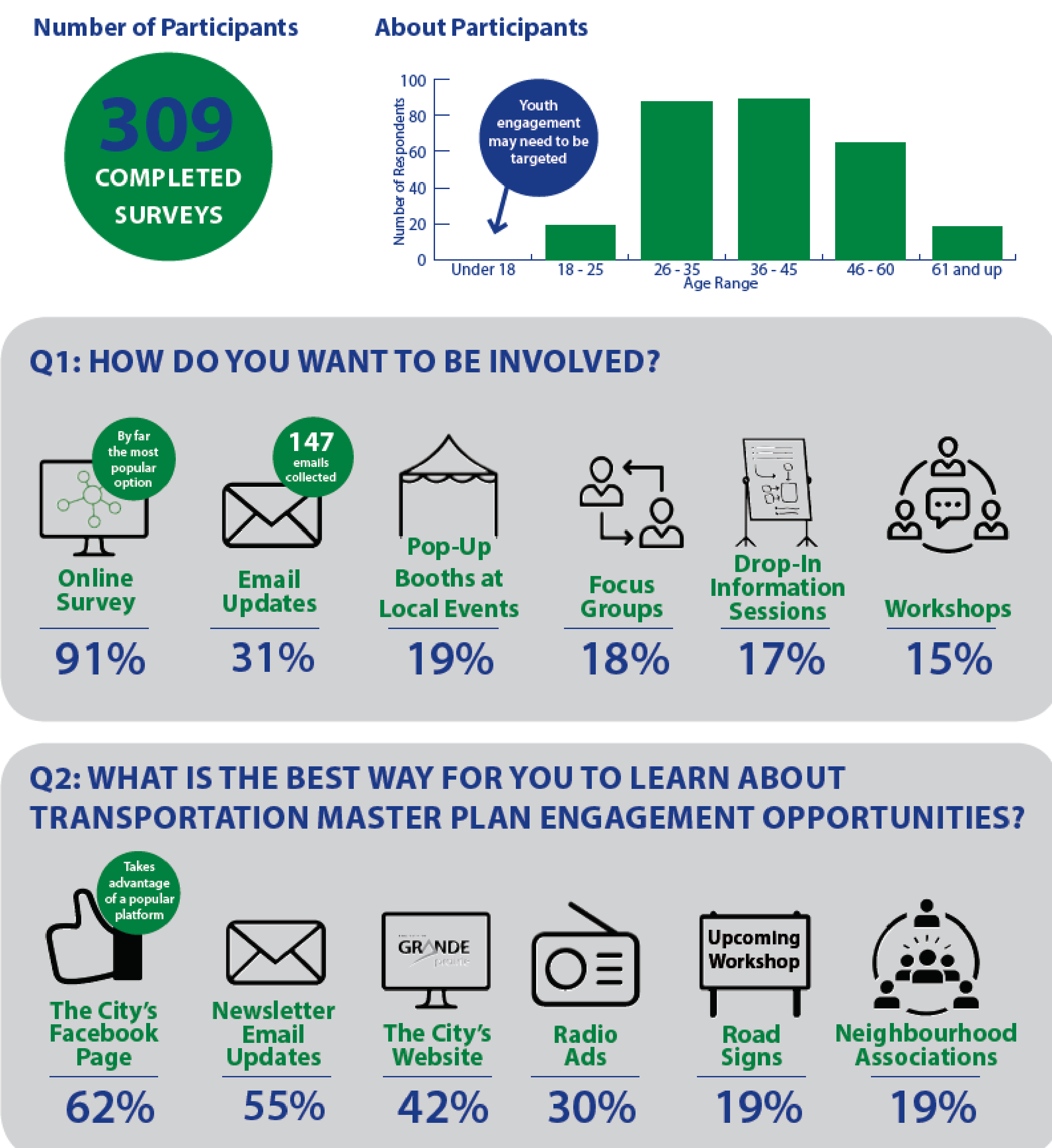
Figure 2-1: Phase One Open House

The strategy and results of each phase of community engagement are summarized in the sections below.

2-2. Pre-Engagement: *How do you want to get involved?*

Hosted on the City's Transportation Master Plan webpage and promoted through the City's social media streams, a pre-engagement online survey was launched on December 4, 2017, to collect input on how people in Grande Prairie wanted to be involved with the Transportation Master Plan. This input, summarized below, was used to drive engagement and communications initiatives throughout the project. This also guided the development of the Project Engagement Plan (PEP; ***Appendix B***).

Figure 2-2: Pre-Engagement Feedback



2-3. Phase 1: *Where are we now and where do we want to go?*

The first phase of community engagement was comprised of public and stakeholder consultation in early 2018. This round of engagement sought input on the key issues to be addressed in the Transportation Master Plan, as well as the key principles to guide the Plan development. Engagement discussions focused on the following questions:

- What principles should drive transportation investments as Grande Prairie grows?
- How do people currently move around Grande Prairie?
- What is working well and what could be improved?
- What would the community like to see more of / less of?

2-3.1. PUBLIC ENGAGEMENT

The public component of this phase of engagement included:

- An online survey hosted on the project webpage (www.cityofgp.com/onthemove) from January 24 to February 2, 2018.
- An in-person engagement event hosted at Teresa Sargent Hall from 4 to 7pm on Thursday, January 25, 2018. The event was a “drop-in” format with a project introduction station followed by three activity stations seeking input.

There were almost 300 respondents to the online survey, and approximately 40 attendees at the Open House. The total response to the first phase of engagement was approximately 0.5% of the city’s population. Although this is lower than expected, the input was meaningful, and did help guide the subsequent technical analysis. The public input is summarized below.

Figure 2-3: Phase One Public Input

6 KEY ISSUES & PRIORITIES

1. Road congestion and capacity
2. Sidewalk and trail connections
3. Traffic control and signal coordination
4. Driving safety
5. Truck corridors
6. Rail crossing delays

On average, respondents said they commute **9 km** for work or school

75% of respondents own a bike

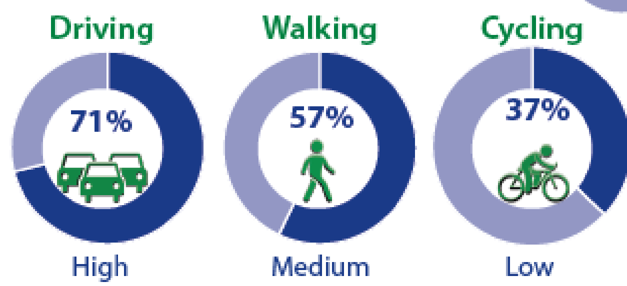
How we engaged

- 1 open house
- Online survey available for 10 days

295 PARTICIPANTS

COMFORT SCORES

How comfortable people feel



SUGGESTIONS FOR IMPROVING TRAFFIC FLOW

- Improve **signal coordination** along main corridors
- **Limit large truck traffic** in residential areas
- **Improve sight lines** at intersections
- **Reduce train delays** at rail crossings
- **Complete the new bypass** for through traffic

SUGGESTIONS FOR IMPROVING WALKING AND CYCLING

- **Address gaps** in the active transportation network, especially for commuters
- **Enhance crosswalks** and **define pedestrian space** to increase safety around vehicle traffic
- Provide more **snow removal and flooding mitigation**
- Improve **path safety**; focus on safe routes
- Provide more **year-round amenities**
- Design for **all ages and abilities**

ACTIVE TRANSPORTATION PREFERENCES

LIKES

- Pathways that are separated from traffic
- Sidewalks and pathways that connect to key destinations
- Safe, lit crossings
- Features like landscaping, benches, signage, lighting and garbage cans
- Year-round maintenance

DISLIKES

- Missing links in the pathway network
- Indirect pathway routes for commuting
- Seasonal flooding impacts
- Safety concerns due to crime and drug use along park pathways

Grande Prairie is very proud of their parks and trails system.

FUNDING PRIORITIES

1. Reducing road congestion and adding more road capacity for cars and trucks
2. Improving road (or system) safety
3. Constructing more sidewalk and pathway connections to key destinations

THINGS WE HEARD

"Cycling for leisure is great on the trails, but commuting is very difficult to get places without having to ride on the road. Truck traffic here makes that a scary/dangerous undertaking."

"As a pedestrian, I am always worried about drivers not seeing me at intersections."

"I only drive because I feel safer than cycling or walking, not because that is my preference."

"I always drive a vehicle in the winter. There is no way around it."

"Almost everywhere that I have walked in Grande Prairie has been missing sidewalks for at least part of it."

"The pot holes are bad!"

"We need to be a more accessible community for those with mobility aids and the elderly."

"Synchronize the lights on main routes."

"I would use the bus service more if there was better frequency and routing options."

2-3.2. STAKEHOLDER ENGAGEMENT

The project team met with identified stakeholders between March 19 and 30, 2019. The stakeholders were divided into user groups and agencies / government authorities, as shown below.

Table 2-1: Identified Project Stakeholders

Agencies
City of Grande Prairie Council
City of Grande Prairie Internal Departments
Alberta Transportation
County of Grande Prairie No. 1
Public School Board
Catholic School Board
Regional College of Grande Prairie

User Groups
Chamber of Commerce
Urban Development Institute
Emergency Services (fire/police/ambulance)
CN Rail
Canfor
Trucking Association

Figure 2-4: Project Stakeholders

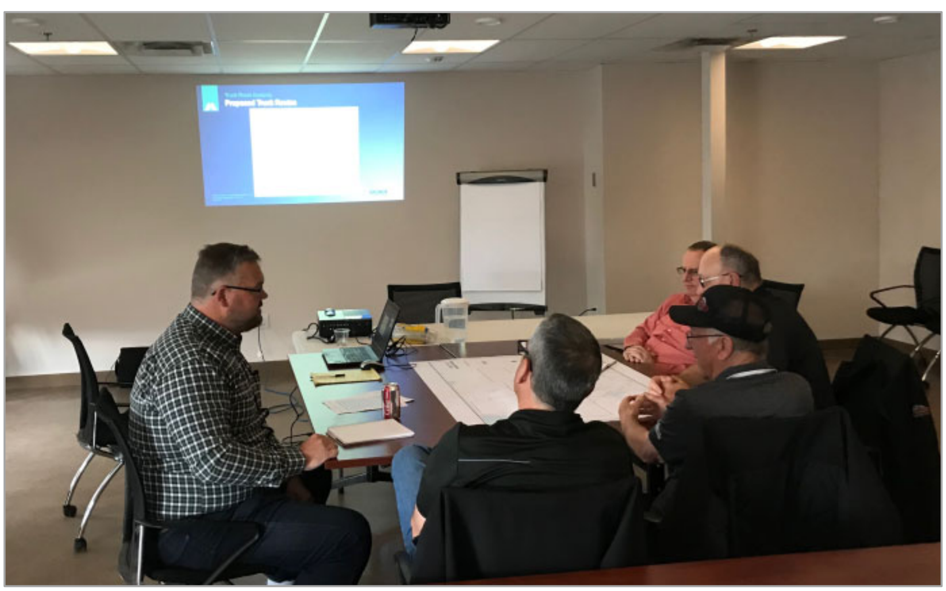
The detailed notes from each stakeholder meeting are provided in ***Appendix C: Project Engagement Results***. The key issues raised by the stakeholders in the first phase of engagement are summarized below.

Table 2-2: Key Comments from Phase One Stakeholder Meetings

Subject	No.	Comments / Feedback
Road Network	1.	In addition to the planned outer ring road, inner ring road(s) are also desirable for moving traffic.
	2.	Significant peak hour delays on 108 Street/Wapiti Road (Highway 40), esp. accessing road from side streets (e.g. Pinnacle Ridge). This is the only route to the oil fields to the south.
	3.	There is a strong desire to see the development of the southwest bypass.
	4.	More lanes are desired along 92nd Street, north of 68th Avenue.
	5.	Connections between the college and the new hospital should be improved.
Traffic Control	6.	There is general support for more roundabouts, instead of signals.
	7.	Truckers desire better access to information for route planning.
	8.	Signals are needed at 92nd Street / 132nd Avenue.
Rail Crossings	9.	Rail crossings are a significant impediment to traffic movement in the city, especially those rail lines running north-south through the city.
	10.	68th Avenue has the longest rail crossing delays in the city. The delays on 100th Avenue are shorter but are more critical due to the proximity to Downtown.
	11.	Trains in the yard block 100th Avenue / 99th Avenue multiple times per day as the cars are loaded and staged. Public education would be beneficial. Gates could be considered but would exacerbate traffic delays.
	12.	Can the rail yard be affordably moved out of town, especially in comparison to the costs of delays, safety, and the need for grade separated crossings?
	13.	Delays from the east-west rail lines are expected to worsen as fracking materials are increasingly hauled from the west.
	14.	The priority crossing locations for emergency response are on 108th Avenue and 100th Avenue.
	15.	New rail crossing on 84th Avenue (West) and Wedgewood Drive are being planned, although CN would like to see these offset by the closure of existing crossings to manage the total number of crossings in the city.
	16.	The extension of 84th Avenue would cross a large number of rail tracks in the yard and would consequently require grade separation.
Safety	17.	Large number of rear-end collisions on Highway 40 due to congestion.
	18.	Students have been hit crossing 108 Street.
	19.	Highway 43/108 Street (“Staples Corner”) is a high collision location
	20.	With growth, intersections on 132nd Avenue are expected to become safety concerns, esp. at 100th Street, 108th Street, and 116th Street.

Subject	No.	Comments / Feedback
Trucking and Goods Movement	21.	116th Street would be a good alternate / truck route for Highway 40, with a connection at the Correction Line. This would require negotiations with the County.
	22.	The impacts of the Canfor Haul Road should be considered in the study. Some public traffic is using the private road to bypass congestion on Hwy 40.
	23.	Truck routes are generally on the city periphery, although it is unclear why dedicated truck routes are shown through Downtown Grande Prairie.
	24.	Traffic congestion and queueing noted on the lumber haul route between Canfor and the rail yard, i.e. via 84th Ave, Resources Rd and 92nd Ave, rail crossing at 68th Avenue.
	25.	It is generally desirable to separate the bikeways from the roadways. However, the planters used as a buffer on 102nd Street seem problematic.
Active Transportation and Transit	26.	The cycle network should be expanded to connect to more destinations.
	27.	Transit usage is low in the city, and the service is considered slow.
	28.	Bus stops should be accessibly connected to the sidewalk/pathway network
	29.	Active transportation solutions should be key to the study recommendations.
	30.	Pedestrian access around 108 Street / Highway 40 should be improved, especially around 68th Avenue.
	31.	Significant growth is expected in the northwest quadrant, especially around the airport.
Future Development Needs	32.	The impact of future development in the surrounding County on the city's transportation network is a major concern, and difficult to predict.
	33.	Infrastructure staging is a concern; necessary property dedications (including for roundabouts) should be identified and secured during the ASP stage.

Figure 2-5: Truck Association Stakeholder Meeting



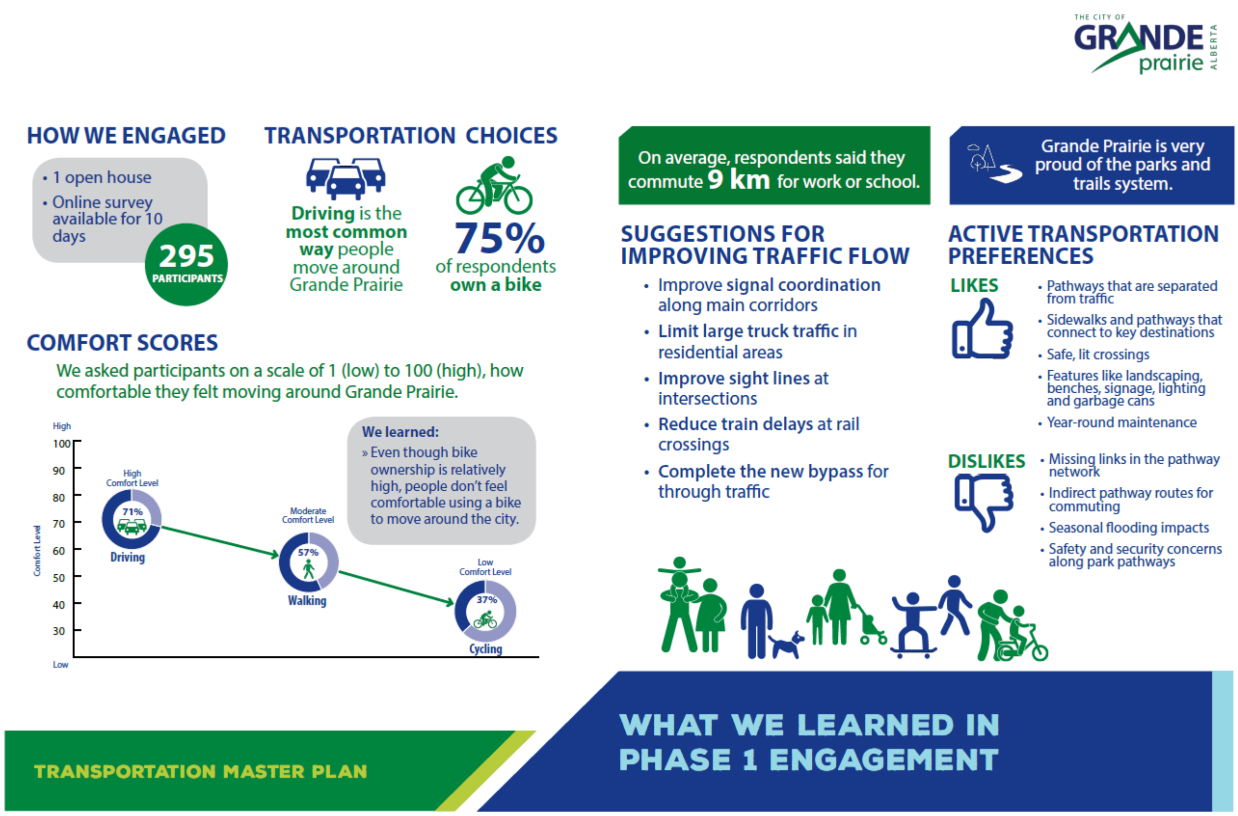
2-4. Phase 2: *How do we get there?*

The second phase of project engagement occurred in the summer of 2018, comprising:

- A booth at Municipal Government Day on June 12 to inform the public about the project and invite people to attend the subsequent open house.
- A public open house at Teresa Sargent Hall in the Montrose Cultural Centre on June 20th from 4 to 8pm. The event was another “drop-in” format with interactive displays (***Figure 2-6***).
- An online survey available from June 12 to July 3, 2018.

This round of engagement provided an opportunity to build on comments received in Phase 1. The guiding principles heard at the beginning of the project were used to identify and further define the challenges within Grande Prairie’s transportation network. Participants in this round had an opportunity to prioritize ideas and potential options for infrastructure and the allocation of funding.

Figure 2-6: Introductory Graphic for Community Engagement – Phase 2



The survey was completed by 183 respondents and approximately 20 people attended the open house. Although the total response rate was approximately 0.3% of the city population (even less than in Phase One), the input was still meaningful, and was incorporated into the analysis accordingly. The responses from both engagement activities are summarized below.

2-4.1. TRAFFIC FLOW AND ROAD SAFETY

Asked what roads were considered to be the highest priorities for traffic flow and capacity improvements (as identified in ***Figure 2-7***), the respondents answered as shown in ***Table 2-3.***

Figure 2-7: Capacity Improvement Options

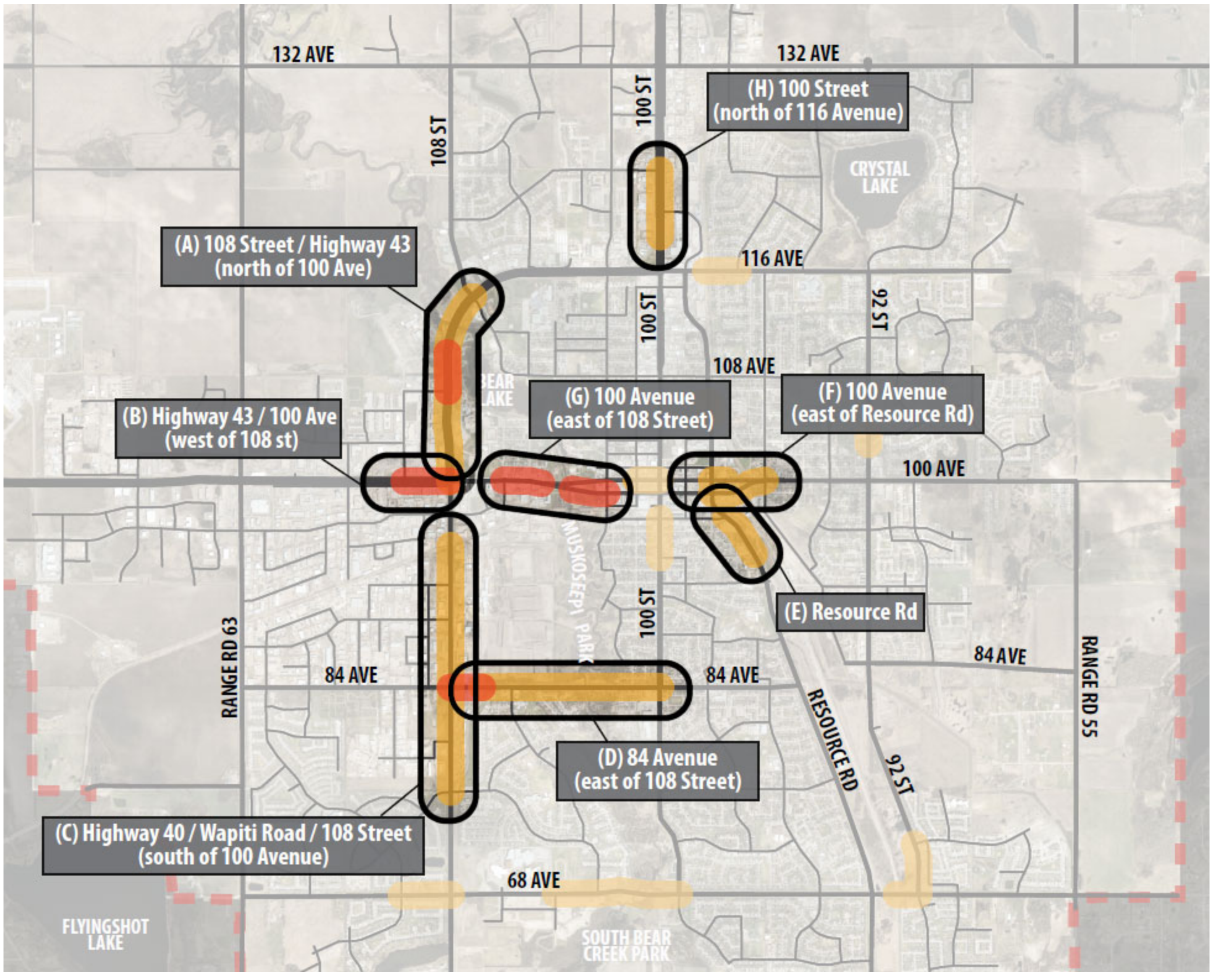


Table 2-3: Road Capacity Improvement Priorities

Open House	
Pri.	**Road Link**
1.	108th Street, north of 100th Avenue
2.	100th Avenue, west of 108th Street
3.	108th Street, south of 100th Avenue
4.	100th Avenue, east of 108th Street
5.	100th Street, north of 116th Avenue

Online Survey	
Pri.	**Road Link**
1.	108th Street, north of 100th Avenue
2.	108th Street, south of 100th Avenue
3.	100th Avenue, west of 108th Street
4.	100th Avenue, east of 108th Street
5.	84th Avenue, east of 108th Street

Asked what locations were considered to have the greatest safety concerns for people who walk, bike, or drive, respondents identified numerous locations. These are discussed in ***Module 5: Safety Analysis***.

2-4.2. SUSTAINABLE TRANSPORTATION

Asked what types of areas were considered to be the highest priorities for **pathway** improvements, respondents identified the following:

Table 2-4: Priorities for Pathway Improvements

Open House		Online Survey	
Pri.	**Area**	**Pri.**	**Area**
1.	Neighbourhoods / School Areas	1.	Natural Areas / Parks / Open Spaces
2.	Commercial / Shopping Districts	2.	Neighbourhoods / School Areas
3.	Natural Areas / Parks / Open Spaces	3.	Connections between City Sectors
4.	Downtown	4.	Downtown
5.	Industrial Areas	5.	Commercial / Shopping Districts

Asked what types of areas were considered to be the highest priorities for **transit** service improvements, respondents identified the following:

Table 2-5: Priorities for Transit Service Improvements

Open House		Online Survey	
Pri.	**Area**	**Pri.**	**Area**
1.	Neighbourhoods / School Areas	1.	Connections between City Sectors
2.	Downtown	2.	Neighbourhoods / School Areas
3.	Government Offices / Institutions	3.	Downtown
4.	Commercial / Shopping Districts	4.	Commercial / Shopping Districts
5.	Industrial Areas	5.	Natural Areas / Parks / Open Spaces

Asked what specific locations within the city needed new pathway links or transit service, attendees at the Open House identified the following priorities:

1. 100th Street, north of 116th Avenue, around the Prairie Mall Shopping Centre
2. 100th Avenue, west of 108th Street
3. 100th Avenue at 100th Street
4. Area surrounding the airport
5. South Bear Creek Park

2-4.3. TRUCK ROUTES

Given three choices for truck routes that should be pursued to facilitate travel to and from Highway 40, south of Grande Prairie (as shown in ***Figure 2-8***), respondents identified the priorities as outlined in ***Table 2-6***.

Figure 2-8: Preferred Truck Routes

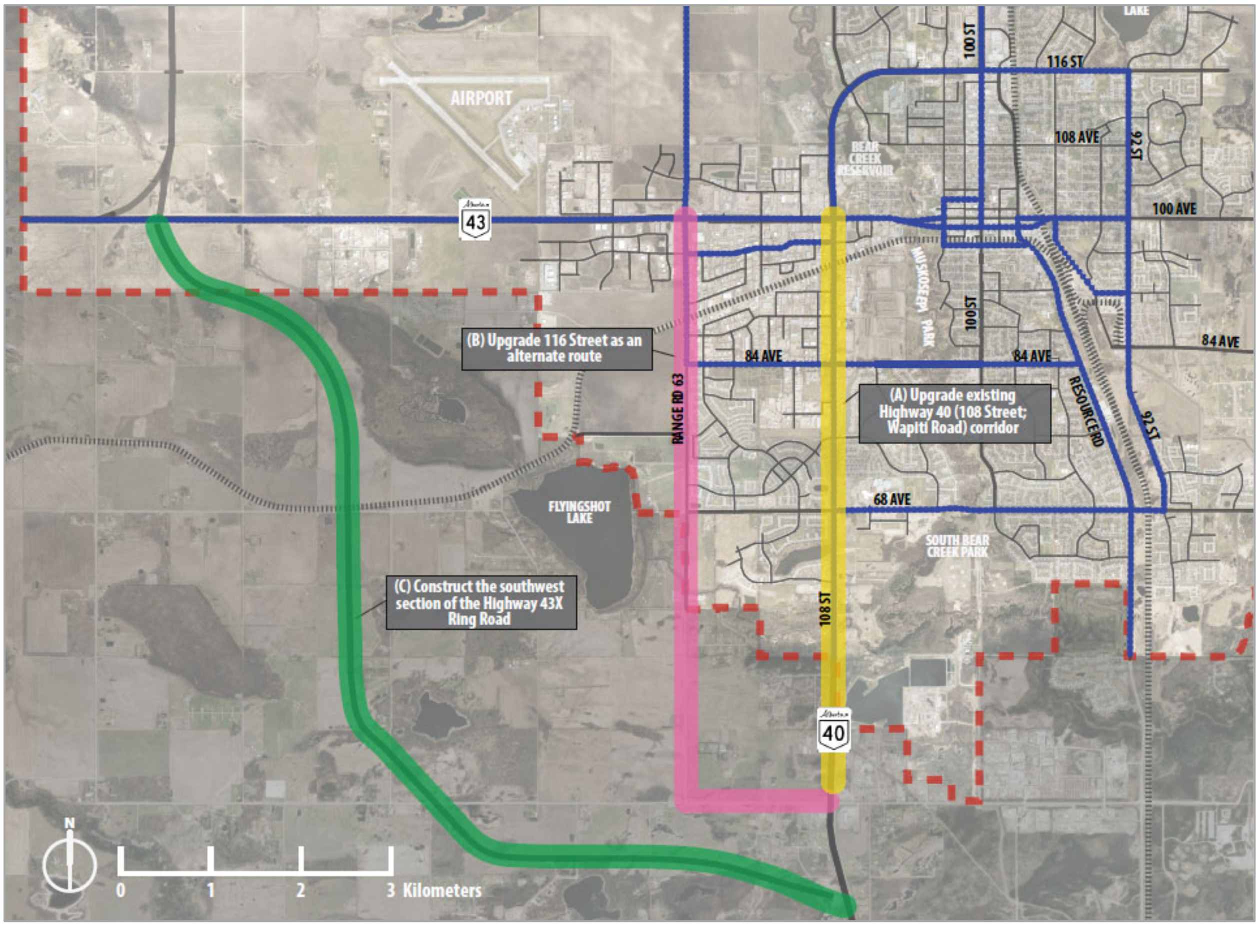


Table 2-6: Priorities for Truck Routes to Highway 40 South

Open House	
Pri.	**Route**
1.	Highway 40X Ring Road (green)
2.	116th Street (pink)
3.	108th Street / Wapiti Road (yellow)

Online Survey	
Pri.	**Route**
1.	Highway 40X Ring Road (green)
2.	116th Street (pink)
3.	108th Street / Wapiti Road (yellow)

2-4.4. RAIL CROSSINGS

Asked what rail crossings should be prioritized for improvements (as provided in ***Figure 2-9***), respondents identified the priorities as shown in ***Table 2-7.***

Figure 2-9: Identified Rail Crossings

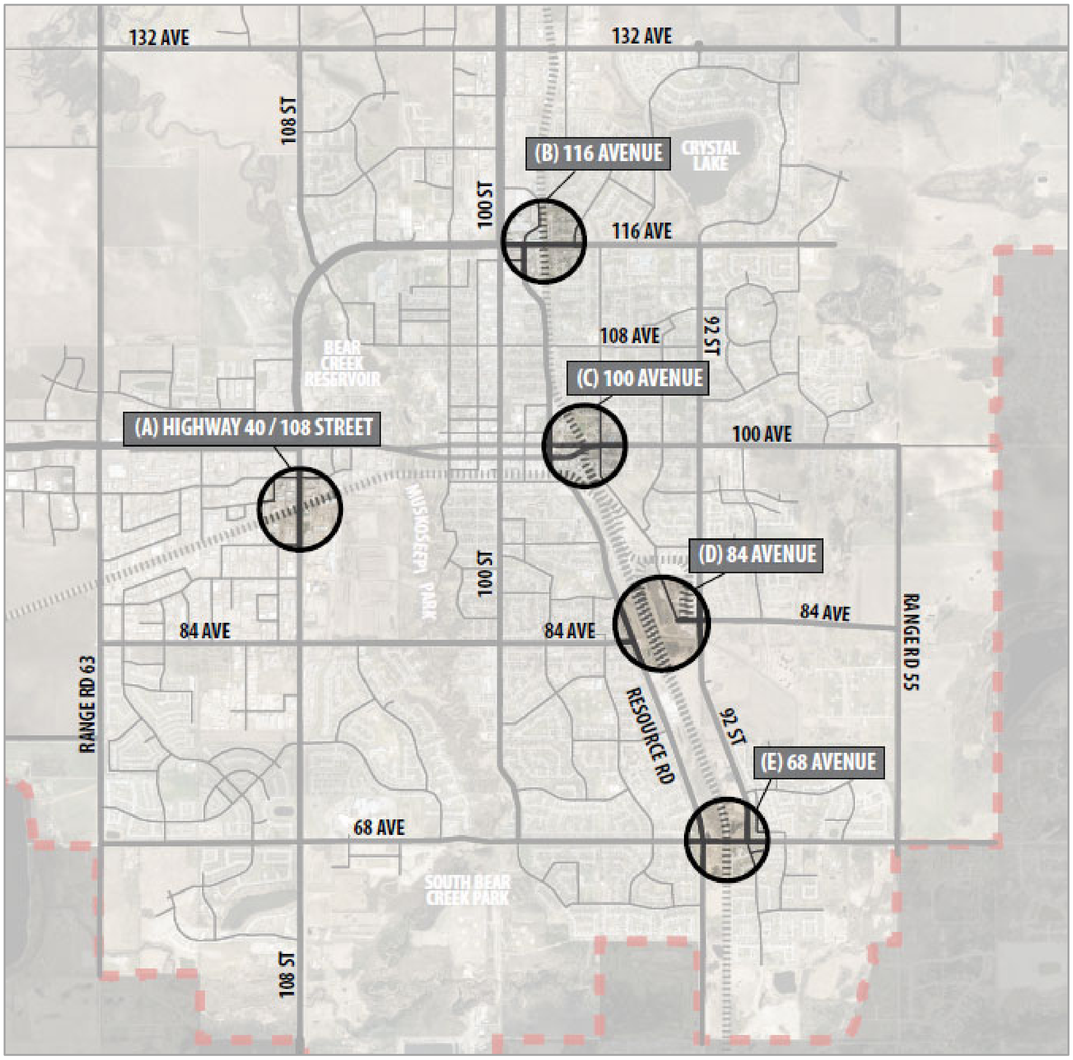


Table 2-7: Priorities for Rail Crossing Improvements

Open House	
Pri.	**Rail Crossing**
1.	100th Avenue, east of Downtown
2.	84th Avenue
3.	68th Avenue
4.	116th Avenue
5.	108th Street (Highway 40)

Online Survey	
Pri.	**Rail Crossing**
1.	100th Avenue, east of Downtown
2.	68th Avenue
3.	116th Avenue
4.	108th Street (Highway 40)
5.	84th Avenue

2-5. Phase 3: *What happens next?*

With the community input and priorities established from the second phase of engagement, the detailed technical analysis for the Transportation Master Plan was completed over the following months. This included EMME modelling of the road network, analysis of the active transportation and transit systems, evaluation of the existing truck routes, and the generation of a preliminary list of recommendations for system improvements (aligned with different population thresholds).

Figure 2-10: Phase 3 Engagement – Presentation Graphic

The third phase of the community engagement occurred in June 2019 to present the results of the analysis to City Council, the Chamber of Commerce, and the stakeholder groups, and outline the steps for the completion of the Transportation Master Plan. The meetings were held between June 24 and June 27, 2019, with the presentation being made available to the general public afterwards. The notes for each meeting are included in ***Appendix C***, with key issues and comments summarized below.

Table 2-8: Key Comments from Phase Three Stakeholder Meetings

Subject	No.	Comments / Feedback
Road Network	1.	92nd Street is experiencing congestion now and should be a higher priority.
	2.	The impact of growing county traffic on the Grande Prairie transportation system is a major concern.
	3.	108 Street improvements (between 116th and 132nd Avenues) should be a priority to address its use by county traffic
	4.	84th Avenue should ideally connect to the ring road.
	5.	Hwy 40 and 84th Ave are bottlenecks in the AM Peak Hour, which was not analyzed by the EMME model.
Traffic Control	6.	The benefits of roundabouts should be emphasized in the report.
Rail Crossings	7.	116th Avenue would be desirable as a rail overpass.
Trucking and Goods Movement	8.	Truck routes should be around the city, not through the Downtown.
	9.	A truck route on 116th Street may be a problem for adjacent residents.
Active Transportation and Transit	10.	Walkability and transit service are important.
	11.	Overpasses should be planned across six-lane roads.
Future Development Needs	12.	The development levy calculations will depend on the findings of the TMP
	13.	The model could be used to identify the effects of external traffic on the city's transportation system for the purpose of negotiating funding assistance.

2-6. Conclusion

As envisioned, the comprehensive planning and implementation of the community engagement was critical to the success of the Transportation Master Plan. The engagement activities provided meaningful information to the public and stakeholders at strategic points in the study, and elicited helpful input to help guide, amend, and validate the study findings.

MODULE 3

Traffic Forecasting

- EMME model introduction
- Model framework
- Traffic forecasts

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3-1. EMME Model Introduction

A city-wide travel demand model is a planning tool consisting of several interlinked components typically used to estimate the number of vehicles or people that will use a major transportation facility in the future (e.g. freeway, river crossing or railway line). The model can also be used to assess the regional impacts of proposed transportation, land-use and policy initiatives such as the introduction of a new roadway, urban densification or parking pricing. Some of these impacts can include shorter travel times, a shift in travel mode from personal vehicles to transit, or an increase in greenhouse gas emissions.

There are several specialized software platforms available for regional transportation demand modelling. The City of Grande Prairie has previously utilized transportation models in various forms to develop their master transportation plan and analyze impacts of network improvements. In 2009, the City of Grande Prairie used a calibrated VISUM model to forecast traffic volumes and to identify congested roadway segments. This information was used to develop the City's Transportation Master Plan including the recommended long-term road network. The software used for Grande Prairie's latest model is based on the EMME platform - short for *Equilibre Multimodal/Multimodal Equilibrium*. Developed by INRO, a company specializing in transportation planning software in Montreal, this package is able to develop reliable estimates of traffic volumes for the entire transportation network based on the fundamentals of travel demand and traffic flow within an equilibrium assignment procedure.

Much has changed over the past decade, and in order to assess the City's transportation network in the base year and in the future, the City of Grande Prairie requires an updated travel demand model. This section describes the model's key components and how the model was used to forecast future traffic conditions in Grande Prairie. A detailed outline of the model development, calibration, and validation is provided in ***Appendix D: EMME Transportation Model***.

3-2. Model Framework

Travel Demand Models are initially developed and calibrated to reflect current travel patterns and network conditions using available data sources. Utilizing the latest in traffic counts and travel time data, the model's specification and predictive capability is a function of the quality and completeness of data being used to calibrate and validate each component. Once fully developed and validated, the model can be used to forecast future travel conditions based on land use and socio-economic growth assumptions within the planning horizon; usually in the 15 to 30-year range. There are several inputs required to develop the travel demand model components including land use and demographic inputs (e.g. population and employment figures), a representation of the region's transportation network and a travel survey that provides details of travel behaviour including time of day, origin, destination and mode. A travel survey typically provides information on the current travel patterns of a representative, random sample of the population.

The updated model follows the standard four-step travel demand modelling approach. The four-step model is a sequential framework that was first developed and implemented in the 1950s for the Detroit and Chicago Metropolitan Areas and has been used extensively in industry since. In this approach, a city is split into smaller geographical components, referred to as Traffic Analysis Zones (or TAZs) which store the land use and demographic inputs. The four model steps are:

- ***Trip Generation:*** The process of estimating the number of trips (such as work trips or school trips) originating from and destined to various TAZs.

- ***Trip Distribution:*** The process of modelling 'where trips go' - In other words, this step involves distributing trips from an origin TAZ to various TAZ destinations in the region.

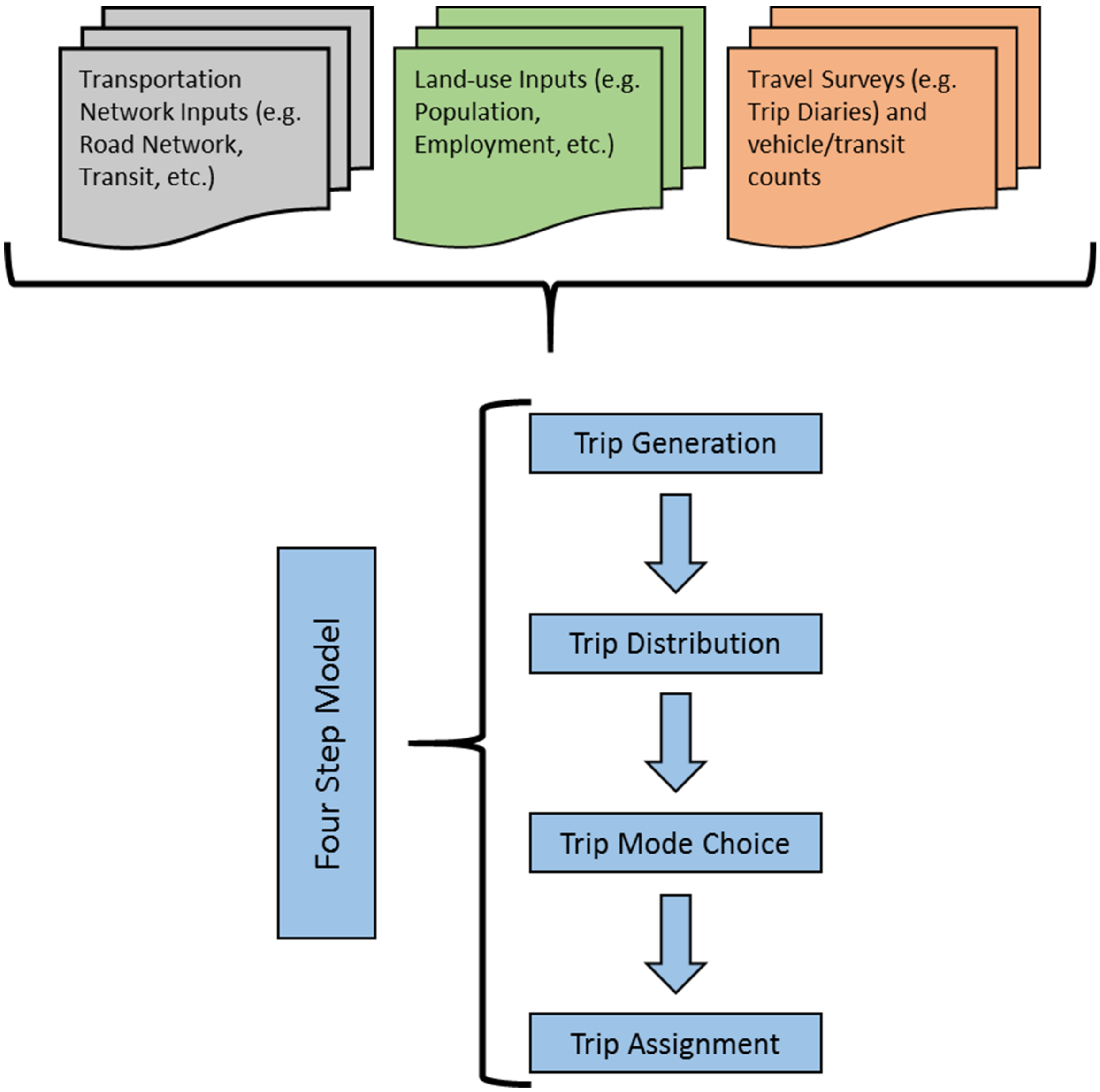
- ***Travel Mode Choice[1]:*** The process of splitting the total number of modelled trips between every TAZ pair into various travel modes – For example if the total number of modelled trips between two TAZs is 100, the mode choice step can split these into 70 trips conducted using a personal vehicle and 30 by transit.

- ***Trip Assignment:*** The process of determining the route choice taken by the trip maker – For example, if there is more than one route connecting two TAZs, the trip assignment process splits the trips between the routes based on various factors such as total travel time and operating cost of each route.

[1] *Note that the current City of Grande Prairie model does not include a transit mode choice sub-component.*

Figure 3-1 illustrates the general framework for the City's travel demand model and its key components and data sources. Each of these components are discussed in more detail in ***Appendix D***.

Figure 3-1: Travel Demand Model Framework



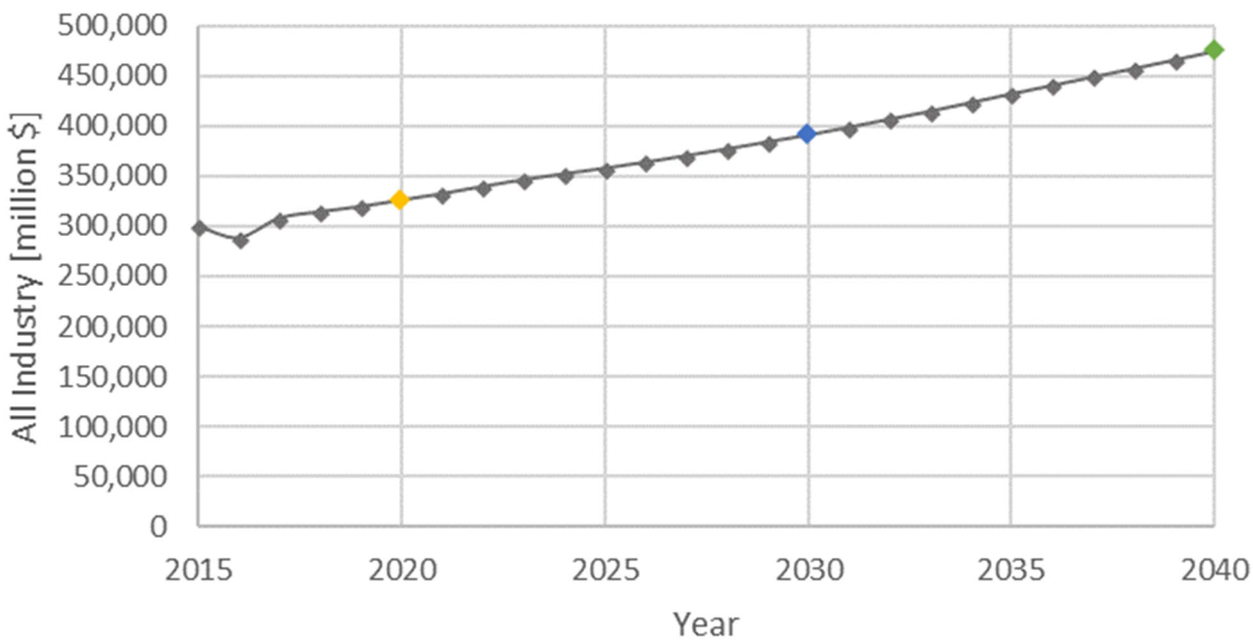
Using this framework, the Grande Prairie EMME model was developed for the Weekday PM Peak Hour. Once calibrated to the base year, the model was then used to forecast PM Peak Hour traffic to future years, as described in the following sections.

3-3. Traffic Forecasts

This section describes the forecast auto demand which is primarily driven by population growth while truck demand is driven by economic growth. Traffic forecasts have been developed for the 70,000, 90,000 and 120,000 population horizons accompanied by an analysis of road network conditions. This series of scenarios is modelled as “Do Nothing”; in other words, no network improvements are made. This is to establish a baseline of network performance information such that a roadway network strategy can be developed to address network deficiencies, as described in ***Module 4***.

For the three growth horizons, the traffic forecasts are based on the City’s development plans (as illustrated in the following sections). In addition, the Alberta provincial Gross Domestic Product forecast is used as a basis for growth in non-residential trip ends, as illustrated in ***Figure 3-2***. The detailed forecasting of future network trips is described in further detail in ***Appendix D*.**

Figure 3-2: Forecast Growth in Alberta GDP



3-3.1. 70,000 POPULATION

With a population horizon of 70,000, ***Figure 3-3*** shows the trip length distribution for this horizon compared to the base year with a noticeable increase in trips within the 2-5 km range. ***Table 3-1*** provides a summary of key system-wide metrics and shows that average trip lengths increase slightly to 4.0 km, Vehicle-Kilometres Travelled (VKT – the total distance travelled by all vehicles in the network during the PM Peak Hour) increases by 30%, and Vehicle-Hours Travelled (VHT – the total travel time of all modelled vehicles in the network during the PM Peak Hour) increases by 62%. The fact that VHT increases faster than VKT indicates that the network is becoming more congested, attestable with the amount of congested lane-kilometres increasing from 2.1 to 3.6 km. This effect is further illustrated in ***Figure 3-4*** which highlights the increased areas of congestion hot spots as well as the areas of development highlighted in dark yellow. This allows the City to correlate future development to increased congestion on the network. In addition to the existing hot spots in the current network, the following corridors become congested:

- 100 St and 116 Ave in the northern part of the city;
- 100 St and Resource Rd just south of the city centre;
- 68 Ave between 100 St and Kateri Dr; and
- Southbound and eastbound approaches to the 68 Ave and 96 St intersection.

Figure 3-3: Trip Length Distribution for 70,000 Population Horizon

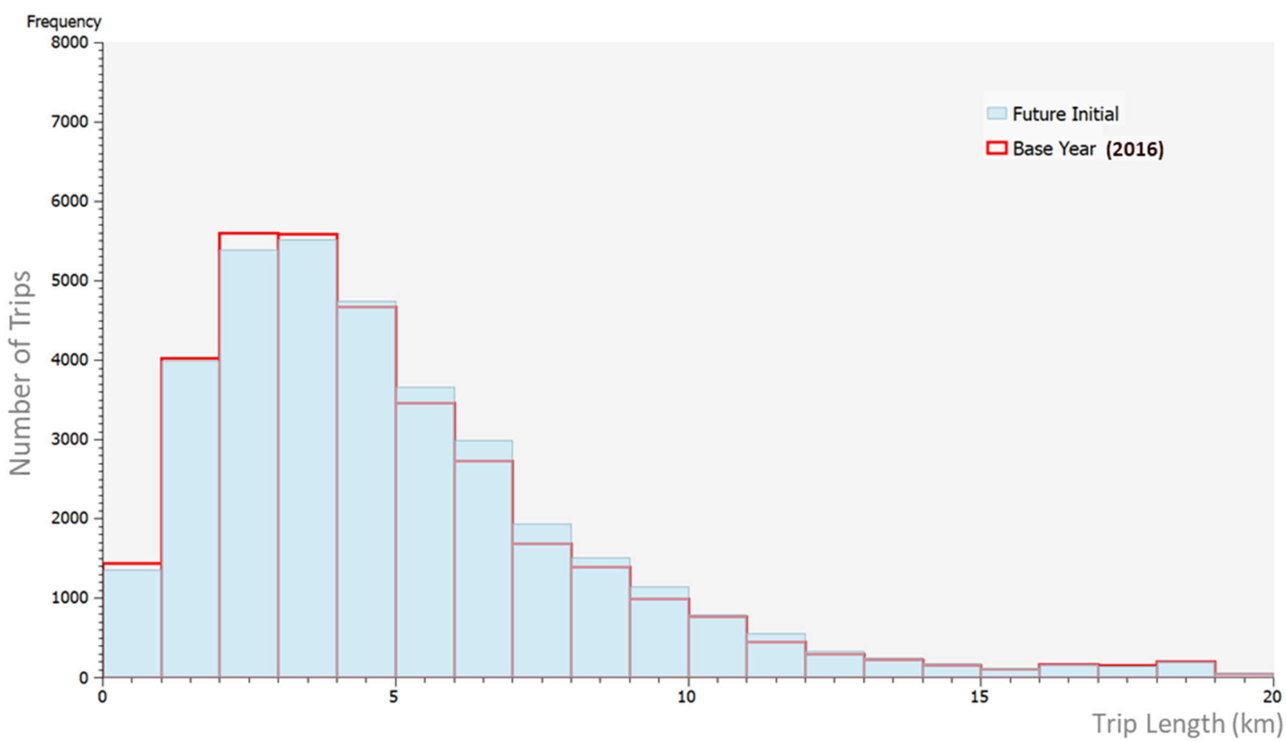
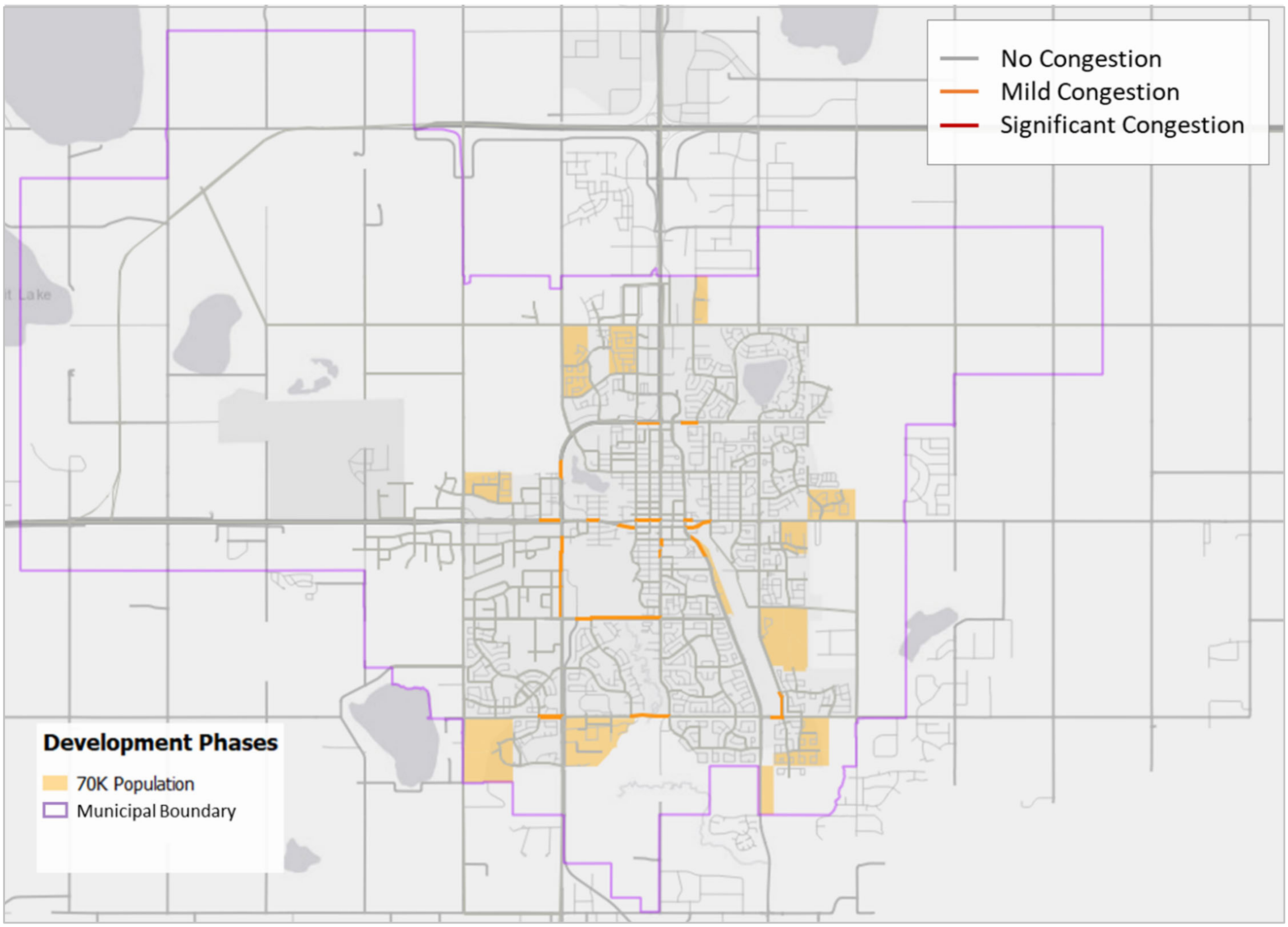


Table 3-1: 70,000 Population Scenario Trip Characteristics with No Improvements

	Average Trip Length [km]	VKT	VHT	Lane-km Congested
Base Year Gravity Model	3.9	139,000	248,000	2.1
70,000 Population Horizon	4.0	167,000	316,000	3.6
% Change (Base-70k)	**11%**	**30%**	**62%**	**183%**

Figure 3-4: 70,000 Population Horizon Network Hotspots with No Improvements



3-3.2. 90,000 POPULATION

With further growth to the 90,000 population horizon, the city sees additional growth in travel demand which results in increased volumes and congestion on the road network. ***Figure 3-5*** shows the trip length distribution for the 90,000 population horizon with significant increases in trips in the 3-10 km range reflective of the development patterns in the outlying areas of the city. This increases the average trip length from 4.0 to 4.5 km between the 70,000 and 90,000 population horizons. Network VKT increases by 30% while network VHT increases faster by 62%. This results in a significant increase in the number of congested lane-kilometres in the network to 10.2 km. This effect is illustrated in ***Figure 3-6*** where the additional network hot spots are highlighted with the development areas highlighted in green. This again allows the City to correlate land development to congestion effects on the network. In addition to the existing and 70,000 population horizon hot spots in the current network, the following corridors become congested:

- 116 St from 132 Ave to 77 Ave;
- Westbound and northbound approaches at the 108 St and 132 Ave intersection;
- 100 St from 128 Ave to 140 Ave;
- Westbound approach at 116 Ave and 92 St intersection; and
- 68 Ave from 114 St to 100 St and 68 Ave from Knowledge Way to 100 St.

Figure 3-5: Trip Length Distribution for 90,000 Population Horizon

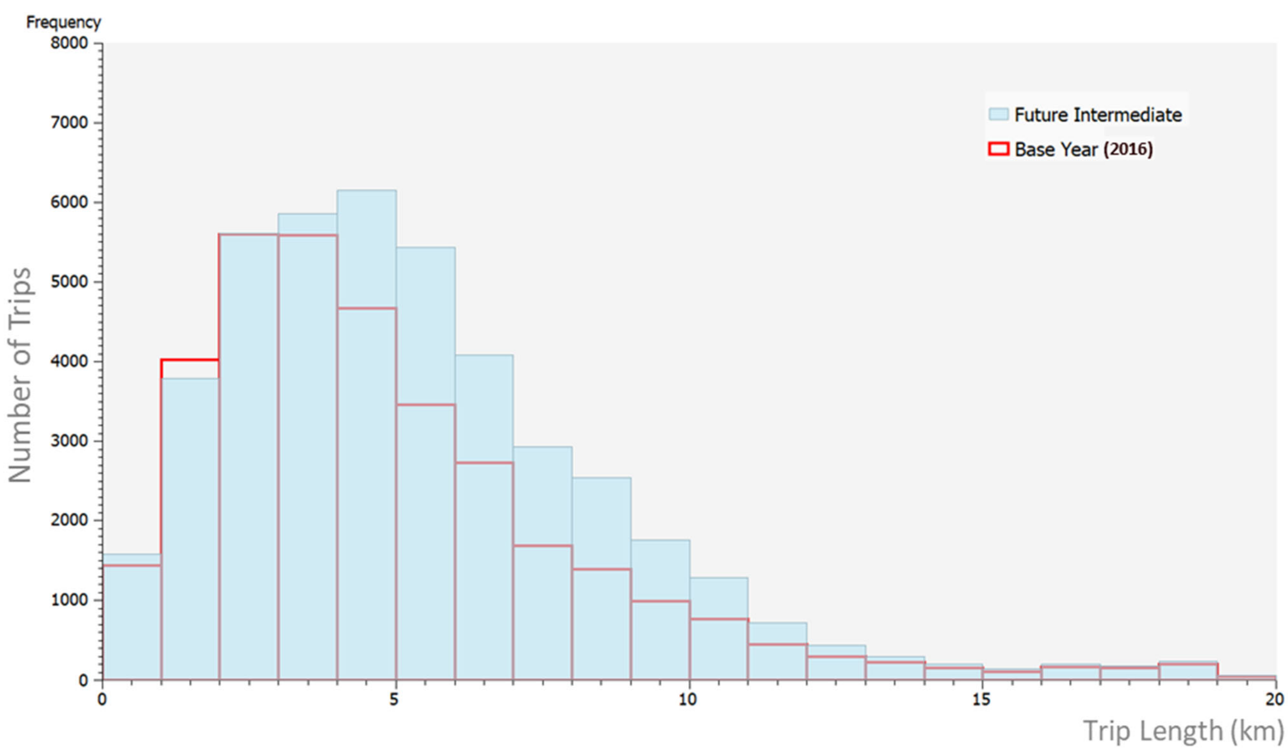
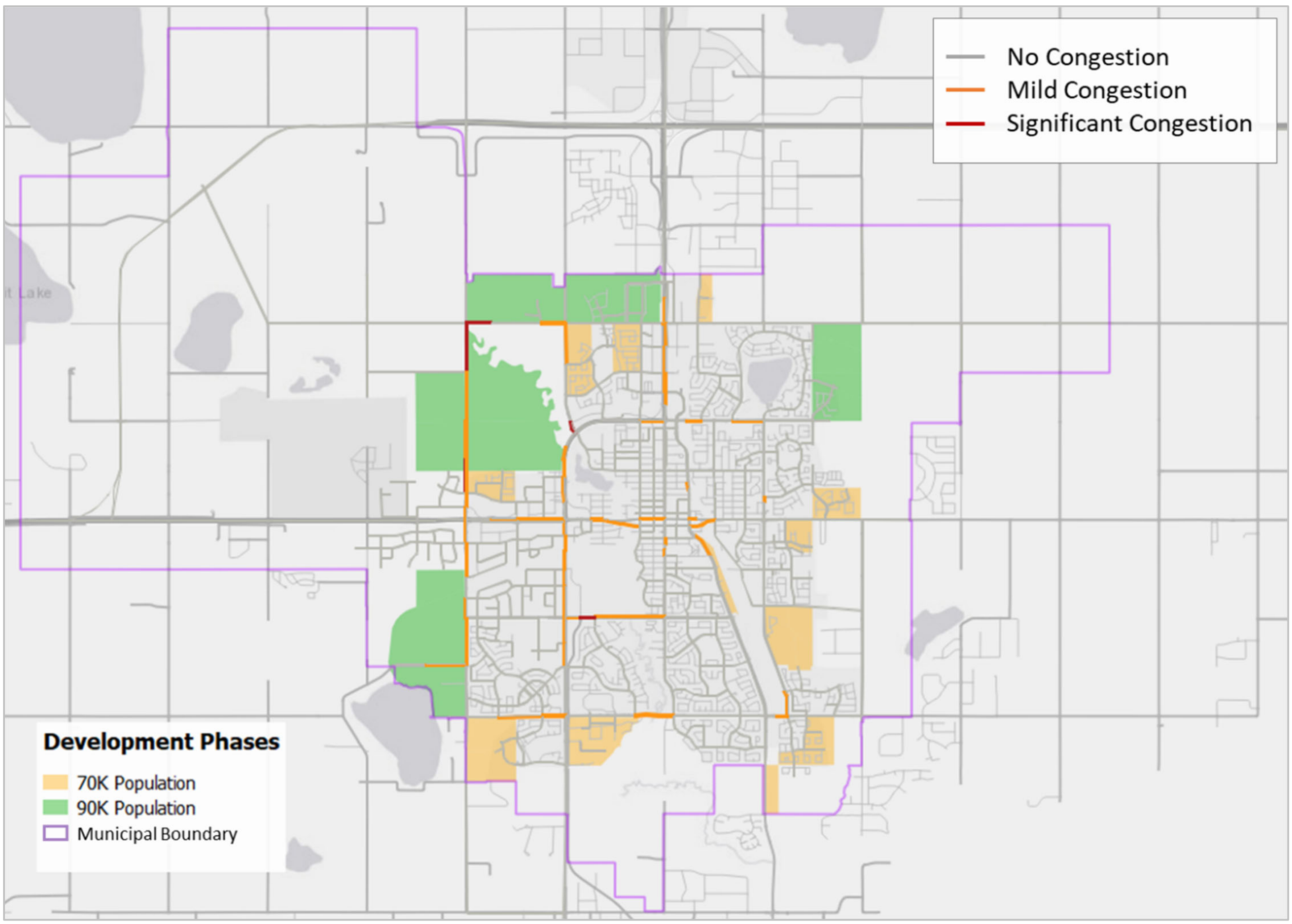


Table 3-2: 90,000 Population Scenario Trip Characteristics with No Improvements

	Average Trip Length [km]	VKT	VHT	Lane-km Congested
Base Year Gravity Model	3.9	139,000	248,000	2.1
70,000 Population Horizon	4.0	167,000	316,000	3.6
90,000 Population Horizon	4.5	217,000	512,000	10.2
% Change (70k-90K)	**11%**	**30%**	**62%**	**183%**

Figure 3-6: 90,000 Population Horizon Network Hotspots with No Improvements



3-3.3. 120,000 POPULATION

With continued growth to the 120,000 population horizon (the ultimate horizon within the study scope), the city will see additional growth in travel demand resulting in increased volumes and congestion on the road network. ***Figure 3-7*** shows the trip length distribution for the 120,000 population horizon with significant increases in trips in the 2-12 km range reflective of the continued development patterns in the outlying areas of the city. This increases the average trip length slightly from 4.5 to 4.6 km between the 90,000 and 120,000 population horizons. Network VKT increases by 32% while network VHT increase faster by 73%. This results in a significant increase in the number of congested lane-kilometres in the network to 34.7 km. This effect is illustrated in ***Figure 3-8*** showing the additional network hot spots with the development areas highlighted in blue. This again allows the city to correlate land development to congestion effects on the network. In addition to the existing, 70,000 and 90,000 population horizon hot spots in the current network, the following corridors become congested:

- 116 St north of 132 Ave;
- Range Rd 55 and Range Rd 54 south of 132 Ave;
- 116 Ave from 96 St to Range Rd 55;
- Range Rd 55 from 116 Ave to south of 100 Ave;
- Segments of 92 St from 116 Ave to 84 Ave
- 84 Ave from Park Rd to Willow Dr; and
- Range Rd 55 north of 68 Ave.

Figure 3-7: Trip Length Distribution for 120,000 Population Horizon

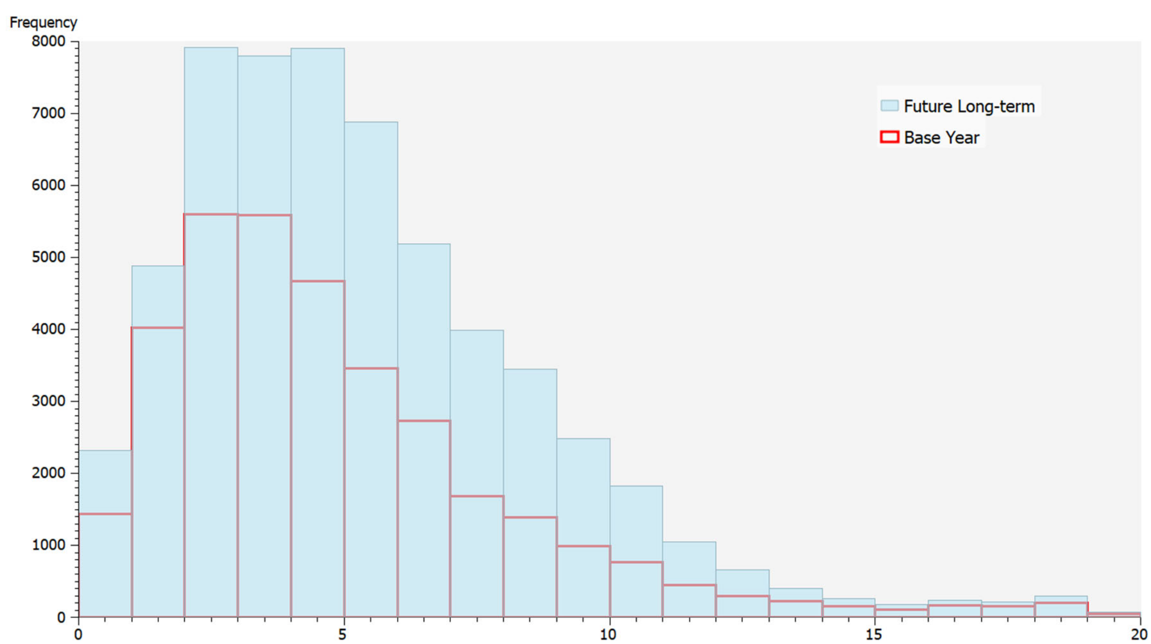
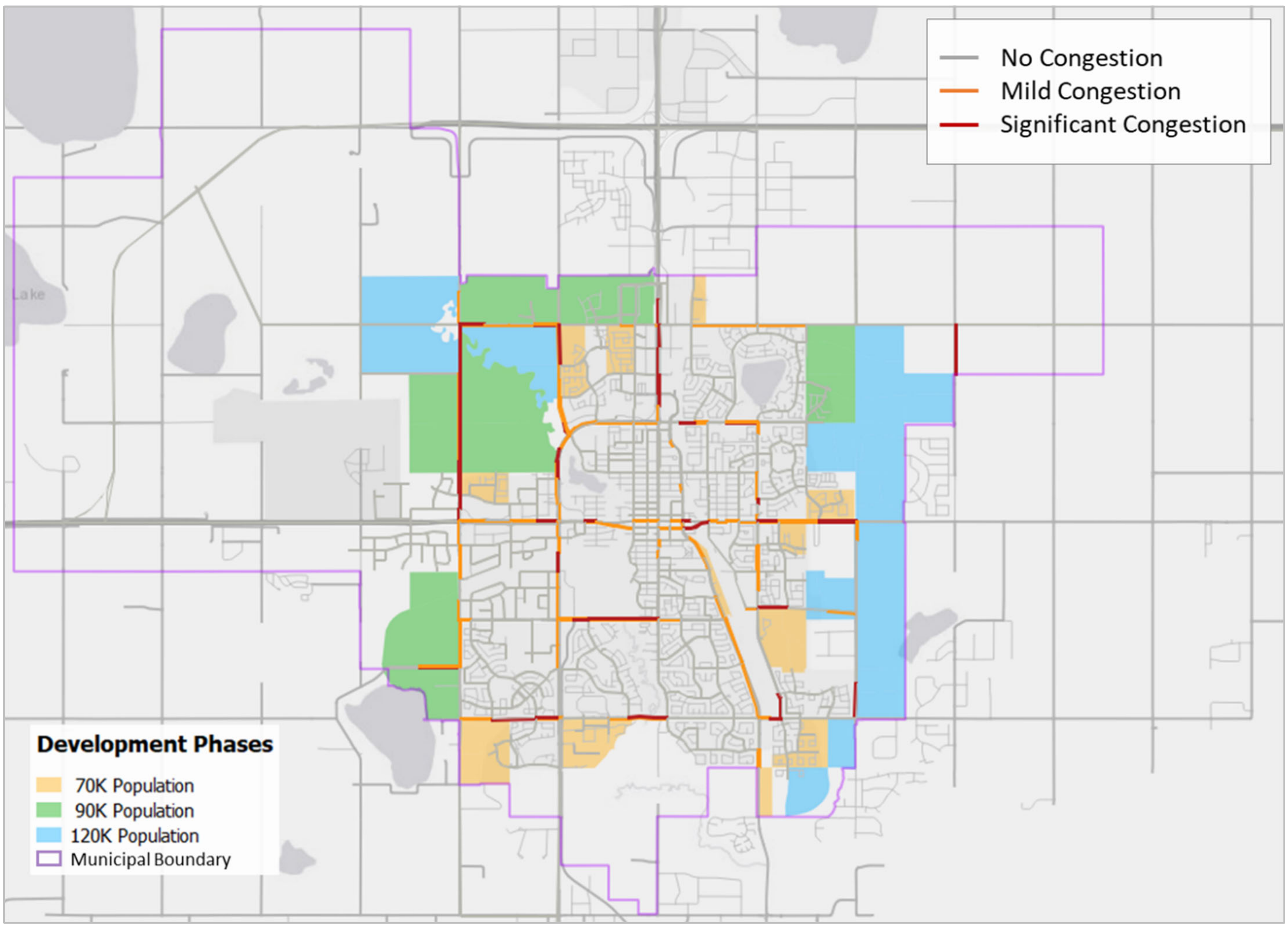


Table 3-3: 120,000 Population Scenario Trip Characteristics with No Improvements

	Average Trip Length [km]	VKT	VHT	Lane-km Congested
Base Year Gravity Model	3.9	139,000	248,000	2.1
70,000 Population Horizon	4.0	167,000	316,000	3.6
90,000 Population Horizon	4.5	217,000	512,000	10.2
120,000 Population Horizon	4.6	286,000	886,000	34.7
% Change (90k-120k)	**3%**	**32%**	**73%**	**240%**

Figure 3-8: 120,000 Population Horizon Network Hotspots with No Improvements



MODULE 4

Road Network Analysis

- EMME network analysis
- Discussion of rail delay issues
- Summary of issues

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4-1. Introduction

As a major city in Northern Alberta, Grande Prairie is heavily reliant on the functionality of the local road network for the movement of people and goods. The city roads serve trips for commuters (to Downtown and the local industries), shoppers (to the Downtown and malls), students (to the public and Catholic schools, and the College), people seeking services (to the hospital and government agencies), and all the commercial and industrial trips between Canfor, the rail yard, the oil fields to the south, etc. The road system is also critical for the transit service, which is directly impacted by delays from traffic congestion. For these reasons, the primary thrust of the Transportation Master Plan is to strategically plan and protect the integrity of the road network.

This module outlines how the EMME model (discussed in ***Module 3***) was applied to identify and prioritize the recommended road network improvements needed to maintain a safe and viable transportation system until the 120,000 population horizon.

Figure 4-1: 92nd Street

4-2. Regulatory Background

The following bylaws impact how Grande Prairie's road network is developed with community growth.

4-2.1. MUNICIPAL DEVELOPMENT PLAN BYLAW

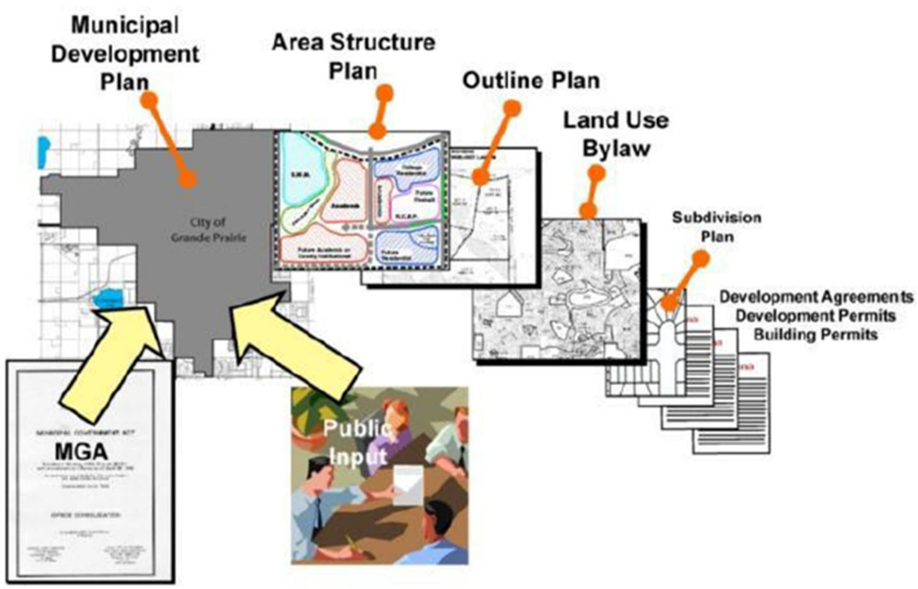
The Municipal Development Plan (MDP, Bylaw C-1237) is a statutory plan and a strategic policy document that provides a framework to guide the location and type of new land uses and development within Grande Prairie. Specifically, the City's Municipal Development Plan addresses the following:

- Future land uses within Grande Prairie
- Proposals for future development plans
- Provision of transportation systems within Grande Prairie and in relation to adjacent municipalities
- Provision of municipal services and facilities

The Bylaw governs all other statutory plans, such as Area Structure Plans (ASPs) and Area Redevelopment Plans (ARPs), as well as the City's Land Use Bylaw (***Figure 4-2***).

Figure 4-2: Hierarchy of Development Plans

Source: Grande Prairie MDP



The key guiding principle in the MDP that relates to the development of the road network is No. 13, which states that the City shall "*Build a comprehensive efficient transportation system that provides for different modes of safe and accessible transport for all our residents."*

Table 4-1 outlines key Municipal Development Plan policies that govern how Grande Prairie's road network is developed with community growth. As shown, road network development is to emphasize user needs, smart growth principles, connectivity and barrier free accessibility.

Table 4-1: Key Municipal Development Policies

Policy Number & Name	Relevance
Policy 4.2 **Contiguous Development**	Development shall, to the extent possible, take place in a contiguous manner such that the required transportation improvements, infrastructure and community services are in place to support it.
Policy 5.2 **Smart Growth Neighbourhood Design Guidelines**	The design of residential neighbourhoods will be encouraged to: e) apply a modified grid street pattern, to the extent possible, as the basis of neighbourhood circulation. i) use collector roadways as transit routes and apply the standards of the Transit Master Plan.
Policy 5.5 **Improve Connectivity**	Council shall develop a strategy through the TMP for improving connectivity within and between new and existing neighbourhoods / major areas. Key priorities include development of a barrier free commuter system for cyclists and pedestrians, development of active transportation design standards and integration of transit.
Policy 6.6 **Smart Growth Principles**	Council supports application of sustainable smart growth principles and design guidelines in new residential areas that result in attractive, inclusive, walkable neighbourhoods with a focus on transit.
Policy 9.4 **Road Standards Review**	Council shall review the City's road standards (Construction and Design Manuals) to allow for a rural cross-section in new industrial subdivisions as a means of reducing development costs.
Policy 12.8 **Pedestrian Design Principles**	The City shall review existing pedestrian design guidelines to ensure consistent integration into all relevant plans (TMP, ASP, ORP, OP), and consider opportunities to achieve a safe, efficient and attractive system that includes wider sidewalks, enhanced landscaping, narrower pavements and barrier free design principles.
Policy 12.10 **Barrier-Free Access**	The City will establish a process to identify the barriers that prevent equal access to existing City services and facilities, then improve accessibility accordingly.
Policy 13.8 **Infrastructure Standards Review**	The City shall undertake a comprehensive review of its infrastructure and design standards to facilitate energy efficiency resulting in more sustainable land use.
Policy 13.13 **Road Classification**	The City shall apply the road classification and network recommendations of the TMP. The recommendations shall be applied to all future ASPs.
Policy 13.14 **Protect for Future Roadways**.	The City shall protect required right-of-way to allow per the recommended road network contained in the TMP
Policy 15.6 **Area Structure Plans**	ASPs will consider arterial and collector roadways, provision of transit service, pedestrian and cycling trail system integration, conformance with neighbourhood Smart Growth Design Guidelights (Policy 5.2)
Policy 15.7 **Outline Plan Requirements**	Plans shall address existing roadways, arterial / collector / local road alignments, proposed transit routes / stops, integration with trail system, truck / DGR, safe road access and safe / convenient pedestrian crossings.

4-2.2. INTERMUNICIPAL DEVELOPMENT PLAN BYLAW

The Intermunicipal Development Plan, adopted as Bylaw C-1248 in June 2010, addresses transportation issues of joint interest between the City and the County of Grande Prairie No. 1. Key policies from the Bylaw that impact the development of Grande Prairie's road network and growth patterns can be summarized as:

- The City and County will support development of regional network improvements outlined in Map 3 (***Figure 4-3***).
- The City and County will share annual road network improvement Capital Plans to promote coordination and joint tendering.
- A half-mile wide referral area is present around the outer annexation area boundary based on the premise that future development in these areas may impact future annexation, requiring coordination between both municipalities.

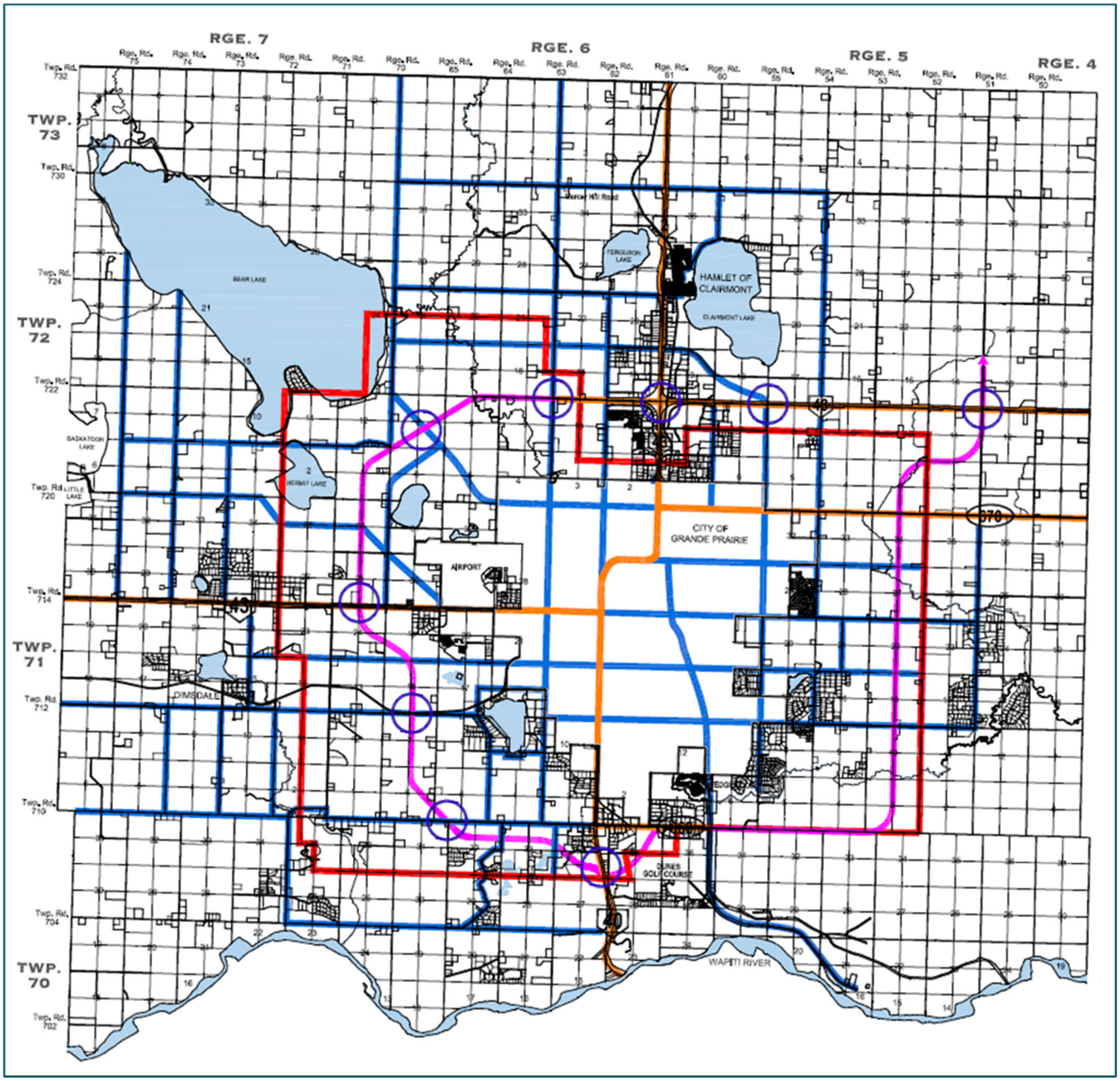
As outlined in these policies, road network development is to emphasize a seamless transition from the provincial highway and county network to the municipal road network, as well as connectivity between municipalities.

4-2.3. LAND USE BYLAW

The City's Land Use Bylaw regulates use and development of land and buildings within Grande Prairie. The Bylaw outlines general development-related parking and on-site loading requirements, as well as physical setback and access needs by specified land uses. Though there is some consideration for potential parking reductions for facilities based on proximity to transit services, as well as bicycle parking, there is generally little provision for development-related integration with overall transportation network and city-wide mobility.

Figure 4-3: Regional Transportation Network

Source: Map 3, Intermunicipal Development Plan



Legend:

- ***EXISTING PROVINCIAL HIGHWAYS***
- ***PROPOSED MAJOR ROAD NETWORK***
- ***PROPOSED BYPASS - PROVINICAL - RING ROAD***
- ***I.D.P. BOUNDARY***
- ***INTERCHANGES - PROPOSED BY ALBERTA TRANSPORTATION***

4-3. Existing Road Network and Cross-Sections

4-3.1. ROAD NETWORK

Grande Prairie's development pattern is divided by two highways, as illustrated in the preceding regional map in ***Figure 4-3.*** Highway 40 runs north / south from 100 Avenue to the south city limits and is under the City's jurisdiction within city limits. Highway 43 currently runs east / west and north / south through the city, connecting the north and west city limits.

The City's road network is divided into arterials, collectors, local roads, and lanes. As described in the guidelines in the Transportation Association of Canada Geometric Design Guide for Canadian Roads (2017), these classifications are based on the road designs, operational needs, traffic volumes, land service, and adjacent land use. Although the design features, operational needs, and adjacent land uses may vary and overlap between different corridor types, traffic and access functions generally govern the determination of the functional classes, as outlined in ***Table 4-2***.

Table 4-2: Road Functional Classifications

Corridor Type	Traffic Function	Access Function
Arterial	Traffic movement is the primary consideration.	Access is restricted to promote optimal traffic movement.
Collector	Traffic movement is important, but not the only consideration.	Access is equally as important as traffic movement.
Local	Traffic movement is a secondary consideration to access.	Access is the primary function
Laneway	Traffic movement is not a consideration.	Access is the sole consideration, particularly for services.

The CN rail line runs north / south and east / west through the city, creating 14 railway-roadway crossings. The alignment of the rail inhibits road and trail connections throughout a large portion of the city and is a significant barrier to connectivity. The at-grade crossings also contribute to delays along key mobility corridors, such as 100 Avenue, 108 Street, 116 Avenue and 116 Street. The options to address the rail crossings are discussed further in ***Module 8: Improvement Options and Evaluation***.

In addition to the railways, there are also natural features (e.g. local creeks, parks, lakes, and environmentally-sensitive areas), existing neighbourhoods, major facilities (e.g. airport), and local industry that constrain the development of the major road network. These areas must be protected, but also create challenges for the transportation system.

4-3.1.1. Arterial Roads

Grande Prairie's arterial network is on a "one mile" grid, such that each major arterial corridor in the north-south and east-west directions is spaced at approximately 1,600m from the other arterials. These corridors generally follow the original district lot boundaries and have been protected accordingly. With the exception of the discontinuity of 84th Avenue at the rail yard, the arterial roads create concentric one-mile ring roads around the city core, as listed in ***Table 4-3***.

Figure 4-4: Existing Grande Prairie Road Network

Source: City of Grande Prairie

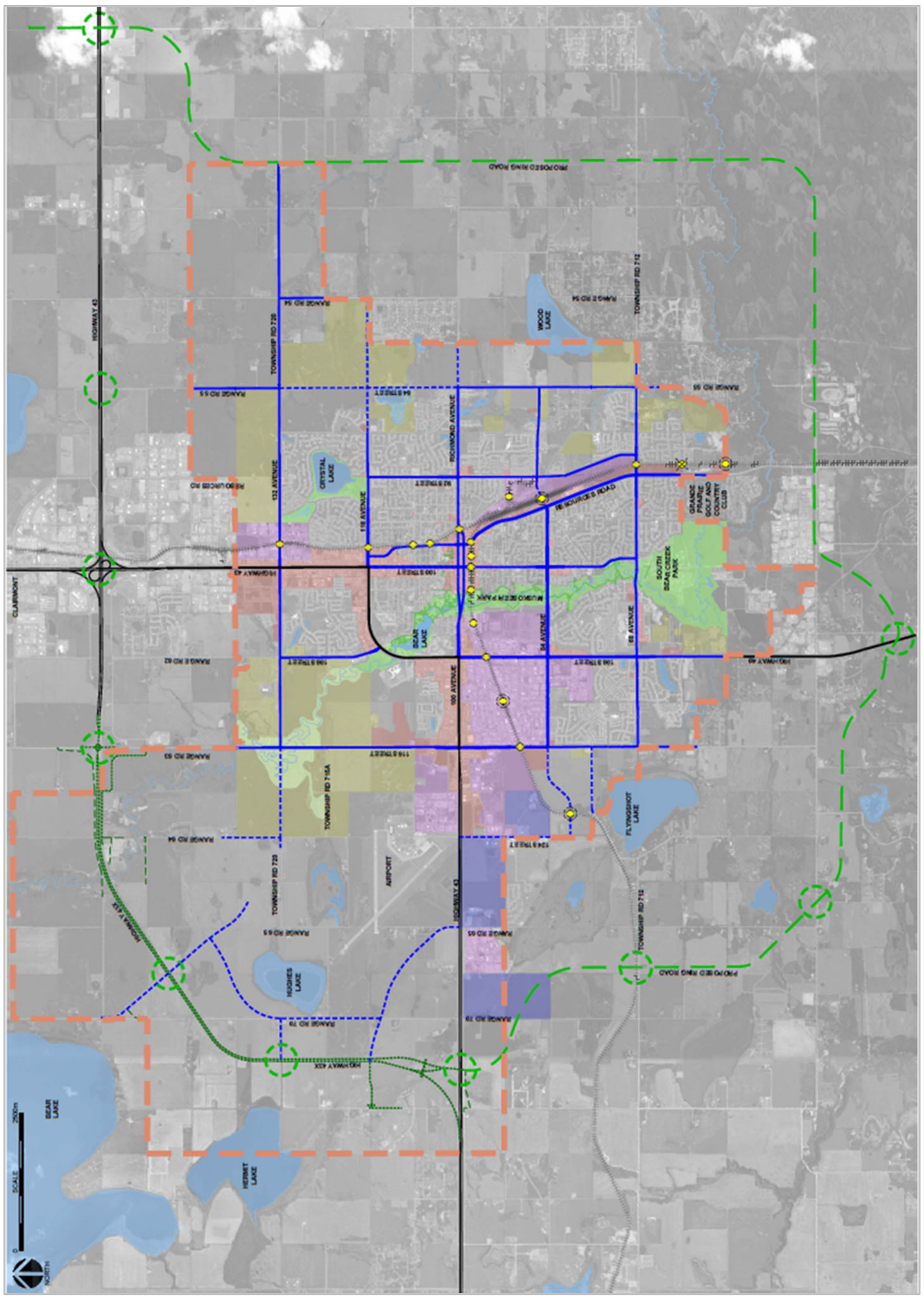


Table 4-3: Arterial Roads in Grande Prairie

Distance from 100th / 100th	East / West Avenues	North / South Streets
Central Roads	100 Avenue	100 Street
"One Mile" Ring (1,600 metres)	84 Avenue (discontinuous at rail yard) 116 Avenue	92 Street (east of rail line) Resources Rd (west of rail line) 108 Street
"Two Mile" Ring (3,200 metres)	68 Avenue 132 Avenue	84 Street 116 Street
Beyond Two Mile Ring		76 Street / Range Rd 54 124 Street

The one-mile grid has been designed well, with four and six lane sections on many of these arterials. However, between these arterials are typically two-lane minor collector roads, which have limited capacity for moving traffic. In the absence of a strong supporting collector (or minor arterial) road network between the arterial grid, the road system has the following issues:

- **Heavier Traffic Demands**: There is much greater traffic demand on the arterial road system, prematurely warranting six lane sections to ensure the system capacity can accommodate the peak hour demands. Further, there can be problematic levels of vehicle turning demand at each arterial road intersection, which increases delays, as well as the warrants for double (or triple) turning lanes.
- **Longer Trip Distances**: Local trips are more circuitous, as the choices for arterial travel are 1,600m apart. This impacts the total Vehicle-Kilometres Travelled (VKT) on the network.
- **Increased Safety Concerns**: Wider arterial roads increase potential conflicts from turning, weaving, and stopping, and especially increase hazards for vulnerable road users (pedestrians, cyclists, etc.).
- **Poorer System Reliability**: Any closures of arterial links due to maintenance, rehabilitation, or traffic incidents immediately impact the system performance, and options for detouring traffic are not generally convenient.

To reduce the pressure on the arterial road system, the City should pursue the development of the supporting road network between the mile grid wherever possible. This can be as opportunities arise within the existing developed area, and especially in future development areas.

4-3.1.2. Collector and Local Roads

Outside the arterial road network, the collectors and local roadways comprise the bulk of the road network, connecting and accessing developments within the city. Every development area includes a network of collector and local roads to provide access to developments and connect to the arterial network. These roads are inherently a function of their respective development areas and are therefore not generally analyzed as part of the Transportation Master Plan. The development of the collector and local road system is therefore left to the city development standards and guidelines, and the Area Structure Plans in which they are situated.

4-3.2. CROSS-SECTIONS

The City's design standards were updated in 2018 and reflect industry best practices from the guidelines established by the Transportation Association of Canada (TAC). Based on these guidelines, the following functional considerations are applied for each class of roadway.

Table 4-4: Functional Considerations by Class of Roadway

Road Class	Posted Speed	Laning	Right-of-Way	Daily Traffic Volume	Lane Width	Intersection Spacing
Arterial	60 – 70 km/h	4 - 6 lanes divided and undivided	38 - 58.5m	5,000 - 30,000	3.5 m (min)	400-800 metres
Collector	50 km/h	2 lanes	23.6 – 30m	1,000 - 8,000	3.5 – 6.25m	100-200 metres
Local	50 km/h	2 lanes	20 – 28m	< 3,000	3 – 5.5m	80-100 metres
Lane	20 km/h	n / a	10m	< 500	3m	n/a

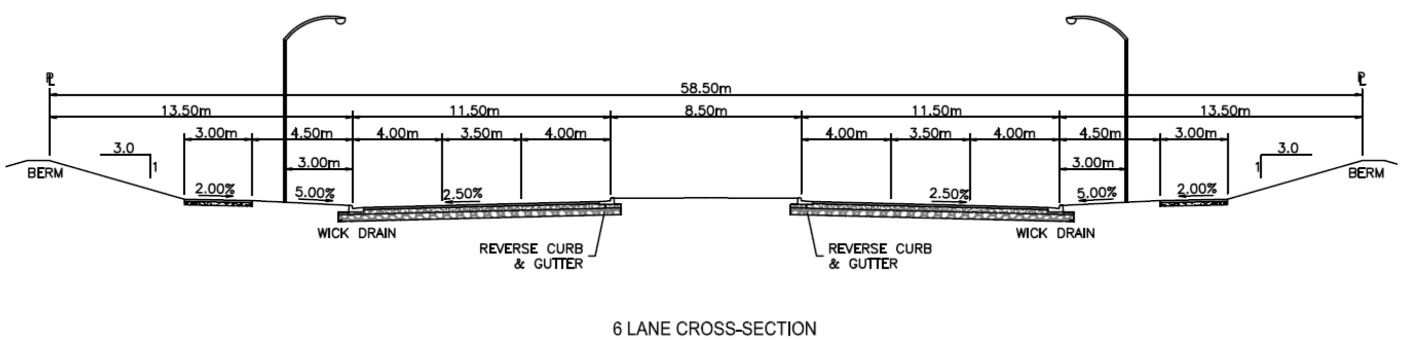
Grande Prairie's typical cross-sections are provided in the City's Design Standards, which are summarized below. These standards can be updated and revisited if and as required following the completion of the Transportation Master Plan.

4-3.2.1. Arterial Roads

The arterial cross-sections identified in the City's design standards apply 3.5 to 4.0m width lanes and 3m wide pathways on both sides of the corridor separated from the road travel way by a 4.5m wide buffer / boulevard (***Figure 4-5***). Additionally, median widths typically range from 5.0 to 8.5m to accommodate turn bays. The City's design standards do not include cross-sections for undivided arterial corridors.

The City's typical cross-sections for urban arterials reflect standard industry practices and ensure preservation of sufficient right-of-way to accommodate multiple types of users (active and vehicular), auxiliary lanes, turn bays, streetscaping, gateway features, lighting and drainage.

Figure 4-5: Six Lane Arterial Road Cross Section
Source: City of Grande Prairie Design Standards

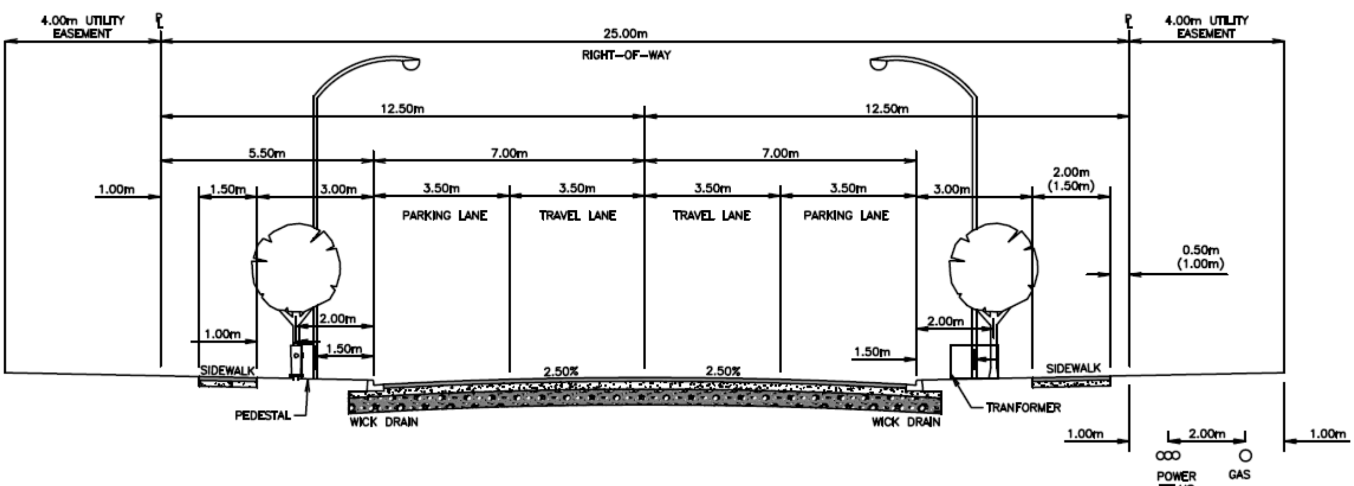


4-3.2.2. Collector Roads

The City's typical cross-sections for collector roadways are subdivided by adjacent land use, with different requirements for residential and commercial / industrial collector corridors. All cross-sections identify sidewalks on both sides of the road that are separated from the road travel way by boulevard. However, available right-of-way is portioned differently in consideration of different road user needs depending on the land use context. For example, while residential and commercial / industrial collectors may both have approximately 23m of right-of-way, the residential cross-section will have narrower travel lanes of 3.5m to allow for 2.75m wide on-street parking lanes while the commercial / industrial cross-section will allocate 6.75m entirely to the travel way, omitting on-street parking allowances. Similarly, the wider collector cross-section allocates more space for a combined bike / parking lane on either side of the road in residential areas, whereas only a narrower on-street parking lane is provided for in commercial / industrial areas.

The City's typical collector cross-section (**Figure 4-6**) provide ample room to accommodate the varying user, access and utility needs that are typically associated with this class of corridor. Further, including sidewalks and/or pathways on both sides of the corridor, regardless of land use context, shows foresight in preserving space for multi-modal considerations. However, some additional consideration for cycling infrastructure may be beneficial, where on-street shared-use cycling facilities are only shown in a residential context. Since cycling demand is generally not limited solely to residential corridors, but rather extends onto commercial / industrial corridors, some additional cross-sections showing more options to incorporate cycling infrastructure may prove useful to help the City guide allocation of right-of-way in new developments.

Figure 4-6: Commercial Collector Cross Section
Source: City of Grande Prairie Design Standards

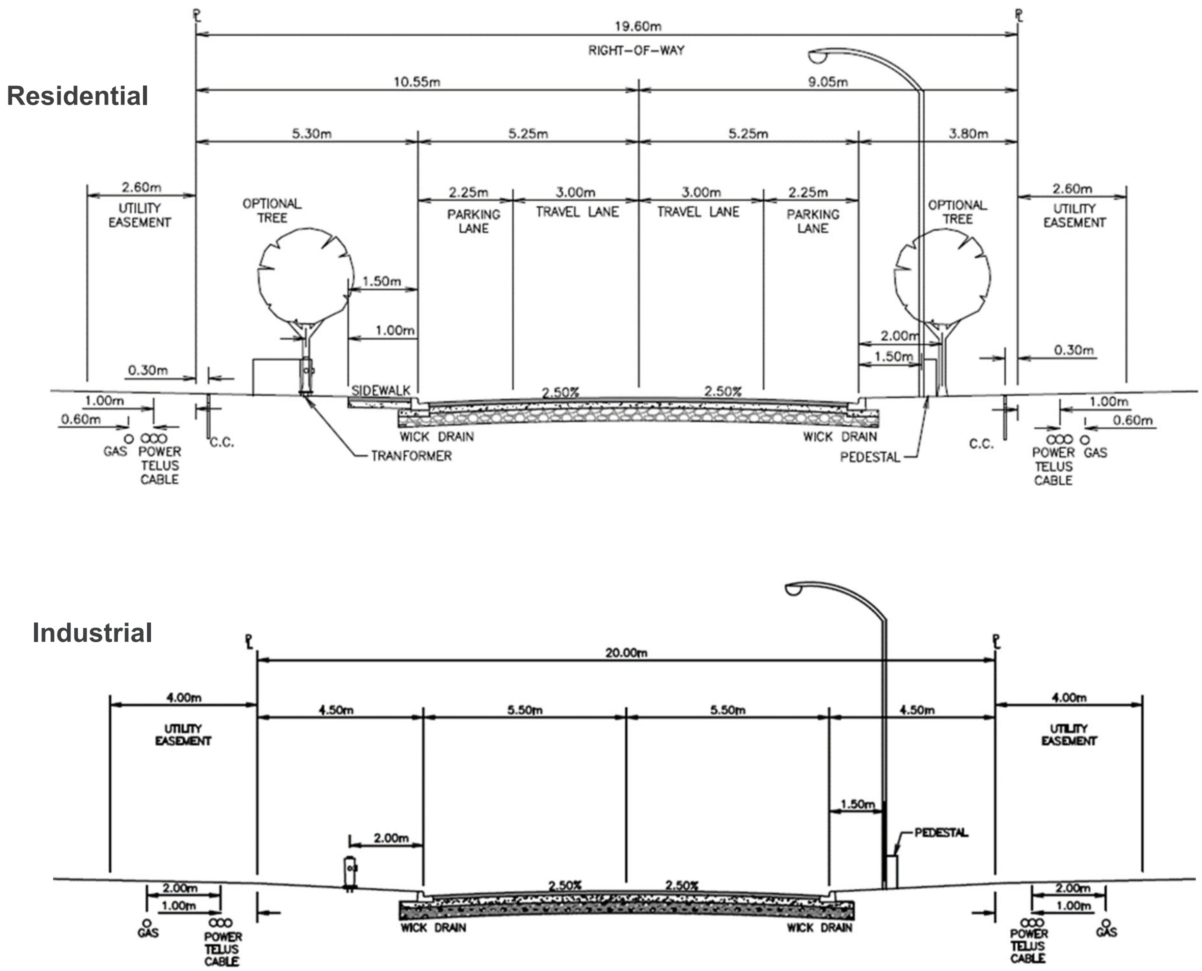


4-3.2.3. Local Roads

The City's typical cross-sections for local roads differentiate between residential and industrial (***Figure 4-7***) land use context, as well as urban and rural development context for the industrial sub-category. The residential cross-section identifies space for a convention sidewalk on only one side of the corridor with on-street parking allowances on both sides of the roadway and narrower (3.0m) travel lanes. The local industrial cross-sections provide no allowance for sidewalks nor on-street parking.

The City's typical local cross-sections are also generally standard for most municipalities. However, they perpetuate an infrastructure gap pertaining to active mobility, where pedestrians are limited to one side of the road in residential areas and have no accommodations in industrial areas. This infrastructure gap is often viewed as a barrier to active transportation and transit utilization, because people have no safe means of connecting from their origin to their destination, whether it's walking from their home to a destination or from a bus stop to their place of employment. Given that local roads tend to make up a large portion of a community's road network, this infrastructure gap can present a very significant disincentive to alternative modes of transportation.

Figure 4-7: Local Road Cross Sections
Source: City of Grande Prairie Design Standards

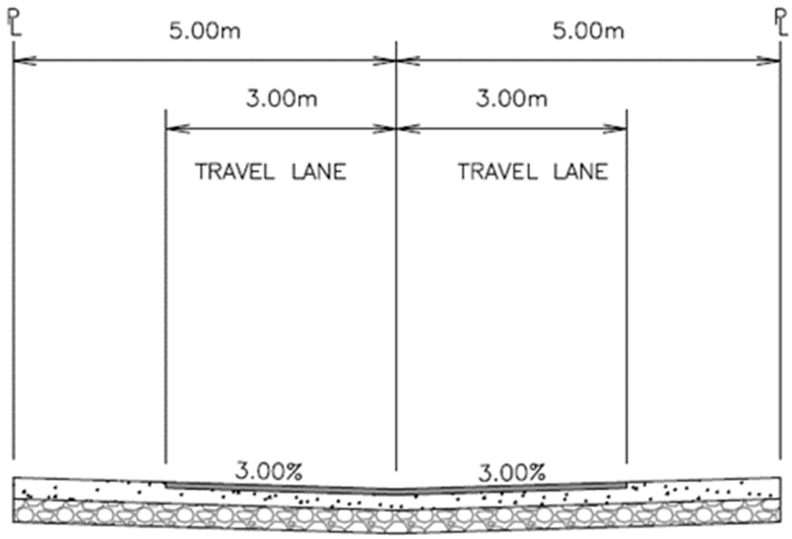


4-3.2.4. Lanes

The City's rear lane cross-section is identified only for a residential context, providing up to 10m right-of-way and 3 m wide lanes for bidirectional travel (***Figure 4-8***). While the right-of-way and travel widths are fairly typical for laneways, the City may wish to review potential commercial laneway configurations for new developments to allow for more diverse development types that focus building frontage towards the street and require consideration for rear land service.

Figure 4-8: Residential Lane Cross Section

Source: City of Grande Prairie Design Standards

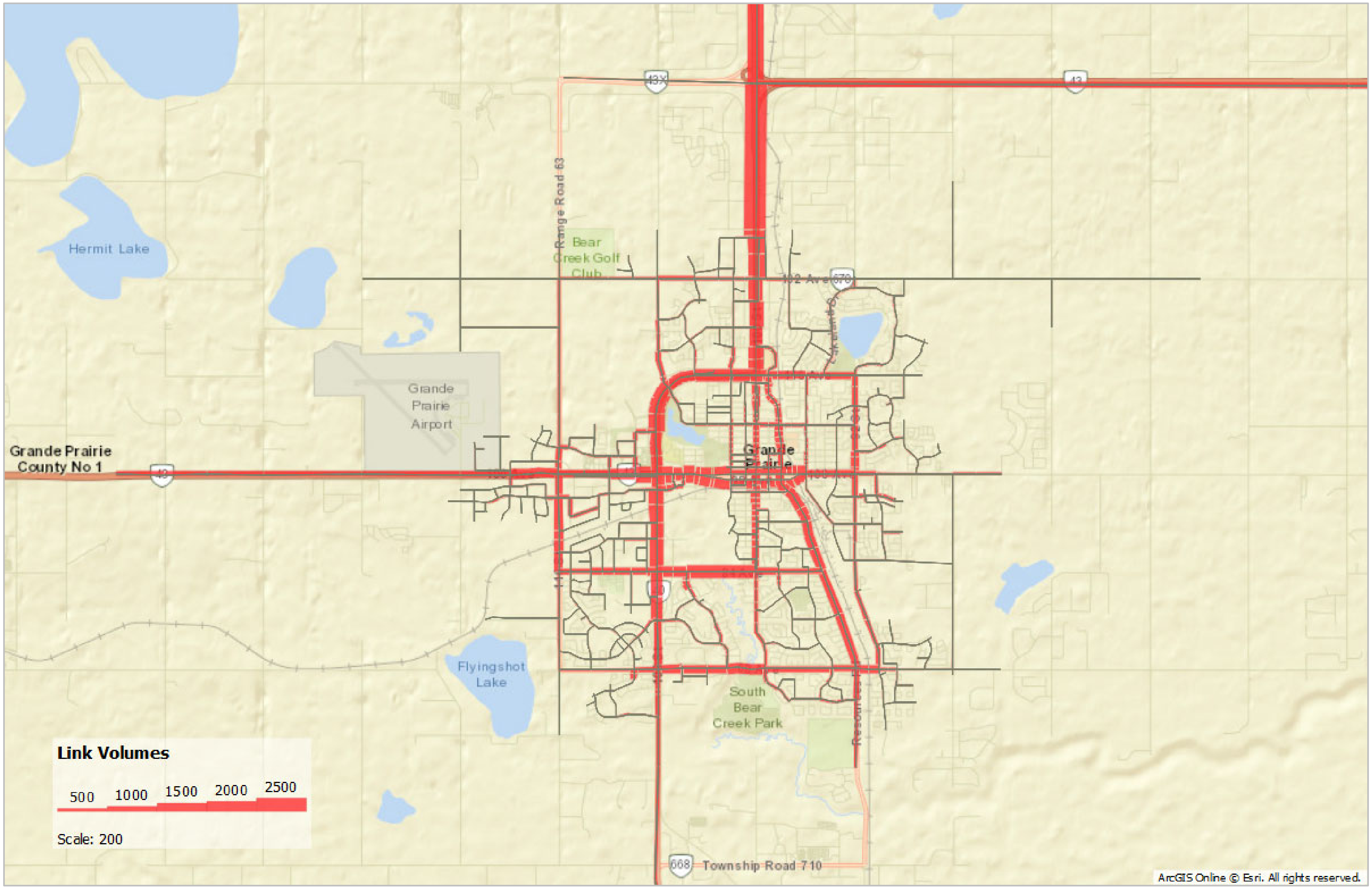


4-4. EMME Road Network Analysis

As discussed in ***Module 3***, a comprehensive EMME transportation model was developed for Grande Prairie. This model is used to analyze the existing road network performance and forecast "bottlenecks" in the future growth scenarios. To address the identified network issues in each horizon scenario, suggested projects are identified and modelled to provide high-level assessments of their effectiveness.

The road performance is measured as a volume-capacity ratio, an approximation for level of congestion. ***Figure 4-9*** maps the observed afternoon peak traffic volumes in the City of Grande Prairie for 2016 base year conditions. The width of each link represents the hourly traffic volume on that link. Traffic volumes are forecast to future horizon population scenarios using the City's travel demand model.

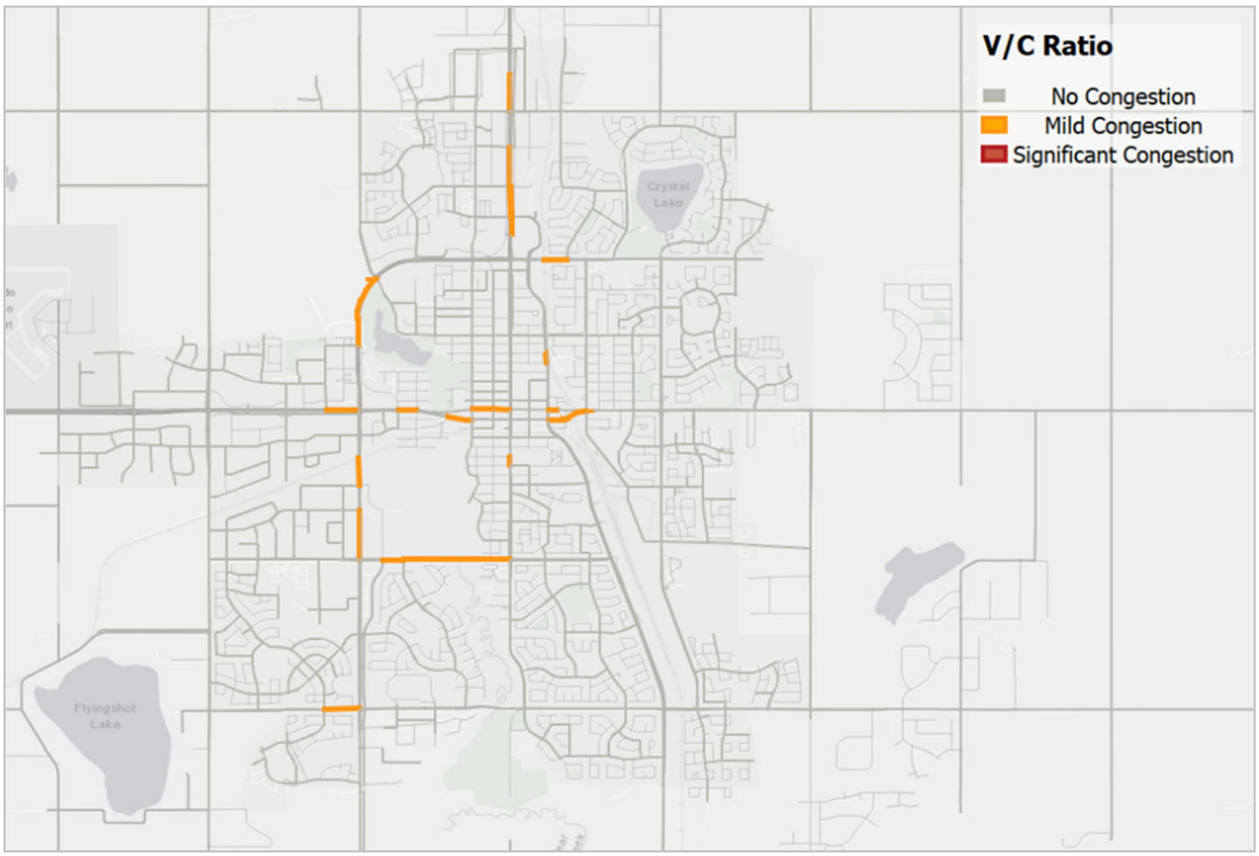
Figure 4-9: 2016 Base Year PM Peak Traffic Volumes



The capacity of each link is estimated based on the road classification and intersection control type. Volume and capacity combined yields the volume-capacity (v / c) ratio: an indicator of congestion levels. A ratio under 0.6 means the traffic is flowing well; a ratio of 0.6 or above means the roadway has mild congestion: the traffic flow is stable but the speed and freedom to maneuver are restricted; a ratio of 0.8 or above suggests the roadway would experience significant congestion.

Figure 4-10 shows the existing congestion levels during the afternoon peak hour. None of the major corridors are experiencing significant delay, however Highway 43, 100 Ave and 84 Ave are operating at mild congestion levels – these corridors are prone to delay if the traffic volume increases.

Figure 4-10: Existing PM Peak Levels of Congestion



4-4.1. 70,000 POPULATION HORIZON

Figure 4-11 illustrates the expected locations of new development areas for the 70K population horizon in orange, as well as the forecast traffic volumes on the existing network when the city reaches this population level. The resulting level of congestion is mapped in ***Figure 4-12***, which shows the mild congestion hotspots correlated to the new development areas. The west approach of Highway 43 in particular shows signs of significant congestion; therefore, improving roadway capacity at this location would be desired to manage the performance of the network during peak conditions.

Figure 4-11: Traffic Volume at 70k Population with Existing Network

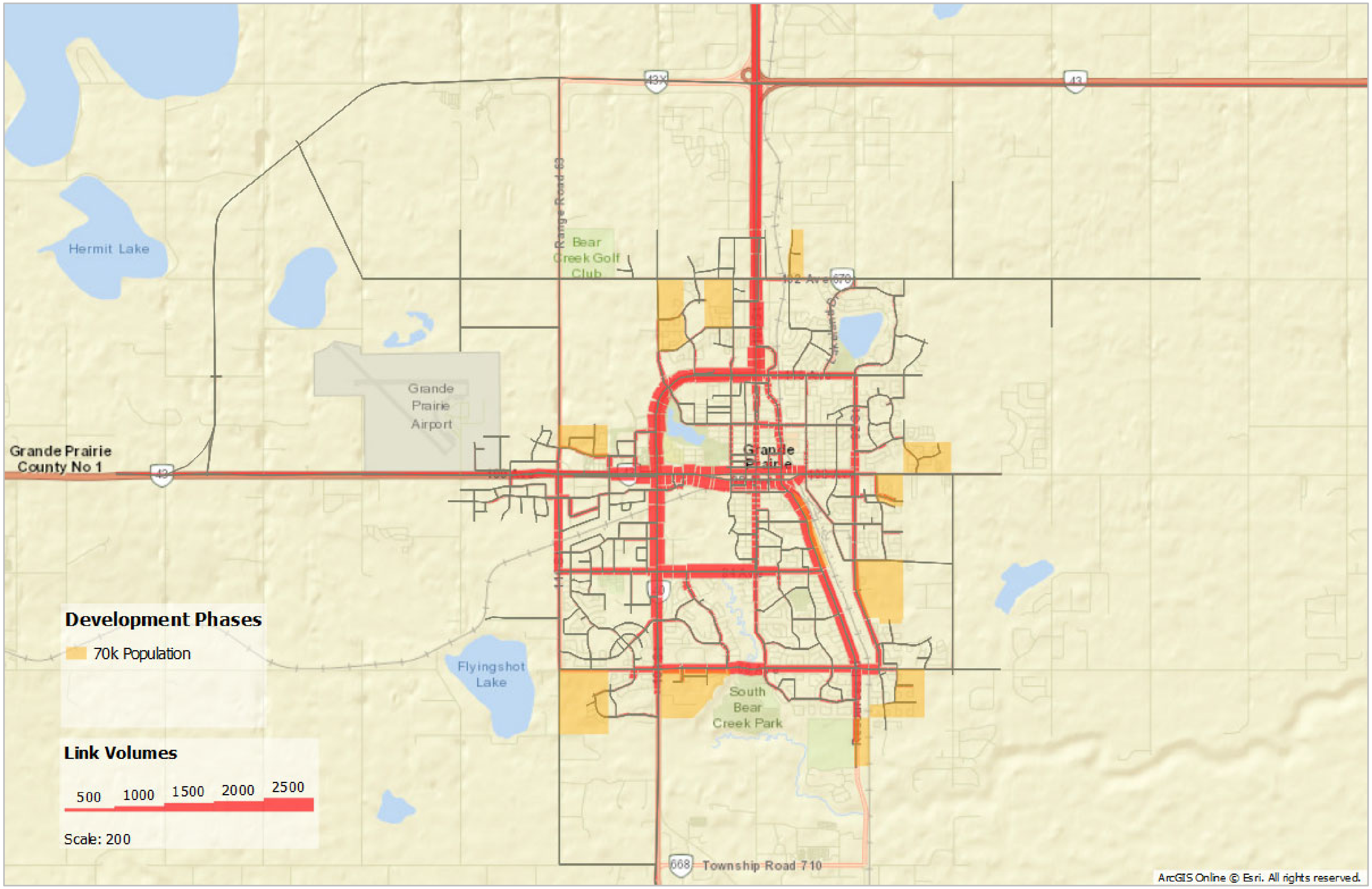


Figure 4-12: Levels of Congestion at 70k Population with Existing Network

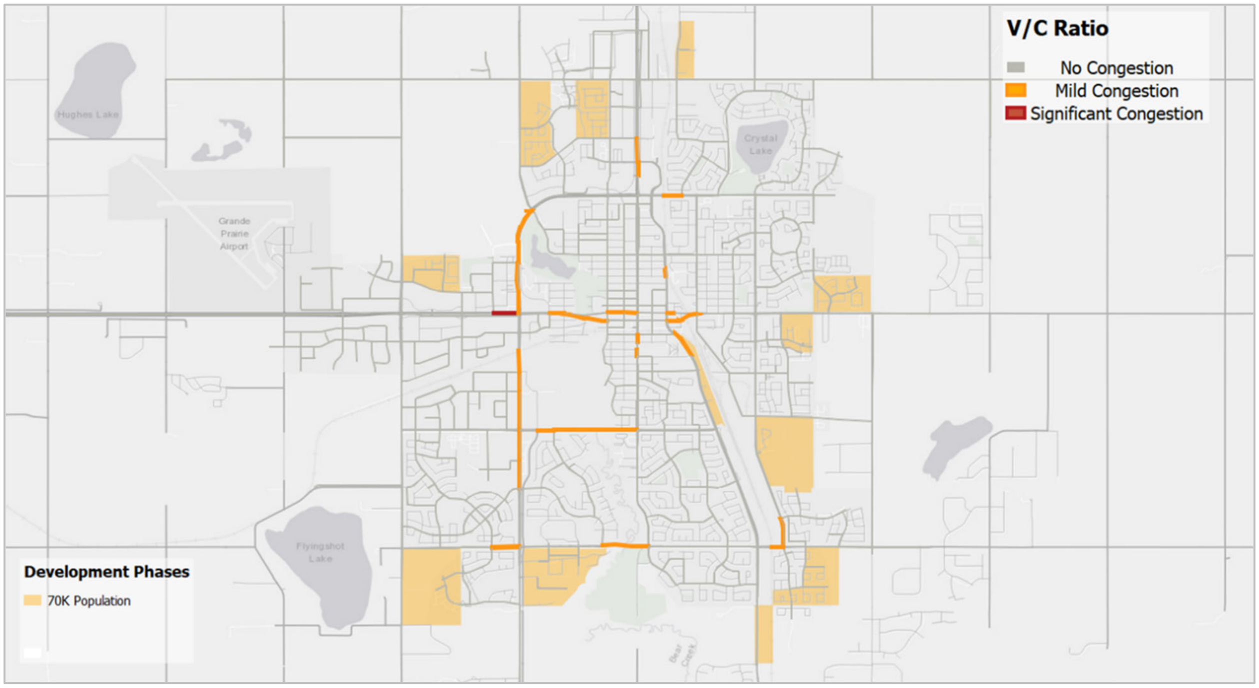


Table 4-5 outlines the candidate projects to be considered between the existing condition and the 70K population horizon to address the predicted traffic congestion. These projects are illustrated in orange in ***Figure 4-13***, which also includes circles identifying the candidate locations for intersection improvements (e.g. signalization, etc.). As discussed in ***Section 4-3.1.1***, the traffic congestion could alternatively be addressed by constructing new links to parallel the congested roads. However, as the congested roads are in the developed part of the city, the construction of new major road links would generally be cost-prohibitive, if not infeasible.

Table 4-5. Short Term Road Network Improvements for 70k Population Scenario

	Road Name	Recommendation
1	Hwy 43X	New provincial connector[1] from 116 St to 100 Ave (H43), with new connection to 132 Ave / 132 Street
2	100 St (H43)	Six lane 116 Ave to 132 Ave
3	108 St (H43)	Six lane Bridge to 100 Avenue
4	100 Ave (H43)	Six lane 112 St to 106 St
5	116 Street	Formalize / upgrade truck route to Hwy 40 via 116 St and TWP Rd 710
6	108 St	Twinning from TWP Rd 704 to 68 Ave

[1] Hwy 43X opened September 2019 and is now officially designated as Hwy 43.

Figure 4-13: Proposed Short Term Projects for 70k Population Horizon

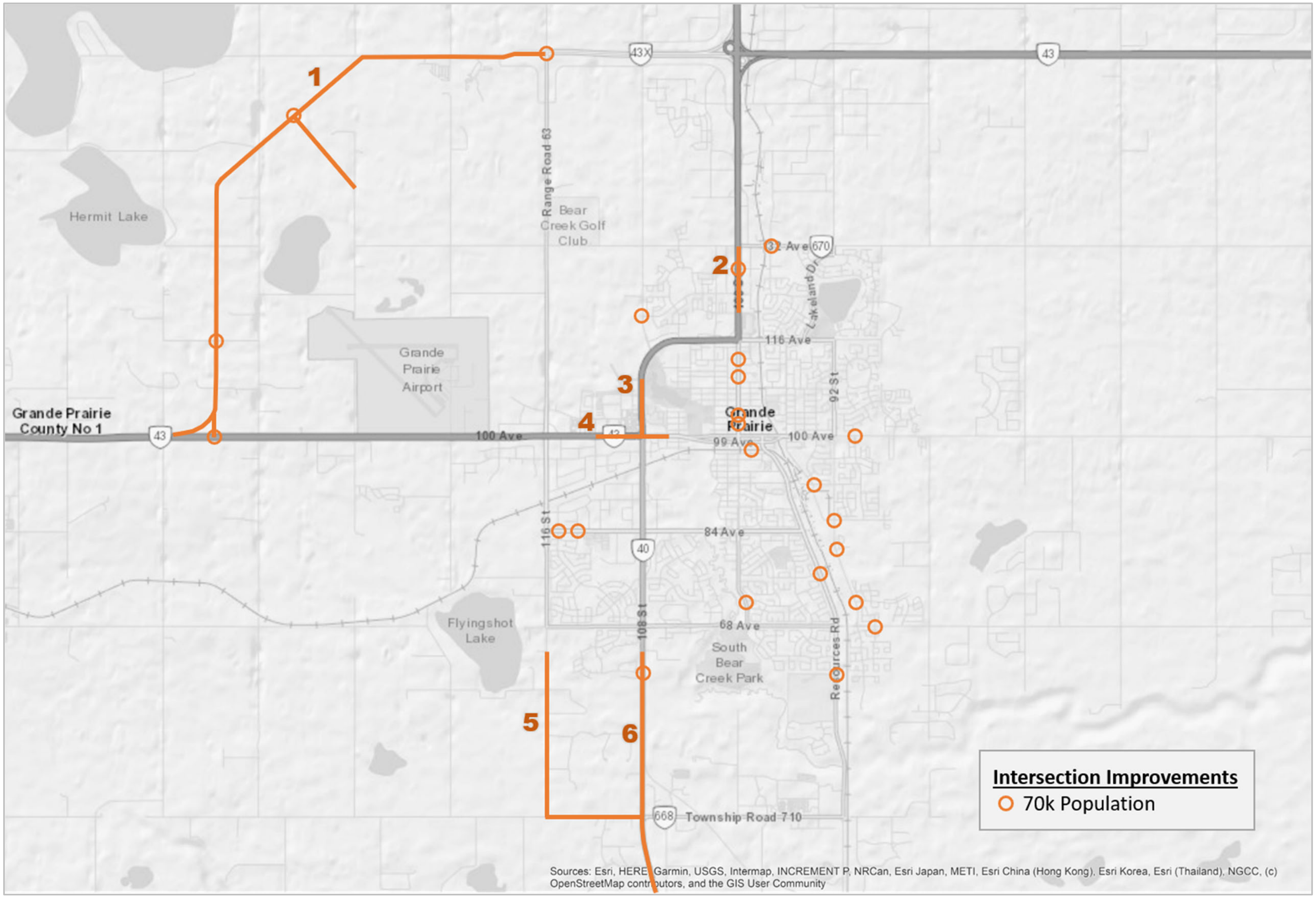


Figure 4-14 illustrates the anticipated traffic pattern shifts at the 70K population horizon with and without the proposed network improvements. For example, the proposed improvements are expected to increase the traffic on Highway 43 (108th Street) from 18% to 25%, depending on the section of the highway.

Figure 4-14: PM Peak Traffic Pattern Shift with Proposed Short Term Network Improvements

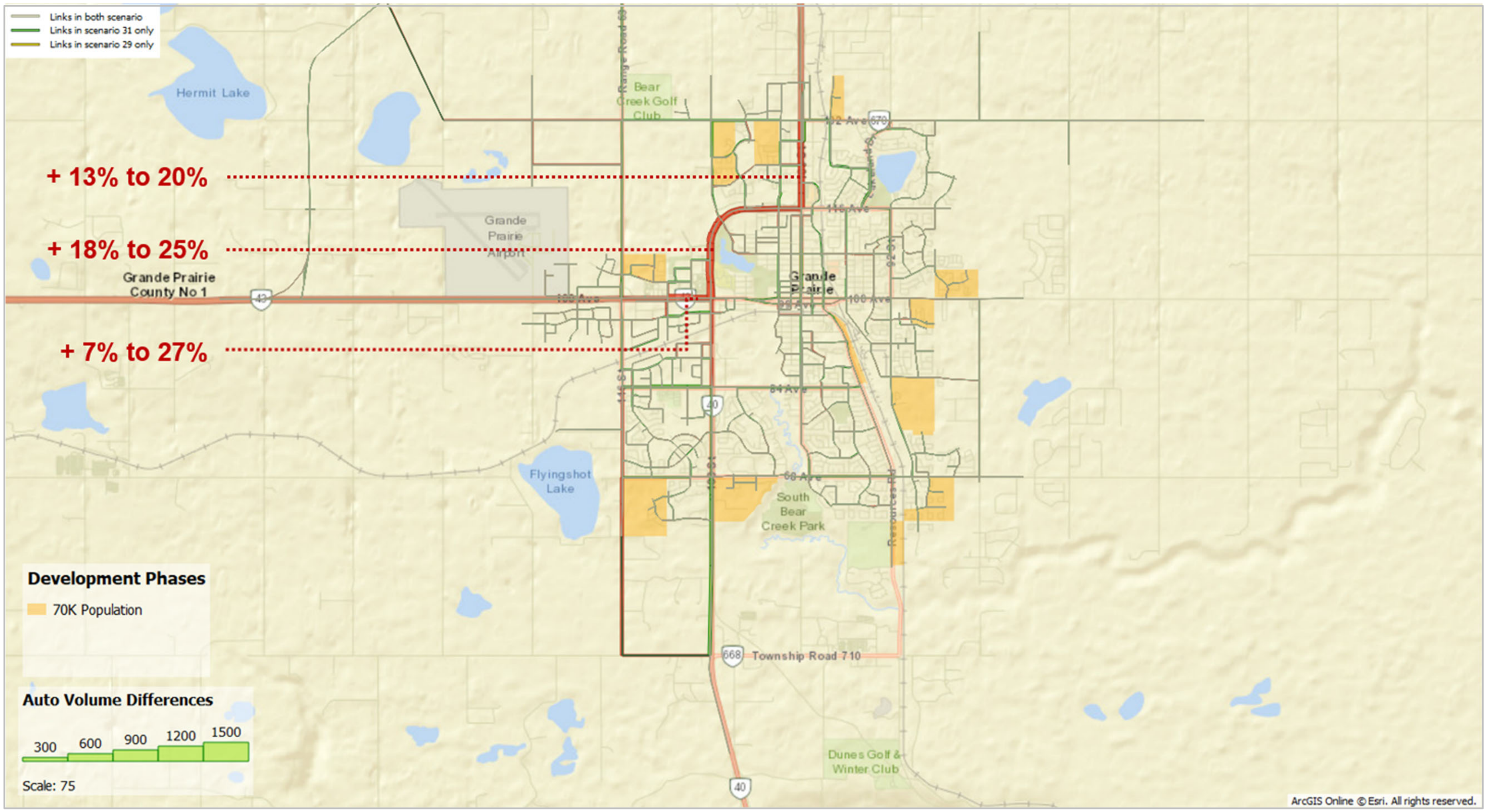
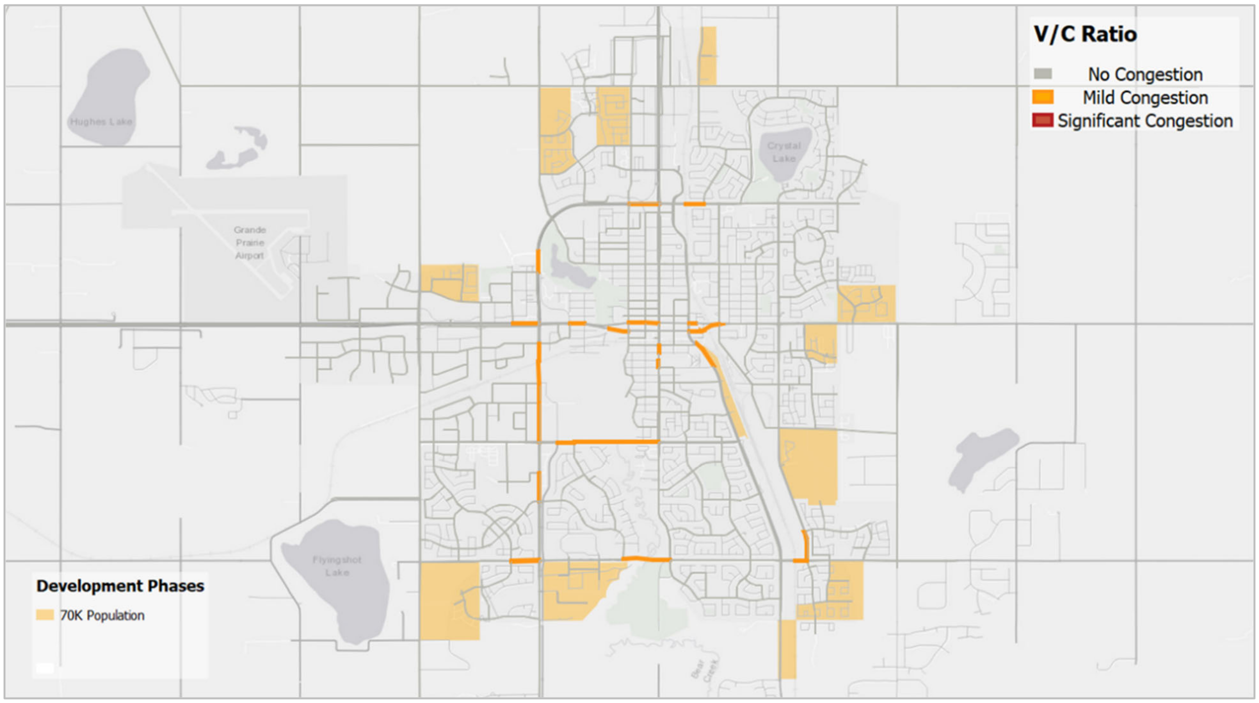


Figure 4-15 illustrates the reduction in the level of congestion for the 70K population scenario after the proposed network improvements have been implemented. The significant congestion hotspots have been either eliminated or significantly reduced.

Figure 4-15: Levels of Congestion at 70k Population with Short Term Improvements



4-4.2. 90,000 POPULATION HORIZON

Figure 4-16 illustrates the expected development locations to reach the 90K population horizon, and the resulting traffic volumes. The developments are concentrated along 116th Street and 132nd Avenue, and the northwest corner of the city, as highlighted in green. This scenario is based on the assumption that the proposed short term network improvements for the 70K population have been implemented. ***Figure 4-17*** shows the increased levels of congestion on the road network as a result of the 90k population horizon.

Figure 4-16: PM Peak Traffic Volumes at 90k Population with Short Term Improvements Only

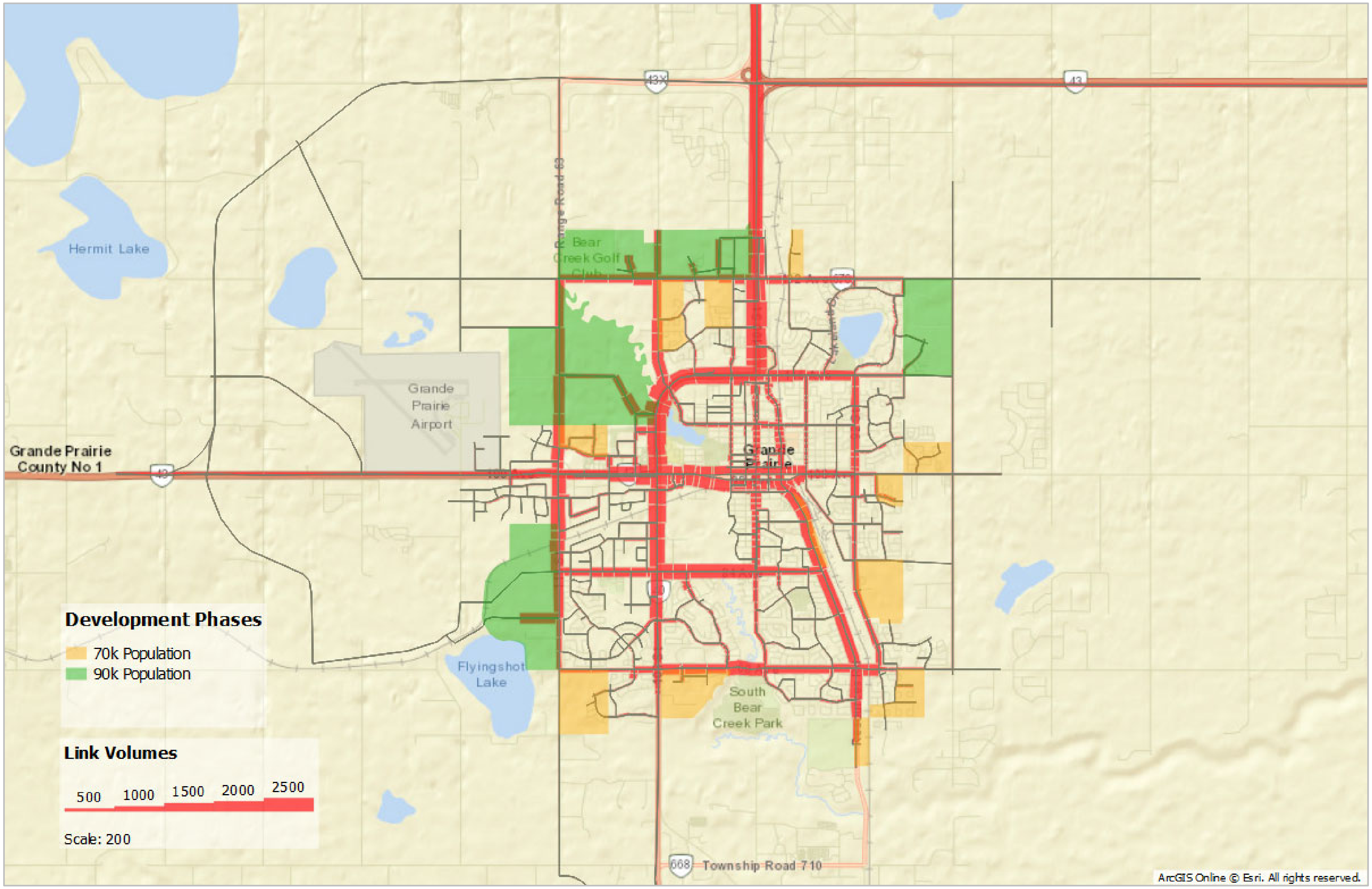
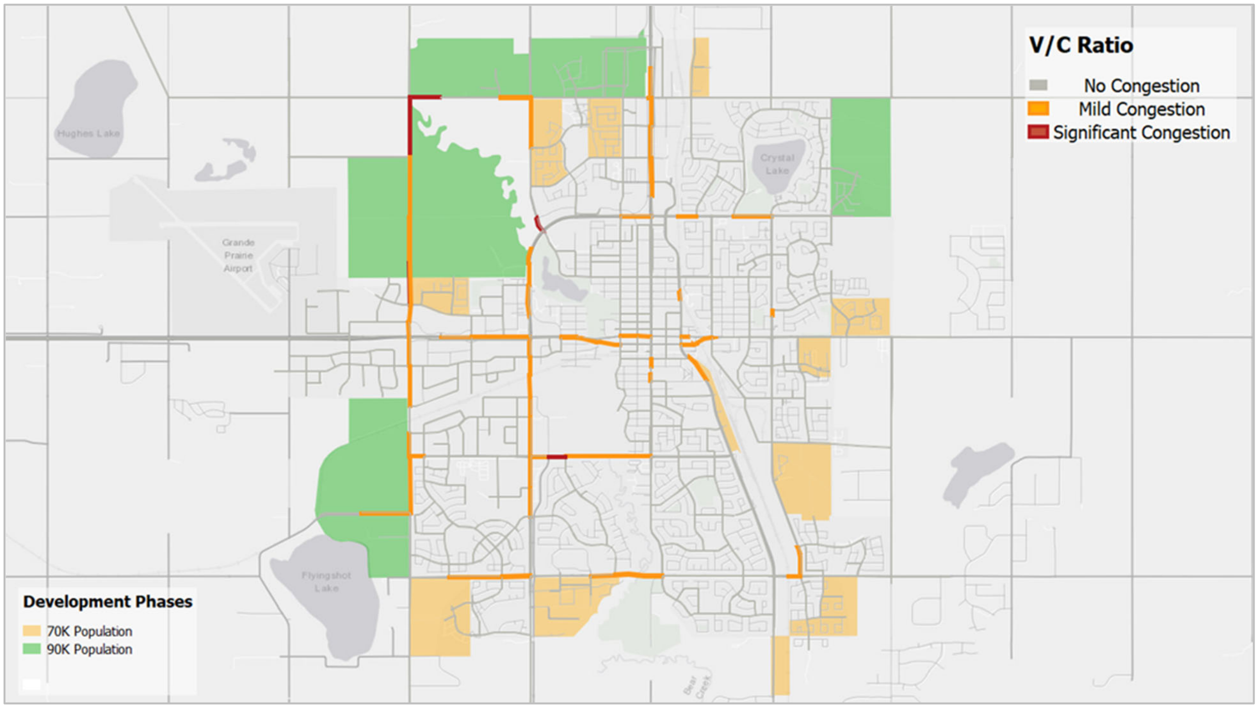


Figure 4-17: Levels of Congestion at 90k Population with Short Term Improvements Only



To address the new congestion for the 90k population scenario, additional network improvements are required. ***Table 4-6*** lists proposed projects to address the increasing mobility needs of the city at the 90K population horizon. These are illustrated in green in ***Figure 4-18***, including additional recommended intersection improvements (shown as green circles).

Table 4-6: Medium Term Road Network Improvements for 90k Population Scenario

No.	Road Name	Recommendation
7	132 Avenue	Four lane 103 Street to 116 Street
8	116 Street	Four lane 104 Ave to 132 Ave
9	116 Ave (H43)	Six lane Bridge to 99 St
10	109 Avenue	Hospital to 116 Ave Connector (via 110 Street)
11	108 St	Four lane 116 Ave to 132 Ave
12	TWP Rd 715	Extension from 132 Street to Hwy 43X. A new flyover will be required when the intersection at 100 Ave and Hwy 43 is upgraded to an interchange.
13a	Hwy 40X	SW section of ring road from Hwy 43 to 84 Ave.
13b	Hwy 40X	SW section of ring road from 116 St to Hwy 40, including modifications to the designated truck route.
14	84 Avenue	Extension from 116 Street to Hwy 40X
15	116 St	Four lane 84 Ave to 68 Ave
16	116 Avenue	Six lane 99 St to 96 St
17	100 Avenue	Four lane 90 St to 84 St
18	84 Street	Build new two-lane road from 100 Ave to 132 Ave, and extend 116 Ave from 88 St to 84 St
19	132 Avenue	Four lane 84 St to 97 St

Figure 4-18: Proposed Medium Term Improvements for 90K Population Horizon

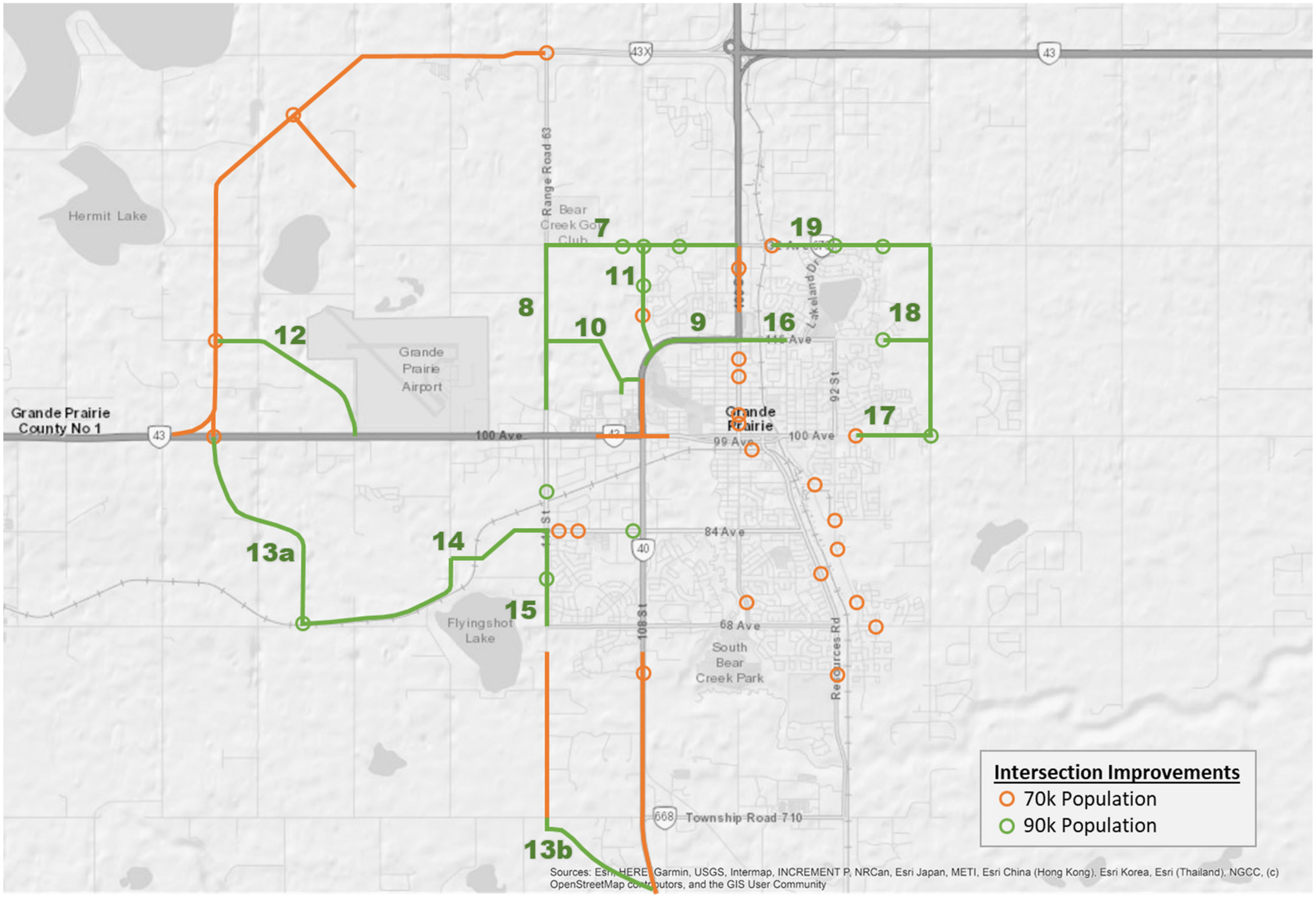


Figure 4-19 illustrates the forecast traffic volume changes with the proposed short and medium term projects in the city. For example, the new connection at 109 Ave is estimated to attract 1,000 vehicles per hour during afternoon peak hour, which helps reduce traffic on Highway 43, the parallel route south of 109 Ave.

Figure 4- 19: PM Peak Traffic Pattern Shift with Proposed Medium Term Network Improvements

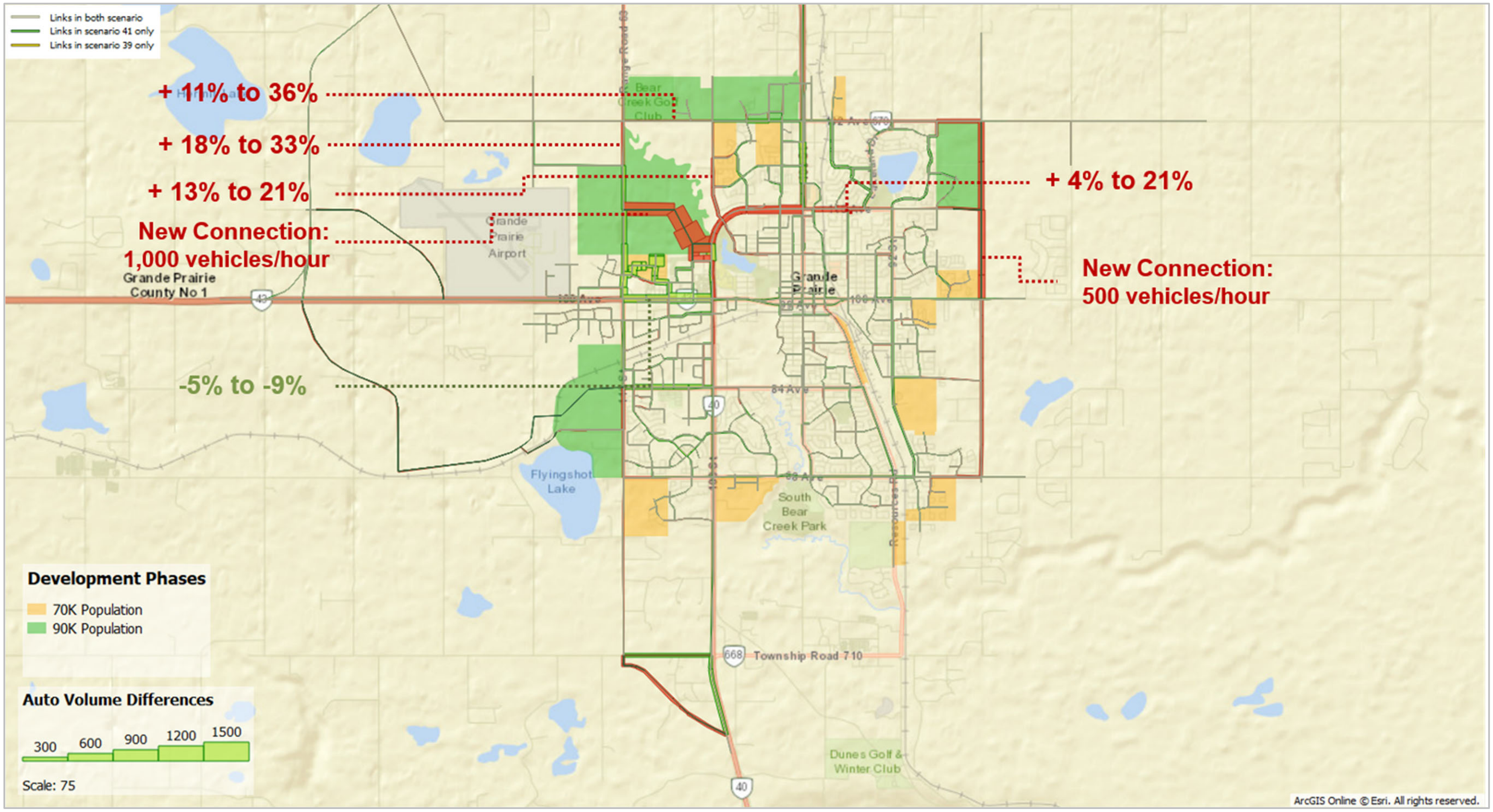
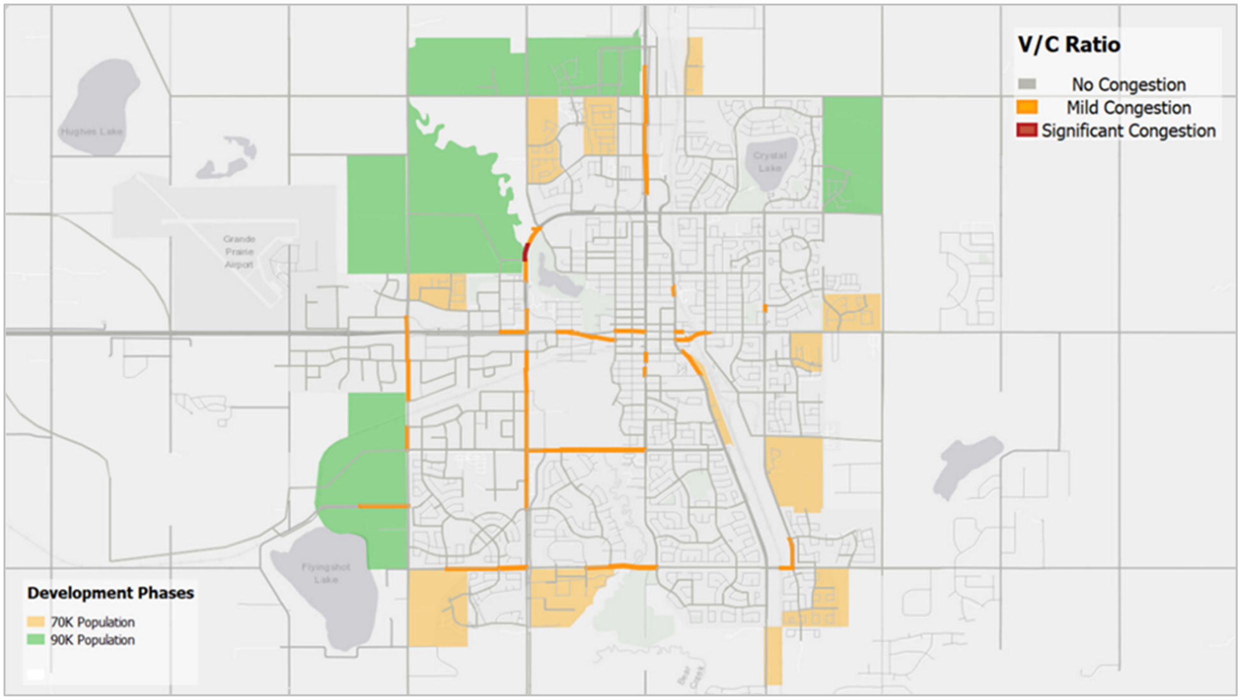


Figure 4-20 shows the level of congestion for the 90K population land use with implementation of the proposed projects. Highway 43 (108th Street) still shows some delay at the four-lane bridge over Bear Creek (the only part of the corridor that is not six lanes), but other significant congestion hotspots have been eliminated.

Figure 4-20: Levels of Congestion at 90k Population with Short and Medium Term Improvements



4-4.3. 120,000 POPULATION HORIZON

Figure 4-21 illustrates the expected locations of long-term development (in blue) to achieve the 120K population growth scenario and the forecast traffic volumes during afternoon peak hour. Most of the developments are near the eastern boundary of the city along 84 Street as well as the northwest sector. The increased traffic volumes result in more congestion hotspots, as illustrated in ***Figure 4-22***. The growth in congestion is especially noticed in the outlying areas where development is occurring and having a pronounced effect on traffic volumes and congestion.

Figure 4-21: PM Peak Traffic Volumes at 120k Population with Short and Medium Term Improvements Only

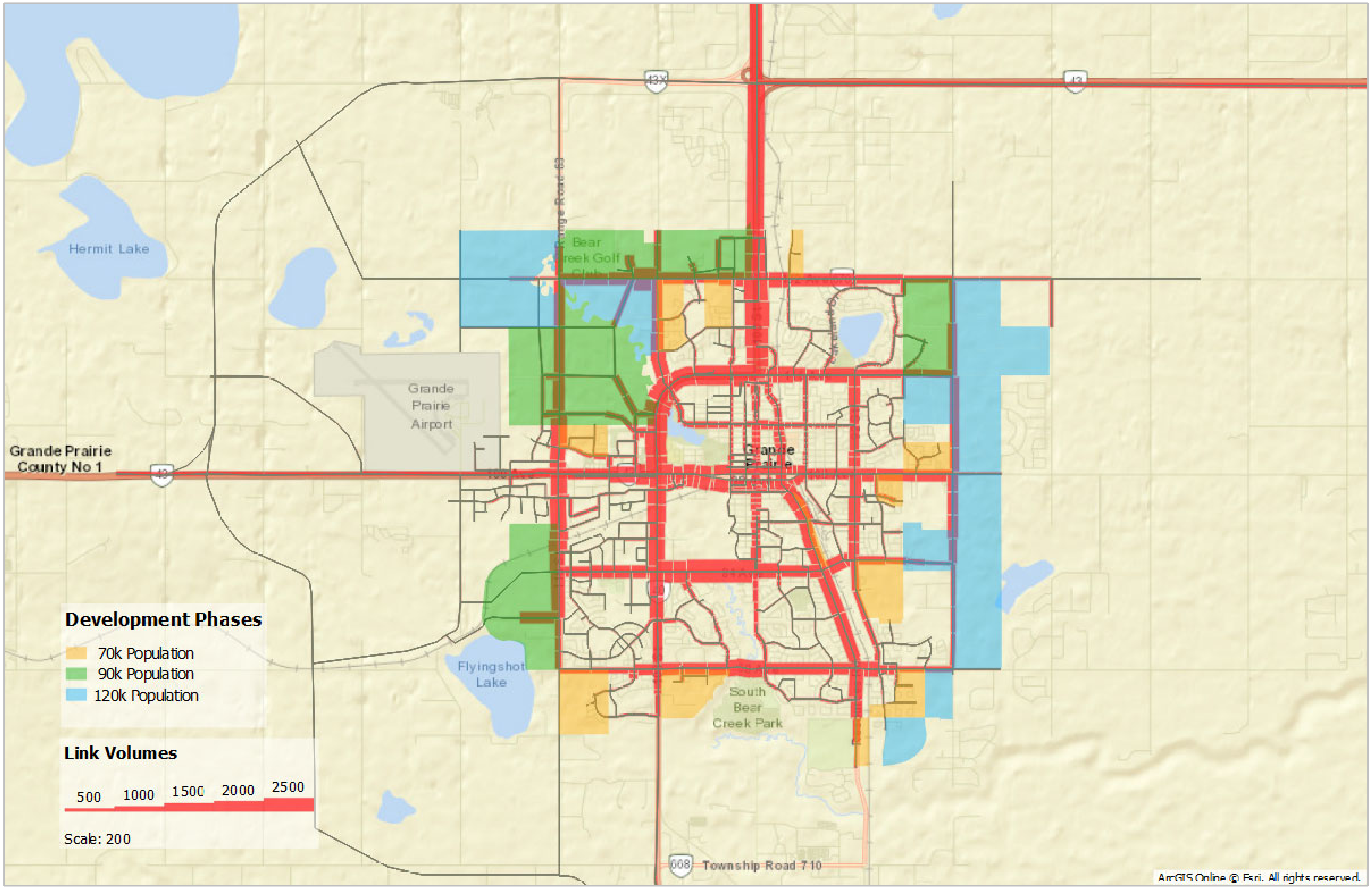


Figure 4- 22: Levels of Congestion at 120k Population with Short and Medium Term Improvements Only

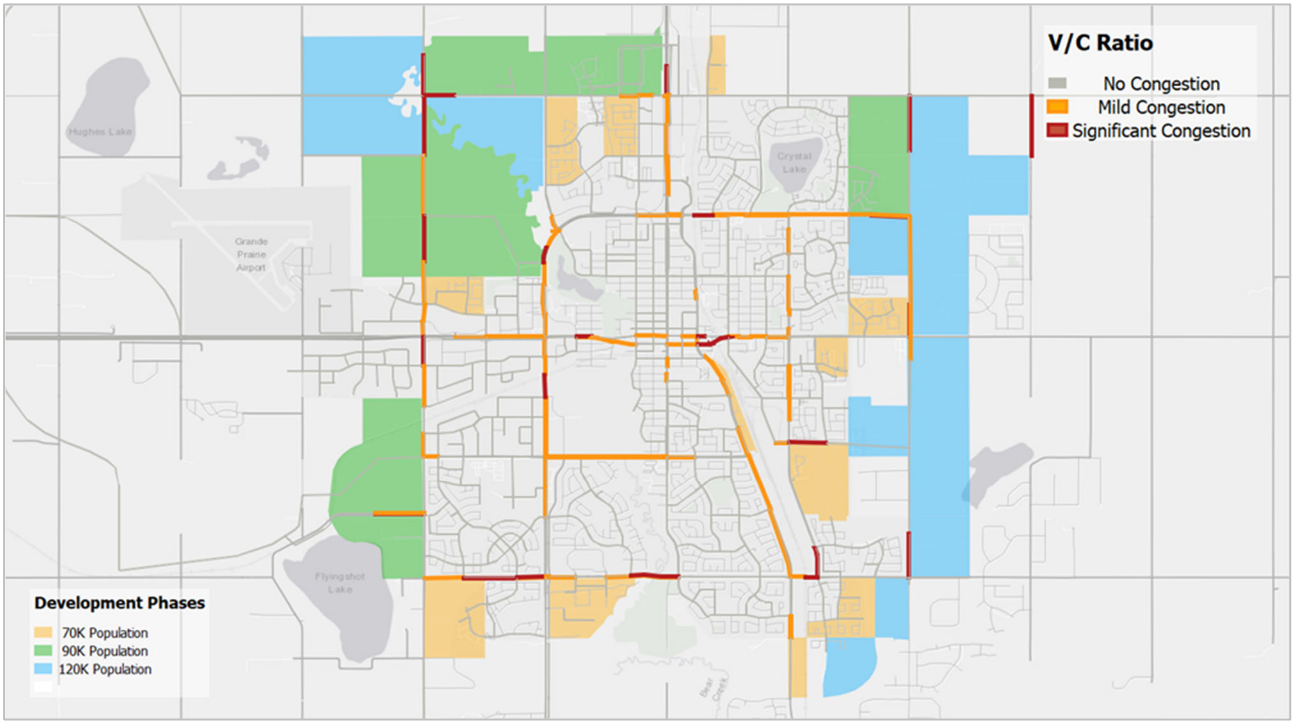


Table 4-7 lists the proposed network improvements to accommodate a population almost double that of today. Two railway crossings on 92 Avenue and 84 Avenue are proposed to improve the east-west connection between the new developments and the rest of the city. ***Figure 4-23*** illustrates these improvements in blue, with proposed intersection improvements shown as blue circles.

Table 4-7: Long Term Road Network Improvements for 120k Population Scenario

	Road Name	Recommendation
20	132 Avenue	Extension from 124 Street to Hwy 43X (with new interchange)
21	107 Avenue	108 St to 116 St / Airport Connector
22	110 Street	Extension to 132 Ave (across Bear Ck) and connection to 124 St
23	124 Street	Connector from 76 Ave to 97 Ave
24	84 Avenue	Six lane 100 St to 108 St
25	68 Avenue	Four lane 108 St to 116 St
26	Hwy 40X	Complete SW section of ring road
27	84 Avenue	Rail overpass (contingent on CN yard relocation)
28	92 Avenue	At grade rail crossing (contingent on CN yard relocation)
29	92 Street	Four lane 68 Ave to 96 Ave
30	84 Street	Four lane near 68 Ave
31	68 Avenue	Four lane 92 St to 84 St
32	84 Street	Four lane 100 Ave to 132 Ave

Figure 4-23: Proposed Network Improvements for 120K Population Horizon

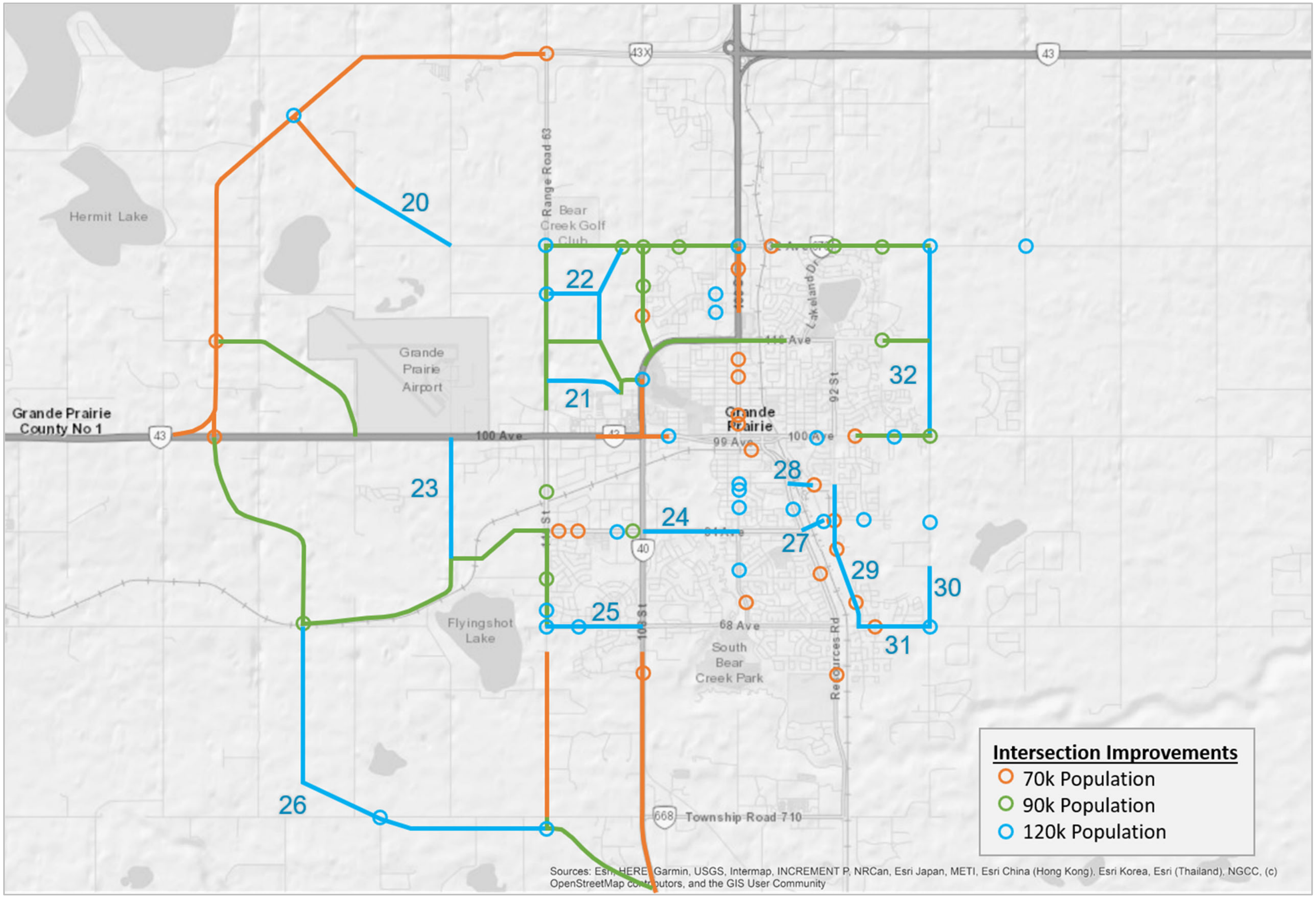


Figure 4-24 shows the change in traffic volume for the proposed projects. For example, the extension of 84 Avenue to complete the inner mile grid is estimated to attract 3000 vehicles per hour during peak periods. This new route reduced the travel demand on alternate routes significantly.

Figure 4-24: PM Peak Traffic Pattern Shift with Proposed Long Term Network Improvements

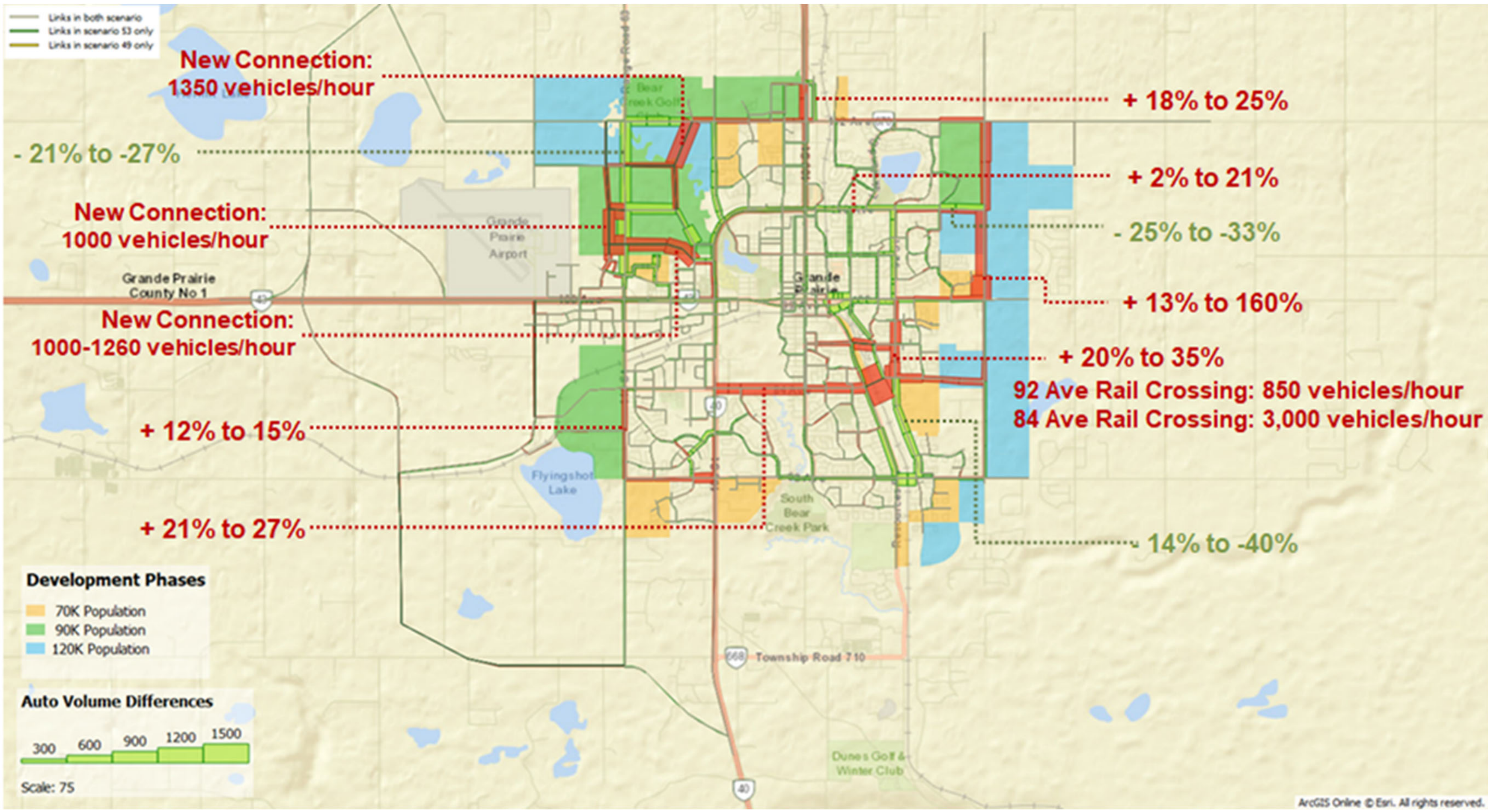
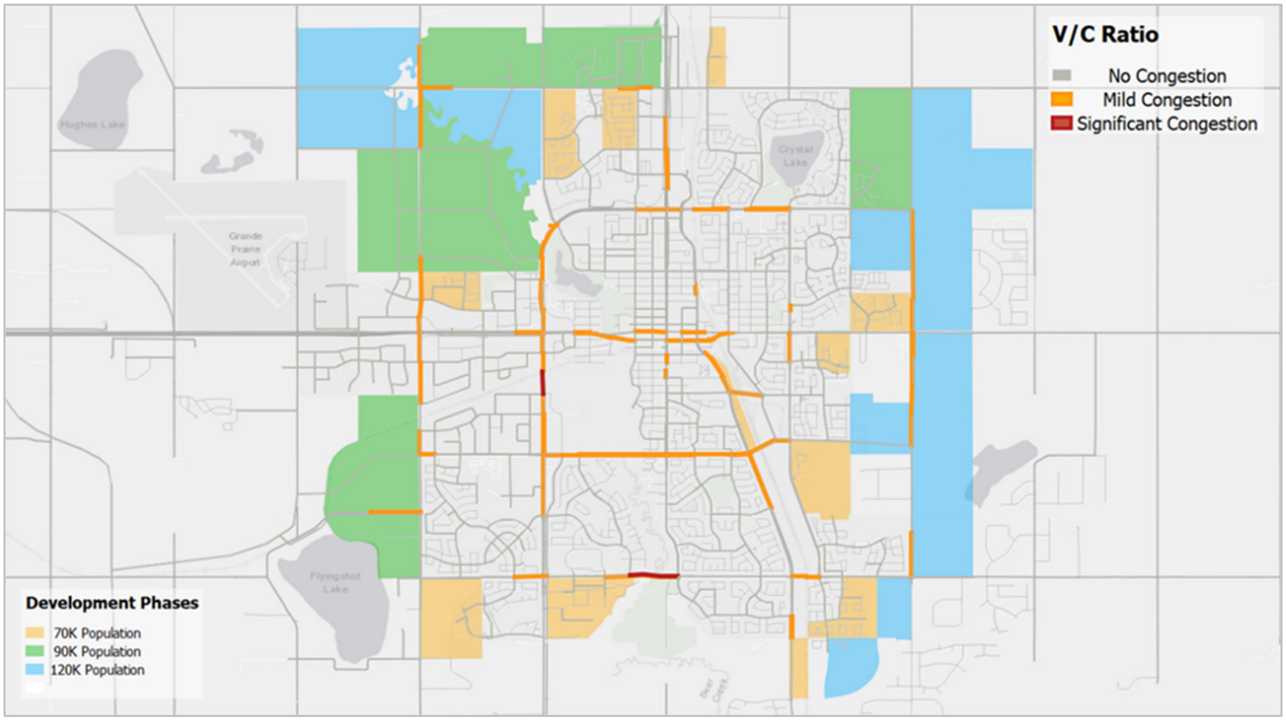


Figure 4-25 shows the level of congestion for 120K population land use after the implementation of the proposed long-term network improvements. The city road network is generally expected to be operating at mild congestion on major corridors under typical peak hour conditions.

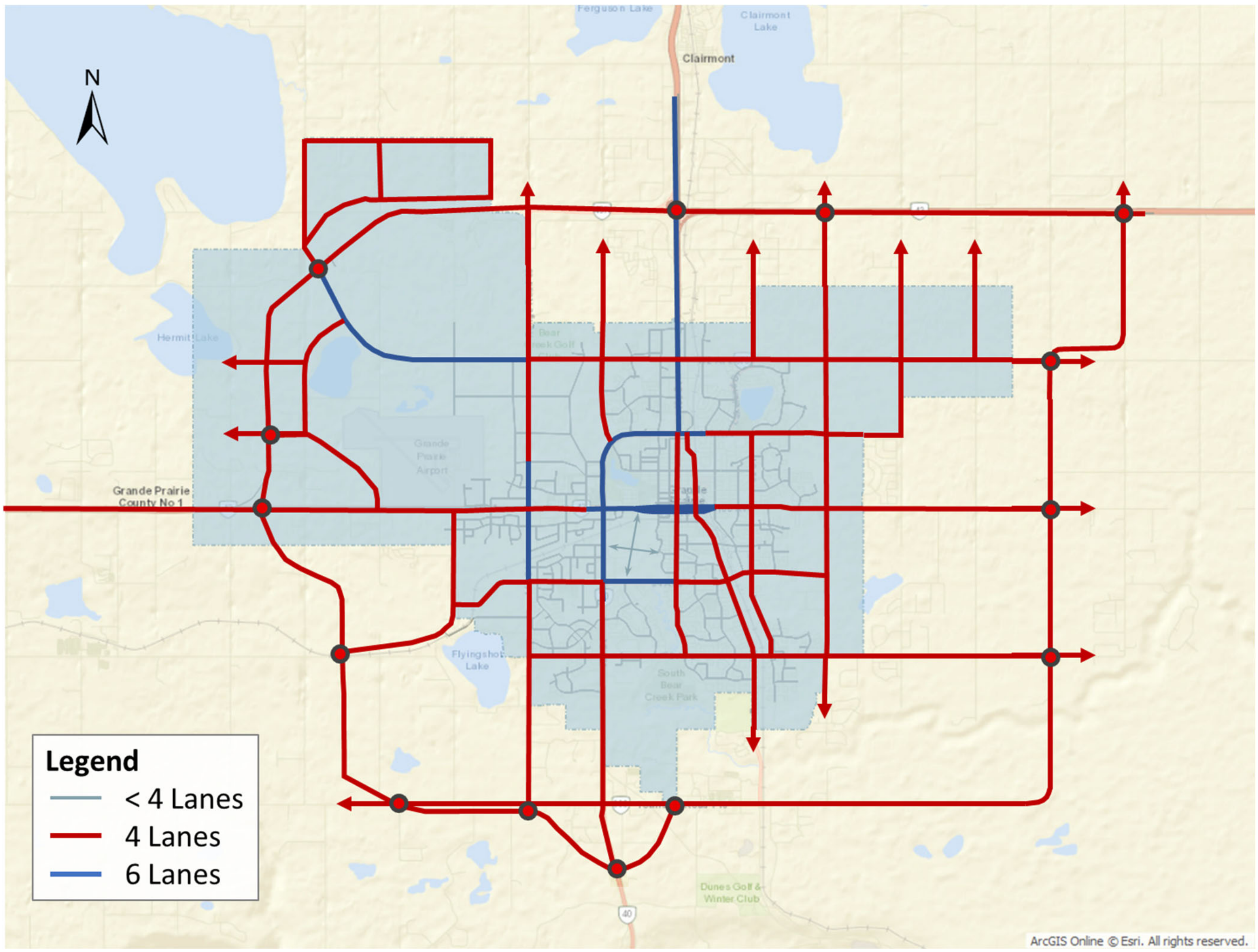
Figure 4-25: Levels of Congestion at 120k Population with All Recommended Improvements



4-4.4. ROAD NETWORK BEYOND 120K POPULATION

For protection of future corridors, the proposed road network beyond the identified 120k population scenario is shown in ***Figure 4-26***. The network is classified by number of lanes and is primarily focused on the district lot boundaries (i.e. the one mile grid). However, as discussed in ***Section 4-3.1.1***, the protection, planning, design, and construction of minor arterials and major collectors between this arterial network will improve the integrity of the network in the developing regions of the city, affecting capacity, trip lengths, reliability, and safety.

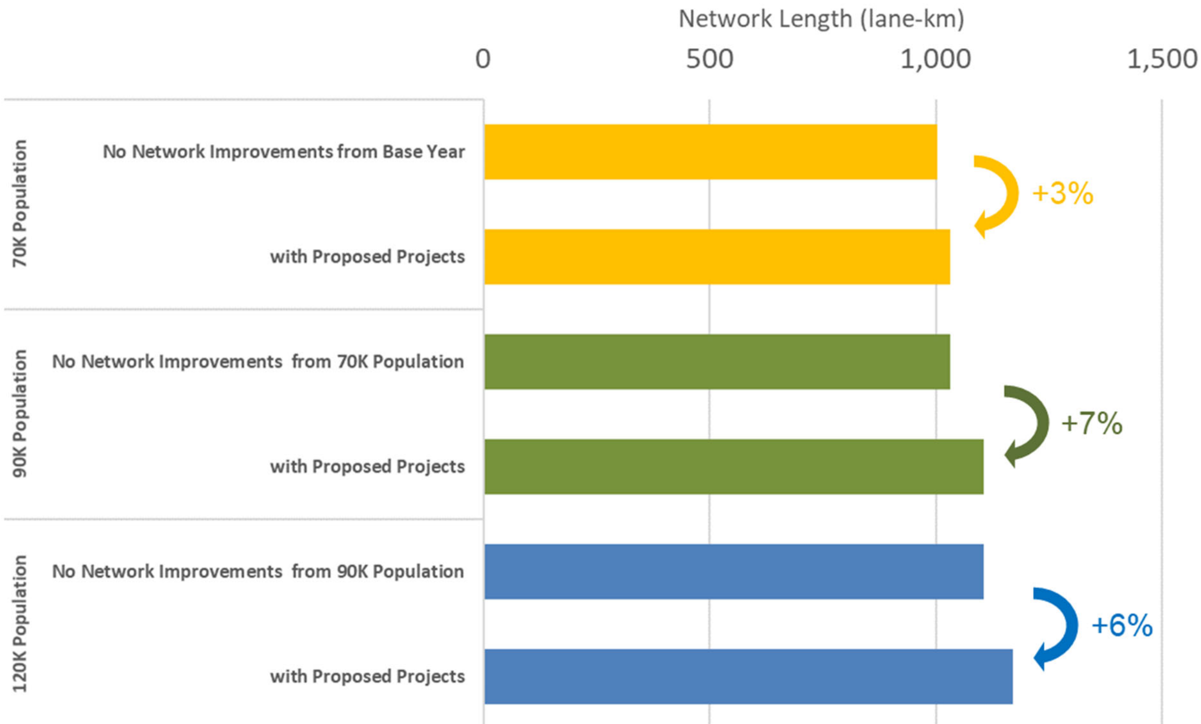
Figure 4-26: Proposed Road Network for Beyond 120 k Population Horizon



4-4.5. NETWORK-WIDE PERFORMANCE

Summing all the recommended road network improvements listed in ***Section 4-4.1*** to ***Section 4-4.3***, the total amount of lane-kilometres in the transportation system would increase in each scenario as shown in ***Figure 4-27***. The suggested improvements for the 70K population horizon results in a 3% increase to the total lane-km on the network, 7% for the 90K population horizon and 6% for the 120K population horizon.

Figure 4-27: Changes in Network Lane-Kilometres



To evaluate the effectiveness of these recommended short, medium, and long term improvements on the total road network, the system performance was measured with the EMME model. ***Figure 4-28*** illustrates the changes to the vehicle-kilometres travelled (VKT) during the afternoon peak hour with each population horizon, and with the recommended improvements for each scenario. The VKT is a measure of the distance all vehicles in the system are travelling during the course of the PM Peak hour. Based on the analysis, the total VKT increases by 32% from the 70K to the 90K population horizon, and another 35% from the 90K to 120K population horizon. This demonstrates the increase in traffic volume in the system, as well as the longer distance people are travelling. The negligible change in network VKT with each group of improvements shows that there is little effect in total travel demand due to network improvements. Specifically, the system improvements are not generally providing shorter routes for people to reach their destinations.

Figure 4-28: Network Vehicle-Kilometres Travelled

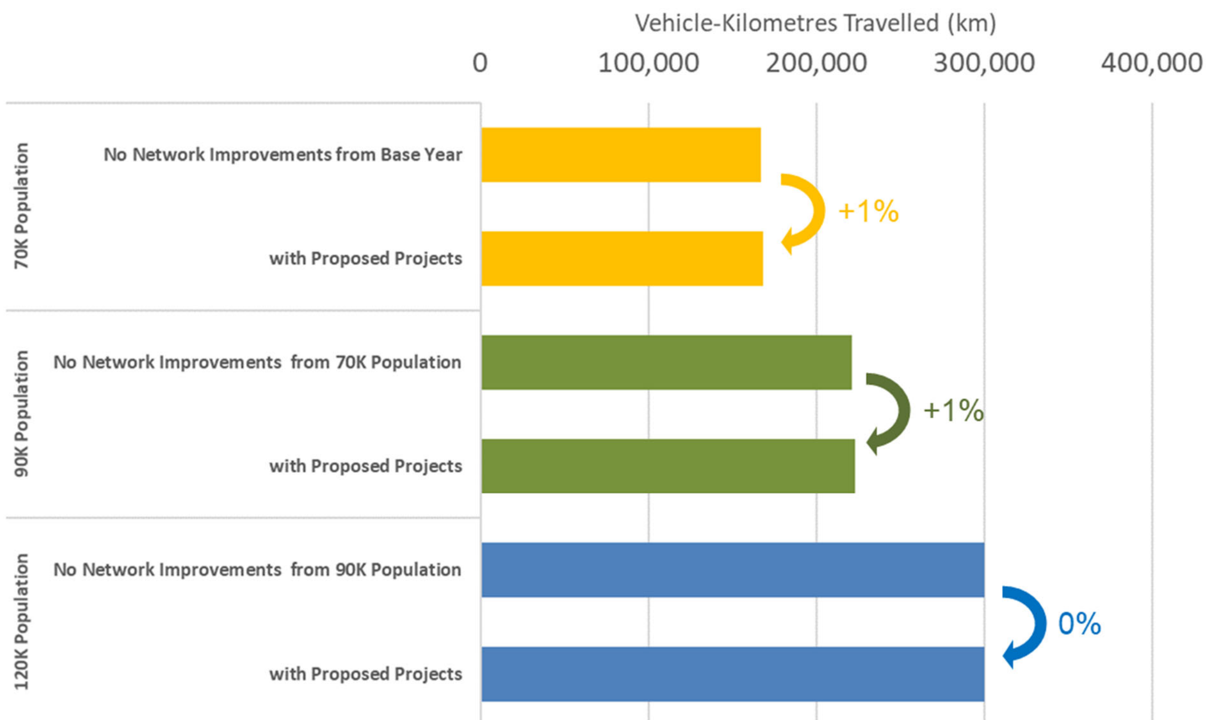


Figure 4-29 compares the vehicle-hours travelled (VHT) during the afternoon peak hour with each population horizon, and with the recommended improvements for each scenario. The VHT is a measure of the total amount of time all vehicles in the system are travelling during the PM Peak Hour. The VHT in the Grande Prairie system grows by 48% from the 70K to 90K population horizon and by another 61% from the 90K to 120K population horizon, much faster than the growth in VKT. This implies that congestion on the network grows faster than the rate of growth in travel demand. This is consistent with findings elsewhere that show network delay growing faster than traffic volumes. However, the recommended road network projects provide significant travel time savings due to the increased road capacity.

Figure 4-29: Network Vehicle-Hours Travelled

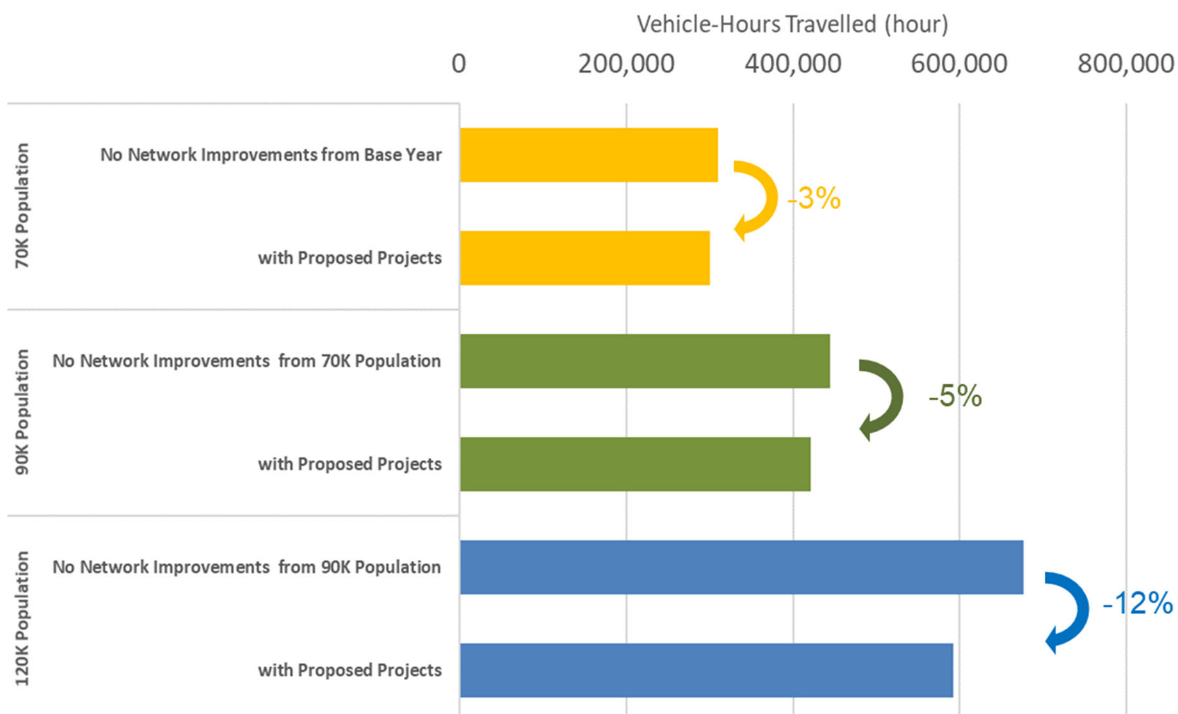


Figure 4-30 compares the amount of congested road sections in the network for the different scenarios. The roadway is considered to be congested if the volume to capacity ratio exceeds 0.8. With the recommended improvements, the total congested lane-km in the 70K and 90K population horizons is completely eliminated, while the suggested improvements result in an 89% reduction for the 120K population horizon.

Figure 4-30: Amount of Congested Lane-Kilometres (where the volume to capacity ratio exceeds 0.8)

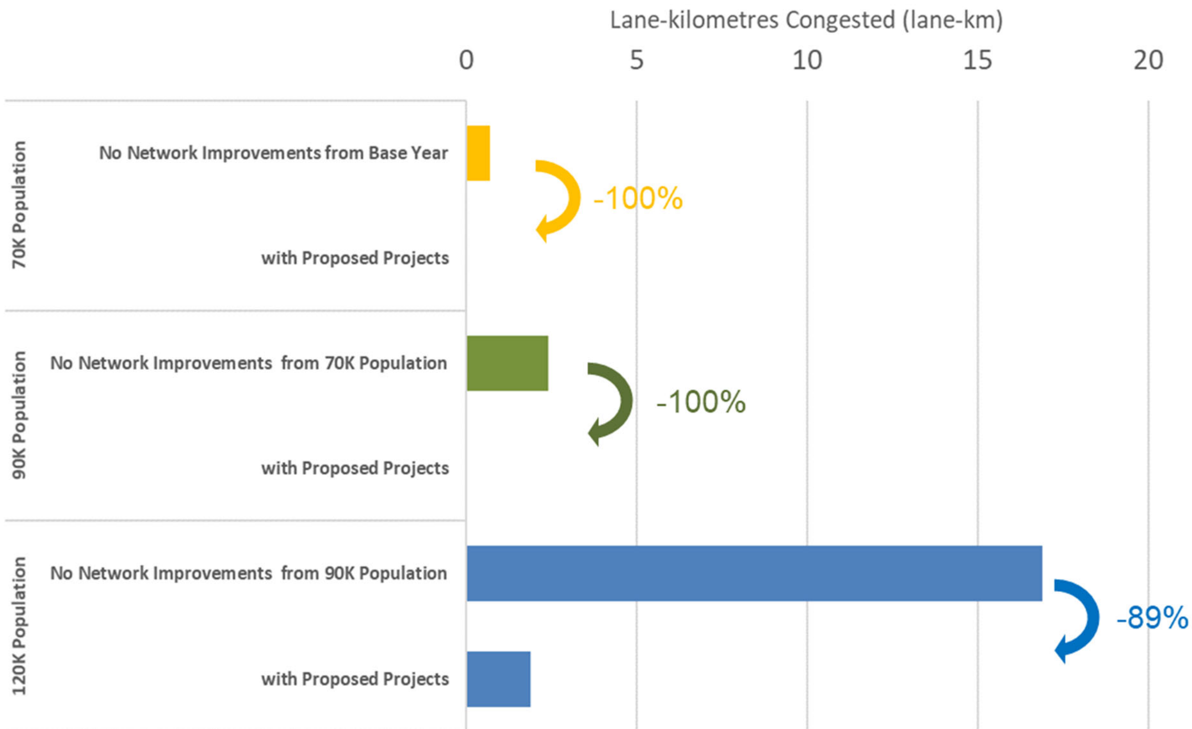
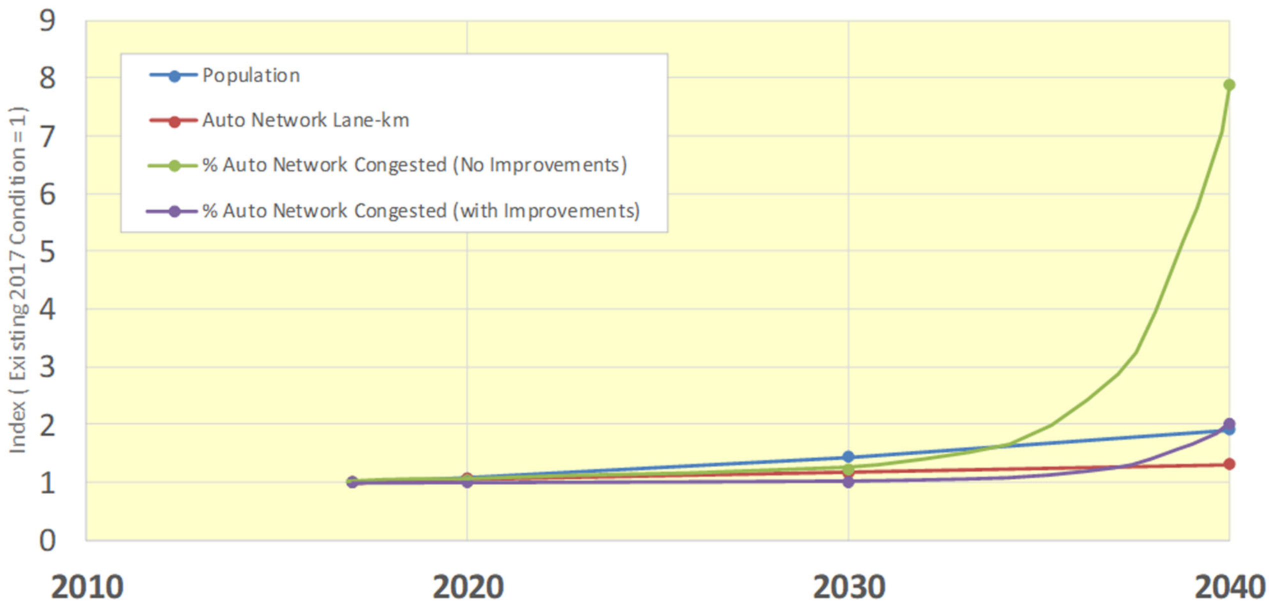


Figure 4-31 is an indexed chart showing the relative growth in population, network lane-km and then the percentage of the network that is congested with and without the suggested network improvements over the assumed growth horizon. It is clear that without any improvements, the growth in congestion is significant, and that the suggested improvements provide a substantial reduction in levels of congestion across the network.

Figure 4-31: Index of Population, Network Lane-km and Network Congestion



4-5. Intersection Improvements

The list of intersections recommended for improvements in ***Section 4-5*** were identified by the EMME model as nodes with traffic volumes that exceed the capacity provided by laning and traffic control that is currently in place. While the majority of these locations are expected to be warrant simple signalization projects, the full scope of improvements at each location will have to be evaluated at an operational level using actual (rather than modelled) traffic volumes.

The City does not currently have a governing preference for a standard type of traffic control, and instead follows *TAC Manual for Uniform Traffic Control Devices* guidance. Though this approach reflects sound engineering practice, there is a growing movement to consider more than just traffic flow when selecting appropriate traffic control devices, such as accessibility and safety impacts. In some communities, this movement has led to increasing preference for roundabout control in lieu of conventional traffic signals. Some agencies such as Alberta Transportation have formally adopted a “Roundabout-First” policy for selecting appropriate traffic control (see AT *Design Bulletin #68*).

Research shows that roundabouts are safer than other forms of intersection control, such as traffic signals or stop-control, and can significantly reduce the frequency of collisions causing injury or fatality at intersections (*2017 TAC Roundabout Design Guide*). Since vehicles navigate roundabouts in a circular fashion, decision-making is simpler and major intersection conflicts (e.g. head-on, right-angle and left-turns) are virtually eliminated. Furthermore, the geometric features that guide motorists into a roundabout tend to reduce operating speed, which reduces driver workload and potential severity of collisions.

The following collision types and safety issues may be addressed with roundabout intersection control:

- Right-angle, head-on, left-turn and U-turn collision configurations
- Injury and fatal collisions resulting from excessive speeds or the above collision configurations
- Sight distance restrictions that may reduce the effectiveness of traffic control

The safety benefits of roundabouts deplete as more circulation lanes are added, as noted in the 2017 *TAC Roundabout Design Guide*. For example, cars navigating a multi-lane roundabout may experience more merging and diverging conflicts than in a single-lane roundabout. Further, pedestrians may find crossing a multi-lane roundabout to be more difficult due to the longer crossing distances that increase duration of exposure and introduce risk of multiple-threat collisions. However, the overall safety benefits of roundabouts are generally beneficial over more conventional forms of traffic control and, with sound design, the potential impacts of added circulation lanes or staged pedestrian crossings may be mitigated.

For the purpose of analysis, all identified intersection improvements are shown as signalization projects. However, the City may choose to implement roundabouts as a preferred alternative wherever the situations allow. Depending on the design and site issues, construction costs for small and medium-sized roundabouts can be comparable to those for new traffic signals. Larger roundabouts may be more expensive due to the larger footprint and consequential property costs. However, the ongoing maintenance and operational costs of roundabouts will offset the incremental capital costs over time.

4-6. Railway Issues and Opportunities

4-6.1. OVERVIEW OF RAIL OPERATIONS IN GRANDE PRAIRIE

The City's Municipal Development Plan addresses train crossing improvements in Policy 13.17, stating: "*The City may investigate the feasibility of undertaking a program of train crossing improvements such that trains will not be required to use their whistles at those crossings which may create a nuisance for residential neighbourhoods*."

Public feedback from the first round of project engagement identified the desire to address or reduce train delays at rail crossings throughout Grande Prairie, particularly at the 99 / 100 Avenue and 68 Avenue crossings (see ***Module 2***). CN operates two rail lines through the community: one runs north / south and the other runs east / west. The development of Grande Prairie around the two rail lines has resulted in several crossings within close proximity, which can be problematic when longer and/or slower-moving trains block more than one crossing. Furthermore, the proximity of the rail yards to 100 Avenue often results in longer trains switching back and forth over the roadway as the train is moved onto different lines for car switching (***Figure 4-32***).

Figure 4-32: Train Switching Delays on 100th Avenue

Motorists have adapted their habits at the 99 / 100 Avenue crossing because of the frequency of trains travelling across 99 Avenue for yard operations, resulting in Stop-Look-Proceed crossing behaviour when the rail crossing warning system is active. In consideration of the inherent risks associated with this activity, a more sustainable solution is desired.

There are several options that the City may explore with CN to address and/or alleviate the concerns at the 99 / 100 Avenue rail crossing, including:

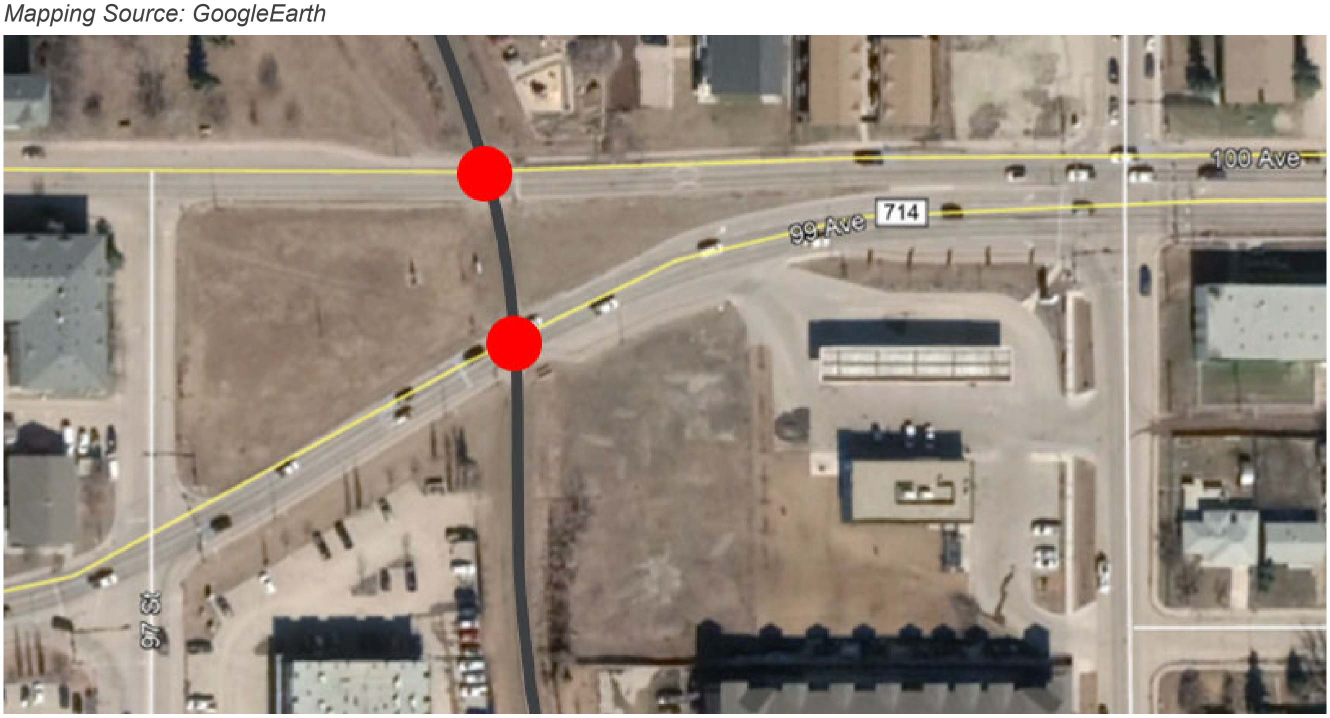
- **Education**: Existing motorist behaviour at the rail crossings is technically permissible and of little concern with respect to safety given the clear sight lines at the crossing and slow speed of the trains. To ensure that motorists are aware of and abiding by the Stop-Look-Proceed crossing procedure when the warning system is active, the City may work with the CN Educational Officer to launch an educational campaign. This campaign may be supplemented with corresponding signage along 99 Avenue and 100 Avenue approaching the crossing to reinforce the Stop-Look-Proceed procedure for crossings.

- **Gates**: A gated warning system may be pursued at the crossing if warranted per Transport Canada protocol. Gates at the crossings, if warranted, would prevent motorists from crossing during train events and eliminate potential for train-vehicle or train-pedestrian / cyclist conflict. However, gates at the crossings would also result in very long traffic delays due to longer, slow moving and stopped trains due to the use of the roadway for switching operations. A rail crossing audit has been completed to consider these issues.

- **Grade-Separation**: The City may work with CN to grade-separate the 99 / 100 Avenue roadway crossing, eliminating all potential for conflict and train-related delay. However, grade-separation would be costly (especially with two roads affected) and require closure of several accesses and intersections along the couplet to safely manage grade change of the corridor (***Figure 4-33***).

Figure 4-33: 99 / 100 Avenue Rail Crossings

Mapping Source: GoogleEarth



4-6.2. PROPOSED NEW RAIL CROSSING LOCATIONS

CN is generally trying to reduce its crossing impacts and therefore endeavors to offset the opening of new crossings with the closure of existing crossings, where appropriate. The main arterial rail crossings in Grande Prairie are listed in ***Table 4-8***.

Table 4-8: Existing Arterial Road Rail Crossings

Rail Line	Road Name	Rail Crossing Control	Comments
East-West	116 Street	Overhead flashers and gates	Potential future candidate for overpass, esp. if 116th Street becomes a designated truck route.
	108 Street / Highway 40	Side-mounted flashers	Heavy traffic on Hwy 40, but relatively low number of train delays at this time.
	100 Street	Overhead flashers	No concerns noted despite heavy traffic.
North-South	132 Avenue	Overhead flashers	No concerns noted.
	116 Avenue	Side-mounted flashers	Concerns noted with crossing delays.
	99 / 100 Avenue	Side-mounted flashers	Concerns noted with crossing delays esp. due to train switching etc. in the adjacent yard.
	68 Avenue	Side-mounted flashers	Concerns noted with delays from long trains.

The City has identified the following potential new rail crossings (shown in red on ***Figure 4-34***):

- **Wedgewood Drive**: Discussions are ongoing between the City and CN regarding opening of a new crossing at an appropriate location to serve new development east of the rail line, in the Wedgewood Drive area. This new crossing will also require closure of an existing, nearby crossing to help offset the overall crossing impacts to the community and rail operations.

- **112 Street:** CN is requiring all new customers to provide on-site, private track storage. The proposed 112 Street crossing may impact an existing customer track (siding).

- **84 Avenue (east):** the extension of 84th Avenue to the east would provide significant network benefits by reducing the traffic demand on Resources Road, 92nd Street, and the two existing crossings on 100th Avenue and 68th Avenue. However, at this time, this proposed connection would require crossing multiple tracks through the CN yards, so an at-grade crossing would be unsafe, and a grade-separated crossing of the tracks would be cost-prohibitive. An overpass would not be feasible without the relocation of the yard. This option is evaluated further in ***Module 8***.

- **92 Avenue:** if the CN yard was relocated as noted above, an at-grade rail crossing at 92nd Avenue would provide additional network benefits by further distributing the traffic crossing the tracks.

- **84 Avenue (west)**: The City has also identified a potential arterial crossing that would extend 84 Avenue to the west and future development (***Figure 4-35***). Given the curvature of the rail line at this location, it may be difficult to meet Transport Canada design and operations requirements for at-grade crossings. One option may be the use of a roundabout to facilitate the connection between 84th Avenue and 124th Street (Range Rd 64) without compromising mobility.

Figure 4-34: Key Rail Crossings in Grande Prairie

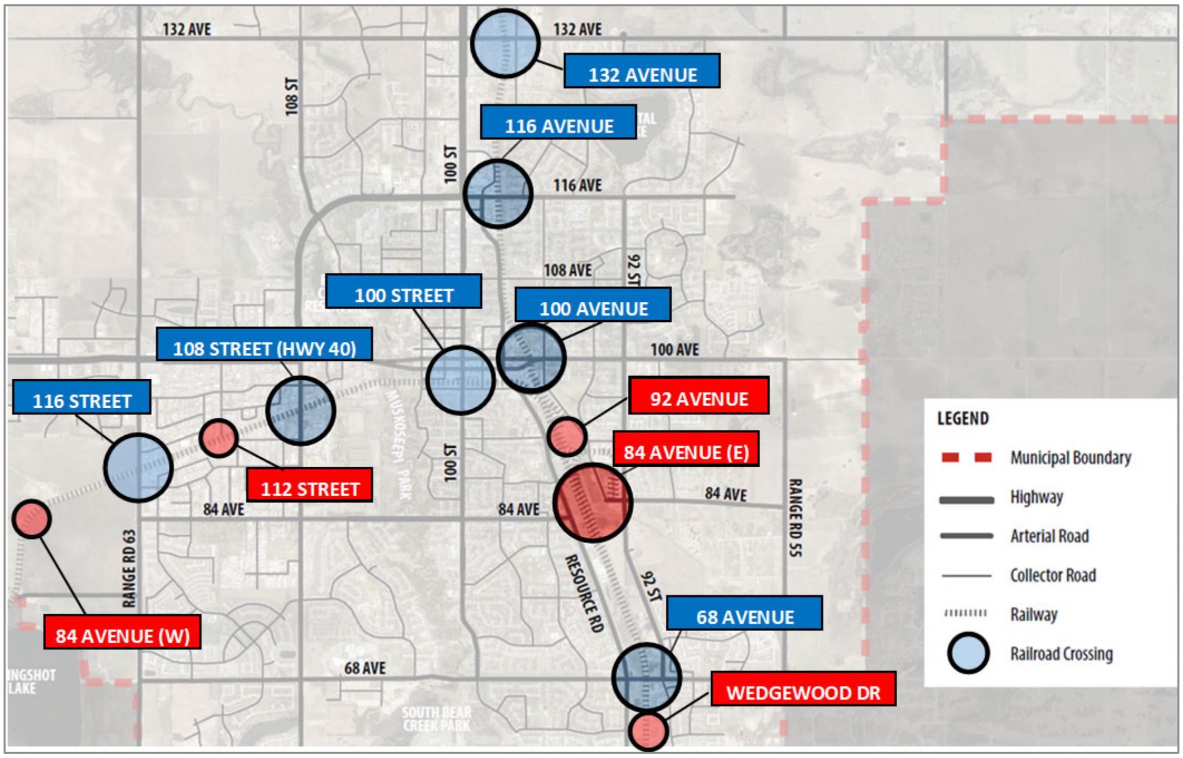
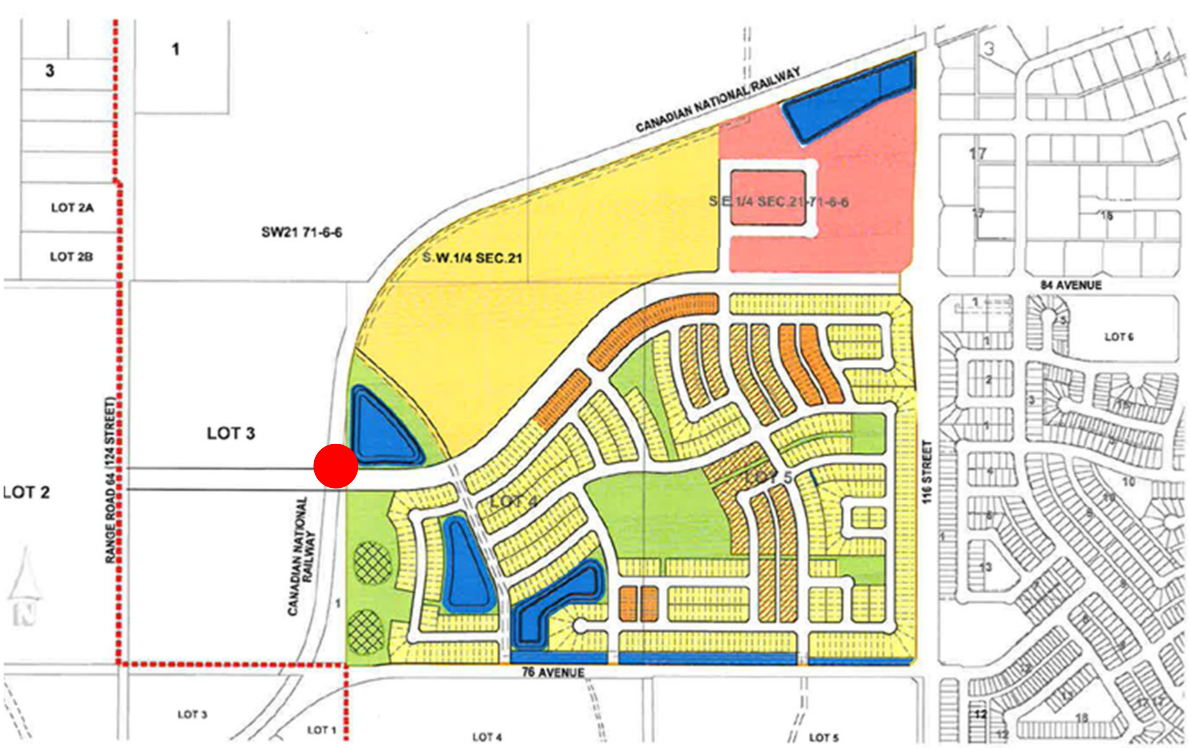


Figure 4-35: Kensington Neighbourhood Plan
Source: Proposed Kensington Transportation Design Report (2017)



CN would also like to explore closure of an existing crossing (likely within the County) to offset impacts associated with opening a new crossing. Given that this new crossing may impact crossing operations within the County / long-term City annexation lands, further cooperative planning between the City, County and CN is desirable to confirm crossing locations, future road network and staging timeline.

4-6.3. TRESPASSING AND WHISTLES

Trespassing is an ongoing concern for CN in Grande Prairie because it creates safety issues due to train-pedestrian conflicts, as well as the need for increased use of train whistles, which is mandated when there is a safety conflict on a rail line. From the community's perspective, increased use of train whistles resulting from trespassing constitutes a nuisance and can impact quality of life, particularly when whistling occurs during evening, night or early morning hours (***Figure 4-36***).

The complete cessation of train whistles through Grande Prairie could be pursued, although this typically requires measures to reduce or eliminate train conflicts with vehicles and pedestrians. These include:

- **Fencing and Trails**: The City and CN may work together to identify locations for fencing and/or trails to delineate crossing paths, and are currently discussing the need for individual mitigation measures. Furthermore, there is a Transport Canada grant program to help municipalities offset fencing, curb and pathway costs that may be beneficial to the City.

- **Gated Crossings**: Complete elimination of whistles would likely require at-grade crossing conflicts to be managed with physical gates. Gates help ensure the crossings are clear before the train arrives. These measures will require significant financial investment, and would increase traffic delays due to train crossings, and worsen connectivity barriers across the rail lines.

Figure 4-36: 100th Avenue Crossing at Night

4-7. Summary of Issues

Based on the road network analysis discussed in this Module, the following issues are advanced for further consideration and implementation:

1. The TMP and resulting improvement programs should support the key policies identified from Municipal Development Plan.
2. The “one-mile grid” system of arterial roads has created a number of major corridors throughout the city, but without the development of a supporting network at lesser spacing, there is undue traffic demand on the arterial roads.
3. The City has a well-classified system of roads, with standard cross sections for each class. If desired, these cross sections could be revisited in the context of the TMP once completed.
4. The EMME model analysis has identified a suite of road network improvements that are linked to the 70k, 90k, and 120k population thresholds, based on assumed growth areas. With a relatively modest increase in the overall lane-kilometres of road system, the expected city growth can be managed with significant savings to the peak hour Vehicle-Hours Travelled. However, there would be little savings in the peak hour Vehicle-Kilometres Travelled without opportunities for shorter trips for motorists.
5. A list of candidate intersections has also been provided for improvements. These are typically signalization but could also involve laning improvements or roundabouts. The specific choice of improvements will depend on operational analysis using measured traffic volumes at the time and physical opportunities that may arise for each situation.
6. Existing at-grade rail crossings in Grande Prairie are frequent concerns for motorists, especially over the north-south rail lines. Grade-separated crossings would resolve these concerns, but would have significant construction costs, and could impact the road and access connections in the vicinity. An overpass at 84th Avenue on the east side of the city would provide significant benefits to the road network but would not be feasible without the relocation of the rail yard.
7. Train whistle cessation may be pursued for the community, but this would require controlling the potential for trespassing through the installation of fencing and gates. These improvements would be costly and may further impact train delays at crossings.

Grande Prairie Transportation Master Plan

MODULE 5

Safety Analysis

- Discussion of collision-prone locations
- Summary of issues

Contents

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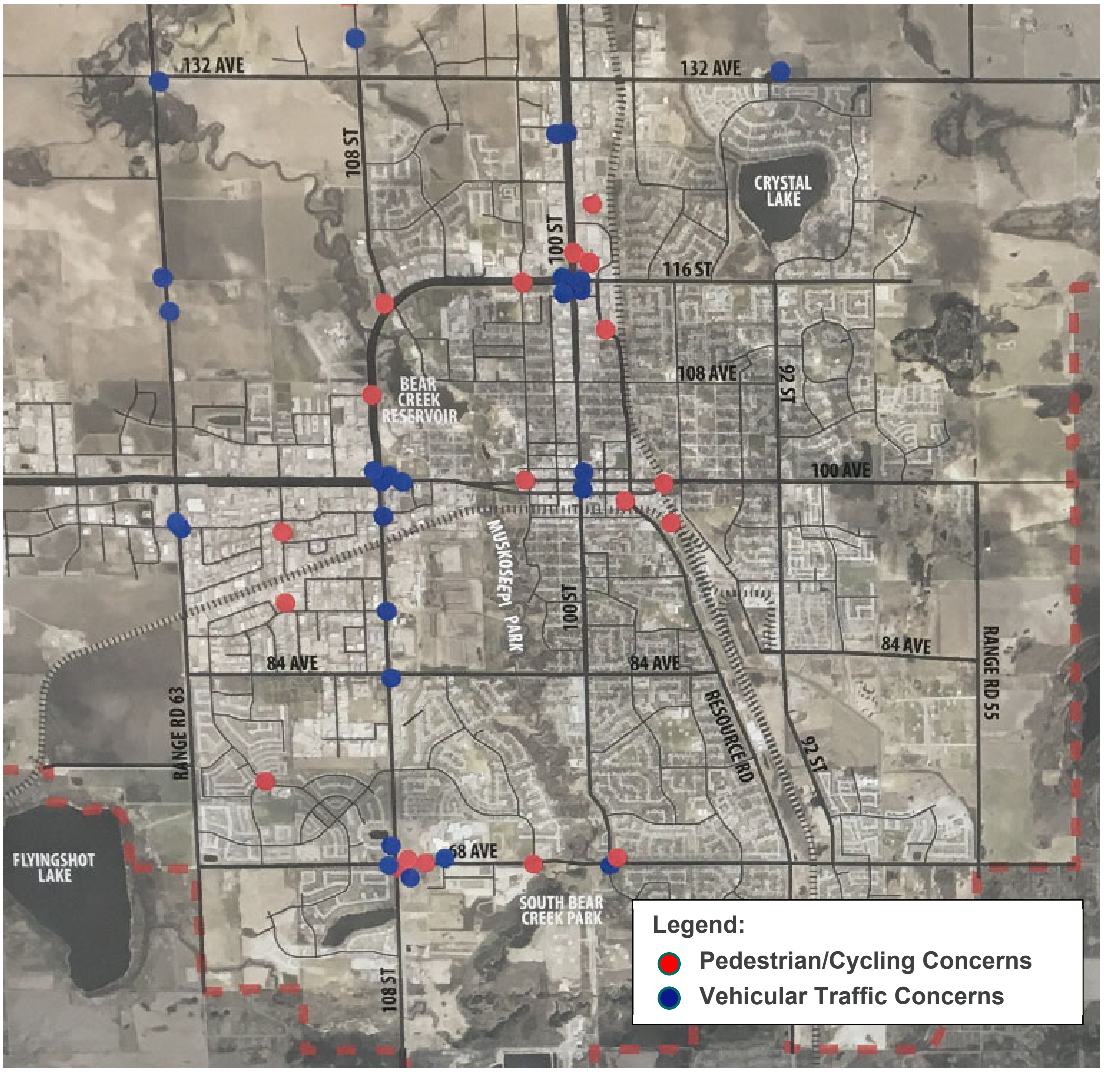
5-1. Road Safety in Grande Prairie

Road safety is an important consideration in the development of a Transportation Master Plan. Irrespective of the operation of the transportation system, traffic and pedestrian collisions represent key performance measures of the functionality and integrity of the transportation system, as well as a real concern to the residents and stakeholders. During the online community survey of 2018, road safety was identified as one of the top six transportation system priorities (see ***Module 2***), and the second highest recommended priority for funding. During the subsequent Open House, attendees identified a number of locations with vehicular and pedestrian safety issues, as shown in *Figure 5-1*.

Figure 5-1: Resident-Identified Locations with Safety Concerns



5-2. Safety Priority Intersections

While a comprehensive safety study is outside the defined scope of this Transportation Master Plan, the City has provided a list of the Top 30 intersections in Grande Prairie with the highest collision rates in the three years between 2016 and 2018. Therefore, the safety analysis in this section is limited to the planning-level consideration of these locations as they relate to the road network analysis (***Module 4***) and the concerns raised by those attending the Open House (***Module 2***). These locations are summarized in *Table 5-1* below, including the number of individuals who identified these intersections as a concern.

Table 5-1: Top 30 Intersections with Highest Collision Rates

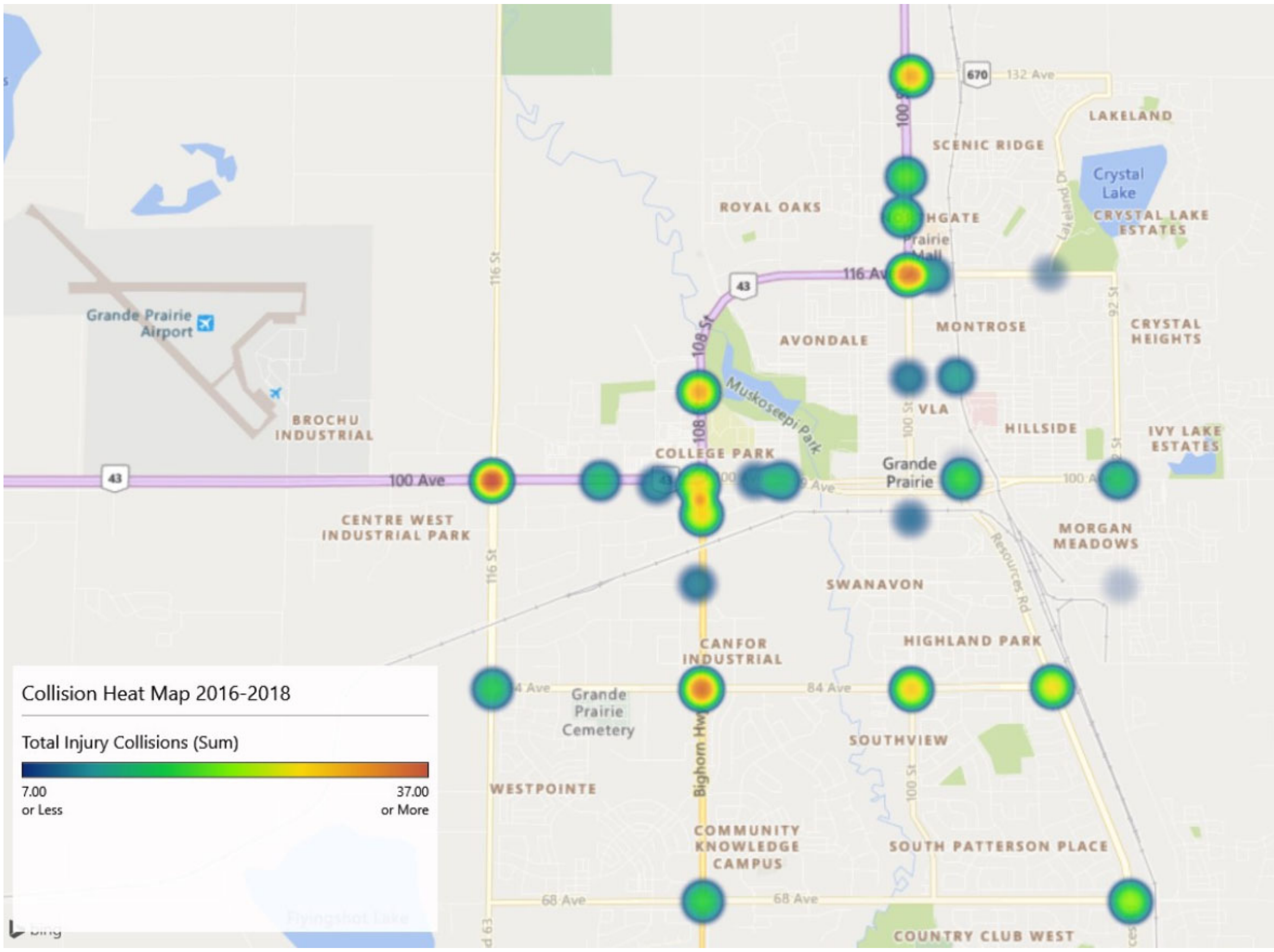
Rank	Intersection	No. Collisions in Study Period	Collision Rate (C/MV*)	Open House Comments	Identified in Road Analysis (Link or I/S)
1	84 Ave And Resources Rd	27	1.10	0	No
2	84 Ave And 100 St	29	0.88	0	No
3	68 Ave And Resources Rd	23	0.79	0	No
4	100 Ave And 116 St	37	0.77	0	No
5	84 Ave And 108 St	35	0.74	1	No
6	84 Ave And 116 St	17	0.72	0	No
7	107 Ave And 108 St	31	0.67	1	Yes
8	132 Ave And 100 St	31	0.66	0	Yes
9	97 Ave And 108 St/West Side Dr	28	0.60	1	No
10	116 Ave And 100 St	34	0.58	6	No
11	68 Ave And 108 St	18	0.56	7	No
12	100 Ave And 98 St/ Resources Rd	18	0.56	0	No
13	121 Ave And 100 St	22	0.54	2	Yes
14	108 Ave And 101 St	7	0.53	0	No
15	108 Ave And 98 St	13	0.52	0	No
16	124 Ave And 100 St	20	0.50	0	Yes
17	100 Ave And 92 St	16	0.49	0	No
18	116 Ave And Lakeland Dr	9	0.49	0	No
19	97 Ave And 100 St	10	0.48	0	No
20	108 Ave And 96 St	7	0.48	1	No
21	100 Ave And 112 St	16	0.46	0	Yes
22	100 Ave And 108 St	28	0.45	4	Yes
23	100 Ave And 105 St	15	0.44	0	No
24	92 Ave And 92 St	8	0.44	0	No
25	108 Ave And 100 St	11	0.42	0	No
26	116 Ave And 99 St	13	0.41	0	No
27	101 Ave And 98 St/ Resources Rd	8	0.38	0	No
28	100 Ave And 106 St	11	0.37	0	Yes
29	92 Ave And 108 St	11	0.32	0	No
30	100 Ave And 110 St	12	0.32	0	Yes

**Collisions per Million Vehicles*

The top collision locations based on injury severity are illustrated in *Figure 5-2*.

Figure 5-2: Grande Prairie Collision Heat Map

Source: City of Grande Prairie



5-3. Recommendations

To address issues with road safety in Grande Prairie, the following is recommended:

1. Conduct a formal “Network Screening” to confirm the Top 20 to 30 collision-prone locations from the most recent 3-5 years of data. The locations could be initially screened by collision frequency (i.e. the number of collisions within the study period). Then the list of locations could be further ranked by a combination of collision rates (i.e. collisions per million-vehicles), collision severities, and the Critical Collision Rate Index (i.e. the ratio of the measured collision rate to the provincial rate expected at similar intersections).

2. For each of the top locations, conduct a formal safety study including site visit(s) and collision analysis to identify trends, evaluate causal factors, and recommend potential counter-measures to address the safety issues.

3. Incorporate road safety improvements into the City’s Capital Program, as project scope and budgets permit.

4. In partnership with other road authorities, safety professionals, and emergency service representatives, develop and adopt a Road Safety Action Plan for Grande Prairie, and set meaningful safety targets for the city, such as “Vision Zero”.

MODULE 6

Active Transportation and Transit

- Pedestrian network
- Cycle/Trail network
- Barrier-free considerations
- Transit system
- Summary of issues

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6-1. Introduction and Project Background

Active Transportation and Transit are integrally linked alternative modes of travel through Grande Prairie that are needed to serve residents of all levels of mobility and means.

This module was established from the review and assessment of three (3) key active transportation resource documents (see right); City planning documents (MDP, LUB, ASP's, park plans – including the Muskoseepi Park Master Plan, and the Transit Master Plan); a complete tour of the City; public engagement sessions and discussion; and resource inventory mapping. All review and assessment information was directly incorporated and expanded upon to identify specific issues affecting system effectiveness, and establish high-level recommendations for Active Transportation system development and enhancement. This effort was not intended to repeat the previous studies so much as revisit the recommendations in the context of the Transportation Master Plan.

Key Active Transportation Resource Documents:

MOVING FORWARD – A Strategy for Active Transportation in Grande Prairie

Alberta Health Services – Walkable Alberta, Grande Prairie Community Report

Grande Prairie Area – Joint Recreation Master Plan

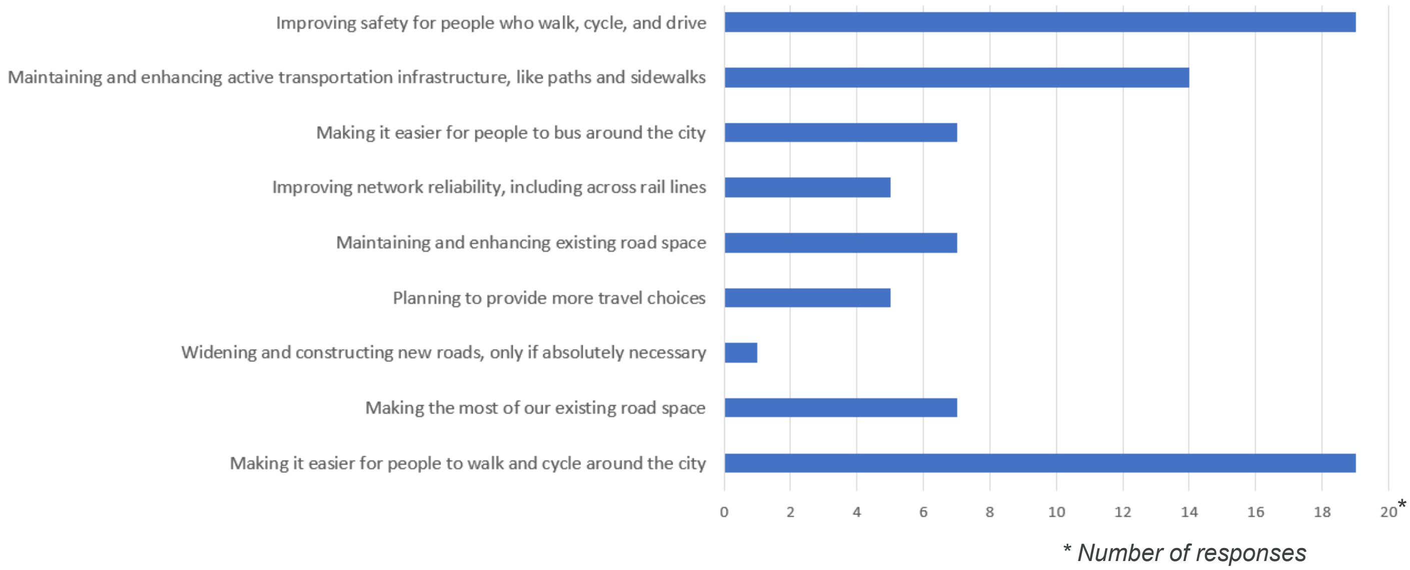
While active transportation and transit routes are improving to better serve the community and promote and increase use by others, there continue to be areas in need of improvement, such as:

- Specific guidelines for active transportation and transit routes/stops within specific zones of the community;
- The integration of active transportation and transit with private land use;
- Incorporating universal/barrier-free accessibility;
- Introducing design guidelines that support year-round use, safety and security, and
- Introducing sustainable planning and design components.

The community engagement (see ***Module 2***) revealed that residents considered investment in active transportation infrastructure to be among their top priorities. During the first Open House (***Figure 6-1***), residents identified the top three guiding principles for the Plan as:

1. Making it easier for people to walk and cycle around the City;
2. Improving safety for people who walk, cycle, and drive; and
3. Maintaining and enhancing active transportation infrastructure.

Figure 6-1: Community Priorities Identified in First Open House



These guiding principles were further supported through similar responses obtained from the three (3) key active transportation resource documents, and through one-on-one discussions with stakeholders and the public.

The community engagement also confirmed the desire for more transit route coverage with higher frequency; better connections to key destinations; more accessible bus stops; more inclusive Handi-bus access; and the consideration of regional transit routes.

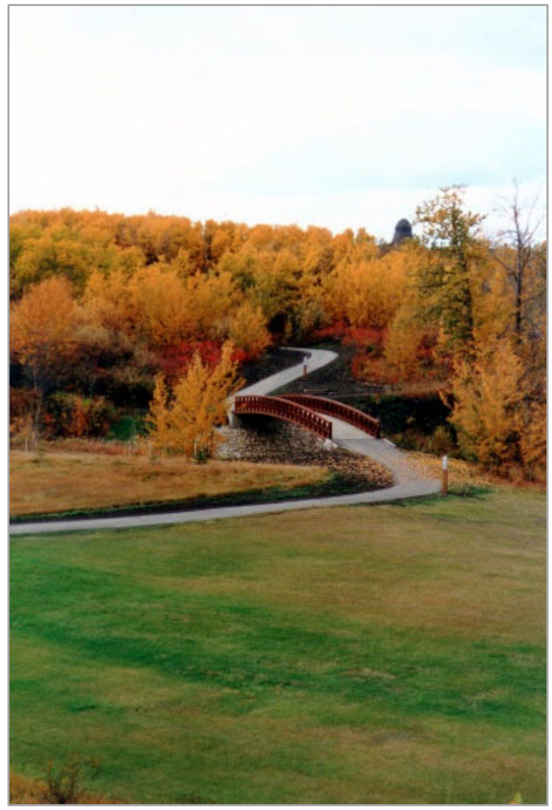
All high-level Active Transportation development and enhancement recommendations provided in the *Transportation Master Plan* (TMP) will require further prioritization and alignment with TMP improvement initiatives and potential City enabling document (e.g., plans, policies, standards) modifications; and detailed planning and design development.

6-2. Active Transportation

The review and assessment of three (3) key active transportation resource documents (*Moving Forward: A Strategy for Active Transportation*; *Walkable Alberta: Grande Prairie Community Report*; and the *Joint Recreation Master Plan*), provided specific issues affecting active transportation system effectiveness. Some of the important findings from these documents are outlined below.

- There is a general desire in the community for increased active transportation (walking, cycling) and transit service, in consideration of urban and natural environments within Grande Prairie.
- The City's role is to provide an active transportation system with wayfinding (incl. education and interpretation), as well as amenities.
- Walking routes should be physically separated from vehicular traffic.
- The City should plan for connectivity, filling the gaps and enhancing existing routes, especially for utilitarian (i.e. commuter) trips. In particular, the industrial areas of the City generally have insufficient sidewalk infrastructure.
- The City should explore the importance of zones, destinations / nodes, neighbourhoods, and regional connections (e.g. with the *Regional Trails Master Plan*).
- The trail network should be rated and included with City's Sidewalk Condition Index.
- The community wants to see a clear decrease in vehicle-pedestrian incidents and near misses.
- Active transportation infrastructure should be developed to reduce traffic demand and congestion around existing schools and proposed new school locations. Most schools in the City appear to have existing sidewalk infrastructure on key routes, with the exception of the schools located on:
    - 116th Avenue
    - 68th Avenue
    - The west side of Grande Prairie, in the industrial area.
- Cyclists should be included in traffic counts.
- Physical barriers should be removed to improve the accessibility of the active transportation system; future studies should include this consideration.
- As a Winter City, Grande Prairie must plan, design, and maintain the active transportation system for inclement conditions.

6-2.1. SWOC ANALYSIS



To consolidate review and assessment findings; better evaluate the existing active transportation system in Grande Prairie; and to build upon and develop key active transportation recommendations, a detailed "SWOC" analysis was conducted. "SWOC" analysis involves the evaluation of the system's:

- **Strengths:** Positive aspects that are internal to the system
- **Weaknesses:** Negative or problematic aspects that are internal to the system
- **Opportunities:** Positive external considerations that can influence the system
- **Challenges:** Negative or problematic considerations that can influence the system.

6-2.1.1. Strengths

The following features benefit active transportation in the City and surrounding region and/or are unique or exemplary in comparison to other municipalities:

1. Numerous natural areas (e.g. Muskoseepi, Bear Creek, O'Brien Lake, Crystal Lake, etc.) and City parks
2. Integration of open spaces with developed trail systems.
3. Well-established active transportation corridors along 84 Avenue, 108 Street and Resources Road.
4. Committed City and community support for investment and improvements.

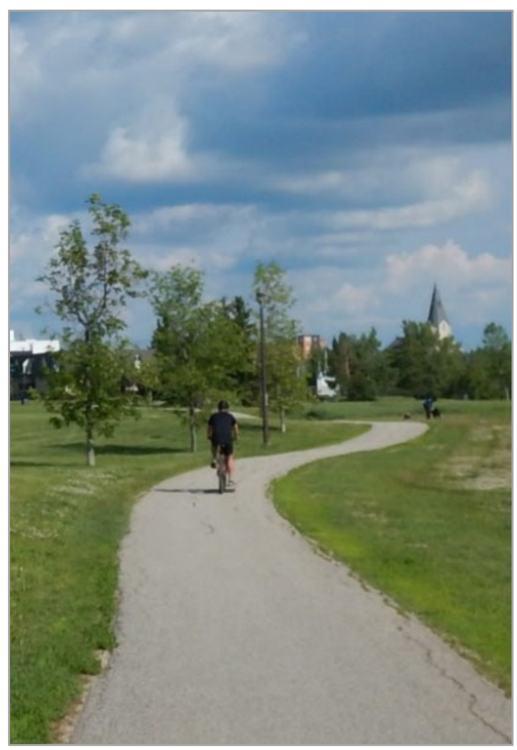
6-2.1.2. Weaknesses

The following features may prevent or otherwise adversely affect active transportation in the City and surrounding region:

1. Significant gaps in the active transportation network:
   a) Local – trails, multi-use trails, sidewalks, etc.
   b) Regional – trail hubs, trails, etc.
   c) Hubs / Trail Heads – access / egress, parking, information, amenities, etc.

2. Active transportation inconsistencies including:
   a) No design guidelines or policies that identify Grande Prairie as a Winter City and the importance of year-round return on investments, development and public infrastructure projects that include active transportation (Refer to the Active Transportation System Recommendations for further component examples of active transportation Winter City planning and design).
   b) Planning, design and guideline / policy integration of public / private land use in residential, commercial, industrial, downtown and regional areas that support safe, secure and barrier-free access within Grande Prairie (see Active Transportation System Recommendations below).
   c) Integration of active transportation modes and public transit through an integrated program and service route/hub system.
3. Poor level of network safety and security (actual and perceived) along routes; at intersections; and in active transportation zones (Refer to the Active Transportation System Recommendations for specific recommendations pertaining to network safety and security developed from the review and assessment process).
4. The need to assess and resolve conflicts between vehicular and active transportation users.
5. The need to assess and resolve the lack of barrier-free accessibility and inclusivity (as recorded in documentation; through TMP public engagement/discussion; and a City-wide tour).
6. Lack of active transportation nodes, especially with appropriate amenities to support year-round use.
7. Lack of City-wide wayfinding and route directories.
8. Limited year-round operations and maintenance on active transportation routes.

6-2.1.3. Opportunities:



The following features or actions could preserve, maintain or enhance active transportation in the City and surrounding region:

1. Establishment of zones for active transportation based on adjacent land use and expected activity, such as:
   a) Neighbourhoods / School Zones + Urban Reserve
   b) Commercial Zones
   c) Industrial Zones
   d) Downtown Zone
   e) Natural Areas, Parks and Open Space Zones
   f) Rural + Regional Connector Zones
   g) Active Transportation Hubs

   These zones are discussed in more detail in the recommendations below.

2. Establishment of design guidelines for roadways, intersections, transit hubs and links with a focus on amenities and community features; safety and security; accessibility; inclusivity; and landscape applications.
3. Implementation of a comprehensive wayfinding / guidance system, including use of mapping, signage, on-line applications, and other features.
4. Development of education / interpretive programs concerning local history, culture, ecology health and wellness, which can encourage more residents to use the active transportation system.
5. Development and promotion of a Winter City perspective that includes guidelines and policies to promote identity and a year-round return on investments, development and public infrastructure projects.
6. Elimination of critical gaps in the active transportation system to create an integrated, continuous system.
7. Promotion of sustainability and low impact development applications.
8. Establishment of a City-Wide Urban Framework that integrates all key aspects of the City (e.g., districts/zones, landmarks/destinations, nodes, edges and corridors); defines current patterns of use (e.g., physical, cultural, social); and identifies the preservation and enhancement of key patterns that positively affect quality of life and sense of place for the community of Grande Prairie.

6-2.1.4. Challenges:

The following existing (typically external) conditions can undermine the existing and potential effectiveness of the City's active transportation system:

1. Grande Prairie is a northern City with long winters.
2. There is an inherent disconnect between public and private land use with respect to regulations, policies, and standards concerning active transportation and barrier-free connectivity.
3. There is no Urban Framework for the City of Grande Prairie.
4. There is a high use of private vehicles – even for trips less than 10km. Ample traffic and parking capacity in Grande Prairie provide no disincentives to using automobiles.
5. There is a need for more "Safe Routes to Schools," including neighbourhood-based routes/standards, neighbourhood and major arterial route crossings, discouraging driving to schools, school bus/parent drop-off standards, traffic control device requirements, etc.
6. The integrity of existing natural areas and habitat needs to be preserved / protected.

Addressing these challenges has been incorporated into the Active Transportation System Recommendations below.

6-2.2. ACTIVE TRANSPORTATION SYSTEM RECOMMENDATIONS

The social, environmental and economic benefits of establishing active transportation within communities is well-documented, including in Grande Prairie. Active transportation routes should be integrated to provide a shared network of use for those on foot or using non-motorized modes. Ultimately, the challenge is to provide a strategic active transportation system that reduces the number of short vehicular trips within the City and encourages residents to use active transportation routes as much as possible.

The City already has a number of active transportation corridors that have been well developed through natural areas (e.g. Muskoseepi, Bear Creek, O’Brien Lake, Crystal Lake, etc.), parks and open space areas, and along key traffic routes (e.g. 84 Avenue, 108 Street, and Resources Road).

To build on these successes, the following active transportation system recommendations have been identified for City consideration. As noted in previous sections, these active transportation development and enhancement recommendations are high-level and consolidate and expand on the review and assessment of key active transportation resource documents; City planning documents; a complete tour of the City; public engagement sessions and discussion; and resource inventory mapping. All recommendations will require further prioritization and alignment with TMP improvement initiatives and potential City enabling document (e.g., plans, policies, standards) modifications; and detailed planning and design development.

1. **Establish an Urban Framework:**

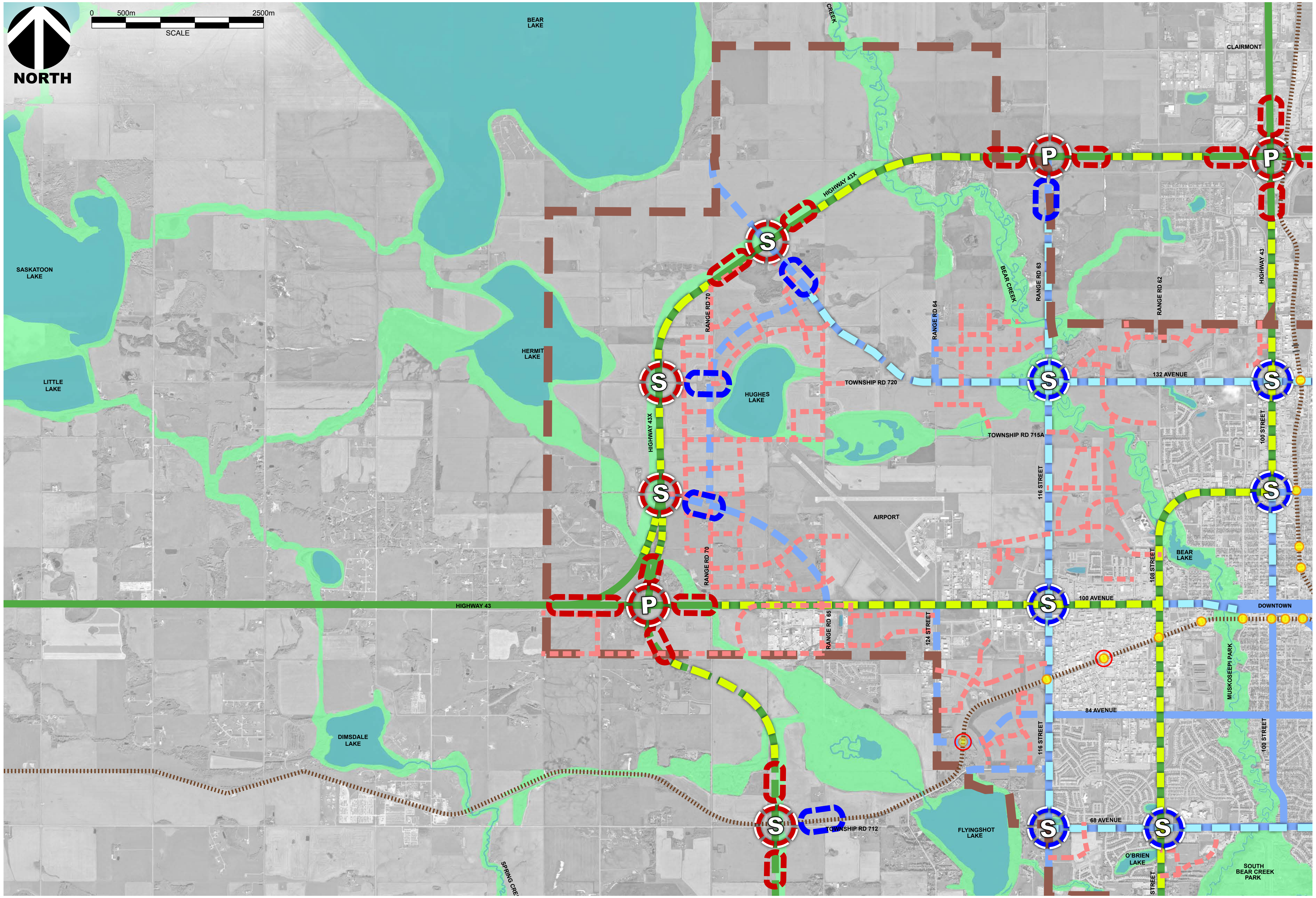
The character and physical qualities of a City is determined and influenced by various components. The visual quality or legibility of these components dictates the organization and recognition of a coherent City through a distinct pattern development. Legibility is a crucial concept in the structuring of a coherent City pattern. A legible City is one where **districts** (areas exhibiting a recognizable and common character), **landmarks** (reference points), **nodes** (focal points), **edges** (natural and built boundaries) and **corridors** (urban channels – roads, walkways, public transit, bicycle routes, etc.) are easily identified and grouped into an overall pattern. These pattern elements structure and harmonize the City, establishing and clarifying points of entry, movement, visual reference, ambient character, and social space – in short, they create a sense of place. To create a distinctive sense of place for City environments, it is important to establish comprehensive and implementable planning and design directions that identify and respond to the potential interactions between pattern elements. A sense of place is physically and cognitively created through these pattern elements. Establishing an Urban Framework would support the integration of pattern elements, including active transportation and municipal and regional transportation routes (highways, collector and arterial); address identified weaknesses, opportunities and challenges (e.g., gaps, guidelines/policies, integrated program and service route/hub system, network safety and security, barrier-free accessibility and inclusivity, node development, wayfinding, operations and maintenance, zone development); and identify and support future joint planning and design initiatives that address community placemaking and a sense of place.

Exhibits 6-1a to ***6-1d*** provide a high-level conceptual overlay of key urban framework areas to be considered with respect to corridor (transportation/active transportation) enhancement opportunities. These enhancement opportunities would also apply district, landmark, node and edge components to supplement and support corridor enhancement. These enhancement opportunities include:

- Potential active transportation (multi-modal) integration into key existing and future City/Regional highway and arterial routes, including components such as: highway greenways; Complete/Green Street development; support landscape and amenity placemaking features.

- A hierarchy (primary and secondary) of potential highway and arterial nodes/gateways into the City and region, incorporating fixed and linear gateway approaches that incorporate components such as: landmarks, landscape and placemaking amenity features.

Integrating and establishing these corridor enhancement opportunities will provide a good 'first impression' of Grande Prairie and a consistent and clear pattern of entry, movement, visual reference, character, social life and experience.



LEGEND - ACTIVE TRANSPORTATION

- HIGHWAY ROUTES
- ARTERIAL ROUTES
- PROPOSED HIGHWAY ROUTES
- PROPOSED ARTERIAL ROUTES
- HIGHWAY GATEWAY
- ARTERIAL GATEWAY
- HIGHWAY LINEAR GATEWAY
- ARTERIAL LINEAR GATEWAY
- P PRIMARY NODE
- S SECONDARY NODE
- ENHANCED ARTERIAL CORRIDOR
- ENHANCED HIGHWAY CORRIDOR

LEGEND - GENERAL

- 2016 CITY BOUNDARY
- FUTURE COLLECTOR ROAD
- RAILWAY LINE
- EXISTING BUS ROUTE
- RAILWAY CROSSING
- FUTURE RAILWAY CROSSING
- WATER BODY
- WATERCOURSE
- NATURAL AREA / PARKS / OPEN SPACE

ACTIVE TRANSPORTATION URBAN FRAMEWORK - NORTHWEST

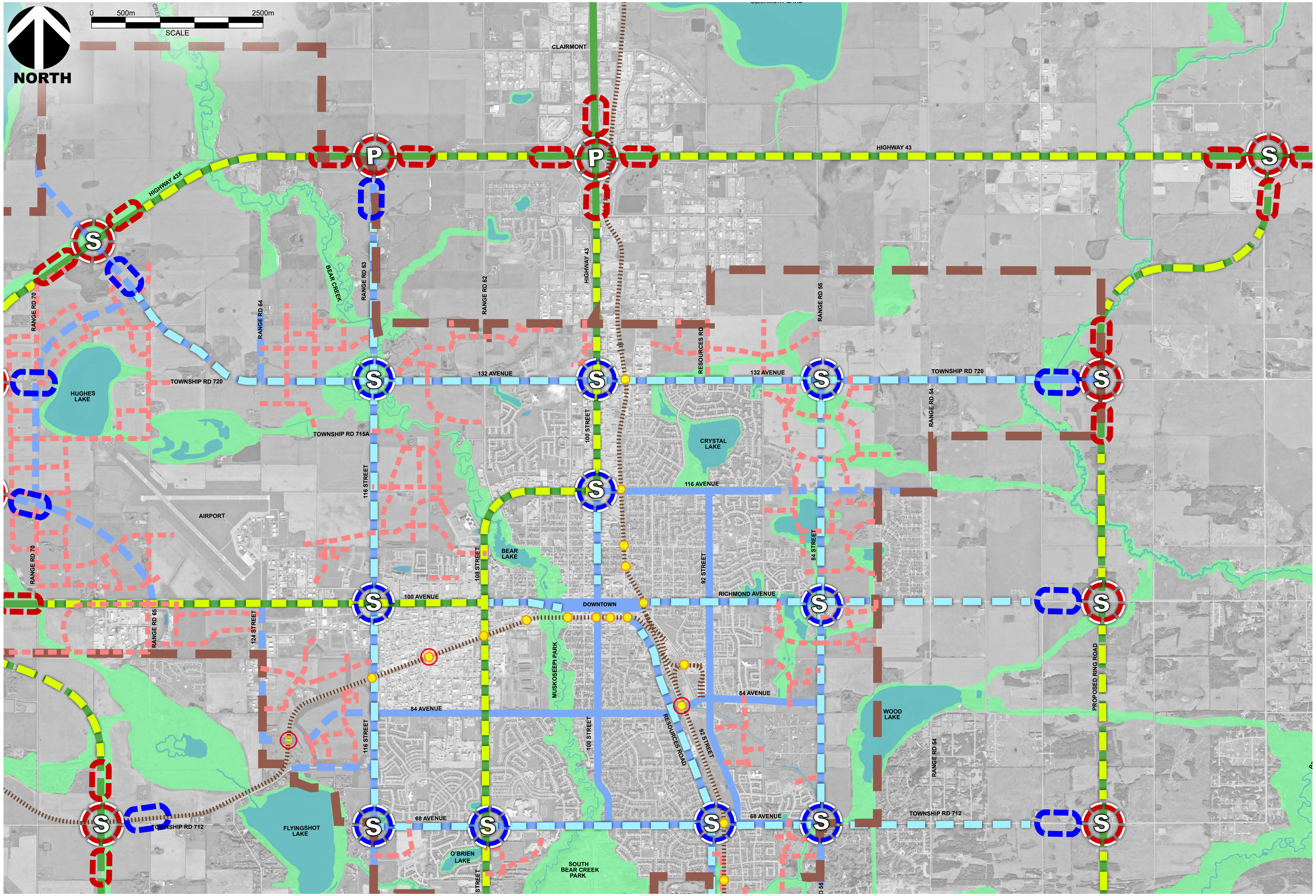
TRANSPORTATION MASTER PLAN
CITY OF GRANDE PRAIRIE

Grande Prairie AB. | February 14, 2020

Prepared by: McElhanney

Prepared for: THE CITY OF GRANDE prairie

EXHIBIT 6-1a



LEGEND - ACTIVE TRANSPORTATION

- HIGHWAY ROUTES
- ARTERIAL ROUTES
- PROPOSED HIGHWAY ROUTES
- PROPOSED ARTERIAL ROUTES
- HIGHWAY GATEWAY
- ARTERIAL GATEWAY
- HIGHWAY LINEAR GATEWAY
- ARTERIAL LINEAR GATEWAY
- P PRIMARY NODE
- S SECONDARY NODE
- ENHANCED ARTERIAL CORRIDOR
- ENHANCED HIGHWAY CORRIDOR

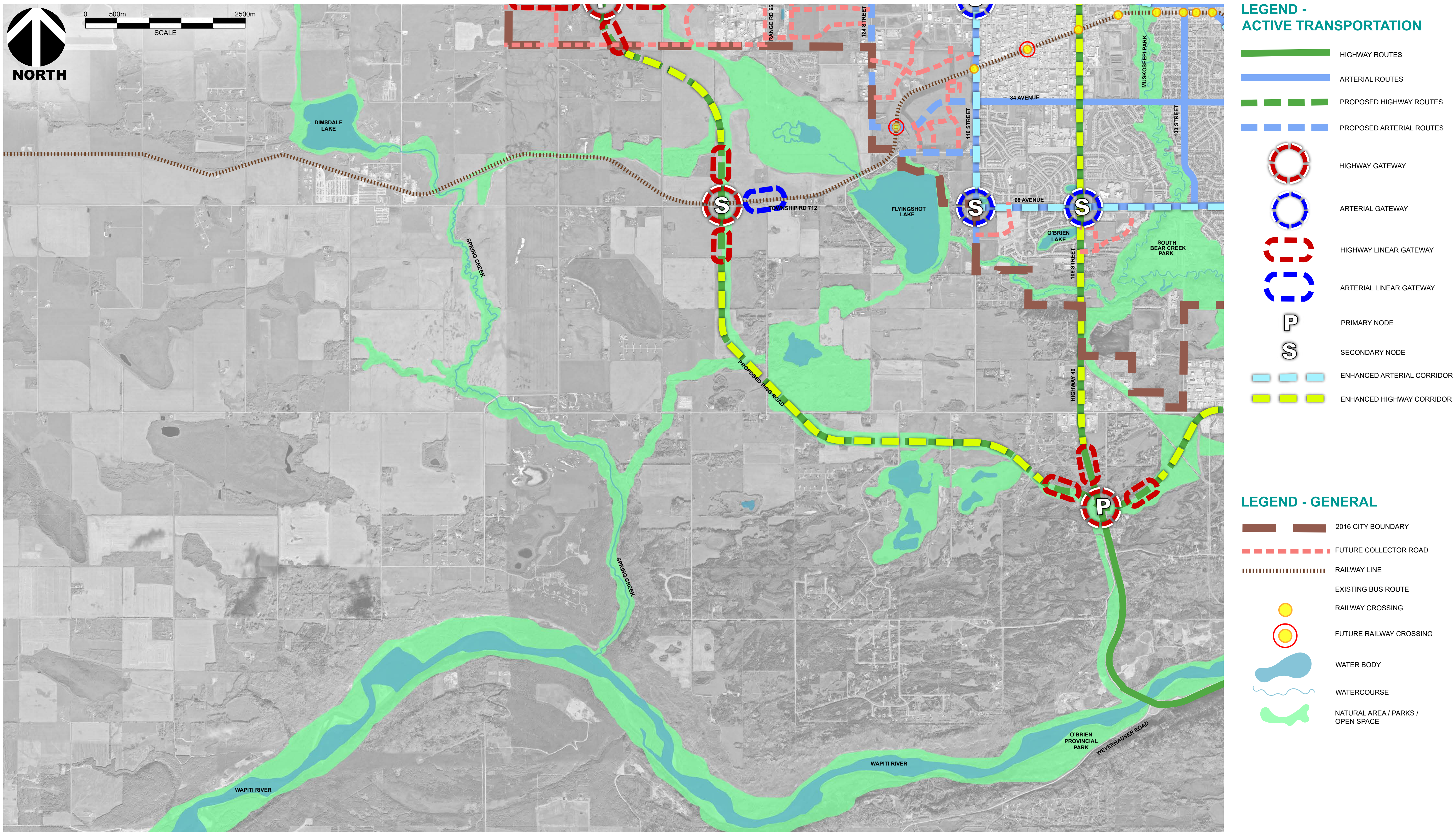
LEGEND - GENERAL

- 2016 CITY BOUNDARY
- FUTURE COLLECTOR ROAD
- RAILWAY LINE
- EXISTING BUS ROUTE
- RAILWAY CROSSING
- FUTURE RAILWAY CROSSING
- WATER BODY
- WATERCOURSE
- NATURAL AREA / PARKS / OPEN SPACE

ACTIVE TRANSPORTATION URBAN FRAMEWORK - NORTHEAST

EXHIBIT 6-1b

Prepared by: McElhanney
Prepared for: THE CITY OF GRANDE prairie



ACTIVE TRANSPORTATION URBAN FRAMEWORK - SOUTHWEST

TRANSPORTATION MASTER PLAN

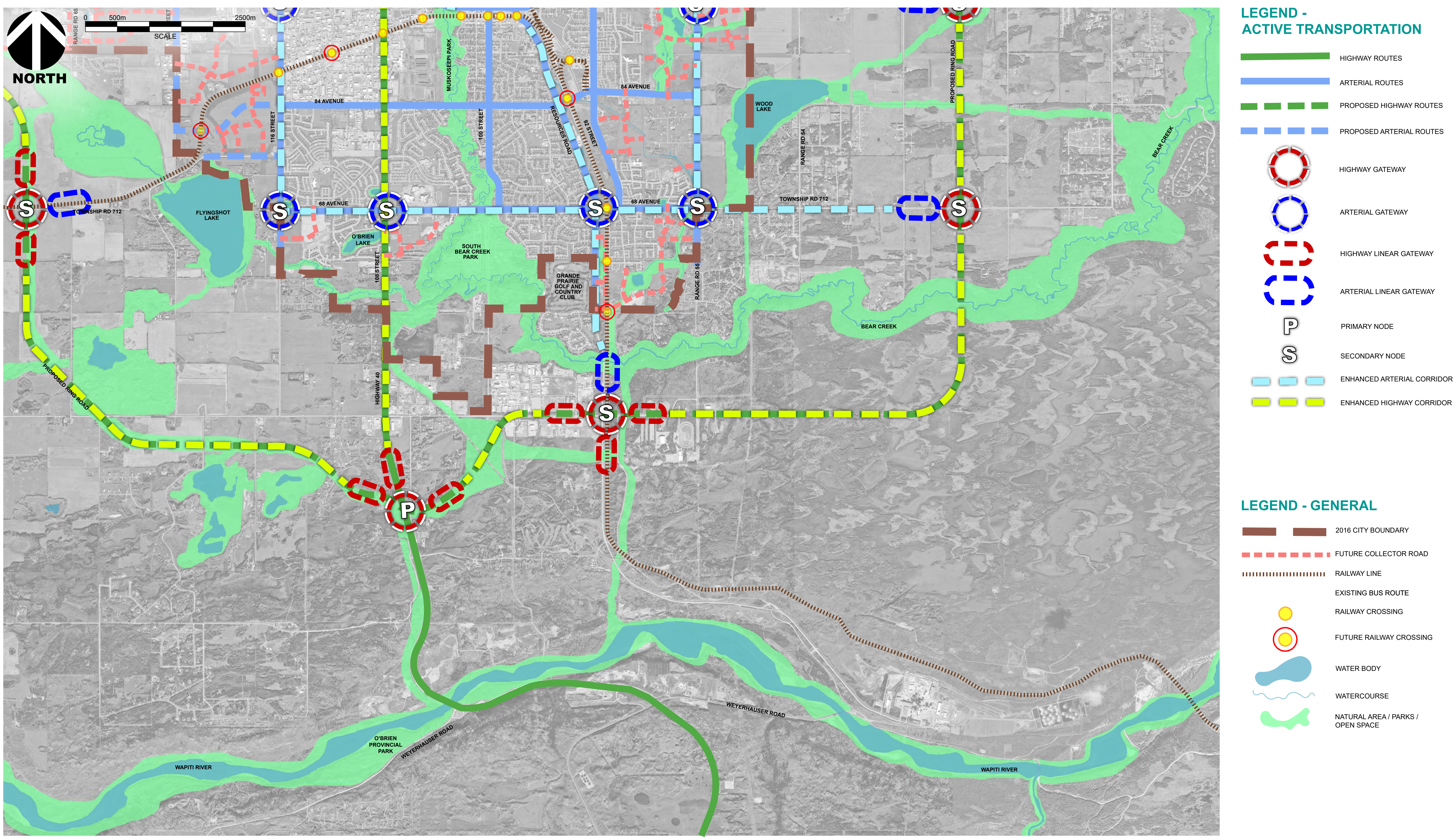
CITY OF GRANDE PRAIRIE

Grande Prairie AB. | February 14, 2020

Prepared by: McElhanney

Prepared for: THE CITY OF GRANDE prairie

EXHIBIT 6-1c



ACTIVE TRANSPORTATION URBAN FRAMEWORK - SOUTHEAST

TRANSPORTATION MASTER PLAN
CITY OF GRANDE PRAIRIE

Grande Prairie AB. | February 14, 2020

EXHIBIT 6-1d

Prepared by: McElhanney

Prepared for: THE CITY OF GRANDE prairie

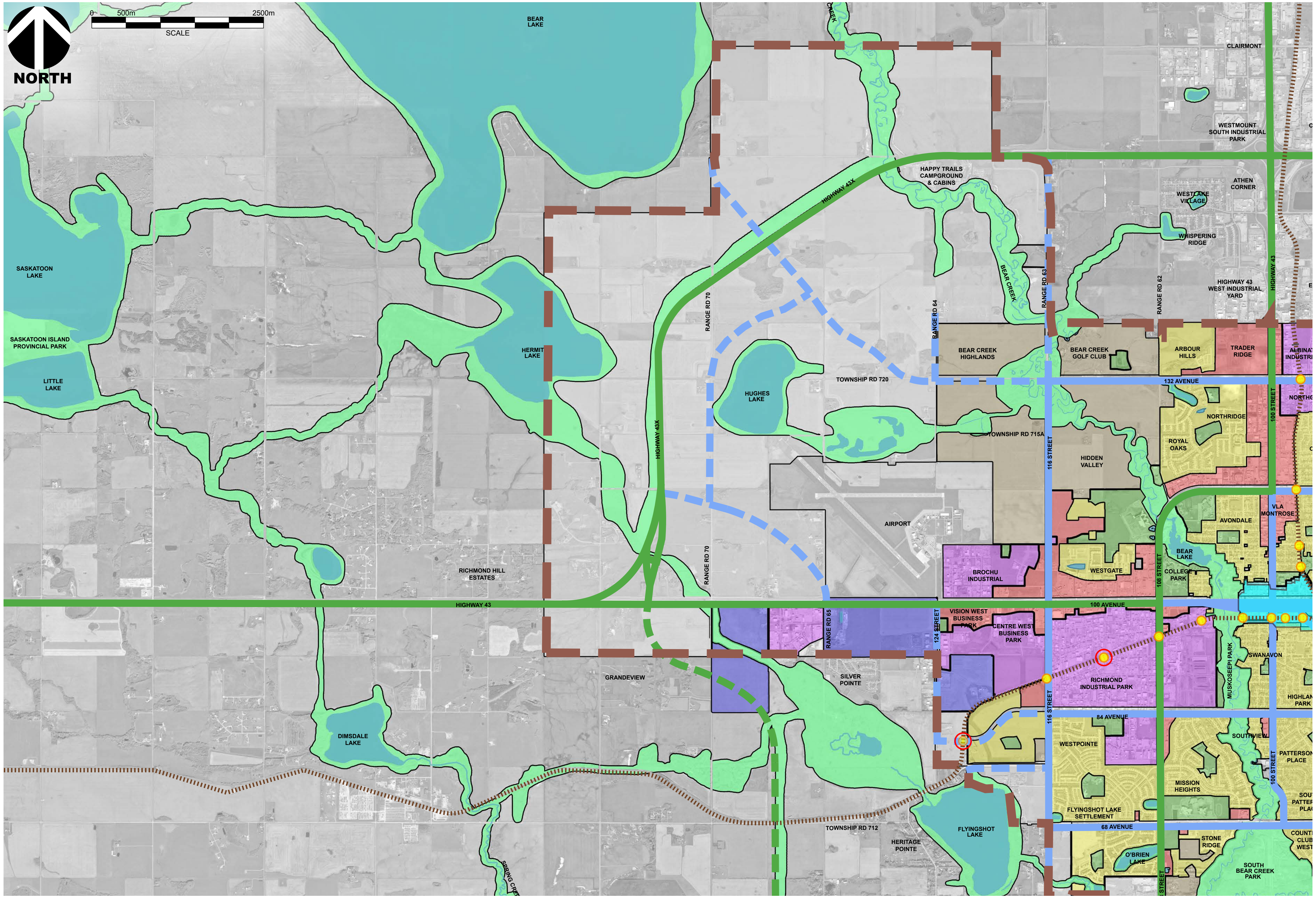
2. Establish Active Transportation Zones

By defining and establishing zones of active transportation, the City can develop specific planning and design guidelines / typologies that are appropriate for each zone in terms of (a) level of vehicular versus active transportation mode share; (b) route safety / security; (c) inclusivity and barrier-free accessibility; (d) winter use; (e) maintenance standards; (f) provision of amenities; (g) aesthetics; and (h) connectivity to other networks and modes. Ultimately, the challenge is to provide a safe and inclusive active transportation system that reduces the number of short vehicular trips within the City and encourages all residents to use active transportation routes to work; the downtown; municipal facilities; shopping areas; park and open space; regional links; and other key destination areas.

Table 6-1 and ***Exhibits 6-2a*** to ***6-2d***, provide a high-level concept for Active Transportation Zone development and the issues and proposed features each Zone would seek to address. Further Active Transportation Zone development should be completed in conjunction with the Urban Framework; TMP improvement initiatives and potential City enabling document (e.g., plans, policies, standards) modifications; and other identified detailed planning and design development.

Table 6-1: Active Transportation Zones

Zone	Issues / Features
Neighbourhood / School + Urban Reserve	"Walkable Neighbourhoods" and "Safe Journeys" program applications (e.g. neighbourhood-based multi-use routes / standards, neighbourhood and major arterial route crossings, discouraging driving to schools, school bus / parent drop-off standards, traffic control device requirements, etc. and integration and improved connectivity with other land use zones.
Public Service	Improvements to edge conditions, character, landscape, Winter City components, etc., and barrier-free connectivity to public service businesses.
Commercial	Improvements to edge conditions, character, landscape, Winter City components, etc., and barrier-free connectivity to commercial development.
Downtown	"Complete Street" and "Green Street" design applications to enhance the pedestrian realm and promote sustainability, safety and security; dedicated bicycle lane routes; and barrier-free connectivity.
Natural Areas, Parks & Open Spaces	Year-round, safe, secure, aesthetic, and barrier-free connectivity for all modes of active transportation that preserve the natural integrity of each 'green' zone and provide links to neighbourhood, commercial, industrial and regional zones.
Industrial	Improvements to landscape and Winter City components, and dedicated barrier-free connectivity to industrial businesses, especially in conjunction with transit routes and stops.
Regional Connectors + Rural Service Areas	Integrating City zones to provide connectivity and extension to surrounding rural neighbourhoods and regional communities; natural areas; and areas of interest.



LEGEND - ACTIVE TRANSPORTATION ZONES

NEIGHBOURHOOD + SCHOOL ZONE
KEY CONCERNS + REQUIREMENTS:
- Walkable Neighbourhoods/Safe Journeys applications; and
- Integration and improved connectivity with other land use zones.

URBAN RESERVE
KEY CONCERNS + REQUIREMENTS:
- Walkable Neighbourhoods/Safe Journeys applications; and
- Integration and improved connectivity with other land use zones.

PUBLIC SERVICE
KEY CONCERNS + REQUIREMENTS:
- Public Service Zone improvements; and
- Dedicated pedestrian barrier-free connectivity to public service businesses.

COMMERCIAL ZONE
KEY CONCERNS + REQUIREMENTS:
- Commercial Zone improvements; and
- Dedicated pedestrian barrier-free connectivity to commercial units.

DOWNTOWN ZONE
KEY CONCERNS + REQUIREMENTS:
- Complete and Green Street design applications;
- Safety and security;
- Dedicated bicycle lane routes; and
- Pedestrian barrier-free connectivity.

NATURAL AREAS / PARKS / OPEN SPACE ZONE
KEY CONCERNS + REQUIREMENTS:
- Provide year-round, safe, secure, aesthetic, and barrier-free connectivity for all modes of active transportation;
- Preserve the natural integrity of each 'green' zone; and
- Provide links to neighbourhood, commercial, industrial and regional zones.

INDUSTRIAL ZONE
KEY CONCERNS + REQUIREMENTS:
- Industrial Zone improvements; and
- Dedicated pedestrian barrier-free connectivity to industrial businesses.

FUTURE COMMERCIAL / INDUSTRIAL ZONE
KEY CONCERNS + REQUIREMENTS:
- Dedicated pedestrian barrier-free connectivity to commercial units and industrial businesses.

RURAL SERVICE AREA
KEY CONCERNS + REQUIREMENTS:
- Integrating City zones to provide connectivity and extension to surrounding rural neighbourhoods and regional communities, natural areas and areas of interest.

LEGEND - GENERAL

- HIGHWAY ROUTES
- ARTERIAL ROUTES
- PROPOSED HIGHWAY ROUTES
- PROPOSED ARTERIAL ROUTES
- 2016 CITY BOUNDARY
- RAILWAY LINE
- RAILWAY CROSSING
- FUTURE RAILWAY CROSSING
- WATER BODY
- WATERCOURSE

ACTIVE TRANSPORTATION ZONES - NORTHWEST

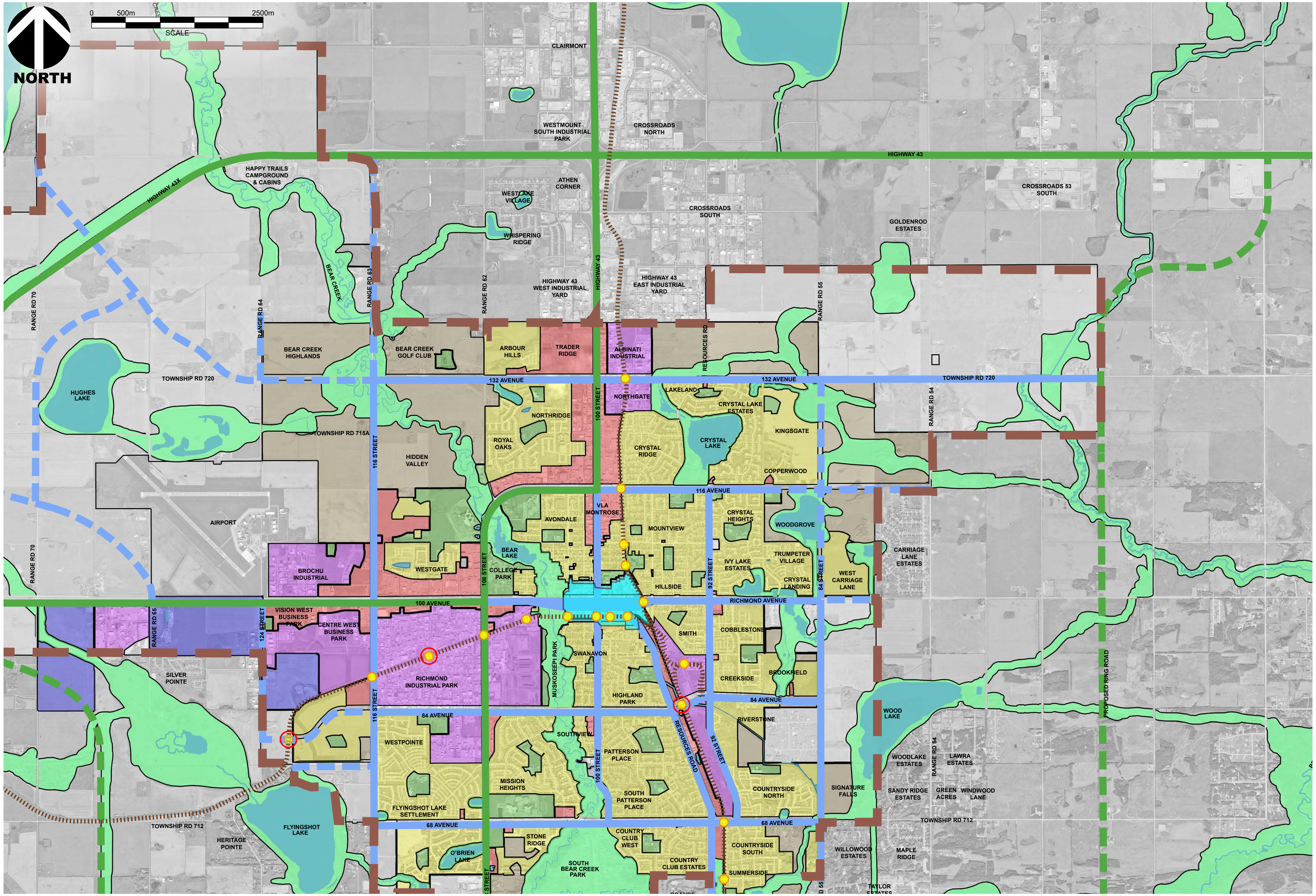
TRANSPORTATION MASTER PLAN
CITY OF GRANDE PRAIRIE

Grande Prairie AB. | February 14, 2020

Prepared by: McElhanney

Prepared for: THE CITY OF GRANDE prairie

EXHIBIT 6-2a



LEGEND - ACTIVE TRANSPORTATION ZONES

NEIGHBOURHOOD + SCHOOL ZONE
KEY CONCERNS + REQUIREMENTS:
- Walkable Neighbourhoods/Safe Journeys applications; and
- Integration and improved connectivity with other land use zones.

URBAN RESERVE
KEY CONCERNS + REQUIREMENTS:
- Walkable Neighbourhoods/Safe Journeys applications; and
- Integration and improved connectivity with other land use zones.

PUBLIC SERVICE
KEY CONCERNS + REQUIREMENTS:
- Public Service Zone improvements; and
- Dedicated pedestrian barrier-free connectivity to public service businesses.

COMMERCIAL ZONE
KEY CONCERNS + REQUIREMENTS:
- Commercial Zone improvements; and
- Dedicated pedestrian barrier-free connectivity to commercial units.

DOWNTOWN ZONE
KEY CONCERNS + REQUIREMENTS:
- Complete and Green Street design applications;
- Safety and security;
- Dedicated bicycle lane routes; and
- Pedestrian barrier-free connectivity.

NATURAL AREAS / PARKS / OPEN SPACE ZONE
KEY CONCERNS + REQUIREMENTS:
- Provide year-round, safe, secure, aesthetic, and barrier-free connectivity for all modes of active transportation;
- Preserve the natural integrity of each 'green' zone; and
- Provide links to neighbourhood, commercial, industrial and regional zones.

INDUSTRIAL ZONE
KEY CONCERNS + REQUIREMENTS:
- Industrial Zone improvements; and
- Dedicated pedestrian barrier-free connectivity to industrial businesses.

FUTURE COMMERCIAL / INDUSTRIAL ZONE
KEY CONCERNS + REQUIREMENTS:
- Dedicated pedestrian barrier-free connectivity to commercial units and industrial businesses.

RURAL SERVICE AREA
KEY CONCERNS + REQUIREMENTS:
- Integrating City zones to provide connectivity and extension to surrounding rural neighbourhoods and regional communities, natural areas and areas of interest.

LEGEND - GENERAL

- HIGHWAY ROUTES
- ARTERIAL ROUTES
- PROPOSED HIGHWAY ROUTES
- PROPOSED ARTERIAL ROUTES
- 2016 CITY BOUNDARY
- RAILWAY LINE
- RAILWAY CROSSING
- FUTURE RAILWAY CROSSING
- WATER BODY
- WATERCOURSE

ACTIVE TRANSPORTATION ZONES - NORTHEAST

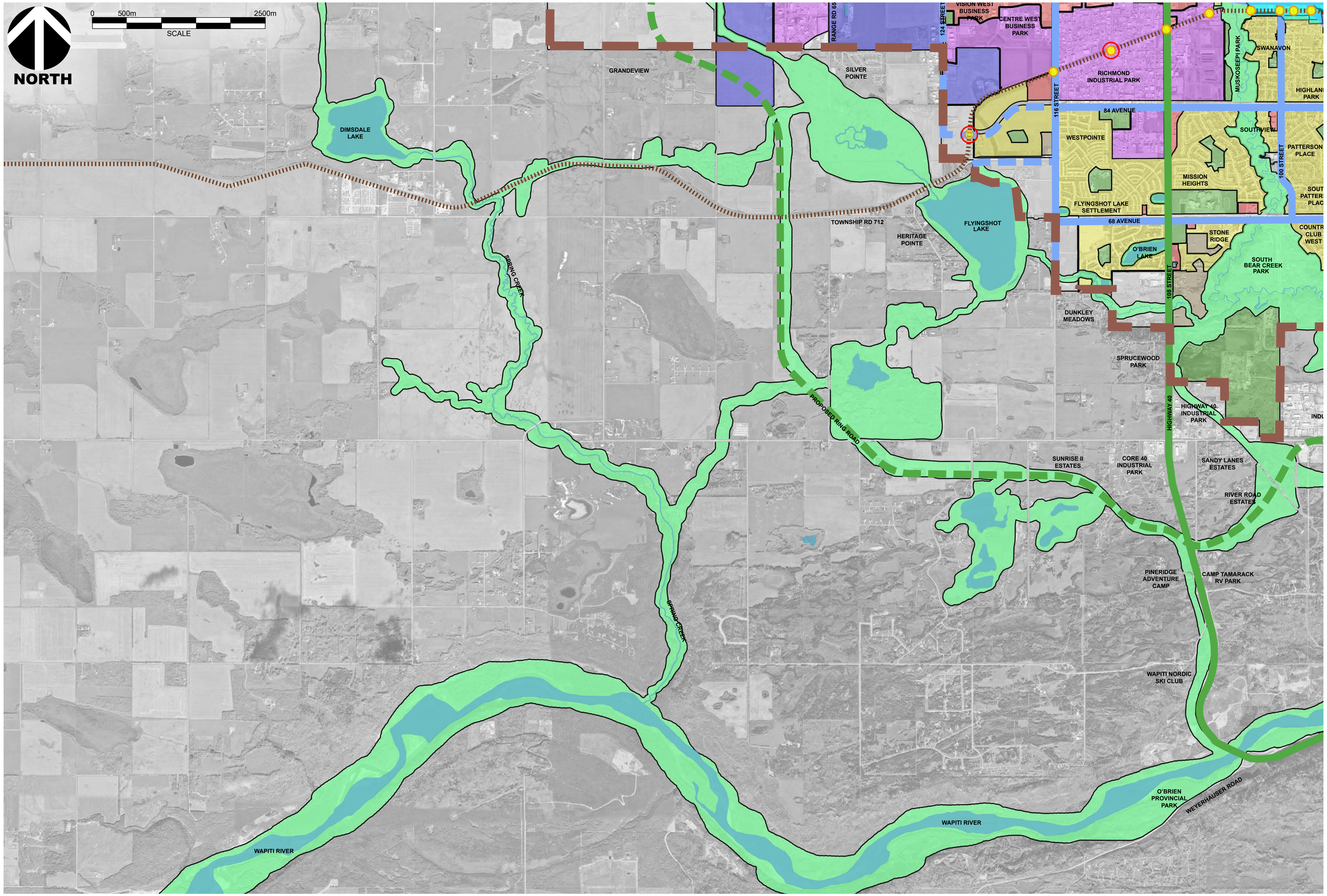
TRANSPORTATION MASTER PLAN
CITY OF GRANDE PRAIRIE

Grande Prairie AB. | February 14, 2020

Prepared by: McElhanney

Prepared for: THE CITY OF GRANDE prairie

EXHIBIT 6-2b



LEGEND - ACTIVE TRANSPORTATION ZONES

NEIGHBOURHOOD + SCHOOL ZONE
KEY CONCERNS + REQUIREMENTS:
- Walkable Neighbourhoods/Safe Journeys applications; and
- Integration and improved connectivity with other land use zones.

URBAN RESERVE
KEY CONCERNS + REQUIREMENTS:
- Walkable Neighbourhoods/Safe Journeys applications; and
- Integration and improved connectivity with other land use zones.

PUBLIC SERVICE
KEY CONCERNS + REQUIREMENTS:
- Public Service Zone improvements; and
- Dedicated pedestrian barrier-free connectivity to public service businesses.

COMMERCIAL ZONE
KEY CONCERNS + REQUIREMENTS:
- Commercial Zone improvements; and
- Dedicated pedestrian barrier-free connectivity to commercial units.

DOWNTOWN ZONE
KEY CONCERNS + REQUIREMENTS:
- Complete and Green Street design applications;
- Safety and security;
- Dedicated bicycle lane routes; and
- Pedestrian barrier-free connectivity.

NATURAL AREAS / PARKS / OPEN SPACE ZONE
KEY CONCERNS + REQUIREMENTS:
- Provide year-round, safe, secure, aesthetic, and barrier-free connectivity for all modes of active transportation;
- Preserve the natural integrity of each 'green' zone; and
- Provide links to neighbourhood, commercial, industrial and regional zones.

INDUSTRIAL ZONE
KEY CONCERNS + REQUIREMENTS:
- Industrial Zone improvements; and
- Dedicated pedestrian barrier-free connectivity to industrial businesses.

FUTURE COMMERCIAL / INDUSTRIAL ZONE
KEY CONCERNS + REQUIREMENTS:
- Dedicated pedestrian barrier-free connectivity to commercial units and industrial businesses.

RURAL SERVICE AREA
KEY CONCERNS + REQUIREMENTS:
- Integrating City zones to provide connectivity and extension to surrounding rural neighbourhoods and regional communities, natural areas and areas of interest.

LEGEND - GENERAL

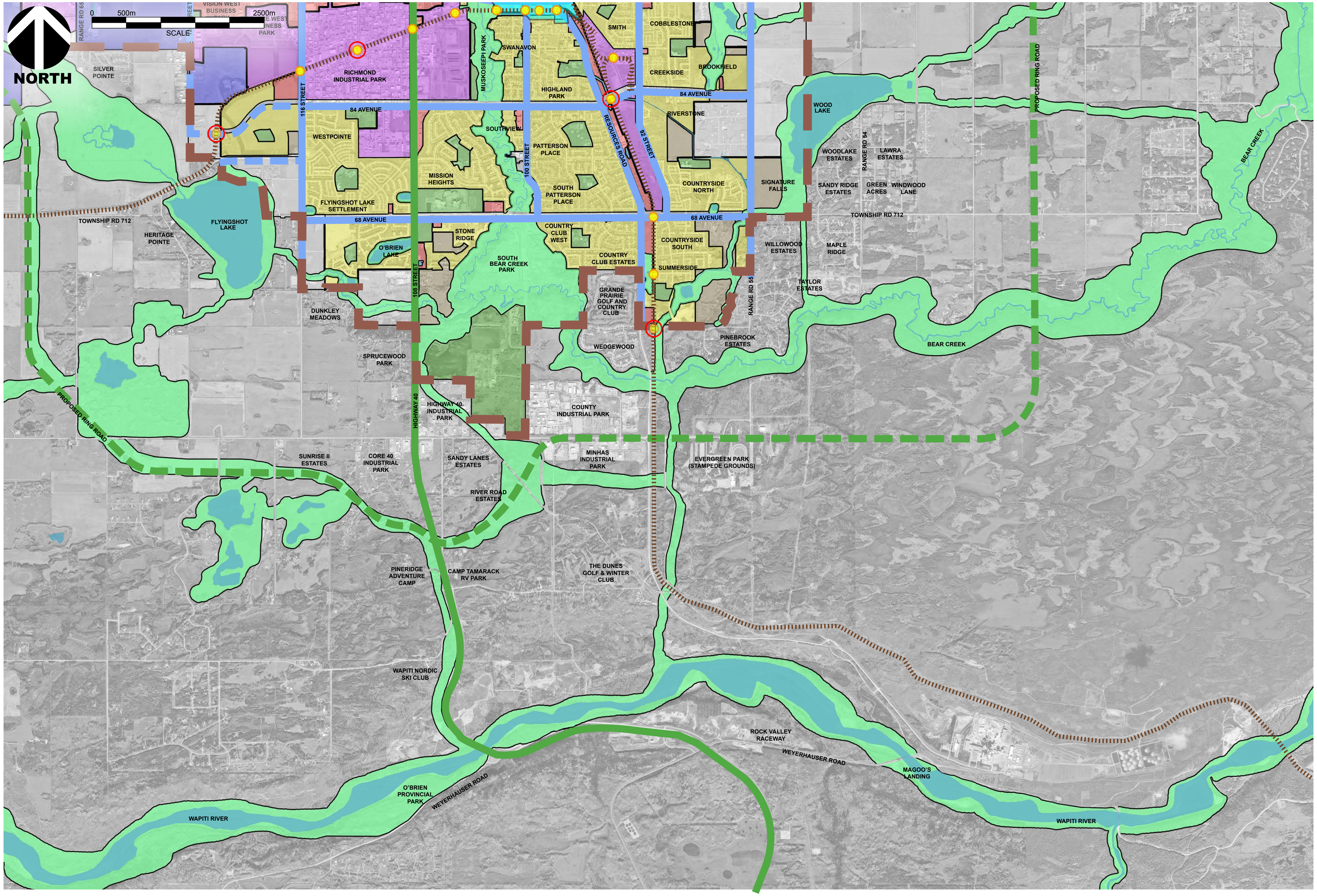
HIGHWAY ROUTES
ARTERIAL ROUTES
PROPOSED HIGHWAY ROUTES
PROPOSED ARTERIAL ROUTES
2016 CITY BOUNDARY
RAILWAY LINE
RAILWAY CROSSING
FUTURE RAILWAY CROSSING
WATER BODY
WATERCOURSE

ACTIVE TRANSPORTATION ZONES - SOUTHWEST

TRANSPORTATION MASTER PLAN
CITY OF GRANDE PRAIRIE
Grande Prairie AB. | February 14, 2020

EXHIBIT 6-2c

Prepared by: McElhanney
Prepared for: THE CITY OF GRANDE prairie



LEGEND - ACTIVE TRANSPORTATION ZONES

NEIGHBOURHOOD + SCHOOL ZONE
KEY CONCERNS + REQUIREMENTS:
- Walkable Neighbourhoods/Safe Journeys applications; and
- Integration and improved connectivity with other land use zones.

URBAN RESERVE
KEY CONCERNS + REQUIREMENTS:
- Walkable Neighbourhoods/Safe Journeys applications; and
- Integration and improved connectivity with other land use zones.

PUBLIC SERVICE
KEY CONCERNS + REQUIREMENTS:
- Public Service Zone improvements; and
- Dedicated pedestrian barrier-free connectivity to public service businesses.

COMMERCIAL ZONE
KEY CONCERNS + REQUIREMENTS:
- Commercial Zone improvements; and
- Dedicated pedestrian barrier-free connectivity to commercial units.

DOWNTOWN ZONE
KEY CONCERNS + REQUIREMENTS:
- Complete and Green Street design applications;
- Safety and security;
- Dedicated bicycle lane routes; and
- Pedestrian barrier-free connectivity.

NATURAL AREAS / PARKS / OPEN SPACE ZONE
KEY CONCERNS + REQUIREMENTS:
- Provide year-round, safe, secure, aesthetic, and barrier-free connectivity for all modes of active transportation;
- Preserve the natural integrity of each 'green' zone; and
- Provide links to neighbourhood, commercial, industrial and regional zones.

INDUSTRIAL ZONE
KEY CONCERNS + REQUIREMENTS:
- Industrial Zone improvements; and
- Dedicated pedestrian barrier-free connectivity to industrial businesses.

FUTURE COMMERCIAL / INDUSTRIAL ZONE
KEY CONCERNS + REQUIREMENTS:
- Dedicated pedestrian barrier-free connectivity to commercial units and industrial businesses.

RURAL SERVICE AREA
KEY CONCERNS + REQUIREMENTS:
- Integrating City zones to provide connectivity and extension to surrounding rural neighbourhoods and regional communities, natural areas and areas of interest.

LEGEND - GENERAL

HIGHWAY ROUTES
ARTERIAL ROUTES
PROPOSED HIGHWAY ROUTES
PROPOSED ARTERIAL ROUTES
2016 CITY BOUNDARY
RAILWAY LINE
RAILWAY CROSSING
FUTURE RAILWAY CROSSING
WATER BODY
WATERCOURSE

ACTIVE TRANSPORTATION ZONES - SOUTHEAST

TRANSPORTATION MASTER PLAN
CITY OF GRANDE PRAIRIE

Grande Prairie AB. | February 14, 2020

Prepared by: McElhanney

Prepared for: THE CITY OF GRANDE prairie

EXHIBIT 6-2d

3. Reduce Network Gaps

Exhibits 6-3a to ***6-3d*** illustrate the current active transportation routes in Grande Prairie and the identified gaps, which include municipal and potential future regional links to surrounding communities, natural areas, and other areas of interest. Some significant gaps, and other opportunities for new system links, include the following:

a) Multi-Use Trails:

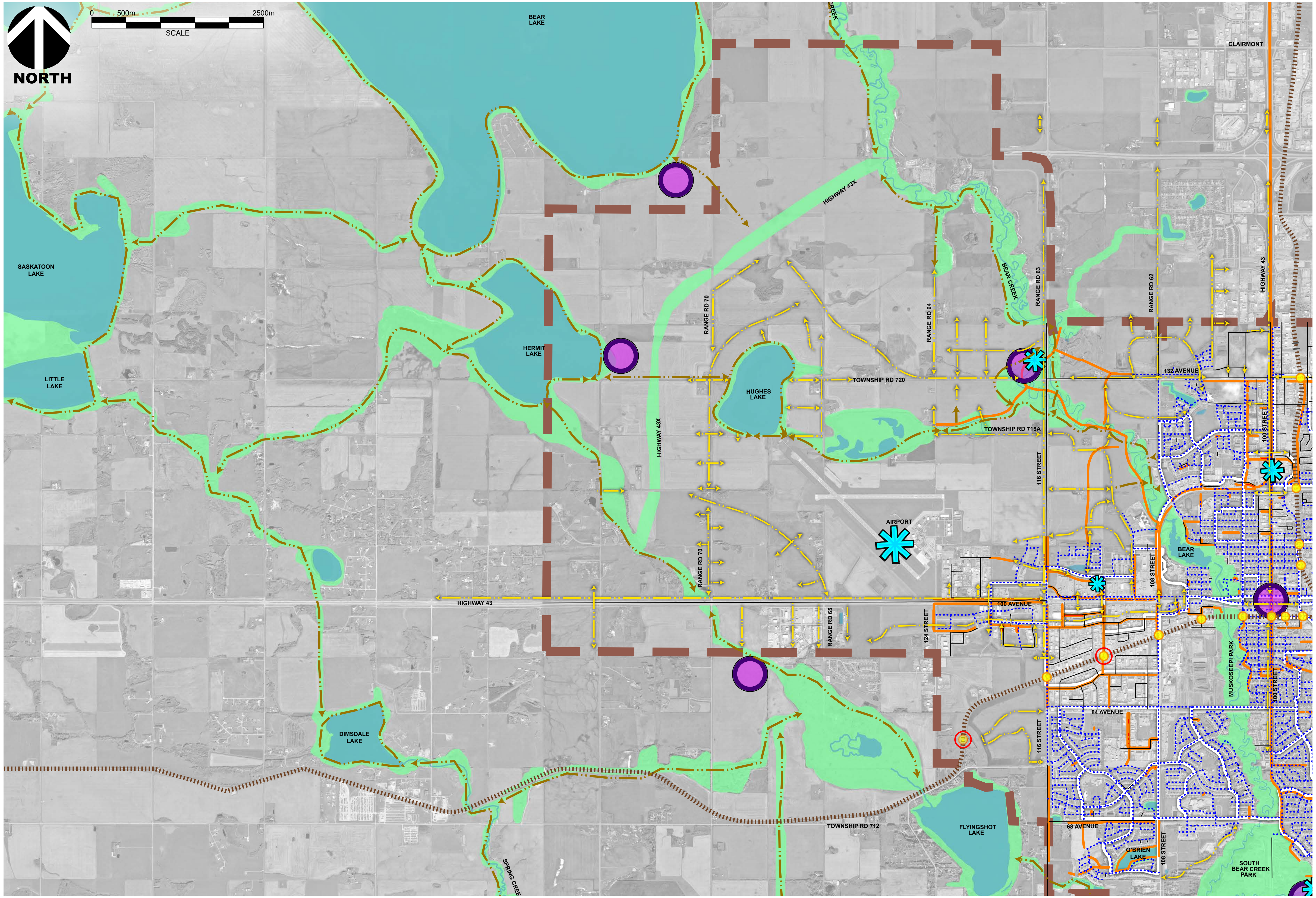
- North end of Bear Creek and neighbourhood connections;
- Around O'Brien Lake perimeter and a crossing to eliminate highway use;
- 68 Avenue – Resource Road to Range Road 55;
- 68 Avenue – 116 Street to 108 Street;
- 98 Street – 108 Avenue to 100 Avenue;
- 116 Street alignment / crossings;
- 100 Street – Downtown to Clairmont (north) and 68 Avenue (south);
- 116 Street – south of 77 Avenue to O'Brien Lake;
- 108 Street – 100 Avenue to 100 Street;
- 132 Avenue – 100 Street to 88 Street;
- 100 Avenue to 68 Avenue via Park Road and 92 Street;
- 100 Avenue – 116 Street to Airport;
- 84 Avenue – 92 Street to Willow Drive
- Dedicated bike route (west-east) through the Downtown;
- Connection to the Dunes and Wapiti Nordic area.

b) Neighbourhoods:

- Hillside;
- Mountainview;
- Scenic Ridge;

c) Key Destination Links:

- College Area - connections to surrounding commercial area;
- Downtown;
- Commercial Areas (e.g. 116 St / 100 Ave; 100 St / 132 Ave to Downtown)
- Hospital area (98 Street);
- Industrial (Richmond area)



LEGEND - ACTIVE TRANSPORTATION

- ACTIVE TRANSPORTATION GAPS
- EXISTING ROAD WITH PEDESTRIAN WALK/TRAIL
- EXISTING ROAD WITH NO PEDESTRIAN WALK/TRAIL
- POTENTIAL FUTURE PATHWAY URBAN
- POTENTIAL FUTURE PATHWAY RURAL
- EXISTING BUS ROUTES
- TRANSIT HUB OPPORTUNITIES
- ACTIVE TRANSPORTATION HUB OPPORTUNITIES

LEGEND - GENERAL

- 2016 CITY BOUNDARY
- RAILWAY LINE
- RAILWAY CROSSING
- FUTURE RAILWAY CROSSING
- WATER BODY
- WATERCOURSE
- NATURAL AREA / PARKS / OPEN SPACE

NOTE:
ACTIVE TRANSPORTATION GAPS HAVE BEEN ESTABLISHED THROUGH CITY OF GRANDE PRAIRIE COMMUNITY CONNECTIVITY MAPPING DATA AND DESKTOP / SITE ANALYSIS COMPLETED DURING THE TRANSPORTATION MASTER PLAN.

ACTIVE TRANSPORTATION GAPS - NORTHWEST

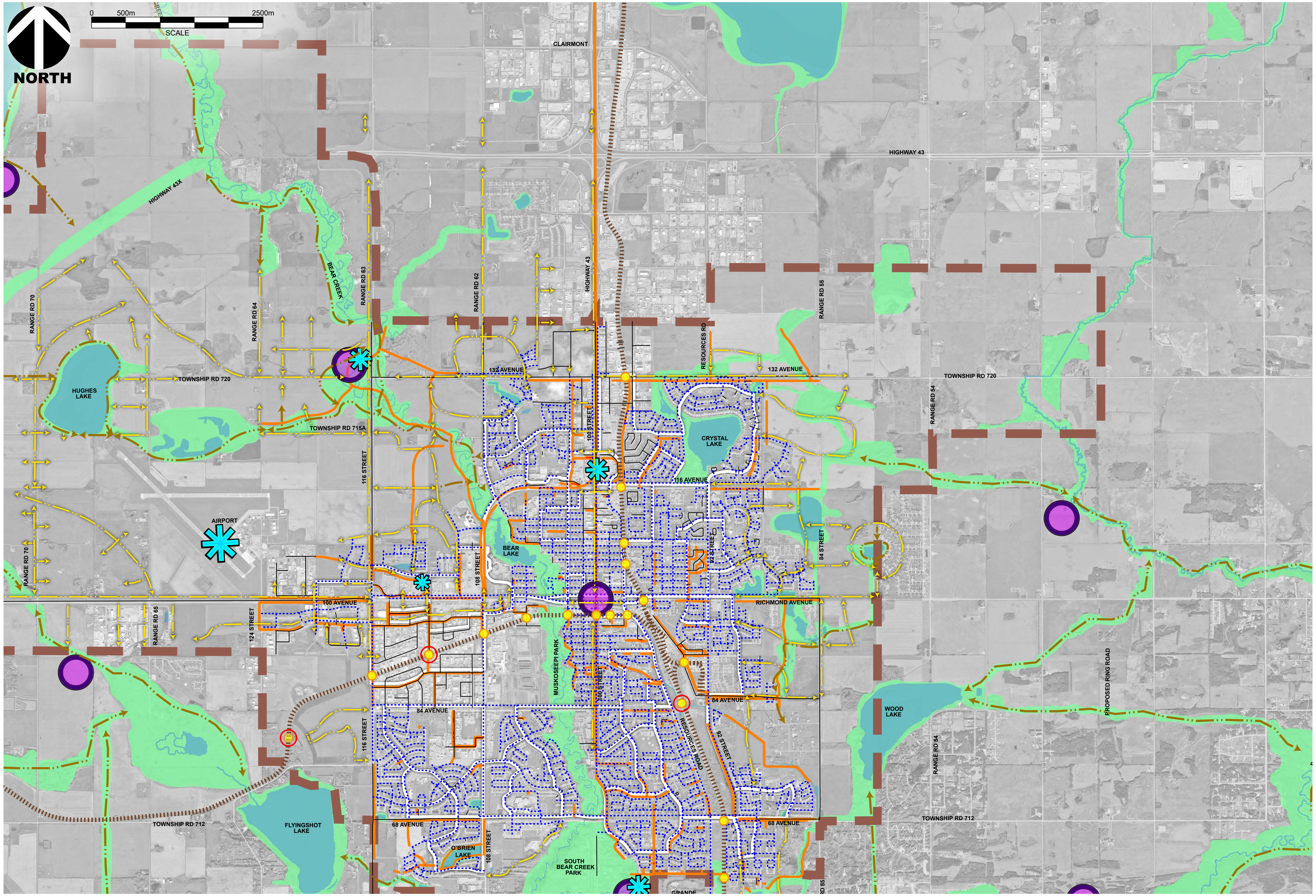
TRANSPORTATION MASTER PLAN
CITY OF GRANDE PRAIRIE

Grande Prairie AB. | March 4, 2020

EXHIBIT 6-3a

Prepared by: McElhanney

Prepared for: THE CITY OF GRANDE prairie



LEGEND - ACTIVE TRANSPORTATION

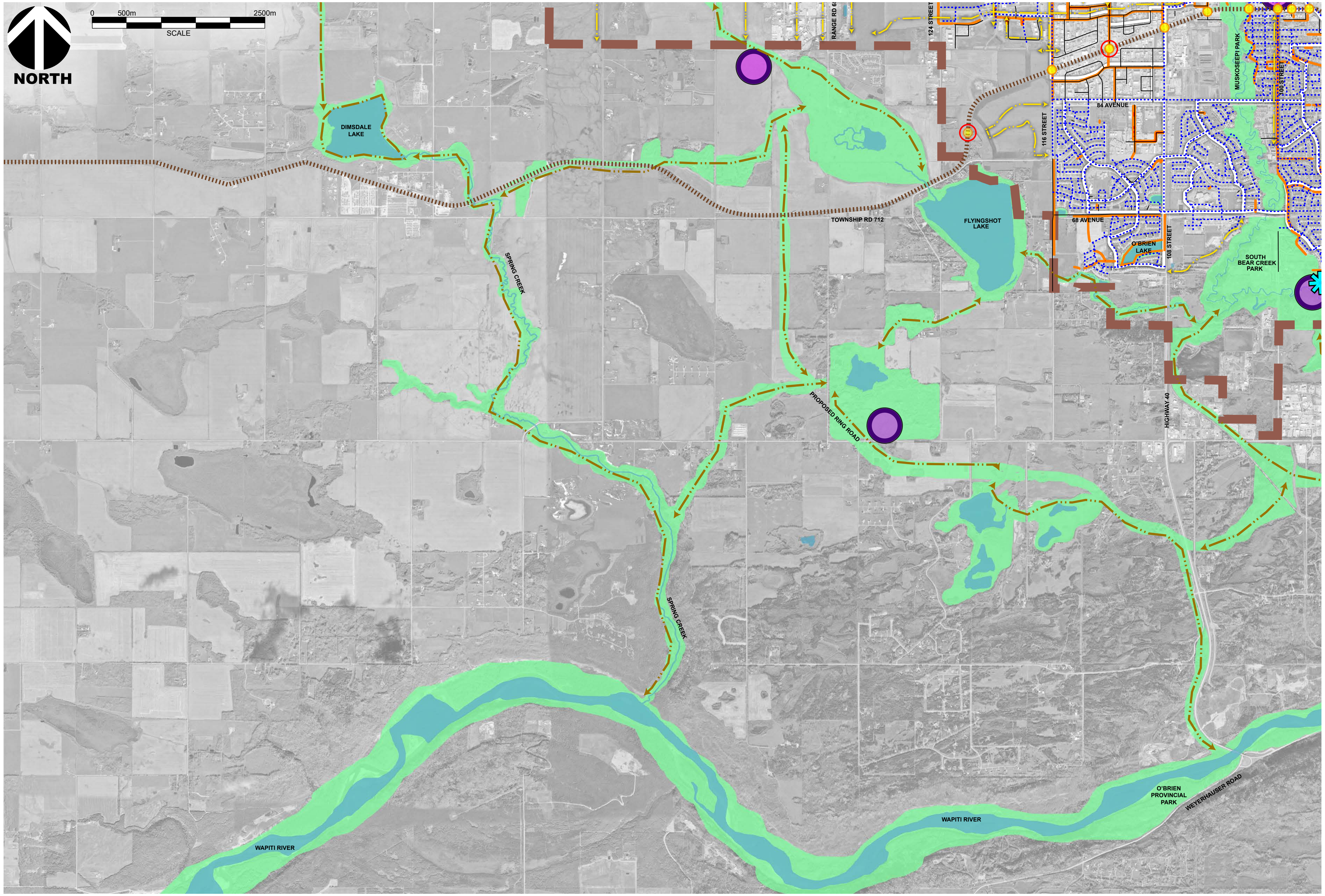
- ACTIVE TRANSPORTATION GAPS
- EXISTING ROAD WITH PEDESTRIAN WALK/TRAIL
- EXISTING ROAD WITH NO PEDESTRIAN WALK/TRAIL
- POTENTIAL FUTURE PATHWAY URBAN
- POTENTIAL FUTURE PATHWAY RURAL
- EXISTING BUS ROUTES
- TRANSIT HUB OPPORTUNITIES
- ACTIVE TRANSPORTATION HUB OPPORTUNITIES

LEGEND - GENERAL

- 2016 CITY BOUNDARY
- RAILWAY LINE
- RAILWAY CROSSING
- FUTURE RAILWAY CROSSING
- WATER BODY
- WATERCOURSE
- NATURAL AREA / PARKS / OPEN SPACE

NOTE:
ACTIVE TRANSPORTATION GAPS HAVE BEEN ESTABLISHED THROUGH CITY OF GRANDE PRAIRIE COMMUNITY CONNECTIVITY MAPPING DATA AND DESKTOP / SITE ANALYSIS COMPLETED DURING THE TRANSPORTATION MASTER PLAN.

ACTIVE TRANSPORTATION GAPS - NORTHEAST



LEGEND - ACTIVE TRANSPORTATION

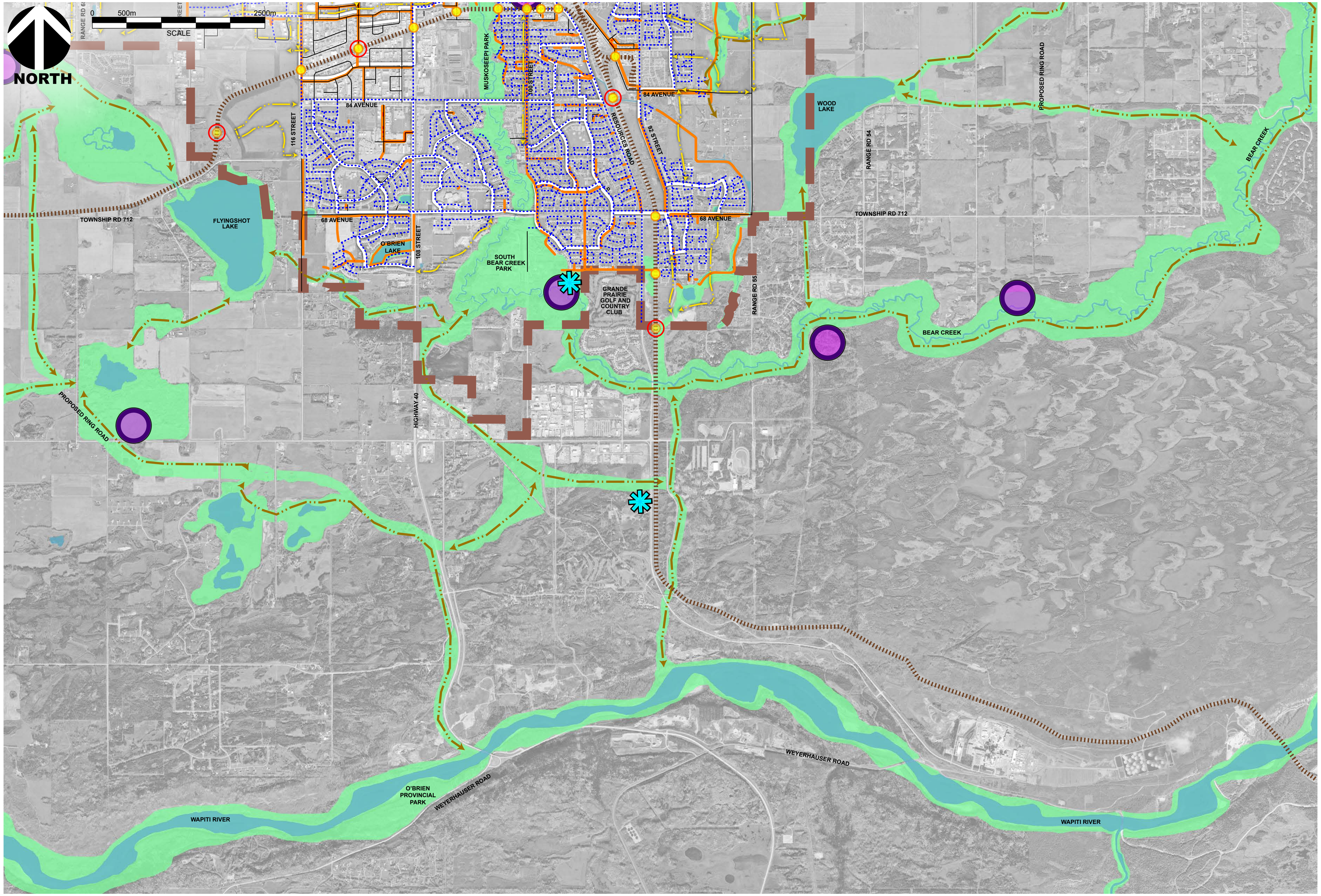
- ACTIVE TRANSPORTATION GAPS
- EXISTING ROAD WITH PEDESTRIAN WALK/TRAIL
- EXISTING ROAD WITH NO PEDESTRIAN WALK/TRAIL
- POTENTIAL FUTURE PATHWAY URBAN
- POTENTIAL FUTURE PATHWAY RURAL
- EXISTING BUS ROUTES
- TRANSIT HUB OPPORTUNITIES
- ACTIVE TRANSPORTATION HUB OPPORTUNITIES

LEGEND - GENERAL

- 2016 CITY BOUNDARY
- RAILWAY LINE
- RAILWAY CROSSING
- FUTURE RAILWAY CROSSING
- WATER BODY
- WATERCOURSE
- NATURAL AREA / PARKS / OPEN SPACE

NOTE:
ACTIVE TRANSPORTATION GAPS HAVE BEEN ESTABLISHED THROUGH CITY OF GRANDE PRAIRIE COMMUNITY CONNECTIVITY MAPPING DATA AND DESKTOP / SITE ANALYSIS COMPLETED DURING THE TRANSPORTATION MASTER PLAN.

ACTIVE TRANSPORTATION GAPS - SOUTHWEST



LEGEND - ACTIVE TRANSPORTATION

- ACTIVE TRANSPORTATION GAPS
- EXISTING ROAD WITH PEDESTRIAN WALK/TRAIL
- EXISTING ROAD WITH NO PEDESTRIAN WALK/TRAIL
- POTENTIAL FUTURE PATHWAY URBAN
- POTENTIAL FUTURE PATHWAY RURAL
- EXISTING BUS ROUTES
- TRANSIT HUB OPPORTUNITIES
- ACTIVE TRANSPORTATION HUB OPPORTUNITIES

LEGEND - GENERAL

- 2016 CITY BOUNDARY
- RAILWAY LINE
- RAILWAY CROSSING
- FUTURE RAILWAY CROSSING
- WATER BODY
- WATERCOURSE
- NATURAL AREA / PARKS / OPEN SPACE

NOTE:
ACTIVE TRANSPORTATION GAPS HAVE BEEN ESTABLISHED THROUGH CITY OF GRANDE PRAIRIE COMMUNITY CONNECTIVITY MAPPING DATA AND DESKTOP / SITE ANALYSIS COMPLETED DURING THE TRANSPORTATION MASTER PLAN.

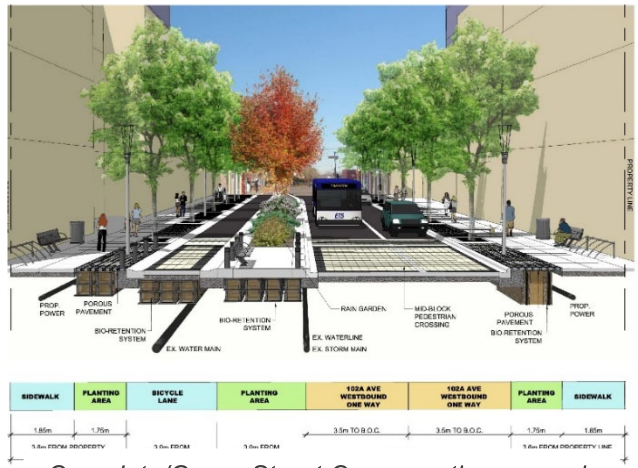
ACTIVE TRANSPORTATION GAPS - SOUTHEAST

Prepared by: McElhanney
Prepared for: THE CITY OF GRANDE prairie

EXHIBIT 6-3d

d) Key Intersections:

- 108 Street intersections
- Resource Road and 76 Avenue
- 116 Street at 68 Ave
- 102 Street at 121 Avenue
- Crosswalks from Swanavon to Muskoseepi Park
- 116 Avenue and 102 Street;



Complete/Green Street Cross-section example

These gaps (and recommended active transportation and transit hubs) should be further reviewed, assessed and addressed in conjunction with the recommended Urban Framework and Active Transportation Zone planning; TMP improvement initiatives and potential City enabling document (e.g., plans, policies, standards) modifications; and other identified detailed planning and design development.

4. Provide Supporting Guidance and Amenities

The active transportation infrastructure should be supported by amenities at strategic hubs in the system (as identified in ***Exhibits 6-3a*** to ***6-3d***), such as parking; way-finding and trail use signage; promotional / educational information; and connections to other modes (e.g. transit). The promotional / educational information could include local history, culture, ecology, and health / wellness.

Active transportation and vehicular transportation routes are integrally linked with respect to wayfinding and should be positioned to establish a seamless transition; provide a consistency in messaging; and evolve with an integrated design approach that incorporates community essences, themes, and interpretive elements.

5. Accommodate Winter Users:

Active transportation routes that are expected to be used in winter (especially those that support utilitarian trips) should be planned and developed with Winter City guidelines that facilitate year-round use. These guidelines should incorporate landscape (aesthetics, microclimate control, separation, safety, security); materials and colour; amenity components (seating nodes, hubs, lighting); operations and maintenance program enhancements (especially in high traffic areas); and year-round destinations, events and festivals. Winter City guidelines should be developed in conjunction with Urban Framework and Active Transportation Zone initiatives, and define key outcomes, rationale and guidelines for the physical components of the private and public realms that support a positive quality of life for residents of Grande Prairie.

6. **Design Sustainable / Low-Impact Infrastructure:**

All transportation routes, including active transportation, should consider sustainable and low impact designs to (a) preserve the natural aspect of the City and region; (b) establish an ecologically-grounded approach that supports a healthier and more walkable and vibrant community; and (c) address a balance in environmental, social, and economic sustainability.

7. **Integrate Planning and Development:**

A current key issue with respect to active transportation in Grande Prairie is the apparent disconnect between publicly provided routes and the barrier-free connections to private development areas. This disconnect is especially evident in commercial, industrial and Downtown areas. Land Use Bylaw requirements and guidelines should be applied to new or redeveloped private developments to provide safe, secure and barrier-free connections to buildings; enhance site / landscape requirements to support these connections; and establish amenities (e.g. secure exterior / interior bicycle parking, showers, change rooms, etc.) that support active transportation use.

8. **Improved Communications Systems:**

Establishing a consistent and well-defined active transportation communications system is important in promoting use; enhancing user experience; and supporting community placemaking. Features such as wayfinding (indicating routes/commuter times/etc.), directories (at key destinations and hubs, complete with wi-fi/on-line applications), and education/interpretation/incentive ideas (history, culture, health, wellness, environmental monitoring, etc.) are important communication system components that support navigation through the community; provide direct access to the various zones and key destinations within the City; and mitigate frustration, apprehension or disorientation. Active transportation and vehicular transportation routes are integrally linked with respect to wayfinding and should be positioned to establish a seamless transition (providing a consistency in messaging); and developed with an integrated design approach that incorporates community essences, themes and interpretive elements. These features are further supported by a strong Urban Framework for Grande Prairie, structured through establishing well-defined districts, landmarks, nodes, corridors and edge conditions to support community development and movement.

6-3. Transit

6-3.1. BACKGROUND INFORMATION

The Grande Prairie Transit Master Plan was delivered in 2017. This Plan established goals over the next ten years to increase (a) ridership by 50%; (b) cost recovery (fares) from 18% to 30%; (c) the number of amenities at transit stops; and (d) the City fleet with the purchase of seven new buses. There were two needs identified: faster routes that align with major travel patterns and attract new riders; and generally better mobility for residents. The Plan is considered ambitious but establishes targets to support and guide system improvements.

The following locations were identified as key hubs of local activity:

- Prairie Mall
- Downtown
- QE2 including Youth Emergency Shelter, Grande Prairie Centre, Spirit Foundation, Continuing Care Centre and Pioneer Hospital
- Eastlink Centre (same as Community Knowledge Campus and Coca Cola Centre)
- Grande Prairie Regional College
- Westgate (to serve the north area as the City develops)
- Grande Prairie Regional Hospital

Of those locations identified, the four recommended for future transit hubs are as follows:

- Downtown, near Towne Centre Mall (including eight bays, benches, receptacles, heated shelters.)
- Westgate / Gateway Area, near 112 St and Westgate Dr (terminus for the north as it develops).
- Prairie Mall (including two-way bus service, controlled crosswalk, shelters).
- Eastlink Centre (CKC) (including two-way service, controlled crosswalk, shelters).

6-3.2. SWOC ANALYSIS

As with the Active Transportation discussed in Section 2, a “SWOC” analysis was performed on the City’s transit system. The results are outlined below.

6-3.2.1. Strengths

The following features benefit transit in the City, and/or are unique or exemplary in comparison to other municipalities:

1. There is a reliable transit system in Grande Prairie that provides service to several key destinations.
2. Online route and bus information is convenient and helpful.

6-3.2.2. Weaknesses

The following features may prevent or otherwise adversely affect transit use in the City:

1. Gaps in the route system, with inconvenient or missing coverage.
2. Insufficient accessibility and inclusivity.
3. No formal transit hubs.
4. Insufficient transit amenities to support year-round use and comfort.
5. Inconvenient transit stop locations and linkages – especially in commercial and industrial areas
6. Lack of dispatch service during the weekend for users with special needs.

6-3.2.3. Opportunities

The following features or actions could preserve, maintain or enhance transit in the City:

1. Integration of transit stops and hubs with transportation / active transportation development.
2. Integration of transit stop and hub development guidelines into public / private development requirements.
3. Increasing the number of buses and frequency on routes.
4. The system could be re-evaluated and re-architected in detail to better serve transit users.
5. Regional routes could be implemented to reduce the impact of external traffic on City roads.
6. The Handi-bus system could be revisited to improve service.
7. Bus stop amenities for the comfort and convenience of winter transit users (e.g. heated shelters).

6-3.2.4. Challenges

The following existing conditions can undermine the existing and potential effectiveness of the City’s active transportation system:

1. Bus route alignments and lack of well-defined and developed hubs.
2. Accessibility and inclusivity issues.
3. Ample traffic and parking capacity in the City diminishes the incentives for transit use.

6-3.3. TRANSIT SYSTEM RECOMMENDATIONS

Based on the *2017 Transit Master Plan*, the recommended service guidelines (standards and performance measures) identify that "*… transit routes should be designed so that 90% of all residences and places of work within the service area are within 400m of a route*". The *Transit Plan* also recommends a series of staged route revisions (year 1, 5 and 10). There are currently 237 stops in the City, and the proposed route revisions will provide for 198 new stops added (with 66 existing stops removed).

Other recommendations to be addressed to support the integration of the *2017 Transit Master Plan* and *Transportation Master Plan* include:

1. **Connectivity:**

   Continue to assess and address gaps in the transit system to maximize coverage in the community. Also, the transit system should be integrated with active transportation modes (walking and cycling) and provide accessible connections to user destinations (both public and private), especially in Commercial and Industrial zones.

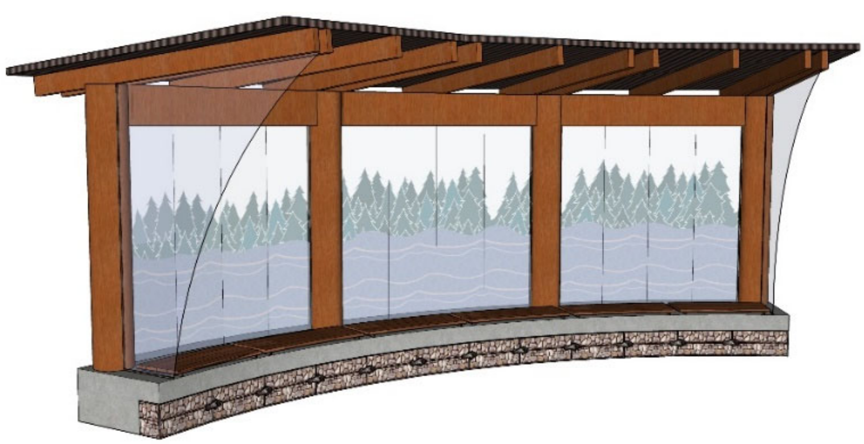
2. **Priority / Queue-jump Measures:**

   As required and as opportunities allow, implement measures to give buses priority through congested intersections to help manage travel times and route scheduling.

3. **Transportation Planning:**

   Ensure new developments, roads, and other initiatives are planned to be transit-supportive in terms of connectivity (especially with active transportation routes and hubs), parking policy, stop infrastructure, and other amenities.

Figure 6-2: Custom Bus Stop Designed Through Urban Framework Process



6-4. Summary of Issues

Pedestrian pathways, cycle routes, and the transit system all provide the public with healthy, alternatives to the private automobile. If implemented strategically, the active transportation and transit systems can shift the commuters' travel choices to more sustainable modes (thereby reducing traffic demand, infrastructure costs, and air pollution), while concurrently ensuring that those unable to drive have equitable access to employment, shopping, and services.

To achieve this strategic implementation of the active transportation and transit systems, the following initiatives are recommended:

1. Active Transportation:

a) Establish an urban framework and design guidelines

b) Establish active transportation zones for the City

c) Reduce gaps in the pathway network

d) Provide supporting guidance (e.g. wayfinding) and amenities

e) Accommodate winter users

f) Design sustainable / low-impact infrastructure

g) Integrate planning and development

h) Improve the communications systems.

2. Transit:

a) Implement the service guidelines from the City's 2017 Transit Master Plan.

b) Improve the connectivity between transit routes, and with the pathway network

c) Install priority / queue-jump measures as required to improve bus flow through congested intersections

d) Ensure new developments, roads and other initiatives are supportive of the transit system.

Grande Prairie Transportation Master Plan

MODULE 7

Trucking and Goods Movement

- Truck routes
- Summary of issues

Contents

Figures

7-1. Truck Traffic in Grande Prairie

The movement of commercial and industrial trucks through and within Grande Prairie is inexorably linked to the economic viability of the city. The forest and oil/gas sectors both depend on trucking to move freight between the open highway system, the Canfor yard, the rail yard, and the oil fields to the south. The construction sector depends on trucking to support the development of public and private enterprises. And most commercial business in the city rely on the shipping and receiving of goods.

In 2016, the City's Traffic Bylaw No. C-1166G designated the formal truck routes as shown in ***Figure 7-1***. The existing Dangerous Goods Routes follow many of the same routes, as shown in ***Figure 7-2.***

Figure 7-1: Existing City Truck Routes
Source: Schedule 3 of Grande Prairie Traffic Bylaw No. C-1166G (2016)

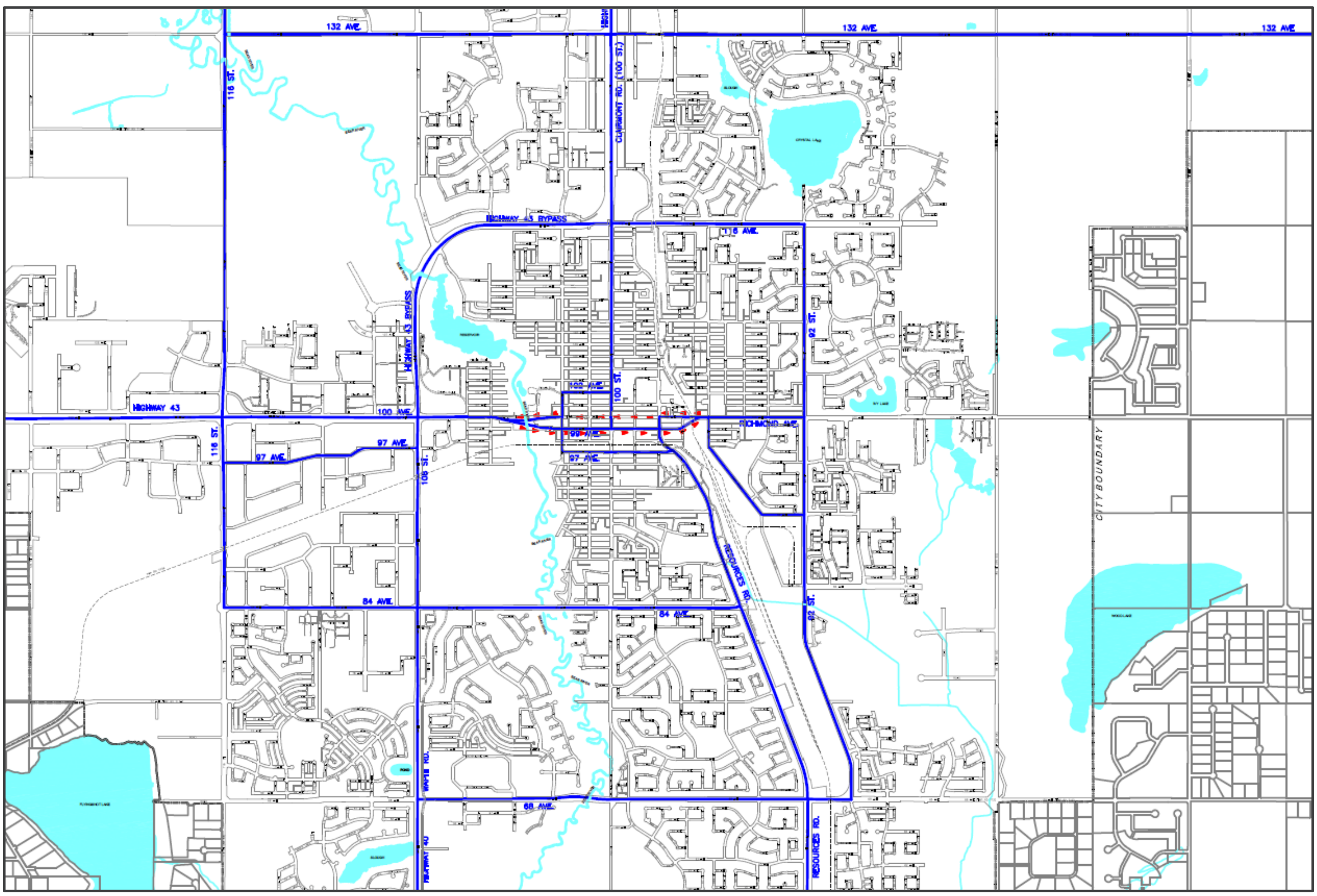
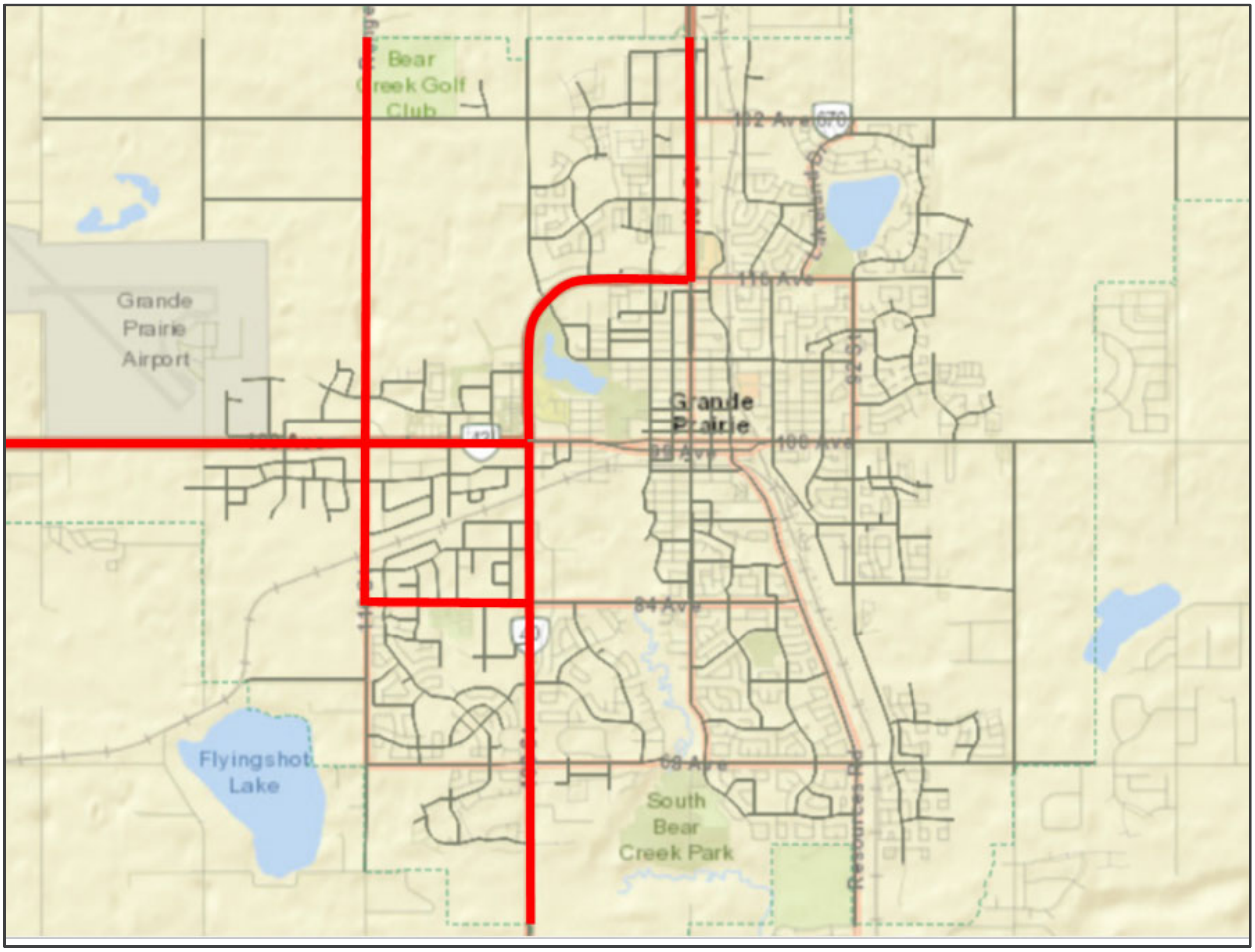


Figure 7-2: Existing Designated Dangerous Goods Routes
Source: City of Grande Prairie



As part of the Transportation Master Plan, the existing truck and dangerous goods routes were reviewed at a planning level. The findings and recommendations are outlined below.

7-2. Truck Route Analysis

In reviewing the City's truck routes in the context of the community engagement and the EMME analysis, the following issues were identified:

1. The existing designated truck routes include 100th Street, 100th Avenue, 99th Avenue, 97th Avenue, and a number of other roads through Downtown Grande Prairie. While occasional trucks may be expected on these roads as required for business in the Downtown, the roads and adjacent pedestrian-friendly streetscaping are not generally compatible with frequent use as a haul route. The truck routes should instead guide trucks safely around the dense urban core. In this respect, these Downtown roads should officially be removed from the list of designated truck routes. Trucks may then continue to use these roads only as required for local business. As stated in Section 9 of the Traffic Bylaw, truckers shall "*use a Truck Route, except for loading or unloading, provided the shortest distance to and from a Truck Route is used*." A similar clause is provided in Section 56 for the carriers of dangerous goods.

2. Due to the significant traffic congestion on Highway 40 (especially in the peak hours), 116th Street is proposed as an alternative route for truck movements to and from the south. This route would extend from 132nd Avenue in the north to the correction line (Township Road 710) for the short term. As the City grows and truck traffic increases, a more direct connection between 116th Avenue and Highway 40 would be needed. For this, a short segment of the southwest ring road is proposed, with future grade-separated interchanges at 116th Street and Highway 40. This route is reflected in the 90k road network in ***Module 4: Road Analysis***. As these connections are outside the municipal boundaries, both the construction of the segment of the ring road and the use of 116th Street as a truck route would depend on the successful consultation and negotiation with Alberta Transportation and the County of Grande Prairie No. 1.

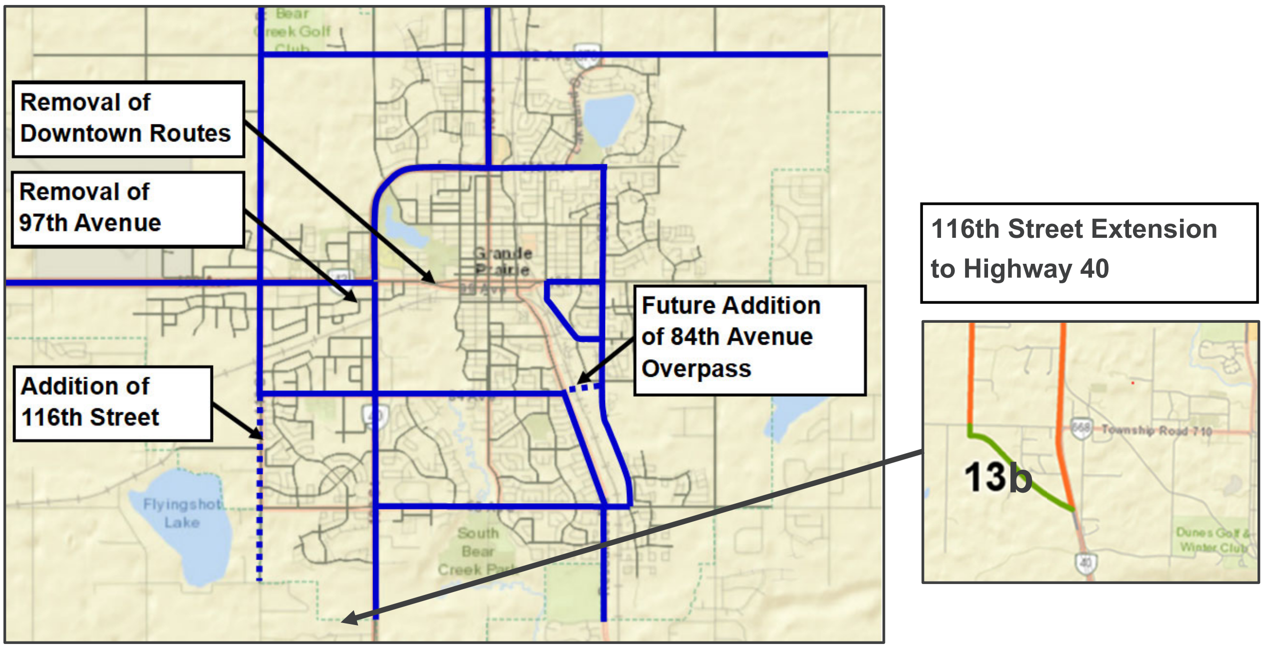
Figure 7-3: Trucking and Traffic on Highway 40

3. If 84th Avenue could feasibly be extended east to 92nd Street (i.e. with the future relocation of the rail yard), this road should be added to the designated truck route network. 84th Avenue could then become a strong continuous link, parallel to Highway 43 / 100th Avenue, and potentially connecting both ends of the ring road in the distant future. At a localized level, this route would also relieve trucking demand on 92nd Street and Resources Road, as well as the two existing at-grade rail crossings at 100th Avenue and 68th Avenue.

7-3. Recommended Truck Route Changes

The five recommended changes to the designated truck route are illustrated in ***Figure 7-4***. The proposed extension of 116th Street to the future Highway 40X southwest ring road (as taken from Recommendation No. 13b from ***Module 4: Road Analysis***) is included for completeness, despite being outside the city limits.

Figure 7-4: Recommended Truck Route Changes



As confirmed with the Trucking Association during the community engagement, a north-south route on the east side of the city is also desirable. The 84th Street corridor could be a candidate for this in future, once constructed.

With the exception of the possible inclusion of 116th Street - Highway 40 connection, these recommendations would not affect the existing Dangerous Goods Route designations. Depending on the trucking demand and land use patterns, the future 84th Avenue (especially with a grade-separated crossing of the tracks) and the future 84th Street may be other candidates for dangerous goods routes.

To support and complement the use of these designated truck routes, more facilities and amenities for truckers (e.g. as card locks, restaurants, vehicle services, etc.) would be beneficial. Online route planning information would also ensure truckers can safely and efficiently move through the city in accordance with City Bylaws.

Grande Prairie Transportation Master Plan

MODULE 8

Improvement Options and Evaluation

- List of recommendations

Contents

Tables

Figures

8-1. Introduction

The individual infrastructure improvement options identified in the preceding modules are discussed and evaluated in more detail in this Module. For each proposed improvement, the evaluation includes:

- A short description of the proposed scope, confirming limits and nature of the work, and any issues that should be considered for implementation;
- The technical and other justification supporting the proposed improvement (e.g. traffic volumes for each horizon scenario) and other issues for consideration; and
- A planning-level (Class "D") estimate (in 2019 Canadian dollars) to build the proposed improvement, based on assumed unit-costs from recent road and bridge construction in Alberta. The assumed unit costs are provided in Appendix E: Cost Estimation Assumptions.

The module is divided into different sections for improvements to the road network, rail crossings, and the active transportation system. Recommended upgrades to the truck routes are included with those concerning the road network.

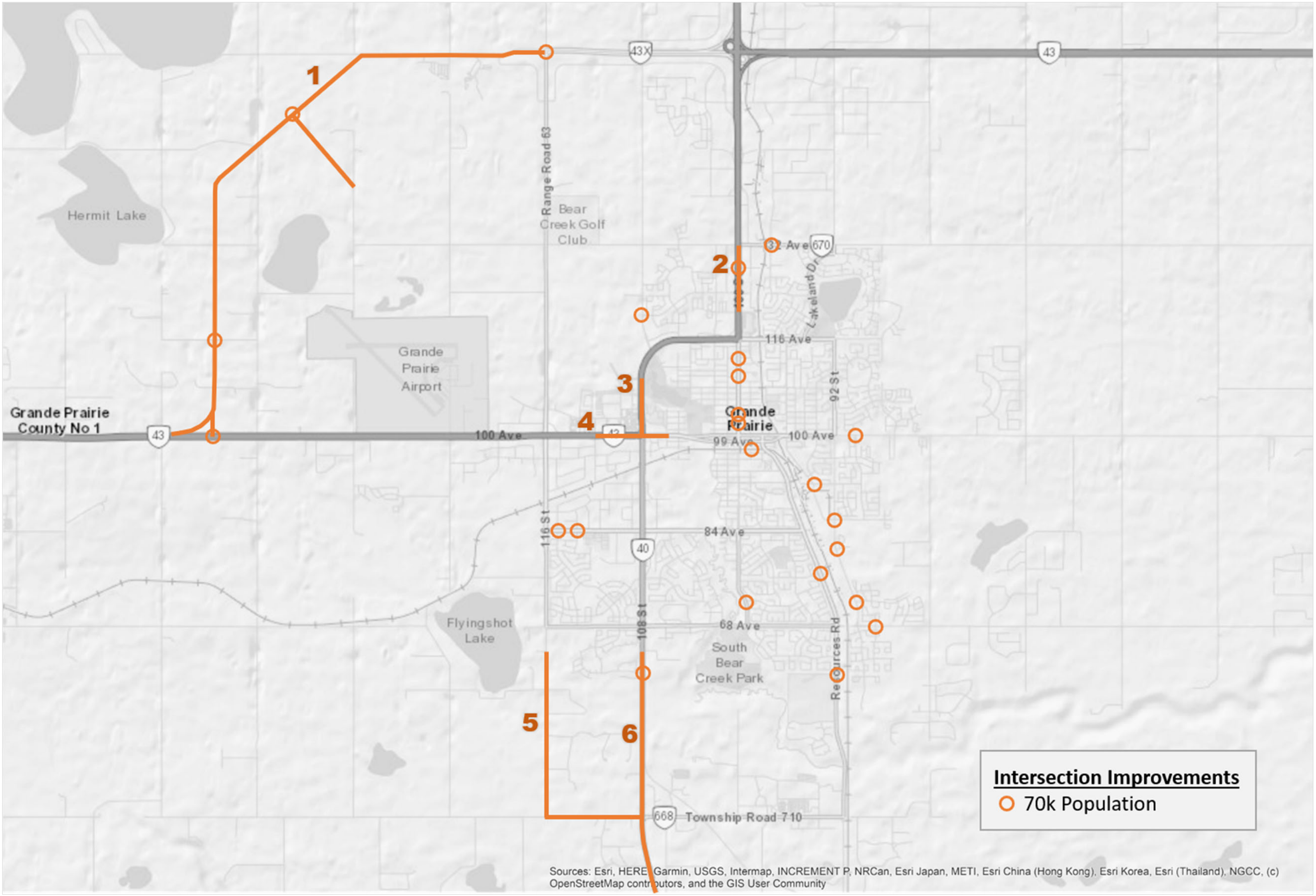
Figure 8-1: Traffic on 116th Avenue

8-2. Road Network Improvements

8-2.1. 70,000 POPULATION HORIZON

To support the expected growth of Grande Prairie to a population of 70,000, the “short term” network improvement are recommended as shown in orange in ***Figure 8-2***. The proposed road link improvements (Nos. 1 to 6) and intersection improvements are discussed in further detail below.

Figure 8-2: Short-Term Road Improvements for 70K Population



8-2.1.1. Highway 43

Improvement No.	1
Road Link	Highway 43 (previously designated as Hwy 43X prior to opening in September 2019)
Scope of Improvements	New divided four lane highway connecting Hwy 43(N) to Hwy 43(W)
Functional Class	Provincial highway
Description	During the TMP, this new highway link was constructed by Alberta Transportation as the northwest segment of the ring road around Grande Prairie. The new road includes at-grade intersections at Highway 43, TWP Rd 715, and 132 Avenue, as well as a roundabout at 116th Street. A future interchange is proposed at the south connection to the existing Highway 43 (100th Avenue).
Expected PM Traffic Volumes 70,000 Pop. 90,000 Pop. 120,000 Pop.	 20 vph* 20 vph* 30 vph* * *Traffic volumes from the EMME model have limited consideration of inter-regional traffic demand external to the city and may be under-represented*.
Estimated Cost	Not applicable (provincial expenditure)

Figure 8-3: Highway 43 Under Construction at 116th Street

8-2.1.2. 100^{th} Street

Improvement No.	2
Road Link	100^{th} Street
Scope of Improvements	Six lane from 124^{th} Avenue to 132^{nd} Avenue (800 metres)
Functional Class	Arterial
Description / Justification	The existing six-lane divided section on 100^{th} Street would be extended further north to 132^{nd} Avenue using available right of way to accommodate high traffic volumes and congestion levels. This corridor provides access to commercial properties along 100^{th} St and is also a busy commuter and through route. Associated intersection improvements and reconfiguration will be required to accommodate turning movements and access to frontage roads.
Expected PM Traffic Volumes	
70,000 Pop.	2,900 vph
90,000 Pop.	4,200 vph
120,000 Pop.	4,800 vph
Estimated Cost	$2.8 Million

Figure 8-4: 100^{th} Street, North of 124^{th} Avenue

Source: Google Streetview

8-2.1.3. 108th Street

Improvement No.	3
Road Link	108th Street
Scope of Improvements	Six Lane from Bear Creek Bridge to 100th Avenue (1,200 metres)
Functional Class	Arterial
Description / Justification	108th St would be widened to a six lane divided standard using available right of way to accommodate high traffic volumes and congestion levels. Similar to 100th St, this corridor provides access to commercial properties as well as the Grande Prairie Regional College and the new regional hospital. In addition, this route is a preferred commuter route and also serves inter-regional through trips. Intersections along 108th St will require reconfiguration to accommodate turning movements.
Expected PM Traffic Volumes 70,000 Pop. 90,000 Pop. 120,000 Pop.	 2,900 vph 3,700 vph 4,300 vph
Estimated Cost	$4.2 Million

Figure 8-5: 108th Street, North of 100th Avenue

Source: Google Streetview

8-2.1.4. 100th Avenue

Improvement No.	4
Road Link	100th Avenue
Scope of Improvements	Six lane 112th Street to 106th Street (1,200 metres)
Functional Class	Arterial
Description / Justification	100th Ave would be widened to a six-lane divided standard to accommodate high traffic volumes and high congestion levels. With no improvements, this segment of roadway would experience significant congestion levels based on anticipated growth and development patterns. This segment provides access to commercial properties in the central core area of the city and also provides a through route for commuters and inter-regional travellers. As this segment includes the major junction at 108th Street, associated intersection and traffic control upgrades would be required.
Expected PM Traffic Volumes 70,000 Pop. 90,000 Pop. 120,000 Pop.	 3,800 vph 3,900 vph 4,300 vph
Estimated Cost	$5.0 Million

Figure 8-6: 100th Avenue, West of 108th Street

Source: Google Streetview

8-2.1.5. 116th Street – Township Road 710

Improvement No.	5
Road Link	116th Street and Township Road 710
Scope of Improvements	Formal designation of 116th Street and Township Road 710 ("correction line") as a truck route.
Functional Class	Arterial
Description / Justification	This corridor is proposed to be designated as a truck route to provide an alternate route between the city's industrial parks (Richmond, Centre West and Brochu) and Highway 40 to the south. This designation would relieve heavy truck traffic on 108 St / Wapiti Road which has significant traffic congestion in the AM Peak Hour, and mild congestion levels during the PM peak. The use of Township Road 710 would be a temporary measure until the southwest ring road is constructed. This designation would require discussion and negotiation with the County of Grande Prairie No. 1 and Alberta Transportation, as it affects roads outside the city limits.
Expected PM Traffic Volumes	
70,000 Pop.	500 vph
90,000 Pop.	2,000 vph
120,000 Pop.	2,800 vph
Estimated Cost	Not applicable, although maintenance activity should be revised as required to support this link as a formal truck route.

Figure 8-7: 116th Street, North of Township Road 710

Source: Google Streetview

8-2.1.6. 108th Street

Improvement No.	6
Road Link	108th Street / Wapiti Road / Highway 40
Scope of Improvements	Four-laning from future Hwy 40X to 68th Avenue
Functional Class	Arterial
Description / Justification	This widening was envisioned in a 2004 Functional Design. At the time of preparing the TMP, this project was under design. The widening of 108th Street is intended to accommodate high traffic and truck volumes. The current roadway provides the main southern gateway to the city and is undivided. Four-laning would provide capacity, reliability and safety enhancements.
Expected PM Traffic Volumes	
70,000 Pop.	1,400 vph
90,000 Pop.	1,600 vph
120,000 Pop.	1,800 vph
Estimated Cost	Not applicable (provincial expenditure)

Figure 8-8: 108th Street / Wapiti Road / Hwy 40, South of 68th Avenue

Source: Google Streetview

8-2.1.7. Short Term Intersection Improvements

Traffic volumes from the City's EMME model identified the following intersections as candidates for improvement at the 70,000 population horizon. These intersections have been identified by the amount of congestion / delay estimated to be experienced by forecast traffic volume at these locations, based on the EMME model assumptions concerning community growth and network development (see ***Module 3***). The improvements may constitute upgrades (e.g. traffic signals, roundabouts, new turning lanes, etc) or downgrades (e.g. movement restrictions), as befits the traffic demand, network objectives, and physical opportunities / constraints at each location. In this respect, more detailed operational analysis will be needed at the implementation stage to confirm the warrants and scope of the actual improvements including updated signal timing plans.

Table 8-1: Candidate Short-Term Intersection Improvements

North-South Road	East-West Road	Estimated Capital Cost*	Additional Comments
97 Street	132 Avenue	$500,000	Four leg intersection
100 Street	128 Avenue	$500,000	Four leg intersection
108 Street	Royal Oaks Drive	$350,000	Three leg intersection
100 Street	113 Avenue	$500,000	Four leg intersection
100 Street	111 Avenue	$350,000	Three leg intersection
100 Street	102 Avenue	$350,000	Three leg intersection
100 Street	103 Avenue	$350,000	Three leg intersection
90 Street	100 Avenue	$350,000	Three leg intersection
99 Street	97 Avenue	$500,000	Four leg intersection
Park Road	92 Avenue	$500,000	Four leg intersection
92 Street	84 Avenue	$500,000	Four leg intersection
115 Street	84 Avenue	$500,000	Four leg intersection
113 Street	84 Avenue	$500,000	Four leg intersection
92 Street	80 Avenue	$350,000	Three leg intersection
Resources Road	76 Avenue	$500,000	Four leg intersection
100 Street	72 Avenue	$350,000	Three leg intersection
92 Street	72 Avenue	$350,000	Three leg intersection
88A Street	68 Avenue	$500,000	Four leg intersection
Resources Road	63 Avenue	$350,000	Three leg intersection
108 Street / Hwy 40	60 Avenue	$350,000	Three leg intersection

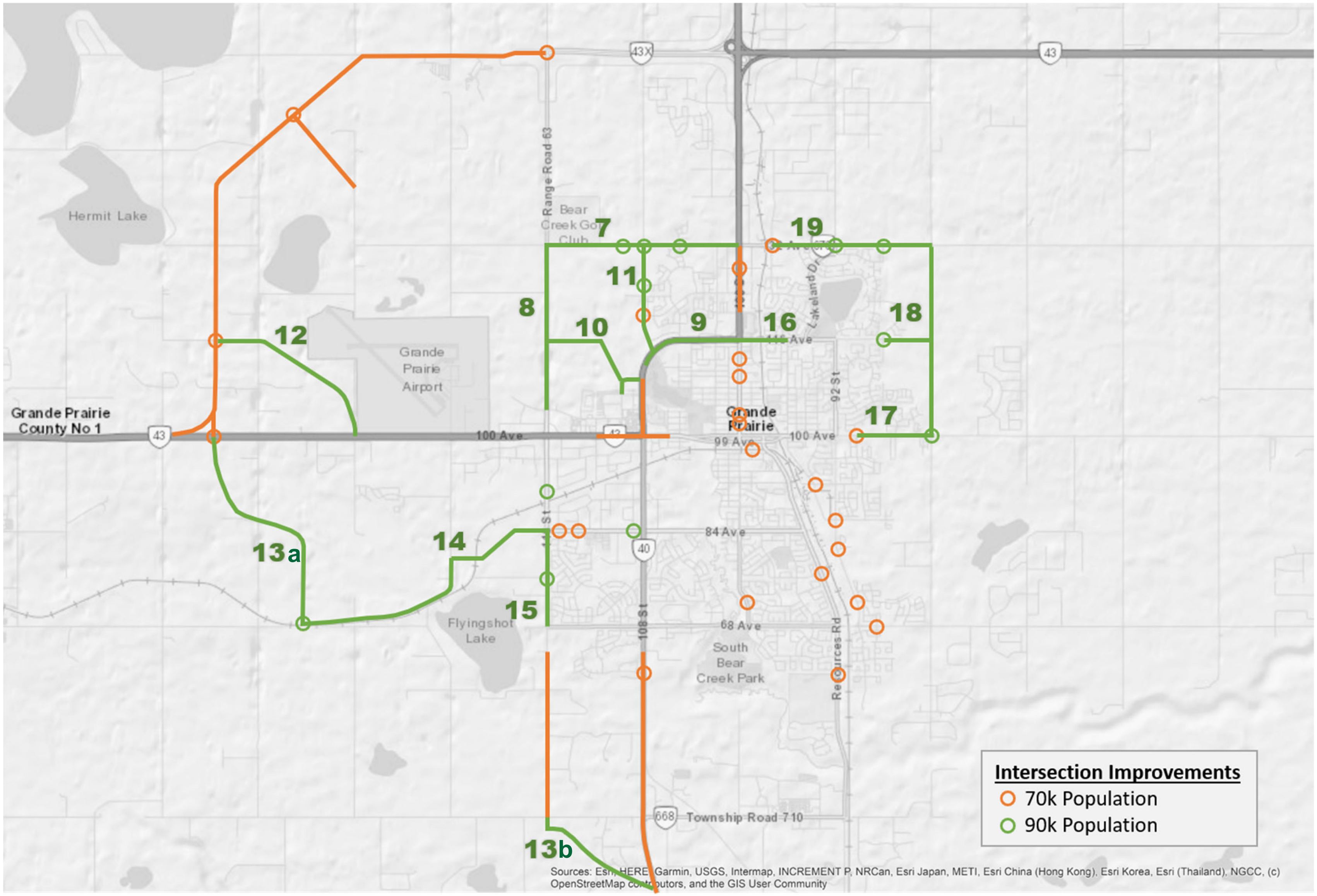
* *These planning-level cost estimates are based on typical costs of signalization (see Appendix E). If a roundabout is constructed, or if the intersection requires laning/geometric improvements, the construction costs may differ.*

In addition to these improvements, the need for a northbound right turn lane on 116th Street at the 132nd Avenue intersection was identified by a number of sources during the community engagement process and should also be considered as a candidate improvement for the short term scenario.

8-2.2. 90,000 POPULATION HORIZON

To support the expected growth of Grande Prairie to a population of 90,000, the “medium term” network improvements are recommended as shown in green in ***Figure 8-2***. The proposed road link improvements (Nos. 7 to 19) and intersection improvements are discussed in further detail below.

Figure 8-9: Medium Term Road Improvements for 90k Population



8-2.2.1. 132 Avenue

Improvement No.	7
Road Link	132 Avenue (Township Road 720)
Scope of Improvements	Four lane 103 Street to 116 Street (2,600 metres)
Functional Class	Arterial
Description / Justification	This roadway will experience significant congestion levels with development expected in the northwest area of the city. A four-lane divided arterial standard will be required to accommodate expected traffic volumes along this segment. This would also provide safety and reliability benefits. The plans for this improvement were developed in a 2012 Functional Design. This widening would also facilitate access to residential properties in the northwest.
Expected PM Traffic Volumes	
70,000 Pop.	230 vph *(low volume due to modelled traffic diverting to Hwy 43)*
90,000 Pop.	1,800 vph
120,000 Pop.	2,400 vph
Estimated Cost	$11.2 Million

Figure 8-10: 132 Avenue (Township Road 720), East of 116 Street

Source: Google Streetview

8-2.2.2. 116 Street

Improvement No.	8
Road Link	116 Street
Scope of Improvements	Four lane 104 Avenue to 132 Avenue (2,800 metres)
Functional Class	Arterial
Description / Justification	116 Street would be widened to a four-lane divided arterial to accommodate future expected development in the northwest area of the city and to relieve congestion on the existing two-lane roadway. The widening will also help accommodate future traffic volumes accessing residential areas and provide safety and reliability benefits. This improvement was envisioned in a 2003 Functional Design and should resolve a concern with the existing continuous crossfall (constructed in anticipation of the future four-laning) as identified in the community engagement process.
Expected PM Traffic Volumes	
70,000 Pop.	400 vph *(low volume due to modelled traffic diverting to Hwy 43)*
90,000 Pop.	2,200 vph
120,000 Pop.	2,500 vph
Estimated Cost	$12.0 Million

Figure 8-11: 116 Street

Source: Google Streetview

8-2.2.3. 116 Avenue

Improvement No.	9
Road Link	116 Avenue
Scope of Improvements	Widen Bear Creek Bridge to 99 St (2,000 metres)
Functional Class	Arterial
Description / Justification	This improvement would continue the six-laning of 108 Street (proposed in the 70k population horizon) further north / east on 116 Avenue to the 99 Street intersection. A major upgrade to the 100 Street intersection is included to facilitate the connection to the regional network. To help manage the costs at this horizon, the six-laning of the Bear Creek Bridge is proposed to be postponed to a future year. Until then, traffic on this corridor would experience a short merge condition in both directions before returning to a six-lane cross section.
Expected PM Traffic Volumes	
70,000 Pop.	3,100 vph
90,000 Pop.	3,700 vph
120,000 Pop.	4,300 vph
Estimated Cost	$7.8 Million

Figure 8-12: Bear Creek Bridge on 108 St / 116 Ave

Source: Google Streetview

8-2.2.4. 109 Avenue

Improvement No.	10
Road Link	109 Avenue – 116 Avenue
Scope of Improvements	Hospital to 116 Street Connector (1,200 metres)
Functional Class	Arterial
Description / Justification	This improvement would be a new two-lane road to connect the roundabout at the regional hospital to 116 Street via the 116 Avenue alignment. In the absence of other east-west corridors between 104 Avenue and 132 Avenue, the traffic demand on this link would be significant. Although the link may be constructed as a collector for this scenario, the location and spacing of this link in the network support its consideration as an arterial. This new road would also provide another route to the hospital, which benefits emergency response times and provides more resilience in the network.
Expected PM Traffic Volumes 70,000 Pop. 90,000 Pop. 120,000 Pop.	 - 1,500 vph 1,519 vph
Estimated Cost	n/a (development-driven improvement)

Figure 8-13: Proposed 109 Avenue Extension to 116 Street

Image Source: Google Earth

8-2.2.5. 108 Street

Improvement No.	11
Road Link	108 Street
Scope of Improvements	Four lane 116 Ave to 132 Ave (1,800 metres)
Functional Class	Arterial
Description / Justification	New development and the resulting traffic demand in the northwest area of the city warrants the upgrade of 108 Street between 116 Avenue and 132 Avenue to a four-lane divided arterial. This will address identified issues with traffic congestion, safety and reliability on this link.
Expected PM Traffic Volumes 70,000 Pop. 90,000 Pop. 120,000 Pop.	 1,000 vph 2,500 vph 3,000 vph
Estimated Cost	$7.7 Million

Figure 8-14: 108 Street, North of 116 Avenue

8-2.2.6. Township Road 715

Improvement No.	12
Road Link	TWP Road 715
Scope of Improvements	Connection from 132 Street to Hwy 43X (3,400 metres)
Functional Class	Arterial
Description / Justification	To support new development and provide an alternate route between 100 Avenue (at 132 Street / Range Road 65) and the new Highway 43 northwest ring road, a two-lane arterial is proposed. This road would connect to the new Highway 43 at the at-grade intersection planned at Township Road 715. The projected traffic volumes (at least from the demand estimated by the EMME model) are not expected to be significant in the short term. For this reason, the project may be considered as a lower priority.
Expected PM Traffic Volumes 70,000 Pop. 90,000 Pop. 120,000 Pop.	 - 30 vph* 40 vph* **Based on the local traffic estimated in the EMME model.*
Estimated Cost	$8.5 Million

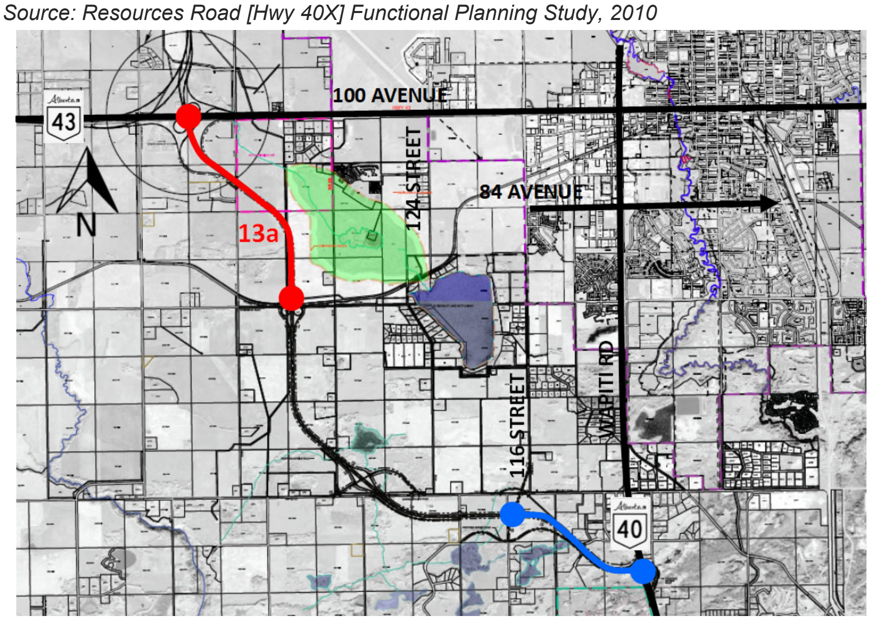
Figure 8-15: Township Road 715

Image Source: Google Earth

8-2.2.7. Highway 40X (Southwest Ring Road; north section)

Improvement No.	13a (north section of ring road)
Road Link	Highway 40X (Southwest Ring Road)
Scope of Improvements	Southwest section of ring road from Hwy 43 to 84 Ave. New interchange at Hwy 43.
Functional Class	Arterial
Description / Justification	The construction of the north section of Highway 40X Southwest Ring Road (Highway 43 to 84 Avenue) would relieve traffic demand on 100 Avenue, while providing a direct connection between the highway and 84 Avenue (in conjunction with Improvement No. 14, outlined below). A functional design of this alignment was commissioned by Alberta Transportation in 2010 (***Figure 8-16***). This route would be a future truck route, further enhancing goods movement around the city. As this would be a provincial highway, this improvement option is provided as a recommendation for discussion and negotiation between the City, Alberta Transportation, and the County of Grande Prairie No. 1.
Expected PM Traffic Volumes 70,000 Pop. 90,000 Pop. 120,000 Pop.	 - 10 vph* 50 vph* ** Traffic volumes from the EMME model have limited consideration of inter-regional traffic demand external to the city and may be under-represented.*
Estimated Cost	Not applicable; provincial highway.

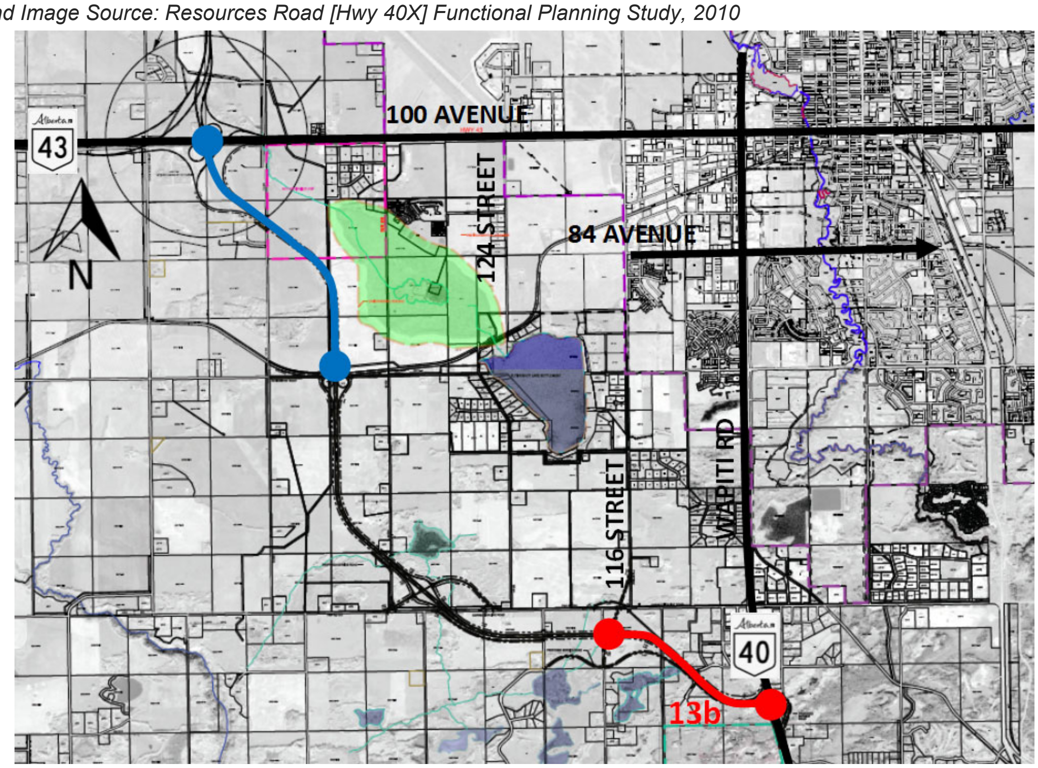
Figure 8-16: North Section (13a) of Highway 40X Southwest Ring Road
Background Image Source: Resources Road [Hwy 40X] Functional Planning Study, 2010



8-2.2.8. Highway 40X (Southwest Ring Road, south section)

Improvement No.	13b (south section of ring road)
Road Link	Highway 40X (Southwest Ring Road)
Scope of Improvements	Southwest section of ring road from 116 St to Hwy 40.
Functional Class	Arterial
Description / Justification	The construction of the south section of this ring road (116 Street to Highway 40) would facilitate the use of 116 Street as a truck route between Grande Prairie and the south. A functional design of this alignment was commissioned by Alberta Transportation in 2010 (***Figure 8-17***). As this would be a provincial highway, this improvement option is provided as a recommendation for discussion and negotiation between the City, Alberta Transportation, and the County of Grande Prairie No. 1.
Expected PM Traffic Volumes 70,000 Pop. 90,000 Pop. 120,000 Pop.	 - 10 vph* 50 vph* ** Traffic volumes from the EMME model have limited consideration of inter-regional traffic demand external to the city and may be under-represented.*
Estimated Cost	Not applicable; provincial highway.

Figure 8-17: South Section (13b) of Highway 40X Southwest Ring Road
Background Image Source: Resources Road [Hwy 40X] Functional Planning Study, 2010



8-2.2.9. 84 Avenue

Improvement No.	14
Road Link	84 Avenue
Scope of Improvements	Extension from 116 St to Hwy 40X (3,700 metres)
Functional Class	Arterial
Description / Justification	In conjunction with Improvement No. 13a above, the extension of 84 Avenue as a two lane arterial to Highway 40X would provide a strong secondary route to south Grande Prairie. The 2010 Functional Design (***Figure 8-18***) proposed to align the future Highway 40X interchange with 68 Avenue; however, this route would be discontinuous at Flyingshot Lake, east of 116 Street. By connecting to 84 Avenue instead, this road would support the development of the proposed Kensington neighbourhood, including a potential roundabout at 124 Street. Furthermore, with a future rail overpass on the east side of Grande Prairie, 84 Avenue could potentially be a continuous route for the future southeast ring road.
Expected PM Traffic Volumes 70,000 Pop. 90,000 Pop. 120,000 Pop.	 - 10 vph* 30 vph* **based on the local traffic estimated in the EMME model.*
Estimated Cost	$9.3 Million

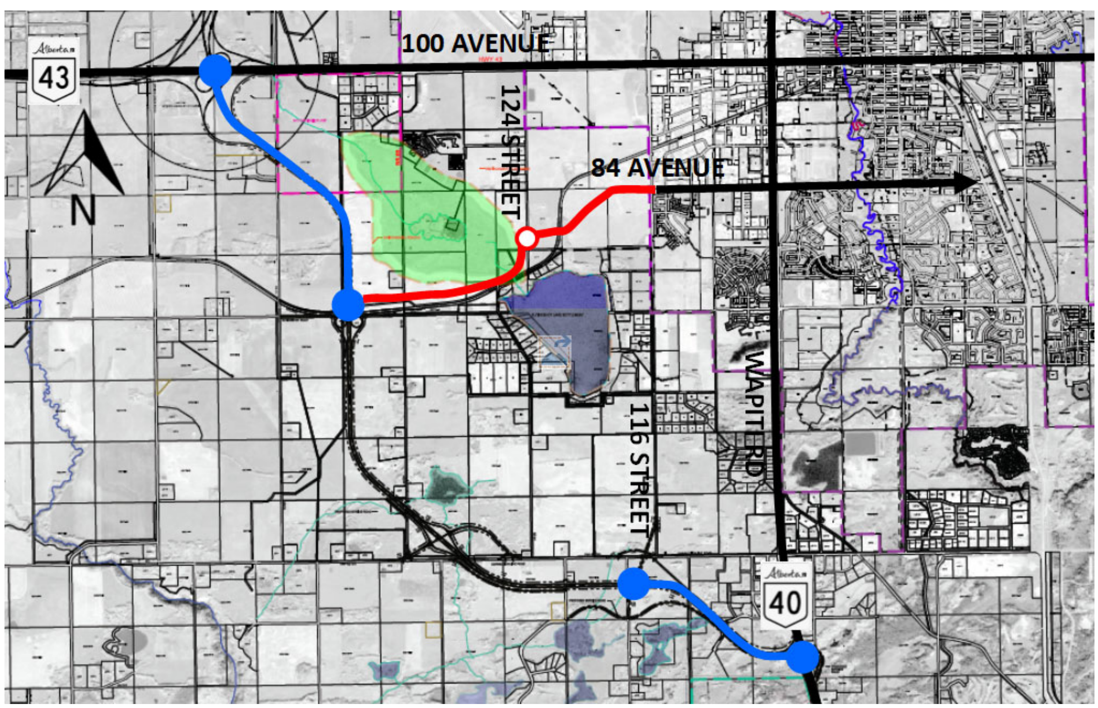


Figure 8-18: 84 Avenue Extension to Hwy 40X
Background Image Source: Resources Road [Hwy 40X] Functional Planning Study, 2010

8-2.2.10. 116 Street

Improvement No.	15
Road Link	116 Street
Scope of Improvements	Four lane 84 Ave to 68 Ave (1,600 metres)
Functional Class	Arterial
Description / Justification	With the projected traffic volume increases on 116 Street and the road's potential designation as a truck route, widening to a four lane divided arterial is warranted and would provide safety and reliability benefits. A functional design for this concept was completed in 2003. Although there are residential subdivisions along the east side of this corridor, the houses are well screened with fencing (***Figure 8-19***).
Expected PM Traffic Volumes	
70,000 Pop.	500 vph
90,000 Pop.	2,000 vph
120,000 Pop.	2,800 vph
Estimated Cost	$6.9 Million

Figure 8-19: 116 Street, South of 84 Avenue

8-2.2.11. 116 Avenue

Improvement No.	16
Road Link	116 Avenue
Scope of Improvements	Six lane 99 Street to 96 Street (600 metres)
Functional Class	Arterial
Description / Justification	Further to Improvement No. 9 (i.e. six laning of 116 Avenue west of 99 Street), this project would extend that six-laning another 600 metres east to 96 Street. The traffic volumes on this section are estimated to be slightly higher than on the section to the west. Both projects may be considered as high priorities. For the purpose of project planning and capital programming, the six laning of 116 Avenue was divided into two projects.
Expected PM Traffic Volumes	
70,000 Pop.	2,900 vph
90,000 Pop.	4,200 vph
120,000 Pop.	4,800 vph
Estimated Cost	$2.1 Million

Figure 8-20: 116 Avenue, East of 99 Street

8-2.2.12. 100 Avenue

Improvement No.	17
Road Link	100 Avenue
Scope of Improvements	Four lane 90 St to 84 St (1,300 metres)
Functional Class	Arterial
Description / Justification	To improve one of the primary connections to the east, the 100 Avenue corridor should be upgraded to a four lane divided arterial. The expected traffic volumes do not become problematic until the 120k population scenario, but this road is considered to be a strategic link to add to the capital program ahead of the expected growth in this part of the City. In addition to enhanced capacity, this upgrade would provide safety and reliability benefits.
Expected PM Traffic Volumes	
70,000 Pop.	329 vph
90,000 Pop.	360 vph
120,000 Pop.	2,400 vph
Estimated Cost	$5.6 Million

Figure 8-21: 100 Avenue, East of 92 Street

8-2.2.13. 84 Street

Improvement No.	18
Road Link	84 Street
Scope of Improvements	100 Ave to 132 Ave Connector (3,500 metres) Also, extend 116 Ave east from 88 St to 84 St (900 metres)
Functional Class	Arterial
Description / Justification	In anticipation of the growth expected in the 120k population horizon, 84 Street should be extended as a two-lane road from 100 Avenue to 132 Avenue. This road would be the primary north-south arterial serving the new development and could also be designated as a truck route for the east side of the city (as noted by the Trucking Association during the community engagement). There are environmental and drainage issues along the corridor that would have to be addressed and mitigated during construction. The City commissioned a functional design of this road in 2012, showing an ultimate four-lane divided arterial design. The road should be completed as two-lanes (which would still afford network safety, truck route, and land access benefits) until widening is warranted.
Expected PM Traffic Volumes	
70,000 Pop.	-
90,000 Pop.	-
120,000 Pop.	500 vph
Estimated Cost	$11.0 Million for both road projects

Figure 8-22: 84 Street at 100 Avenue, Looking North

8-2.2.14. 132 Avenue

Improvement No.	19
Road Link	132 Avenue
Scope of Improvements	Four lane 84 St to 97 St (2,700 metres)
Functional Class	Arterial
Description / Justification	The growth in the northeast corner of the city will rely heavily on 132 Avenue. To address issues with traffic congestion, this road should be upgraded to a four lane divided arterial which would also provide safety and reliability benefits. A functional design of this upgrade was prepared in 2012.
Expected PM Traffic Volumes	
70,000 Pop.	400 vph
90,000 Pop.	1,400 vph
120,000 Pop.	2,600 vph
Estimated Cost	$11.6 Million

Figure 8-23: 132 Avenue, East of 100 Street

8-2.2.15. Medium Term Intersection Improvements

As with the previous section, the EMME model identified the following intersections as candidates for improvement at the 90,000 population horizon. These improvements may constitute upgrades (e.g. traffic signals, roundabouts, new turning lanes, etc.) or downgrades (e.g. movement restrictions), as befits the traffic demand, network objectives, and physical opportunities / constraints at each location. More detailed operational analysis will be required at the implementation stage to confirm the warrants and scope of the improvements.

Table 8-2: Candidate Medium-Term Intersection Improvements

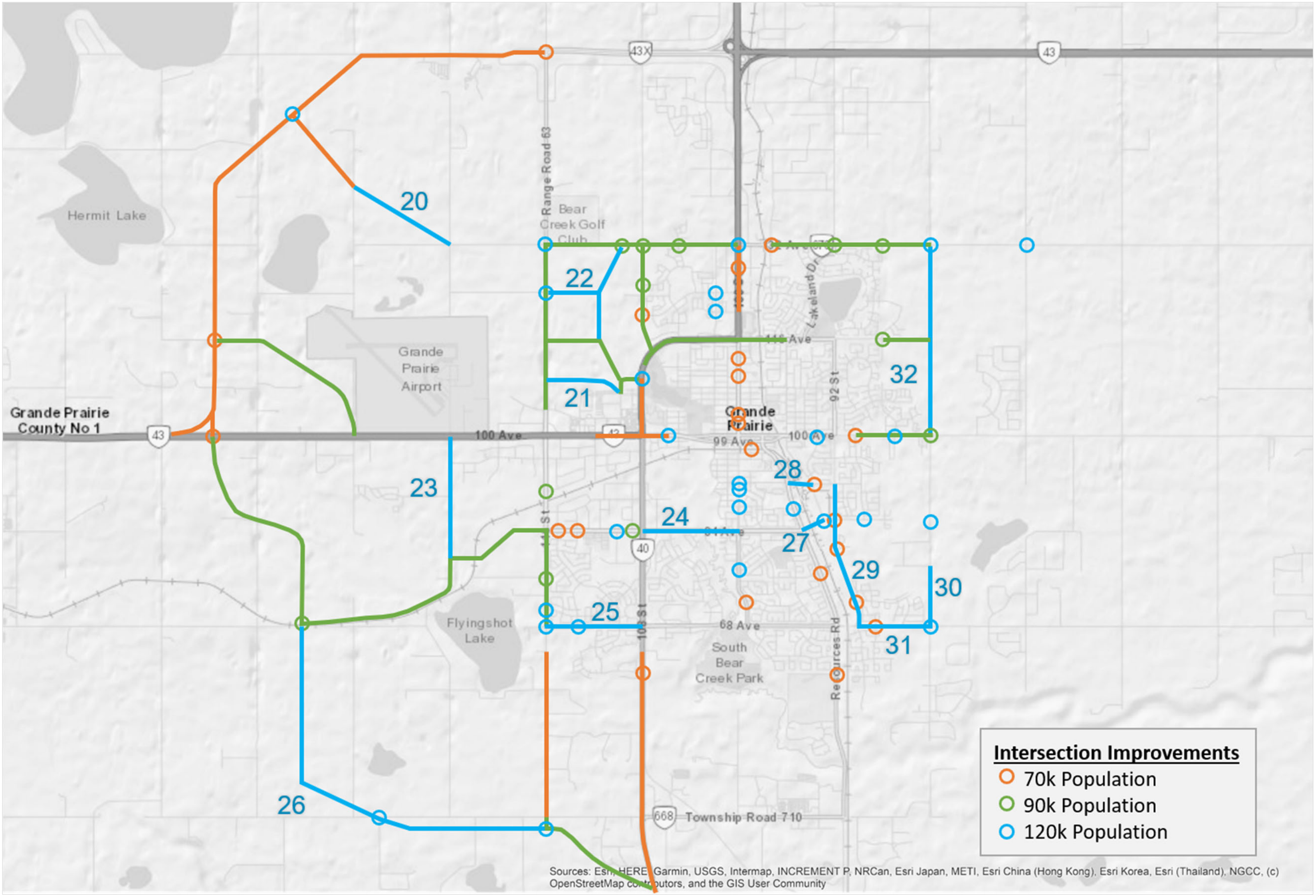
North-South Road	East-West Road	Estimated Capital Cost*	Additional Comments
110 Street	132 Avenue	$350,000	Three leg intersection
108 Street	132 Avenue	$500,000	Four leg intersection
105 Street	132 Avenue	$500,000	Four leg intersection
92 Street	132 Avenue	$500,000	Four leg intersection
88 Street	132 Avenue	$350,000	Three leg intersection
108 Street	128 Avenue	$350,000	Three leg intersection
88 Street	116 Avenue	$350,000	Three leg intersection
84 Street	100 Avenue	$500,000	Four leg intersection
116 Street	95 Avenue	$350,000	Three leg intersection
109 Street	84 Avenue	$500,000	Four leg intersection
116 Street	77 Avenue	$500,000	Four leg intersection
Hwy 40X (SW Ring)	84 Avenue	N / A	Connection to ring road.

* *These planning-level cost estimates are based on typical costs of signalization (see Appendix E). If a roundabout is constructed, or if the intersection requires laning/geometric improvements, the construction costs may differ.*

8-2.3. 120,000 POPULATION HORIZON

To support the expected growth of Grande Prairie to a population of 120,000, the “long term” network improvement are recommended as shown in blue in ***Figure 8-24***. The proposed road link improvements (Nos. 20 to 32) and intersection improvements are discussed in further detail below.

Figure 8-24: Long Term Road Improvements for 120k Population

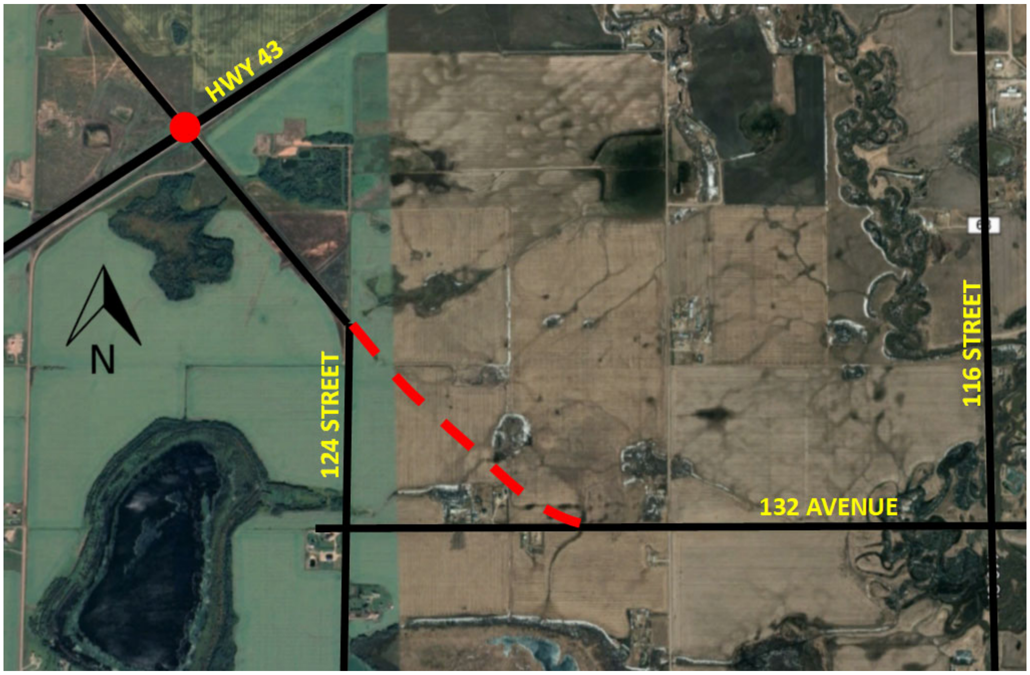


8-2.3.1. 132 Avenue

Improvement No.	20
Road Link	132 Avenue
Scope of Improvements	Extension from 124 Street to Hwy 43X with new interchange (2,000 metres)
Functional Class	Arterial
Description / Justification	A new two-lane arterial is required to facilitate the connection between 132 Avenue and the Highway 43 northwest ring road, such that traffic does not need to deviate through 124 Street. Although this is a strategic improvement to complete the network, the traffic volumes predicted to use this link are not heavy, and the distance saved is not great. For this reason, this improvement is not considered a high priority.
Expected PM Traffic Volumes	
70,000 Pop.	40 vph*
90,000 Pop.	50 vph*
120,000 Pop.	60 vph*
	Traffic volumes from the EMME model have limited consideration of inter-regional traffic demand external to the city and may be under-represented.
Estimated Cost	$5.0 Million

Figure 8-25: Proposed 132 Avenue Extension to New Highway 43 Ring Road

Image Source: Google Earth



8-2.3.2. 107 Avenue

Improvement No.	21
Road Link	107 Avenue
Scope of Improvements	108 Street to 116 Street / Airport Connector (1,300 metres)
Functional Class	Collector
Description / Justification	As a key link in the “half mile” collector network, and as a strategic connection between 108 Street and the airport neighbourhood, the 107 Avenue extension is proposed for the 120k population horizon. A significant volume of traffic is expected to use this link, which relieves demand on the arterial network and provides resiliency.
Expected PM Traffic Volumes	
70,000 Pop.	-
90,000 Pop.	-
120,000 Pop.	1,300 vph
Estimated Cost	n/a (development-driven project)

Figure 8-26: Proposed 107 Avenue Connector

Image Source: Google Earth

8-2.3.3. 110 Street

Improvement No.	22
Road Link	110 Street
Scope of Improvements	Extension to 132 Avenue (across Bear Creek; 1,600 metres) Also 124 Avenue connection to 116 Street (800 metres)
Functional Class	Collector
Description / Justification	As with Improvement No. 21, these connections complete the “half mile” collector network in the northwest area of the city. The attracted traffic volumes are not as heavy as the 107 Avenue connector but are still a significant relief to the demand on the arterial network. These new links also support expected development in the area and help reduce trip lengths and increase resiliency by virtue of densifying the grid system. The crossing of Bear Creek will add to the costs of this road extension.
Expected PM Traffic Volumes 70,000 Pop. 90,000 Pop. 120,000 Pop.	 - - 900 vph
Estimated Cost	n/a (development driven improvement)

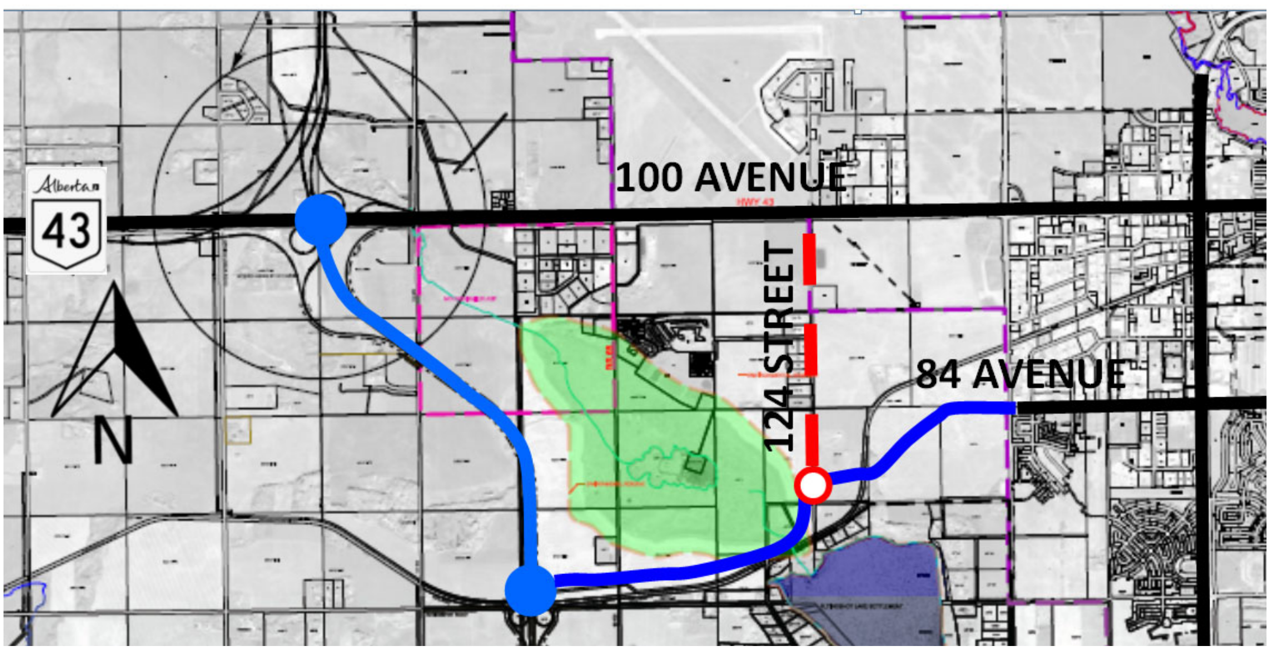
Figure 8-27: 110 Street Extension to 132 Avenue

Source: Google Streetview

8-2.3.4. 124 Street

Improvement No.	23
Road Link	124 Street
Scope of Improvements	Connector from 76 Ave to 97 Ave (2,000 metres)
Functional Class	Arterial
Description / Justification	Formalize, upgrade, and pave the two lane arterial road between 76 Avenue and 97 Avenue, and construct a roundabout at the connection with 84 Avenue. The roundabout will allow for more continuous traffic flow along 84 Avenue, as it connects between Grande Prairie and the Highway 40X ring road. This link will help to complete the grid and provide resiliency to the network.
Expected PM Traffic Volumes	
70,000 Pop.	-
90,000 Pop.	-
120,000 Pop.	100 vph
Estimated Cost	$3,000,000

Figure 8-28: 124 Street Connection, 76 Avenue to 97 Avenue
Background Image Source: Resources Road [Hwy 40X] Functional Planning Study, 2010



8-2.3.5. 84 Avenue

Improvement No.	24
Road Link	84 Avenue
Scope of Improvements	Six lane 100 Street to 108 Street (1,600 metres)
Functional Class	Arterial
Description / Justification	With future development, the expected traffic demand and resulting congestion on 84 Avenue warrants six laning of the existing four lane divided section. The demand on 84 Avenue will increase further if the connections can be achieved to Highway 40X southwest ring road and across the rail lines to the east.
Expected PM Traffic Volumes 70,000 Pop. 90,000 Pop. 120,000 Pop.	 2,700 vph 3,100 vph 4,500 vph
Estimated Cost	$5.6 Million

Figure 8-29: 84 Avenue, East of 108 Street

8-2.3.6. 68 Avenue

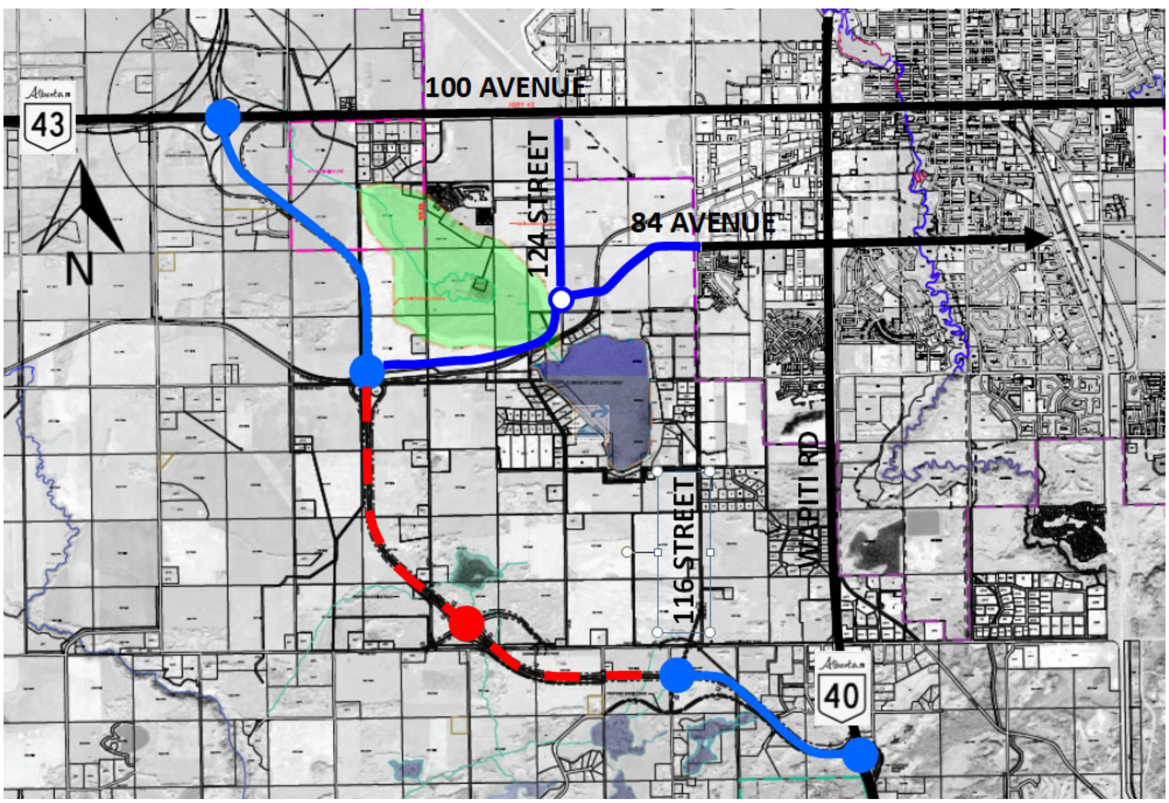
Improvement No.	25
Road Link	68 Avenue
Scope of Improvements	Four lane 108 Street to 116 Street (1,600 metres)
Functional Class	Arterial
Description / Justification	To address severe traffic congestion expected on 68 Avenue, the two lane section should be widened to a four-lane divided arterial for the 120k population scenario. In addition to increased capacity, this will provide safety and reliability benefits to the network.
Expected PM Traffic Volumes	
70,000 Pop.	1,300 vph
90,000 Pop.	1,400 vph
120,000 Pop.	2,300 vph
Estimated Cost	$6.9 Million

Figure 8-30: 68 Avenue, West of 108 Avenue

8-2.3.7. Highway 40X

Improvement No.	26
Road Link	Highway 40X
Scope of Improvements	Southwest section of ring road
Functional Class	Arterial
Description / Justification	This connection would complete the southwest ring road between Highway 43 / Highway 43X and Highway 40 (***Figure 8-31***). As this is a provincial highway, the scope and timing would be determined by Alberta Transportation.
Expected PM Traffic Volumes	
70,000 Pop.	-
90,000 Pop.	-
120,000 Pop.	20 vph* * *Traffic volumes from the EMME model have limited consideration of inter-regional traffic demand external to the city and may be under-represented.*
Estimated Cost	Not applicable; provincial highway.

Figure 8-31: Highway 40X Southwest Ring Road
Background Image Source: Resources Road [Hwy 40X] Functional Planning Study, 2010



8-2.3.8. 84 Avenue

Improvement No.	27
Road Link	84 Avenue
Scope of Improvements	Rail overpass (contingent on CN yard relocation)
Functional Class	Arterial
Description / Justification	This improvement is the extension of 84 Avenue between Resources Road and 92 Street. The connection would attract a large volume of traffic as there are limited east-west routes across the rail tracks. This is discussed further in ***Section 3***.
Expected PM Traffic Volumes	
70,000 Pop.	-
90,000 Pop.	-
120,000 Pop.	3,000 vph
Estimated Cost	See ***Section 3***

Figure 8-32: CN Rail Yard, near proposed 84 Avenue Crossing, Looking East

8-2.3.9. 92 Avenue

Improvement No.	28
Road Link	92 Avenue
Scope of Improvements	At grade rail crossing (contingent on CN yard relocation)
Functional Class	Collector
Description / Justification	This improvement is the extension of 92nd Avenue across the rail tracks and would attract a significant volume of traffic (thereby providing relief to the other crossings). This is discussed further in ***Section 3***.
Expected PM Traffic Volumes	
70,000 Pop.	-
90,000 Pop.	-
120,000 Pop.	800 vph
Estimated Cost	See ***Section 3***.

Figure 8-33: Location of Proposed 92 Avenue Rail Crossing, Looking East

8-2.3.10. 92 Street

Improvement No.	29
Road Link	92 Street
Scope of Improvements	Four lane 68 Ave to 96 Ave (3,000 metres)
Functional Class	Arterial
Description / Justification	The widening of 92 Street would address significant traffic congestion predicted in the 120k population horizon. However, a number of sources in the community engagement identified this widening as required sooner, potentially due to traffic demand outside the PM Peak Hour analyzed by the EMME model. In this respect, the improvement may be a strong candidate for earlier implementation. A functional design for the widening was commissioned by the City in 2013.
Expected PM Traffic Volumes	
70,000 Pop.	1,400 vph
90,000 Pop.	1,400 vph
120,000 Pop.	2,300 vph
Estimated Cost	$12.9 Million

Figure 8-34: 92 Street, North of 68 Avenue

8-2.3.11. 84 Street

Improvement No.	30
Road Link	84 Street
Scope of Improvements	Four lane, 68 Avenue to 76 Avenue (1,000 metres)
Functional Class	Arterial
Description / Justification	The right-of-way should be secured to widen 84 Street to a four-lane divided arterial north of 68 Avenue to mitigate significant future issues with traffic congestion due to the proposed development on the east side of the city. In addition, providing a divided roadway would offer safety and reliability benefits. A functional design for this improvement was commissioned by the City in 2012.
Expected PM Traffic Volumes	
70,000 Pop.	100 vph
90,000 Pop.	400 vph
120,000 Pop.	1,100 vph
Estimated Cost	$4.3 Million

Figure 8-35: 84 Street, North of 68 Avenue

8-2.3.12. 68 Avenue

Improvement No.	31
Road Link	68 Avenue
Scope of Improvements	Four lane 92 Street to 84 Street (1,300 metres)
Functional Class	Arterial
Description / Justification	68 Avenue should be upgraded to a four-lane divided arterial between 92nd Street and 84 Street due to the traffic congestion generated by the proposed development area to the east. In addition to increased capacity, this would provide additional safety and reliability benefits.
Expected PM Traffic Volumes	
70,000 Pop.	900 vph
90,000 Pop.	1,000 vph
120,000 Pop.	1,900 vph
Estimated Cost	$5.6 Million

Figure 8-36: 68 Avenue, East of 92 Street

8-2.3.13. 84 Street

Improvement No.	32
Road Link	84 Street
Scope of Improvements	Four lane from 100 Avenue to 132 Avenue (3,500 metres)
Functional Class	Arterial
Description / Justification	Further to Improvement No. 18 (the construction of a two lane arterial from 100 Avenue to 132 Avenue), this improvement is comprised of widening the road to a four-lane divided arterial. The significant growth expected in the area would warrant this widening to address issues with traffic congestion and provide safety and reliability benefits. In 2012, the City commissioned a functional design of this road.
Expected PM Traffic Volumes	
70,000 Pop.	-
90,000 Pop.	500 vph
120,000 Pop.	2,100 vph
Estimated Cost	$15.1 Million

Figure 8-37: 84 Street Alignment, Looking South from 132 Avenue

8-2.3.14. Long Term Intersection Improvements

As with the previous two sections, the EMME model identified the following intersections as candidates for improvement at the 120,000 population horizon. These improvements may constitute upgrades (e.g. traffic signals, roundabouts, new turning lanes, etc.) or downgrades (e.g. movement restrictions), as befits the traffic demand, network objectives, and physical opportunities / constraints at each location. More detailed operational analysis will be required at the implementation stage to confirm the warrants and scope of the improvements.

Table 8-3: Candidate Long-Term Intersection Improvements

North-South Road	East-West Road	Estimated Capital Cost*	Additional Comments
Hwy 43X (NW Ring)	132 Avenue	N / A (provincial)	Three leg intersection
116 Street	132 Avenue	$500,000	Signal and I / S upgrade
100 Street	132 Avenue	$500,000	Signal and I / S upgrade
84 Street (RR 55)	132 Avenue	$500,000	Four leg intersection
Range Road 54	132 Avenue	$500,000	Four leg intersection
116 Street	124 Avenue	$500,000	Four leg intersection
102 Street	124 Avenue	$500,000	Four leg intersection
102 Street	121 Avenue	$500,000	Four leg intersection
108 Street	109 Avenue	$350,000	Signal and I / S upgrade
106 Street	100 Avenue	$350,000	Signal and I / S upgrade
93 Street	100 Avenue	$500,000	Four leg intersection
Landing Drive	100 Avenue	$500,000	Four leg intersection
100 Street	92 Avenue	$500,000	Four leg intersection
100 Street	90 Avenue	$500,000	Four leg intersection
100 Street	88 Avenue	$500,000	Four leg intersection
Resources Road	88 Avenue	$500,000	Four leg intersection
110 Street	84 Avenue	$350,000	Three leg intersection
Park Road	84 Avenue	$350,000	Three leg intersection
Willow Drive	84 Avenue	$350,000	Three leg intersection
84 Street (RR 55)	84 Avenue	$350,000	Three leg intersection
100 Street	Prairie Road	$500,000	Four leg intersection
116 Street	Pinnacle Drive	$350,000	Three leg intersection
116 Street	68 Avenue	$500,000	Four leg intersection
114 Street	68 Avenue	$350,000	Three leg intersection
84 Street	68 Avenue	$500,000	Four leg intersection
Range Rd 65	Hwy 40X (SW Ring)	N / A (provincial)	Four leg intersection
116 Street	Hwy 40X (SW Ring)	N / A (provincial)	Three leg intersection

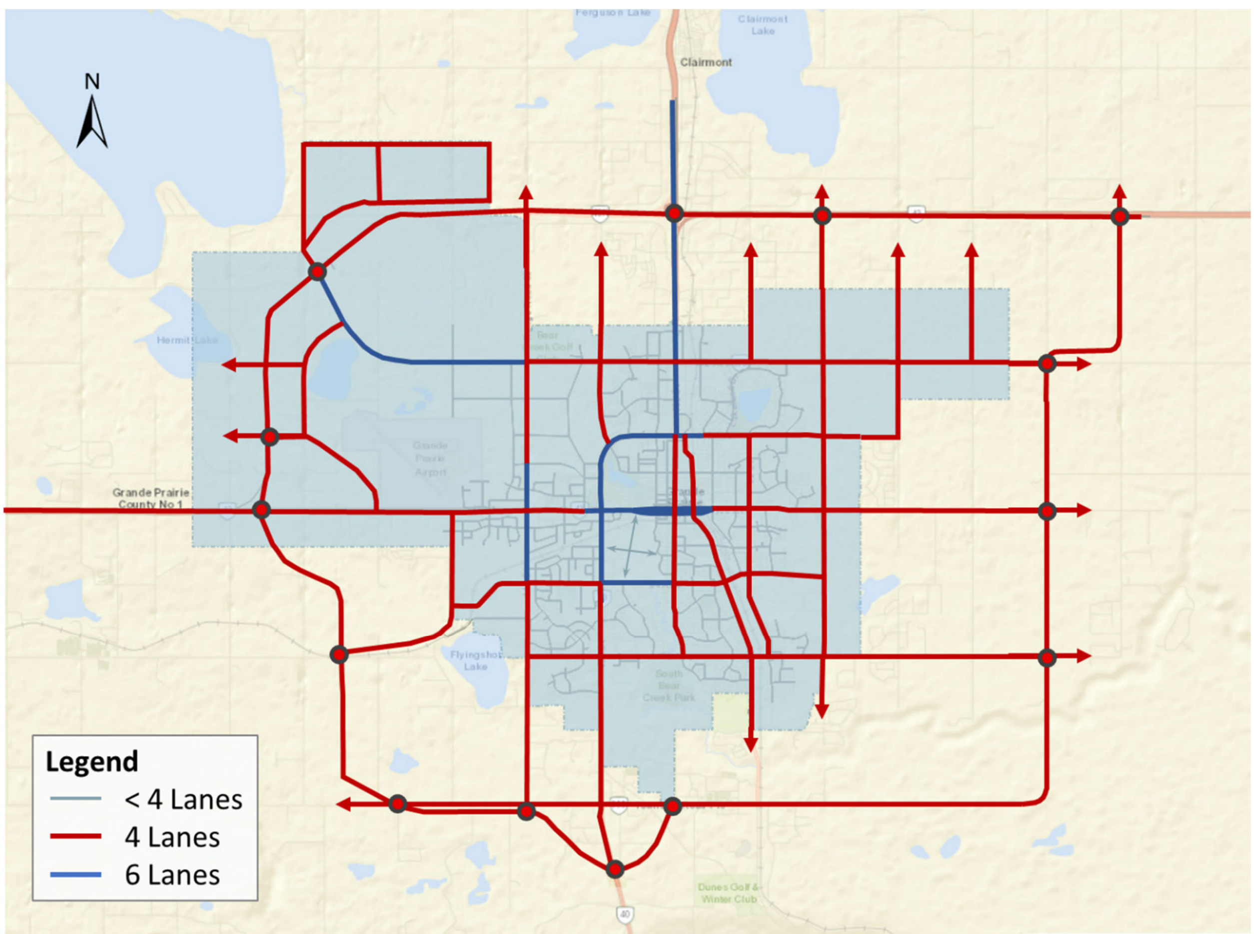
* *These planning-level cost estimates are based on typical costs of signalization (see Appendix E). If a roundabout is constructed, or if the intersection requires laning/geometric improvements, the construction costs may differ.*

8-2.4. BEYOND 120K POPULATION IMPROVEMENTS

The City of Grande Prairie will continue to develop beyond the 120,000 population horizon and will need to consider and protect for future network connections. Within the city limits, the arterial network system (largely following the District Lot boundaries) must be reserved and built as required to accommodate future city development pressures. Outside the city limits, these same arterial roads should be planned to extend and connect to the provincial ring road and county road system in order to address development pressures and trip patterns generated outside the city and ensure the overall network functions as one integrated system.

Figure 8-38 illustrates the existing and potential future arterial network, as taken from current development plans, the Intermunicipal Development Plan (IDP), and other logical connections that follow the "mile grid". The arterial roads are shown in blue (six lanes) and red (four lanes). Between each identified arterial road should be at least one major collector road to enhance the arterial system capacity, provide redundancy / resiliency to the network, and reduce overall trip lengths (i.e. the system VKT). Even within the city core, any future redevelopment (e.g. if Canfor should relocate) are opportunities to add these necessary collector links. The City should reserve and protect for these arterial and collector road links whenever possible.

Figure 8-38: Potential Future Network Links Beyond 120K Population



8-3. Rail Crossing Improvements

8-3.1. 84TH AVENUE OVERPASS

As frequently noted in the community engagement, and as observed during the site visits, one of the critical transportation issues on the east side of Grande Prairie is the train delays at the 100 Avenue and 68 Avenue crossings. At 100 Avenue, the train delays are often caused by yard operations, which can involve extending cars onto 100 Avenue for short periods while trains are connected. At 68 Avenue, the delays are typically attributed to long trains moving through the city. The delays at both crossings are exacerbated by the absence of a crossing opportunity at 84 Avenue, located midway between the two existing crossings. Without a crossing at 84 Avenue, there is a higher crossing demand at 68 Avenue and 100 Avenue, as well as unnecessary levels of congestion on Resource Road and 92 Street as traffic circulates to the two crossings. The emergency response is also impacted by the train delays, as noted in the stakeholder consultation meetings.

Extending 84 Avenue across the rail line would not be feasible as an at-grade crossing due to the safety problems associated with the multiple train tracks in the yard. Extending 84 Avenue as a grade-separated overpass would be cost-prohibitive due to the need for a long (~90 metre) bridge span over the tracks.

If the rail operations in Grande Prairie are beginning to exceed the capacity of the existing yard (as may be evident from the rail car movements across 100 Avenue), any significant increase in the rail activity may require a larger yard at some point in the future. If CN were to relocate the Grande Prairie rail yard out of the city, the benefits may include:

- CN would have a larger facility which could fully contain its operations, and potentially allow room for further expansion in the future.
- Elimination of vehicle-rail and pedestrian-rail conflicts on 100 Avenue due to yard activity; the only train delays would be caused by the occasional passing trains.
- A reduction in the number of tracks at 84 Avenue could improve the feasibility of a grade-separated crossing, which would reduce traffic delays, congestion, and emergency response times on the road network.
- A more secure location for the yard, outside the urban area.
- The potential redevelopment of the existing yard property to a commercial and/or residential use.
- A potential reduction in noise pollution coming from the yard, especially at night.

To approximate the cost of relocating the rail yard, the following planning-level assumptions and calculations are presented for consideration (***Table 8-4***)

Table 8-4: Planning-Level Cost Estimate for Rail Yard Relocation

No.	Item	Cost
1.	Rail construction (assuming 20% increase over existing 1.6 km yard with 9 tracks at $1,000 / metre)	$17 Million
2.	Supporting building(s) and yard construction	$10 Million
3.	Property costs	*
	Subtotal	$27 Million
	Contingency (50%)	$13 Million
	Total	**$40 Million**

* *New property costs are assumed to be offset by the sale / lease and redevelopment of the existing yard property.*

The typical costs of grade-separated rail crossings (based on similar recent projects in Canada) range from $25 Million to $60 Million, depending on the scope and complexity. At 84 Avenue, these costs would likely be toward the low end of the range. Therefore, approximately $65 Million in infrastructure costs would be offset by the benefits listed above. In comparison, a rail overpass at 68 Avenue would be significantly more expensive due to the presence of the adjacent development and would provide substantially fewer benefits to the network and rail yard functionality.

An overpass at 100 Avenue (***Figure 8-39***) would likely be cost-prohibitive due to the dense urban environment, the need for two overpasses (99 Avenue and 100 Avenue), and the adjacent major intersections upstream and downstream of the tracks.

The potential relocation of the rail yard and construction of an overpass at 84 Avenue warrant further study to fully quantify the costs and benefits.

Figure 8-39: Existing Rail Crossing at 100 Avenue

8-3.2. OTHER RAIL CROSSING IMPROVEMENTS

8-3.2.1. 92 Avenue

As discussed in ***Module 4***, if the rail yard relocated outside the city, there would be another opportunity to improve east-west road capacity with the installation of a new at-grade rail crossing at 92 Avenue. In ***Section 8-2.3.9*** above, the EMME model estimates the traffic volume that would use this connection to be approximately 800 vehicles per hour in the 120k population horizon. This would provide significant relief to the other crossings, improve network reliability / resilience, and reduce total trip times in the system.

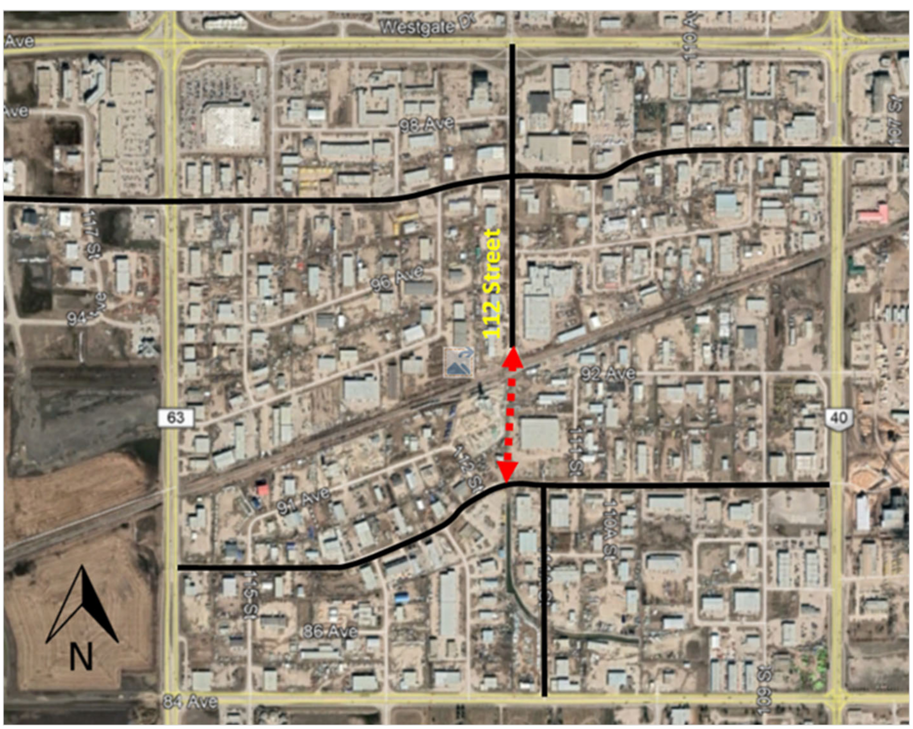
8-3.2.2. 116 Street

As discussed in ***Modules 4*** and ***7***, the potential designation of 116 Street as a truck route would make this rail crossing an attractive option for grade-separation. An overpass would ensure traffic and goods movement would continue to safely flow across the city network independent of train schedules. An overpass on 108 Street / Wapiti Road, in comparison, would be cost-prohibitive due the density of adjacent development on that corridor. Therefore, the right-of-way for an overpass should be preserved, and network connections in the vicinity designed in consideration of the future structure.

8-3.2.3. Other Locations

Additional at-grade rail crossings should be implemented as needed and where appropriate, as permitted by CN. Candidate locations include 112 Street, Wedgewood Drive, and 84 Avenue (West). In particular, the proposed crossing on 112 Street would complete a necessary collector link between the 110 Avenue and 84 Avenue arterials (***Figure 8-40***). This reduces network congestion and trip lengths in the area.

Figure 8-40: Proposed 112 Street Rail Crossing



8-4. Active Transportation and Transit Improvements

While it is beyond the scope of this study to evaluate individual improvements to the pathway and transit systems in detail, the need for a comprehensive vision for sustainable transportation is critical to the future viability of the transportation system. As development grows in both the city and surrounding county, traffic volumes and travel distances to and from the city core will increase to the point that even a six-lane road network would not be able to support the resulting vehicular traffic. Therefore, with each planned road improvement, there should be parallel investments in sustainable transportation infrastructure.

The active transportation and transit system improvements outlined in ***Module 6*** provide for healthy and sustainable improvements and strategies to attract residents and commuters to the transit system (for longer trips across town) and the pathway system (for relatively short trips, ***Figure 8-41***). With the strategic development and maintenance of a convenient, reliable, and integrated system, sustainable transportation modes can effectively reduce the vehicular demand on the road system. This would offset the need and timing for major road improvements and parking accommodation, while at the same time reduce travel times, traffic congestion, and air pollution.

Figure 8-41: Existing Sidewalk, Grande Prairie

Grande Prairie Transportation Master Plan

MODULE 9

Implementation Plan

- Proposed capital plans
- Program and policy initiatives
- Further study

Contents

Tables

Figures

9-1. Introduction

Compiling and summarizing the findings from the previous modules of the Transportation Master Plan, this module outlines a plan for implementing the study recommendations to ensure Grande Prairie's transportation system strategically and effectively develops with the projected city growth. This includes the infrastructure improvement plans (for adoption into the capital plan, as required), suggested program and policy initiatives to support and complement the infrastructure investments, and suggestions for further study.

9-2. Recommended Infrastructure Improvements

Using the assumptions for city growth and development patterns as analyzed in the City's EMME model, the following infrastructure improvements are recommended for implementation.

9-2.1. 70K POPULATION HORIZON (FIVE YEAR PLAN)

9-2.1.1. Road System Improvements

Based on the early growth scenario, and to address the known areas of traffic congestion in the city, the road improvements illustrated in orange in ***Figure 9-1*** and listed in ***Table 9-1*** should be planned for early implementation. In the cases of Improvement No. 1 (Highway 43 Northwest Ring Road) and Improvement No. 6 (Highway 40/108 Street/Wapiti Road Widening), these provincial projects are already in progress, and are included for completeness. The remaining projects are recommended for addition to the City's Five Year Capital Program.

The EMME modeling analysis did not anticipate a need to widen 92 Street (as proposed in the 120k Population Horizon, Section 9-2.3) in this scenario. However, as congestion on this road was raised as a concern by a number of participants during the community engagement, 92 Street should be monitored to determine if early implementation of the widening becomes necessary.

Figure 9-1: Major Road Improvements for 70k Population Horizon

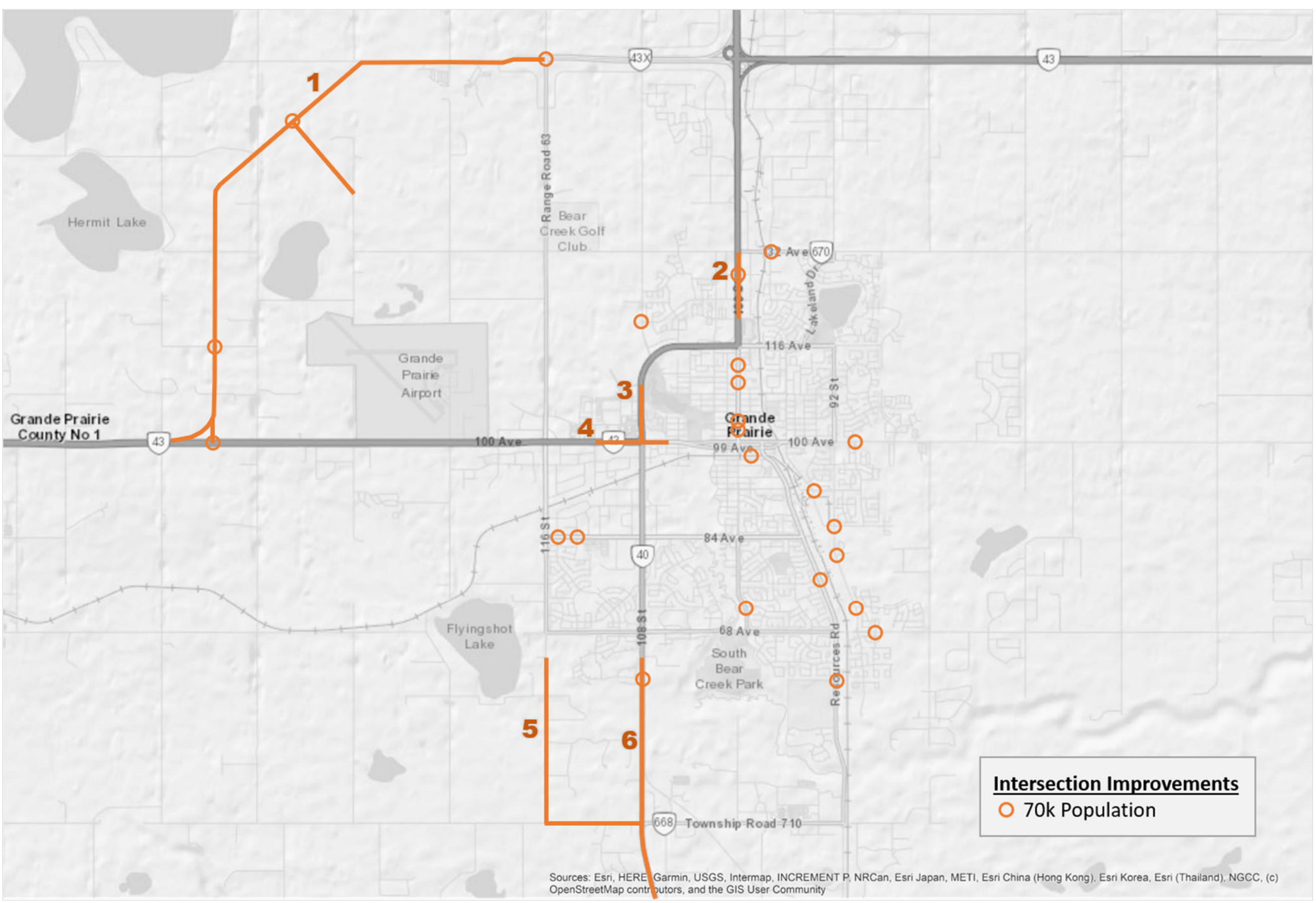


Table 9-1: Short Term (70k Population) Improvement Recommendations

	Road Name	Description	Estimated Cost
1	Hwy 43X NW Ring Road	New divided four lane highway connecting Hwy 43(N) to Hwy 43(W)	Not applicable (provincial expenditure)
2	100 Street	Six lane from 124th Avenue to 132nd Avenue	$2.8 Million
3	108 Street	Six Lane from Bear Creek Bridge to 100th Avenue	$4.2 Million
4	100 Avenue	Six lane 112th Street to 106th Street	$5.0 Million
5	116 Street	Formalize/upgrade truck route to Hwy 40 via 116 St and TWP Rd 710	Not applicable
6	108 St	Four-laning from future Hwy 40X to 68th Avenue	Not applicable (provincial expenditure)
		Total Estimated Costs:	**$12.0 Million**

In addition to the major road link improvements listed in ***Table 9-1***, there are 20 candidate intersection upgrades, identified in ***Figure 9-1*** as orange circles, and listed in ***Table 8-1*** of ***Module 8***. These improvements were identified by the amount of congestion / delay estimated at these locations by the EMME model, and may include traffic signals, roundabouts, and/or laning/geometric upgrades. Based on assumed upgrade costs for three and four-leg intersections (as outlined in ***Appendix E***), the total cost of intersection improvements is estimated at an additional $8.5 Million.

9-2.1.2. Active Transportation and Transit Improvements

The Five-Year Capital Plan recommendations for active transportation and transit improvements are based on the assessment and review of the Community Connectivity mapping provided by the City of Grande Prairie; the SWOC overview (including feedback obtained from the community engagement); and the findings from ***Module 6: Active Transportation and Transit***. The short-term transit recommendations from ***Module 6*** are listed below.

1. Implement the service guidelines from the City's 2017 Transit Master Plan.
2. Improve the connectivity between transit routes, and with the pathway network
3. Install priority / queue-jump measures as required to improve bus flow through congested intersections
4. Ensure new developments, roads and other initiatives are supportive of the transit system.

The active transportation pathway recommendations have been classified and prioritized according to the following connectivity gap criteria:

1. Identified Alignment Requirement and Safety Issue
2. Identified Intersection/Crossing Safety Issue
3. Alignment Requirement

4. Intersection/Crossing Requirement
5. Dedicated Bicycle Route Requirement

Using these classifications, the recommended short-term improvements for pathway infrastructure are listed in ***Tables 9-2*** to ***9-6*** below.

Table 9-2: Priority 1 - Identified Alignment Requirements and Safety Issues

Alignment	Comments
68 Avenue: 116 Street to 108 Street and 92 Street to 84 Street	Long sections (east of 92nd Street; west of 108th Street) without pedestrian/cyclist accommodation on major route. Implementation should consider connectivity to surrounding zones of development; AT communications system (e.g. way-finding); the visual integrity along the corridor; winter city, low-impact, amenity and aesthetic/microclimate applications to enhance safety, security and use.
Wapiti Road (108 St): East edge of O'Brien Lake to 68 Avenue	Constrained width for pathway section adjacent to major roadway.
100 Street: Clairmont to 68 Avenue	This alignment has sections of existing active transportation development; however, this alignment has been identified as a (physical/perceived) unsafe route for users with poor connectivity to adjacent commercial/ residential areas and the Downtown.

Table 9-3: Priority 2 - Identified Intersection / Crossing Safety Issues

Alignment	Comments
68 Avenue and 108 Street/Wapiti Road **68 Avenue and 100 Street** **76 Avenue and Resources Road** **Highway 43 and 116 Avenue** **Highway 43 and 102 Street** **100 Avenue and 116 Street** **102 Street and 121 Avenue** **102 Street – connections to Swanavon neighbourhood along 102 Street** **116 Avenue and 102 Street**	History of pedestrian safety concerns at large intersections with heavy traffic volumes. Implementation should consider connectivity to surrounding zones of development; active transportation communications system (e.g. way-finding, signing, warning lights, etc); intersection improvements, winter city, low-impact, amenity and aesthetic/microclimate applications to enhance safety, security and use.

Table 9-4: Priority 3 – Alignment Requirement

Alignment	Comments
116 Street: 77 Avenue to O'Brien Lake **116 Street: Highway 43 (100 Avenue) to north of 108 Avenue** **Highway 43 (108 Street): 100 Avenue to 102 Street** **North Bear Creek Trail System with connectivity to surrounding neighbourhoods (Hidden Valley; Royal Oaks; Bear Creek Highlands and Arbour Hills).** **96 Avenue: 100 Street to 98 Street** **100 Avenue: 84 Street to 124 Street**	Implementation should consider connectivity to surrounding zones of development; AT communications system (e.g. way-finding); the visual integrity along the corridor; winter city, low-impact, amenity and aesthetic/microclimate applications to enhance safety, security and use. Note: segments of 100 Avenue corridor alignment have been completed; however, this segment has been identified as an (physical/perceived) unsafe route for users with poor connectivity to adjacent commercial/ residential areas and the Downtown.

Table 9-5: Priority 4 – Intersection/Crossing Requirement

Alignment	Comments
116 Street at 68 Avenue; 77 Avenue; 84 Avenue; and 104 Avenue **108 Street (Wapiti Road) at Highway 43; 84 Avenue; 89 Avenue; 100 Avenue; 108 Street/connections to Bear Creek**	Implementation should consider connectivity to surrounding zones of development; AT communications system (e.g. way-finding, signing, warning lights, etc); intersection improvements, winter city, low-impact, amenity and aesthetic/microclimate applications to enhance safety, security and use.

Table 9-6: Priority 5 – Dedicated Bicycle Route Requirement

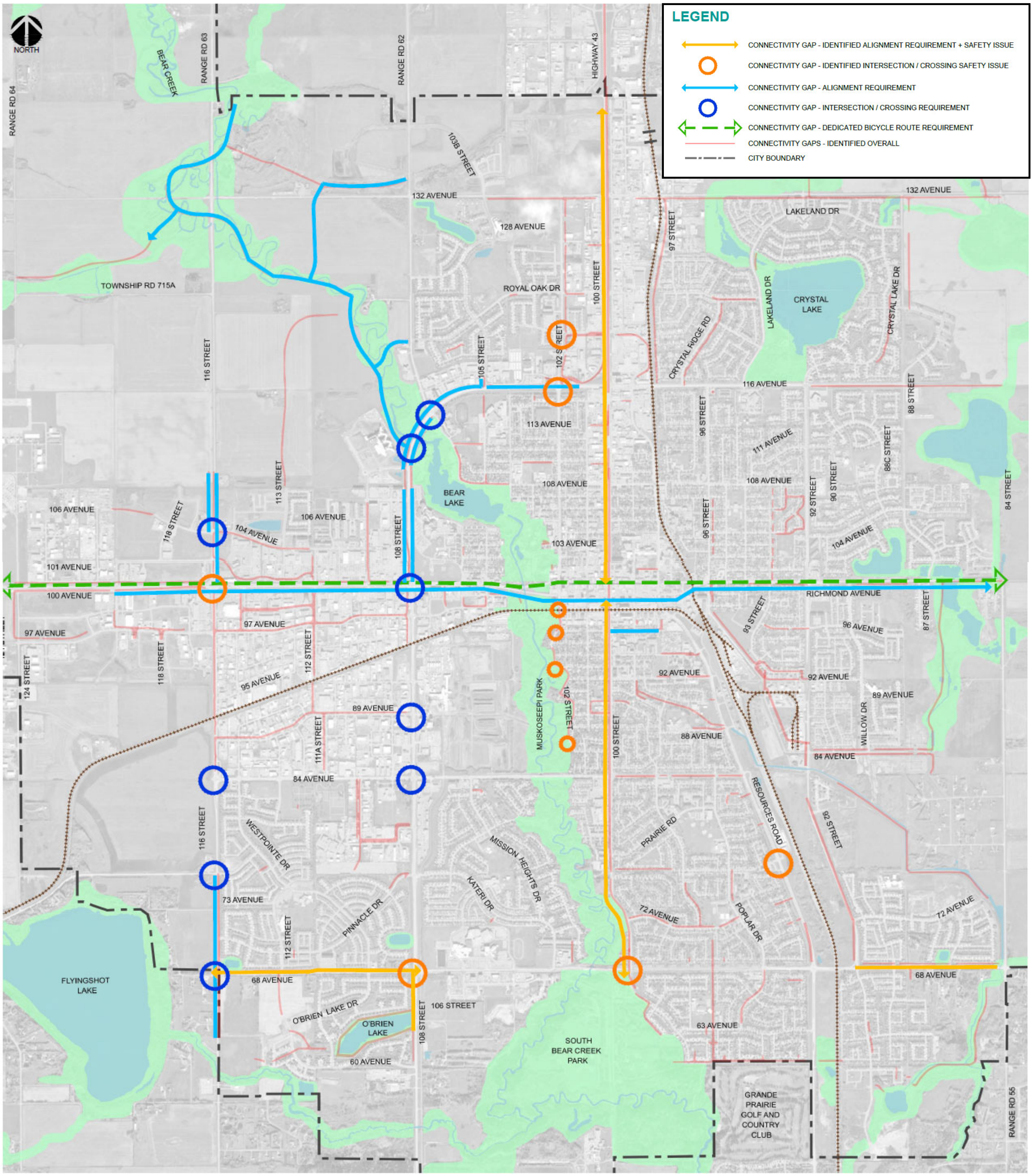
Alignment	Comments
100 Avenue: 84 Street to 124 Street (*Figure 9-2*)	Dedicated bicycle routes are an item not specifically addressed in the TMP. The 100 Avenue dedicated bicycle route was an alignment addressed during the public engagement process. Additional dedicated bicycle routes could consider: 116 Street; Wapiti Road/Highway 43; 100 Street; Resource Road; 92 Street; 68 Avenue; 84 Avenue and 132 Avenue. These alignments should consider the extension and connectivity to proposed regional connectivity and active transportation hubs. Note: segments of 100 Avenue corridor alignment have been completed; however, this segment has been identified as an (physical/perceived) unsafe route for users with poor connectivity to adjacent commercial/ residential areas and the Downtown.

Figure 9-2: 100 Avenue, Eastbound Approach to City Centre

Source: Google Streetview

The recommended improvements in the preceding tables are illustrated in ***Figure 9-3.***

Figure 9-3: Five Year Capital Plan - Active Transportation and Transit



9-2.2. 90K POPULATION HORIZON (MEDIUM TERM)

9-2.2.1. Road System Improvements

As the community grows to a 90k population, the recommended road improvements to address the estimated traffic congestion are illustrated in green in ***Figure 9-4***, and listed in ***Table 9-7***. These improvement recommendations are based on the assumption that the short-term improvements (as shown in orange) have been constructed as required.

Figure 9-4: Medium Term Road Improvements for 90k Population

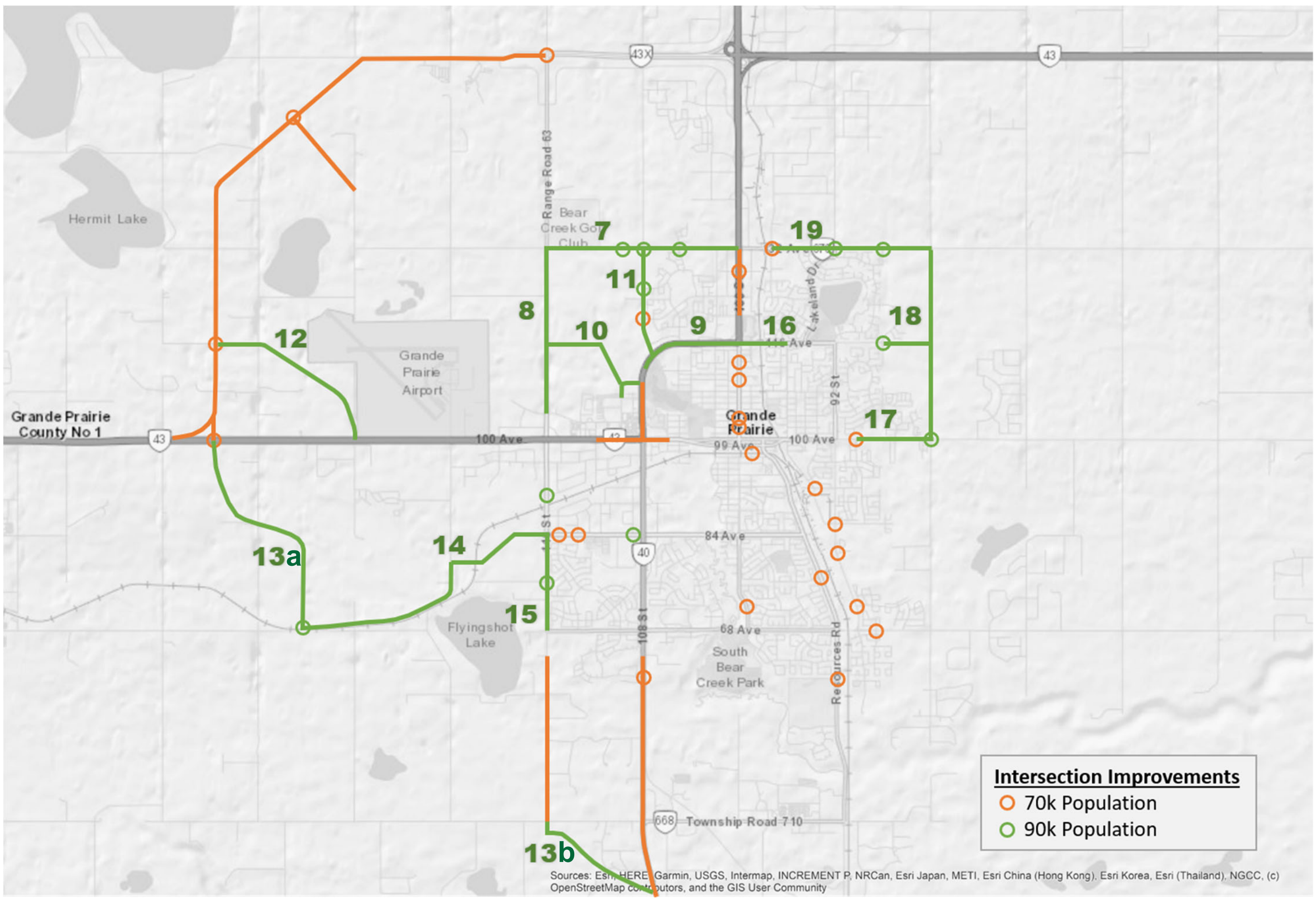


Table 9-7: Medium Term (90k Population) Improvement Recommendations

No.	Road Name	Recommendation	Estimated Cost
7	132 Avenue (Township Road 720)	Four lane 103 Street to 116 Street	$11.2 Million
8	116 Street	Four lane 104 Ave to 132 Ave	$12.0 Million
9	116 Ave (H43)	Widen Bear Creek Bridge to 99 St	$7.8 Million
10	109 Avenue	Hospital to 116 Ave Connector (via 110 Street)	n/a (development-driven)
11	108 Street	Four lane 116 Ave to 132 Ave	$7.7 Million
12	TWP Rd 715	Extension from 132 Street to Hwy 43X	$8.5 Million
13a	Hwy 40X	SW section of ring road from Hwy 43 to 84 Ave.	Not applicable; provincial highway.
13b	Hwy 40X	SW section of ring road from 116 St to Hwy 40. Modify truck route on 116 Street.	Not applicable; provincial highway.
14	84 Avenue	Extension from 116 Street to Hwy 40X	$9.3 Million
15	116 Street	Four lane 84 Ave to 68 Ave	$6.9 Million
16	116 Avenue	Six lane 99 St to 96 St	$2.1 Million
17	100 Avenue	Four lane 90 St to 84 St	$5.6 Million
18	84 Street	Build new two-lane road from 100 Ave to 132 Ave, and extend 116 Ave from 88 St to 84 St	$11.0 Million
19	132 Avenue	Four lane 84 St to 97 St	$11.6 Million
		Total Estimated Costs:	**$93.7 Million**

In addition to the major road link improvements listed in ***Table 9-7***, there are 12 candidate intersection upgrades, identified in ***Figure 9-4*** as green circles, and listed in ***Table 8-2*** of ***Module 8***. These improvements were identified by the amount of congestion / delay estimated at these locations by the EMME model, and may include traffic signals, roundabouts, and/or laning/geometric upgrades. Based on assumed upgrade costs for three and four-leg intersections (as outlined in ***Appendix E***), the total cost of intersection improvements is estimated at an additional $4.75 Million.

9-2.2.2. Active Transportation and Transit Improvements

The active transportation infrastructure and transit system improvements outlined in the short-term scenario above should be continued for the 90k population (medium term) horizon. As the city grows, the importance of the sustainable transportation modes increases as a means to offset vehicular traffic demand, and ensure all residents have viable, safe, and convenient transportation alternatives within Grande Prairie.

Specific improvement options are not provided for the medium and long term population horizons, as these will be more effectively identified, prioritized, and programmed as the development patterns, travel demands, and safety concerns become apparent. However, the principles outlined in ***Module 6*** should be pursued, namely:

1. Establish a visual framework and design guidelines
2. Establish active transportation zones for the city
3. Continue to reduce gaps in the pathway network, and improve connectivity with transit
4. Provide supporting guidance (e.g. wayfinding) and amenities
5. Accommodate winter users
6. Design sustainable / low-impact infrastructure
7. Integrate planning and development
8. Ensure new developments, roads and other initiatives are supportive of transit and pathways.
9. Improve the communications systems.

9-2.3. 120K POPULATION IMPROVEMENTS

The recommended road improvements to address the estimated traffic congestion from the 120k population horizon are illustrated in blue in ***Figure 9-5***, and listed in ***Table 9-8***. These improvement recommendations are based on the assumptions that the short-term and medium-term improvements (as shown in orange and green respectively) have been constructed as required.

Figure 9-5: Long Term Road Improvements for 120k Population

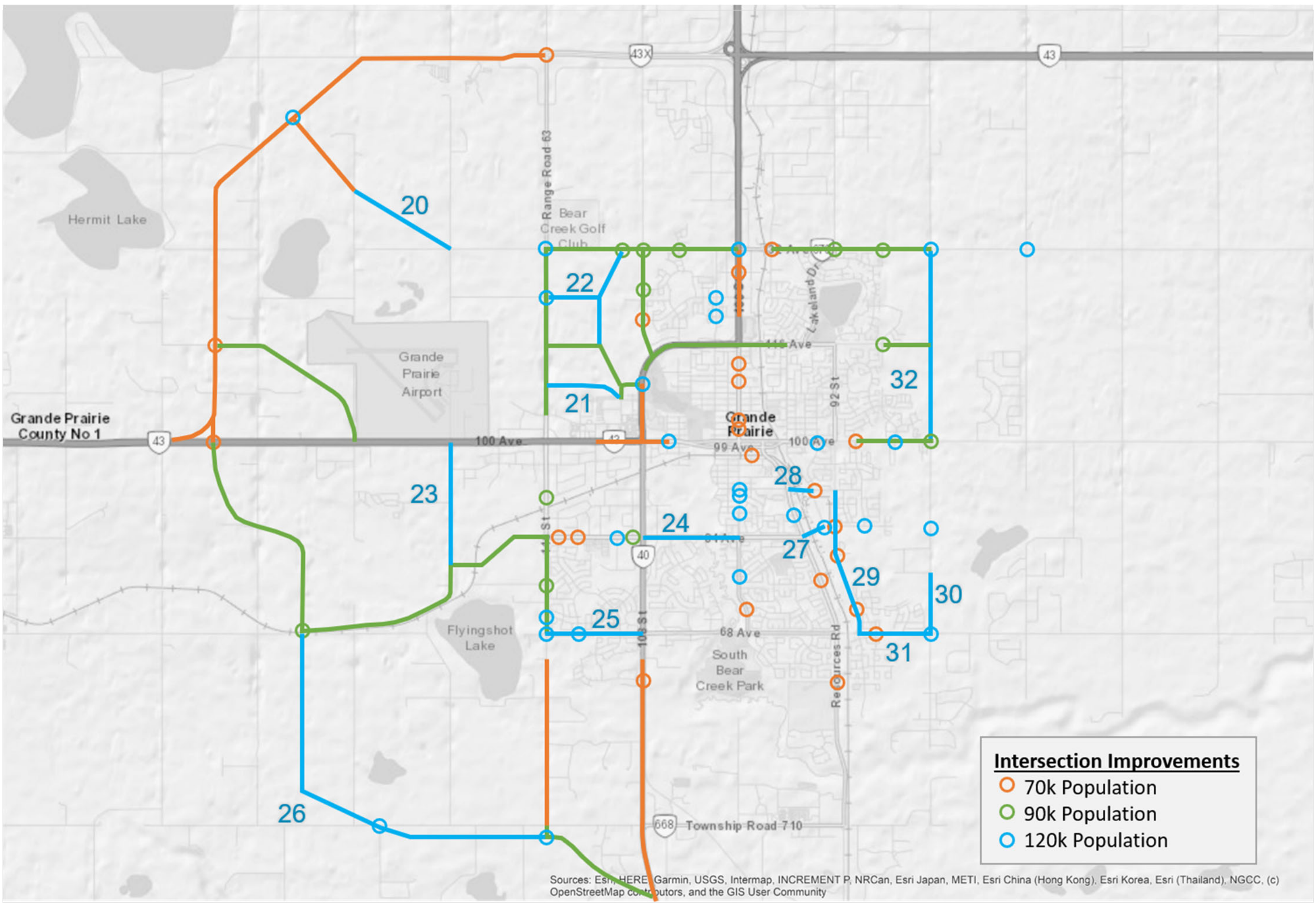


Table 9-8: Long Term (120k Population) Improvement Recommendations

No.	Road Name	Recommendation	Estimated Cost
20	132 Avenue	Extension from 124 Street to Hwy 43X	$5.0 Million
21	107 Avenue	108 St to 116 St/Airport Connector	n/a (development-driven)
22	110 Street	Extension to 132 Ave (across Bear Ck) and connection to 124 St	Not applicable; development-driven
23	124 Street	Connector from 76 Ave to 97 Ave	$3.0 Million
24	84 Avenue	Six lane 100 St to 108 St	$5.6 Million
25	68 Avenue	Four lane 108 St to 116 St	$6.9 Million
26	Hwy 40X	Complete SW section of ring road	Not applicable; provincial highway.
27	84 Avenue	Rail overpass (contingent on CN yard relocation)	$30.0 Million
28	92 Avenue	At grade rail crossing (contingent on CN yard relocation)	$0.5 Million
29	92 Street	Four lane 68 Ave to 96 Ave	$12.9 Million
30	84 Street	Four lane near 68 Ave	$4.3 Million
31	68 Avenue	Four lane 92 St to 84 St	$5.6 Million
32	84 Street	Four lane 100 Ave to 132 Ave	$15.1 Million
		Total Estimated Costs:	**$88.9 Million**

In addition to the major road link improvements listed in ***Table 9-8***, there are 27 candidate intersection upgrades, identified in ***Figure 9-5*** as blue circles, and listed in ***Table 8-3*** of ***Module 8***. These improvements were identified by the amount of congestion / delay estimated at these locations by the EMME model, and may include traffic signals, roundabouts, and/or laning/geometric upgrades. Based on assumed upgrade costs for three and four-leg intersections (as outlined in ***Appendix E***), the total cost of intersection improvements is estimated at an additional $10.8 Million.

Figure 9-6: 84 Avenue

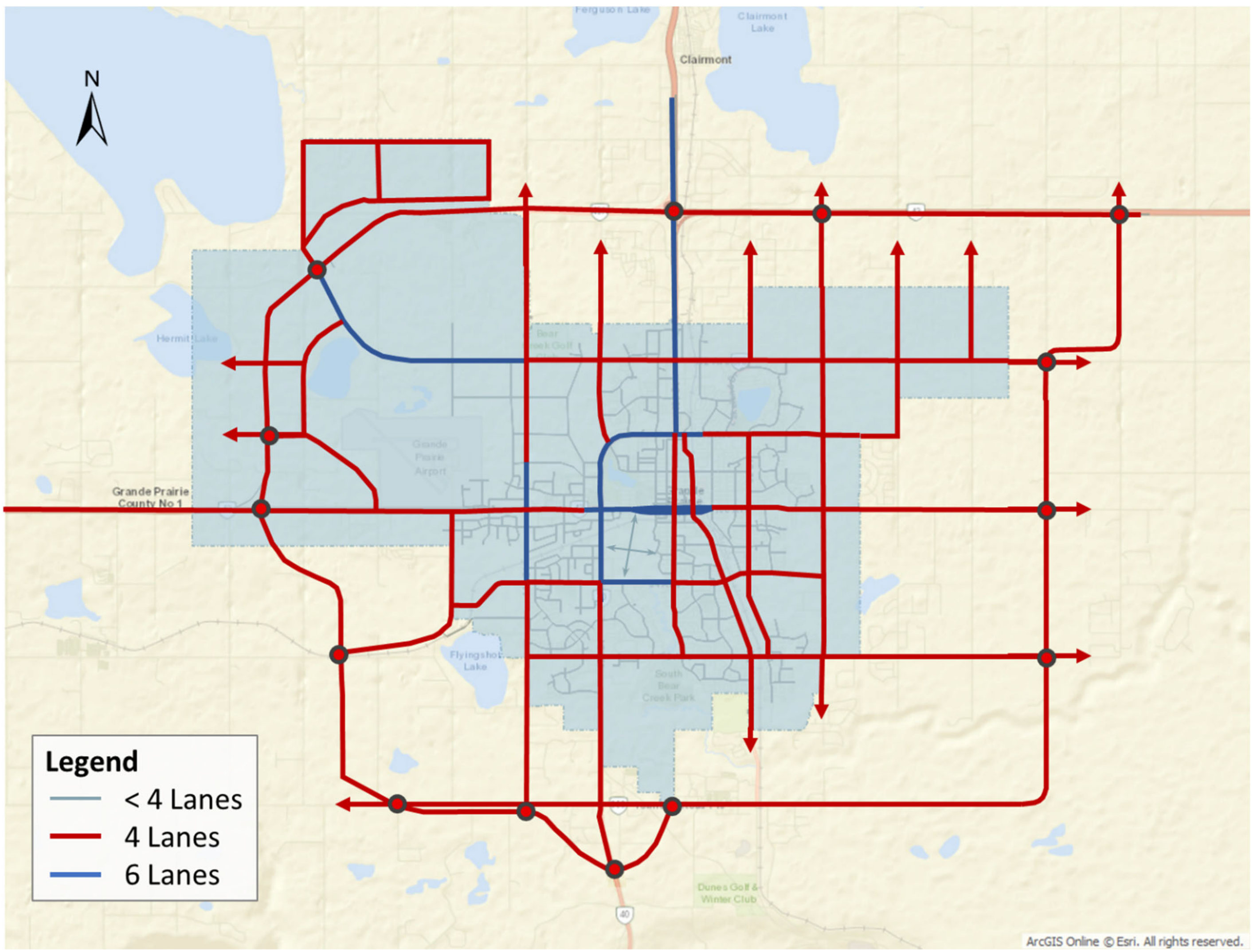
9-3. Program and Policy Initiatives

The following program and policy initiatives will complement and enhance the effectiveness of the infrastructure recommendations outlined in the Transportation Master Plan.

9-3.1. CORRIDOR PROTECTION

To ensure the necessary road right-of-way is available for construction, the City should actively protect the identified corridors as land development, redevelopment, area structure plans, and other opportunities arise. This includes the primary arterial network, which largely follows the District Lot boundaries on the "one mile grid" (as shown in ***Figure 9-7***), as well as a strong supporting collector (or minor arterial) network between these major arterial links.

Figure 9-7: Potential Future Major Road Network Links



9-3.2. TRAFFIC DEMAND MANAGEMENT

Transportation Demand Management (TDM) is the application of specific measures to positively reduce or redistribute traffic demand. The target of these measures are often commuters in the peak hours. The effective implementation of TDM measures can create numerous benefits for a city, including reducing traffic congestion, reducing greenhouse gas emissions, offsetting the need for major road and parking capacity improvements, and facilitating a healthier lifestyle for residents.

TDM initiatives are divided into two types:

- ***Incentives*** reward commuters for choosing the preferred travel behaviours. Typical incentives include subsidized bus fares, carpool programs, high occupancy vehicle lanes, and the provision of infrastructure and land use patterns that encourage healthy travel choices.

- ***Disincentives*** discourage commuters from choosing the non-preferred travel behaviours. Typical disincentives include parking fees, gasoline surcharges, congestion charges, bridge tolls, etc.

Many TDM measures are only effective in larger metropolitan centres. However, as Grande Prairie is currently transitioning from a relatively small city to a larger urban centre, the City can implement a number of measures that can help manage transportation demand now, such as:

1. Providing a strong pedestrian and cycle network as an alternative for shorter trips.
2. Improving the transit service, routes, and schedules to attract ridership for longer trips.
3. Continuing to densify and infill the existing city area, and discourage sprawl development.
4. Allowing developers to reduce their off-street parking requirements in exchange for accommodating trail and/or transit trips.
5. Revisiting the parking policy, especially in the Downtown area.

9-3.3. SUSTAINABLE TRANSPORTATION MARKETING

With the recommended upgrades to the active transportation and transit systems, the local residents will need to be informed of the improved choices available to them. A positive marketing program could explain the system improvements as they are implemented, promote the benefits of sustainable transportation, and entice people to revisit their travel choices. The marketing program could include such specific initiatives as formal media releases; social media groups; pathway system guide books; online applications; educational programs; and community events (promotional and competitive).

9-4. Further Study

Extending from the findings of the Transportation Master Plan, there are a number of issues that require more detailed study. These include intersection operational analysis and signal warrant calculations, functional and detailed designs of road improvements, pathway connectivity analysis and design, and transit system rerouting. In addition, the following specific initiatives should also be considered as funding permits:

1. ***Network Screening:*** As discussed in ***Module 5***, a formal Network Screening would complement the work done in the Transportation Master Plan. This would involve a detailed review of the most recent claims records and/or RCMP collision data to identify the top “collision-prone” locations by considering the collision frequencies, rates, and severities. With an associated analysis of the collision trends at each location, the study can identify effective counter-measures to reduce the number of incidents.

2. ***Active Transportation and Transit System Policy:*** While pathways and transit routes can be improved to better serve the community, there continues to be specific regulatory and policy initiatives that are needed from the City to support sustainable transportation at a system level. These include the formal establishment of zones (as outlined in ***Module 6***); the integration of active transportation and transit with private land use; standards and guidelines for accessibility; introduction of guidelines for year-round use; and planning/design practices to improve safety and security for users.

3. ***Truck Route Study:*** Planning-level truck route recommendations were provided in ***Module 7***. However, a more detailed study of the truck and dangerous goods routes in Grande Prairie would address such issues as the specific road design considerations for truck routes; the parking and other amenities needed along the routes; the bylaws/policies necessary to regulate truck movements on and off the designated routes; and the planned emergency response for dangerous goods routes.

4. ***Downtown Parking Study:*** A comprehensive update to the Downtown Parking Plans would help the City plan for the increase in activity (and hence parking demand) in the Downtown Core. Furthermore, there were a number of participants in the community engagement that expressed concern about the existing parking supply and regulations in Downtown Grande Prairie.

9-5. Conclusion

The Grande Prairie Transportation Master Plan is intended to be a high-level planning study to guide planning, policy, and capital investment, based on broad assumptions about the nature and location of city growth over the foreseeable future. The individual study recommendations are not intended to replace detailed study and operational analysis, but rather to guide the development of the City's Capital Program, prioritize more detailed traffic operational studies, commission infrastructure designs, and negotiate agreements and funding opportunities with other agencies.

As the actual city development patterns may diverge from those assumed in the Transportation Master Plan, the EMME model should be updated and the study recommendations revisited as required.

Figure 9-8: Sunrise over Grande Prairie

Grande Prairie Transportation Master Plan

MODULE 10

Closure

Contents

10-1. Closure

This Transportation Master Plan has been prepared by McElhanney Ltd. (McElhanney) for the benefit of the City of Grande Prairie. The information and data contained herein represent McElhanney's best professional judgment in light of the knowledge and information available to MCSL at the time of preparation.

McElhanney Ltd. denies any liability whatsoever to other parties who may obtain access to this report for any injury, loss or damage suffered by such parties arising from their use of, or reliance upon, this document or any of its contents without the express written consent of McElhanney or the City of Grande Prairie.

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APPENDICES

APPENDIX A

Input from Previous Studies

1. Previous Road Link Recommendations

Location	Recommendation	2009 Transportation Plan	Functional Planning Studies	Hwy 40 SE Resource Rd Study	Hwy 43 Condition Assessment	Annexation Infrastructure Study	Municipal Development Plan	Northwest Traffic Study	Traffic Impact Studies
84 Street	100 Ave to 132 Ave Connector (4 lanes)	✓	✓			✓	✓		
92 Street	Four lane 68 Ave to 96 Ave		✓						
112 Street	Railway Xing & connection to 89 Ave	✓							
100 St (H43)	Three SB lanes: 124 Ave to Prairie Mall				✓				
116 Ave (H43)	Six lane Bridge to 99 St	✓			✓				
108 St (H43)	Six lane 100 Ave to Bridge	✓			✓				✓
100 Ave (H43)	Add 3rd EB lane 112 St to 106 St	✓			✓				
100 Avenue	Four lane 90 St to 84 St		✓						
95 Avenue	Construct west leg at 116 St	✓							
116 Avenue	Six lane 99 St to 96 St	✓							
116 Street	Four lane 104 Ave to 132 Ave		✓						
116 Street	Six lane 100 Ave to 84 Ave	✓	✓						✓
116 Street	Four lane 84 Ave to 68 Ave	✓	✓						✓
Resources Rd	Six lane 99 Ave to 76 Ave	✓							
108 St (H40)	Six lane 100 Ave to 76 Ave	✓	✓						
108 St (H40)	Four lane 68 Ave to 60 Ave	✓	✓						
100 Avenue	Four lane 90 St to 84 St		✓						
102 Street	Corridor upgrades 102 Ave to 108 Ave		✓						
132 Avenue	Four lane 84 St to 97 St; 102 St to 116 St		✓						
Resource Rd (H40x)	SW Ring Road from H43 to H40			✓		✓	✓		
East Ring Rd	SE/NE Ring Road from H40 to H43					✓	✓		
132 Avenue	Extension to Highway 43X					✓	✓		
107 Avenue	108 St to 116 St/Airport Connector							✓	
109 Avenue	Hospital to 116 Ave Connector							✓	
110 Street	Extension to 132 Ave (across Bear Ck)							✓	

2. Previous Intersection Recommendations

Location	Recommendation	2009 Transportation Plan	Hwy 43 Condition Assessment	Functional Planning Studies	Traffic Impact Studies
95 Ave at 116 St	Signalize	✓			✓
68 Ave at 116 St	Signalize	✓			
All signals on Highway 43	Retime		✓		
132 Ave at 100 St	NB/SB right turn lanes		✓		
132 Ave at 108 St	Signalize/WB Adv. Left				✓
132 Ave at 104A St	Signalize/EB Adv. Left				✓
100 Ave at 128 St	Signalize		✓		
116 Ave at 100 St	Double NB/SB left turn lanes		✓		
100 Ave (H43) at 108 St	Double NB/SB left turn lanes		✓		
100 Ave (H43) at 110 St	Add NB/SB right turn lanes		✓		
100 Ave (H43) at 112 St	Add EB/SB/NB right turn lanes		✓		
100 Ave (H43) at 116 St	Add WB merge lane		✓		
100 Ave at 96 St	Double NB left turn lane			✓	
100 Ave at 90 St	Signalize			✓	
100 Ave at 84 St	Signalize			✓	
68 Ave at 92 St	Double EB left turn lane			✓	
72 Ave at 92 St	Signalize			✓	
84 Ave at 92 St	Signalize			✓	
Arbour Hills Blvd at 108 St	Signalize when warranted				✓
63rd Ave at Resources Rd	Signalize				✓
76 Ave at 116 St	Signalize				✓
84 Ave at 118 St	Signalize/upgrade				✓
84 Ave at 116 St	EB Duel Left				✓
109 Ave at 108 St	NB Duel Left turns				✓
110 Ave at 115 St	Roundabout				✓
110 Ave at 114 St	Roundabout				✓
116 Ave at 115 St	Roundabout				✓

3. 2009 Transportation Master Plan Recommendations

3.1. CAPITAL PLAN RECOMMENDATIONS

The 2009 Transportation Master Plan recommended a series of roadway improvements and traffic signal installations for the 5-year (2010 to 2014) and 10-year (2015 to 2019) horizons, as outlined below.

Table 1: Five-Year Capital Plan Recommendations

Roadway	Location / Limits	Description
Roadway Improvements		
84 Street	132 Ave to 100 Ave	Construct 2 lanes of 4-lane divided arterial
92 Street	116 Ave to 100 Ave	Upgrade to 4-lane divided
112 Street	Railway to 89 Ave	Railway crossing and new 2-lane roadway
116 Avenue	88 St to 84 St	Construction 2-lane urban roadway
108 Street	100 Ave to 105 St	Upgrade to 6-lane divided
116 Avenue	105 St to 99 St	Upgrade to 6-lane divided
Traffic Signals		
68 Avenue	Knowledge Way	Install traffic signal at one intersection
116 Avenue	105 St	Install traffic signals

Table 2: Ten-Year Capital Plan Recommendations

Roadway	Location / Limits	Description
Roadway Improvements		
68 Avenue	108 St to Poplar Dr	Upgrade to 4-lane divided
84 Avenue	Resources Rd to 84 St	Functional Planning Study
95 Avenue	116 St	Construct west leg of intersection
116 Avenue	99 St to 96 St	Upgrade to 6-lane divided
116 Street	100 Ave to 97 Ave	Upgrade to 6-lane divided
116 Street	97 Ave to 84 Ave	Upgrade to 6-lane divided
116 Street	84 Ave to 68 Ave	Upgrade to 4-lane divided
Resources Rd	99 Ave to 76 Ave	Upgrade to 6-lane divided
100 Avenue	112 St to 106 St	Upgrade EB direction to 3 lanes
108 Street	100 Ave to 76 Ave	Upgrade to 6-lane divided
108 Street	68 Ave to 60 Ave	Upgrade to 4-lane divided
Intersection Improvements		
116 Street	84 Ave	Construct SB dual LT bay
97 Avenue	116 St	Construct SB RT Bay

Roadway	Location / Limits	Description
Traffic Signals		
116 Street	95 Ave	Install traffic signal
116 Avenue	97 St	Install traffic signal
116 Avenue	96 St	Install traffic signal
92 Street	111 Ave	Install traffic signal
92 Street	108 Ave	Install traffic signal
92 Street	104 Ave	Install traffic signal
116 Street	68 Ave	Install traffic signal
100 Avenue	124 St	Install traffic signal

3.2. LONG-TERM ROAD NETWORK RECOMMENDATIONS

The recommended long-term road network plan was generally consistent with the existing Municipal and Intermunicipal Development Plans, with the following exceptions:

- The MDP and IDP include an extension of 84 Avenue east of 84 Street, but the TMP does not include this extension because it conflicts with existing and potential development. Per the TMP, areas east and south of the city may be adequately served by extension of 68 Avenue and 100 Avenue.
- The MDP does not include 92 Street extending north of 132 Avenue as an arterial road, but the IDP includes this extension. The TMP also includes this extension to maintain a one-mile grid and serve adjacent industrial lands, given the limited access opportunities to the north and west.
- The IDP does not include extension of Airport Road south of 100 Avenue (Hwy 43), but the MDP includes this extension. The TMP also includes this extension to serve industrial lands to the east.

3.3. ACTIVE TRANSPORTATION RECOMMENDATIONS

The report recommendations for active transportation improvements built upon best-practices pertaining to infrastructure design, such as adoption of Complete Streets principles, as well as identifying missing links and addressing governance requirements. ***Table 3*** presents key recommendations from the 2009 Transportation Master Plan that have been adopted and/or still likely apply to present-day conditions and initiatives. Many of these recommendations are considered in ***Module 6: Active Transportation and Transit*****.**

Table 3: Active Transportation Recommendations

Recommendations
Sidewalk and Trail Infrastructure
Establish a program for funding missing sidewalks, trails and curb ramps. Develop prioritization methodology for funding.
Establish a policy for the desired state of the pedestrian circulation system (i.e. all new roadways should have sidewalks on both sides).
Amend Land Use Bylaw to require new / renovated developments to connect building doors to the sidewalk.

Recommendations
Cycling Infrastructure and Facilities
Monitor the success of the required bicycle parking requirements of the Land Use Bylaw.
Provide bicycle parking on public property in areas where buildings are built-up to the front property line, such as some downtown buildings.
Plan a system of off-street trails and on-street bicycle routes that connect key activity centres (Downtown, Prairie Mall, GPRC, Coca-Cola Centre).
Dedicate funding to design and construct above-noted facilities. The funding should be set as a percentage of roadway expenditures.

3.4. TRANSIT RECOMMENDATIONS

The 2009 Transportation Master Plan outlined a number of recommendations for the transit system that were since superseded by the 2017 Transit Master Plan. These issues are discussed in ***Module 6: Active Transportation and Transit*.**

3.5. GOODS MOVEMENT RECOMMENDATIONS

The 2009 Transportation Master Plan identified the following staged truck routes for short-term (5-year), medium-term (10-year) and long-term (+10 year) horizons:

- **Short-Term**: Add Dangerous Goods Route to 99 Street north of 132 Avenue and 116 Street north of Hwy 43. Streamline truck routes downtown with removal of the 101 Ave connection between Resources Rd and 102 St.
- **Medium-Term**: Add truck route along the 84 Street extension from 68 Ave to north city limits.
- **Long-Term**: Add truck route along 116 Street from 84 Avenue to south city limits.

These recommendations are discussed in ***Module 7: Trucking and Goods Movement***.

APPENDIX B

Project Engagement Plan

Table of Contents

1. Engagement Context

Grande Prairie is a cultural, economic and industrial hub for northwestern Alberta, serving a vast trade area with a population approximately four times greater than that within the city. In addition to serving greater area needs, the city's population has also surged since 2011, and Grande Prairie is now recognized as one of the youngest cities in Canada. This growth, community and service area context has resulted in tremendous transportation demand that challenges the City to balance travel and growth-related demands.

Though a Transportation Master Plan was completed in 2011, the recent pace of growth has created the need for a new Transportation Master Plan. This new plan is about more than just roads; it's about guiding transportation investments to provide safe, attractive and efficient options for moving people and goods around the city. This plan will recommend future transportation projects, initiatives and investments for the City to implement over short-term (0-5 years), medium-term (5-10 years) and long-term (10-20 years) horizons. These recommendations will address the transportation infrastructure, as well as the policies and bylaws used to manage how people build, live and move around Grande Prairie.

Ultimately, the goal of this project is to develop a new Transportation Master Plan to support transportation needs today, tomorrow and into the future in a way that aligns with the community's vision and priorities. Project engagement will focus on generating broad awareness of the project, identifying the principles and values that should drive the project, then testing ideas to ensure they meet those principles and values.

2. Engagement Goals and Objectives

The main goal of the community engagement is to facilitate development of a new Transportation Master Plan that aligns with the community's vision and priorities for mobility and infrastructure investment. Engagement should foster meaningful discussion so input is valuable to technical analysis, and the resulting technical recommendations should be checked against how well they meet the community's input. Finally, the feedback loop should be clear, so stakeholders understand how their input will be used, if it was used, and why / why not.

To achieve these goals, project information must be easily accessible to the population at large, using plain language, in an engaging format and a variety of avenues to deliver the information. The project webpage will be a key touchpoint for delivering information, providing links to content, surveys and contact information, alongside a clear explanation of what to expect next. Other avenues will support this key touchpoint, including in-person engagement activities, such as "pop-up" booths and events.

Engagement will be broad and diverse, reflecting a range of stakeholder groups. It will also ensure that highly-impacted stakeholders are involved personally. Lines of flexible communication will be opened to key stakeholder groups, such as Alberta Transportation, outside communities, Urban Development Institute (UDI) and others, so they are involved, and have ample opportunity to participate. Whether stakeholders want to passively or actively engage, opportunities will be presented that meet a variety of desired participation levels.

Engagement will also be responsive to evolving stakeholder needs as the project unfolds, adapting approaches as per ongoing feedback. To that extent, engagement success will be measured to gauge what works and what needs adjusting. Measurements will be qualitative and quantitative, building upon various forms of stakeholder and project team feedback to ensure engagement hears, acknowledges and responds to evolving needs.

3. Stakeholder Assessment

This assessment identifies key stakeholder groups, how they may be affected by project decision, how they may affect project decisions and how they may participate. Stakeholders have been categorized as part of City Administration (**Internal**) and separate from City Administration (**External**).

Stakeholder	Internal Stakeholder Needs Assessments
Project Steering Committee	**Possible Impacts of Project Decisions on Stakeholder**: Project recommendations will impact how they do business by setting priorities for the next 10 - 20 years that may supplement or disrupt current work. Specifically, recommendations will impact capital planning, development review and approvals, and levy structures. **Ability of Stakeholder to Affect Project Decisions**: Responsible for key decisions driving project progress from kick-off in Fall 2017 to Council review of recommendations in Fall 2018. **Likely Stakeholder Engagement Expectations**: High degree of involvement in all project decisions. **Ability of the Project to Meet Stakeholder Engagement Expectations:** Certain. Project Steering Committee will have highest level of involvement in the project, reviewing, approving and directing major project decisions at key milestones.
Other Departments	**Possible Impacts of Project Decisions on Stakeholder**: Project recommendations will set priorities and initiatives that may directly affect ongoing projects, planning and workloads. Existing policies and processes may also be impacted, such as prioritization of sidewalk rehabilitation projects, neighbourhood renewal, emergency response times, parks & recreation plan integration, snow clearing or crosswalk control warranting. **Ability of Stakeholder to Affect Project Decisions**: Provide input into and feedback on ideas and project recommendations. **Likely Stakeholder Engagement Expectations**: Desire for involvement may vary depending on how they are impacted by the project. **Ability of the Project to Meet Stakeholder Engagement Expectations:** Certain. A variety of engagement opportunities will be provided to this stakeholder group, ranging from informing (internal updates and webpage) to collaborate (workshop).
Council	**Possible Impacts of Project Decisions on Stakeholder**: Project recommendations will impact their future decisions and the wards they represent. Council will need to decide whether they adopt the project recommendations, then will need to decide whether they approve resulting capital planning and regulatory changes (i.e. levy structure). **Ability of Stakeholder to Affect Project Decisions**: Ultimately responsible for approving and adopting project recommendations. **Likely Stakeholder Engagement Expectations**: Desire for involvement may vary depending on the Councillor. **Ability of the Project to Meet Stakeholder Engagement Expectations:** It may be difficult to meet expectations for a high level of involvement. Council will be informed, but not involved until they are asked to approve/adopt project recommendations. Councillors seeking more involvement will need to work with their wards during engagement.

Stakeholder	External Stakeholder Needs Assessments *(Table 1 of 2)*
Public (General Public, Seniors, Students, Neighbourhood Associations, Cycling Clubs, Outside Communities such as Clairmont and Grande Prairie County No. 1)	**Possible Impacts of Project Decisions on Stakeholder**: Project recommendations will impact how people move around Grande Prairie, how they access Grande Prairie, ands how their civic funds are allocated to shape their community. **Ability of Stakeholder to Affect Project Decisions**: Provide input into and feedback on ideas and recommendations. **Likely Stakeholder Engagement Expectations**: Desire for involvement may range from low to high. **Ability of the Project to Meet Stakeholder Engagement Expectations:** Certain for those expecting Inform to Involve level of engagement, but it will be difficult to meet expectations of those seeking a Collaborate or higher degree of involvement since the greatest opportunity for meaningful and impactful involvement will be during implementation of the recommended priorities from the TMP.
Alberta Transportation (AT)	**Possible Impacts of Project Decisions on Stakeholder**: Recommendations may impact how AT prioritizes future funding in Grande Prairie. **Ability of Stakeholder to Affect Project Decisions**: Responsible for Highway 43X configuration and accesses, as well as funding and projects impacting highway network operation through Grande Prairie. **Likely Stakeholder Engagement Expectations**: Desire for involvement likely to be low except for provincial highway-related issues. **Ability of the Project to Meet Stakeholder Engagement Expectations:** Certain. Given the importance of highways to Grande Prairie's transportation network, a very high level of involvement would be desirable to bring AT into discussions regarding desire for greater community access to Highway 43 X. However, it is likely that AT will prefer a lower level of involvement, providing basic information regarding the bypass corridor and accesses that should be incorporated into the TMP.
Urban Development Institute (UDI)	**Possible Impacts of Project Decisions on Stakeholder**: Project recommendations may impact how they plan, build and finance new developments. **Ability of Stakeholder to Affect Project Decisions**: Provide input into and feedback on ideas and recommendations. **Likely Stakeholder Engagement Expectations**: Moderate degree of involvement. **Ability of the Project to Meet Stakeholder Engagement Expectations:** Certain for low-moderate expectations, but it may be difficult to meet expectations of those seeking a high degree of involvement.

Stakeholder	External Stakeholder Needs Assessments *(Table 2 of 2)*
Chamber of Commerce, Canfor, Trucking Association	**Possible Impacts of Project Decisions on Stakeholder**: Project recommendations may impact how they business, such as customer and employee parking and/or access, as well as goods movement and deliveries for business operation. **Ability of Stakeholder to Affect Project Decisions**: Provide input into and feedback on ideas and recommendations. **Likely Stakeholder Engagement Expectations**: Likely desire moderate to high degree of involvement in decisions that impact them, such as truck route modifications, access requirements, etc. **Ability of the Project to Meet Stakeholder Engagement Expectations:** Certain for expectations of Inform to Involve level of engagement, but it may be difficult to meet expectations of those seeking a higher degree of involvement.
School Boards	**Possible Impacts of Project Decisions on Stakeholder**: Project recommendations may impact how students and employees travel to and from schools. **Ability of Stakeholder to Affect Project Decisions**: Provide input into and feedback on ideas and recommendations. **Likely Stakeholder Engagement Expectations**: Moderate desire for involvement. **Ability of the Project to Meet Stakeholder Engagement Expectations:** Certain for low-moderate expectations, but it may be difficult to meet expectations of those seeking a high degree of involvement.
Accessibility Committee	**Possible Impacts of Project Decisions on Stakeholder**: Project recommendations will impact investment in transportation network accessibility, including but not limited to requirements for accessible design, infrastructure retrofit and community infrastructure and connectivity planning. **Ability of Stakeholder to Affect Project Decisions**: Provide input into and feedback on ideas and recommendations. **Likely Stakeholder Engagement Expectations**: Moderate to high degree of involvement. **Ability of the Project to Meet Stakeholder Engagement Expectations:** Certain for low-moderate expectations, but it may be difficult to meet expectations of those seeking a high degree of involvement.

The following table recommend appropriate levels of engagement based on anticipated stakeholder needs and project ability to meet those needs. This table builds upon the International Association of Public Participation (IAP2) spectrum of participation and the City of Grande Prairie's *ActivateGP* citizen engagement policy. Per *ActivateGP*, the following commitments are made for each level of engagement:

- **Inform:** We will keep you informed.
- **Consult:** We will keep you informed, listen to and acknowledge concerns and aspirations, and provide feedback on how public input influenced the decision.
- **Involve:** We will work with you to ensure that your concerns and aspirations are directly reflected in the alternatives developed and provide feedback on how public input influenced the decision.
- **Collaborate:** We will look to you for advice and innovation in formulating solutions and incorporate your advice and recommendations into the decisions to the maximum extent possible.
- **Empower:** We will implement what you decide.

Stakeholder Group	Inform	Consult	Involve	Collaborate	Empower	Comments
Project Steering Committee				✓		
Other Departments	✓	✓	✓	✓		A variety of opportunities will be provided to facilitate various degrees of input and feedback loops throughout the process ranging from Inform (i.e. webpage information) to Collaborate (i.e. internal workshop).
Council	✓					
Public	✓	✓	✓			A variety of opportunities will be provided to facilitate various degrees of input and feedback loops throughout the process ranging from inform (i.e. webpage information) to involve (i.e. public event).
Alberta Transportation				✓		
Outside Communities	✓	✓	✓			A variety of opportunities will be provided to facilitate various degrees of input and feedback loops throughout the process ranging from inform (i.e. webpage information) to involve (i.e. public event).
UDI			✓	✓		Each stakeholder group will be invited to participate, but the ultimate level of involvement will depend on the specific feedback being sought (i.e. specific issues to be addressed and/or ideas to be tested). A variety of opportunities will be provided to facilitate various degrees of input and feedback loops throughout the process, preferably ranging from involve (i.e. in-person meetings) to collaborate (i.e. direct input into key directions impacting the specified stakeholder group).
Chamber of Commerce			✓	✓		
Trucking Association			✓	✓		
Canfor			✓	✓		
School Boards			✓	✓		
Accessibility Comm.			✓			

4. Key Messages

The following key messages provide a basic overview of the project to communicate what is happening, why it is happening and how it will happen. These messages may need to evolve as the project unfolds and more clarity is developed regarding specific technical directions.

What is the project?

This project will develop a Transportation Master Plan to support Grande Prairie's transportation needs today, tomorrow and into the future. This project is about more than just roads, it's about guiding transportation investments to provide safe, attractive and efficient options for moving people and goods around the city.

The Transportation Master Plan will:

- assess what is currently happening with Grande Prairie's transportation network;
- address what needs to happen as the community continues to grow and evolve; then
- advance an implementation plan with recommendations for projects, initiatives and investments to guide transportation network management and growth.

Why is this project happening?

Grande Prairie is growing and the transportation needs of the community are evolving alongside that growth. The City's last Transportation Master Plan was developed in 2009 and needs updating to reflect how evolving economic activities, development planning and community dynamics are changing transportation needs.

Why is this project important?

Recommendations from the Transportation Master Plan will impact how Grande Prairie invests in transportation infrastructure and manages growth. Some recommendations will impact how the City does business by clarifying transportation links for future neighbourhoods or feeding into the policies and bylaws that guide how the transportation network is managed. Other recommendations will impact how transportation projects are prioritized for funding, including corridor improvements, pathway construction and transit facility investments.

There are many competing needs for how people and goods move around the city, whether it's walking, rolling, bussing, driving or trucking. The Transportation Master Plan will recommend a prioritized implementation plan that balances how the community invests in mobility as it grows.

Who will be involved?

Involvement from the entire community is needed so recommendations from the Transportation Master Plan incorporate and reflect the needs and priorities of residents, visitors, developers and businesses.

How will the community be involved?

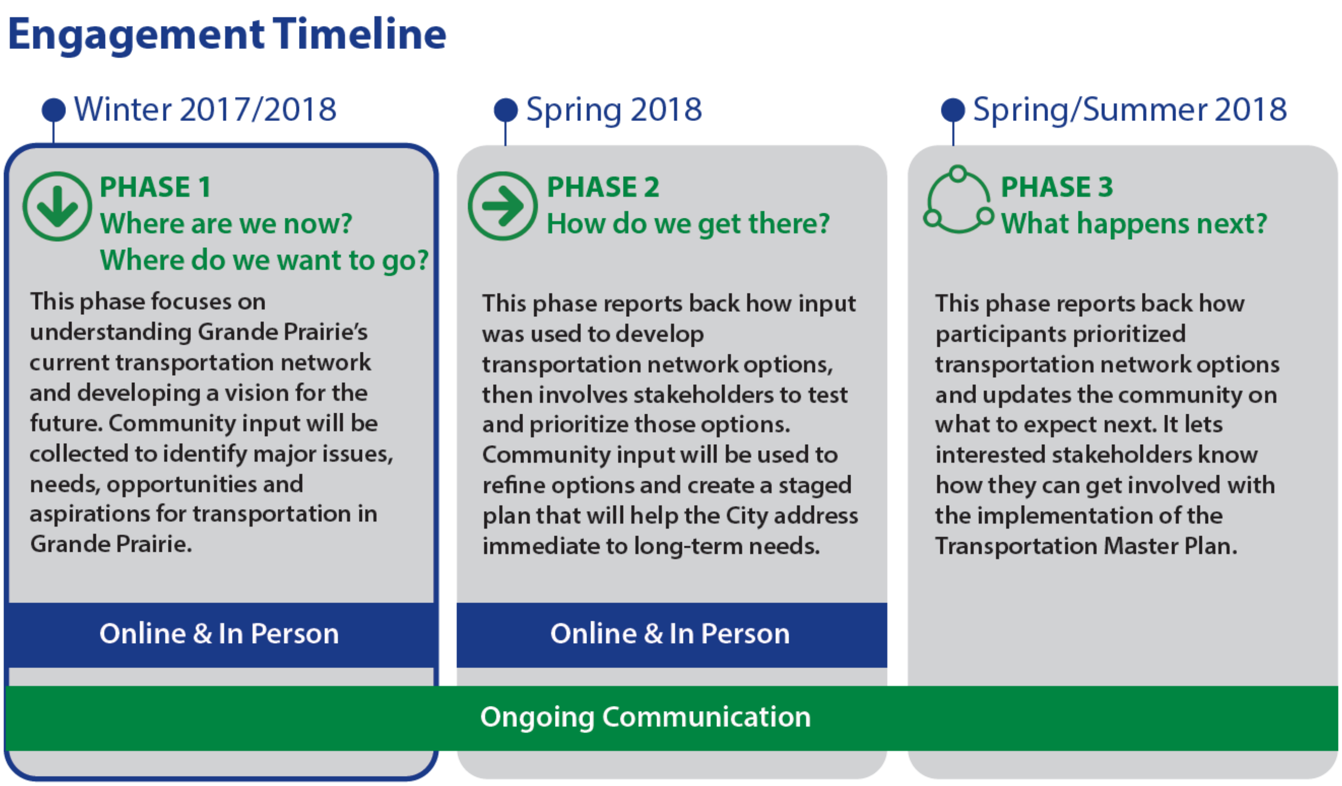
The following three rounds of engagement will occur at critical points in the project.

1. The first round of engagement will initiate the project by seeking input on the key issues to be addressed in the Transportation Master Plan, as well as the key principles to guide the development of the Transportation Master Plan. Discussions will focus on the following questions:
   - What principles should drive transportation investments as Grande Prairie grows?
   - How do people currently move around Grande Prairie?
   - What is working well and what could be improved?
   - What would the community like to see more of / less of?

2. The second round of engagement will test and prioritize the ideas that were developed per input from the first round of engagement. The discussion will likely focus on the following questions:
   - These are the key guiding principles heard at the beginning of the project. Is anything missing?
   - Do these ideas and options meet the key guiding principles identified at the beginning of the project?
   - Are there other ideas and options that meet the key guiding principles and should be explored?
   - How should these options be prioritized, and why?

3. The third, and last, round of engagement will not seek community input, but rather will present a Transportation Master Plan that is built upon the prioritized and refined options identified during the last round of engagement, outline how community input was (or wasn't) used and why, then let the community know what to expect next as the City moves towards implementation of the Transportation Master Plan.

How long will this project take?



5. Engagement Activities, Resources and Timelines

Engagement activities, resources and timelines for each round of engagement are identified herein. Discussions, timelines, tools and activities may need to evolve as the project unfolds to ensure that the right stakeholder groups are addressed in the most appropriate manner. Further, in addition to the planned engagement activities led by McElhanney, it is assumed that the City's Project Steering Committee will utilize engagement materials for other engagement activities as opportunity arises, including but not limited to the following:

- Project presentations and roundtable discussions at planned stakeholder group meetings (i.e. Chamber of Commerce, UDI, Trucking association, etc.).
- Informal "pop-up" booths at community events.
- Information tables at other City engagement events.

Ongoing meetings (up to 5), phone and email communications with key stakeholders groups identified by the City (CN, Canfor, AT, Chamber of Commerce, Trucking Association, UDI, School Board) are anticipated throughout the life of this project. These meetings and communications are not scheduled within this Project Engagement Plan, but instead are flexible to meet the individual needs of each group since it is likely they will have different expectations of involvement throughout different phases of the project.

5.1. Feedback Loop

Feedback from each round of engagement will guide the next phase of analysis in the following manner:

- **Pre-Engagement:** The pre-engagement survey will seek input on how the community would like to be engaged in the project. Input will be incorporated into the Project Engagement Plan to guide project engagement planning and activities. An infographic summary of feedback will be developed and posted to the project webpage to let the community know how their input was used. Future engagement activities will stand as proof of how public input was used.

- **Round 1:** This round of engagement will seek for input regarding *Where are we now and where do we want to go?* Input from the round of engagement will inform the key issues that are addressed in the Transportation Master Plan and will develop the key principles that guide development of alternatives to address how the community will invest in mobility as it grows. Input will be captured in a *What we heard* report that is made available on the project webpage.

- **Round 2:** This round of engagement will seek input regarding *How do we get there?* Engagement will commence with an explanation of how input from Round 1 engagement was or wasn't used to develop options and why so the community understands the value of their feedback and where it was incorporated. The key guiding principles developed during Round 1 will be confirmed with the community to ensure nothing was missed. Once guiding principles are confirmed, input will be sought regarding options and priorities that were developed using Round 1 input. Feedback received during this round of engagement will be used to refine and prioritize recommendations for the Transportation Master Plan, and the final recommendations will be weighed against how well they align with the key guiding principles developed with community.

- **Round 3:** This round of engagement will focus on presenting the project recommendations, including an outline of how they incorporate (or don't incorporate) feedback from the community and why.

The proposed feedback loop, illustrated below, will need to be responsive to evolving community engagement needs as the project unfolds and may be modified throughout the project accordingly.

Figure 1 - Feedback Loop

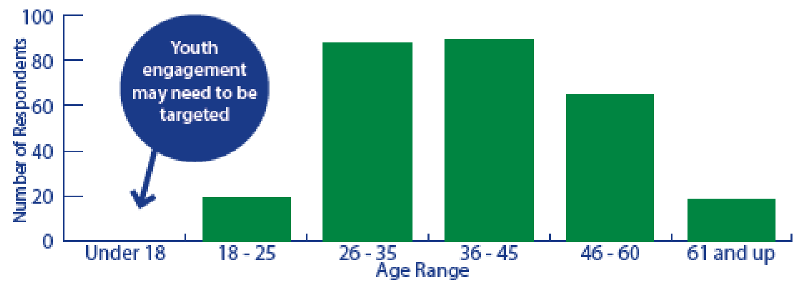
5.2. Pre-Engagement Survey Results

Hosted on the City's Transportation Master Plan webpage and promoted through the City's social media streams, a pre-engagement online survey was launched on December 4, 2017 and remained open for 10 days. The intent of the pre-engagement survey was to collect input on how people in Grande Prairie wanted to be involved with the Transportation Master Plan. This input has been incorporated into this Project Engagement Plan to guide project planning and engagement activities.

Number of Participants

309 COMPLETED SURVEYS

About Participants



Q1: HOW DO YOU WANT TO BE INVOLVED?

Online Survey (By far the most popular option)	91%
Email Updates (147 emails collected)	31%
Pop-Up Booths at Local Events	19%
Focus Groups	18%
Drop-In Information Sessions	17%
Workshops	15%

Q2: WHAT IS THE BEST WAY FOR YOU TO LEARN ABOUT TRANSPORTATION MASTER PLAN ENGAGEMENT OPPORTUNITIES?

The City's Facebook Page (Takes advantage of a popular platform)	62%
Newsletter Email Updates	55%
The City's Website	42%
Radio Ads	30%
Road Signs (Upcoming Workshop)	19%
Neighbourhood Associations	19%

5.3. Round 1 – *Where are we now and where do we want to go?*

What will be asked?

- What principles should drive transportation investments as Grande Prairie grows?
- How do people currently move around Grande Prairie?
- What is working well and what could be improved?
- What would you like to see more of/less of?

How will feedback be used?

Feedback from this round of engagement will directly impact technical work completed in Phases 1 and 2 of the project (refer to Project Management Plan for technical phasing). Input from the round of engagement will inform the key issues that are addressed in the Transportation Master Plan and will develop the key principles that guide development of alternatives to address how the community will invest in mobility as it grows. Input will be captured in a *What we heard* report that is made available on the project webpage and will be reviewed at the beginning of the next round of engagement so people understand what happened with their feedback.

What is the timeline?

Engagement planning and activities will begin in December 2017 with submission of draft engagement outline and end in April 2018, including the following sequence of events:

- **Dec 2017 to early-Jan 2018:** Engagement Planning
- **Jan 22 - Feb 2:** Public engagement activity and online survey to identify current issues, needs and aspirations that should be addressed by the project.
- **Feb 2 - Mar 9:** Incorporate public feedback into traffic model.
- **Mar 15:** Half-day internal workshop to test traffic model results, brainstorm ideas to address gaps and future needs, then identify key attributes and functions to be considered when evaluating options.

The above timeline may shift if additional origin-destination data collection is pursued, as this will impact traffic model development timelines and move the internal workshop to a later date.

What activities and tools will be used?

Activities:

- Webpage update, including online survey.
- Public event (open house).
- Internal workshop.

Tools:

- Advertising: Social media, radio, etc.
- In-person activities.
- Webpage update with engagement content and information.
- Online Survey.
- *What We Heard* summary.

Round 1 Activities	Description and Responsibility	Timeline (2018)
Engagement Materials	**McElhanney** will develop/submit engagement content (public activity plan, workbook outline, ad/webpage/survey content).	Dec 13
	City will review and provide feedback to McElhanney.	Conference Call: Dec 20
	McElhanney will finalize materials and submit to City.	Jan 10
Engagement Planning	**City** will book public engagement venue / address logistics.	Dec 20
	City will distribute public engagement ads through desired platforms.	Jan 10 - 19
	City will manage public engagement social media campaign.	Jan 22 – Feb 2
	City will identify representatives for internal workshop, book venue/address logistics and extend invitations.	Jan 22 – Mar 10
Engagement Facilitation	**City** will update project webpage.	Launch: Jan 22
	McElhanney will facilitate and document public event.	Jan 24
	McElhanney will monitor and collate online survey feedback.	Jan 22 – Feb 2
	McElhanney will facilitate and document internal workshop.	Week of Mar 12
Engagement Feedback Loop	**McElhanney** will develop/submit draft *What We Heard* engagement summary alongside *Tech Memo #1 (Existing Conditions, Issues, Aspirations and Next Steps)*	Feb 16
	City will review and provide feedback at Steering Committee Meeting #3.	SCM#3: Feb 28
	McElhanney will develop/submit *Tech Memo #2 (Future Needs, Opportunities and Next Steps)* incorporating internal workshop input.	Mar 30
	City will review and provide feedback at Steering Committee Meeting #4.	SCM#4: Apr 11

5.4. Round 2 – *How do we get there?*

Discussions, timelines, tools and activities identified for this round of engagement are preliminary and will need to adjust to evolving needs as the project unfolds and community expectations become clear.

What will be asked?

- These are the key guiding principles we heard at the beginning of the project. Is anything missing?
- Do these ideas and options meet the key guiding principles identified at the beginning of the project?
- Are there other ideas and options that meet the key guiding principles and should be explored?
- How would you prioritize these options and why?

How will feedback be used?

Feedback from this round of engagement will directly impact technical work completed in the final Phase 3 of the project (refer to Project Management Plan for technical phasing). Engagement will commence with an explanation of how input from Round 1 engagement was or wasn't used to develop options and why so the community understands the value of their feedback and where it was incorporated. The key guiding principles developed during Round 1 will be confirmed with the community to ensure nothing was missed. Once guiding principles are confirmed, input will be sought regarding options and priorities that were developed using Round 1 input. Feedback received during this round of engagement will be used to refine and prioritize recommendations for the Transportation Master Plan, and the final recommendations will be weighed against how well they align with the key guiding principles developed with community.

What is the timeline?

Round 2 engagement planning and activities will begin at the end of April 2018 (with submission of draft engagement outline) and end at the beginning of July, including the following sequence of events:

- **Apr to mid-June:** Engagement Planning
- **mid-June:** Public engagement activity, pop-up booth at GPRC or Municipal Government Day (June 13) and online survey to test and prioritize ideas.
- **early-July:** Review feedback and identify key directions for project recommendations.

What activities and tools will be used?

Activities:

- Webpage update, including online survey.
- Public event, possibly aligned with Municipal Government Day.
- GPRC and/or Municipal Government Day pop-up booth(s).

Tools:

- Advertising: Social media and other avenues at discretion of City.
- In-person activities.
- Webpage update with engagement content.
- Online survey.
- *What We Heard* summary

Round 2 Activities	Description and Responsibility	Timeline (2018)
Engagement Materials	**McElhanney** will develop/submit engagement content (public activity plan, workbook outline, ad/webpage/survey content).	May 11
	City will review and provide feedback to McElhanney	May 23
	McElhanney will finalize materials and submit to City.	Jun 6
Engagement Planning	**City** will book public engagement venue / address logistics.	May
	City will distribute public engagement ads through desired platforms.	late-May / early-June
	City will plan GPRC and/or Municipal Government Day pop-up booth, incl. staff facilitators.	late-May / early-June
	City will manage public engagement social media campaign.	late-May / early-June
Engagement Facilitation	**City** will update project webpage.	Launch: June 13
	McElhanney will facilitate and document public event.	week of June 18
	McElhanney will monitor and collate online survey feedback.	Jun 13 - 27
	City will facilitate and document pop-up booth (GPRC and/or Municipal Government Day).	June 13
Engagement Feedback Loop	**McElhanney** will develop/submit draft *What We Heard* engagement summary.	first week of Jul
	Project Team will review feedback and direction for project recommendations.	second week of Jul

5.5. Round 3 – *What happens next?*

Discussions, timelines, tools and activities identified for this round of engagement are preliminary and will need to adjust to evolving needs as the project unfolds and community expectations become clear.

What will be asked?
The third, and last, round of engagement will not be seeking community input, but rather will present the prioritized options identified during the last round of engagement, refined into a strategic Transportation Master Plan, outline how input was (or wasn't) used and let the community know what to expect next as the City moves towards implementing the Plan.

What is the timeline?
Round 3 engagement planning and activities are expected to begin in August 2018 with submission of draft engagement outline and end in mid-September when the recommended Transportation Master Plan is presented to Council. The following sequence of events is expected:

- **Early August:** Engagement Planning
- **Mid-September:** Council presentation and public information campaign to let the community know what happens next.

What activities and tools will be used?

Activities:

- Webpage update.
- Council Presentation.

Tools:

- Advertising: Social media and other avenues at discretion of City.
- Council Presentation, public agenda.
- Webpage update.

Round 3 Activities	Description and Responsibility	Timeline (2018)
Engagement Materials	**McElhanney** will develop/submit engagement content (webpage update content, presentation outline).	Early August
	City will review and provide feedback to McElhanney.	August
	McElhanney will finalize materials and submit to City.	first week of September
Engagement Planning	**City** will schedule Council presentation.	August
	City will manage public engagement social media campaign.	September
Engagement Facilitation	**City** will update project webpage.	Launch: early September
	McElhanney will present to Council.	October

6. Share Kit

This share kit is intended to provide options for social media links to the City's project webpage and/or online survey. Options are provided based on each round of engagement corresponding to the expected desires for involvement and feedback. This share kit provides the City with options to use as necessary, distributing through typical avenues of communication and contacts, and modifying content as desired. The content will likely need to be modified as the project unfolds to evolve alongside feedback and engagement needs.

Period	Tweet / Post Options
Pre-Engagement Survey (Nov 2017)	• Grande Prairie is *On The Move*. How do you want to be involved? LINK TO SURVEY • Let us know how you want to be involved with the Transportation Master Plan. LINK TO SURVEY • How do you want to be engaged? The City wants to hear from you. LINK TO SURVEY
Round 1 Engagement (Jan 2018)	• Grande Prairie is *On The Move*. Let's talk about how you move around Grande Prairie. LINK TO WEBPAGE • Want to have your say? Tell the City what you think about getting around Grande Prairie. LINK TO WEBPAGE • The City is creating a Transportation Master Plan and wants to hear from you. LINK TO WEBPAGE • Grande Prairie is *On The Move*. Share your thoughts about transportation in Grande Prairie. LINK TO WEBPAGE • Stuck in a rut? Let's talk about how you move around Grande Prairie. LINK TO WEBPAGE • Planning for the future includes you. Let us know what you think about transportation in Grande Prairie. LINK TO WEBPAGE
Round 2 Engagement (Spring 2018)	• Grande Prairie is *On The Move*. Let's test ideas for moving around the city. LINK TO WEBPAGE • Planning for the future includes you. Let us know what you think about transportation in Grande Prairie. LINK TO WEBPAGE • The City is creating a Transportation Master Plan and wants to hear from you. LINK TO WEBPAGE • Stuck in a rut? Let's talk about how you move around Grande Prairie. LINK TO WEBPAGE
Round 3 Engagement (Fall 2018)	• Grande Prairie is *On The Move*. Let's talk about what happens next. LINK TO WEBPAGE

7. Lessons-Learned and Potential Risks

Through *ActivateGP*, the City of Grande Prairie has promised to ensure processes are well designed, open, inclusive and respectful. Delivering on that promise requires learning from previous engagement processes and identifying potential risks so the communication and engagement strategy may anticipate and mitigate them.

7.1. Lessons-Learned

Per the project kick-off meeting, the items listed below were identified by the City's Project Steering Committee as lessons-learned from past projects that may be applied to the Transportation Master Plan (documented in meeting minutes from October 18, 2017). Resolutions have been developed to address each of the identified issues and ensure lessons-learned are incorporated into the Project Engagement Plan. Resolutions and actions will need to be sufficiently flexible to evolve alongside stakeholder feedback as the project unfolds.

- Storm Water Management Study was very dry, pertained to only one area and only one person showed up to the open house. In the past, all engagement has been driven by engineers who can't communicate in a way that engages the public.
    - RESOLUTION: Ensure content is in plain English and engaging, focusing on how information or options will impact the audience.
- We expect stakeholders to come to us all at the same time. This doesn't work because they won't speak freely with each other around. Planning tried a dual meeting format where same day meetings occurred with agencies, AT, business, affected land owners, etc.
    - RESOLUTION: Provide a variety of opportunities and formats for key stakeholders to participate, including email, phone conversation and in-person meetings as opportunity arises. The City's Project Team may also follow-up with key stakeholder groups, particularly in-person, to ensure communication remains open and accessible.
- If engagement activities are held during the day, people work and may not show up. Activities and activity times need to be more flexible.
    - RESOLUTION: A variety of participation opportunities will be provided to address varying involvement needs, ranging from informing (passive), online engagement and in-person engagement. Opportunities will be responsive to feedback from the Pre-Engagement Survey to build upon the engagement avenues identified as preferred. Further engagement opportunities will be responsive to ongoing community feedback as the project progresses.
- Stakeholders can feel like the City has already made the decision before seeking input.
    - RESOLUTION: Project engagement will begin early to ensure that community input drives technical analysis. Input from each round of engagement will be documented and what was (or wasn't) used will be explained alongside an explanation why. Further, each round of engagement will begin by explaining what was heard earlier, how it was (or wasn't) used and why so there is clarity regarding the use and value of feedback.

- People need to buy into the vision for the future Grande Prairie… and this is what can happen if we maintain our current trajectory. But if we propose change that is too radical, it will scare people away (developers, etc.). Overall, people need to be aware of our options.
    - RESOLUTION: Changes will be founded in Key Guiding Principles developed by and with the community at the beginning of the project. Recommendations will be checked against how well they meet the Key Guiding Principles to ensure they reflect and meet the community's input. Implementation of Complete Streets (downtown) was not embraced by the community even though they had input into it.
- Some people were upset by reducing lane widths from 4m to 3.5m in the downtown. Though roads remained wide enough for two vehicles to pass, people would drive down the middle of the road and complain that they could not make turns.
    - RESOLUTION: Effort will be made to clearly and visually explain how actions and recommendations will impact people's everyday lives, so the context and change is understood. This builds upon the earlier resolution to ensure all communications and content are in plain English and focus on how the information (or recommendations) will impact the audience.
- The Operations Department has concerns with change (i.e. reduced road width can change how they plow road, Transit opposed roundabouts in downtown, etc)
    - RESOLUTION: An internal workshop will be held to verify issues identified by the public during early engagement, confirm key guiding principles that will drive development of options, then identify opportunities and options to be explored, as well as what those may mean to each department.

7.2. Potential Risks

Per the project kick-off meeting, the items listed below were identified by the Project Steering Committee as risks that may impact this project. Resolutions have been developed to address each of the risks. Risks and resolutions will need to be sufficiently flexible to evolve alongside stakeholder feedback as the project unfolds.

- Apathetic but critical public (especially keyboard warriors)
    - RESOLUTION: Engagement materials will try to emphasize why the discussion matters to the community, how the project affects them, and how they may affect the project (if they choose). Opportunities for input are easy to reach and project information is presented in an appealing way that facilitates a positive dialogue.
- History / issues with change.
    - RESOLUTION: Change is difficult and it is important to be honest about it. Engagement content will strive to ensure that potential changes are clearly explained so the community understands what is involved and how they will be impacted. Establishing understanding will facilitate appropriate expectations when it is time to implement recommendations.
- Internal issues amongst City Administration (change resistance, suspicious, insular).
    - RESOLUTION: The internal workshop will aim to bring different groups together to discuss needs and try to develop and understanding of trade-offs associated with different options. As with public engagement, consensus will not be the goal, but rather identifying solutions with clear reasoning and compromise that is understood.

- New council with unknown agendas and/or inexperience / lack of understanding / desire to micromanage.
  - RESOLUTION: Council will be kept informed of what is happening at each stage of the project with a Project Briefing Note. They may participate in engagement activities alongside the community and will be kept informed of what the community is saying with the *What We Heard* summaries.
- Level of Service C traffic operation is seen as something bad by general public.
  - RESOLUTION: Engagement will ask the community to prioritize funding efforts based on key guiding principles. Honest discussion regarding limited resources for project funding and the trade-offs that must be considered when setting priorities will help to shift the discussion towards compromise, balance and what that means.
- Timeline (capital budget and offsite levy reliant on TMP deliverables).
  - RESOLUTION: Capital Budget and offsite levy milestones will be incorporated into the project schedule to ensure that recommendations are sufficiently developed to inform these other processes, as needed.
- Public endorsement of recommendations required.
  - RESOLUTION: Engagement will not focus on building consensus, but rather on building awareness of what is happening and what that means for the community, such that the reasons for recommendations or specific actions are clearly understood. Further, input will be transparently incorporated into recommendations to allow people to see how their feedback was (or wasn't) used and why (or why not).
- Expectations of TMP outcomes (some fixation on train yard flyover, integration of road network with SW Resources Rd).
  - RESOLUTION: Early project engagement will focus on identifying key issues to be addressed, with follow-up engagement to ensure nothing was missed.

This Project Engagement Plan will be reviewed with the City after each round of engagement (Pre-Engagement Survey, Round 1 and Round 2) alongside review of the *What We Heard* summaries to ensure that engagement planning, activities, tools, risks and resolutions reflect evolving needs as the project unfolds.

8. Measures of Success

The following measures of success will be monitored and updated as the project progresses to adapt to evolving community and project needs.

Measures of Success	
What are key indicators of success for the project engagement process?	Integrity of the feedback loop is maintained. Recommendations meet the key guiding principles developed with the community. Engagement participants report that engagement events were useful and they felt heard. Engagement feedback is diverse and reflects a range of stakeholder groups. Community is generally aware of the Transportation Master Plan project.
What will be measured or evaluated about the project engagement process?	Exit surveys at events. • **At least 80 percent of event participants report being satisfied with the session.** • **At least 80 percent of event participants report that they felt their input was heard.** Engagement participation. • **At least 300 people will participate in each round of engagement, including in-person and online activities.** • **Participation is broad and captures feedback from identified stakeholder groups.** Project team feedback. • **The project team feels that engagement feedback was representative of community interests / differing perspectives and provided the information needed to further the project.**
When and how will these elements be measured?	After each round of engagement.
What will be done with the results of the evaluation?	Apply lessons-learned to improve the next round of engagement.

APPENDIX C

Project Engagement Results

Phase 1 Stakeholder Meetings

The Phase 1 stakeholder meetings were held in Grande Prairie from March 19 to 22, 2018. The City held several additional meetings afterwards, which have also been included below.

1. Chamber of Commerce / Urban Development Institute

The following feedback is from the combined stakeholder group meeting with the Chamber of Commerce and Urban Development Institute (UDI), held on Monday, March 19 at 2 pm in Centre 2000.

Attendees:

- Becky Bozarth, Chamber of Commerce
- Cindy Simigan, Chamber of Commerce
- Tom Pura, Chamber of Commerce
- Cheryl Budjack, Chamber of Commerce
- Dan Wong, Chamber of Commerce
- Fred Grandmaison, Chamber of Commerce
- Robin Hutchinson, City of Grande Prairie
- Dena Marth, UDI
- Bob Leslie, UDI
- Glenn Stanker, McElhanney
- Katherine Clark, McElhanney

Notes:

1. The movement of traffic north to south is a significant flow of traffic through the City. The movement of traffic east to west is lower, and is inhibited by the railway. However, this is where growth is expected.
2. The City should develop an internal ring road using 68th Ave, 116th St, 116th Ave and 92nd St, in addition to the proposed external ring road.
3. Some concerns with the existing road network include:
   - Significant delays for vehicles turning onto 108 Street (Highway 40) from the Pinnacle Ridge neighbourhood at peak hours. Also safety concerns for pedestrians crossing 108 Street to get to the Community Knowledge Campus.
   - Drivers appear to disrespect the pedestrian signal at 105th Street and 100th Avenue. Signalize?
   - Some traffic signals appear to have insufficient advance green times.
   - The downtown couplet has 99th Avenue eastbound as a high speed, three lane road with relatively few businesses, while 100th Avenue westbound is slower speed with more businesses. Can westbound traffic be diverted, potentially to the north? Can the transition to Resources Road be improved?
   - Mission Heights is being used as a shortcut to Highway 40 south.
   - Congestion on Highway 43 at 108th Street. As of January 1, 2019, the City will assume jurisdiction for Highway 43 when the new section of the Highway 43X ring road is complete.
4. The congestion on Highway 40 south of town is problematic all day, but especially during peak hours; this is the only route to the oil fields south of town. The slow moving traffic also contributes to numerous rear end collisions. Train and truck traffic in Grande Prairie will increase substantially due to the Gold Creek industrial development south of the city. 116th Street may be a good alternative truck route, and could connect to Highway 40 at the “correction line” (35th Avenue). This would require negotiation with the County.

5. 68^{th} Avenue has the longest rail crossing delays in Grande Prairie. The delays on 100^{th} Avenue are shorter, but are more critical due to the proximity to Downtown.
6. Road rehabilitation on major routes could help improve traffic patterns. For example, some people avoid 100^{th} Street, and instead divert at 132^{nd} Avenue to 102^{nd} Street.
7. New residential development around the new hospital will be desirable. However, the northwest quadrant of the city is likely to have transportation problems given the expected development. Suggestions include:
   - Extend 107th Ave at the hospital to 108 Avenue at 124^{th} Street near the Airport.
   - Relocate the entrance of the College.
8. The City will likely see densification of the existing residential areas.
9. There is good east-west capacity on 132^{nd}, 100^{th}, and 68^{th} Avenues.
10. Parking Downtown is plentiful and low cost; some drivers just have to walk a little longer. A new pay parking system is under way to improve pay options.
11. There is general support for more roundabouts and fewer traffic signals.
12. There is desire to keep bike paths off the roadway. Suggestions/comments include:
    - The most expensive place to put a bike lane is on the roadway.
    - The cycling network is not connected to destinations. More connections to Bear Ck needed.
    - Use Muskoseepi as a cycling connection instead of the road network.
    - 102^{nd} St bike lane has been created with planters as barricades, which is problematic.
13. Examples of good multi-use trails are on:
    - 84^{th} Avenue west of 108 Street to the Cemetery
    - 68^{th} Avenue
    - 92^{nd} Street
    - Resources Rd
14. Transit usage is low in Grande Prairie, and service is generally considered slow. There is a local desire see students use public transit more. Other comments:
    - The distance between transit stops and residential homes is an obstacle.
    - Heated transit stops and advance time notification would be beneficial for a winter city.
    - Transit hubs are subject to NIMBY. An exchange is needed Downtown, potentially behind mall.
    - UPASS idea supported.
15. Bus stops should be connected to the sidewalk/pathway network.
16. Suggested areas requiring further study: Functional study for Highway 40.
17. Pedestrian countdown signals are appreciated.
18. Key road connections to the northern communities (108 Street and 92 Street) are unpaved north of 132 Avenue. However, these roads are of little benefit to the residents of Grande Prairie.

2. Alberta Transportation

The following meeting was held by the City of Grande Prairie with Alberta Transportation on January 25, 2018.

Attendees:

- Danny Jung, Alberta Transportation
- Kristine Donnelly, City of Grande Prairie
- Robin Hutchinson, City of Grande Prairie
- Glenn Stanker, McElhanney
- Lee Thomas, McElahnney

Notes:

1. The new northwest ring road will be named Highway 43X for now. All connections to the new ring road have been agreed, except for the first one north of Highway 43. The EMME model should analyze this connection.
2. After the Highway 43X connection is finished, Alberta Transportation will decommission the old Highway 43 within the limits of Grande Prairie. However, Range Road 70 will remain a provincial road until the interchange on Highway 43 is completed; the connection will be signalized for the time being. Alberta Transportation will also keep the section of Highway 43 through Clairmont.
3. Alberta Transportation will transfer $5 Million per year for four years ($20 Million total) to the City as part of the decommissioning of Highway 43. A study by Opus has identified some ideas on how this funding can be spent.
4. There are no development applications along the new Highway 43X alignment at this time; the land is largely unserviced at this time.
5. The functional planning for the southwest right road was completed in 2010. This road can be called Highway 40X for now. There are no plans to construct it in the foreseeable future. However, the EMME model should analyze the connections to this route also.
6. Commercial and industrial development south of town is driving the need for the southwest ring road.
7. The ring roads on the east side of Grande Prairie are being considered by the County; Alberta Transportation has not been involved. The EMME model should analyze the east side ring road as well, to the extent it is needed to accommodate projected traffic volumes.
8. The Hughes Lake ASP has not yet been approved by Alberta Transportation.
9. The weigh scales at Highway 43/Highway 43X intersection could potentially be relocated to Highway 40, south of Grande Prairie.

3. Catholic and Public School Districts

Representatives from the Public and Catholic School Districts were present for this meeting, held on Tuesday, March 20 at 9:30 am in the City Service Centre. Both Districts would like to see a reduction in students being driven to school and an increase in students walking to school. Parent-comfort in students' proximity to traffic and safe routes to school were significant concerns.

Attendees:

- Geoff Baccon, Public School District
- Randy Lester, Catholic School District
- Sandy McDonald, Superintendent Catholic School District
- Karl Germann, Superintendent Catholic School District
- Robin Hutchinson, City of Grande Prairie
- Glenn Stanker, McElhanney
- Katherine Clark, McElahnney

Notes:

1. There are 18 public schools with 8400 students; 1/4 of students are bussed and 1/3 of total student body is eligible for bussing. Bell times are 8:10 AM and 3:00 PM.
2. There are 10 Catholic schools with 4200 students; 2300 students applied for bussing. Bell times are 8:40 AM and 3:16 PM.
3. School buses moving travelling north/south have challenges at Wapiti Rd (108 Street/Hwy 40), 116 St, and 84 Street. Students have been hit crossing 108 Street coming out of Pinnacle.
4. There is a strong desire to see a southwest bypass.
5. New schools are identified for development on the west side of Grande Prairie.
6. Eligibility criteria for school bussing includes:
   - Students Kindergarten to Grade 3 living more than 1.7km from school
   - Students Grade 4 and higher living more than 2.4km from school
   - Students in any grade crossing a major arterial road

   If there is extra capacity on the bus, kids living within the catchment can have bus service on user pay basis. Also, students can go to schools outside their catchment, but have to manage their own rides.
7. Many kids are driven to school by their parents, creating traffic congestion at bell times. The School Districts would like to discourage this by improving the safety of the routes to school. Specifically:
   - Developing more (and wider) sidewalks, crosswalks, pedestrian signals along routes to schools.
   - Connect schools to residential areas with paths.
   - Build off-street pathways to prevent children walking along major roadways.
   - Improve snow and ice clearing on routes to school.
   - Increase the distance of the student drop-off zones from the schools, which also reduces congestion around the schools.
   - Ensure ASPs emphasize the need to coordinate pathway connections early in development.
8. Snow removal is critical for school transportation as narrow roadways complicate bus pickup/dropoff.
9. The School Districts would like to get students in grades 9-12 on public transit to increase the available capacity on the yellow buses for students in grades K-8. UPass exists in other Alberta cities.
10. The 2017 *Transit Master Plan* identified transit hubs that are different than hubs for schools. The school-special services are being discontinued with the new transit plan. The School Districts would prefer four quadrant hubs for residential destinations. The Prairie Mall and Downtown hubs don't meet the needs for school students going home.

11. The School Districts are concerned that anticipated problems with the traffic control and safety (e.g. at new schools) are not addressed until evidence of the problems is available. The School Districts would instead like to see problems addressed pro-actively, based on predicted traffic patterns in new areas. It is also important to set aside appropriate areas for schools in the Area Structure Plans.
12. Knowledge Way should be made free-flow inbound to prevent vehicle queuing on 68th Avenue. A second access to 68th Avenue was not permitted. The Campus is considering raised crosswalks.
13. School Boards would like a higher rate of parking spaces stipulated in the City Bylaws because there are not typically enough spaces to accommodate staff and students. Parking is pushed onto the street.
    - Primary problem is parking for staff; secondary problem is parking for students.
    - The District recognizes that meeting student parking demand is contradictory to goal of increasing walking to school.
    - Congestion and "Safe Route to School" issues at each school will have to be resolved individually, and in consultation with the School Councils and parent groups.
    - Dedicated bus pullouts work well where allowed, but are not being implemented anymore. More dedicated drop-off areas for parents are desired.
    - The solutions involve a combination of Engineering, Education, and Enforcement.
    - Also need to focus on accessibility.
14. Trucks are parking next to Grande Prairie Christian School on 110 Street, limiting sight lines of those leaving the property. Consider instating parking restriction in this area, especially for trucks.
15. Grande Prairie Composite High School is intended to be replaced by a school on a smaller lot (i.e. from 9 acres to 6 acres).
16. The 68th Avenue train is a significant concern. CN is running longer trains with increasing frequency due to fracking plant activity in Wembley. This is exacerbating the delays.
17. Ecole Montrose School and Alexander Forbes school are the most challenging public schools for transportation. Ecole St. Gerard and Mother Teresa are the most challenging Catholic schools.

4. Council Session

All councillors except Councillor Friesen were present for this meeting. There was a strong focus on the future of Grande Prairie, rail crossings, and emerging transportation technologies, such as autonomous cars. The Council Session was held on Tuesday, March 20 at 2:00 pm at City Hall.

Attendees:

- Mayor Bill Given
- Councillor Blackburn
- Councillor Bressey
- Councillor Clayton
- Councillor Minhas
- Councillor O'Toole
- Councillor Pilat
- Councillor Theissen
- Robin Hutchinson, City of Grande Prairie
- Kristine Donnelly, City of Grande Prairie
- Lydia Sadiq, City of Grande Prairie
- Glenn Stanker, McElhanney
- Lee Thomas, McElhanney
- Katherine Clark, McElhanney

Notes:

1. Rail crossings at 116 St and 68th St are significant problems:
   - There is desire to see grade-separation of the rail crossing, or to have the rail moved out of town. The costs for each should be compared at a high level.
   - CN Rail traffic has been increasing and trains are getting longer.
   - CN completed significant upgrades to their yards within the last 2 years (approx. $20M) and may not be receptive to change in the area.
   - There is some concern with delays to emergency vehicles / emergency response times due to train crossings. Anecdotally – delays may reach upwards of 10-15 minutes, but follow-up is required from Emergency Response Services to confirm.
   - There is a pattern of trains backing up / pulling forward across 100 Ave/99 Ave multiple times to load train cars into the yard. This causes frequent corridor blockages by slow-moving trains and motorists have adopted a behaviour of stopping when they see the crossing system is active (crossing signals flashing), looking for cars, then crossing the railway if they are not in immediate danger. There is safety concern with this motorist behaviour.
   - Council requested clarification regarding the length of time that trains are allowed to block a road at crossings.
2. There is a desire to have a southwest bypass to help alleviate congestion.
3. Maintenance concerns were noted with potholes from 156 Ave to Highway 43. These potholes are viewed as a safety concern because avoidance manoeuvres can conflict with other road users.
4. Turning trucks are causing extensive rutting / asphalt rutting at Wapiti Road and 84 Avenue. Council questions whether some intersections should have greater structural requirements to accommodate turning truck traffic along truck routes. Suggestion to include statement in TMP regarding need for augmented pavement structural requirements where there is significant stop-n-go and/or turning movements of heavy vehicles (trucks or buses) along truck and bus routes.
5. There is desire to see active transportation and road solutions in the capital project recommendations.
6. Council wants to see some flexibility in the recommendations to be able to focus on areas of interest even if changes to these areas are not warranted.
7. The County is supportive of development on the east side of Grande Prairie.
8. Future growth is predicted in the direction of the airport. Consider a Hospital-Airport Connector.

9. There is desire to see a commuter loop, LRT or monorail in the future.
10. There are notable concerns about the impact that autonomous vehicles might have on the transportation network – will they alleviate congestion? will they change how we use existing facilities? to what extent should we plan for autonomous vehicles? This context should be touched upon in the TMP.
11. There is interest in how smart transportation technologies, such as Bluetooth travel monitoring and smart streets, may be incorporated to improve system management.
12. There is support from council for more roundabouts throughout the community.
13. There is desire to understand the impacts of County development on the City's transportation network. The County is asking for 108 Street to be paved.
14. Aesthetics of high visibility industrial areas should be considered along major corridors.
15. 84th Avenue is expected to extend west, as development continues.
16. The impacts from the Canfor Haul Road should be considered and evaluated.
17. The existing yellow bridge across Bear River (near 93 Ave) should be upgraded/improved.
18. Should the service roads be closed along 100 Avenue, e.g. around 108 Street?
19. Better pedestrian access is needed around 108 Street, especially across the highway around 104 Ave.
20. Consider Hillside ARP recommendations in the 92-96 Street Area.
21. What is the future of the access roads along 100 Street?
22. More lanes are desired along 92 Street, north of 68 Avenue.
23. Can 105 Street be extended north to Highway 43, through the field?
24. Concerns noted about congestion at 132 Avenue / 92 Street, especially at bell times at Maude Clifford Public School. A roundabout may be an option.
25. A pedestrian/cycle overpass is desirable across 108 Street, at 68 Avenue, for the CKC.
26. Areas of future study:
    - Railway issues – crossings, delays, and whistles / noise.
    - The EMME model can be used to evaluate the impacts of County development on City roads.
    - Garbage / service needs should be considered when reviewing roadway cross-sections in TMP.
    - Autonomous vehicles and impacts of smart transportation technologies
    - Truck route clarity once bypass is open.
    - Existing Hwy 43: needs widenings (lanes, crosswalks and sidewalks)
    - Downtown parking plan, as well as throughout the city.
    - Crosswalk control devices: what is available and when/where should it be implemented?

5. City Administration Workshop

Representatives from various municipal departments attended this workshop, including Capital Projects, Active Transportation, Construction, Planning/Development, Enforcement, Energy and Environment, and Parks. This meeting was held on March 22nd at the City Service Centre.

Attendees:

- Michele Gairdner, City of Grande Prairie, Environment
- Ashley McLauchlin, City of Grande Prairie, Development Engineering
- Mathew Hinton, City of Grande Prairie, Capital Planning and Construction
- Jill McCord, City of Grande Prairie, Project Tech (Active Transportation)
- Marl Hoseasson, City of Grande Prairie, Capital Construction
- Kelly Kokesch, City of Grande Prairie, Enforcement
- Lindsay Juniper, City of Grande Prairie, Parks
- Caleb Benson, City of Grande Prairie, Parks
- Kristine Donelly, City of Grande Prairie, Engineering
- Robin Hutchinson, City of Grande Prairie, Engineering
- Glenn Stanker, McElhanney
- Lee Thomas, McElhanney
- Katherine Clark, McElhanney

Planning

1. A major concern is charging appropriate levies for arterial road improvements.
2. The intersection corner truncations that are currently dedicated during the planning phases are typically too small to protect intersection sight lines after development.
3. Cross-sections should be updated in the design guidelines to reflect desired changes in road design.
4. There are concerns about appropriate standards for sidewalks in industrial areas.
5. Municipal staff do not feel they have the authority to require developers to plan/design beyond the typical city standards, such as better corner truncations, pedestrian connections, roundabouts, etc. Guidance from the MDP and TMP is needed.
6. The staging of infrastructure is a concern: Desire to see policy direction on dedicating property ahead of development during the ASP to stage infrastructure.
7. The City would like to see potential locations suitable for roundabouts identified in the TMP, such that land may be set aside during the ASP phase. A roundabout-first policy would be beneficial, with support from Council. An education session on roundabouts is needed for staff and Council.

Environment

1. City has set a goal to reduce GHG emissions for both the community as a whole and the municipal offices. The key targets are buildings and transportation.
2. Desire to see more active transportation in the community.
3. The northeast quadrant of the City has complicated environmental issues involving wetlands.

Bylaw Enforcement

1. Trucks routes are primarily on the periphery of the city core, with the understanding that truckers may take the most direct route to/from destinations within the city (e.g. furniture stores). A designated route is desired on 116 Street. 132nd Avenue also has lots of truck traffic. It is unclear why there are truck routes through the Downtown; Kelly will review this.
2. A review of dangerous goods carriers and parking is in progress.
3. Parking of commercial vehicles in residential areas is not permitted. Bylaw Enforcement can review time restricted truck parking around Grande Prairie Christian School to address School Board's concerns (e.g. trucks removed by 6am).
4. High collision areas include: Staples corner at 108 St and Hwy 43, and 132nd Ave

Active Transportation

1. The City is planning new locations for active transportation, and identifying missing links. Active transportation infrastructure gaps are prioritized based on such inputs as proximity to school, etc. Retrofitting established areas is particularly challenging. Jill can provide a spreadsheet of the 255 missing links, as well as sidewalk warrant criteria.
2. Residents prefer sidewalks and pathways offset from the road, especially for childrens' safety.
3. The TMP should provide guidance for prioritizing active transportation. It is challenging now to shift road users to active transportation when transit and cycling trips take much longer than those in automobiles, and parking is generally convenient and inexpensive.
4. Guidance is also required for the planning/design of local road infrastructure, which is generally implemented by developers under the Land Use Bylaw.
5. With an appropriate increase in funding, the City could theoretically assume the responsibility for all sidewalk clearing in winter, rather than having residents do this. The City already clears trails.

Parks

1. Parks works with Jill in active transportation. The Master Plan of 2012 reviews mobility.
2. The existing road design standards complicate the planting of trees in the boulevard due to narrow widths and shallow utility conflicts.
3. There has been a lot of progress in recreational trail development, with 23 km now constructed. The City and County are working together to develop this further.
4. The residents want more wayfinding, information stations, illumination, and education on trails.
5. A formal Recreational Trails Master Plan is needed.

Capital Program

1. Guidance for capital programming initiatives is needed. The Five Year Plan needs to be updated by June. McElhanney needs to provide recommended improvements especially regarding new signals, intersection improvements, roundabouts, and road widening. The long term program can be completed later in the project.
2. The trail/pathway program recommendations can also come later. This has a dedicated budget.
3. A more consistent standard for road improvements and traffic control is needed.

6. Trucking Association

The Trucking Association met with the project team on March 20th at the City Service Centre.

Attendees:

- Rick Tullson, Trucking Association
- Erick Hansen, Trucking Association
- Gary Heaven, Trucking Association
- Wade Nellis, City of Grande Prairie
- Robin Hutchinson, City of Grande Prairie
- Kristine Donnelly, City of Grande Prairie
- Glenn Stanker, McElhanney
- Katherine Clark, McElhanney

Notes:

1. 92nd Street need repaving.
2. Signals are warranted at 92nd Street / 132nd Avenue.
3. Corner radii at some of the Highway 43 – Wapiti Road intersections (e.g. 84th Avenue EB to SB) are too short to accommodate large turning trucks without overtracking and damaging roadside infrastructure.
4. The southwest ring road is needed to relieve congestion, and to provide another truck route. The east bypass is also going to be needed, and requires funding/planning from Alberta Transportation. The EMME model is needed to clarify the timing and connections to the ring roads.
5. There is a significant amount of industrial growth in the south generating more truck traffic. A short term solution is to use 116 Street as a truck route / bypass; some trucks are already using this route. The City upgraded the road structure of 116 Street within the last two years to support truck use. The County would need to endorse 116th Street as a formal truck route due to the necessary upgrades and property acquisition.
6. There is a desire to see more truck and dangerous goods parking that is within walking distance to amenities (hotels, food, etc). The bylaws prohibit overnight parking, but it is happening anyhow.
7. Trucking on 92nd Street around the rail yard works well. However, this route could theoretically be replaced by 84th Street as it develops in the future.
8. The existing truck routes include designated roads through Downtown. These may be unnecessary as truck trips through the City typically stay on the periphery roads, and truck trips to destinations within the City are already permitted.
9. Truckers desire better access to information for route planning through Grande Prairie.
10. Truckers would appreciate more advance warning signs at traffic signals to help safe stopping manoeuvres.

7. Emergency Services

This meeting was attended by Fire, Police and a Canfor representative. Emergency Medical Services was invited but was not able to be in attendance. The discussion with Canfor is recorded separately below.

This meeting was held on March 21st at the City Services Building.

Attendees:

- James Kostuk, Fire Department
- Jeff McIntosh, RCMP
- Robin Hutchinson, City of Grande Prairie
- Glenn Stanker, McElhanney
- Katherine Clark, McElhanney

Notes:

1. There are two railway tracks in Grande Prairie, one runs north-south and the other east-west. The primary concern is with the former, and the impact on emergency response. However, the delays from the east-west are expected to worsen as the frak material hauling from Wembley increases.
2. The priority crossing locations for emergency response are at 108th Avenue and 100th Avenue.
3. The two fire halls and the police station are on the west side of the tracks. The Emergency Medical Services (Ambulance) is on the east side of the tracks. The fire departments have had incidents with the trains delaying emergency responses. However, they have compensated with multiple unit responses. The police have also been delayed by trains when making calls to the east side of the tracks, especially on 100th Avenue. There is no mutual aid agreements yet with the County.
4. Both the police and fire departments can contact the railway to move the trains. This process can still take up to 15 minutes. When police or fire response teams are blocked, they can try to cross at other locations. However, this is not effective when the trains are long and moving slowly.
5. A combined firehall and police station is currently being considered in the northeast section of the City.
6. Train derailments are a significant concern with the proximity of buildings to the railway.
7. The fire hall does not have exit markings or signal controls to prevent blockage when answering calls.
8. Police and fire identified the following as high collision intersections:
   - 68th Ave at the CKC
   - Staples corner at 108 St and Hwy 43
   - 100 St, 116 Ave and Hwy 43 due to red light running and heavy congestion.
   - 132nd Ave and 100th St likely to be a future problem due to congestion
   - Highway 40 (Wapiti Road) at 76th Avenue, especially due to red light running
9. Future expected problem intersections include:
   - 116th Street and 132nd Avenue due to congestion. Turning lane improvements will be needed.
   - 108th Street at 132nd Avenue due to the new school in the area.
10. Locations that are working well include:
    - 84th St: capacity feels comfortable
    - Northeast Quadrant of the City: comfortable flow of traffic.
11. A new north-south corridor on the east side of the City is needed.
12. Emergency Services noted that the severity of the congestion may be a perception issue, and is not resulting in real time delays.

8. Canfor

One representative from Canfor was present for the combined meeting with the police and fire departments. The forest sector represents a fraction of the industry within Grande Prairie. The oil and gas industry makes up a significant portion of the industry within Grande Prairie and traffic headed south on Highway 40.

This meeting was held on March 21st .

Attendees:

- Jon Taszlikowicz, Canfor
- Robin Hutchinson, City of Grande Prairie
- Glenn Stanker, McElhanney
- Katherine Clark, McElhanney

Notes:

1. Canfor has approximately 150 log trucks per day and 60 chip trucks per day. An additional 45 minutes has been added to the haul times due to the delays from traffic congestion.
2. The timber supply trucks for Canfor come from the north on 116 Street, then turn east on 84th Avenue, then into the mill via Wapiti Road (Highway 40). Trips to and from the south use the Canfor Haul Road, adjacent to Highway 40. Lumber shipping trips to and from the rail yard use 84th Avenue, Resources Road, and 92nd Avenue, crossing the tracks at 68th Avenue. The latter route experiences a lot of queuing and congestion.
3. Some trucks are short-cutting via 116 Street and 68th Avenue. There are no current plans for widening 68th Avenue (west of Wapiti Road) due to the potential impact on adjacent residents.
4. There are daily conflicts with non-permitted users of the Canfor haul road. Drivers are using the haul road as an alternative to the congestion on Highway 40. This constitutes a safety concern, as the haul road is radio controlled, with permit access only. Enforcement is required.
5. Canfor is currently using the downtown truck route because it is permitted. However, the logic behind the routing needs to be revisited.
6. Canfor would like to see Highway 40 south twinned. Lots of congestion, especially in the AM Peak.
7. Large trucks on the highway often drive two abreast, rather than staying in the right lane.
8. The permit system for dangerous goods works well, showing where carriers can stop etc. There are no official truck or dangerous goods routes in the County.

9. Regional College of Grande Prairie

The meeting with the Regional College was completed independently by Robin Hutchinson on March 26th. The Regional College can support up to 10,000 students and has intentions to provide access for this population of students. The meeting was attended by:

- Robin Hutchinson, City of Grande Prairie
- Bill Knudslien, Manager of Enterprise Risk, Regional College
- Nathaniel Smith, Regional College

The Regional College recommended the following:

1. Create better transportation connections between the college and the new hospital.
2. Install a new access to the Regional College near the Dollarama (108St and 104 Ave)
3. Upgrade the 107 Ave intersection and signal to improve flow into and out of the college.
4. Incorporate bike lanes into roadways and pathways.

10. County of Grande Prairie

The meeting with the County of Grande Prairie was completed independently by the City of Grande Prairie on March 27th. The meeting was attended by:

- Kristine Donnelly
- Matt Hinton
- Robin Hutchinson
- Director of Public Works for the County: Dale Van Volkingburgh.

Comments included:

1. Alignment and connectivity of the ring road planned by the province.
2. Projected areas of growth and road upgrades identified in the County's TMP.

11. CN Rail

Lee Thomas attended a meeting with representatives from CN Rail on March 27th. The intent of this meeting was to ensure CN plans are incorporated into Transportation Master Plan as a key consideration for all network infrastructure recommendations. The goal is to begin discussion, at a high level, of planning initiatives regarding the railway in Grande Prairie. The meeting was attended by:

- Julianne Trelfall, CN Manager of Public Works
- Greg Karpo, CN Manager of Business Development and Real Estate
- Lee Thomas, McElhanney

Overview of Rail Operations in Grande Prairie:

1. The community has several crossings within close proximity, which can be problematic when longer and/or slower-moving trains block more than one crossing.
2. Rail operations are market-driven and difficult to accurately project over the long-term. There has been steady growth in rail traffic impacting Grande Prairie over the past 5 years due to the shifting/strengthening market, and it is likely this growth will continue into 2019.
3. The north/south line is the dominant line for train traffic and primarily serves grain, frac, drilling and oil markets. The east/west line is lesser-used and primarily serves oil markets.
4. At present, there are no planned major infrastructure projects for rail facilities in Grande Prairie.
5. CN has updated some crossing systems with smart systems to be adaptive to slower-moving trains and reduce the impact of bells/whistles at crossings.

New Crossings / Crossing Closures:

1. CN is generally trying to reduce its crossing impacts and would like to offset opening of new crossings with crossing closures, where appropriate.
2. **Wedgewood Drive**: discussions are ongoing regarding opening a new crossing at an appropriate location on Wedgewood Drive, as well as potential closure to offset the opening of a new crossing.
3. **112 Street**: This proposed crossing impacts customer tracks/siding (i.e. not CN-owned). Compensation would likely need to be provided to the customer for facility relocation if a crossing were provided here, which may be prohibitive to crossing development.
4. **84 Avenue (east):** This proposed connection would cross several CN lines that are used for storage and switching. Grade-separation would be required.

5. **84 Avenue (west):** Given the curvature of the rail line, it may be difficult to meet Transportation Canada design and operational requirements for grade-crossings. Would also need to be offset with closure of an existing crossing (likely within the County) to minimize impacts. Given that this new crossing may impact crossing operations within the County / long-term annexation area, further cooperative planning between the City, County and CN is desirable to confirm crossing locations, future road network, and staging timelines.

Trespassing:

1. Trespassing is a key issue for CN in Grande Prairie because it creates safety issues due to train/pedestrian conflict and requires more frequent use of whistles when conflict arises.
2. CN understands that the whistling can be a nuisance to the community, but notes that whistle cessation requires measures to stop trespassing (i.e. fencing) and would likely also necessitate gates at grade-crossings.
3. CN is open to working with the City to identify locations where fencing and/or trails would be beneficial. Though there is a general mandate to protect rail right-of-way, requiring installation of all infrastructure outside of rail right-of-way, CN is willing to discuss needs for individual mitigation measures. CN also notes that Transport Canada has a grant program to help municipalities offset the costs of fencing, curbs and pathways that may be beneficial to the City.
4. Though CN understands the impact of train whistles on the community, full whistle cessation would likely require gating of all crossings, which can be very costly and will worsen traffic delays during crossing events.

100 Ave Crossing:

1. It is understood that yard operations can impact 100 Avenue, as well as crossings to the north due to slower train speeds entering the yards.
2. Longer trains can pose a challenge during switching operations, requiring repeated movement over 100 Avenue as the train is moved onto/off different lines for car switching.
3. CN requires all new customers to provide car storage on-site and is developing switching yards outside of City limits, such as the “four-corners” site, which will help to offset growing demands and extend the life of their existing yards within Grande prairie.
4. The City has observed motorists using the crossing between train movements. CN is aware of this activity, and expects drivers to follow the rules of the road.
5. Strategies to maintain safety of the 100 Avenue crossing include:
    - City and CN can work together to educate the public, with assistance from CN’s Educational Officer, regarding proper crossing protocol. May also supplement 100 Ave corridor with signage communicating the Stop-Look-Proceed When Safe crossing function.
    - City may look at grade-separated solutions.
    - Gates may be considered, but will result in very long traffic delays due to longer, slower moving trains and the need to use the roadway for switch activities.

Phase 3 Stakeholder Meetings

The following stakeholder meetings were held in Grande Prairie between June 24 and 27, 2019 to present the findings of the study, explain the next steps, and invite further feedback.

1. Grande Prairie City Council

The Transportation Master Plan team was invited to deliver the Phase 3 engagement presentation to the City Council's Strategic Priorities Working Group on Monday, June 24, 2019, at City Hall.

Notes:

1. 92nd Street is experiencing issues with congestion now; it may be a candidate for improvement sooner.
2. The effect of growing volume of traffic entering the city from the adjacent county (esp. via 108th Street) could significantly impact the network functionality. This growth should be quantified and isolated.
3. 108th Street improvements between 116th and 132nd Avenues may need to be a higher priority to address the issues with county traffic.
4. The benefits of roundabouts should be clearly stated in the report.
5. The study should clarify any impacts there may be to the City's design manual as a result of the analysis.
6. Feedback from the public on the study findings is important.
7. The levy calculations will depend on the findings in the Transportation Master Plan.
8. The TMP and EMME model could be used as the basis for negotiating funding assistance based on the amount of external traffic creating demands on the City's transportation system.

2. Public Agencies Meeting No. 1: Catholic School District

This meeting was held at the City's Service Centre on Tuesday, June 25th, 2019.

Attendees:

- Karl Germann, Catholic Superintendent
- Randy Lester, Transportation Supervisor
- Glenn Stanker, McElhanney
- Robin Hutchinson, City of Grande Prairie

Notes:

1. A northbound right turn lane is needed on 116th Street at 132nd Avenue.
2. 100th Street is an efficient route with signal optimization.
3. Good to see the areas of expected growth.

3. User Groups Meeting No. 1: Canfor and Fire Department

This meeting was held at the City's Service Centre on Tuesday, June 25th, 2019.

Attendees:

- James Kostuk, Fire Department
- Rob McLaughlin, Canfor
- Moharam Ibrahim
- Glenn Stanker, McElhanney
- Robin Hutchinson, City of Grande Prairie

Notes:

1. 116th Avenue would be desirable for a rail overpass. An underpass would have issues with drainage.
2. This study (and identified growth areas) will influence future fire station planning and development.
3. The county doesn't have official truck routes, although the shortest routes are expected to be used.
4. All Canfor traffic is travelling from north to south. Trucks use the haul route to come in loaded (northbound), then return empty on Hwy 40. This route requires a 180 degree turn at 78th Avenue and Pinnacle. The haul road pre-emption works well (i.e. at 68th, 76th, and 84th Avenues), except in winter.
5. Night shifts save 15 minutes in travel time over the day shifts for Canfor haul trips.
6. The county has not authorized Canfor to use 116th Street as a haul route, although it is well used by other truckers.
7. Mill trips are better using the highway.
8. Lumber trucks come from the rail yard. A relocated rail yard out of town would work well.

4. Public Agencies Meeting No. 2: AT and Public School District

This meeting was held at the City's Service Centre on Wednesday, June 26th, 2019.

Attendees:

- David Richards, Alberta Transportation
- Danny Jung, Alberta Transportation
- Norm Guindon, Public School District
- Sandy McDonald, Public School District
- Geoff Barron, Public School District
- Glenn Stanker, McElhanney
- Robin Hutchinson, City of Grande Prairie

Notes:

1. Walkability and transit are important.
2. Extra development may occur along the new ring road; this was not part of the assumptions.
3. 108th Street North needs to be paved.
4. Most truck traffic travels north-south.
5. There are plans in place to upgrade the Highway 43 Bypass, and retime the traffic signals, when the corridor is turned over to the City.

5. User Groups Meeting No. 2: Trucking Association

This meeting was held at the City's Service Centre on Wednesday, June 26th, 2019.

Attendees:

- Rick Tumson, Overland Transport
- Erick Hansen
- Gary Heaven
- Glenn Stanker, McElhanney
- Robin Hutchinson, City of Grande Prairie

Notes:

1. The county wants 108 Street paved from 132nd Avenue to the city limits.
2. Traffic congestion is an issue on 92nd Street.
3. Ideally truck routes should be around the city to reduce traffic congestion and pavement deterioration.
4. The removal of truck routes through Downtown Grande Prairie makes sense. Trucks can always leave the designated routes to travel (by the shortest feasible paths) to and from their origins/destinations.
5. Truck parking is currently a concern around the college. A better plan is needed.
6. The extension of 84th Street will depend on land development in the area.
7. The travel time on Wapiti Road (Highway 40) has improved with the new signal timing plan.
8. 84th Avenue should connect to the southwest ring road. If possible, a roundabout could be constructed to facilitate the connection around the lake and rail line.

6. Chamber of Commerce / UDI

This meeting was held at the Chamber of Commerce on Thursday, June 27th, 2019.

Attendees:

- Tanya Oliver, Chamber of Commerce
- Ken Loudon, Chamber of Commerce
- Testius Genis, Chamber of Commerce
- Dan Wong, Chamber of Commerce
- Cindy Park, Chamber of Commerce
- Scott Pravitz, UDI Grande Prairie
- Scott Roessler, UDI Grande Prairie
- Glenn Stanker, McElhanney
- Robin Hutchinson, City of Grande Prairie

Notes:

1. The model is based on population thresholds, which are not tied to any expected horizon years.
2. Hwy 40 and 84th Avenue are bottlenecks in the AM Peak, especially the bridge on Highway 40. The model doesn't consider this AM scenario.
3. The intersection of Hwy 40 and 84th Avenue needs to be widened for truck turning movements.
4. Residents on 116th Street may likely have concerns with this road used as a truck route.
5. The rapid growth of the city is a concern.
6. 92nd Street is congested now, especially between 68th Avenue and 84th Avenue.
7. The six laning of the Highway 43 bridge is planned to be resolved in the long term.
8. Consider the use of pedestrian overpasses on roads that have been six-lanes; otherwise crossing times are an issue.

An additional meeting between the City and UDI was held on August 15, 2019; no additional issues raised.

Public Input

Phase 1 Open House

1. In your view, what are today's most important transportation issues to be addressed in the Transportation Master Plan?	
Road Congestion and capacity	14
Driving safety	6
Sidewalk and trail connections	16
Train delays	7
Transit service and convenience	6
Traffic calming in residential areas (measures to slow traffic)	7
Traffic control and signal coordination	8
Cycling facilities and connections	8
Accessibility for persons with restricted mobility	9
Parking availability	3
Trucking corridors	11

2. In your view, what should be the key guiding principles for Grande Prairie's Transportation Master Plan?	
Making it easier for people to walk and cycle around the city	19
Making the most out of our existing road space	7
Widening and constructin new roads, only if absolutely necessary	1
Planning to provide more travel choices	5
Maintaining and enhancing existing road space	9
Improving network reliability, including across rail lines	5
Making it easier for people to bus around the city	7
Maintaining and enhancing active transportation infrastructure, like paths and sidewalks	14
Improving safety for people who walk, cycle and drive	19

3. Understanding that investments often compete for funding, how would you prioritize the following?	
Grade separation for rail crossings to improve network reliability and capacity	4
Reducing road congestion & adding more road capacity for cars and trucks	16
Constructing more sidewalk and path connections to key destinations	19
Constructing more cycling facilities and lanes to key destinations	9
Improving bus frequency and route coverage	10
Improving system accessibility for those with mobility issues	10
Improving road (or system) safety	12

4. How frequently do you use the following modes?					
	5 or more days a week	A few times a week	A few times a months	A few times a year	Never
Car/Truck	13	3			1
Bicycle	2	1	2	6	3
Bus	2	2		3	7
Walking	2	7	4	3	
Other		2		1	2

5. What influences your preferred way of moving around?	
I like the convenience of my truck/car	11
I need my car/truck for work	7
I share a car with someone in my house hold	2
I don't own a car	3
I walk or cycle for my health	9
I walk, cycle or bus to save money	5
I like the convenience of walking or cycling	6
I live close to work/school	
The weather impacts how I move around	11

6. Do you have access to walking and cycling routes that connect you to the places you want to go?	
Yes, I can use sidewalks, trails and on-street bicycle routes to get most places	7
No, there are gaps(like missing sidewalks or crosswalks) or other issues (like snow removal lack of shelter) that makes walking or cycling more difficult	10

7. Do You Own A Bicycle?	
Yes	8
No	4

8. Are you comfortable cycling around GP?	
Yes	7
No	5

9.Are you comfortable walking around GP?	
Yes	8
No	3

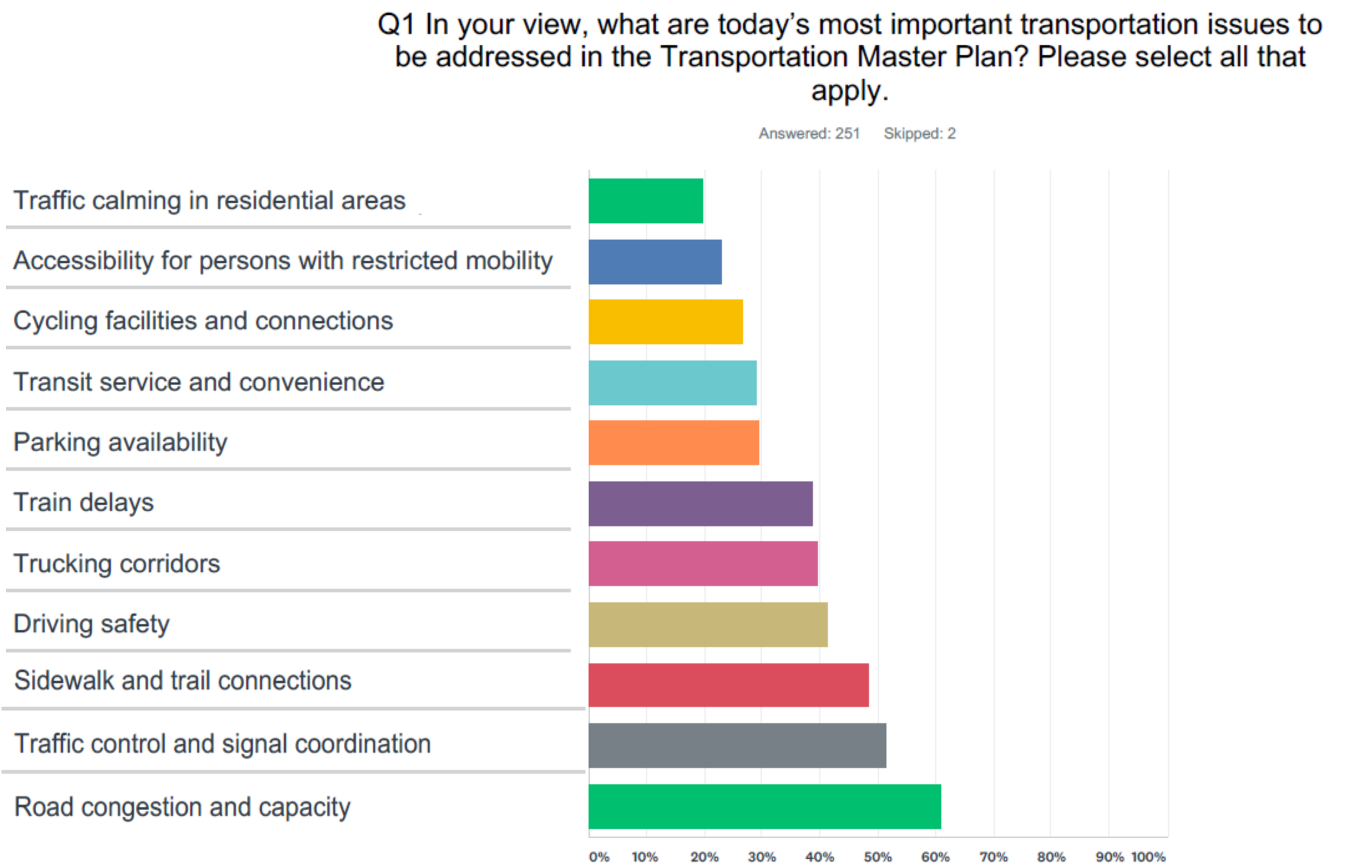
10. What could improve your walking and/or cycling experience and comfort?	
More sidewalks, crosswalks, trails, and cycling routes	7
More aesthetic features and year round amenities, like secure bike storage, wind/rain shelters, rest areas, lighting, buffer space from traffic	8
More/better signage to help find your way	5
Better year round access and connections to destinations	4
Better information so I know where I can cycle or walk like maps and online route finders	4

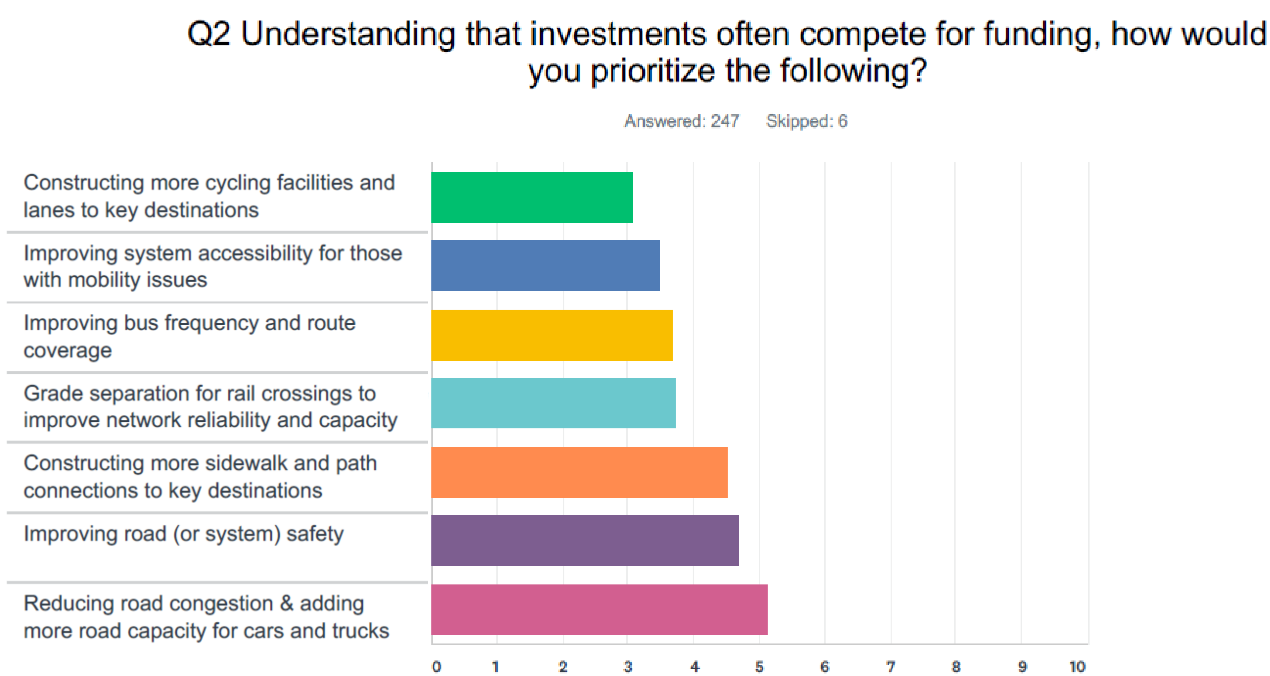
11.How satisfied are you with today's session?					
	Very Satisfied	Somewhat Satisfied	Satisfied	Dissatisfied	N/A
Clarity of Information	7	3			
Projects Team's Response to Questions	9				1
Opportunity to Provide Input	10				
Opportunity to Hear Others	4	3	2		1
Sessions location	9	1			
Session time	8	2			

12. Do you feel your input was heard?	
Yes	9
No	0

Phase 1 Online Survey

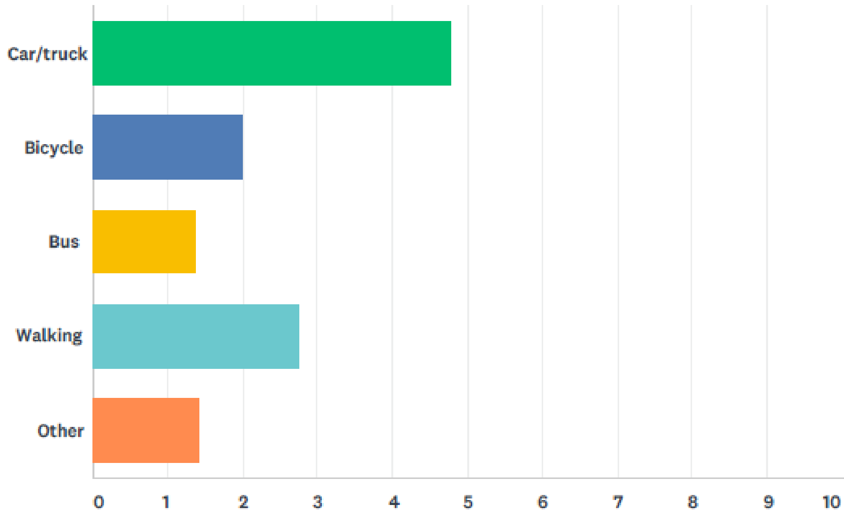
The following pages provide the highlights from the online survey during the first phase of community engagement.





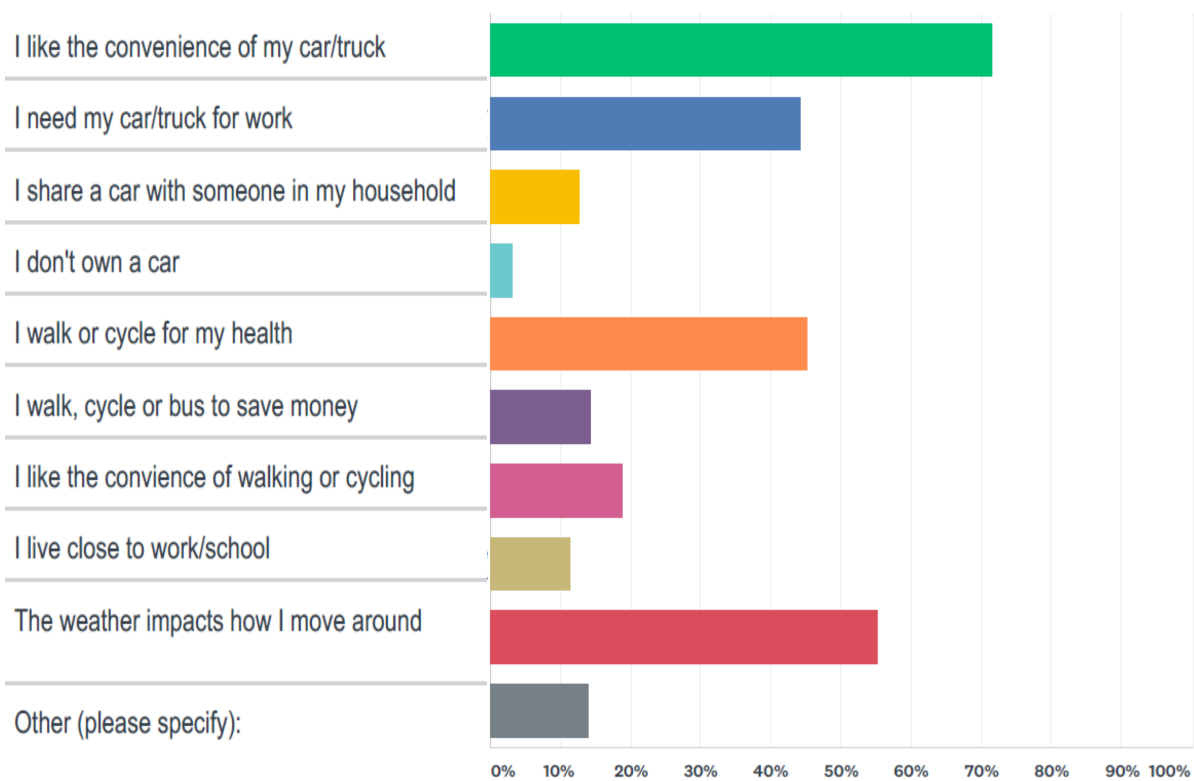
Q6 How frequently do you use the following ways to get around?

Answered: 249   Skipped: 4



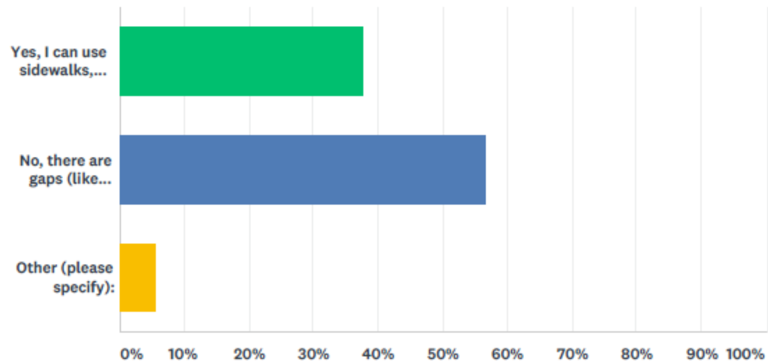
Q7 What influences your preferred way of moving around? Please all that apply.

Answered: 250   Skipped: 3



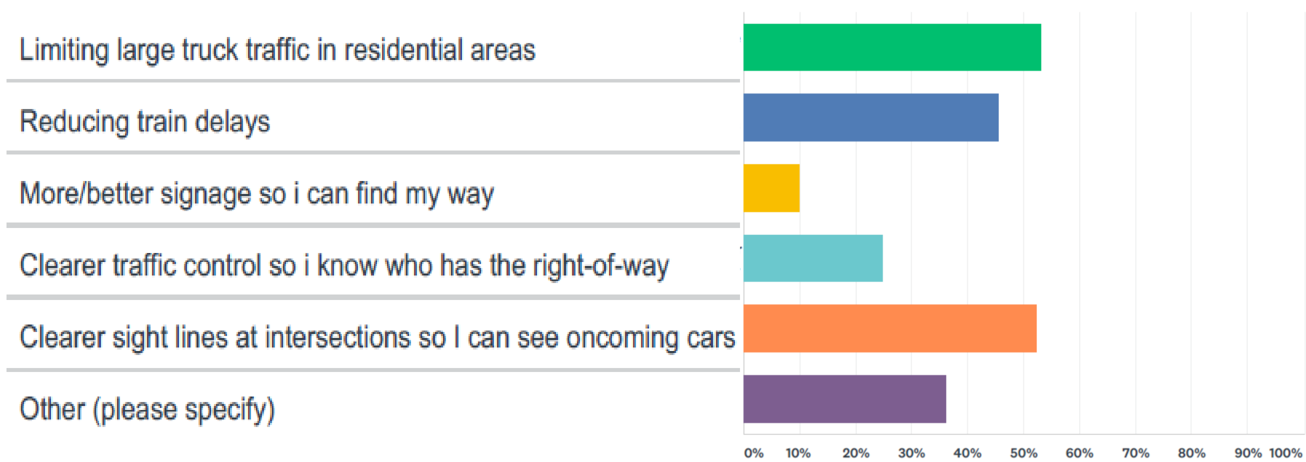
Q8 Do you have access to walking and cycling routes that connect you to the places you want to go?

Answered: 247 Skipped: 6



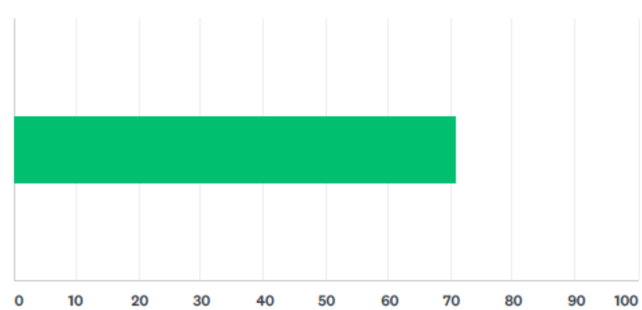
Q13 What could improve your driving experience and comfort? check all that apply.

Answered: 241 Skipped: 12



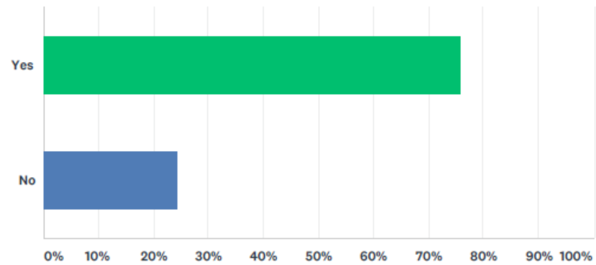
Q12 Are you comfortable driving in Grande Prairie?

Answered: 226 Skipped: 27



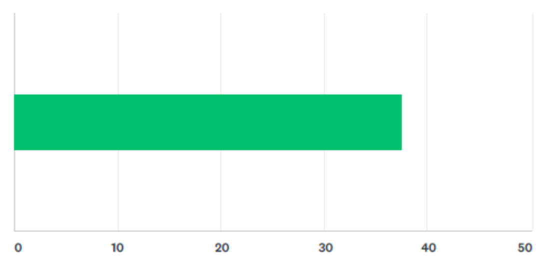
Q14 Do you own a bicycle?

Answered: 247 Skipped: 6



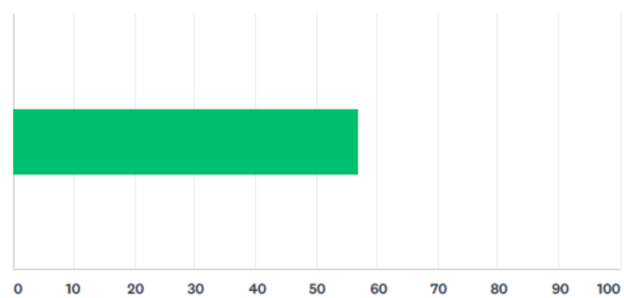
Q15 Are you comfortable cycling around Grande Prairie?

Answered: 201 Skipped: 52



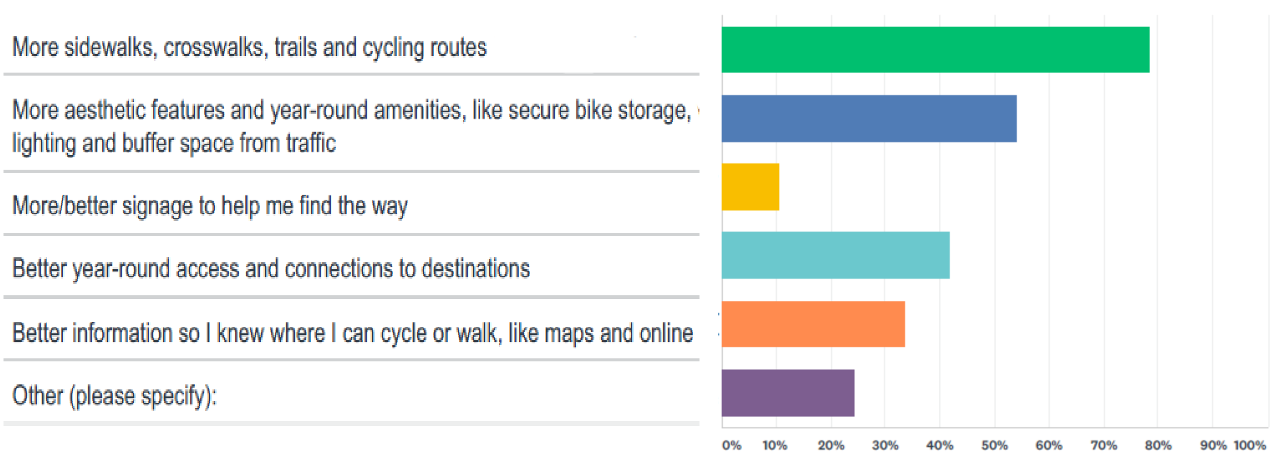
Q16 Are you comfortable walking around Grand Prairie?

Answered: 234 Skipped: 19



Q17 What could improve your walking and/or cycling experience and comfort? Please check all that apply.

Answered: 222 Skipped: 31

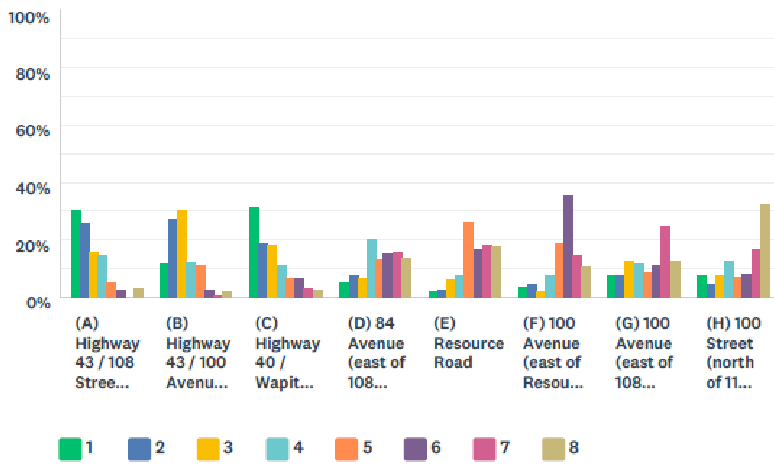


Phase 2 Online Survey

The following pages provide the highlights from the online survey during the second phase of community engagement.

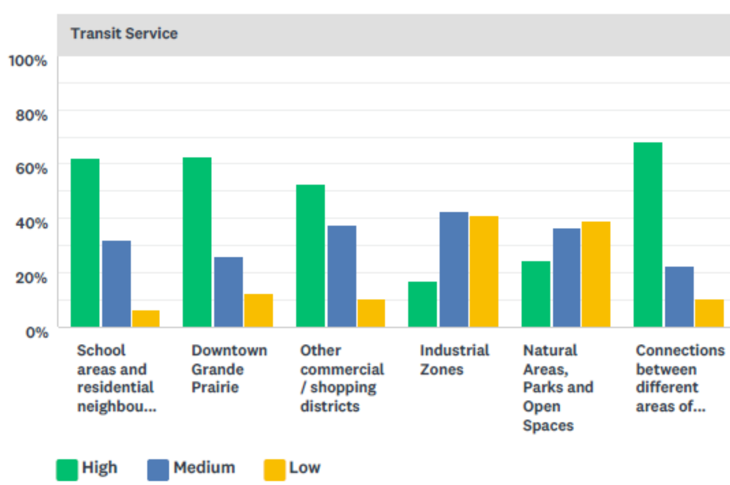
Q1 Rank the following roads in the order you would choose for traffic flow and capacity improvements (1 is the highest/most important):

Answered: 181 Skipped: 2



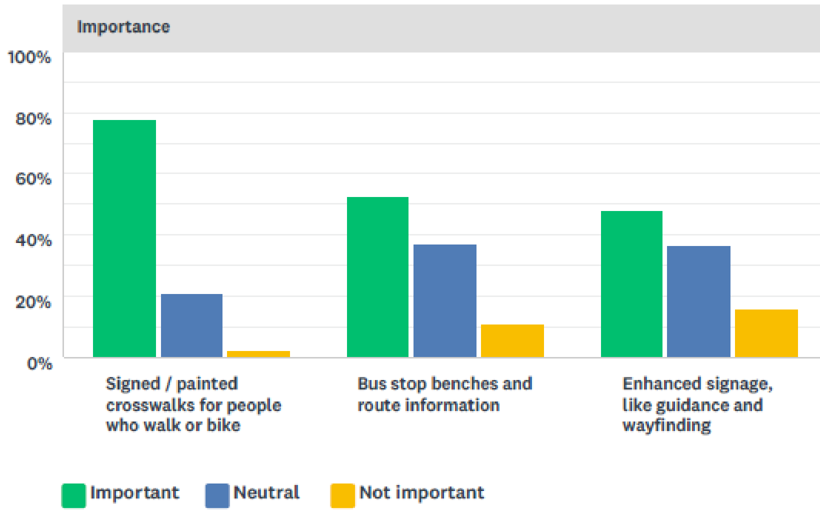
Q2 What priorities would you assign to the following areas for pathways and bus service?

Answered: 156 Skipped: 27



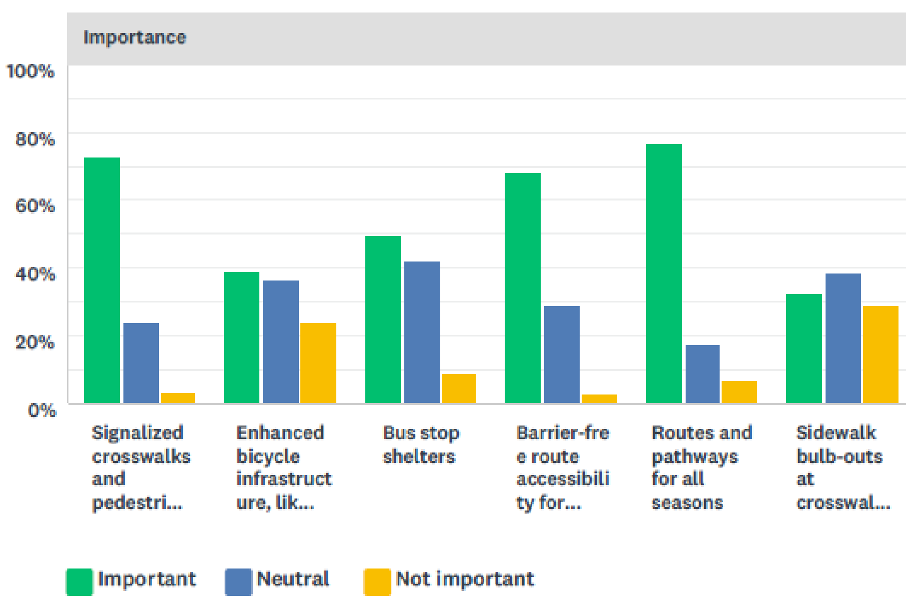
Q3 Low Cost Improvements

Answered: 155 Skipped: 28



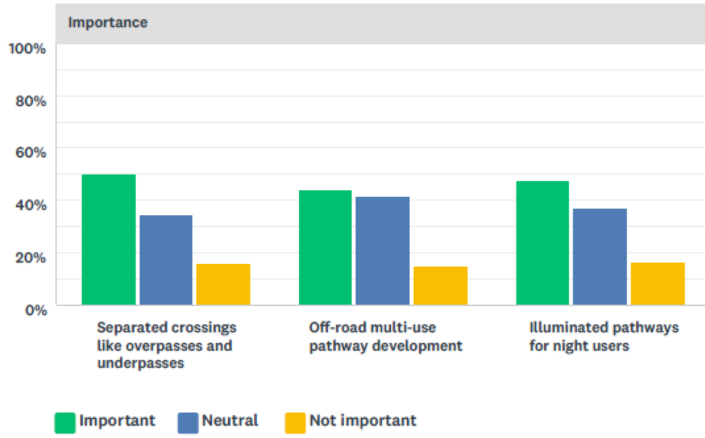
Q4 Medium Cost Improvements

Answered: 156 Skipped: 27



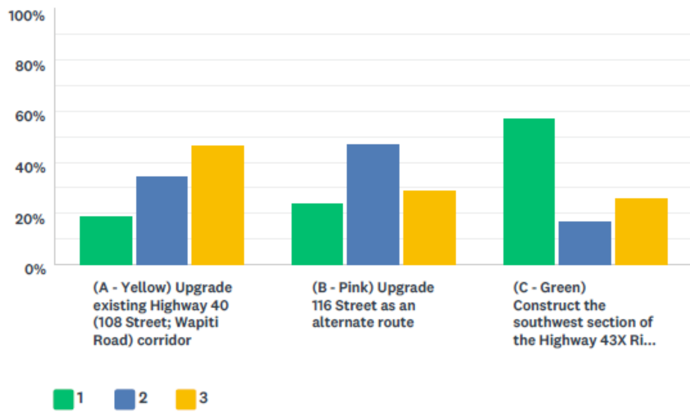
Q5 High Cost Improvements

Answered: 156 Skipped: 27



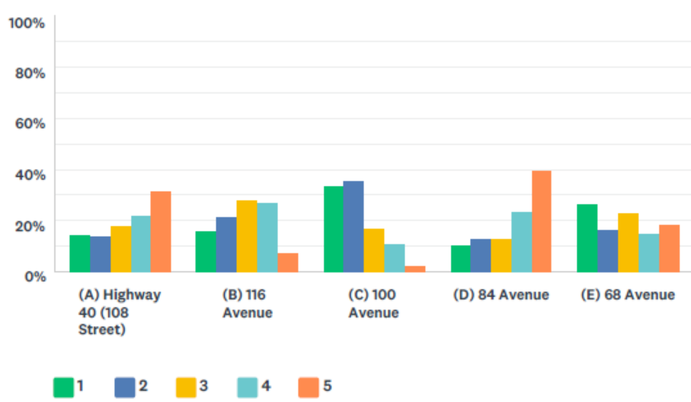
Q6 Please rank the following road improvement options for truck traffic to and from Highway 40 (1 is the highest/most important):

Answered: 157 Skipped: 26



Q7 What priority would you assign to each crossing for consideration of improvements (1 is the highest/most important)?

Answered: 153 Skipped: 30



APPENDIX D

EMME Transportation Model

McElhanney

Contents

Tables

Figures

1. Introduction

Further to ***Module 3: Traffic Forecasting***, the detailed explanation of the development, calibration, and validation of the Grande Prairie EMME Transportation is outlined below.

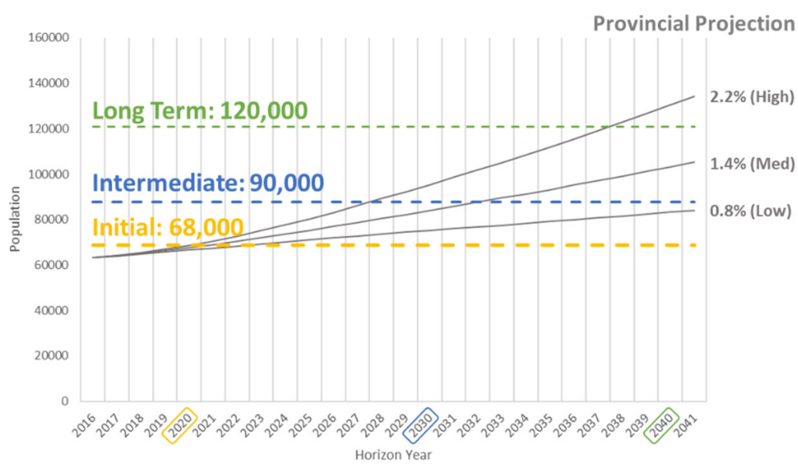
2. Key Model Assumptions

Several assumptions need to be made in order to develop the City of Grande Prairie transportation model. This section describes the key assumptions and their values for the base and future planning horizons.

2.1. POPULATION PROJECTIONS AND ECONOMIC GROWTH

Population is the key driver of trip making activity in the Grande Prairie transportation model. Based on 2016 Census, the population of Grande Prairie in the base year is approximately 63,000. Province of Alberta forecasted the Grande Prairie population grow to an initial horizon of 68,000 people (+8% from base), an intermediate horizon of 90,000 people (+43% from base) and a long term horizon of 120,000 people (+90% from base) as shown in ***Figure 1*** below[1]. Generally, it is anticipated that Grande Prairie will reach these populations levels by 2020, 2030 and 2040 based on growth rates from Alberta's population projections. These time horizons are required to develop the economic growth assumptions for the model which drives increases in commercial vehicle activity.

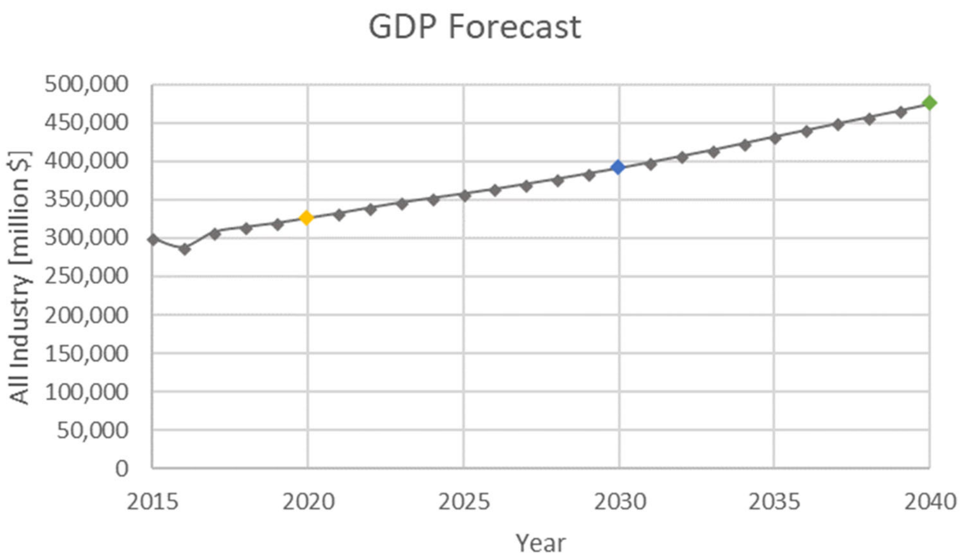
Figure 1 Future Population Projection



[1] *Assumes that 80% of Census Division 19 population growth occurs in the City of Grande Prairie.*

Figure 2 provides the forecast growth in Alberta's economy measured in terms of the provincial gross domestic product based on the Conference Board of Canada's Alberta Outlook Long-Term Economic Forecast. The GDP figure is expressed in real dollars which are inflation adjusted. By 2020, Alberta's economy is forecast to grow 6% compared to the base year, by 2020 it is forecast to grow 27% compared to the base year and by 2040 it is forecast to grow 54% compared to the base year. These growth rates are applied to the production of commercial vehicles at the traffic zone level of detail within the model to forecast growth in this sector.

Figure 2 Economic Growth Forecast



2.2. COST COMPONENTS

This section describes the key cost components in the City of Grande Prairie transportation model that provides a basis for trip distribution and route choice as described later in this report.

2.2.1. Value of Travel Time

How people value their time is a key assumption fundamental to choice-making in a travel demand model. The value of travel time is based largely on people's income level using the assumption that higher income travellers value their time at a higher rate and will make choices such as shortest time. For example, lower income travellers will choose routes and modes that minimize out-of-pocket costs that might not be the quickest from trip origin to destination. The following provides the average value of travel time assumptions from 2016 Census:

- $28/hr for autos based on 50% of the median hourly household income
- $37/hr for trucks based on average wage rate + 25% payroll expense

2.2.2. Vehicle Operating Costs

Another travel metric fundamental to choice making in travel demand models is vehicle operating cost which is typically measured as dollars or cents per kilometre. Like the value of time, this metric varies significantly depending on the type of vehicle being used and its fuel efficiency. The Canadian Automobile Association provides a estimate of the average vehicle operating cost based on a selection of, and characteristics of, typical vehicles within the Canadian automobile fleet. The following provides the average vehicle operating costs:

- 16.5¢/km for autos based on Canadian Automobile Association
- 82.5¢/km for trucks based on industry metrics

2.2.3. Generalized Cost of Travel

The Grande Prairie travel demand model uses a generalized cost formulation where decisions around trip making are based on a combination of congested travel time and out-of-pocket costs. This formulation provides a means to model trip making decisions based on multiple factors, not just travel time. Generalized costs are expressed in minutes based on the following formula[2]:

$$\textbf{[Generalized Cost]}_{ij} = \textbf{[Congested Travel Time]}_{ij} + \textbf{[Out-of-Pocket Costs]}_{ij} \,/\, \textbf{Value of Travel Time}$$

This formulation allows the City of Grande Prairie to not only test network improvements with confidence, it provides a means to test pricing policies such as parking charges or fuel price changes. This formulation also allows for downstream calculation of user benefits using the consumer surplus method which calculates network-wide travel time savings or user benefits for transportation network improvements. Generalized cost minutes saved are monetized to dollar values using the value of travel time allowing for comprehensive project evaluation considering network-wide effects. With user benefits expressed in dollars, a project benefit-cost ratio and net present value can be calculated and used to make informed decisions on network strategy and investment.

2.2.4. Inflationary Effects

With monetization of travel costs over a long-term planning horizon, consideration has to be given to inflationary effects. In other words, a dollar today is not valued the same as a dollar in the future. Because of the complexity of forecasting economic variables such as income, fuel price and parking charges, the model assumes that all monetary values inflate at the same rate. In effect, the model takes today's prices and travel behaviour characteristics and then projects those into the future. This allows forecasting of future conditions to be based on known quantities rather than speculation. To account for future uncertainty in these variables, the model can be run through a series of sensitivity tests whereby each variable can be expressed as a range of possibilities and the model can run to produce a range of possible outcomes.

---

[2] *Note that subscript ij denotes a trip from origin i to destination j.*

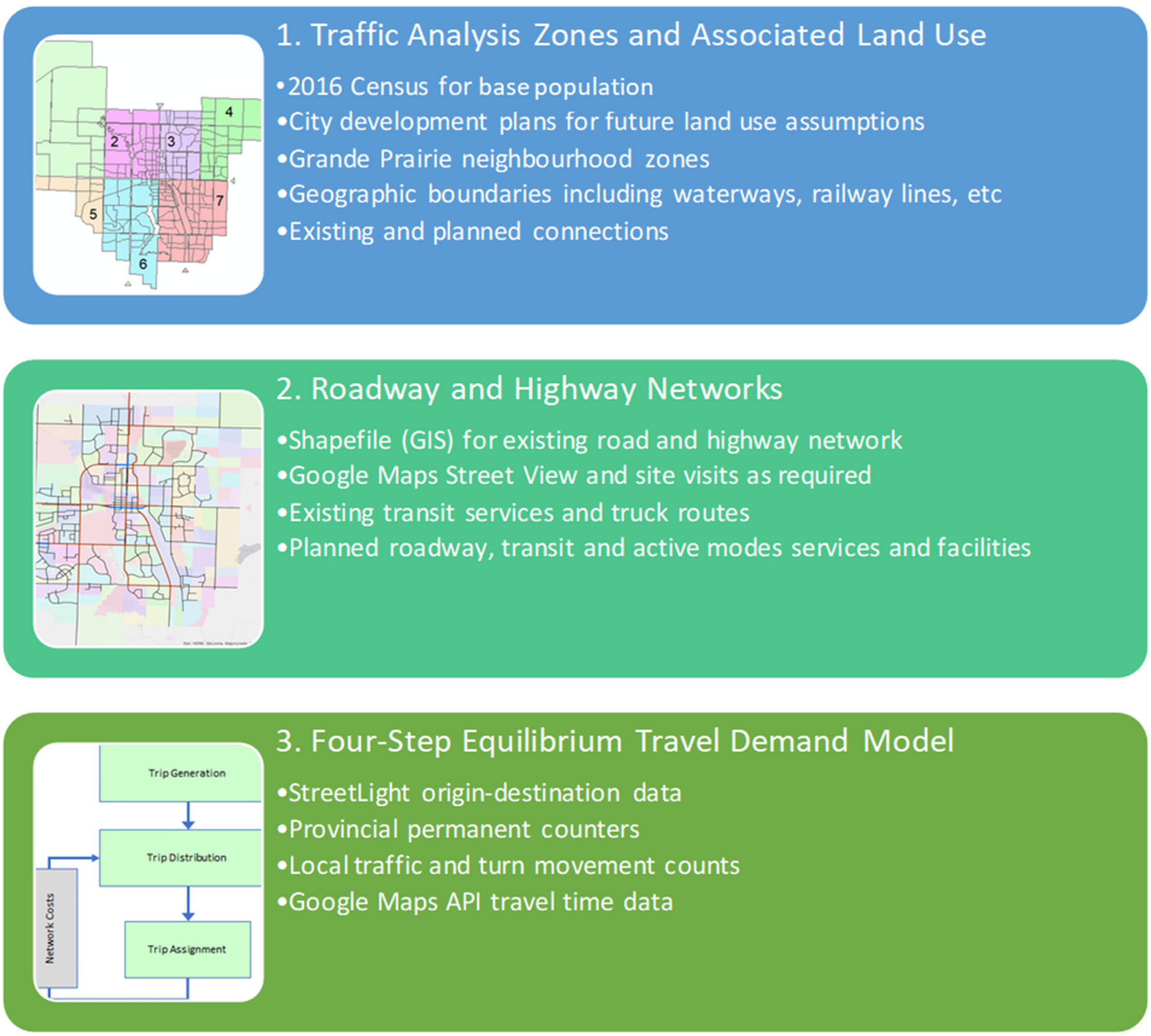
3. Model Components

There are four main sets of data required as inputs for developing the Grande Prairie travel demand model:

- A geographic representation of Traffic Analysis Zones (TAZ) in the region with associated land use estimates;
- A network representing the road and transit infrastructure in the region; and
- A relatively recent travel survey to calibrate various components of the transportation model.

These are illustrated in ***Figure 3*** below. Since transportation models are generally calibrated to current travel conditions, it is important that the years from which each of those inputs be recent and as close temporally to each other as possible. The following sections provide more details on each of these inputs.

Figure 3 Grande Prairie Transportation Model Key Components



3.1. TRAFFIC ZONE SYSTEM AND LAND USE DATA

The Traffic Zone (TAZ) system forms the basis for trip productions and attractions based on land use and demographic data. TAZs typically conform to geographic features such as neighbourhoods, municipal and county boundaries, natural features such as waterways and the road and rail networks. The size of traffic zones is also a function of land use density so that there is a relative balance of trip productions and attractions by zone. The TAZ system adopted for this project retains the 250 zones used in the last version of the City's VISUM model and adds 27 new zones to account for new development areas and to provide refinement in some existing areas (ie Canfor Industrial zone 3801 and Railway Industrial zone 3701). With the addition of external zones and new zones, there is a total of 277 traffic zones contained in the model databank as shown in ***Figure 4***.

The model uses a four-digit traffic zone numbering system that provides a useful means of aggregating land use and travel data. The City is divided into an ensemble of traffic zones or sub-areas that were used to calibrate the model but also provide a means of summarizing model data. ***Figure 5*** provides a map highlighting these seven sub-areas.

Figure 4 27 New Zones (Highlighted) Added to the Traffic Zone System used in previous VISUM Model

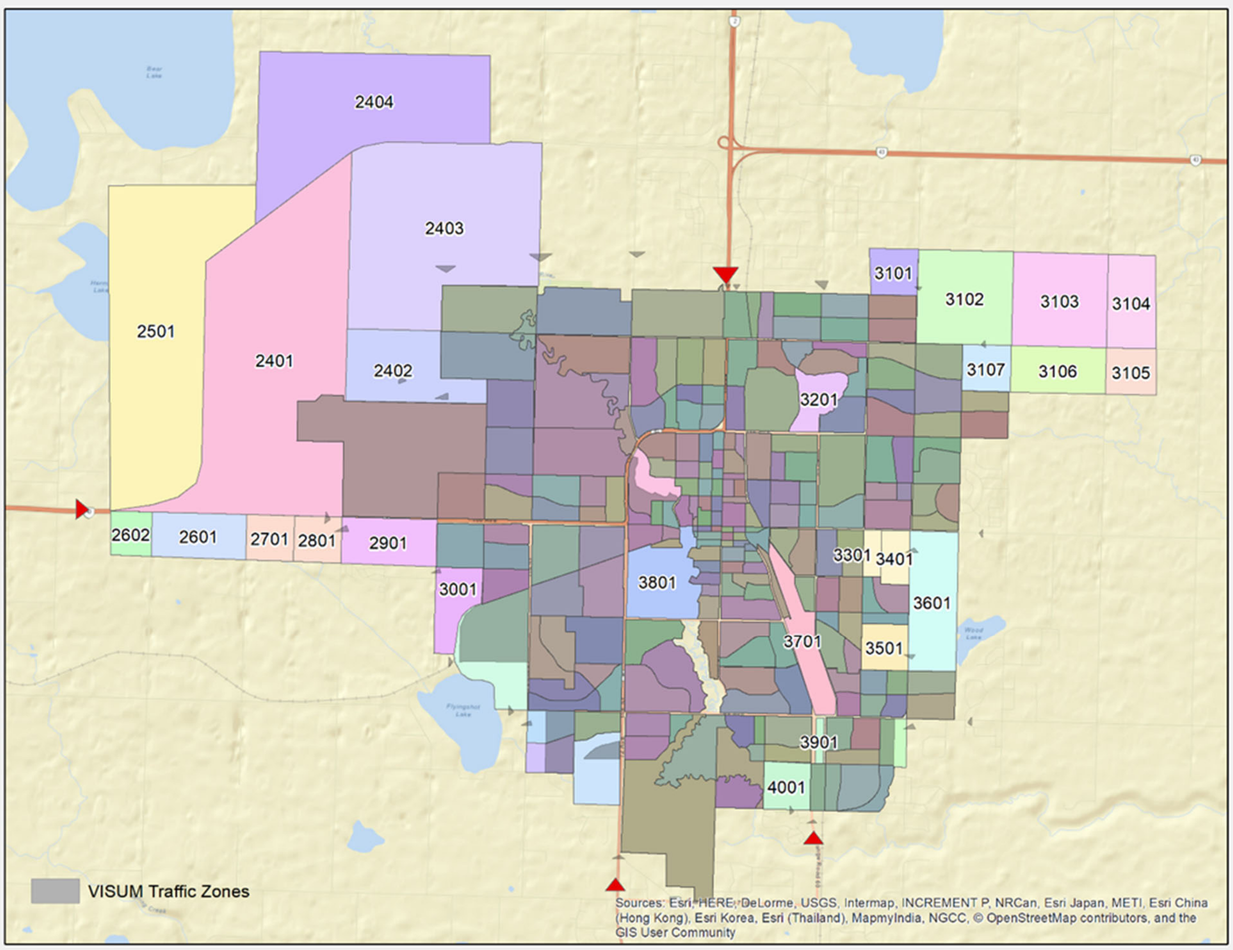
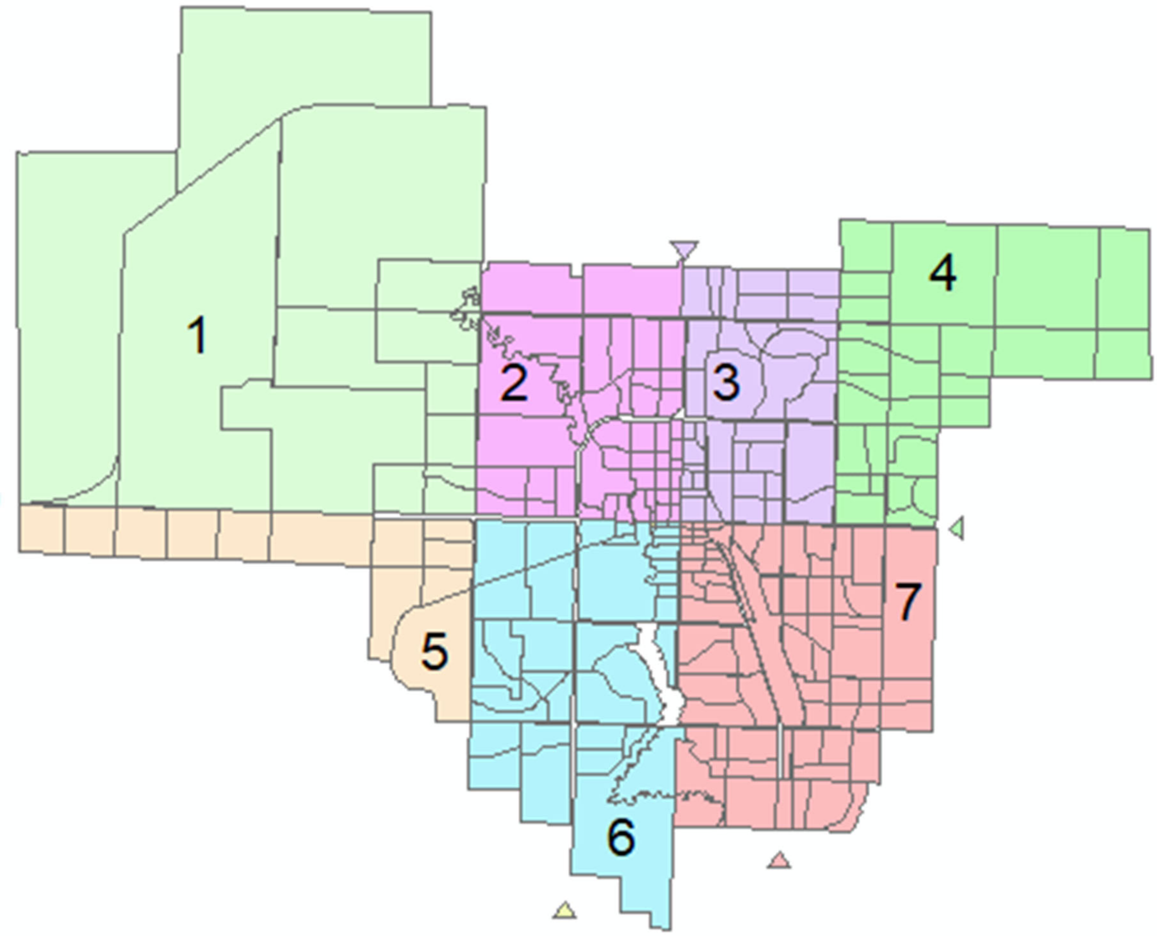


Figure 5 Traffic Zone System Sub-areas



3.1.1. Land Use Data

The development of the base land use data is derived from the 2016 Census with the traffic zone allocation based on the City's land use information. ***Figure 6*** shows the designated land uses within the City boundaries based on parcel level data. This was used to first identify residential locations to allocate dissemination area level population estimates from the Census. It was also used to identify other major activity centres within commercial, industrial and institutional land uses.

The next step involved taking the parcel level household unit data and allocating it to the traffic zone level of detail. The number of household units from the parcel level data was normalized to the total number of households from the Census at the dissemination level of detail, see ***Figure 7***. On average, each "single unit household" represents 0.96 household units due to areas of no residents as well as green spaces mixed within the land use. On average, each "multiple household units" represents 19.3 household units due to apartments and housing developments on one big block. Each dissemination area has unique "single unit household" and "multiple household units" multipliers based on the land development characteristics of each sub-area.

Figure 6 Grande Prairie Land Use Designation

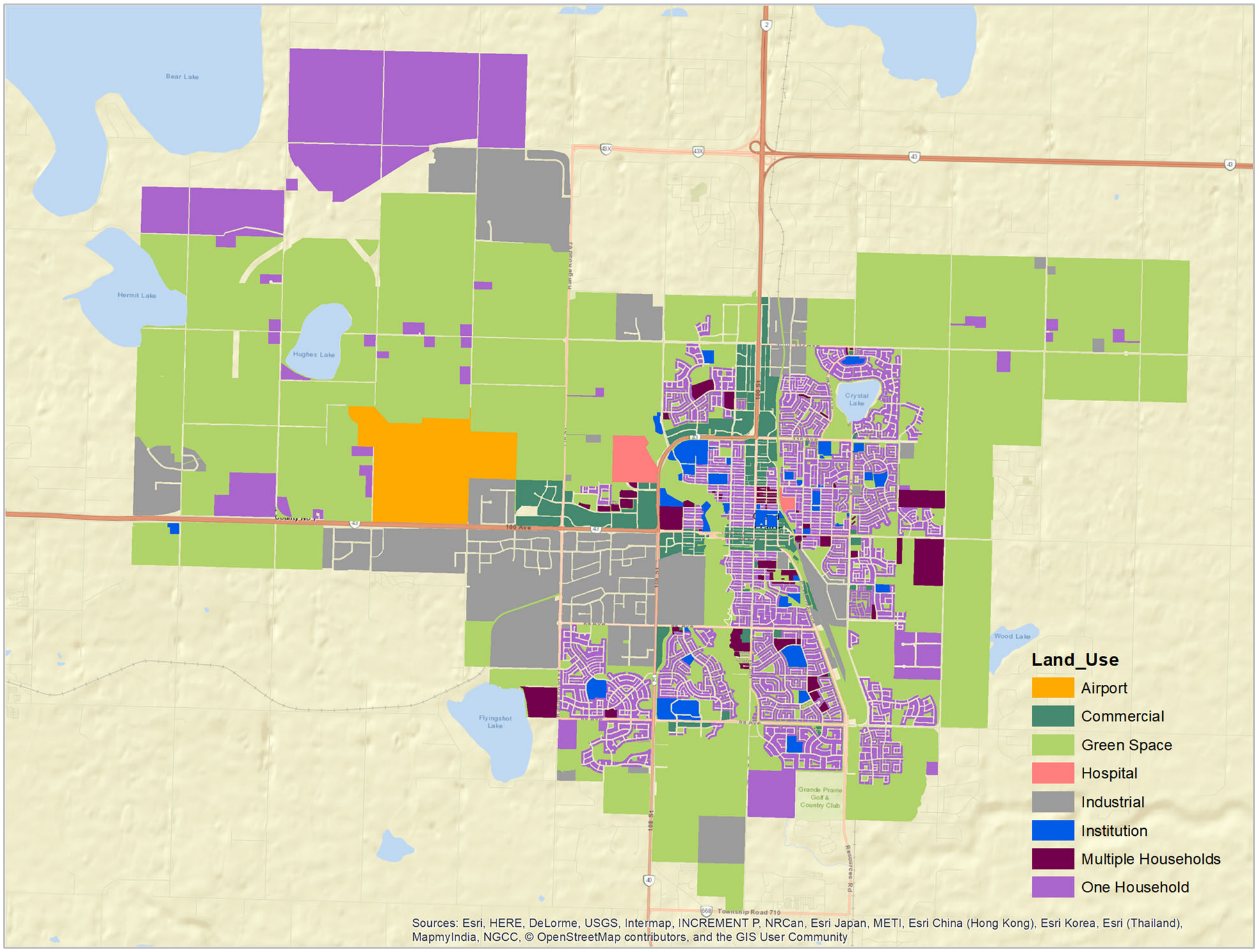
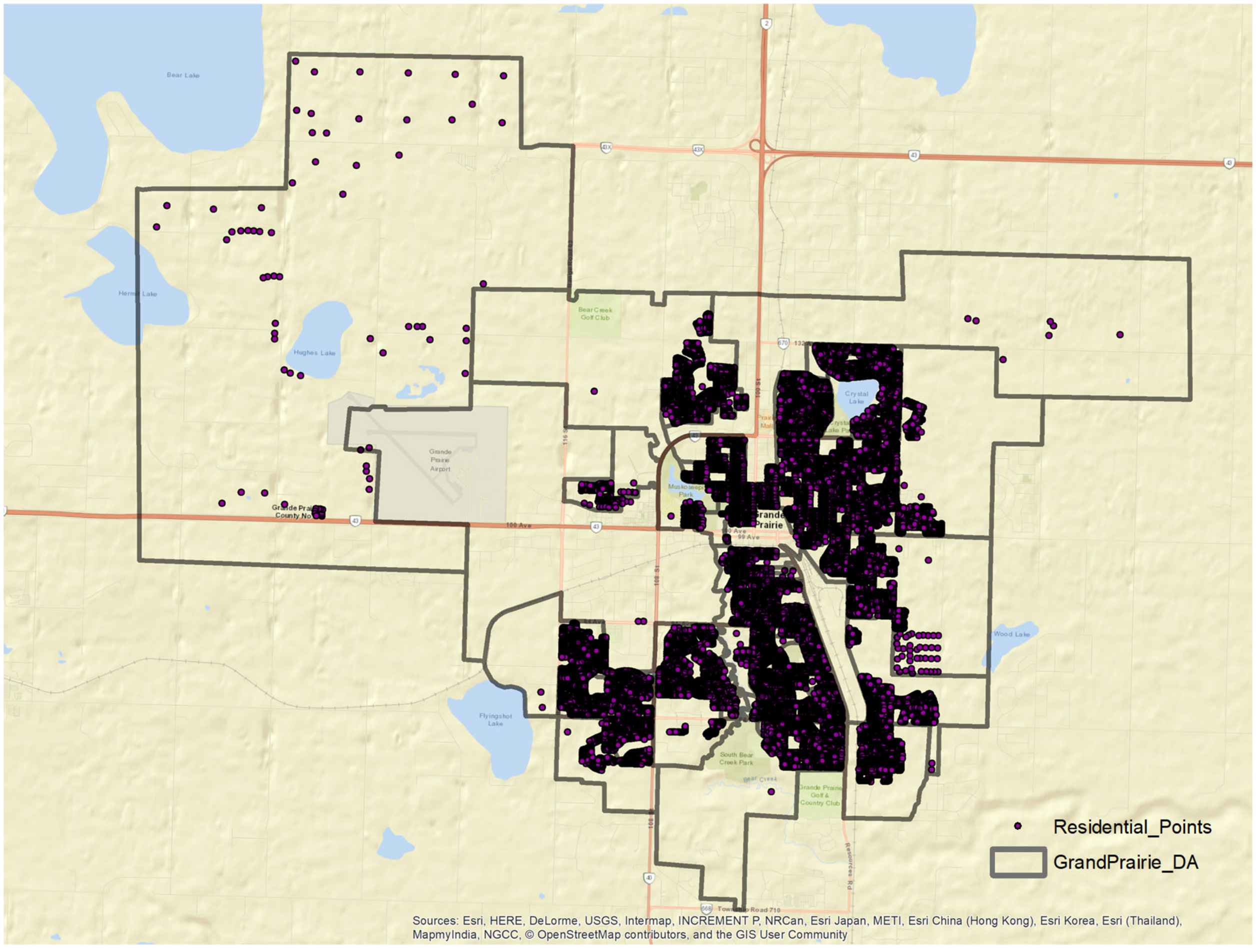
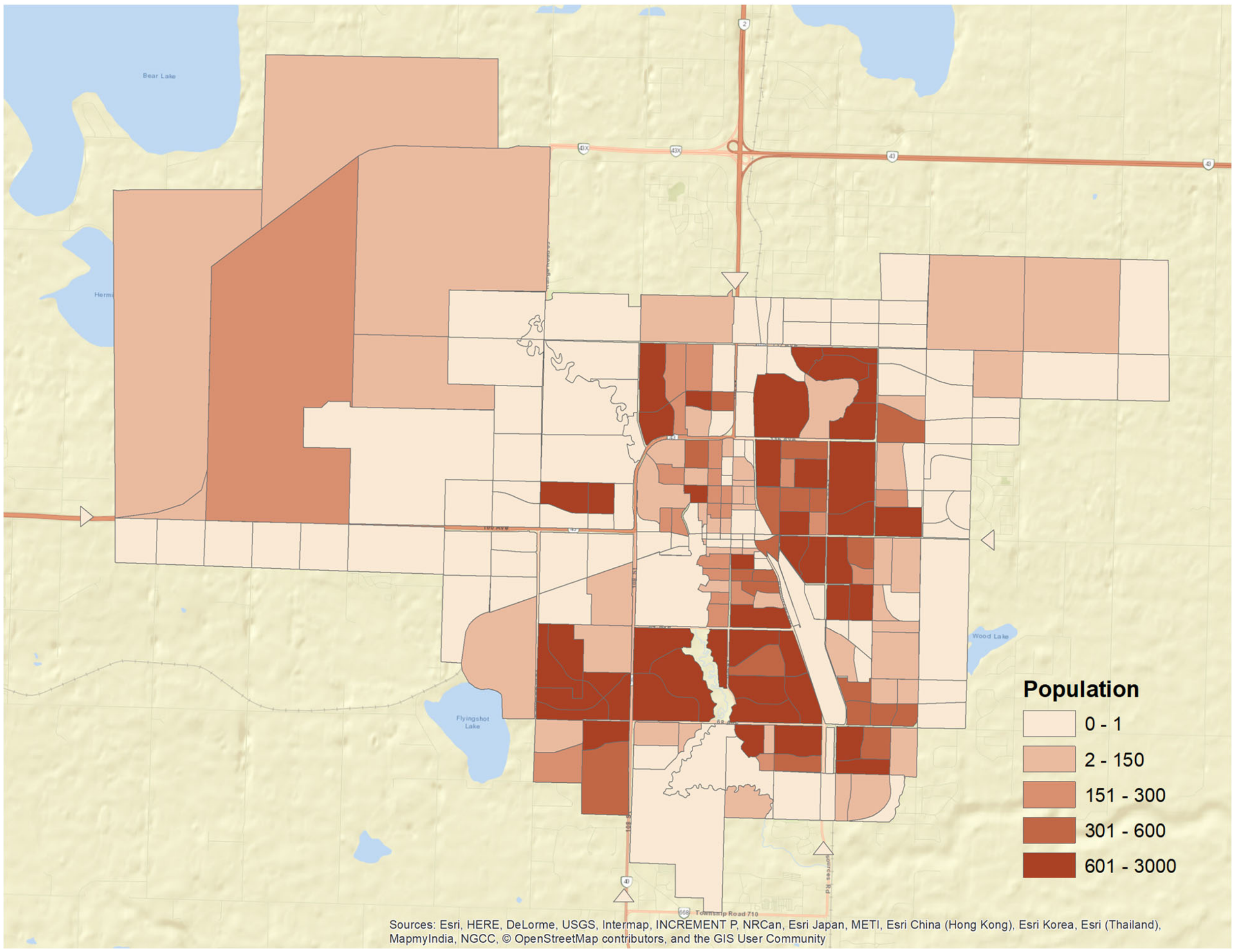


Figure 7 Grande Prairie Household Unit Locations



The household location points were then captured at the traffic zone level of detail and used to develop the total population within each traffic zone. ***Figure 6*** shows the population estimates by traffic zone based on this methodology. The darker shaded areas show higher population zones which generate more trips as described in ***Section 4.***

Figure 8 2016 Population Estimates by Traffic Zones



3.2. ROAD NETWORK AND VOLUME-DELAY FUNCTIONS

The road network provides a means of representing the assigned traffic volumes by link for the entire network for the PM peak hour. The configuration of the network is built from a base GIS layer that provides the initial geometry and physical representation of the network. This layer provides representation of the local, collector, arterial and freeway segments. For travel demand modelling purposes, only the collector roadways and higher classifications are represented as shown in ***Figure 9*** below along with the traffic zone system. This is based on the resolution of the traffic zone system and the model's ability to assign trips to the network. To model the local roadway level of detail would require a much more refined traffic zone system, almost down to the individual parcel level which is not realistic or required for long-range City-wide network planning.

Figure 9 Traffic Zone System Sub-areas

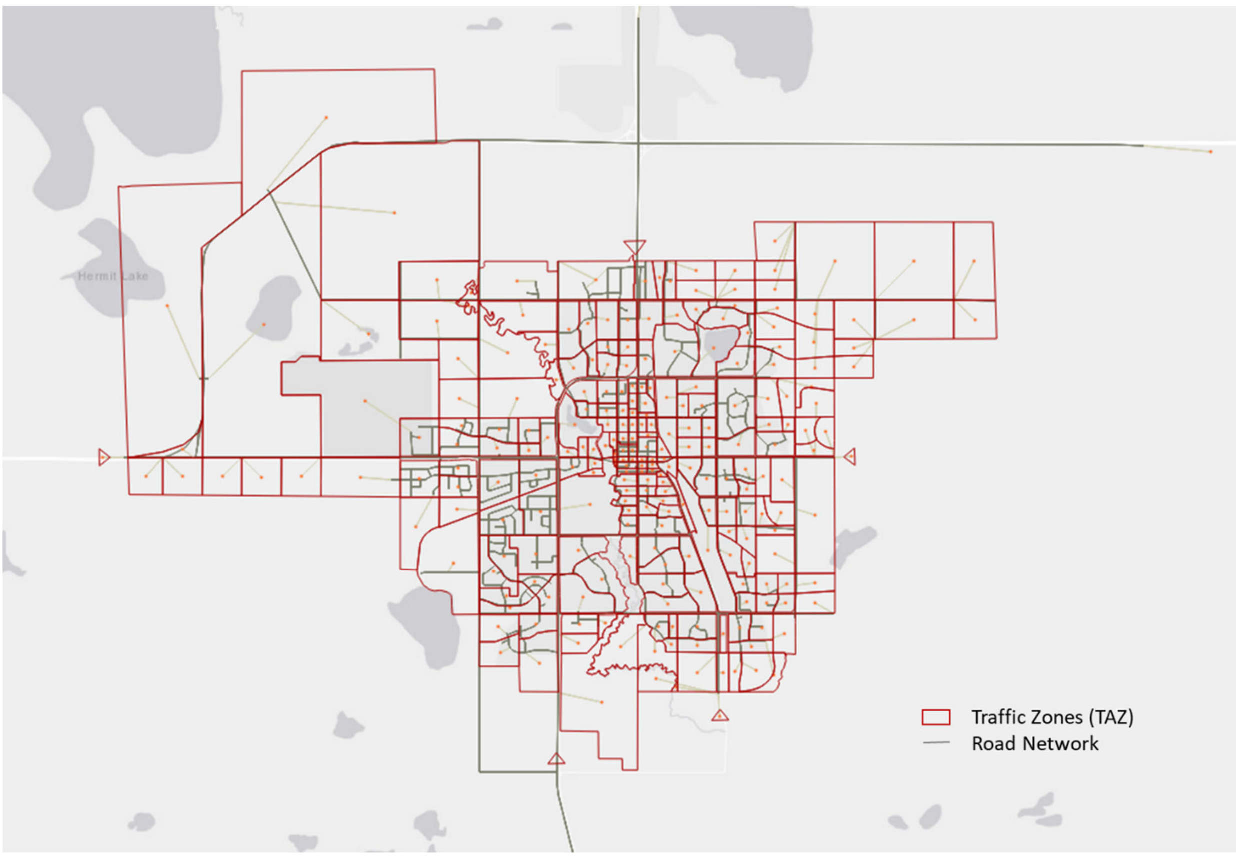
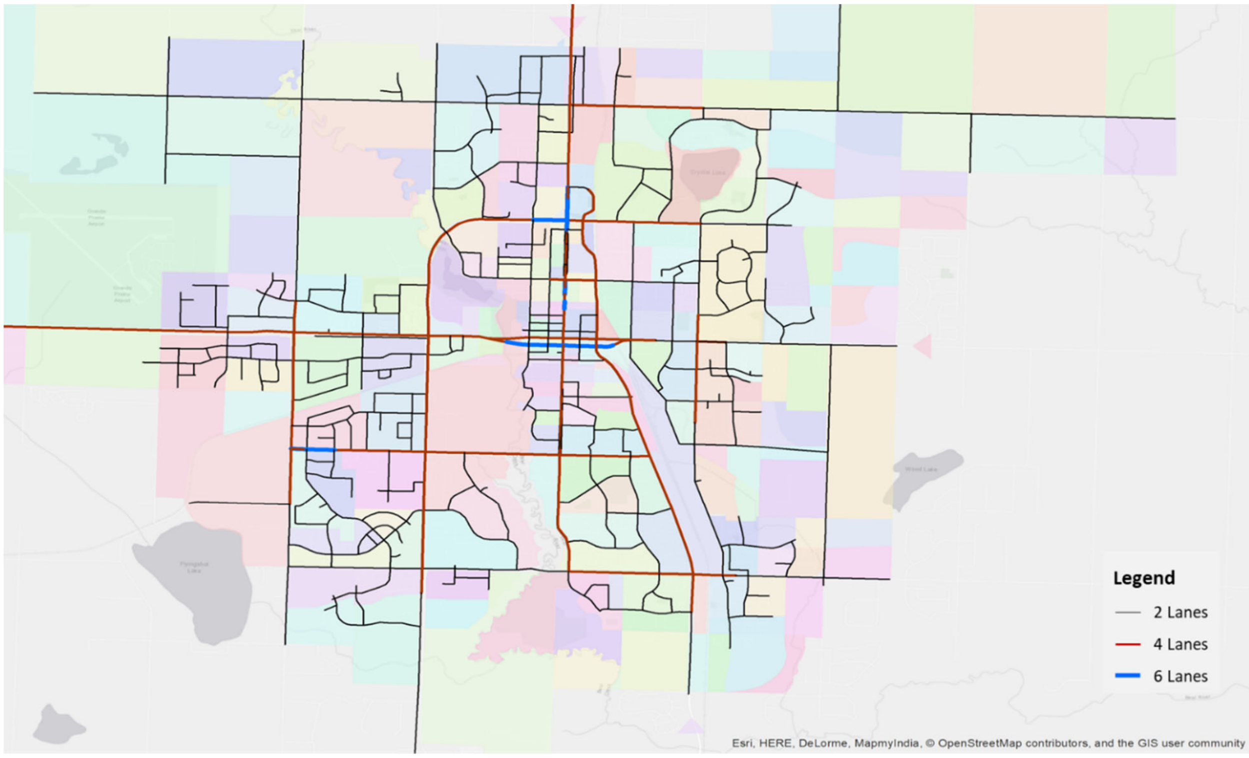


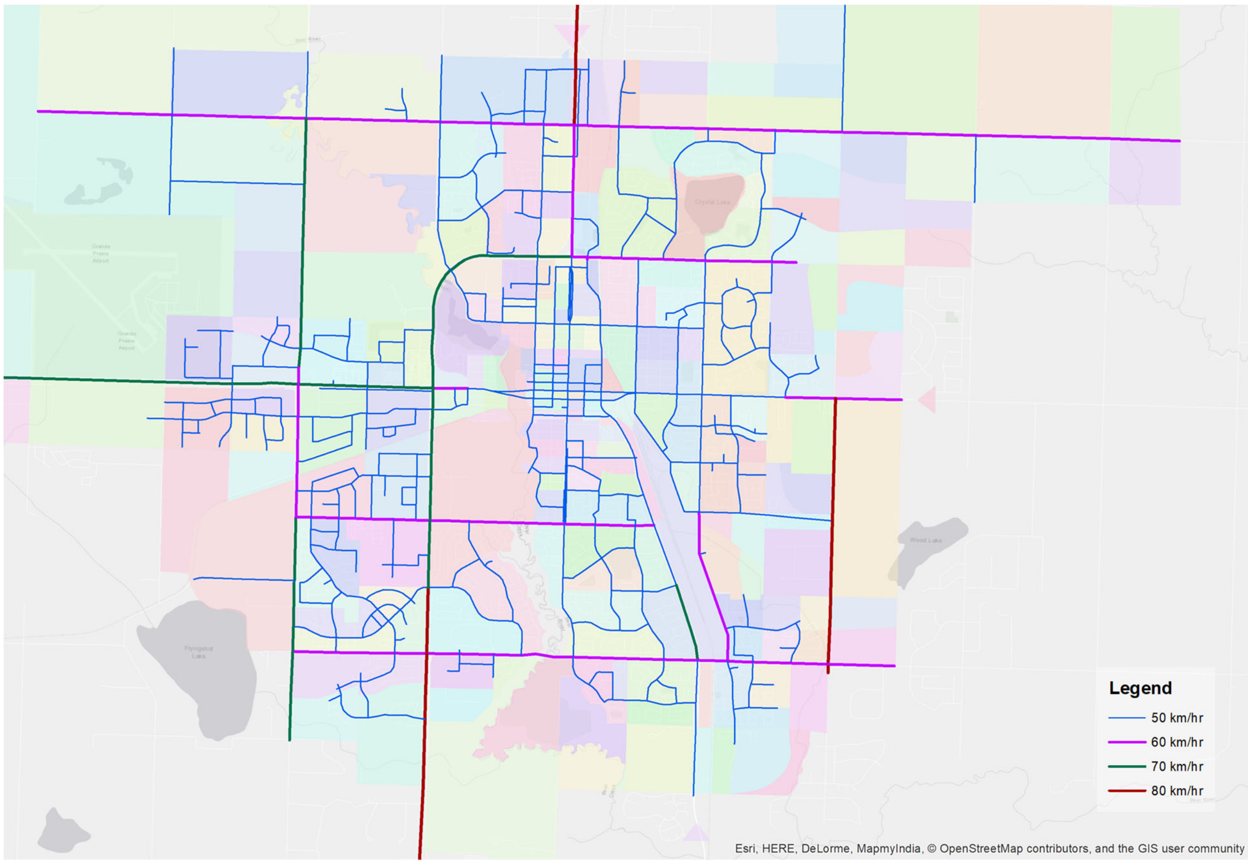
Figure 10 provides a map showing the extent and coverage of the model roadway network including the number of directional mid-block lanes. For clarification, a link with two lanes is representing one lane in each direction. Additional lanes at intersections are represented through use of volume-delay functions. As a point of clarification, each link is also represented by a node at each end. Each directional link is defined to have a starting node (or the i-node) and an ending node (or the j-node).

Figure 10 Road Network Representation with Number of Lanes



In addition to the number of lanes, the road network contains other attributes that represent the physical characteristics of the network. These include the link length, posted speed limit and capacity represented by a volume-delay function as explained in ***Section 3.2.1. Figure 11*** provides a map of speed limits within the Grande Prairie network.

Figure 11 Posted Speed Limits by Link



3.2.1. Volume-Delay Functions

Capacity on the Grande Prairie transportation network is represented through use of volume-delay functions (VDFs) that are based on a correlation between link volume and congested travel time. A VDF is assigned to all network links and the formulation of congested travel time is a function of vehicle volume, posted speed, nominal lane capacity and the number of lanes. Network links are assigned a two-digit VDF number which identifies the facility type and the nominal capacity per lane of these links.

Specialized VDFs have been developed for links that represent either a free flow or controlled intersection at the end of the link, or the j-node. Controlled intersection are those that include a traffic control device such as a stop sign, a traffic signal or a roundabout. VDFs for these links consist of three parts: a constant fixed delay, a free flow component and a congested component defined as follows:

- **Constant Fixed Delay** – To reflect the additional delay of "missing the green light" a constant term of 0.1 minutes (or 6 seconds) is added to each intersection-based VDF which produces some average delay at all controlled intersections.
- **Free Flow Component** – Takes into consideration the travel time under free flow conditions. The travel time is calculated based on the posted speed limit on the link and the distance travelled.
- **Congested Component** – Includes delay which increases the link's travel time exponentially (to the power of four) once the volume exceeds the link's nominal capacity. Multiplying this component by a factor of 0.85 was found to improve the model fit against observed travel times.

The general formulation for VDFs ("fd_{int}") is shown below. Note that operating volumes include auto volumes which are determined within the model during the assignment stage, plus the volume of commercial vehicles or trucks which also operate on the network.

$$fd_{int} = 0.1 + (\text{length} \times 60 / \text{posted speed}) + ((\text{auto volume} + \text{truck volume})/(\text{nominal capacity} \times \text{lanes}))^4$$

As mentioned earlier in the introduction, the numbering scheme for the VDFs was designed to identify the facility type and the nominal capacity per lane for the links in the model. The nominal capacity per lane is dependent on the facility type and can be easily determined by multiplying the first digit of the VDF by 200. As shown in ***Table 1***, links have increasing capacity per lane with each additional approach lane at the intersection, e.g. left and right turn bays.

Table 1 Nominal Capacities & VDF Based on Intersection Control

Controlled Intersections	Nominal Lane Capacity (vph/lane)	VDF
Stop Sign	400	20
Traffic Signal - no additional lanes	600	30
Traffic Signal - 1 additional lane	800	40
Traffic Signal - 2 additional lanes	1,000	50
Traffic Signal - 3 additional lanes	1,200	60
Traffic Signal - 4 additional lanes	1,400	70
Free Flow Link	1,600	80

Plots of each of the VDFs are plotted in ***Figure 12*** for a typical one-kilometre link with a posted speed of 50 kilometres per hour. As shown, once volume reach nominal capacity, the travel time on the link increases geometrically. Nominal capacity can also be expressed as the onset of delay with true capacity being the total measured traffic throughput during peak conditions. ***Figure 13*** shows the location of all existing signalized intersections in the Grande Prairie transportation model. For further clarification on definitions, ***Figure 14*** and ***15*** provide illustrations of VDFs at example intersections.

Figure 12 Volume Delay Function Plots of 1 km Link at 50 kph

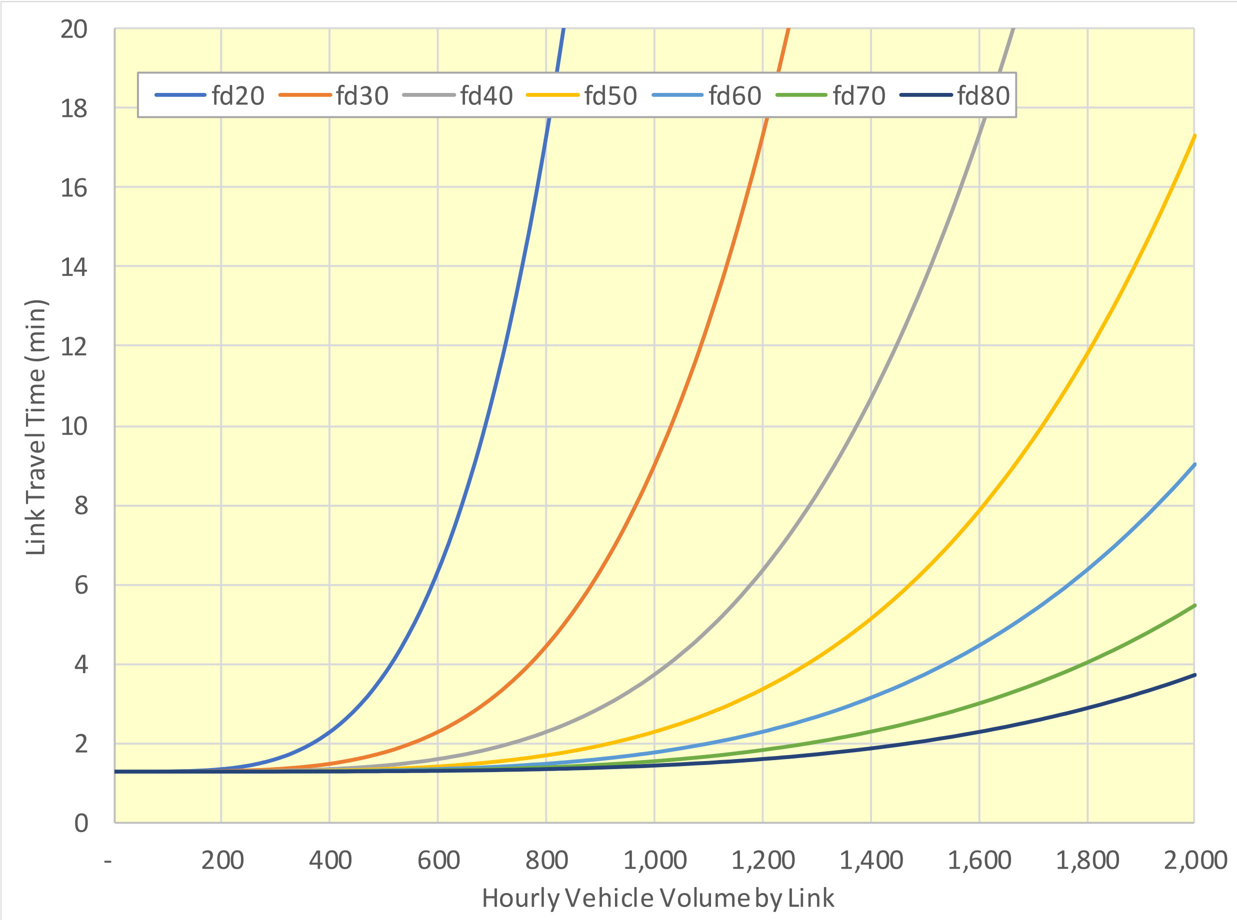


Figure 13 Existing Traffic Signal Locations

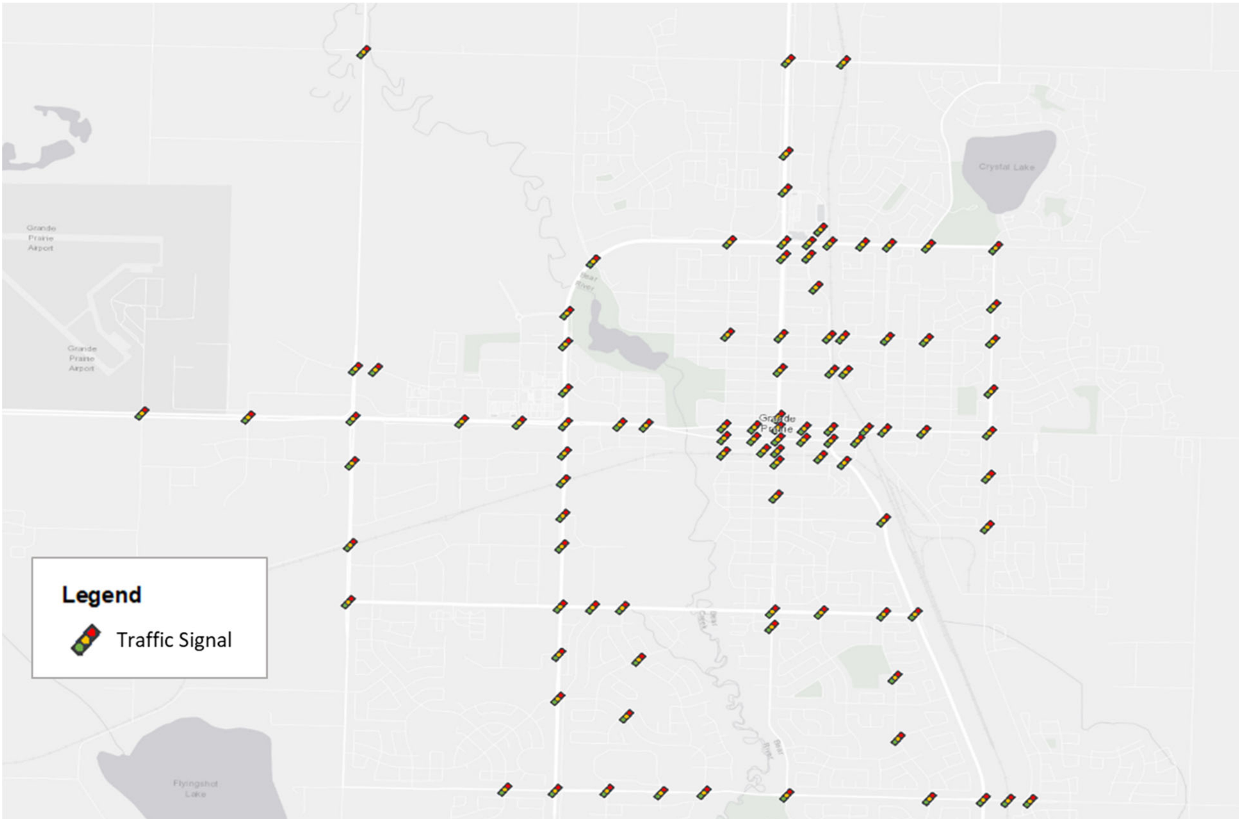


Figure 14 Volume Delay Function (VDF) for Signalized Intersection

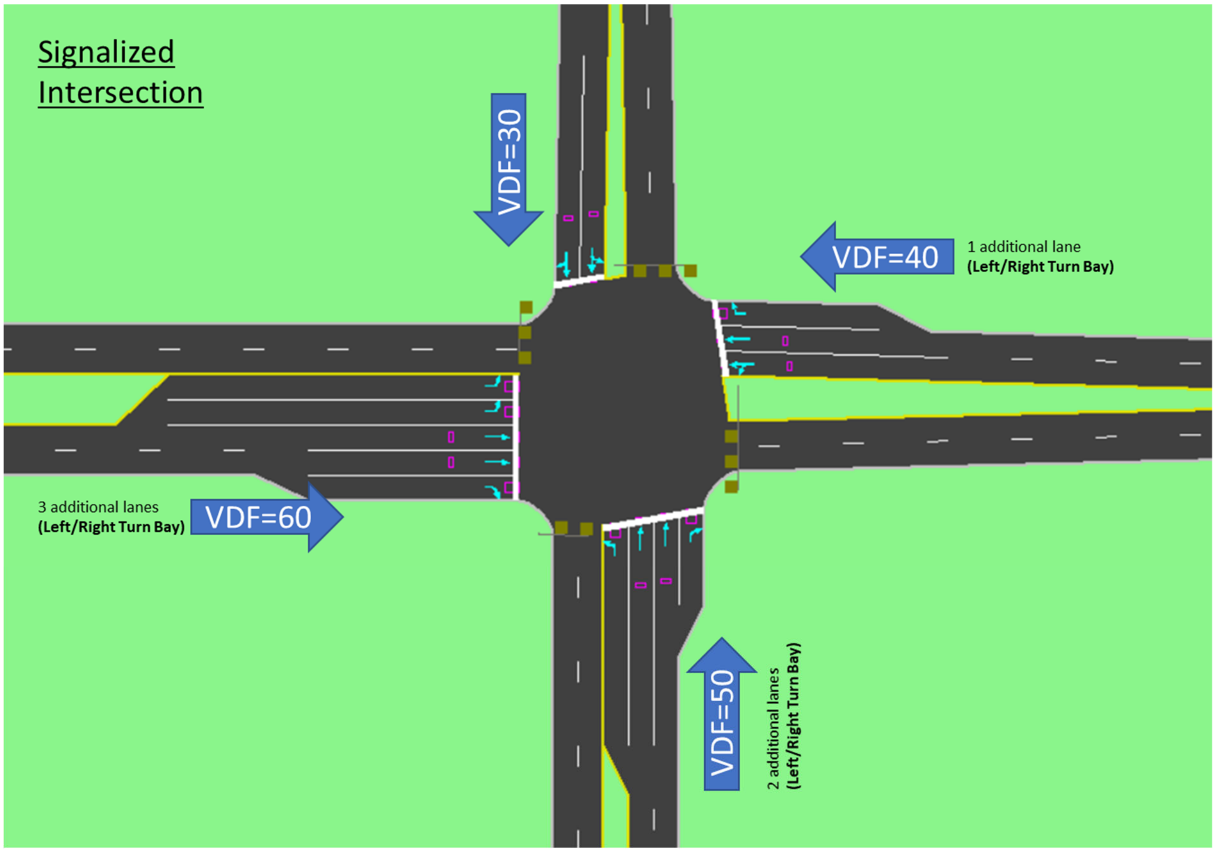
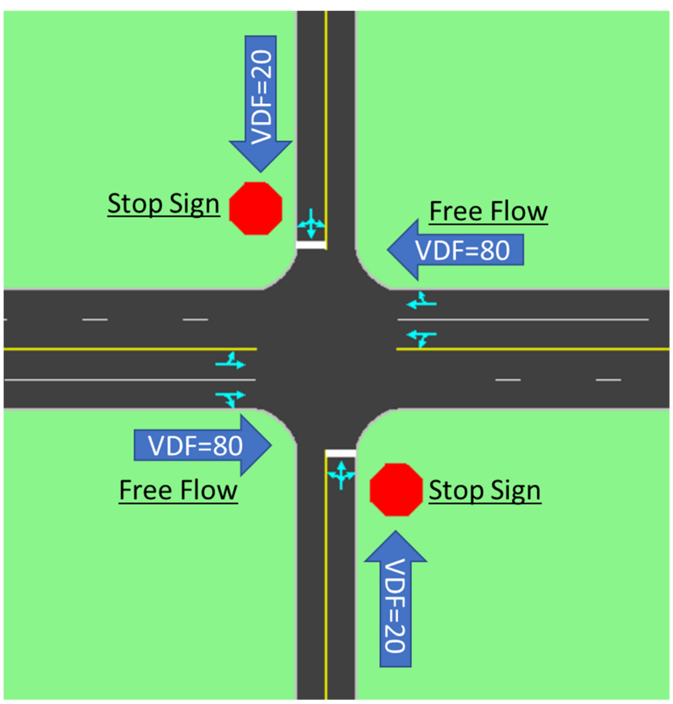


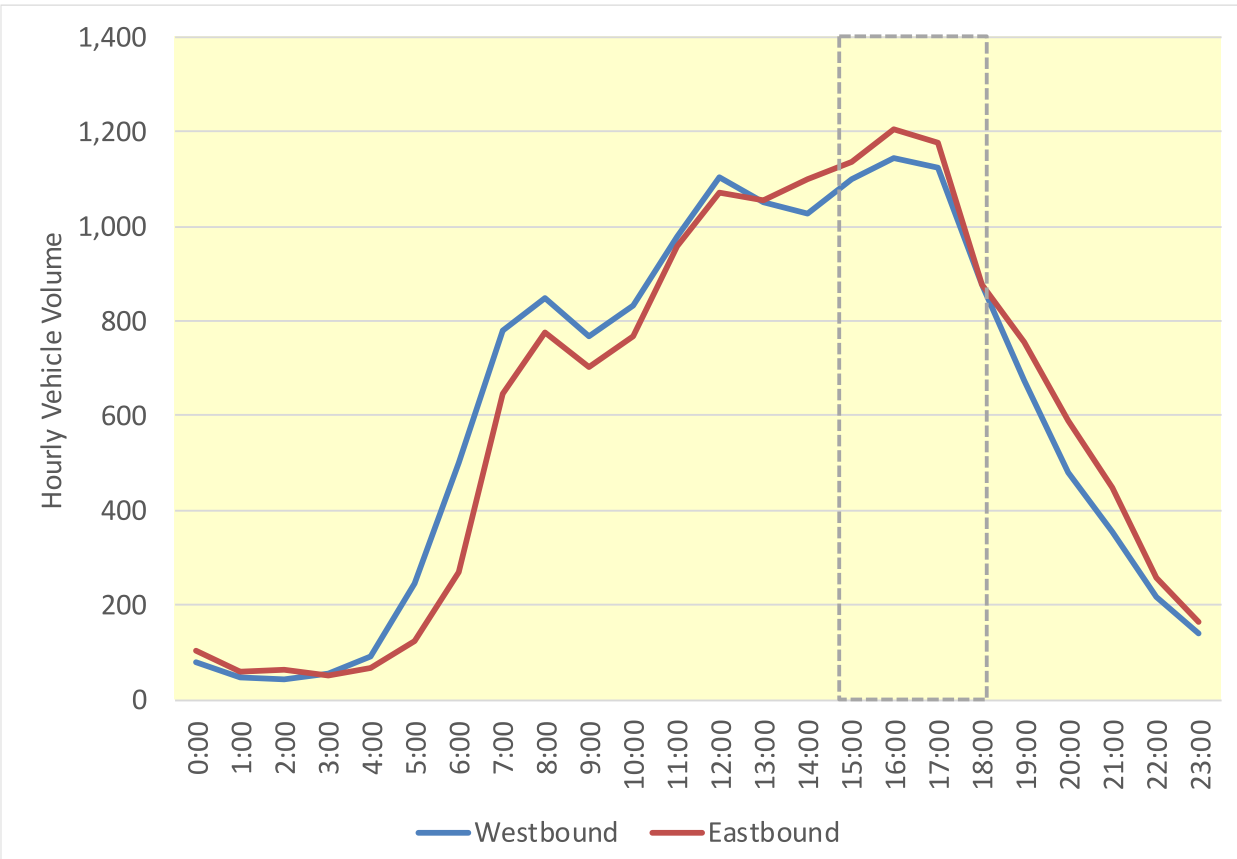
Figure 15 Volume Delay Function (VDF) for Unsignalized Intersection



4. Base Year Model Development

The City of Grande Prairie transportation model serves as a tool for understanding travel impacts such as population growth and transportation investment. Based on recent traffic counts showing the busiest time periods and discussions with the City, the Weekday PM Peak was selected as the basis for the transportation model. ***Figure 16*** shows the hourly traffic profile for Highway 43 just west of 102 St, highlighting the afternoon peak as having the heaviest traffic volumes. While specific neighbourhoods may have higher traffic volumes at other times of the day or the week, for the purposes of modeling, the Weekday PM Peak is generally the busiest time period on a network basis. Using localized information about the nature of traffic patterns and land use, the results of the PM Peak analysis can be extrapolated to infer traffic patterns at other times of day as required. This section describes the validation metrics that were gathered and summarized to calibrate and validate the Grande Prairie transportation model.

Figure 16 Hwy 43 Traffic Count Showing PM Peak Period



4.1. VALIDATION DATA

As mentioned earlier, the model's specification and predictive capability is a function of the quality and completeness of the data feeding into each of its components. This section provides a description of the validation data and metrics that were used in developing the City's travel demand model.

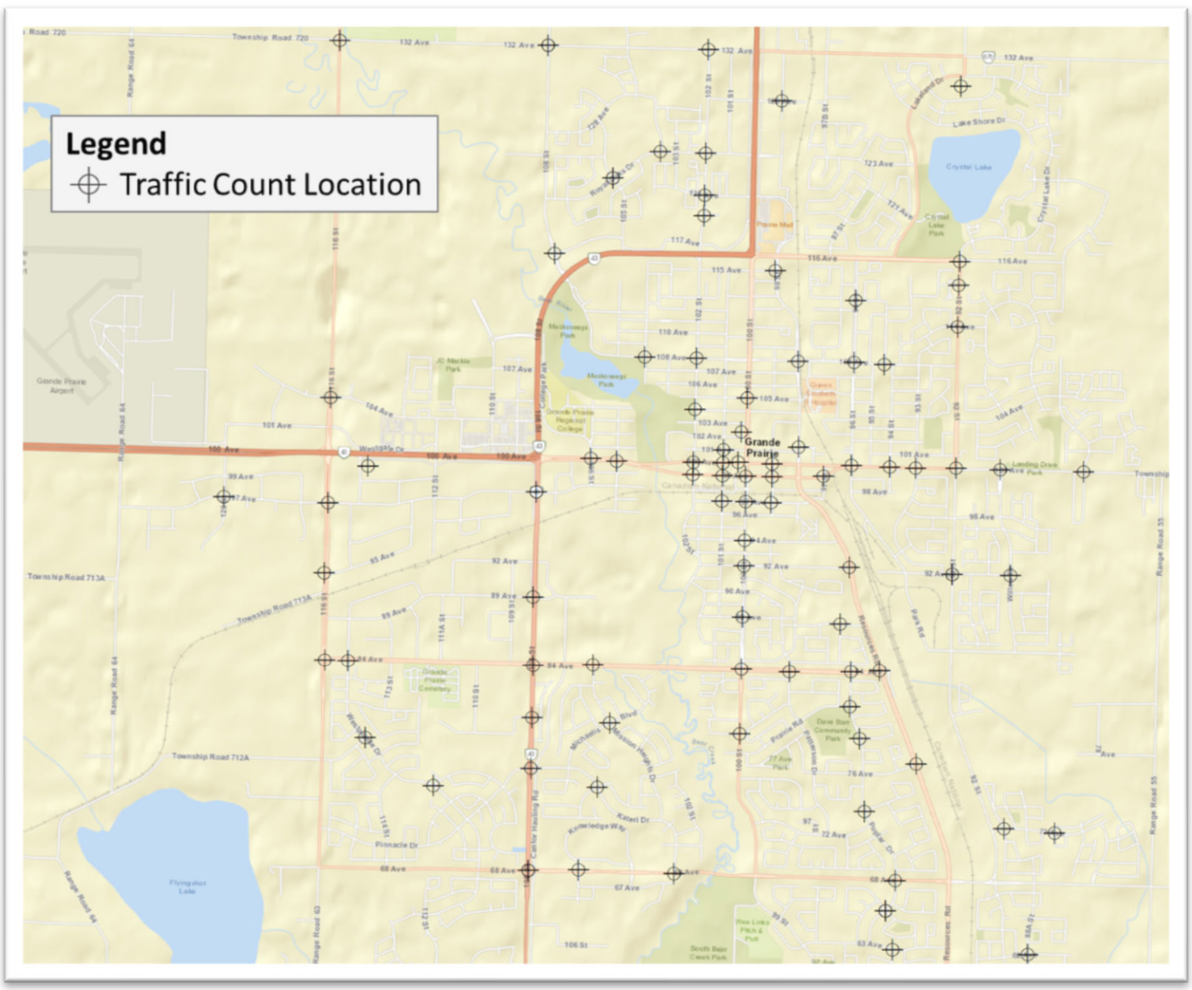
4.1.1. Traffic counts

Several sources of traffic count data were made available for validating the transportation model. These counts represent the number of vehicles passing over a specific location, usually at 15-min intervals by direction. For the City of Grande Prairie, this data is used to determine the number of vehicles travelling past specific locations throughout the afternoon peak period. The vehicle volumes profile was used to determine the true peak hour. The following sources were used to collect traffic count information:

- Alberta Transportation Permanent Counters
- City of Grande Prairie Short Counts
- City of Grande Prairie Intersection Turning Counts

Figure 17 shows the location of all traffic counts that were used to validate the Grande Prairie transportation model. All traffic count data was summarized for the afternoon peak period (3:00-6:00 pm) for model validation purposes.

Figure 17 Traffic Count Locations



4.1.2. StreetLight Origin-Destination Data

Origin-destination data is information about where travellers within and through Grande Prairie start and end trips within the network. This data shows how, when, and on what routes people are travelling, as well as the number of trips that are local versus outside city limits. Consequently, this data is the major source for model calibration. For the City, origin-destination data was derived from ***StreetLight Insight***.

StreetLight Insight is an online platform that algorithmically integrates trillions of spatial data points from millions of devices – cell phones, connected cars, fleet management systems, smart phone applications, and more – into trips and activities. It allows travel pattern queries by traffic zones, time of day, month, and vehicle type – commercial versus personal vehicles. ***Figure 18*** shows a sample of the Streetlight data; the grey area is the origin traffic analysis zone boundary, distribution of trip destinations are highlighted by a thematic colour spectrum from green to red, with red indicating high activity centres. Travel patterns from the 277 traffic analysis zones discussed in the previous section are extracted as the basis for the origin-destination matrix input to the travel demand model.

Travel patterns provided by StreetLight are expressed as indices, meaning the activity intensities are relative to other traffic zones. In order to normalize the demand patterns to traffic counts over the same period of the query at a permanent counter, a factoring approach was employed. ***Figure 19*** maps the six Alberta Transportation permanent counters in the study area. They cover major gateways in and out of the City of Grande Prairie on the North, West and South end. AADT at these traffic count locations are loaded into the Streetlight algorithm to calibrate travel demand to absolute number of trips. This travel demand matrix becomes the foundation for calibrating the Grande Prairie transportation model discussed in ***Section 4.2.***

Figure 18 StreetLight Project Example

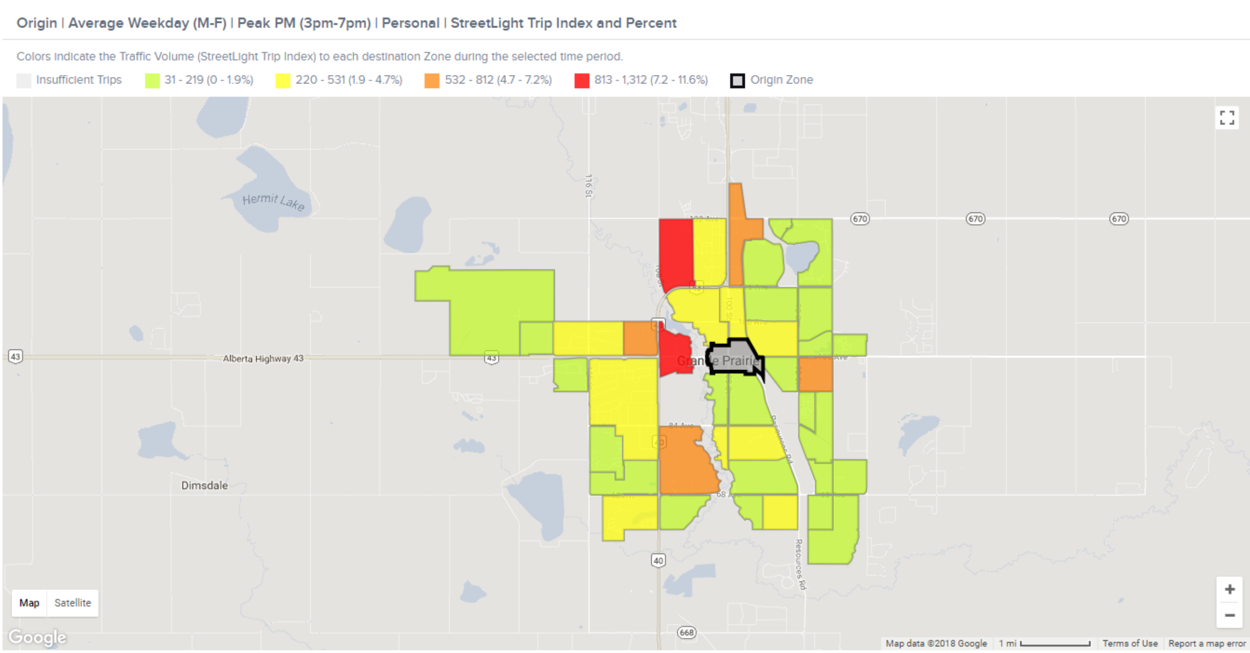
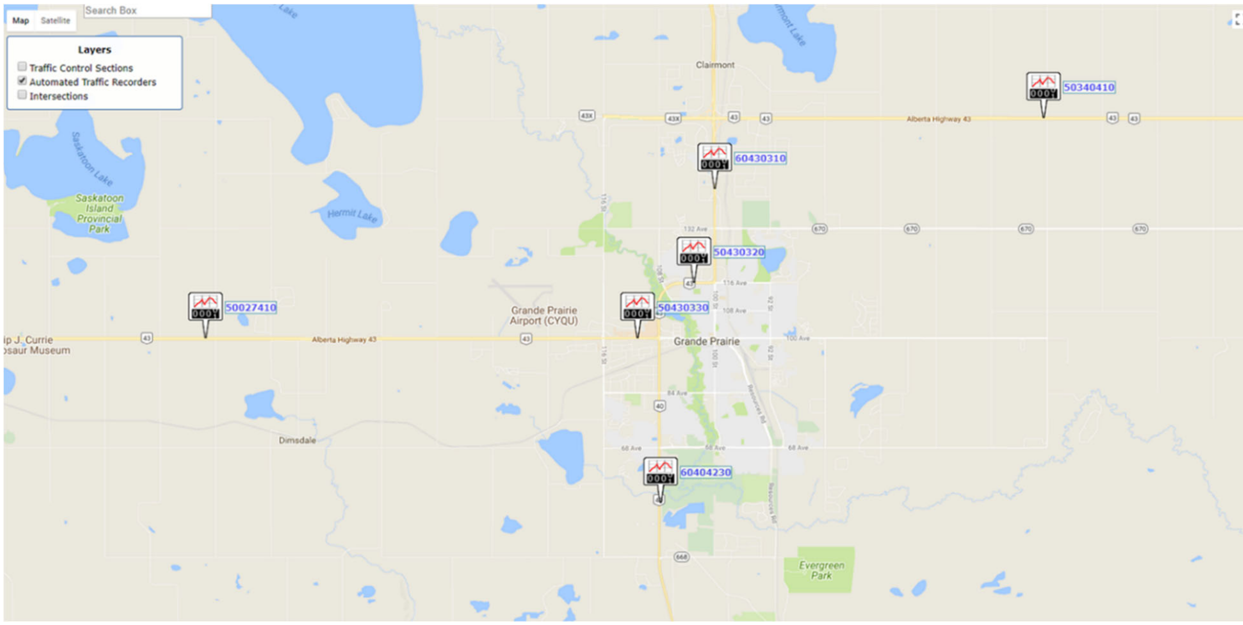


Figure 19 StreetLight Project Calibration Locations

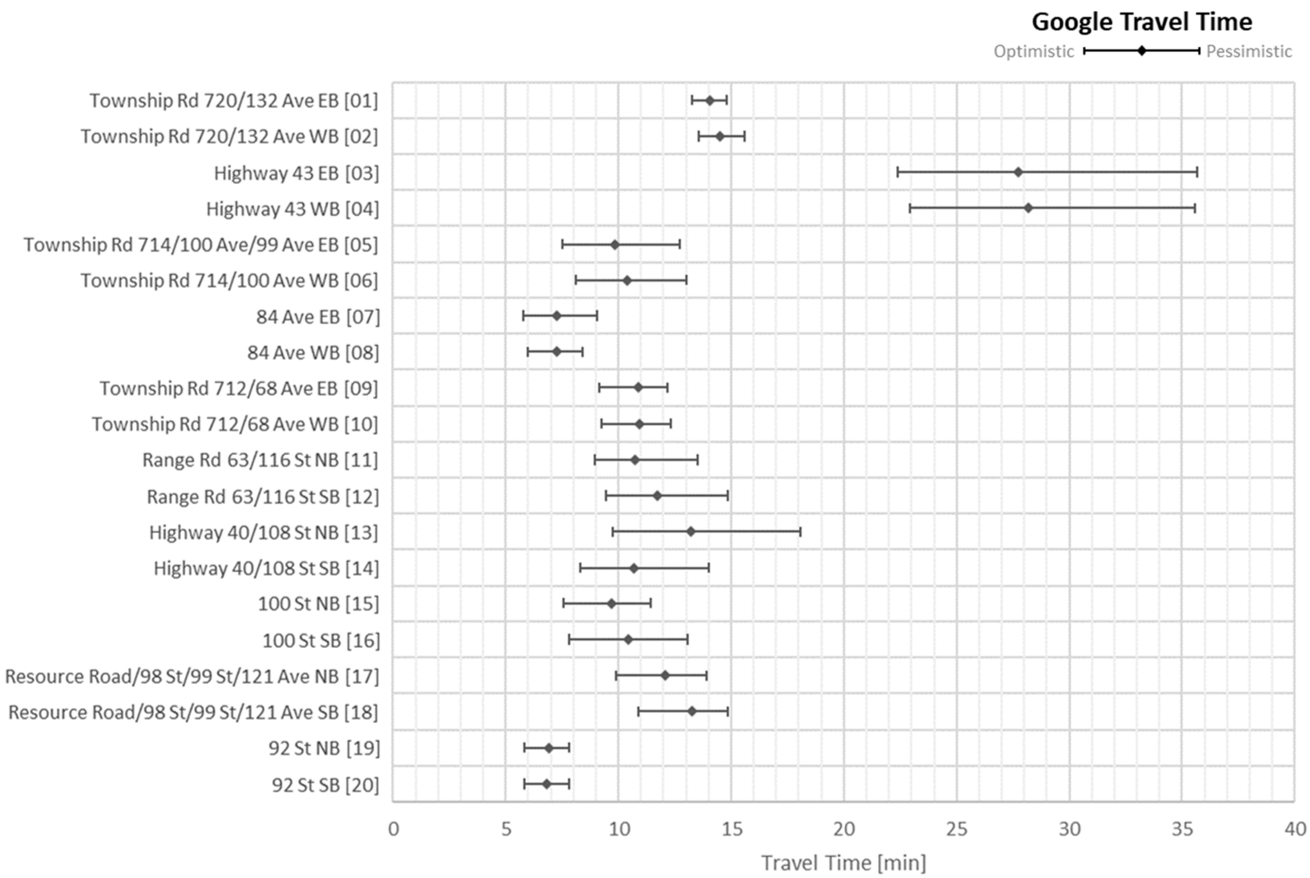


4.1.3. Google Maps API Travel Time

Model calibration is also based on information about the speed that traffic is currently measured moving through the network. The Google Maps API provides travel time information as a range of pessimistic to optimistic estimates as well as a best guess. This provides a range of travel times during different parts of the day useful for validating the Grande Prairie transportation model. A trip is defined as an origin-destination pair, with a departure datetime. In this assignment, the departure times are scheduled at 15-min intervals from 3pm to 6pm on Tuesday, Wednesday and Thursday to represent the typical afternoon peak period condition. Travel times on ten corridors by both directions were queried to validate against the modelled travel time that informs route choice in the model. ***Figure 20*** illustrates the coverage of the travel time validation corridors, which includes major roadways in the city. Corridor end-to-end travel times are shown in ***Figure 21***.

Figure 20 Travel Time Validation Corridors

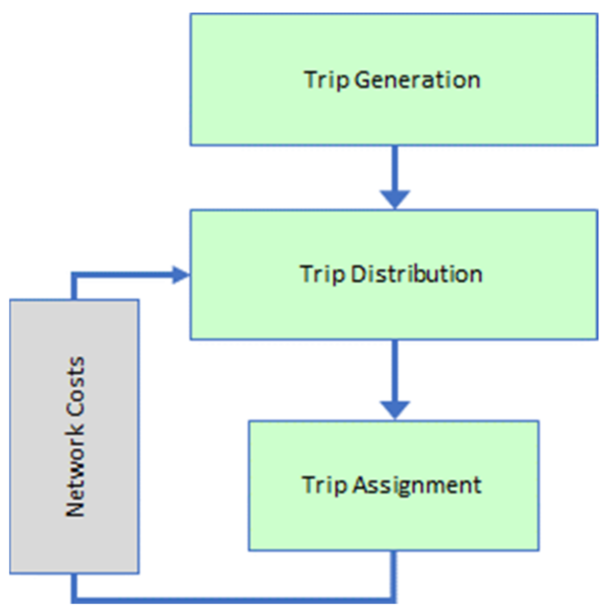
Figure 21 Google Travel Times for Major Corridors



4.2. BASE YEAR CALIBRATION

The origin destination matrix developed using StreetLight and traffic count data provided the primary data set for developing the Grande Prairie transportation model. This section provides a summary of the calibration of the base year model for trip generation, trip distribution and trip assignment. The model structure was based on the standard four-step travel demand modelling procedure shown in ***Figure 22***. The model cycles between the trip assignment and trip distribution stages to reach an equilibrium state discuss further in ***Section 4.2.2.*** Note that a mode split formulation for transit was not included in this version of the model.

Figure 22 Grande Prairie Transportation Model Structure



4.2.1. Trip Generation

The first stage of the model calculates the number of trips generated by each traffic zone. The trip generation rate is 0.4 trips/person during the PM peak hour on the attraction end. This was the observed trip generation rate using the expanded StreetLight OD matrix which was then assigned to the network and validated using the traffic count information. In other words, the assigned survey matrix match observed traffic volumes at key locations.

This trip rate benchmarks closely to trip diary benchmarks from Metro Vancouver which sees 0.34 trips per person and the City of Kamloops also see 0.34 trips per person. It's important to note that these surveys were self reported by survey respondents online where there tends to be some under-reporting of trips. As such a higher, and more accurate, trip rate estimate is derived form the passive smartphone data collection from the StreetLight dataset.

For the PM peak hour, the dominant pattern is trips from work to home. On the production end, trip generation is based on ITE Trip Generation rates for the following land use types:

- Commercial: 3.71 trips per 1,000 square feet
- Industrial: 0.97 trips per 1,000 square feet
- Hospital: 0.93 trips per 1,000 square feet

Trip productions are then balanced to trip attractions in the trip distribution stage using a gravity model formulation described in the next section.

4.2.2. Trip Distribution

The trip distribution component determines the number of person trips travelling between OD pairs throughout the study area. This stage involves several steps beginning with the calculation of trip impedances which is another way of expressing travel costs. The model uses a generalized cost formulation that combines travel time and out of pocket costs (vehicle operating, parking, etc) converted to generalized costs minutes using the value of travel time determined earlier. Based on the structure of the model and how it cycles through network costs, trip distribution is affected by changes to the network. Trip distribution is also then affected by growth in congestion on the network which has a tendency to shorten trip lengths.

The trip distribution component of the model is based on the gravity model formulation which predicts the intensity of trip making between OD pairs based on the number of trips generated (similar to mass) and their proximity (distance) to each other. This formulation has been used extensively across various travel demand models and provides a robust formulation to account for travel behaviour changes as a city grows and develops in the future.

The calibration of the trip distribution component was based on the seven super zones as discussed earlier in ***Figure 4*** of ***Section 3.1***. A matrix balancing procedure in EMME is used to scale trip productions to trip attractions. ***Table 2*** provides a summary of the origin-destination table derived from the

StreetLight OD dataset. There are a total of 29,000 trips made during the PM peak hour, 88% of which are internal within the City of Grande Prairie and 12% of which are external trips defined as having one or both trip ends outside City boundaries.

Table 2 Origin-Destination Table for 7 Super Zones

	GY 01	GY 02	GY 03	GY 04	GY 05	GY 06	GY 07	External
GY 01	20	30	10	-	10	50	40	30
GY 02	90	1,600	1,130	10	170	1,550	1,350	420
GY 03	40	1,400	1,530	50	70	740	930	550
GY 04	-	70	80	10	-	50	80	40
GY 05	-	130	130	-	20	220	390	50
GY 06	80	1,490	900	30	230	3,290	2,240	400
GY 07	30	1,100	1,070	40	80	1,710	1,260	240
External	30	410	930	20	20	320	290	40

Figure 23 provides the formulation for estimating trip impedances as well as a conceptual diagram of the trip-origin-destination matrix with intrazonal trips highlighted in orange. There are a number of calibration coefficients that were adjusted for observed travel behaviour in the City of Grande Prairie. The beta coefficient was adjusted to fit the general distribution of trips observed in the city which has a scaling effect on the shape of the model's trip length distribution. Generalized costs are calculated from the previous iteration's trip assignment which outputs travel times between OD pairs. An average 16 minute impedance for intrazonal trips was estimated based on observed travel times within each of the traffic zones. Finally, a set of K-factors were developed to account for travel patterns that could not be explained from the StreetLight dataset which generally provides a 20-25% sample of trips. These form additional model calibration coefficients to account for unique trip making patterns observed in the City of Grande Prairie.

Figure 24 then provides a plot of the trip length distribution for the calibrated trip distribution component showing the number of trips (y-axis) within specific distance bins (x-axis). The red outline provides the trip length distribution from the observed StreetLight OD matrix and then the blue bars show the gravity model formulation. The gravity model provides an average trip length of 3.9 km while the observed is 4.1 km which is sufficient for city-wide transportation planning purposes. The general distribution of trips is well represented using the gravity model formulation which is shown in the closely matched shape of the trip length distribution between modelled and observed.

Figure 23 Impedance Function

$$Imp = e^{[\beta*(GC+IZ)+K]}$$

- β = Coefficient to best fit observed average trip length
- GC = Auto Generalized Cost (in minutes)
- IZ = Intra-Zonal Travel Time Penalty (16 min)
- K = Spatial Distribution Calibration

Time Saving [min]	GY1	GY2	GY3	GY4	GY5	GY6	GY7
GY1							
GY2						-1.9	-3.3
GY3		-5.0	-6.3				
GY4							
GY5			-3.1			-17.5	
GY6					-7.5	-6.8	
GY7		-6.3	-3.8		-8.8		

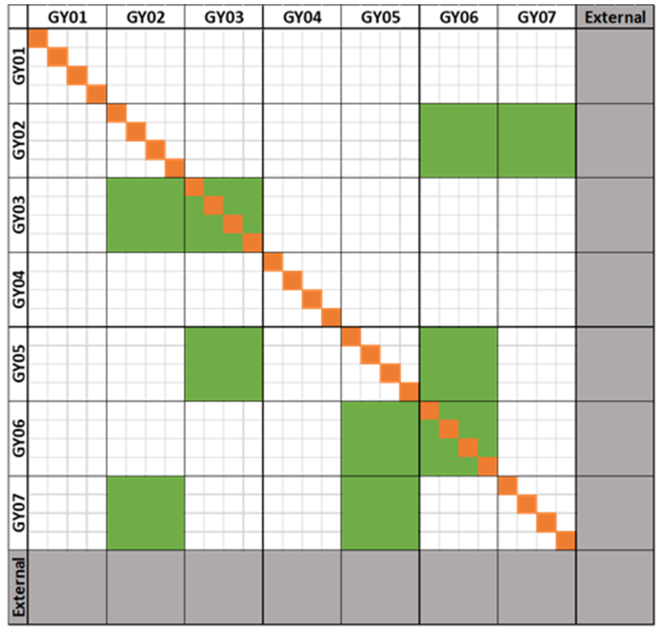
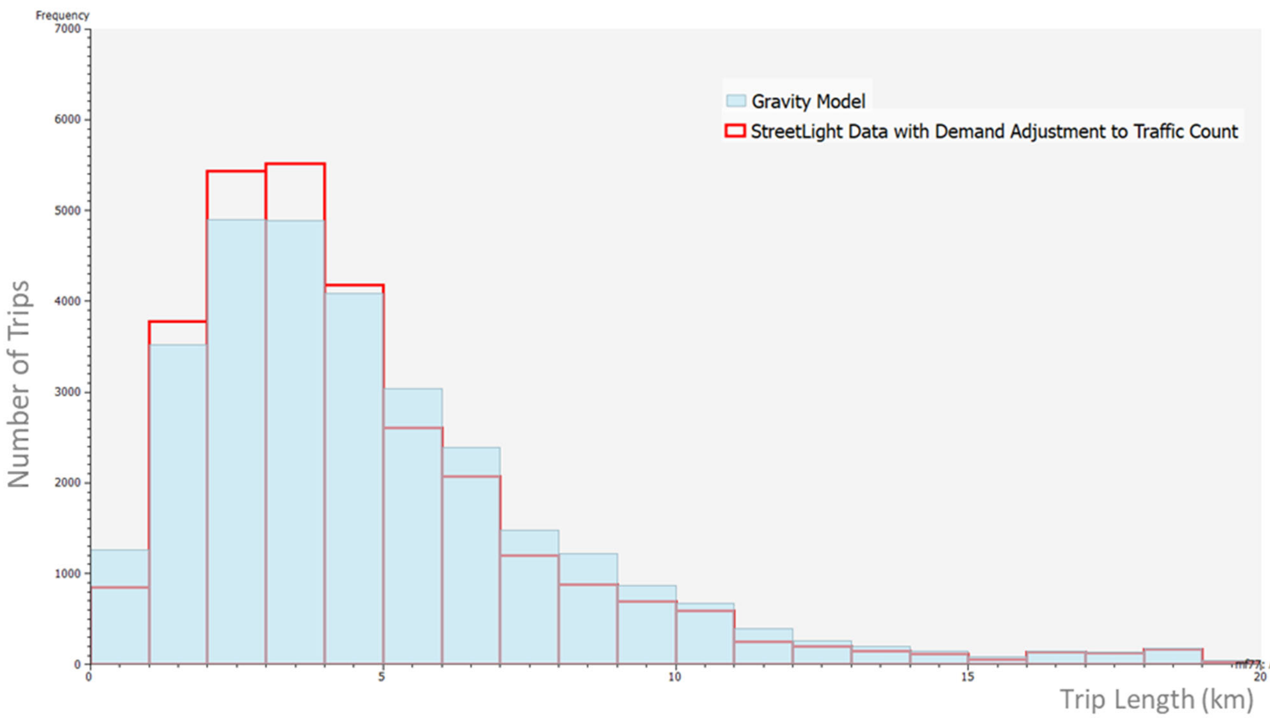


Figure 24 Trip Length Distribution



4.2.3. Mode Split

There was no mode split component included in the Grande Prairie transportation model. Transit (and other sustainable transportation) mode shares were considered small enough to be not included in the analysis at this time. The focus of this analysis was the road network to address current issues and challenges with the historically highest mode share in Grande Prairie, and address the identified issues with rapid community growth and expansion. In the future, as the other modes become more attractive to users, especially with investments in sustainable transportation, these modes can be added to the EMME model for future studies.

4.2.4. Trip Assignment

The final stage of the model is trip assignment where the OD demand matrix is assigned using an equilibrium procedure in the EMME model. An equilibrium assignment uses congested travel time as the cost measure on which trip makers base their route choice. Auto assignment is an iterative procedure that eventually attains an equilibrium state which, by definition, means that no network user can reach their destination by choosing a different route. In other words all network users have chosen their shortest congested time path. Outputs from this stage include network generalized costs as an OD matrix which is fed back into the trip distribution stage. This cycling between trip distribution and trip assignment reaches a primary equilibrium state when output travel times from the assignment stage are equivalent to the travel time outputs from the trip distribution stage.

Further outputs from this stage include network link volumes and speeds. ***Figure 25*** shows the trips assigned to the city's roadway network where the width of each link bar is equivalent to the PM peak hour volume. The red bars show the modelled volumes while the transparent blue bars show the observed volumes from traffic counts. As shown, there is a good fit between modelled and observed traffic volumes. ***Figure 26*** shows a scatterplot of the modelled (y-axis) and observed (x-axis) traffic volumes. Based on a total of 30 observation points, the model has reached an R2 value of 0.86. R2 is a statistical measure that represents the proportion of variance between an independent variable (traffic counts) and a dependent variable (the model). It provides a measure of the goodness of fit between two datasets with an R2=1 meaning that there is a perfect fit, or no variance. Most traffic volumes fall within 10% of the observed value keeping in mind that day-to-day variation in traffic volumes can exceed 10%.

The final validation check involved checking travel times on the roadway network. ***Figure 27*** provides a summary of observed versus modelled travel times for key corridors in the City. As shown, most of the corridors fall well within the Google Maps API optimistic and pessimistic travel time estimates. There are a few minor outliers but the general fit is good. At this point the model is considered to be fully calibrated and validated and suitable to forecast travel demand and test the impacts of infrastructure investment.

Figure 25 Volume Validation to Traffic Counts

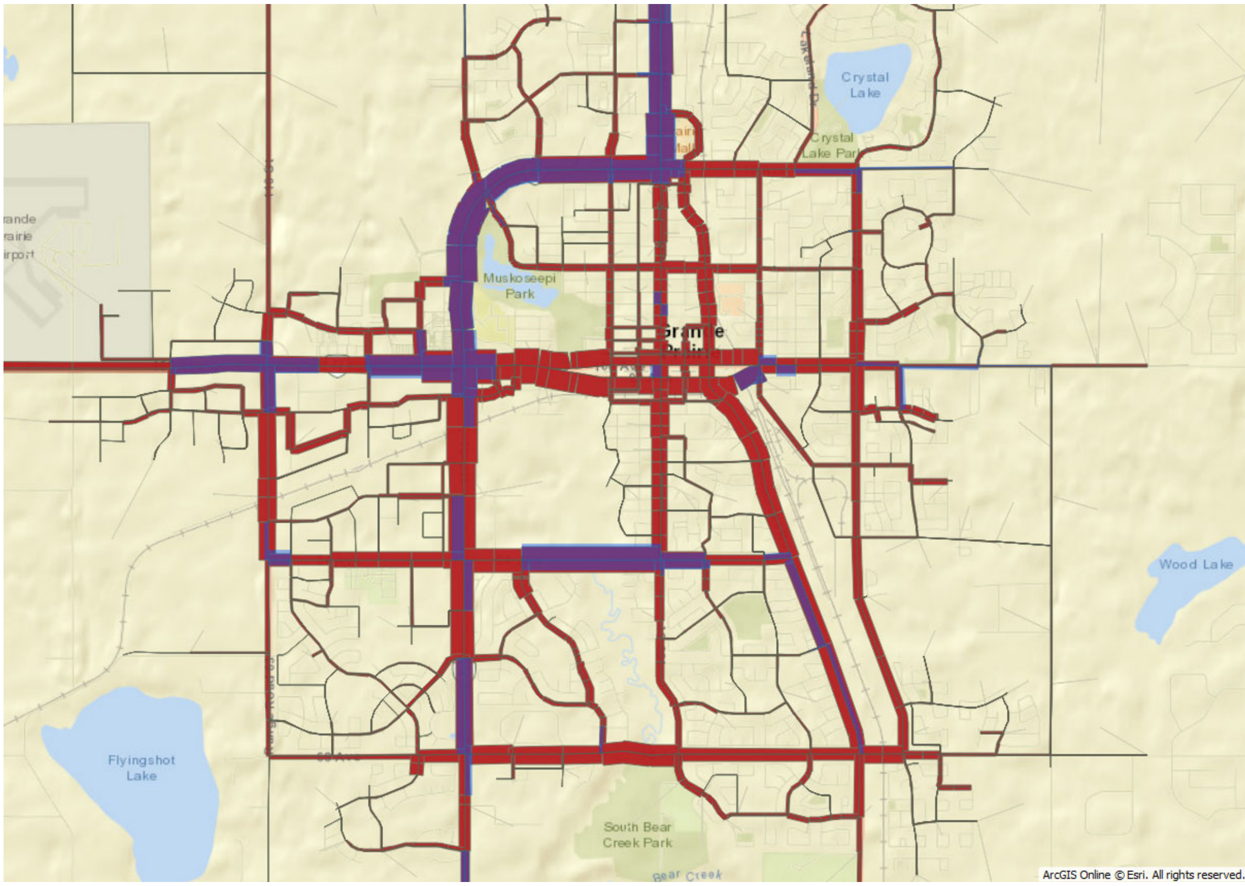


Figure 26 Modelled Volume vs Traffic Count Scatter Plot

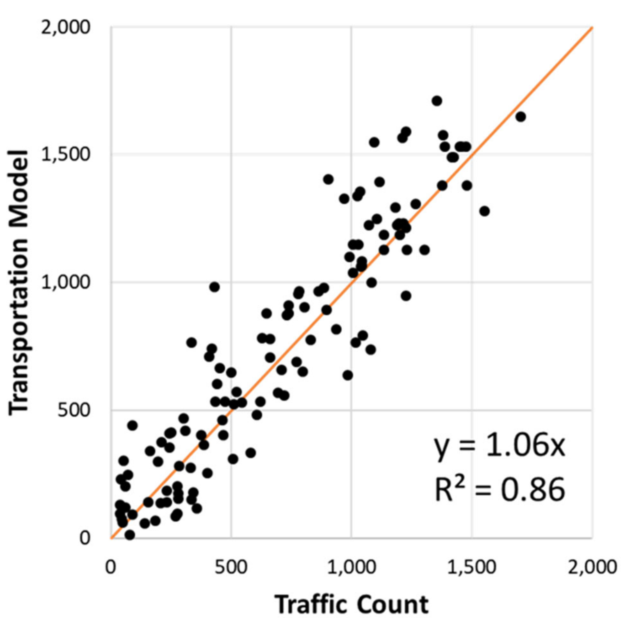
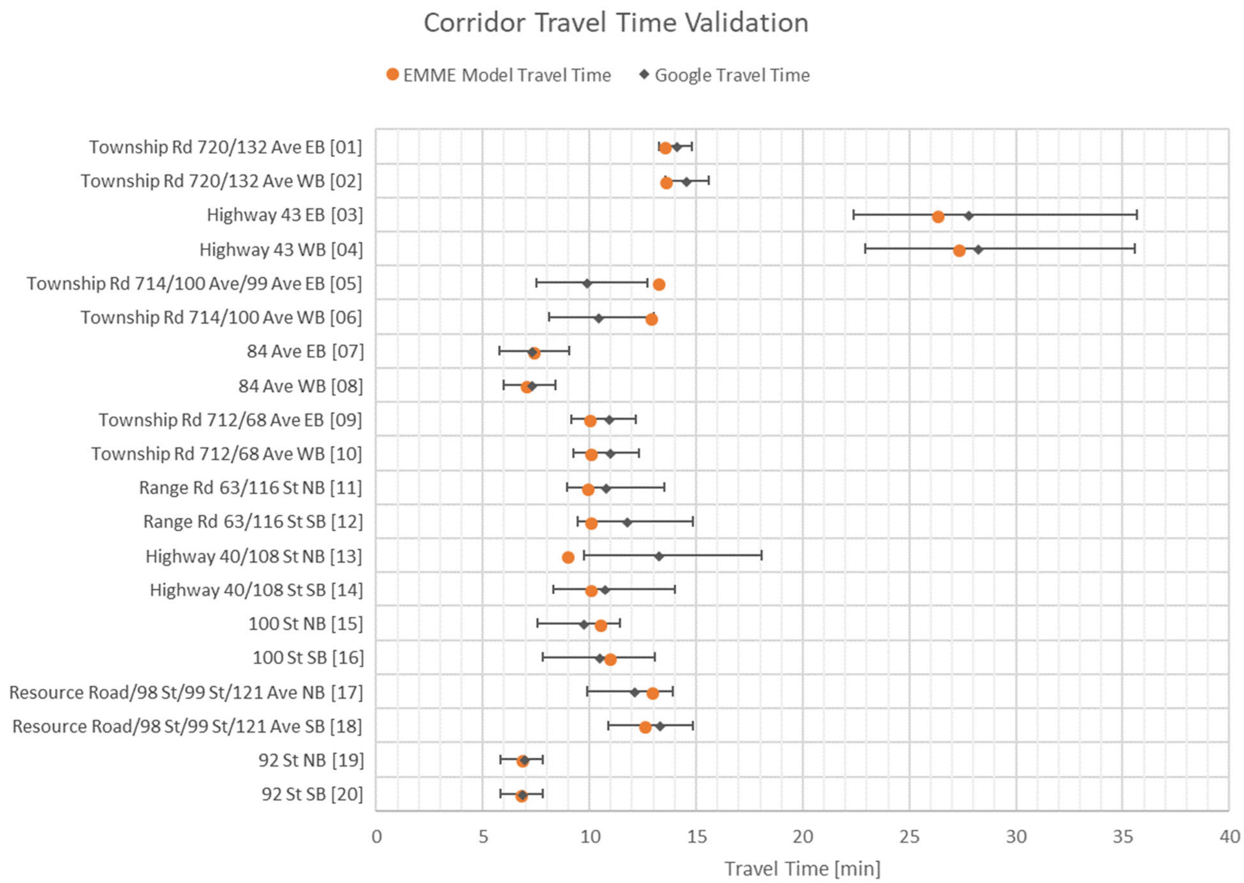


Figure 27 Corridor Travel Validation



4.3. BASE YEAR NETWORK CONDITIONS

With a fully developed base year model, an initial review of current network conditions can be conducted. ***Figure 28*** shows the estimated traffic volumes for current conditions at the city's current population of 63,000 residents. This provides a basis for conducting an assessment of congestion on the network. Before doing so, some definitions of congestion need to be established. ***Table 3*** provides an illustration and definition of different levels of service that can be experienced on each link of the model, as they have been interpreted for use in the EMME model. These levels of congestion were then applied in the transportation model to highlight congestion hot spots (outlined in grey) as illustrated in ***Figure 29***. Significant congestion is experienced along 99 Ave and 100 Ave through the central part of the city, along segments of Highway 43 and then some small segments along 84 Ave and 68 Ave likely related to intersection capacity. This type of information was used to identify possible projects to address current and future congestion levels.

Figure 28 Current Year Road Segment Volumes

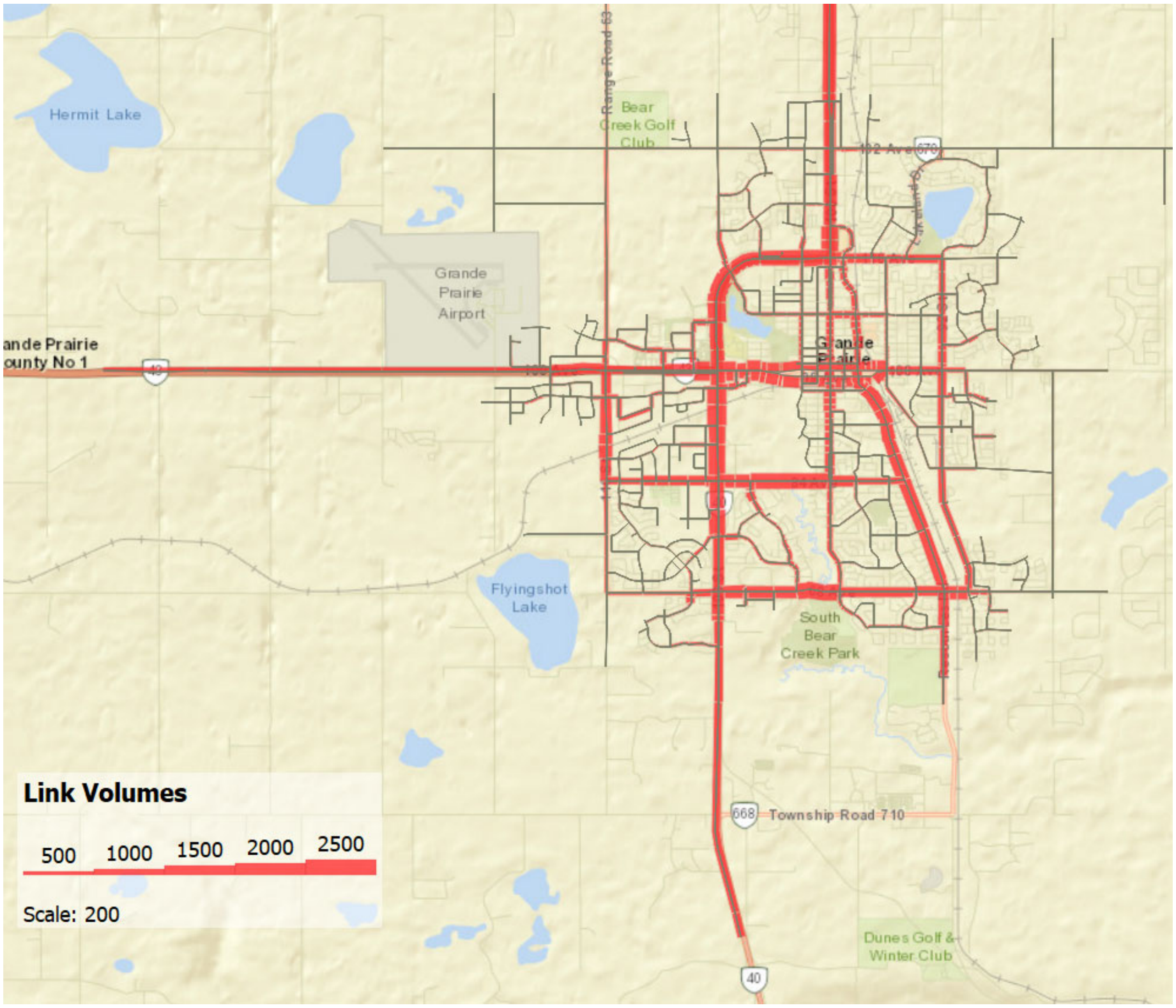
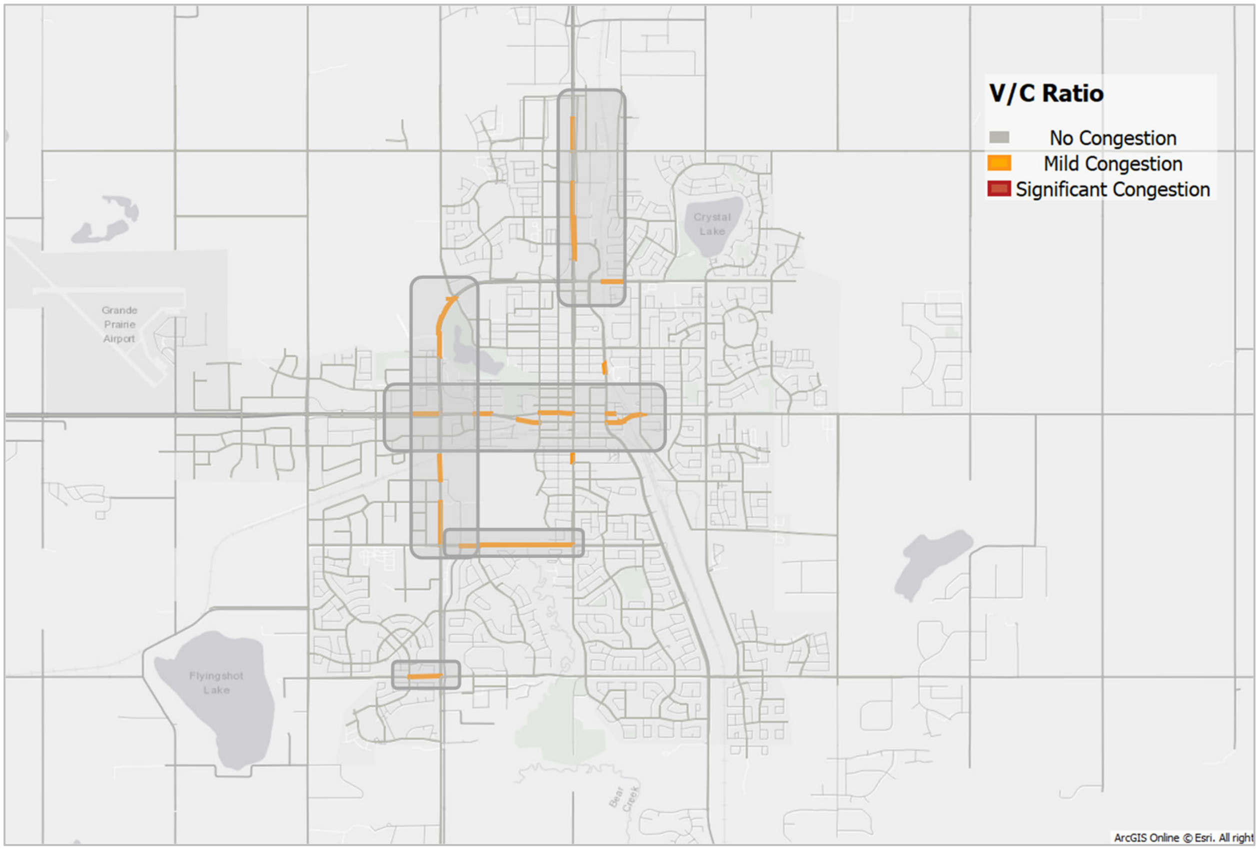


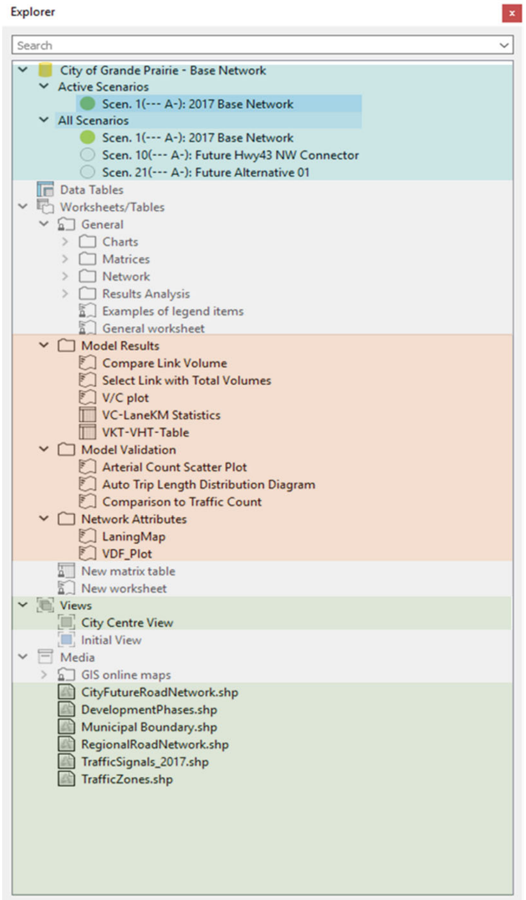
Table 3 Level of Service and Volume-to-Capacity Ratio Definitions

	**LOS A**: *Free-flow* traffic with individual *user unaffected* by the presence of others in the traffic stream. *Highest quality of service*, *no delays*. **V/C < 0.6**
	**LOS B**: *Stable* traffic flow with a high degree of freedom to select speed and operating conditions but with *some influence* from other user. *No delays*. **V/C < 0.6**
	**LOS C**: *Restricted flow* that remains *stable* but with significant interactions with others in the traffic stream. The general level of comfort and convenience declines noticeably at this level (*Minimal delay*). **V/C < 0.6**
	**LOS D**: *High-density flow* in which speed and freedom to maneuver are restricted and comfort and convenience have declined even though flow remains stable (*Minimal delays*). **V/C 0.6-0.8**
	**LOS E**: *Unstable* flow *at or near capacity* levels with poor levels of comfort and convenience (*Significant delays*). **V/C > 0.8**
	**LOS F**: *Forced traffic* flow in which the amount of traffic approaching a point exceeds the amount that can be served. LOS F is characterized by stop-and-go waves, poor travel times, low comfort and convenience, and increased collision exposure (*Considerable delay*) **V/C > 0.8**

Figure 29 Current Year Congested Road Segments



5. EMME Model File Explorer



Scenarios

Sc1: 2017 Base Network
Sc10: Future Base (2017 Base Network + Hwy43 NW Connector)
Sc21: Future Base + Alternative 01 (Hwy43 upgrade to 6 lanes)

EMME Default Worksheets and Resources

Model Result Worksheets

Compare Link Volume: compare link volumes between two scenarios
Select Link with Total Volumes: select link analysis plot
V/C plot: V/C ratio plot
VC-LaneKM Statistics: Congested Lane-km Statistics
VKT-VHT-Table: VKT & VHT Statistics

Model Validation Worksheets

Arterial Count Scatter Plot: Arterial Traffic Count Validation Scatter Plot
Auto Trip Length Distribution Diagram: versus distribution from StreetLight Data
Comparison to Traffic Count: Traffic Count Validation Network Plot

Network Attribute Worksheets

Arterial Count Scatter Plot: Arterial Traffic Count Validation Scatter Plot
Auto Trip Length Distribution Diagram: versus distribution from StreetLight Data
Comparison to Traffic Count: Traffic Count Validation Network Plot

Shapefiles

City Centre View: Zoom network to city centre
CityFutureRoadNetwork: 2017 Road Network + Hwy43 NW Connector
DevelopmentPhases: Future Initial/Intermediate/Long-term Developments
Municipal Boundary: City of Grande Prairie Boundary
RegionalRoadNetwork: City + County Road Network
TrafficSignals_2017: 2017 Traffic Signal Locations
TrafficZones: Traffic zones

APPENDIX E

Unit Costs for Improvements

Appendix E:

Unit Costs for Improvements

No.	Scope of Improvement		Unit Cost
	From	To	
1.A	No road	Two-lane rural road (new)	$2,500/metre
1.B	Gravel Road	Two-lane rural road (new)	$1,500/metre
2.A	No road (or dirt/gravel road)	Two-lane urban road (new)	$4,100/metre
2.B	Gravel Road	Two-lane urban road (new)	$3,900/metre
3.	Two-lane rural undivided road	Four-lane rural undivided road	$2,100/metre
4.	Two-lane rural undivided road	Four-lane rural divided road	$2,800/metre
5.	Two-lane rural undivided road	Four-lane urban undivided road	$3,600/metre
6.	Two-lane rural undivided road	Four lane urban divided road	$4,300/metre
7.	Two-lane urban undivided road	Four-urban undivided road	$3,000/metre
8.	Two-lane urban undivided road	Four-lane urban divided road	$3,300/metre
9.	Four-lane urban undivided road	Six-lane urban divided road	$3,700/metre
10.	Four-lane urban divided road	Six-lane urban divided road	$3,500/metre
11.	Three Leg Intersection	Planning-Level Cost of Upgrade	$350k/intersection
12.	Four Leg Intersection	Planning-Level Cost of Upgrade	$500k/intersection
13.	Bridges	Planning-Level Cost of Upgrade	$5,000/square metre

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CANADA BEST MANAGED COMPANIES