MISSION MOBILITY 2050

CITY OF MISSION TRANSPORTATION PLAN

Final Report

MAY 2022

CITY OF MISSION ON THE FRASER

May 2022

Prepared by Urban Systems in partnership with TranSafe Consulting and TetraTech

TransLink Trip Diary Data Disclaimer:
The research and analysis are based on data from TransLink and the opinions expressed do not represent the views of TransLink.

The City of Mission acknowledges that it is situated within the unceded, ancestral and shared territory of the Stó:lō people. Mission is situated on Mathewsi, Semá:th, Kwantlen, Katzie, Sq'éwlets, and Leq'a: mel traditional territories.

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I ♥ MISSION
SHOP LOCAL EAT LOCAL SUPPORT LOCAL

1. INTRODUCTION

The City of Mission is developing an updated Transportation Plan – **Mission Mobility 2050** – to help address current transportation challenges and shape the future of transportation in Mission. As Mission grows, the City's transportation system must evolve and be designed to move everyone efficiently and comfortably, no matter how people choose to get to their destinations. Mission Mobility 2050 is an update to the City's 2016 Transportation Plan and will shape Mission's transportation decision-making over the next thirty years.

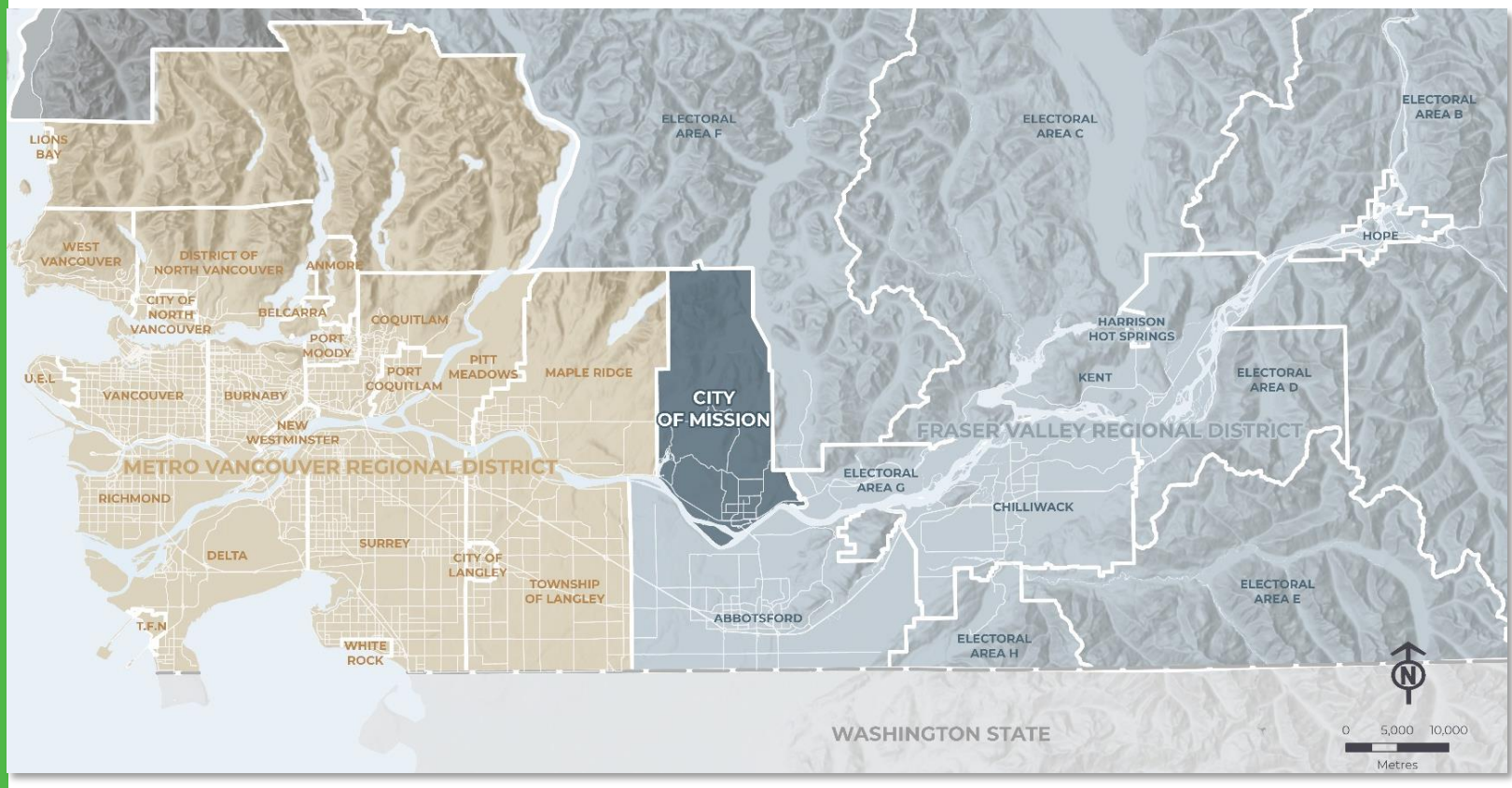
1.1 BACKGROUND

The City of Mission is a rapidly growing community of over 44,000 people nestled between the Fraser River and the Coast Mountains. The City is located on the traditional, ancestral, and unceded territories of the Stó:lō People. S'ólh Téméxw is the traditional territory of the Stó:lō and extends across the Fraser Valley and Fraser Canyon, from Yale to Langley. Mission is situated on Mathexwi, Semá:th, Kwantlen, Katzie, Sq'éwlets, and Leq'a: mel traditional territories.

Mission is centrally located in British Columbia's Lower Mainland, with close proximity to communities in both Metro Vancouver the Fraser Valley. Mission has a distinct small town, rural character to go along with urban amenities and easy access to nearby population centres due to its location along Highway 7 and Highway 11. Mission is one of the largest municipalities by land area in the Lower Mainland and has become an attractive option for young families looking for more affordable housing prices. Located approximately 70 kilometres east of Downtown Vancouver – and connected via the West Coast Express – more and more commuters are making Mission home.

Mission and other surrounding communities in the Fraser Valley are rapidly growing. The City has doubled in population over the past 40 years and is expected to further double to nearly 90,000 residents by 2050. Neighbouring municipalities such as Maple Ridge and Abbotsford are also expected to continue to grow rapidly. Combined, this local and regional population growth is placing increasing pressures on the City's transportation network, resulting in the need for the City to update its priorities and plans for investment.

Mission Mobility 2050 is an opportunity for the City to take stock of all forms of transportation in Mission today, plan for the future, and strategically guide its growth today and to 2050.



1.2 WHAT IS MISSION MOBILITY 2050?

To optimize Mission's transportation network and guide improvements for all modes of transportation over the next 30 years, the City has developed Mission Mobility 2050, a comprehensive update to the 2016 Transportation Plan. Since the 2016 plan was developed, there have been several significant changes in the City and surrounding area that influence the City's transportation system. The City completed an Official Community Plan (OCP) update in 2018, setting the framework for this multi-modal transportation plan, with several policies related to walking, cycling, transit, goods movement, parking, and motor vehicles.

Mission Mobility 2050 will guide the City's transportation investments and decision-making over the next 30 years. The plan is being updated to ensure alignment with emerging best practices, including the B.C. Active Transportation Design Guide, and to respond to recent and planned growth patterns in Mission. An updated plan is also needed to address continued and/or planned growth and development, particularly in the Silverdale and Cedar Valley areas, which will place increasing pressures on the City's transportation system.

Mission Mobility 2050 provides an integrated framework for a comprehensive, safe, and efficient multi-modal transportation system that meets both present and future needs of residents and visitors. The plan identifies ways to ensure the quality of life, economic vibrancy, and environmental sustainability of the City. This includes identifying strategic opportunities to increase the City's sustainable transportation mode share (such as encouraging walking, cycling, and transit use to schools, businesses, recreational facilities, and employment centres throughout the City). The plan also addresses important trends in transportation, such as the need for improve road safety and focus on complete streets, Transportation Demand Management (TDM), Transit Oriented Development (TOD), and new and emerging forms of mobility (such as ride hailing, car sharing, and emerging modes such as e-bikes and e-scooters).

INDIGENOUS CONTEXT

The City of Mission is committed to reconciliation with First Nations communities and peoples and will work to ensure that its activities, initiatives, and partnerships reflect the intent of the United Nations Declaration on the Rights of Indigenous People (UNDRIP), and the Truth and Reconciliation Commission's (TRC) Calls to Action. The City is starting with the adoption of a set of principles that will guide its relationships with indigenous peoples and commits to the revision and creation of policies to be consistent with UNDRIP and the TRC Calls to Action.

1.3 MISSION MOBILITY 2050 PROCESS

Mission Mobility 2050 was developed over an 18-month period starting in December 2020. The plan was developed based on best practices from around the world as well as local expertise and extensive community input to chart the course for we want to live and move around our community in the future. The process included five phases:

- **Phase 1: Project Launch** involved collecting and reviewing relevant background information and data, conducting traffic counts, and developing the base travel demand model.
- **Phase 2: Defining our Vision** involved preparing a detailed understanding of the City's existing transportation system, identifying current issues and opportunities for the road, transit, pedestrian, and active mobility networks, as well as developing a shared vision for Mission's transportation system.
- **Phase 3: Exploring What's Possible** involved exploring the possibilities for each mode of transportation individually before developing an integrated plan that reflects the aspirations and directions for each mode.
- **Phase 4: Refining Options** involved selecting preferred options for each mode of transportation.
- **Phase 5: Moving Forward** involved developing the final Plan, including an implementation and funding strategy that will ensure that the Plan is affordable and implementable.

A Traffic Safety Strategy was conducted in parallel to the plan and consisted of data analysis, identifying safety trends, proposed augmentations, and a five-year implementation strategy for recommendations.

COVID-19 CONSIDERATIONS

Mission Mobility 2050 was developed during the global COVID-19 pandemic. The COVID-19 pandemic drastically changed mobility patterns and reshaped the way people use and travel through public spaces.

The plan considers these changing mobility needs and opportunities for ensuring safe spaces are provided to move throughout the City, while ensuring physical and mental health, safety, and well-being in both the short-term and long-term.

1.4 COMMUNITY ENGAGEMENT

Throughout the development of the plan, the community was engaged to provide direction and input on various aspects of the plan.

ROUND 1 ENGAGEMENT

The first round of engagement focused on understanding existing conditions for mobility in Mission. An online survey was available on the Engage Mission website for Mission residents to complete between December 1, 2020, and January 18, 2021. The survey was designed to understand travel habits and priorities for the transportation network. The survey included an interactive map, where respondents were able to drop markers on a map to identify issues and ideas for transportation improvements.

The survey received 348 views, resulting in 168 responses. More than 90% of survey respondents were Mission residents and almost 70% identified as being property owners. The survey results are not representative of Mission's population. **Figure 1** notes the differences in transportation mode share and general age group between the online survey results and overall community demographics based on TransLink's 2017 Regional Trip Diary Survey. The TransLink survey is deemed to be more appropriate as it is considered a representative, statistically significant population survey.

ROUND 2 ENGAGEMENT

The second round of engagement focused on presenting the draft long-term plan and obtaining input on levels of support for the key directions in the draft plan. The City hosted a virtual public open house on December 9, 2021 and posted a recording of the open house on the Engage Mission website. At the open house, attendees were invited to ask questions and provide comments on the draft plan. Residents were also provided to ask questions and provide comments through the Questions and Answers tool on the Engage Mission website.

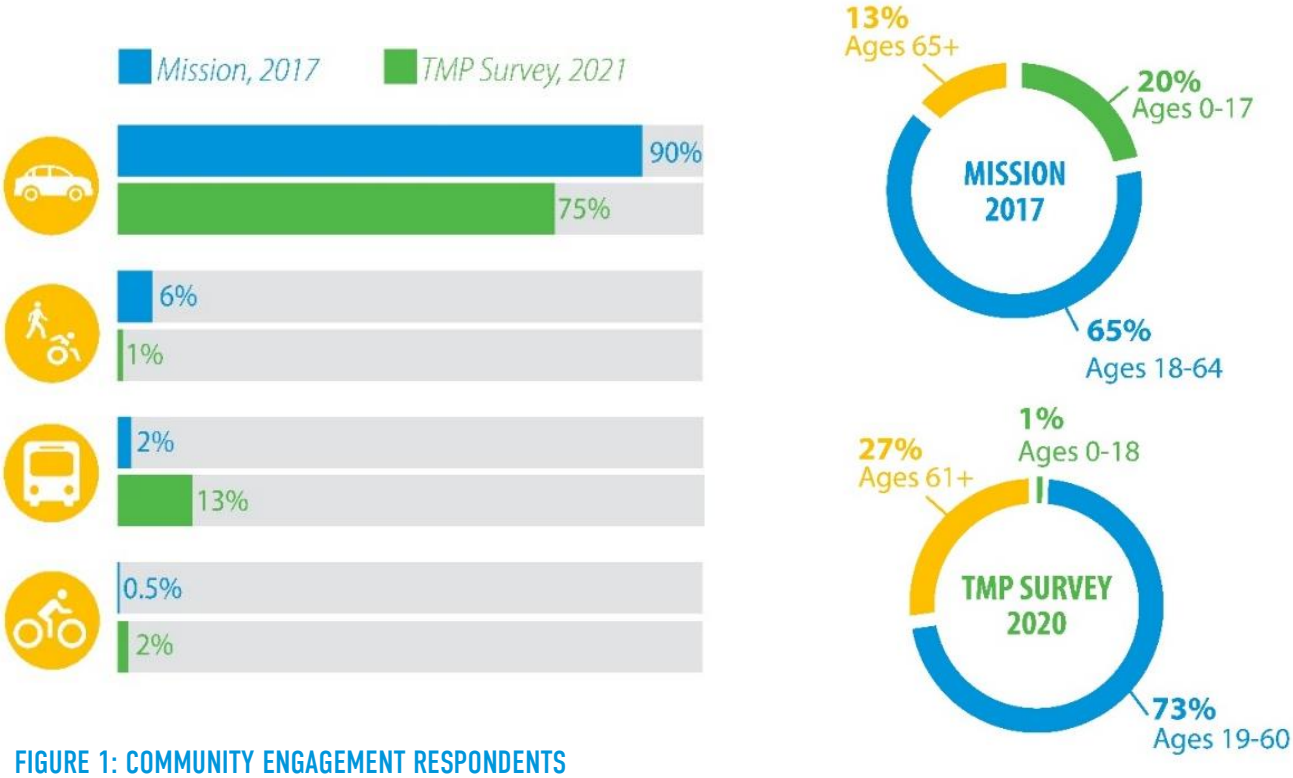


FIGURE 1: COMMUNITY ENGAGEMENT RESPONDENTS

1.5 HOW TO READ THE PLAN

This document summarizes current conditions, issues, and opportunities for transportation in Mission, and offers insight into how these, along with the overarching policy context, influence the transportation network. Finally, this document provides strategies and actions to build a transportation network that meets the vision and goals of the plan. The plan includes the following sections:

- **Section 1: Introduction** provides an overview and purpose of the plan, the study process, an overview and summary of community engagement and the structure of this report.
- **Section 2: Drivers of Change** summarizes the local and regional elements that shape transportation in Mission, including land use and demographic patterns, equity considerations, the policy and funding context, and travel patterns and trends.
- **Section 3: Visioning the Future** summarizes the plan's framework, modal hierarchy, vision, goals and mobility targets.
- **Section 4: Pillars** outlines six foundational elements of the plan, including safe mobility, land use integration, streets for people, changing technologies, asset management, and equity and accessibility. These pillars are foundational elements that impact all aspects of Mission's transportation system.
- **Section 5: Integrated Mobility Plan** provides strategies and actions related to active transportation, transit, the street network, and emerging technologies for the City to implement to achieve the vision and goals of the plan.
- **Section 6: Implementation Plan** provides an implementation and phasing strategy, including short, medium, and long-term priorities along with cost estimates and a funding strategy.

WHAT IS SUSTAINABLE TRANSPORTATION?

Mission Mobility 2050 focuses on prioritizing sustainable forms of transportation. This includes transit, walking, and cycling, as well as other forms of active transportation such as rollerblading, skateboarding, and scootering. This also includes promoting Zero Emissions Vehicles and other emerging forms of micro-mobility such as e-bicycles.

2. DRIVERS OF CHANGE

The City's transportation system is shaped by many local and regional factors, including land use and demographics, policy context, current and historic mobility trends, and key issues that have been identified by the community. This section summarizes they key factors that shape mobility patterns in Mission.

2.1 SHAPING INFLUENCES ON MOBILITY

Transportation plays a significant role in the development of healthy and sustainable communities, as transportation policies, plans, and infrastructure are a fundamental part of the impact of the built environment on residents' mobility patterns and quality of life. Transportation can impact a community in a number of ways, and the plan can help the City respond to a number of intersecting emerging and critical challenges facing the City and its citizens, including:

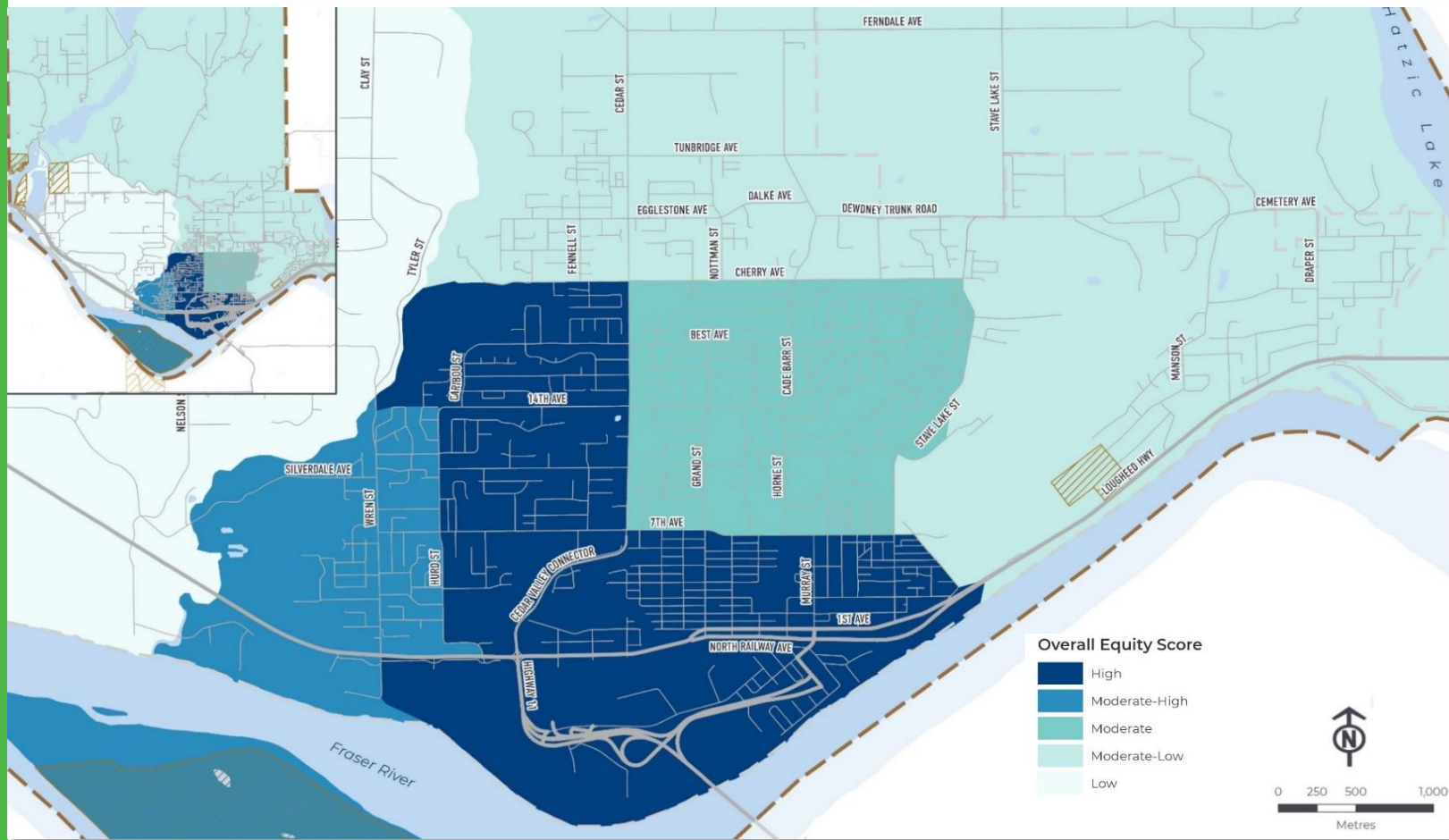
- **Road Safety:** High automobile speeds and traffic volumes all contribute to traffic-related injuries and deaths for pedestrians, cyclists, and motorists. Safe road design can improve safety and address citizens' perception of safety.
- **Climate Change:** Transportation-related air pollutants are the largest contributors to poor air quality and produce greenhouse gas (GHG) emissions, which has negative implications for community quality of life, public health, and climate change. Supporting sustainable transportation options, such as walking, rolling, cycling, and transit use, can reduce the impacts of transportation on climate change.
- **Public Health:** Transportation and urban planning policies can effectively encourage physical activity. With more active transportation and transit options, people can be more active. Being more physically active can improve health and reduce rates of obesity, chronic disease, and premature death.
- **Equity:** Affordable and equitable transit service can enable residents of all incomes and abilities to access necessary services and supports (i.e., employment, education, healthcare, public and social services, and healthy food) that are critical components to health.
- **Housing Affordability and Transportation:** Housing and transportation costs, both of which are often the two largest expenditures for households, are barriers for many. Affordable housing options need to be provided where households have access to sustainable, cost-effective transportation options and choices, particularly transit, and proximity to places of employment and daily needs.
- **Economy:** An efficient transportation network benefits more than just commuting employees – goods are delivered with ease, customers can access shops more frequently, and the community becomes a sought-after destination for new businesses.
- **Noise:** Road traffic is the biggest cause of noise in many cities, which can exacerbate stress levels, increase blood pressure, cause sleep disturbance, and negatively affect mental health. Reducing the number of vehicles on the road by creating a positive environment for low-impact transportation options like walking and cycling will help mitigate noise issues.
- **Social Cohesion and Inclusion:** Cycling, walking, and transit have been shown to stimulate physical activity, which leads to increased social interaction and cohesion. Social inclusion can lead to greater cohesiveness and result in positive outcomes such as better health and increased participation in community life.

2.2 AN EQUITY-CENTERED PLAN

One of the aims of the plan is to develop a multi-modal transportation network that serves all areas of the City and provides equitable access for all residents. This means being inclusive of – and prioritizing – people of all ages, abilities, backgrounds, and identities. It is especially important to focus on centering equity and supporting equity-seeking populations, which may include, but are not limited to, the following:

- Women
- Seniors
- The Black, Indigenous, and People of Colour (BIPOC) community
- Immigrants and refugees
- The LGBTQIA+ community
- People with accessibility needs, including those with challenges related to mobility, vision, hearing, strength, dexterity, and/or comprehension
- People who are socio-economically disadvantaged
- People experiencing homelessness
- People experiencing substance use disorder

Equity-seeking populations face unique and intersecting challenges when navigating the transportation system, including the threat of discrimination and violence. They may be uncomfortable walking, rolling, and cycling due to personal safety concerns. These populations – especially seniors and the BIPOC community – also tend to be overrepresented in traffic fatalities and serious injuries. The plan has conducted an analysis to identify areas with the greatest equity need and to focus investments in these areas. This analysis identified areas of high concentrations of several equity-seeking groups based on Statistics Canada Census data, including low-income populations, new immigrants, Indigenous peoples, seniors, and children.



2.3 COMMUNITY CONTEXT

Mission has a distinct small town, rural character to go along with urban amenities and easy access to nearby population centres due to its location just off Highway 7 and Highway 11, along with the West Coast Express into downtown Vancouver. The City's central location within the Lower Mainland provides a strategic connection between Metro Vancouver and the Fraser Valley, and it is only 20 kilometres from the Canada-United States border.

The City of Mission has a total land area of just over 227 square kilometres and contains a mixture of urban, industrial, rural, and natural environments. Mission has one of the largest land areas of any Lower Mainland municipality, but its population is concentrated within a relatively compact urban growth area. Much of Mission's commercial areas are located near downtown and along Highway 7 near the waterfront. Because these areas are located downhill from where most residents live, these areas can be challenging to access by walking and cycling. Highway 7 and the rail corridors serve as barriers between the neighbourhoods, especially for walking and cycling access.

About 64% of Mission residents work outside of the City in surrounding communities. This generates regional travel and commuting between Mission and other Lower Mainland communities, and is well-supported with the West Coast Express, a commuter rail service terminating in Mission that provides excellent commuter access to employment in downtown Vancouver.

The City is expected to double to nearly 90,000 residents by 2050, and will experience a moderately high employment growth to 18,000 jobs by 2050. Much of the growth will take place in Silverdale, Cedar Valley, and the Waterfront. Mission will likely continue attracting new residents looking for greater affordability.

Mission will also be impacted by growth in surrounding communities as over 400,000 new residents are projected to reside in Maple Ridge and Abbotsford by 2050. This rapid regional growth and development will place increasing pressures on the City's transportation system in the coming years. This is expected to increase traffic volumes along key commuter and commercial corridors such as Highway and Highway 11. In addition, as Highway 7 cuts through downtown Mission, heavy truck traffic has had implications on businesses and residents in the area, moving the Ministry of Transportation and Infrastructure (MOTI) to consider a downtown bypass.

2.4 INTEGRATING WITH OTHER PLANS AND POLICIES

The plan is closely linked to several other plans and policies at the local, regional, and provincial levels as well as with the connections with Indigenous communities. These documents set the overarching goals, visions, and objectives for land use, transportation, and other key long-term planning considerations in the City and beyond.

EXTERNAL PLANS AND POLICIES

Both the Provincial and Federal governments have established bold targets to reduce greenhouse gas (GHG) emissions. Canada has set a target to cut its GHG emissions by 40-45% below 2005 levels by 2030, while the Province's *CleanBC* plan includes targets to reduce GHGs to 40% below 2007 levels by 2030, 60% by 2040, and 80% by 2050.

The Province released *Move. Commute. Connect. — B.C.'s Active Transportation Strategy* in 2019. The strategy sets bold targets to double the percentage of trips taken with active transportation by 2030 as a way to help the Province meet its GHG emissions targets To support the implementation of active transportation infrastructure, the Province released the *B.C. Active Transportation Design Guide* to ensure consistent active transportation facility design across the Province. The Province also administers the *Active Transportation Infrastructure Grant* to support active transportation investments across British Columbia**.** These provincial initiatives, along with Canada's new federal *National Active Transportation Strategy* and *National Active Transportation Fund*, represent new partnership opportunities to help finance transformational active transportation infrastructure programs for communities with shovel-ready projects that meet the goals of making active transportation safe, comfortable, and connected.

At the regional level, the Fraser Valley Regional District (FVRD) is currently in the process of developing the updated Regional Growth Strategy: Fraser Valley Future 2050 which sets a goal to develop a safe and efficient transportation system for people and goods that promotes transit, walking and cycling, and minimizes the transportation system's impact on air quality. BC Transit has also developed the Abbotsford-Mission Transit Future Action Plan, an update to the 2013 plan that envisions the transit network 25 years from now.

Indigenous communities are significant landowners both directly in and adjacent to the major municipalities in the FVRD, in addition to territory that stretches through and beyond the rest of the FVRD. Each Nation in the FVRD has their own plans concerning land use and development within their territories. Proper consultation and consideration of these independent ambitions is critical.

LOCAL PLANS AND POLICIES

Several overarching City plans are closely tied to the transportation plan. The City's OCP envisions "a sustainable, safe community that supports healthy lifestyles and engaged citizens," including creating a "Compact and Complete Community" accessible by walking, cycling, and transit. In addition, a number of City-wide plans have implications on the City's growth and structure, including the *Parks, Trail, and Bicycle Master Plan* (2009) and *Parks, Recreation, Arts & Culture, Fraser River Heritage Park*, & *Centennial Park Master Plans* (2018), which discusses the importance of linking the transportation network to recreational trails and facilities. The City has also developed comprehensive areas plans for major growth areas, including *Silverdale* and *Cedar Valley*, and is currently undertaking a *Waterfront Revitalization Master Plan*.

2.5 MOBILITY IN MISSION TODAY

MODE SHARE

Based on data from TransLink's 2017 Trip Diary Survey, 90% of trips made by Mission residents are by motor vehicle. Sustainable transportation makes up approximately 8% of daily trips made by Mission residents, including walking (5.7%), transit (2.4%), and cycling (less than 0.1%) (see **Figure 2**).

Denser urban environments are more conducive of walking and rolling, and are easier to serve by transit in Mission. Sustainable mode share is highest within the Mission Core, with the downtown and waterfront areas having the highest sustainable transportation mode shares, with this number significantly lower outside of the Mission Core.

TRIP DISTANCE

Although the average driving trip distance is 17.5 km per trip, almost 40% of all driving trips are less than 5 km, including over 25% that are less than 3 km, a distance which could be replaced by active transportation (see **Figure 3**).

TRIP PURPOSE

The majority (68%) of trips made by Mission residents are for shopping, personal business, social, recreational, or dining purposes (see **Figure 4**).

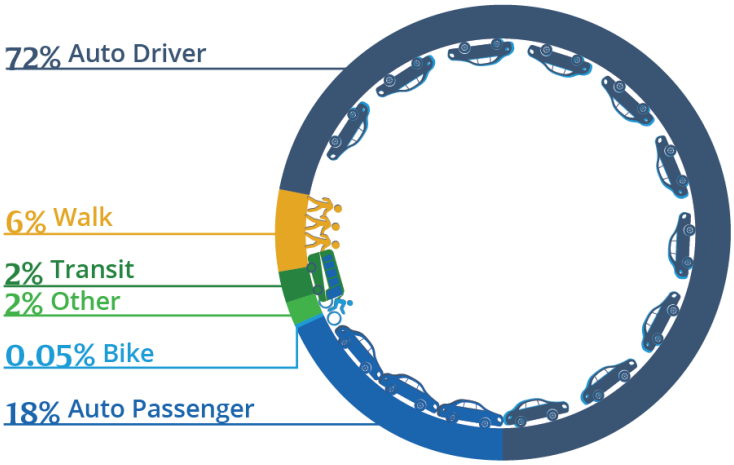


FIGURE 2: MODE SHARE OF ALL TRIPS MADE BY MISSION RESIDENTS (2017)

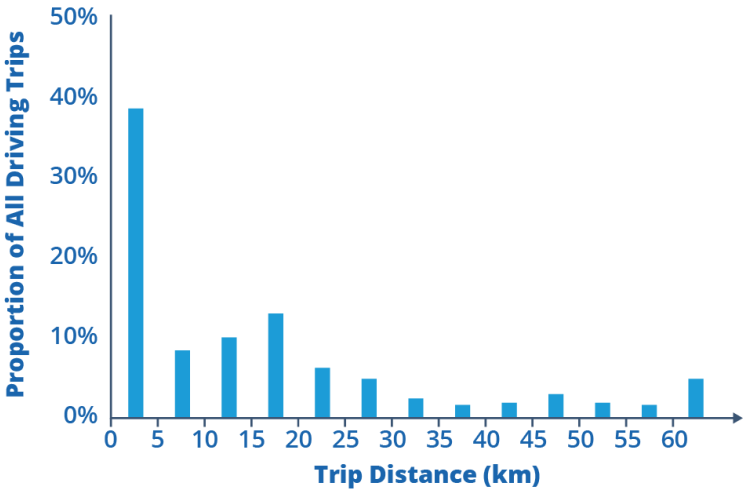


FIGURE 3: DISTANCE OF AUTO DRIVER TRIPS (2017)

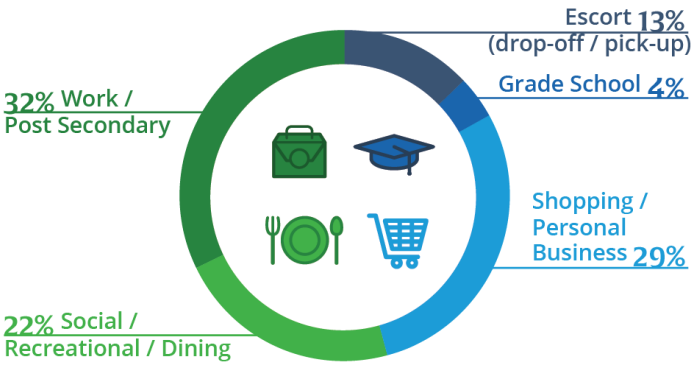


FIGURE 4: PURPOSE OF ALL TRIPS (2017)

DESTINATIONS

65% of the trips generated by Mission residents stay within Mission, while approximately 18% travel to Abbotsford (11.6%) and Maple Ridge (6.4%). Other destinations include Vancouver, Langley, Burnaby, and Surrey (see **Figure 5**)

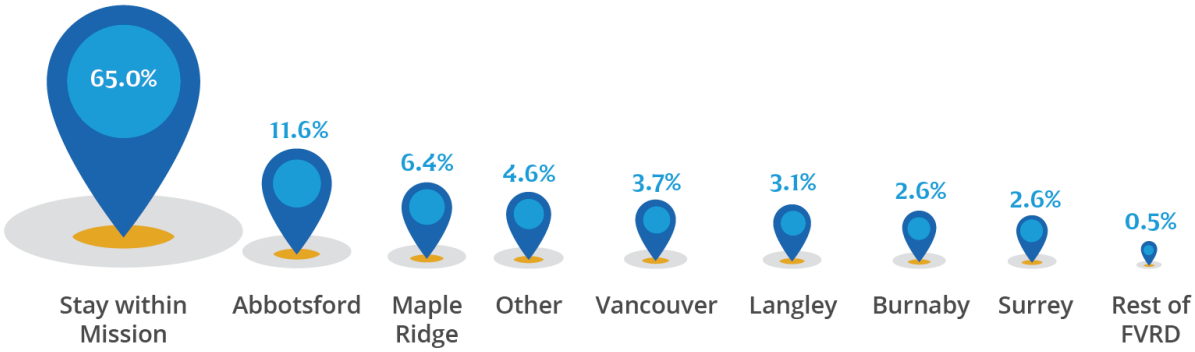


FIGURE 5: DESTINATIONS OF ALL TRIPS ORIGINATING IN MISSION (2017)

*Also includes Electoral Area G

KEY ISSUES

Several specific transportation issues have been identified by residents and City staff for review during the development of Mission Mobility 2050. Some overarching themes included:

- Improving safety for all road users.
- Creating an enhanced pedestrian experience, especially around schools, parks, and other key pedestrian generators (including adding more sidewalks, improving accessibility, and better utilizing trails and cut-throughs).
- Increasing connections to the City's recreational trail network, including potentially utilizing the dike system.
- Expanding the active mobility network and creating a signature All Ages and Abilities active mobility corridor.
- Intersection improvements (traffic control, sightlines for turning movements, turning lanes, and improved pedestrian crossings).
- Transit stop amenities.
- Addressing the role of Highway 7 within the City, including exploring new bypasses.
- Connecting Silverdale to the rest of the City, including a new crossing of Silverdale Creek.
- Addressing motor vehicle congestion and high motor vehicle speeds and volumes.
- Parking and loading.

3. VISIONING THE FUTURE

Mission Mobility 2050 presents a long-term vision that aligns with the City's Strategic Focus Areas and builds on the overarching goals of the City and the region as a whole. The plan also presents a long-term vision along with supporting goals and objectives that are intended to be long-range, holistic, and integrated.

To achieve the vision, goals, and objectives, the plan includes six overarching pillars, which are foundational elements that impact all aspects of Mission's transportation system. Moving beyond the pillars, the plan includes an Integrated Mobility Plan that is organized into four mode-specific themes: active transportation, transit, goods movement, and driving.

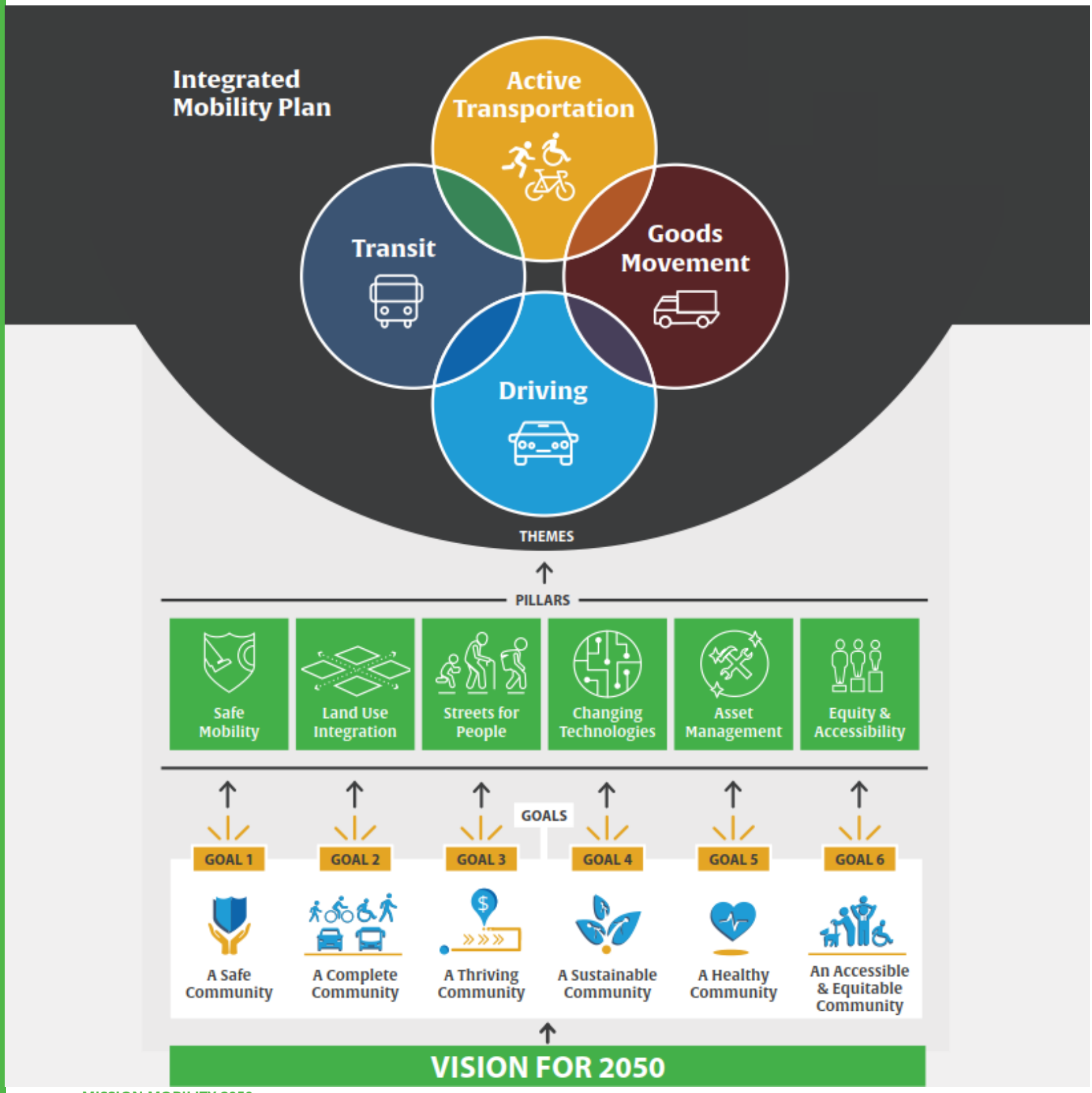
3.1 STRATEGIC FOCUS AREAS

The City has identified six Strategic Focus Areas in its *2018 – 2022 Strategic Plan*. These are areas that Council considers as priorities for the near and longer term. The ongoing core work of the City must support one or more of Council's Goals and Strategic Focus Areas. Mission Mobility 2050 supports each of the following Strategic Focus Areas in the following ways:

STRATEGIC FOCUS AREA	HOW MISSION MOBILITY 2050 ALIGNS
Safe Community	Mission Mobility 2050 focuses specifically on improving the safety of pedestrians, cyclists, and vehicles on Mission's roads. Developing and implementing pedestrian and active mobility networks as well as complete streets road standards support safer streets for all modes.
Secure Finances, Assets, and Infrastructure	Mission Mobility 2050 considers the transportation capital budget context within the City, ensuring that all actions are practical, planned and promote financial sustainability. Mission Mobility 2050 directly supports the City's goal to pursue excellence in financial management and planning through a focus on asset management and integration with the City's other engineering master plans for long-term infrastructure planning.
Bold Economic Development	Mission Mobility 2050 considers local businesses in Mission as well as the commuter population, which supports the prosperity of Mission and its residents. Without a functioning transportation network, Mission residents, businesses and goods would not be able to move throughout the city or the region. Mission Mobility 2050 directly promotes more business investment in Mission, ensuring the long-term interests of Mission.
Liveable Complete Community	Mission Mobility 2050 directly identifies and promotes amenities that enhance the quality of life in Mission, creates more recreational opportunities for residents, and supports focusing growth and development in areas that reduce trip distances and ensure that destinations and people's daily needs are within easy walking and cycling distances in order to create a liveable, attractive, and complete community.
Engaged Community	Mission Mobility 2050 underwent two phases of community engagement to guide and shape the outcome of the plan. The plan is directly tied to the community's priorities and concerns, and input was used to strengthen the principles and concepts within the plan, producing enhanced results. Mission Mobility 2050 is directly tied to engaging and collaborating with Mission residents.
Organizational Excellence	Mission Mobility 2050 engages with residents and businesses in Mission in order to better understand how the transportation network serves them and could be improved. The plan aims to try new and more efficient ways of planning for the transportation network. Mission Mobility 2050 directly supports organizational excellence, with continuous improvement as a key principle of the plan.

3.2 PLAN FRAMEWORK

The framework for the plan is based on the vision for 2050 and six overarching goals which set the long-term direction of the plan. The plan includes six foundational pillars that impact all aspects of transportation in Mission, and an integrated mobility plan with detailed strategies and actions for all modes of transportation.



3.3 VISION, GOALS, AND OBJECTIVES

The plan's vision, goals, and objectives are intended to be long-range, holistic, and integrated with the overarching goals of the City of Mission and the region as a whole. The vision and goals were developed based on existing plans and policies – such as the OCP and *2018 – 2022 Strategic Plan* – along with feedback from City staff, council, stakeholders, and community members.

VISION FOR 2050

*Mission is a **sustainable**, **safe**, and **thriving** hillside community nestled between the Fraser Valley and the Coast Mountains. Our **urban and rural communities** are connected with a **multi-modal transportation network** that supports residents and visitors of **all ages, abilities, incomes, and identities** to move safely and comfortably while using **active transportation, transit, and driving**.*

*Making **bold moves** to build the Mission we want while **maintaining our small town community feel and friendly neighbourhoods,** we will ensure **health and safety** is the top priority when improving the transportation system, and will use progressive, forward-looking strategies to connect **people and goods** to one another and across the region.*

GOALS AND OBJECTIVES

The plan includes six goals, each with more detailed supporting objectives. Key Performance Indicators (KPIs) have been developed for each objective to ensure the City is able to monitor performance.

Goal	Objective	Key Performance Indicator
GOAL 1  **A Safe Community** *Improve the safety of all road users, prioritizing vulnerable road users*	Objective 1.1: Significantly reduce the number of collisions on Mission's roads	Number of total reported collisions per year
	Objective 1.2: Reduce the severity of collisions on Mission's roads, including reducing serious injuries and fatalities	Number of reported collisions per year resulting in injury or fatality
	Objective 1.3: Improve the safety of vulnerable road users such as pedestrians, cyclists, and motorcyclists	Number of reported collisions per year involving pedestrians, cyclists, and motorcyclists

Goal	Objective	Key Performance Indicator
GOAL 2  **A Complete Community** *Develop complete communities that provide integrated mobility choices*	Objective 2.1: Promote walking for as the preferred choice for all short trips	Proportion of all trips under 2km made by walking
	Objective 2.2: Improve the transit customer experience with high quality transit services and facilities	Proportion of bus routes with frequent transit service (15-minute service throughout the day) Proportion of bus stops with benches and shelters
	Objective 2.3: Encourage cycling as a convenient form of transportation for short- and medium-distance commuter and transportation trips	Proportion of all trips between 2km and 8km made by cycling

Goal	Objective	Key Performance Indicator
GOAL 3  **A Thriving Community** *Ensure the efficient movement of people and goods to support the local and regional economy*	Objective 3.1: Identify and address areas of congestion and delay to improve the reliability of the transportation network	Intersections with LOS 'E' or below
	Objective 3.2: Ensure goods movement are able to move efficiently throughout the City's transportation network	Average peak period observed speeds on major corridors as compared to posted speed limits

Goal	Objective	Key Performance Indicator
GOAL 4  **A Sustainable Community** *Reduce adverse transportation-related environmental outcomes*	Objective 4.1: Reduce the average distance driven by Mission residents	Number of average daily km driven by Mission residents
	Objective 4.2: Promote sustainable modes of transportation such as walking, cycling, and transit	Mode share of walking, cycling, and transit
	Objective 4.3: Support non-polluting forms of transportation, including electric vehicles and e-bikes	Proportion of vehicles owned by Mission residents that are Zero Emission Vehicles (ZEVs)
	Objective 4.4: Reduce GHG emissions and other transportation-related emissions and support provincial and federal GHG emissions reduction targets	Proportion of community-wide GHG emissions attributed to on-road transportation

Goal	Objective	Key Performance Indicator
GOAL 5  **A Healthy Community** *Improve the health and well-being of Mission residents and the broader community*	Objective 5.1: Encourage all active and healthy forms of transportation, including walking, wheeling, and cycling	Mode share of walking and cycling
	Objective 5.2: Improve local air quality	Average particulate matter readings for select arterial roadways
	Objective 5.3: Reduce noise generated by the transportation system	Average decibel level readings for select arterial roadways
	Objective 5.4: Encourage mixed use developments to provide the opportunity for residents to access goods and services within a 15-minute walk	Proportion of residents within a 15-minute walking distance (1500 metres) of commercial areas

Goal	Objective	Key Performance Indicator
GOAL 6  **An Accessible & Equitable Community** *Ensure that people of all ages, abilities, incomes, and identities can comfortably reach their destination while using their mode of choice*	Objective 6.1: Design the City's transportation system to be universally accessible to meet the needs of all users	Proportion of sidewalks that are least 1.8 metres wide Proportion of bus stops designated as accessible
	Objective 6.2: Engage with equity-seeking groups and consider their needs in all transportation decision-making	Identification of equity-seeking groups and development of decision-making framework to support their needs

3.4 MOBILITY TARGETS

Targets provide a way to measure progress towards achieving the goals and objectives of the plan. Targets are an important tool for the City to monitor the results of policies and actions that have been implemented. They will help to ensure that the Plan is implemented as intended, and to determine whether the Plan is achieving its goals. The Plan includes one primary target to increase the proportion of trips made by sustainable transportation. The plan sets a target to **increase proportion of trips made by sustainable transportation by 50% by 2030, with continued 50% increases by 2040 and 2050.**

This approach was chosen to ensure the City has a focus on a near-term achievable target as opposed to a long-term aspirational target, which helps the City to plan for and monitor progress with these near-term targets, while still having an aspirational long-term target. This overarching target would result in a target to increase the sustainable transportation mode share from 8% to 12% by 2030 (a 4% increase), followed by a 6% increase to 18% by 2040 and a 9% increase to 27% by 2050, as shown in **Figure 6**.

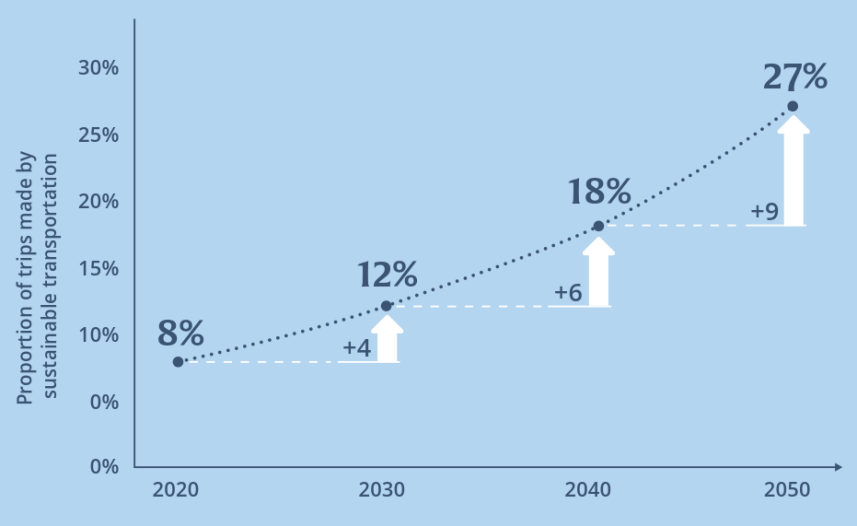


FIGURE 6: MOBILITY TARGETS

These targets are consistent with targets for transit identified in BC Transit's Transit Future Action Plan for the Central Fraser Valley Transit System. Assuming the same distribution between sustainable modes were to stay the same as today, with transit accounting for approximately 30% of sustainable transportation trips, this would result in a 5% transit mode shares by 2040, which is similar to the 4% target by 2038 identified in the Transit Future Action Plan.

This target represents a significant and bold change in regard to the City's priorities and investments. A shift to larger proportions of sustainable trips not only indicates changes to transportation choice but are an indicator of how attractive the city is for walking, cycling, and using transit. Higher sustainable transportation mode shares are an indicator of how integrated the City's transportation system is with land use patterns. It is also an indication of how investments in sustainable modes can shift the amount of driving in support of a healthier and more vibrant community. This target implies future growth in locally generated trips. As the city grows and is intentional about building great places and safe, accessible transportation networks, more people will make walking, cycling, and transit trips their first choice.

3.5 PILLARS

Pillars support every theme identified in the plan and should be applied to the transportation network with broad strokes. Six Pillars were identified to support all planning for the transportation network in Mission. The Pillars are supported by a series of more specific Directions to support the inclusion of important principles that may be beyond the defined scope of the transportation network.

PILLAR 1: SAFE MOBILITY recognizes that a transportation network that is dangerous or unsafe is not acceptable, and prioritizes safety in all aspects of the plan. The transportation network aims to provide safe and secure movement of all people, goods and services across all modes of transportation, as well as supporting emergency response.

PILLAR 2: LAND USE INTEGRATION recognizes that land use and transportation are intricately connected and influence one another. With Mission largely situated on a hillside with most destinations at the bottom of the hill, it is critical for Mission to re-think land use patterns to consider grades and distances between daily needs and destinations. As Mission is a rapidly growing community, both land use and transportation decisions influence how growth is managed.

PILLAR 3: STREETS FOR PEOPLE sees the transportation network not only as a place that serves vehicles, but all modes, and especially pedestrians. Streets for People creates environments that prioritize vulnerable road users in the planning process through a variety of means such as place-making and support programs to increase interest and confidence in sustainable transportation.

PILLAR 4: CHANGING TECHNOLOGIES proactively incorporates flexibility into the City's transportation planning processes, acknowledging that new mobility and disruptive technologies are currently changing the way we move and will continue to do so in the future. Embracing these technologies offers an opportunity to harness their benefits.

PILLAR 5: ASSET MANAGEMENT incorporates good governance into the plan, coordinating infrastructure improvements and ensuring that the transportation network is maintained in good condition.

PILLAR 6: EQUITY AND ACCESSIBILITY ensures the City seeks to provide equitable and universally accessible mobility options for all residents and visitors of all ages and abilities regardless of age, ability, gender, income, race, or other socio-demographic characteristics.

3.6 INTEGRATED MOBILITY PLAN

To achieve the vision and goals of the plan, Mission Mobility 2050 consists of four Mode-Specific Themes that were built off staff feedback, community engagement, review of existing conditions, and a best practices review. Each theme includes a series of Strategies and detailed Actions.

THEME 1

ACTIVE TRANSPORTATION focuses on making the City great for walking and rolling by expanding the sidewalk and multi-use path network, providing accessibility improvements, and creating beautiful and interesting public spaces.

THEME 2

TRANSIT focuses on enhancing the transit system to create a convenient and attractive public transit system for Mission's residents, supporting both local and regional trips by people of all ages and abilities.

THEME 3

GOODS MOVEMENT focuses on promoting a safe and efficient network for Mission's businesses to reduce travel times, ensure the life of the street network and promote livability, as well as maintain essential connections to the regional economy via rail and marine.

THEME 4

DRIVING focuses on balancing the safety needs of all road users and strategically investing in the road network to help people move safely and efficiently across the City.

3.7 BOLD MOVES

To help achieve the vision, goals, and targets, the plan identifies 10 Bold Moves, with one bold move for each of the six pillars and four modal plans. Together, these 10 Bold Moves provide clear direction on the highest impact strategies and actions that the City can take over the near-term. Each of these bold moves are described in further detail among the Strategies and Actions elsewhere in the plan.

#1
SAFE MOBILITY: Implement all recommendations of the Traffic Safety Strategy Implementation Plan by 2024.

#2
LAND USE INTEGRATION: Develop a Mobility Hub implementation plan and design guidelines by 2024.

#3
STREETS FOR PEOPLE: Develop a Safe and Active Routes to School Program and develop School Travel Plans for all schools in Mission by 2026.

#4
CHANGING TECHNOLOGIES: Develop an implementation plan for significant increase in public electric vehicle charging stations by 2024.

#5
ASSET MANAGEMENT: Implement the multi-year pavement rehabilitation plan by 2024.

#6
EQUITY AND ACCESSIBILITY: Develop Universal Design standards to incorporate into the City's Development and Subdivision Control Bylaw by 2025.

#7
ACTIVE TRANSPORTATION: Implement a priority network of all ages and abilities active transportation corridors by 2027.

#8
TRANSIT: Ensure all bus stops in Mission are accessible by 2030.

#9
GOODS MOVEMENT: Work with partners to develop an implementation plan for a downtown truck route bypass by 2024.

#10
DRIVING: Adopt updated multi-modal street cross-sections in the City's Development and Subdivision Control Bylaw by 2023.

4. PILLARS

Transportation is related to and influences many other aspects of how Mission functions and operates. The plan includes six Pillars that cover foundational topics that must be considered within each of the transportation modes and their impacts. This section outlines the recommendations for each of the six pillars, which were built off city staff feedback, community engagement, review of existing conditions and a best practices review.

PILLAR 1: SAFE MOBILITY

The safety of Mission's transportation network is a top priority, regardless of the travel mode being used. The plan includes an overarching emphasis on road safety and creating safe streets where serious injuries and fatalities are not acceptable. Safe mobility is considered in all aspects of Mission Mobility 2050, with the fundamental premise that the City will commit to significantly reducing collisions resulting in serious injuries and fatalities.

The City has the ability to directly influence traffic safety on and along the roads within its jurisdiction through the infrastructure it can provide along those roads. Signage, lighting, sidewalks, traffic markings, flashing beacons, traffic signals, traffic calming, geometric improvements, are all measures the City can install or construct as necessary.

A detailed analysis of collision analysis was conducted for this plan and is included in **Appendix A.** Between 2015 and 2019, there was an average of approximately 445 collisions reported to ICBC that resulted in injuries or fatalities in Mission, and this number has been relatively stable over the past five years. Between 1-2% of these casualty collisions resulted in fatalities over this period. Further, approximately 14% of collisions resulting in injury or fatality involved vulnerable road users, including pedestrians (9%), cyclists (2%) and motorcyclists (3%).

In 2019, the City endorsed a Traffic Safety Strategy. A review of traffic safety related complaints received by the City resulted in five broad categories of safety issues that can be targeted by the City:

- **Speeding vehicles** on major roads, minor roads, and rural roads.
- **Intersection safety** at signalized intersections, all-way stops, two-way stops, and driveways.
- **Roadway geometry** including requests for roadside barriers and curve warning signs.
- **Pedestrian safety** at crossings, at midblock locations and near elementary schools.
- **Cycling safety**, including a lack of comfortable facilities for people of all ages and abilities.

The Traffic Safety Strategy identified potential mitigation measures for each issue, which agencies might be involved, and the steps required to implement improvements. The City now requires an implementation plan for the Traffic Safety Strategy.

Direction 1.1: Adopt and implement a Traffic Safety Strategy Implementation Plan that advances the City's commitments to safe mobility for all road users, with a specific focus on vulnerable road users

A Traffic Safety Strategy Implementation Plan has been developed with recommended safety mitigation measures for each of five topic areas. The Traffic Safety Strategy Implementation Plan is included in **Appendix B** and includes the following recommendations:

- **Speeding improvements:**
  - **Speed reader boards** on major roads and rural roads at high collision locations.
  - **Road narrowings** involving reducing lane widths on major roads to improve safety.
  - **Road diets** involving reallocating road space on major roads to improve safety and provide active transportation facilities.
  - **Traffic calming** such as curb extensions, road narrowings, and speed humps on local and collector roads and near elementary schools where warranted.
- **Pedestrian safety improvements:**
  - Install **Rapid Rectangular Flashing Beacons (RRFBs)** and **overhead flashing beacons**, **leading pedestrian intervals**, **reducing curb radii**, **adding curb extensions**, and **other site improvements** at road crossings and near elementary schools.
  - **Pedestrian/corridor safety reviews** and **sidewalk improvements** along roadways.
- **Intersection safety improvements:**
  - **Cedar Street and 7th Avenue:** provide north-south left turn lanes, consolidating driveways, reducing corner radii, and aligning curb ramps with crosswalks, and reducing 7th Avenue lane widths.
  - **Cedar Valley Connector:** review feasibility of coordinating traffic signal with Highway 7 to reduce congestion at downgrade, provide warning of signal ahead on southbound approach, provide northbound advance phase or restrict left-turn due to limited visibility, and enhance signal visibility on northbound and southbound approaches.
  - **Cedar Street and 14th Avenue:** Reduce corner radii and align curb ramps with crosswalks, consider narrower lanes along Cedar Street, and provide greater continuity of pedestrian and bicycle facilities through the intersection.
  - **7th Avenue and Hurd Street:** Narrow the westbound departure leg (remove merge control) and reduce corner radii and align curb ramps with crosswalks.
  - **Review signal timing and phasing** at all traffic signals on a revolving 5-year cycle.
- **City-wide safety improvements:**
  - Conduct a **network screening of off-road collisions**.
  - Conduct a **network screening of collisions in adverse road surface conditions**.
  - Conduct a network **screening of collisions during dark conditions**.
  - Other than the weather and lighting changes above, conduct **educational campaigns**.
  - Determine the causes of **collisions on Sundays**.

- **Review trends in driver inattentive collisions** by location, time and driver age and other demographics as well as other behaviours.
- Conduct a **network screening of two-lane undivided roads**.
- **Identify the high collision locations** and determine the need for adjusting curve superelevation, anti-skid treatment, and/or curve warning and delineation.

- **Safety improvements on MOTI roadways:**
  - Speeding issues along major corridors.
  - Pedestrian safety improvements at road crossings and along roads.
  - Intersection safety and signalized intersections.

Implementing the City's Traffic Safety Strategy will involve a combination of engineering activities, funding, and communications. As well, the resulting construction and/or installation of improvements will require funding, including capital funding and staff resources. The City should adopt and implement the five-year plan included in the plan to improve safe mobility that builds upon the Traffic Safety Strategy.

Direction 1.2: Implement design treatments that reduce the risk of severe injuries and fatalities and create safer streets

There are a number of specific engineering treatments that the City can take to improve safety for all road users as noted above, including:

- Implement **fully protected left turns** at signalized intersections.
- Provide **Leading Pedestrian Intervals** at signalized intersections.
- Install **Rectangular Rapid Flashing Beacons (RRFBs)** at uncontrolled approaches to improve pedestrian safety, where warranted.
- **Reduce curb radii** where possible with any new and improved street designs to prioritize slower turn movements and improve pedestrian safety, while ensuring design and control vehicles can be accommodated.
- Implement **roundabouts** or other treatments that **slow speeds** through intersections.
- Address the **relatively steep downgrades** (greater than 5%) on intersection approaches.
- Reduce the **number of conflicts at driveways** and the **proximity of driveways to intersections.**
- Include **warning and delineation on horizontal curves** and reduce complexity on intersection approaches.

Direction 1.3: Adopt a 'Safe System Approach' to improve road safety

The City should follow a 'Safe System Approach' to road safety. This approach aims to create a safe mobility system that is forgiving of human error. Everyone involved in the transport system, including planners, engineers, policy makers, and police officers, have a shared responsibility with road users for designing a road system that does not allow human error to result in serious or fatal outcomes. The Safe Systems Approach utilizes four pillars – **Safe Roads, Safe Speeds, Safe People** (or road users), and **Safe Vehicles**. Sometimes a fifth pillar – **Post-Crash Care** – is also included.

Direction 1.4: Develop comfortable, connected, and complete networks for that are suitable for people of All Ages and Abilities (AAA)

In order to ensure the City is designing and building infrastructure for vulnerable road users of all ages and abilities, the City should ensure it follows the recommendations and design guidance from the BC Active Transportation Design Guide as well as other national and international best practices. Further details and recommendations for active transportation are provided in the Mode-Specific Themes section.

Direction 1.5: Review collision data and target safety improvements to high collision intersections at five-year intervals

A review of recent collision data identified a number of collision-prone corridors and intersections. The top collision prone corridors and intersections are summarized below and shown in **Map 1**. Note that locations under the City's jurisdiction are bolded, while those under MOTI jurisdiction are not bolded.

Collision-Prone Corridors	Collision-Prone Intersections
• Highway 11 (MOTI) • Abbotsford-Mission Bridge (MOTI) • Lougheed-Hwy 7 (MOTI) • 1st Avenue (MOTI) • **Hurd Street** • **Cedar Valley Connector** • **Dewdney Trunk Road** • **7th Avenue** • **Cedar Street** • **14th Avenue** • **Keystone Avenue** • **Stave Lake Street** • **Wilson Street**	• Highway 7 & Highway 11 (MOTI) • **Cedar Street & 7th Avenue** • Murray Street/Glasgow Street and 1st Avenue/Highway 7 (MOTI) • Lougheed Highway & Park Street (MOTI) • Lougheed Highway & Hurd Street (MOTI) • **Cedar Valley Connector & Mall Access** • **Cedar Street & 14th Avenue** • Lougheed Highway & Nelson Street (MOTI) • Lougheed Highway & Wren Street (MOTI) • **Grand Street & 7th Avenue** • **Hurd Street & 7th Avenue** • **Best Avenue & Cedar Street** • Lougheed Highway & Haig Street (MOTI) • Lougheed Highway & Hayward Street (MOTI) • **Wren Street & 7th Avenue**

The City should continue to use collision data to identify high collision locations based on the most recent five-year period. By reviewing this collision data, the City will be able to target safety improvements to those areas that need it most and develop a list of recommended treatments for the intersections and problematic segments. Through this work, the City can create a five-year action plan to address some of the most serious issues in Mission. The City should also work with MOTI to coordinate and prioritize safety improvements on roadways under MOTI jurisdiction.

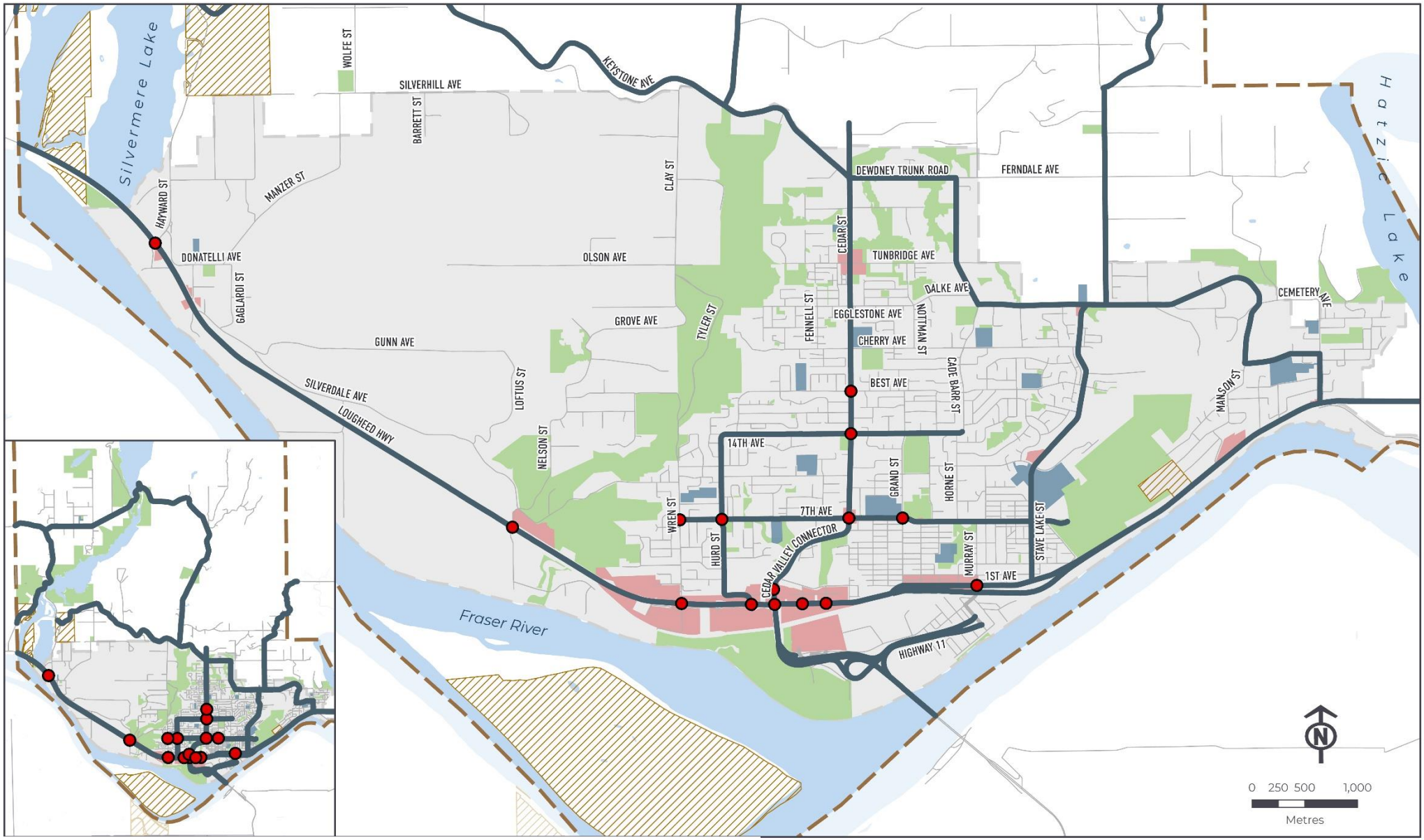
Direction 1.6: Develop a Prioritized List of Traffic Calming Sites for Improvements

The Traffic Safety Strategy includes a number of safety issues on various road types in the City, including speed complaints on local roads, along with traffic calming measures as a potential mitigation measure. The City's current Traffic Calming Policy was adopted in 2019 and includes potential application of various traffic calming measures such as vertical deflections, horizontal deflections, roadway narrowing, and non-physical measures in residential areas or on roadways adjacent to a park or school. The plan review indicates it is a sophisticated policy and the consideration of traffic calming measures are generally consistent with national guidelines. As part of Mission

Mobility 2050, traffic calming requests provided by the City from 2017 to 2019 were reviewed. Seven locations met the eligibility criteria and met the minimum threshold for traffic calming:

- McRae Avenue (Eider Street to Edge Street)
- Grand Street (11th Avenue to 14th Avenue)
- Badger Avenue (West of Beaver Drive to Beaver Drive)
- 14th Avenue (Taulbut Street to Grand Street)
- Kenney Avenue (Oyama Street to Nelson Street)
- 14th Avenue (Cedar Street to Caribou Street)
- Best Avenue (Caribou Street to Bobcat Drive)

The details of the review of traffic calming request are provided in **Appendix C**. The City should develop an annual budget to implement traffic calming measures where warranted and should begin with the seven warranted projects noted above.



MAP 1: COLLISION PRONE LOCATIONS

- Collision Prone Intersection
- Collision Prone Corridor
- Parks and Open Space
- School
- Commercial
- Urban Growth Boundary
- First Nation Reserve Land
- Municipal Boundary

PILLAR 2: LAND USE INTEGRATION

Land use and transportation are interconnected – the transportation network can support land use patterns with appropriate investments to enable and encourage people to walk, cycle, and use transit. Higher sustainable transportation mode shares are an indicator of how integrated the City's transportation system is with land use patterns. It is also an indication of how investments in sustainable modes can shift the amount of driving in support of a healthier and more vibrant community.

Like other North American communities, Mission faces challenges from being an auto-dependent community. The form of most North American cities has evolved from being compact and vibrant places of mixed-use areas where people could choose to live, work, shop, socialize and recreate in close proximity, to having more dispersed and segregated land use patterns. This change in the urban structure and form of cities has made it more difficult to walk and cycle to serve our daily needs, and has made it very difficult to provide attractive transit services within dispersed land use patterns. In Mission, most commercial areas are located at the bottom of the hillside near the waterfront and across major barriers such as highway and railway, which makes it challenging for many residents to access daily goods or services without a vehicle.

Mission Mobility 2050 considers land use integration, promoting a compact, complete, and connected city that allows residents to live and work in close proximity to one another, facilitating higher sustainable mode share. The recommendations for the Land Use Integration pillar provide an overarching perspective to linking and deepening Mission's transportation network and land use planning and can help to achieve several of the goals of the plan, including *A Complete Community* and *A Healthy Community.*

Direction 2.1: Ensure the transportation system supports land use patterns with appropriate investments to enable and encourage people to walk, roll, cycle, and use transit

The development of walkable, mixed-use communities around transit hubs, key destinations and the waterfront is an essential component of land use integration in Mission. This can mean guiding development to ensure destinations and daily needs are within reasonable walking and cycling distances from all residents, as well as providing increased investments in pedestrian, cycling and transit infrastructure in new neighbourhoods such as Silverdale and Cedar Valley. Investments in sustainable transportation infrastructure and programming will directly influence the sustainable mode share, and the amount of driving.

Direction 2.2: Continue to consolidate growth within Mission's urban areas, with a mix of housing types, jobs, services, and amenities

Mission's 2018 OCP establishes a clear approach to urban structure and growth. It is based on a dense urban core and new urban neighbourhoods, such as the Waterfront Comprehensive Planning Area, Cedar Valley, Hatzic and Silverdale. The OCP also focuses on densifying core areas and neighbourhood centres, and supporting infill in existing neighbourhoods. Mission Mobility 2050 supports and reinforces the importance of these OCP directions. Dense and complete communities are easier to serve with the transportation network – and investment can be more focused. Communities with a range of transportation options, including convenient and accessible options, can reduce urban sprawl and promote a healthier and more equitable environment. Consolidating growth in Mission's urban areas will boost local businesses, grow a sense of community, and allow residents to work in Mission, instead of commuting.

Direction 2.3: Develop mobility hubs between sustainable modes of transportation (walking, rolling, cycling, and transit)

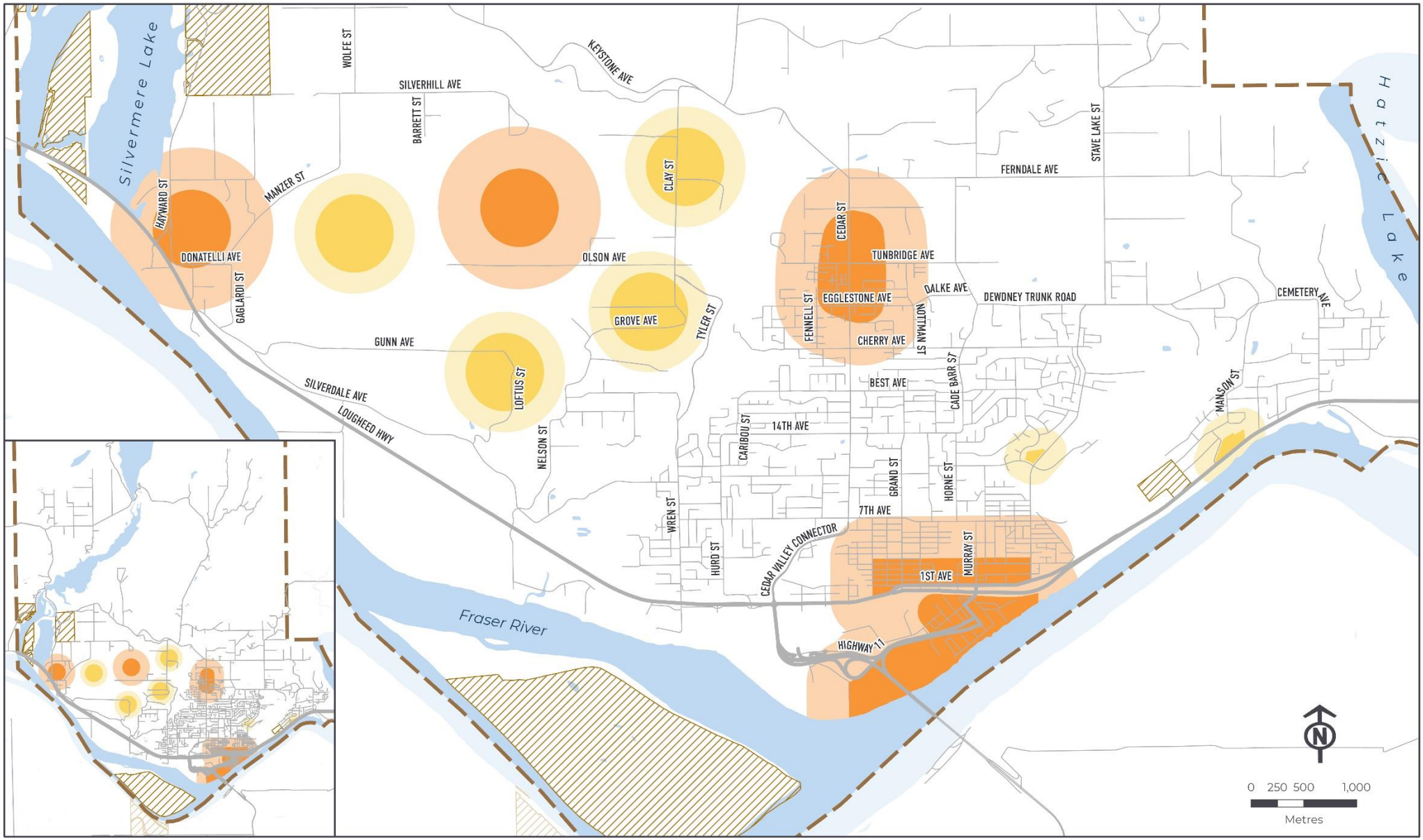
Through the integration of land use and transportation planning, it is possible to provide the setting for transit-oriented, walkable, and bicycle-friendly communities, which are inherently less dependent on private automobile use. Areas where future development and densification are planned for in Mission could shift travel patterns towards more sustainable transportation choices by integrating land use and transportation planning to create mobility hubs. The mobility hubs will be vibrant centres full of energy and life, and characterized by the rapid and rhythmic movement of people. Future mixed-use development and densification in these hubs along with ensuring current or future transit service passes through or terminates at mobility hubs along with high quality active transportation infrastructure will shift travel patterns towards more sustainable transportation choices and active travel modes. Mobility hubs in Mission are proposed in alignment with OCP land use policies and include mobility hubs in the Downtown, Waterfront Area, Cedar Valley, and Silverdale (see **Map 2**).

Direction 2.4: Support the development of affordable residential housing in close proximity to active transportation networks, transit, and community destinations

The Lower Mainland is experiencing an affordability crisis, and the influx of residents to Mission speaks to the desire for residents to have affordable residential housing options, and an affordable transportation network. With more affordable housing options near transit hubs and community destinations, Mission can reduce the need for a personal vehicle and reduce the amount of driving needed on a daily basis. With more free time to focus on what is important, residents will benefit from less stress, and the ability to maximize convenience and value.

Direction 2.5: Leverage development as an opportunity to enhance the transportation network

Working with developers offers an opportunity to streamline the advancement of the long-term transportation network. For example, the City can require that new developments provide sufficient internal and external pedestrian connections with a fine-grained road network to promote walking, including connections beyond the development, convenient and secure short- and long-term bicycle parking, or high-quality end-of-trip facilities. The City can consider incoming applications for large new developments as a trigger to provide improved connectivity, active transportation, high quality urban design, and placemaking features to support efficient transit access and create pedestrian-friendly streetscapes, such as pedestrian-scale lighting, benches, street frontages and massing that support sustainable transportation, and other urban design features.



MAP 2: MOBILITY HUBS

- Primary Mobility Hub
- Primary Mobility Hub Buffer (400m)
- Secondary Mobility Hub
- Secondary Mobility Hub Buffer (200m)
- First Nation Reserve Land
- Municipal Boundary

CITY OF Mission ON THE FRASER

PILLAR 3: STREETS FOR PEOPLE

The Streets for People pillar prioritizes safety, livability, and connection through the reallocation of road space – currently oriented to cars – for use by people walking, biking, rolling, or taking transit. If Mission takes a human-centred approach and creates streets that are convenient, attractive, safe, and inviting for people of all ages and abilities, more people will enjoy using more sustainable modes. This approach helps to reduce automobile dependence and greenhouse gas (GHG) emissions, improve public health outcomes and road safety, and create more livable and vibrant communities.

Streets for people can be designed in many ways: expanding the public realm, space for parks, widening and increasing comfort or accessibility of sidewalks, protected bicycle lanes, dedicated transit lanes, or traffic calming measures. Supporting the design of streets for people are programs and activations that support the pedestrian realm such as wayfinding, lighting, seating, and programs that promote confidence in walking, cycling or active school travel.

In Mission, sustainable mode share is highest within the Mission Core, with the downtown and waterfront areas having over 7.5% sustainable mode share in 2016. Hatzic and the eastern portion of the Mission Core were next highest (6.5%-7.5%). Outside of the Mission Core, sustainable mode share is less than 4.5%. This is unsurprising, as denser urban environments are better for walking and rolling, and are easier to serve by transit.

Mission Mobility 2050 views streets as places that serves everyone, and where walking is the most fundamental form of transportation – it is part of every trip, whether that trip is made by car, transit, or bicycle. Streets are considered places that should be attractive, enjoyable, and convenient for people to access everyday destinations, visit with friends and family, and enjoy all that Mission has to offer. While the movement and accessibility for cars is also considered in the plan, it is balanced with the need to accommodate people first.

Direction 3.1: Create safe, welcoming, and comfortable places that attract pedestrians and make streets an enjoyable place to be

The experience that pedestrians have while walking and visiting public spaces influences their desire to walk more in the future. Creating public spaces that invite and welcome pedestrians will ensure that pedestrians are safe and enjoy the space that is meant for everyone in Mission. Streets are also the gateway to and from transit stops and transit service. How individuals experience streets can heavily define their sense of safety, security, and inclusion. Features such as pedestrian-scale lighting, benches and other urban design features can attract pedestrians of all ages and abilities to enjoy the streets of Mission in a new way.

TransLink has developed a **Tactical Urbanism Toolkit** that can be used as a guide for demonstration and interim projects focused on active transportation and placemaking. Tactical urbanism is a set of tools and techniques that can be used to pilot low cost, rapid implementation improvements to the street, and they can greatly enhance the pedestrian realm. Projects can last for hours, days, or weeks, and some become permanent.

Direction 3.2: Develop support programs and initiatives that encourage people to walk and highlight the benefits of walking, including enhanced wayfinding, walking clubs, and a Safe Routes to School program

Programs and initiatives that promote education or awareness of sustainable transportation can help to drive interest, build community, and shift sustainable mode share. The City can support or develop groups such as walking clubs or Safe Routes to School programs to ensure that residents are learning how to safely use the road and grow the number of sustainable transportation users on the roads. Mission can work with local organizations who already do this work, contract those who are experts in the space, or start their own with the aid of international best practices.

Promoting awareness and education can also include consistent wayfinding that guides people throughout Mission, connecting them to popular destinations or hidden gems. Maps, signage, and kiosks with information can promote effective wayfinding throughout the City.

PILLAR 4: CHANGING TECHNOLOGIES

Like all cities across North America and the world, Mission is experiencing significant changes in its transportation system. Climate change, affordability, and innovation have brought new devices to our streets, changing the way we move today and adding an element of uncertainty on how we will move in the future. The impacts of these new devices and patterns are only just beginning to be understood – and set precedent for needing to build flexibility into our transportation system.

While changing technologies can have negative impacts, they offer a lot of opportunity to bring positive change to Mission and the region. These modes can be more sustainable, safer, provide increasingly affordable mobility options and allow residents to navigate Mission's challenging topography. The adoption of these technologies could be rapid – for example, Electric vehicles (EVs) are growing in popularity in BC, and with the provincial government's legislation requiring all motor vehicles sold by 2040 to be zero emissions, the number of electric vehicles is set to increase significantly. This uncertainty highlights the need for aligned provincial and local policy that ensures changing technologies options are brought forward within a framework that supports community objectives.

Changing technologies covers a suite of new and emerging transportation modes such as ride hailing, carshare, bike share, scooter share, and micro-transit. It also covers the electrification of transportation (electric cars and e-bikes), autonomous vehicle technology, and mobility-as-a-service (MAAS) platforms. Mission Mobility 2050 plans for the introduction of changing technologies in Mission and considers how to enhance the existing infrastructure and systems for current trends such as Zero Emission Vehicles (ZEVs) and charging stations.

Direction 4.1: Expect new and disruptive technologies and plan to accommodate new modes and higher numbers of Zero Emission Vehicles

As part of its climate plan, the Government of Canada has committed to achieve net-zero emissions by 2050 and has a goal to reach 100% of passenger zero-emission vehicle sales by 2040. To work towards this, communities must start planning for a significant increase in Zero Emission Vehicles (ZEVs). In addition to ZEVs, new mobility such as car share, bike share and micromobility offer new ways to travel around cities without a car. While these can offer many benefits, cities must build flexibility into their policy, design guidelines and enforcement to expect the unexpected. While we plan for pedestrians, cyclists, and motor vehicles currently, consider the impact of new mobility technologies on facility design.

Direction 4.2: Facilitate the use of more sustainable modes in Mission such as Zero Emission Vehicles through the installation of charging stations

The federal government is providing incentives to help municipalities invest in infrastructure to support ZEVs, including providing funding through the Zero-Emission Vehicle Infrastructure Program.

ZEVs are recharged by plugging into the electricity grid. Three charge types are available:

- **Level 1 (One Hour of Charge – 8 km of Range):** Standard cord-set that plugs into a regular wall socket.
- **Level 2 (One Hour of Charge – 30 km of Range):** The most common level for public charge stations. Requires 4 to 6 hours to fully charge an EV.
- **Level 3 (One Hour of Charge – 250 km of Range):** Requires 30-45 minutes to fully charge an EV.

To support the necessary infrastructure required for the future, many cities have begun requiring that new buildings provide electric outlets to service residential parking, and some municipalities are requiring that a share of new commercial and industrial parking stalls be wired for Level 2 charging. To support the use of electric vehicles, the City should install public charging stations at all community facilities by 2030 and ament its Zoning bylaw to require electric outlets. There are a number of existing electric vehicle charging stations in Mission. Potential locations for Electric Vehicle charging stations are shown in **Map 3**, with additional charging stations proposed at hospitals, community centres, transit exchanges, commercial areas, and Fraser River Heritage Park.

Direction 4.3: Plan for new mobility services and devices that can increase sustainable mode share and equity in Mission, and decrease challenges due to topography

The City should consider the following to encourage new modes on the transportation network:

- Seek strategic partnerships to **encourage car share operations** to come to Mission.
- Consider the potential for **new mobility connections to and from West Coast Express.**
- Develop an approach to on-street and off-street public parking that includes **incentives for car share vehicles** (i.e. priority parking, free parking at parking meters).
- Investigate the potential for **parking variances** if developers provide and support car share services. This provision is based on research that car share vehicles can significantly reduce the need for private vehicle ownership.
- **Reserve a supply of priority parking spaces** in higher density areas already well served by transit, such as near the West Coast Express.

Direction 4.4: Use Intelligent Transportation Systems to improve the efficiency of the transportation system

Intelligent Transportation Systems (ITS) involve the implementation of advanced technology on transportation operations. This emerging area is beneficial in reducing congestion and increasing road safety. ITS technology can create a communication link between the various vehicles and road systems including traffic signals, transit vehicles, and all other travellers providing drivers (and autonomous vehicles in the future) with advance warning about changing or upcoming travel conditions. The City should consider undertaking a comprehensive examination of the practical applications for ITS in Mission, which could include the provision of real time information to drivers, dynamic corridor signal coordination, transit signal prioritization, as well as future-oriented applications such as vehicle to infrastructure technology.

Direction 4.5: Plan for the introduction of Autonomous Vehicles to Mission and the region

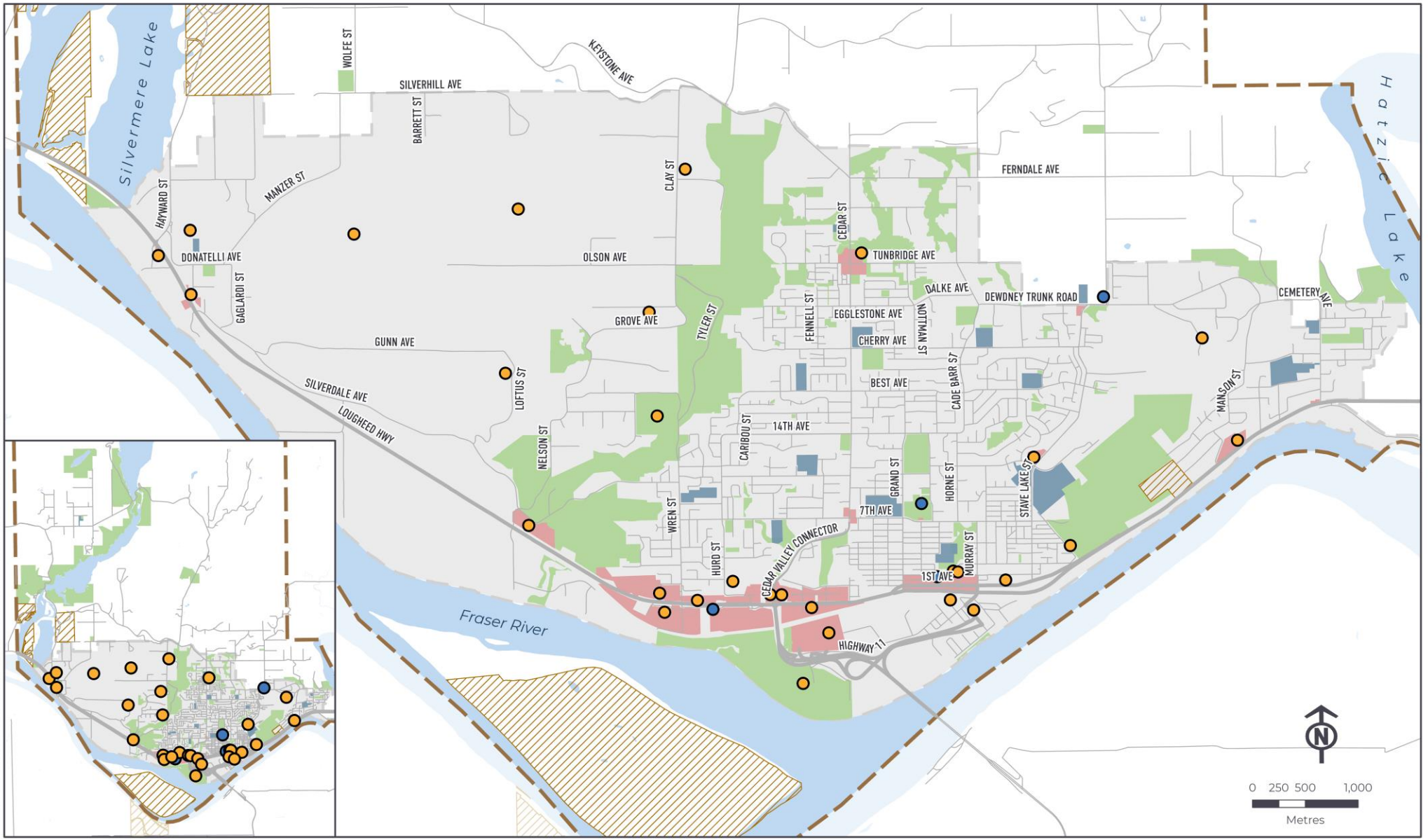
Autonomous Vehicles (AVs) are driverless vehicles that are programmed to operate and navigate from a point of origin to a destination without human intervention. AV technology is rapidly evolving – industry analysts expect AVs to be available for purchase with market adoption occurring over the next 30 years. AVs could extend the freedom of personal mobility to those who cannot or are unwilling to drive such as the visually impaired and youth under the age of 16; additionally, AVs could provide new mobility options for those without access to an automobile. As 90% of vehicle collisions are a result of human error, research suggests that autonomous vehicles may be able to significantly reduce the 112,000 fatal and personal injury collisions that occur across Canada each year as reported by Transport Canada.

However, AV technology is still not certain and is not likely to fix all existing transportation problems. It will need to be introduced in an equitable way and thoughtfully integrated with other existing transportation modes, including walking, cycling, and transit. Mission can take a proactive approach to planning for an uncertain future. These steps can include:

- Undertake studies to evaluate the impact that AVs would have on accessibility, safety, mobility, parking demand, public transit, multi-modality, and land use.
- Develop long-range transportation models that incorporate a degree of uncertainty.
- Regularly update the Transportation Plan to account for uncertainty.

Direction 4.6: Support BC Transit's shift to a low carbon fleet program

BC Transit has committed to a low carbon fleet program and the electrification of the fleet by 2040. While details of the preferred technology have not been confirmed, in order to maintain maximum flexibility, programs for electric vehicle charging infrastructure should consider that off-site electric vehicle bus charging may be required. The City should work with BC Transit to identify candidate locations for off-street electric vehicle bus charging, including transit exchanges.



MAP 3: ELECTRIC VEHICLE CHARGING STATION CONCEPTUAL NETWORK

- Existing Charging Stations
- Proposed Charging Stations
- Parks and Open Space
- School
- Commercial
- Urban Growth Boundary
- First Nation Reserve Land
- Municipal Boundary

City of Mission ON THE FRASER

PILLAR 5: ASSET MANAGEMENT

Canadian municipalities spend $12-15 billion annually on infrastructure; however, existing infrastructure continues to age while demand continues to grow. In a rapidly growing city like Mission, asset management is key to keeping the transportation system in a state of good repair and maintaining fiscal responsibility.

Mission Mobility 2050 ensure that the City coordinates across departments so that the duplication of efforts is minimized, working towards Mission's goals. By incorporating Mission Mobility 2050 recommendations along with other plans that review and plan for infrastructure improvements such as utilities, traffic signals, pavement, sewer, water and drainage, the City can promote integrated capital planning that optimizes spending.

Assessment findings, budget review and staff input shows that Mission will need to increase investment in their transportation infrastructure to sustain existing service levels and address deteriorating assets. In addition, investments in infrastructure must increase to support its growing population and promote sustainable mode share.

Staff have indicated challenges meeting current maintenance requirements needed to maintain existing service levels, let alone increase service levels. Staff have expressed concern that budgets for paving and other rehabilitation have recently been reduced. This concern is exacerbated since there has been significant cost increases for all construction works and staff resources are already stretched.

The City should take every opportunity to extend the remaining life of existing infrastructure to avoid service level reduction and further financial strain. In addition, keeping the transportation system in a state of good repair can ensure that all road users stay safe, and enjoying their mode of choice in Mission.

Direction 5.1: Focus on asset management and ensure the transportation system is in a state of good repair

Taking an asset management approach to inform infrastructure investments is crucial to ensuring that the funding and resources are allocated to keep the transportation system in a state of good repair. Taking stock of infrastructure at regular intervals allows the City to identify infrastructure that is deteriorating and optimize renewal works before more costly repairs are needed. This will enable the City to prioritize investments and create a long-term plan to extend the life of Mission's assets through coordinated maintenance, rehabilitation, improvements, and construction based on upcoming plans and projects.

As part of Mission Mobility 2050, a pavement condition assessment was conducted. The pavement study examined the current roadway pavement conditions throughout the City and provided a multi-year rehabilitation program. This study guides the City in developing rehabilitation programs to ensure that the roads are paved and remain in good condition, supporting the transportation choices of Mission residents, visitors, and businesses. This assessment also included capturing an inventory of all sidewalks, curb and gutter, and signage in the City which is an important first step for asset management to have baseline data for these assets.

The City should continue to assess its pavement condition at regular intervals and plan to address problem areas across departments where possible. The City should also assess other transportation-related infrastructure such as bridges, streetlights, and traffic signals to ensure that Mission remains in a state of good repair, and the City has a clear understanding of what investments are needed and when.

Non-infrastructure solutions that can lower costs or extend asset life can also be considered. For example, Mission can approach asset management through establishing service levels that prioritize investment, risk management, integrating land use planning integration with infrastructure planning, demand management and public education. The City can also identify materials that last longer when rehabilitated, or promote more sustainable modes that take less of a toll on the transportation network's infrastructure than heavy trucks and vehicles.

Direction 5.2: Develop an Asset Management Plan and database to monitor condition of assets and track capital improvements across departments in a consistent way

The City should take a holistic view to managing its infrastructure assets in a coordinated way across departments. The City should establish an Asset Management Program that centrally manages the City's infrastructure asset information and considers and prioritizes all infrastructure rehabilitation and improvement needs that are informed through ongoing inspections and condition monitoring. This should include all transportation assets, including streets, sidewalks, transit stops and amenities, bicycle facilities, traffic signals, and signs, among other things. Mission's Asset Management Program should inform and support ongoing and prioritized capital planning weather the project is deferred or advanced and support collaboration and sharing of projects.

PILLAR 6: EQUITY AND ACCESSIBILITY

Equity and accessibility must be considered in order to make a transportation system work for people of all ages and abilities. Affordable and equitable transit service can enable residents of all incomes and abilities to access necessary services and supports (i.e., employment, education, healthcare, public and social services, and healthy food) that are critical components to health. Designing city streets with accessibility in mind can make it easy and convenient to walk to everyday destinations for people with disabilities, seniors, parents with children, or even people walking home with a cart from grocery shopping. Improving accessibility can therefore benefit everyone, not just those with mobility or other challenges. The walking environment must, therefore, include accessibility features to accommodate the unique needs of these groups and to provide better pedestrian experience for everyone.

Mission Mobility 2050 considers equity and accessibility throughout the design and prioritization, promoting a transportation network that works for and serves all of Mission's residents.

Direction 6.1: Develop and design universally accessible streets

Best practice in accessibility is to follow Universal Design principles, which create inclusion for all by making designs equitable, flexible, and simple, and intuitive to navigate. Universal Design ensures that the transportation network is accessible people of all ages and abilities. This includes people with reduced mobility, vision, hearing, strength, dexterity, and comprehension. Accessibility is especially important in Mission due to its demographics and steep topography.

The B.C. Active Transportation Design Guide provides a universal accessibility design toolkit covering a range of strategies that can improve the accessibility in Mission, including:

- Accessible sidewalks (at least 1.8 metres wide) that are free of obstructions.
- Ensuring surfaces are smooth, firm, slip-resistant, free of tripping hazards, and well maintained year-round.
- Accessible curb ramps.
- Frequent resting spots, especially on uphill segments.
- Detectable warning surfaces.
- Audible pedestrian signals.
- Pedestrian-scale lighting.
- Intuitive wayfinding.

Direction 6.2: Include equity as a criterion in the City's planning and prioritization

Affordable and equitable transportation options can enable residents of all incomes and abilities to access necessary services and supports (i.e. employment, education, healthcare, public and social services, and healthy food) that are critical components to health. By including equity as a criterion in the City's planning and decision-making phase, those who need transportation improvements the most will reap the most benefit.

The City of Bellingham is an example of a jurisdiction that recognizes that not all neighbourhoods have the same level of transportation service needs. As a result, the City focuses upgrades on lower-income neighbourhoods with higher needs for sidewalks, bikeways, and transit service.

Direction 6.3: Work with Indigenous communities to better understand their needs and improve mobility options across communities

The City is committed to advancing meaningful reconciliation with Indigenous Peoples. Indigenous Peoples have inhabited the Fraser Valley for time immemorial. The City is situated within the unceded, ancestral and shared territory of the Stó:lō people. Mission is situated on Matsqui, Sema:th, Kwantlen, Katzie, Sq'éwlets, and Leq'a: mel traditional territories. Today there are 30 Nations in the Fraser Valley, representing three broad language groups. According to Statistics Canada's 2016 Census, Indigenous Peoples make up nearly 8% of Mission's population. In addition, Kwantlen First Nation has three Reserves and Matsqui First Nation has one Reserve within Mission, and the Pekw'Xe:yles (Peckquaylis) Reserve is shared and used by over 20 Nations (see **Map 4**). There are also several other Reserves within or directly adjacent to the City of Mission. As such, there are many Indigenous Peoples within and around Mission that access services, recreation, and other destinations within the City of Mission and beyond.

Mission Mobility 2050 recognizes the importance of working together with Indigenous communities to better understand their needs and ensure the mobility network serves their community members' needs.

Direction 6.4: Apply an intersectional, equity-focused lens to transportation decision-making and work with service providers and other organizations representing vulnerable and under-represented groups to identify their unique mobility needs

Equity means striving for a just, free, and fair society where all people have access to the necessary opportunities and resources to live a healthy and meaningful life. In the context of Mission Mobility 2050, striving for equity means providing safe, accessible, and convenient mobility options for all residents.

Several identity factors influence equity, including race, gender, sexual orientation, income, age, ability, religion, and several other factors. The intersection of these diverse identity factors creates unique experiences of discrimination and privilege. Applying an intersectional, equity-focused lens means striving to recognize and mitigate these factors through planning and design, education, awareness, or other policies. The federal government uses a tool called Gender-Based Analysis Plus (GBA+) to apply an intersectional equity lens.

Many of the groups noted above are often under-represented through the public engagement process but have unique needs that can make travelling through communities challenging. The City should conduct targeted communication and engagement with equity-seeking groups to better understand and address their mobility barriers, to identify the best forums for participation, and to explore opportunities to encourage active transportation. This action is also a reminder that the City could consider equity during all future planning, engagement, and design exercise.

MAP 4: FIRST NATIONS RESERVES IN MISSION AREA

First Nation Reserve Land

Municipal Boundary

5. INTEGRATED MOBILITY PLAN

Mission Mobility 2050 includes an Integrated Mobility Plan that provide detailed guidance for four mode-specific themes: active transportation, transit, goods movement, and driving. This section outlines the recommendations for each of the four key themes, which were built off city staff feedback, community engagement, review of existing conditions and best practice review. Each theme contains several strategies and actions for Mission to complete in order to reach the vision and goals for its transportation network.

THEME 1: ACTIVE TRANSPORTATION

Active transportation refers to using one's own power to get from one place to another, and can include walking, cycling, scootering, or skateboarding, and other forms of human-powered mobility. Active transportation brings a range of benefits to individuals, families, and the community such as cost-savings, a less congested transportation network, new social connections, safer streets, and healthier populations.

Providing active transportation facilities is important to facilitating all trips in Mission – walking is the most fundamental form of transportation as it is a part of every trip, whether that trip is made by bicycle, transit, or car. Walking currently accounts for approximately 5.7% of all trips made by Mission residents, while cycling currently accounts for less than 1% of all trips in Mission. With increased investment and attention paid to active transportation networks, such as having an all ages and abilities (AAA) walking, rolling, and cycling network that is comfortable, complete, and connected, trips by active transportation can become more desirable and more common.

Walking and cycling to everyday destinations can be easy if streets and neighbourhoods are safe and well-designed for pedestrian and cycling safety and accessibility. The networks must be accessible to a large cross-section of people, including people with disabilities, seniors, and parents with children. Accessibility is particularly important at intersections and crossings, as a difficult crossing can make trips much longer or create safety issues, particularly for seniors, children, and people with physical and cognitive disabilities. The plan includes active transportation networks that are geared towards both people walking, wheeling, and cycling.

This theme includes the following five strategies to promote active transportation in Mission:

Strategy 1.1: Develop a complete, connected, and accessible pedestrian network

Strategy 1.2: Develop an active mobility network for people of all ages and abilities

Strategy 1.3: Enhance trails and greenways to provide recreational opportunities

Strategy 1.4: Create and enhance existing crossings to accommodate all ages and abilities

Strategy 1.5: Develop support programs and initiatives that encourage people to use active transportation

STRATEGY 1.1: DEVELOP A COMPLETE, CONNECTED, AND ACCESSIBLE PEDESTRIAN NETWORK

When asked to identify their top three issues or challenges for walking in Mission, 65% of respondents identified *lack of sidewalks or pathways* as a top issue or challenge, followed by *intersection safety* and *hills are too steep*. When asked what the City could do to encourage more walking, *building more sidewalks, building more trails and pathways*, and *ensuring sidewalks and pathways are well-lit* were the most popular responses among respondents.

Providing a comfortable, complete, and connected pedestrian network is critical to creating an environment where people of all ages can walk for a variety of trip purposes. Many areas in Mission do not have sidewalks connecting to schools, transit, recreation, or shopping areas, resulting in significant gaps in the pedestrian network. When there is no sidewalk, people are forced to walk on the road or use vehicles for short trips.

People with mobility challenges are often the ones most affected by a lack of sidewalks. Some existing sidewalks require accessibility improvements. In some areas of Mission, sidewalks are narrow or partially blocked by obstructions, such as hydro poles. The City has seen cases of pedestrians – especially those using mobility devices – experiencing challenges and even getting injured when trying to navigate around obstructions in the sidewalk.

Action 1.1A: Fill in gaps in the sidewalk network by strategically investing in new sidewalks and upgrading 'walking strips' on existing streets

The City should work to strategically invest in completing the sidewalk network. The proposed long-term sidewalk network is shown in **Map 5.** The sidewalk network was developed based on the following factors:

Factor	Description	Minimum Number of Sidewalks
Road Classification	Arterial (within UGB*)	Both sides
	Collector (within UGB*)	Both sides
	Local (within UGB*)	One side
	Arterial (outside UGB*)	One side (shoulder)**
	Collector (outside UGB*)	One side (shoulder)**
	Local (outside UGB*)	One side (shoulder)**
Transit	On a bus route	Both sides
	Bus service within 100m	Both sides
	Bus service within 400m	One Side
Schools	Directly adjacent to any school	Both sides
	School within 150m	Both sides
	School within 400m	One Side
Parks	Directly adjacent to any park	Both sides
	Park within 150m	Both sides
	Park within 400m	One Side
Key Destination	Directly adjacent to key destination	Both sides
	Destination within 150m	Both sides
	Destination within 400m	One Side
Commercial and Multi-Family Residential Areas	Within commercial area	Both sides
	Within 400m of commercial area	One Side

**Note: UGB = Urban Growth Boundary*

***Note: In rural areas outside of the Urban Growth Boundary, a shoulder or sidewalk could be provided on both sides of the street when adjacent to residential areas, schools, or parks, or if on a bus route.*

New sidewalks can be implemented in three primary ways:

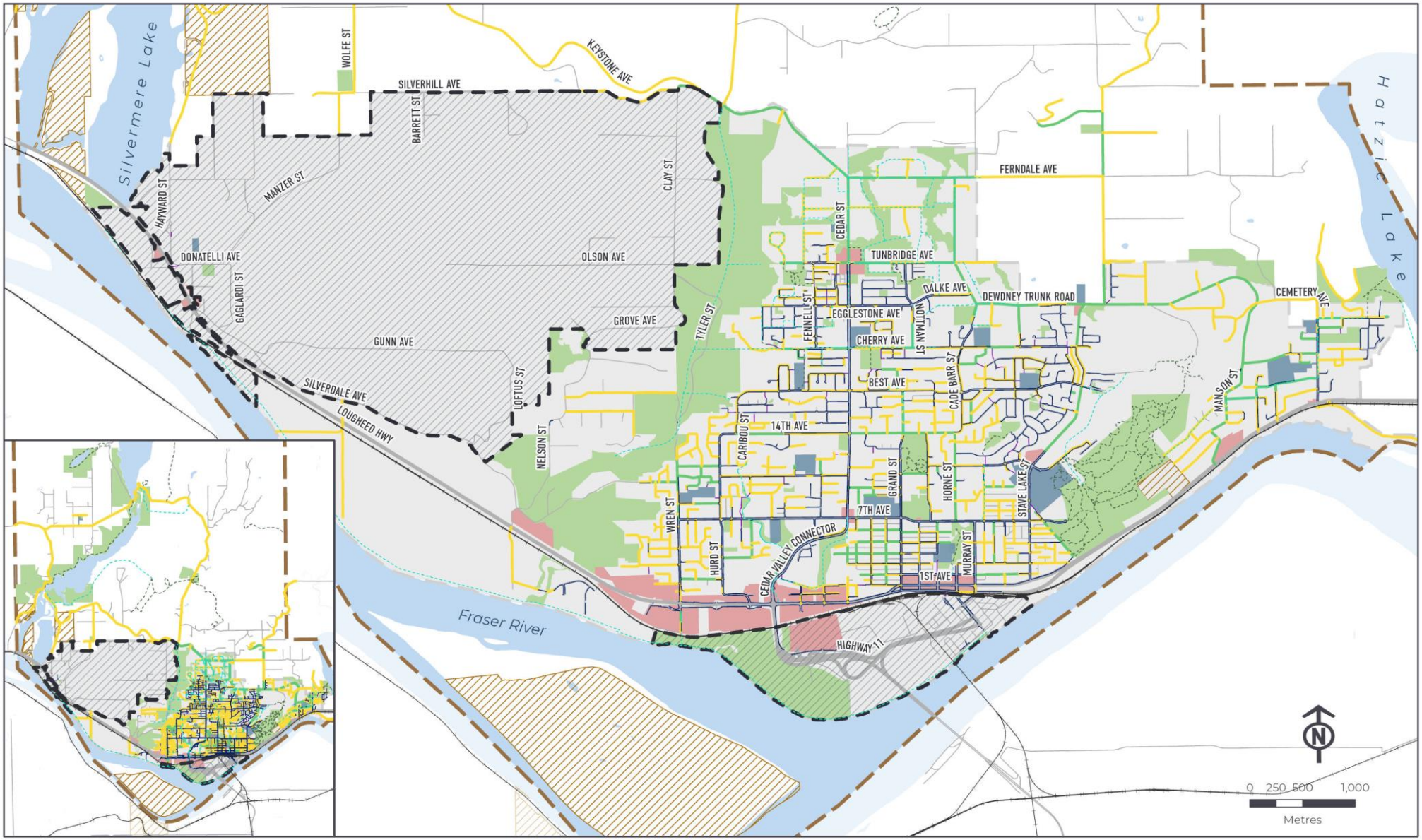
- **City-initiated sidewalks,** which focuses on filling in gaps on major streets and on bus routes, as well as connections to parks and schools.
- **Developer-initiated sidewalks,** which will be required through redevelopment as per the City's Development and Subdivision Control Bylaw. These can be triggered in areas of redevelopment as well as through residential infill. For residential infill, the City should consider cash-in-lieu payments for sidewalks to avoid 'leapfrog' sidewalk development.
- **Resident-initiated sidewalks,** where residents can request a sidewalk through the Local Area Service program. Sidewalk requests undergo an engineering evaluation by City staff and then go through a sidewalk evaluation matrix.

Mission also has a number of "walking strips" along numerous roadways throughout the City. Walking strips do not provide physical separation from traffic, making them less safe and comfortable for pedestrians than sidewalks; however, they help to fill in gaps in the City's existing sidewalk network and have the potential to be improved using temporary, low-cost elements such as flexible delineators or concrete curbs or barriers. The proposed sidewalk network includes upgrades to walking strips in urban areas.

The plan recognizes that sidewalks are not practical in most rural areas. As such, the plan instead recommends providing paved shoulders along collector and arterial roads in rural areas of Mission to provide dedicated space for people to walk. Walking strips should also be provided on rural roads with transit service.

Action 1.1B: Strategically upgrade and widen sidewalks in areas of high pedestrian demand

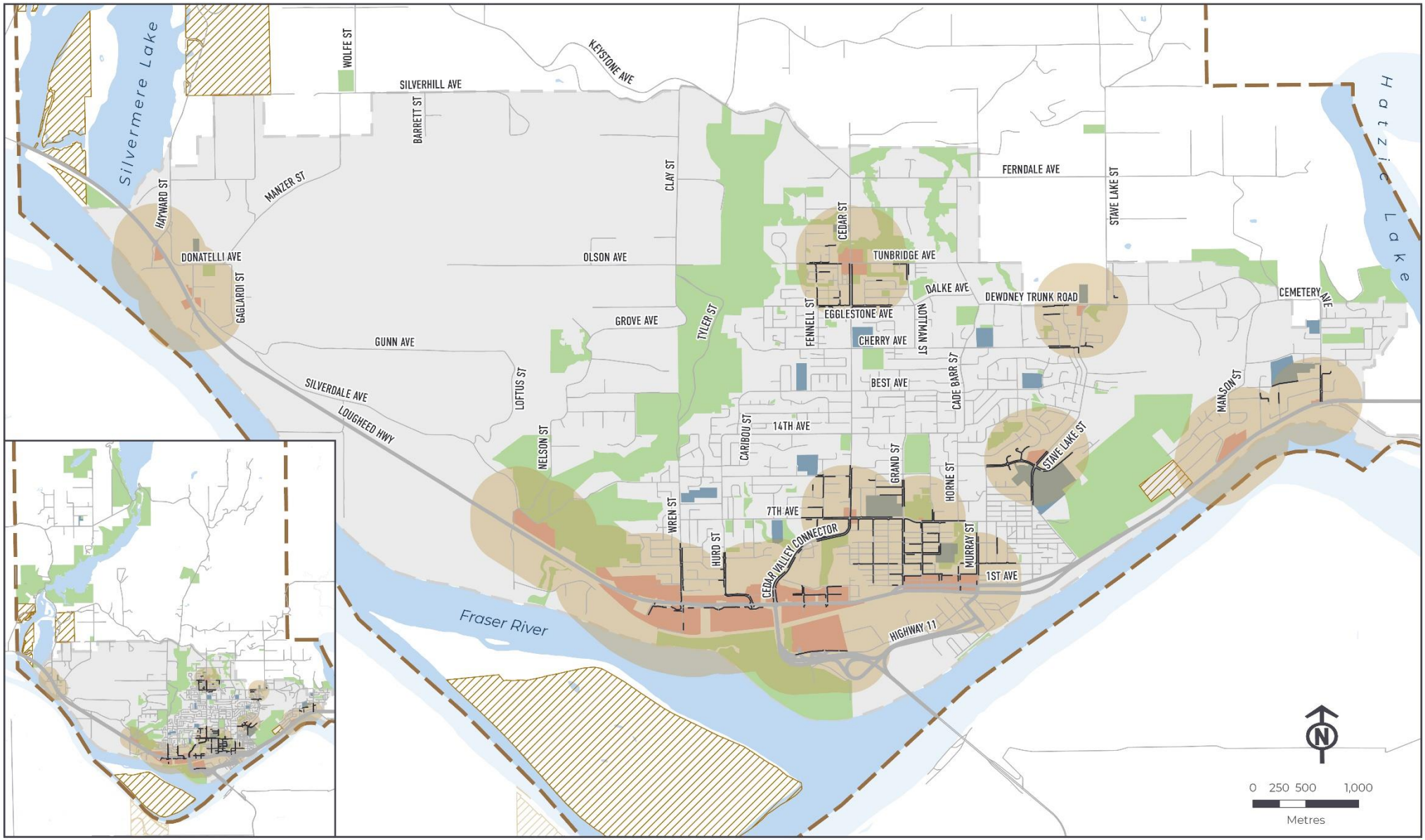
The comfort and experience of walking is influenced by how streets are designed, including sidewalk width and whether a buffer is provided between pedestrians and vehicles. The B.C. Active Transportation Design Guide indicates that the desired minimum clear with for sidewalks is 1.8 metres to allow for universal accessibility and enable two people using mobility aids to comfortably pass each other. In commercial areas and other areas of high pedestrian activity, the desired clear width should be even wider. In addition, walking is more comfortable if a boulevard is provided to separate pedestrians and vehicles. In many cases throughout the City, sidewalks do not meet this minimum desired clear width, nor do they have boulevards to provide separation. The City should strategically upgrade and widen sidewalks in areas of high pedestrian demand, as shown in **Map 6**.



MAP 5: LONG-TERM SIDEWALK NETWORK

- Proposed Sidewalk - Both Sides
- Proposed Sidewalk - One Side
- Proposed Trail
- Existing Sidewalk
- Existing Trail
- Neighbourhood Walkway
- Railway
- Parks and Open Space
- School
- Commercial
- Urban Growth Boundary
- Separate Neighbourhood / Area Planning Area
- First Nation Reserve Land
- Municipal Boundary

CITY OF MISSION ON THE FRASER



MAP 6: POTENTIAL UPGRADES TO EXISTING SIDEWALKS

- Candidate for Sidewalk Upgrade
- Key Destination Buffer (400 m)
- Parks and Open Space
- School
- Commercial
- Urban Growth Boundary
- First Nation Reserve Land
- Municipal Boundary

City of Mission ON THE FRASER

Action 1.1C: Ensure streets are designed to be universally accessible

In order to ensure that pedestrian facilities are designed to be safe, accessible, and comfortable for people of all ages and abilities, the City should follow universal design principles, which is best practice in accessibility. This approach creates inclusion for all by making designs that are equitable, flexible, and simple and intuitive to navigate. While universal design covers people of all ages and abilities, there is a focus on those people facing accessibility challenges in the transportation network. This includes people with reduced mobility, vision, hearing, strength, dexterity, and comprehension. Accessibility is especially important in Mission due to its aging demographic and steep topography.

The B.C. Active Transportation Design Guide lays out a universal accessibility design toolkit covering a range of strategies that can improve the pedestrian network in Mission, including:

- **Surfaces that are smooth, firm, slip-resistant, free of tripping hazards, and well maintained** year-round.
- **Accessible curb ramps**.
- Frequent **resting spots**, especially on uphill segments.
- **Detectable warning surfaces**.
- **Audible pedestrian signals**.
- Pedestrian scale **lighting**.
- Intuitive **wayfinding**.

STRATEGY 1.2: DEVELOP AN ACTIVE MOBILITY NETWORK FOR PEOPLE OF ALL AGES AND ABILITIES

Active mobility refers to a range of wheeled users, including people cycling, rollerblading, skateboarding, or using other human-powered wheeled devices. When asked to identify the main issues or challenges for active mobility in Mission, more than half of those who responded to this question selected *hills are too steep* as one of their top three issues/challenges, followed by *bicycle routes do not feel safe* and *lack of bicycle routes*. When asked what the City could do to encourage more active mobility, *building bicycle lanes physically protected from traffic* and *building more trails and pathways* were the most popular ways to encourage more active mobility.

Mission's existing active mobility network consists of approximately 33 km of bicycle facilities that are made up of three types of facilities: bicycle lanes, shared roads, and multi-use pathways. Most of the active mobility network consists of shared roadways. While some of these shared routes are on streets with lower traffic speeds and volumes, others are on busier streets, resulting in an uncomfortable experience for many people. In addition, areas with steep topography present a challenge to people cycling in terms of network connectivity as well as an increased physical challenge. As such, although the City has a network of on-street facilities, most facilities are not comfortable for people of all ages and abilities. Wherever possible, future active mobility facilities should be designed to be comfortable for all ages and abilities, also known as "AAA" active mobility facilities.

Action 1.2A: Develop a complete, comfortable, and connected active mobility network that places all residents and businesses within close proximity of an active mobility corridor, and provides connections to key destinations

The City should work towards developing a City-wide AAA active mobility network that consists of physically separated facilities such as multi-use pathways, protected bicycle lanes, and off-street pathways on streets with high traffic volumes, and local street bikeways on quieter streets. Intersection treatments such as cross-rides, bicycle signals, and protected intersections can make a significant difference in improving the safety and comfort of a bicycle facility. The City also maintains 11 km of recreation mountain biking trails in the Municipal Forest. The City partners with the Fraser Valley Mountain Bike Association to oversee another 40+km of trails on Bear and Red Mountains. Providing safe cycling routes to access trail heads is a key consideration for the plan.

The active mobility network is shown in **Map 7** and was developed based on the following principles:

- **A Comfortable Network**. The proposed active mobility network focuses on developing an All Ages and Abilities ("AAA") network. The purpose of an AAA network is to provide an interconnected system of active mobility facilities that are comfortable and attractive for all users. The AAA active mobility network includes three types of bicycle facilities that are most effective at increasing ridership: local street bikeways, protected bicycle lanes, and off-street pathways, as shown in **Figure 7**. These facilities are the most preferred types of facilities by all users and are proven to be the safest types of facilities. While a major guiding principle of Mission's proposed active mobility network is to provide AAA facilities, it is important to note that there is still a place for complementary, non-AAA facilities such as painted bicycle lanes to support the AAA network, particularly in rural areas. It should also be noted that while the proposed active mobility network identifies recommended facility types, these are only preliminary recommendations and may be adjusted as each project advances through the planning and design process. However, the intent is that any corridor identified as being a AAA facility should continue to be AAA, even if the facility type may change.
- **A Complete Network**. The proposed active mobility network ensures all areas within Mission are within a close distance to a designated and complete active mobility corridor. This involves developing a minimum City-wide grid that ensures that most residents and areas of the City are within 400 metres of a designated active mobility corridor. The minimum grid network includes both the AAA network and the supporting network.
- **A Connected Network**. Providing direct AAA routes to Mission's waterfront, commercial, businesses, employment and educational destinations is an important component of making active mobility an attractive transportation option. The proposed active mobility network aims to provide high quality and direct north-south and east-west connections to connect each of the City's key community destinations such as schools, parks, and recreational opportunities.

The proposed active mobility network is based on establishing a "spine" network of critical active transportation corridors to gain early momentum. The City should focus on establishing a core network of "spine" corridors over the near-term, including east-west AAA facilities 7th Avenue and 14th Avenue, which are currently being advanced by the City. The City should then focus on establishing north-south AAA facilities on connecting routes, such as Wren Street, Hurd Street, Grand Street, Horne Street, and Stave Lake Street. This would establish a core network of AAA facilities that provides east-west and north-south connections in much of the urban areas of the community.

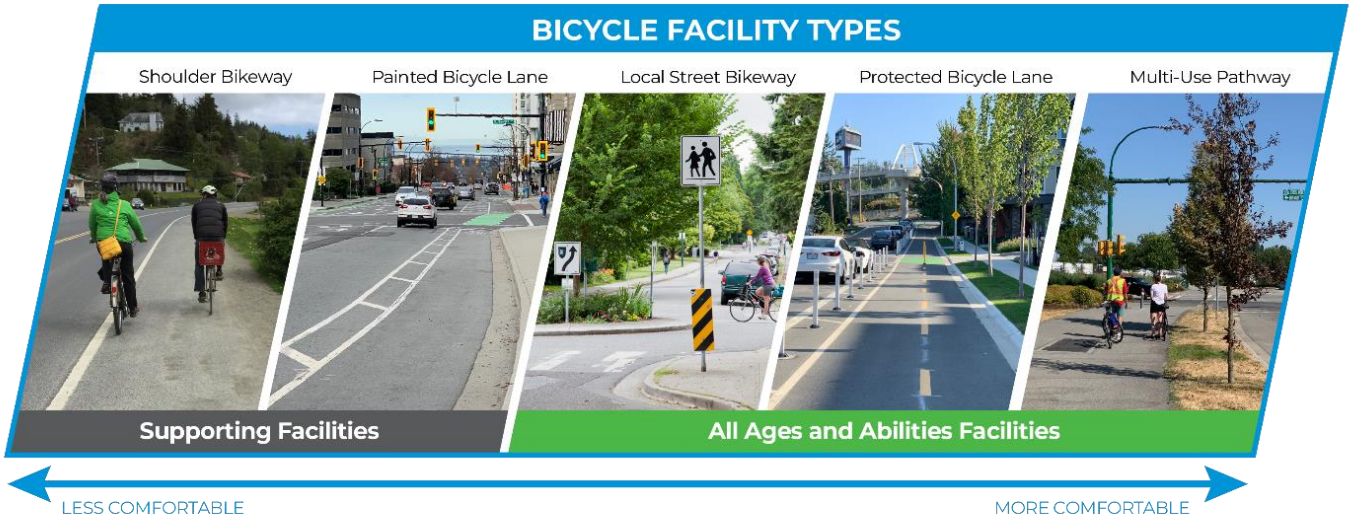
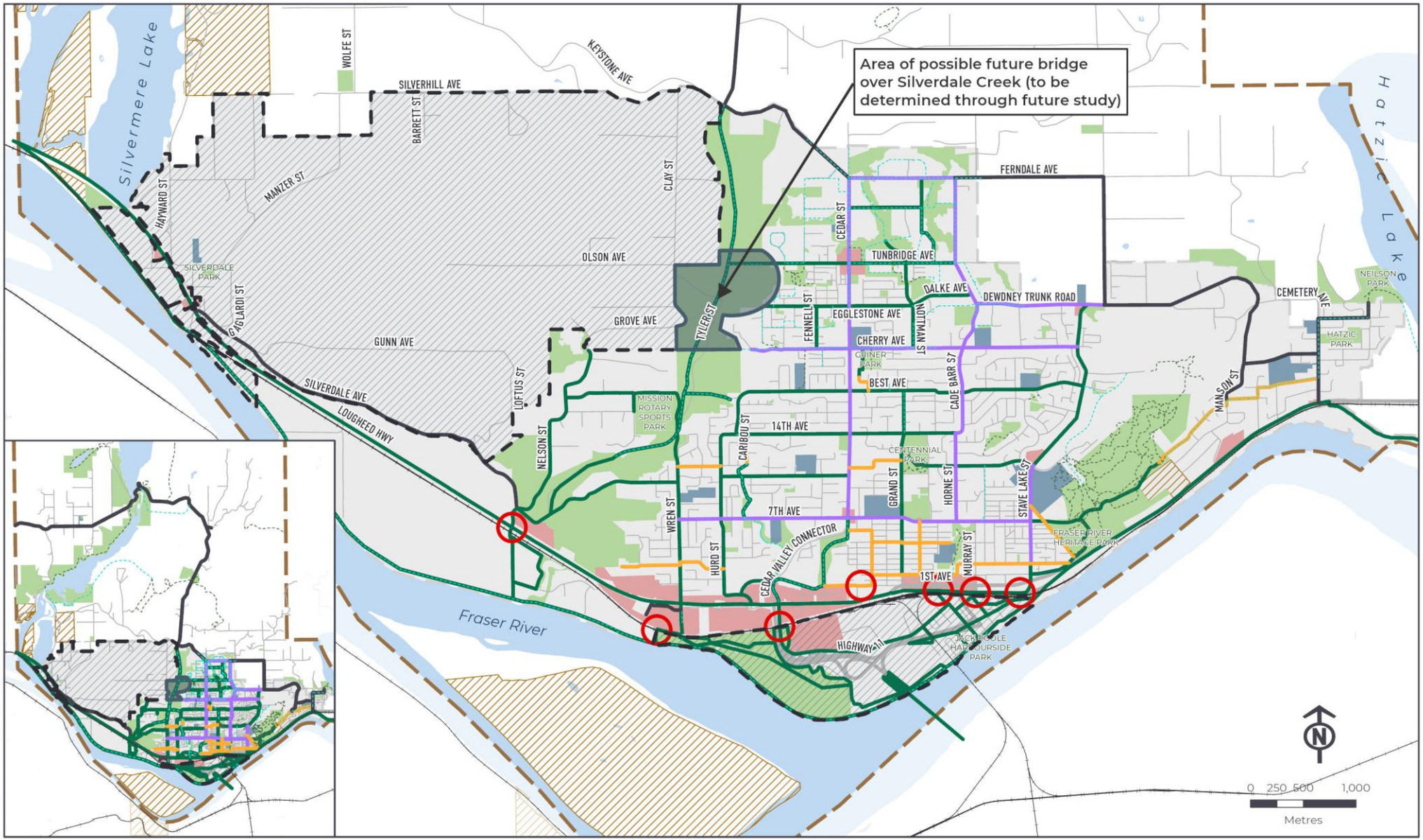


FIGURE 7: BICYCLE FACILITY TYPES

Pilot projects are an effective way to reduce the implementation time of on-street protected bicycle lanes and can help build support for changes to the street design. Rapid implementation at a network level is more effective in increasing ridership than building projects in isolation.



MAP 7: LONG-TERM ACTIVE MOBILITY NETWORK

- Multi-Use Pathway
- Protected Bicycle Lane
- Local Street Bikeway
- Painted Bicycle Lane / Shoulder Bikeway
- New / Improved Crossing Needed
- Proposed Trail
- Existing Trail
- Railway
- Parks and Open Space
- School
- Commercial
- Urban Growth Boundary
- Separate Neighbourhood / Area Planning Area
- First Nation Reserve Land
- Municipal Boundary

CITY OF MISSION ON THE FRASER

STRATEGY 1.3: ENHANCE TRAILS AND PATHWAYS TO PROVIDE RECREATIONAL AND TRANSPORTATION OPPORTUNITIES

The City is known for its scenic, natural, and cultural landscapes has an extensive off-street pathway and trail network. The City should identify opportunities to enhance trails and pathways to provide active mobility opportunities for both recreational and transportation purposes.

Action 1.3A: Identify, plan for, and invest in trails and pathways to seamlessly connect the pedestrian network

The City is known for its scenic, natural, and cultural landscapes has an extensive off-street pathway and trail network. The City developed a Parks, Trails and Bicycle Master Plan (PTBMP) to provide direction to the City for the management of the trails, parks, and outdoor recreation systems. The PTBMP found that residents identify the recreational opportunities afforded by the City's natural environment as one of their primary reasons for living in Mission. The PTBMP includes a number of recommendations under the theme of "Creating Connections for a Healthy Community" that the City should consider pursuing through the plan. These recommendations focus on improving pedestrian and bicycle connections, including:

- Create the "Mission River Walk" from Silverdale to Fraser River Heritage Park consisting of a minimum 3-metre-wide paved multi-use pathway.
- Wherever practical, provide universal access and connectivity between parks and trails.
- Complete trails through natural areas, particularly where they will link recreation areas.
- Formalize a bike and pedestrian connection from Fraser River Heritage Park to the Hatzic community;
- Adopt trail standards.
- Enhance linkages with the Mission Municipal Forest.
- Partner with recreational/volunteer groups to construct and maintain trails.
- Establish trail construction and maintenance partnerships with other agencies.
- Improve park and trail safety using Crime Prevention Through Environmental Design (CPTED) principles.
- Collaborate with MOTI on the construction of a Lougheed Highway pedestrian overpass in the vicinity of the Hayward Connector and a second, future overpass in the vicinity of Fraser River Heritage Park.
- Work with the Planning Department to create public access to Silvermere Lake.
- Support recreational and commuter cycling initiatives.

Action 1.3B: Support regional initiatives to develop a continuous waterfront greenway

There are a number of regional initiatives aimed to create a continuous active transportation corridor throughout Metro Vancouver and the Fraser Valley, following the Fraser River. These initiatives include the Experience the Fraser (ETF) project and vision for Great Blue Heron Way connection to connect Indigenous communities from the Salish Sea to the Fraser Canyon (see **Figure 8**). The Vision for ETF is that it is an invitation to "experience and explore the dynamic, lower Fraser River corroder from Hope to the Salish Sea…To celebrate the spirit and stories of its varied landscapes, diverse communities, and rich natural and cultural heritage."

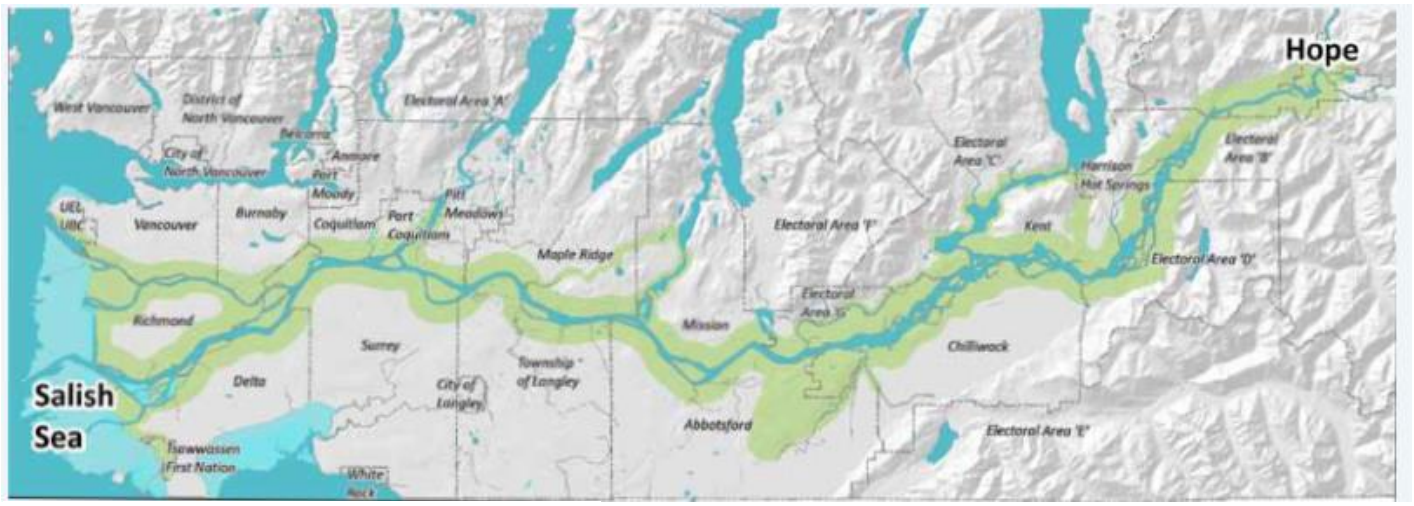


FIGURE 8: EXPERIENCE THE FRASER VISION

In addition to the continuous waterfront connection envisioned by ETF, the City has been considering a potential waterfront greenway since 2007. With ongoing plans for redeveloping Mission's waterfront, there is potential opportunity to create a waterfront greenway, allowing people walking, rolling, and cycling to travel along the shore of the Fraser River. The river frontage is not currently publicly accessible due to the Lougheed Highway, private property, and industrial operations. Initiation of a waterfront greenway should consider the following challenges:

- Establishment of physical connections with the rest of Mission to ensure access to City-wide recreational opportunities.
- Creation of an integrated, continuous, paved recreational path along the length of the project area, including the "working waterfront" (industrial activities).
- Ensuring public, recreational access to the river wherever possible.
- Integration of environmental values and features into riverfront parkland.
- Ensuring protection from floodwaters despite increased public access to the river.

As demand for this area's industrial products shifts, the use of these lands will change. This opportunity aligns with the proposed ETF route. There is the potential to coordinate with development and utility work to create this new walking opportunity. Additionally, there is opportunity to better utilize the City's dike network, formalizing pedestrian access as development occurs and the City secures ownership over it.

Action 1.3C: Develop a context sensitive approach to separating users on multi-use pathways

Multi-use pathways are off-street pathways that are physically separated from motor vehicle traffic and can be used by any non-motorized user. This includes people walking, cycling, and using other forms of active mobility such as skateboarding, kick scootering, and in-line skating.

In many communities, multi-use pathways are considered a comfortable active transportation facility appropriate for people of all ages and abilities. However, multi-use pathway conditions may feel less comfortable if there is a high volume and a diverse mix of users, as this can make the pathway feel congested and can be uncomfortable if the speed differential between users is high. The growth in popularity of electric bicycles and small, one-person electric vehicles has the potential to compound this conflict. To manage these potential conflicts, the plan suggests a context-sensitive approach to separating users on multi-use pathways. In many cases, with

relatively low volumes, multi-use pathways may be appropriate. In areas of higher pedestrian and/or cycling demand, as well as in locations where pedestrian and/or cycling volumes increase, the City can take a flexible approach to providing additional separation, including providing paint separation, material separation, and/or tactical/visual separation, as shown in **Figure 9**. Each of these options require the same amount of pathway width but illustrate a hierarchy of approaches to consider if separation between users is desired.

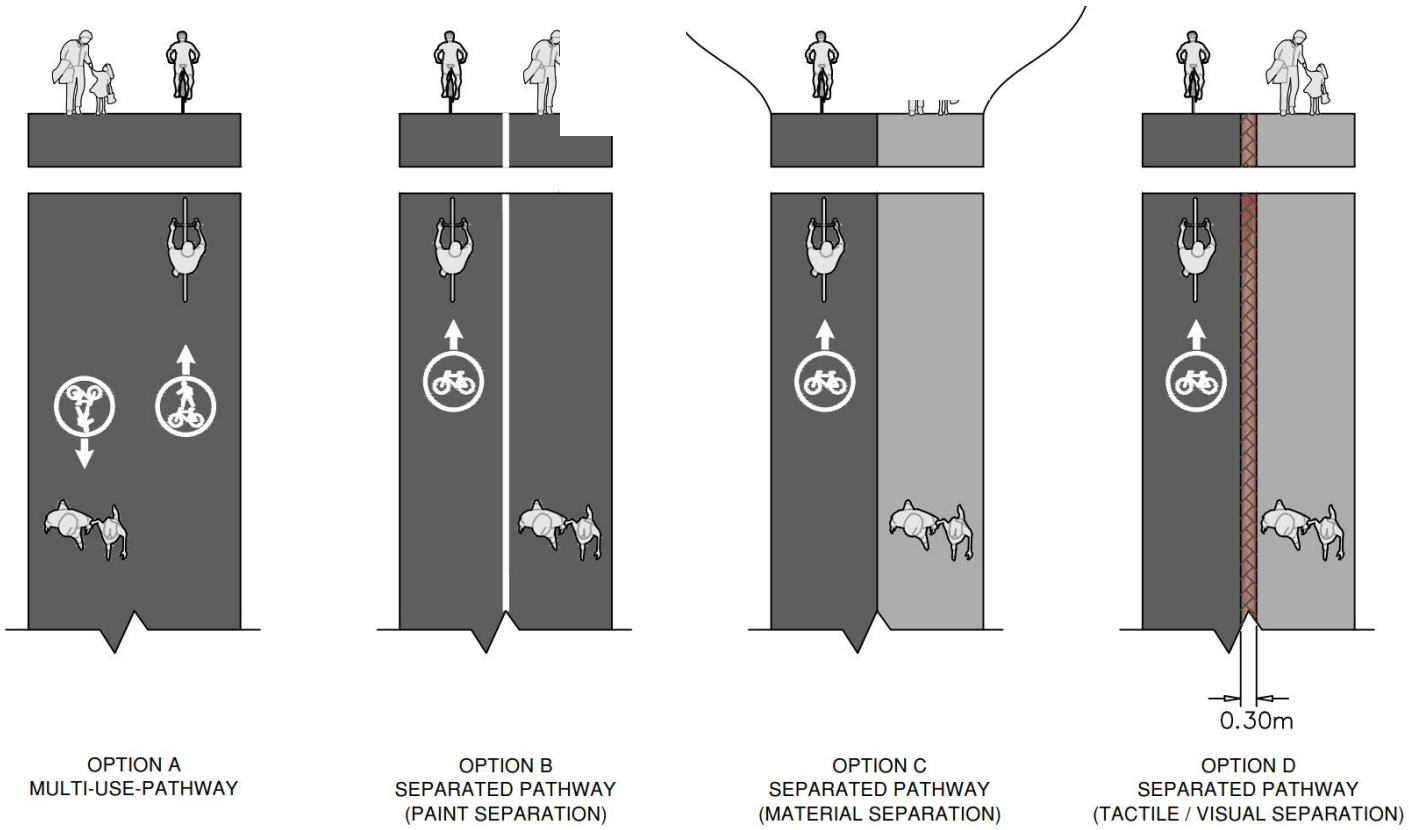


FIGURE 9: CONTEXT SENSITIVE APPROACH TO PATHWAY USER SEPARATION

STRATEGY 1.4: CREATE AND ENHANCE EXISTING CROSSINGS TO ACCOMMODATE ALL AGES AND ABILITIES

Mission has developed a Traffic Safety Strategy that recommends enhancing pedestrian and cycling crossings to ensure all Mission residents can safely make use of these facilities. Addressing pedestrian and cycling safety at crossings is multi-faceted – it includes addressing personal safety (i.e., sightlines, lighting, eyes on the street) and traffic safety (i.e., separation from motor vehicles, reduced speeds, and volumes).

Action 1.4A: Implement warranted crosswalk improvements

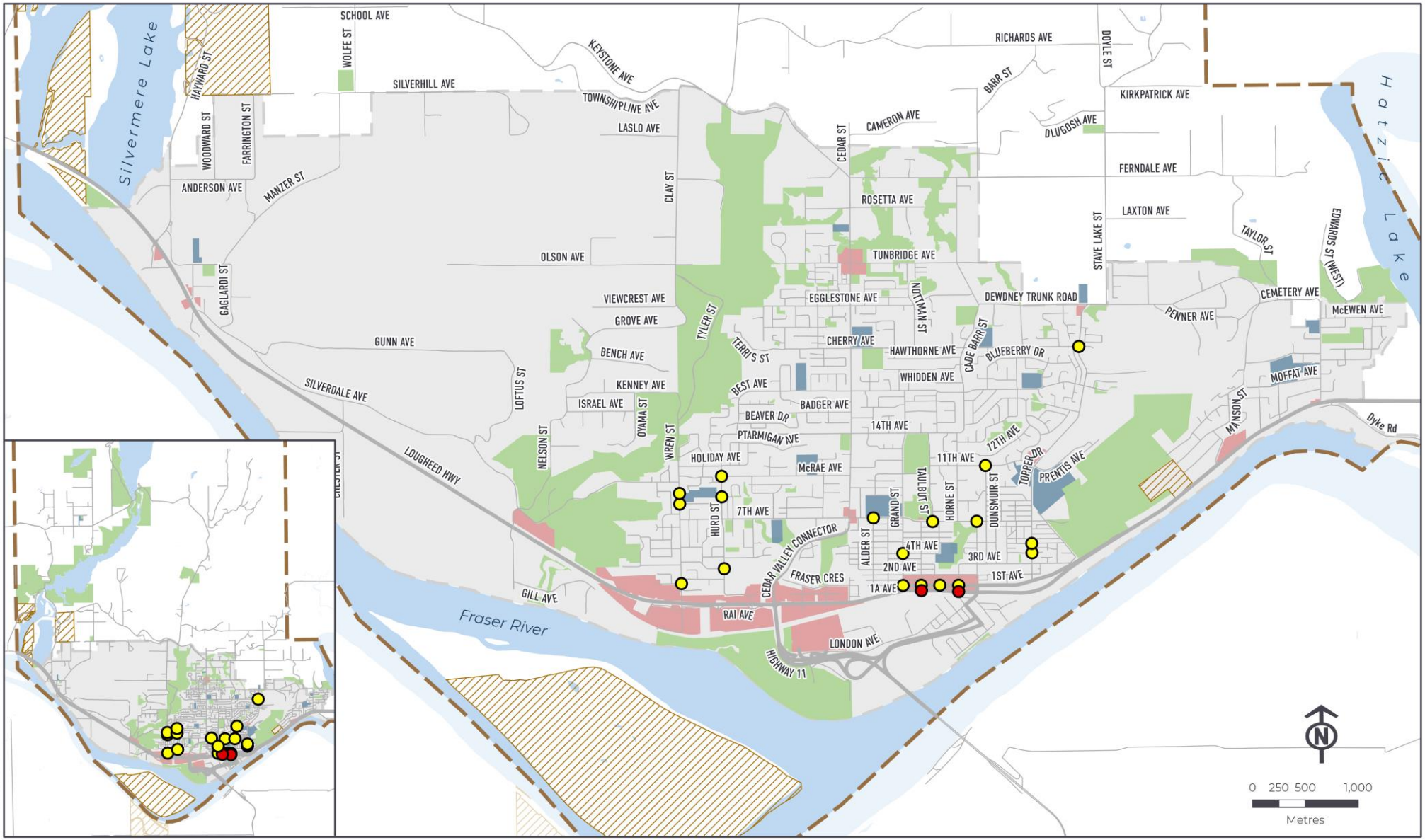
A review of pedestrian crosswalk warrants was conducted as part of Mission Mobility 2050. The City's Traffic Safety Strategy includes pedestrian safety as one of the categories where public complaints have been received and safety issues have been identified. In response to "vehicles not stopping for pedestrians, pedestrian visibility issues", it lists as potential mitigation measures: "install crosswalks, streetlights, pedestrian-activated flashing beacons, curb bulges", and that implementation would be determined based on crossing control warrants.

In the August 19, 2019, Council Report, it was noted that "several projects have been identified by staff based on existing known issues, including five priority one crosswalks. These are already being tracked and evaluated, with priorities assigned based on a warrant system. The improvements include new overhead flashing beacons at three locations and rapid rectangular flashing beacons at two locations.

A warrant analysis was conducted following the Transportation Association of Canada's Pedestrian Crossing Control Guide, Third Edition (refer to **Appendix D** for details). 88 candidate locations were reviewed for the consideration of crosswalks. Based on this warrant analysis, the plan recommends a number of crosswalk upgrades, as shown in **Map 8**. The list of locations proposed for pedestrian crossing control includes upgrades at 23 locations, including:

- 2 upgrades from ground-mounted systems to ground-overhead mounted systems.
- 18 new RRFBs (17 of which are currently ground-mounted crossings and one of which is uncontrolled).
- 3 new overhead flashers (all of which are currently ground-mounted systems).

In addition to the warranted crosswalk improvements at this time, the City should continue to review opportunities for new and upgraded crosswalks on an ongoing basis. It should be noted that any new or upgraded crosswalks should follow an engineering warrant process and be warranted based on the Transportation Association of Canada's Pedestrian Crossing Control Guidelines.



MAP 8: PEDESTRIAN CROSSING IMPROVEMENTS

- GM2 (overhead signs)
- RRFB
- Parks and Open Space
- School
- Commercial
- Urban Growth Boundary
- First Nation Reserve Land
- Municipal Boundary

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Action 1.4B: Provide additional pedestrian crossing enhancements to improve pedestrian safety and accessibility

There are a range of potential pedestrian crossing treatments that can improve both pedestrian and traffic safety, ranging from unmarked crossings to marked crosswalks, signalized crossings, and grade separation. In addition, there are a number of features that can be used at intersections to improve pedestrian safety and accessibility.

The following enhancements should be considered along with the implementation of any crosswalk improvements:

- **Sidewalks:** Sidewalks were noted to be absent at some of the crosswalk locations in the warrant analysis. While it is understood that sidewalks may not be able to provided at many rural locations, short sections of sidewalks were noted to be missing near some of the proposed crosswalks. The absence of sidewalks may discourage pedestrians from using the designated crosswalk location.
- **Continuous Sidewalks Across Local Streets, Lanes, and Driveways:** The sidewalk network is not continuous for pedestrians as it is interrupted by crossing roads and grade changes. Providing continuous sidewalk treatments at the same grade as the sidewalk at local streets, lanes, and driveways can help to prioritize pedestrians, improve accessibility, and reduce motor vehicle volumes and speeds.
- **New Marked Crosswalks:** Identify opportunities for new crosswalks where warranted to improve pedestrian safety, connectivity, and accessibility.
- **Crosswalk Upgrades:** RRFBs and overhead flashers can be provided to raise visibility at crosswalks. To make crosswalks even more visible, pedestrian activated flashing lights can also be provided overhead. This would be more costly but may be more advantageous at certain locations.
- **Curb Extensions:** Curb extensions along roads with permanent parking are strongly recommended, to reduce crossing distances. A handful of locations were noted where the implementation of curb extensions is expected to reduce the need for an RRFB; however, depending on the City's policy and budget for curb extensions vs. RRFBs, this should be more closely reviewed at all of the locations.
- **Aligned Curb Let-downs:** To increase the effectiveness and accessibility of crosswalks, it is advisable to provide smaller curb radii so that curb let-downs can be aligned with crosswalks rather than directing pedestrians away from the painted crosswalk. This is especially important for users of mobility devices.
- **Tactile Surface Treatments:** Treatments that can alert visually impaired pedestrians of the location of the edge of the curb and further direct them into the crosswalk (in addition to the aligned curbs noted above). should be considered to be provided, starting with locations where elderly or visually impaired pedestrians are most likely to be using, and in the downtown locations where pedestrian volumes are high.
- **Lighting:** Street lighting should be present at all intersections to ensure people walking are clearly visible at night.
- **Audible pedestrian signals:** Used at signalized intersections to assist pedestrians with disabilities by communicating when to walk in non-visual formats, including audible tones, speech messages, or vibrating surfaces. Braille can also be found on pedestrian signals.
- **Pedestrian countdown timers:** Indicate to people walking how much time they have to cross the street at a signalized intersection. Countdown timers may be installed with or without pedestrian push button actuation.

Action 1.4C: Provide cycling crossing treatments to improve cycling safety

Intersections tend to be high conflict areas along active mobility corridors, so careful consideration must be taken to ensure people cycling can navigate them in a safe and comfortable manner. These areas need treatments that make people cycling clearly visible to motorists at intersections. Treatments should aim to increase visibility, indicate clear right-of-way, and facilitate eye contact and awareness with other modes. Intersection treatments can improve cycling movements and can be coordinated with timed or specialized signals.

Crossing treatments can include elements such as colour, signage, medians, signal detection, and pavement markings. The type of treatment required depends on the bicycle facility, whether there are intersecting bicycle routes, street classification, and land use. Some examples of crossing treatments include:

- **Protected Intersections** combine bicycle signal phasing, design elements and space allocation to help protect cyclists from turning cars.
- **Coloured Conflict Zone Markings** include green markings to designate conflict zones and areas where people cycling are travelling. They raise awareness and visibility of people cycling, make cycling movements more predictable, guide bicycle users and motorists through conflict zones or complex intersections, and provide clarity of right-of-way.
- **Dashed Bicycle Lane Markings** through intersections position people cycling appropriately as they travel through the intersection and make other road users aware of people cycling.
- **Bicycle Boxes** provide a space for people cycling to wait to cross the intersection. They are often located in advance of a vehicle stop line and provide the person cycling with a "head start" and make them more visible.
- **Reduced crossing distances** through treatments such as curb extensions or two-stage median crossings, which are positioned in the middle of the roadway allowing people cycling to cross the road in two stages instead of one providing them with a space to wait before making the second stage of their crossing.
- **Cross-rides** are pavement markings used to indicate that people cycling are permitted to use the crosswalk and do not need to dismount, although people cycling still need to yield to motor vehicle traffic before crossing at a cross-ride. These pavement markings may be combined with a pedestrian crosswalk or used on their own to indicate a separated bicycle crossing.
- **Enhanced Bicycle Signal Crossings** can include full signals as well as pedestrian and bicycle activated signals. Bicycle loop detectors, bicycle pushbuttons, or other technologies such as video, infrared, or pressurized mats can activate the signals. Dedicated bicycle signals with bicycle symbols on the signal heads can provide phasing between cyclists and motorists.

Action 1.4D: Review and ensure clear sightline and clarity of right-of-way at intersections

Safe intersection design principles include ensuring clear sightlines and clarity of right-of-way. In Mission, many collisions are caused due to poor sightlines and limited warning for road users. While sightline considerations vary depending on the activity at an intersection or crossing point, to improve sightlines sight triangles (both approach and departure) should be reviewed and addressed if they do not adequately serve road users. Sight triangles should be free of obstructions such as on-street parking, barriers, and street trees to ensure that road users have enough time to see and react to other users at a crossing or intersection. When obstructions cannot be moved, treatments to increase visibility or awareness should be used.

In areas with greater volumes of active transportation users, sightlines should be maximized, and consideration should be made to lower the posted speed limit if the target design speed is lower than posted.

Strategy 1.4E: Update the City's street design standards to provide AAA active transportation facilities, and consider active transportation improvements on all new and upgraded streets based on these standards

The B.C. Active Transportation Design Guide is a detailed planning and engineering reference that provides practical design guidance and application information for active transportation infrastructure for jurisdictions of all sizes throughout the province. The guide builds on international best practices and seeks to maximize the benefits of investing in active transportation infrastructure. Mission should aim to implement active transportation infrastructure that is in line with the design guide in order to increase its active transportation mode share moving forward.

Mission Mobility 2050 includes updated street design standards, as described in further detail below. These design standards should be adopted into the City's Development and Subdivision Control Bylaw. The City should ensure that all new and upgraded streets follow these updated design standards and include the provision of AAA active transportation facilities.

STRATEGY 1.5: DEVELOP SUPPORT PROGRAMS AND INITIATIVES THAT ENCOURAGE PEOPLE TO USE ACTIVE TRANSPORTATION

There are a number of education, awareness, and other support initiatives that can help shift travel habits by highlighting the benefits of active transportation modes and providing information to make walking and cycling easier. Many programs that encourage and educate people on the benefits of walking are similar to those that also support cycling. Both modes provide great alternatives to short local trips. In many cases, coordination with non-profit organizations, community groups, and other agencies (e.g. ICBC, police, school districts) can help improve the effectiveness of these programs

Action 1.5A: Develop and support programs to encourage walking

Making walking an attractive and enjoyable activity will increase walking in Mission. The City should work partners to develop and support a range of programs to encourage walking, including:

- **Safe Routes to school program:** These programs are designed to promote walking and cycling among school-aged children to help to encourage safe walking and cycling at a young age. These can include a "Walking School Bus" program where walking routes are coordinated, and students are "picked up" by a group of classmates so they can walk to school together. The City should develop a formal Safe Routes to School Program and develop School Travel Plans for 1-2 schools per year.
- **Walking Clubs:** Forming clubs or groups can help get people active while encouraging social interaction. A common example of a type walking club is a Senior Walking Group, which provide many social and health benefits.
- **Neighbourhood walking maps:** Information about local walking routes for transportation and recreation can be provided. These maps can be linked with the bicycle network map. Maps should be available in hard copy and digital formats. Educational tips can also be provided on the City's website.
- **Pedestrian Wayfinding:** Better wayfinding information can help support pedestrian-friendly design for people using the City's sidewalks, trails, and multi-use pathways. Kiosks for pedestrians can display key

information such as transit routes, community facilities, and businesses. Maps that show "you are here" information, and a five-minute walking distance can also help give people a sense of scale. Wayfinding signage and kiosks are especially important at the intersection of major pedestrian routes, such as two different multi-use trails

Action 1.5B: Develop and support programs and facilities to encourage cycling

In addition to on-street and off-street network connections, there are other bicycle infrastructure improvements that can make cycling a more attractive and convenient transportation choice. Opportunities include enhanced wayfinding, bicycle parking supply and development requirements, end-of-trip facilities, bicycle-transit integration, and the creation of an online bicycle network map.

In addition, education, awareness campaigns, events and other incentive and information programs can help bolster cycling activity in addition to infrastructure improvements. While it is understood that the installation of a well-connected network of AAA active mobility facilities is likely to help promote cycling within the city, it has also been found that infrastructure alone is often not enough to see higher levels of ridership.

The City should work partners to develop and support a range of programs to encourage cycling, including:

- **Bicycle wayfinding:** While most residents know how to travel through the city by car, it may not be obvious which routes are the best by bicycle. For both experienced and inexperienced cyclists, signage and pavement markings can help riders to find the best routes that match their cycling abilities and comfort levels and to find new routes as they become more confident. Bicycle route signage and pavement markings can also highlight for drivers and other road users where they should expect to see greater concentrations of cyclists, which can help to educate drivers and cyclists and to improve cycling safety.
- **Bicycle Parking:** Providing safe, secure parking for bicycles is an important part of improving cycling conditions throughout Mission. It is important to recognize that the fear of bicycle theft or vandalism is a significant deterrent to cycling. There are many different types of bicycle parking that can be tailored to specific situations. One of the key considerations in providing bicycle parking is to locate the 'right' bicycle parking facility in the 'right' place. The best type of bicycle parking facility for a specific location is driven by user needs (such as the purpose of the trip, length of the trip, and length of stay); and other factors (such as adjacent land uses, available space, and safety).
- **End-of-trip Facilities:** End-of-trip facilities such as showers and clothing lockers at workplaces are critical components of making cycling more convenient for employees. Many bicycle commuters have long commutes or are required to wear professional clothing attire and need a place to change before coming into the office. The City should consider requirements for end-of-trip facilities as part of a Zoning Bylaw requirement.
- **Amenities:** The City should also identify opportunities to provide cycling amenities throughout the City. Cycling amenities include drinking fountains with bottle fill stations throughout City and bicycle maintenance stations placed at key locations throughout the City.
- **Pump tracks, bike parks, and gardens:** The City should consider opportunities to encourage cycling through recreational facilities, such as pump tracks, bike parks, and "bike traffic garden" education parks with demonstration infrastructure. These can include display boards/kiosks, bike racks, and repair stands. Possible partners for this bike traffic garden could include the BC Cycling Coalition, ICBC, Fraser Health,

and Mission School District. The City has recently implemented three pump tracks and the City should work with partners to identify additional opportunities.

- **Promotional Events:** Promotional events help to raise awareness and showcase the benefits of cycling as healthy sustainable transportation options. These events can be mixed in with other active transportation events. Bike to Work Week is a fantastic example of an enjoyable community event that simultaneously promotes cycling and provides cycling education.
- **Bicycle User Map:** Bicycle user maps enable users to identify designated cycling routes that match their cycling ability and comfort level. The City should develop a bicycle map that identifies bicycle facility types and includes important local destinations and amenities. The map should be available in both hard copy and digital formats. The City should consider creating an interactive online map or encouraging innovation by releasing open-source mapping data.

THEME 2: TRANSIT

Transit can reduce the overall environmental and community impacts of transportation. Transit benefits those who choose to use it as well as those who have no other option. For people who do not drive, transit can often be the only option for getting to work, school, shopping areas, and recreational centres. Convenient and attractive public transit is critical to creating a vibrant and sustainable community. In combination with walking and cycling, transit can provide an attractive alternative to automobile travel for both local and regional connections.

Transit service in Mission forms part of BC Transit's Central Fraser Valley Transit System. The service is provided through a funding partnership model, where about half of the service costs are borne by local governments, and the other half by the Province of BC, through BC Transit. Decisions relating to changes in service levels, routes, and fares are made by local government partners. BC Transit provides management of the service, oversees the contracted operating company, and provides professional guidance through the development of strategic transit plans. Actual growth of each system is determined by the regular three-year expansion agreements signed annually between BC Transit, the City of Mission, and City of Abbotsford.

Transit accounts for approximately 2.4% of all trips made by Mission residents, as compared to 1.5% in the FVRD and 11.7% in Metro Vancouver region wide. Most transit trips made by Mission residents are made to commute to work or post-secondary institutions work (69%), followed by shopping and personal business (25%), escorting (3%), and social, recreational, or dining purposes (2%).

All transit service is confined to the City's urban growth boundary, with the densest service in Mission's downtown. Mission's core area has good transit coverage, with most residents located within 400 metres (5-minute walk) of a transit stop. Walkability to transit is somewhat hindered by the steep slopes in many parts of the City.

In order to increase transit mode share in Mission, the City is taking steps to improve the connections to and from transit, as well as in partnership with BC Transit and TransLink to improve local and regional connections to Mission.

This theme includes the following three strategies to promote transit in the City of Mission:

Strategy 2.1: Work with BC Transit to develop an updated transit network and improve transit service

Strategy 2.2: Enhance the transit user experience

Strategy 2.3: Review the feasibility of enhancing West Coast Express service and adding a new station

STRATEGY 2.1: WORK WITH BC TRANSIT THROUGH THE LOCAL TRANSIT AREA PLAN REVIEW TO DEVELOP AN UPDATED TRANSIT NETWORK AND IMPROVE TRANSIT SERVICE

When asked to identify the main issues or challenges for transit in Mission, more than half of those who responded to this question selected *West Coast Express isn't frequent enough* as one of their top three issues/challenges, followed by *transit doesn't go to where I need to go* and *transit doesn't run frequently enough at night*. When asked what the City could do to encourage people to take transit more, *make transit routes faster and more direct* and *provide more transit service on weekends and evenings* were the most popular responses.

Given Mission's planned population growth, transit improvements are very important to maintain and improve the transportation network. Mission currently forms approximately 25% of the Central Fraser Valley's 110,000 annual service hours, or approximately 28,000 services hours for its current population of approximately 44,000 residents, which represents lower per capita service hours than many other similar communities in British Columbia. Overall, there has been a trend of ridership growth in Mission, as evidenced by the increase in productivity (passenger boardings per service hour). BC Transit recommends that a regular investment trajectory (either annual or biannual) be considered to keep pace with growth in the City, and it is also suggested that service levels should increase at a rate faster than population growth to match other similar sized communities. This will help to work towards the targets in the plan as well BC Transit's target transit mode share of 4% by 2038.

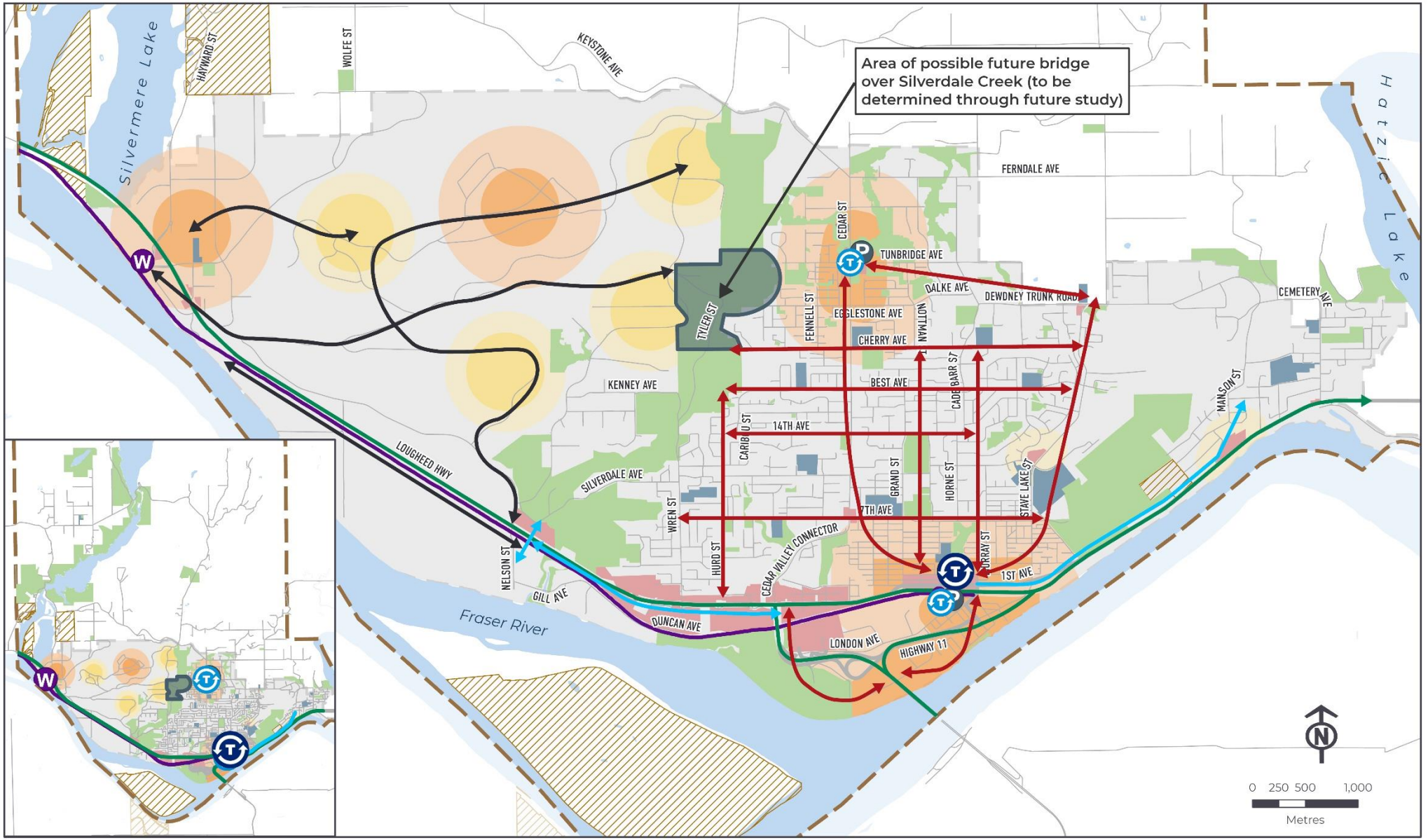
Action 2.1A: Support the development of an updated transit network focusing on frequent and direct transit service along with phased implementation to increase service hours

Transit service in Mission, and throughout the Fraser Valley, is planned and partially funded by BC Transit. As such, route planning and service frequency is not within the City's jurisdiction. However, this plan provides an opportunity to provide strategic guidance on the types of transit improvements that would be desired, which can be considered by BC Transit in its future planning processes. BC Transit is undertaking a Transit Future Action Plan review for the Abbotsford-Mission Transit Future Plan.

In February 2018, BC Transit completed the Central Fraser Valley Transit Future Action Plan, which serves as an update to the 2012 Central Fraser Valley Transit Future Plan. While the planned updates focused much of the improvements in Abbotsford, 2,500 service hours were added in Mission. BC Transit will be initiating a Local Area Transit Plan process for transit improvements in 2022. Through this process, BC Transit and Mission should work together to reimagine the future transit network and service levels, including increasing service hours and determining key route realignments. A core network of high frequency, direct transit routes will support Mission in reaching its transit mode share goals and increasing local and regional connectivity.

In addition, the FVRD board has approved further planning, costing, and consultation for a potential new bus route on the north side of the Fraser River between the City of Mission and District of Kent, adding to the regional transit options.

Much of the current transit network in Mission currently consists of one-way loops. The City should work with BC Transit through the Local Area Transit Plan review to update the network to focus on identifying frequent and direct transit corridors that connect major destinations, as well as replacing one-way loops with bi-directional service that follows the same path in each direction. This change will make the system more dependable and easier to understand. A conceptual transit network is shown in **Map 9**.



MAP 9: LONG-TERM CONCEPTUAL TRANSIT NETWORK

- West Coast Express

Future Transit Facilities

- Major Transit Facility
- Minor Transit Facility
- Park & Ride
- West Coast Express Station
- Enhanced West Coast Express Service
- Enhanced Regional & Inter-Regional Transit
- Frequent Local Desire Lines
- Enhanced Local Connections
- Potential Transit Corridor
- Primary Mobility Hub
- Primary Mobility Hub Buffer (400m)
- Secondary Mobility Hub
- Secondary Mobility Hub Buffer (200m)
- Parks and Open Space
- School
- Commercial
- Urban Growth Boundary
- First Nation Reserve Land
- Municipal Boundary

CITY OF MISSION ON THE FRASER

Additional considerations for the updated transit network include:

- Develop a transit network to the Silverdale area.
- Extend service to the Silver Creek Industrial Park.
- Improve service on Route #35.
- Increase service between Mission and Metro Vancouver (service currently provided by TransLink).
- Provide targeted transit improvements in Silverdale, Cedar Valley, and Hatzic, particularly as redevelopment occurs.

Action 2.1B: In partnership with BC Transit, improve transit service frequency to make transit more convenient at all times of day

To make transit a more attractive alternative than driving to, from, and within Mission, it is recommended that the City work with BC Transit to increase service frequencies on local routes, with desired service levels of at least 15 minutes during peak periods and 30 minutes during off-peak periods, as well as increased evening and weekend service. Mission should consider connecting key destinations such as the University of the Fraser Valley, which will allow the City to focus its existing resources towards serving areas with the highest densities of population and employment, which aligns with the OCP vision, as well as towards areas with the highest existing ridership.

The City should also work with BC Transit to increase regional transit service on the #31 route to 15-minute service throughout the day on weekdays and at least 30-minute service on evenings and weekends.

Action 2.1C: Identify opportunities for transit optimization to improve bus speed and reliability

Transit optimization involves identifying the causes of bus delay along existing routes and applying a suite of transit priority measures, infrastructure enhancements, and operational policies that can better utilize existing transit resources by improving speed and reliability. These measures can produce short-term benefits with relatively low capital expenditures. TransLink has published a detailed Transit Priority Toolkit[1] that summarizes each strategy (see **Figure 10**). Many of the most effective tools are under municipal jurisdiction, including:

- **Traffic signal operations** such as passive signal priority or transit-signal priority.
- **Dedicated transit lanes**.
- **Managing curb uses**.
- **Enhancing infrastructure**, including roadways, intersections, and transit stops. Curb management can help transit by reducing conflicts between buses, parked cars, and other vehicles in bus stops.
- **Bus bulges, boarding islands, floating bus stops, and improved platform designs** and amenities can improve transit operations as well as safety and accessibility.

[1] https://www.translink.ca/-/media/Documents/plans_and_projects/managing_the_transit_network/bus_speed_reliability/Transit_Priority_Toolkit.pdf?la=en&hash=0714387EE00B4800D0EA858C5EF5495C5955A4C7

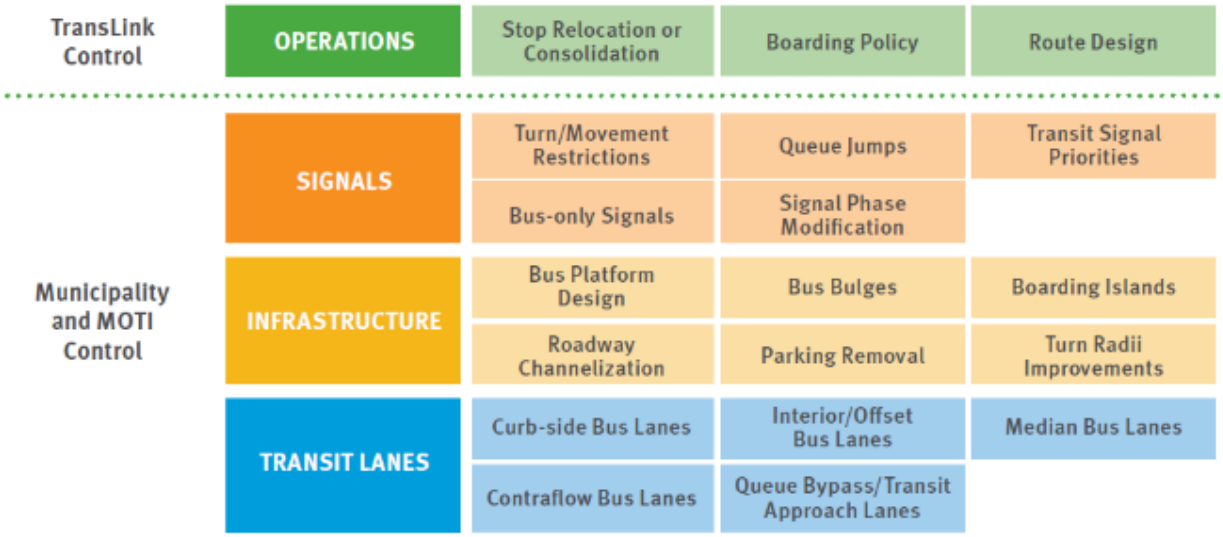


FIGURE 10: TRANSIT OPTIMIZATION MEASURES
Source: TransLink Bus Speed and Reliability Report

Action 2.1D: Support BC Transit's commitment to technology initiatives to enhance the rider experience and reduce environmental impacts

BC Transit is committed to continuously enhancing the user experience. As part of this, BC Transit is moving forward with the installation and development of technology initiatives to improve efficiency, increase security, and put passengers in control of their transit experience, including the following initiatives:

- **Low Carbon Fleet:** BC Transit is actively pursuing new and emerging low carbon technologies, supported by the use of renewable fuels. In November 2018, BC Transit approved a Low Carbon Fleet Program to support provincial targets for GHG emissions and to align with the provincial *CleanBC* plan. Core to this program is a 10-year fleet replacement strategy to replace over 1,200 existing buses and expand the fleet by an additional 350 buses by using the potential of advanced GHG reducing technology.
- **SmartBus program:** The first phase of the SmartBus program will introduce real-time bus information, automated stop announcements, and closed-circuit TV Cameras onboard each bus. The implementation of these bus technology improvements is planned for 2022.

  The second phase of the program will involve reviewing the fare technology and fare payment systems with the intent to move to an advanced fare collection system. The goal is to introduce an electronic fare collection system where customers bring their own ticket (i.e. mobile phone app or credit card) and will require the introduction of onboard fare validators and a backend system for fare validation, payment processing, account management and payment reconciliation.

Action 2.1E: In partnership with BC Transit, explore the feasibility of digital on-demand transit to provide service in rural areas.

Digital on-demand transit uses technology to dynamically dispatch a bus, van, or fleet of vehicles to locations dictated by the riders. Real-time information and mobile platforms for customers and drivers support the transition to more flexible service models. A typical digital on-demand bus service will have no (or limited) fixed schedules and customers can request it as they need it by using an app. It also has flexible and responsive routing but may still

have fixed route stops so it can be more efficient and allow multi-user boardings. A digital on-demand project aligns with BC Transit's Strategic Plan. As part of the Action Area on Safe and Responsive Delivery, BC Transit is looking at innovative and flexible delivery models. BC Transit has not yet made any decisions on where and when to conduct a digital on-demand transit pilot. As part of the upcoming Local Area Transit Plan review, the City should work with BC Transit to explore the concept of digital on-demand transit and explore if this could be a potential strategy for Mission, particularly in rural areas.

Action 2.1F: In partnership with BC Transit, review potential locations for transit exchanges and park-and-rides throughout the City

Transit exchanges are required when multiple buses converge on one location and passengers need to transfer between buses in a safe and efficient manner. They also provide opportunity for vehicles to layover, and for operators to take a break. The only existing transit exchange in Mission is the Downtown Exchange. In addition, Park & Rides provide low-density and semi-rural areas with a method to access the transit system in lieu of, or in complement to, neighbourhood transit service.

Creating formal Park & Rides, whether private or shared-use lots, will help attract new customers. Park & Rides can be useful even well outside of the Urban Containment Boundary, such as areas to the north and west of the urban core. Other Transportation Demand Management (TDM) measures such as pay-parking can also have a strong influence on how attractive transit is as well. Fuel costs compounded by parking can shift the balance in favour of transit for people commuting from rural or remote areas.

As part of the 2013 Transit Future Action Plan, BC Transit determined a Mission Transit Exchange Review as a short-term priority. Mission's only transit exchange, located Downtown on 2nd Avenue at Horne Street, is not a key destination for most transit users and does not provide a direct connection to the waterfront or West Coast Express. A location that provides better connections to the West Coast Express would offer great benefits to both local and regional commuters. Through the Mission Waterfront Revitalization Master Plan, the waterfront will become an area that is much more connected, and easily accessed by residents and visitors. Considering a transit exchange in the waterfront will further advance connectivity in the area.

In addition to improvements to the Downtown Exchange, the Transit Future Action Plan identifies additional minor exchanges in Cedar Valley and the Waterfront, as well as Park & Ride locations on the south side of the Downtown Exchange and a future Park & Ride at the Cedar Valley Exchange. In addition, a transit exchange will be provided in the Silverdale area.

STRATEGY 2.2: ENHANCE THE TRANSIT USER EXPERIENCE

Enhancing the transit user experience is key to improving ridership. In Mission, transit service is infrequent, routes are indirect, and there are limited supporting amenities. Improving bus stop passenger amenities is one way that Mission can make transit use more accessible and enjoyable for its residents. Amenities that make bus stops and transit exchanges more comfortable can also have a significant impact on passenger safety and satisfaction, in addition to attracting new customers.

Action 2.2A: Provide seamless walking and cycling connections to transit

All trips, including transit trips, begin with walking. Improving walking and cycling connections to transit, and seamlessly integrating the three modes, will improve mode share across all three sustainable options, and increase the attractiveness of each compared to vehicles. Ensuring connections within 400 metres of transit are safe and

comfortable for walking and rolling will increase the ability of people of all ages and abilities using transit. Walking connections to transit include ensuring all bus stops have sidewalks on both sides of the street and crosswalks to provide direct access to cross the street to access bus stops. Core considerations for cycling connections to transit include safe routes to transit, which can mean ensuring the active mobility network provides direct connections to transit, along with providing bicycle racks at high activity bus stops.

Action 2.2B: Improve bus stop passenger amenities

Transit ridership is not solely dependent on the frequency of service. Transit stop amenities are important for making transit a convenient, attractive, and accessible transportation mode. Bus stop amenities, including benches and shelters, are shown in **Map 10,** and summarized in **Table 1**. Only 15% of Mission's transit stops have both a shelter and bench, while another 22% have a bench only. The rest lack any basic amenities. Other amenities, such as bicycle parking, customer information, lighting, and garbage bins, can be considered as part of the upcoming Local Area Transit Plan review.

TABLE 1: TRANSIT STOP AMENITIES

Amenity	#	Percentage
Bench Only	24	22%
Shelter Only	0	0%
Shelter & Bench	16	15%
No Amenity	69	63%
Total	**109**	**100%**

Upgrades to transit facility amenities that Mission can consider include:

- **Benches and Shelters:** Shelters provide protection weather protection, making waits significantly more pleasant. Benches allow people to rest after their walk to the transit stop and are especially important for seniors and people with physical disabilities.
- **Litter/Recycling Bins:** Help to keep the area clean.
- **Customer Information:** Information on fares, delays, access transit, and safety, with contact information for the transit agency.
- **Transit System Maps:** Assists with wayfinding and indicates which buses stop at the route.
- **Real-time Updates:** Electronic displays at bus stops indicating the estimated arrival time for each bus. Real-time information can also be provided online and through smartphone apps, although not all transit users will have access to the internet when waiting at a transit stop.
- **Public Art:** Art can beautify and add interest to a transit ride and stop.

Action 2.2C: Ensure a universally accessible transit system

Transit must be accessible for everyone, especially given its role as the primary alternative to personal vehicles. Transit accessibility in Mission is challenging due to the steep, hilly terrain, and long crossing distances. While BC Transit offers custom transit service in Mission for people with physical or cognitive impairments who cannot independently use the conventional transit system, all transit stops should be accessible. For example, the street leading up to the stop should be well-maintained and should include the necessary pedestrian accessibility

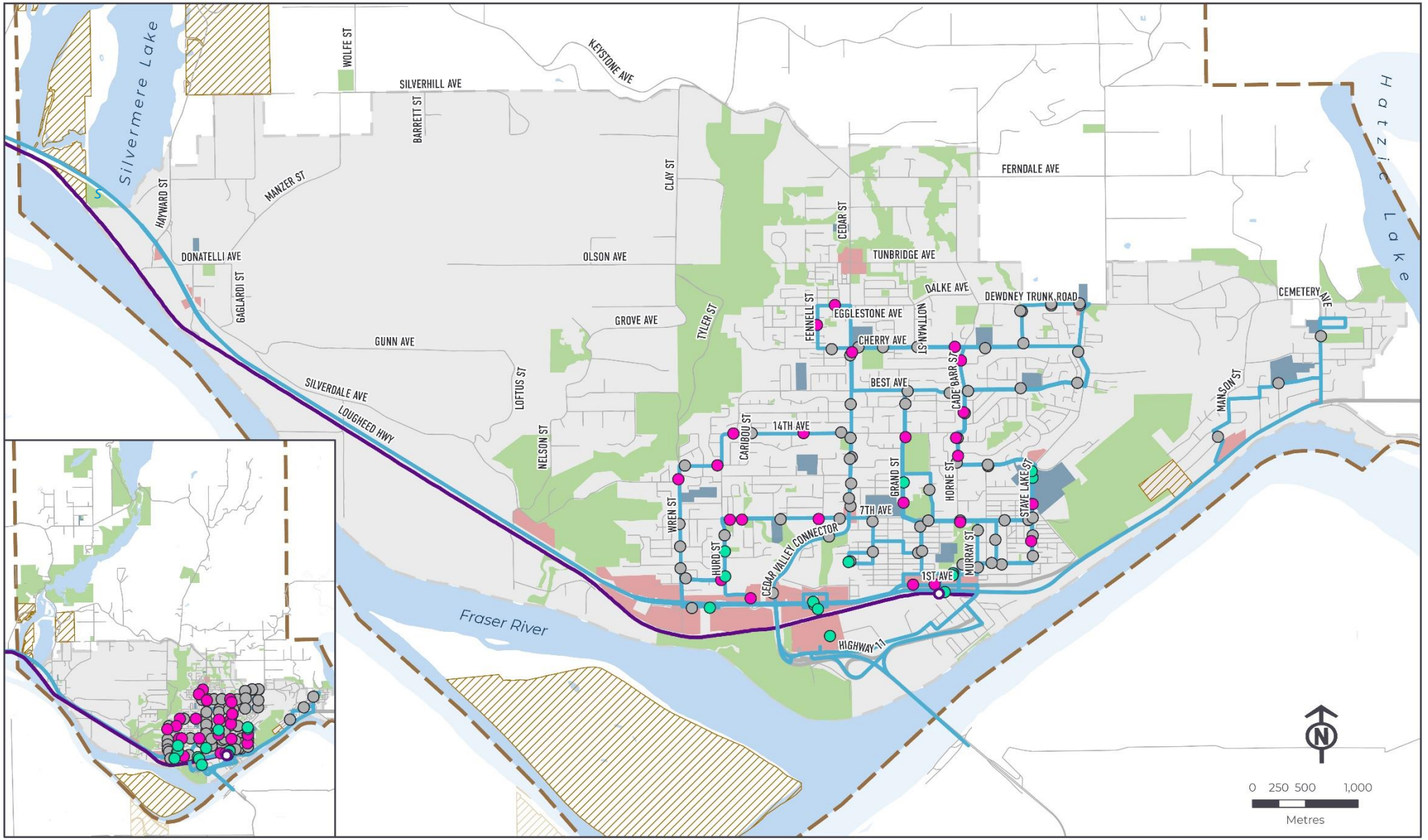
treatments to allow those with differing mobility to safely reach the transit stop, including sidewalks and crossings. Treatments can include sidewalks, crosswalks near bus stops, and accessible curb letdowns.

Other additional transit accessibility improvements can include:

- **Public washrooms** near major transit stops.
- **Increased safety measures** such as lighting and visible locations (for example, CEPTED), as well as safety information on buses and transit stops.
- Passenger **emergency call systems.**
- **Adequate customer information and wayfinding** to assist users in navigating the transit system. For example, the wayfinding must consider people with cognitive difficulties, language barriers, and tourists who may need extra assistance using transit.

Action 2.2D: Identify transit supportive programs and policies to encourage transit use among new riders, with a specific focus on equity-seeking populations

There are a range of transit support programs and policies that the City and BC Transit can consider to encourage transit ridership. Examples include working with partners to have a "bus buddy" program to help address barriers to transit ridership for new riders and show new users how to use the transit systems. Support programs could be considered through the use of grants or funding for community organizations, environmental groups, partners with service clubs, and organizations representing equity-seeking populations, to help 'show the ropes' to new transit users.



MAP 10: PROPOSED TRANSIT AMENITIES

Bus Stop Amenities

- Bench and Shelter
- Bench Only
- No Amenities
- Bus Route
- West Coast Express

- Parks and Open Space
- School
- Commercial
- Urban Growth Boundary
- First Nation Reserve Land
- Municipal Boundary

CITY OF MISSION ON THE FRASER

STRATEGY 2.3: IMPROVE REGIONAL TRANSIT CONNECTIVITY AND SERVICE

Mission plays an important role in the regional transit system, with regional transit connections to the west provided by the West Coast Express and TransLink regional transit service (Route #701), as well as connections to the south and east provided by BC Transit.

The West Coast Express provides a critical role in expanding travel choices for Mission residents, particularly those travelling to downtown Vancouver. The West Coast Express provides peak-hour directional inter-regional commuting service from Waterfront Station in Vancouver to Mission City Centre, the eastern terminus of the West Coast Express. There are currently four departures from Mission each morning and four trains returning each evening (it should be noted that there were five trains per day before COVID-19, and service is currently reduced to four trains).

The West Coast Express is operated by TransLink and runs on Canadian Pacific Railway (CPR) tracks. the City pays TransLink approximately $750,000 per year for the right to have a station in Mission. There were approximately 135,000 boardings at Mission City Station in 2019, representing a 3.9% growth over 2018. This represents an average of 530 daily boardings at Mission City Station in 2019, spread across four departures. This station ranks sixth out of eight West Coast Express stations in terms of ridership. However, rapid growth is projected in the City, including the future Silverdale neighbourhood, resulting in a proposed West Coast Express station along the west leg of Donatelli Avenue in the Fraser Landing Precinct. In addition, in 2013, TransLink completed the "West Coast Express Strategy: Service, Fleet and Infrastructure 2013-2014." Projections indicated the need to add a sixth train to support near term demand and support future expansion.

Action 2.3A: Improve regional transit connections to Abbotsford and Metro Vancouver

Route #31 currently provides regional transit service south to the City of Abbotsford. This route provides an important connection to Abbotsford as well as regional connections from Abbotsford. Through the upcoming Local Area Transit Plan review, BC Transit should work with the City to explore the possibility of extending the Route #31 to the McCallum Fraser Valley Express (FVX) stop. The FVX was recently extended to Lougheed SkyTrain station, and a connection on the Route #31 to the FVX would provide another option for Mission residents to travel to Metro Vancouver as well as benefiting students at the University of the Fraser Valley (UFV).

Action 2.3B: Work with TransLink to explore the potential for a second West Coast Express station

A second West Coast Express station would support the rapid growth that is expected in the Silverdale neighbourhoods, and provide a sustainable transportation option to Downtown Vancouver. The Silverdale Comprehensive Planning Area (SCPA) study concluded that the anticipated residential growth of Mission (including Silverdale) and Abbotsford will generate enough ridership to support an additional West Coast Express Station.

A recommended location for this station is along the west leg of Donatelli Avenue in the Fraser Landing Precinct. The City's OCP also recommends exploring opportunities for locating a second West Coast Express Station in this area. The Master Infrastructure Strategy (MIS) for SPCA assessed the potential demand for a second West Coast Express station in the Silverdale Area. This study found that, based on the existing population at Abbotsford and Mission, the West Coast Express ridership/combined Mission-Abbotsford population ratio is approximately 0.28% or about 28 riders per every 10,000 people. The Abbotsford-Mission Transit Future Plan (2013) sets a target of increasing transit mode share from the existing 3% to an 8% by the year 2036, which is almost a threefold increase. The MIS assumed conservatively that the ratio of West Coast Express riders to population in the Abbotsford-Mission area will also increase from existing 0.28% to 0.50% in the future (as transit mode share almost triples) and

estimated that the population growth and mode shift could bring West Coast Express ridership for Mission-Abbotsford to approximately 1,500 riders per day. The report concluded that the most active West Coast Express stations in the Tri-City area presently accommodate approximately 1,000 daily riders each. Assuming that the existing Mission City station could accommodate a similar passenger load, the ridership increase could be accommodated at the new Silverdale hub area.

The approximate location and land area identified in the MIS for a potential second station is shown in **Figure 11**. TransLink does currently have plans for an additional West Coast Express station at this location, but they were consulted about the desire for an additional West Coast Express and the process to establish land requirements. Through these discussions, it was determined that TransLink would likely be supportive of the potential for a future station, but that further details would be required through more detailed study. The City should work with TransLink to confirm the specific land requirements and cost estimates for a station and ancillary parking.

FIGURE 11: POTENTIAL WEST COAST EXPRESS STATION LOCATION

Action 2.3B: Work with partners to expand West Coast Express services

The City's OCP outlines a desire to upgrade West Coast Express service to provide greater frequency of trips as well as weekend service. Expanding midday and weekend West Coast Express services would make the West Coast Express a more convenient alternative to commuting to and from downtown and other parts of Vancouver. In support of the economic growth of Mission, reverse peak service has also been identified as a high priority to bring commuters from other parts of the region to the City, as well as mid-day train services to augment TrainBus and weekend train service. These service and capacity expansions should be explored further with TransLink and CPR.

Action 2.3C: Ensure multi-modal connections to West Coast Express are accessible and comfortable for people of all ages and abilities

Enhancing active transportation facilities and ensuring comfortable connections to transit stops can enhance the transit experience and make transit more accessible. Improved sidewalks, bicycle facilities, and adding micromobility systems near transit stops can help resolve the 'first- and last-mile' problem of accessing transit. Multi-modal transportation hubs can provide bicycle parking and other end-of-trip amenities.

THEME 3: GOODS MOVEMENT

Goods movement is a crucial component of the regional and municipal transportation network in Mission, the Fraser Valley, and Lower Mainland. Goods movement, or freight, is broadly defined as the wide array of activities involved in transporting goods (primary, intermediate, or finished) from producer/supplier to consumer. Goods movement can travel along a supply chain by one or multiple modes including road, rail, marine, air, and pipeline. While Mission has marine and rail goods movement facilities in addition to the road network, these are not under municipal jurisdiction; however, the City can continue to work with partners to maximize the benefits to the community.

Goods movement can be accommodated by road, rail, or water. There are several truck routes travelling within and to Mission, including Wren Street, Cedar Valley Connector/Cedar Street, Stave Lake Street, Dewdney Truck Road, and Keystone Avenue, as well as the provincial highways. There is also a CPR corridor that runs along the Mission waterfront, and the opportunity to consider increased goods movement by water.

The reliable flow of goods to, from and within Mission is integral to a thriving local economy. Mission Mobility 2050 focuses on the goods movement by truck on municipal roads. The plan also provides guidance on goods movement on provincial highways and other modes such as rail (CP Rail) and water (Fraser River), although these are not under the City's governance.

This theme includes the following three strategies to streamline goods movement in the City of Mission:

Strategy 3.1: Update the designated goods movement network

Strategy 3.2: Continue to work with MOTI and the BC Trucking Association to explore the potential for a downtown truck bypass

Strategy 3.3: Consider alternatives to the road network, including rail and marine networks

STRATEGY 3.1: UPDATE THE DESIGNATED GOODS MOVEMENT NETWORK

An effective truck route network is an essential component of the plan as the movement of goods throughout the City is critical for the economic health of the City. Mission has a defined truck route network that traverses the city and minimizes the impacts of goods movement. However, further optimizing goods movement routes and deliveries can helps to reduce truck travel times, reduce congestion and operational issues related to high truck volumes, increase safety at intersections not designed to accommodate wide turning movements, and help preserve alternate routes from deterioration due to heavy truck loadings.

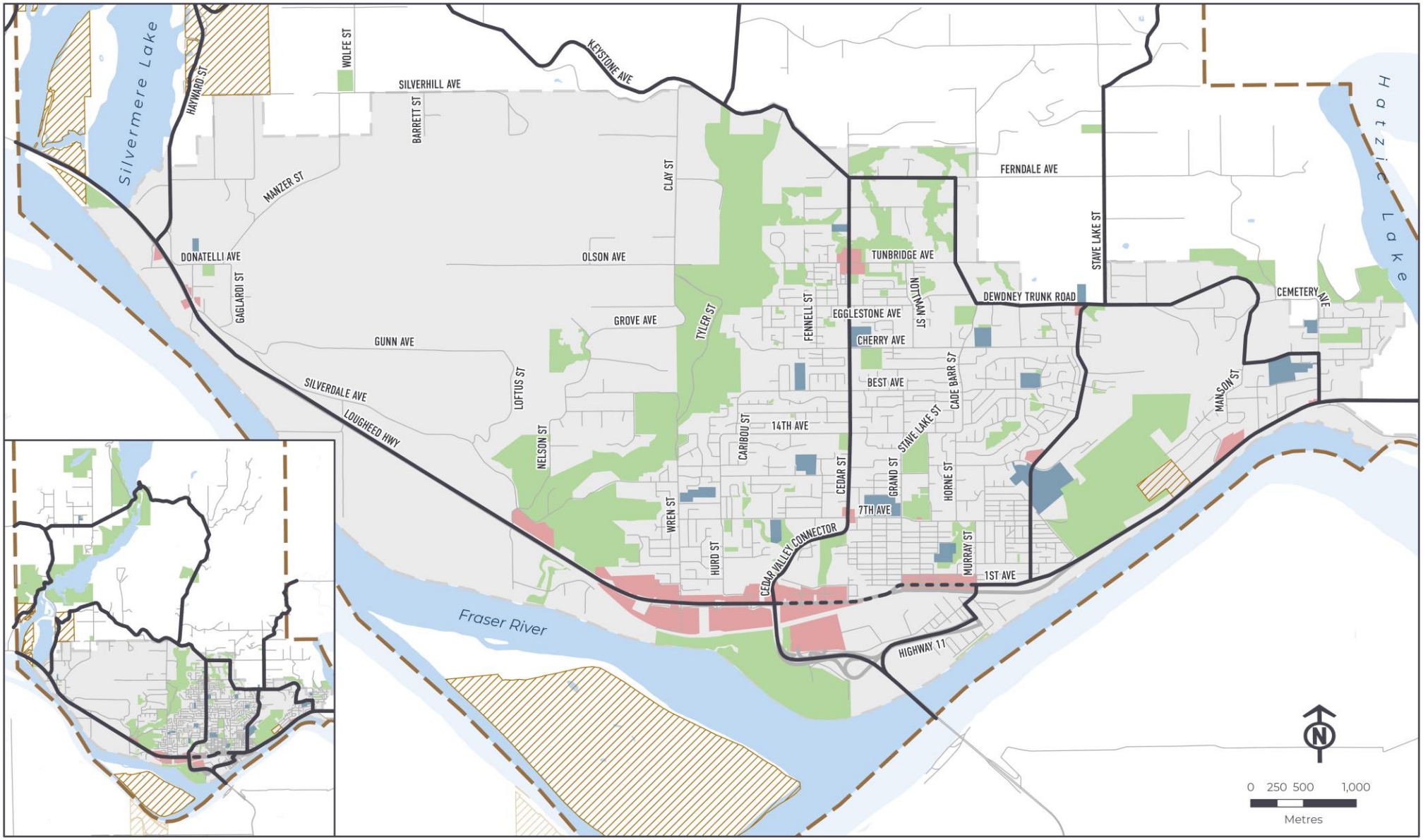
Action 3.1A: Update the City's designated Truck Route Map

Goods movement is an important component for a thriving economy as it allows businesses and residents to receive goods, and employs all of the folks in between the producer and consumer.

Mission has a rapidly growing population, and to ensure Mission's business community continues to thrive, the City should update its truck route map to promote a more reliable, efficient, and stronger local goods movement network that balances the competing priorities on some corridors. Underscoring Mission's goods movement network should be Mission's key objectives to create a thriving and sustainable place to live, work and play.

Map 11 illustrates proposed changes to the City's truck network. The proposed changes include:

- **Removing 7th Avenue:** 7th Avenue is currently classified as a Municipal Truck Route. However, Based on recent traffic counts, truck volumes account for approximately 1% percent of the corridor volumes in the AM and PM peak hours. This suggests that trucks are primarily using the roadway to deliver goods to nearby businesses and not as a thoroughfare. As 7th Avenue is a priority corridor for transit and cycling, and does not include significant commercial or industrial uses, it is not required as a truck route. It should be emphasized that trucks would still be able to utilize 7th Avenue to access their final destination, and that the design of 7th Avenue will still accommodate goods movement.
- **Removing Wren Street:** With the proposed removal of 7th Avenue, Wren Street would no longer be required from a network perspective. In addition, Wren Street has steep grades that are not suitable for goods movement.
- **Potential future removal of Lougheed Highway between Cedar Valley connector and Murray Street:** As described below in Strategy 3.2, a potential truck route bypass could provide the opportunity to redirect heavy vehicle traffic from downtown Mission. In the short-term, this could reroute westbound truck traffic only, with the potential for both directions being rerouted over the long-term. More details are provided below.



MAP 11: GOODS MOVEMENT NETWORK

- Truck Route
- Potential Future Removal from Truck Route Network
- Parks and Open Space
- School
- Commercial
- Urban Growth Boundary
- First Nation Reserve Land
- Municipal Boundary

City of Mission ON THE FRASER

Action 3.1B: Develop a Truck Route Bylaw to harmonize with the region and modernize the truck network

In conjunction with Action 3.1A, the City should develop a Truck Route Bylaw to regulate the use of goods movement through the City. By working with municipal partners such as Maple Ridge and Abbotsford, Mission should ensure the entire goods movement system is efficient and avoids circuitous routes throughout the region. Key considerations for the Truck Route Bylaw include:

- Including regionally harmonized and consistent wording referring to the Commercial Transport Regulations by Reference.
- Including a definition of a truck to be vehicles with a GVW greater than 11,800 kg.
- Updating the Truck Route network based on the findings of Action 3.1A.
- Ensuring that trucks can still use non-designated truck routes to access their final destinations.

STRATEGY 3.2: CONTINUE TO WORK WITH MOTI AND THE BC TRUCKING ASSOCIATION TO EXPLORE THE POTENTIAL FOR A DOWNTOWN TRUCK ROUTE BYPASS

MOTI continues to explore near-term alternatives to address heavy vehicle traffic in downtown Mission that has significant impacts on local merchants, visitors, and the City.

Action 3.2A: Consider the rerouting of westbound truck traffic at the intersection of Murray Street

To address the primary issue of the impacts of truck traffic on the downtown area of Mission (particularly along First Avenue), rerouting westbound truck traffic at the intersection of Murray Street should be advanced with the City of Mission and the BC Trucking Association and other commercial vehicle stakeholders. The change would have modest impacts on traffic patterns at the intersections for the north and south sides of the Murray Street Overpass.

Action 3.2B: Implement minor operational improvements to First Avenue and Murray Street, and Glasgow Avenue and Horne Street

To facilitate the rerouting of truck traffic through the downtown area of Mission, minor operational improvements are recommended at the following locations:

- **First Avenue and Murray Street:** Modify the two westbound lanes to better reflect and accommodate existing and forecast traffic volumes by changing the westbound inside lane from a shared through and left-turn lane to a dedicated left-turn lane. The curb lane would continue to serve support shared through and right-turn vehicles. Approximately 150 metre of storage is required to accommodate left-turn traffic and to minimize impacts of vehicle queues on through traffic.
- **Glasgow Avenue and Horne Street:** Modify the intersection to improve tracking for southbound left-turn trucks from the Murray Street Overpass to the receiving lanes along Horne Street.

Action 3.2C: Over the long-term, work with MOTI to develop Highway 7 Bypass for vehicles and goods movement

As discussed in further detail in Theme 4: Driving, the City should work with MOTI to support the development of a Highway Bypass between the Cedar Valley Connector to east of Stave Lake Street. This long-term highway realignment would divert regional-serving traffic goods movement away from the City's downtown core.

STRATEGY 3.3: CONSIDER ALTERNATIVES TO THE ROAD NETWORK, INCLUDING RAIL AND MARINE NETWORKS

With the popularity of online shopping increasing and the number of delivery vehicles on our roads, cities of all sizes have implemented a variety of measures to make their roads responsive to higher and unique demand such as time restricted loading, which could help relieve congestion on busy commercial streets. In addition, right-sizing delivery vehicles by using smaller, more nimble delivery vehicles (i.e., cyclogistics) can lower greenhouse gas emissions and make loading easier. As Mission continues to grow and intensify, this emerging approach to urban delivery should be considered in the future.

Additionally, Mission may have the potential to grow its alternative goods movement networks through rail and marine. The Port of Vancouver has been actively investigating the potential for expanded short sea shipping capabilities along the Fraser River. Short sea shipping functions best in places with a high density of terminal facilities, access to rail and major trucking routes, and good linkages between them, making Mission a great candidate.

Action 3.3A: Continue to work with the Vancouver Fraser Port Authority to evaluate and provide a dedicated common short sea shipping facility

Mission Mobility 2050 included a high-level assessment of the waterfront's potential to accommodate a Fraser River short sea shipping terminal facility. The intent of such a facility would be to support both the efficiency of the larger transportation and logistics network and the objectives of the City's Employment Lands Strategy, specifically generation of a broader array of quality industrial and commercial employment opportunities.

The general viability of short sea shipping is highly dependent on a number of key geographic and transportation network-related factors. Short sea shippers typically work over shorter distances and with smaller vessels and barges. Short sea shipping functions best in places with a high density of terminal facilities, access to rail and major trucking routes, and good linkages between them. Northern Europe has a strong short sea shipping network that includes ocean shipping between countries and river and canal shipping along rivers. The density of port facilities in northern Europe is immense, a function of the number of countries trading in the region.

The south coast of B.C. and Vancouver Island are similarly dependent on marine goods movement, and there are opportunities to make efficiencies to those systems though a more focused look at the short sea shipping network.

Currently, the movement of goods through Metro Vancouver is not constrained enough to entice current operators to alter their business models, which are highly dependent on drayage from trucking. However, over time, as industrial land supply continues to become more constrained (and land prices continue to climb accordingly), and as road and rail congestion increases, both existing and new operators in the region are more likely to consider incorporating short sea shipping as part of their larger logistics strategy.

To make a case for future short sea shipping in Mission, the following issues, questions, and potential opportunities (among potentially others) will need to be further explored as part of a more comprehensive and commodity and operator-specific review:

- Continue to assess and expand the rail capacity in Mission.
- Continue to optimize the goods movement network, streamlining permitting and reducing congestion.
- Market Mission's short sea shipping terminal to new potential operators and goods that may be looking for terminal logistics as land prices increase.

- Integrate end of trip trucking facilities nearby (showers, parking, Wi-Fi).
- Continue to connect the waterfront to Mission and Highway 7/11.
- Continue to study candidate land parcels for a new short sea shipping terminal location.
- Perform additional modelling and forecasting to determine when land and transportation infrastructure capacity will make short sea shipping viable.
- Complete environmental impact, hydrological and financial analyses/studies to model dredging requirements and impacts on the Fraser River.
- Identify target markets, tenants, operators, and those that will face difficulties accessing lands and ports further west.

Action 3.3B: Explore the potential to integrate new rail yards into a short sea shipping terminal operation

As short sea shipping terminals function best in places with a high density of terminal facilities, access to rail and major trucking routes, and good linkages between them, Mission should explore the potential to integrate new rail yards to the potential terminal location.

THEME 4: DRIVING

The City's street network is made up of different components, each serving specific functions within the overall network. While streets provide an important function of ensuring mobility and access to a community, they are not just corridors for moving vehicles and goods. They are also public spaces that can largely shape and define the character of a community. As roadways, the street network represents the primary component of the City's transportation system, as it supports not only automobile traffic, but all other modes of travel as well.

The City of Mission has a well-established road network that includes approximately 300 km of roads that provide access to homes, businesses, services, and properties. The road system within the urban area is formed by a grid network which provides strong connectivity and access to adjacent areas. Travel by private vehicle is the dominant mode of transportation in Mission today, as vehicles account for over 90% of trips made by Mission residents, as compared to 91% in the FVRD and 72% in Metro Vancouver region-wide. Most private vehicle trips made by Mission residents as drivers are to commute to work or post-secondary institutions work (35%), followed by shopping and personal business (32%), social, recreational, or dining purposes (19%) and escorting/dropping off (15%). By improving the safety and efficiency of the driving conditions in Mission, roads can be a safer place for all road users, making driving an enjoyable activity when necessary.

This theme includes six strategies to promote safe and efficient driving in the City of Mission.

Strategy 4.1: Adopt an updated multi-modal street network classification and complete streets standards

Strategy 4.2: Develop complete streets improvement strategies for major streets

Strategy 4.3: Incorporate safety and operational improvements

Strategy 4.4: Coordinate highway improvements with the Ministry of Transportation and Infrastructure

Strategy 4.5: Maintain roadways in a good state of repair

Strategy 4.6: Improve the safety of rural roads

STRATEGY 4.1: ADOPT AN UPDATED MULTI-MODAL STREET NETWORK CLASSIFICATION AND COMPLETE STREETS STANDARDS

Streets are multi-functional spaces that serve many users and different modes of transportation. Streets should be planned, designed, operated, and maintained to enable accessible, comfortable, convenient, and safe access and mobility for all users, regardless of their selected mode of travel. This means accommodating the following functions within the road allowance:

- **Mobility of People:** Streets enable people to travel to their desired destination, including trips within a community or between communities, by walking, rolling, cycling, taking transit, ridesharing, driving, and any combination.
- **Mobility of Goods:** Streets support the reliable movement of goods and services to serve the local economy and beyond.
- **Access for People:** Streets facilitate people's arrival to their destination or transfer point between modes. Access for people includes bus stops, bicycle parking, passenger loading zones, and driveways.
- **Access for Goods:** Streets facilitate the exchange of goods and services between buyers and sellers by providing the infrastructure and interfacing between the street, building, and commercial or business activity, including but not limited to sidewalk, storefront, display, driveway, and loading facilities.
- **Activation:** Streets provide social spaces for people to inhabit and enjoy, and contribute to a community's vibrancy, safety, and sense of place. Street activation includes plazas and parklets, outdoor patios, public art, wayfinding and special street name signage, and street furniture.
- **Greening:** Streets incorporate landscaping and sustainable features within streetscape design to mimic natural systems found in nature and contributes to aesthetics, comfort, and enjoyment of moving through or being on the street.
- **Storage:** Streets can provide for parking for cars, commercial vehicles, bicycles, scooters, and other emerging technologies, as well as receptacles (i.e. recycling and garbage) to support people's use of the street

Action 4.2A: Review and update the City's street network classification map

The City's street network is divided into a street network classification hierarchy including arterial, collector, and local streets. Developing an updated street network classification through a lens of multi-modal transportation can set the directions and requirements of future road projects as well as existing roads retrofitting works.

Detailed traffic volumes and analysis was conducted as part of this plan for existing and future conditions. Detailed traffic analysis and modelling results are provided in **Appendix E**. With the City's projected growth, the City's street network is anticipated to accommodate increased traffic demands. While a typical collector street is currently defined as a roadway that carries approximately 1,000 to 8,000 vehicles per day, a number of them will likely carry more than 8,000 vehicles per day by 2050. The City should monitor the traffic growth as development occurs and ensure the road network is properly designated as intended.

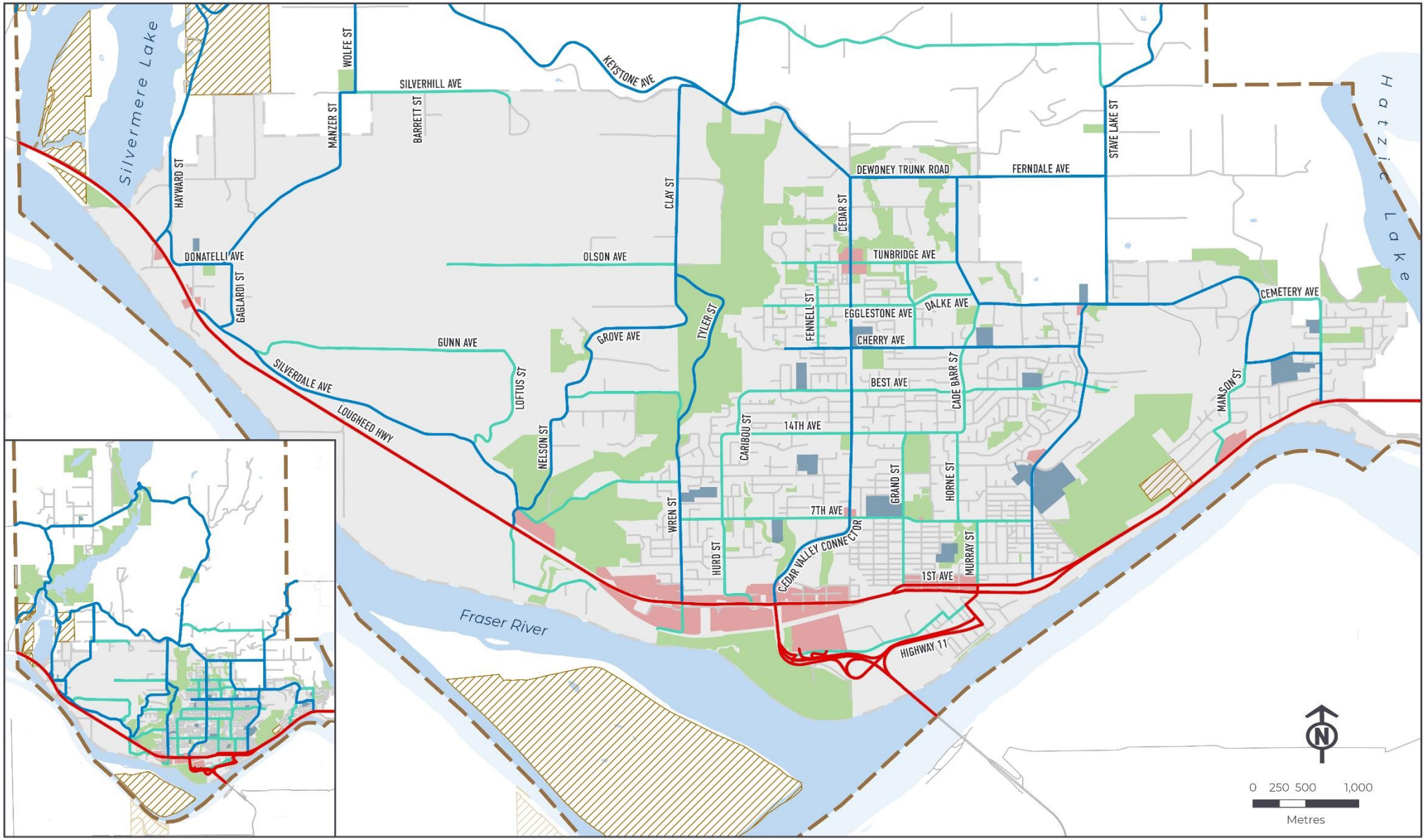
An updated street classification system has been developed to reflect network connectivity, current and anticipated travel demands, and direction from other area plans, including the Cedar Valley Engineering Plan. **Map 12** and **Map 13** illustrate the City's existing and future proposed road classification. The future road classification map includes downgrading certain roads (such as Tyler Street, Nelson Steet, and Grove Ave which are proposed to be downgraded

from arterial to collector). These downgrades should only take place once the new Silverdale Creek crossing is built to ensure alternative connections are in place.

The updated multi-modal street network classification should consider all road users including pedestrians, cyclists, buses, private vehicles, and commercial trucks. The function and needs of each road classification needs to be clearly defined to provide a safer and yet functional environment to all road users.

Action 4.2B: Develop and update street standards based on completed streets principles

The City has adopted standard cross-section drawings for various road classifications in its Development and Subdivision Control Bylaw. These standard drawings provide space for all roadway users and include medians, boulevards, and other features of complete streets. Updated standard cross-sections have been developed and should be adopted into the Development and Subdivision Control Bylaw. Key features of each cross-section are summarized in **Table 2,** including the primary and secondary functions of each street classification as well as the intended accommodation for each road user.



MAP 12: EXISTING ROAD NETWORK CLASSIFICATION

- Highway
- Arterial
- Collector
- Local
- Parks and Open Space
- School
- Commercial
- Urban Growth Boundary
- First Nation Reserve Land
- Municipal Boundary

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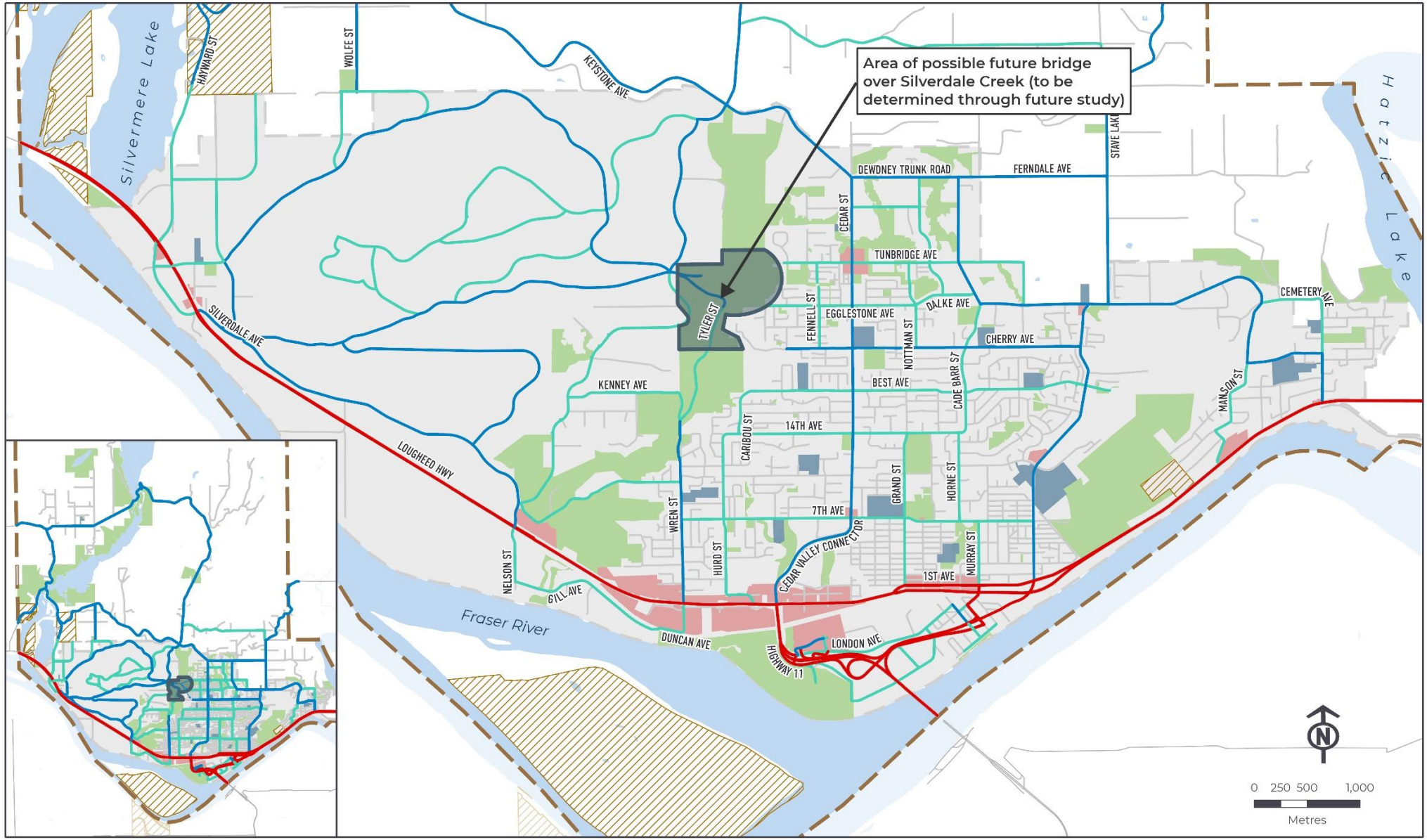


MAP 13: FUTURE ROAD NETWORK CLASSIFICATION

- Highway
- Arterial
- Collector
- Local
- Parks and Open Space
- School
- Commercial
- Urban Growth Boundary
- First Nation Reserve Land
- Municipal Boundary

City of Mission On the Fraser

TABLE 2: MULTI-MODAL STREET NETWORK CLASSIFICATION GUIDELINES

	Primary Functions	Secondary Functions	Vehicle lanes	Crossing Opportunities	Pedestrian facilities	Cycling facilities	On-street parking
Arterial (4-lane)	• Mobility for people • Mobility for goods	• Access for people* • Activation • Greening	4 3.35/3.5 metre lanes	Every 200 – 400 metres	1.8 metre sidewalk or 4.0 metre multi-use pathway on both sides separated by landscaped boulevard	4.0 metre multi-use or separated pathway	None
Arterial (2-lane)	• Mobility for people • Mobility for goods	• Access for people* • Access for goods • Activation • Greening	2 3.5-metre lanes	Every 200 – 400 metres	1.8 metre sidewalk or 4.0 metre multi-use pathway on both sides separated by landscaped boulevard	4.0 metre multi-use or separated pathway	None
Collector	• Mobility for people • Access for people • Access for goods	• Mobility for goods** • Activation • Greening • Storage	2 3.3-metre lanes	Every 100 – 200 metres	1.8 metre sidewalk or 4.0 metre multi-use pathway on both sides separated by landscaped boulevard	4.0 metre multi-use or separated pathway	Both sides
Residential / Local	• Access for people • Access for goods • Greening	• Activation • Storage • Mobility for People	2 3.0-metre lanes	Every 100 metres	1.8 metre sidewalk on one side and optional multi-use pathway on other side separated by landscaped boulevard	3.0 metre multi-use pathway	Both sides
Suburban Residential	• Access for people • Access for goods • Greening	• Activation • Storage • Mobility for People	2 3.0-metre lanes	Every 100 metres	1.8 metre sidewalk on one side separated by landscaped boulevard	Not required; shared local street bikeway can be provided	Both sides
Rural Residential	• Access for people • Access for goods • Greening	• Activation • Storage • Mobility for People	2 3.5-metre lanes	Every 400 – 800 metres	2.0 metre walking strip on one side	Not required	None
Industrial	• Mobility for goods • Mobility for people • Access for goods	• Access for People	4 3.0-metre lanes	Every 200 – 400 metres	1.8 metre sidewalk on one side separated by landscaped boulevard	Not required	None

*Access for people via private vehicle on arterials is typically limited to facilitate faster, higher capacity mobility for all modes.
** Although most truck routes are along Arterials, Collector streets often serve to connect Arterials to Industrial areas or other destinations. Trucks are permitted to travel from a truck route to their destination by the most direct path and Major Collectors serve a mobility for goods function in these contexts.

STRATEGY 4.2: DEVELOP COMPLETE STREETS IMPROVEMENT STRATEGIES FOR MAJOR STREETS

Mission Mobility 2050 identifies a number of improvements to arterial and collector streets to improve mobility for all road users. These improvements include capacity improvements for motor vehicles as well as complete streets improvements to improve mobility for all road users.

Action 4.2A: Identify major street improvements

The City's street network includes a network of arterial, collector and local streets as well as provincial highways (Highway 7 and Highway 11) throughout the City. The street network presents a critical component of the City's transportation system, as it supports not only automobile traffic, but walking, transit, cycling, and goods movement. This section identifies recommended improvements for major (arterial and collector) streets within the City. The improvements described in this section bring together many components of the plan that have been described elsewhere in this report.

Key observations about transportation patterns in Mission that have shaped the street network improvement strategies include:

- **Local & regional growth:** The City's population is expected to double by 2050. The growth within Mission, including the Cedar Valley Neighbourhood and Silverdale Neighbourhood in particular, along with growth in the neighbouring municipalities such as Abbotsford and Maple Ridge, will place increasing pressure on the City's road network.
- **Limited major east-west connectivity:** Within the urban areas of Mission, a significant portion of east-west traffic uses Highway 7 to enter and leave Mission. As travel demands across the City continues to grow, additional pressure will be placed on these connections, impacting local travel and overall connectivity and accessibility.
- **Capacity deficiencies:** While most of the corridors are operating below capacity today, some of them are anticipated to experience capacity deficiency in the future with the projected growth. Many intersections will operate at failing conditions if the network remains unchanged, resulting long delays and queue lengths. Many of them are along major corridors including Highway 7, Cedar Valley Connector and Cedar Street.

This section describes improvements to the City's major streets to address the issues noted above. Major road network improvements are shown in **Map 14** and summarized in **Table 3**.

SILVERDALE CONNECTOR

The Silverdale Connector is a new east-west connection from Silverdale to the Cedar Valley area. The new 2-lane road will provide access between the Silverdale community and the rest of the urban areas in Mission. There are several potential alignment options for this connector. The specific alignment for this connector has not yet been established and will be determined through a future study. This alignment options in the future study will include evaluation of a number of factors, such as environmental impacts, geotechnical concerns, land and construction costs, and property impacts. The study will make a recommendation for the optimal location for this connection based on technical considerations and public consultation. Traffic analysis indicates that the Silverdale Connector will accommodate approximately 1,000 to 1,200 vehicles per hour with approximately 650 vehicles per hour in the peak direction over the next 30 years. The Silverdale Connector is designed to better serve the trips that stay within Mission and alleviate the traffic pressure of Highway 7. This new connection will be driven by the Silverdale development, which is anticipated to be a long-term initiative.

CHERRY AVENUE (CHARMAN STREET TO STAVE LAKE STREET)

Between Charman Street and Cedar Street, Cherry Avenue is expected to require widening to a 3-lane road. The section between Cedar Avenue and Charman Street may also require utility coordination by the City.

CEDAR STREET UPGRADE (MCRAE AVENUE TO CHERRY AVENUE)

Currently, Cedar Street is an arterial street acting as the main north-south connection in Mission. Cedar Street serves both local and regional trips as the south end of this street transitions into Cedar Valley Connector, which connects to Highway 7 and Highway 1. The southern portion of Cedar Street between Cherry Avenue and 7 Avenue generally provides a 4-lane cross-section with a few segments that are 3-lane. Traffic analysis indicates that the future traffic demand on Cedar Street can reach up to approximately 2,000 vehicles per hour in the peak direction, which will exceed the current capacity, especially at the 3-lane segments. Therefore, providing a continuous 4-lane cross-section with turn lanes at intersections will be required. As the traffic volumes in this section are already approximately 900 vehicles per hour in the peak direction today and are expected to increase as the population grows, this section will require widening to 4-lane with a short-term timeline when the City's population reaches approximately 55,000 people.

CEDAR STREET UPGRADE (CHERRY AVENUE TO DEWDNEY TRUNK ROAD)

Cedar Street is generally a 3-/4-lane road between Cherry Avenue and Tunbridge Avenue, and a 2-lane road between Tunbridge Avenue and Dewdney Trunk Road. Traffic analysis indicates that the future traffic demand for this section can reach up to approximately 1,000 vehicles per hour in the peak direction, which may exceed its current capacity. Therefore, most of the sections of this road will need to be widened to four lanes to accommodate future growth with a medium-term timeline when the City's population reaches approximately 65,000 people. This can likely be accomplished as development occurs on adjacent lands.

The City can also consider widening this section to 3-lane road with active transportation facilities while having the additional lands secured in the short-/medium term.

CADE BARR STREET (14TH AVENUE TO DEWDNEY TRUNK ROAD)

Cade Barr Street is a 2-lane collector that runs north-south between 14th Avenue and Dewdney Trunk Road. Traffic analysis indicates the future demand on Cade Barr can reach up to approximately 650 vehicles per hour in the peak direction. While the traffic demand does not necessarily warrant a 4-lane cross-section throughout the entire corridor, providing extra travel lanes will likely alleviate Cedar Street's traffic pressure, hence reducing travel times for local trips in the Cedar Valley neighbourhood. Therefore, widening Cade Barr Street is a long-term project which will be directly driven by development.

HIGHWAY 11 WATERFRONT CONNECTOR (HORNE STREET TO NORTH RAILWAY AVENUE)

As part of the City's Waterfront redevelopment initiatives, the Highway 11 Waterfront Connector connects Horne Street and North Railway Avenue. A preferred concept that includes a 4-lane bypass connecting Waterfront and North Railway and Lougheed Highway was identified in 2008. This option also converts the existing three-legged intersection of Lougheed Highway and Stave Lake Street into a four-legged intersection that connects to the new connector. Traffic analysis indicates that the new connection is anticipated to divert up to approximately 800 vehicles per hour in one direction from the Horne Street and Glasgow Avenue intersection, which is experiencing capacity issues under today's conditions. Given the current congestion issues at Horne Street and Glasgow Avenue, providing such a connection will alleviate the current pressures immediately. However, this project should also align well with the goals and visions of Waterfront redevelopment.

As Highway 11 is under MOTI's jurisdiction, the City should partner with MOTI through the Waterfront Neighbourhood planning process.

STAVE LAKE STREET (LOUGHEED HIGHWAY TO DEWDNEY TRUNK ROAD)

Stave Lake Street is a 2-lane north-south arterial street with some 3-lane segments. With the planned growth in the City, particularly the Stave Heights Neighbourhood and Cedar Valley Neighbourhood, and also being connected to the new realigned Highway 11 extended from the Waterfront, Stave Lake Street is anticipated to accommodate up to approximately 1,100 vehicles per hour in the peak direction, which exceeds the current roadway capacity. Therefore, widening Stave Lake Street into a 4-lane road is required with a medium- to long-term timeline when the City's population reaches approximately 75,000 people. In addition, the widened Stave Lake Street could potentially alleviate Cedar Street's traffic pressure by providing more capacity for north-south traffic. Additionally, the existing three-legged intersection at Best Avenue will become a four-legged intersection with turn lanes as part of the Stave Heights redevelopment. The existing three-legged intersection at Stave Lake Street and Lougheed Highway will also become a four-legged intersection with turn lanes in support of the new Highway 11 extension/realignment from the Waterfront.

The City can also consider widening this section to 3-lane road with active transportation facilities in the short-/medium term while securing additional lands for the long-term improvements.

DEWDNEY TRUNK ROAD (TUNBRIDGE AVENUE TO CADE BARR STREET)

Currently, Dewdney Trunk Road is a 2-lane road with no turn lanes at intersections. Traffic analysis indicates that the future traffic demand for this segment can reach up to approximately 1,700 vehicles per hour by 2050, with significantly turning traffic at the Dalke Avenue intersection. Therefore, widening this segment into a 4-lane road with turn lanes at intersections is required, and will be largely driven by development when the City's population reaches approximately 85,000 people. This project will also be coordinated with the City's utility projects.

DEWDNEY TRUNK ROAD (FERNDALE AVENUE TO CEDAR STREET AND TUNBRIDGE AVENUE TO FERNDALE AVENUE)

Traffic analysis indicates that the future traffic demand for this segment will reach approximately 600 to 700 vehicles per hour by 2050. While the demand does not trigger a widening project, the cross-section of Dewdney Trunk Road will be upgraded to an urban standard to better serve the growing community. This project will also be coordinated with the City's utility projects.

EMIRY STREET (NORTH OF TUNBRIDGE AVENUE)

The Emiry Street roadway upgrade is identified from the City's Cedar Valley Engineering Plan. The upgrade includes a proposed multi-use pathway with landscaping on both sides. This project will also be coordinated with the City's utility projects. The timeline of this project will be largely driven by Cedar Valley's development which are projected to complete before 2050.

GRAND STREET (11TH AVENUE TO 14TH AVENUE)

Grand Street is currently a 2-lane road with no turn lanes at intersections. Traffic analysis indicates that the peak directional volume can reach up to approximately 500 vehicles per hour. Therefore, widening Grand Street into a 3-lane road with turn lanes in the middle is required by 2050.

NEW HARMS ROAD AND IHLES AVENUE

The addition of Harms Road and Ihles Avenue in the northeast corner of Dewdney Trunk Road and Cade Barr Street will provide local connections in support of the future development in Cedar Valley. These new roads are planned

to be 2-lane roads similar to Tunbridge Avenue and Harms Street. The timeline of these new roads will be local development driven.

SILVERDALE AVENUE BRIDGE

This Silverdale Avenue Bridge near Hemlock Street carries little traffic today, but it is expected to carry additional traffic as the development in Silverdale occurs. The bridge is identified in the City's DCC plan for bridge upgrade. The project will be largely driven by the progress of Silverdale's development, which is anticipated to be a long-term initiative.

TUNBRIDGE AVENUE (DEWDNEY TRUNK ROAD TO NEALE DRIVE)

Tunbridge Avenue is currently a 2-land road. A Tunbridge Avenue roadway upgrade to an urban standard is identified in the City's Cedar Valley Engineering Plan. The upgrade includes a proposed multi-use pathway with landscaping on both sides. The timeline of this project will be largely driven by Cedar Valley's development, which is projected to complete before 2050.

WREN STREET (7TH AVENUE TO KENNEY AVENUE)

Wren Street carries approximately 300 vehicles per hour today. With the new growth in the Israel-Bench neighbourhood and Silverdale it is anticipated to accommodate an additional 100 to 200 vehicles per hour of traffic in the future. The road's cross-section can be upgraded to urban standards to provide a better connection for the community. The project will be largely driven by the progress of development, which is anticipated to be a long-term initiative.

14TH AVENUE (HURD STREET TO CADE BARR STREET)

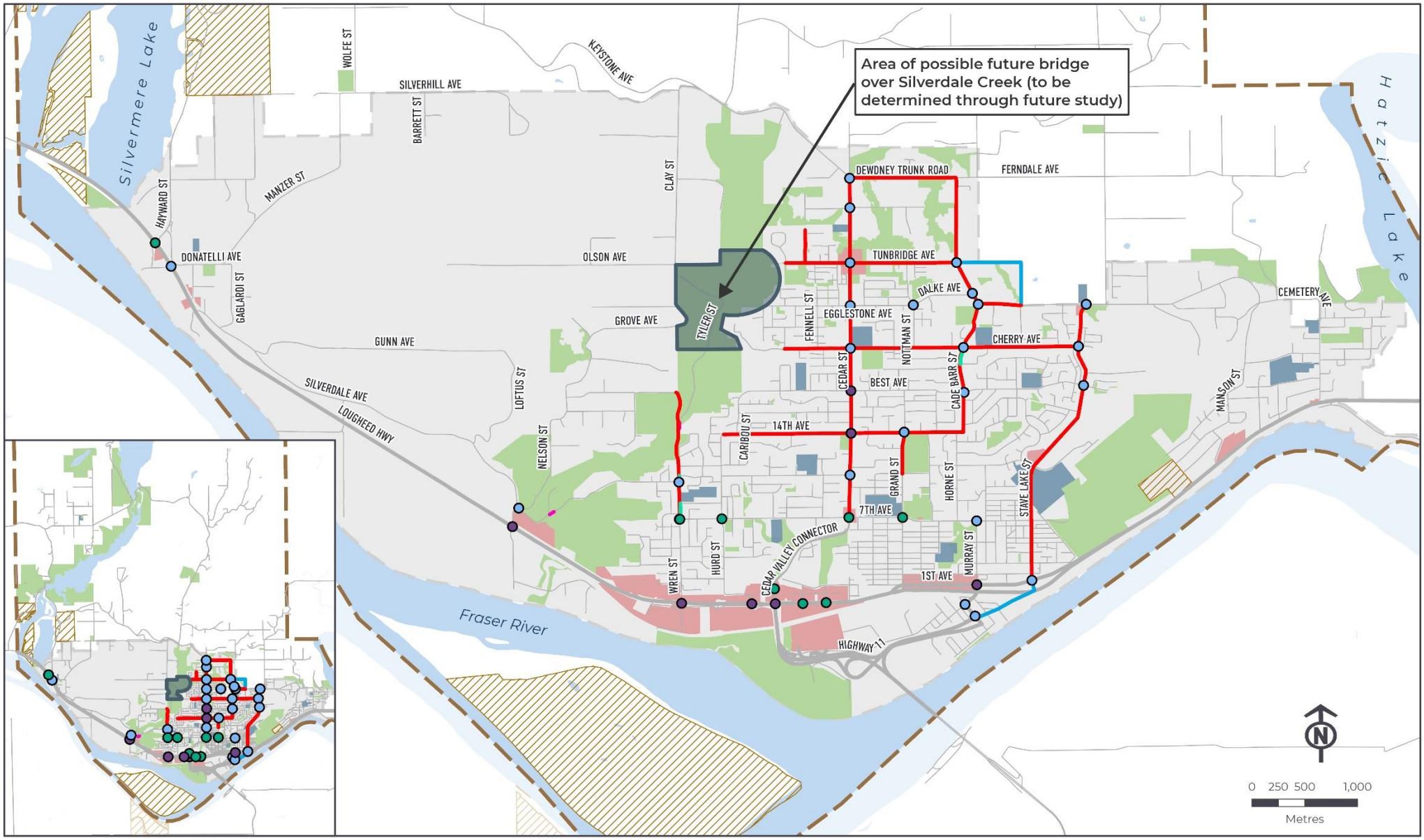
14th Avenue is an east-west collector street that is set to be upgraded to a collector-road standard. The construction of this project including utility and road works has begun and is expected to complete in 2024.

TABLE 3: MAJOR ROAD NETWORK IMPROVEMENTS

No.	Project	Existing	Improvement	Timeline
1	Silverdale connector	N/A	2-lane new road and bridge over Silverdale Creek (alignment to be confirmed)	Long-term and driven by Silverdale
2	Cherry Ave between Charman and Cedar	2-lane	2-3 lane with turn lanes	Long-term and driven by the new Cherry Ave connector
4	Cherry Ave between Cedar and Stave Lake	2-lane	2-lane with turn lanes	Long-term and driven by the new Cherry Ave connector
3	Cedar St between 7th Avenue and Cherry Ave	3-lane with turn lanes	4-lane	Med-term (approx. 60k population)
5	Cedar St between Laminman Ave and Dewdney Trunk Rd	2-lane	4-lane	Med-term (approx. 75k. population)
6	Cedar St between Tunbridge Ave and Laminman Ave	2-lane	4-lane	Med-term (approx. 65k population)
7	Cedar St between Egglestone Ave and Tunbridge	4-lane with turn lanes	Road upgrade	Med-term (approx. 65k population)
8	Cedar St between Cherry Ave and Egglestone Ave	4-lane with turn lanes	Road upgrade	Med-term (approx. 60k population)
9	Cade Barr between 14th Ave and Dewdney Trunk Rd	2-lane	2-lane with turn lanes	Long-term and driven by development
11	Hwy 11 extension/realignment from the Waterfront	N/A	4-lane new road	Long-term and driven by the Waterfront redevelopment
10	Stave Lake St (between Lougheed and Dewdney Trunk Rd)	2/3 lanes with turn lanes at some intersections	4-lane	Med-term (approx. 75k population)
14	Dewdney Trunk Rd between Tunbridge Ave and Cade Barr St	2-lane	4-lane	Long-term (approx. 85k population)
12	Dewdney Trunk Rd between Ferndale Ave and Cedar	2-lane	Road upgrade to urban standard	Development driven

TABLE 3: MAJOR ROAD NETWORK IMPROVEMENTS

No.	Project	Existing	Improvement	Timeline
13	Dewdney Trunk Rd between Tunbridge Ave and Ferndale Ave	2-lane	Road upgrade to urban standard	Development driven
15	Dewdney Trunk Rd between Harms St and Cade Barr St	2-lane	2-lane with turn lanes	Long-term
16	Emiry St north of Tunbridge Ave	2-lane	Road upgrade w/ MUPs and landscape	Urban standard / development driven
17	Grand St between 11th Ave and 14th Ave	2-lane	2-lane with turn lanes	Long-term (approx. 90k population)
18	Harms Rd and Ihles Ave	N/A	2-lane new road	Long-term and driven by development
19	Silverdale Ave Bridge	2-lane	bridge upgrade	Long-term and driven by Silverdale
20	Tunbridge Ave between Dewdney Trunk Rd and Neale Dr	2-lane	Road upgrade w/ MUPs and landscape	Long-term and driven by development
21	Wren St between 7th Ave and Kenney Ave	2-lane	Road upgrade	Long-term and driven by development in the Israel-Bench neighbourhood and Silverdale
22	14th Ave between Hurd St and Cade Barr St	2-lane	Road upgrade	Short-term (construction begin soon with utility works)



MAP 14: MAJOR ROAD NETWORK IMPROVEMENTS

Intersection Projects

- Safety Improvements (top 15 collision locations)
- Operational Improvements
- Safety & Operational Improvements

Road Projects

- Road Upgrade
- New Road
- New Sidewalk
- Bridge Upgrade

- Parks and Open Space
- School
- Commercial
- Urban Growth Boundary
- First Nation Reserve Land
- Municipal Boundary

CITY OF MISSION ON THE FRASER

Action 4.2B: Develop interim improvement strategies for major streets to accommodate active transportation in advance of major improvements

Many of the major road network improvements identified above are long-term improvements that will be required to accommodate future growth and development. It is also recommended that the City develop interim improvement strategies to reallocate road space where possible to accommodate improved active transportation facilities while maintaining current operational requirements. **Figure 12** illustrates potential interim improvement strategies for arterial and collector roads. Based on traffic analysis, the arterial road improvement strategy could apply to both Cedar Street and Stave Lake Street as an interim condition to provide interim protected bicycle lanes while meeting traffic demands over the short- and medium-term by reallocating road space to provide a three-lane cross-section with either a two-way centre turn lane or an uphill climbing lane to create space for protected bicycle lanes.

FIGURE 12: INTERIM IMPROVEMENT STRATEGIES

STRATEGY 4.3: INCORPORATE SAFETY AND OPERATIONAL IMPROVEMENTS

There are a number of locations throughout Mission that have been identified to have safety issues and/or existing or projected operational issues. The City should undertake spot improvements to improve intersection safety and operations at these locations.

Action 4.3A: Identify and improve existing connections that have been identified as having safety, operational or geometric issues

There are a number of locations throughout Mission that have been identified to have safety issues and/or operational issues. **Table 4** and **Table 5** summarize the intersections that are either on the City's road network or MOTI's highways within Mission which have safety and/or operational issues. At most locations, improvements involve intersection modifications such as adding turn lanes, installing new traffic signals, installing pedestrian and bicycle signals, crosswalk upgrades, and/or installing new crosswalks throughout the City.

Small intersection improvements can mitigate existing safety issues and extend the life of infrastructure, helping to delay larger more expensive improvements.

Road safety is supported by ICBC through their Road Safety Improvement Program and could be a source of funding for spot safety improvements in Mission. Over the last 5 years, ICBC has contributed funds to the City for road safety improvements. It is recommended that the City continue to invest in road safety through its partnership with ICBC.

Every five years, the City should conduct a study to update its project traffic signal requirements with updated signal warrant analyses.

WHAT IS LEVEL OF SERVICE (LOS)?

The overall performance of an intersection is typically measured by the delays experienced by vehicles for each individual movement and collectively, also referred to as the level of service (LOS). The LOS is defined by a letter grade and can range between LOS A (best) to LOS F (worst). LOS A through C generally indicates that the intersection experiences very few delays during the peak hour whereas LOS F suggests the delays are significant (greater than 80 seconds per vehicle at a signalized intersection and greater than 50 seconds per vehicle at an unsignalized intersection) and that the intersection is not meeting typical operational criteria. For planning purposes, overall intersection operation of LOS D or better and minor approach operation of LOS E or better are generally considered an acceptable threshold, while operations outside of these thresholds may require improvement.

SIGNALS VS. ROUNDABOUTS

Intersection roundabouts are an alternative strategy to address intersection delays and safety. Rather than implement conventional signalized intersections, modern roundabouts can be considered to support higher traffic volumes especially when traffic volumes are well balanced on all approaches. However, roundabouts are more expensive and require more land than conventional signals, so roundabouts may not be feasible in some cases.

It is recommended that the City consider the use of roundabouts as part of any intersection improvement to enhance safety and mobility. The City should also work with ICBC to establish a proactive implementation strategy.

TABLE 4: MISSION INTERSECTION IMPROVEMENTS

Intersection	Current Control Type	2019		2050 Base		Top 15 Collision Location	Improvements	Timeline (Population)
		AM	PM	AM	PM			
Nelson St & Silverdale Ave	Unsignalized	A	A	F	F		Signal with turn lanes	Long-term (Silverdale)
Wren St & 7th Ave	Unsignalized			A	A	✓	Safety Improvements	
Hurd St & 7th Ave	Signalized			B	B	✓	Safety Improvements	
Cedar Valley Connector & Mall Access	Signalized			B	B	✓	Safety Improvements	
Cedar Valley Connector/Cedar St & 7th Ave	Signalized	B	B	D	E	✓	Additional turn lanes	Med-term (55k pop)
Cedar St & McRae Ave	Signalized	A	A	F	C		4-lane Cedar St with turn lanes	Med-term (55k pop)
Cedar St & 14th Ave	Signalized	B	B	F	F	✓	4-lane Cedar St with turn lanes	Med-term (55k pop)
Cedar St & Best Ave	Signalized	A	A	F	D	✓	4-lane Cedar St with turn lanes	Med-term (55k pop)
Cedar St & Cherry Ave	Signalized	A	A	E	C		Additional turn lanes on Cherry	Med-term (55k pop)
Cedar St & Egglestone Ave	Signalized	A	A	F	D		4-lane Cedar St with turn lanes	Med-term (65k pop)
Cedar St & Tunbridge Ave	Signalized	A	A	F	F		4-lane Cedar St with turn lanes	Med-term (65k pop)
Cedar St & Rosetta Ave	Signalized	A	A	F	F		4-lane Cedar St with turn lanes	Med-term (65k pop)
Cedar St & Dewdney Trunk Rd	Unsignalized	A	A	F	D		Signal, 4-lane Cedar St	Med-term (65k pop)
Grand St & 7th Ave	Signalized			B	B	✓	Safety Improvements	
Grand St & 14th Ave	Unsignalized	B	B	E	D		Signal	Long-term (75k pop)

TABLE 4: MISSION INTERSECTION IMPROVEMENTS

Intersection	Current Control Type	2019		2050 Base		Top 15 Collision Location	Improvements	Timeline (Population)
		AM	PM	AM	PM			
Nottman St & Egglestone Ave/Dalke Ave	Unsignalized	A	A	F	A		Signal with turn lanes	Long-term (80k pop)
Cade Barr St & Best Ave	Unsignalized	B	B	E	F		Signal	Long-term (90k pop)
Cade Barr St & Cherry Ave	Unsignalized	A	A	F	E		Signal with turn lanes	Long-term (90k pop)
Cade Barr St & Dewdney Trunk Rd	Unsignalized	A	A	F	F		Signal with turn lanes	Med-term (70k pop)
Dewdney Trunk Rd & Dalke Ave	Unsignalized	A	A	F	F		Signal with turn lanes	Med-term (60k pop)
Dewdney Trunk Rd & Tunbridge Ave/Ihles Ave	Unsignalized	A	A	F	E		Signal	Long-term (90k pop)
Murray St & 7th Ave	Unsignalized	A	A	F	F		Signal	Med-term (60k pop)
Stave Lake St & Best Ave	Unsignalized	A	A	F	F		Signal with turn lanes	Med-term (60k pop)
Stave Lake St & Dewdney Trunk Rd (west intersection)	Unsignalized	A	A	F	F		Signal with turn lanes	Med-term (60k pop)
Wren St & Silverdale Ave	Unsignalized	A	A	F	F		Signal with turn lanes	Long-term (Silverdale)
Stave Lake St & Cherry Ave	Unsignalized	A	A	A w/ F movements			Signal	Long-term (90k pop)

Table 5 summarizes the MOTI's intersections that requirements safety and / or operational improvements. The City should work with MOTI to confirm each project's details and timelines.

TABLE 5: MOTI INTERSECTION IMPROVEMENTS

Intersection	Current Control Type	2019		2050 Base		Top 15 Collision Location
		AM	PM	AM	PM	
St Anthony's Way/Hayward St & Hwy 7 (Lougheed Hwy)	Signalized	A	A	B	C	✓
McLean St/Silverdale Ave & Hwy 7 (Lougheed Hwy)	Signalized	A	A	F	B	
Nelson St & Hwy 7 (Lougheed Hwy)	Signalized	B	B	F	C	✓
Wren St & Hwy 7 (Lougheed Hwy)	Signalized	B	C	E	F	✓
Hurd St & Hwy 7 (Lougheed Hwy)	Signalized	B	C	E	F	✓
Hwy 11/Cedar Valley Connector & Hwy 7 (Lougheed Hwy)	Signalized	C	D	F	F	✓
Haig St & Hwy 7 (Lougheed Hwy)	Signalized	A	B	B	C	✓
Park St & Hwy 7 (Lougheed Hwy)	Signalized	A	A	B	C	✓
Horne St & Glasgow Ave	Signalized	C	F	F	F	
Glasgow Ave/Murray St & Hwy 7 (Lougheed Hwy/1st Ave)	Signalized	C	C	F	F	✓
Hwy 7 / 1st Ave & Stave Lake St	Signalized	B	B	C	F	
Horne St & Hwy 11	Unsignalized	Not included in traffic analysis				

STRATEGY 4.4: COORDINATE HIGHWAY IMPROVEMENTS WITH MOTI

As described previously, Highway 7 through Mission is expected to have capacity issues resulting in long delays and queue lengths at intersections. While the plan focuses on improvements for the City's road network, the City should coordinate with the MOTI on improvements to locations under MOTI jurisdiction.

Action 4.4A: Work with MOTI to identify issues and opportunities to improve regional mobility

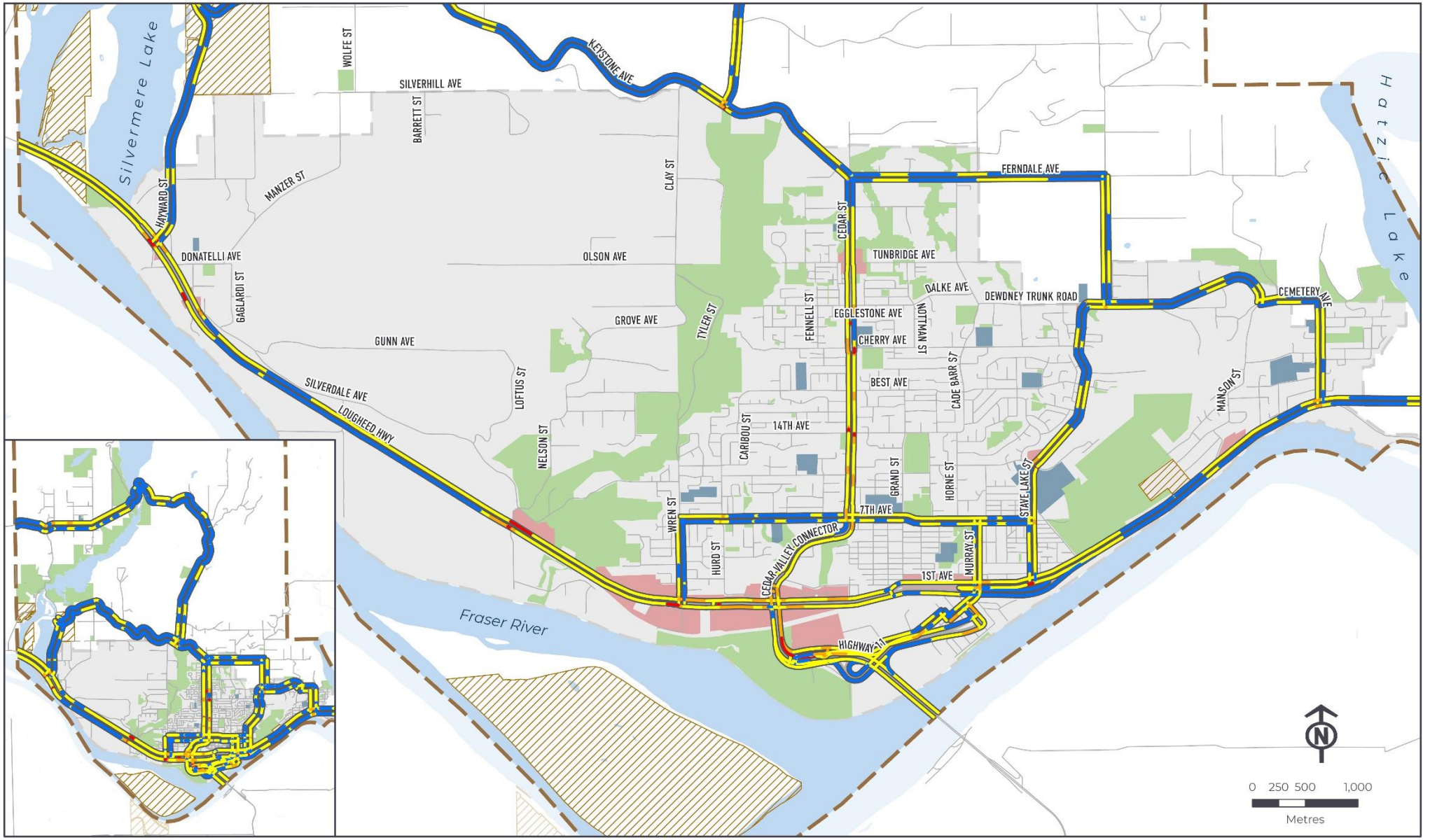
Most signalized intersections under MOTI jurisdiction in Mission operate at generally LOS "C" or better under existing conditions, except the Highway 7 / Highway 11 / Cedar Valley Connector intersection and the Horne Street & Glasgow Avenue intersections. These intersections have a number of movements operating with longer delays and queues at the movement level. Under the 2050 scenario, MOTI intersections within Mission are anticipated to have capacity deficiencies, especially along the highway and major connections.

In addition, under existing conditions, MOTI roadways in Mission experience a high degree of "speed variance", which involves comparing the variance between 85th percentile and 15th percentile speeds (see **Map 15**). Most MOTI highways in Mission have a speed variance of between 20 and 35km/hr, and this increases to be greater than 50km/hr at certain intersections such as Nelson Street and Wren Street). A high-speed variance indicates poor reliability of the road network.

Finally, safety is a concern along MOTI corridors. The traffic safety review found that the top four collision-prone corridors in Mission are along MOTI facilities (Highway 11, Abbotsford-Mission Bridge, Highway 7, and 1st Avenue, respectively), while eight of the top 15 collision prone locations in Mission are at MOTI intersections. Additionally, many of the intersections are not comfortable for active transportation, as most locations do not have pedestrian or cycling facilities that are comfortable for people of all ages and abilities.

Based on this assessment, there are a number of key issues for MOTI to consider in its transportation and development strategy study for the Fraser Valley area, including:

- Existing capacity issues at the Highway 7 / Highway 11 / Cedar Valley Connector intersection and the Horne Street & Glasgow Avenue intersection.
- Projected capacity issues at most intersections by 2050.
- Poor reliability of the road network.
- Corridor and intersection safety issues.
- Significant goods movement traffic using 1st Street and North Railway Avenue through Mission's downtown core.
- Limited alternative east-west routes and the need for a bypass to reduce regional traffic pressures on City streets.
- Safety of vulnerable road users.



MAP 15: PM PEAK STANDARD VARIANCE

Speed

- <= 20 km/h
- > 20km/h - 35 km/h
- > 35 km/h - 50 km/h
- > 50 km/h

- Parks and Open Space
- School
- Commercial
- Urban Growth Boundary
- First Nation Reserve Land
- Municipal Boundary

CITY OF MISSION ON THE FRASER

Action 4.4B: Review the eastern bypass and two-way operations in the downtown area

The "Highway 7/North Railway Avenue Two-way Operation, Downtown Mission Transportation Review" (2013) study analyzed the feasibility of two-way operation in Downtown Mission. Having a two-way system instead of the existing one-way couplet provides a better balance of demands by separating local and regional traffic. It also allows the City to develop a more pedestrian-friendly environment for Downtown Mission. The 2013 study included traffic analyses for the intersections on 1st Avenue and North Railway Avenue in Downtown Mission and concluded that converting North Railway Avenue to two-way operations with a preference of 1st Avenue two-way operation is feasible. The traffic growth was based on a rate of 2% per year for 15 years (30% increase overall). The analysis showed that the network would operate at acceptable conditions by 15 years. However, the model results also indicate that some intersections will reach capacity by the 15-year horizon. Growing the volumes to the 2050 horizon using the same growth rate assumption shows that all of the intersections (Grand Street, James Street, Welton Street, and Horne Street) on 1st Avenue may need to be signalized. The intersection at Grand Street and 1st Avenue may also require additional travel lanes and/or turn lanes to accommodate increased traffic demand.

While the intersection of Murray Street and Lougheed Highway is expected to operate at failing conditions regardless of whether the downtown network operates as a two-way system or a one-way couplet system, an additional eastern bypass is likely to alleviate the pressure from this area. Traffic analysis indicates that the new Waterfront bypass will take away approximately 150 vehicles per hour of traffic from Lougheed Highway between Murray Street and Cedar Valley Connector, and a significant amount of traffic demand especially turning traffic from the intersection of Murray Street and 1st Avenue.

Action 4.4C: Need for an additional signal on Hwy 7 east of Hwy 11 (near Haig and Park Streets)

The 35 ha area north of Highway 7 east of the Cedar Valley Connector near Haig Street and Park Street is designated commercial and multi-family residential in the City's OCP. The land is currently occupied by commercial, retail, and service businesses and the site traffic is served by the two signalized intersections on Lougheed Highway at Haig Street and Park Street. Currently, both intersections are operating at acceptable traffic operational conditions accommodating approximately 850 vehicles per hour and 1,450 vehicles per hour, including entering and exiting trips, in the morning and afternoon peak hours, respectively. Traffic analysis indicates that an additional 800 trips (approximately 50/50 splits for entering / exiting) will result in LOS "F" with lengthy delays and queue lengths for a few critical turning movements, with the overall intersection level of service operating at LOS "D" in the afternoon peak hour. When the additional site trips increase to 1,000 trips, both intersections will operate at LOS "E" with a number of movements operating at LOS "F" with excessive delays and queue lengths. In summary, when the additional site-generated trips are within 800 trips per hour (approximately 400 trips for entering and exiting), the current signals at Haig Street and Park Street are anticipated to accommodate the additional trips through minor signal improvements (signal re-timing, new left-turn phase, and signal head) as needed. When the additional site-generated trips are beyond 800 trips per hour, an additional signal, at Wardrop Street potentially, should be considered to alleviate the pressure from the existing network.

STRATEGY 4.5: MAINTAIN ROADWAYS IN A GOOD STATE OF REPAIR

Mission Mobility 2050 includes a focus on the ongoing operations and maintenance of the City's roadways. As part of the plan, a pavement condition assessment was conducted that collected and analyzed pavement data, reported the existing network pavement condition, and provided the City with an updated pavement management program at various alternative financial funding scenarios.

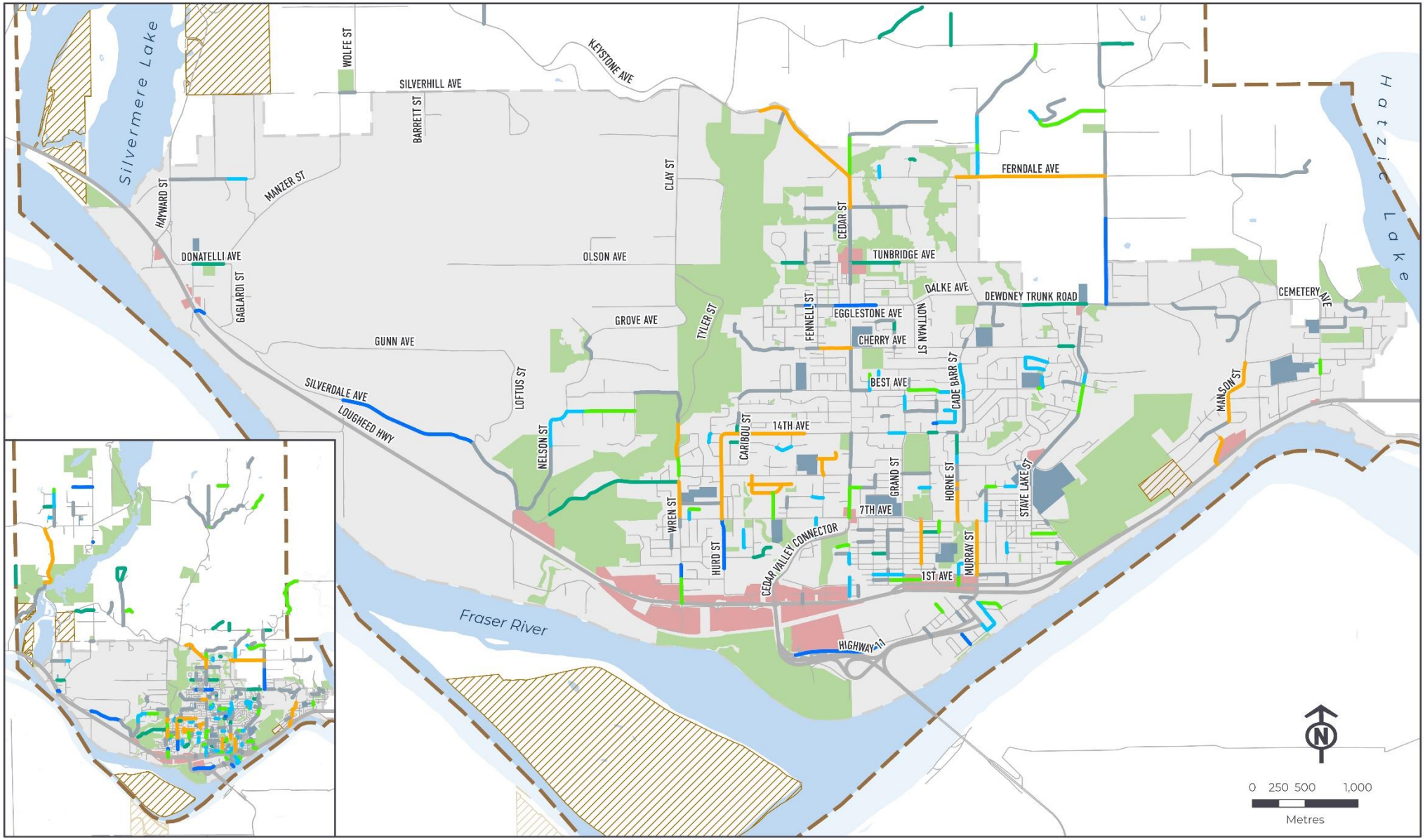
Life-cycle cost analysis was conducted for each paved road segment. The purpose was to forecast the overall condition of the network with alternative budget scenarios, determine the long-term funding required to sustain the pavement network and backlog cost, and to develop a rehabilitation program.

Action 4.5A: Develop and implement a multi-year pavement rehabilitation plan by 2030

A pavement rehabilitation plan was developed at a network-level, with an implementation plan to rehabilitate the road network (see **Map 16**). It was found that a minimum funding level of $2.4 million per year is required from 2023 to maintain the current backlog cost / condition for the next 10 years. At the time of implementation, project-level assessments and designs should be completed. The City should consider updating the plan with new data in three to four years for major roads and five to six years for local roads. This will provide an opportunity to update deterioration model calibration, include new or rehabilitated pavements in the plan. This timeframe is consistent with other municipalities in western Canada.

Action 4.5B: Consider multi-modal improvements with all road upgrades and pavement rehabilitations

Whenever the City upgrades a road with pavement rehabilitation or other improvements, it should identify opportunities to improve the road for other users, including adding sidewalks, bicycle facilities, and transit facilities. The City should review the proposed sidewalks, active mobility, and transit improvements as part of all road upgrades.



MAP 16: PAVEMENT REHABILITATION PLAN

Pave Year
- 2022
- 2023
- 2024
- 2025
- 2026
- 2027 - 2030

- Parks and Open Space
- School
- Commercial
- Urban Growth Boundary
- First Nation Reserve Land
- Municipal Boundary

CITY OF MISSION ON THE FRASER

STRATEGY 4.6: IMPROVE SAFETY OF RURAL ROADS

While much of the City's development patterns and traffic pressures are concentrated in Mission's current and future urban areas, a significant portion of Mission's land area is made up of rural land uses, which are expected to remain rural in the future. This includes areas to the north and west served by several arterial streets including Dewdney Trunk Road, Keystone Avenue, and Wilson Street. Due to the nature of the surrounding land uses, rural roads are typically 2-lane streets with limited access points. Therefore, the traffic on these rural roads is typically free flow and operating at high speeds. During the morning and afternoon peak periods, many rural roads experience average speeds that are significantly higher than the posted speed limit, as shown in **Figure 13**.

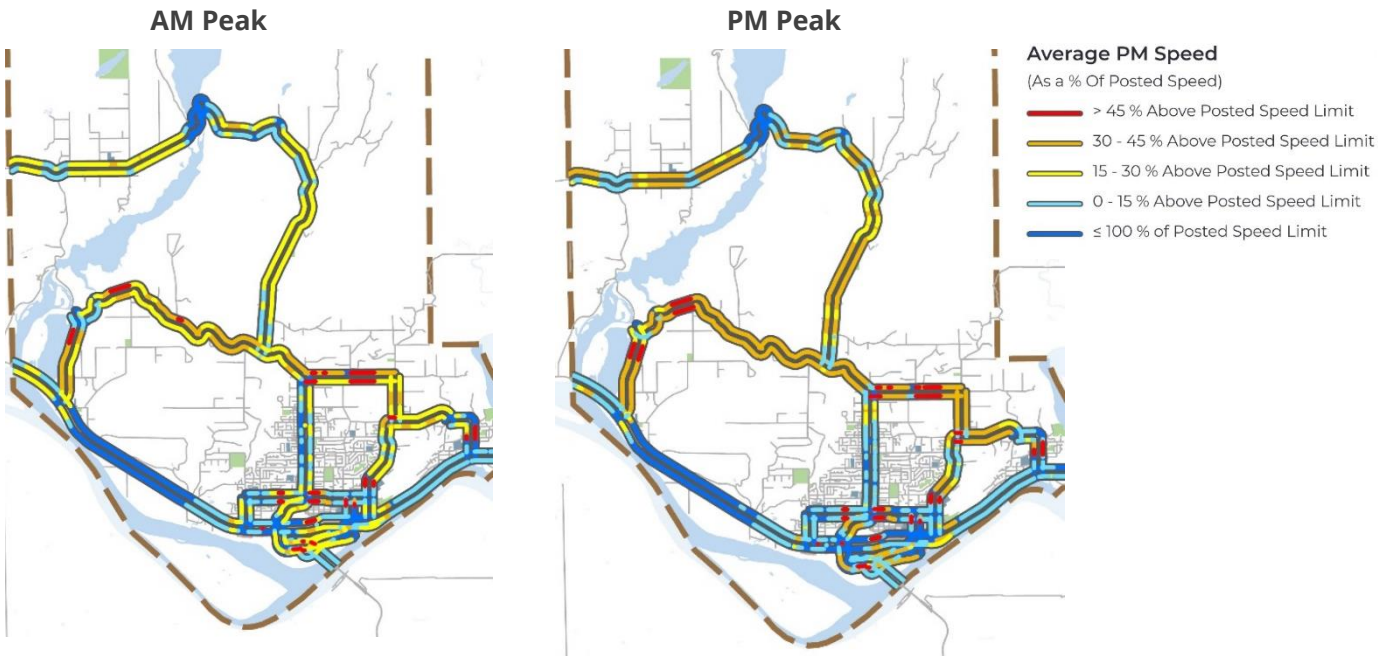


FIGURE 13: AVERAGE SPEEDS ABOVE POSTED SPEED LIMIT

In addition, many of Mission's rural roads are in hilly areas and have challenging geometries with numerous vertical and horizontal curves along with lack of paved shoulders to provide space for pedestrians and cyclists. Many of these rural roads are also essential trucking routes for the businesses and services in the areas, including dump trucks used to serve gravel pits and the landfill. Many of these rural roads also serve as important transportation corridors for residential areas in the north and west part of the City, including the Steelhead community, and also provide access to the City's extensive recreational trail network. The mix of geometric issues, high traffic speeds, presence of large trucks, lack of comfortable active transportation facilities, and connections to residential areas all present safety issues.

The collision analysis conducted for the plan identified a number of rural traffic safety issues. In fact, the analysis found that rural residential streets have almost the exact same number of casualty collisions as urban residential streets, with speeding in particular being an important contributing factor on rural roads (**Figure 14**). The toolbox of treatments for speed mitigation includes traffic calming, reduced speed limits, and other

speed management measures such as fog lines, transverse pavement markings, and enhanced signage, are all tools that could be considered along rural roads to address speeding issues.

The collision analysis also found that while most collisions occurred at locations where the roadway is straight and flat, a significant portion of collisions occurred on roadways with grades, and nearly 40 collisions occurred at locations where the grade coincided with a horizontal curve, which is a particularly common condition in rural areas. The toolbox of treatments for grades and horizontal curves includes effective warning, delineation, and vehicle control along curves.

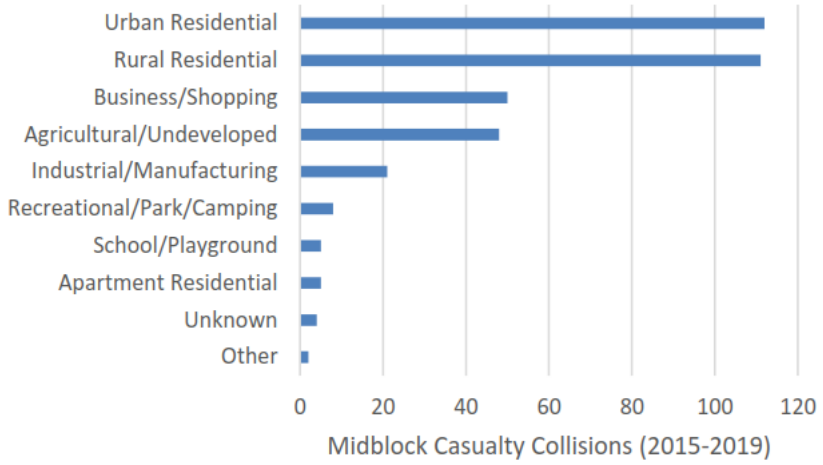


FIGURE 14: LAND USE IN MIDBLOCK CASUALTY COLLISIONS

The collision analysis found that there are relatively few high collision intersections in rural areas, and that instead there are several collision prone corridors with a small number of reported collisions at specific intersections, but with many intersections experiencing reported collisions. locations. Collision prone corridors include:

- Keystone Avenue
- Stave Lake Road/Street
- Dewdney Trunk Road
- Wilson Street

In addition, the collision analysis found that there are 10 locations in rural areas that have experienced at least 5 collisions over the past five years, or at least 1 collision per year. These top rural collision locations include (in order):

- Dewdney Trunk Road and Cedar Street
- Dewdney Trunk Road and Wilson Street
- Dewdney Trunk Road and Keystone Avenue
- Dewdney Trunk Road and Burma Street
- Dewdney Trunk Road and Cardinal Street
- Stave Lake Street and Ferndale Avenue
- Keystone Avenue and Hayward Street

- Dewdney Trunk Road and Bell Street and Yeo Street
- Keystone Avenue and Townshipline Avenue
- Dewdney Trunk Road and Ferndale Avenue

Action 4.6A: Implement the recommendations of the In-Service Safety Review of rural roads in the Steelhead community

Representatives from the Steelhead Community Association have expressed concerns regarding traffic safety concerns on roads in the Steelhead area. Concerns include the effects of heavy truck traffic in the community noting the increasing conflicts with trucks and the residents and recreational users in the area. The Steelhead Community Association requested that various safety measures be established for their local roads, that a traffic study on Dewdney Trunk Road in Steelhead and Stave Falls be completed. In response to local community's concerns, the City partnered with ICBC to conduct an In-Service Road Safety Review of major roadways in Steelhead, including Dewdney Trunk Road, Keystone Avenue, and Hayward Street. The purpose of the In-Service Road Safety Review is to provide an in-depth study of roadway safety and operations for all users in the Steelhead area, to identify any safety deficiencies, and to provide recommendations for short term improvements and/or medium to long-term capital upgrades. The study found that the primary contributing causes of collisions in the area are:

- The existing roadway geometry of the study area corridors including horizontal curves and vertical curves is contributing to reduced control of the vehicle, causing off-road collisions.
- Lack of traffic controls and traffic calming along the corridors is contributing to increased speeding and driver inattentiveness, causing poor decision making and an increased risk of collisions.
- Lighting conditions are contributing to reduced visibility, causing an increased risk of collisions at night.
- Weather conditions are contributing to loss of traction on the road surface, causing vehicles to lose control and increasing risk of collisions.
- Visitors at recreational spots who may be unfamiliar with the study area road characteristics resulting in driver confusion are contributing to increased collisions on weekends.
- Inexperienced drivers with lack of guidance on maintaining proper control of the vehicle considering the roadway characteristics are causing an increased risk of collisions.

The study identified a number of countermeasures that could be considered to address identified safety issues and included the following recommendations:

- Start with implementation of the suggested short-term engineering countermeasures.
- Perform a follow-up evaluation of road safety after the application of short-term engineering countermeasures.
- Prepare targeted education and enforcement campaigns as suggested in the list of countermeasures.
- Conduct a Parking and Transportation Demand Management (TDM) Study at the recreational spots to develop long-term solutions for parking demands during the summer.
- Collect intersection turning movement counts to determine warrants for all-way intersection stop controls.
- Perform further cost/benefit assessments for the long-term engineering countermeasures prior to application.

- Improve intersection skew angles, re-configure channelized islands, reduce turning radius, and provide intersection ahead warning signs as intersection specific treatments.

Action 4.6B: Conduct a safety review of other major rural roads in Mission

The City should also review the safety of other major rural roads in Mission beyond the Steelhead community, including Dewdney Trunk Road, Keystone Avenue, Hayward Street, Wilson Street, Richards Avenue, and Stave Lake Road. This review should include an in-depth study of roadway safety and operations on these roads and identify opportunities to improve road safety and active transportation, including speed management measures, geometric improvements, lighting improvements, and active transportation improvements to consider providing paved shoulders on one or both sides of rural roads.

6. IMPLEMENTATION PLAN

The strategies and actions developed as part of Mission Mobility 2050 are intended to guide Mission's policy, planning, and capital investment decisions as well as on-going operations and maintenance activities related to transportation over the next 30 years and beyond. To achieve the vision and goals of the plan, an implementation strategy is necessary to provide a framework for advancing specific transportation improvements.

6.1 OVERALL PLAN COSTS

Conceptual order-of-magnitude cost estimates were developed for each of the capital investments identified in the plan to provide a sense of the potential overall future levels of transportation investment for the City in current (2022) dollars. These order-of-magnitude costs are for comparative purposes and discussion purposes only and are based on a conceptual level of effort that did not involve any design work. The cost estimates are based on typical unit costs and recent pricing in Mission and elsewhere. The cost estimates have been provided to identify the relative cost for planning purposes but should be refined based on further design work for budgeting purposes. Actual costs for implementation could vary significantly for each initiative as costs change over time and are typically not used for project budgeting purposes. In addition, possible contributions from other agencies and the private sector are not possible to estimate.

The level of investment required to implement all improvements recommended in the plan is estimated to be in the range of $335 – 425 million over the next 30 years, as summarized in **Table 6**. While the analysis was done assuming a full build-out of Cedar Valley in the next 30 years, the actual build-out horizon year of Cedar Valley may go beyond 30 years. Therefore, the actual cost of the plan may be lower if full build out of Cedar Valley does not occur within the 30-year lifespan of the plan. It should be noted that these cost estimates do not include items such as property costs, environmental mitigation costs, and utility relocations. Detailed dost breakdowns for all capital investments are provided in **Appendix F**.

TABLE 6: ESTIMATED LEVEL OF INVESTMENT

Improvement Type		Level of Investment
Road Network		
1.	Corridors	$101 – $146 million
2.	Intersections	$9 - 19 million
3.	Rehabilitation	$72 million
4.	Safety Improvements	$7.5 million
Pedestrian Network		
5.	Sidewalks	$86 – 106 million
6.	Crossings	$1 million
Bicycle Network		
7.	Bicycle Facilities and Multi-Use Pathways	$44 – 59 million
Transit Network Management		
8.	Bus Stop Improvements	$3.7 million
9.	Transit Exchanges	$10 million
Total		**$335 – 425 million**

6.2 IMPLEMENTATION PRINCIPLES

The implementation plan was developed based on the following guiding principles:

- **The Transportation Plan is one step towards implementing the vision for transportation in Mission; it is not the last step.** The strategies in the plan are intended to lay the groundwork for implementation over the long-term. It is important to recognize that implementation will require significant investment and resources, as well as a shift to prioritize walking, cycling, and transit to meet the vision, goals, and targets of the Plan. The plan includes significant investments in new infrastructure, upgrades to existing infrastructure, ongoing maintenance of existing and new facilities, resources for development of new standards and policies, funding for new programming and public education, and staff resources. It will require ongoing support from the City and its partners, along with sustained investment in all transportation modes.
- **The Transportation Plan is a flexible and living document.** For each long-term network plan, there is some level of flexibility for the specific locations and corridors that are recommended. The plan presents recommendations based on public input and technical analysis; however, the City will need to review the feasibility and desirability of each infrastructure project. As this plan is a long-term, strategic document, it is anticipated that additional projects will emerge over time to reflect changing priorities.
- **The City should monitor, review, and update the Transportation Plan on a regular basis, as needed.** As the City begins implementing the strategies and actions of the plan, a monitoring and reporting strategy will be needed to measure and communicate progress towards achieving the vision, goals, and targets. Reporting back on the indicators identified with each of the goals and objectives in the plan is one of the ways the City can report on progress made in implementing the Plan. As the City moves forward with implementing the plan, the document will need to be updated to reflect the changing priorities and conditions over time.
- **The City should actively foster partnerships and seek external funding sources to help implement the plan.** Many of the strategies and actions in the plan will require partnerships with other agencies. The City should foster partnerships with other agencies, including senior levels of government, and should seek all opportunities for external funding support to help implement the plan.
- **The City will engage in further public consultation to implement the recommendations included in the Transportation Plan.** Many of the initiatives require more detailed input and technical work. The City should work closely with partners, residents, and stakeholder groups to move forward with priorities in the plan.
- **The City should incorporate the short-term priorities into its 5-year Financial Plan, and a new investment strategy should be developed for the long-term.** Finally, there will be an annual review as part of the financial planning and municipal budgeting process, with a full review of the Transportation Plan recommended every 5 years.

6.3 PRIORITIZING ACTIONS

This section groups and prioritizes each action identified under each of the pillars and themes of the plan. Strategies for implementing each of the actions identified in the Transportation Plan are outlined in **Tables 7-11** below. These tables provide guidance with respect to:

- **Timeframe.** Each action is identified as either a short-term (0-5 years), medium-term (6-10 years) or long-term (over 10 years) initiative. Many actions will be implemented on an ongoing basis, in which case they are shown under each timeframe. It should also be noted that these priorities may change over time. If an opportunity arises to immediately implement an action identified as a medium or long-term priority, such as an infrastructure redevelopment opportunity or other capital project, the City should seek to maximize the opportunity.
- **Method of Implementation.** This column identifies how each action will be implemented: as a capital project, through ongoing operations and maintenance, as a policy or programming initiative, or through some combination of the above.
- **Responsibility.** This column suggests the primary and secondary responsibility for each action. Many actions are the primary responsibility of the City of Mission (including Engineering, Public Works, Planning, Parks & Recreation, Communications, or Finance), while other actions should be led by external agencies, such as other government agencies (such as MOTI, BC Transit, and/or TransLink), community groups, or the private sector. Many of the projects identified in the plan are also eligible to be included in a Development Cost Charge (DCC) program.
- **Financial.** This column outlines financial implications, including the anticipated relative cost and resource requirements.

TABLE 7: ACTION SUMMARY – PILLARS

PILLARS	TIMEFRAME			METHOD OF IMPLEMENTION			RESPONSIBILITY		FINANCIAL	
	Short (0-5 years)	Medium (6-10 years)	Long-Term (11+ years)	Capital	Operations and Maintenance	Policy and Programming	Primary	Secondary	Capital	Operating (Staff & Consultant Resources)
Pillar 1: Safe Mobility										
Direction 1.1: Adopt and implement a Traffic Safety Strategy Implementation Plan that advances the City's commitments to safe mobility for all road users, with a specific focus on vulnerable road users.	✓			✓		✓	Engineering	ICBC, RCMP	$$	✓
Direction 1.2: Implement design treatments that reduce the risk of severe injuries and fatalities and create safer streets	Ongoing			✓			Engineering		$$	
Direction1.3: Addopt a 'Safe Systems Approach' to improve road safety	✓					✓	Engineering	ICBC, RCMP		
Direction 1.4: Develop comfortable, connected, and complete networks for that are suitable for people of All Ages and Abilities (AAA)	Ongoing			✓			Engineering		$$$	✓
Direction 1.5: Review collision data and target safety improvements to high collision intersections at five-year intervals	Ongoing						Engineering	ICBC		✓
Direction 1.6:Develop a Prioritized List of Traffic Calming Sites for Improvements		✓		✓		✓	Engineering			✓
Pillar 2: Land Use Integration										
Direction 2.1: Ensure the transportation system supports land use patterns with appropriate investments to enable and encourage people to walk, roll, cycle, and use transit	Ongoing					✓	Planning	Engineering		
Direction 2.2: Continue to consolidate growth within Mission's urban areas, with a mix of housing types, jobs, services, and amenities	Ongoing					✓	Planning	Engineering		
Direction 2.3: Develop mobility hubs between sustainable modes of transportation (walking, rolling, cycling, and transit)	✓	✓					Planning, Engineering	Development Community		
Direction 2.4: Support the development of affordable residential housing in close proximity to active transportation networks, transit, and community destinations	Ongoing					✓	Planning			
Direction 2.5: Leverage development as an opportunity to enhance the transportation network	Ongoing					✓	Development Community	Planning, Engineering		
Pillar 3: Streets for People										
Direction 3.1: Create safe, welcoming, and comfortable places that attract pedestrians and make streets an enjoyable place to be	Ongoing			✓			Engineering, Planning		$$	✓
Direction 3.2: Develop support programs and initiatives that encourage people to walk and highlight the benefits of walking, including enhanced wayfinding, walking clubs, and a Safe Routes to School program	✓					✓	Engineering, Planning	School District, ICBC		✓
Pillar 4: Changing Technologies										
Direction 4.1: Expect new and disruptive technologies and plan to accommodate new modes and higher numbers of Zero Emission Vehicles	✓					✓	Engineering			✓
Direction 4.2: Facilitate the use of more sustainable modes in Mission such as Zero Emission Vehicles through the installation of charging stations	✓	✓		✓			Engineering		$	
Direction 4.3: Plan for new mobility services and devices that can increase sustainable mode share and equity in Mission, and decrease challenges due to topography		✓				✓	Engineering			✓
Direction 4.4: Use Intelligent Transportation Systems to improve the efficiency of the transportation system	✓				✓		Engineering			✓
Direction 4.5: Plan for the introduction of Autonomous Vehicles to Mission and the region		✓				✓	Engineering, Planning			
Direction 4.6: Support BC Transit's shift to a low carbon fleet program		✓	✓	✓		✓	BC Transit, Engineering		$	
Pillar 5: Asset Management										
Direction 5.1: Focus on asset management and ensure the transportation system is in a state of good repair	Ongoing				✓		Engineering, Finance			✓
Direction 5.2: Develop an Asset Management Plan and database to monitor condition of assets and track capital improvements across departments in a consistent way	✓				✓	✓	Engineering, Finance			✓
Pillar 6: Equity and Accessibility										
Direction 6.1: Develop and design universally accessible streets	Ongoing			✓			Engineering		$$	
Direction 6.2: Include equity as a criterion in the City's planning and prioritization	✓					✓	Planning, Engineering			
Direction 6.3: Work with Indigenous communities to better understand their needs and improve mobility options across communities	Ongoing					✓	Planning, Engineering			✓
Direction 6.4: Apply an intersectional, equity-focused lens to transportation decision-making and work with service providers and other organizations representing vulnerable and under-represented groups to identify their unique mobility needs	Ongoing					✓	Planning, Engineering			✓

TABLE 8: ACTION SUMMARY – ACTIVE TRANSPORTATION

THEME 1: ACTIVE TRANSPORTATION	TIMEFRAME			METHOD OF IMPLEMENTION			RESPONSIBILITY		FINANCIAL	
	Short (0-5 years)	Medium (6-10 years)	Long-Term (11+ years)	Capital	Operations and Maintenance	Policy and Programming	Primary	Secondary	Capital	Operating (Staff & Consultant Resources)
Strategy 1.1: Develop a Complete, Connected, and Accessible Pedestrian Network										
Action 1.1A: Fill in gaps in the sidewalk network by strategically investing in new sidewalks and upgrading 'walking strips' on existing streets	Ongoing			✓		✓	Engineering		$$$	✓
Action 1.1B: Strategically upgrade and widen sidewalks in areas of high pedestrian demand		✓	✓	✓			Engineering		$$$	
Action 1.1C: Ensure streets are designed to be universally accessible	Ongoing			✓			Engineering		$$	
Strategy 1.2: Develop an Active Mobility Network for People of All Ages and Abilities										
Action 1.2A: Develop a complete, comfortable, and connected active mobility network that places all residents and businesses within close proximity of an active mobility corridor, and provides connections to key destinations	Ongoing			✓			Engineering, Parks		$$$	✓
Strategy 1.3.: Enhance Trails and Pathways to Provide Recreational and Transportation Opportunities										
Action 1.3A: Identify, plan for, and invest in trails and pathways to seamlessly connect the pedestrian network	✓			✓			Engineering, Parks			✓
Action 1.3B: Support regional initiatives to develop a continuous waterfront greenway		✓	✓			✓	Engineering, Parks	FVRD, Adjacent municipalities		✓
Action 1.3C: Develop a context sensitive approach to separating users on multi-use pathways		✓	✓	✓	✓	✓	Engineering			
Strategy 1.4: Create and Enhance Existing Crossings to Accommodate All Ages and Abilities										
Action 1.4A: Implement warranted crosswalk improvements	✓			✓			Engineering	ICBC	$$	
Action 1.4B: Provide additional pedestrian crossing enhancements to improve pedestrian safety and accessibility	✓			✓			Engineering	ICBC	$$	
Action 1.4C: Provide cycling crossing treatments to improve cycling safety		✓		✓			Engineering	ICBC	$$	
Action 1.4D: Review and ensure clear sightlines and clarity of right-of-way at intersections	Ongoing				✓		Engineering			✓
Strategy 1.4E: Update the City's street design standards to provide AAA active transportation facilities, and consider active transportation improvements on all new and upgraded streets based on these standards	✓			✓	✓	✓	Engineering			✓
Strategy 1.5: Develop Support Programs and Initiatives that Encourage People to Use Active Transportation										
Action 1.5A: Develop and support programs to encourage walking		✓	✓			✓	Engineering	Parks, Planning, Communications, School District		✓
Action 1.5B: Develop and support programs and facilities to encourage cycling		✓	✓			✓	Engineering	Parks, Planning, Communications, School District		✓

TABLE 9: ACTION SUMMARY – TRANSIT

THEME 2: TRANSIT	TIMEFRAME			METHOD OF IMPLEMENTION			RESPONSIBILITY		FINANCIAL	
	Short (0-5 years)	Medium (6-10 years)	Long-Term (11+ years)	Capital	Operations and Maintenance	Policy and Programming	Primary	Secondary	Capital	Operating (Staff & Consultant Resources)
Strategy 2.1: Work with BC Transit to Develop an Updated Transit Network and Improve Transit Services										
Action 2.1A: Support the development of an updated transit network focusing on frequent and direct transit service along with phased implementation to increase service hours	✓					✓	BC Transit, Engineering			✓
Action 2.1B: In partnership with BC Transit, improve transit service frequency to make transit more convenient at all times of day	✓				✓	✓	BC Transit, Engineering			✓
Action 2.1C: Identify opportunities for transit optimization to improve bus speed and reliability				✓	✓		Engineering	BC Transit	$$	✓
Action 2.1D: Support BC Transit's commitment to technology initiatives to enhance the rider experience and reduce environmental impacts.	✓					✓	BC Transit	Engineering		
Action 2.1E: In partnership with BC Transit, explore the feasibility of digital on-demand transit to provide service in rural areas.		✓			✓	✓	BC Transit	Engineering		
Action 2.1F: In partnership with BC Transit, review potential locations for transit exchanges and park-and-rides throughout the City			✓	✓		✓	Engineering	BC Transit		✓
Strategy 2.2: Enhance the Transit User Experience										
Action 2.2A: Provide seamless walking and cycling connections to transit	Ongoing			✓			Engineering		$$	
Action 2.2B: Improve bus stop passenger amenities	Ongoing			✓			Engineering		$$	
Action 2.2C: Ensure a universally accessible transit system	Ongoing			✓			Engineering	BC Transit		✓
Action 2.2D: Identify transit supportive programs and policies to encourage transit use among new riders, with a specific focus on equity-seeking populations	Ongoing					✓	Community Organizations	BC Transit, Engineering		
Strategy 2.3: Improve Regional Transit Connectivity and Service										
Action 2.3A: Improve regional transit connections to Abbotsford and Metro Vancouver	✓					✓	BC Transit	Engineering		
Action 2.3B: Work with TransLink to explore the potential for a second West Coast Express station			✓			✓	Engineering	TransLink, CP Rail		✓
Action 2.3C: Work with partners to expand West Coast Express services			✓			✓	Engineering	TransLink, CP Rail		✓
Action 2.3D: Ensure multi-modal connections to West Coast Express are accessible and comfortable for people of all ages and abilities	Ongoing			✓			Engineering			

TABLE 10: ACTION SUMMARY – GOODS MOVEMENT

THEME 3: GOODS MOVEMENT	TIMEFRAME			METHOD OF IMPLEMENTION			RESPONSIBILITY		FINANCIAL	
	Short (0-5 years)	Medium (6-10 years)	Long-Term (11+ years)	Capital	Operations and Maintenance	Policy and Programming	Primary	Secondary	Capital	Operating (Staff & Consultant Resources)
Strategy 3.1: Update the Designated Goods Movement Network										
Action 3.1A: Update the City's designated Truck Route Map	✓			✓		✓	Engineering	BC Trucking Association	$$	✓
Action 3.1B: Develop a Truck Route Bylaw to harmonize with the region and modernize the truck network		✓				✓	Engineering	BC Trucking Association		✓
Strategy 3.2: Continue to Work with MoTI and the BC Trucking Association to Explore the Potential of a Downtown Truck Bypass										
Action 3.2A: Consider the rerouting of westbound truck traffic at the intersection of Murray Street	✓			✓			Engineering, MoTI	BC Trucking Association	$$	✓
Action 3.2B: Implement minor operational improvements to First Avenue and Murray Street, and Glasgow Avenue and Horne Street	✓			✓			Engineering, MoTI	BC Trucking Association	$$	✓
Action 3.2C: Over the long-term, work with MOTI to develop Highway 7 Bypass for vehicles and goods movement			✓	✓			Engineering, MoTI	BC Trucking Association	$$$	✓
Strategy 3.3: Consider Alternatives to the Road Network, Including Rail and Marine Networks										
Action 3.3A: Continue to work with the Vancouver Fraser Port Authority to evaluate and provide a dedicated common short sea shipping facility			✓			✓	Engineering	Vancouver Fraser Port Authority		✓
Action 3.3B: Explore the potential to integrate new rail yards into a short sea shipping terminal operation			✓			✓	Engineering	Vancouver Fraser Port Authority		✓

TABLE 11: ACTION SUMMARY – DRIVING

THEME 4: DRIVING	TIMEFRAME			METHOD OF IMPLEMENTION			RESPONSIBILITY		FINANCIAL	
	Short (0-5 years)	Medium (6-10 years)	Long-Term (11+ years)	Capital	Operations and Maintenance	Policy and Programming	Primary	Secondary	Capital	Operating (Staff & Consultant Resources)
Strategy 4.1: Adopt an Updated Multi-Modal Street Network Classification and Complete Streets Standards										
Action 4.2A: Review and update the City's street network classification map	✓					✓	Engineering			
Action 4.2B: Develop and update street standards based on completed streets principles	✓					✓	Engineering			
Strategy 4.2: Develop Complete Streets Improvement Strategies for Major Streets										
Action 4.2A: Identify major street improvements	Ongoing			✓			Engineering		$$$	✓
Action 4.2B: Develop interim improvement strategies for major streets to accommodate active transportation in advance of major improvements	✓	✓		✓			Engineering		$$	✓
Strategy 4.3: Incorporate Safety and Operational Improvements										
Action 4.3A: Identify and improve existing connections that have been identified as having safety, operational or geometric issues	Ongoing			✓			Engineering		$$$	✓
Strategy 4.4: Coordinate Highway Improvements with the Ministry of Transportation and Infrastructure										
Action 4.4A: Work with MOTI to identify issues and opportunities to improve regional mobility		✓				✓	Engineering, MoTI			✓
Action 4.4B: Review the eastern bypass and two-way operations in the downtown area			✓			✓	Engineering, MoTI			✓
Action 4.4C: Need for an additional signal on Hwy 7 east of Hwy 11 (near Haig and Park Streets)			✓			✓	Engineering, MoTI			✓
Strategy 4.5: Maintain Roadways in a State of Good Repair										
Action 4.5A: Develop and implement a multi-year pavement rehabilitation plan by 2030	✓				✓		Enginerering		$$$	✓
Action 4.5B: Consider multi-modal improvements with all road upgrades and pavement rehabilitations	✓	✓		✓	✓		Enginerering		$	✓
Strategy 4.6: Improve the Safety of Rural Roads										
Action 4.6A: Implement the recommendations of the In-Service Safety Review of rural roads in the Steelhead community	✓					✓	Enginerering			✓
Action 4.6B: Conduct a safety review of other major rural roads in Mission		✓				✓	Enginerering			✓

6.4 PRIORITIZING IMPROVEMENTS

6.4.1 ROAD NETWORK IMPROVEMENTS

Approximately 60 road projects have been identified for short-term, medium-term, and long-term horizons. While the analysis was conducted assuming a full build-out of Cedar Valley in the next 30 years, the actual build-out horizon year of Cedar Valley may go beyond 30 years. Therefore, the actual cost of the plan may be lower if full build out of Cedar Valley does not occur within the 30-year lifespan of the plan. The total corridor and intersection improvements for road network projects under the City's jurisdiction are estimated to cost approximately **$110 – 165 million** over the next 30 years depending on the build out of Cedar Valley.

The average historic spending for transportation in Mission is approximately $3 million per year. Based on the road network prioritization, it is anticipated that approximately $53 million in investment is required over the next ten years, including development driven and DCC eligible projects. Although this is higher than the City's historic spending levels, by leveraging development driven projects, DCC eligible projects, and external grant opportunities, the City's share of this capital cost is anticipated to be in alignment with historic funding levels. As such, priorities have been established that fit within these funding levels over the short- and medium-term. **Map 17** illustrates the short-term, medium-term, and long-term road network improvements.

Based on the existing and future conditions traffic analysis conducted for Mission Mobility 2050, all road network projects are assumed to have a 100% benefit factor for DCCs, excluding rural arterial roads that are being upgraded to an urban standard without widening, and new collector roads. The tables identify projects that are dependent upon development in Cedar Valley, and identifies which projects might not proceed within the 30-year plan timeframe should full build out of Cedar Valley not occur within the next 30 years.

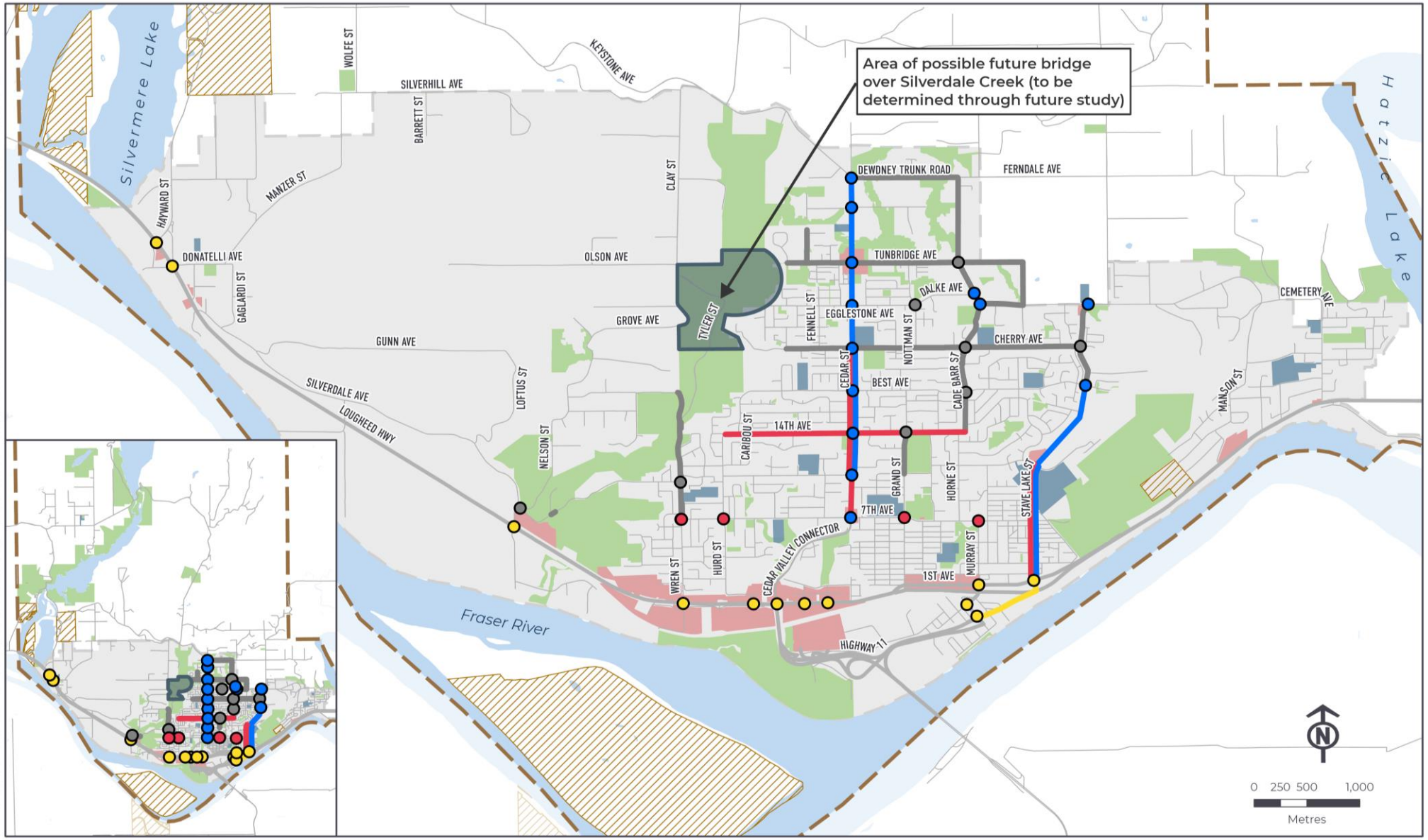
Table 12 summarizes the proposed funding allocations by time horizon. It should be noted that these priorities are intended to be flexible to provide the City with guidance – priorities are likely to change over time and should not be considered fixed.

Projects that are funded, or partially funded by the 2018 DCC bylaw are noted in the comments column. For long-term corridor improvements, projects that are "over-sizing" eligible are also identified. "Over-sizing" mean frontage improvements and other upgrades that will required to be provided by developers with their developments.

In the short-term, the City should encourage MOTI to prioritize provincial highway investments to improve the traffic operational performance along Highway 7 at major intersections, namely the Cedar Valley Connector intersection and Murray Street intersection, as well as the Glasgow Avenue and Horne Street intersection. The City should also work towards the reconfiguration of Cedar Street and Stave Lake Street by leveraging development opportunities. Additionally, the City should allocate dedicated annual funding for signals, warning signs, and other minor intersection improvements each year.

Over the medium-term, the City should expand Cedar Street and Stave Lake Street to four-lane roads throughout with intersection improvements along the corridor, as well as upgrade the existing intersections within Cedar Valley through leveraging development opportunities.

Over the long-term, with the build-out of Silverdale, a number of roads and intersections, namely Cherry Avenue, Dewdney Trunk Road, Tunbridge Avenue, and Wren Street will need to be improved to accommodate the additional traffic demand. Additionally, a number of intersections throughout the City will need to be improved by then to support the increased future traffic demand.



MAP 17: MAJOR ROAD NETWORK IMPROVEMENT PRIORITIES

Intersection Projects

- Short-Term Priority
- Medium-Term Priority
- Long-Term Priority
- MOTI

Road Projects

- Short-Term Priority
- Short and Medium Term Priority
- Medium-Term Priority
- Long-Term Priority
- MOTI

- Parks and Open Space
- School
- Commercial
- Urban Growth Boundary
- First Nation Reserve Land
- Municipal Boundary

City of Mission On the Fraser

TABLE 12: SUMMARY OF ROAD NETWORK PRIORITIES

		Assuming Cedar Valley Full Build-Out		
Priority	**Number of Projects**	**Total Project Costs**	**Total DCC Recoverable**	**Non-DCC Costs**
Short-Term (0-5 years)	8	$12,669,000	$10,593,000	$2,076,000
Medium-Term (6-10 years)	19	$40,269,000	$39,866,310	$402,690
Long-Term (10-30 years)	23	$112,290,000	$94,201,470	$18,088,530
Total	***50***	***$165,228,000***	***$144,660,780***	***$20,567,220***

		Excluding Cedar Valley Development Driven Projects		
Priority	**Number of Projects**	**Total Project Costs**	**Total DCC Recoverable**	**Non-DCC Costs**
Short-Term (0-5 years)	8	$12,669,000	$10,593,000	$2,076,000
Medium-Term (6-10 years)	19	$29,081,000	$28,790,190	$290,810
Long-Term (10-30 years)	23	$69,176,000	$67,725,900	$1,450,100
Total	***50***	***$110,926,000***	***$107,109,090***	***$3,816,910***

6.4.2 ACTIVE TRANSPORTATION IMPROVEMENTS

Nearly 90 new sidewalk projects have been identified in the plan. In total, new sidewalks are estimated to cost approximately $87-107 million (as noted in **Table 6** above). Additionally, 20 active mobility network improvement projects have been identified, including a network of multi-use pathways, protected bicycle lanes, local street bikeways, and supporting facilities such as paved bicycle lanes and shoulder bikeways. In total, these active mobility network projects will cost approximately $44-59 million (as noted in **Table 6** above).

Active transportation improvements have been prioritized to ensure that key network connections are completed first over the next 5-10 years. The general approach to prioritization was to identify approximately 2 kilometres per year of sidewalks and 2 kilometres per year of active mobility facilities to implement over the short- and medium-term, with the remaining projects listed as long-term.

Both the walking and active mobility projects will be funded through a range of City contributions and development contributions. Additionally, some of the major road network improvements outlined above, such as Cherry Avenue, Cedar Street, and Stave Lake Street, will include active transportation components as part of their scope. As a result, the funding the active transportation portions of these projects will be part of the major road network budget instead of the active transportation budget. However, in some cases (e.g. Grand Street and Wren Street), the road network upgrades are considered long-term but the active transportation upgrades are higher priority and should be completed in the next decade to improve safety and network connectivity. In these cases, active transportation facilities have been included on the short- and medium-term priority maps.

PEDESTRIAN NETWORK

For the walking network, a pedestrian prioritization analysis was conducted to determine the areas of the City in most need of sidewalk improvements. This analysis considers several factors, including overall network connectivity, road class, equity, and proximity to schools, transit routes, commercial areas, and other key destinations. **Table 13** shows the detailed prioritization criteria. The results of the analysis are shown in **Appendix G**. This map was examined to determine short- and medium-term sidewalk projects that are achievable under existing budgets over the next decade.

The short-term sidewalk priorities also include several sidewalk projects that were already identified in the City of Mission's 2021 Capital Plan. In addition to the sidewalk network, there are also multi-use pathways that are being proposed as part of the cycling network. These facilities can serve as comfortable walking facilities and would be used in place of a sidewalk along one side of street for the proposed corridors.

TABLE 13: PEDESTRIAN NETWORK PRIORITIZATION CRITERIA

Factor	Description	Score
Road Classification	Arterial	10
	Collector	7.5
	Local	1
Transit	On a bus route	15
	Not on a bus route, but within 200 metres of a bus stop or West Coast Express station	12
	Not on a bus route, but within 200-400 metres of a bus stop or West Coast Express station	9
	Not on a bus route, but within 400-600 metres of a bus stop or West Coast Express station	6
	Not on a bus route, but within 600-800 metres or West Coast Express station	1
Schools	Directly adjacent to any school	20
	Within 200 metres of any school	15
	Within 200 – 400 metres of any school	10
	Within 400 – 600 metres of any school	5
	Within 600 – 800 metres of any school	1
Parks, Seniors Centres, or Civic Facilities	Directly adjacent to any park, seniors centre, or civic facility	20
	Within 200 metres of any park, seniors centre, or civic facility	15
	Within 200 – 400 metres of any park, seniors centre, or civic facility	10
	Within 400 – 600 metres of any park, seniors centre, or civic facility	5
	Within 600 – 800 metres of any park, seniors centre, or civic facility	1
Commercial Areas	Within a Town Centre	10
	Outside a Town Centre, but within 200 metres of a commercial land use	7.5
	Outside a Town Centre, but within 200-400 metres of a commercial land use	5
	Outside a Town Centre, but within 400-600 metres of a commercial land use	2.5
	Outside a Town Centre, but within 600-800 metres of a commercial land use	1
Network Need	No Sidewalks or Trails on Either Side	10
	Sidewalk or Trail Already on One Side	2.5
	Sidewalks or Trails on Both Sides	N/A
Equity	Located in Area of Highest Equity Need	10
	Located in Area of Moderate-High Equity Need	7.5
	Located in Area of Moderate Equity Need	5
	Located in Area of Moderate-Low Equity Need	2.5
	Located in Area of Low Equity Need	1

The short- and medium-term priority walking projects are identified in **Map 18**. There are approximately 12 kilometres of short-term priority sidewalks identified and around 8 kilometres of medium-term priority

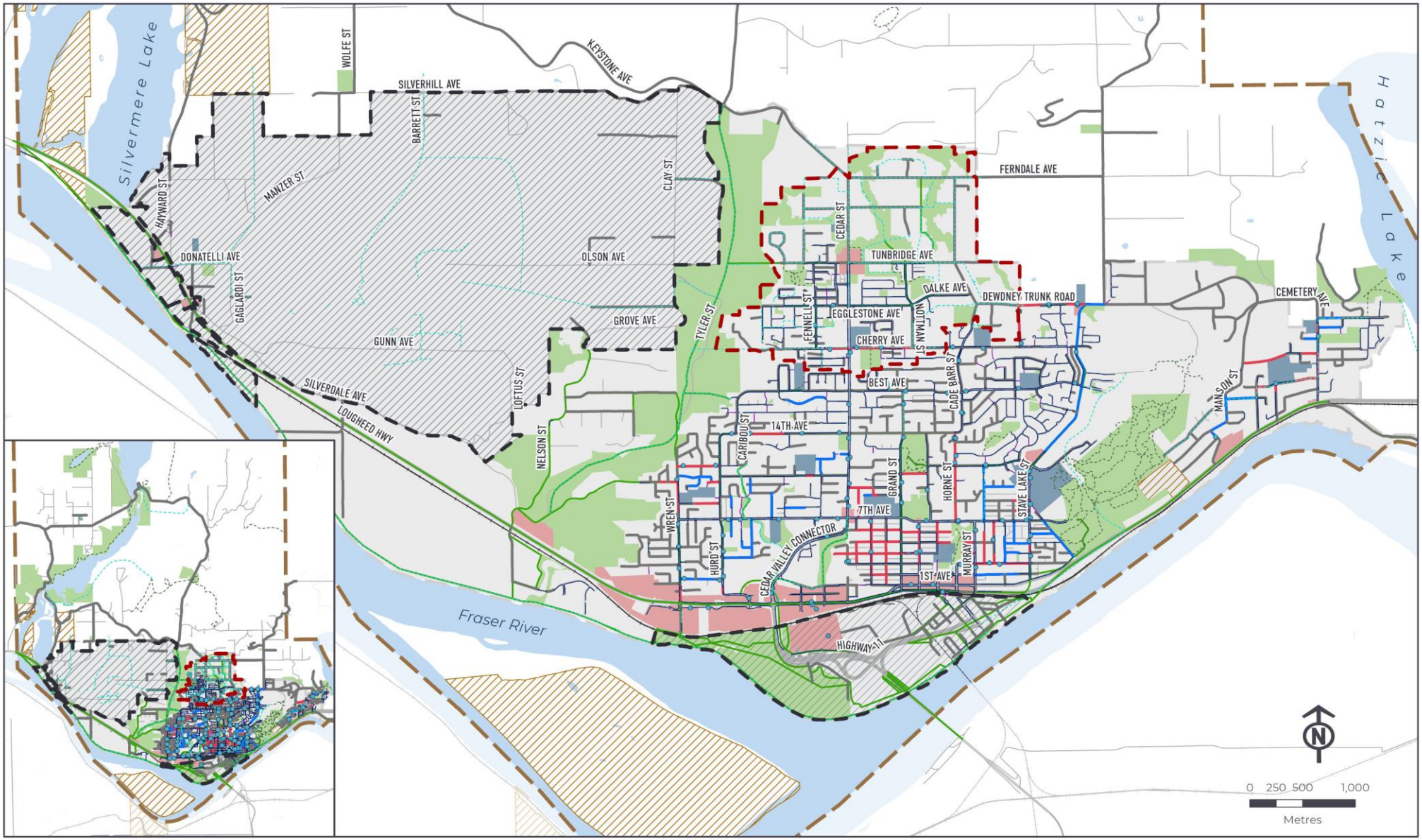
sidewalks identified. As a result, the City will need to build about 2 kilometres of sidewalk per year on average over the next decade.

The total cost of sidewalk improvements over the short- and medium-term is $19.6 million. Long-term sidewalk projects are not listed in detail as the focus is on near term network improvements. However, as shown in **Table 14**, the plan proposes approximately 40km kilometres of sidewalks over the 10–30-year horizon, for a total cost between $66-86 million. It should be noted that the long-term build out of the sidewalk network will fall outside the 30-year horizon of this plan. Additional long-term sidewalks will be required beyond the 30-year time frame to complete the plan.

Sidewalks were only considered DCC eligible on arterial and collector roads as these sidewalks would increase people moving capacity on these major roadways. A benefit factor of 50% was assumed for these sidewalks on arterial and collector roads. It should be noted that it is assumed that all the sidewalks could be implemented as frontage improvements by development.

The total lengths and costs for the short- and medium-term sidewalks are based on building a sidewalk on one side of the road, and they consider whether curb and gutter or urban drainage is required.

For the sake of calculating unit costs for sidewalk construction, assumptions were made regarding existing stormwater drainage based on the City of Mission web map. Street segments without sufficient existing drainage coverage but with at least one side fully covered by curb and gutter are assumed to be in proximity to other storm drainage networks, meaning only regular urban drainage would be needed. All street segments that have more than half their lengths covered by existing facilities are assumed to be fully covered instead since the overwhelming majority have existing curbs and gutters, meaning no new urban drainage would be required.



MAP 18: SIDEWALK NETWORK PRIORITIES

- Short-Term Priority
- Medium-Term Priority
- Long-Term Priority
- Existing Sidewalk
- Multi-Use Pathway
- Existing Trail
- Proposed Trail
- Neighbourhood Walkway
- Railway
- Parks and Open Space
- School
- Commercial
- Urban Growth Boundary
- Cedar Valley Land Use Plan
- Separate Neighbourhood / Area Planning Area
- Municipal Boundary
- First Nation Reserve Land

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TABLE 14: SUMMARY OF SIDEWALK NETWORK PRIORITIES

Priority	Total Length (km)	Total Cost	Total DCC Recoverable	Non-DCC Costs
Short-Term (0-5 years)	12.7	$12,545,816	$701,041	$11,844,744
Medium-Term (6-10 years)	8.1	$6,932,805	$127,517	$6,805,288
Long-Term (10-30 years)	40.0	$66-86M	-	-
Total	***60.3***	***$87-107M***	***$828,558***	***$18,650,032***

ACTIVE MOBILITY NETWORK

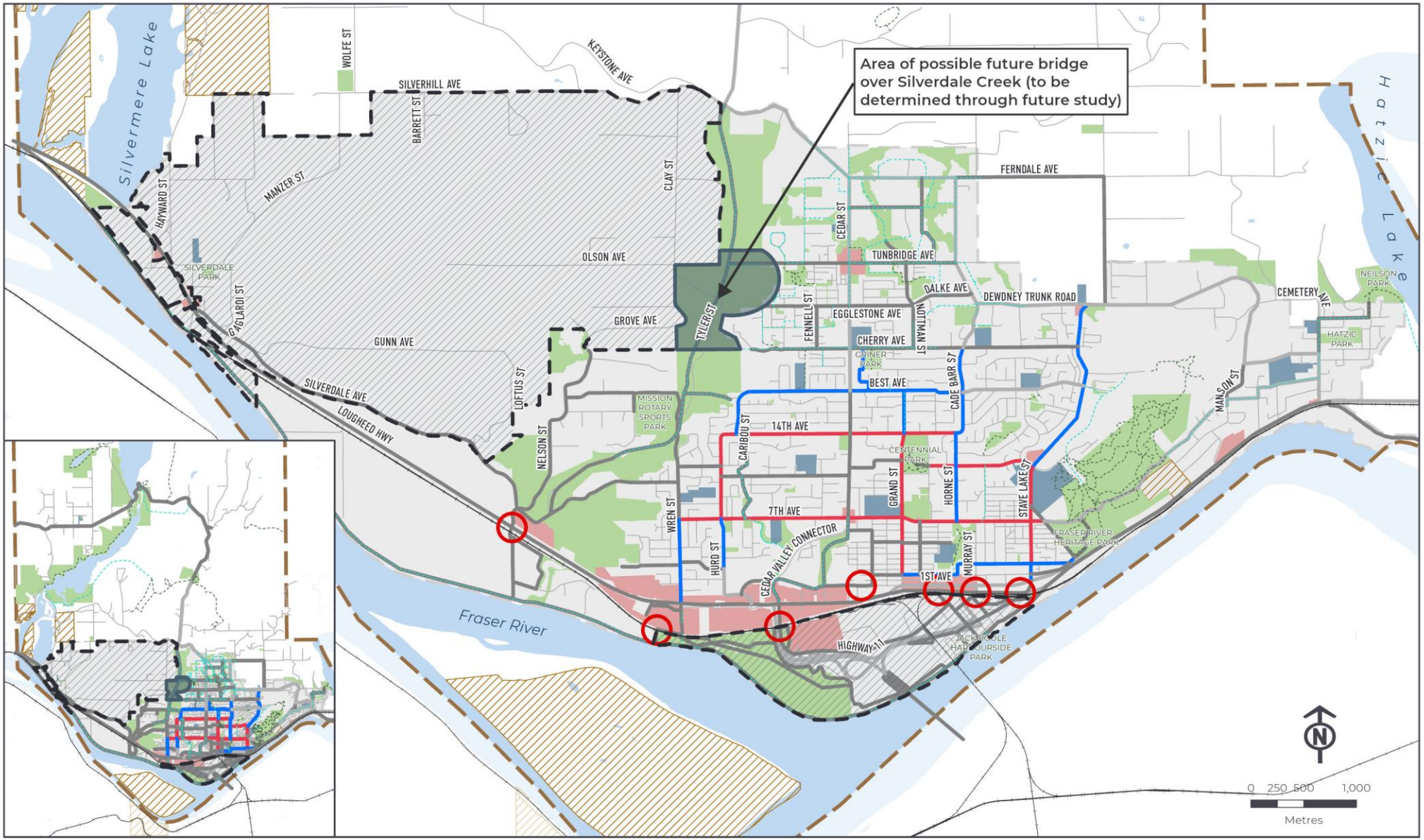
The active mobility network was also analyzed to determine feasible short- and medium-term projects, with the goal of creating a core network of safe and comfortable facilities over the next 5-10 years. The short- and medium-term priority active mobility projects are identified in **Map 19**. There are just over 10 kilometres of short-term priority active mobility facilities identified and just under 10 kilometres of medium-term priority active mobility facilities identified. As a result, the City will need to build about 2 kilometres of active mobility facilities per year on average over the next decade.

Table 15 summarizes the proposed funding allocations by time horizon. The total cost of active mobility network improvements over the short- and medium-term is $19.2 million. Long-term active mobility projects are not listed in detail as the focus is on near term network improvements. However, as shown in **Table 15**, the plan proposes nearly 86 kilometres of long-term active mobility facilities at a cost of $25-40 million.

All active mobility facilities were considered DCC eligible as these facilities would increase people moving capacity. A benefit factor of 50% was assumed for these bicycle facilities.

TABLE 15: SUMMARY OF ACTIVE MOBILITY NETWORK PRIORITIES

Priority	Total Length (km)	Total Cost	Total DCC Recoverable	Non-DCC Costs
Short-Term (0-5 years)	10.1	$10,779,297	$5,335,752	$5,443,545
Medium-Term (6-10 years)	9.3	$8,436,979	$4,154,345	$4,238,272
Long-Term (10-30 years)	85.7	$25-34M	-	-
Total	***105.1***	***$44-59M***	***$9,490,097-***	***$9,681,817***



MAP 19: ACTIVE MOBILITY PRIORITY PROJECTS

- Short-Term Priority
- Medium-Term Priority
- Long-Term Priority
- Existing Cycling Facility
- New / Improved Crossing Needed
- Proposed Trail
- Existing Trail
- Railway
- Parks and Open Space
- School
- Commercial
- Urban Growth Boundary
- Separate Neighbourhood / Area Planning Area
- First Nation Reserve Land
- Municipal Boundary

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6.4.3 SAFETY IMPROVEMENTS

The Traffic Safety Strategy identified four major categories for the City to implement safety measures in the next five years: speed management, pedestrian crossing, intersection, and city-wide improvements. At this time, the City has committed a funding level for three more years, however, a total of $1,250,000 of funding for a five-year short-term program is used assuming the City will continue to contribute at the same level ($250,000 per year) for the final two years, and extend this level of funding over the long-term. Details of the safety improvements are provided in **Appendix E**.

Speed management measures should be implemented at a number of road segments throughout Mission including major roads, collector roads, local roads, rural roads and near elementary schools. The program will be implemented through devices such as speed reader boards and traffic calming measures and potentially road narrowing and road diet.

Thirteen pedestrian crossing safety improvements have been identified in the Plan, including new crosswalks, upgrades to existing crosswalks, and intersection upgrades. In total, pedestrian crossing improvements are estimated to cost approximately $891,000 for pedestrian crossings. All but one (Stave Lake Street and Cherry Avenue) of these improvements would be funded through City contributions. Note that the locations under MOTI's jurisdiction are not included in the map and summary table and are provided in the Traffic Safety Strategy in the appendix.

Intersection safety improvements that reduce conflicts between road users are identified for several locations for the next five years including providing additional turn lanes, consolidating driveways and accesses, reducing corner radii and pedestrian crossing distances, and providing warning signs. Additionally, the City should allocate $20,000 per year in optimizing signal timing and phasing at all traffic signals on a revolving five-year cycle.

In addition to location-specific safety improvements, a network screening for Mission should be carried out to identify collision contribution factors for identifying future safety improvements.

All four categories will need to be carried out together to ensure that the road network in Mission is not only nominally safety (the design meets design standards) but also substantively safe, which means the actual crashes are within expected ranges.

6.4.4 TRANSIT IMPROVEMENTS

The Plan emphasizes the need to work closely with BC Transit to develop an updated transit network and improved service, in addition to working with TransLink to assess the potential for a new West Coast Express station. In terms of improvements that are within the City of Mission's sole jurisdiction, the plan calls for improving the transit user experience by providing enhanced bus stop amenities, such as new bus stops and shelters.

For full accessibility, both a shelter and bench should be provided at each bus stop. Only 16 of 109 (15%) of Mission's bus stops have both a shelter and a bench, leaving 93 stops that could be improved. Over the short- and medium term (2022-2032), $80,000 per year should be allocated to installing transit shelters and accessibility improvements. This funding will enhance two bus stops per year, implementing bus shelters at 20 bus stops over the next decade.

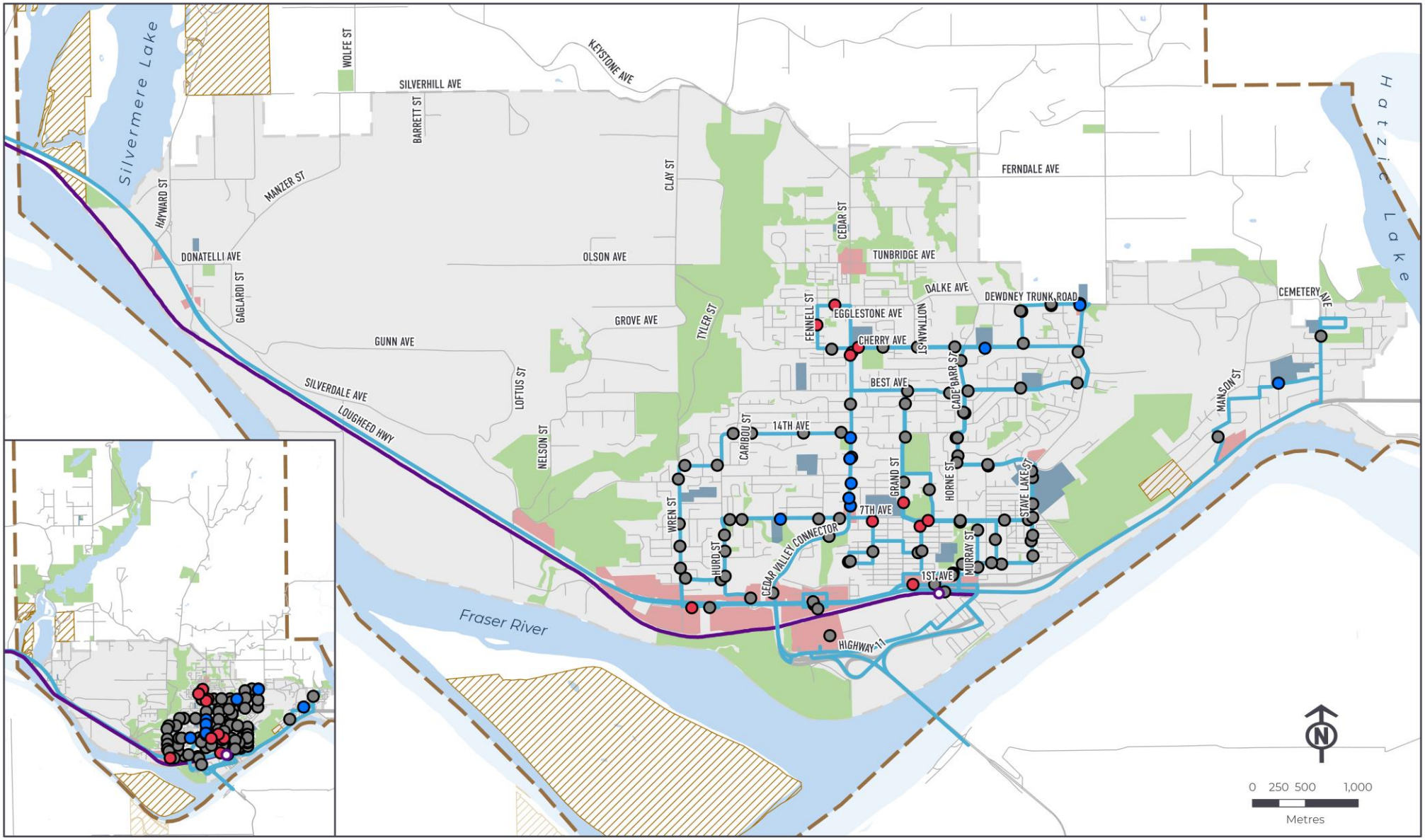
Priority bus shelter improvements are shown in **Map 20**. Bus stops were prioritized based on existing amenities (i.e. focusing on stops with no shelters) and transit stop activity. BC Transit data showing the top ten busiest stops for boarding and alighting in the Mission transit system was used as a reference, with any stops on that list not already containing shelters prioritized for upgrading. Stops were also chosen based on proximity to key destinations and well as the number of transit routes served by that stop, with those serving multiple routes prioritized over single route stops. Cedar Street was prioritized for several medium-term bus stop improvements because Cedar Street suffers from congestion and serves as a key north-south corridor. It has the potential to function as an effective transit connection if transit improvements are made, including stop improvements and future transit priority measures.

Over the long-term, there would be an additional 73 bus stop improvements needed. To complete all these improvements by 2050, the City should consider increasing the funding allocated to bus stop improvements in order to complete an average of 4 bus stops ($160,000) per year. The total long-term investment to provide shelters at all 93 remaining bus stops is $3.7 million. In addition, the City should plan for additional transit exchanges. $10 million has been assumed for budgeting purposes for new transit exchanges. **Table 16** summarizes the proposed funding allocations by time horizon.

TABLE 16: SUMMARY OF TRANSIT PRIORITIES

Priority	Number of Bus Stops	Total Cost
Short-Term (0-5 years)	10	$400,000
Medium-Term (6-10 years)	10	$400,000
Long-Term (10-20 years)	73	$12,920,000*
Total	***93***	***$13,720,000***

* Includes $10 million for new transit exchanges over the long-term, along with $2,920,000 for transit amenities.



MAP 20: TRANSIT AMENITY PRIORITY PROJECTS

- Short-Term Priority
- Medium-Term Priority
- Long-Term Priority
- Bus Route
- West Coast Express
- Parks and Open Space
- School
- Commercial
- Urban Growth Boundary
- First Nation Reserve Land
- Municipal Boundary

City of Mission On the Fraser

6.5 ASSET MANAGEMENT

Asset Management is a key pillar of Mission Mobility 2050. Two broad strategic directions for asset management were identified in the Asset Management Pillar in Section 4, including ensuring the transportation system remains in a state of good repair and facilitating this process by establishing an Asset Management Program that is used to inform an integrated and prioritized capital planning and budgeting process.

The City currently faces key challenges regarding asset management, including difficulty maintaining existing service levels due to insufficient budget and staffing levels. As a result, the City's knowledgeable staff are currently having to be reactive – rather than advancing proactive maintenance, rehabilitation and repair work informed by routine inspections that can have a direct impact in extending the life of the City's assets and service levels.

For example, there is no active program for crack sealing, while other core road maintenance programs such as shoulder maintenance and ditching are behind. A new approach is required to ensure the City's assets remain in a state of good repair and to lower the total life-cycle cost of sustaining the road network through prioritized and proactive works.

The importance of prioritizing works is highlighted since the City continues to grow, many new projects are being proposed as part of this plan, and construction costs have increased significantly. **Figure 15** shows the life-cycle impact of reactive versus proactive works. Overall, the lowest cost approach is to undertake rehabilitation of assets before more significant costly repairs and reconstruction are required.

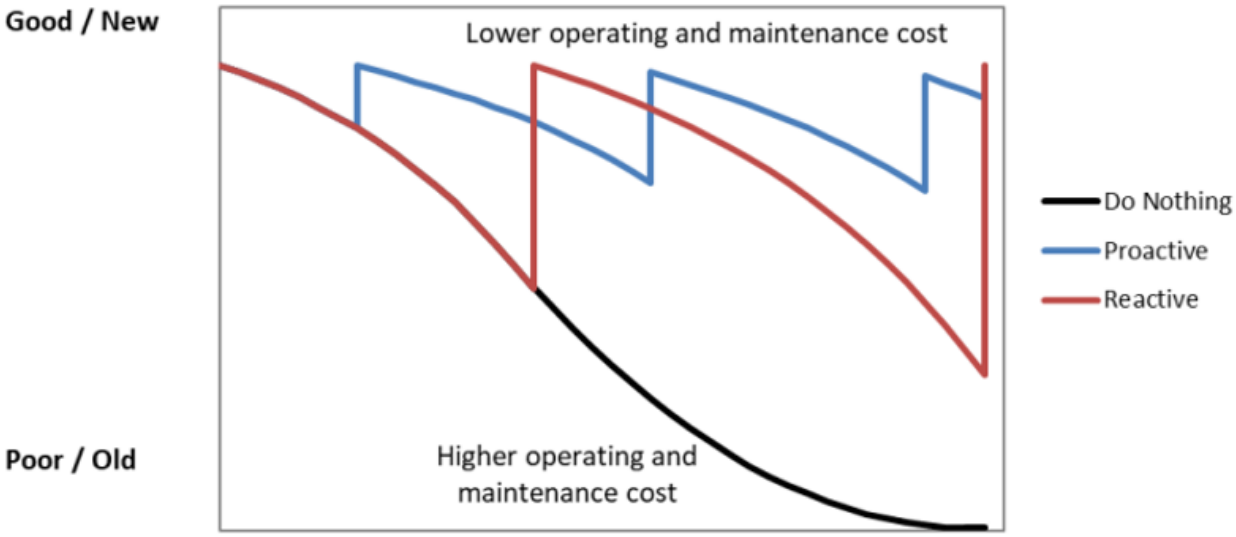


FIGURE 15: LIFE-CYCLE IMPACT OF PROACTIVE VS. REACTIVE WORKS

A comparison of the pavement condition assessment work from 2016 to 2021 shows a gradual deterioration rate of 5–8% for the City's roads. If the City does not invest in flattening the rate of deterioration, it will make future investments more costly and service levels harder to meet.

The 2021 Pavement Condition Assessment and Roadway Asset Geocoding report by Tetra Tech concluded that a minimum funding level of **$2.4 million** per year is required from 2023 onwards for 10 years to sustain the

City's transportation assets and start addressing the backlog of roads showing signs of deterioration. This investment level is just for Mission's transportation assets and does not incorporate any of the other infrastructure.

Since annual investments of $2.4 million may be unattainable, this highlights the importance of undertaking all measures possible to extend the useful life of the City's transportation assets and focus major rehabilitation and reconstruction efforts to integrated projects that address multiple priorities including improved service levels. In addition, decisions may need to be made for prioritizing major rehabilitation and reconstruction works to arterial and collector roads and focus life-extending maintenance activities such as crack sealing and shouldering for local roads.

Part of creating the City's Asset Management Program is to enable information to be collected, shared, and used to inform and prioritize maintenance, rehabilitation, and capital planning. Staff highlighted the desire to see more collaboration between Operations, Engineering, and Finance so that each department can provide key contribution to current needs, resources, cost tracking, budget impact, prioritize spending, and funding strategies. Informing the City's Asset Management Program is best when it is a team effort with identified roles and responsibilities.

In discussions with City staff, it was identified that there is not currently an internal system that enables the effective tracking of asset condition, planned work and proposed capital works. There would also be a benefit of increasing deliberate collaboration between Engineering, Operations, and Finance as each department holds valuable information and insight for effective planning. Using systems that enable collaboration and project planning helps to reduce the burden of each department summarizing content in disparate systems to support specific meetings. Current examples of collaborative systems include ESRI's new capital project solutions templates and Decision Optimization Technology as well as others worth exploring.

Although the asset management considerations within the scope of the plan is limited, City staff consulted as part of the planning process were consistent in highlighting the need for additional staff resources and budget to sustain the existing transportation assets. Staff are committed to sustaining Mission's assets and feel that proactive and life-extending maintenance works may be best done internally to ensure the work is done well and that the best value is realized.

6.6 COST SUMMARY

Table 17 summarizes the short-, medium-, and long-term costs for all aspects of the plan described above. The level of investment required to implement all improvements recommended in the plan is estimated to be in the range of $335 to 425 million. It should be noted that these cost estimates do not include items such as property costs, environmental mitigation costs, and utility relocations.

In the short-term, $51 million will be required to fund all proposed projects. This will require $10,200,000/year over the next five years. In the medium-term, up to $70 million will be required to fund all proposed projects, which will require $14,000,000/year from years 5-10 of this plan. Finally, over the long-term, $225 - 300 million will be required meaning approximately $11,250,000 to 15,000,000/year over the final 10-30 years of the plan. This will require ramping up investment in transportation to ensure that the road, pedestrian, bicycle, and transit networks are fully built out as described in the plan. The following section outlines funding considerations to help make this investment a reality.

TABLE 17: OVERALL SUMMARY OF PROJECT COSTS

Improvement Type	Level of Investment			Total
	Short-Term (0-5 years)	Medium-Term (6-10 years)	Long-Term (10-30 years)	
Road Network				
Corridors	$13 million	$23 – 28 million	$65 – 105 million	$101 – 146 million
Intersections	-	$5 – 12 million	$4 – 7 million	$9 – 19 million
Rehabilitation	$12 million	$12 million	$48 million	$72 million
Safety Improvements	$1.25 million	$1.25 million	$5 million	$7.5 million
Pedestrian Network				
Sidewalks	$13 million	$7 million	$66 – 86 million	$86-106 million
Crossings	$0.25 million	$0.25 million	$0.5 million	$1 million
Bicycle Network				
Bicycle Facilities and Multi-Use Pathways	$11 million	$8 million	$25 – 34 million	$44 – 59 million
Transit Network Management				
Bus Stop Improvements	$0.4 million	$0.4 million	$2.9 million	$3.7 million
Transit Exchanges	-	-	$10 million	$10 million
Total	**$51 million**	**$57 – 70 million**	**$225 – 300 million**	**$335 - 425 million**

Of the total long-term of the plan, approximately $120 – 158 million is anticipated to be DCC recoverable, depending on the build-out of Cedar Valley, as summarized in **Table 18**.

TABLE 18: DCC RECOVERABLE COSTS

Improvement Type	DCC Recoverable
Road Network	
Corridors	$100 – 128 million
Intersections	$9 – 19 million
Rehabilitation	N/A
Safety Improvements	N/A
Pedestrian Network	
Sidewalks	$1 million
Crossings	N/A
Bicycle Network	
Bicycle Facilities and Multi-Use Pathways	$10 million
Transit Network Management	
Bus Stop Improvements	N/A
Transit Exchanges	N/A
Total	**$120 – 158 million**

6.7 FUNDING CONSIDERATIONS

While the plan is estimated to cost approximately $335-425 million over the next 30 years and beyond, these costs can be shared by pursuing external funding from other levels of governments, partnerships with other organizations and the development industry, and integration of improvements with other plans and projects. This can help to reduce the City's share of project costs. This section describes several strategies that the City may consider to help leverage its investments and to maximize its ability to implement transportation improvements.

The City should pursue all available sources of funding for transportation facilities and programs, including the programs identified below. As funding opportunities change regularly, the information in this section is subject to change. The City should regularly check with all levels of government to keep up to date on current funding opportunities.

However, it is recognized that the external funding sources do not provide a consistent and stable funding stream, and that in order to ensure completion of projects identified in the plan, consistent funding sources should be identified to help ensure staff can logically plan for improvements and coordinate these improvements with other capital works to provide economies of scale for construction activities providing best value for capital expenditures.

- **Capital Planning:** The City should incorporate the recommendations from the plan into its short-, medium-, and long-term budgeting plans to ensure that the projects are accounted for in the City's capital planning process. To accommodate this, the City may seek changes to its capital budget to fund the implementation of this Plan over the medium- and long-term. The City should also seek to integrate transportation improvements with other capital projects, such as utility projects.
- **Development Cost Charges:** The City has a DCC bylaw that should be updated to include projects identified in the plan. It should be emphasized that DCC eligible projects should not only include street network projects but can also include active transportation and transit projects that benefit new growth in the community.
- **Developers:** An important component of the implementation of the plan will be the City's ability to leverage transportation investments during planning of new development projects. Some ways in which transportation investments can be leveraged through developers include:
    - Voluntary public realm improvements
    - Community amenity contributions
    - Density bonusing contributions
    - Funding in lieu of parking
    - Providing high quality bicycle parking facilities
- **Federal Funding:** There are several programs that provide funding for environmental and local transportation infrastructure projects in municipalities across Canada. Typically, the federal government contributes one third of the cost of municipal infrastructure projects. Provincial and municipal governments contribute the remaining funds, and in some instances, there may be private sector investment as well. The Federal Government recently announced the National Active

Transportation Fund (ATF), which will provide $400 million over five years to help build new and expanded active transportation facilities across the country.

- **Provincial Programs and Initiatives:** The Provincial Government administers the Active Transportation Infrastructure Grant program, which promotes new, safe, and high-quality active transportation infrastructure through cost-sharing with local governments. The grant program provides funding for infrastructure which forms part of an active transportation network plan adopted by a BC local government. To ensure maximum success at obtaining grant funding, the City should have grant-ready concepts pre-developed for application.
- **Green Municipal Funds:** The Federation of Canadian Municipalities manages the Green Municipal Fund, with a total allocation of $550 million. This fund is intended to support local government efforts to reduce pollution, reduce greenhouse gas emissions, and improve quality of life. The expectation is that knowledge and experience gained in best practices and innovative environmental projects will be applied to national infrastructure projects.
- **Carbon Tax Rebate:** Each municipality that has signed the Climate Action Charter receives an annual rebased based on completion of the CARIP form. The City could choose to direct this funding towards sustainable transportation projects, such as funding bicycle, pedestrian, and transit infrastructure.
- **ICBC:** ICBC provides funding for road safety improvements, including pedestrian and bicycle infrastructure, particularly where these have the potential to reduce crashes, improve safety, and reduce claims costs to ICBC. Funding is available through ICBC's Road Improvement Program, and other ICBC programs include the Speed Watch Program (through the Community Policing Centres), Speed and Intersection Safety Program, Counter Attack, Operation Red Nose, and Road Sense Speaker Program for Schools
- **Local Area Service Program:** Sidewalks can be implemented through Local Area Service Program, which is a cost sharing process for implementing desired neighbourhood infrastructure works such as sidewalks, curb and gutter, lane paving, and street lighting. The property owners who directly benefit from the project pay a portion of the costs and the City pays the remaining construction costs.
- **Private Sector:** Many corporations wish to be good corporate neighbours— to be active in the community and to promote environmentally-beneficial causes. Bicycle and pedestrian routes and facilities in particular are well-suited to corporate sponsorship and have attracted significant sponsorship both at the local level and throughout North America. Examples in BC include Construction Aggregates in Sechelt, which constructed an overpass over a gravel conveyor to provide a link for pedestrians and cyclists, and 7-Eleven and Molson Breweries, which have sponsored multi-use pathways in Metro Vancouver.

APPENDIX A

TRAFFIC SAFETY STRATEGY COLLISION ANALYSIS

As the first steps in the development of the Traffic Safety Strategy component of the City of Mission's Transportation Plan, TranSafe carried out an analysis of recent collision data (Task 3.1 of workplan) and site visits to some of the more collision-prone locations (Task 3.4 of workplan). The preliminary findings are summarized in this document, and will be used to inform subsequent tasks of the Traffic Safety Strategy, including the development of recommendations and an implementation strategy.

1.0 COLLISION DATA

1.1 Data Sources

Collision data was provided by the City of Mission for the past 10 years. Two databases were reviewed and used in the analysis:

- TAS Data:
    - generally more severe collisions attended by police
    - more detailed roadway and location description
    - includes fields for lighting, road surface, weather, TCDs, contributing directions of travel, injury severity (minor/major/ fatal), and driver-related factors
- ICBC Claims Data
    - only includes information obtained from those with ICBC coverage
    - are mostly self-reported, which reduces their reliability
    - includes incident descriptions (narratives)

The following actions were taken to provide a thorough, high-quality analysis effort:

- Collision frequencies and high-level trends were analyzed using both the ICBC and TAS data.
- The TAS data was relied upon for the understanding of casual trends, which is more accurate.
- "Recent collisions" was defined as collisions occurring within the past 5 years (2015 to 2019). This period approximately reflects the analysis period following the previous Transportation Plan (June 2016).
- To take an approach based on Vision Zero and Safe System principles, the analysis was focused on casualties (injuries and fatalities).

1.2 Data Cleansing

Prior to the analysis, the data were cleansed as follows:

- Records of collisions in parking lot collisions and alleys were removed as most of these are on private property and in low speed environments.
- Collisions at similar locations but coded using different road names were consolidated.

2.0 CITY-WIDE COLLISION TRENDS

Trends in the City's collision databases were analyzed with the objective of understanding patterns that could both inform the selection of countermeasures that could be effective throughout the road network, as well as to provide a reference for the identification of trends for the modal or location-based analysis presented later in this report.

2.1 Overall Collision Frequency and Severity

The collision analysis is focused on casualty collisions (injury and fatality collisions). There was a total of 687 casualty collisions in the TAS database, with the annual breakdown provided in FIGURES 2.1 and 2.2, and

The annual distributions generally indicate that collisions have gradually declined, with a significant drop in 2019. This may be related to changes in reporting as well as the impacts of the City's road safety efforts.

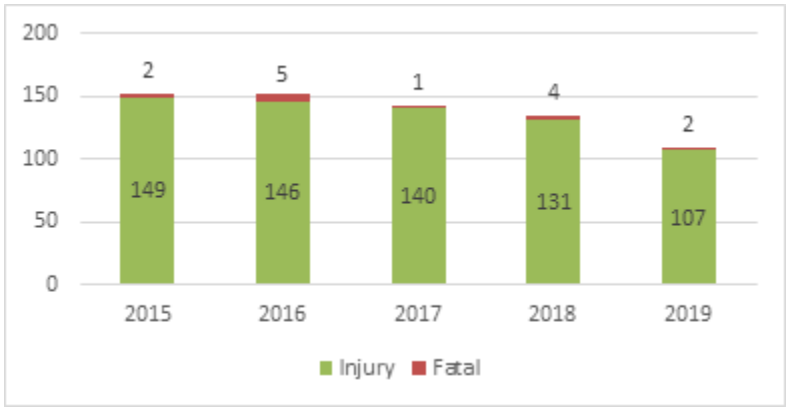


FIGURE 2.1 ANNUAL TREND IN CASUALTY COLLISIONS (TAS, 2015-2019)

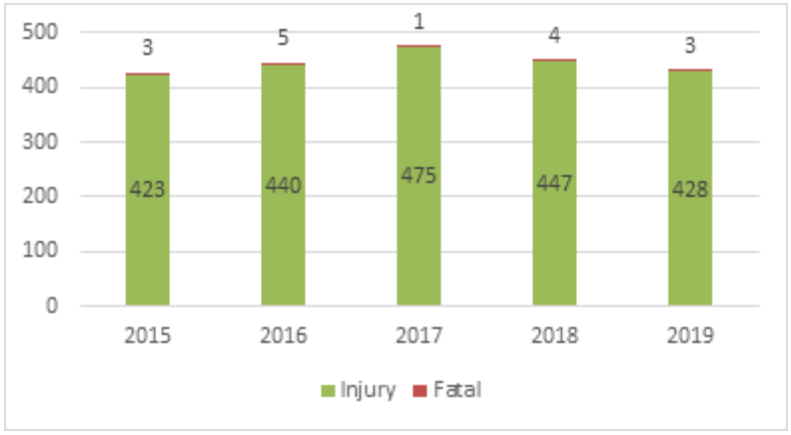


FIGURE 2.2 ANNUAL TREND IN CASUALTY COLLISIONS (ICBC, 2015-2019)

While the TAS data suggested a steady decline since 2016, the ICBC data showed an increase in 2017, prior to a more gradual decline in 2018 and 2019, as compared to the TAS data. This trend is likely related to reporting practices, e.g. a drop in police-attendance to crashes and/or delayed injury claims. Regardless, the overall trend shows a decline in the total collision frequency.

The severity breakdown of casualty collisions is shown in FIGURE 2.3. Between 1 and 2 percent of the casualty collisions resulted in fatality. This is comparable to other jurisdictions.

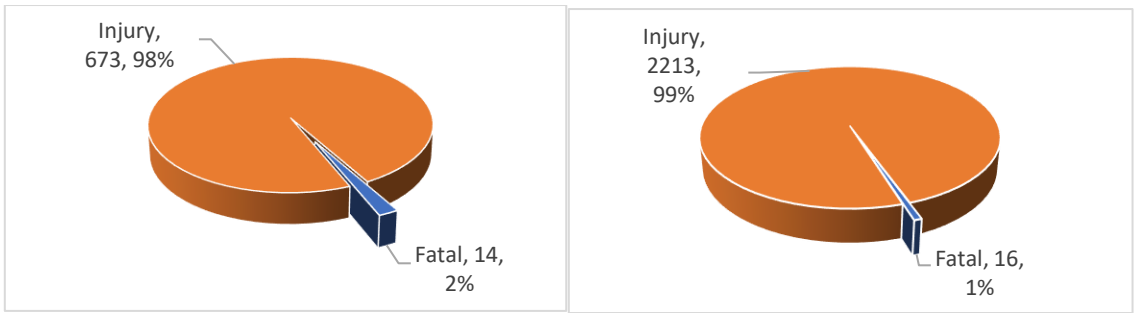


FIGURE 2.3 COLLISION SEVERITY (2015-2019)

2.2 Casualty Collisions by Mode

The breakdown of casualty collisions by mode is shown in FIGURE 2.4 and 2.5, and was based on the pedestrian, bicycle and motorcycle flag categories. The distributed indicated that a total of 15% of the casualty collisions involved the most "vulnerable" modes. All other collisions were assumed to involve vehicles only (including trucks and buses) or other miscellaneous devices (e.g. scooters, farm vehicles). The distribution based on the ICBC data is also included, but should not be relied on since some pedestrians and cyclists are less likely to make insurance claims than vehicles and motorcyclists.

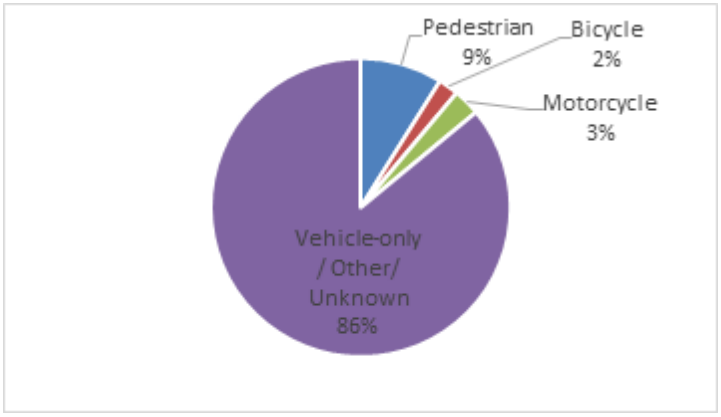


FIGURE 2.4 CASUALTY COLLISIONS BY MODE TYPE (TAS, 2015-2019)

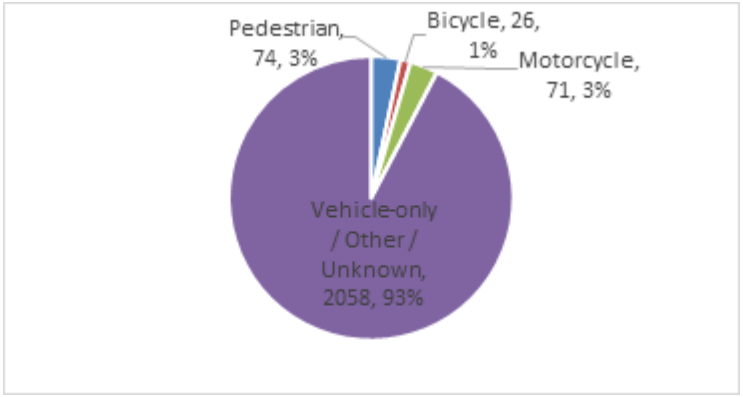


FIGURE 2.5 CASUALTY COLLISIONS BY MODE TYPE (ICBC, 2015-2019)

The remainder of the collision analysis in this section is based on more causal in nature; therefore, the focus is on the TAS data which provides more reliable itemized information for these characteristics (short of reviewing the merged incident descriptions, which is outside of the scope of this review).

2.3 Casualty Collision Types

Collision types were reviewed to provide an indication of the types of manoeuvres that have been resulting in collisions. The distribution in FIGURE 2.6 indicates that the most common collision type is rear end, followed by off road right, right angle and left-turn collisions, which typically result in injury. The number of head-on collisions is also relatively high, and resulted in the most fatalities.

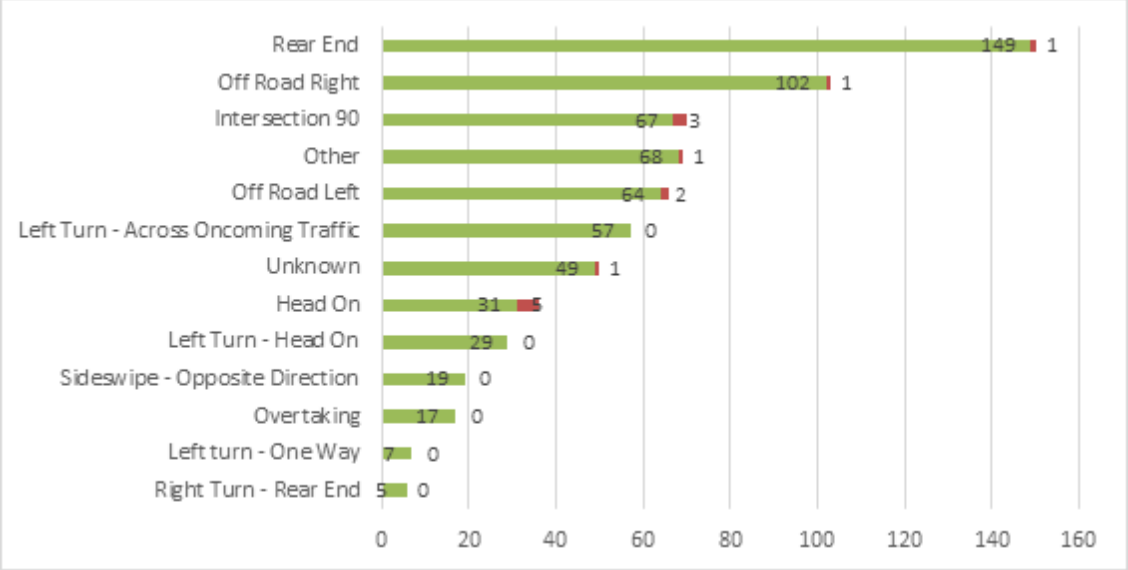


FIGURE 2.6 CASUALTY COLLISION TYPES (TAS, 2015-2019)

2.4 Environmental Distributions of Casualty Collisions

The environmental conditions (weather, road surface and lighting condition) during casualty collisions were reviewed to indicate their possible role in the collision occurrence. The distributions are shown in FIGURE 2.7.

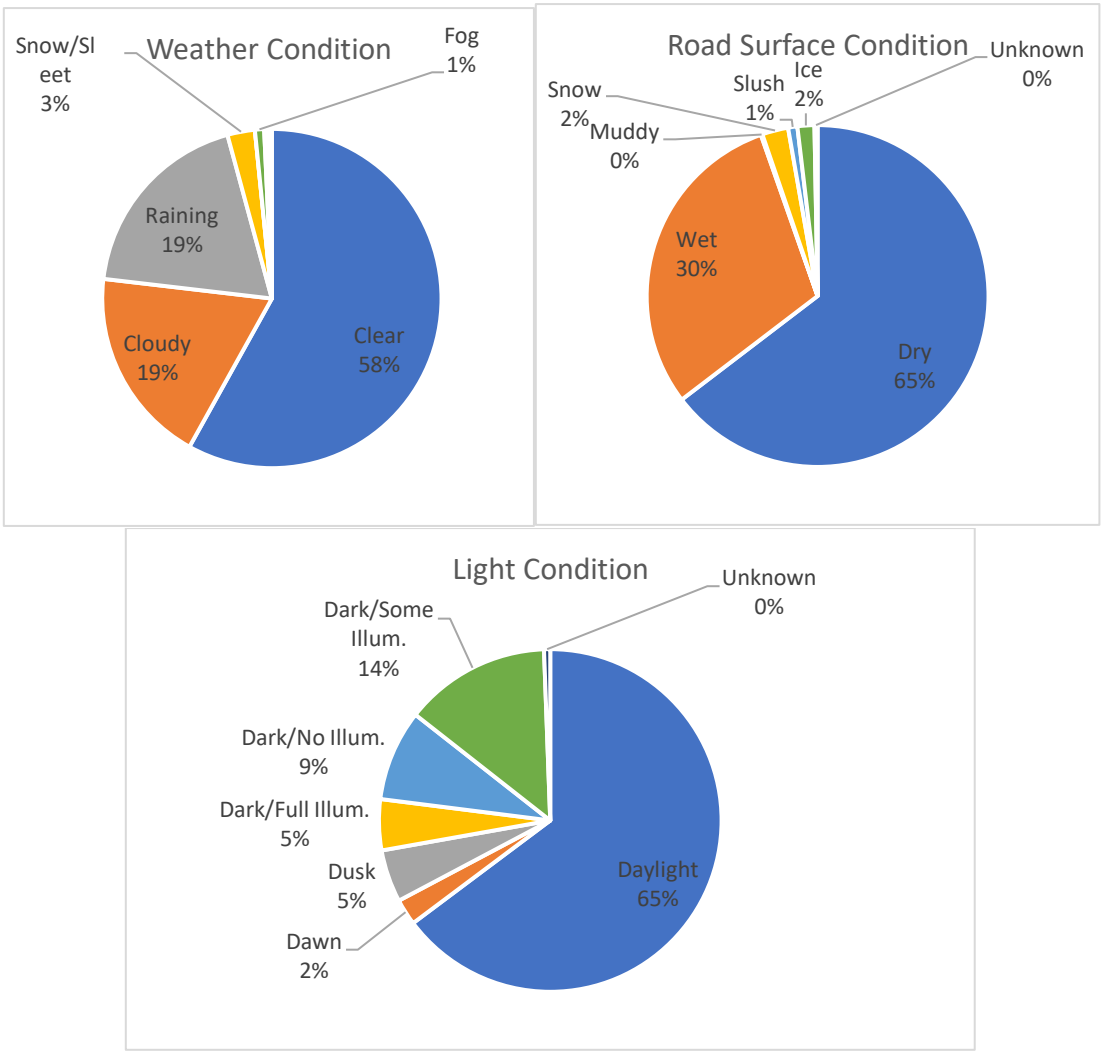


FIGURE 2.7 ENVIRONMENTAL DISTRIBUTIONS OF CASUALTY COLLISIONS (TAS, 2015-2019)

The results indicated that:

- up to 23% of casualty collisions occurred in adverse weather
- up to 35% of casualty collisions occurred during slippery road surface conditions
- up to 35% of casualty collisions occurred during dark, semi-dark or illuminated conditions

While these trends have no particular significance unless compared to other municipalities, they can provide a reference to compared trends at specific locations.

2.5 Temporal Distributions of Casualty Collisions

The casualty collisions were analyzed for temporal patterns (i.e. month, day of the week and period of the day), to get an understanding of the relationship of collision occurrence to traffic volume patterns. The collision distributions are shown in FIGURE 2.8. Traffic volumes patterns are presented separately.

FIGURE 2.8 TEMPORAL DISTRIBUTIONS OF CASUALTY COLLISIONS (TAS, 2015-2019)

Overall, the temporal distributions indicate that:

- Collisions are relatively constant throughout the year, with peaks in December, July and August. Most of the fatalities occurred in the Fall and Winter months.
- Collisions are constant throughout the week, and slightly higher on Fridays.
- Collisions increase during the day, peaking from 3-6 pm and remaining relatively high until 9 pm.

2.6 Location Type

The location type indicates whether a collision occurs at an intersection or midblock location. The breakdown of intersection and midblock collisions is shown in FIGURE 2.9.

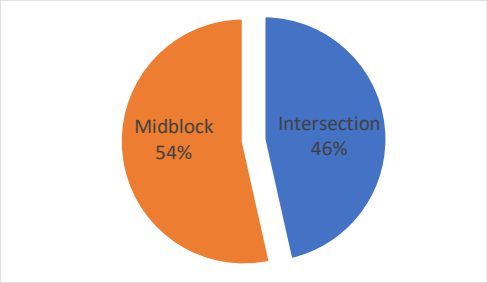


FIGURE 2.9 CASUALTY COLLISION LOCATION TYPE (2015-2019)

The results indicated that a slightly higher proportion of collisions occur at midblock locations than at intersections. Of the intersection collisions, it is of interest to determine the intersection control type. The distribution was determined based on the "Traffic Control" field. While this typically indicates that traffic control that was shown to the user involves, it will differ by direction; therefore to obtain an understanding of the overall traffic control, any reference that was made to signalized operation was assumed to occur at a signalized intersection. The traffic control was indicated for 233 oof the 318 intersection collisions. Of these, 58% of them were reported at signalized intersections.

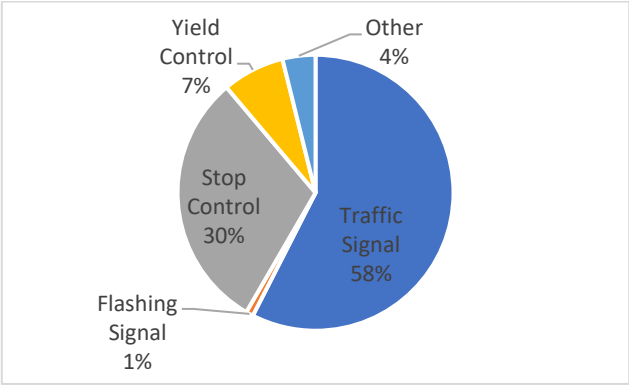


FIGURE 2.10 CASUALTY COLLISION INTERSECTION TRAFFIC CONTROL (TAS, 2015-2019)

2.7 CONTRIBUTING FACTORS TO CASUALTY COLLISIONS

Contributing factors to casualty collisions, as reported by police, were reviewed. In the TAS "COMBINED" database, police assign up to three contributing factors for each party. Although they are assigned for only a small proportion of collisions and are somewhat subjective, they can still indicate causal factors. "Contributing factor #1" typically indicates the most significant factor, while contributing factors 2 and 3 indicate equal or less significant factors. The top cited factors, along with the number of times each was cited (in some cases more than once in a single collision due to multiple parties involved), are summarized in TABLES 2.1 to 2.3.

TABLE 2.1 CONTRIBUTING FACTOR #1 IN CASUALTY COLLISIONS

CONTRIBUTING FACTOR 1	FATAL	INJURY	TOTAL
Driver Inattentive	5	228	233
Alcohol Suspected	1	42	43
Road Condition	0	43	43
Drive Too Fast for Conditions	1	37	38
Ability Impaired by Alcohol	0	35	35
Fail to Yield ROW	0	29	29

TABLE 2.2 CONTRIBUTING FACTOR #2 IN CASUALTY COLLISIONS

CONTRIBUTING FACTOR 2	FATAL	INJURY	TOTAL
Fail to Yield ROW	1	56	57
Drive Too Fast for Conditions	1	43	44
Exceed Speed Limit	0	43	43
Driver Inattentive	2	34	36
Road Condition	0	35	35

TABLE 2.3 CONTRIBUTING FACTOR #3 IN CASUALTY COLLISIONS

CONTRIBUTING FACTOR 3	FATAL	INJURY	TOTAL
Driver Error/Confusion	0	39	39
Road Condition	2	37	39
Weather	2	25	27
Driver Inattentive	0	16	16
Glare/Sunlight	3	12	15

"Driver Inattentive" was found to be the most significant contributing factor, followed by failure to yield, alcohol impairment, driving too fast for conditions and exceeding the speed limit.

3.0 CASUALTY COLLISION ANALYSIS IN SUPPORT OF THE CITY'S EMPHASIS AREAS

In the City's Traffic Safety Strategy, five emphasis areas were established. To understand the issues and possible opportunities to address each area, the following analyses were conducted:

1. Speeding: analysis of speed-related collisions and speed limits (Section 3.1)
2. Intersection Safety: network screening of collision-prone locations (Section 4.0)
3. Roadway Geometry: analysis by land use, road type and road character (Section 3.2);
4. Pedestrian Safety: analysis of pedestrian collisions (Section 3.3); and
5. Bicycle and "other vehicle" safety: analysis of bicycle (Section 3.4) and motorcycle (Section 3.5) collisions.

3.1 Speed-Related Collisions

In support of the "speeding" category identified by the City, an analysis was conducted of the possible role of speeding in collisions. In Section 2.7, speeding was identified as being among the top three contributing factors to casualty collision in the City. In addition, an analysis was conducted of the land use, road class and speed limit in midblock collisions (collisions between intersections), as these three factors are known to significantly influence vehicle travel speed. While these analyses have not been normalized by distance or traffic volume, they can provide an indication of the influence of these factors and longer-term planning opportunities.

3.1.1 Land Use

The distribution of midblock casualty collisions by land use is shown in FIGURE 3.1.

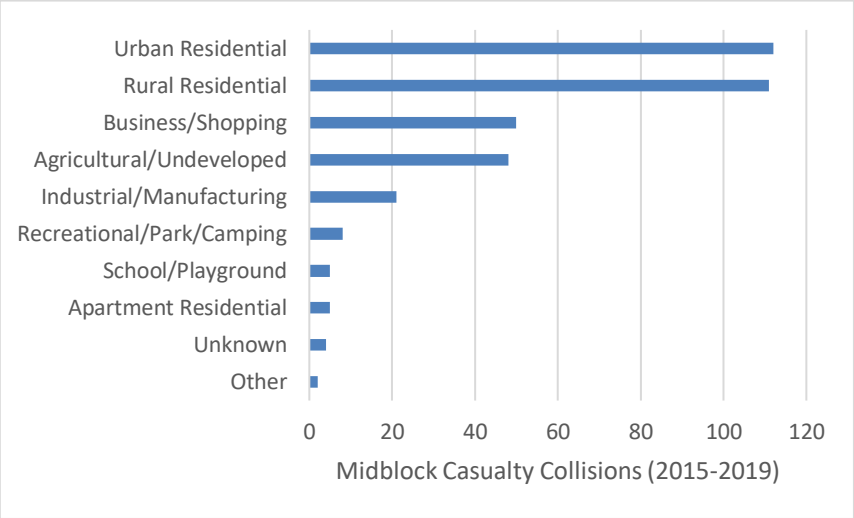


FIGURE 3.1 LAND USE IN MIDBLOCK CASUALTY COLLISIONS (TAS, 2015-2019)

The distribution indicates that most midblock casualty collisions occurred along residential streets (urban and rural). This may suggest the need for additional measures (such as traffic calming or reduced speed limits) along urban residential streets, and other speed management measures along rural residential streets.

3.1.2 Road Class

Information on how casualty collisions related to road classification is useful because certain measures are appropriate for roads of different classes and cross sections. While the collision data does not provide functional classification (e.g. arterial, collector, local), it provides an indication of the width and median separation.

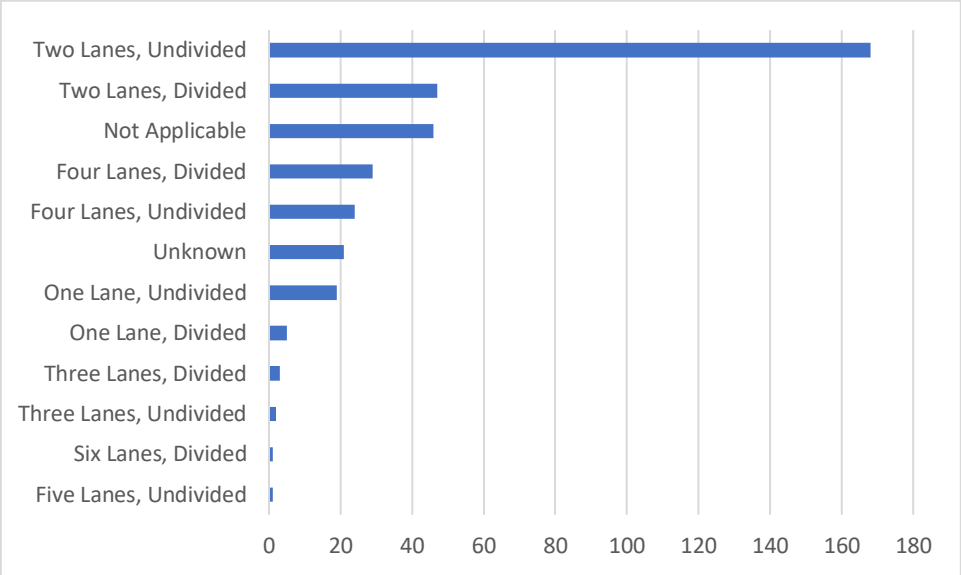


FIGURE 3.2 ROAD CLASS (WIDTH) IN CASUALTY COLLISIONS (TAS, 2015-2019)

The distribution indicates that most casualty collisions occur on two-lane roads, followed by four-lane roads; and that undivided roads are generally associated with a higher collision frequency. However, the role of road class can be more accurately reviewed based on exposure data (distance and traffic volume along each road class type).

3.1.3 Speed Limit

The casualty collision frequency by speed limit was reviewed. The distribution shown in FIGURE 3.3 reveals that most collisions occur along roads with a 50 km/h speed limit. Again, since most roads have a speed limit of 50 km/h, this may be expected, and a more scientific analysis would consider distance and traffic volume characteristics.

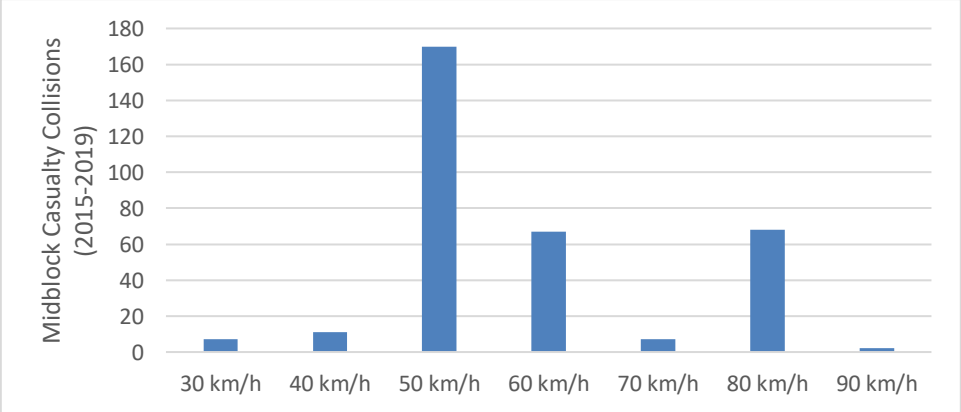


FIGURE 3.3 MIDBLOCK CASUALTY COLLISIONS BY SPEED LIMIT (TAS, 2015-2019)

3.2 Collisions by Roadway Geometry Characteristics

Roadway geometric characteristics include horizontal and vertical alignment, among other factors. The role of roadway geometry in casualty collisions was reviewed based on the "road character" field in the database. The distribution is shown in FIGURE 3.4.

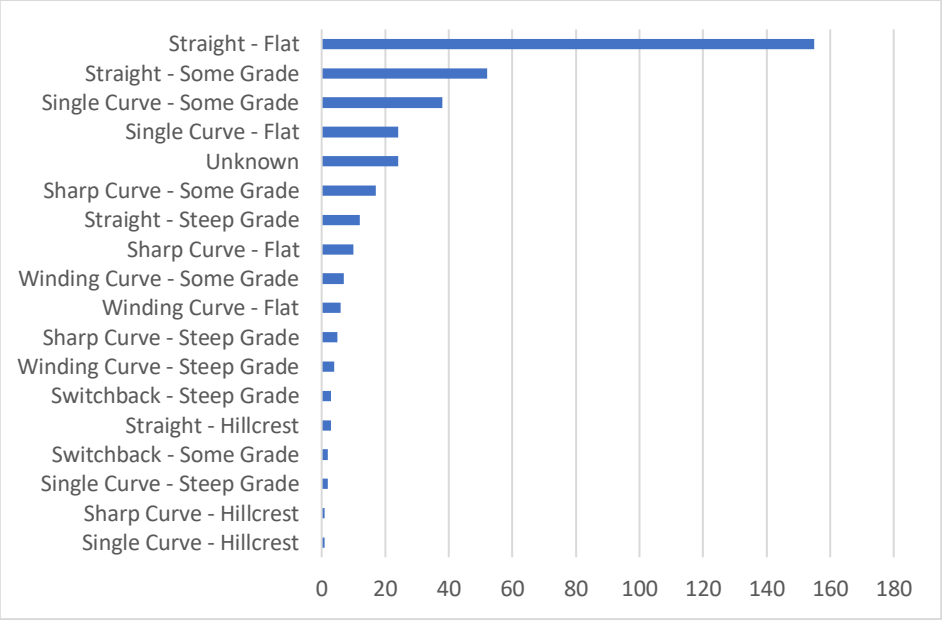


FIGURE 3.4 MIDBLOCK CASUALTY COLLISIONS BY ROAD CHARACTER (TAS, 2015-2019)

The distribution indicates that although most collisions occurred where the roadway is straight and flat, a significant proportion have a grade, and nearly 40 collisions occurred at locations where the grade coincided with a horizontal curve. There is a large toolbox of treatments for effective warning, delineation and vehicle control along curves, which can be considered along these roads.

3.3 Pedestrian Collisions

A total of 61 pedestrian casualty collisions were reported between 2015 and 2019 based on the TAS data, including two that resulted in fatality. Based on the ICBC data, there were 74 pedestrian casualty collisions, including the two fatal collisions. The annual trend is shown in FIGURES 3.5 and 3.6. The distribution shows a gradually increasing trend between 2015 and 2018 and a drop in 2019.

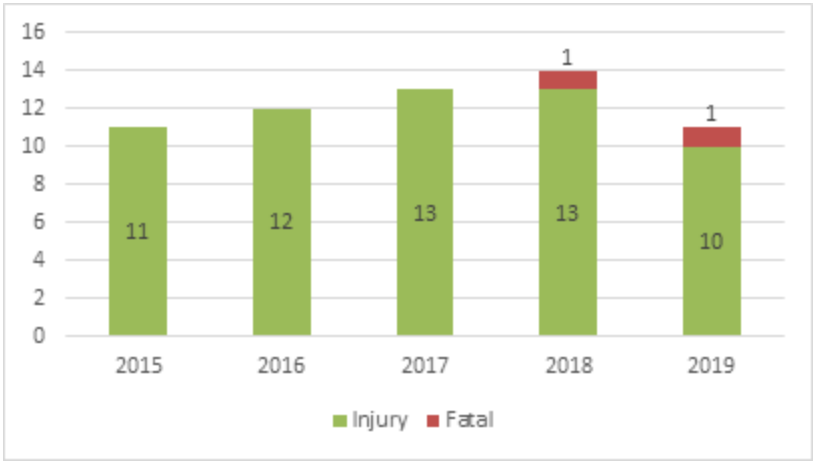


FIGURE 3.5 ANNUAL DISTRIBUTION OF PEDESTRIAN CASUALTY COLLISIONS (TAS)

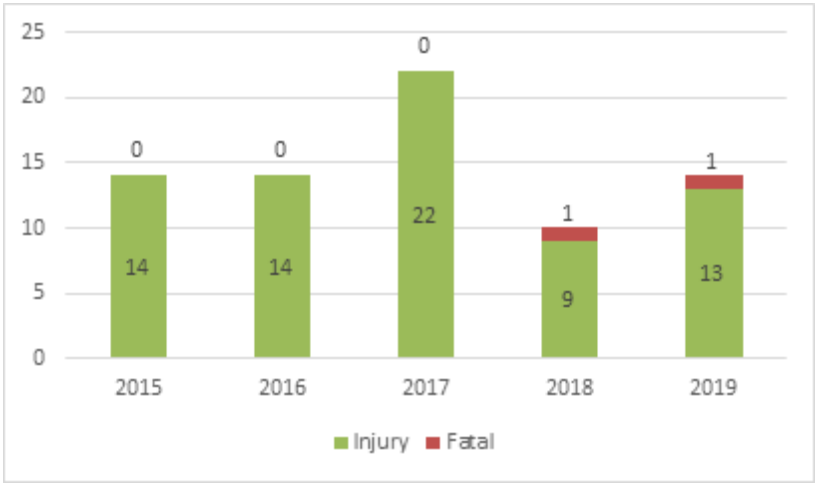


FIGURE 3.6 ANNUAL DISTRIBUTION OF PEDESTRIAN CASUALTY COLLISIONS (ICBC)

Environmental conditions are shown in FIGURES 3.7 and FIGURE 3.8.

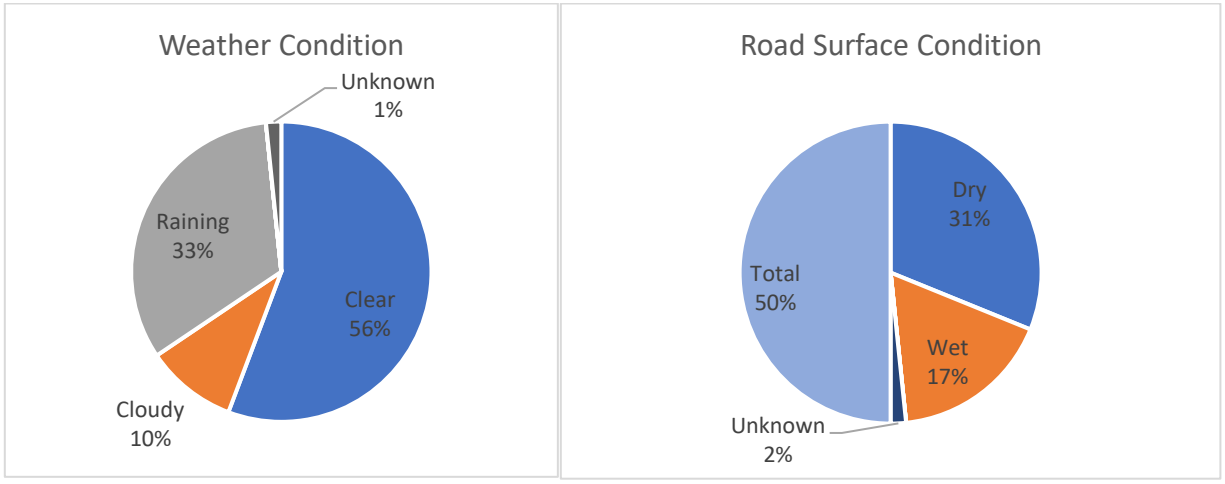


FIGURE 3.7 PEDESTRIAN COLLISIONS BY WEATHER AND SURFACE CONDITION (TAS, 2015-2019)

About 1/3 of pedestrian casualty collisions occur in inclement weather and up to 1/5 occur in slippery road surface conditions. These proportions are lower than the overall average for casualty collisions, and may suggest that pedestrian volumes are lower during these adverse conditions. This can be verified by comparing these collision patterns to any seasonal pedestrian volumes that may be available.

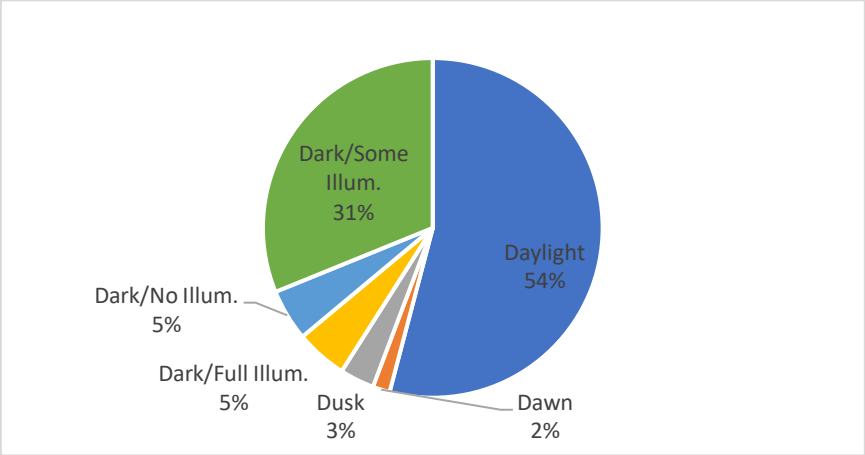


FIGURE 3.8 PEDESTRIAN CASUALTY COLLISIONS BY LIGHTING CONDITION (TAS, 2015-2019)

The distribution indicates that 46% of pedestrian collisions occur during dark, semi-dark or illuminated conditions. This proportion is significantly higher than the overall total, and suggests that pedestrians may not be sufficiently visible or expected outside of daylight conditions.

Pedestrian collisions by location type are summarized in FIGURE 3.9. The distribution suggests that 23% of pedestrian collisions occurred at signalized intersections. However, the "none" category likely includes some collisions at signalized intersections.

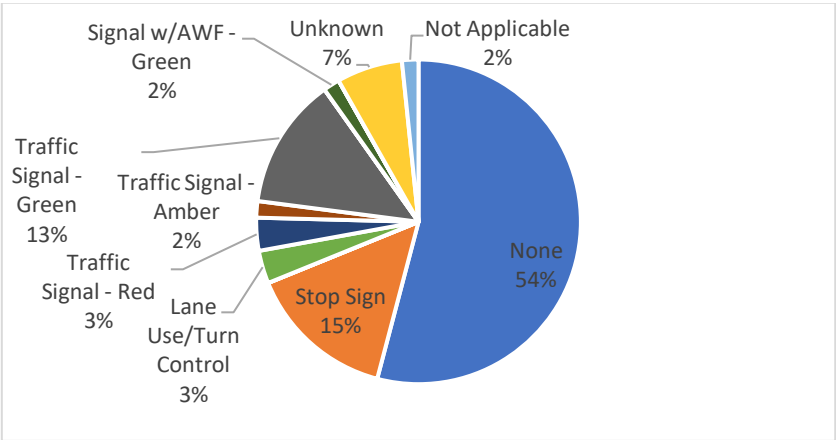
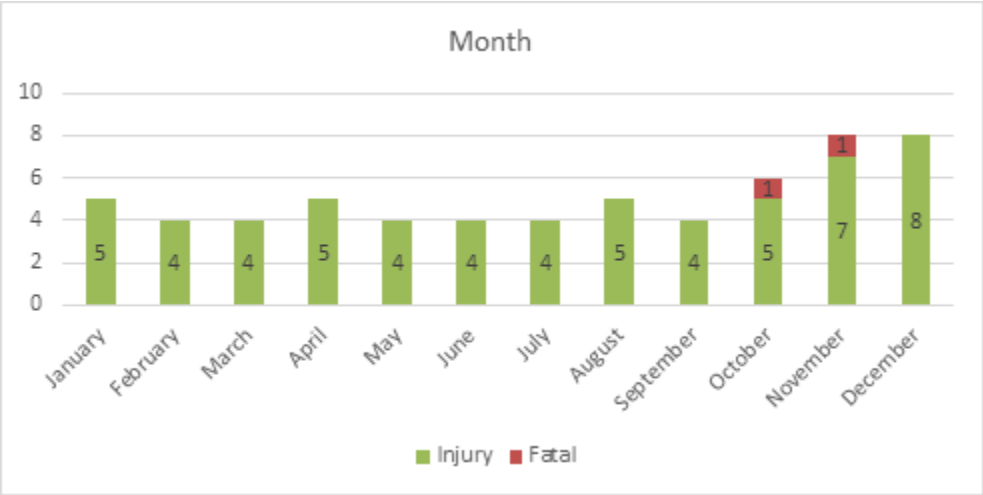


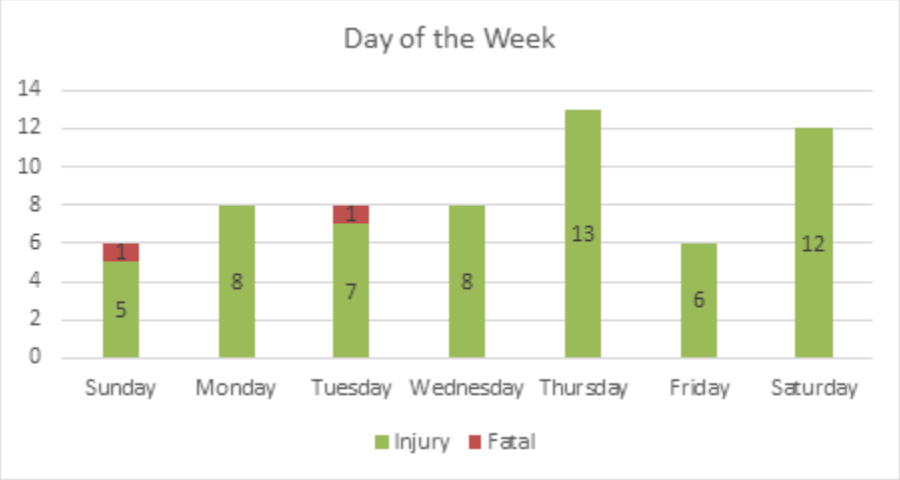
FIGURE 3.9 LOCATION AND TRAFFIC CONTROL DURING PEDESTRIAN COLLISIONS (TAS, 2015-2019)

Temporal distributions of pedestrian collisions are shown in FIGURE 3.10. The distributions indicate that:

- Pedestrian collisions occur throughout the year, but are higher in the fall months, when pedestrians may be less visible or expected. The two fatalities also occurred in the fall months.
- Pedestrian collisions occur throughout the week, but peak on Thursdays and Saturdays.

- Pedestrian collisions increase during the course of the day, including after the end of the afternoon peak hour. This is consistent with the high proportion of collisions in dark conditions.





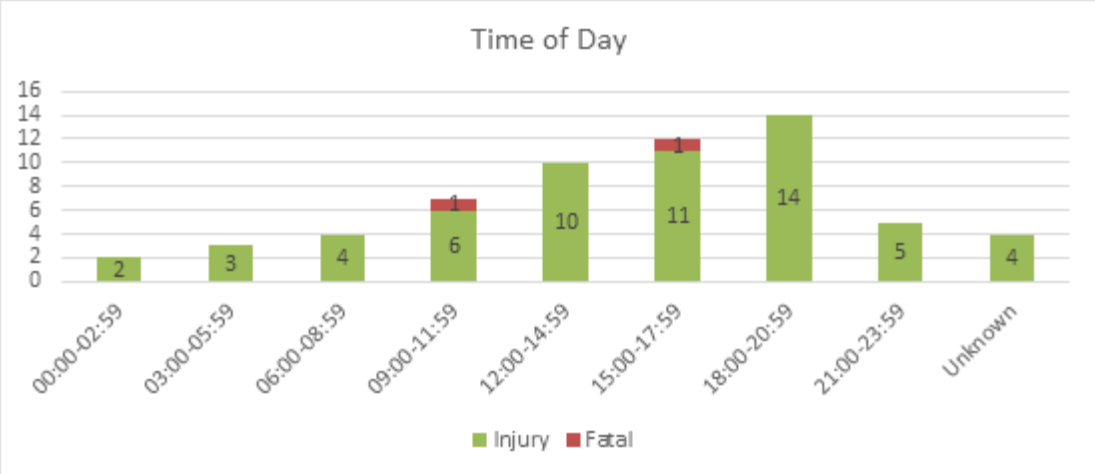


FIGURE 3.10 TEMPORAL DISTRIBUTION OF PEDESTRIAN CASUALTY COLLISIONS

3.4 Bicycle Collisions

A total of 15 casualty collisions involving bicycles were reported between 2015 and 2019, based on the TAS data, and 26 based on the ICBC data. None of the bicycle collisions were fatal. A similar analysis of the TAS bicycle collision data was conducted as in the other emphasis areas. The results indicated the following trends:

- Where the location type was known, approximately 30% of bicycle collisions occurred at intersections (evenly split between signalized and unsignalized intersections)
- The large majority of bicycle collisions (over 90%) occurred during clear, dry, daylight conditions.
- The majority of bicycle collisions (over 60%) occurred during the summer months, which cyclists volumes are likely highest.
- All the cyclist collisions occurred on weekdays, suggesting that most collisions may have involved commuting cyclists.
- Nearly half of the bicycle collisions occurred between 3 and 6 pm.

3.5 Motorcycle Collisions

A total of 20 casualty collisions involving motorcycles were reported between 2015 and 2019, including one fatal collision in 2019. 71 motorcycle collisions were reported to ICBC, including 5 fatal collisions (both of which are significantly higher than in the TAS data). A similar analysis was conducted of the TAS motorcycle collision data as in the other emphasis areas. The results indicated the following trends:

- There has been an increase in motorcycle collisions since 2015, peaking at 6 collisions in 2018.
- Where the location type was known, 40% of motorcycle collisions occurred at intersections (10% at signalized and 30% at unsignalized intersections).
- The majority of motorcycle collisions occurred in clear, dry, daylight conditions (more than the overall City average for each of these conditions).
- 75% of motorcycle collisions occurred between May and August, when motorcycle activity is typically at it highest.
- 73% of motorcycle collisions occurred on Saturday and Sunday, suggesting they occur during recreational use.
- 60% of motorcycle collisions occurred between 12 and 6 pm, again suggesting recreational use.

4.0 NETWORK SCREENING OF COLLISION-PRONE LOCATIONS (USING TAS DATA)

Screening of the road network was conducted of collision prone corridors and intersections:

- Corridors were analyzed based on midblock collision data.
- Intersections were ranked by total collision frequency.

4.1 Collision-Prone Corridor Locations

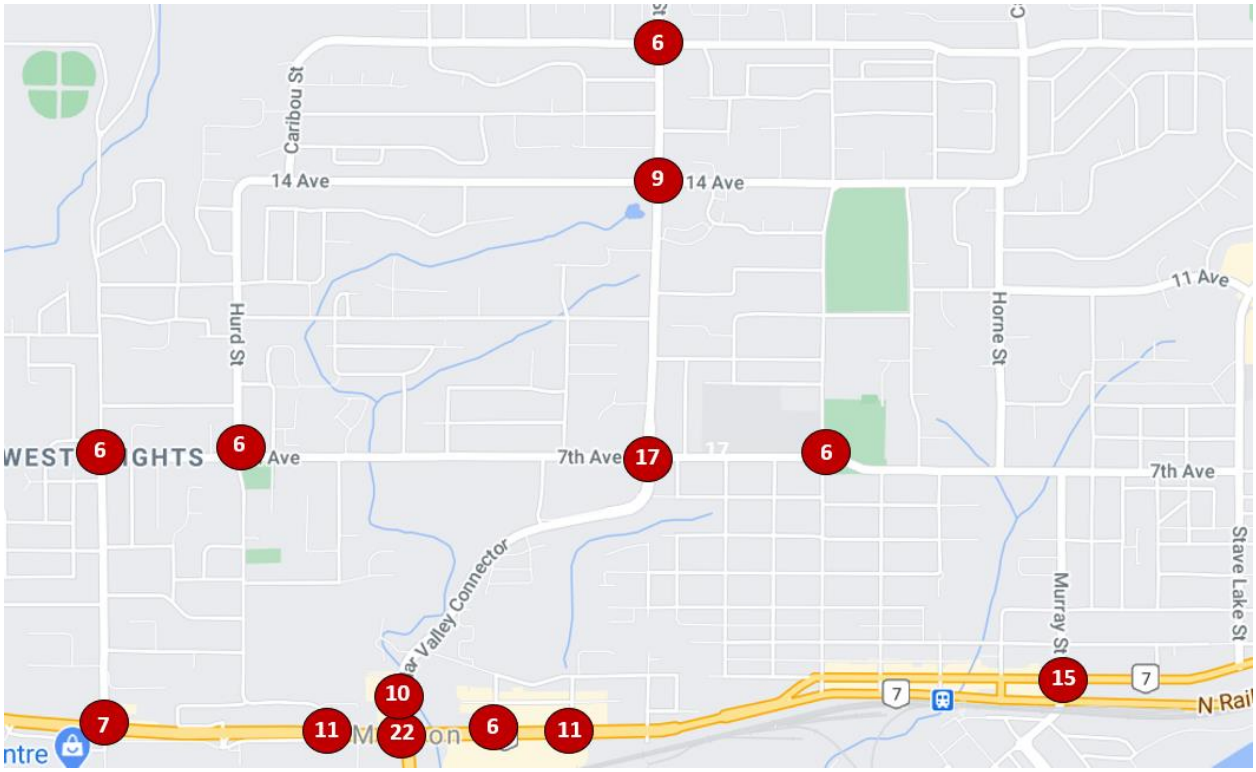
Corridors were analyzed to determine the relative risk, on a per km basis, to identify which would more likely benefit from safety improvement initiatives. A summary of the corridors (including highways) is summarized in TABLE 4.1. The results indicate that, other than the highways, the corridors with the highest collision rates per km include 1st Avenue (see footnote), Hurd Street and Cedar Valley Connector.

TABLE 4.1 CORRIDORS RANKED BY COLLISION FREQUENCY PER KM (TAS, 2015-2019)

FREQUENCY PER KM RANK	CORRIDOR	5 YEAR COLLISION FREQUENCY	LENGTH (km)	FREQUENCY PER KM
1	Highway 11	16	1.5	10.7
2	Abbotsford-Mission Bridge	13	1.5	8.7
3	Lougheed/Hwy 7	106	13	8.2
4	1st Avenue	9	1.2 (Murray-Wardrop)	7.5
5	Hurd Street	6	0.8	7.5
6	Cedar Valley Connector	8	1.3	6.2
7	Dewdney Trunk Road	47	8	5.9
8	7 Avenue	19	3.3	5.8
9	Cedar Street	18	3.3	5.5
10	14 Avenue	7	2.3	3.0
11	Keystone Avenue	10	6.5	1.5
12	Stave Lake Road/Street	12	8.5	1.4
13	Sylvester Road	8	6	1.3
14	Wilson Street	8	6.3	1.3

4.2 Collision-Prone Intersections

The 5-year collision frequency (TAS, 2015-2019) by intersection is shown in FIGURE 4.3 and listed in TABLE 4.2. All locations with an average of more than 1 collision (15 intersections) per year are included.



Note: Lougheed/Nelson (8 collisions) and Lougheed/Hayward (6 collisions) are located further west of the area shown on the map

FIGURE 4.1 INTERSECTION COLLISION FREQUENCY (TAS, 2015-2019)

TABLE 4.2 INTERSECTION RANKING BY COLLISION FREQUENCY (TAS, 2015-2019)

RANK	INTERSECTION	5 YEAR COLLISION FREQUENCY
1	Hwy 7/Lougheed Hwy & Hwy 11/Cedar Valley Connector	22
2	Cedar St & 7 Ave	17
3	Murray St/Glasgow & 1 Ave/Hwy 7/Lougheed Hwy	15
4	Park St & Lougheed Hwy	11
5	Hurd St & Lougheed Hwy	11
6	Cedar Valley Connector & Mall Access (signal)	10
7	Cedar St & 14 Ave	9
8	Nelson St & Lougheed Hwy	8
9	Wren St & Lougheed Hwy	7
10	Grand St & 7 Ave	6
11	Hurd St & 7 Av	6
12	Best Ave & Cedar St	6
13	Haig St & Lougheed Hwy	6
14	Hayward St & Lougheed Hwy	6
15	Wren St & 7 Ave	6

4.3 Top Pedestrian Collision Locations

The locations of pedestrian collisions at intersections were identified using the ICBC data. All intersections with 3 or more pedestrian collisions are shown in FIGURE 4.2.

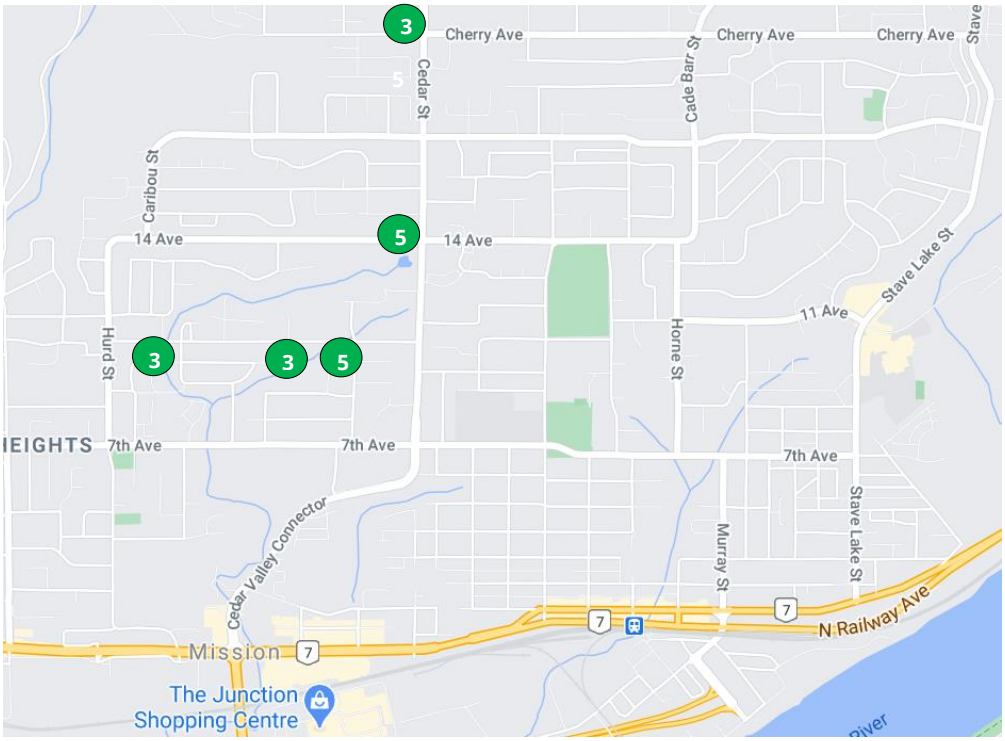


FIGURE 4.2 TOP PEDESTRIAN COLLISION LOCATIONS (ICBC, 2015-2019)

The corridors with concentrations of pedestrian collisions were identified using the TAS data, and are summarized in TABLE 4.3.

TABLE 4.3 CORRIDOR RANKING BY PEDESTRIAN COLLISION FREQUENCY (TAS, 2015-2019)

Corridors	Fatal	Injury	Total
7TH AVE	0	13	13
LOUGHEED HWY	1	7	8
CEDAR ST	1	6	7
1ST AVE	0	5	5
WREN ST	0	4	4

The ranking indicates that other than Lougheed Highway, the most pedestrians collisions occurred along 7th Avenue, followed by Cedar Street, which was also the site of one pedestrian fatality. Pedestrian safety improvements can be considered along significant portions of these corridors.

4.4 Top Bicycle Collision Locations

The network screening of bicycle collisions revealed that these were spread out across the road network, with no more than a single bicycle collision at a specific location.

4.5 Top Motorcycle Collision Locations

The network screening of motorcycle collisions using ICBC data revealed that:

- 3 occurred at the intersection of Highway 7 and Hayward Street
- 3 occurred at the intersection of Highway 7 and Highway 11

Motorcycle collisions are often related to the combination of speed, congestion and changes in vertical alignment and road surface. These intersections can be more closely reviewed to determine possible contributing factors to collisions involving motorcycles.

5.0 NETWORK SCREENING OF COLLISION-PRONE LOCATIONS (USING ICBC CRASH MAPS)

Screening of the road network using ICBC data was conducted using ICBC Crash Maps (https://public.tableau.com/profile/icbc#!/vizhome/LowerMainlandCrashes/LMDashboard) and the highlights are summarized in this section.

5.1 Casualty Collisions by Location

The 5-year casualty (injury plus fatality) collision frequency (ICBC, 2015-2019) by location is shown in FIGURE 5.1 and the locations with 20 or more collisions over 5 years are listed in TABLE 5.1.

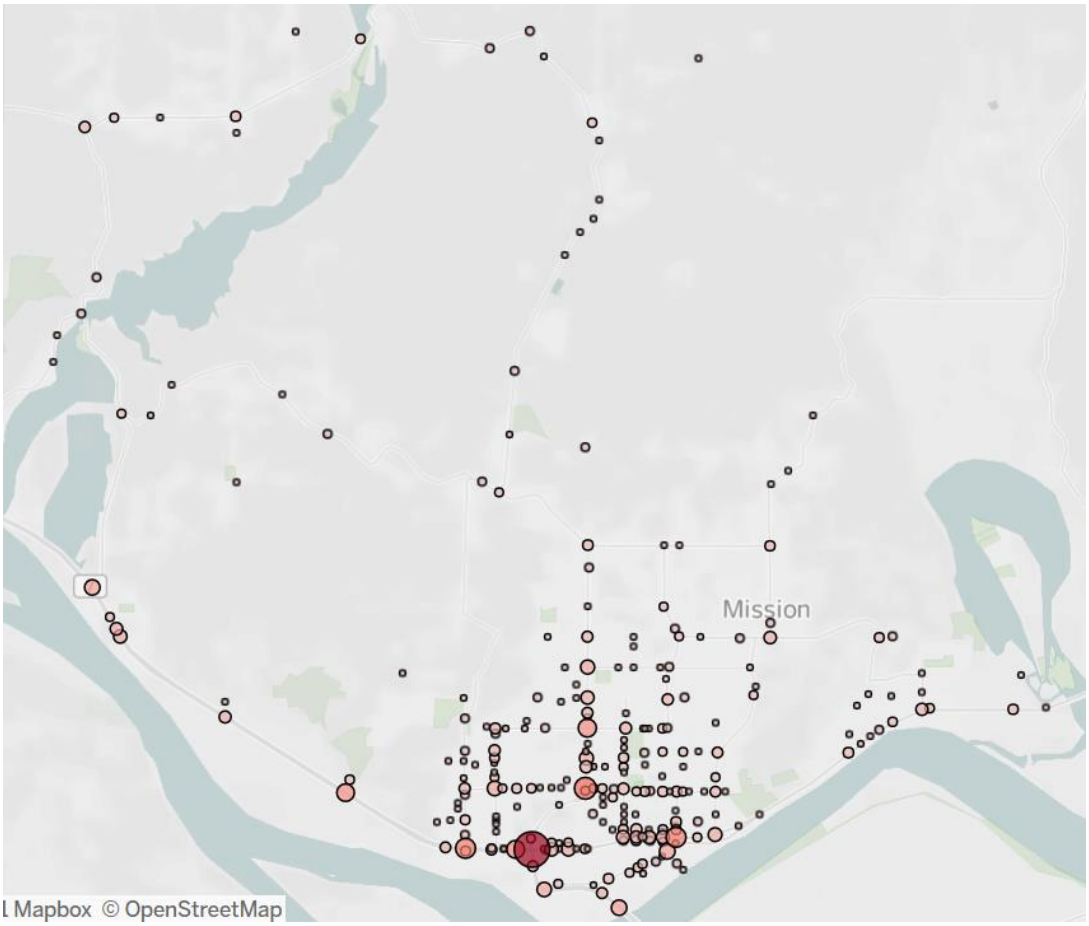


FIGURE 5.1 CASUALTY COLLISIONS BY LOCATION (ICBC, 2015-2019)

TABLE 5.1 TOP CASUALTY COLLISION LOCATIONS (ICBC, 2015-2019)

Location	Crashes
CEDAR VALLEY CONN & HWY 11 & LOUGHEE..	325
7TH AVE & CEDAR ST	93
1ST AVE & GLASGOW AVE & MURRAY ST	72
LOUGHEED HWY & WREN ST	72
14TH AVE & CEDAR ST	54
HURD ST & LOUGHEED HWY & RAI AVE	51
LOUGHEED HWY & NELSON ST	49
GLASGOW AVE & HORNE ST	34
ABBOTSFORD MISSION BRIDGE	33
HAYWARD CONN & LOUGHEED HWY & ST A..	33
7TH AVE & HURD ST	28
DYKE RD & DYKE RD OFFRAMP & DYKE RD O..	26
CEDAR ST & CHERRY AVE	24
CEDAR ST & MCRAE AVE	23
1ST AVE & STAVE LAKE ST	22
LOUGHEED HWY & PARK ST & MALL ACCESS	22
HAIG ST & LOUGHEED HWY & MALL ACCESS	20
LOUGHEED HWY & MCLEAN ST & SILVERDAL..	20

Intersections for which traffic volumes were available were also ranked by collision rate, and the results are summarized in TABLE 5.2.

TABLE 5.2 INTERSECTION COLLISION RATES

Intersection	5-Year Collision Frequency (ICBC)	Rate (ICBC)	Rank (ICBC)
Hwy 7 & Cedar Valley	325	3.57	1
7 Ave & Cedar St	93	2.05	2
Hwy 7 & Murray St	72	1.54	3
Cedar St & 14 Ave	54	1.38	4
Hwy 7 & Wren St	72	1.30	5
7 Ave & Hurd St (W)	28	1.04	6
Hwy 7 & Hurd St (E)	51	0.88	7
Hwy 7 & Park St	22	0.69	8
Cedar St & Best Ave	19	0.56	9
Hwy 7 & Haig St	20	0.52	10
7 Ave & Grand St	11	0.46	11
Cedar Valley Connector & Mall Access	3	0.08	12

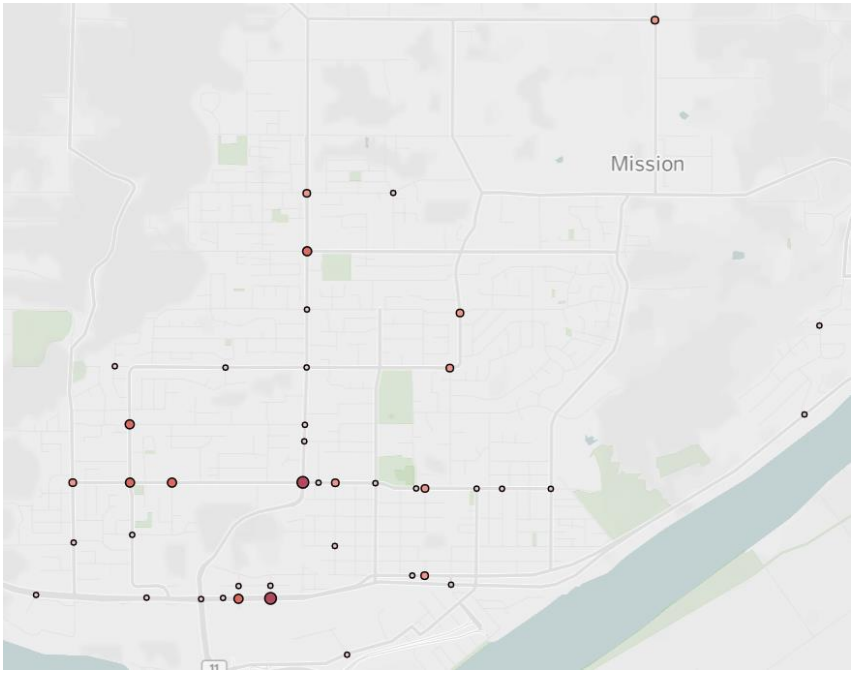
The results of the analysis indicated that:

- The top six intersections by casualty collision frequency were also the top six by collision rate. This suggests that the high frequency is not only related to traffic volumes but may be influenced by other site-specific characteristics.

- Other locations with a high collision frequency are Lougheed Hwy and Nelson St (the first traffic signal for traffic from the west), and the Glasgow Ave and Horne St Intersection.
- Other locations with a high collision rate are the intersections of Lougheed Hwy with Hurd St (west intersection) and Park St.

5.2 Pedestrian Collisions by Location

The locations of pedestrian collisions at intersections were identified using the ICBC data. All intersections with 3 or more pedestrian collisions are shown in FIGURE 5.2. The corridors with the most pedestrian collisions are Lougheed Hwy, Cedar St and 7 Avenue.

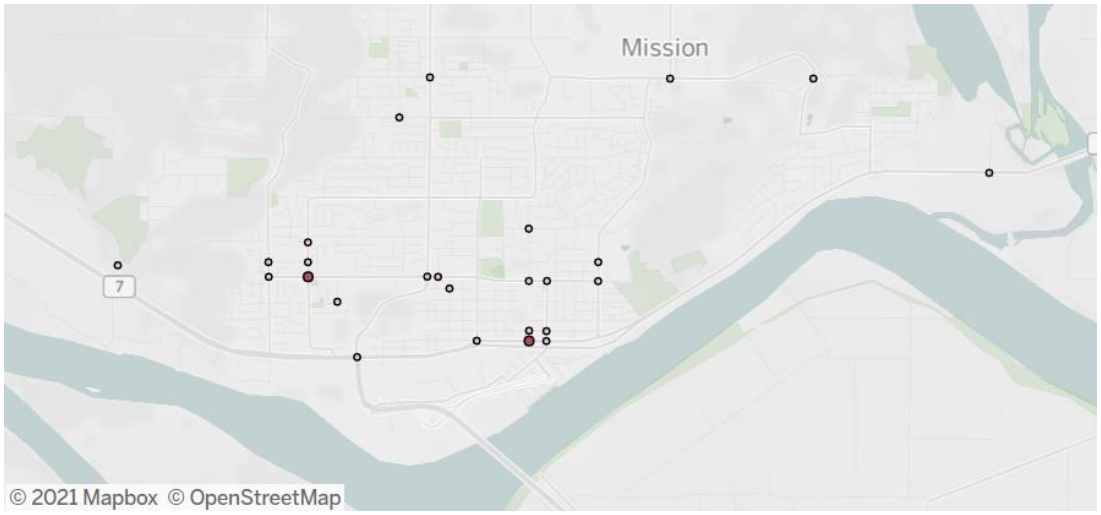


Location	Crashes
7TH AVE & CEDAR ST	5
LOUGHEED HWY & PARK ST & MALL ACCE..	5
7TH AVE & HURD ST	3
7TH AVE & LEE ST	3
CEDAR ST & CHERRY AVE	3
HAIG ST & LOUGHEED HWY & MALL ACCESS	3
HURD ST & MCRAE AVE	3
14TH AVE & HORNE ST	2
1ST AVE & WELTON ST	2
7TH AVE & ALDER ST	2
7TH AVE & WELTON ST	2
7TH AVE & WREN ST	2
BEST AVE & CADE BARR ST	2
CEDAR ST & EGGLESTONE AVE	2
FERNDALE AVE & STAVE LAKE ST	2
LOUGHEED HWY	2
10TH AVE & CEDAR ST	1
14TH AVE & CEDAR ST	1
14TH AVE & EAGLE CRES	1
14TH AVE & TANAGER ST	1

FIGURE 5.2 PEDESTRIAN COLLISION LOCATIONS (ICBC, 2015-2019)

5.3 Bicycle Collisions by Location

The network screening of bicycle collisions using ICBC data revealed that these were spread out across the road network, with no more than two bicycle collisions in the vicinity of any one location. Bicycle collisions are shown in FIGURE 5.3. The corridor with the most bicycle collisions is 7 Avenue.

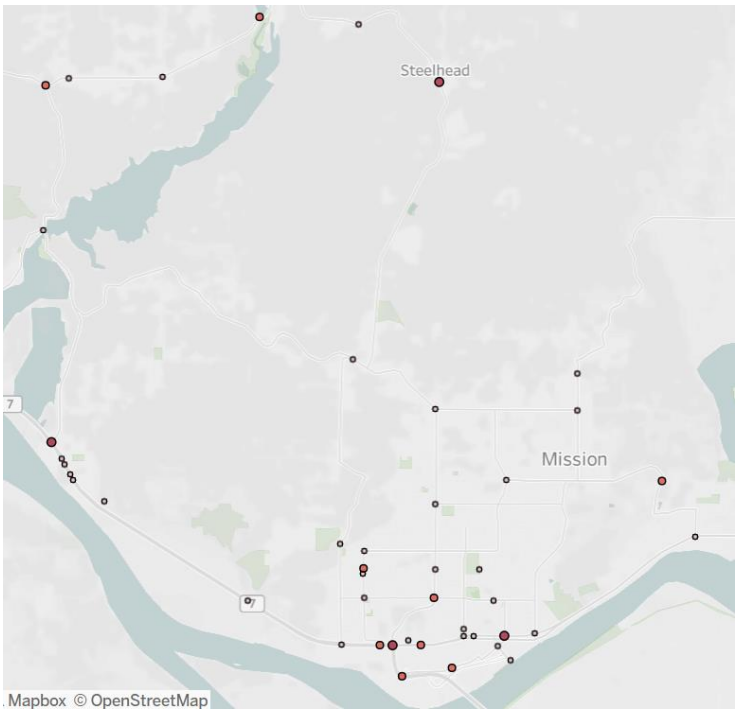


Location	Crashes
1ST AVE & HORNE ST	2
7TH AVE & HURD ST	2
11TH AVE & HORNE ST	1
1ST AVE & GLASGOW AVE & MURRAY ST	1
1ST AVE & GRAND ST	1
2ND AVE & HORNE ST	1
2ND AVE & MURRAY ST	1
6TH AVE & ALDER ST	1
7TH AVE & CEDAR ST	1
7TH AVE & HORNE ST	1
7TH AVE & JUNIPER ST	1
7TH AVE & MURRAY ST	1
7TH AVE & STAVE LAKE ST	1
7TH AVE & WREN ST	1
9TH AVE & STAVE LAKE ST	1
BURMA ST & DEWDNEY TRUNK RD	1
CEDAR ST & EGGLESTONE AVE	1
CEDAR VALLEY CONN & HWY 11 & LOUGH..	1
CEMETERY AVE & DEWDNEY TRUNK RD & ..	1
CHERRY AVE & FENNELL ST	1

FIGURE 5.3 BICYCLE COLLISION LOCATIONS (ICBC, 2015-2019)

5.4 Motorcycle Collisions by Location

The network screening of motorcycle collisions using ICBC data revealed that these were spread out across the road network, with no more than three motorcycle collisions at a specific location. The corridors with the most motorcycle collisions are Lougheed Hwy., Cedar Valley Connector, Hurd St. and Dewdney Truck Rd.



Location	Crashes
1ST AVE & GLASGOW AVE & MURRAY ST	3
CARDINAL ST & DEWDNEY TRUNK RD	3
CEDAR VALLEY CONN & HWY 11 & LOUGH..	3
HAYWARD CONN & LOUGHEED HWY & ST ..	3
7TH AVE & CEDAR ST	2
BURMA ST & DEWDNEY TRUNK RD	2
CEMETERY AVE & DEWDNEY TRUNK RD & ..	2
DEWDNEY TRUNK RD & WILSON ST	2
DYKE RD & DYKE RD OFFRAMP & DYKE RD ..	2
HOLIDAY AVE & HURD ST	2
HURD ST & LOUGHEED HWY & RAI AVE	2
LONDON AVE & MISSION WAY	2
LOUGHEED HWY	2
LOUGHEED HWY & PARK ST & MALL ACCE..	2
11TH AVE & TAULBUT ST	1
12TH AVE & CEDAR ST	1
14TH AVE & HURD ST	1
1ST AVE & GRAND ST	1
1ST AVE & JAMES ST	1
1ST AVE & STAVE LAKE ST	1

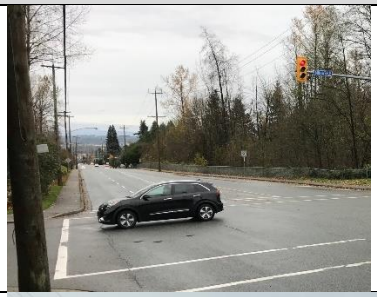
FIGURE 5.4 MOTORCYCLE COLLISION LOCATIONS (ICBC, 2015-2019)

6.0 SITE VISITS

Brief site visits were conducted to several of the intersections with a high collision frequency. The observations were conducted on in mostly cloudy conditions, with light rain. Observations that may be related to the safety performance are summarized in TABLE 5.1.

TABLE 5.1 OBSERVATIONS AT HIGH COLLISION FREQUENCY INTERSECTIONS

LOCATION AND OBSERVATIONS	PHOTOS
Hwy 7/ Hwy 11/Cedar Valley Connector • High-speed environment in spite of surrounding commercial land use • High-volume, congested intersection • Very wide lanes, long crossing distance, high-speed right-turns • Downgrades on some approaches • Lack of left-turn arrows on two approaches	 
Cedar St & 7 Ave • Driveways in close proximity • Steep downgrades • Lack of LT lanes/phases on E/W (major street) approaches	 
Murray St/Glasgow & 1 Ave/Hwy 7/Lougheed Hwy • Steep grades on N/S approaches, particularly SB (>15%) • Horizontal curve on NB approach • Very wide pedestrian crossing distance at EBRT lane	 
Park St & Lougheed Hwy • High speeds on EB approach due to proximity to highway • Several commercial generators on each corner • High eastbound LT volume, lack of left-turn protection • Horizontal curve along SB approach	 
Hurd St & Lougheed Hwy	Not visited
Cedar Valley Connector & Mall Access • Northbound congestion back to Highway 7	

LOCATION AND OBSERVATIONS	PHOTOS
<u>Cedar St & 14 Ave</u> • Cedar appears overdesigned (5 lanes): long ped. Crossing distance • Lack of development; high-speed environment • Poor/discontinuous pedestrian facilities	 
<u>Nelson St & Lougheed Hwy</u> • First signal from the west after a long distance • High speed environment; likely rear end collisions • AWF in place (looks new)	
<u>Wren St & Lougheed Hwy</u> • High-speed environment • Top of hill, but sight distance appears adequate • Steep SB approach • Lots of generators, including UFV and commercial uses	 
<u>Grand St & 7 Ave</u> • Schools and parks in the area • Likely high pedestrian volumes crossing between schools and recreation areas, but long crossing distance • Consider road dieting/curb extensions, and extension of 30 km/h PG zone	

LOCATION AND OBSERVATIONS	PHOTOS
<u>Hurd St & 7 Av</u> • 7 Avenue very wide • Merge location immediately after intersection (WB exit) • Horizontal curve on NB approach	 
Best Ave & Cedar St	Not visited
Haig St & Lougheed Hwy	Not visited
Hayward St & Lougheed Hwy	Not visited
<u>Wren St & 7 Ave</u> • T-intersection • High SB speeds (downgrade) • Parking permitted close to crosswalk • Excessively wide lanes; long ped crossing distances	 

Other general observations include:

- The steep changes to vertical curvature, generally uphill towards the north
- The high proportion of pickup trucks, which are capable of high speeds and can sometimes block sight lines to pedestrians/cyclists or traffic control devices
- The overdesign (extra and wide lanes) of the collector roadways
- The focus of most commercial development towards the south end of the City and residential development towards the north end, necessitating a lot of north-south movement within the City
- The absence of good quality and continuous pedestrian and bicycle facilities at several locations

APPENDIX B

TRAFFIS SAFETY STRATEGY IMPLEMENTATION PLAN

A. SPEEDING

LOCATION TYPE	TYPE OF IMPROVEMENT	RATIONALE	COST	LOCATION AND YEAR OF IMPLEMENTATION				
				2019-2021	2022	2023	2024	Beyond
ANNUAL BUDGET								
a. On Major Roads	Speed Reader Boards	Highest collision frequency per km (for 2022-2024) 2019-2021 were identified by the City.		Draper Street near Hatzic Park - Completed 14th Avenue west of Tanager Street - Completed 7th Avenue west of Taulbut Street - Completed		Hurd St	Cedar Valley Connector (note: guardrail on east side of roadway, north of Fraser Crescent already installed)	
	Road Narrowing	Reduce lane widths to improve safety						
	Road Diet	Reallocate road space to provide improve safety and provide active transportation facilities				Stave Lake St – Highway 11 to 11 Ave		Cedar St
b. On Collector Roads	Traffic Calming (curb extensions, road narrowings)	Warrant points, collisions, speeds (TSS Tech Memo #2)	See TM #2 for suggested measures for each location		Grand St – 11 Ave to 14 Ave (37 pts)	14 Ave – Cedar St to Caribou St (30 pts) 14 Ave – Taulbut St to Grand St (32 pts)	Best Ave – Caribou St to Bobcat Dr (23 pts)	
c. On Local Roads	Traffic Calming (speed humps, etc.)	Warrant points, collisions (TSS Tech Memo #2)	See TM #2 for suggested measures for each location			Badger Ave – West of Beaver Dr (35 pts)	Kenney Ave – Oyama Ave to Nelson St (30 pts)	

d. Near Elementary Schools	Traffic Calming (curb extensions, raised crosswalks, RRFB, etc.)	Warrant points, protection of student pedestrians (TSS Tech Memo #2)	See TM #2 for suggested measures for each location	Draper St – McEwan Ave to Henry Ave (40 pts)		McRae St – Eider St to Edge St (39 pts)		
e. On Rural Roads	Speed Reader Boards	Highest collision frequency per km, Motorcycle collisions			Dewdney Trunk Rd	Hayward St		

Can select locations for speed readerboards, road diets, etc. based on collisions and measured speeds. The corridors with the highest collision frequency per km are (other than Hwy 7 and 11 and 1st Avenue):

Hurd Street

Cedar Valley Connector

Dewdney Trunk Road

Hayward Street

Corridors with the highest rate of non-compliance with the posted speed limit

B. PEDESTRIAN SAFETY

LOCATION TYPE	TYPE OF IMPROVEMENT	RATIONALE	COST	LOCATION AND YEAR OF IMPLEMENTATION				
				2019-2021	2022	2023	2024	Beyond
ANNUAL BUDGET								
a. At road crossings	Overhead flashing beacons and site improvements	Warrant results		Stave Lake St at 9th Ave Wren St at 7th Ave Wren St at Hillcrest Ave				
	Leading Pedestrian Intervals, reduce curb radii	Pedestrian collisions						
	RRFB + curb extensions	Pedestrian collisions			7th Ave at Lee St (3 collisions/5 yrs)			
	Side-mounted rapid rectangular flashing beacons and site improvements	Warrant results (TSS Tech Memo #3)		Grand Street at 4th Ave-with curb ext 7th Ave at Taulbut St Cherry Ave at Stave Lake (separate budget)	Wren St at Raven Ave Hurd St & Hillcrest Ave Hurd St & Lamont Ave (or GM + CE) Hurd St & McRae Ave (or GM + CE)	Stave Lake & 4th Ave Stave Lake & 5th Ave 11th Ave & Dunsmuir St 7th Ave & Alder St 7th Ave & Murray St		
b. Along roads	Pedestrian/corridor safety reviews	Pedestrian collisions			7 Ave – Wren to Stave Lake (23 ped crashes/5 yrs)	Cedar St – 7 Ave to Eggle-stone (14 ped crashes/5 yrs)		
	Sidewalk improvements	Prioritized through Transportation Plan		Cherry Ave – 75 m of missing section on north side east of Harms Cade Barr – 150 m on east side between Whidden and Cherry Wren St – 150 m on east side between 7th Ave and Van Velzen Wren St – 150 m on east side south of Sandpipe Pl (to existing sidewalk in front of school)				

c. Near elementary schools	RRFB + curb extension	Warrant results			Wren St at West Hts Elementary School			
	Leading Pedestrian Intervals	Ped collisions			Cherry Ave at Cedar St			

C. INTERSECTION SAFETY

LOCATION TYPE/ LOCATION	IMPROVEMENT	RATIONALE	COST	LOCATION AND YEAR OF IMPLEMENTATION				
				2019-2021	2022	2023	2024	Beyond
ANNUAL BUDGET								
a. Signalized	Anti-skid treatment at downgrade approaches			Cedar St: near McRae Avenue and 14th Avenue				
Cedar St & 7 Ave	Provide N/S left-turn lanes Consolidate driveways/move further from intersection Reduce corner radii and align curb ramps with crosswalks Reduce 7 Avenue lane widths (corridor measure)	Crash Freq Rank = 2 Crash Rate Rank = 2			✓			
Cedar Valley Connector & Mall Access	Review feasibility of coordinating traffic signal with Hwy 7 to reduce congestion along downgrade Provide warning of signal ahead on SB approach Provide NB advance phase, or restrict left-turn due to limited visibility Enhance signal visibility on NB and SB approaches	Crash Freq Rank = 3 Crash Rate Rank = 12				✓		
Cedar St & 14 Ave	Reduce corner radii and align curb ramps with crosswalks Consider road diet along Cedar St (corridor measure) Provide greater continuity of pedestrian and bicycle facilities through intersection	Crash Freq Rank = 5 Crash Rate Rank = u/k					✓	
7 Ave & Hurd St	Narrow WB departure leg (remove merge control) Reduce corner radii and align curb ramps with crosswalks	Crash Freq Rank = 11 Crash Rate Rank = 6						✓
Signal Timing and Phasing (Various Locations)	Review signal timing and phasing at all traffic signals on a revolving 5-year cycle		$20,000 per year		✓	✓	✓	✓

Note: All signalized locations that ranked in the top 6 by either collision frequency or collision rate were reviewed.

D. CITY-WIDE SUGGESTIONS

ISSUE/TREND	SUGGESTIONS
Off-road (right and left) and head-on casualty collisions (200 casualty collisions in 5 years)	Conduct a network screening of off-road collisions; and Review the need for enhanced delineation on curves Review clear zones at high collision locations (in rural areas) Review the need for roadside and median barrier protection Review the need for speed control along corridors
High proportion of casualty collisions during adverse (wet or slippery) road surface conditions (35%)	Conduct a network screening of collisions in adverse road surface conditions; and Review the grade of the roadways where these are concentrated Review the effectiveness of road drainage at these locations Review the need for anti-skid surfacing Review the need to raise the priority of particular roadways for clearing snow
High proportion of total and casualty collisions during dark conditions with some or no illumination (total: 23%), (pedestrian: 36%)	Conduct a network screening of collisions during dark conditions; and Assess the lighting levels at the locations with “some” illumination Assess the need for illumination at the locations with “no” illumination
High proportion of casualty and fatal collisions during fall and winter months, including pedestrian collisions (October to January)	Other than the weather and lighting changes above, conduct educational campaigns: about safe driving during dark and winter conditions about the need for pedestrians to wear reflective gear to increase their conspicuity
High proportion of collisions on Sundays (similar to weekday average, which is unusually high)	Determine the causes of collisions on Sunday. Weekend collisions are typically related to recreational trips, which are typically associated with higher vehicle speeds and inattention Conduct educational campaigns and targeted enforcement on weekends to mitigate the associated behaviours
Most commonly reported #1 contributing factor in casualty and fatality collisions was “Driver Inattentive”	Review trends in driver inattentive collisions by location, time and driver age and other demographics as well as other behaviours (analyze “clustered” behaviours) Review the types of inattention by reviewing collision details, in particular to determine the prevalence of distraction from cell phone use or other activities while driving Develop education and enforcement programs to address identified trends in collisions in which the driver was identified as “inattentive”
High proportion of casualty collisions along two-lane undivided roadways (more than 50%)	Conduct a network screening of two-lane undivided roads Review the geometry, speed and other characteristics along these roads Review the benefits of separation, barriers, illumination, speed management and other treatments
Locations with casualty collisions where horizontal and vertical curves coincide (40 collisions/5 years)	Identify the high collision locations and determine the need for adjusting curve superelevation, anti-skid treatment, and/or curve warning and delineation

The above trends could be reviewed and strategies developed as part of the development of a City-wide Transportation Safety Plan.

E. ITEMS TO DISCUSS WITH MINISTRY OF TRANSPORTATION

ISSUE	LOCATION TYPE	IMPROVEMENT TYPE	LOCATIONS	RATIONALE
A. Speeding	Along Corridors	Speed Readerboards	Highway 7 (locations based on speeds) Highway 11 (locations based on speeds) 1st Avenue (locations based on speeds))	Corridors with the highest collision rate per km
B. Pedestrian Safety	a. At road crossings	Leading Pedestrian Intervals, reduce curb radii	Park St at Lougheed Hwy	5 collisions/5 yrs
		Side-mounted rapid rectangular flashing beacons and site improvements	1st Ave at Grand St 1st Ave at Horne St 1st Ave at James St 1st Ave at Welton St	Warrant results (TSS Tech Memo #3)
		Ground-mounted – Level 2	Railway Ave at Horne St Railway Ave at James St	Warrant results
	b. Along roads	Pedestrian/corridor safety reviews	Lougheed – Hwy 11 to Park St	10 pedestrian-vehicle crashes/5 yrs
C. Intersection Safety	a. Signalized intersections	Replace right turn islands with Smart Channels Anti-skid treatment on EB approach Consider N/S protected-only LT phasing Longer Term: consider feasibility of multilane roundabout	Hwy 7 & Hwy 11/Cedar Valley Connector	Crash Freq Rank = 1 Crash Rate Rank = 1
		Replace right turn islands with Smart Channels Reduce width of right-turn roadways Anti-skid treatment on NB & SB downgrade approaches Provide reflective delineation (e.g. LDS along NB approach) Review the feasibility of a sidewalk on east side of bridge to intersection.	1st Ave & Glasgow/Murray	Crash Freq Rank = 3 Crash Rate Rank = 3
		Provide speed reader board after 60 km/h sign Consider WB gateway treatment prior to TS to emphasize speed limit Anti-skid treatment on SB downgrade approach Enhance signal visibility on NB and SB approaches Provide more urban design on approaches.	Lougheed Hwy & Wren St	Crash Freq Rank = 3 Crash Rate Rank = 5

		Align south frontage roads further from intersection		
		Protected phase for E/W left turns (or LPI – see pedestrian safety) Reduce corner radii and align curb ramps with crosswalks Improve delineation along southbound approach curve	Lougheed Hwy & Park St	Crash Freq Rank = 15 Crash Rate Rank = 8
		Anti-skid treatment on SB downgrade approach Enhance signal visibility on NB and SB approaches Review feasibility of E/W left-turn restrictions	Lougheed Hwy & Hurd St	Crash Freq Rank = 6 Crash Rate Rank = 7
		Post speed reader board WB after the 80 km/h sign Review timing, position of AWFs Provide Intersection Safety Device (speed camera) Longer Term: Reduce design and posted speed to 70 km/h (corridor measure)	Lougheed Hwy & Nelson St	Crash Freq Rank = 6 Crash Rate Rank = unknown

APPENDIX C

NEIGHBOURHOOD TRAFFIC CALMING REQUESTS

As part of the development of the Traffic Safety Strategy component of the City of Mission (City's) Transportation Plan, TranSafe carried out a review of traffic calming requests (Task 3.2 of workplan) and the City's analysis. The preliminary findings are summarized in this memo, and will be used to inform the Traffic Safety Strategy recommendations and implementation priorities.

1.0 BACKGROUND AND CONTEXT

1.1 Transportation Plan and Traffic Safety Strategy Context

Attachment A of the March 18, 2019 Council Report contains a summary of public complaints and safety issues present on various road types in the City. In response to vehicle speeding complaints on local roads, traffic calming measures were identified by the City as potential mitigation measures, and it was noted that an updated traffic calming policy was being prepared.

In the August 19, 2019 Council Report, it was noted that Council Resolution 18/704 directed staff to review traffic safety related complaints, categorize and prioritize them, and identify works which would address them. The City's current Traffic Calming Policy was adopted as Council Resolution RC19/549 on September 16, 2019.

In the Request for Proposal, it was noted that as part of the Traffic Safety Strategy, the Consultant would analyze requests for traffic calming projects and prepare a prioritized list of sites for improvements.

As part of the plan preparation, the City provided a Traffic Calming Priority List, along with evaluation criteria and a comparison of practices in other municipalities.

1.2 City Traffic Calming Policy

The City's Traffic Calming policy states that:

- All Traffic Calming measures installed in the City of Mission shall conform to the standards established in the Transportation Association of Canada's Canadian Guide to Traffic Calming (February 2018) and any revisions thereto.
- In general, Traffic Calming measures will only be installed in residential areas or on a roadway adjacent to a park or school. Traffic Calming measures will generally be limited to the measures and applications listed in TABLE 1 (from Page 3 of the City's Traffic Calming Policy).

TABLE 1 DISTRICT OF MISSION TRAFFIC CALMING MEASURES

NEIGHBOURHOOD TRAFFIC CALMING POLICY
EPW.32(A)

Traffic Calming Measure	Location Applicability				
	Local	Rural Local	Collector	Arterial	Emerg/ Priority #1 Snow Route
VERTICAL DEFLECTION					
Raised Crosswalk (only considered where there is an existing marked crosswalk, or a crosswalk is warranted)	✓	×	■	×	×
Speed Cushion	✓	■	■	×	×
Speed Hump	✓	■	■	×	×
Speed Bump	Lane only	×	×	×	×
HORIZONTAL DEFLECTION					
Chicane	✓	×	×	×	×
Curb Radius Reduction	✓	×	✓	■	×
Traffic Circle / Mini-Roundabout	✓	×	■	×	×
ROADWAY NARROWING					
Curb Extension	✓	×	✓	×	■
On-Street Parking (as appropriate by road cross-section)	✓	×	✓	×	■
Centre Median	✓	×	✓	×	■
NON-PHYSICAL MEASURES (includes surface treatments and education)					
Transverse Rumble Strips	■	■	■	■	■
On-Road Pavement Markings ("Sign", converging chevrons)	✓	■	✓	■	■
Speed Display Devices	×	■	✓	✓	✓
Speed Watch	✓	■	✓	■	■
✓ Appropriate	■ Use with Caution		× Not Appropriate		

1.3 Candidate Locations

Traffic calming requests on the list provided were received by the City between September 9, 2017 and October 16, 2019. A total of 20 requests were listed. However, two locations did not specify a location. Therefore, the 18 requests with locations are listed in TABLE 2, along with the road classification. The analysis of these locations will be presented in Section 2.0.

TABLE 2 TRAFFIC CALMING REQUESTS

Request Date	Location	From	To	Road Class
9-Sep-17	Grand St	11th Ave	14 Ave	Collector
22-Sep-17	Badger Ave	West of Beaver Dr	Beaver Dr	Local
4-Dec-17	McRae Street	Eider St	Edge St	Local
21-Aug-18	Norrish Ave	Manson St	Private Property	Local
22-Aug-18	Kenney Ave	Oyama St	Nelson St	Local
21-Sep-18	Draper St	McEwan Ave	Henry Ave	Collector
21-Sep-18	McEwan Ave	Draper St	McTaggert St	Local
21-Sep-18	Henry Ave	Dewdney Trunk Rd	Owen St	Local
21-Sep-18	Henry Ave	Owen St	McTaggert St	Local
21-Sep-18	Ewert Ave	Owen St	McTaggert St	Local
10-Oct-18	Donatelli Ave	Manzer St	Hayward St S	Arterial
14-Oct-18	Best Ave	Caribou St	Bobcat Dr	Collector
14-Oct-18	Caribou St	Badger Ave	Best Ave	Collector
17-Oct-18	Sliverdale Ave	Wren Ave	Nelson St	Arterial
7-Nov-18	14th Ave	Taulbut St	Grand St	Collector
12-Sep-19	Manzer St	Donatelli Ave	Silverhill Ave	Arterial
16-Oct-19	Vosburgh Ave	Manson St	Coleman St	Local
	14 Ave	Cedar St	Caribou St	Collector

2.0 APPLICATION OF TRAFFIC CALMING POLICY

2.1 Application Methodology

The methodology followed by City staff was reviewed based on the information available within a spreadsheet provided by the City. The methodology appeared to reflect the September 2019 Traffic Calming Policy document:

- For each location, the 85th percentile speed was measured, and given a score based on the extent to which it differed from the posted speed limit;
- The daily traffic volume and road classification were reviewed, and the location given a score based on how much the traffic volume differed from a predefined threshold for each road class;
- The presence of a school within 150 metres was noted, and given a score that varied with the type of school;
- If a park was located within 150 metres, a higher score was assigned;
- The number of preventable collisions was determined, and a higher score assigned if it exceeded a predefined threshold;
- If it was along a bike route, a higher score was assigned;
- Four additional criteria were identified to determine the eligibility for traffic calming. If any of the following were applicable, the roadway would not be eligible for traffic calming.
    - Grade exceeds 8%
    - Primary emergency access route
    - Snow clearing Priority Level 1
    - Transit route
- A total score was provided that was a summation of the scores assigned for the criteria above. A result of "not eligible" was returned if any of the final four criteria were met. A ranking was provided the ranked each location in decreasing order of the Total score.

2.2 Municipal Comparison

The City also conducted a comparison of its Traffic Calming warrant criteria with other municipalities in Metro Vancouver and the Fraser Valley, and with its previous policy. The comparison is summarized in TABLE 3, and indicates that:

- The City's previous policy was based on speeds, volumes and collisions. The current policy also includes road classification; grade; the presence of pedestrian generators and cycling; and the needs of transit and emergency vehicles.
- The City's current policy compares with the other municipalities as follows:
    - The explicit consideration of pedestrian and cyclist presence reflects the priority the City places on the protection of the most vulnerable road users;
    - The explicit consideration of road class is consistent with the Canadian Traffic Calming Guide;

- The rationale for excluding sidewalks is unclear; but it may reflect that the District considers the need for sidewalks independently of traffic calming;
- The lack of information to distinguish local and through traffic makes it challenging to establish shortcutting as an issue; therefore, the need for traffic calming is driven primarily by speed and safety considerations.

TABLE 3 MUNICIPAL COMPARISON OF TRAFFIC CALMING CRITERIA

Municipality	System	SPEED	VOLUME	PED GENERATORS	CYCLING	TRANSIT/ EMERG	ACCIDENTS	RD CLASS	NON-LOCAL TRAFFIC	SIDEWALKS	GRADE	Funding	Comments
Mission (updated)		YES	YES	YES	YES	YES	YES	YES			YES		
Mission	Single or Dual criteria	YES	YES				YES					Both varies based on	
Abbostford	Multi-warrant system	YES	YES			YES		YES	YES		YES		identifies collectors not
Maple Ridge	Single criteria	YES	YES					YES					different number for different classifications
ToL	Multi-criteria scoring/ prioritization	YES	YES	YES	YES	YES	YES	YES	YES	YES		Municipal	
New West	Primary and secondary scoring	YES	YES	YES	YES	YES		YES				Municipal, and low priority by	different scoring based on local or
N. Van	Multi-criteria scoring/ prioritization	YES	YES	YES	YES		YES						
Squamish	Multi-criteria scoring/ prioritization	YES	YES	YES	YES		YES		YES			Municipal	
Coquitlam	Petition											Owners	Do not seem to have criteria, only petition
Chilliwack	MORITORIUM												

2.3 Application Results

Based on the application of the above-described policy and procedures, the locations ranked for traffic calming measures are summarized in TABLE 4 and in FIGURE 1.

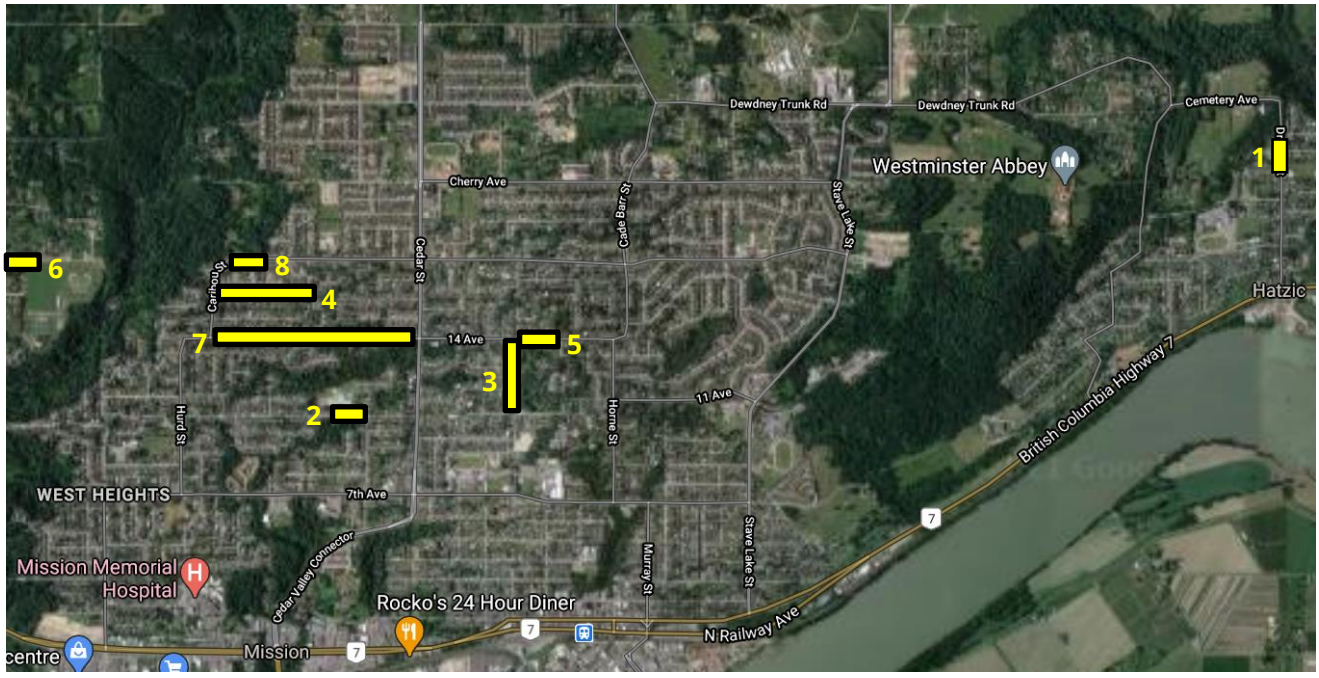
The City policy states that, based on the results of the warrant application,:

- 40 points or greater - may be considered for Traffic Calming
- 20 to 39 points - may be considered for resident-funded Traffic Calming
- 20 points or less – will not be considered for Traffic Calming

Of the 18 requests listed in TABLE 1 (only the requests that listed a location), 8 locations met the eligibility criteria and met the minimum threshold of 20 points to be considered for traffic calming. These locations are listed in order of the priority points in TABLE 4.

TABLE 4 TRAFFIC CALMING PRIORITY LOCATIONS

Ranking	Location	From	To	Road Class	Daily Volume	Actual 85th Percentile Speed	Posted Speed Limit	Type of school within 150m	Is there a park within 150m?	Preventable MV Collisions (5 yrs)	Is this a Bike Route?	Total Points
1	Draper St	McEwan Ave	Henry Ave	Collector	1636	45.0	30	Elementary School	Yes	2	Yes	40
2	McRae St	Eider St	Edge St	Local	1065	49.0	30	Elementary School	No	0	No	39
3	Grand St	11th Ave	14 Ave	Collector	5670	61.6	50	None	Yes	3	Yes	37
4	Badger Ave	West of Beaver Dr	Beaver Dr	Local	530	56.2	30	None	Yes	2	No	35
5	14 Ave	Taulbut St	Grand St	Collector	5665	62.4	50	None	Yes	0	No	32
6	Kenney Ave	Oyama St	Nelson St	Local	2000	55.0	50	None	Yes	3	Yes	30
7	14 Ave	Cedar St	Caribou St	Collector	4744	70.0	50	None	No		No	30
8	Best Ave	Caribou St	Bobcat Dr	Collector	3091	57.5	50	None	No	8	Yes	23



The list includes:

- 5 collector roads and 3 local roads;
- 3 collector road locations with high volumes and speeds (Grand Street and 14 Avenue);
- 2 locations within school zones;

- 5 locations near parks; and
- 4 locations along designated bike routes.

2.4 Modification of Collision Score Based on Recent Data

Since Task 3.1 of the workplan included a recent analysis of collisions, the values in the Preventable Motor Vehicle collisions were checked and updated with the total collisions along that segment. The results are summarized in TABLE 5. The updated collision analysis includes all collisions reported along the segment, excluding intersections with stop control on the candidate street or with a collector. Further analysis of each individual collision would provide a more insight into the preventability of the collision; however, this was outside of the scope of this review.

TABLE 5 PREVENTABLE MOTOR VEHICLE COLLISIONS (UPDATED WITH 2015-2019 DATA)

Ranking	Location	From	To	Preventable MV Collisions (5 yrs) – District Analysis	MV Collisions (5 yrs) – 2015-2019 ICBC Data	Comments	MV Collisions most likely to be preventable (2015-2019 ICBC Data)	Revised Collision Score	Revised Total Score	Revised Ranking
1	Draper St	McEwan Ave	Henry Ave	2	3	1 at each int	3	0	40	2
2	McRae St	Eider St	Edge St	0	2	1 at each int	2	0	39	3
3	Grand St	11 Ave	14 Ave	3	29	18 at 14 Ave, 6 at 11 Ave	5	5	42	1
4	Badger Ave	West of Beaver Dr	Beaver Dr	2	2	At Badger/ Antelope	2	0	35	4
5	14th Ave	Taulbut St	Grand St	0	21	18 at Grand St	3	0	32	6
6	Kenney Ave	Oyama St	Nelson St	3	3	2 at Nelson	3	0	30	7
7	14 Ave	Cedar St	Caribou St	Blank	90	81 at Cedar, 4 at Caribou	5	5	35	4
8	Best Ave	Caribou St	Bobcat Dr	8	3	2 at Bobcat	3	0	18	8

If the new collision scores are applied, Location #3 becomes the highest-ranked location, Location #7 attain a higher ranking, and Location #8 drops below the threshold to be considered for traffic calming.

2.5 Site Visits

Virtual site visits were conducted to each of the top 8 ranked locations (based on the City's ranking) in order to confirm the need for traffic calming, as well as to identify the type of traffic calming that might be most appropriate. The results of the qualitative review are summarized in TABLE 6.

TABLE 6 SITE VISITS TO TOP CANDIDATE LOCATIONS

LOCATION, COMMENTS	PHOTOGRAPH

Draper St – McEwan to Henry
• Elementary school, parking backs onto travel lane
• Potential Enhancements:
  ○ provide raised crosswalks at existing crosswalk locations
  ○ speed display device midway
  ○ school pavement markings
	

McRae Street – Eider to Edge
• Sidewalks on both sides but portion missing on south side
• School on north side but no crosswalk nearby
• Potential Enhancements:
  ○ Curb extensions at existing crosswalks
  ○ Raised crosswalk near school entrance
  ○ Fill in missing sidewalk
	

Grand St – 11th to 14th
• Park on east side throughout
• Sidewalks both sides (except at north end)
• Relatively wide (parking sporadic)
• Potential Enhancements:
  ○ Curb extensions at existing crosswalk location at 12 Ave (bicycle-friendly)
  ○ Additional crosswalk at Orchid Dr. with curb extensions
  ○ Speed display devices at both ends (11 Ave and 14 Ave)
  ○ Fill in missing sidewalks
	

Badger Ave – W of Beaver to Beaver
• Long, straight, flat section
• Sidewalk on north side
• 30 km/h playground zone
• Potential Enhancements:
  ○ Sidewalk on S. side along park
  ○ Crosswalk at Beaver
  ○ Speed humps W. of PG
  ○ Speed display device at E. end
	

LOCATION, COMMENTS	PHOTOGRAPH

14th Ave – Taulbut to Grand
• Rural cross-section, no sidewalk or crosswalks
• Straight, flat section
• Park along south side
• <u>Potential Enhancements:</u>
  ○ Playground Area signage
  ○ Crosswalk at Taulbut
  ○ Sidewalk on S. side along park
  ○ Speed display device near 14th
	

Kenney Ave – Oyama to Nelson
• No sidewalks
• Very narrow along E. portion and just E. of S-curve
• Large residential properties
• <u>Potential Enhancements:</u>
  ○ Due to absence of sidewalks, post lower speed limit
  ○ Speed humps at intermittent intervals to reinforce reduced speed limit
	

14 Ave – Cedar to Caribou
• Wide roadway, residential
• Sidewalk changes sides then disappears, narrow shoulder
• <u>Potential Enhancements:</u>
  ○ Long-term: continuous SW and parking on N. side
  ○ Continuous shoulder/bike lane OR parking on S. side
  ○ Roundabout at Tanager
  ○ Speed display devices
	

Best Ave – Caribou to Bobcat
• Local bikeway, sidewalk on S. side, parking both sides
• <u>Potential Enhancements:</u>
  ○ Crosswalk on E. side of Bobcat
  ○ Consider 40 km/h speed limit
  ○ Speed Display Devices, Speed Watch
	

2.6 Additional Considerations

The review of the City's evaluation methodology for assessing traffic calming requests found that it is sophisticated in its coverage of a wide range of factors. The method considers both safety factors as well as the limits imposed by standards and other roadway functions. A review of alignment with current best practices was conducted, with the following findings:

- In the Safe System Approach2 to setting speed limits, the 85th percentile speed is not explicitly considered. Speed limits are selected based on the anticipated road users, and traffic calming is used to reinforce this target speed. For example, on local roads, if pedestrians or cyclists are expected or intended to be in the roadway, the speed limit would be set to be 30 km/h, and traffic calming devices that include some vertical deflection (such as speed humps), or significant horizontal deflection (such as roundabouts or chicanes) are likely to be considered. 85th percentile speed can, however, help determine the extent of the measures that may be required to achieve the target speed.
- Traffic Calming devices can be provided along transit routes without impacting transit comfort and travel time by placing "breaks" in speed humps to allow for the wheels of transit vehicles to remain at grade. These devices are referred to as "speed cushions". While the City's policy currently does not permit Traffic Calming along transit routes; with this modification, it is likely that additional locations would be eligible for calming.
- Providing sidewalks and crosswalks can often mitigate the need for traffic calming measures.

3.0 CONCLUSIONS

The following conclusions are made based on the preceding review of Neighbourhood Traffic Calming locations in the City of Mission.:

- The City has developed a sophisticated policy for the evaluation of the need for Traffic Calming, explicitly considering the presence of cycling and the proximity of schools and parks, in addition to vehicle speeds, volumes and collision history.
- The City's consideration of traffic calming measures is generally consistent with the TAC/CITE Canadian Guide to Traffic Calming (2018).
- In the City's list of requests, information was missing from some locations (locations, traffic volumes, etc.) that precluded their inclusion in the analysis.
- Of the 20 requests on the list provided by the City, 8 locations met the minimum threshold for considering traffic calming, and one met the threshold for City-funded implementation and has already been improved.
- The "preventable collisions" score was updated based on recent data, and if applied would result in minor changes to the ranking of the locations.
- A virtual site visit was conducted of each location meeting the threshold, and suggested enhancements were proposed that include traffic calming as well as sidewalks, crosswalks or reduced speed limits as appropriate.

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[2] Speed Management: A Road Safety Manual for Decision-Makers and Practitioners: https://www.ite.org/technical-resources/topics/speed-management-for-safety/setting-speed-limits/

APPENDIX D

REVIEW OF CROSSWALK WARRANTS

As part of the development of the Traffic Safety Strategy component of the City of Mission (City's) Transportation Plan, TranSafe carried out a review of pedestrian crosswalk warrants (Task 3.3 of workplan) and of the City's analysis. The preliminary findings are summarized in this memo, and will be used to inform the Traffic Safety Strategy recommendations and implementation priorities, based on the City's feedback.

1.0 BACKGROUND AND CONTEXT

1.1 Transportation Plan and Traffic Safety Strategy Context

Attachment A of the March 18, 2019 Council Report on Traffic Safety includes Pedestrian Safety as one of the categories where public complaints have been received and safety issues have been identified. In response to "vehicles not stopping for pedestrians, pedestrian visibility issues", it lists as potential mitigation measures: "install crosswalks, street lights, pedestrian-activated flashing beacons, curb bulges", and that implementation would be determined based on crossing control warrants. It also notes as an implementation item: "Update Crosswalk Policy to include RRFB and Special Crosswalk, review all non-stop controlled pedestrian crossings for conformance to current Pedestrian Crossing Control Guide (underway)."

In the August 19, 2019 Council Report, it was noted that "several projects have been identified by staff based on existing known issues, including five priority one crosswalks. These are already being tracked and evaluated, with priorities assigned based on a warrant system. The improvements include new overhead flashing beacons at three locations and rapid rectangular flashing beacons at two locations."

In the Request for Proposal, it was noted that as part of the Traffic Safety Strategy, the Consultant would analyze crosswalk requests and prepare a prioritized list of sites for improvements.

As part of the plan preparation, the City provided a crosswalk assessment spreadsheet that was used to select the 2019 projects funded by this strategy.

1.2 City Crosswalk Policy

The Pedestrian Crossing Control Policy adopted by the City in Nov. 2020uses the *TAC Pedestrian Crossing Control Guide, Third Edition (June 2018)*. This publication is referred to in this memo as PCCG. The spreadsheet developed by the City predated the new policy, and the Consultant was retained to update it in accordance with the new policy.

2.0 METHOGOLOGY

2.1 Candidate Locations

The City provided a list of 86 locations where crosswalks exist and two where evaluations are underway. Nine are on roads under provincial jurisdiction (1st Ave, N. Railway Ave).for the consideration of crosswalks. The list is summarized in TABLE 1, along with the existing crossing control. improvements to the locations in green are underway. The meaning of the yellow highlights was unclear.

TABLE 1 LIST OF CROSSWALK REQUESTS

STREET	CROSS STREET	EXISTING CROSSING CONTROL
7th Ave	Taulbut St	GM
Grand St	4th Ave	GM
Stave Lake St	9th Ave	GM
Wren St	7th Ave	GM
Wren St	Hillcrest Ave	GM
Wren St	*Raven Ave*	*GM*
Stave Lake St	4th Ave	GM
Stave Lake St	5th Ave	GM
Wren St	Midblock (West Heights Elementary)	GM
Wren St	Van Velzen Ave	GM
11th Ave	Dunsmuir St	GM
7th Ave	James St	GM
7th Ave	Murray St	GM
7th Ave	Alder St	GM
7th Ave	Birch Ave	GM
Hurd St	Lamont Ave	GM
Hurd St	McRae Ave	GM
Hurd St	Beuckert Ave	GM
Hurd St	Hillcrest Ave	GM
Cedar St	Tunbridge Ave	GM1
14th Ave	Horne St	GM
1st Ave	Grand St (west of)	GM
1st Ave	Horne St	GM
1st Ave	James St	GM
1st Ave	James St	GM
1st Ave	Welton St	GM
1st Ave	Welton St	GM
2nd Ave	Horne St	GM
2nd Ave	Horne St	GM
2nd Ave	Welton St	GM
2nd Ave	Welton St	GM
7th Ave	Juniper St	GM
7th Ave	Columbia St	GM
7th Ave	Eider St	GM
7th Ave	Lee St	GM
7th Ave	Peterson St	GM
7th Ave	Strachan St	TS - Ped
Alder St	3rd Ave	GM
Best Ave	Midblock (Hillside Elementary)	GM
Best Ave	Midblock (Cherry Hill Elementary)	GM
Best Ave	Philbert St	GM
Best Ave	Dorothea Ct	GM
Best Ave	Kudo Dr	GM
Best Ave	Miller St	GM
Blueberry Dr	Gale Pl	None
Bobcat Dr, West	Ohashi Crt	GM
Cade Barr St	Dewdney Trunk Rd	GM
Cade Barr St	Cox Dr	GM
Cherry Ave	Aster Terr	GM
Cherry Ave	Harms St	GM
Cherry Ave	Midblock (Alberta McMahon East)	GM
Cherry Ave	Midblock (Alberta McMahon West)	GM
Dewdney Trunk Rd	Draper St	GM

STREET	CROSS STREET	EXISTING CROSSING CONTROL
Dewdney Trunk Rd	Moffat Ave	GM
Dewdney Trunk Rd	Stave Lake Dam (west of)	GM
Dewdney Trunk Rd	Stave Lake St (west)	GM
Dewdney Trunk Rd	Stave Lake Dam	GM
Donatelli Ave	Hayward St	GM
Donatelli Ave	McLean St	GM
Draper St	McEwen Ave	GM
Forbes St	Copper Pl	GM
Grand St	12th Ave	GM
Grand St	2nd Ave	GM
Grand St	11th Ave	GM
Grand St	Midblock (at Leisure Centre)	GM
Hurd St	Scott Ave	TS - Ped
James St	2nd Ave	GM
James St	3rd Ave	GM
James St	4th Ave	GM
James St	5th Ave	GM
Knight Ave	Broom St	GM
London Ave	Overpass to Hwy 11	GM
McRae Ave	Edge St	GM
McRae Ave	Eider St	GM
McRae Ave	Thrasher St	GM
Mershon St	Midblock (at WCE Parking)	GM
Miller Cres	Midblock (at 8301 Miller)	GM
Murray St	3rd Ave	TS - Ped
Rai Ave / Frontage Rd	Walmart Access Rd	GM
Railway Ave, North	Horne St	GM
Railway Ave, North	James St	GM
Railway Ave, North	Welton St	GM2
Sandpiper Pl	Sandpiper Dr	GM
Taulbut St	11th Ave	GM
Welton St	5th Ave	GM
Wren St	Tyler St	GM
Wren St	Holiday Ave	GM
Stave Lake St	Cherry Ave	RRFB (2021)

The total number of crosswalks by traffic control type are:

- 82 ground-mounted systems with side-mounted signs;
- 1 “ground mounted” system with overhead-mounted signs (Railway Avenue & Welton Street);
- 1 RRFB location (Stave Lake St & Cherry Ave), implemented in 2021
- 3 pedestrian signals (half-signals): 1) 7 Avenue & Strachan Street; 3) Hurd Street & Scott Avenue; and 3) Murray Street & 3rd Avenue; and
- 1 location without any crosswalk controls: Blueberry Drive & Gale Place

The locations highlighted in green in TABLE 1 include the following improvements (scheduled for implementation in 2021):

Overhead flashing beacons and site improvements at:

- Stave Lake Street at 9th Avenue
- Wren Street at 7th Avenue

- Wren Street at Hillcrest Avenue

Side-mounted rapid rectangular flashing beacons and site improvements at:

- Grand Street at 4th Avenue (with curb extensions)
- 7th Avenue at Taulbut Street
- Cherry Avenue at Stave Lake Street (already operational, with road markings in Spring 2021)

2.2 Application Methodology

The methodology followed by City staff was reviewed based on the information available within the spreadsheet. For each location, the spreadsheet included (other than the location):

- Existing Crosswalk Control. From the TAC PCCG, these are:
    - GM ground-mounted
    - GM1 ground - side-mounted
    - GM2 ground - overhead-mounted
    - RRFB rectangular rapid flashing beacon
    - OF overhead flashing beacon system
    - TS traffic signal system
    - TS1 half signal
    - TS2 full signal
- Number of travel, turn, part-time parking lanes (to estimated crossing distance)
- Number of full-time parking lanes (to estimate crossing distance)
- Number of lanes (for warrant application)
- Average Daily Traffic (ADT) and source (was not available for rural locations)
- Speed Limit (posted limit)
- School Route (whether the crosswalk was within or near a school zone)
- 85th Percentile Speed (this is not used in the TAC warrant, but was provided for one location)
- Recommended Treatment (completed by City staff)
- Cost Estimate (not completed)
- Priority (1, 2 or 3, completed by City staff)
- Presence of let-downs (Yes or No)
- Notes (rationale for recommendation, or assumptions regarding traffic counts)

The PCCG considers locations with 15 EAU (equivalent adult unit) per hour to be eligible for the review of crossing control. It was noted that pedestrian volumes were not indicated for any of the locations. For the purpose of this review, although several likely do not meet this threshold, none of the locations were eliminated from consideration on the basis of pedestrian volume.

2.2 Application Results

Based on our review of the City's application of the TAC crosswalk policy and procedures, the following results emerged:

- RRFBs were recommended at 13 locations;
- OF were recommended at 3 locations;
- Either GM or RRFB were recommended at 9 locations;
- The complaints at 5 locations were to be investigated further; and
- No changes were recommended at all other locations (all have existing GM systems).

2.3 Verification of Warrant Results

A review was conducted of all the warrant results by re-conducting them in accordance with the decision support tool in the TAC Pedestrian Crossing Control Guide. The preliminary assessment in the TAC method, other than pedestrian volumes, also considers the distance from the nearest traffic control device and the presence of a pedestrian desire line at the location. In the absence of pedestrian volumes and information on desire lines, the TAC warrants conducted in this exercise excluded these factors. However, the were assessed as part of TranSafe's recommendations.

The TAC warrant results and TranSafe's independent review results are summarized in TABLE 2. The review concluded that the warrant results provided by the City were consistent with the TAC PCCG – with the assumptions noted above – for all locations, with the exception of 8 locations (see TABLE 2). TranSafe conducted a closer review of all locations where the TAC assessment yielded a different result than the City's recommendation, as well as locations where City did not provide a recommendation. TranSafe's review explicitly considered the following factors:

- Distance from traffic signals: Given that Mission is a relatively small community, the distance factor was taken to represent the distance to the signalized crossing; if the distance was within 100-200 metres, the site was not to be considered for upgrading.
- Crossing distance: Some crossings noted as 3 lanes were closer to 4 lanes. Where curb extensions could not be provided (e.g. due to lack of sidewalks), 4 lanes was assumed.
- Pedestrian generators: The proximity of major generators such as commercial, recreational uses and schools were considered, in the absence of pedestrian counts.
- Traffic volumes: A more conservative approach was applied, due to Mission's size and priority on traffic safety and vulnerable road users, with the following volume thresholds (compared to Table 1 of the PCCG): 1,500 to 3,750; 3,750 to 7,500; 7,500 to 10,000; and 10,000 to 15,000.
- Alignment: Higher priority where changes in alignment reduces sight distance or expectation.
- Consistency: Consistency along corridors (e.g. overhead displays on Railway Ave) considered.

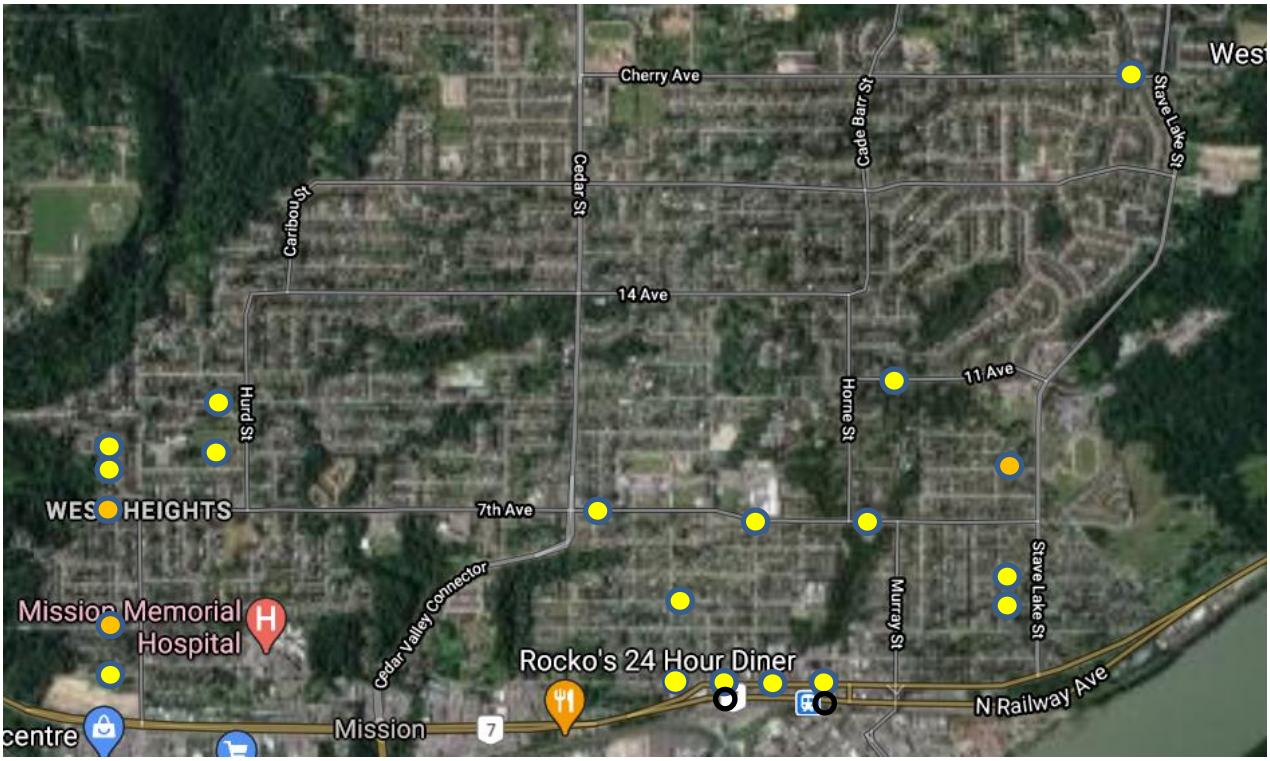
TABLE 2 LOCATIONS REVIEWED FOR VERIFICATION OF PEDESTRIAN CROSSING CONTROL UPGRADES

LOC #	Street	Cross Street	Existing Crossing Control	City Recom-mendation	TAC Warran t	TranSafe Recom-mendation	Comment
1	1st Ave	Grand St	GM	RRFB	RRFB	RRFB	None
2	1st Ave	Horne St	GM	RRFB	RRFB	RRFB	None
3	1st Ave	James St	GM	RRFB	RRFB	RRFB	Check need for both sides
4	1st Ave	Welton St	GM	RRFB	RRFB	RRFB	Check need for both sides
5	Railway Ave N	Horne St	GM	GM	RRFB	GM2	Vol lower than 1 Ave
6	Railway Ave N	James St	GM	GM	RRFB	GM2	Vol lower than 1 Ave
7	Railway Ave N	Welton St	GM2	GM	RRFB	GM2	Vol lower than 1 Ave
8	Wren St	7th Ave	GM	OF	OF	OF	None
9	Wren St	Hillcrest Ave	GM	OF	OF	OF	None
10	Wren St	Raven Ave	GM	RRFB	OF	RRFB	Close enough to Hillcrest
11	Wren St	West Hts. Elementary	GM	RRFB	RRFB	RRFB	Suggest curb extension
12	Wren St	Van Velzen	GM	RRFB	RRFB	RRFB	None
13	Stave Lake St	9th Ave	GM	OF	RRFB	OF	>7,500; near school
14	Hurd St	Beuckert Ave	GM	GM or RRFB	GM	GM	Lower crossing demand, curb extension
15	Hurd St	Hillcrest Ave	GM	GM or RRFB	GM	RRFB	>7,500; near hospital
16	Hurd St	Scott Ave	TS - Ped	TS - Ped	GM	TS - Ped	Assists veh. movements
17	Hurd St	Lamont Ave	GM	GM or RRFB	GM	RRFB	Alternatively: GM + CE
18	Hurd St	McRae Ave	GM	GM or RRFB	GM	RRFB	Alternatively: GM + CE
19	Stave Lake St	Cherry	None	-	GM	RRFB	> 7,500; alignment
20	Stave Lake St	4th Ave	GM	RRFB	RRFB	RRFB	None
21	Stave Lake St	5th Ave	GM	RRFB	RRFB	RRFB	None
22	11th Ave	Dunsmuir St	GM	GM or RRFB	GM	RRFB	4 lanes; but can't put CE
23	7th Ave	Alder St	GM	GM or RRFB	GM	RRFB	> 7,500; 4-lanes wide
24	7th Ave	Birch Ave	GM	GM or RRFB	GM	GM	120 m from Grand
25	7th Ave	Taulbut St	GM	RRFB	GM	RRFB	Midway between signals
26	7th Ave	James St	GM	GM or RRFB	GM	GM	Close to TS at Grand
27	7th Ave	Murray St	GM	GM or RRFB	GM	RRFB	Proximity to Park
28	7th Ave	Strachan St	TS - Ped	TS - Ped	GM	TS - Ped	Proximity to learning ctr
29	Murray St	3rd Ave	TS - Ped	TS - Ped	GM	TS - Ped	For vehicle movements
30	Grand St	4th Ave	GM	RRFB	RRFB	RRFB	None

Note 1: Locations where upgrades are recommended are shaded in TABLE 2.
Note 2: The locations listed in TABLE 1 but excluded from TABLE 2 require traffic volume data.

2.4 Recommended Pedestrian Crossing Control Upgrades

The locations recommended for upgrades (shaded in TABLE 1) are mapped in FIGURE 1.



GM2 (overhead signs) RRFB OF (overhead flashing beacon)

FIGURE 1 LOCATIONS WITH RECOMMENDED PEDESTRIAN TRAFFIC CONTROL UPGRADES

The list of locations recommended for pedestrian crossing control includes upgrades at 23 locations:

- 2 upgrades from GM to GM2 (on N. Railway Avenue);
- 18 new RRFBs (17 are currently GM crossings and one is uncontrolled); and
- 3 new OF (all currently GM crossings).

Additional locations that can be reviewed once traffic volumes are available:

- Dewdney Trunk Rd at Stave Lake Dam (west of);
- Dewdney Trunk Rd at Stave Lake St (west);
- Dewdney Trunk Rd at Stave Lake Dam;
- Donatelli Ave at Hayward St; and
- Donatelli Ave at McLean St.

No downgrades of the crosswalk controls were recommended in this review, recognizing that municipalities typically have a specific process in place to consider removals of traffic or pedestrian signals. However, it

should also be recognized that traffic control devices in general typically do not provide additional safety benefits to road users at locations where they are unwarranted.

TranSafe's review also did not include an evaluation of locations for crosswalks other than at the locations provided by the City, nor the consideration of which side of the intersection to provide the crosswalk.

2.5 Additional Enhancements

The following enhancements should be considered along with the implementation of the identified crossing treatments:

- Sidewalks: Sidewalks were noted to be absent at some of the crosswalk locations. While it is understood that sidewalks cannot be provided at the rural locations, short sections of sidewalks were noted to be missing near some of the proposed crosswalks. The absence of sidewalks may discourage pedestrians from using the designated crosswalk location.
- Curb Extensions: Curb extensions along roads with permanent parking are strongly recommended, to reduce crossing distances. A handful of locations were noted where the implementation of curb extensions is expected to reduce the need for an RRFB; however, depending on the City's policy and budget for curb extensions vs. RRFB, this should be more closely reviewed at all of the locations.
- Aligned Curb Let-downs: To increase the effectiveness and accessibility of crosswalks, it is advisable to provide smaller curb radii so that curb let-downs can be aligned with crosswalks rather than directing pedestrians away from the painted crosswalk. This is especially important for users of mobility devices.
- Tactile Surface Treatments: Treatments that can alert visually impaired pedestrians of the location of the edge of the curb and further direct them into the crosswalk (in addition to the aligned curbs noted above) should be considered to be provided, starting with locations where elderly or visually impaired pedestrians are most likely to be using, and in the downtown locations were pedestrian volumes are high.
- Overhead RRFB's: To make RRFB's even more visible, RRFB's can be provided overhead. This would be more costly, but may be more advantageous at certain locations.

3.0 CONCLUSIONS

The following conclusions are made based on the preceding review of Pedestrian Crosswalk locations in the City of Mission.:

- The City has identified 88 locations where it reviewed the need for upgrading the pedestrian crossing control.
- The City currently has a handful of locations with Pedestrian Signals, one location with an RRFB, and no locations with Overhead Flashers (OF) or RRFBs.
- Current plans include two additional RRFBs and 3 new OFs.
- The City's review recommended upgrading the crossing control at 25 locations.
- TranSafe conducted the TAC pedestrian crossing control warrant at all locations, which yielded a different result than the City's recommendation at 8 of these locations. The details are provided in Section 2.3.

- For all of the locations where either City staff or the TAC warrant suggested an upgrade to the current crossing control, and in particular at locations where the results were different, TranSafe conducted a more explicit review of the distance from traffic signals or other crossing locations, pedestrian crossing distance, pedestrian generators, roadway alignment, and consistency along corridors; and applied a more conservative threshold for vehicle volumes.
- The results of the analysis indicated that pedestrian crossing control upgrades are recommended at 23 locations:
    - 2 upgrades from GM to GM2 (on N. Railway Avenue);
    - 18 new RRFBs (17 are currently GM crossings and one is uncontrolled); and
    - 3 new OF (all currently GM crossings).
- Traffic volumes were missing at several rural locations. The need for crosswalk upgrades at these locations can be reviewed as part of the Transportation Plan or by City staff once these are available.
- No additional locations were reviewed for the need for crossing controls other than the list provided by the City; the optimal side of the intersection for RRFBs was also not identified.
- Several enhancements should be considered together with upgraded crosswalks, such as filling in missing sidewalks, providing curb extension or tighter corner radii at intersections, tactile treatments, and possible overhead positioning of RRFBs at certain locations. These details can be identified as part of the Transportation Plan or separately by City staff.

APPENDIX E

TRAFFIC ANALYSIS AND MODELLING SUMMARY

1.0 INTRODUCTION

This appendix documents the traffic analysis process and modelling assumptions as part of the technical analysis of the City of Mission's Transportation Plan.

2.0 EXISTING CONDITION ASSESSMENT

2.1 Study Intersection

Intersections for operational analysis were established by including all of the signalized intersections of Mission's arterial and collector roads, selected major unsignalized intersections, and the BC MOTI's signals within Mission where MOTI's traffic data was available. In total, 54 intersections were analyzed and illustrated through graphics presented in a later section of this document.

2.2 Data Collection

As intersection turning movement traffic volumes are required for traffic operational analysis, a combination of data sources from the last five years or so was reviewed and compiled, including traffic counts, traffic impact studies, engineering traffic studies / plans, and the signal downloads data from MOTI. As the intersections' raw traffic data came from different years and months, all intersections' raw traffic volumes have been reviewed and adjusted to balance between intersections to account for historical growth and seasonality. Additionally, because some of the traffic counts were collected in 2020, which were likely impacted by the ongoing COVID-19 pandemic, adjustment factors of up to 1.1 were used. The adjustment factors were developed based on the traffic patterns from the nearest MOTI permanent count station at the Mission Bridge.

Corridor traffic volumes for major corridors were established using the historical 24-hour tube counts or were estimated by converting the PM peak hour traffic volumes to daily traffic volumes using "K" factors. The "K" factors are typically around 10% (PM traffic volumes = 10% of daily traffic volumes) for urban and subarea communities. A review of the historical 24-hour tube counts in Mission suggests a K factor of 9% for the City network and 10% for highways, aligning with the typical urban and suburban areas values. The average daily traffic volumes are illustrated in **FIGURE 1**.

2.3 Existing Intersection Operational Analysis

Synchro (v11) was used to evaluate the traffic performance for study intersections. Intersection Level of Service (LOS) are illustrated in **FIGURE 2** to **FIGURE 6**.

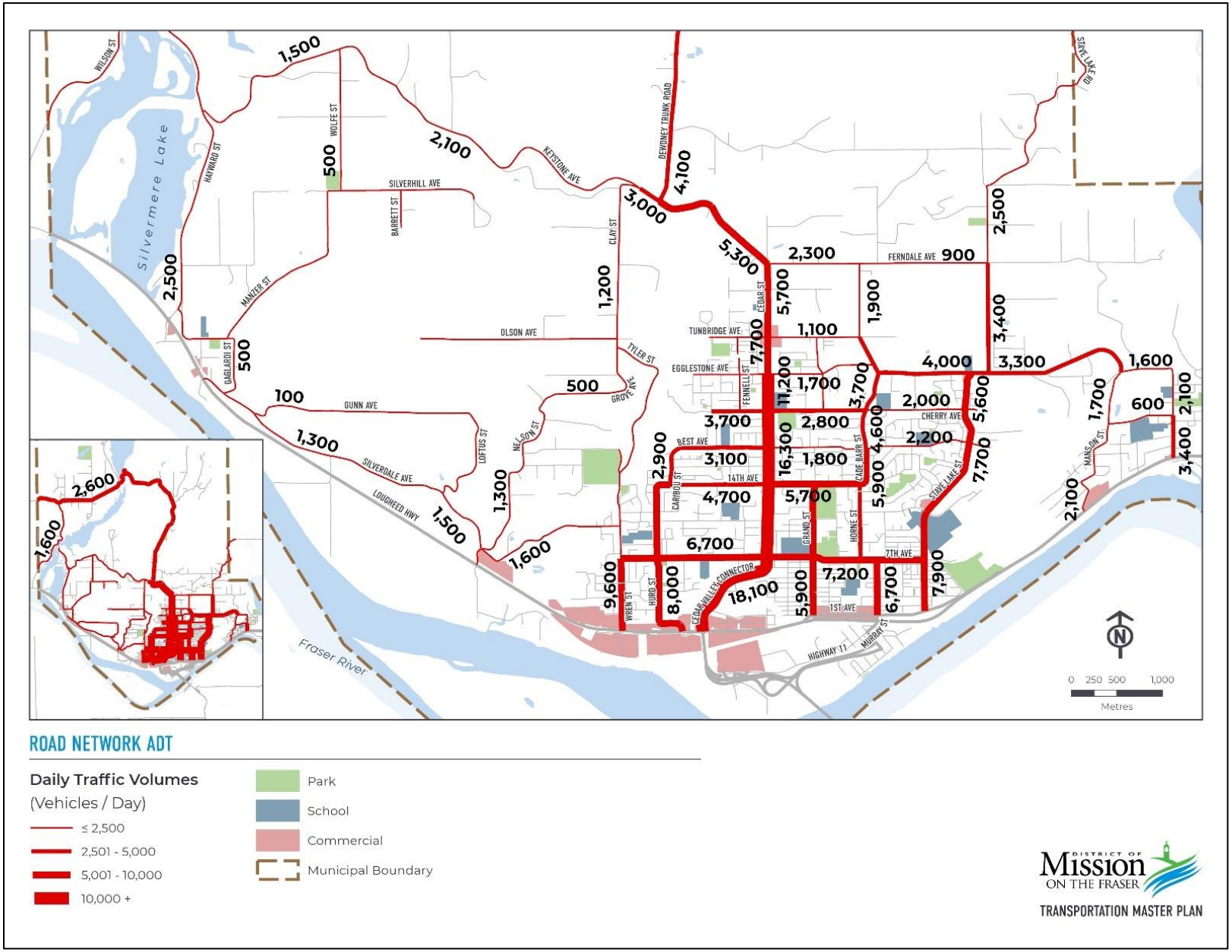


FIGURE 1: EXISTING DAILY TRAFFIC VOLUMES

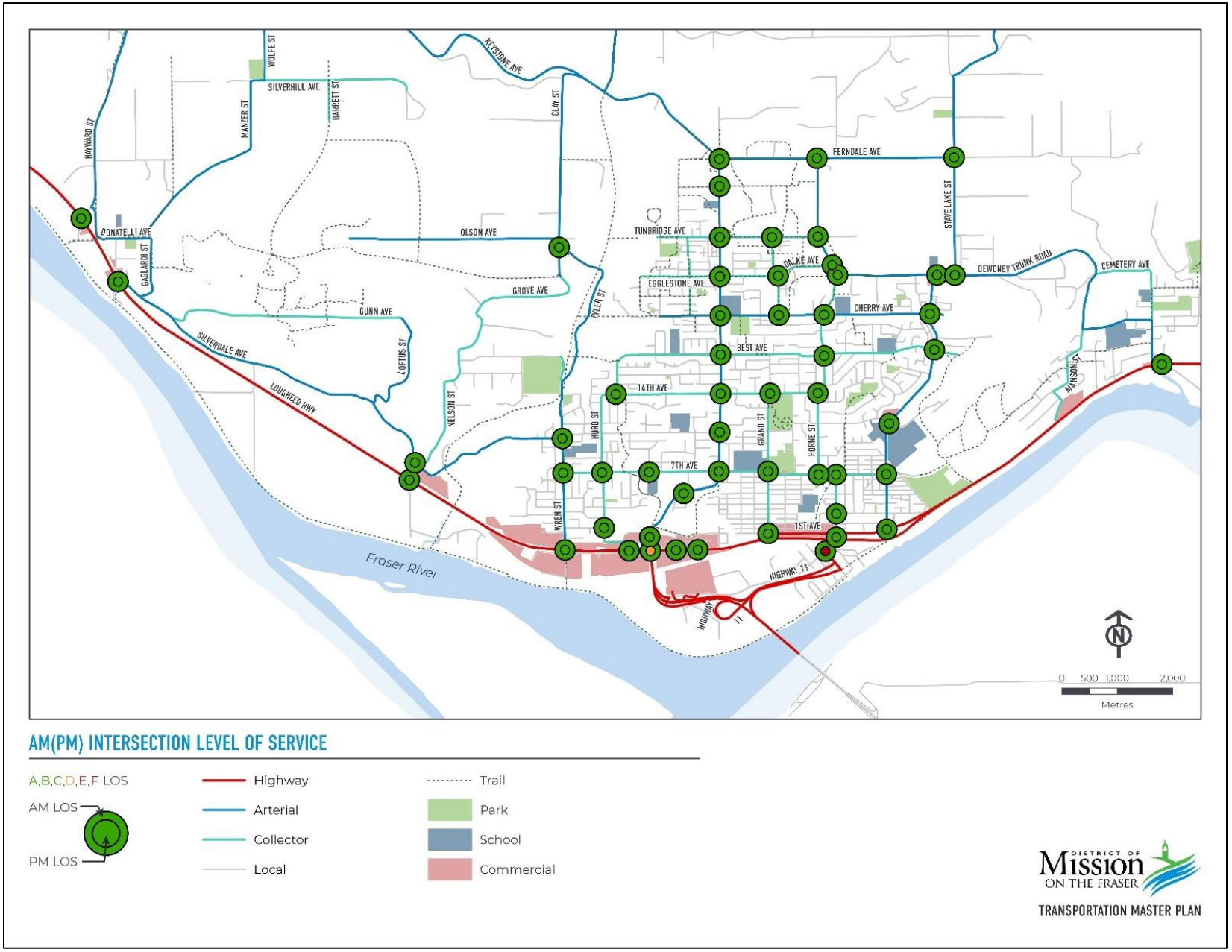


FIGURE 2: EXISTING AM (PM) OVERALL INTERSECTION LEVEL OF SERVICE

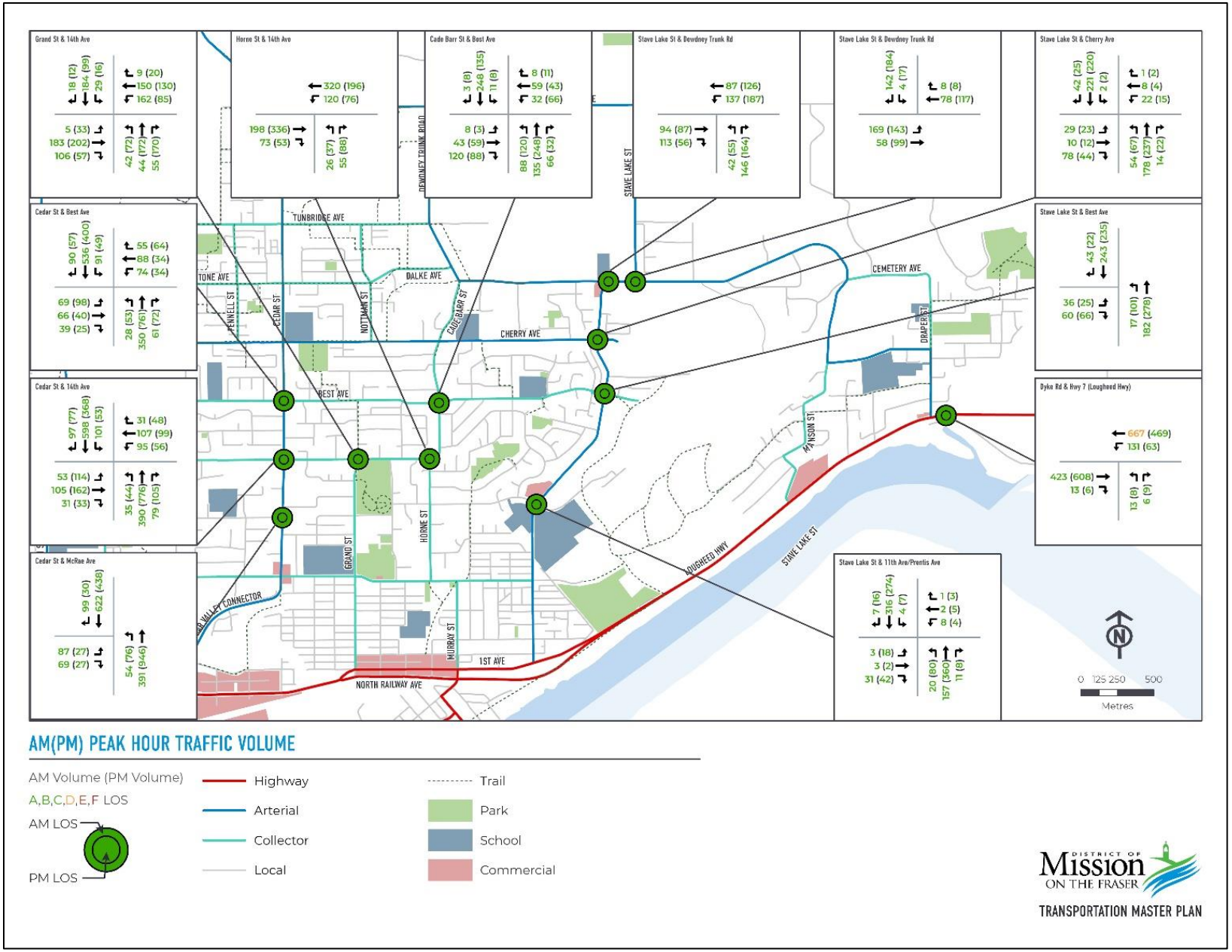


FIGURE 3: EXISTING AM (PM) PEAK HOUR TRAFFIC VOLUMES AND LOS (MISSION CORE NORTH)

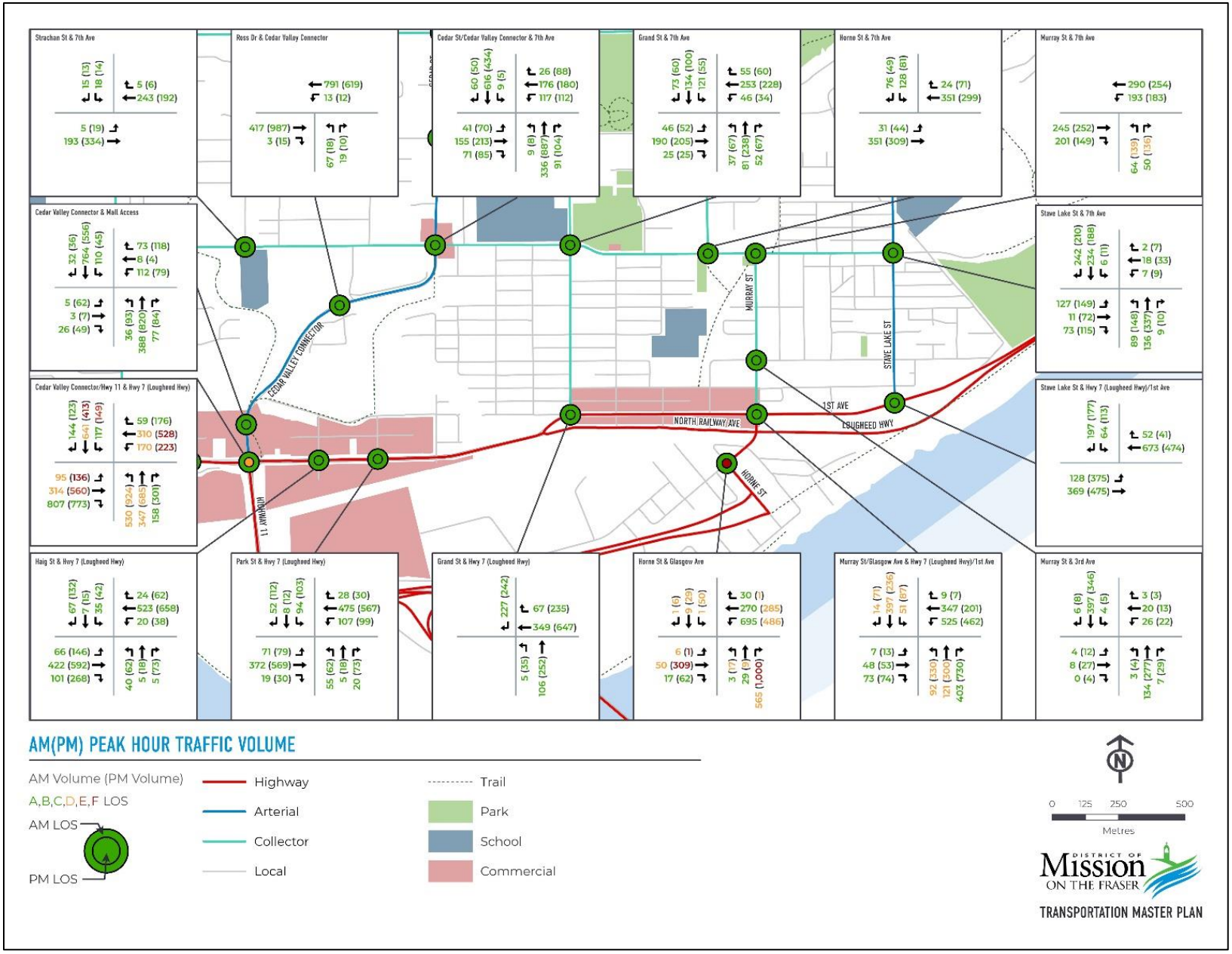


FIGURE 4: EXISTING AM (PM) PEAK HOUR TRAFFIC VOLUMES AND LOS (MISSION CORE SOUTH)

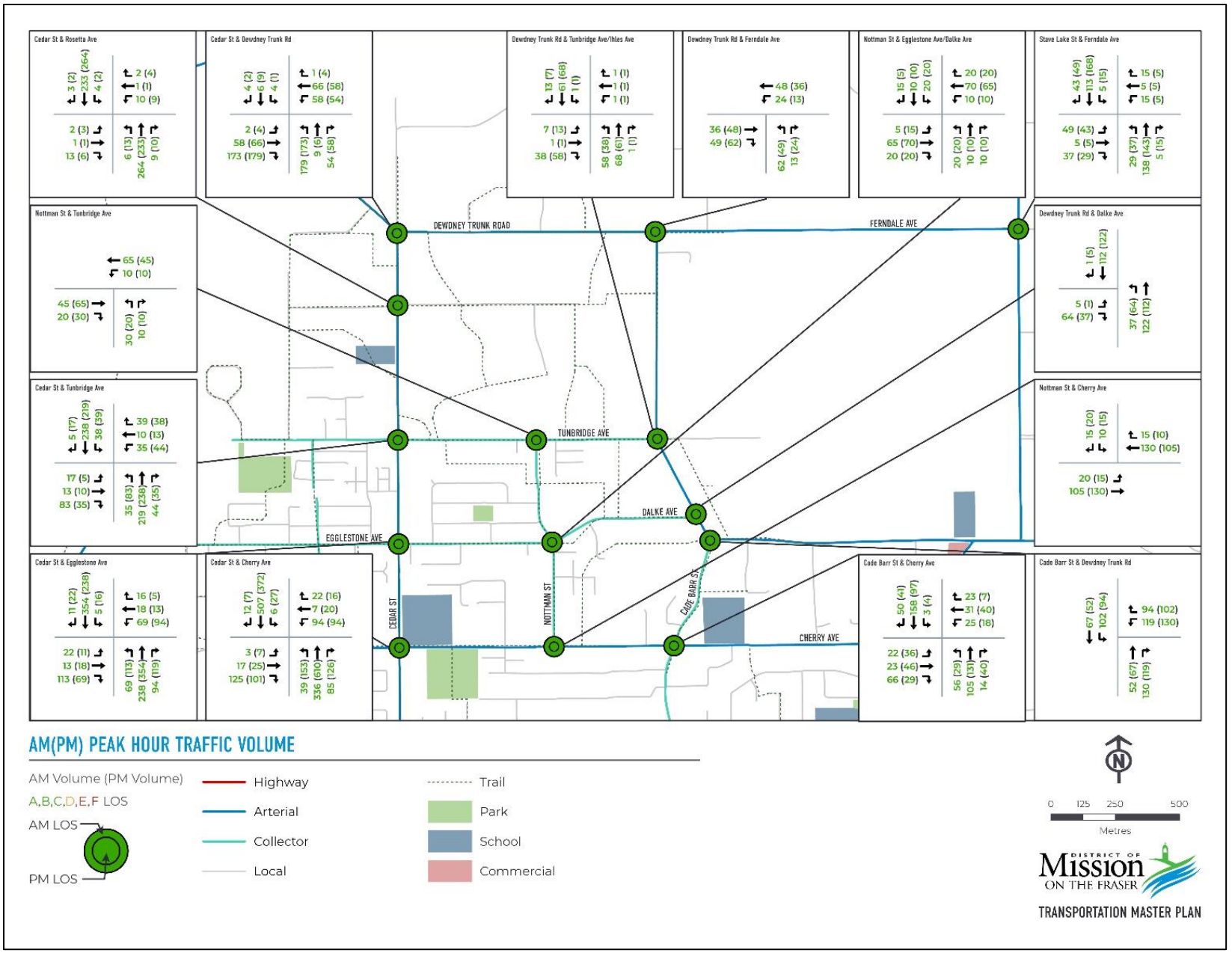


FIGURE 5: EXISTING AM (PM) PEAK HOUR TRAFFIC VOLUMES AND LOS (CEDAR VALLEY)

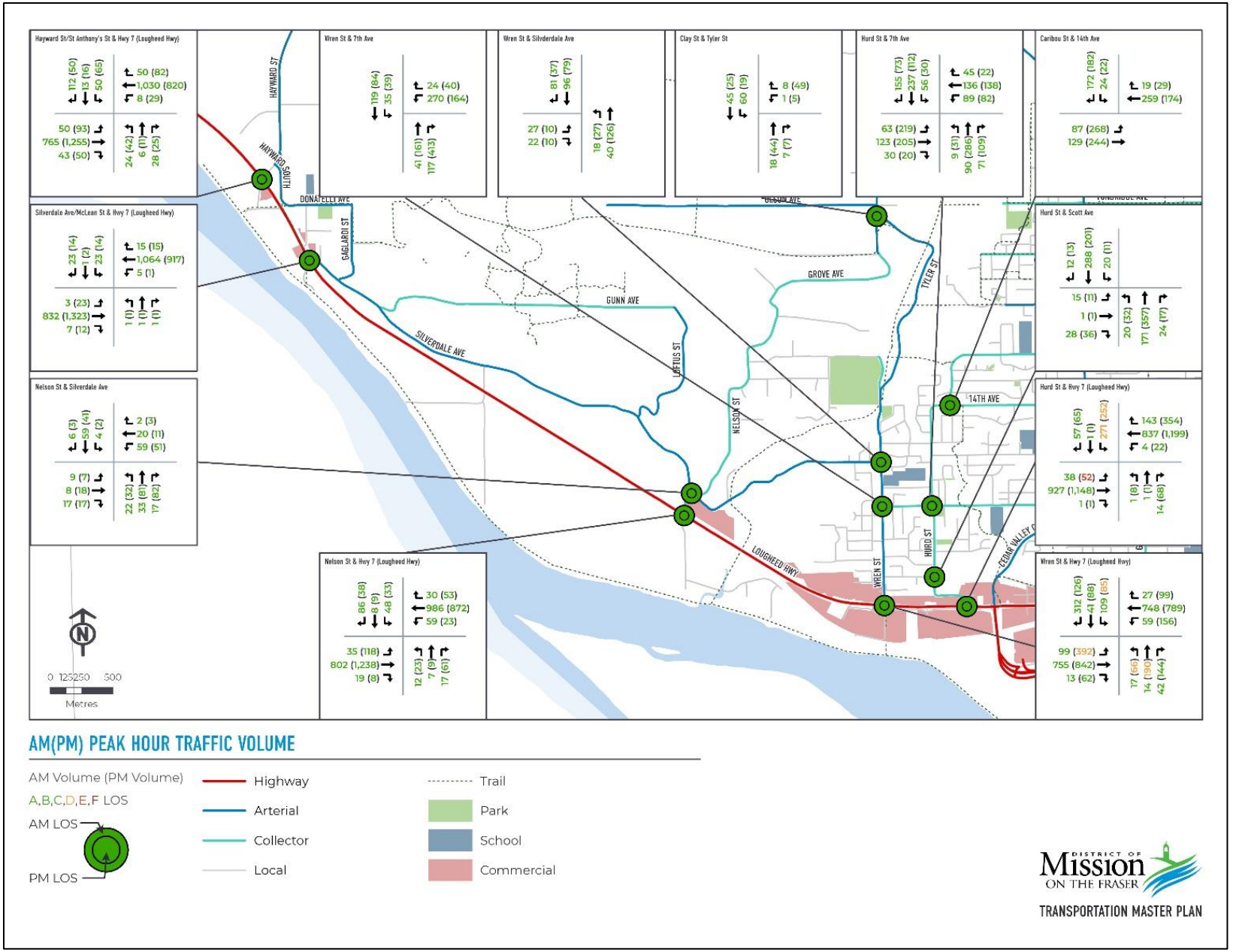


FIGURE 6: EXISTING AM (PM) PEAK HOUR TRAFFIC VOLUMES AND LOS (MISSION WEST)

3.0 FUTURE BASE TRAFFIC CONDITION ASSESSMENT

The TransLink Regional Transportation Demand Model (RTM), version 3.4, was used as the main tool for developing future traffic volume growth assumptions. The RTM is a macroscopic model that covers the entire Lower Mainland. The RTM package includes four horizons: 2011, 2017, 2035 and 2050 and has 17 traffic analysis zones (TAZs) within Mission (see **FIGURE 7**). The 2017 and 2050 models were used for existing and future horizon analysis.

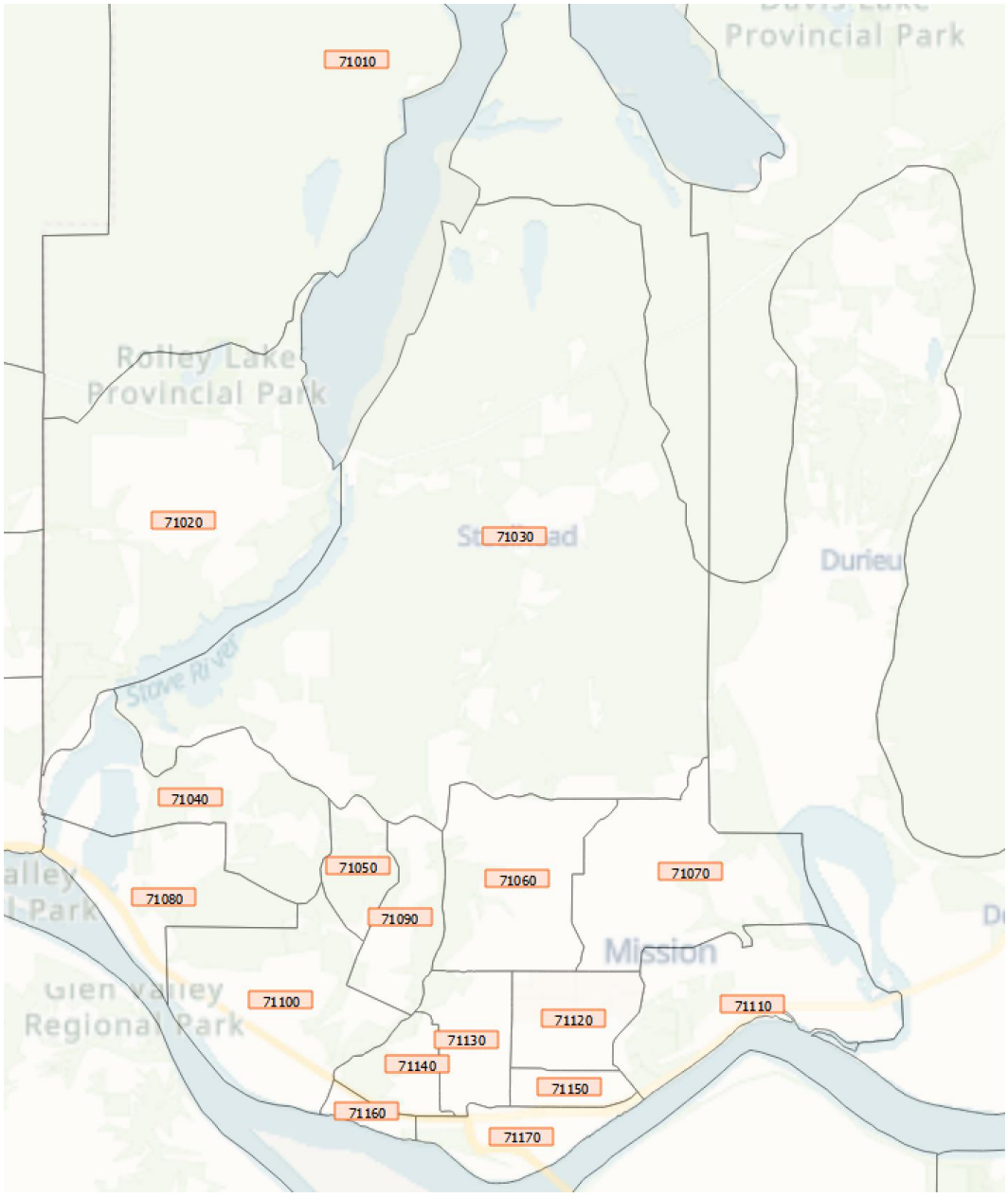


FIGURE 7: MISSION TAZ

3.1 Confirming Base

The 2017 model network was reviewed and adjusted based on Google Maps images so that the existing network reflects today's condition (see **FIGURE 8**).

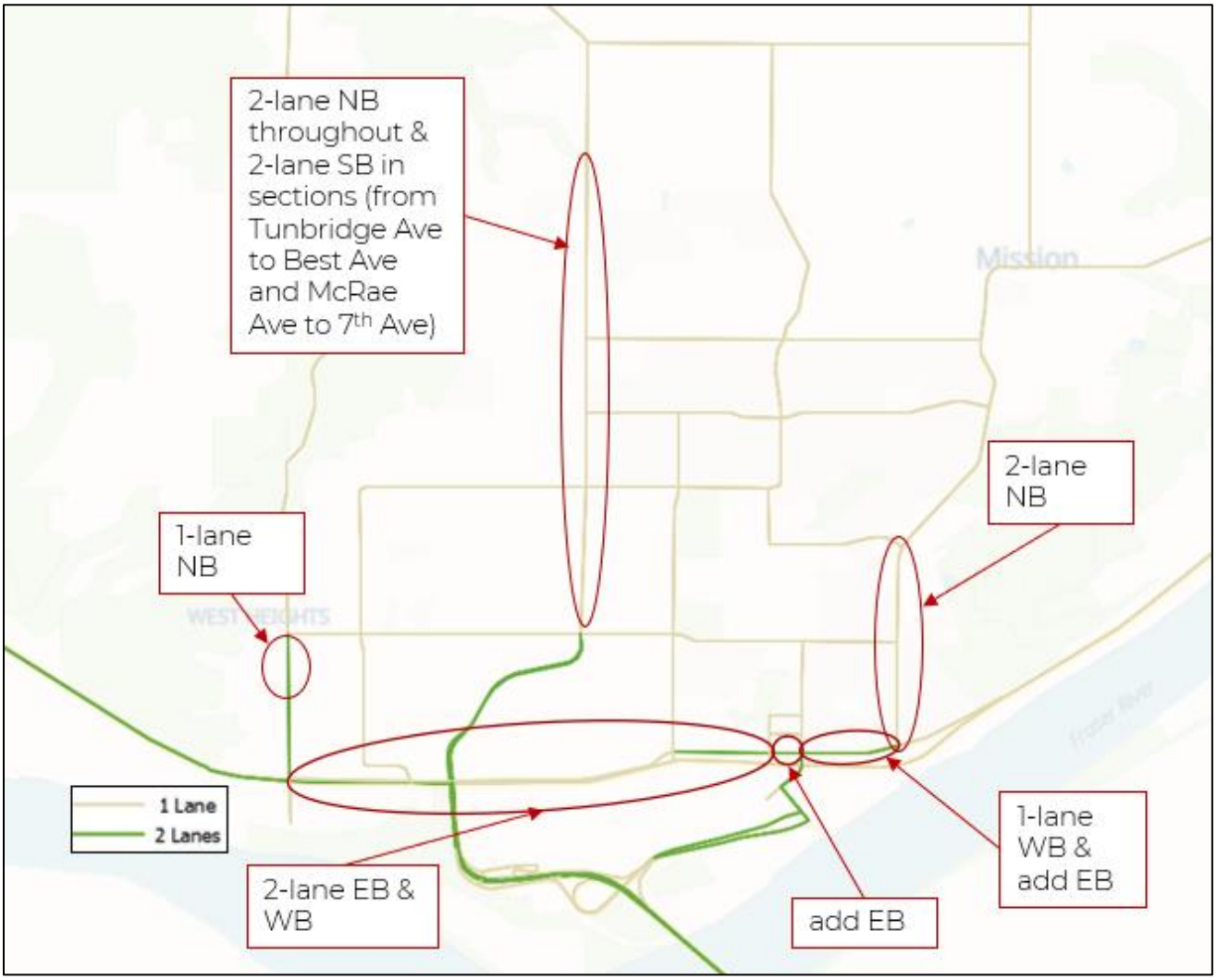


FIGURE 8: EXISTING NETWORK MODIFICATION

The existing land use assumptions from the RTM were confirmed with the City and were adjusted using the information provided by the City. The adjusted population information reflects a 2% increase in Mission's total population and the employment number (total of 12,619 jobs) remains unchanged. **TABLE 1** summarizes the adjusted population by TAZ.

TABLE 1: ADJUSTED 2017 POPULATION BY TAZ

TAZ	Description	Population
71010	Rural north	3
71020	Rural Ruskin	1,680
71030	Rural Steelhead	1,221
71040	Rural Hayward	612
71050	Rural SCPA north	108
71060	Cedar Valley	5,754
71070	Northeast	2,431
71080	Silvermere	519
71090	Rural Clay St	442
71100	SCPA	719
71110	Hatzic (Parr)	3,341
71120	North of Downtown	9,532
71130	Hospital and north	8,277
71140	West of Hurd	2,934
71150	Downtown	3,893
71160	Gill	4
71170	Waterfront	257
	Total	**41,727**

A comparison (**TABLE 2**) of the vehicle trips generated in Mission between the 2017 model and the TransLink Trip Diary showed that the model results are almost the same (within 1% of difference) as the Trip Diary's results.

TABLE 2: VEHICLE TRIP GENERATION COMPARISON (TRIP DIARY VS. RTM)

	Vehicle Trips (day)
2017 RTM	59,218
2017 Trip Diary	59,712
Difference (Absolute)	-494
Difference (%)	-1%

The review of traffic volumes at the screenline level (seven screenlines[3]) indicates that the model traffic volumes can have large discrepancies (GEH >5[4]) throughout the city. Through conversations with TransLink, it was learned that the discrepancies could be attributed to using only a few days of observed counts and

[3] The seven screenlines include: 1) Highway 7 west of Hayward St, 2) Highway 7 east of Nelson St and west of Wren St, 3) Highway 7 East of Stave Lake Street and West of Manson Avenue, 4) Highway 7 East of Dyke Road, 5) Mission Bridge, 6) between Highway 7 and 7 Avenue, and 7) north of Best Avenue.

[4] The GEH Statistic is a formula used in traffic modelling to compare two sets of traffic volumes. Typically, a GEH less than five is considered a good match between the modelled and observed volumes.

having a different peak hour in Mission than the region, and adjusting the model's slicing factors could be considered. However, without having access to TransLink's detailed Trip Diary data and the detailed assumptions of slicing factors, adjustments to slicing factors can only be made through judgement and iterations. Therefore, five iterations were conducted to best improve the GEH values. Compared to the original results where less than 10% of the screenlines' GEH are less than 5, 60% of modified results archived the GEH threshold after five iterations. Given that the growth assumptions will be developed using the difference between the existing and future horizons instead of the direct model output and also knowing that the model's overall trip generation is valid, it was concluded that the modified RTM could be used for the purpose of this study.

3.2 Developing Future Growth Assumptions

The future 2050 land use assumptions, including population and employment, provided by the City are summarized in TABLE 3. The land use information, including detailed breakdowns (which were estimated proportionally using the totals), were incorporated in the model.

TABLE 3: ADJUSTED 2050 POPULATION BY TAZ

TAZ	Description	Population	Employment
71010	Rural north	4	50
71020	Rural Ruskin	2,299	308
71030	Rural Steelhead	1,671	700
71040	Rural Hayward	837	163
71050	Rural SCPA north	148	28
71060	Cedar Valley	18,754	1,250
71070	Northeast	2,831	1,100
71080	Silvermere	5,019	117
71090	Rural Clay St	605	84
71100	SCPA	15,219	1,200
71110	Hatzic (Parr)	5,171*	1,200
71120	North of Downtown	10,132	1,989
71130	Hospital and north	9,077	2,101
71140	West of Hurd	3,534	600
71150	Downtown	6,393	2,804
71160	Gill	6	1,500
71170	Waterfront	5,257	3,225
	Total	**86,956**	**18,419**

*: detailed population estimates for Parr Local Area Plan were provided separately and are discussed in this document in a later section.

To form the future base condition, several major planned projects within Mission were confirmed by the City and were incorporated into the model along with the MOTI's projects:

- New east-west connection (4-lane) through Silverdale connecting Highway 7 and Tyler Street
- Gunn Avenue/Silverdale Avenue (2-lane) connecting Highway 7 & Nelson Street

- New Silverdale bridge (2-lane) connection Tyler Street and Cherry Avenue
- New local connections (Ihles Avenue and Harms Street) connecting Dewdney Trunk Road north and east near Cade Barr Street
- Waterfront connection
- Highway 7 (4-lane) between Silverdale Avenue and Nelson Street

The City also provided some concept drawings for specific roads, including Cherry Avenue from west of Cedar Street to Stave Lake Street, 14 Avenue from Hurd Street to Tanager Street, Stave Lake Road from 11 Avenue to Dewdney Trunk Road. The model network was confirmed and updated as needed to include these planned corridor improvements.

3.3 Future Operational Analysis

Using the difference between the modified RTM 2017 and 2050 models, a set of growth factors ranging from 1.0% to 2.5% per year were used to most of the network as the first base "layer" for traffic growth. For a few areas where detailed information was available, manual adjustment was made to each intersection instead:

- Cedar Valley: the additional trips from the City's Cedar Valley Engineering Traffic Assessment were used.
- Parr Area: since the model' TAZ is large for this area, trip generation and assignment were conducted using the land use assumptions (1,211 single-family detached units and 483 low-rise units) provided by the City and ITE Trip Generation method to estimate the additional trips for Stave Lake Road, especially the trips using the new fourth leg of the Stave Lake Road and Best Avenue intersection.
- Traffic volumes in and out at the intersections that serve the future Silverdale development (at Donateli Avenue and Silverdale Avenue) are from the model's direct output.

It should be noted that at the time of the model development, the Silverdale Neighbourhood Plan was under development and detailed land use and network information was not available to feed into the plan's traffic analysis work. Therefore, the results for Silverdale are high-level results, and the detailed projections and proposed network should be referred from the Silverdale Neighbourhood Plan upon its completion. Similarly, as the City's Waterfront Neighbourhood Plan is underway at this time, the detailed analysis and proposed mitigations should be referred from the Neighbourhood Plan upon its completion.
Using the estimated growth assumptions, the future intersection traffic volumes were developed. **FIGURE 9** to **FIGURE 13** illustrate the associated volume and LOS results under the 2050 base condition.

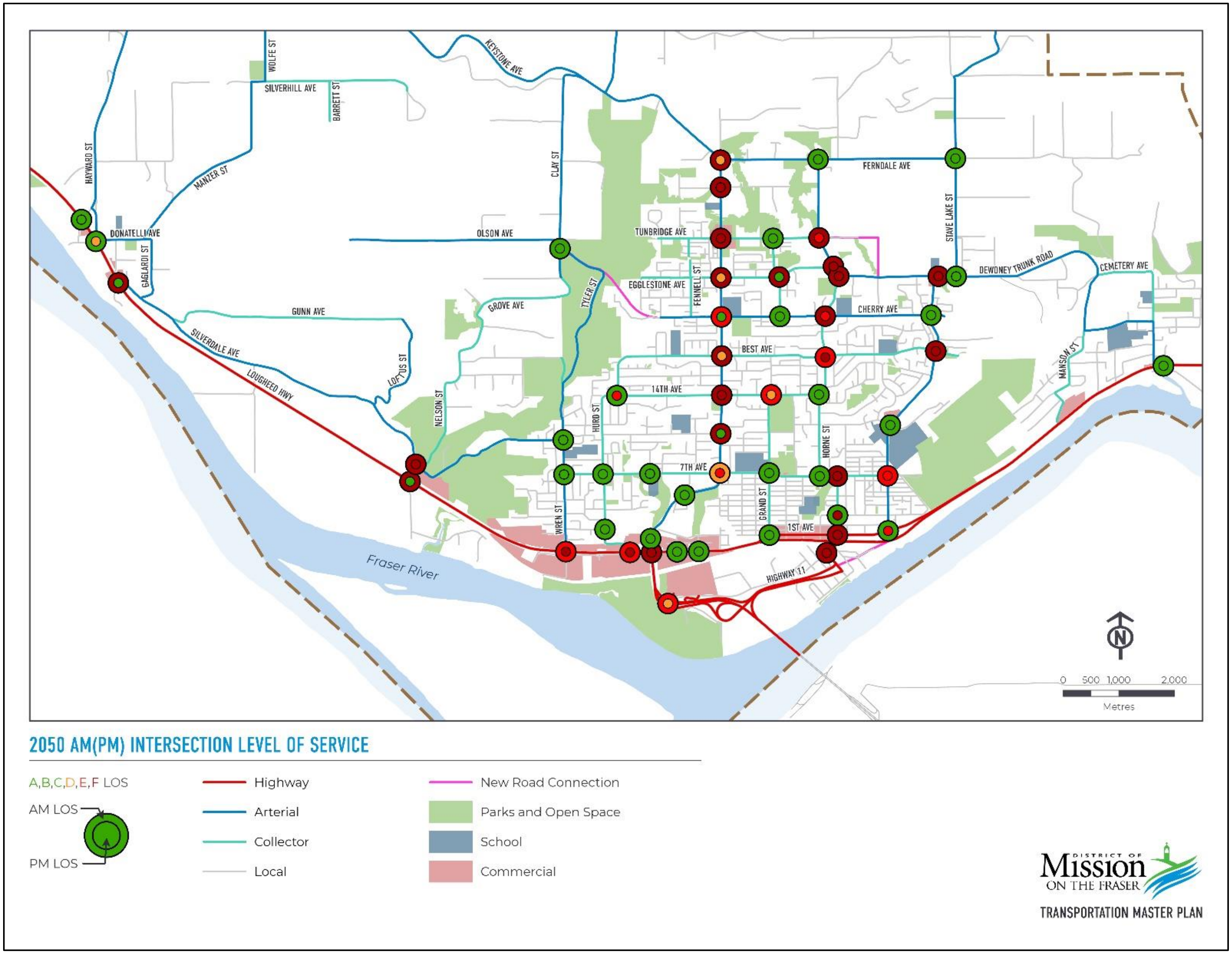


FIGURE 9: 2050 AM (PM) OVERALL INTERSECTION LEVEL OF SERVICE

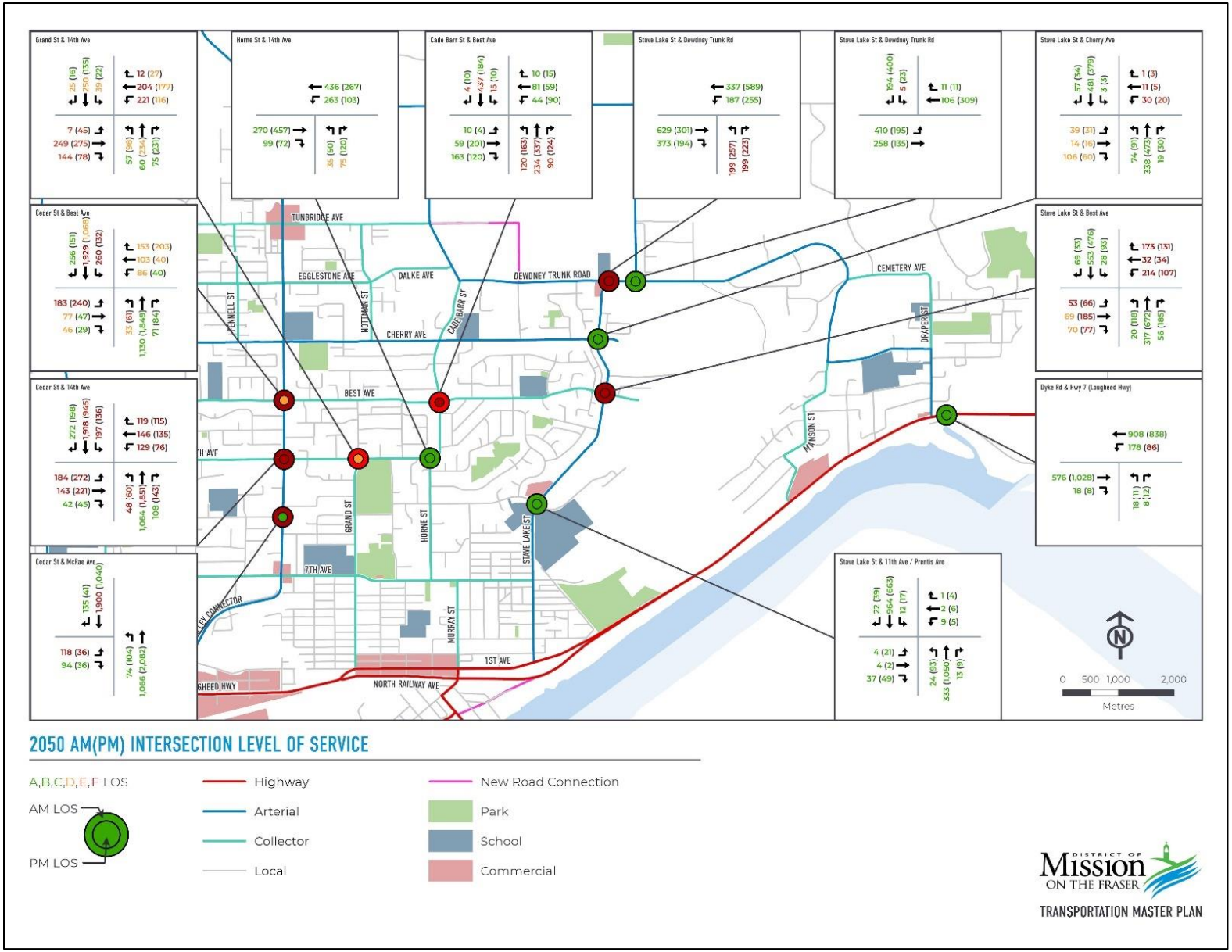


FIGURE 10: 2050 AM (PM) PEAK HOUR TRAFFIC VOLUMES AND LOS (MISSION CORE NORTH)

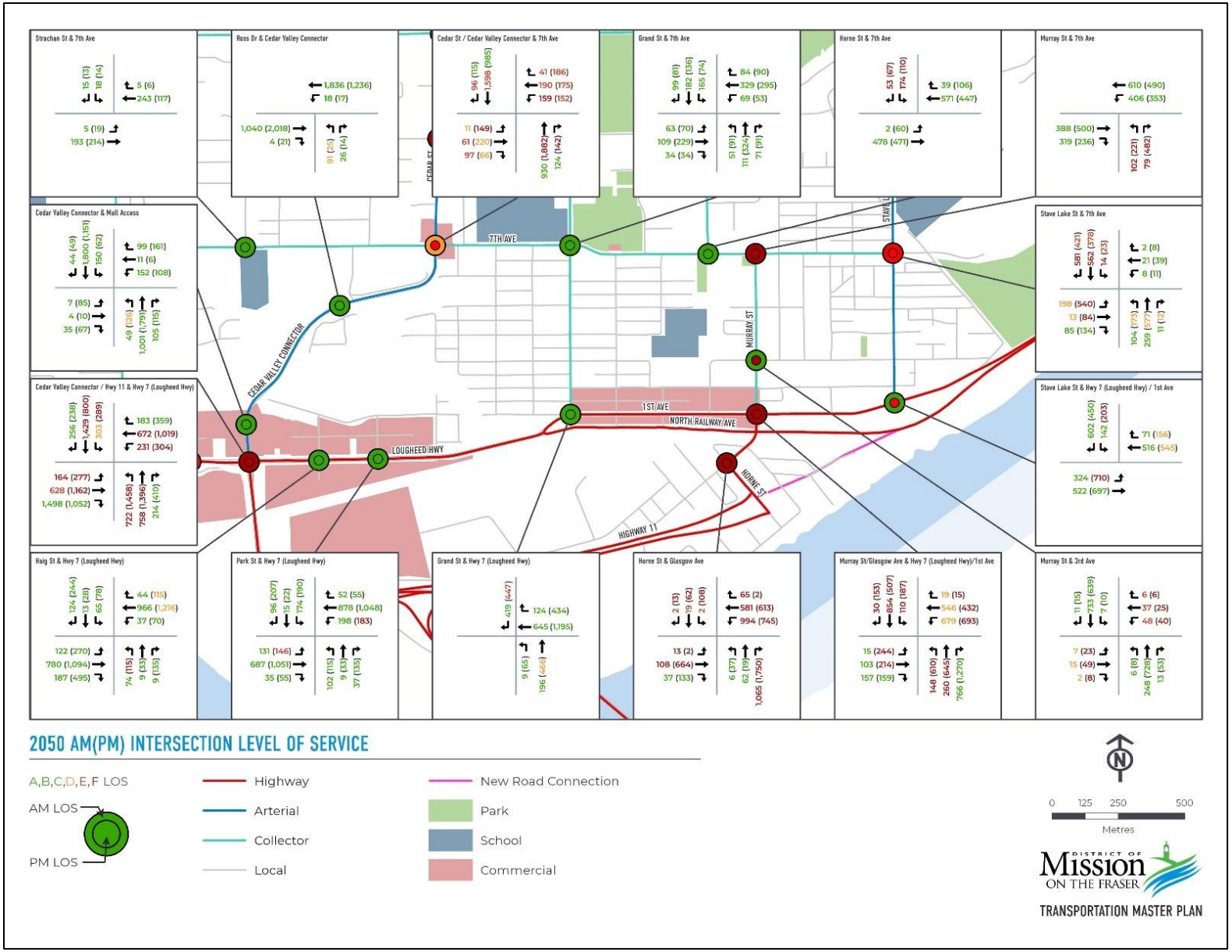


FIGURE 11: 2050 AM (PM) PEAK HOUR TRAFFIC VOLUMES AND LOS (MISSION CORE SOUTH)

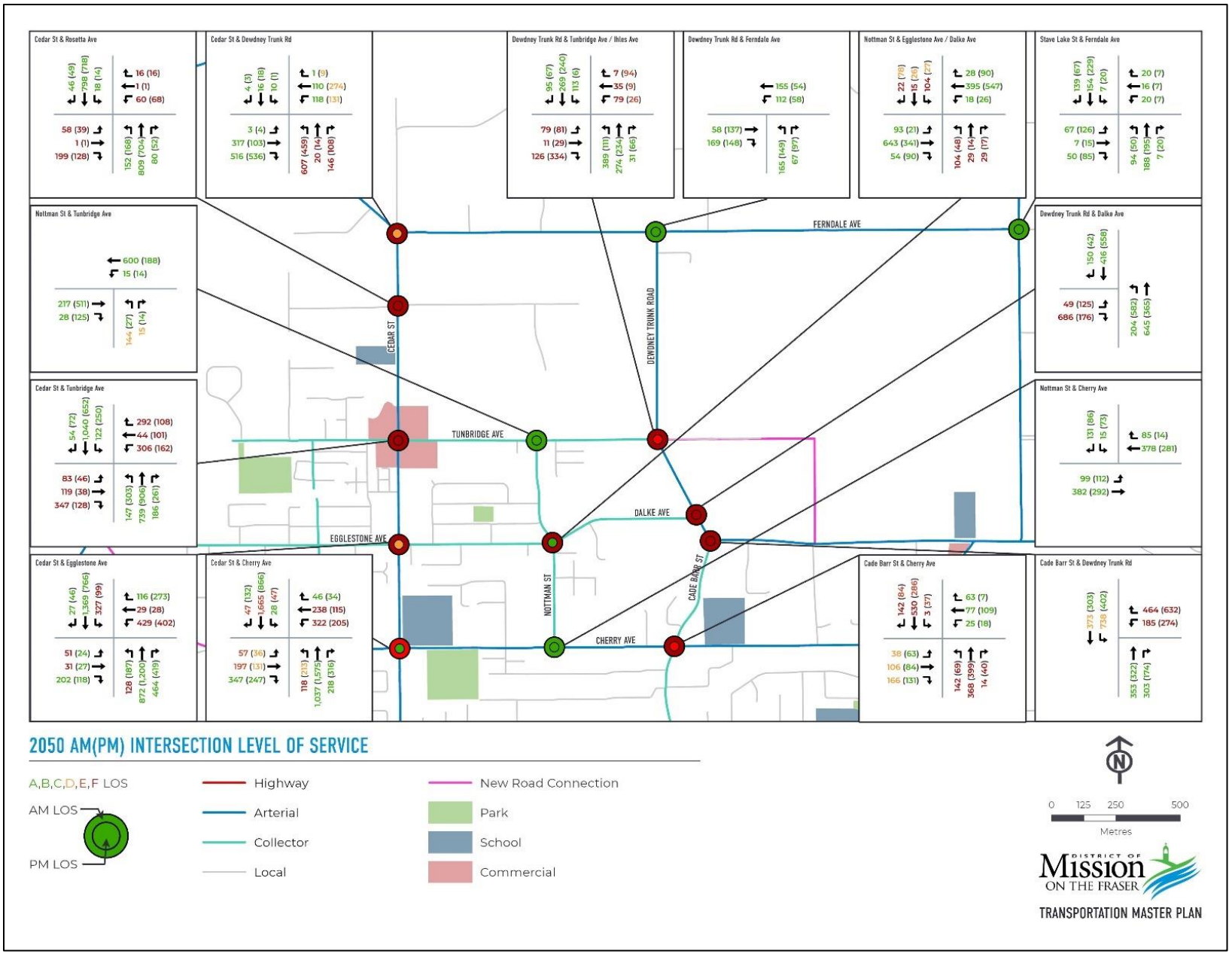


FIGURE 12: 2050 AM (PM) PEAK HOUR TRAFFIC VOLUMES AND LOS (CEDAR VALLEY)

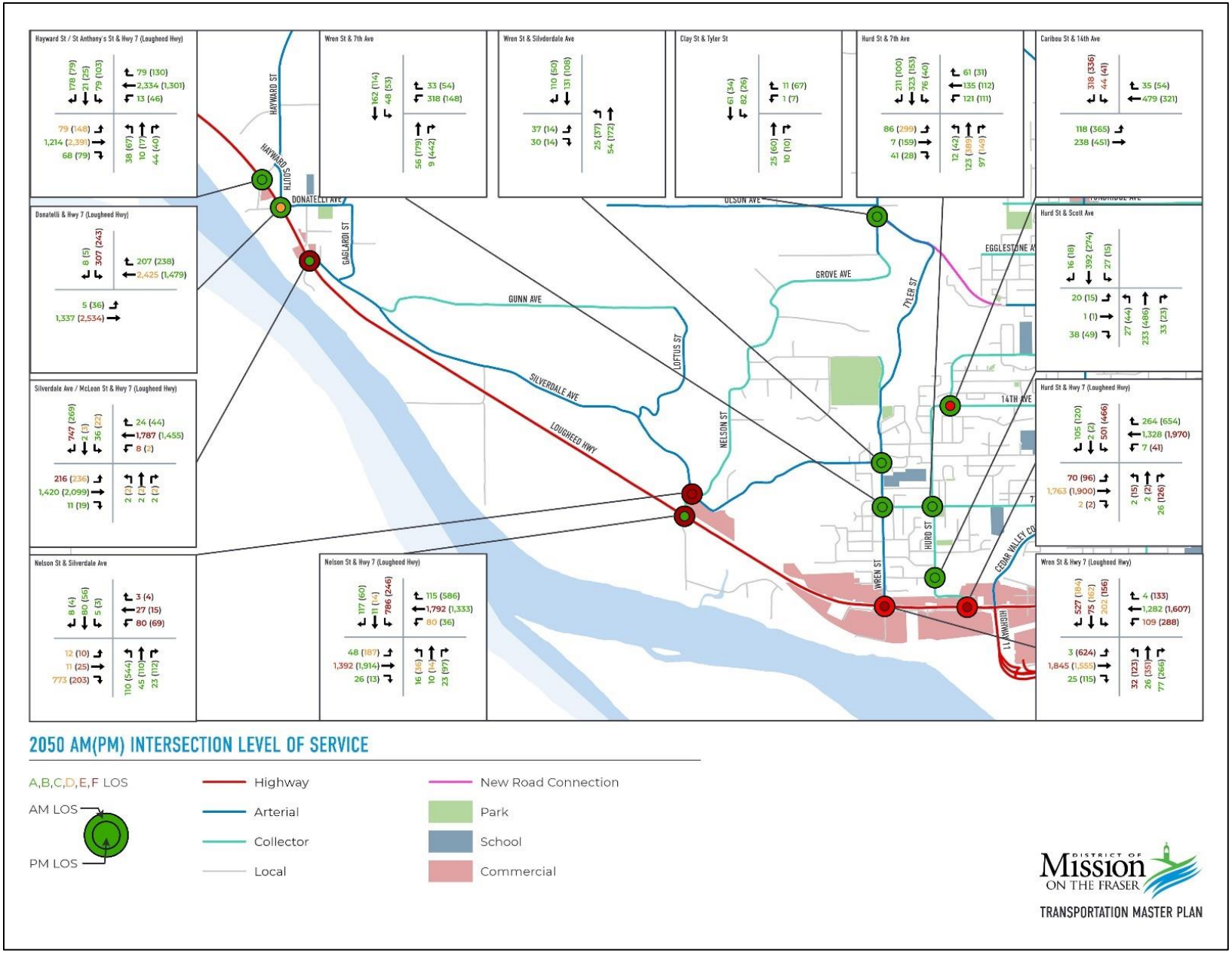


FIGURE 13: 2050 AM (PM) PEAK HOUR TRAFFIC VOLUMES AND LOS (MISSION WEST)

A review of the future base operational analysis indicated that a number of corridors and intersections will have capacity issues under the 2050 base condition. Therefore, corridor and local intersection improvements were explored in Synchro and the recommended improvements are summarized in the main plan document.

APPENDIX F

DETAILED COST ESTIMATES

TABLE F-1: SHORT-TERM ROAD NETWORK PROJECTS (0-5 YEARS)

Project ID	Description	Improvement Type	Category	Project Cost	DCC Eligibility / Benefit Factor	Municipal Assist Factor (1%)	DCC Recoverable	Non-DCC Costs	Comments	Cedar Valley Development Driven Projects (Y/N)
C1	Cedar Street between 7 Avenue and Cherry Avenue	Interim cross-section	Corridor Improvements	$1,085,000	N/A	N/A	N/A	$1,085,000		N
C2	Stave Lake Street between Lougheed Highway and 11 Avenue	Interim cross-section	Corridor Improvements	$884,000	N/A	N/A	N/A	$884,000		N
C3	14 Avenue between Hurd Street and Cade Barr Street	Road upgrade	Corridor Improvements	$10,700,000	100%	$107,000	$10,593,000	$107,000	Funded by DCC reserve (November 16, 2020, Council report)	N
		Sub-total (Corridor Improvements)		**$12,669,000**		**$107,000**	**$10,593,000**	**$2,076,000**	**Total (Long-term) excl. Cedar Valley Development Driven Projects**	**$12,669,000**
I1	Hurd Street & 7th Avenue	Improved alignment	Intersection Improvement	-	N/A	N/A	N/A	N/A	part of the 7 Avenue Greenway Project	N
I2	Wren Street & 7th Avenue	Improved alignment	Intersection Improvement	-	N/A	N/A	N/A	N/A	part of the 7 Avenue Greenway Project	N
I3	Grand Street & 7th Avenue	Improved alignment	Intersection Improvement	-	N/A	N/A	N/A	N/A	part of the 7 Avenue Greenway Project	N
I4	Murray Street & 7th Avenue	Improved alignment	Intersection Improvement	-	N/A	N/A	N/A	N/A	part of the 7 Avenue Greenway Project & also funded by the 2018 DCC bylaw	N
I5	Cedar Valley Connector/Mall Access	Warning signals/signal coordination/enhanced signal visibility	Intersection Improvement	**-**	N/A	N/A	N/A	N/A	See safety improvements for cost	N
		Sub-total (Intersection Improvements)		**-**	**-**	**-**	**-**	**-**	**Total (Long-term) excl. Cedar Valley Development Driven Projects**	**-**
		Total (Short-term)		**$12,669,000**		**$107,000**	**$10,593,000**	**$2,076,000**	**Total (Short-term) excl. Cedar Valley Development Driven Projects**	**$12,669,000**

TABLE F-2: MEDIUM-TERM ROAD NETWORK PROJECTS (6-10 YEARS)

Project ID	Description	Improvement Type	Category	Project Cost	DCC Eligibility / Benefit Factor	Municipal Assist Factor (1%)	DCC Recoverable	Non-DCC Costs	Comments	Cedar Valley Development Driven Projects (Y/N)
C4	Cedar Street between McRae Avenue and Cherry Avenue	4-lane	Corridor Improvements	$3,298,000	100%	$32,980	$3,265,020	$32,980		N
C5	Cedar Street between Cherry Avenue and Egglestone Avenue	Road upgrade	Corridor Improvements	-	-	-	-	-	Recently completed	N
C6	Cedar Street between Egglestone Avenue and Tunbridge Avenue	Road upgrade	Corridor Improvements	-	-	-	-	-	Currently Underway. Funded by DCC	N
C7	Cedar Street between Tunbridge Avenue and Laminman Avenue	4-lane	Corridor Improvements	$2,637,000	100%	$26,370	$2,610,630	$26,370	2018 DCC bylaw ($811,448 as DCC recoverable)	Y
C8	Cedar Street between Laminman Avenue and Dewdney Trunk Road	4-lane	Corridor Improvements	$1,431,000	100%	$14,310	$1,416,690	$14,310	2018 DCC bylaw ($1,506,788 as DCC recoverable)	Y
C9	Stave Lake Street between Lougheed Highway and Best Avenue	4-lane	Corridor Improvements	$20,536,000	100%	$205,360	$20,330,640	$205,360	Road upgrade for the 11 Avenue to Best Avenue segment is part of the 2018 DCC bylaw ($14,157,000 as DCC recoverable)	N
		Sub-total (Corridor Improvements)		**$27,902,000**		**$279,020**	**$27,622,980**	**$279,020**	**Total (Long-term) excl. Cedar Valley Development Driven Projects**	**$23,834,000**
I6	Cedar Valley Connector/Cedar Street & 7th Avenue	Additional turn lanes and safety improvements	Intersection Improvement	$3,770,000	100%	$37,700	$3,732,300	$37,700	2018 DCC Bylaw ($3,736,260 as DCC recoverable)	N
I7	Cedar Street & McRae Avenue	4-lane Cedar St with turn lanes	Intersection Improvement	$217,000	100%	$2,170	$214,830	$2,170		N
I8	Cedar Street & 14th Avenue	4-lane Cedar St with turn lanes & safety improvements	Intersection Improvement	$217,000	100%	$2,170	$214,830	$2,170		N
I9	Cedar Street & Best Avenue	4-lane Cedar St with turn lanes & safety improvements	Intersection Improvement	$248,000	100%	$2,480	$245,520	$2,480		N
I10	Cedar Street & Cherry Avenue	Additional turn lanes on Cherry	Intersection Improvement	$217,000	100%	$2,170	$214,830	$2,170		Y

Project ID	Description	Improvement Type	Category	Project Cost	DCC Eligibility / Benefit Factor	Municipal Assist Factor (1%)	DCC Recoverable	Non-DCC Costs	Comments	Cedar Valley Development Driven Projects (Y/N)
I11	Cedar Street & Egglestone Avenue	4-lane Cedar St with turn lanes	Intersection Improvement	$465,000	100%	$4,650	$460,350	$4,650		Y
I12	Cedar Street & Tunbridge Avenue	Signal with turn lanes	Intersection Improvement	$1,447,000	100%	$14,470	$1,432,530	$14,470	2018 DCC Bylaw ($356,400 as DCC recoverable)	Y
I13	Cedar Street & Rosetta Avenue	Signal with turn lanes	Intersection Improvement	$1,012,000	100%	$10,120	$1,001,880	$10,120	2018 DCC Bylaw ($356,400 as DCC recoverable)	Y
I14	Cedar Street & Dewdney Trunk Rd	Signal with turn lanes	Intersection Improvement	$582,000	100%	$5,820	$576,180	$5,820	2018 DCC Bylaw ($356,400 as DCC recoverable)	Y
I15	Cade Barr Street & Dewdney Trunk Rd	Signal with turn lanes	Intersection Improvement	$795,000	100%	$7,950	$787,050	$7,950	2018 DCC Bylaw ($356,400 as DCC recoverable)	Y
I16	Dewdney Trunk Rd & Dalke Avenue	Signal with turn lanes	Intersection Improvement	$1,590,000	100%	$15,900	$1,574,100	$15,900		Y
I17	Stave Lake Street & Best Avenue	Signal with turn lanes	Intersection Improvement	$795,000	100%	$7,950	$787,050	$7,950		N
I18	Stave Lake Street & Dewdney Trunk Rd (west intersection)	Signal with turn lanes	Intersection Improvement	$1,012,000	100%	$10,120	$1,001,880	$10,120		Y
		Sub-total (Intersection Improvements)		**$12,367,000**		**$123,670**	**$12,243,330**	**$123,670**	**Total (Long-term) excl. Cedar Valley Development Driven Projects**	**$5,247,000**
		Total (Medium-term)		**$40,269,000**		**$402,690**	**$39,866,310**	**$402,690**	**Total (Medium-term) excl. Cedar Valley Development Driven Projects**	**$29,081,000**

TABLE F-3: LONG-TERM ROAD NETWORK PROJECTS (10-30 YEARS)

Project ID	Description	Improvement Type	Category	Project Cost	DCC Eligibility / Benefit Factor	Municipal Assist Factor (1%)	DCC Recoverable	Non-DCC Costs	Comments	Cedar Valley Development Driven Projects (Y/N)	"Over-sizing" Eligible (Y/N)
C10	Silverdale Connector	2-lane new road and bridge over Silverdale Creek (alignment to be confirmed)	Corridor Improvements	$50,000,000	100%	$500,000	$49,500,000	$500,000	Based on discussion with City staff. Actual cost to be determined through a subsequent study	N	N
C11	Cherry Avenue between Charman Street and Cedar Street	2-3 lane with turn lanes	Corridor Improvements	$2,431,000	100%	$24,310	$2,406,690	$24,310		N	Y
C12	Cherry Avenue between Cedar Street and Stave Lake Street	2-lane with turn lanes	Corridor Improvements	$5,828,000	100%	$58,280	$5,769,720	$58,280		N	N
C13	Cade Barr Street between 14 Avenue and Dewdney Trunk Road	2-lane with turn lanes	Corridor Improvements	$4,269,000	100%	$42,690	$4,226,310	$42,690	2018 DCC Bylaw ($3,098,867 as DCC recoverable)	Y	Y
C14	Dewdney Trunk Road between Tunbridge Avenue and Cade Barr Street	4-lane with turn lanes	Corridor Improvements	$2,585,000	100%	$25,850	$2,559,150	$25,850		Y	N
C15	Dewdney Trunk Road between Ferndale Avenue and Cedar Street	Road upgrade to urban standard	Corridor Improvements	$3,539,000	0%	N/A	N/A	$3,539,000		Y	Y
C16	Dewdney Trunk Road between Tunbridge Avenue and Ferndale Avenue	Road upgrade to urban standard	Corridor Improvements	$2,832,000	0%	N/A	N/A	$2,832,000		Y	Y
C17	Dewdney Trunk Road between Harms Street and Cade Barr Street	2-lane with turn lanes	Corridor Improvements	$1,416,000	50%	$7,080	$700,920	$715,080		Y	N
C18	Emiry Street north of Tunbridge Avenue	Road upgrade w/ MUPs and landscape	Corridor Improvements	$766,000	0%	N/A	N/A	$766,000		N	Y

Project ID	Description	Improvement Type	Category	Project Cost	DCC Eligibility / Benefit Factor	Municipal Assist Factor (1%)	DCC Recoverable	Non-DCC Costs	Comments	Cedar Valley Development Driven Projects (Y/N)	"Over-sizing" Eligible (Y/N)
C19	Grand St between 11 Avenue and 14 Avenue	2-lane with turn lanes	Corridor Improvements	$124,000	100%	$1,240	$122,760	$1,240	2018 DCC Bylaw ($960,782 as DCC recoverable)	N	N
C20	Harms Road and Ihles Avenue	2-lane new road	Corridor Improvements	$3,150,000	0%	N/A	N/A	$3,150,000		Y	Y
C21	Silverdale Avenue Bridge	bridge upgrade	Corridor Improvements	$1,200,000	100%	$12,000	$1,188,000	$12,000	2018 DCC Bylaw ($1,188,000 as DCC recoverable)	N	N
C22	Tunbridge Avenue between Dewdney Trunk Road and Neale Drive	Road upgrade w/ MUPs and landscape	Corridor Improvements	$6,142,000	0%	N/A	N/A	$6,142,000		Y	Y
C23	Wren Street between 7 Avenue and Kenney Avenue	Road upgrade	Corridor Improvements	$4,687,000	100%	$46,870	$4,640,130	$46,870	Road upgrade costs reserved by the 2018 DCC bylaw ($3,130,380 as DCC recoverable)	N	N
C24	Stave Lake between Best Avenue and Dewdney Trunk Road	4-lane	Corridor Improvements	$16,579,000	100%	$165,790	$16,413,210	$165,790	Road upgrade costs reserved by the 2018 DCC bylaw ($9,801,000 as DCC recoverable)	Y	N
			Sub-total (Corridor Improvements)	**$105,548,000**		**$884,110**	**$87,526,890**	**$18,021,110**	**Total (Long-term) excl. Cedar Valley Development Driven Projects**	**$65,036,000**	
I19	Nelson Street & Silverdale Avenue	Signal with turn lanes and safety improvements	Intersection Improvement	$1,012,000	100%	$10,120	$1,001,880	$10,120		N	-
I20	Grand Street & 14th Avenue	Signal	Intersection Improvement	$525,000	100%	$5,250	$519,750	$5,250	2018 DCC Bylaw ($356,400 as DCC recoverable)	N	-
I21	Nottman Street & Egglestone Avenue/Dalke Avenue	Signal with turn lanes	Intersection Improvement	$1,012,000	100%	$10,120	$1,001,880	$10,120		Y	-
I22	Cade Barr Street & Best Avenue	Signal	Intersection Improvement	$578,000	100%	$5,780	$572,220	$5,780	2018 DCC Bylaw ($673,200 as DCC recoverable)	N	-
I23	Cade Barr Street & Cherry Avenue	Signal with turn lanes	Intersection Improvement	$1,447,000	100%	$14,470	$1,432,530	$14,470	2018 DCC Bylaw ($356,400 as DCC recoverable)	N	-
I24	Dewdney Trunk Rd & Tunbridge Avenue/Ihles Avenue	Signal	Intersection Improvement	$578,000	100%	$5,780	$572,220	$5,780	2018 DCC Bylaw ($356,400 as DCC recoverable)	Y	-

Project ID	Description	Improvement Type	Category	Project Cost	DCC Eligibility / Benefit Factor	Municipal Assist Factor (1%)	DCC Recoverable	Non-DCC Costs	Comments	Cedar Valley Development Driven Projects (Y/N)	"Over-sizing" Eligible (Y/N)
I25	Wren Street & Silverdale Avenue	Signal with turn lanes	Intersection Improvement	$578,000	100%	$5,780	$572,220	$5,780	Traffic signal costs reserved by 2018 DCC Bylaw ($356,400 as DCC recoverable)	N	-
I26	Stave Lake Street & Cherry Avenue	Signal	Intersection Improvement	$1,012,000	100%	$10,120	$1,001,880	$10,120		Y	-
			Sub-total (Intersection Improvements)	**$6,742,000**		**$67,420**	**$6,674,580**	**$67,420**	**Total (Long-term) excl. Cedar Valley Development Driven Projects**	**$4,140,000**	
			Total (Long-term)	**$112,290,000**		**$951,530**	**$94,201,470**	**$18,088,530**	**Total (Long-term) excl. Cedar Valley Development Driven Projects**	**$69,176,000**	

TABLE F-4: MOTI ROAD NETWORK PROJECTS

Project ID	Description	Improvement Type	Category
M) C1	Hwy 11 extension/realignment from the Waterfront	4-lane new road with turn lanes	Corridor Improvements
M) I1	St Anthony's Way/Hayward St & Hwy 7 (Lougheed Hwy)	Safety Improvements	Intersection Improvement
M) I2	McLean St/Silverdale Ave & Hwy 7 (Lougheed Hwy)	Operational improvements	Intersection Improvement
M) I3	Nelson St & Hwy 7 (Lougheed Hwy)	Safety and operational improvements	Intersection Improvement
M) I4	Wren St & Hwy 7 (Lougheed Hwy)	Safety and operational improvements	Intersection Improvement
M) I5	Hurd St & Hwy 7 (Lougheed Hwy)	Safety and operational improvements	Intersection Improvement
M) I6	Hwy 11/Cedar Valley Connector & Hwy 7 (Lougheed Hwy)	Safety and operational improvements	Intersection Improvement
M) I7	Haig St & Hwy 7 (Lougheed Hwy)	Safety Improvements	Intersection Improvement
M) I8	Park St & Hwy 7 (Lougheed Hwy)	Safety Improvements	Intersection Improvement
M) I9	Horne St & Glasgow Ave	Operational improvements	Intersection Improvement
M) I10	Glasgow Ave/Murray St & Hwy 7 (Lougheed Hwy/1st Ave)	Safety and operational improvements	Intersection Improvement
M) I11	Hwy 7 / 1st Ave & Stave Lake St	Operational improvements	Intersection Improvement
M) I12	Horne St & Hwy 11	Operational improvements	Intersection Improvement
M) P1	1 Avenue & Grand Street	RRFB and site improvements	Pedestrian Crossing
M) P2	1 Avenue & Horne Street	RRFB and site improvements	Pedestrian Crossing
M) P3	1 Avenue & James Street	RRFB and site improvements	Pedestrian Crossing
M) P4	1 Avenue & Welton Street	RRFB and site improvements	Pedestrian Crossing
M) P5	Railway Avenue & Horne Street	Ground mounted signs	Pedestrian Crossing
M) P6	Railway Avenue & James Street	Ground mounted signs	Pedestrian Crossing

TABLE F-5: SHORT-TERM PEDESTRIAN NETWORK PROJECTS (0-5 YEARS)

Project ID	Description	Category	Length (m)	Project Cost	DCC Eligibility / Benefit Factor	Municipal Assist Factor (1%)	DCC Recoverable	Non-DCC Costs	Comments
S1	10th Avenue between Alder Street and Cedar Street	Sidewalk	219	$190,964	N/A	N/A	N/A	$190,964	
S2	11th Avenue between Taulbut Street and Grand Street	Sidewalk	229	$378,227	N/A	N/A	N/A	$378,227	
S3	14th Avenue between Tenager Street and Caribou Street	Sidewalk	498	*	N/A	N/A	N/A	N/A	Collector road. Cost in Table 7 (Road Network)
S4	2nd Avenue between Alder Street and Birch Street	Sidewalk	123	$52,735	N/A	N/A	N/A	$52,735	Mobility Hub (Downtown)
S5	2nd Avenue between James Street and Mission City Farmers Market	Sidewalk	93	$39,872	N/A	N/A	N/A	$39,872	Mobility Hub (Downtown)
S6	3 Avenue between Murray Street and Stave Lake Street	Sidewalk	501	$214,017	N/A	N/A	N/A	$214,017	Mobility Hub (Downtown)
S7	4 Avenue between Grand Street and 32761 4 Avenue	Sidewalk	623	$1,030,281	N/A	N/A	N/A	$1,030,281	Mobility Hub (Downtown)
S8	4 Avenue between Grand Street and 33019 4 Avenue	Sidewalk	13	$5,427	N/A	N/A	N/A	$5,427	Mobility Hub (Downtown)
S9	4 Avenue between Grand Street and Mission Public Schools (Northwest)	Sidewalk	27	$23,772	N/A	N/A	N/A	$23,772	Mobility Hub (Downtown)
S10	4 Avenue between James Street and Mission Public Schools (Northeast)	Sidewalk	63	$103,905	N/A	N/A	N/A	$103,905	Mobility Hub (Downtown)
S11	4 Avenue between Murray Street and End of block to the west	Sidewalk	115	$49,145	N/A	N/A	N/A	$49,145	Mobility Hub (Downtown). From 2021 Budget (Year: 2027). $242,100
S12	5 Avenue between Grand Street and Maple Street	Sidewalk	404	$669,095	N/A	N/A	N/A	$669,095	Mobility Hub (Downtown)
S13	5 Avenue between Welton Street and Mission Central (North)	Sidewalk	68	$112,343	N/A	N/A	N/A	$112,343	Mobility Hub (Downtown). From 2021 Budget (Year: 2026). $268,300
S14	5 Avenue between Murray Street and End of block to the west	Sidewalk	100	$87,079	N/A	N/A	N/A	$87,079	Mobility Hub (Downtown). From 2021 Budget (Year: 2027). $181,300
S15	6 Avenue between Grand Street and Maple Street	Sidewalk	405	$669,757	N/A	N/A	N/A	$669,757	Mobility Hub (Downtown)
S16	6 Avenue between James Street and Grand Street	Sidewalk	153	$133,143	N/A	N/A	N/A	$133,143	Mobility Hub (Downtown)
S17	6 Avenue between Welton Street and 33271 6 Avenue	Sidewalk	117	$101,795	N/A	N/A	N/A	$101,795	Mobility Hub (Downtown). From 2021 Budget (Year: 2026). $259,400
S18	8 Avenue between Sharpe Street and Stave Lake Street	Sidewalk	135	$117,556	N/A	N/A	N/A	$117,556	From 2021 Budget (Year: 2027). $257,900
S19	9 Avenue between Alder Street and 32911 9 Avenue	Sidewalk	32	$52,118	N/A	N/A	N/A	$52,118	
S20	9 Avenue between Sharpe Street and Stave Lake Street	Sidewalk	135	$117,556	N/A	N/A	N/A	$117,556	From 2021 Budget (Year: 2027). $225,800
S21	Alder Street between 2nd Avenue and 7th Avenue	Sidewalk	524	$456,031	N/A	N/A	N/A	$456,031	Mobility Hub (Downtown)
S22	Alder Street between 9 Avenue and 10th Avenue	Sidewalk	62	$26,325	N/A	N/A	N/A	$26,325	
S23	Birch Street between 1 Avenue and 5 Avenue	Sidewalk	401	$349,186	N/A	N/A	N/A	$349,186	Mobility Hub (Downtown)

Project ID	Description	Category	Length (m)	Project Cost	DCC Eligibility / Benefit Factor	Municipal Assist Factor (1%)	DCC Recoverable	Non-DCC Costs	Comments
S24	Bluebird Court/Sandpiper Place between Hurd Street and Bluebird Court	Sidewalk	95	$40,556	N/A	N/A	N/A	$40,556	
S25	Cherry Avenue between 32729 Cherry Avenue and Cedar Street	Sidewalk	150	$130,618	N/A	N/A	N/A	$130,618	Long-Term Road Project, but recommend short-term AT improvement. Arterial road. From 2021 Budget (Year: 2024). $868,100 (covers combined Harris to Judith segment) Arterial road. From 2021 Budget (Year: 2024). $868,100 (covers combined Harris to Judith segment)
S26	Cherry Avenue between 32909 Cherry Avenue and Judith Street	Sidewalk	209	$182,082	N/A	N/A	N/A	$182,082	
S27	Cherry Avenue between Cedar Street and 32966 Cherry Avenue	Sidewalk	298	$493,052	N/A	N/A	N/A	$493,052	Long-Term Road Project, but recommend short-term AT improvement. Arterial road. From 2021 Budget (Year: 2024). $943,700 (covers combined Harris to Cade Barr segment)
S28	Cherry Avenue between Harris Street and Cedar Street	Sidewalk	232	$202,023	N/A	N/A	N/A	$202,023	
S29	Cherry Avenue between Judith Street and 33209 Cherry Avenue	Sidewalk	312	$271,686	N/A	N/A	N/A	$271,686	
S30	Coleman Street between Pakenham Place and Moffat Avenue	Sidewalk	52	$85,705	N/A	N/A	N/A	$85,705	
S31	Columbia Street between 3 Avenue and 7445 Columbia Street	Sidewalk	96	$83,596	N/A	N/A	N/A	$83,596	Mobility Hub (Downtown)
S32	Columbia Street between 7530 Columbia Street and 7th Avenue	Sidewalk	123	$203,177	N/A	N/A	N/A	$203,177	Mobility Hub (Downtown)
S33	Dewdney Trunk Rd between 33710 Dewdney Trunk Rd and Harms Street	Sidewalk	196	$323,628	N/A	N/A	N/A	$323,628	
S34	Dewdney Trunk Rd between Draper Street and Shimek Street	Sidewalk	152	$132,098	N/A	N/A	N/A	$132,098	Long-Term Road Project, but recommend short-term AT improvement. Arterial road
S35	Dewdney Trunk Rd between Fisher Place and Dewdney Trunk Rd	Sidewalk	189	$313,369	N/A	N/A	N/A	$313,369	
S36	Dewdney Trunk Rd between Mycon Street and Manson Street	Sidewalk	410	$677,533	N/A	N/A	N/A	$677,533	
S37	Dewdney Trunk Rd between Stave Lake St and 33812 Dewdney Trunk Rd	Sidewalk	159	$138,629	N/A	N/A	N/A	$138,629	
S38	Dunsmuir Street between 3 Avenue and 7552 Dunsmuir Street	Sidewalk	297	$258,624	N/A	N/A	N/A	$258,624	Mobility Hub (Downtown)
S39	Harms Street between Cherry Avenue and Dewdney Trunk Rd	Sidewalk	369	$321,408	N/A	N/A	N/A	$321,408	Cedar Valley
S40	Holiday Avenue between Hurd Street and Wren Street	Sidewalk	362	$315,138	N/A	N/A	N/A	$315,138	
S41	Horne Street between 14 Avenue and 7th Avenue	Sidewalk	818	$711,869	50%	$3,559	352,375	$359,494	Collector road
S42	Hurd Street between Hurd St (Southwest) and 7273 Hurd Street	Sidewalk	69	$114,329	50%	$572	$56,593	$57,736	Collector road
S43	James Street between 3 Avenue and James at 7th Avenue Bus Stop	Sidewalk	337	$144,017	N/A	N/A	N/A	$144,017	Mobility Hub (Downtown)
S44	Juniper Street between 7th Avenue and 10th Avenue	Sidewalk	264	$230,062	N/A	N/A	N/A	$230,062	
S45	Lawrence Lane between 8161 Lawrence Lane and Moffat Avenue	Sidewalk	69	$59,736	N/A	N/A	N/A	$59,736	
S46	Maple Street between 3 Avenue and 5 Avenue	Sidewalk	193	$319,491	N/A	N/A	N/A	$319,491	Mobility Hub (Downtown)
S47	Moffat Avenue between Hatzic Elementary (Southwest) and Coleman Street	Sidewalk	111	$182,992	N/A	N/A	N/A	$182,992	

Project ID	Description	Category	Length (m)	Project Cost	DCC Eligibility / Benefit Factor	Municipal Assist Factor (1%)	DCC Recoverable	Non-DCC Costs	Comments
S48	Moffat Avenue between Mycon Street and Dewdney Trunk Road	Sidewalk	216	$357,049	N/A	N/A	N/A	$357,049	
S49	Silverdale Avenue between Rook Cres and Wren Street	Sidewalk	207	$207,068	50%	$1,035	$102,499	$104,569	Collector road. From 2021 Budget (Year: 2023). $334,000
S50	Stave Lake Street between 4 Avenue and 5 Avenue	Sidewalk	80	$34,103	50%	$341	$33,762	$341	Arterial road
S51	Van Velzen Avenue between Hurd Street and West Heights Elementary (Southeast corner)	Sidewalk	259	$428,194	N/A	N/A	N/A	$428,194	
S52	Welton Street between 5 Avenue and 6 Avenue	Sidewalk	87	$144,441	N/A	N/A	N/A	$144,441	Mobility Hub (Downtown). From 2021 Budget (Year: 2027). $127,2000
S53	Welton Street between 6 Avenue and 7th Avenue	Sidewalk	87	$144,441	N/A	N/A	N/A	$144,441	Mobility Hub (Downtown)
S54	Wren Street between Silverdale Avenue and Robin Cres	Sidewalk	294	$256,012	50%	$1,280	126,725	$129,286	Arterial road. From 2021 Budget (Year: 2027). $537,111
S55	Wren Street between Trembath Avenue and Hwy 7	Sidewalk	138	$58,761	50%	$294	$29,087	$29,674	Arterial road
Total (Short-term)			**11,966**	**$12,545,816**		**$7,081**	**$701,041**	**$11,844,744**	

TABLE F-6: MEDIUM-TERM PEDESTRIAN NETWORK PROJECTS (6-10 YEARS)

Project ID	Description	Category	Length (m)	Project Cost	DCC Eligibility / Benefit Factor	Municipal Assist Factor (1%)	DCC Recoverable	Non-DCC Costs	Comments
S56	10th Avenue between Dunsmuir Street and 33578 10 Avenue	Sidewalk	276	$456,487	N/A	N/A	N/A	$456,487	
S57	2nd Avenue between Murray Street and 33600 2nd Avenue	Sidewalk	408	$354,933	N/A	N/A	N/A	$354,933	Mobility Hub (downtown)
S58	4th Avenue between Ryan Street and 33581 4 Avenue	Sidewalk	120	$51,197	N/A	N/A	N/A	$51,197	Mobility Hub (downtown)
S59	5th Avenue between Ryan Street and Stave Lake Street	Sidewalk	212	$351,258	N/A	N/A	N/A	$351,258	Mobility Hub (downtown)
S60	5a Avenue between Mary Street and Stave Lake Street	Sidewalk	195	$169,542	N/A	N/A	N/A	$169,542	Mobility Hub (downtown)
S61	9th Avenue between Alder Street and 32865 9 Avenue	Sidewalk	84	$72,885	N/A	N/A	N/A	$72,885	
S62	Blott Street between 7th Avenue and 7524 Blott Street	Sidewalk	174	$288,220	N/A	N/A	N/A	$288,220	
S63	Blott Street between Lamont Avenue and 7647 Blott Street	Sidewalk	93	$80,983	N/A	N/A	N/A	$80,983	
S64	Bobcat Drive between 32493 Bobcat Drive and Adams Avenue	Sidewalk	419	$179,017	N/A	N/A	N/A	$179,017	
S65	Charnley Avenue between Charnley Drive and Cedar Street	Sidewalk	120	$197,717	N/A	N/A	N/A	$197,717	
S66	Charnley Drive between Charnley Avenue and Christine Morrison Elementary	Sidewalk	211	$90,043	N/A	N/A	N/A	$90,043	
S67	Dewdney Trunk Road between Stave Lake Street and Stave Lake Street	Sidewalk	156	$257,611	50%	$1,288	127,517	130,094	Arterial road. South of Mission City Hall
S68	Diamond Avenue between Hurd Street and Lee Street	Sidewalk	271	$115,983	N/A	N/A	N/A	$115,983	
S69	Douglas Avenue between Draper Street and Cambie Court	Sidewalk	142	$60,769	N/A	N/A	N/A	$60,769	
S70	Dunsmuir Street between 7764 Dunsmuir Street and 7th Avenue	Sidewalk	378	$625,912	N/A	N/A	N/A	$625,912	
S71	Dunsmuir Street between 7773 Dunsmuir Street and 11 Avenue	Sidewalk	74	$122,436	N/A	N/A	N/A	$122,436	
S72	Eider Street between McRae Avenue and Charnley Drive	Sidewalk	141	$60,299	N/A	N/A	N/A	$60,299	
S73	Fleming Avenue between Peterson Street and 32610 Fleming Avenue	Sidewalk	188	$163,273	N/A	N/A	N/A	$163,273	
S74	Kite Street between McRae Avenue and Kite St (east-west)	Sidewalk	155	$66,239	N/A	N/A	N/A	$66,239	
S75	Lee Street between 7th Avenue and Diamond Avenue	Sidewalk	358	$311,307	N/A	N/A	N/A	$311,307	
S76	Manson Street between Norrish Avenue and Rockridge Place	Sidewalk	510	$444,276	N/A	N/A	N/A	$444,276	
S77	Martin Avenue between Lee Street and 7489 Martin Place	Sidewalk	169	$147,337	N/A	N/A	N/A	$147,337	
S78	Mary Street between Riverview Street and 7th Avenue	Sidewalk	421	$366,253	N/A	N/A	N/A	$366,253	Mobility Hub (downtown)

Project ID	Description	Category	Length (m)	Project Cost	DCC Eligibility / Benefit Factor	Municipal Assist Factor (1%)	DCC Recoverable	Non-DCC Costs	Comments
S79	McEwen Avenue between Draper Street and Weaver Crescent	Sidewalk	219	$93,632	N/A	N/A	N/A	$93,632	
S80	Ryan Street between 3 Avenue and 7518 Ryan Street	Sidewalk	244	$212,211	N/A	N/A	N/A	$212,211	Mobility Hub (downtown)
S81	Sandpiper Drive/Place between Bluebird Court and Sandpiper Drive	Sidewalk	321	$137,308	N/A	N/A	N/A	$137,308	
S82	Sandpiper Place between Sandpiper Drive and Wren Street	Sidewalk	189	$80,641	N/A	N/A	N/A	$80,641	
S83	Scott Avenue between Hurd Street and Wren Street	Sidewalk	388	$338,040	N/A	N/A	N/A	$338,040	
S84	Sharpe Street between 5 Avenue and 7th Avenue	Sidewalk	197	$325,778	N/A	N/A	N/A	$325,778	Mobility Hub (downtown)
S85	Stave Lake Street between 11 Avenue and Best Avenue	Sidewalk	1,530	*	N/A	N/A	N/A	N/A	Arterial road. Cost in Table 7 (Road Network)
S86	Strachan Street between Grebe Crescent and 7th Avenue	Sidewalk	224	$370,947	N/A	N/A	N/A	$370,947	
S87	Vosburgh Avenue between Manson Street and Coleman Street	Sidewalk	277	$241,382	N/A	N/A	N/A	$241,382	
S88	Weaver Crescent between Draper Street and 4893 Weaver Crescent	Sidewalk	231	$98,889	N/A	N/A	N/A	$98,889	
Total (Medium-term)			**8,294**	**$6,932,805**		**$20,888**	**$127,517**	**$6,805,288**	

TABLE F-7: SHORT-TERM BICYCLE NETWORK PROJECTS (0-5 YEARS)

Project ID	Description	Facility Type	Category	Length (m)	Project Cost	DCC Eligibility / Benefit Factor	Municipal Assist Factor (1%)	DCC Recoverable	Non-DCC Costs	Comments
B1	11 Avenue between Stave Lake Street and Taulbut Street	Multi-Use Pathway	Bicycle Facility	986	$1,257,035	50%	$6,285	$622,232	$634,803	
B2	14 Avenue between Horne Street and Grouse Avenue	Multi-Use Pathway	Bicycle Facility	2,280	*	N/A	N/A	N/A	N/A	Cost in Table 7 (Road Network)
B3	7th Avenue between Wren Street and Mary Street	Protected Bicycle Lane	Bicycle Facility	3,420	$6,297,588	50%	$31,488	$3,117,306	$3,180,282	
B4	Grand Street between 14 Avenue and 2nd Avenue	Multi-Use Pathway	Bicycle Facility	1,330	$1,695,251	50%	$8,476	$839,149	$856,102	Long-Term Road Project, but recommend medium-term AT improvement
B5	Hurd Street between Grouse Avenue and 7th Avenue	Multi-Use Pathway	Bicycle Facility	713	$909,063	50%	$4,545	$449,986	$459,077	
B6	Stave Lake Street between 3 Avenue and 11 Avenue	Protected Bicycle Lane	Bicycle Facility	904	*	N/A	N/A	N/A	N/A	Cost in Table 7 (Road Network)
B7	Wren Street between Holiday Avenue and 7th Avenue	Multi-Use Pathway	Bicycle Facility	487	$620,360	50%	$3,102	$307,078	$313,282	
		Total (Short-term)		**10,120**	**$10,779,297**		**$53,896**	**$5,335,752**	**$5,443,545**	

TABLE F-8: MEDIUM-TERM BICYCLE NETWORK PROJECTS (6-10 YEARS)

Project ID	Description	Facility Type	Category	Length (m)	Project Cost	DCC Eligibility / Benefit Factor	Municipal Assist Factor (1%)	DCC Recoverable	Non-DCC Costs	Comments
B8	2nd Avenue between Grant Street and Horne Street	Neighbourhood Bikeway	Bicycle Facility	503	$20,120	50%	$101	$9,959	$10,161	
B9	3 Avenue between Horne Street and Mary Street	Neighbourhood Bikeway	Bicycle Facility	1,120	$44,800	50%	$224	$22,176	$22,624	
B10	Best Avenue between Cade Barr Street and Caribou Street	Multi-Use Pathway	Bicycle Facility	1,950	$2,485,519	50%	$12,428	$1,230,332	$1,255,187	
B11	Cade Barr Street between 14 Avenue and Cherry Avenue	Protected Bicycle Lane	Bicycle Facility	849	$1,563,349	50%	$7,817	$773,858	$789,491	Long-Term Road Project, but recommend medium-term AT improvement
B12	Caribou Street between Best Avenue and 14 Avenue	Multi-Use Pathway	Bicycle Facility	529	$673,639	50%	$3,368	$333,451	$340,188	
B13	Horne Street between 2nd Avenue and 3 Avenue	Neighbourhood Bikeway	Bicycle Facility	83	$3,328	50%	$17	$1,647	$1,681	
B14	Horne Street between 14 Avenue and 7th Avenue	Protected Bicycle Lane	Bicycle Facility	821	$1,511,605	50%	$7,558	$748,244	$763,361	
B15	Hurd Street between 7th Avenue and Hillcrest Avenue	Multi-Use Pathway	Bicycle Facility	470	$598,691	50%	$2,993	$296,352	$302,339	
B16	Hyde Street between Best Avenue and 14 Avenue	Multi-Use Pathway	Bicycle Facility	386	$492,005	50%	$2,460	$243,542	$248,463	
B17	Stave Lake Street between 3 Avenue and 1 Avenue	Multi-Use Pathway	Bicycle Facility	144	*	N/A	N/A	N/A	N/A	Cost in Table 7 (Road Network)
B18	Stave Lake Street between 11 Avenue and Araki Court	Multi-Use Pathway	Bicycle Facility	1,470	*	N/A	N/A	N/A	N/A	Cost to be developed separately through existing detailed design process
B19	Stave Lake Street between Araki Court and Dewdney Trunk Road	Multi-Use Pathway	Bicycle Facility	224	*	N/A	N/A	N/A	N/A	
B20	Wren Street between 7th Avenue and Hwy 7	Multi-Use Pathway	Bicycle Facility	784	$999,561	50%	$4,998	$494,783	$504,778	
	Total (Medium-term)			**9,332**	**$8,436,979**		**$41,963**	**$4,154,345**	**$4,238,272**	

TABLE F-9: SHORT-TERM ROAD NETWORK PROJECTS (0-5 YEARS)

Project ID	Description	Improvement Type	Project Cost	Category	Comments
N/A	Speed management at various locations Draper Street from McEwan Avenue to Henry Avenue Grand Street from 11 Avenue to 14 Avenue Dewdney Trunk Road Hurd Street Stave Lake Street from Highway 11 to 11 Avenue 14 Avenue from Cedar Street to Caribou Street 14 Avenue from Taulbut Street to Grand Street Badger Avenue west of Beaver Drive McRae Street from Eider Street to Edge Street Hayward Street Cedar Valley Connector Best Avenue from Caribou Street to Bobcat Drive Kenney Avenue from Oyama Avenue to Nelson Street Cedar Street	Various speed management method for major / collector / local / rural roads and schools including Speed reader boards Road narrowing / road diet Traffic calming	TBD	Speed Management	Refer to Appendix Traffic Safety Strategy, Table A for detailed locations
N/A	City-wide Review	Network screening	TBD	City-wide Improvements	Refer to Appendix Traffic Safety Strategy, Table D for detailed locations
		Sub-total (Speed management and city-wide review)	**$94,000**		
P1	7 Avenue & Lee Street	RRFB and curb extensions	$74,250	Pedestrian Crossing	
P2	Cherry Avenue & Stave Lake Street	RRFB and curb extensions	-	Pedestrian Crossing	Separated budget
P3	Wren Street & Raven Avenue	RRFB and curb extensions	$74,250	Pedestrian Crossing	
P4	Hurd Street & Hillcrest Avenue	RRFB and curb extensions	$74,250	Pedestrian Crossing	
P5	Hurd Street & Lamont Avenue	RRFB and curb extensions	$74,250	Pedestrian Crossing	
P6	Hurd Street & McRae Avenue	RRFB and curb extensions	$74,250	Pedestrian Crossing	
P7	Stave Lake Street & 4 Avenue	RRFB and curb extensions	$74,250	Pedestrian Crossing	
P8	Stave Lake Street & 5 Avenue	RRFB and curb extensions	$74,250	Pedestrian Crossing	
P9	11 Avenue & Dunsmuir Street	RRFB and curb extensions	$74,250	Pedestrian Crossing	
P10	7 Avenue & Alder Street	RRFB and curb extensions	$74,250	Pedestrian Crossing	
P11	7 Avenue & Murray Street	RRFB and curb extensions	$74,250	Pedestrian Crossing	
P12	Wren Street & West Heights Elementary School	RRFB and curb extensions	$74,250	Pedestrian Crossing	
P13	Wren Street & Van Velzen Avenue	RRFB and curb extensions	$74,250	Pedestrian Crossing	
P14	Cherry Avenue & Cedar Street	Pedestrian Leading Intervals	-	Pedestrian Crossing	Part of road intersection improvements / Signal re-timing
		Sub-total (Pedestrian Crossing)	**$891,000**		

Project ID	Description	Improvement Type	Project Cost	Category	Comments
S1	Hurd St & 7th Ave	Improved alignment	-	Intersection Safety	part of the 7 Avenue Greenway Project
S2	Cedar Valley Connector/Mall Access	Warning signals/signal coordination/enhanced signal visibility	$165,000	Intersection Safety	
S3	Cedar Valley Connector/Cedar St & 7th Ave	Additional turn lanes/access mgmt/improved alignment	-	Intersection Safety	Part of road project
S4	Cedar St & 14th Ave	Improved alignment	-	Intersection Safety	Part of road project
S5	Signal re-timing for all signals	Optimized signal timing splits / phasing	$100,000	Intersection Safety	$20,000 per year on a revolving 5-year cycle
		Sub-total (Intersection Safety)	**$265,000**		
		Total (5-year Safety Improvements)	**$1,250,000**		

TABLE F-10: SHORT-TERM TRANSIT AMENITY PROJECTS (0-5 YEARS)

Project ID	Bus Stop ID	Description	Side of Street	Route	Cost	Category	Comments
T1	107752	1st Ave at James	N	31	$40,000	Bus Stop Amenity Upgrade	8th busiest bus stop (boardings only) of Route 31 map (see Table 9, Discussion Paper 1)
T2	107788	Grand at 9th Ave	E	33, 39	$40,000	Bus Stop Amenity Upgrade	Busy stop based on Mission Transit Stop Activity map (see Figure 21, Discussion Paper 1), although outside of top ten
T3	107798	Cherry at Cedar	M	33	$40,000	Bus Stop Amenity Upgrade	Serves school, church, and Cedar Valley Manor retirement community
T4	107800	Fennell at Mitchell	W	33	$40,000	Bus Stop Amenity Upgrade	7th busiest bus stop of Routes 32,33,34,35 (see Table 9, Discussion Paper 1)
T5	107802	Cedar at Janzen	W	33	$40,000	Bus Stop Amenity Upgrade	Serves school, church, and Cedar Valley Manor retirement community
T6	107847	James at 7th Ave	W	34	$40,000	Bus Stop Amenity Upgrade	Near leisure centre and arena
T7	107850	Alder at 7th Ave	W	39	$40,000	Bus Stop Amenity Upgrade	Near secondary school\
T8	107870	Rai at Wren	S	32, 33, 34, 35	$40,000	Bus Stop Amenity Upgrade	9th busiest bus stop of Routes 32,33,34, (see Table 9, Discussion Paper 1)
T9	107883	7th Ave at Taulbut	N	33, 34	$40,000	Bus Stop Amenity Upgrade	Appears to be busy on Mission Transit Stop Activity map (see Figure 21, Discussion Paper 1), although outside of top ten
T10	120050	Egglestone at Machell	N	33	$40,000	Bus Stop Amenity Upgrade	8th busiest bus stop of Routes 32,33,34,35 (see Table 9, Discussion Paper 1)
				Total (Short-term)	**$800,000**		

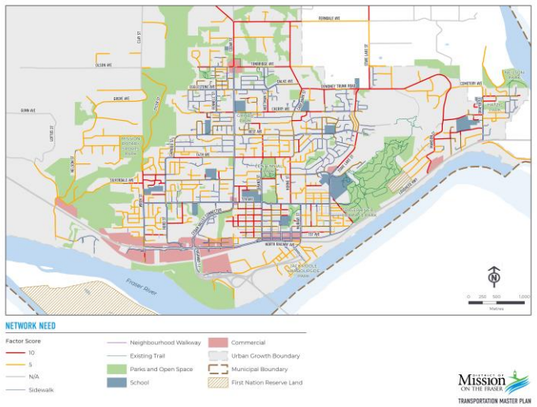
TABLE F-11: MEDIUM-TERM TRANSIT AMENITY PROJECTS (6-10 YEARS)

Project ID	Bus Stop ID	Description	Side of Street	Route	Cost	Category	Comments
T11	107764	7th Ave at Peterson	S	32, 39	$40,000	Bus Stop Amenity Upgrade	Near Fraser View Learning Centre
T12	107767	Cedar at 7th Ave	E	32, 33	$40,000	Bus Stop Amenity Upgrade	Cedar St corridor
T13	107768	Cedar at 10th Ave	E	32, 33	$40,000	Bus Stop Amenity Upgrade	Cedar St corridor
T14	107769	Cedar at Charnley	E	32, 33	$40,000	Bus Stop Amenity Upgrade	Cedar St corridor
T15	107804	Cedar at 14th Ave	W	32, 33	$40,000	Bus Stop Amenity Upgrade	Cedar St corridor
T16	107805	Cedar at Charnley	W	32, 33	$40,000	Bus Stop Amenity Upgrade	Cedar St corridor
T17	107806	Cedar at 10th Ave	W	32, 33	$40,000	Bus Stop Amenity Upgrade	Cedar St corridor
T18	107830	Cherry at Aster	S	34	$40,000	Bus Stop Amenity Upgrade	Near Edwin S Richard Elementary School
T19	107834	Stave Lake a Dewdney Trunk	S	34	$40,000	Bus Stop Amenity Upgrade	Near Riverside College, Municipal Works yard, City Hall
T20	107856	Moffat at Lawrence	N	35	$40,000	Bus Stop Amenity Upgrade	Near Hatzic Middle School
				Total (Medium-term)	**$800,000**		

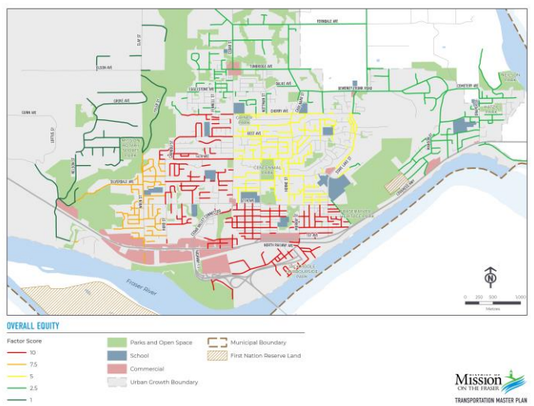
APPENDIX G

SIDEWALK PRIORITIZATION RESULTS

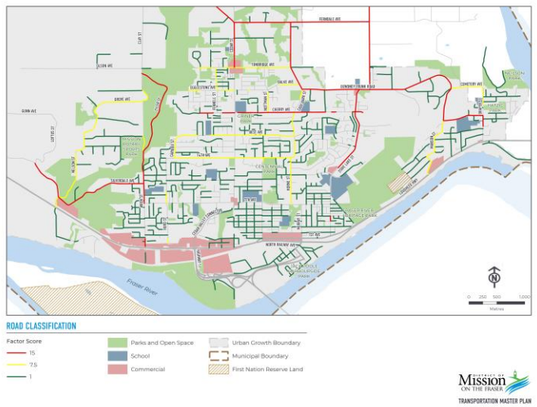
NETWORK NEED



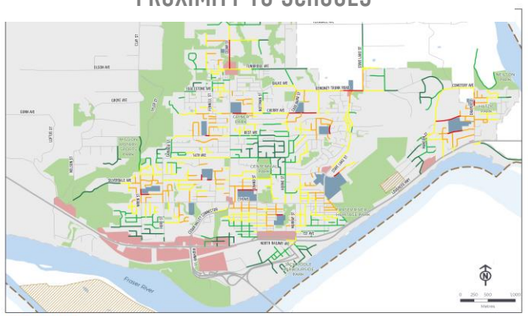
OVERALL EQUITY



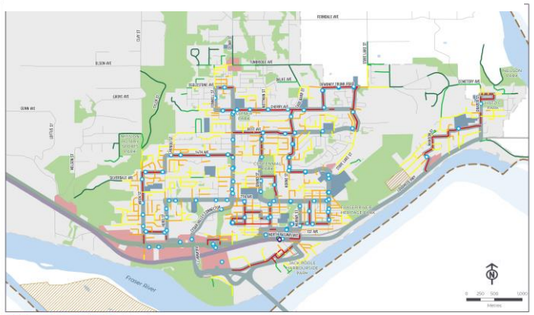
ROAD CLASSIFICATION



PROXIMITY TO SCHOOLS



PROXIMITY TO TRANSIT NETWORK



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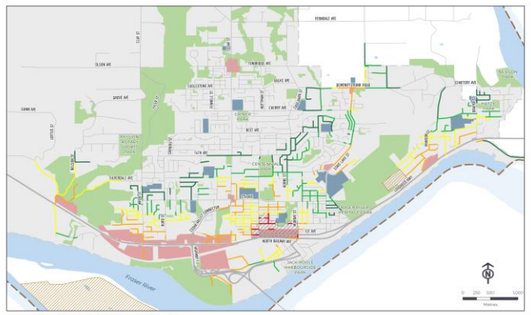
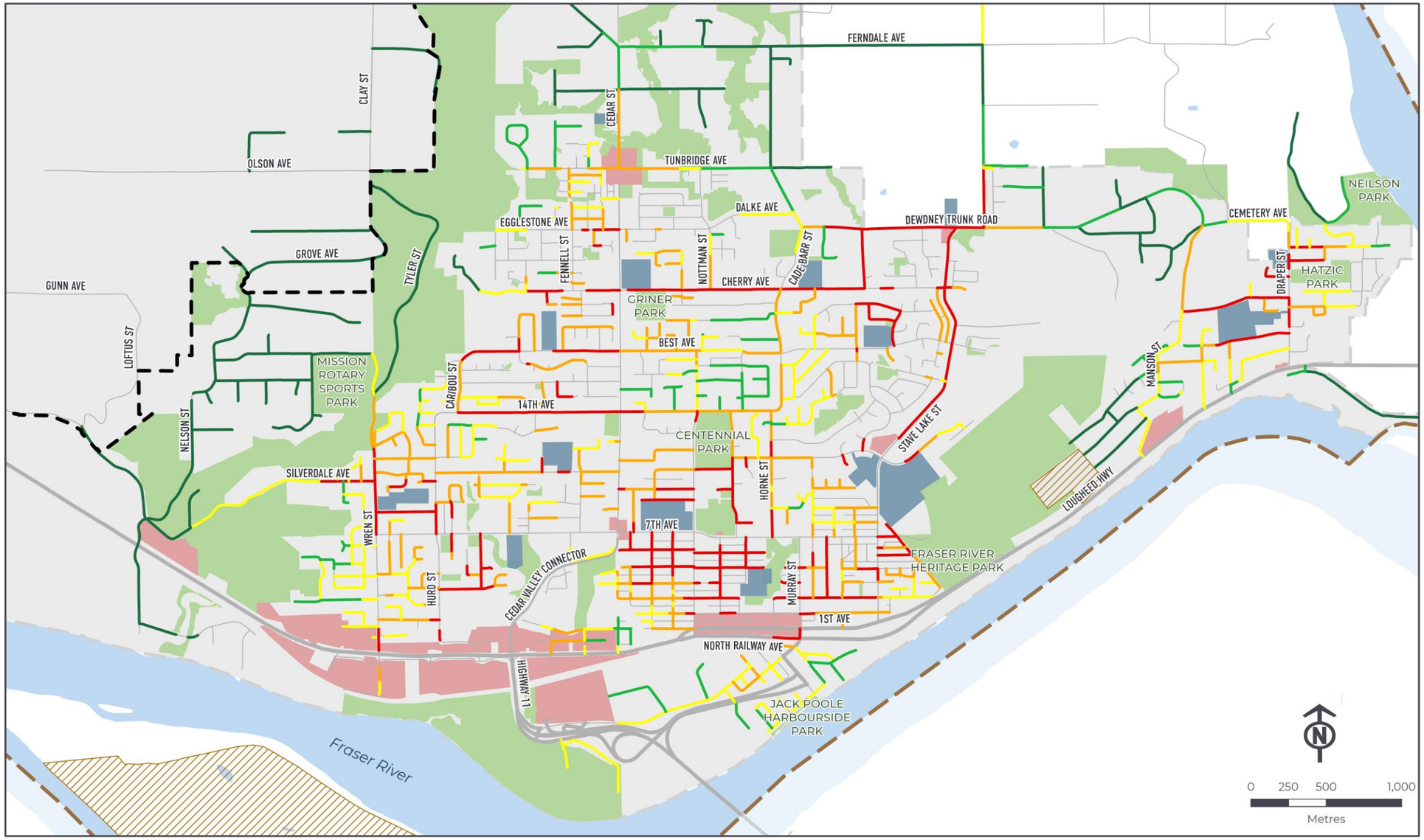


PROXIMITY TO KEY DESTINATIONS



OVERALL PEDESTRIAN PRIORITIZATION SCORE

Factor Score

- ≥ 60
- 50 - 60
- 40 - 50
- 30 - 40
- ≤ 30

- Parks and Open Space
- School
- Commercial
- Urban Growth Boundary
- Municipal Boundary
- First Nation Reserve Land

Silverdale Comprehensive Planning Area

NewOCPType

- Silverdale Comprehensive Planning Area

DISTRICT OF Mission ON THE FRASER

TRANSPORTATION MASTER PLAN