ISL Engineering and Land Services

FINAL REPORT

Inspiring sustainable thinking

City of Chilliwack

Transportation Plan Update

July 2018

ISL Engineering and Land Services

ISL Engineering and Land Services Ltd. is an award-winning full-service consulting firm dedicated to working with all levels of government and the private sector to deliver planning and design solutions for transportation, water, and land projects.

Table of Contents

Executive Summary

A Introduction A-1

B Signal Plan B-1
B.1 New Traffic Signals B-1
B.2 Site Inventory B-1
B.3 Efficiency of Signal Operations B-3
B.4 Review of Intergreen Times B-4
B.5 Review of External Signal Hardware B-5
B.6 Roundabout B-7
B.7 Improvements B-7
B.8 Recommendations B-10

C Safety Plan C-1
C.1 Network Screening Study C-1
C.2 Safer City C-5
C.3 Traffic Calming Policy C-7
C.4 Recommendations C-7

D Traffic Growth D-1
D.1 Historic Traffic Growth D-1
D.2 Future Traffic Growth D-1
D.3 Area of Concern D-2
D.4 Recommendations D-3

E Pavement Rehabilitation E-1
E.1 Pavement Life Cycle E-1
E.2 Pavement Management System E-1
E.3 2014 Pavement Assessment Report E-2
E.4 Recommendations E-3

F Downtown Parking Study F-1
F.1 Study Area F-1
F.2 Parking Inventory Survey F-1
F.3 Public Parking Supply Inventory F-1
F.4 Traffic and Parking Demand Management Strategies F-3
F.5 High Parking Demand Areas F-4
F.6 Recommendations F-5

G Road Network G-1
G.1 Functional Classification G-1
G.2 Existing Road Network G-2
G.3 Future Improvements G-5
G.4 Recommendations G-5

H Zoning Setbacks & Bylaws H-1
H.1 Zoning Bylaw Review H-1
H.2 Official Community Plan Bylaw 2014, No. 4025 Review H-1
H.3 Zoning Bylaw 2001, No. 2800 Review H-5
H.4 Land Development Bylaw 2014, No. 3055 H-7
H.5 Recommendations H-8

I Transit Plan I-1
I.1 Existing Transit System I-1
I.2 Regional Connectivity I-3
I.3 Review of Demand, Supply and Routing I-3
I.4 Plan for Future Transit Growth I-7
I.5 Recommendations I-7

J Cycle Plan J-1

K Bridge Plan K-1
K.1 Summary of the 2016 Bridge Inspection Report K-1
K.2 Recommendations K-6

L Traffic Volumes L-1
L.1 24 Hour Counts L-1
L.2 Intersection Counts L-2
L.3 Review of Annual Traffic Count Program L-3
L.4 2017 Traffic Count Program L-4
L.5 Recommendations L-5

M Pedestrian Plan M-1
M.1 Introductions M-1
M.2 Roads M-2
M.3 Crossings M-4
M.4 Priorities M-10
M.5 Recommendations M-13

N Regional Connections to Highway 1 ..... N-1
N.1 Traffic Volumes along Highway 1 N-1
N.2 Traffic Volumes at Interchange Locations N-2
N.3 Evans Road Interchange N-2
N.4 Lickman Road Interchange N-4
N.5 Other Interchange improvements N-4
N.6 Parallel Routes N-5
N.7 Recommendations N-5

O Railway Plan O-1
O.1 Existing Rail Services O-1
O.2 Crossing Facilities O-1
O.3 Rail Crossing Collisions O-2
O.4 Grade Crossing Regulations O-2
O.5 Recommendations O-2

P Airport Plan P-1
P.1 Land Use Designations and Zoning P-1
P.2 Airport Airside Facilities P-2
P.3 Groundside Transportation Connections P-3
P.4 Recommendations P-4

Q Truck Plan Q-1
Q.1 Municipal Truck Routes Q-1
Q.2 2016 Existing Truck Route Network Q-1
Q.3 Proposed Changes to Truck Route Q-2
Q.4 Other Issues Q-3
Q.5 Recommendations Q-3

R Financial Plan R-1
R.1 Recommendations as Proposed in Transportation Plan Update R-1
R.2 Review of the Latest Capital Management Plan R-4

LIST OF TABLES

Table B.1 LOS Definition for Signalized Intersections in HCM B-3
Table B.2 Intersections with Overall Capacity Deficiencies B-3
Table B.3 Intersections with Capacity Deficiencies for Individual Movements B-4
Table B.4 External Signal Hardware Inventory for new signals B-6
Table B.5 External Signal Hardware Inventory for original signals from 2007 plan B-7
Table B.6 Recommended Signalized Intersection Improvements B-8
Table C.1 Top 21 High Collision Signalized Intersections C-2
Table C.2 Top 10 High Collision Unsignalized Intersections C-2
Table C.3 Ongoing/Future Safer City Programs/Projects C-6
Table D.1 Historic Traffic Growth D-1
Table D.2 Land Use Growth Assumptions D-1
Table F.1 On-Street Public Parking Supply Inventory Summary F-2
Table F.2 Off-Street Parking Summary F-3
Table F.3 Chilliwack General Hospital On-Site Parking Cost F-4
Table G.1 Road Functional Classification and Roles G-1
Table G.2 Peak Hour Factors G-2
Table I.1 Chilliwack Transit Routes I-1
Table I.2 Proportion of Ridership per Route from 2013 to 2015 ..... I-5
Table I.3 Summary of the City of Chilliwack Transit Pricing I-6
Table K.1 Bridge Inventory Summary K-12
Table K.2 Bridge Maintenance Cost Summary K-3
Table K.3 Bridge Replacement Cost Summary K-34
Table K.4 Bridge Seismic Rating Summary K-5
Table M.1 Crossing Treatment Selection Matrix M-9
Table M.2 Points for Crossing Safety Improvement M-11
Table M.3 Points for Sidewalk Safety Improvement M-11
Table M.4 Points for Road Conditions M-12
Table M.5 Priority Projects M-14
Table N.1 Capacity Issues for Parallel Routes of Highway 1 ..... N-5
Table O.1 2012 and 2013 Injury Collisions at Railway Crossing Locations O-2
Table Q.1 Municipal Truck Routes Q-2

LIST OF FIGURES

Figure B.1 Traffic Signal Locations B-2
Figure C.1 Top 31 Candidate Intersections for Correctability C-3
Figure D.1 EMME V/C Ratio Output (Year 2021) ..... following Page D-6
Figure D.2 EMME V/C Ratio Output (Year 2031) ..... following Page D-6
Figure D.3 EMME V/C Ratio Output (Year 2051) ..... following Page D-6
Figure D.4 Priority Candidates for Transportation Road improvements ..... following Page D-6
Figure D.5 Recommended Road Capacity Improvements by 2031 ..... following Page D-6
Figure F.1 Downtown On-Street Parking Inventory and Regulation ..... following Page F-6
Figure F.2 Public Off-Street Parking and High Parking Demand Areas ..... following Page F-6
Figure G.1 Existing and Future Road Classification Map ..... following Page G-6
Figure G.2 Hourly Traffic Distributions (Arterial Roads) G-3
Figure G.3 Hourly Traffic Distributions (Collector and Local Roads) G-4
Figure I.1 Transit Service Map (BC Transit, as of November 2017) I-2
Figure I.2 Conventional Transit Yearly Ridership (In Thousands of Riders) by Year I-4
Figure I.3 HandyDART Yearly Ridership Trends (In Thousands of Riders) by Year I-4
Figure I.4 HandyDART Usage by Time of Day I-5
Figure I.5 Distribution of Ridership Fare Method (as of 2015/2016) I-6
Figure K.1 Existing Chilliwack Bridge Location Map (2014 Bridge Inspection Report) .... following Page I-6
Figure L.1 Roadway Segments with Highest 24-Hour Traffic Counts L-1
Figure L.2 Traffic Growth Comparison between 2014 and 2016 ..... L-2
Figure L.3 Intersections with Highest AM Traffic Counts L-2
Figure L.4 Intersections with Highest PM Traffic Counts L-3
Figure M.1 Share the Road Signs for Rural Roads M-3
Figure M.2 Curb Extensions (Yarrow) M-5
Figure M.3 Narrow Object Marker on Curb Extension (New Westminster) M-5
Figure M.4 Median Island at Crosswalk (North Vancouver) M-5
Figure M.5 Conventional Flashing Light Crossing (Nanaimo) M-6
Figure M.6 Rapid Rectangular Flashing Beacon (Abbotsford) M-6
Figure M.7 Advance Stop Line on Multiple Lane Approach M-7
Figure N.1 2005 and 2014 AADT along Highway 1 ..... N-1
Figure N.2 2014 and 2016 Surveyed Two-Way Traffic Volumes at Interchanges N-2
Figure N.3 Highway 1 and Evans Road Interchange N-3
Figure N.4 Daily Traffic Volumes along Vedder Road and Evans Road N-3
Figure N.5 Preliminary Design for the Highway 1 and Lickman Road Interchange N-4
Figure O.1 CN and Southern Railway Crossing Locations ..... following Page O-2
Figure O.2 Existing CN Rail Crossings O-1
Figure P.1 Aerial Photograph of Chilliwack Airport P-1
Figure P.2 Entrance and Exit from Airport Loop Road P-3
Figure P.3 Bike Lanes Ending at Cessna Drive P-3
Figure P.4 Airport Road Eastbound Bus Stop P-4
Figure Q.1 Truck Route ..... following Page Q-4
Figure R.1 Short- and Long-Term Capacity Improvement Projects R-5

This Page is Intentionally Left Blank

Executive Summary

The City of Chilliwack (the City) is located 100 kilometres east of Metro Vancouver, British Columbia, near the west end of the Fraser Valley. Chilliwack is one of the largest communities in the Fraser Valley, serving as one of the main economic, educational and cultural hubs in the area. The transportation system within the City provides a critical function to move people and goods effectively, safely and reliably on both the local and regional levels.

In response to the changing and evolving transportation challenges facing the community, the City has recognized the need to consolidate the transportation priorities in one document. The first *City of Chilliwack Transportation Plan* was completed in June 2001 and the *2007 Transportation Plan* was finalized in December 2008. The City decided on updating the transportation plan to consolidate priorities in order to identify the changes in transportation conditions and would like to deliver a cost-effective and efficient multi-modal transportation network.

With steady population and economic growth, the City balance road capacity demands with motorist, pedestrian, cyclist and transit needs. This *Transportation Plan Update* included an analysis and summary of the recommendations of other relevant previous reports and City policy documents to reflect the goals set out in this *Plan*, to ensure consistent vision. In addition, the management of financial resources to prioritize transportation project spending needs to be completed within a framework that is based on sound technical analysis.

A total of seventeen individual plans are discussed in this *Transportation Plan Update*, including; Signal Plan, Safety Plan, Traffic Growth, Pavement Rehabilitation, Downtown Parking, Road Network, Zoning Setbacks and Bylaw, Transit System, Cycle Plan, Bridge Plan, Traffic Volumes, Pedestrian Plan, Regional Connections to Highway 1, Railway Plan, Airport Plan, Truck Routes, and Financial Plan.

Signal Plan

The Signal Plan provides the latest traffic volume and signal timing information for a total of sixty-nine (69) traffic signals located within the boundary of Chilliwack, which is an increase of eighteen (18) signals from the fifty-one (51) signals identified in the *2007 Signal Plan*. The intersections that were identified as having at least one movement with poor capacity performance (Level of Service D or worse), where reviewed to identify possible improvements for increasing intersection capacity. Revisions to signal timing and signal phasing as well as geometric improvement methods were considered. Signal hardware and intergreen times were also reviewed as part of the plan. The Signal Plan identified a number of recommendations, including:

- Consider the signal timing improvements identified in *Transportation Plan Update*
- Include roundabout traffic operation analysis in future studies.
- Consider signal coordination along major north-south transportation corridors such as Vedder Road, Yale Road, and Young Road to reduce traffic congestion.
- Consider evaluating the traffic operations and road safety for the intersections of Vedder Road and Luckakuck Way.

Safety Plan

The purpose of the Safety Plan is to provide recommendations to guide the City on capital spending for road safety improvements within the community through *Network Screening Study*, Safer City Program, and Traffic Calming Policy. A list of top high collision signalized intersections (using collision data from 2009 to 2013) were compared to the previous list, and the top intersections and rankings were overall similar. The secondary screening process was also undertaken and summarized to identify not only key issues, but also traffic conditions, intersection characteristics, and opportunities for each top high collision location.

Based on the identified results for each of the candidate intersections, common safety issues and trends were confirmed and identified.

The Safer City Program focuses on immediate (existing changes) that provide concern and action for the long term (future changes). To ensure the initiative is effective and optimize the 3 E's (Engineering, Education and Enforcement) for maximum effect, standard regularized programs and projects have been adopted. The list of ongoing programs and future projects provided by the Safer City Coordinator is updated and summarized.

The Safety Plan identified the following recommendations:

- Continue to work with ICBC on road safety improvements with the support of funding and investment through the Road Improvement Program.
- Consider and categorize (improvement type and implementation timing) the City-wide and site-specific recommendations from the *2014 Network Screening Study*.
- Continue to operate programs and projects in the Safer City Program to raise public awareness of road safety.
- Continue to collaborate with RCMP enforcement activities to address traffic offences.
- Continue to coordinate with other transportation agencies and committees/boards to enhance driver behavior.
- Develop Traffic Calming Policy for the City to provide an alternative option of traffic calming tool.

Traffic Growth

Historic growth trends were estimated from two-way traffic volumes provided in the *2016 Traffic Count Program* and traffic volume growth patterns from 2007, 2011 and 2013 to 2016 were summarized. The model outputs and study findings from the *City of Chilliwack EMME3 Model - 2012 Update* were reviewed, which identified traffic growth expectations in horizon years of 2021, 2031, and 2051. Compared to 2011 (baseline year in the *2012 EMME Model Update*), the population is expected to almost double in 2051 with significant growth expected for residential and industrial land use areas. Results from *2012 EMME Model Update* of links with expected volume-to-capacity (v/c) ratios in years 2021, 2031 and 2051 were identified.

With the *2012 EMME Model Update* results, it is recommended that by 2031, road capacity improvements are focused on several major north-south and east-west corridors, including:

- Lickman Road corridor (Keith Wilson Road – Old Orchard Road);
- Evans Road / Tyson Road / Ashwell Road corridor (Watson Road – Wolfe Road);
- Vedder Road / Yale Road corridor (Promontory Road – Bernard Avenue);
- Young Road corridor (Luckakuck Way – Airport Road);
- Luckakuck Way corridor (Evans Road – Young Road); and
- Watson Road / Promontory Road corridor (Tyson Road – Chilliwack River Road).

Pavement Rehabilitation

The City conducts asphalt rehabilitation on roads based on a 'worst first' criteria. Using the results of the periodic condition survey, a proportion of the annual asphalt rehabilitation budget is allocated to the worst arterial, collector, and local roads to attain the City Council pavement quality goals for each category and for the entire network. For pavement management system, the City has been trying to maintain an overall average PQI of 6.0. The minimum acceptable PQI is 3.5 for local roads and 4.5 for arterial / collector roads.

As a result, the pavement rehabilitation section contained the following recommendations:

- Consider additional field data collection (visual and structural) and a new report in 2019 to update the current PQI and to develop and update the yearly candidate roads for the next 5-year pavement rehabilitation plan including structural data (FWD) and subsurface information.
- Consider increasing the annual road rehabilitation budget to $5.2M to maintain a PQI of 6.0.
- Review construction costs yearly to adjust budgets for industry increases/decreases and market fluctuations to maintain the target PQI.
- Monitor the proposed work from the PMS and the actual work completed and note the field conditions.
- Determine if upgrades other than the travel surface should be considered, other factors such as traffic volumes, and local improvement / upgrading requirements should be studied.

Downtown Parking

For the Downtown Parking Plan, two different parking surveys were conducted, on-street and off-street public parking supply inventory surveys. About 1,420 on-street parking spaces are identified in the downtown area. Utilizing the changes from the 2007 parking inventory study, there was an effective increase of 31 spots, approximately 2%. In addition to the lots included in the 2007 Downtown Parking, two additional public off-street parking lots were identified at 9260 Young Road (corner of Young and Princess) and 46031 Empress Lane (North side of Empress lane). To promote sustainable transportation and growth of downtown into the future, traffic and parking demand management strategies could be implemented within the City, such as; promoting walking and cycling, pay parking during peak times, shift scheduling for high parking demand areas, improving transit service, and encouraging carpooling and car sharing.

As part of the Downtown Parking Plan, two high parking demand areas were identified Chilliwack General Hospital and the Landing Centre to analyze and provide comments or recommendations to improve the parking for these areas. Recommendations for the Downtown Parking Plan include:

- Consider consulting with the relevant stakeholders in the downtown area to investigate the feasibility of implementing parking demand management strategies.
- Provide marked parking spaces for all public off-street parking lots.
- Provide effective and convenient wayfinding measures for the Landing Centre area such as maps of available parking near the accesses.

Road Network

The Road Network Plan identifies the different types of roads (Freeway, Arterial, Collector and Local) based on their purposes and functions and indicates how traffic patterns vary on them. The functional road classifications reflect the intended purpose of the roadway, appropriate connections, access controls, and independent of the actual traffic volumes. *The 2016 Traffic Count Program* identified corridors with the highest volumes and approximate two-way daily traffic are: north-south corridor Yale Road between Spadina Avenue and Vedder Road with AADT (Annual Average Daily Traffic) between 10,000 and 36,000 vehicles and; east-west corridor Promontory Road between Vedder Road and Uplands Road with AADT between 13,000 and 21,000 vehicles. The peak hour factors (peak hour volume divided by daily volume) and hourly variations for two-way traffic volumes during average weekdays were summarized. Planned future enhancements to the road network for the next ten years (2016-2025) were listed from the *City of Chilliwack Comprehensive Municipal Plan*. As a result, this Road Network Plan recommends the following:

- Update the Road Network Classification Strategy every three to five years to assist land developments within the City boundary.

Zoning Setbacks & Bylaws

A number of bylaws set out regulations which can impact transportation infrastructure or the need to travel in some ways, and have been reviewed in this section, including; Official Community Plan (OCP) Bylaw 2014, No. 4025, Zoning Bylaw 2001, No. 2800 and, Land Development Bylaw 2014, No. 3055.

The *OCP*, like in many other cities, is recognizing that designing purely for the automobile is not sustainable in the longer term and there is a need to prioritize walking, cycling, and transit in the OCP and carry through in the implementation plan within this document and within the *City's Capital Plan*.

Setbacks from roadways is the most critical set of dimensions that should be addressed through a transportation plan as this allows for capacity improvements (for cars and other modes) at later times. Setbacks or right of way is often dictated by road classification, thus it's important that the future *Road Network Plan* sets out classifications that support future land use to ensure road widths or right of way is provided to accommodate future plans.

The *Land Development Bylaw* sets out the cross sections for varying types of roadway. Given the proposed improvements to accommodate cyclists that are being planned as part of the *Cycling Plan*, it will be necessary to update the *Land Development Bylaw* to include new cross sections for routes that contain bicycle facilities. It is currently not clear what each cross section should provide in terms of laning, parking, and turn provision.

From the transportation perspective, the following recommendations were developed:

- Review Capital Plan to confirm City spending reflects Vision and Goals of the *Chilliwack 2040 OCP*.
- Consider Pedestrian and Cycle Plans to inform all new road projects
- Review bylaw setbacks upon finalisation of *Transportation Plan Update*, accompanying *Cycling Plan* and future revision to cross-sections in *Land Development Bylaw*.
- Provide specific laning examples for a given pavement width.
- Include example of cycle facilities and their space requirements in line with *Cycling Plan* that accompanies this *Transportation Plan Update*
- Reduce acceptable lane widths to 3m in areas intended for low speeds and with low truck volumes
- Set design speed equal to posted speed
- Review *Cycle Plan* and develop example cross-sections for various bicycle facilities.

Transit Plan

The Chilliwack Transit System is cost shared service between the City and BC Transit and the City and the Fraser Valley Regional District Board make decisions on fares, routes, and service levels, based on the public's feedback and BC Transit information. Seven conventional bus routes within the City, two community/seasonal bus routes and three regional connecting bus routes are provided. The Transit Plan reviewed the *Transit Future Plan - Chilliwack Area (2012)* with near-term, short-term and long-term planning goals and priorities. Data generated using revenue information, assumptions regarding the number of users per month, BC Pass and some fare collection system data were used to analyze ridership and fare method trends. The recent *Transit Expansion Project* recently approved by the Chilliwack City Council, which outlines an improvement plan for 2017 through 2019, was also reviewed. To continue to work towards increasing the mode share and improve the level of service for the transit service, the following recommendations are proposed;

- Work with BC Transit to monitor and review ridership data to identify locations that may benefit from additional transit service or future developments that could benefit from transit access.
- Promote changes and improvements to the transit system using social media and maximize the effectiveness of the promotion by partnering with neighborhood and advocacy groups.

- Review and evaluate the results from the proposed improvements in the next three years and report in the next Transportation Plan.

Cycle Plan

A comprehensive Cycle Plan was developed and discussed while the recommendations were prepared in the separate *Chilliwack Cycle Plan* (May 2017). The Cycle Plan contained a number of key components which including, goals and objectives to encourage cycling and improve safety for cyclists. The plan is focused on eliminating gaps on and between existing routes, and improving routes to incorporate protection for cyclists from motor vehicle traffic. An implementation plan with priorities for protected facilities, bicycle parking, transit integration, community engagement, marketing, education and enforcement, maintenance and monitoring. Guidance for designing, construction and maintaining bicycle facilities, based on state-of-the-art guidelines used in North America, but adapted to conditions in Chilliwack.

The Cycle Plan provided the following recommendations:

- Implement Quick Win projects
- Develop and implement a city-wide bicycle route signage system
- Design and implement protected bicycle facilities in consultation with residents, businesses and other stakeholders
- Extend the Sardis Rail Trail south to the Vedder River and north to Hocking Avenue
- Develop an annual program to install more bicycle racks and implement secure bicycle parking
- Incorporate priority bicycle projects into future capital plans
- Implement an annual bicycle monitoring program

Bridge Plan

The main objective of the Bridge Plan is to summarize the information collected in the *2016 Bridge Inspection Report*, to compare the findings in the *2007 Plan* and to identify the upcoming prioritized needs for rehabilitation and upgrades. The *2012 – 2016 Roads Bridge Inspection Program* of twenty-three (23) bridges (22 vehicle bridges and 1 pedestrian bridge) within the City's boundaries. The inspection reports, analysis and recommendations were documented in the *2016 Bridge Inspection and Maintenance Report.* Each structure condition and structure components were rated based on the *Bridge Rating System* similar to the *Public Works and Government Services of Canada's Rating System*. The suggested repair / maintenance works were identified for each bridge and the associated costs were estimated based on all anticipated maintenance expenditure. The bridge replacement costs were summarized from the *2016 Inspection Report* to assist the City with budgeting requirements.

Based on the findings provided in the Bridge Plan the following recommendations are provided:

- Consider repairing or replacing bridges CB23 Banford Road (< 1,000 ADT) and CB24 Parker Road (<100 ADT)
- Complete medium and low priority items at bridges requiring high priority upgrades at the same time.
- Consider the network functionality perspectives when conducting this work.
- Prepare effective traffic management plans when doing any bridge works, to minimize delays and ensure safety for the bridge users and the workers.
- Upgrade or replace the bridges located along high traffic routes or bicycle routes.
- Continue the practice of conducting Inspection Reports at regular intervals, and of acting on the recommendations of these reports to ensure that these critical network links remain functional and safe.

Traffic Volumes

As part of the *City of Chilliwack Traffic Count Program*, in 2016, automatic two-way 24-hour counts were conducted at 86 stations, and manual turning movements were conducted at 78 stations, during the months of April and May. When comparing the 2016 and 2014 traffic count data, it was found that the majority road segments (88.6%) experienced traffic growth with the highest growth occurring on Vedder Mountain Road West of BC Hydro Rail. Based on the intersection count data, the top 15 intersections with the highest recorded morning or afternoon peak hour volumes were summarized. As a result, the following recommendations were developed:

- Alternate traffic counts at all signalized intersections at least every two years and traffic counts at selected unsignalized intersections at least every three years.
- Continue to include newly installed signalized intersections and selected unsignalized intersections that the City intends to conduct intersection upgrade in the near future.
- Continue to conduct continuous traffic count data collection at permanent count stations along major transportation corridors (Vedder Road, Evans Road, Promontory Road, Vedder Mountain Road, and Yarrow Central Road) for a complete year.
- Review development-related applications and automate collection of traffic count data from any traffic impact assessment study conducted and add into traffic data count inventory.
- Review and conduct traffic data collection for locations with unusual traffic peak patterns, such as a nearby school, sports field or provincial park.
- Identify areas with high development activities and select key intersections and corridors for future data collection.
- Consult and collaborate with MoTI for data collections at highway intersections

Pedestrian Plan

The Pedestrian Plan is informed by the *City's Official Community Plan (2015)* and the *Downtown Land Use and Development Plan (2009)* and contains the following key components: Roads, Crossings, Priorities and Projects. Roads section identifies improvements to the City's standard drawings for roads and other plans that illustrate road cross-sections, to more safely accommodate pedestrians. The crossing section provides guidance regarding the different types of pedestrian crossing treatments, which include midblock crossings and multiuse crossings used by cyclists and other modes of active transportation.

The priorities section was developed to provide a prioritizing projects so as to implement those providing the greatest benefits and greatest return on investment. These priorities are intended to provide a basis for City staff, decision makers, stakeholders and others to plan, budget and implement pedestrian facilities. As well, it is expected that the methodology for determining priorities might be modified as needed to support the City's objectives. Sidewalk and crossing projects previously documented by the City have been re-evaluated and ranked using the methodology. From the Pedestrian Plan, the following recommendations are provided:

- Consider the 25 highest-ranking priority sidewalk and crossing projects have been identified and Implement over the next 5 years or more
- Consider warrant analysis studies for additional high profile pedestrian crossing locations as identified by the public and/or the City.

Regional Connection to Highway 1

To compare traffic volumes along Highway 1, the daily traffic volumes at the count stations in Langley, Abbotsford, Chilliwack, and Hope were reviewed for both 2005 and 2014 data. Available daily traffic volumes at various interchange locations on major municipal roads for 2014 and 2016 (with percentage change in two years) were also collected and summarized.

Output from the *2012 EMME Update* report indicate that the four major interchanges at Lickman Road, Evans Road, Vedder Road, and Young Road will experience capacity issues by 2021, and two Highway 1 Interchanges at Prest Road and Yale Road West will experience capacity issues by 2051.

Daily traffic volumes along Vedder Road (North of Luckakuck Way) and Evans Road (South of Evans Road Roundabout) were analyzed, and found that traffic volume on Evans Road continues to increase since 2011 and Vedder Road traffic volume experiences a decline since 2007 and remain relatively consistent after 2012. The preliminary design for Lickman Road Interchange was reviewed, which is expected to be implemented in 2017 – 2018. The capacity issues for parallel routes of Highway 1 were also reviewed.

The following recommendations were developed to be considered in this plan:

- Continue to conduct traffic counts at the major interchange locations between Lickman Road and Prest Road to monitor the change in traffic patterns;
- Consider capacity improvements to the Lickman Road (preliminary design completed in 2015), Prest Road and Young Road corridors (to be designed) at the highway interchanges;
- Review construction schedule and budget for any improvements to the interchanges with the scheduled capitol projects in the latest *Comprehensive Municipal Plan*

Railway Plan

Canadian National (CN) and Southern Railway of British Columbia Limited (SRY) are the two railway companies that have tracks situated in Chilliwack while Chilliwack is a major interchange point between CN Rail and SRY. The Railway Plan focuses on CN railway in Chilliwack while SRY railway is not discussed as part of the Plan. There are 15 CN at-grade crossings in total in Chilliwack. The CN Rail track intersects with several arterial roads in the City from west to east, which are Industrial Way, Lickman Road, Evans Road, Young Road, Broadway, Prest Road, Annis Road, and Yale Road. A total of sixteen collisions occurred in the 24-month period with eleven reported in 2012 and five in 2013. Of those two studied years, eight casualty collisions were reported with no fatal collisions found. The new *Railway Crossings Regulations (GCR)* were put into enforcement through the *Railway Safety Act* by Transport Canada in November 2014. As per Section 12 of the new *Grade Crossings Regulation*, key information for all 15 CN at-grade crossings was summarized and submitted to the City in a separate document (*Detailed Grade Crossing Safety Assessment Report*). This assessment reviewed each rail crossing to assist the City to identify necessary improvements to comply with the new *Grade Crossings Regulations* related to surface, signs, sightlines, and warning systems.

The following recommendations were identified for the Railway Plan:

- Conduct the detailed railway crossing assessment in accordance with the new *Grade Crossings Regulations* as early as possible to undertake the relevant safety reviews could be undertaken for all existing CN rail at-grade crossings to determine cost estimate for required safety improvements so that all CN rail at-grade crossings to be fully compliant with the legislation by November 2021.
- Review and improve safe railway crossing facilities for pedestrians, including persons using assisted devices and cyclists, at the existing and future at-grade railway crossings. This could include repairing or replacing failing crossing surfaces, providing smooth separated pedestrian / cyclist crossing surfaces across rails, ensuring adequate visibility of warning system and updated signage according to MUTCD.

Airport Plan

The Chilliwack Airport is located on Airport Road, east of Young Road, north of Highway 1 and is situated on 130 acres with 1,219 metres (3,990 feet) paved and lit runway that includes a parallel taxiway. The airport is owned by the City but managed and operated by Magnum Management Inc. through a 50-year ground lease initiated in 1997. The current land use for the Chilliwack Airport is not expected to change in the near future. Some of the vacant greenfield land surrounding the Airport is designated as Agricultural Land Reserve.

The Zoning Bylaw stipulates that "Within the flight path of the Chilliwack Municipal Airport, the maximum height of buildings and structures permitted elsewhere in the BYLAW shall be controlled by Transport Canada Regulations." It is planned that the Chilliwack Airport will continue to serve business and general aviation.

Some growth in demand can be expected from general population growth in the Fraser Valley. Automobile, goods movement, transit, pedestrian and cyclist access facilities have been reviewed. The following recommendations have been provided:

- Provide a sidewalk on the south (Airport) side of Airport Road, at a minimum from the bus stop to the terminal building.
- Provide bicycle parking within the airport's parking lot.
- Prepare noise forecast contours in the zoning map to identify the noise impacts by the air traffic operations.

Truck Plan

Municipal truck routes in Chilliwack are assigned in paragraphs 36, 37, and Schedule 6 of the *Bylaw 3023* (updated to January 31, 2011) and Trans-Canada Highway (Highway 1) through Chilliwack is designated as a provincial truck route. Since the 2007 Transportation Plan, there have been several changes on the truck route network in Chilliwack, including four additions to the truck route network and four removals to the truck route network. Changes could be considered, aiming to best serve the commercial and industrial land uses within the City, minimize the number of at-grade rail crossings on the network, minimize the intrusion of trucks in residential areas, and avoid school zones where possible. New truck traffic data could be included in traffic counts with classification in the annual traffic count program. Truck routes and roadways that have received truck movement related complaints from the public can be prioritized. Additionally, the City may need to update the *1998 Truck Route Study to* review existing truck route network in consultation with trucking industry and business association, analyze existing operation and safety conditions, and identify required upgrades along designated truck routes.

The following recommendations have been provided:

- Present the proposed changes to truck routes (listed in *Section Q.3*) could be presented to City Council and adopted / amended as necessary. Subsequently, the *Traffic Bylaw Schedule 6* could be updated to reflect the most up-to-date municipal truck routes and include a truck route map.
- Post standard "Truck Route" and "No Trucks" signs on the relevant road sections and decision points, such as intersections to provide the effective wayfinding to motor vehicle drivers.
- Conduct a dangerous goods route study to identify the most appropriate municipal dangerous goods routes within the City in consultation with the BC Ministry of Transportation and Infrastructure.
- Undertake a compressive truck route study to update the information and outcomes found in the *1998 Truck Route Study*.

Recommendation Summary

The major recommendations for various Transportation Plans are summarized in ***Table ES-1*** and the suggested resources (in-house of future study) for each recommendation are also included.

Financial Plan

The *Financial Plan* summarized all of the recommendations from the *Transportation Plan Update*, grouped by in-house and future work / follow-up study projects. The *2018 Comprehensive Municipal Plan* (outline expenditure from 2018 to 2027) was also reviewed and the transportation related projects were summarized in ***Figure ES-1***. The results of review, as shown in the New Capital Work, indicated that the following capital road capacity improvement projects scheduled to begin for full or partial completion in 2018 conform with recommended or desirable capital program described in the *Transportation Plan Update*. The improvement projects beginning in 2018 and continuing in 2019 as also listed on the next page. Figures in brackets show the budget amounts of these capital projects for 2018 or 2019.

Year 2018

- Widening of Vedder Road, Promontory Road to Keith Wilson ($7,020,000)
- Widening of Promontory Road, Vedder Road to Chilliwack River Road ($2,680,000)
- Intersection improvements at Vedder Road and South Sumas Road ($3,420,000)
- Evans Road Phase IV ($275,000)
- Prest Road Phase 1 ($1,540,000) and Phase 2 ($2,245,000)
- Intersection improvements at Chilliwack River Road and Knight Road ($355,000)
- Hack Brown / Annis Road Intersection improvements ($2,215,000)
- Capacity Improvements for Knight Road ($235,000)
- Prest Road Bridge Upgrade at Semiult ($685,000)
- Vedder Road Bridge Replacement ($1,600,000)
- Intersection improvements at Vedder Mountain Road and Cultus Lake Road ($2,110,000)
- Intersection improvements at Evans Road and Stevenson Road ($900,000)
- Capacity Improvements at the Lickman Road Interchange ($6,400,000)
- Implementation of Pedestrian Signals ($325,000)

Year 2019 (continuation of Year 2018 works)

- Widening of Promontory Road, Vedder Road to Chilliwack River Road ($2,925,000).
- Implementation of Pedestrian Signals ($50,000 per year, continuous).

Table ES-1: City of Chilliwack Transportation Plan Update Recommendation Summary

Section	Section	Recommendation	Recourses
B	SIGNAL PLAN	Consider the signal timing improvements identified in *Transportation Plan Update*	In-house
		Include roundabout traffic operation analysis	Future Study
		Consider signal coordination along major north-south transportation corridors such as Vedder Road, Yale Road and Young Road to reduce traffic congestion	Future Study
		Consider evaluating the traffic operations and safety for the intersection of Vedder Road and Luckakuck Way	Future Study
C	SAFETY PLAN	Continue to work with ICBC on road safety improvements with the support of funding and investment through the Road Improvement Program	In-house
		Consider and categorize (improvement type and implementation timing) the City-wide and site-specific recommendations from the *2014 Network Screening Study*	Future Study
		Continue to operate programs and projects in the Safer City Program to raise public awareness of road safety	In-house
		Continue to collaborate with RCMP enforcement activities to address traffic offences	In-house
		Continue to coordinate with other transportation agencies and committees/boards to enhance driver behavior	In-house
		Develop Traffic Calming Policy for the City to provide an alternative option of traffic calming tool	Future Study
D	TRAFFIC GROWTH	Consider road capacity improvements focused on several major north-south and east-west corridors listed in the Transportation Plan	Future Study
E	PAVEMENT REHABILITATION	Consider additional field data collection (visual and structural) and a new report should be generated in 2019, including structural data (FWD) and subsurface information	Future Study
		Consider incrementally increasing the annual road rehabilitation budget to $5.2 Million, to maintain an average PQI of 6.0	In-house
		Review construction costs yearly to adjust budgets for industry increases/decreases and market fluctuations	In-house
		Monitor the proposed work from the PMS and the actual work completed and note the field conditions	In-house
		Considered other factors such as traffic volumes, and local improvement / upgrading requirements to determine if upgrades other than the travel surface should be considered	Future Study
F	DOWNTOWN PARKING	Consider consulting with the relevant stakeholders in the downtown area to investigate the feasibility of implementing parking demand management strategies	In-house
		Provide marked parking spaces for all public off-street parking lots	In-house
		Provide effective and convenient wayfinding measures for the Landing Centre area such as maps of available parking near the accesses	In-house
G	ROAD NETWORK	Update the Road Network Classification Strategy every three to five years to assist land developments within the City boundary	Future Study
H	ZONING SETBACKS & BYLAWS	*OCP:* Review Capital Plan to confirm City spending reflects Vision and Goals of the *Chilliwack 2040 OCP*	In-house
		OCP: Consider Pedestrian and Cycle Plans to inform all new road projects	Future Study
		Zoning Bylaw: Review bylaw setbacks upon finalization of *Transportation Plan Update* , accompanying *Cycling Plan* and future revision to cross-sections in *Land Development Bylaw*	Future Study
		Land Development Bylaw: Provide specific laning examples for a given pavement width	Future Study
		Land Development Bylaw: Include example of cycle facilities and their space requirements in line with Cycling Plan that accompanies this *Transportation Plan Update*	In-house
		Land Development Bylaw: Reduce acceptable lane widths to 3m in areas intended for low speeds and with low truck volumes	In-house
		Land Development Bylaw: Set design speed equal to posted speed	In-house
		Land Development Bylaw: Review *Cycle Plan* and develop example cross-sections for various bicycle facilities	In-house
I	TRANSIT PLAN	Work with BC Transit to monitor and review ridership data to identify locations that may benefit from additional transit service or future developments that could benefit from transit access	In-house
		Promote changes and improvements to the transit system using social media and maximize the effectiveness of the promotion by partnering with neighborhood and advocacy groups	In-house
		Review and evaluate the results from the proposed improvements in the next 3 years and report in the next Transportation Plan	Future Study

Table ES-1 continued: City of Chilliwack Transportation Plan Update Recommendation Summary

Section	Section	Recommendation	Recourses
J	CYCLE PLAN	Implement quick win projects	In-house
		Develop and implement a City-wide bicycle route signage system	Future Study
		Design and implement protected bicycle facilities in consultation with residents, businesses and other stakeholders	Future Study
		Extend the Sardis Rail Trail south to the Vedder River and north to Hocking Avenue	Future Study
		Develop an annual program to install more bicycle racks and implement secure bicycle parking	In-house
		Incorporate priorities bicycle projects into future capitol plans	In-house
		Implement an annual bicycle monitoring program	In-house
K	BRIDGE PLAN	Consider repairing or replacing bridges CB23, Banford Road (< 1,000 ADT) and CB24, Parker Road (< 100 ADT)	Future Study
		Complete medium and low priority items at bridges requiring high priority upgrades at the same time	Future Study
		Consider the network functionality perspectives when conducting work	In-House
		Prepare effective traffic management plans when doing any bridge works, to minimize delays and ensure safety for the bridge users and the workers	Future Study
		Upgrade or replace the bridges located along high traffic routes or bicycle routes	Future Study
		Continue the practice of conducting Inspection Reports at regular intervals, and acting on the recommendations of these reports to ensure that these critical network links remain functional / safe	In-House
L	TRAFFIC VOLUMES	Alternate traffic counts at all signalized intersections at least every 2 years and traffic counts at selected unsignalized intersections at least every 3 years	In-house
		Continue to include newly installed signalized intersections and selected unsignalized intersections that the City intends to conduct intersection upgrade in the near future	In-house
		Continue to conduct continuous traffic count data collection at permanent count stations along major transportation corridors (such as Vedder Road, Evans Road and Yale Road) for a complete year	In-house
		Review development-related applications and collect traffic count data from any traffic impact assessment study conducted and add into traffic data count inventory	In-house
		Review and conduct traffic data collection for locations with unusual traffic peak patterns, such as a nearby school, sports field or provincial park	In-house
		Identify areas with high development activities and select key intersections and corridors for future data collection	In-house
		Consult and collaborate with BC MoTI for data collections at highway intersections managed by MoTI	In-house
M	PEDESTRIAN PLAN	Consider the 25 highest-ranked priority sidewalk and crossing projects, to be implemented over the next 5 years or more	In-house
		Consider warrant analysis studies for additional high profile pedestrian crossing locations as identified by the public and/or the City.	Future Study
N	REGIONAL CONNECTIONS TO HIGHWAY 1	Continues to conduct traffic counts at the major interchange locations between Lickman Road and Prest Road to monitor the change in traffic patterns	In-house
		Consider capacity improvements for Lickman Road (preliminary design completed in 2015) and Young Road corridors (to be designed) near the highway interchanges	Future Study
		Review construction schedule and budget for any improvements to the interchanges with the scheduled capital projects in the latest *Comprehensive Municipal Plan* .	In-house
O	RAILWAY PLAN	Undertake relevant safety reviews for all existing CN rail at-grade crossings to determine cost estimate for required safety improvements	Future Study
		Review and improve safe railway crossing facilities for pedestrians, including persons using assisted devices and cyclists, at the existing and future at-grade railway crossings	Future Study
P	AIRPORT PLAN	Provide a sidewalk on the south (Airport) side of Airport Road, at a minimum from the bus stop to the terminal building	In-house
		Provide bicycle parking within the airport's parking lot	In-house
		Prepare noise forecast contours in the zoning map to identify the noise impacts by the air traffic operations	Future Study
Q	TRUCK PLAN	Present the proposed changes to truck routes to City Council and adopt / amend as necessary. The *Traffic Bylaw Schedule 6* could be updated to reflect the most up-to-date municipal truck routes	In-house
		Post standard "Truck Route" and "No Trucks" signs on the relevant road sections and decision points, such as intersections to provide the effective wayfinding to motor vehicle drivers	In-house
		Conduct a dangerous goods route study to identify the most appropriate municipal dangerous goods routes within the City in consultation with the BC Ministry of Transportation and Infrastructure	Future Study
		Undertake a compressive truck route study to update the information and outcomes found in the *1998 Truck Route Study*	Future Study

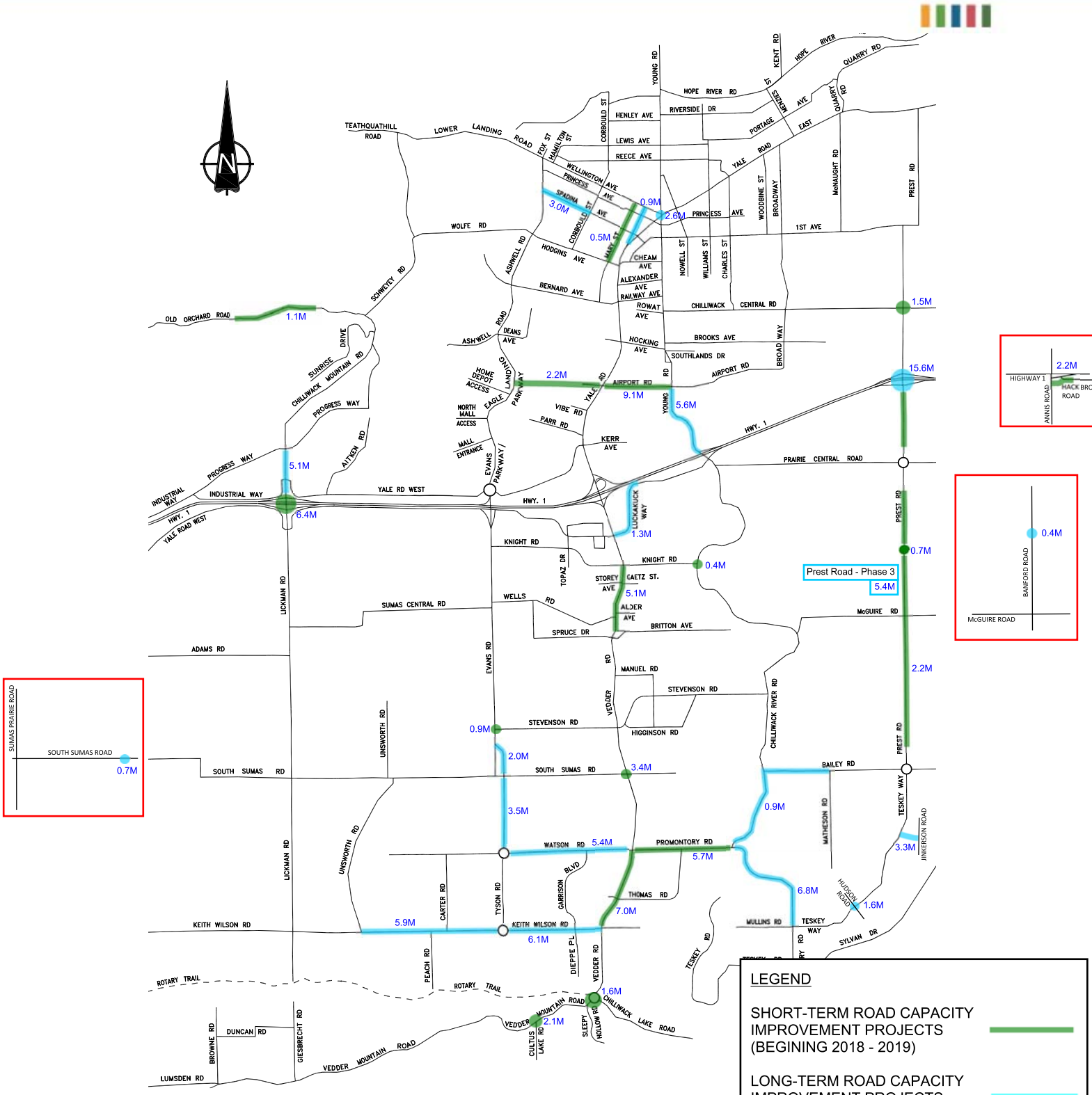


Figure ES.1: Short- and Long-Term Road Capacity Improvement Projects (Based on the 2018 Comprehensive Municipal Plan)

A Introduction

The City of Chilliwack is located 100 kilometres east of Vancouver, British Columbia, near the west end of the Fraser Valley. Chilliwack is one of the largest communities in the Fraser Valley, serving as one of the main economic, educational and cultural hubs in the area. The transportation system within the City provides a critical function to move people and goods effectively, safely and reliably on both the local and regional levels.

The first *City of Chilliwack Transportation Plan* was completed in June 2001 and the *2007 Transportation Plan* was finalized in December 2008. In 2016, the City of Chilliwack decided to update the transportation plan update was compiled to consolidate priorities in order to deliver a cost-effective and efficient multi-modal transportation network. Similar to past years, with steady population and economic growth, the City of Chilliwack will also balance road capacity demands with pedestrian, cyclist and transit needs. This Transportation Plan Update included an analysis and summary of the recommendations of other relevant previous reports and all relevant City policy documents to reflect the goals set out in this Plan, to ensure consistent vision. In addition, the management of financial resources to prioritize transportation project spending needs to be completed within a framework that is based on sound technical analysis.

To complete this Transportation Plan Update, similar study areas were chosen from the 2001 and 2007 Transportation Plans. City staff have been consulted to confirm the subject areas of the study, and have supplied the plans and documents that form the basis of much of this Transportation Plan. In addition to the Executive Summary, the Transportation Plan Update consists of the following similar sections:

A. **Introduction**: This Introduction provides an overview of the topics discussed in the Transportation Plan Update.

B. **Signal Plan**: This section updates the signal timing plans that were provided in the previous Transportation Plan. Signal operation analysis was completed for all signalized intersections with overall level of service reported, along with critical movements. Recommended improvements, were identified to improve critical movements at various intersections. Existing signal installations have been reviewed to identify hardware deficiencies. Existing modern roundabouts were also discussed.

C. **Safety Plan**: About 4,796 collisions were reported from 2009 to 2013. A review of the recent *2014 Network Screening Study* was conducted to identify and prioritize the locations where the collision risk is highest, based on collision data and the top 31 candidate intersections correctability were able to be identified. Ongoing and future programs / projects as part of the Safer City initiative were reviewed. Traffic calming was also discussed.

D. **Traffic Growth**: Historic count data has been reviewed to determine past growth trends in Chilliwack, and the *City of Chilliwack EMME3 Model – 2012 Update* was reviewed for this study has been used to determine future growth estimates. Locations have been identified where future volumes can be expected to generate growth-related transportation improvement needs by 2021 and 2031.

E. **Pavement Rehabilitation**: The pavement life cycle and the results / recommendations from the *2014 Pavement Assessment Report* were reviewed. Recommendations to improve the existing system were developed.

F. **Downtown Parking**: This section includes an update on the public parking supply, on- and off-street, within the downtown area. Parking survey results were summarized for the on-street public parking supply and the off-street public parking supply. Parking characteristics and potential improvements for high parking demand areas such as Chilliwack General Hospital and Landing Centre.

G. **Road Network**: The existing road network was discussed, in terms of types of roads, purpose, function, and how the traffic patterns vary. Planned enhancements and improvements were summarized in this section.

H. **Zoning Setbacks and Bylaws**: Current zoning and bylaws, such as the *Official Community Plan*, *Zoning Bylaw* and *Land Development Bylaw* as they relate to the transportation network performance were summarized. Recommended actions and changes were developed for all three documents in order to meet the intent of the OCP.

I. **Transit System**: Existing transit facilities and routes in Chilliwack have been identified. Transit ridership information from the last three years were summarized. The results collected from the *Transit Future Plan – Chilliwack Area* (2012) were reviewed and summarized to determine the short- and long-range strategy to improve the City's transportation network.

J. **Cycle Plan**: A comprehensive Cycle Plan was developed and discussed while the recommendations were prepared in the separate *Chilliwack Cycle Plan* (May 2017).

K. **Bridge Plan**: Results and recommendations of the *2016 Bridge Inspection Report* have been reviewed, summarized and compared to the findings in the *2007 Transportation Plan*. Upcoming priorities and needs for rehabilitation and upgrades have been identified.

L. **Traffic Volumes**: The 2016 traffic counts were reviewed to determine the highest traffic volumes for road segments and intersections, and the comparison of traffic growth. The annual traffic count program was reviewed to develop recommendation to improve the data collection process.

M. **Pedestrian Plan**: The Transportation Plan Update provides a review of the process for prioritization requests for new sidewalks, and identifies ways in which the process could be improved. The Plan also introduces additional types of pedestrian facilities to improve pedestrian safety and encourage walking, particularly pedestrian crossing treatments.

N. **Regional Connections to Highway 1**: The traffic volumes and growth at the existing seven interchanges along Highway 1 were identified and discussed. The upgrades proposed in the *2007 Transportation Plan* was discussed and other future improvements were also recommended.

O. **Railway Plan**: Rail crossings and vehicle collision at rail crossings have been inventoried in the Plan. The new grade crossing regulations have also been discussed.

P. **Airport Plan**: Air traffic and the role of the airport on the City's roadside network were discussed as well as the land use designation and zoning, airside facilities and groundside transportation facilities.

Q. **Truck Plan**: The latest Chilliwack truck routes are identified and issues relating to their use were discussed. Possible changes to existing truck routes were also reviewed.

R. **Financial Plan**: The financial plan compiles the results of the above components to establish a financing strategy for implementing transportation network improvements.

The document therefore establishes the framework for the multi-modal upgrades to the City's transportation network, to support structured and sustainable growth of the City.

B
Signal Plan

B.1 New Traffic Signals

This Signal Plan provides the updates of the 2007 Signal Plan with up-to-date traffic volume and signal timing information. A total of sixty-nine (69) traffic signals are located within the boundary of Chilliwack, which is an increase of eighteen (18) from the fifty-one (51) signals identified in the 2007 Plan, a 35% increase over nine years. Sixty-three (63) of the intersections are operated by the City, while the other six (6) signals at Highway 1 interchanges are managed by BC Ministry of Transportation and Infrastructure (MoTI). The new traffic signals identified since 2007 include:

- Ashwell Road and Bernard Avenue
- Evans Road and Ashwell Road/Deans Avenue
- Eagle Landing Parkway and Home Depot Access
- Eagle Landing Parkway and Walmart Access North
- Eagle Landing Parkway and Walmart Access South
- Vedder Road and Gaetz Street/Storey Avenue (Pedestrian Signal)
- Vedder Road and Alder Avenue (Pedestrian Signal)
- Tyson Road and South Sumas Road
- Keith Wilson Road and Unsworth Road
- Keith Wilson Road and Dieppe Place/Garrison Boulevard
- Promontory Road and Chilliwack River Road
- Promontory Road and Teskey Way
- Evans Road and Knight Road
- Luckakuck Road and Evans Road off-ramp
- Westbound Highway 1 off-ramps at Lickman Road (MoTI)
- Eastbound Highway 1 off-ramps at Evans Road (MoTI)
- Westbound Highway 1 off-ramps at Prest Road (MoTI)
- Eastbound Highway 1 off-ramps at Prest Road (MoTI)

Two intersections have been converted from pedestrian signal to full signal since 2007:

- Yale Road and Charles Street
- Vedder Road and Manuel Road

B.2 Site Inventory

A desktop inventory with site visits was conducted to identify any intersection configurations or laning changes since the 2007 Plan. The new signalized intersections added to the network were confirmed and the intersection configurations were verified with site visits. In addition, any changes or road improvements identified since 2007 were also updated from information collected on site visits. The locations of the existing signalized intersections have been provided in ***Figure B.1***.

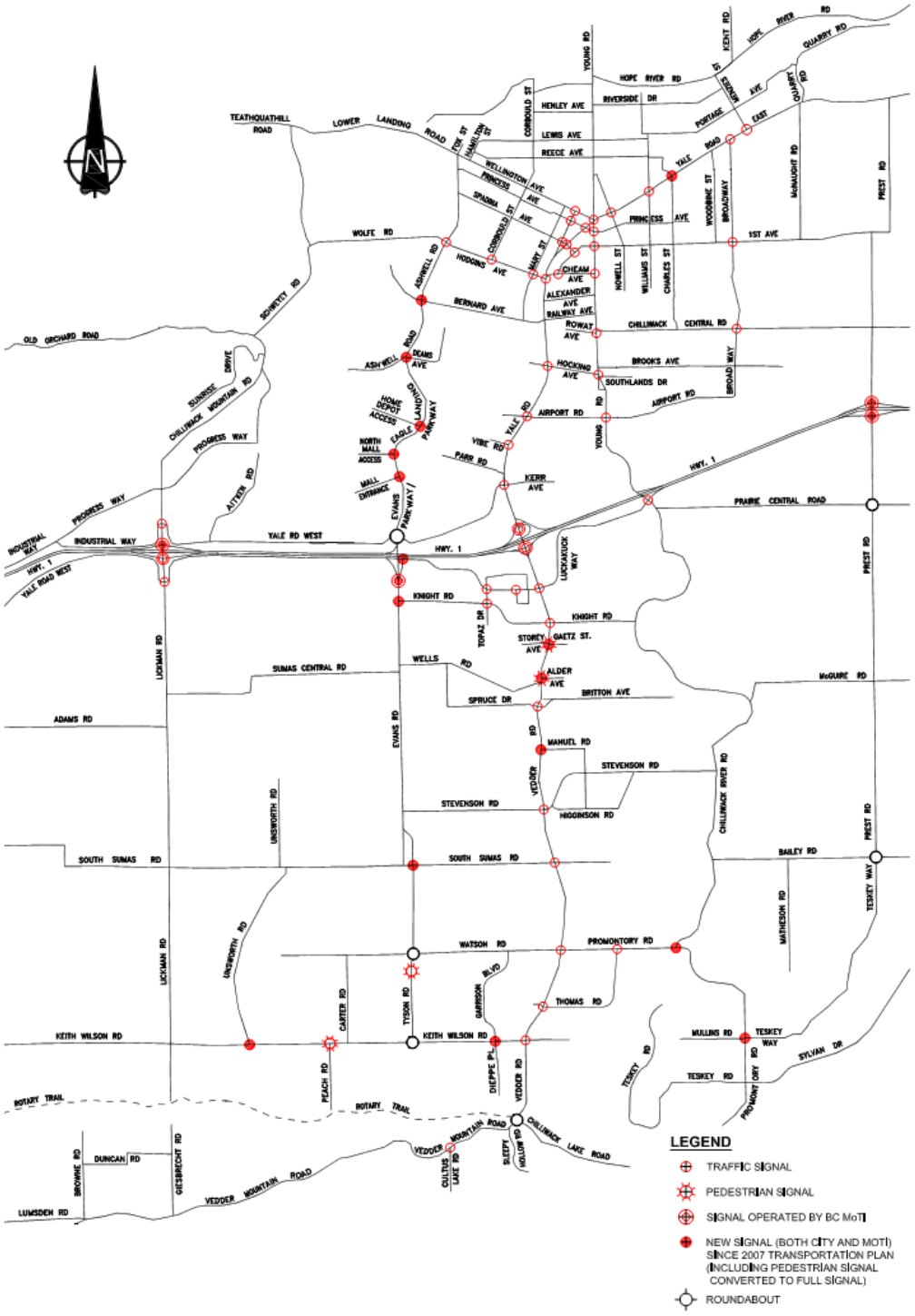


Figure B.1 *Traffic Signal and Roundabout Locations (as of December 2017)*

B.3 Efficiency of Signal Operations

Similar to the 2007 Plan, traffic operation performances were analyzed using Synchro software. The original 2007 file undertaken using Synchro (version 6) software were upgraded to Synchro (version 9) software in 2016. Synchro software analysis is based on the standard methods of the *Highway Capacity Manual (HCM)*. In *HCM*, measures of effectiveness were developed including control delay in seconds per vehicle (sec/veh), level of service (LOS), and 95th percentile queue length in metres. LOS is defined based on the average control delay (***Table B.1***).

Table B.1 LOS Definition for Signalized Intersections in HCM

Traffic Control	LOS	A	B	C	D	E	F
Signalized	Average Control Delay (sec/veh)	0-10	10-20	20-35	35-55	55-80	>80

The City of Chilliwack threshold for identifying improvements to be made is LOS D or worse. ***Table B.2*** had been prepared to identify the intersections at LOS D or worse and which critical movements are experiencing low LOS. ***Table B.3*** shows intersection with an overall LOS C or better but with critical movements that have LOS D or worse. In the Critical Movement notes, NB, SB, EB, and WB denote northbound, southbound, eastbound, and westbound respectively, while RT, T, and LT denote Right-turn, Through and Left-turn.

Table B.2 Intersections with Overall Capacity Deficiencies (based on December 2016 data)

Intersection	Overall LOS (Average Delay)	Critical Movement
Tyson Road & South Sumas Road	F(116.3)	NBT,SBT
Evans Road & Knight Road	D (50.8)	SBLT, SBT, WBLT
Promontory Road & Chilliwack River Road	D (37.9)	SBLT, EBLT, EBT

The intersections were listed in order based on the calculated overall intersection delay. The overall intersection delay was extracted from the Synchro output. It is noted that some signalized intersections were not included in the analysis due to unavailable intersection turning movement data at the time of this report preparation. All signalized intersections with missing traffic counts have been be added to the City of Chilliwack Intersection Count program (as of 2017). The traffic operations of these intersections could be included in future Transportation Plans.

Table B.3 Intersections with Capacity Deficiencies for Individual Movements (data from December 2016)

Intersection	Overall LOS (Average Delay)	Critical Movement
Young Road & Airport Road	C (34.8)	EBT, WBLT, SBRT
Vedder Road & Luckakuck Way	C (32.9)	EBLT, EBT, WBLT, WBT, NBLT, SBLT
Vedder Road & Watson Road/Promontory Road	C (31.7)	EBT, WBLT, WBT
Vedder Road & Yale Road/Kerr Road	C (31.5)	EBLT, WBLT, WBT, NBLT, SBLT
Vedder Road & Knight Street	C (30.8)	EBT, WBLT, WBT
Yale Road & Airport Road	C (29.2)	EBT, WBLT, NBT
Lickman Road & Yale Road	C (28.4)	NBLT, NBT, SB
Vedder Road & Thomas Road	C (28.1)	WBLT, NBT
Ashwell Road & Bernard Avenue	C (25.4)	NB
Vedder Road & Stevenson Road/Higginson Road	C (25.3)	EBT, WBLT, WBT
Promontory Road & Teskey Road	C (24.5)	NBT
Yale Road & Hodgins Avenue/Cheam Avenue	C (21.5)	EBT, WBLT, WBT
Yale Road & Hocking Road	C (20.8)	EBT, WBLT, WBT
Mall Entrance & Luckakuck Way	C (20.1)	SBLT
Topaz Drive & Luckakuck Way	B (13.6)	NBLT
Vedder Road & Spruce Drive/Britton Avenue	B (11.1)	EB, WBLT, WBT

B.4 Review of Intergreen Times

The *ITE Traffic Engineering Handbook* provides guidance on intergreen time (yellow/amber change interval and red change interval). The Yellow (amber) change interval is designed to warn drivers of an imminent change in right-of-way assignment. The amber time should be long enough as to allow enough time for vehicles to stop without rear-end collisions occurring, but also short enough as to not reduce the efficiency of the intersection. The yellow time is usually in between 3 and 6 seconds.

The red clearance interval follows after the yellow phase, allowing for a vehicle to clear the intersection before the green phase begins for the cross-street. The red clearance phase can also be called an all-red interval because all movements will experience a short red time during this phase. This red clearance or all-red interval, will also help clear vehicles that have queued in the intersection due to lack of sufficient crossing gaps in oncoming traffic.

According to the formula in the *ITE Handbook*, the intergreen time is calculated using the sum of the yellow interval time and the red interval time;

$Y = t + \frac{V}{2a + 2Gg}$	• Y= Length of the Yellow interval • V = 85th Percentile approach speed (estimated for Through = Speed Limit + 11 km/h, Left = Speed Limit – 8 km/h) • t = Perception-Reaction time (assumed 1.0 seconds) • a = Average deceleration rate (assumed as 3.0 metres/second/second) • G = approach percent grade • g = Gravitational constant (9.81 metres/sec/sec)

$R = \left[\frac{W + L}{V}\right]$	• R = Red Clearance Interval (seconds) • V = 85th percentile approach speed (Through = Speed Limit + 11 km/h, Left = 32 km/h) • L = Vehicle Length (assumed 6 metres) • W = Intersection width

Considering the flat nature of most intersection, the calculated yellow interval time was between 3.5 seconds and 3.8 seconds for intersection with a posted approach speed limit of 50 and 60 kilometers per hour, respectively. It is recommended a red clearance time be longer than one second. The red clearance time calculated was in the range of 1.0 to 1.5 seconds in most locations. Since the red clearance time depends on the intersection width, some wider cross sections may require longer clearance phases.

Based on information provided from the City, generally the amber time implemented City-wide is 3.5 seconds and a red clearance phase of 1.5 seconds. It was noted that for movements crossing a standard two-lane cross sections, these values fall within the acceptable range recommended by the *ITE Traffic Engineering Handbook.* However, longer all-red clearance intervals could generally be required for crossing major roadways with four or more travel lanes, such as Vedder Road, Young Road, and Yale Road.

B.5 Review of External Signal Hardware

The following five components were considered in external signal hardware and were reviewed for new signals. (Improvements to the signalized intersections that were identified in the 2007 study were also included). These components included:

- Signal Poles,
- Signal Arms,
- Signal Heads,
- Pedestrian Signal Heads, and
- Pedestrian Push Buttons.

The results of the review for the new traffic signals has been summarized in ***Table B.4***. The results show that all new signals installed since the 2007 Plan are compliant with external signal hardware standards. The review of the original signals in the 2007 Plan were also summarized in ***Table B.5*** and the results show that all original signals concerns were addressed since 2007.

Table B.4 External Signal Hardware Inventory for New Signals Installed Since 2007 Transportation Plan (up to December 2016)

Signalized Intersection		Signal Pole	Signal Arm	Signal Head	Pedestrian		Notes
North-South Road	East-West Road				Head	Push Button	
Ashwell Rd/Eagle Landing Pkwy	Deans Ave/Ashwell Rd	✓	✓	✓	✓	✓	New Four-Leg Signal
Eagle Landing Pkwy	Eagle Landing Mall South Access	✓	✓	✓	✓	✓	New Four-Leg Signal
Eagle Landing Pkwy	Eagle Landing Mall North Access	✓	✓	✓	✓	✓	New Signal, North Leg Crossing
Eagle Landing Pkwy	Home Depot Access	✓	✓	✓	✓	✓	New Signal, No West Leg Crossing due to sidewalk discontinuity
Ashwell Rd	Bernard Ave	✓	✓	✓	✓	✓	New Signal
Vedder Rd	Storey Ave/Gaetz St	✓	✓	✓	✓	✓	New Ped Signal
Vedder Rd	Alder Ave	✓	✓	✓	✓	✓	New Ped Signal
Tyson Rd	South Sumas Rd	✓	✓	✓	✓	✓	New Signal
Unsworth Rd	Keith Wilson Rd	✓	✓	✓	✓	✓	New Signal
Garrison Blvd / Dieppe Pl	Keith Wilson Rd	✓	✓	✓	✓	✓	New Signal
Vedder Rd	Chilliwack Lake Rd	✓	✓	✓	✓	✓	New Signal
Chilliwack River Rd	Promontory Rd	✓	✓	✓	✓	✓	New Signal
Promontory Rd	Teskey Way	✓	✓	✓	✓	✓	New Signal
Evans Rd	Knight Rd	✓	✓	✓	✓	✓	New Signal
Luckakuck Way	Evans Rd	✓	✓	✓	✓	✓	New Signal
Yale Rd	Charles St	✓	✓	✓	✓	✓	Upgraded from Ped Signal

Table B.5 External Signal Hardware Inventory for Original Signals from 2007 Plan (up to December 2016)

Signalized Intersection		Signal Pole	Signal Arm	Signal Head	Pedestrian		Notes
North-South Road	East-West Road				Head	Push Button	
Vedder Rd	Keith Wilson Rd	✓	✓	✓	✓	✓	N/A
Vedder Rd	Stevenson Rd	✓	✓	✓	✓	✓	N/A
Vedder Rd	Luckakuck Way	✓	✓	✓	✓	✓	2 Signal Heads for E/W Direction
Menzies St	Yale Rd	✓	✓	✓	✓	✓	Push Button + Signal Head Added
Broadway St	Yale Rd	✓	✓	✓	✓	✓	Push Button + Signal Head Added

B.6 Roundabout

Since the 2007 Plan, there has been the installation of six modern roundabouts within the City of Chilliwack. These roundabouts are located on;

- Tyson Road at Keith Wilson Road
- Tyson Road at Watson Road
- Evans Road at Yale Road (Dual-Lane Roundabout)
- Prest Road at Prairie Central Road
- Prest Road at Bailey Road
- Vedder Road at Chilliwack Lake Road

All six locations are included in the City Intersection Count Program. Since most of these intersections have been recently completed, traffic operations analysis was not provided at the time of this report. However, more information on roundabouts should be included in future plans to ensure that they are operating adequately.

B.7 Improvements

Improve Intersection Capacity

All of the intersections that were identified as having at least one movement at or below the LOS D (Shown in ***Table B.2*** and ***B.3***), where reviewed to identify possible improvements for increasing intersection capacity. The following improvement methods were considered;

- Signal Timing Improvements
- Signal Phasing Improvements
- Geometric Improvements

With the above improvements categories, some recommended improvements were presented to improve the intersection capacity in ***Table B.6***. These suggested improvements did not take into consideration factors such as available roadway width, existing signal progressions or corridor coordination.

Table B.6 Recommended Signalized Intersection Improvements (as of December 2016)

Intersection	Overall LOS	Improvement		
		Timing	Phasing	Geometry
Tyson Road & South Sumas Road	F → C	Optimize Splits for North/Southbound		
Evans Road & Knight Street	D → B	Reduce Cycle Length, Optimize Splits	-	Provide Southbound Left-Turn Lane
Promontory Road & Chilliwack River Road	D → C	Increase Cycle Length	Increase Eastbound and Westbound green time (ϕ2/ϕ6)	-
Young Road & Airport Road	C → C	Optimize Cycle Length	-	-
Vedder Road & Luckakuck Way	C → C	See Section Below		
Vedder Road & Watson Road/Promontory Road	C → C	Reduce Cycle Length, Optimize Splits	-	-
Vedder Road & Yale Road/Kerr Road	C → C	Reduce Cycle Length, Optimize Splits	-	-
Vedder Road & Knight Street	C → C	Reduce Cycle Length, Optimize Splits	-	-
Yale Road & Airport Road	C → C	-	Restrict Eastbound to Right-Turn Only	-
Lickman Road & Yale Road	C → B	Reduce Cycle Length, Optimize Splits	-	Westbound left-turn lane
Vedder Road & Thomas Road	C → B	Reduce Cycle Length	-	Additional northbound and southbound lane
Ashwell Road & Bernard Avenue	C → C	Optimize Signal Split	-	-
Vedder Road & Stevenson Road/Higginson Road	C → C	Reduce Cycle Length	-	-
Promontory Road & Teskey Road	C → C	Optimize Signal Split, Timing	-	-
Yale Road & Hodgins Avenue/Cheam Avenue	C → C	-	Protected-permissive East/westbound left-turn	Re-alignment of intersection
Yale Road & Hocking Road	C → C	Optimize Signal Split	-	-
Mall Entrance & Luckakuck Way	C → B	Optimize Signal Split	-	-
Topaz Drive & Luckakuck Way	B → B	Optimize Signal Split	-	-
Vedder Road & Spruce Drive/Britton Avenue	B → B	Reduce Cycle length	-	-

Signal Hardware Improvements

The results from the signal hardware inventory were provided in ***Table B.4*** and ***B.5***. Given the results of the signal inventory, all previously identified deficiencies from previous plan (***Table B.5***) were addressed and all new signals (***Table B.4***) provided adequate signal hardware. However, for fully protected simultaneous left-turn at the Luckakuck Way and Vedder Road intersection, each direction is recommended to have one signal head per through movement and two special heads with left-turn arrow for the protected left-turn movements. This typical Signal Layout is provided *in TAC's Manual of Uniform Traffic Control Devices for Canada, Figure B3-7 and B3-8*. With the current split phasing configuration, through movement and green arrow signal head could be acceptable.

Signal Timing Update

In addition to the suggestions provided in ***Table B.6***, it was also noted that many of the identified intersections were located along a few of the same major transportation corridors (Vedder Road, Yale Road and Young Road, Luckakuck Way). Therefore, it may be possible that these corridors will need to be reevaluated and coordination along the corridors recalibrated for the increase in traffic volumes.

If the City of Chilliwack is considering implementing a City-wide intergreen policy, standard amber times of 3.5 seconds could be considered for all signalized intersections. The recommended all-red clearance time, as discussed, will vary based on the crossing distance. Therefore, the value currently generally used by the City, 1.5 seconds, would be adequate for crossing the standard two or three lane cross-section; however, (for four or more lanes), longer clearance times would be required.

Vedder Road and Luckakuck Way Intersection

The Vedder Road and Luckakuck Way intersection currently has the longest recommended cycle length of 120 seconds within the City. To allow the pedestrian clearance and the protected left turn movement phases, the pedestrian walking phase was reduced from the standard 7-second to a 5-second walk time. Pedestrian clearance phases are calculated based on average pedestrian walking speed. The walking speed typically used for analysis is 1.2 metres per second, however, in area with higher number senior and children crossing or pedestrians with mobility challenges, 1.0 metres can be used. Due to the high traffic volumes at the intersection, balancing the vehicle traffic and pedestrian mobility needs can be challenging.

Other challenges identified at the intersection are the channelized right turn islands which present visibility challenges and safety concerns due to the configuration of the intersection. There are also concerns due to accesses along the horizontal curve of the turn. A preliminary options analysis could be conducted to determine preferred intersection treatment to improve vehicle and pedestrian safety, while ensuring effective vehicle traffic and pedestrian movements.

B.8 Recommendations

- Consider the signal timing improvements identified in ***Table B.6***.
- Include roundabout traffic operation analysis in future studies.
- Consider signal coordination along major north-south transportation corridors such as Vedder Road, Yale Road and Young Road to reduce congestion.
- Consider evaluating the traffic operations and road safety for the Vedder Road and Luckakuck Way intersection.

C
Safety Plan

Over the years, the City allocated capital expenditures to undertake road safety improvements, programs/ projects, and policies for the road network and local neighbourhoods within Chilliwack. These annual budget allocations for the Capital Works Programs, in conjunction with funding and investment from ICBC's Road Improvement Program, were primarily based on identified countermeasures from previous road safety studies. The purpose of this Safety Plan is to update and provide recommendations based on the previous plans and recent studying findings to guide the City on capital spending for road safety improvements within the community through Network Screening Study, Safer City, and Traffic Calming Policy.

C.1 Network Screening Study

The objective of a network screening study is to identify a list of high collision locations within the municipal boundary that can benefit from correctable road safety improvements, and to identity the priorities – typically where collision risk is the greatest. The latest *City of Chilliwack Network Screening Study* on the City's road network was conducted and completed in December 2014, comprising of two major phases within the study process: Preliminary Network Screening (safety analysis and site ranking) and Secondary Network Screening (preliminary review of collision patterns and site visit).

Five years of ICBC collision data (insurance claims), recorded within the City's limits between January 1st, 2009 and December 31st, 2013, was obtained and reviewed. Through filtering of crashes in parking lots, claims involving parking vehicles, and collisions at intersections under MOTI jurisdiction (i.e. locations along Highway 1), a total of 4,796 collisions (within about 489 intersections) in the five-year study period was identified. According to the temporal distributions/numbers of collisions by year, collision occurrences were on a decline by approximately 15%. The reduction in collisions between 2009 and 2013 can be attributed to a number of factors, including a decrease amount of traffic volumes and an increase use of alternate modes. Similar trends of collision reduction were also identified during the same study period in other Fraser Valley municipalities including Abbotsford and Mission.

Based on the Preliminary Network Screening (excluding intersections with collision frequencies of less than five collisions per year which likely to have a low benefit-cost potential), a total of 44 high collision locations were identified – 33 signalized intersections and 11 unsignalized intersections (including roundabouts and special crosswalks). The frequency of intersection collisions is usually related to vehicular exposure – intersection entering traffic volumes. Therefore, using the 2013 traffic data (vehicular counts) provided by the City, the safety performance indicators of each identified high collision locations were calculated, as follows:

- Collision Frequency: averages number of total collisions (casualty and property damage only) per year
- Collision Rate: compares collision characteristics across different locations with different traffic volumes
- Collision Severity Ratio: weights severity of collisions to equivalent property damage only collisions
- Collision Prediction Models: estimates collision frequency based on site-specific character of location

Through consultation with the City and ICBC, ranking criteria were established to refine and identify the list of intersections to be examined in further detail through correctability analyses. To narrow down the identified 44 high collisions locations, intersections considered as lower priority sites based on screening criteria were eliminated from the list (i.e. locations where recent or multi-year improvements have been made). As a result, 31 intersections (21 signalized and 10 unsignalized intersections) were identified as candidate intersections as shown in ***Table C.1*** and ***Table C.2*** (respectively) and illustrated together in ***Figure C.1***.

Compared to the previous list in the 2007 Safety Plan, it is noted that the top intersections and rankings were overall similar, except for the Yale Road and Airport Road intersection. This intersection was no longer part of the list of top candidate intersections – possibly due to the improved traffic signal timing plan.

Table C.1 Top 21 High Collision Signalized Intersections (from the 2014 Network Screening Study)

Intersection	Collision Frequency	
	Collisions/Year	Rank
Vedder Road and Luckakuck Way	57.2	1
Vedder Road and Promontory Road	51.2	2
Yale Road and Hocking Avenue	26.6	3
Vedder Road and Knight Road	26.0	4
Yale Road and Hodgins Avenue	23.0	5
Lickman Road and Industrial Way	20.6	6
Promontory Road and Chilliwack River Road	19.8	7
Young Road and 1st Avenue	18.0	9
Young Road and Airport Road	16.6	10
Vedder Road and South Sumas Road	16.4	11
Vedder Road and Keith Wilson Road	16.2	12
Vedder Road and Thomas Road	15.8	13
Vedder Road and Stevenson Road	15.0	14
Young Road and Chilliwack Central Road	13.4	15
Young Road and Wellington Avenue / Yale Road	12.2	16
Evans Road and Knight Road	12.0	17
Vedder Road and Spruce Drive / Britton Avenue	10.2	18
Young Road and Hocking Avenue	9.2	19
Luckakuck Way and Topaz Drive	7.8	20
Hodgins Avenue and Mary Street	7.8	20
Lickman Road and Luckakuck Way	7.2	24

Table C.2 Top 10 High Collision Unsignalized Intersections (from the 2014 Network Screening Study)

Intersection	Collision Frequency	
	Collisions/Year	Rank
Evans Road and Yale Road (Roundabout in 2015)	24.8	1
Yale Road and Alexander Avenue	9.0	2
Vedder Road and Chilliwack Lake Road (Roundabout in 2017)	8.4	3
Vedder Road and Gaetz Street / Storey Avenue	7.6	4
Prest Road and Chilliwack Central Road	6.8	5
Vedder Road and Wells Road	6.6	6
Young Road and Railway Avenue	6.4	7
Prest Road and Yale Road	6.0	8
Prest Road and 1st Avenue	6.0	8
Prest Road and Bailey Road (Roundabout in 2015)	5.2	11

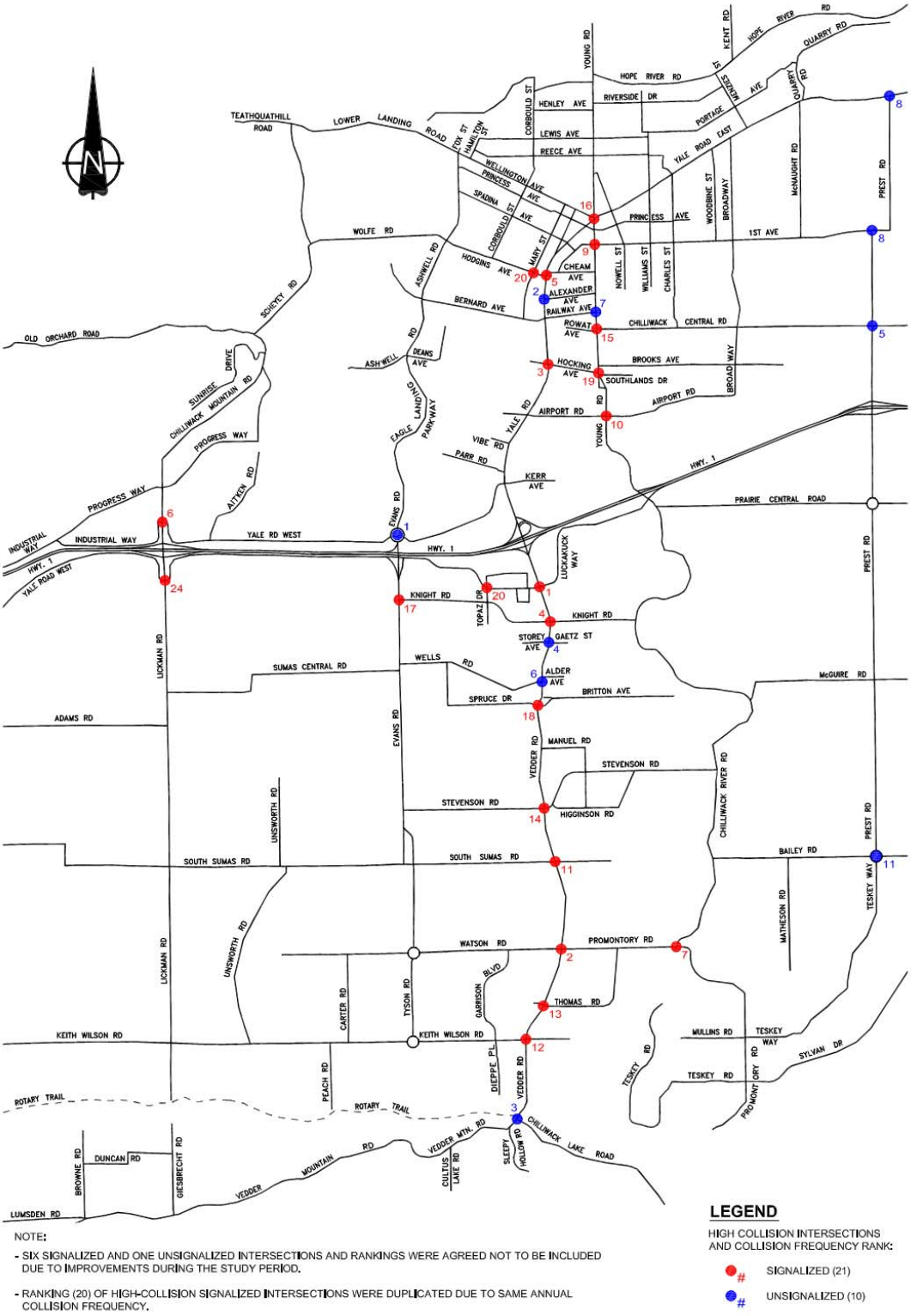


Figure C.1 *Top 31 Candidate Intersections for Correctability (from the 2014 Network Screening Study)*

Through the Secondary Network Screening process (examining further to identify collision patterns and key issues through preliminary claims reviews and detailed site visits), the study findings were compiled and summarized in a detailed one-page summary for each of the candidate intersections. To understand and identify safety issues and trends on top of preliminary reviews of collision data, over-representation analyses were conducted using the Chi-square test. The Chi-square test was used to determine whether the proportion of one attribute found (such as a particular collision type) at a specific intersection varies significantly from the proportion in the City-wide network at similar locations. All candidate intersections were further examined by field reviews to identify not only key issues, but also traffic conditions, intersection characteristics, and opportunities for improvements. These site visits also considered on signal and intersection visibility, adjacent land use, driver and pedestrian compliance and behaviour, completed/planned improvements, as well as the interaction between vehicles and cyclists/pedestrians.

Based on the identified results for each of the candidate intersections, common safety issues and trends were confirmed and identified as follows:

- Rear-end collisions were recorded as the dominate collision type for 29 out of 31 candidate intersections;
- Intersections located along major north-south corridors in the City, mainly on Vedder Road (11 out of 31 intersections), Yale Road (8 out of 31 intersections) and Young Road (6 out of 31 intersections), were identified as the most collision prone intersections;
- Identified collision types occurring along key arterials were typical of urban intersections – with high traffic volumes and direct access to adjacent development; and,
- Pedestrians-/cyclists-related collisions were primarily due to vehicles failing to yield.

In addition to the site-specific improvements to address the identified key safety issues, the following recommendations (that can be considered to improve road safety in Chilliwack) were verified and included:

- Review traffic signal coordination on Vedder Road, Yale Road, and Young Road to improve corridor operation efficiency and also reduce the rear-end collision risk;
- Conduct detailed corridor studies on key arterials, such as Vedder Road, Yale Road, and Young Road to identify countermeasures to address traffic operational and road safety issues;
- Review the City's bicycle and sidewalk network to identify gaps and to ensure crossings for cyclists and pedestrians are safe and accessible; and,
- Maintain pavement markings, traffic signs, and road surface as part of the City's Operating Program.

A corridor-wide level improvement strategy may provide a more comprehensive strategy to deal with the safety issues more effectively, compared to improvements at isolated intersections. Corridor-wide strategies can often be expected to provide a "halo" effect – i.e. the implementation of the improvement could impact the extent of the corridor.

With only high-level reviews of high collision locations within the City and conceptual safety improvement recommendations, it is recommended that detailed studies are to be conducted and these identified City-wide and site-specific countermeasures are to be categorized into phased approaches as follows:

- Immediate-term (less than one year) such as repaint/provide pavement markings and mount/relocate road signs) and short-term (between 1 to 3 years) such as annual operation/maintenance services should be started to identify and allocate the necessary resources (human and financial), and set up a schedule to implement the desired countermeasures in an appropriate time period
- medium-term (between 3 to 5 years) such as investigate access management and long-term (after 5 years) such as realign lane configuration should be verified with a more detailed analysis of the collision types in the ICBC claim data and conducted with benefit-cost analyses on these countermeasures.

C.2 Safer City

In 2003, ICBC sponsored the Safer City initiative in an attempt to reduce the number of vehicle accidents. The objective of the Safer City Program is to establish a sustainable process for significantly improving road safety in British Columbia cities. Safer City is creating and increasing road safety by integrating the following initiatives:

- Engineering Practices
- ICBC Road Improvement Program
- Autoplan Broker Programs (geared towards youth and communities)
- BCAA Programs
- Volunteer Work (campaigns, etc.)
- Police Enforcement

Since 2004, the City launched the Safer City Program as a systematic approach to promoting road safety within the community. The Safer City Program continues to operate from the same core objective and comprehensive framework as per the 2007 Plan. Similarly, the integration program is based on the 3-E process – Engineering, Education, and Enforcement. The Chilliwack Safer City Working Group maintains to coordinating collaborative efforts of programs and projects through:

- The City Engineering Department (as road owner);
- ICBC Road Improvement Program (as program sponsor); and,
- Chilliwack Detachment of RCMP Traffic Section (as enforcement element).

Along with secondary partnership (other effective and influential groups) in the community, they are targeting current and future drivers, and providing education and awareness of road safety. To achieving the prime focus of Safer City, past programs and projects include:

- Road Network Classification Strategy and System Update
- Road Form Guideline and Process Development
- Traffic Impact Assessment Registry
- Integrated Corridor Program (targeted aggressive driving at intersections)
- ICBC Road Safety Curriculum Promotion
- Community Questionnaire
- Local Webpage Development (www.safercity.ca)

The Safer City Program focuses on immediate (existing changes) that provide concern and action for the long term (future changes). To ensure the initiative is effective and optimize the 3 E's for maximum effect, standard regularized programs and projects have been adopted. The list of ongoing programs and future projects provided by the Safer City Coordinator is updated and summarized in ***Table C.3***.

Table C.3 Ongoing/Future Safer City Programs/Projects

Projects/Programs	Frequency
Speed Watch Program *(Speed Monitoring Efforts)*	Ongoing
• Speed Surveys	As Required
• 3-Strikes (You're Out!) Campaign	Ongoing
Hey Neighbour, Please Slow Down! Campaign	Ongoing
Safer School Travel (STT) Program	Ongoing
• School Road Safety Plan	As Required
• Traffic Safety Around Schools & Playgrounds Regulations	Ongoing
• Back to School Road Safety Projects	Ongoing
School Bus Safety	Ongoing
Drive/Bike/Walk in Roundabouts	Ongoing
Truck Routes and Commercial Vehicle Projects	Ongoing
Distracted Driving Projects	Ongoing
Public Engagement on Road Safety *(Brochures)*	Ongoing
• Weekly Partner Reporting	Weekly
• Safer City Annual Report	Annual
• Earned Media *(Road Safety Profile)*	Ongoing
• Road Safety Satisfaction Survey Development	2017
Pedestrian Safety	Ongoing
Cycling Safety Initiatives	Ongoing
Impaired Driving Initiatives and Projects	Ongoing
Occupant Restraints (Child Seat Checks)	Ongoing
Other Modes Safety (Low-Powered Vehicle/Longboard)	Ongoing
Rail Safety	Ongoing
Integrated Corridor Projects	As Required
Road Classification Update	Every 5 Years
Safety Audit Policy/Bylaw	Individual
Pace Car Program	Ongoing
Road Safety Solutions Team	Ongoing
Road Improvement Program	Ongoing

Overall, it is recommended that the Safer City Program has:

- Ongoing Safer City engineering (i.e. roundabouts) and education (i.e. public awareness activities) to improve the overall road safety in the community;
- Ongoing enforcement (i.e. aggressive driving, speeding, distracted driving, etc.); and,
- Ongoing discussions with other transportation agencies (i.e. BC Transit, MOTI, etc.) and committees/boards (i.e. TAC) to encourage, support, and enhance driver awareness and improve road vehicle safety.

C.3 Traffic Calming Policy

In addition to the coordinated efforts of the City's Safer City Program (raising driver's awareness and adjusting driver's behavior through campaigns and projects) as well as RCMP's enforcement (speeding, aggressive driving, impaired driving, seatbelt use, and other traffic offences), traffic calming device could be an effective and alternative tool for the City.

It is understood that the City currently has a moratorium on traffic calming devices (speed bumps, speed humps, traffic circles, speed tables, raised intersections, raised crosswalks, etc.). According to the result of the pilot projects in 2000, installation of traffic calming devices within local neighbourhoods might have caused resident travel discomforts, increase traffic noises, delayed emergency responsiveness, snow removal difficulties, and potential traffic diversions. However, a formal traffic calming policy, including the clear information about funding, application, and procedure, should be considered as part of the ongoing commitment to Safety City Program.

It is recommended that Traffic Calming Policy to be developed for the City based on research of the *TAC Canadian Guide to Neighbourhood Traffic Calming Manual* and similar *Traffic Calming Policies* implemented in the Lower Mainland, Fraser Valley, Squamish-Lillooet Regional District, and elsewhere. A typical Traffic Calming Policy could include, but not limited to the following subjects:

- Purpose (consisting definition, objectives, etc.)
- Application
- Policy and Guiding Principles (considering road classification, measure consideration, other modes, potential improvements, etc.)
- Finance
- Procedure (including request form, flow chart, initiation study, identified issues, plan development, measure implementation, etc.)

C.4 Recommendations

- Continue to work with ICBC on road safety improvements with the support of funding and investment through the Road Improvement Program.
- Consider and categorize (improvement type and implementation timing) the City-wide and site-specific recommendations from *the 2014 Network Screening Study*.
- Continue to operate Safer City Program programs and projects to raise public awareness of road safety.
- Continue to collaborate with RCMP enforcement activities to address traffic offences.
- Continue to coordinate with other transportation agencies and committees/boards to enhance driver behavior.
- Develop Traffic Calming Policy for the City to provide an alternative option of traffic calming tool.

This Page is Intentionally Left Blank

D
Traffic Growth

D.1 Historic Traffic Growth

Historic growth trends were estimated from two-way traffic volumes provided in the 2016 Traffic Count Program. Traffic volume growth patterns from 2007, 2011 and 2013 to 2016 were summarized in Table D.1. The average values are annual growth rates of the entire road network assuming linear growth; the maximum and minimum growth percentages at any particular count station in the averaged 3, 5, and 9 year time frames are also included. It is noted that the annual traffic growth rates are doubled from 2007 to 2011 and slowly increase from 2011 to 2016.

Table D.1 Historic Traffic Growth

Years		Average Annual Growth Rate		
From	To	Average Value	Minimum Value	Maximum Value
2007	2016	+1.4%	-4.7%	+14.4%
		All Roads	Luckakuck Way West of Evans Road	Tyson Road North of Keith Wilson Road
2011		+3.5%	-2.8%	+20.6%
		All Roads	Luckakuck Way West of Young Road	Tyson Road North of Keith Wilson Road
2013		+3.9%	-8.9%	+13.9%
		All Roads	Yale Road West of Broadway	Vedder Mountain Road West of BC Hydro Rail

D.2 Future Traffic Growth

Future traffic growth rate summarizes the model outputs and findings from the *City of Chilliwack EMME3 Model - 2012 Update* (*2012 EMME Model Update*) which identified traffic growth expectations in horizon years of 2021, 2031, and 2051. Forecasted traffic growth assumptions in the *2012 EMME Model Update* with the percent growth compared to 2011 values were listed in ***Table D.2***. Compared to 2011 (baseline year in the *2012 EMME Model Update*), the population is expected to almost double in 2051 with significant growth expected for residential and industrial land use areas.

Table D.2 Land Use Growth Assumptions

Year	Total Population	Residential, Dwelling Units	Non Retail or Industrial Employment	Industrial, Square Metres	Retail, Square Metres
2011	82,463	32,972	21,377	226,973	393,189
2021	100,316	41,539	25,933	384,726	429,882
	22%	26%	21%	70%	9%
2031	116,992	50,609	26,385	551,057	515,424
	42%	53%	23%	143%	31%
2051	155,558	75,567	34,344	901,810	637,658
	89%	129%	61%	297%	62%

D.3 Area of Concern

As explained in the *2010 Highway Capacity Manual*, the volume to capacity ratio (v/c ratio) is a key indicator of the level of congestion experienced on the road network. Descriptions for various v/c ratio categories are explained below:

V/C Ratio < 0.60: Traffic flows at posted speed with little interference from unsignalized access points along the corridor. On multilane arterials, lane changing maneuvers can be easily made. Delay at signalized intersections is usually, on average, less than 25 seconds which relates to Level of Service (LOS) C.

0.60 < V/C Ratio < 0.85: Traffic experiences some congestion with travel speed decreasing slightly below posted speeds. Access from the corridor, if no separate facility is provided (e.g. left turn lane), causes delays to through traffic. Access to the corridor becomes more difficult as acceptable gaps in the through traffic decrease. Lane changing along the corridor becomes difficult. Delays at signalized intersections increase with the average delay approximately in the range of 25 to 40 seconds which relates to LOS D.

0.85 < V/C Ratio < 1.00: Traffic flow becomes congested with long queues forming at intersections. Travel speeds are well below posted speeds. Unsignalized access to and from the corridor is difficult as gaps become infrequent. Signalized intersection delays, on average, are in the range of 40 to 60 seconds which related to LOS E. A v/c ratio of 0.85 is typically the threshold used to define acceptable operation in urban areas.

V/C Ratio > 1.00: Operations are generally at or above capacity, usually occurring at bottleneck locations. Traffic flow becomes heavily congested with significant queues forming at intersections. Vehicles are slow with excessive delays (stop-and-go condition). Signalized intersection delays, on average, exceed 60 seconds which related to LOS F. A v/c ratio of 1.00 or more indicates roadways operate over capacity.

Results from *2012 EMME Model Update* of links with expected volume-to-capacity (v/c) ratios for the above four categories in years 2021, 2031 and 2051 are shown in ***Figure D.1*** to ***D.3***. It is noted that only the weekday PM peak period is modelled. The following road segments with **v/c ratios over 1.0** can be considered as priority candidates for growth-related transportation road improvements:

Up to 2021:

- Lickman Road (Luckakuck Way – Progress Way, Sumas Central Road – South Sumas Road);
- Tyson Road (Watson Road – Evans Road);
- Evans Road (Highway 1 – Ashwell Road);
- Ashwell Road (Evans Road – Bernard Avenue);
- Promontory Road (Thomas Road – Vedder Road);
- Watson Road (Vedder Road – Sappers Way);
- Vedder Road (Promontory Road – Luckakuck Way);
- Yale Road (Vedder Road – Hocking Avenue);
- Young Road (Luckakuck Way – Airport Road);
- Luckakuck Way (Evans Road – Topez Drive);
- Chilliwack Central Road (Young Road – Nowell Street);

Up to 2031 (additional road segments from 2021 condition):

- Lickman Road (Keith Wilson Road – South Sumas Road);
- Chilliwack Mountain Road (Aitken Road – Schweyey Road);
- Evans Road (Tyson Road – Knight Road);
- Watson Road (Sappers Way – Tyson Road);

- Yale Road (Evans Road – Atchelitz Road);
- Luckakuck Way (Topez Drive – Vedder Road);
- Keith Wilson Road (Lickman Road – Canterbury Drive);
- Hodgins Avenue (Ashwell Road – Corbould Street);
- Prest Road (Bailey Road – Prairie Central Road);
- Hack Brown Road / Nixon Road (Annis Road – South End);

There are more road segments with v/c ratio over 1.00 in the 2051 model; however, it is expected that road capacity improvements be undertaken before 2051. Therefore, the 2051 traffic conditions are used only for reference purpose. The priority candidates for transportation road improvements up to 2021 are shown in ***Figure D.4***.

D.4 Recommendations

With the *2012 EMME Model Update* results, it is recommended that by 2031, road capacity improvements are focused on several major north-south and east-west corridors (shown in ***Figure D.5***), including the following:

- Lickman Road corridor (Keith Wilson Road – Old Orchard Road);
- Evans Road / Tyson Road / Ashwell Road corridor (Watson Road – Wolfe Road);
- Vedder Road / Yale Road corridor (Promontory Road – Bernard Avenue);
- Young Road corridor (Luckakuck Way – Airport Road);
- Luckakuck Way corridor (Evans Road – Young Road); and
- Watson Road / Promontory Road corridor (Tyson Road – Chilliwack River Road).

This Page is Intentionally Left Blank

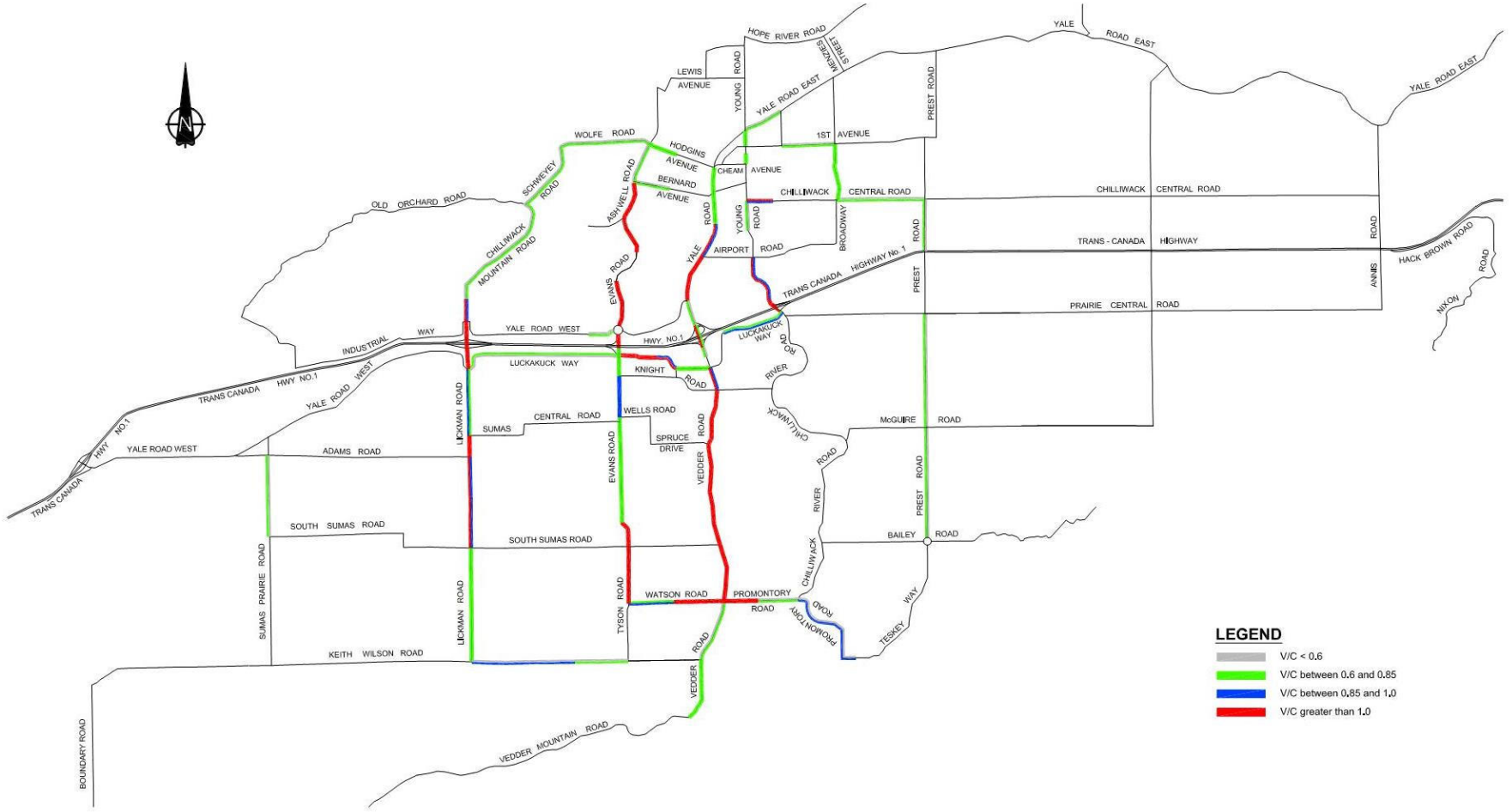


Figure D.1: EMME V/C Ratio Output (Year 2021)

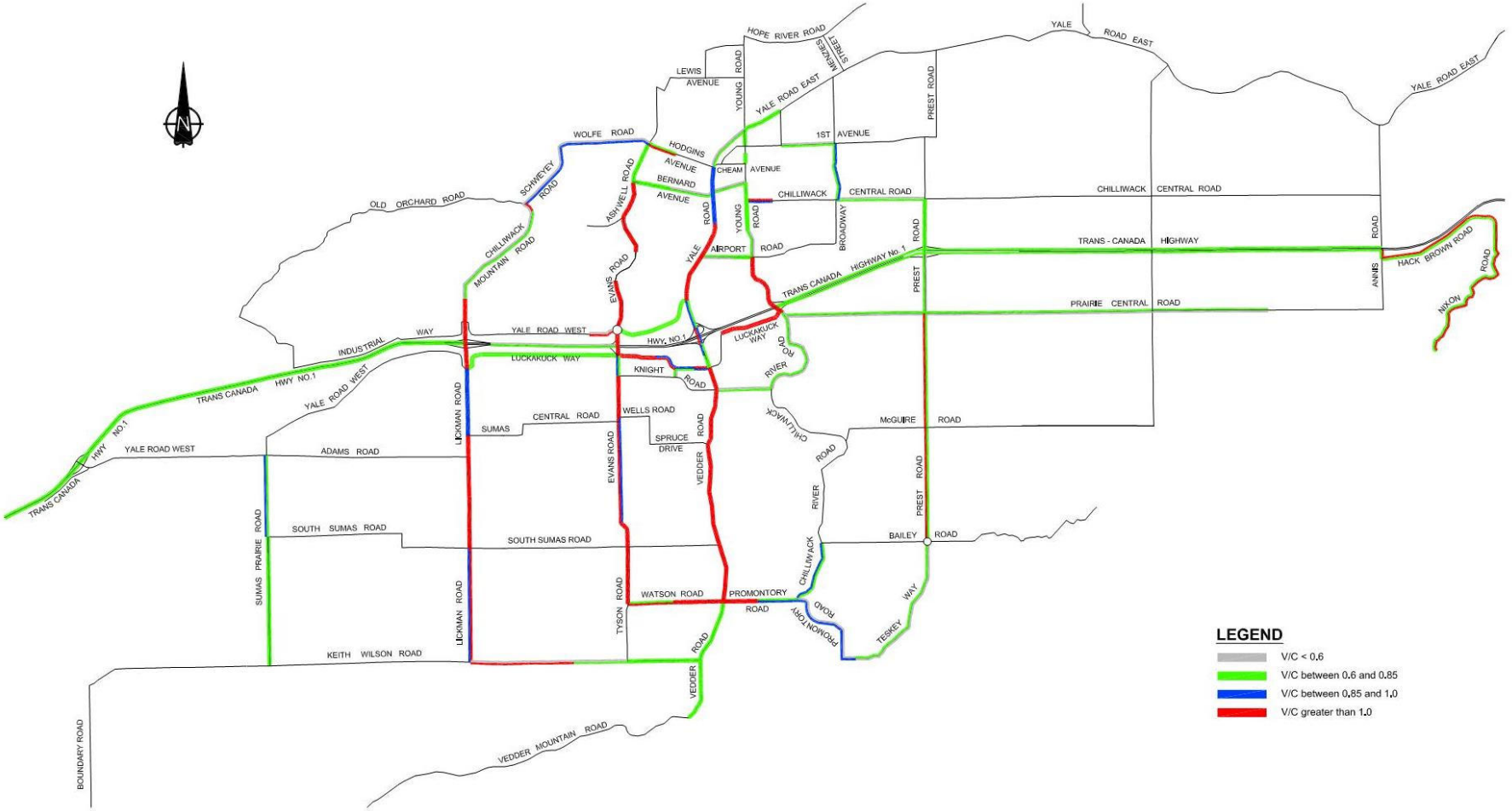


Figure D.2: EMME V/C Ratio Output (Year 2031)

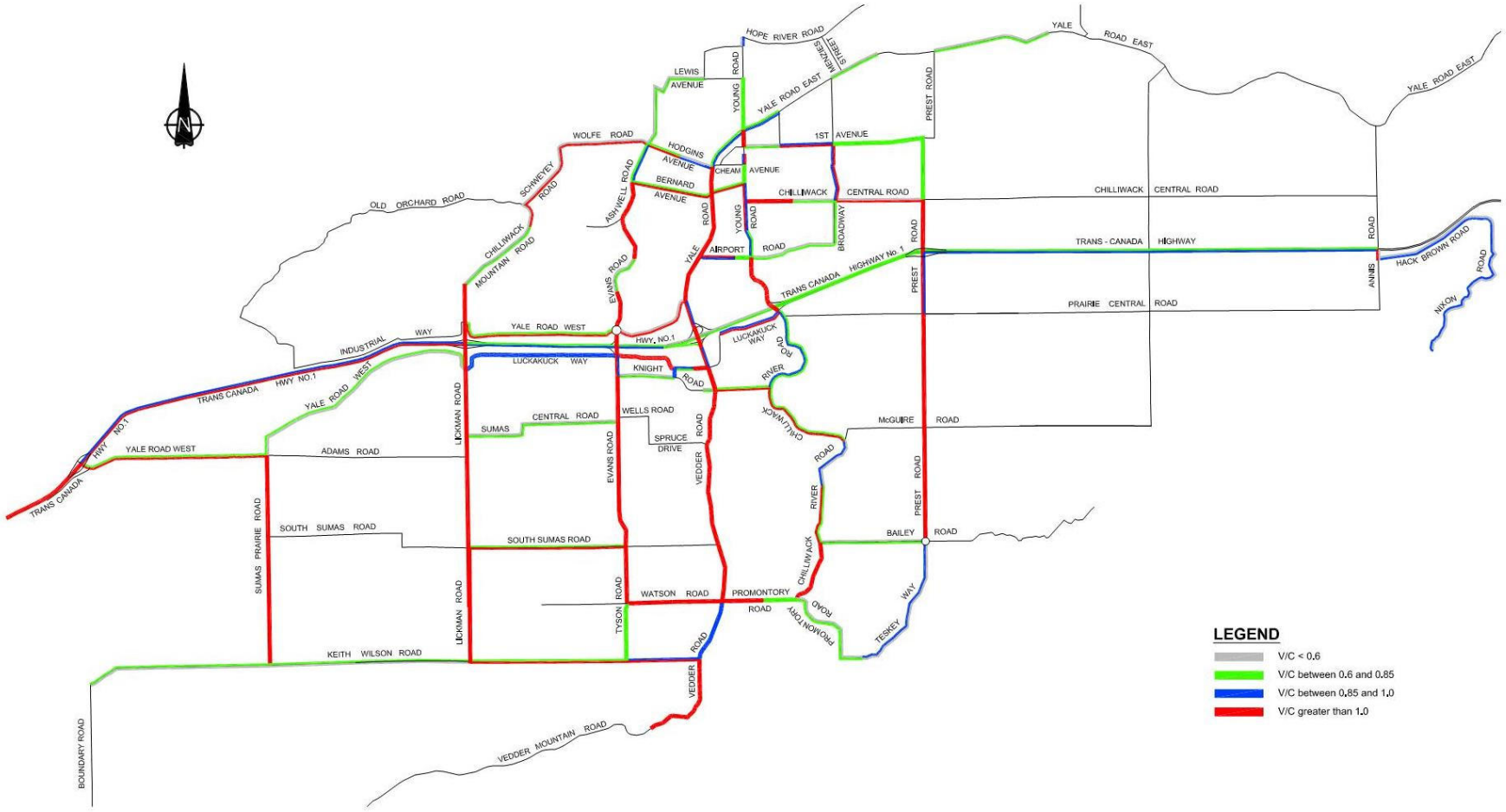


Figure D.3: EMME V/C Ratio Output (Year 2051)

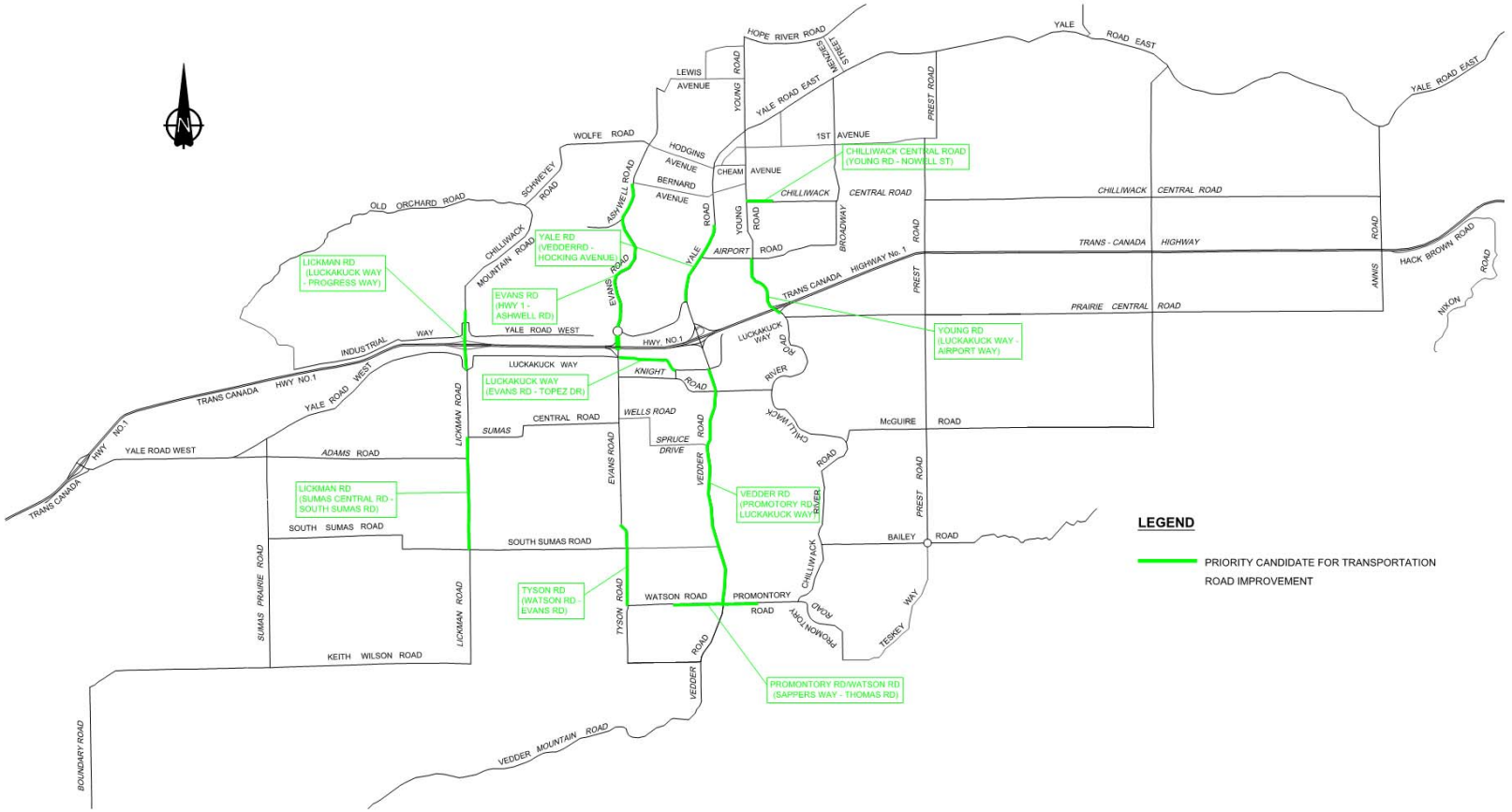


Figure D.4: Priority Candidates for Transportation Road Improvements

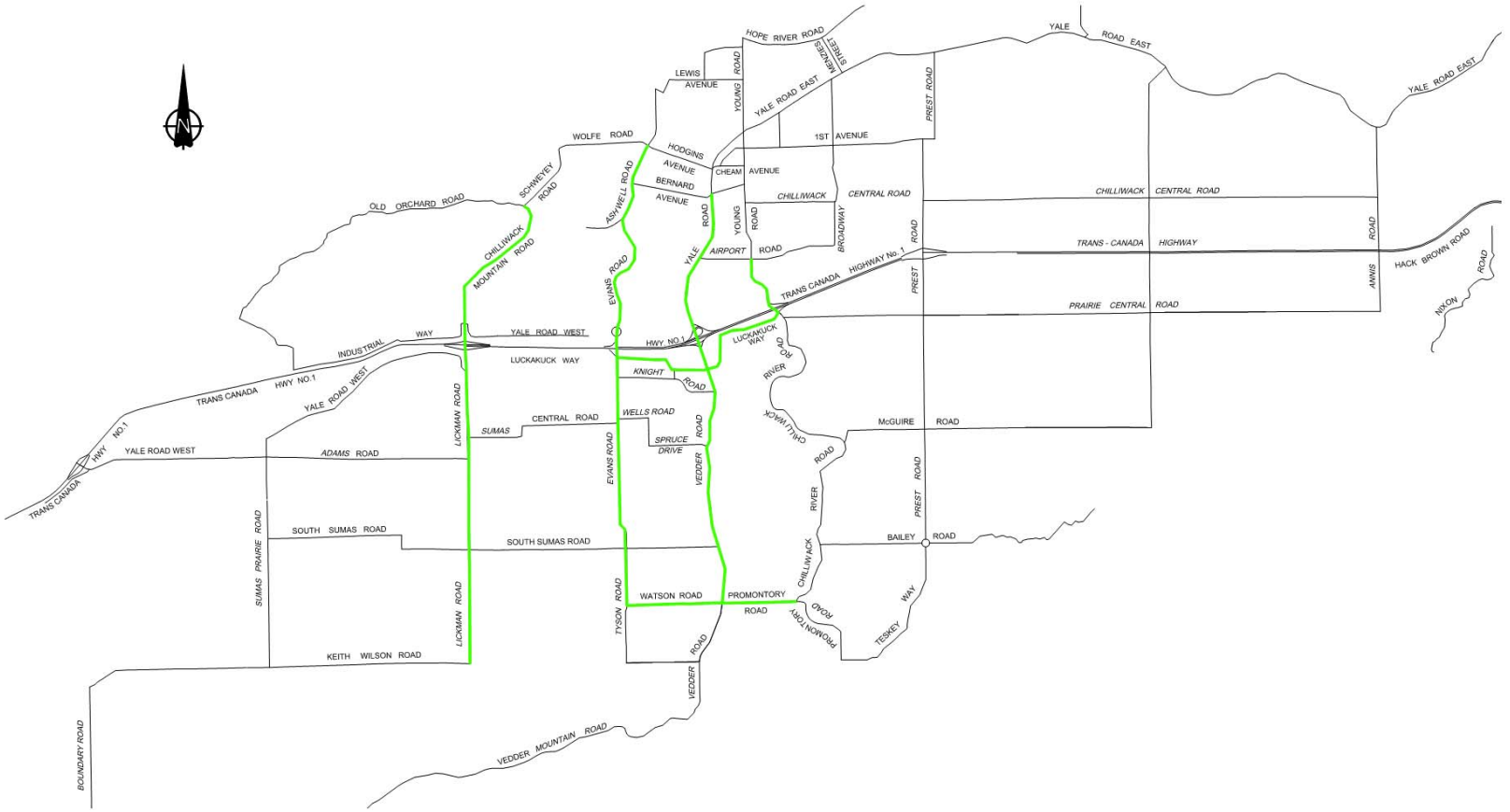


Figure D.5: ***Recommended Road Capacity Improvements by 2031***

E
Pavement Rehabilitation

The cost of streets and pavement represent a large portion of the taxpayers' investment in transportation infrastructure. Protection of that investment through adequate rehabilitation and maintenance should be a high priority. Often, street rehabilitation budgets have been cut in some communities, particularly in not rehabilitating streets in the critical rehabilitation windows. But savings accrued in the short term by deferring rehabilitation are lost in the long run by extremely expensive rebuilds and repairs.

E.1 Pavement Life Cycle

Pavements typically have a design life of about 10-15 years on arterial road ways and 15-30 years on local roadways. The riding surface generally remains in good condition for about 10 years, with preventative maintenance carrying the pavements through to its 15-year life. After this, the process of deterioration accelerates quickly. The pavement reaches a critical point at which the materials are no longer hold together. As water permeates the sub base through cracks, the ability of the surface to carry vehicle loads declines, increasing the severity and frequency of the surface cracking.

Shortly after this, the condition drops from fair to poor, then decreases quickly to the failure point. The key is to determine at what point on the pavement lifecycle curve action should be taken.

The City conducts asphalt rehabilitation on roads based on a 'worst first' criteria. Using the results of the periodic condition survey a proportion of the annual asphalt rehabilitation budget is allocated to the worst Arterials, Collectors, and Local roads to attain the City Council pavement quality goals for each category and for the entire network.

This is somewhat contrary the general practice in the industry, which is to place higher priority on streets in good to fair condition while poor and very poor should be part of a planned program to bring these roads up to standard. This is sometimes challenging, as public perception may be that the wrong roads are being repaired. This is contrary to what the rehabilitation dollar is providing to the life cycle of the road.

E.2 Pavement Management System

The City of Chilliwack is responsible for the administration of a paved roadway network within the entire city (total of 1,201 lane-kilometres), except the provincial highways. The total replacement value of the City's road pavement is in excess of $800 Million. To maintain a desirable level of service to the users of the road network, a cost-effective method should be adopted.

In 1987, the City started using the Super Pavement Management System (SuperPMS) data collection program to evaluate the existing road conditions and to provide multiyear budget requirements for maintaining the road network. The SuperPMS is capable of establishing a five-year maintenance program based on the amount of City-appropriated funds and the desired overall pavement performance. Additional data collection was done in 1991, 1996, 2004, 2009 and 2014. The Pavement Quality Index (PQI) ratings were developed for the existing road conditions and road rehabilitation has historically been based on this planning tool. The PQI is a function of the roughness, distress and structural adequacy expressed on a scale of 0 to 10. A newly constructed pavement has a score of 10 while the score of 0 indicates the road is impassable.

The North American average is a PQI of 6.2 with no more than 20 percent of the network identified as backlog. The City of Chilliwack has been trying to maintain an overall average PQI of 6.0. The minimum acceptable PQI is 3.5 and 4.5 for local roads and arterial / collector roads respectively.

E.3 2014 Pavement Assessment Report

The most recent report from the City of Chilliwack SuperPMS program was produced in 2014 (*2014 Pavement Assessment Report* by Stantec). The results indicated that the 2014-network average PQI is predicated to be 6.9, implying 5.0 percent of the roadways were below the minimum PQI requirements. The 2009 network average PQI was 6.4 with 16.5 percent of network backlog.

The *2014 Report* reviewed the annual pavement rehabilitation as recommended in the 2014 Capital Budget. In the proposed budget scenario, the network average PQI drops from 6.9 to 6.0 in 2024. In the needs based budget, the PQI will drop to 6.5 in 2024. The drop in PQI in 2024 is driven in large part by the higher needs near the later part of the 10-year forecast period.

The study findings indicated a projected PQI of 6.0 in 2024 ($33.6M total over 10 years). The needs driven budget with a total cost of approximately $51.5M results in a PQI of 6.6 in 2024.

The proposed City budget of $33.6M results in approximately 10% of the network length being deficient in 2024. The needs based budget of $55.5M rehabilitates road sections as they come into need. This means there are no deficient pavements in the year the budget is implemented.

In addition, harsh 2016/17 winter resulted in extraordinary road damage and deterioration. WSP conducted a visual review off all arterial and major collector roads to assign a numerical quality rating to each section based on the PASER system.

E.4 Recommendations

To maintain the City's pavement conditions up to the satisfactory levels of service, the City may consider the following recommendations:

- Consider additional field data collection (visual and structural) and a new report in 2019 to update the current PQI and to develop and update the yearly candidate roads for the next 5-year pavement rehabilitation plan, including, structural data (FWD) and subsurface information.
- Consider incrementally increasing the annual road rehabilitation budget to $5.2M to maintain a PQI of 6.0.
- Review construction costs yearly to adjust budgets for industry increases/decreases and market fluctuations to maintain the target PQI.
- Monitor the proposed work from the PMS and the actual work completed and note the field conditions.
- Determine if upgrades other than the travel surface should be considered, other factors such as traffic volumes, and local improvement / upgrading requirements should be studied.

This Page is Intentionally Left Blank

F
Downtown Parking Study

The downtown parking study was conducted to evaluate any changes from the Chilliwack Downtown Parking Study done in 2007 and to determine the public parking supply on- and off-street for the downtown area. In addition, high parking demand areas, such as the Chilliwack General Hospital and Landing Centre, were identified to review the existing parking characteristics and identify potential improvements.

For this study two different parking surveys were conducted, including an on-street public parking supply inventory survey and an off-street public parking supply inventory survey. Parking supply for private parking lots and parking demand for both public and private parking were not considered for this study.

F.1 Study Area

The downtown parking study took the same boundaries used for the 2007 Downtown Parking Study. Figure F.1 shows the study area limits where the boundary includes the Historic Downtown with commercial and retail developments, a residential area near downtown, light industrial area north of Railway Avenue, the Chilliwack General Hospital and Exhibition Park. Although the Prospera Centre and Landing Centre are not within the study area, off-street parking facilities will be discussed as part of the review of the High Parking Demand Areas.

F.2 Parking Inventory Survey

To update the data to reflect the existing parking supply and regulations for the Downtown Chilliwack area, an on-street parking inventory survey was conducted on Tuesday August 23, 2016 and the off-street parking survey was conducted on September 7, 2016. Public parking spaces, both on- and off-street, are defined as those provided, maintained and enforced by the City and designed for the use of the general public.

For the on-street parking survey, the parking regulation was recorded and any changes from the 2007 on-street parking survey were identified and adjusted to reflect the changes in the number of parking spaces. For the off-street parking survey, the survey recorded total parking stall available, parking regulation, and the number of handicapped accessible spots.

F.3 Public Parking Supply Inventory

The number of on-street parking spaces was counted within the study area. Where parking spaces were marked on the pavement, they were counted accordingly. Where pavement markings were not provided, the number of spaces were estimated using the parking dimension of seven (7) metres over the available parking distance, as recommended by the Traffic Engineering Handbook published by Institute of Transportation Engineers, 2016.

Similar to the 2007 Downtown Parking Study, the overflow parking for events located on the south side of Spadina Avenue between Ashwell Avenue and Colbould Street were considered off-street parking. These parking stalls were included in the off-street parking supply totals. Further discussion of this lot has been provided in the discussion of high parking demand areas, specifically the Landing Centre Parking Lot.

Public parking restrictions were indicated by regulator signage. The time limits used in the downtown area include 3-hour, 2-hour, 1-hour, 30-minute, and 15-minute. "No Parking" was noted, during the survey, for locations where parking was restricted due to road geometry, traffic volumes or otherwise signed as "No Parking" or "No Stopping". Table F.1 has been provided as a comparison of the public parking restrictions of 2016 and 2007 studies.

Table F.1 On-Street Public Parking Supply Inventory Summary

Regulation	2016 Study		2007 Study		Difference (in 2016)	
	Spaces	Percent	Spaces	Percent	Spaces	Percent
No Time Limit	526	37%	522	38%	+ 4	- 1%
3-Hour	264	19%	287	21%	- 23	- 2%
2-Hour	590	42%	534	39%	+ 56	+ 3%
1-Hour	14	1%	25	2%	- 11	- 1%
30-Minute	9	1%	9	1%	0	0%
15-Minute	16	1%	10	1%	+ 6	0%
Total	1,419	100%	1,387	100%	+ 32	+ 2%

A total of **1,419** on-street parking spaces are identified in the downtown area. Utilizing the changes from the 2007 parking inventory study, there was an effective increase of **31** spots, approximately **2%**. ***Figure F.1*** shows the location of on-street parking and the corresponding parking regulation.

In general, the shorter parking time restrictions are located near the retail, commercial, and office developments. On-street parking near residential, was generally longer time restriction or no parking restrictions. The number of spaced with no time limit had changed very little since the 2007 Study. The most significant changes from the 2007 Study was the reduction in 3-hour parking spaces by 23 (- 2%) and an increase in 56 (+ 3%) 2-hour parking spaces. Overall the changes for on-street parking were not significant since the 2007 Study.

The public off-street parking facilities were also surveyed. In addition to the lots included in the 2007 Study, two additional lots were identified at 9260 Young Road (corner of Young and Princess) and 46031 Empress Lane (North side of Empress lane). Off-street parking lots that provided pavement markings were counted accordingly to determine the number of spaces. However, the number of spaces on the gravel lots without pavement markings (46031 Empress Lane and 46190 Yale Road East) were estimated since there were no defined markings. A total of 725 off-street parking spaces were within the study area. ***Figure F.2*** shows the location of the off-street parking lots and summarized in ***Table F.2***.

The public parking (on- and off-street) were generally free of charge for short term parking, with long term parking option available for $1/day. The exception is the lot on Main Street between Kipp Avenue and Princess Avenue which is a pay parking lot, managed by Diamond Parking, which was not included in the table.

Table F.2 Off-Street Parking Summary

Number	Name	Location	Previous Supply (2007)	Updated Supply (Handicap)	Regulation	
					Time Limit	Price
1	Library	45860 First Ave.	39	37 (3)	2 Hrs	N/A
2	Princess	45915 Princess Ave.	73	80 (2)	3 Hrs	$1/day*
3	Empress Lane	46027 To 46055 Princess Ave.	58	49 (1)	3 Hrs	$1/day*
4	Open Gravel Lot	46190 Yale Road East	65	45**	2 Hrs	N/A
5	Spadina	Spadina Ave.	273	273	No Limit	N/A
6	Victoria	46006 to 9355 Victoria Ave	151	134 (6)	3 Hrs	$1/day*
7	Open Lot	9347 to 9343 Young Road North	32	12 (1)	3 Hrs	$1/day*
8	Young & Princess	9260 Young Road	0	70 (3)	3 Hrs	$1/day*
9	Back Lane Gravel Lot	46031 Empress Lane	0	25**	2 Hrs	N/A
		Total	**691**	**725**		

* Parking cost is $1/day over the 3-hour limit

** No parking lines are observed and best estimate of total supply provided

F.4 Traffic and Parking Demand Management Strategies

To promote sustainable transportation and growth of downtown into the future, traffic and parking demand management strategies could be implemented within the City of Chilliwack. Some examples of parking demand management strategies include.

- **Promoting walking and cycling.** By promoting, improving ease of use and safety of active transportation facilities, the City can reduce the overall parking demand. Having a pedestrian and cyclist friendly downtown can also provide economic and cultural benefits to the downtown retail and commercial areas.
- **Pay Parking during peak times.** Done in conjunction with promoting and improving active and public transportation, this can provide an increased incentive to use alternate modes rather than single occupancy vehicles to access services within Downtown Chilliwack. Pay parking could be implemented during the peak times such as Monday to Saturday from 8:00 am to 5:00 pm.
- **Shift scheduling for high parking demand areas, such as Chilliwack General Hospital.** Proper management of shift scheduling at the Hospital can reduce the overall demand for parking, meaning that when a shift change occurs there is no need to provide parking for two complete shifts of workers (the shift beginning and the shift ending).
- **Improving Transit Service.** Transit services should be provided during the peak times to the high parking demand areas to reduce the vehicle parking demand as transit options become more desirable and efficient.

- **Encourage carpooling and car sharing.** Carpool parking spaces could be provided at convenient locations in downtown to encourage people going to the same location to travel together. Additionally, car sharing services can help reduce the parking demand by allowing people to share vehicles through the service.

To determine the potential effectiveness of implementing these parking demand management strategies, additional studies into parking demand and patterns, as well as consultation with stakeholders should be conducted.

F.5 High Parking Demand Areas

As part of the downtown parking study, two high parking demand areas were identified to analyze and provide comments or recommendations to improve the parking for these areas. These areas include the Chilliwack General Hospital and the Landing Centre. Additional parking surveys were not required for this task however a site visit was conducted on September 7, 2016 to confirm parking restrictions and onsite parking configurations as marked in ***Figure F.2***.

Chilliwack General Hospital

The Chilliwack General Hospital is bounded on the north side by Hodgins Avenue, west by Newman Road, south by Menholm Road and Mary Street on the east. Operated by Fraser Health, the Chilliwack General Hospital has approximately 1,400 employees and over 130 care beds.

There is on-site pay parking located on the north, east, and south sides of the hospital with an additional lot located on the south side of Menholm Road. The pay parking rate for hospital parking lots has been provided below in ***Table F.3***.

Table F.3 Chilliwack General Hospital On-Site Parking Cost (from Fraser Health Website)

Time	Rate ($)
Hourly	1.75
Day (12 Hours)	5.75
1 Week Permit	18.75
1 Month Permit	42.25
1 Month (Senior)	33.00

The on-street parking near the hospital was also included in the downtown parking study survey. There is a total of eighty-three (83) 2-hour on-street parking on Mary Street, Menholm Road and Hodgins Avenue, eleven (11) 3-hour parking spaces and eighteen (18) no time limit spaces on Newman Road. In addition to those spaces adjacent to the hospital, there are sixty-eight (68) 2-hour limit and twenty-three (23) no time limit spaces available on Mary Street and Edward Street between Menholm Road and Bernard Avenue, within walking distance.

Landing Centre

The Landing Centre is bound by; Spadina Avenue to the north, Hodgins Avenue to the south, Corbould Street to the east and Ashwell Road to the west. This area includes many different facilities including the Prospera Centre, Exhibition Field, Landing Sports Centre, Evergreen Hall, Chilliwack Cultural Centre, and the Landing Leisure Centre.

The Prospera Centre and Exhibition Field parking (on the southwest side) are event paid parking at the rate of $5 for the event. There are also additional free parking lots provided at the Landing Leisure Centre, Landing Sports Centre, and Spadina Avenue Parking lot.

A site visit was conducted to review the parking facilities. It was noted that the available parking was not clearly marked and drivers may not be aware of additional vacant spots in other parking areas. The parking facilities could benefit from the improved wayfinding, such as, the addition of a map of the area posted in the parking lots, near the accesses. These maps could help visitors find the facilities they are looking for and additional parking options if the parking lots reach capacity.

F.6 Recommendations

The study provides an update to the 2007 Downtown Parking Study, looking specifically at the parking supply for Downtown Chilliwack. The conclusion to the parking study shows that little change has occurred for the overall available parking, with a 2% increase in spaces available. Some recommendations have been identified in this report summarized below:

- Consider consulting with the relevant stakeholders in the downtown area to investigate the feasibility of implementing parking demand management strategies
- Provide marked parking spaces for all public off-street parking lots
- Provide effective and convenient wayfinding measures for the Landing Centre area such as maps of available parking near the accesses

This Page is Intentionally Left Blank

Figure F.1: Downtown On-Street Parking Inventory and Regulation

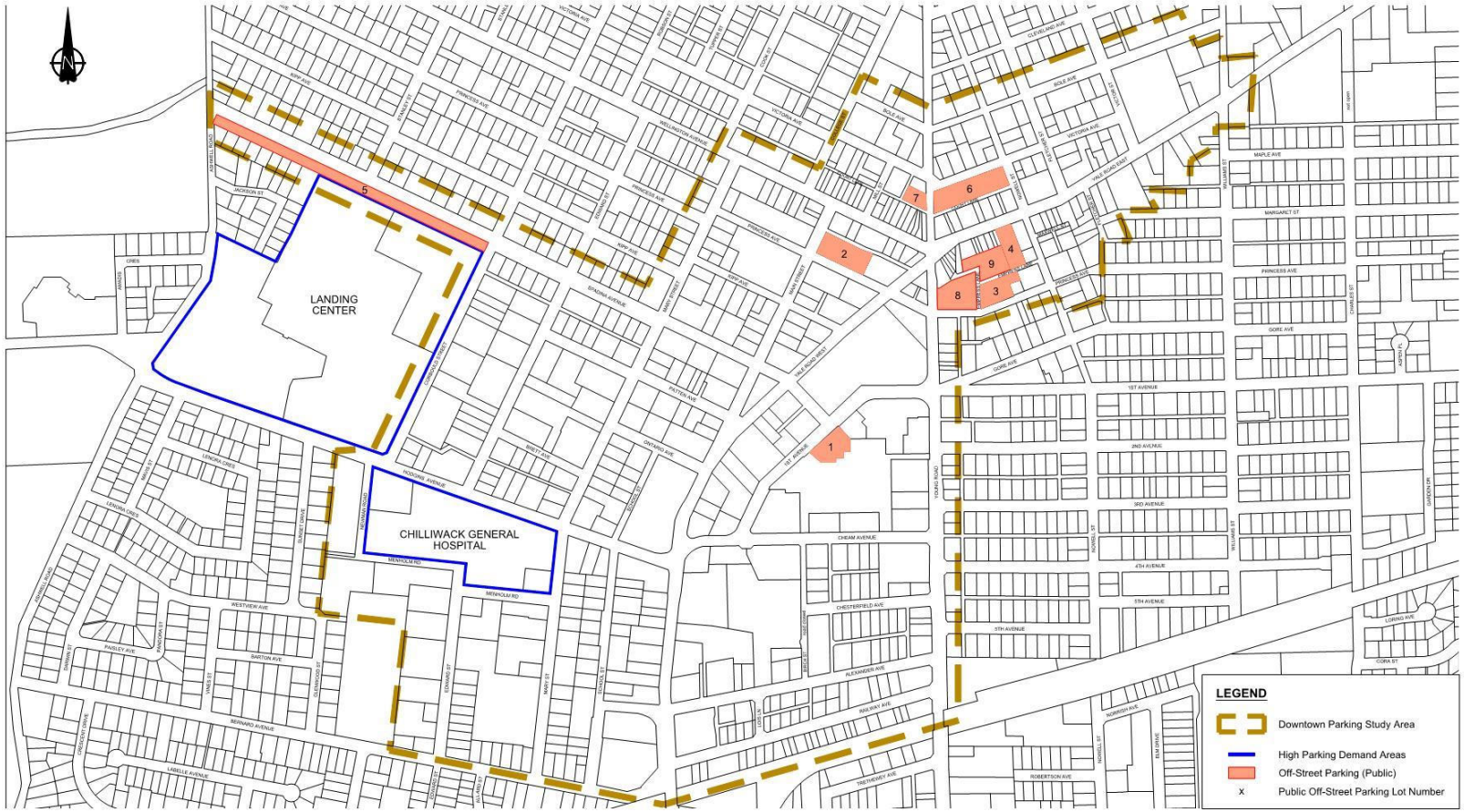


Figure F.2: Public Off-Street Parking and High Parking Demand Areas

G
Road Network

This section discusses the road network in Chilliwack in terms of the different types of roads, their purposes and functions, and how traffic patterns vary on them. Planned enhancements of the road network are also discussed.

G.1 Functional Classification

The City of Chilliwack has a system of arterial, collector, and local streets that connect the areas within the community and provide access to various land uses. Highway 1, controlled and managed by the British Columbia Ministry of Transportation and Infrastructure (MOTI), is a freeway providing regional connections. The existing and anticipated future road classification is shown in ***Figure G.1***.

The functional classification and their roles of all road classes are described in ***Table G.1***. The road classification reflects the intended purpose of the roadway, and indicates appropriate connections and access controls; however, it is independent of the actual traffic volumes. Access to public roads is controlled in Chilliwack through paragraphs 56 and 57 of the Highway and Traffic Bylaw 2004, No. 3023 (January 31, 2011). The *Network Classification Strategy: Final Report (2006)* has noted that, roads of one classification should connect only with roads of the same or adjoining classifications to achieve efficient traffic service. When intersection improvements are made, the City of Chilliwack requires level of service "C" or better for the overall intersection and each approach leg.

Table G.1 Road Functional Classification and Roles

Parameter		Freeway	Arterial	Collector	Local
Purpose		Accommodate long distance trips	Accommodate mostly through traffic on trips between important activities or population centers	Connect the local street system and abutting land uses to arterials	Connect abutting land uses (e.g., residences and businesses) to the transportation network
Access Controls		Access is permitted at interchanges only	Access is typically controlled through limits on the number and spacing of driveways and intersections	Few access controls, although driveway design and location may be regulated[1]	Allows driveways and stop-controlled access
Connections	Normal	Arterial, freeway	Collector, arterial, freeway	Local, collector, arterial	Local, collector
	Less Preferable	Collector, local	Local	Freeway	Freeway, arterial
Commercial Traffic Use		Goods movement between centers		Limited to local deliveries	

According to the City of Chilliwack Staff Report date February 22, 2008, the arterial and collector roads are also divided into major and minor roads. The definitions of the road classifications are:

- Major Arterials: These roadways are long, continuous corridors supporting long-distance travel between the collector road systems. These are Chilliwack's most important roads, linking neighbourhoods and major centers.
- Minor Arterials: Are designed and planned to support large traffic volumes of through traffic unrelated to an area and serves a distribution function to get traffic to and from the collector and local road system.
- Major Collectors: The traffic service function of this type of roadway is to carry moderate volumes of traffic between local road and arterial road system.
- Minor Collectors: Are intended to provide traffic service and land access service primarily for smaller residential areas – where traffic volumes are generally lower and familiar with community.

G.2 Existing Road Network

In the Chilliwack road network, north-south connectors spanning Highway 1 accommodate the highest daily traffic flows. *The 2016 Traffic Count Program* identified corridors with the highest volume and approximate two-way daily traffic:

- North-south corridor: Yale Road between Spadina Avenue and Vedder Road with AADT between 10,000 and 36,000 vehicles per day
- East-west corridor: Promontory Road between Vedder Road and Uplands Road with AADT between 13,000 and 21,000 vehicles per day

Connections to Highway 1
An important consideration in the road network of Chilliwack is its connection to Highway 1 (Trans-Canada Highway), which traverses the municipality from east to west. Regional connection to Highway 1 is discussed in ***Section N*** of this Transportation Plan.

Variations in Traffic
Based on the results from the *2016 Traffic Count Program*, ten City roads were selected with two roads in each road classification. The peak hour factors (peak hour volume divided by daily volume) were summarized in ***Table G.2***, and hourly variations for two-way traffic volumes during average weekdays on ten municipal roads of five different classifications are shown in ***Figure G.2*** and ***G.3***.

Table G.2 Peak Hour Factors

Classification	Road		Traffic Count Date	Peak Hour Factor
Major Arterial	Evans Road	South of Roundabout	April 20, 2016	7.8%
	Vedder Road	South of Wells Road	April 21, 2016	8.5%
Minor Arterial	Wolfe Road	West of Ashwell Road	April 13, 2016	8.2%
	Keith Wilson Road	West of Vedder Road	April 20, 2016	8.0%
Major Collector	Menzies Street	South of Hope Slough	April 14, 2016	8.9%
	Stevenson Road	East of Vedder Road	April 21, 2016	8.5%
Minor Collector	Corbould Street	South of Reece Avenue	April 13, 2016	8.9%
	Wells Road	West of Vedder Road	April 20, 2016	8.9%
Local	Jinkerson Road	East of Teskey Way	April 21, 2016	8.4%
	Cultus Lake Road	South of Vedder Mountain Road	April 14, 2016	8.0%

Figure G.2 shows the variations in average two-way weekday counts conducted on major and minor arterial roads. It is found that, the morning peak is apparent between 0800 and 0900 hours. Due to traffic for the local business, the midday hourly flows were comparable or higher than the morning peak hour flow. The two-way traffic flow reached its peak between 1600 and 1700 hours and then it declined progressively.

Figure G.3 shows the variations in average two-way weekday counts conducted on non-arterial roads. Similarly, the morning peak is apparent between 0800 and 0900 hours. Due to major local commuter and school traffic, the midday hourly flows were generally lower than or comparable to the morning peak hour flow. The midday peak for Cultus Lake Road was higher than the AM peak due to its recreational use. The two-way traffic flow reached its peak between 1600 and 1700 hours and then it declined progressively.

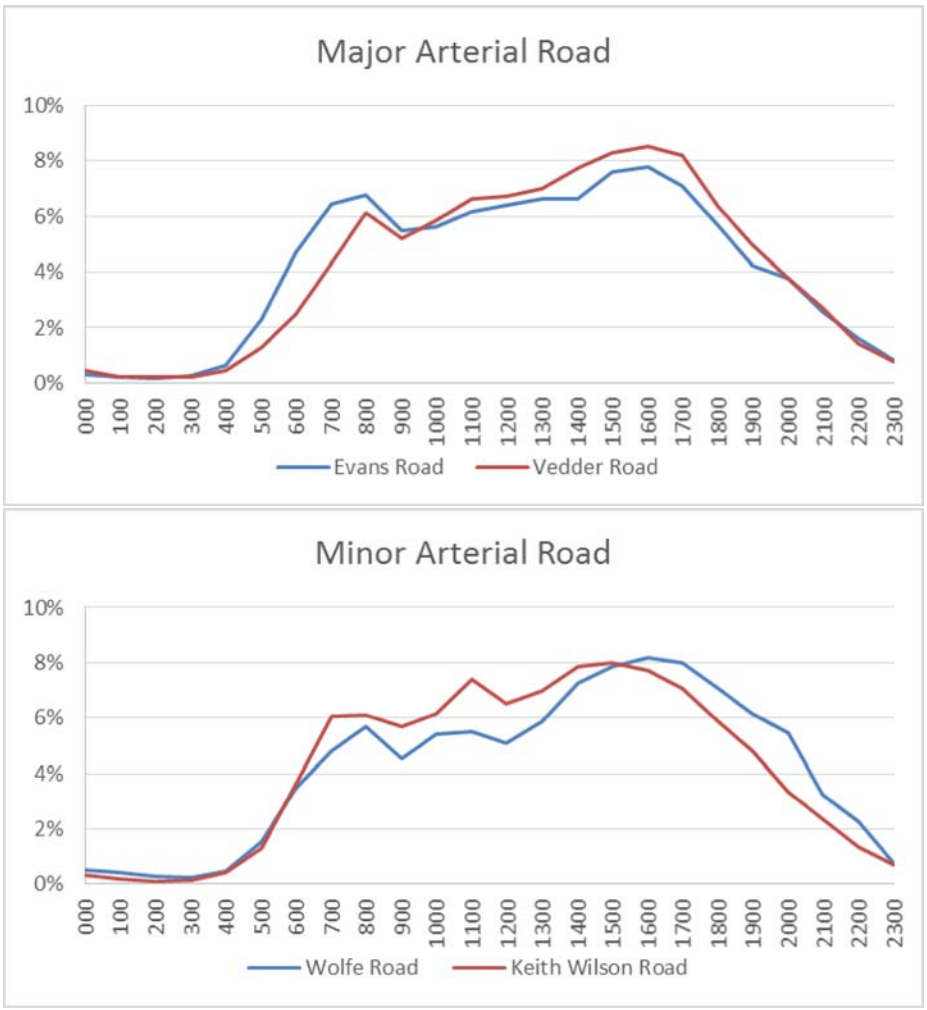
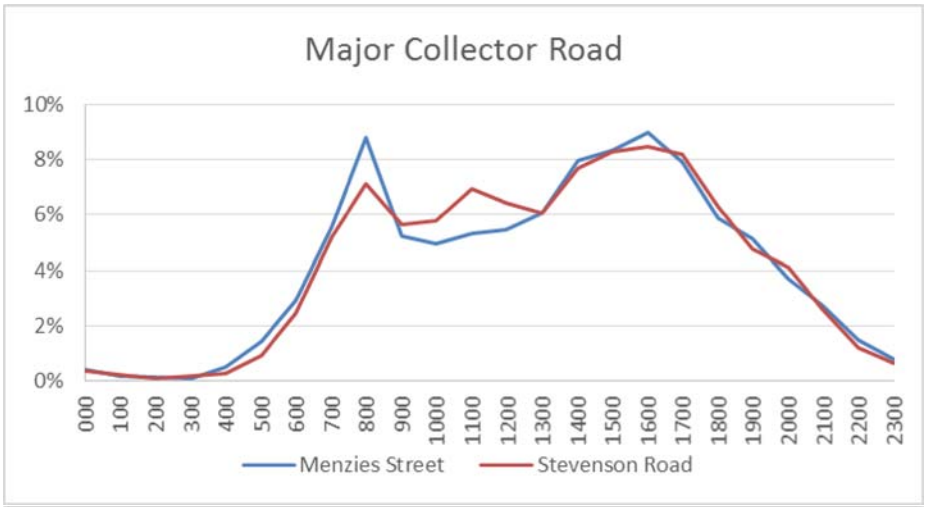
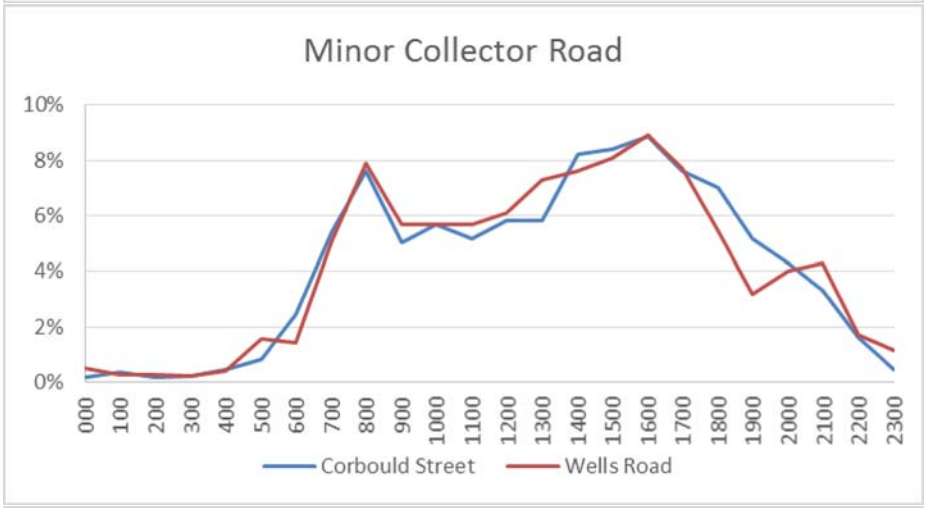


Figure G.2 Hourly Traffic Distributions (Arterial Roads)





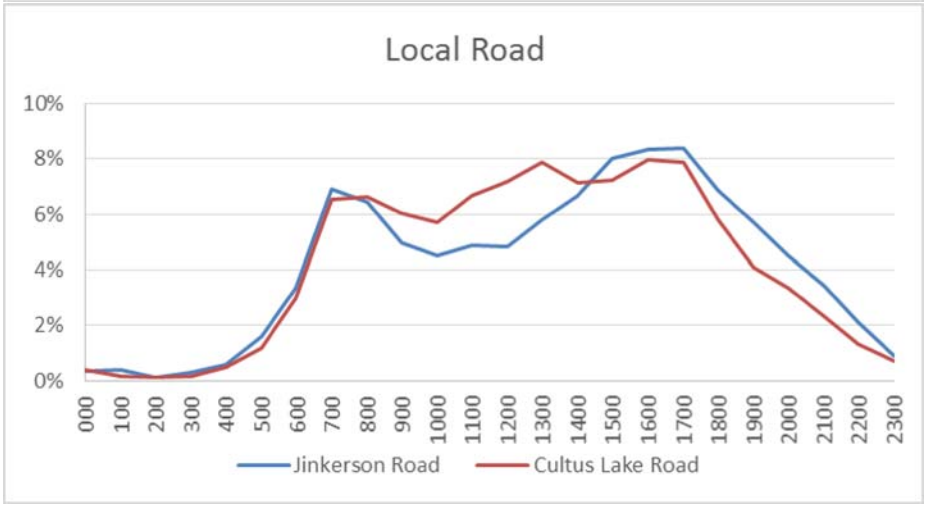


Figure G.3 Hourly Traffic Distributions (Collector and Local Roads)

G.3 Future Improvements

Planned future enhancements to the road network for the next ten years (2016-2025) were provided in the *City of Chilliwack Comprehensive Municipal Plan* and are listed below.

2016 – 2017

- Promontory Road (Vedder Road to Chilliwack River Road)
- Watson Road (Vedder Road to Tyson Road)
- Evans Flyover / Connector Phase 2
- Prest Road Phase 1 – roundabout at Bailey Road & Prairie Central Road
- Chilliwack River Road and Knight Road
- Hack Brown Road and Annis Road Intersection
- Knight Road
- Bridge – Prest Road at Semiult
- Vedder Road Bridge Replacement
- Vedder Mountain Road at Cultus Lake Road – roundabout
- Evans Road and Stevenson Road – signalization, 4-lane cross section
- Pedestrian Signals – Yarrow Central Road at Kehler Street
- Lickman Road Interchange

It is noted that Prest Road Phase 1 – roundabout at Bailey Road and prairie Central Road was completed in 2016 and Promontory Road, Evans Road and Stevenson Road intersection as well as Vedder Mountain Road and Cultus Lake Road roundabout (provisional) were planned for 2017. The remaining roadworks may be considered in 2018 or beyond.

2018 – 2020

- Vedder Road and South Sumas Road Intersection
- Tyson Road (South Sumas Road to Watson Road)
- Vedder Road (Knight Road to Britton Road)
- Chilliwack Mountain Road (Schweyey Road to Shrewsbury Drive)
- Prest Road Phase 2
- Keith Wilson Road (Vedder Road to Tyson Road)
- Bridge – Banford Road at Semiult
- Teskey to Sylvan Hillside Construction
- Spadina Avenue (Ashwell Road to Corbould Street)
- Chilliwack Mountain Road

2021 – 2025

- Young Road (Highway 1 to Airport Road)
- Yale Road Two-way-left-turn-lane (Hocking Avenue to CN Railway Overpass)
- Luckakuck Way (Young Road to Railway Crossing)
- Evans Phase 4
- Airport Road (Evans Road to Yale Road)
- Airport Road (Yale Road to Young Road)
- Lickman North
- Vedder Road (Keith Wilson Road to Bridge)
- Bridge – South Sumas Road at McGillvray
- Prest Road Phase 3 (Trans-Canada Highway to Bailey Road)
- Prest Road Interchange
- Main Street

G.4 Recommendations

- Update the Road Network Classification Strategy every three to five years to assist land developments within the City boundary.

This Page is Intentionally Left Blank

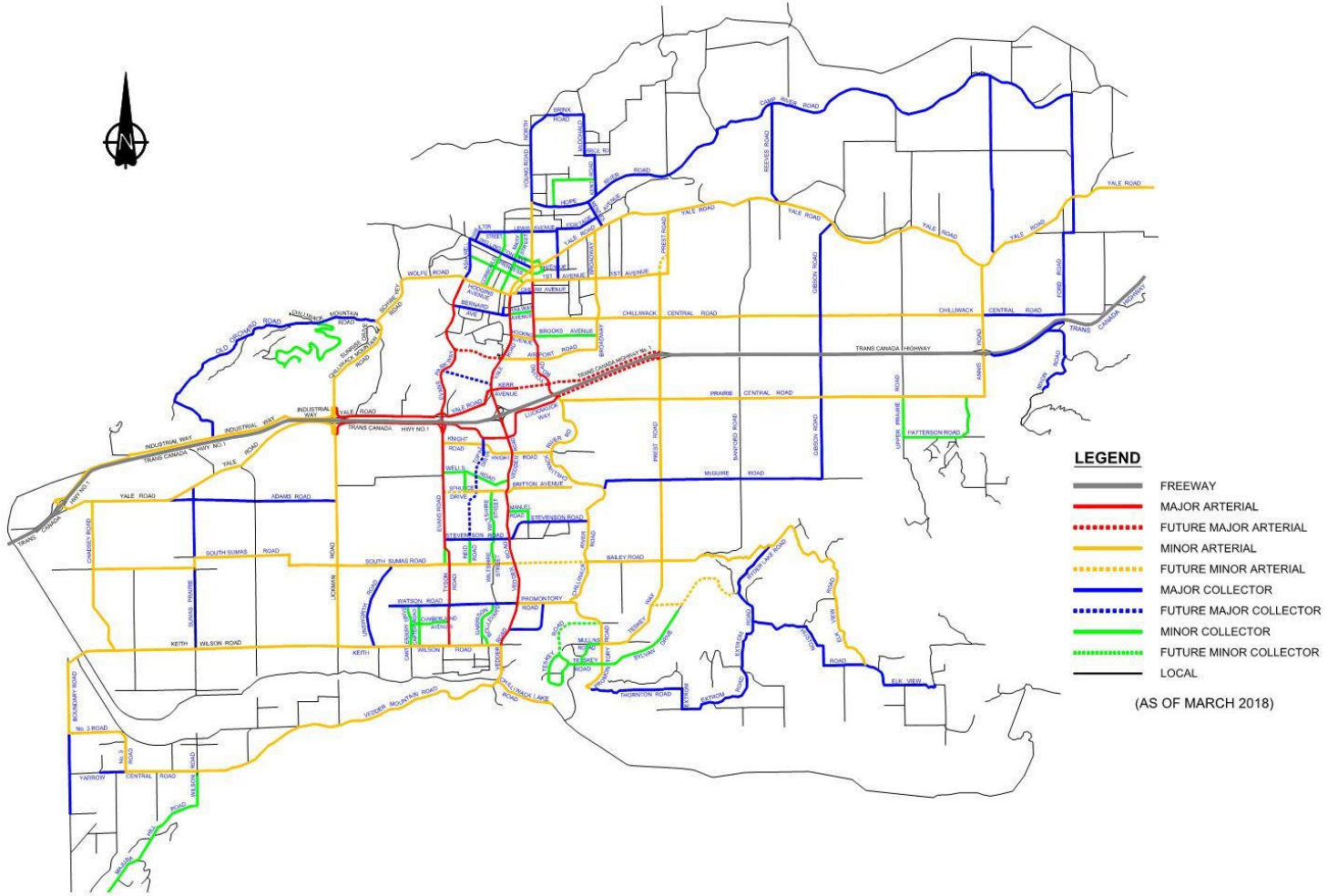


Figure G.1: Existing and Future Road Classification Map

H
Zoning Setbacks & Bylaws

H.1 Zoning Bylaw Review

The City's bylaws can have a significant impact on transportation demands by dictating, enforcing or restricting the type of development that may be permitted in specific locations and allocating space between properties for transportation infrastructure.

Today, more than ever, land use planning offers some of the greatest opportunities to manage growth in a responsible manner and reduce the need for automobile travel. A number of bylaws set out regulations which can impact transportation infrastructure or the need to travel in some ways, including;

- Official Community Plan (OCP) Bylaw 2014, No. 4025
- Zoning Bylaw 2001, No. 2800
- Land Development Bylaw 2014, No. 3055

H.2 Official Community Plan Bylaw 2014, No. 4025 Review

Overview

The City's *OCP* recognizes that new residential development will come in the form of higher densities and the City supports this approach. The size of the City and relatively flat terrain along the valley floor lends itself well to making many of the day-to-day trips in the core by walking or cycling providing the infrastructure is in place to accommodate and land uses are positioned to enable such trips. Where development is also taking place on surrounding hillsides, this presents a greater challenge for sustainable travel due to distances, grades, and less dense development.

It is important that this Transportation Plan supports the vision and goals of the *OCP* with respect to future transportation. The vision is "**The City of Chilliwack is a healthy, engaged, sustainable community**". The goals to help achieve that vision are as follows:

- ***GOAL 1, Manage Growth Responsibly**: Maintain urban growth boundary, densify, comprehensively plan sustainable communities, selectively develop hillsides, ensure development pays for itself, and provide required infrastructure capacities.*
- ***GOAL 2, Strengthen Agriculture:** Protect the urban-rural interface and ensure the economic viability of agriculture.*
- ***GOAL 3, Grow the Economy:** Diversify economic and employment opportunities, revitalize the downtown, and create jobs for the anticipated population increase.*
- ***GOAL 4, Protect the Environment:** Foster community and individual responsibility in environmental protection and enhancement.*
- ***GOAL 5, Build Healthy Attractive Communities:** Engage the public, emphasize social well-being, build healthy environments, develop infrastructure cost-effectively, and promote attractive design.*

Chilliwack 2040 OCP, Page21

Specific Transportation Components

Goal 5 is the most relevant albeit other goals have somewhat of an influence on transportation. There are many components to Building Attractive Communities but the mobility component is the most relevant in this instance. The City's *OCP* generally covers these components.

> *"Healthy community development gives priority to transit development, cycling, walking, and reducing automobile traffic within and without the City. It ensures equity in access and mobility, and enables Chilliwack to maintain or improve its air quality while growth continues. It reduces the demand for road capacity, and supports a compact land use pattern.*
>
> *In working toward healthy community goals, transportation planning should be closely linked to land use strategy (such as density, core and mixed use development), the development approval process (for roadway acquisition and sidewalk provision), and public education on health and the benefits of transit, walking and cycling. Planning for a healthy aging population also requires attention to its mobility characteristics, including special accommodation by buses, intersection design for safer crossing, improved sidewalk surface, and more resting places.*
>
> *Therefore, the long term transportation vision should integrate a full spectrum of transportation modes, and define their respective roles and performance targets in the City's movement of people and goods over the next three decades. It is only through the use of all transportation modes that the City can move forward as a complete community. Meanwhile, the long term transportation planning process should be broad-based and multi-disciplinary in order to address the needs of an aging population and healthy community objectives."*
>
> *Chilliwack 2040 OCP, Page 47*

Other parts of this Transportation Plan will provide more detailed commentary on specifics to that plan, but the *OCP* does provide general direction on how the City should be managing transportation.

With regards to transit, the Transit Future Plan predicts a fourfold increase in transit ridership and the need for infrastructure to support this. It mentions densification along transit corridors and the creation of urban environments more conducive to walking, cycling, and transit usage.

The City's *OCP* recognizes that in the short to medium term the car will continue to be the dominant mode of transportation, but improvements should be limited to existing physical limits with any shortfall being picked up by alternative modes of travel. For key routes in the City, the *OCP* still predicts a need to widen roads and adjust intersections to improve their carrying capacity including provision for cyclists. The *OCP* also includes a want for new north-south routes (again, including bicycle provision) to take some of the load from Vedder Road, but such improvements will require consultation with the Agricultural Land Commission and First Nation Reserves.

> *Direct Objectives for mobility in Chilliwack are:*
>
> - *Provide a balanced, integrated, multi-modal transportation system that supports mobility at the neighbourhood, city-wide and regional/provincial levels.*
> - *Ensure equity in mobility and access for all citizens, including children, youth, seniors and the disadvantaged.*
> - *Promote sustainable transportation to reduce greenhouse gas emissions.*

- *Integrate land use and transportation planning for healthy community development.*
- *Improve public safety and reduce the negative impact of increasing traffic on the Trans-Canada Highway and the CNR mainline.*

Mobility Policies specified within the City's OCP are:

1. *Integrate the current road network plans, long term capital works, Transit Future Plan, bicycle plans, and sidewalk/walkway capital work programs; and work toward a comprehensive healthy community transportation strategy that reinforces mobility choices and emphasizes a more balanced priority among the various modes of transportation.*
2. *Design roadways for multi-modal purposes, supporting vehicular traffic as well as walking, cycling, other non-motorized and slow moving personal transportation.*
3. *Corroborate transportation investment with land use planning (at city-wide and neighbourhood levels) to:*
    a. *Densify the community cores, including the downtown; and*
    b. *Redevelop neighbourhoods that are ready for large scale residential replacement and reinvestment.*
4. *Monitor the densification on process and mixed use development in community cores and the urban corridor, and establish city-wide benchmarks for a balanced and realistic mix of motorized and non-motorized movements of people, goods and services in order to support the healthy community goals and the GHG reduction objectives.*
5. *Improve and reinforce the established road network of the urban corridor that emphasizes the three main north-south routes: Yale-Vedder, Evans-Ashwell, and Chilliwack River Road-Young-Broadway. (Map 13)*
6. *Elevate the capacities and design standards of the supplementary north-south routes, Prest Road and Lickman Road, as per the City's 10-year capital work plan.*
7. *Consider new secondary north-south routes within Sardis-Vedder, especially in the block between Vedder Road and Evans Road to enable short intra and inter-neighbourhood trips.*
8. *Continue to improve urban road connectivity, especially the east-west route links: from Airport Road to Evans/Ashwell Road, the South Sumas extension between Vedder Road and Chilliwack River Road, and other locations that are essential to network development.*
9. *Expand the local transit system in accordance with the Transit Future Plan's recommendations; consider this plan's servicing level as the minimum target and monitor the urban corridor's densification and mixed use development for new transit attraction points and expansion opportunities.*
10. *Improve the standards and connectivity of the bicycle route network with an aim to:*
    a. *Establish cycling within the urban corridor as an effective alternative transportation mode, particularly for school trips and short distance traveling;*
    b. *Develop an attractive, safe, city-wide recreational bicycle route system to promote outdoor activity, community health and tourism; and*
    c. *Link on- and off -road bicycle routes and hiking trails for an effective outdoor recreational network.*
11. *Expand the sidewalk and walkway systems and improve their standards, designs and connectivity to encourage:*
    a. *Alternative transportation for school and regular short-distance trips;*
    b. *Healthy living and a vibrant street life in neighbourhoods that are associated with the downtown, community cores and other nodes in the urban corridor; and*
    c. *Active living in suburban neighborhoods.*

12. Develop a mobility strategy for seniors, with a focus on alternative modes of transportation (including scooters), seniors' service locations and other frequent destinations, the locational relationship between their homes and service provider / shopping facilities, and assistance to driving seniors and to seniors at risk of shut-in due to very limited access to private and public transportation.

Chilliwack 2040 OCP, Page 49-50

Transportation Related Components

For Goals 1 to 4 there are a number of objectives and policies relating to transportation which should be considered in the development of this plan and any future infrastructure:

- *Support healthy community development through the application of complete community principles and planning of appropriate community infrastructure.*
- *Ensure new developments contribute adequate funds for future infrastructure expansion and upgrade.*
- *Emphasize the established community cores of Chilliwack-proper (downtown), Sardis and Vedder through densification and urban design.*
- *Enhance livability and urban design through Design Guidelines pertaining to "form and character" for residential and commercial developments, Complete Community principles and Healthier Community recommendations.*
- *Through best practice manuals, neighbourhood plans and community workshops, inform the public and development industry about the attributes and advantages of well-designed densification projects.*
- *Adopt a sustainability checklist in the application process to evaluate proposed developments' environmental, social and economic contributions to the community, and to inform public and private decision-making.*
- *Implement the Community Integrated Air Quality, Energy and Greenhouse Gas Action Plan to reduce GHG emissions, air pollutants, and energy consumption related to Transportation, Buildings/Processes, Waste, Agriculture, Open burning.*
- *A community design that fosters social interaction and inclusion, such as an effective layout and density and high connectivity of transportation systems, including roads, the transit system, and alternative transportation (cycling and walking).*
- *Land uses that support appropriate combination of homes, businesses, community and cultural facilities and employment growth.*
- *A multi-modal mobility system that gives due priority to active transportation (cycling and walking) to promote health.*
- *Safe, comfortable and attractive streets, public spaces, buildings and structures.*
- *These healthy community foci do not displace the traditional municipal planning functions such as providing adequate utility services and road capacities; however, they do influence how these municipal services should be delivered.*
- *The healthy community future has to connect with present urban systems, and move forward through evolution; it does not aim for a short-term total transformation, nor should it. Hence, the policies and actions of this Plan, and their implementation through land use designation and road/utility network schedules, represent a transition toward the 2040 future.*

- *Develop an integrated, multi-purpose park and green space system that embraces recreation/nature oriented activities, environmental conservation, non-motorized transportation, neighbourhood connectivity, view corridor/vista preservation, community character and healthy community development.*
- *Develop comprehensive walkway and trail networks in support of healthy community and alternative transportation initiatives.*
- *Expand the current trail network throughout the community: Incorporate walking, cycling, and where appropriate, equestrian paths; Maximize the use of natural areas and non-vehicular routes to link community and neighbourhood parks, recreational/school/civic facilities, and residential subdivisions; and Integrate the City's parks and trail networks with regional, provincial and national systems, including the Trans Canada Trail.*
- *Developing a trail and greenway network that emphasizes: links between/within neighbourhoods and communities for walking and cycling; greenways for their vistas and scenic significance. (Map 12B) Proposed New Parks and Trails.*
- *Securing access to mountain biking/hiking trails on crown land, greenways and the on-road cycling network.*

Chilliwack 2040 OCP, Page 24-47

The OCP, like in many other cities, is recognizing that designing purely for the automobile is not sustainable in the longer term and there is a need to prioritize walking, cycling, and transit. This must carry through in the implementation plan within this document and within the City's Capital Plan. A city's true vision lies not within a vision statement, but within its budget!

- **Recommendation: Review Capital Plan to confirm City spending reflects Vision and Goals of the Chilliwack 2040 OCP.**

The OCP still includes new road projects. Adding caution that these are expensive, and that many bike lanes, cycle tracks, and pedestrian realm upgrades can be constructed for the price of a new road, often to the betterment of the community. New road capacity also tends to induce vehicle demand by making travel by automobile easier and thus more attractive, negating the potential for traffic congestion to encourage trips by other modes. Lastly where the City does proceed with any new road construction and must consider the inclusion of pedestrian and bicycle facilities.

- **Recommendation: Consider Pedestrian and Cycle Plans to inform all new road projects.**

H.3 Zoning Bylaw 2001, No. 2800 Review

Zoning as a concept was developed to separate land uses so that people could live further from their industrial jobs and enjoy the "fresh air" out in the suburbs. The side effect is the need to travel for many different purposes. Mixed land uses provide an opportunity to transition back to a more compact form of living, where the option to walk or cycle is a viable choice for many trip purposes.

Zoning Setbacks

Within the bylaw, setbacks come in two types, traditional property setbacks that dictate the limits of a building within an individual property lot, and setbacks from other features such as roadways and water courses.

With regards to transportation, the setbacks for roadways are the most critical component as they limit the ability to expand the roadway in the future or add multi-modal components such as sidewalks, bike lanes, or paths within the municipal right of way.

Building setbacks, defined as *"the minimum distance from a respective lot line which a building or structure may be located unless otherwise specified by General or Special Regulation or as required by the BUILDING CODE (current edition)"* are one component of land use planning that controls density. Lower setbacks allow for higher density development while higher setbacks tend to create larger lots and what may be referred to as "sprawl". Minor changes to property setbacks can have a small impact on transportation demand by allowing potentially higher densities, assuming building size doesn't change. Higher densities support improved transit and provide greater potential demand for other infrastructure such as bike lanes. However, at the individual property level the impacts are relatively small. Greater gains can be had from allowing medium and higher densities where previously only low density development was permitted.

Setbacks from roadways is the most critical set of dimensions that should be addressed through a transportation plan as this allows for capacity improvements (for cars and other modes) at later times. Setbacks or right of way is often dictated by road classification, thus it's important that the future Road Network Plan sets out classifications that support future land use to ensure road widths or right of way is provided to accommodate future plans. Existing setbacks from roadways are summarized below:

Notwithstanding the setback requirements under the requirements listed with each ZONE, the following setbacks are specifically required:

(1) SETBACK FROM HIGHWAYS AND RAILWAYS

a. *Where MAJOR ARTERIAL ROADS are less than 30m in width, the front and/or exterior side setback required for a use within a ZONE shall be subject to an increase of the difference between 15m and the distance from the design center line of the road allowance and adjoining property line. (AB #3584)*

b. *Where MINOR ARTERIAL ROADS are less than 25m in width, the front and/or exterior side setback required for use within the a ZONE shall be subject to an increase of the difference between 12.5m and the distance from the design center line of the road allowance and adjoining property line. (AB #3584)*

c. *Where MAJOR and MINOR COLLECTOR ROADS are less than 20m in width, the front and/or exterior side setback required for use within a ZONE shall be subject to an increase of the difference between 10m and the distance from the design center line of the road allowance and adjoining property line. (AB #3584)*

d. *Where LOCAL ROADS are less than 15m, 17.5m, or 20m in width, the front and/or exterior side setback required for use within a ZONE shall be subject to an increase of the difference between 7.5m, 8.75m or 10m and the distance from the design center line of the road allowance and adjoining property line. LOCAL ROAD widths are determined by the Director of Engineering." (AB #3584)*

e. *No Building shall be located closer than 4.5m to the property line fronting on any Arterial Highway without approval of the Minister of Transportation. ARTERIAL HIGHWAYS within the City are:*
   - *Trans Canada Highway No. 1*
   - *Chilliwack Lake Road (Vedder Road to City boundary)*

f. *Buildings for residential use or occupancy shall be located no closer than 30m from the boundary of the right-of-way of the Trans Canada Highway and the Mainline of the CNR, nor closer than 15m from the boundary of the right-of-way of the B.C. Hydro Railway (Southern Railway of British Columbia).*

g. *Where a LANE is less than 6m in width, the setback required for a use from the adjoining lot line, shall be subject to an increase of the difference between 3m and the distance from the design center line of the LANE ROW and the adjoining property line.*

Zoning Bylaw 2001, No. 2800, 5.09 SUPPLEMENTARY SETBACK REGULATIONS

The above setbacks are based on historical cross-section requirements. Given the increasing demand for active transportation facilities in various forms. Setbacks will be dictated by multiple components of this overall Transportation Plan and accompanying standalone Cycling Plan, but must ensure sufficient space is available for all modes including automobile, transit, walking and cycling.

- **Recommendation: Review bylaw setbacks upon finalisation of Transportation Plan, accompanying Cycling Plan and future revision to cross-sections in Land Development Bylaw.**

H.4 Land Development Bylaw 2014, No. 3055

This bylaw sets out the cross sections for varying types of roadway. Given the proposed improvements to accommodate cyclists that are being planned as part of the Cycling Plan, it will be necessary to update the Land Development Bylaw to include new cross sections for routes that contain bicycle facilities.

The current bylaw requires the following cross sections for each classification:

> - *Local/Minor – 15-20m ROW width*
> - *Major/Minor Collector – 20m ROW width*
> - *Minor Arterial – 25m ROW width – 19m pavement width*
> - *Major Arterial – 30m ROW width – 21m pavement width*
>
> Land Development Bylaw 2014, No. 3055, Section 2.5.2.2

It is not clear what each cross section should provide in terms of laning, parking, and turn provision. For example, a Major Arterial with 21m pavement could include 2.4m parking lanes each side, two 3.3m travel lanes in each direction, and a 3m turn lane. But in some cases it is difficult to develop a cross section that meets each of the recommended pavement widths.

- **Recommendation: Provide specific laning examples for a given pavement width.**
- **Recommendation: Include example of cycle facilities and their space requirements in line with Cycling Plan that accompanies this Transportation Plan**

The bylaw states that *"all travel lanes on multi-lane roads that are not used exclusively for turning movements shall be between 3.3 and 3.7 m wide, or as per "TAC" Standard"*. It is becoming more common for lane widths as low as 3m to be acceptable in urban areas with low truck volumes, providing one method to help reduce vehicle speeds to safer levels and helping to free up space for other improvements such as bike lanes. The "TAC" standards are currently being updated and is expected to be released early 2017. The lane widths for any new roadways or changes to existing roadways should be carefully considered and be appropriate to the context of the street, rather than historic precedents.

- **Recommendation: Reduce acceptable lane widths to 3m in areas intended for low speeds and with low truck volumes**

The bylaw also states that "For arterials and collectors the minimum design speed shall be 10 km/h higher than the posted speed". This approach is fast becoming outdated on the basis that if roads are designed for higher speeds, cars will travel at higher speeds. In an effort to reduce collision severity and thus fatalities from automobile crashes, designing roads to be travelled at the posted speed is considered a more appropriate way forward. It is recommended that this section be revised to set design speed to the posted speed. As above it is expected that revised guidance may be included in the updated "TAC" standards and should be updated in the bylaw if necessary.

- **Recommendation: set design speed equal to posted speed**

Space for bicycles can be provided in three ways, reallocation of vehicle lanes to bicycle facilities, reduction in vehicle lane widths to make space for bicycle facilities, or widening of the pavement to provide new space for bicycle facilities. If space for bicycles is provided in addition to vehicle lanes, they shall be in accordance with guidance set out in the Cycling Plan.

- **Recommendation: Review Cycling Plan and develop example cross-sections for various bicycle facilities.**

H.5 Recommendations

In summary, the City could considers the following actions with regards to meeting the intent of the OCP and the following changes to its Zoning and Land Development Bylaws:

OCP

- Review Capital Plan to confirm City spending reflects Vision and Goals of the Chilliwack 2040 OCP.
- Consider Pedestrian and Cycle Plans to inform all new road projects

Zoning Bylaw

- Review bylaw setbacks upon finalisation of Transportation Plan, accompanying Cycling Plan and future revision to cross-sections in Land Development Bylaw.

Land Development Bylaw

- Provide specific laning examples for a given pavement width.
- Include example of cycle facilities and their space requirements in line with Cycling Plan that accompanies this Transportation Plan
- Reduce acceptable lane widths to 3m in areas intended for low speeds and with low truck volumes
- Set design speed equal to posted speed
- Review Cycle Plan and develop example cross-sections for various bicycle facilities.

I Transit Plan

I.1 Existing Transit System

The Chilliwack Transit System is cost shared service between the City of Chilliwack and BC Transit. The City of Chilliwack and the Fraser Valley Regional District Board make decisions on fares, routes, and service levels, based on the public's feedback and BC Transit information. Buses are operated by FirstCanada ULC and the service operates 7 days a week, with most routes running from 6:30 am and 11:00 pm. There are seven conventional bus routes within the City of Chilliwack, two community/seasonal bus routes and three regional connecting bus route (as of November 2017). The two community bus routes connect Chilliwack to the Yarrow/Greendale and Cultus Lake communities. The existing bus routes have been summarized in ***Table I.1***, and the most recent transit routes map can be seen in ***Figure I.1***.

Table I.1 Chilliwack Transit Routes (as of November 2017)

Route Number	Route Name	Description	Type
1	Vedder	Services from University of Fraser Valley to Downtown Chilliwack along Vedder Road	Conventional
2	Evans	Service from Downtown to Cottonwood Mall Connection along Evans Road	Conventional
3	Chilliwack	Service for Downtown and the Fairfield region	Conventional
4	Promontory	Service for various areas in the Premontory, Vedder and Sardis Regions to Cottonwood Mall	Conventional
5	Yarrow/Greendale	Service from the University of Fraser Valley to the Yarrow and Greendale Regions	Community
6	Cultus Lake	Service from Cultus Lake to the Vedder Route into Chilliwack	Community / Seasonal
7	Broadway	Service from Downtown and Cottonwood Mall through East Chilliwack, servicing the Chilliwack Municipal Airport	Conventional
8	Tyson	Service from University of Fraser Valley to Cottonwood Mall along Cottonwood Mall	Conventional
9	Industrial	Service from Downtown to Cottonwood Mall along Young Street and Connecting with Lickman Park & Ride	Conventional
11	Agassiz/Harrison	Service from Downtown Chilliwack to Agassiz and Harrison Regions	Regional
22	Hope	Services from the in Agassiz and Harrison Region (Connecting Route 11) to	Regional
66	Fraser Valley Express (FVX)	Regional, limited-stop service connecting Chilliwack, Abbottsford and Langley (Metro-Vancouver)	Regional

Since the previous *2007 Transportation Plan*, BC Transit has created the *Transit Future Plan - Chilliwack Area (2012),* which identified the state of the transit system and infrastructure in 2012 and outlined a plan for the future transit planning. The *Transit Future Plan* identified near-term, short-term, and long-term planning goals and priorities. The near-term priorities were implemented and are reflected in the current transit system, including the implementation of a Vedder-Yale line and the realignment of local routes. Many of the short-term priorities were implemented as well, including; downtown Chilliwack transit exchange review, improved Sunday service, holiday service, improved local service frequency and span of service. Many of the medium- to long-term have also been implemented or are planned to be implemented as part of the *City of Chilliwack - Transit Expansion Project* (discussed later in this section).

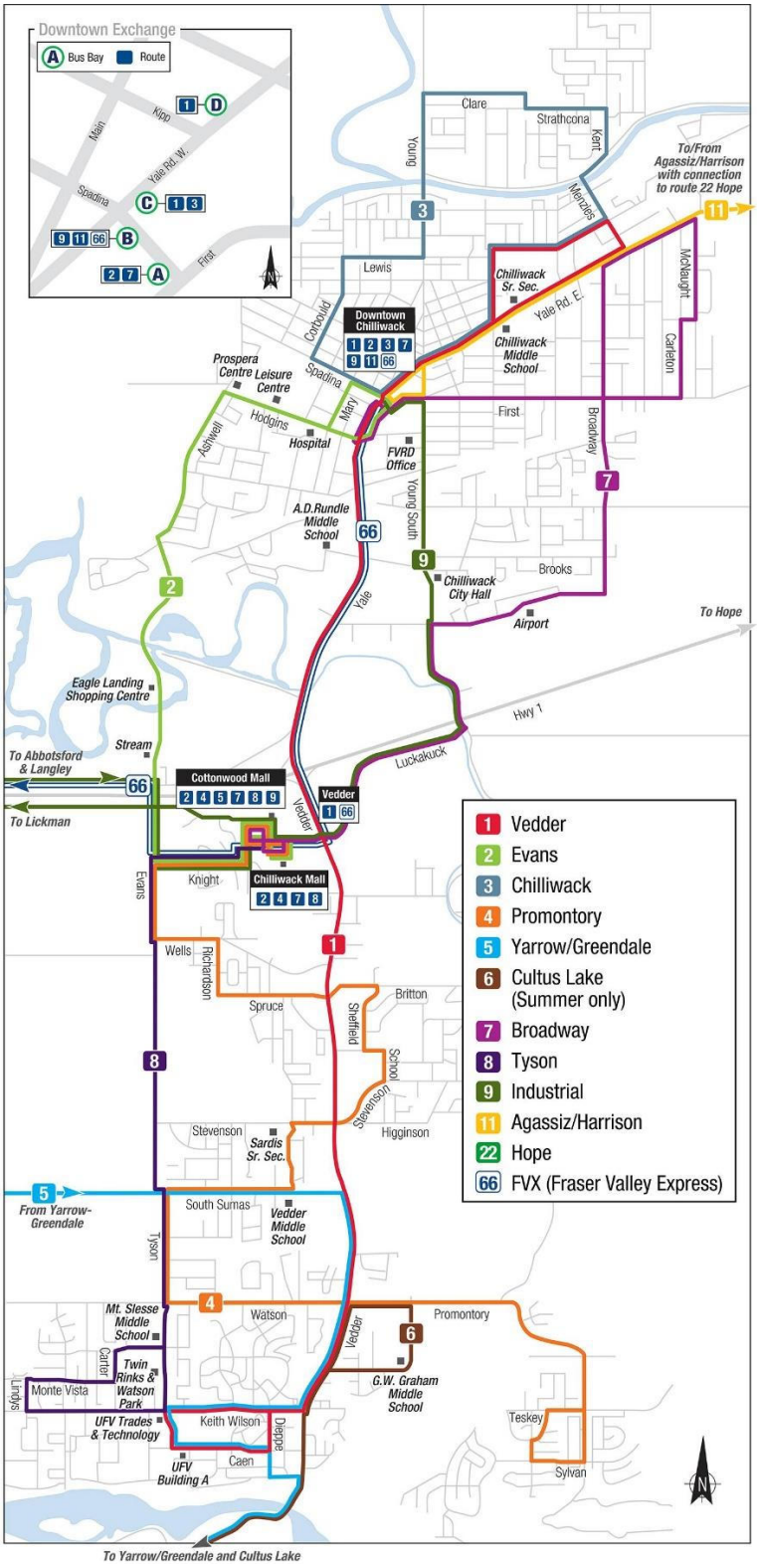


Figure I.1 Transit Service Map (BC Transit, as of November, 2017)

Complementing the transit system is the HandyDART service, which is a door-to-door shared service for eligible Chilliwack residents who are unable to take the conventional fixed-route services. This HandyDART service is provided to people with disabilities and registration for the service is free of charge. The service operates between 7:45am and 4:45pm on Monday, Tuesday, Thursday, and Friday, between 7:45am and 9:30pm on Wednesday; and between 9:00am and 5:00pm on Saturday. There is no service on Sunday and Statutory Holidays. In addition to the HandyDART service, the Taxi Saver Program provides a 50% subsidy on taxi rides when the HandyDART service cannot fulfill the ride demand, and is available to all HandyDART customers.

I.2 Regional Connectivity

In April 2015, Route 66 Fraser Valley Express (FVX) was implemented, providing a connecting route for Chilliwack, Abbotsford, and Langley. This route not only provides additional transit options for commuters, but also allow transit access to the Abbotsford Airport and other regional tourist destinations. Route 66 begins at the Downtown Chilliwack transit exchange and stops at the Vedder transit stop, and at the Lickman Park & Ride before heading towards Abbottsford. *The Fraser Valley Express Service and Ridership Review* (FVX Review, February 2016), provides an outline of the ridership information for this route. The Downtown Chilliwack, Vedder and Lickman Park & Ride stops accounted for 17%, 9% and 5% of the total weekday bus stop activity, respectively, along the route.

Route 11 to Agassiz/Harrison is also a regional connection, providing transit between the two communities. The regional bus routes are part of the transit system but through different local partners – the Fraser Valley Regional District (FVRD). A regional connection bus service is provided for the Agassiz and Harrison Region to the Hope Region which is assessable from the connecting Route 11 from Chilliwack.

I.3 Review of Demand, Supply and Routing

The 2012 *Transit Future Plan* sets the goal for a transit mode share target of two percent of all trips by 2036, meaning an increase in ridership from 492,000 in 2011 to 1,900,000 rides annually, approximately a 286% increase in rides per year.

Transit Usage Trends

BC Transit has provided ridership information from 2010 to current. The data is collected for a period between April and March (final full period is April 2015 – March 2016). This data is generated using revenue information, assumptions regarding the number of users per month, BC Pass and some fare collection system data. The ridership trends can be seen in ***Figure I.2***.

Ridership has been rising steadily since 2012/13, somewhat consistent with the goals set out by BC Transit in the *Transit Future Plan*. It should be noted that ridership may have increased due to many factors such as; significant changes to the transit system and routing in 2013 (as a result of the *Transit Future Plan* recommendations), and the addition of Route 66 VFX in 2015, which were included in the total ridership numbers.

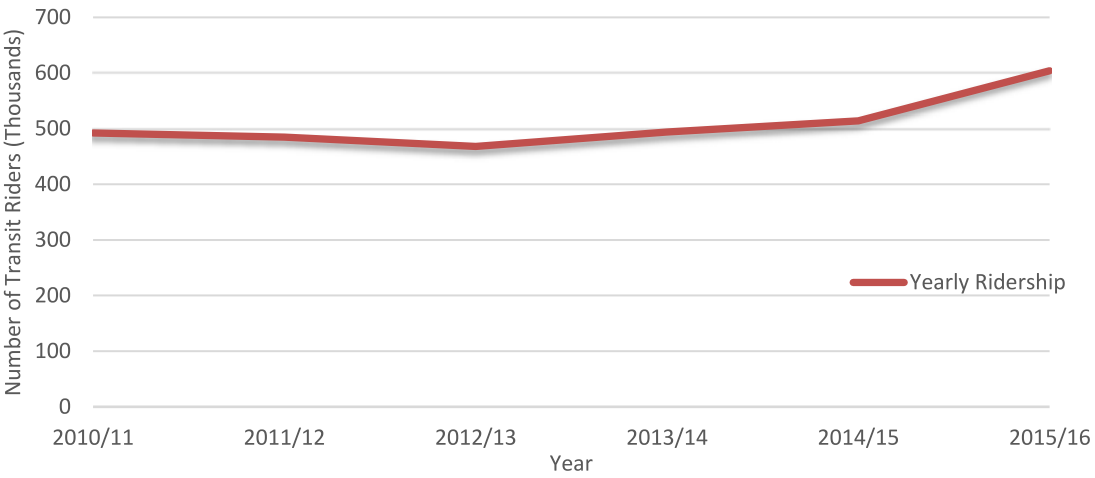


Figure I.2 Conventional Transit Yearly Ridership (In Thousands of Riders) by Year

HandyDART Usage Trends

The HandyDART service ridership was analyzed over the same time period as the conventional bus service. The ridership trends since April 2010 – March 2011 have been provided in ***Figures I.3***. It was observed that the total ridership has been declining, likely due to reductions in group trips from various care homes that have begun to provide their own vehicles for trips.

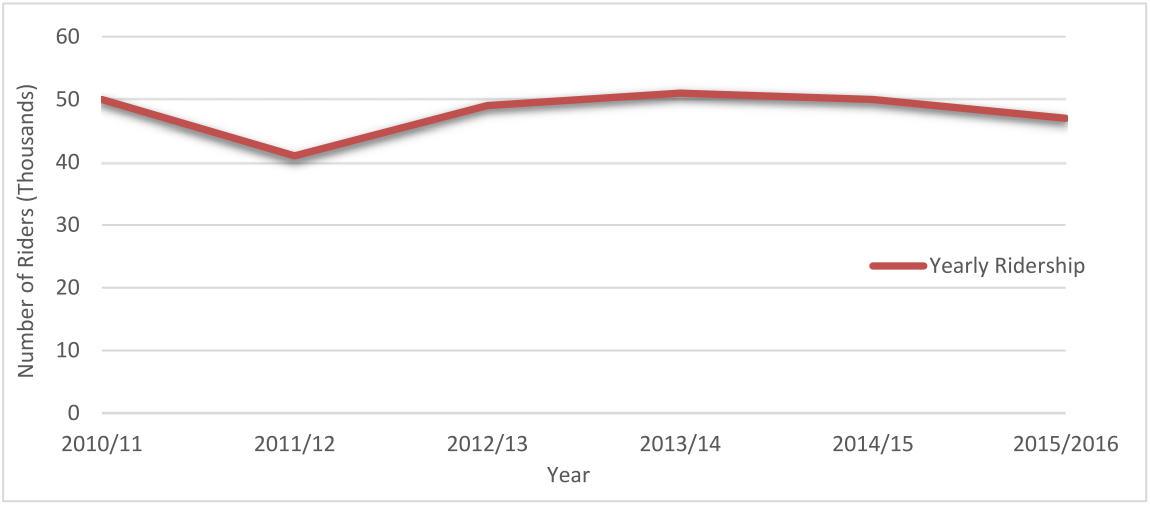


Figure I.3 HandyDART Yearly Ridership Trends (In Thousands of Riders) by Year

Transit Demand

The HandyDART service demand has been split into three periods, and has been summarized in ***Figure I.4*** below. The morning (from 7:45 am to 9:45 am) and evening (from 2:00 pm to 5:00 pm) period were determined to be the peak times for HandyDART ridership. The morning period has an average of 59 rides (approximately 30 riders per hour) and the evening period had an average of 98 riders (approximately 33 riders per hour).

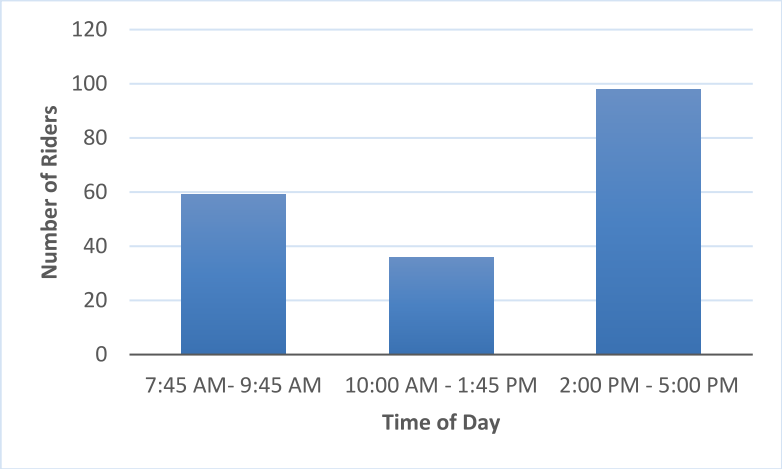


Figure I.4 HandyDART Usage by Time of Day

Transit Demand and Routing

BC Transit has provided ridership information on the last three years (2013 – 2015) on proportion of riders per route and it has been compiled in ***Table I.2***. This data is generated using the onboard fare collection system information by calculating ridership using the fare collected when riders come onto the bus. This does not include ridership for regional bus routes such as; Route 11 to Agassiz/Harrison and Route 66 for Fraser Valley Express.

Table I.2 Proportion of Ridership per Route from 2013 to 2015

Year	Route Number								Total
	1	2	3	4	5	6	7	8	
2013	59%	16%	7%	13%	< 1%	< 1%	3%	1%	100%
2014	61%	14%	6%	11%	< 1%	1%	5%	2%	100%
2015	61%	14%	6%	12%	< 1%	< 1%	6%	1%	100%

The actual transit ridership data was not directly used because major changes to the transit route and route numberings were made in 2013, therefore the data may not be reliable to evaluate 'by route'. However, as shown in Table 1.2, the proportions of ridership remained relatively consistent through the years. Slight increases were found in Route 1, likely related to the addition of Route 66 in 2015 while the increases were shown in Route 7 due to improved service for that route.

Transit Revenues and Costs

Bus fare (Single Trip) as of April 2016, for an adult is $2.00, and for a senior or full-time student is $1.75 while children 4 and under are free. Other payments options are available to riders such as packages of ten tickets, day pass, monthly pass, and semester pass (available to students with valid ID). A full summary of bus fare pricing can be found in ***Table I.3***. Route 66 FVX is not transfer eligible with the prices to board being $5.00 for cash, $45.00 for 10 passes, $100.00 for adult monthly pass and $85.00 for student and senior monthly pass.

Table I.3 Summary of the City of Chilliwack Transit Pricing, Except Route 66 FVX (As of April 2016)

Single Ticket	
Adult	$2.00
Student/Senior	$1.75
10 Tickets	
Adult	$18.00
Student/Senior	$15.57
Day Pass	
Adult	$5.00
Student/Senior	$4.00
Monthly Pass	
Adult	$44.00
Student/Senior	$35.00
Semester Pass	
Student Semester Pass	$122.00

In addition to the variable pricing, BC Transit provides information on the various pass programs and incentives including the Transit Pass Tax Credit, Tax Exemption, Government of BC Bus Pass Program (for eligible fixed-route bus riders) and Post-Secondary Student U-Pass (for Fraser Valley University students).

The ridership fare type breakdown for 2015/2016 has been summarized in ***Figure I.5***, showing what percentage of users used which fare method.

As shown, cash and monthly passes are the most used method of fare at 37% and 30%, respectively. 19% of riders used a BC Bus Pass, which is a program offered by the Ministry of Social Development and Social Innovation, for eligible bus users on fixed-route service.

The Chilliwack share of the transit funding in 2016 ($2.4 Million) was provided by transit revenues (about $0.8 Million or 30%) and by property taxes (about $1.6 Million or 70%).

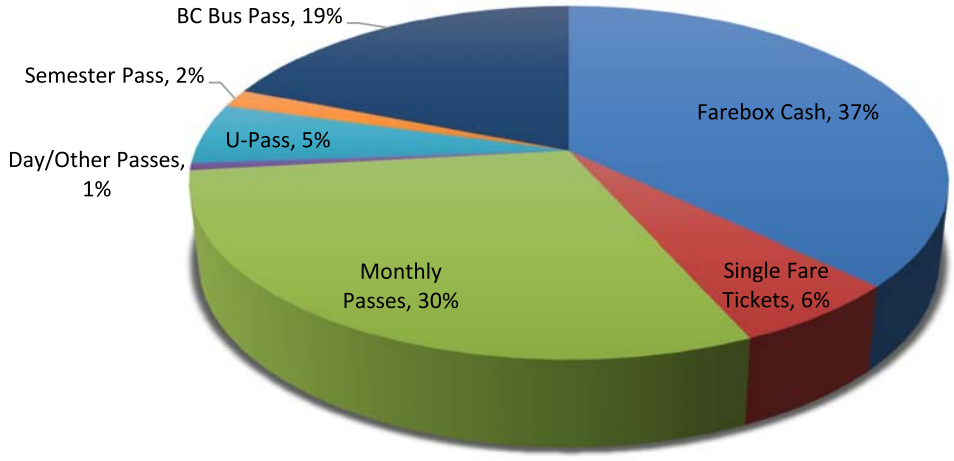


Figure I.5 Distribution of Ridership Fare Method (as of 2015/2016)

I.4 Plan for Future Transit Growth

In June 2016, Chilliwack City Council (Council) approved the *Transit Expansion Project* which is a twelve-point transit improvement plan starting in September 2017 through to September 2019, including the addition of seven new busses over three years, such as:

In 2017:

- Increase frequencies on Route 1 and Route 3,
- Expand Route 8, weekday services to Yarrow & Greendale,
- Provide weekday service to employment/industrial areas, and
- Expand customer services.

In 2018:

- Increase weekday frequency of Route 7 and Route 8,
- Extend Route 4, as well as extend of Route 1, 2, 3 and 4 to meet the earlier Route 66 FVX trips.

In 2019:

- Increase frequencies on Route 2 and Route 4,
- Add AM trips on Route 1 and Route 2 to meet 6:15am Route 66 FVX, and
- Increase weekend frequency of Route 7 and Route 8.

BC Transit is planning on implementing their Smart Bus program for the Chilliwack area in the future as well. This includes initiatives such as Automated Passenger Counts (APC) and Automated Vehicle Location technology which allows users to access real-time location information on transit vehicles.

This study provides a summary of the available data acquired from BC Transit and the City of Chilliwack. It has also summarized some of the goals identified by BC Transit and the plans that they will be using to accomplish them. The Transit Future Plan set the goal of having a mode split of 2% by 2036, meaning an increase from 491,000 rides annually in 2012 to 1.9 million annually in 2036. The Chilliwack Transportation Advisory Council (TAC) presented the *Transit Expansion Project,* which was then approved by Council in June 2016, which sets out a plan to improve and expand services for the next three years.

I.5 Recommendations

To continue to work towards the mode share goals and improve the level of service for the transit service, it is recommended that the City of Chilliwack;

- Work with BC Transit to monitor and review ridership data, especially once Automated Ridership Counts are implemented, to identify locations that may benefit from additional transit service or future developments that could benefit from transit access.
- Promote changes and improvements to the transit system using social media and maximize the effectiveness of the promotion by partnering with neighborhood and advocacy groups.
- Review and evaluate the results from the proposed improvements in the next 3 years and report in the next Transportation Plan.

This Page is Intentionally Left Blank

J
Cycle Plan

A comprehensive Cycle Plan was developed and discussed while the recommendations were prepared in the separate *Chilliwack Cycle Plan* (May 2017). The *Cycle Plan* contained a number of key components which including, goals and objectives to encourage cycling and improve safety for cyclists. The plan is focused on eliminating gaps on and between existing routes, and improving routes to incorporate protection for cyclists from motor vehicle traffic. An implementation plan with priorities for protected facilities, bicycle parking, transit integration, community engagement, marketing, education and enforcement, maintenance and monitoring. Guidance for designing, construction and maintaining bicycle facilities, based on state-of-the-art guidelines used in North America, but adapted to conditions in Chilliwack.

The Cycle Plan provided the following recommendations:

- Implement Quick Win projects
- Develop and implement a city-wide bicycle route signage system
- Design and implement protected bicycle facilities in consultation with residents, businesses and other stakeholders
- Extend the Sardis Rail Trail south to the Vedder River and north to Hocking Avenue
- Develop an annual program to install more bicycle racks and implement secure bicycle parking
- Incorporate priority bicycle projects into future capital plans
- Implement an annual bicycle monitoring program

This Page is Intentionally Left Blank

K
Bridge Plan

The main objective of the Bridge Plan of the Transportation Plan Update is to summarize the information collected in the 2016 Bridge Inspection Report, to compare the findings in the 2007 Transportation Plan and to identify the upcoming prioritized needs for rehabilitation and upgrades.

K.1 Summary of the 2016 Bridge Inspection Report

The City of Chilliwack retained a bridge consultant to complete the *2012 – 2016 Roads Bridge Inspection Program (*2012, Delcan, a Parsons company) of twenty-three (23) bridges within the City's boundaries. The inspection reports, analysis and recommendations were documented in the *2016 Bridge Inspection and Maintenance Report.* The City's 23 bridge structures (see ***Figure K1***), include twenty two (22) vehicular bridges and one (1) pedestrian bridge. One of the vehicle bridges was restricted to pedestrian loading only. ***Figure K.1*** also shows Bridge CB 26 (McLeod Road) and CB 28 (Gillanders Road). Based on the *2007 Transportation Plan*, these two bridges had been replaced with plate culvert structures. No further discussion could be found in the *2016 Inspection Report*. The *2016 Inspection Report* included a bridge inventory, bridge maintenance survey, photographs of the structures, summary of inspection procedures, summary of inspections, maintenance and recommendation summary. The priority of the repair / maintenance works was established based on safety concerns, and the estimated cost for these improvement works were also determined.

Bridge Inventory Report

The inventory report includes information on the identification of the bridge, structure data, seismic data and waterway data. The identification data includes bridge name and location, year built, load capacity, number of lanes, daily traffic volumes and possible bypass detour length. The structural data includes the number of spans, span length, bridge width, alignment and superstructure type, number and types of piers and abutment/foundation types and any utilities crossing the bridge. Seismic data includes PGA, seismic performance zone, structure importance category, soil type and liquefaction potential was also included. Waterway data provides information on navigability, channel stability and bank protection. The bridges included in the *2016 Inspection Program* are listed in ***Table K.1.*** The number of vehicular lanes and the daily two-way traffic volume (2012, 2016 and anticipated 2020) for each bridge are included.

Yale Road West over Chilliwack Creek has the highest daily traffic volume at close to 40,000 while Prest Road over Semiault Creek, Luckakuck Way over Atchelitz Creek and Yale Road Overpass over CN Rail have higher traffic volumes than 2012. All other bridges have similar traffic volumes. Two new bridges on Eagle Landing Parkway have anticipated 2020 ADT (Annual Average Daily Traffic) of 27,000 (bridge) and 14,000 (culvert).

Condition Survey Report

The condition survey report for each bridge provided the following structural information:

- Approaches (pavement, shoulder and signage);
- Waterway (opening, bed, bank and training works);
- Abutments (foundations, walls, wingwalls, lagging and expansion joints);
- Bearings (fixed, expansion, lateral and longitude restraint, support length and bearing plates);
- Piers (pile/bent interface, pilecap and bracing);
- Stringers / Girders (deflection, contact surface, diaphragms and beams); and,
- Deck (surface, membrane, drainage, curbs, sidewalks and railings).

Each structure condition and structure components were rated based on the *Bridge Rating System* similar to the *Public Works and Government Services of Canada's Rating System*. The ratings ranged between 1 and 5, with 1 corresponding to "excellent condition, no repaired required" 5 corresponding to "critical condition,

repair is urgent". The identified issues and/or latest improvements were listed in the "Comment" column of the bridge inventory survey report. Seismic concerns were noted under "Requirements for Detailed Review" in the bridge maintenance survey report.

Table K.1 Bridge Inventory Summary

NO.	BRIDGE NAME	NUMBER OF LANES	DAILY VOLUME (vehicles/day)		
			2014	2016	2020
CB02	Chilliwack Central Road over Banford Ditch	2	5,000	5,000	6,000
CB06	Chapman Road over Hope River	2	7,000	7,000	7,500
CB07	Yale Road East over Dunville Creek	2	7,000	7,000	7,500
CB08	Yale Road East over Big Ditch	2	4,200	4,200	4,500
CB09	Chartwell Drive over Hope Slough	2	< 100	< 100	< 100
CB10	Footbridge over Hope Slough	-	Ped Only	Ped Only	Ped Only
CB11	Luckakuck Way over Atchelitz Creek	2	unknown	17,000	18,000
CB12	Yale Road West over Chilliwack Creek	4	25,000	25,000	27,000
CB13	Haig Drive over Luckakuck Creek	1	Ped Only	Ped Only	Ped Only
CB14	Boundary Road over Stewart Creek	2	100	100	100
CB15	Vedder Bridge over Chilliwack River	2	12,500	12,500	13,500
CB16	Eckert Road over Stewart Creek	2	< 100	< 100	< 100
CB18	South Sumas Road over McGillivray Slough	2	< 100	< 100	< 100
CB20	Keith Wilson Road over Vedder Canal	2	6,000	6,000	6,500
CB21	Young Road over Hope Slough	2	13,000	13,000	14,000
CB22	Menzies Street over Hope Slough	2	7,000	7,000	7,600
CB23	Banford Road over Semiault Creek	2	unknown	unknown	< 1,000
CB24	Parker Road over Big Ditch	1	<10	< 10	< 100
CB25	Pelly Road over Hope River	2	< 100	< 100	< 100
CB27	Prest Road over Semiault Creek	2	10,700	10,700	11,600
CB30	Yale Road Overpass over CN Rail	4	40,000	40,000	43,000
CB31	Eagle Landing Parkway over Chilliwack Creek	4	unknown	unknown	27,000
CB32	Eagle Landing Parkway over Chilliwack Creek Culvert	2	unknown	unknown	14,000

*Daily Volumes (Vehicles/Day) sourced from Delcan *2012 – 2016 Roads Bridge Inspection Program (2014)* and *2016 Bridge Inspection and Maintenance Report (2016)*

Maintenance Survey Report

Based on the results of the condition survey report, the items in "FAIR", "POOR" or "CRITICAL" condition were identified and summarized in the bridge maintenance survey report. The proposed improvement works (monitor, maintenance, install, repair or replace) were suggested in the report.

Recommendations for improvement include:

- Monitor cracks and gaps
- Monitor settlement
- Monitor signs of water ingress
- Monitor erosion
- Monitor corrosion
- Monitor timber delaminations
- Remove debris accumulation
- Installation of approach barriers
- Repair of concrete girder spalling or cracking
- Repair potholes
- Repair guardrails

- Replace missing bolts
- Conduct in depth structural assessment

The suggested repair / maintenance works were identified for each bridge and the associated costs were estimated based on all anticipated maintenance expenditure. The priority groupings of repairs/maintenance items are organized as follows:

- Urgent Repairs
- Repairs within 1 year
- Repairs to be completed within 3 years
- Repairs to be completed within 5 years
- Monitor
- Maintenance

Table K.2 summarizes the total suggested maintenance / repair cost estimates as prepared by the *2016 Inspection Report* including a 25% contingency.

Table K.2 Bridge Maintenance Cost Summary

NO.	BRIDGE NAME	Urgent	1 year	3 years	5 years	Maintenance
CB02	Chilliwack Central Road over Banford Ditch		$ 10,000	$ 1,000		$ 1,000
CB06	Chapman Road over Hope River			$ 10,000		$ 15,300
CB07	Yale Road East over Dunville Creek			$ 10,000		$ 3,000
CB08	Yale Road East over Big Ditch					$ 5,000
CB09	Chartwell Drive over Hope Slough					
CB10	Footbridge over Hope Slough					$ 100
CB11	Luckakuck Way over Atchelitz Creek	$ 25,000		$ 7,000		$ 4,000
CB12	Yale Road West over Chilliwack Creek		$ 10,000			$ 500
CB13	Haig Drive over Luckakuck Creek					
CB14	Boundary Road over Stewart Creek	$ -		$ 5,000		$ 2,000
CB15	Vedder Bridge over Chilliwack River	N/A	N/A	N/A	N/A	N/A
CB16	Eckert Road over Stewart Creek					
CB18	South Sumas Road over McGillivray Slough					
CB20	Keith Wilson Road over Vedder Canal		$ 20,000			$ 6,000
CB21	Young Road over Hope Slough	$ 15,000		$ 1,000		
CB22	Menzies Street over Hope Slough		$ -			$ 2,000
CB23	Banford Road over Semiault Creek	$ 15,000	$ 10,000	$ 7,000		$ 4,000
CB24	Parker Road over Big Ditch	$ 15,000	$ 1,000			$ 3,000
CB25	Pelly Road over Hope River			$ 5,000		$ 1,500
CB27	Prest Road over Semiault Creek			$ 6,000		$ 1,000
CB30	Yale Road Overpass over CN Rail					$ 2,000
CB31	Eagle Landing Parkway over Chilliwack Creek					$ 9,000
CB32	Eagle Landing Parkway over Chilliwack Creek Culvert					$ 5,500
	Sub Total	**$ 70,000**	**$ 51,000**	**$ 52,000**	**$ -**	**$ 64,900**
	25% Contingency	**$ 17,500**	**$ 12,750**	**$ 13,000**	**$ -**	**$ 16,225**
	Total	**$ 87,500**	**$ 63,750**	**$ 65,000**	**$ -**	**$ 81,125**

Bridge Replacement

Several of the bridges that the City's owns and maintains were constructed in the 1950 and designed to lower seismic criteria. In addition, many structures do not have sidewalks/shoulders to accommodate pedestrian/cyclists. The *2016 Inspection Report* included bridge replacement costs to assist the City with budgeting requirements. They have assumed that the timber bridges will be replaced with steel structures and bridges will be widened to suite the latest safety standards (if required). The bridge replacement costs are based on a unit rate per square meter and are listed in ***Table K.3***. The *2016 Inspection Report* indicated that Banford Road Bridge (CB23) should be considered for replacement within the next five years.

Table K.3 Bridge Replacement Cost Summary

NO.	BRIDGE NAME	Construction Cost	Engineering Cost	25% Contingency	Total Replacement Cost	Total Unit Rate ($/m^2)
CB02	Chilliwack Central Road over Banford Ditch	$ 817,300	$ 163,460	$ 245,190	$ 1,225,950	$ 11,145
CB06	Chapman Road over Hope River	$ 1,060,946	$ 212,189	$ 318,284	$ 1,591,418	$ 7,914
CB07	Yale Road East over Dunville Creek	$ 1,237,603	$ 247,521	$ 371,281	$ 1,856,405	$ 8,265
CB08	Yale Road East over Big Ditch	$ 1,423,121	$ 284,624	$ 426,936	$ 2,134,681	$ 9,339
CB09	Chartwell Drive over Hope Slough	$ 2,283,270	$ 456,654	$ 684,981	$ 3,424,905	$ 6,105
CB10	Footbridge over Hope Slough	$ 154,920	$ 30,984	$ 46,476	$ 232,381	$ 6,105
CB11	Luckakuck Way over Atchelitz Creek	$ 2,131,830	$ 426,366	$ 639,549	$ 3,197,745	$ 7,941
CB12	Yale Road West over Chilliwack Creek	$ 2,158,728	$ 431,746	$ 647,618	$ 3,238,092	$ 6,105
CB13	Haig Drive over Luckakuck Creek	$ 117,216	$ 23,443	$ 35,165	$ 175,824	$ 6,105
CB14	Boundary Road over Stewart Creek	$ 817,300	$ 163,460	$ 245,190	$ 1,225,950	$ 11,145
CB15	Vedder Bridge over Chilliwack River	$ 4,078,074	$ 815,615	$ 1,223,422	$ 6,117,111	$ 7,866
CB16	Eckert Road over Stewart Creek	$ 460,764	$ 92,153	$ 138,229	$ 691,145	$ 9,406
CB18	South Sumas Road over McGillivray Slough	$ 698,940	$ 139,788	$ 209,682	$ 1,048,410	$ 7,943
CB20	Keith Wilson Road over Vedder Canal	$10,701,075	$ 2,140,215	$ 3,210,323	$ 16,051,613	$ 6,930
CB21	Young Road over Hope Slough	$ 1,119,250	$ 223,850	$ 335,775	$ 1,678,875	$ 6,105
CB22	Menzies Street over Hope Slough	$ 1,398,471	$ 279,694	$ 419,541	$ 2,097,707	$ 7,556
CB23	Banford Road over Semiault Creek	$ 358,160	$ 71,632	$ 107,448	$ 537,240	$ 6,105
CB24	Parker Road over Big Ditch	$ 358,160	$ 71,632	$ 107,448	$ 537,240	$ 6,105
CB25	Pelly Road over Hope River	$ 609,400	$ 121,880	$ 182,820	$ 914,100	$ 8,310
CB27	Prest Road over Semiault Creek	$ 850,960	$ 170,192	$ 255,288	$ 1,276,440	$ 14,505
CB30	Yale Road Overpass over CN Rail	$18,266,160	$ 3,653,232	$ 5,479,848	$ 27,399,240	$ 6,105
CB31	Eagle Landing Parkway over Chilliwack Creek	$ 4,346,760	$ 869,352	$ 1,304,028	$ 6,520,140	$ 6,105
CB32	Eagle Landing Parkway over Chilliwack Creek Culvert	$ 1,956,042	$ 391,208	$ 586,813	$ 2,934,063	$ 6,105

Structural Load and Seismic Vulnerability

The bridges had been 'screened' for potential seismic vulnerabilities in the *1997 Bridge Inspection Report* (prepared by J.W. Welder & Associates Ltd). Based on the recommendations of the *2000 Bridge Inspection Report*, the City was performing seismic upgrading of some structures and "Peer Reviews" were being undertaken as part of the design-build process. The *2016 Bridge Inspection Report* provided a seismic rating of the bridges as well as requirements for detailed review. It recommended a geotechnical investigation to understand ground behavior during a seismic event as well as structural investigation into the lateral load resisting path of the bridges.

The *2016 Bridge Inspection Report* also listed the structural adequacy of the bridge and determined the design vehicle for each bridge. Two bridges were recommended to have load signs to limit heavier vehicles from crossing. The structural adequacy and seismic rating are shown in ***Table K.4***.

Table K.4 Bridge Seismic Rating Summary

NO.	BRIDGE NAME	Design Load	Seismic Rating	Comments
CB02	Chilliwack Central Road over Banford Ditch	BCL-625	Good	no immediate concerns noted
CB06	Chapman Road over Hope River	BCL-625	Good	Flow through abutments could compromise embankments
CB07	Yale Road East over Dunville Creek	BCL-625	Good	no immediate concerns noted
CB08	Yale Road East over Big Ditch	Triple Load posted at 42/30/16 tonnes	Good	no immediate concerns noted
CB09	Chartwell Drive over Hope Slough	BCL-625	Good	Designed to S6-88
CB10	Footbridge over Hope Slough	pedestrian	Good	no immediate concerns noted
CB11	Luckakuck Way over Atchelitz Creek	delaminations of girders may reduce capacity	Good	no immediate concerns noted
CB12	Yale Road West over Chilliwack Creek	BCL-625	Good	no immediate concerns noted
CB13	Haig Drive over Luckakuck Creek	5.5 tones		
CB14	Boundary Road over Stewart Creek	BCL-625	Good	no immediate concerns noted
CB15	Vedder Bridge over Chilliwack River	BCL-625	Good	no immediate concerns noted
CB16	Eckert Road over Stewart Creek	BCL-625	Fair	narrow bearing seat, may be lacking drift pins
CB18	South Sumas Road over McGillivray Slough	BCL-625	Fair	short bearing seat, may be lacking drift pins
CB20	Keith Wilson Road over Vedder Canal	BCL-625	Good	Designed to S6-88
CB21	Young Road over Hope Slough	BCL-625	Good	no immediate concerns noted
CB22	Menzies Street over Hope Slough	BCL-625	Good	no immediate concerns noted
CB23	Banford Road over Semiault Creek	BCL-625	Good	no immediate concerns noted
CB24	Parker Road over Big Ditch	Triple Load posted at 17/12/6 tonnes	Good	no immediate concerns noted
CB25	Pelly Road over Hope River	BCL-625	Good	no immediate concerns noted
CB27	Prest Road over Semiault Creek	BCL-625	Fair	short bearing seat, may be lacking drift pins
CB30	Yale Road Overpass over CN Rail	BCL-625	Good	Designed to S6-88
CB31	Eagle Landing Parkway over Chilliwack Creek	BCL-625	Good	no immediate concerns noted
CB32	Eagle Landing Parkway over Chilliwack Creek Culvert	BCL-625	Good	no immediate concerns noted

Priority Bridges

Generally, bridges with higher traffic volumes have a more critical role in the transportation network. Bridges along Vedder Road, Yale Road, Young Road and Luckakuck Way are critical to the adequate functioning of the road network in the event that the City is subjected to a significant seismic event. From a network functionality perspective, the following four bridges are considered the most important:

- Yale Road Overpass over CN Rail (CB30);
- Yale Road West over Chilliwack Creek (CB12);
- Young Road over Hope Slough (CB21); and,
- Prest Road over Semiault Creek (CB27).

In addition, Eagle Landing Parkway at Chilliwack River (CB31) and Eagle Landing Parkway at Chilliwack River Culvert (CB32) are important due to high traffic volumes.

Vedder Road Bridge over Chilliwack River was on the list but since removed due to its design build replacement program currently underway.

Recommendations

The *2016 Bridge Inspection Report* indicated that the majority of the bridges were in fair to good condition. As per ***Table K.2***, the report noted several bridges with maintenance recommendations that were urgent. They are listed below.

1. CB11 Luckakuck Way over Atchelitz Creek – Conduct in-depth assessment of concrete box girder deterioration

2. CB12 Yale Road West over Chilliwack Creek – Close lane and repair erosion issues at south abutment
3. CB21 Young Road over Hope Slough – Construct a proper support for SW concrete approach barrier
4. CB23 Banford over Semiault Creek – Repair failing NE wing wall (consider replacement)
5. CB24 Parker Road over Big Ditch – Repair SE wing wall

Maintenance recommendations that were to be completed within 1 year are listed below.

1. CB02 Chilliwack Central over Banford Ditch – Increase barrier lengths
2. CB12 Yale Road West over Chilliwack Creek – Address pile corrosion
3. CB20 Keith Wilson over Vedder Canal – Seal transverse cracks
4. CB23 Banford over Semiault Creek – Repair beams
5. CB24 Parker Road over Big Ditch – Repair strut

K.2 Recommendations

Based on the *2016 Bridge Inspection Report* and the updated transportation plan, the following lists the structures and recommended maintenance conditions:

- Repair bridges recommended in Section K.1. While there are two structures with low traffic levels, Bridge CB23, Banford Road (< 1,000 ADT) and CB24, Parker Road (< 100 ADT), their deficiencies are significant and their priority is high. Bridge CB23 is recommended for replacement.
- Complete medium and low priority items at bridges requiring high priority upgrades at the same time as this will increase cost-effectiveness and reduce traffic disruption. Other medium and low improvements should be planned and budgeted as necessary.
- Consider the network functionality perspectives outlined above when conducting this work.
- Prepare effective traffic management plans when doing any bridge works, especially along high volume roads, to minimize delays and ensure safety for the bridge users and the workers.
- Upgrade or replace the bridges located along high traffic routes or bicycle routes as the bridge inventory of numerous bridges found that becoming functionally obsolete and the decks are generally narrower than current standards, lack proper transition barriers and have railing systems that do not meet current standards.
- Continue the practice of conducting Inspection Reports at regular intervals, and of acting on the recommendations of these reports to ensure that these critical network links remain functional and safe.

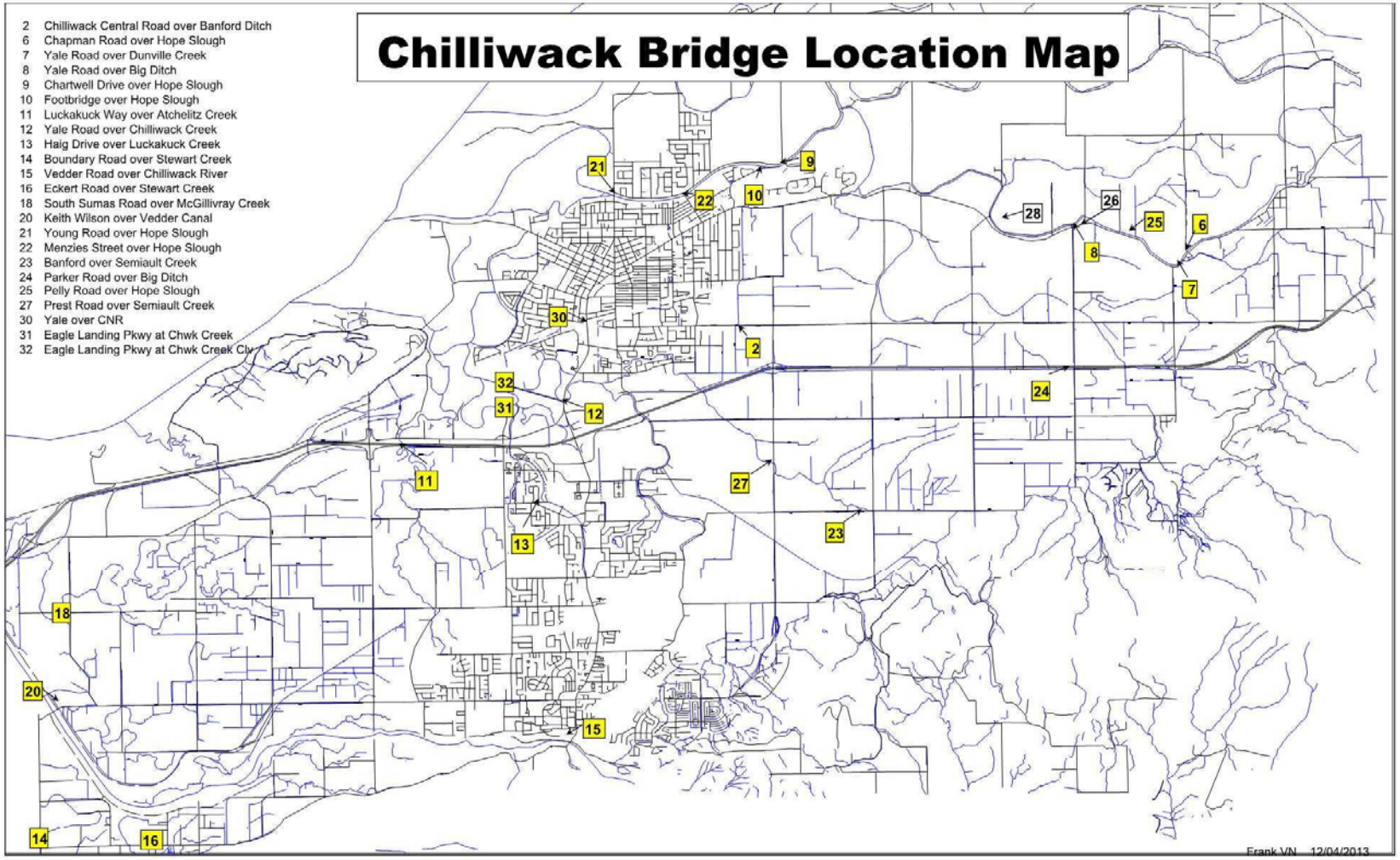


Figure K.1: Existing Chilliwack Bridge Location Map (From 2014 Bridge Inspection Report)

L
Traffic Volumes

Traffic counts are conducted regularly for the City of Chilliwack by TransTech Data Services Ltd. under the *City of Chilliwack Traffic Count Program*. In 2016, automatic two-way 24-hour counts were conducted at 86 stations, and manual turning movements were conducted at 78 stations, during the months of April and May. In 2014, 24-hour counts were conducted at 87 stations and manual counts at 77 intersections, during the months of September and October. No traffic counts were conducted in 2015.

L.1 24 Hour Counts

A summary of the two-way 24-hour counts, taken from the City of Chilliwack *2016 Traffic Count Program* report, is provided in ***Figure L.1***. The highest 24-hour volumes are found on the main north-south corridors of Yale Road, Vedder Road, Evans Road, and Young Road. Luckakuck Way and Promontory Road have the highest east-west volumes. See *Section G Road Network* for an in-depth analysis of the 24-hour counts.

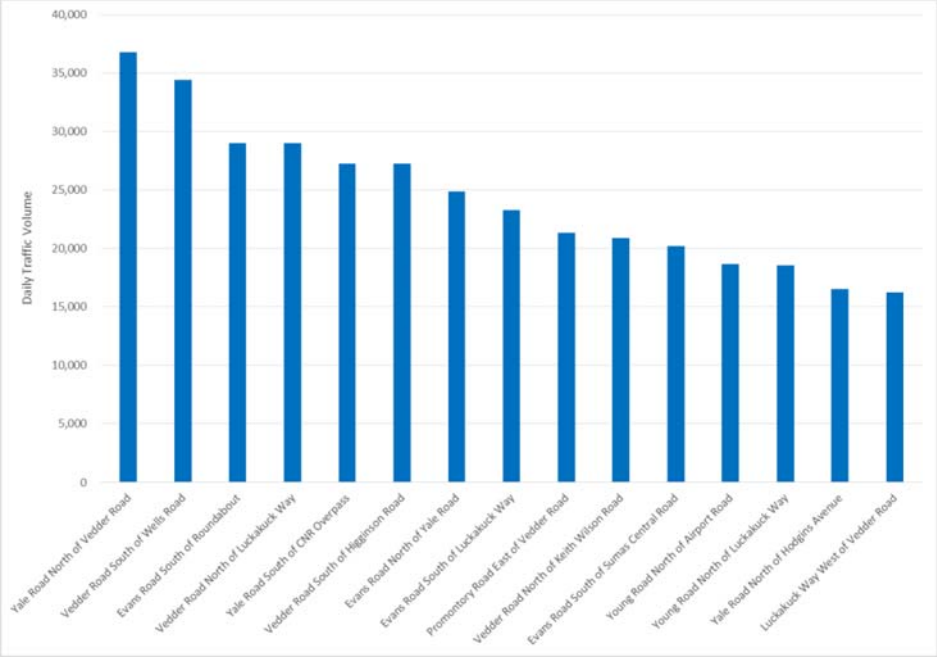


Figure L.1 Roadway Segments with Highest 24-Hour Traffic Counts

The available 24-hour traffic counts in the years of 2014 and 2016 were also compared. It was found that the majority road segments (88.6%) experienced traffic growth with the highest growth occurring on Vedder Mountain Road West of BC Hydro Rail. The growth observed at Gibson Road South of Chilliwack Central Road was noted to be a result of Prest Road construction. Garrison Boulevard South of Tamihi Way experienced 24.5% traffic decline in comparison to 2014 traffic volume data. However, it is noted that 2014 traffic volume has an unusual traffic volume peak and 2016 traffic volume is comparable to traffic volumes of previous years, such as 2013. The 2014 traffic volume peak might be due to construction activities along parallel major routes. Traffic growth distribution for all count stations from 2014 to 2016 is shown in ***Figure L.2***.

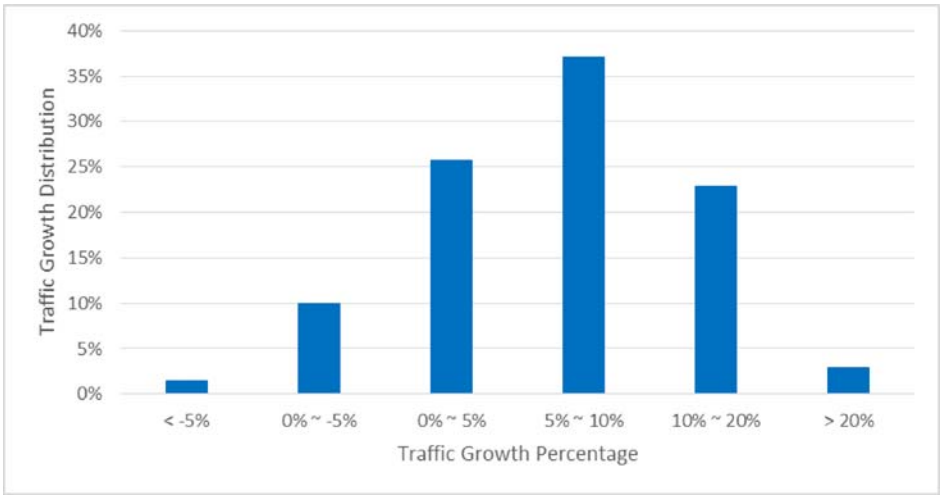


Figure L.2 Traffic Growth Comparison between 2014 and 2016

L.2 Intersection Counts

As part of the annual traffic count program, intersection counts were conducted by TransTech from 0700 to 0900 hours, and from 1600 and 1800 hours. Sample hourly traffic distributions on Chilliwack arterial roads, shown in *Section G*, indicated that the morning and afternoon peak hours are likely to be captured within these survey periods.

Top 15 intersections with the highest recorded morning or afternoon peak hour volumes are summarized in ***Figure L.3*** and ***Figure L.4***. These intersections are all located in the same north-south corridors with the highest 24-hour count, namely the Yale Road, Vedder Road, Evans Road, and Young Road corridors. These four corridors connect Chilliwack Proper neighbourhood to Sardis and Vedder neighbourhoods, and provide regional connection to Highway 1.

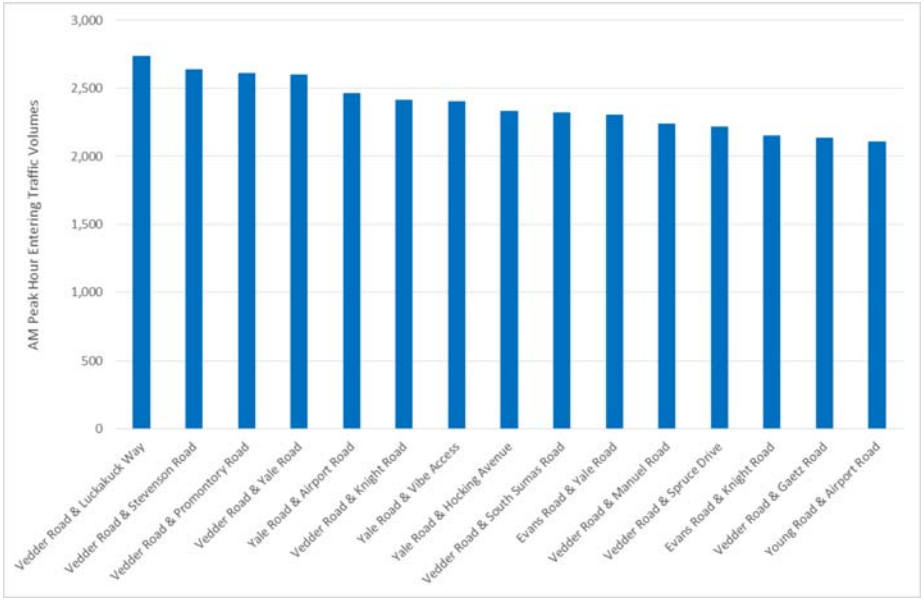


Figure L.3 Intersections with Highest AM Traffic Counts

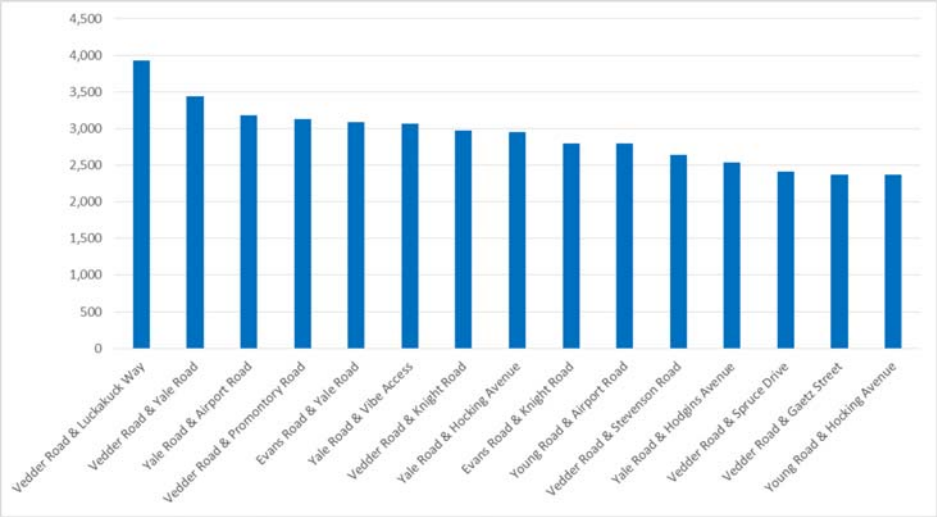


Figure L.4 Intersections with Highest PM Traffic Counts

L.3 Review of Annual Traffic Count Program

The City's annual traffic count program provides the traffic volume data that is necessary for transportation planning throughout the City of Chilliwack. The count program should be continued to maintain an up-to-date source of detailed traffic information at intersections and along chosen corridors. Since 2007 Transportation Plan, more unsignalized intersections and roundabouts were surveyed.

Based on information provided by the City, there are total 69 signalized intersections, 62 of which are managed by the City and the rest are managed by MoTI. Ideally, traffic counts at all signalized and selected unsignalized intersections should be conducted every 1 to 2 years. However, with expected budget constraints, rotation of traffic count collection for all identified intersection could be considered.

It is recommended that, traffic counts at all signalized intersections be conducted at least every 2 years and traffic counts at selected high traffic volume unsignalized intersections be conducted at least every 3 years. It is critical to include all newly installed signalized intersections as part of the data count program and selected unsignalized intersections that the City intends to conduct intersection upgrade in the short-term time period.

Due to unavailability of continuous count data for a complete year within the City, daily and monthly traffic variation patterns are not reviewed. However, it is important to understand traffic variation, and thus continuous traffic count data collection at a permanent count station for a complete year is recommended at key corridors, such as Vedder Road, Evans Road, and Yale Road.

In addition to the provision of rotation of traffic count program, the following are also recommended:

- Review development-related applications and collect traffic count data from any traffic impact assessment study conducted and add into traffic data count inventory;
- Review and conduct traffic data collection for locations with unusual traffic peak patterns, such as a nearby school, sports field or provincial park since these areas are more likely to have brief predictable peaks in vehicle traffic volumes and higher volumes of vulnerable road users such as pedestrians and cyclists (including children);

- Identify areas with high development activities and select key intersections and corridors for future data collection;
- Consult and collaborate with MoTI for data collections at highway intersections.

L.4 2017 Traffic Count Program

More specific to the 2017 traffic count program, traffic data collections at the following additional locations are also recommended:

- For railway at-grade crossings:
  - Industrial Way (Mile 77.26);
  - Prest Road (Mile 70.33);
  - Banford Road (Mile 69.27);
  - Gibson Road (Mile 68.35);
  - Upper Prairie Road (Mile 67.35);
  - Nevin Road (Mile 65.28);
  - Ford Road (Mile 65.10); and
  - McGrath Road (Mile 64.95).

- For new traffic signals:
  - Luckakuck Way and Evans Road;
  - Ashwell Road and Deans Avenue;
  - Eagle Landing and Walmart Access North;
  - Eagle Landing and Walmart Access South;
  - Eagle Landing and Home Depot Access;
  - Yale Road and Charles Street;
  - Keith Wilson Road and Peach Road / Canterbury Drive;
  - Lickman Road Ramp North (MoTI);
  - Lickman Road Ramp South (MoTI);
  - Evans Road Off-ramp (MoTI);
  - Vedder Road Ramp North (MoTI);
  - Vedder Road Ramp South (MoTI);
  - Prest Road Ramp North (MoTI); and
  - Prest Road Ramp South (MoTI).

L.5 Recommendations

- Alternate traffic counts at all signalized intersections at least every 2 years and traffic counts at selected unsignalized intersections at least every 3 years.
- Continue to include newly installed signalized intersections and selected unsignalized intersections that the City intends to conduct intersection upgrade in the near future.
- Continue to conduct continuous traffic count data collection at permanent count stations along major transportation corridors (Vedder Road, Evans Road, Promontory Road, Vedder Mountain Road, and Yarrow Central Road) for a complete year.
- Consider add the permanent count stations at Yale Road, Eagle Landing Parkway, Young Road,
- Review development-related applications and automate collection of traffic count data from any traffic impact assessment study conducted and add into traffic data count inventory.
- Review and conduct traffic data collection for locations with unusual traffic peak patterns, such as a nearby school, sports field or provincial park.
- Identify areas with high development activities and select key intersections and corridors for future data collection, similar to those listed in **Section L.4**.
- Consult and collaborate with MoTI for data collections at highway intersections.

This Page is Intentionally Left Blank

M
Pedestrian Plan

M.1 Introductions

As in most communities, new sidewalks in Chilliwack are constructed where possible as part of the development of adjacent lands. The City also constructs sections of sidewalk itself as needed to fill in gaps in the pedestrian network and create continuous routes to key destinations such as schools and community facilities. The City determines priorities for sidewalk construction annually, considering pedestrian demand, traffic volumes, existing and nearby pedestrian facilities, and proximity to schools.

The *Transportation Plan Update* provides the opportunity to review the City's process for prioritizing requests for new sidewalk installations and identify ways in which the process could be improved. It also provides the opportunity to identify additional types of pedestrian facilities to improve pedestrian safety and encourage walking, particularly pedestrian crossing treatments.

The Pedestrian Plan contains the following key components:

- **Roads.** The Pedestrian Plan identifies improvements to the City's standard drawings for roads and other plans that illustrate road cross-sections, to more safely accommodate pedestrians.
- **Crossings.** The Pedestrian Plan identifies crossing treatments that can be used to enhance road crossings and improve pedestrian safety, and the conditions in which these are applicable. (The absence of a safe road crossing is a barrier to walking)
- **Priorities.** The Pedestrian Plan presents an enhanced methodology to prioritize requests for sidewalks, crossings and other pedestrian facilities, incorporating changes to improve safety and connectivity for pedestrians and maximize the City's return on investment.
- **Projects.** Sidewalk and crossing projects previously identified by the City as well as new crossing projects have been evaluated and ranked using the enhanced methodology to identify those projects that can be considered for implementation in the next 5 or more years.

Goals

The goals for the Pedestrian Plan are informed by other City plans:

- The City's *2040 Official Community Plan* (2015) establishes a goal to "build healthy attractive communities," and in support of this the OCP emphasizes "a multi-modal mobility system that gives due priority to active transportation (cycling and walking) to promote health." Of particular relevance to the Pedestrian Plan is the subsequent mobility policy to "expand the sidewalk and walkway systems and improve their standards, designs and connectivity."
- The *Downtown Land Use and Development Plan* (2009) establishes the following access and mobility objective: "Prioritize walking, cycling, and transit use within the downtown to provide safe, convenient, and pleasant access for people of all ages and abilities."

Based on the relevant goals from other plans, two primary goals guided development of the Pedestrian Plan:

- **Improve mobility** by walking and other active transportation modes, including for persons with disabilities. Improving existing facilities for pedestrians and developing new facilities will expand the pedestrian network, improve mobility and increase the number of trips by walking, as well as other modes such as cycling and transit.
- **Improve safety** for pedestrians and vulnerable road users. A significant deterrent to walking is "fear of traffic," particularly when crossing major roads. Improving safety with more sidewalks, better crossings and other facilities will not only help to minimize conflicts between pedestrians and other road users and reduce injuries, but will also reduce the fear of traffic and increase the number of walking trips.

M.2 Roads

This section identifies improvements to the City's standard drawings for roads and other plans that illustrate road cross-sections, to more safely accommodate pedestrians.

Urban Roads

An important factor in accommodating pedestrians and encouraging walking is the width of sidewalks and other pedestrian facilities. The 2007 *Transportation Plan* references the *Safer City Road Form* report (2005), which indicates that minimum sidewalk widths should be:

- 1.8 m in urban areas.
- 2.0 m when adjacent to curb.
- 2.4 m in commercial areas with high pedestrian volumes.
- 3.0 m at bus stops.
- 2.4 m to 3.0 m at schools, parks, hospitals and recreational facilities.

The City's *Standard Drawings* for urban roads illustrate cross-sections for roads of various pavement and right-of-way widths. On three urban road cross-sections, the widths identified for sidewalks are 1.5 m, which is less than the recommended widths above. Sidewalk widths should be increased to at least 1.8 m on the following standard drawings:

- Urban roads 13.5 m pavement width (drawing DR-9).
- Urban roads 19.5 m pavement width (drawing DR-10).
- Urban roads 21.0 m pavement width (drawing DR-11).

As noted in the 2007 *Transportation Plan,* where feasible planting strips or boulevards are recommended between the sidewalk and roadway to increase the safety and comfort of pedestrians.

The City might also wish to add drawings illustrating some urban road cross-sections with 2.4 m sidewalks appropriate for commercial areas and other locations with high pedestrian volumes.

The *Downtown Land Use and Development Plan* (2009) similarly illustrates arterial, collector and greenway cross-sections with 1.5 m sidewalks (*Figures 3.4, 3.5, 3.6, 3.7* and *3.16*). The illustrated sidewalk widths in the Plan should be increased as follows:

- 1.8 m on streets in residential areas downtown.
- 2.4 m on commercial streets downtown, including greenways in commercial zones.
- 2.4 m to 3.0 m on downtown streets at locations with existing or anticipated high pedestrian volumes, including at bus stops.

Rural Roads

The City's *Standard Drawings* for rural roads identify two types of roads. Arterial/collector roads incorporate a 1.5 m asphalt walkway on one side, delineated with a solid painted white line (drawing DR-4). Local roads do not include any pedestrian facilities, only crushed aggregate shoulders of 1.0 m to 1.5 m width (drawing DR-3). To enhance pedestrian safety on rural roads, the following changes should be made to rural road standards:

- 1.5 m paved shoulders on both sides of rural arterial roads so as to safely accommodate pedestrians and cyclists, consistent with the minimum width of a bicycle lane on an urban road and with TAC and other guidelines. This dimension is also consistent with the City's *Land Development Bylaw No. 3055* (2014), which indicates that on rural roads bicycle lanes and/or paved sidewalks shall be provided on both sides of the road. As arterial roads are also bicycle routes (existing or planned), this change is consistent with the City's *Cycle Plan*.

- 1.5 m paved shoulder walkway on at least one side of rural collector roads, as in the current standard drawing.
- 1.0 m paved shoulder walkway on one side of local rural roads in residential areas. Two 3.5 m traffic lanes plus one 1.0 m walkway, a total pavement width of 8.0 m, which is consistent with the upper limit for pavement width of a local rural road as indicated on the standard drawing.
- As per standard design practices, the 1.0 m or 1.5 m dimension is measured from the centre of the white paint line separating the shoulder from the traffic lane (which is typically 100 mm wide) to the edge of the pavement.

A pedestrian version of the “Share the Road” sign can be used on rural roads to alert motorists to the potential presence of pedestrians on the shoulder, as illustrated in ***Figure M.1***. Share the Road signs can also incorporate a bicycle icon on designated bicycle routes.

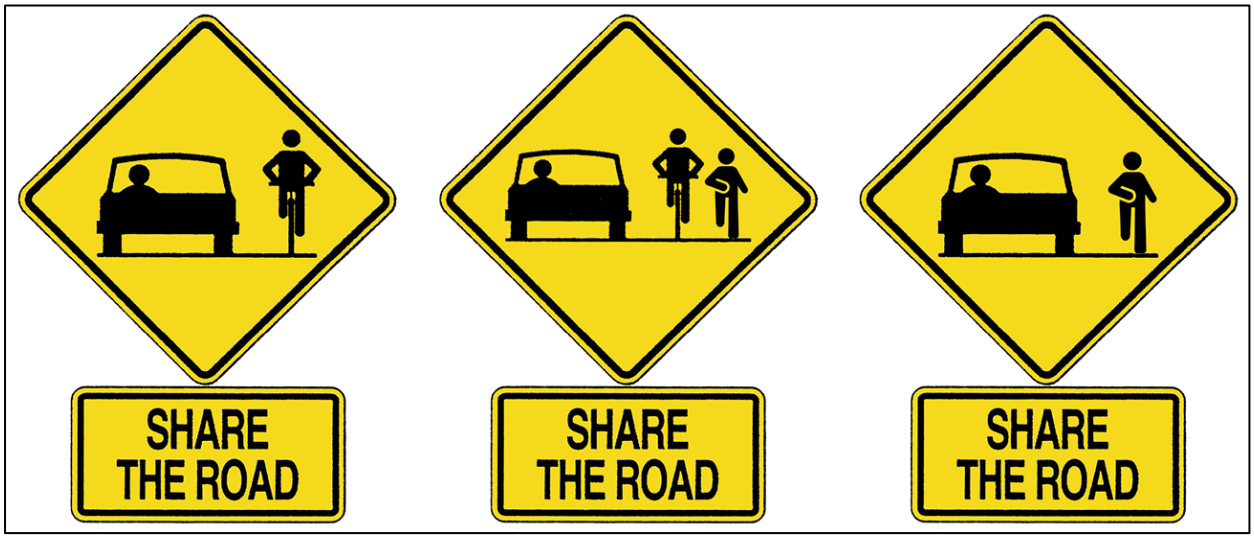


Figure M.1 – Share the Road signs for rural roads

M.3 Crossings

Pedestrian crossing treatments are an important part of the pedestrian network, as they improve safety for pedestrians at road crossings and prevent major roads from becoming obstacles that discourage people from walking. This section provides guidance regarding the following types of pedestrian crossing treatments, which include midblock crossings and multiuse crossings used by cyclists and other modes of active transportation:

- Marked crossings, optionally with enhancements such as curb extensions and median islands.
- Crossings with pedestrian-activated flashing lights.
- Signalized crossings, including pedestrian-activated signals and full traffic signals activated by motor vehicles as well.
- Grade-separated crossings, including underpasses and overpasses.

Types of Crossings

Four general types of pedestrian crossings are described below, plus optional features that can be used to enhance safety at crossings. The applicability of each type of crossing to specific road conditions is described later in this section.

A. Marked Crossings
B. Flashing Light Crossing
C. Signals
D. Grade Separation

A. Marked Crossings

The most basic type of crossing treatment is a marked crossing, with pavement markings and signs. Reasons for marking a crossing include:

- Direct pedestrians to cross at locations where visibility, road width, illumination and other conditions create a higher level of safety.
- Indicate to motorists that pedestrians frequently cross at a particular location.
- Guide pedestrians though complex and confusing intersections.

It is important to mark crossings only where there is a clear need for markings and a resulting benefit. Otherwise, the City could quickly end up with an excess of marked crossings, which would reduce the effectiveness of crosswalk markings and signs where they are needed, as well as increase costs and create “visual pollution.”

Experience in communities across North America has shown that painting stripes on a road to designate a crosswalk does not necessarily improve pedestrian safety. In San Diego, for example, a study found that twice as many pedestrian-vehicle collisions occurred in marked crosswalks as in unmarked, unpainted crosswalks. The risk in painting crosswalk markings is that it can create a perception of safety and give pedestrians a false sense of security, without any real safety improvement. To improve safety, crosswalk markings and signs can be used conjunction with other treatments:

- **Illumination** of the crosswalk, as well as approaches to the crosswalk for approximately 10 m on either side of the crosswalk, to increase visibility of pedestrians at night.

- **Curb extensions** involve extending the curb on one or both sides of the roadway, narrowing the width of the road to as little as 6 m. A typical curb extension installation is illustrated in ***Figure M.2***. The primary benefit of curb extensions is improved pedestrian safety as a result of the reduced crossing distance, which reduces the amount of time pedestrians are exposed to traffic. Curb extensions also improve the visibility of pedestrians to motorists, and improve the visibility of on-coming traffic for pedestrians. In addition, curb extensions can reduce vehicle speeds, both for through vehicles and for turning vehicles, and prevent motorists from parking close to an intersection or crosswalk.

Figure M.2 *Curb Extensions (Yarrow)*

Figure M.3 *Narrow Object Marker on Curb Extension (New Westminster)*

Curb extensions on arterial and collector roads should maintain a lane width of at least 4.0 m to accommodate cyclists, and should be identified with object markers to increase their visibility to motorists (object markers are optional on curb extensions on local streets). To avoid obstructing motorists' view of pedestrians at curb extensions, it is recommended that standard size object markers (300 mm x 900 mm) should be located as far forward (towards approaching traffic) as possible, so that as motorists approach the curb extension they are able to see around the object marker to see pedestrians. Alternatively, narrow object markers (approximately 100 mm x 2000 mm) can be used, as illustrated in ***Figure M.3***.

- **Median island.** When a median island is used in conjunction with a crosswalk as shown in ***Figure M.4***, pedestrian safety is improved, and the median island can act as a refuge for pedestrians. The island should be at least 1.2 m wide, and curb ramps or a cut through the island should be used where pedestrians cross the median to accommodate persons with physical disabilities, people with strollers, children on bicycles and others. The only significant downsides of median islands are that in some cases it is necessary to widen the road to accommodate the island, which incurs a capital cost, and in other cases median islands can reduce the availability of on-street parking.

Figure M.4 *Median Island at Crosswalk (North Vancouver)*

B. Flashing Light Crossings

This crossing treatment incorporates pedestrian-activated flashing lights mounted at the side of the road, plus on the median if there is one. In addition to the signs and pavement markings used at a marked crossing, a flashing light crossing includes lane change prohibitions on multiple lane approaches using solid white lines.

Unmarked crosswalks exist by default at every intersection, and motorists are required to yield to pedestrians crossing in an unmarked crosswalk. The purpose in adding signs and pavement markings at a crosswalk is to increase the visibility of the crossing to approaching motorists, and to encourage pedestrians to cross a road at a specific location. Flashing lights further increase the visibility of a crossing, particularly at night, and also provide the additional benefit of clearly indicating to motorists that a pedestrian is present. Flashing lights offer significant safety benefits compared with marked crossings that incorporate only signs and pavement markings.

Figure M.5 *Conventional Flashing Light Crossing (Nanaimo)*

The conventional flashing light crossing incorporates round amber beacons mounted at the sides of the crossing, flashing in an alternating pattern. A conventional flashing light crossing is illustrated in ***Figure M.5***.

Flashing light crossings are currently not used in Chilliwack because of a concern that they do not force motorists to stop to the extent that a pedestrian signal does. Although a pedestrian signal imposes an additional requirement on motorists by requiring them to stop regardless of whether or not there is a pedestrian present, because of this and because of their cost, pedestrian signals would be an excessive measure in many cases.

Rapid rectangular flashing beacons (RRFBs) are an alternative to conventional circular flashing beacons. A pair of RRFBs on each side of the crossing displays an asymmetric wig-wag flash pattern of 70 to 80 flash cycles per minute, similar to that used on emergency vehicles. A RRFB crossing in a school zone is shown in ***Figure M.6***.

Figure M.6 *Rapid Rectangular Flashing Beacons (Abbottsford)*

The primary benefit of RRFBs is that they significantly increase the rate at which motorists yield to pedestrians compared with marked crosswalks with or without conventional amber flashing lights. Tests of RRFBs in Calgary found yielding rates as high as 95%, much higher than before the RRFBs were installed.

RRFBs are in use in Abbotsford, Surrey, New Westminster and a number of communities across Canada. RRFBs have been approved as a traffic control device by the Transportation Association of Canada, which is currently developing guidelines for their installation, and RRFBs will be included in the next revision of the *Manual of Uniform Traffic Control Devices for Canada*, currently anticipated to be published in 2020.

Optional treatments that may be added to a RRFB or conventional flashing light crossing include:

- Overhead signs and flashing lights to supplement side-mounted signs, in locations where the visibility of side-mounted signs and lights may be affected, or where there is a need for additional visibility and advance warning of the crossing.
- An advance stop line and accompanying “Stop Line” signs on multiple lane approaches to pedestrian crossings, particularly at midblock crossings as illustrated in ***Figure M.7***. Moving the stop line further from the crossing minimizes the potential “multiple lane threat,” in which a vehicle stops in one lane, a pedestrian begins crossing and is struck by a vehicle in the second lane that did not stop.

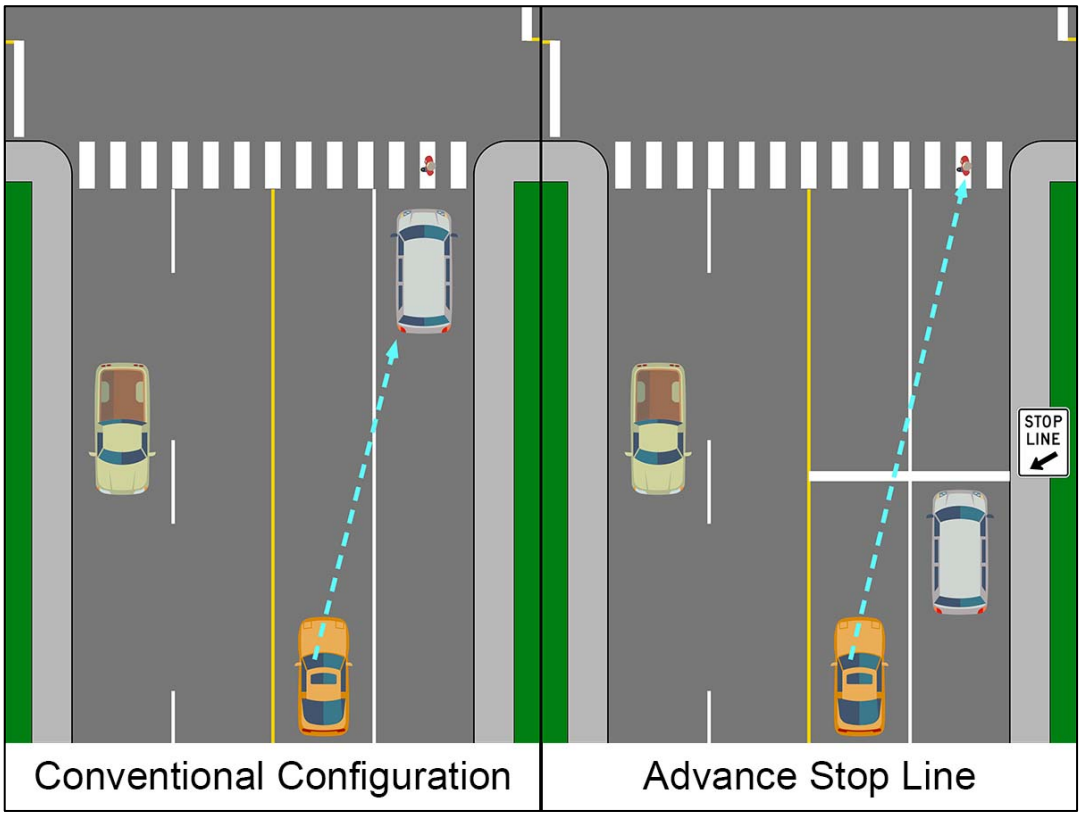


Figure M.7 *Advance Stop Line on Multiple Lane Approach*

- Curb extensions and/or a raised median, as described before.
- A pedestrian fence (on the median or at roadside) as a means of directing pedestrians to the crossing.
- Elephants’ feet markings at multiuse pathway crossings.

C. Signals

The two types of signalized crossings used in B.C. are pedestrian-activated signals and full traffic signals that are activated by motor vehicles as well as pedestrians. Optional components that may be added to a signal include:

- Pedestrian countdown signals, which incorporate a numeric countdown display of the remaining crossing time. While the meaning of the flashing orange hand in a conventional pedestrian signal may not be clear to many people, the meaning of the countdown display is immediately clear. Pedestrians can use the display to gauge whether sufficient time remains for them to cross the intersection, based on their ability to walk or even run. Pedestrian countdown signals are standard at all new traffic signal installations in Chilliwack, and have been retrofitted at some locations with high pedestrian volumes.

- Audible pedestrian signals, which broadcast “cuckoo” and “chirp” sounds for north-south and east-west crossings, respectively, so that pedestrians with visual impairments know when the walk signal is displayed and can orient themselves correctly. The City currently allocates sufficient funding to install audible traffic signals at one or two intersections identified with the input of advocacy groups like the White Cane Club and the CNIB.
- Curb extensions and/or a raised median, as described before.
- Reduced corner radii and right turn on red prohibitions to reduce the potential for conflicts between pedestrians and turning vehicles.
- A pedestrian fence (on the median or at roadside) to direct pedestrians to the crossing.

D. Grade Separations

Grade separations include underpasses and overpasses. In general, overpasses are preferred as they avoid personal security issues often associated with underpasses. In both cases, the key considerations are the change in elevation and travel distance involved in using the overpass or underpass. Generally, pedestrians and cyclists wish to travel directly across a road, and the more that a crossing requires that they travel up or down and divert or “double back,” the less likely they are to use it. To this end, a pedestrian fence (on the median or at roadside) is an optional treatment that can be used at a grade-separated crossing as a means of encouraging pedestrians to use the overpass or underpass. The width of the facility is also an important consideration, and a width of at least 4.0 m is the desirable minimum for a multiuse grade-separated crossing.

Applicability of Crossing Treatments

The 2007 *Transportation Plan* indicates that the need for pedestrian crossings should be assessed based on the warrant methodology in the *Pedestrian Crossing Control Guide Second Edition (2012),* published by the Transportation Association of Canada (TAC). A similar warrant methodology is used in the *Pedestrian Crossing Control Manual for British Columbia* published by the Ministry of Transportation and Infrastructure. In the warrant methodology, the number of pedestrians per hour (in equivalent adult units) is calculated, as well as the number of crossing opportunities per hour, and from these two figures an appropriate crossing treatment is identified.

There are several problems with using warrants to assess the need for pedestrian crossings:

- Warrants based on existing pedestrian volumes under-represent the need for crossing improvements, as existing pedestrian volumes are typically low where crossings are unimproved. Attempting to estimate future pedestrian volumes is difficult and there are no reliable methods for doing so, which means that warrants based on future pedestrian volumes are also an unreliable measure of the need for crossing improvements.
- Warrants require a certain minimum number of pedestrians per hour and maximum number of crossing opportunities in order for a location to qualify for particular crossing treatments. These are arbitrary thresholds that are intended more to preserve traffic flow rather than to accommodate pedestrian movement.
- Warrants identify pedestrian crossing improvements based on the premise that more pedestrians justifies more crosswalk enhancements. This means that at locations with few pedestrians, warrants will often indicate that no crossing treatments or improvements are necessary. Low levels of use should not preclude crossing improvements, but can be considered in prioritizing improvements as discussed in ***Section M.4***.

The *Pedestrian Crossing Control Guide (2012)* replaces the *Pedestrian Crossing Control Manual (1998)* with a "Decision Support Tool" to determine whether or not a pedestrian crossing is appropriate in a particular location. Overall this a much better approach to identifying the need for and appropriate types of pedestrian crossing treatments. For the purposes of the Pedestrian Plan, the extensive guidelines for selecting crossing treatments in the new Guide have been simplified as shown in Table M.1, which indicates the road conditions for which each of the four crossing treatments are appropriate. Table M.1 is based on the Decision Support Tool Treatment Selection Matrix in the new *Pedestrian Crossing Control Guide.*

Table M.1 Crossing Treatment Selection Matrix

Average Daily Traffic (vpd)	Posted Speed Limit (km/hr)	Number of Lanes (see note)	Crossing Treatment			
			Marked	Flashing	Signals	Grade Separated
< 5,000	≤ 50	2 or 3	✓	✓		
		4+			✓	
	60+	2 or 3	✓	✓	✓	
		4+			✓	
5,000–10,000	≤ 50	2 or 3	✓	✓	✓	
		4+			✓	
	60+	2 or 3		✓	✓	
		4+ w/ median			✓	
		4+ no median			✓	✓
10,000+	≤ 50	2 or 3		✓	✓	
		4+ w/ median		✓	✓	✓
		4+ no median			✓	✓
	60+	2 or 3		✓	✓	✓
		4+			✓	✓

Notes regarding the selection of crossing treatments indicated in ***Table M.1*** include:

- The number of traffic lanes includes left turn and right turn lanes, plus an equivalent of one traffic lane to account for bicycle lanes and/or parking lanes. Other unused road space (such as on a road constructed to a four-lane width but only marked with two traffic lanes) is not included.
- On roads with four or more traffic lanes, raised medians should only be accounted for if they are 1.2 m or more in width. Roads with narrower medians or painted medians should be considered to have no median for the purposes of selecting a crossing treatment.
- Marked crossings and flashing amber crossings should not be used on multilane roads with two or more traffic lanes in one direction due to a "multiple lane threat," in which a vehicle stops in one lane, a pedestrian begins crossing and is struck by a vehicle in the second lane that did not stop. Many jurisdictions no longer use marked crossings on multilane roads for this reason. Signals are indicated as the appropriate treatment instead.
- It is generally not desirable to use signals on roads with less than 5,000 vehicles per day and posted speed limits of 50 km/h or less, as there are usually frequent gaps in traffic that might encourage pedestrians to cross without waiting for the signal to change. Flashing light crossings are preferable to signals in these conditions as the lights begin flashing immediately.
- Signals should not be used at roundabouts to avoid significant traffic operations impacts.
- Stopping sight distance should always be checked as per the *Geometric Design Guide for Canadian Roads,* and if necessary (and possible) changes made to the roadway to create sufficient stopping sight distance.

M.4 Priorities

Due to the numbers of requests for new and upgraded crossings, there will likely be more crossings identified for implementation than can be funded in any one year from the City's available budget. As a result, staff require a means of prioritizing projects so as to implement those first that provide the greatest benefits and greatest return on investment.

This section describes how sidewalks, crossings and other pedestrian facilities can be prioritized for implementation. The purpose of the methodology documented in this section is to objectively determine the relative importance of various pedestrian projects, in terms of their contribution to the goals identified in ***Section M.1***. Priorities are determined based on a set of objective criteria. Each potential project is evaluated and a rating calculated from its cumulative score, with the highest ratings indicating the highest-priority project to be implemented first.

These priorities are intended to provide a basis for City staff, decision makers, stakeholders and others to plan, budget and implement pedestrian facilities. The priorities determined using the methodology described in this section are not intended to be "cast in stone." Rather, it is expected that the priorities will be reviewed and updated on a regular basis as some projects are completed and new locations are identified for improvements, and as conditions at other locations change. As well, it is expected that the methodology for determining priorities might be modified as needed to support the City's objectives.

Criteria

The City currently uses the following criteria to rank sidewalk projects (points for each criterion are summed to a total score):

- Road classification (arterial = 15 points, collector = 10 points, local = 5 points)
- Traffic volume (≥ 10,000 vpd = 15 points, < 10,000 vpd = 15 * [daily volume/10,000] points)
- Pedestrian volume (high = 15 points, moderate = 10 points, low = 5 points)
- Distance to school property (< 100 m = 15 points, 100 m to 1000 m = 10 points, > 1000 m = 5 points)
- Installation type (first side = 5 points, second side = 2 points)
- Links to other facilities (link to existing sidewalk at both ends = 15 points, at one end = 10 points, neither end but is a habitual travel path = 5 points)

There are several limitations to the existing criteria:

- They do not consider other types of priority destinations other than schools.
- They do not consider benefits to other users other than pedestrians, particularly cyclists who might use a crossing or multiuse path.
- They do not fully consider the contribution of a project within the overall pedestrian and transportation network.
- They do not directly account for the number of traffic lanes on a road, which is important for pedestrian crossings but also affects pedestrian comfort on sidewalks.
- They do not provide a means to account for other factors such as support the opportunity to advance the project by combining it with another road project, the cost and complexity of the project, dependency on redevelopment of adjacent properties, property acquisition requirements, regulatory or legislative obstacles, and community support or opposition.

To address these limitations, a new set of criteria was developed, as described below. These criteria incorporate all of the criteria in the previous ranking system, and expand the criteria to address the limitations identified above. Although intended to evaluate pedestrian projects, the criteria are sufficiently robust that they could be used to evaluate other active transportation projects, such as bicycle facilities, so that all projects can be collectively assessed and prioritized for budgeting purposes.

The criteria are applied to sidewalks and crossing treatments collectively rather than separately, even though at present they are funded separately. The reason for this is to ensure that funds allocated to pedestrian improvements yield the greatest return on investment, regardless of the type of improvement. With the inclusion of flashing lights as a crossing treatment, the City now has a lower-cost option to use to enhance pedestrian safety, which in some cases can offer a greater benefit-cost ratio than a sidewalk project. By applying the criteria collectively to sidewalks and crossing treatments the City can achieve the greatest benefits for pedestrians with available funding.

For each of the following criteria, any number of points can be assigned. The descriptions below simply provide guidance as to the appropriate numbers of points for certain conditions. For example, while there are five points levels described for the "network contribution" criterion (0, 5, 10, 15 and 20 points), it is possible to assign a project an intermediate number of points if appropriate, such as 8 points or 12 points.

- **Safety improvement** provides a measure of the relative improvement in safety associated with a project. It incorporates the previous "installation type" criterion, as the first sidewalk on a street would provide a greater improvement in safety as a second sidewalk installation on the other side of the street. Tables M.2 and M.3 indicate the points assigned for a range of safety improvements for crossings and sidewalks. Points can be assigned for other types of pedestrian projects up to 20 points as follows:
  - 20 points = significant safety benefits.
  - 10 points = moderate safety benefits.
  - 5 points = minor safety benefits.

Table M.2 Points for Crossing Safety Improvement

Existing Condition	Improved Condition			
	Marked Crossing	Flashing Light Crossing	Signal	Grade Separated
None	10	15	20	25
Marked crossing	0	10	15	20
Flashing light crossing	–	0	10	15
Signal	–	–	0	10
Grade separation	–	–	–	0

Table M.3 Points for Sidewalk Safety Improvement

Existing Condition	Improved Condition		
	Shoulder Walkway	Sidewalk One Side	Sidewalk Both Sides
None	10	20	25
Substandard shoulder or path	5	15	20
Shoulder walkway	–	10	15
Sidewalk one side	–	0	5
Sidewalk both sides	–	–	0

- **Use.** This criterion provides a measure of the current use and potential future use if a facility is implemented or improved. It incorporates the previous "pedestrian volume" criterion, but is not restricted to pedestrians – if cyclists and other road users would make use of the facility, they are also accounted for. This criterion is calculated as [existing use + 2 x future use], where:
  - 5 points = high use.
  - 3 points = moderate use.
  - 1 points = low use.

- **Priority destinations** include schools (elementary, middle and secondary schools), daycare centres, playgrounds, seniors homes and assisted living facilities, transit exchanges and high-use bus stops (which are typically equipped with bus shelters), and locations where there are two high-traffic pedestrian generators on opposite sides of the road, creating a strong pedestrian desire line across the road at that location. This criterion incorporates the previous "distance to school property" criterion, but considers other types of priority destinations as well. Points are assigned as follows:
  - 15 points = school within 100 m.
  - 10 points = school within 500 m.
  - 10 points = other priority destination(s) within 100 m.
  - 5 points = other priority destination(s) within 500 m.
  - 0 points = no school or other priority destination within 500 m.
- **Network contribution** provides a measure of the relative contribution of a pedestrian facility within the overall transportation network. It incorporates the previous "links to other facilities" criterion, but assesses the importance of the facility and any links within the context of the overall pedestrian network. The contribution of each facility is considered in terms of directness of access and proximity to alternative facilities. Ratings are assigned as follows:
  - 20 points = critical network link that completes a gap in the network between high-use attractions, with no alternatives within walking distance (approximately 250 m).
  - 15 points = moderately important link that completes a gap in the network with no alternatives nearby (within approximately 250 m).
  - 10 points = moderately important link that is also close to an alternative facility of use to some pedestrians.
  - 5 points = moderately important link with a network connection at only one end.
  - 0 points = unimportant link on periphery of network.
- **Road conditions.** This criterion combines the previous "road classification" and "traffic volume" criteria, and adds a criterion for number of traffic lanes. It provides a measure of the road conditions affecting pedestrian safety and comfort, and for road crossings a measure of the obstacle to walking that a road presents. Points are assigned as indicated in ***Table M.4***.

Table M.4 Points for Road Conditions

Traffic Volume (AADT)	Road Classification				
	Local	Collector		Arterials	
		2 or 3 Lanes	4+ Lanes	2 or 3 Lanes	4+ Lanes
0–999	0 points	1 point	3 points	3 points	5 points
1,000–2,499	1	3	5	5	7
2,500–4,999	2	5	7	7	10
5,000–7,499	3	7	10	10	13
7,500–9,999	–	8	12	12	16
10,000–19,999	–	10	15	15	20
20,000+	–	15	20	20	25

- **Cost.** This criterion reflects the anticipated capital and operating costs associated with each action. The value of this criterion is that it can help to prioritize a number of small low-cost projects that cumulatively provide a greater return on investment than a single, costly project. Point scores are based on an estimate of order-of-magnitude costs, and include the potential for funding from other agencies to reduce the City's costs (for example, ICBC provides cost sharing funding for safety improvements that benefit vulnerable road users).

- 15 = lowest cost (less than $5,000)
- 10 = low cost ($5,000 to $25,000)
- 6 = moderate cost ($25,000 to $250,000)
- 3 = high cost ($250,000 to $1 million)
- 0 = highest cost (more than $1 million)

- **Other factors.** This criterion reflects other factors that could increase or decrease the priority of each action. These other factors might include, for example, the appeal of a facility to users, support for other City objectives, opportunity to advance the project (or defer it) by combining it with another road project, the complexity of the project, dependency on redevelopment of adjacent properties, property acquisition requirements, regulatory or legislative obstacles, and community support or opposition. A subjective rating reflects opportunities or obstacles to implementation, as summarized below:
  - 10 = significant opportunities to implement the project in the short term.
  - 0 = neutral, no significant opportunities or obstacles to implementation.
  - -10 = significant obstacles that prevent implementation in the short term.

Crash history is not included as a criterion. Pedestrian crashes are relatively infrequent events, and consequently the number of pedestrian crashes occurring at a particular location during the past five years does not correlate well with the overall safety risk. Instead, as discussed in ***Section M.1***, crash history is considered if a road safety assessment is subsequently undertaken for a high-priority crossing location.

Projects

Sidewalk and crossing projects previously documented by the City have been re-evaluated and ranked using the methodology in ***Section M.1***. Additional new projects have also been evaluated, focusing on improvements to existing marked crossings near schools, on higher-volume roads and on multilane roads. The evaluation of all projects is summarized in the "Pedestrian Plan Projects" spreadsheet. The 25 highest-ranked priority projects are listed in ***Table M.5***. Years in which projects have previously been identified for implementation are noted in the descriptions.

In addition to the projects previously documented, the City has also selected five specific crossing locations to be analyzed in a *Warrant Analysis Study* (July 2017), prepared by ISL, in order to determine the appropriate crossing treatment. The crossing locations in the *2017 study* included: Keith Wilson Road at Lindys Drive, Vedder Road at Lark Road, Knight Road between Diamond Crescent and Sapphire Drive, Wellington Avenue / Lower Landing Road at Fox Street / Ashwell Road, and Hodgins Avenue between Edwards Street and Mary Street. These locations could be considered high profile pedestrian crossing sites and have been selected based on recent public concerns and requests. One locations (Keith Wilson Road at Lindys Drive) was included in the ranked priority project and ranked 20th priority. Based on the study findings of the *2017 Warrant Analysis Study*, three locations were warranted to have a special crosswalk treatment with overhead flashers, one location with overhead mounted sign crosswalk with zebra-type pavement markings, and one location with four-way stop-control and marked crosswalk on all legs.

M.5 Recommendations

- Consider the 25 highest-ranking priority sidewalk and crossing projects (***Table M.5***) over the next 5 years or more, using the methodology discussed in the Transportation Plan Update.
- Consider warrant analysis studies for additional high profile pedestrian crossing locations as identified by the public and/or the City.

Table M.5 Priority Projects

Type	Road	Location	Description	Score
Crossing	Young Rd	At Chwk Ctr Elem.	Flashing light crossing	82
Crossing	Bernard Ave	Crescent Dr	Flashing light crossing	78
Crossing	Tyson Rd	Cumberland Ave	Flashing light crossing	77
Crossing	S Sumas Rd	Wiltshire St	Flashing lights, illumination	76
Crossing	Watson Rd	At Watson Elem.	Median island	75
Crossing	Knight Rd	Sardis Rail Trail	Multiuse crossing and signs	73
Sidewalk	Selkirk	Balmoral–school	Sidewalk 1 side (planned 2018)	72
Crossing	Wellington Ave	Hamilton St	Flashing light crossing	71
Crossing	Yale Rd	Banford St	Flashing lights, illumination	70
Crossing	S Sumas Rd	Dover St	Flashing lights, illumination	70
Crossing	Watson Rd	Garrison Blvd	Flashing light crossing	70
Crossing	Hamilton St	Reece Ave	Flashing light crossing	69
Crossing	Evans Rd	Commercial Ct	Signal (planned 2017)	67
Crossing	Stevenson Rd	Wiltshire St	Flashing light crossing	66
Crossing	Evans Rd	Wells Rd	Signal (planned 2017)	65
Crossing	Kent Rd	Strathcona Rd	Flashing light crossing	65
Crossing	First Ave	Charles St	Flashing light crossing	65
Sidewalk	Chwk Central Rd	Broadway–school	Sidewalk to Highroad Academy	63
Sidewalk	Tyson Rd	Twin rinks–Keith W	Sidewalk on 2nd side	63
Crossing	Keith Wilson Rd	Lindys Dr	Flashing light crossing	62
Sidewalk	Webster	5558–Keith Wilson	Sidewalk 1 side	61
Sidewalk	Strathcona Rd	Crystal–Oval	Sidewalk 1 side	61
Crossing	Young Rd	Reece Ave	Median island	61
Crossing	Yale Rd	At 45966	Illumination	61
Sidewalk	Sumas Prairie Rd	Downing–Jansen	Sidewalk 1 side	60

N
Regional Connections to Highway 1

Managed by the BC Ministry of Transportation and Infrastructure (MoTI), seven interchanges currently connect the following municipal roads to Highway 1 (Trans-Canada Highway) within the City of Chilliwack from west to east with interchange type and movements identified:

- Yale Road West (simple diamond, full movements);
- Lickman Road (simple diamond, full movements);
- Evans Road (half diamond, access to and from the west only);
- Vedder Road (half diamond and partial cloverleaf, full movements);
- Young Road (half diamond, access to and from the east only);
- Prest Road (simple diamond, full movements); and
- Annis Road (simple diamond, full movements).

Upgrades to two interchanges were made since 2007 Transportation Plan, including the Evans Road Interchange and the Lickman Road Interchange, which will be discussed in more details in the following sections.

N.1 Traffic Volumes along Highway 1

To compare traffic volumes along Highway 1, the daily traffic volumes at the count stations in Langley, Abbotsford, Chilliwack, and Hope were reviewed for both 2005 and 2014 data. The count station IDs are as follows:

- Langley (5.4 km east of 200 Street): P-16-7EW (61450P);
- Abbotsford (Just East of Bradner Road): P-17-4EW (61500P);
- Chilliwack (1.3 Km West of Vedder Road): P-17-9EW (63060P); and
- Hope (20.2 km East of Route 9): P-17-1EW (61470P).

Figure N.1 shows that the two-way traffic volumes along Highway 1 increased from 2005 to 2014 (with percentage in nine years) for all stations and generally decreased from west to east. The 2014 annual average daily traffic (AADT) volumes was estimated at 38,000 vehicles near the Vedder Road Interchange.

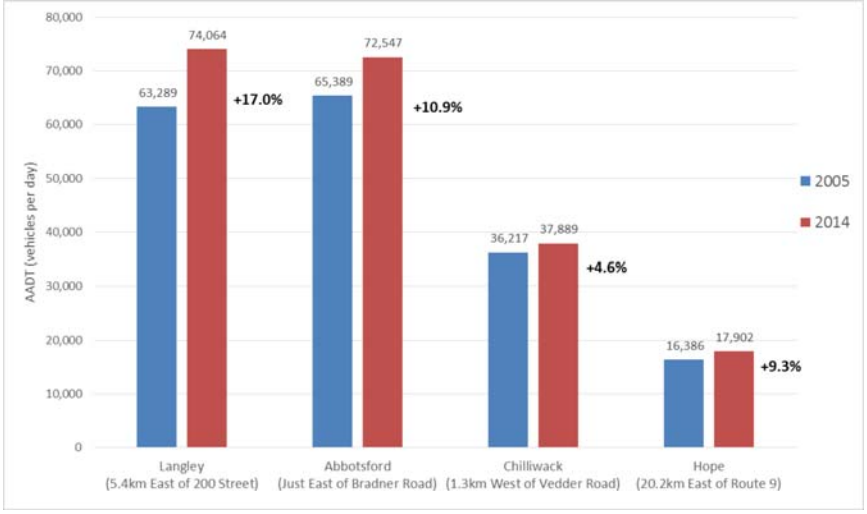


Figure N.1 2005 and 2014 AADT along Highway 1

N.2 Traffic Volumes at Interchange Locations

Available daily traffic volumes at various interchange locations on major municipal roads for 2014 and 2016 (with percentage change in two years) were also collected and summarized in ***Figure N.2***. Traffic volume data is not available at the Yale Road West interchange and therefore not included in the analysis.

All daily traffic volumes were extracted from 2014 and 2016 *Traffic Count Program*, except for daily traffic volumes on Lickman Road. Traffic volumes on Lickman Road were estimated by converting the PM peak hour traffic volume to daily traffic volume (multiplied by 10). It shows that Evans Road and Vedder Road experience the highest traffic volumes crossing Highway 1, followed by Young Road. Traffic volumes at all listed interchange locations continue to grow from 2014 to 2016.

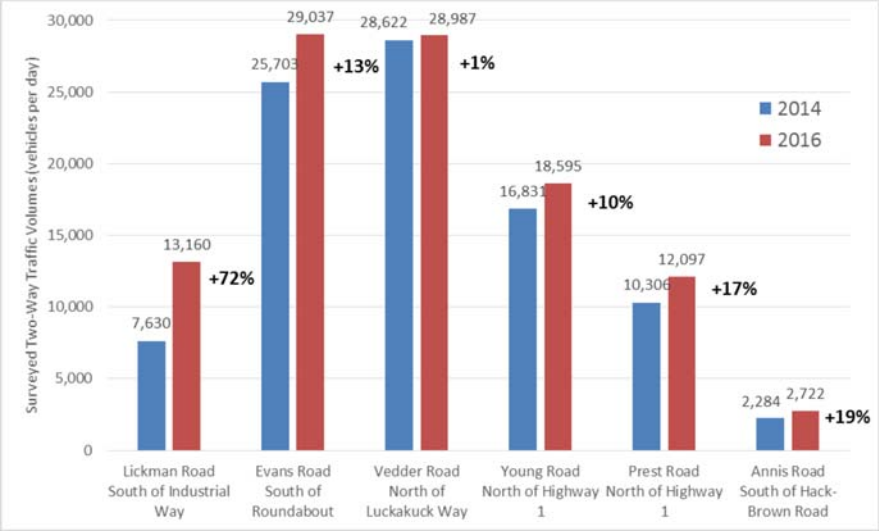


Figure N.2 2014 and 2016 Surveyed Two-Way Traffic Volumes at Interchanges

Output from the *2012 EMME Update* report indicate that the four major interchanges at Lickman Road, Evans Road, Vedder Road, and Young Road will experience capacity issues by 2021, and two interchanges at Prest Road and Yale Road West will experience capacity issues by 2051. Traffic count surveys also show that traffic volumes have continued to increase along major roadways crossing Highway 1, especially Lickman Road and Evans Road.

N.3 Evans Road Interchange

Since the *2007 Transportation Plan*, the Evans Road Interchange at Highway 1 was constructed and completed (***Figure N.3***). It was designed as a half diamond interchange with an on-ramp and off-ramp to the west. Eagle Landing Parkway (north of the Evans Road Interchange) was opened to traffic in November 2009 and the Evans Road interchange was completed and open to traffic in October 2010. The intersection of Evans Road and Yale Road is the first roundabout in the City of Chilliwack.

The Evan Road interchange and connector spans over Highway 1 for a distance of approximately 2.5 kilometres. It links to Evans Road and Knight Road to the south, and connects to Yale Road and Ashwell Road to the north, providing an alternate north-south corridor route for residents, businesses, and visitors between Chilliwack Proper and Sardis and Vedder neighborhoods. It has four-lane cross section (two-lane each direction) and on-street bike lanes on both sides with sidewalk located on the east side. In 2016, over 29,000 vehicles per day were recorded to use the Evans Road Connector.

Figure N.3 Highway 1 and Evans Road Interchange

Traffic volumes on Evans Road increased by 16% in 2 years, while traffic volumes on Vedder Road only increased by 1% over the same. ***Figure N.4*** shows the daily traffic volumes along Vedder Road (North of Luckakuck Way) and Evans Road (South of Evans Road Roundabout) since 2007. It shows that traffic volume on Evans Road continues to increase since 2011 and Vedder Road traffic volume experiences a decline since 2007 and remain relatively consistent after 2012. The decline of traffic since 2007 could be due to increased level of congestions on Vedder Road (Vedder Road Interchange was last upgraded in 2004), which diverted traffic to other alternate routes, such as Young Road / Chilliwack River Road. The opening of the Evans Road interchange provided another alternate route of crossing Highway 1 and in 2016 similar traffic volumes along two major arterials were found.

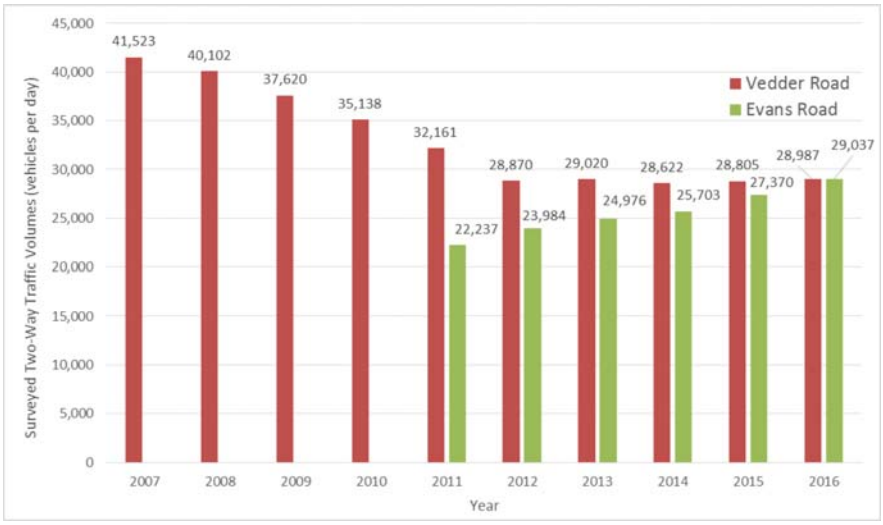


Figure N.4 Daily Traffic Volumes along Vedder Road and Evans Road

N.4 Lickman Road Interchange

The Lickman Road Interchange is a simple diamond with full movements. Based on information provided by the City, there is no change for the on-ramp and off-ramp at the south end, and the on-ramp and off-ramp at the north end was upgraded to a signalized intersection to improve traffic operation and safety.

A preliminary design for the Lickman Road Interchange was completed in 2015, as shown in ***Figure N.5***, to improve the level of service (LOS) and accommodate potential future growth. The City received Provincial Grant Funding in late 2016 and will be advancing to construction in 2017-2018.

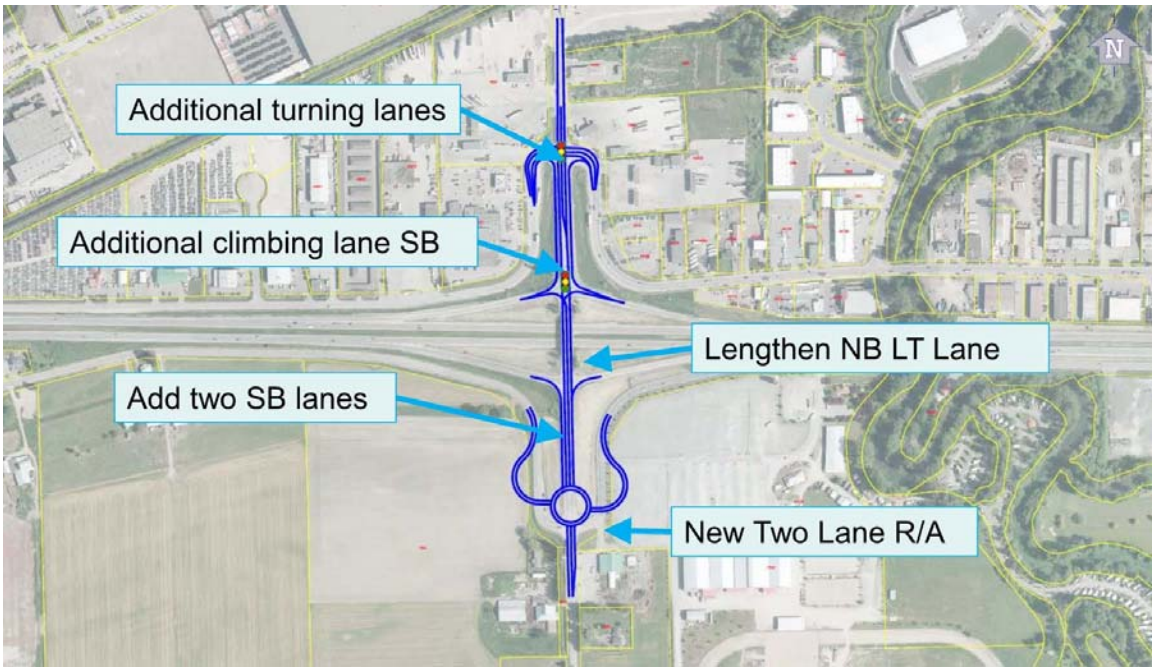


Figure N.5 Preliminary Design for the Highway 1 and Lickman Road Interchange (as provided by the City)

N.5 Other Interchange improvements

The City should discuss with MoTI in order to determine additional Highway 1 accesses and potential interchange improvements. Interchanges to consider for future improvements could include the upgrade of the Prest Road interchange and the modification of the Young Road interchange.

N.6 Parallel Routes

The parallel routes of Highway 1 were also reviewed and any potential issues and improvements were identified. The major parallel routes were listed below.

North of Highway 1:

- Industrial Way between Yale Road West and Lickman Road; and
- Yale Road between Lickman Road and Vedder Road.

South of Highway 1:

- Yale Road between Highway 1 Interchange and Lickman Road; and
- Luckakuck Way between Lickman Road and Young Road.

Based on the modelling outputs from the *2012 EMME Update* report, capacity issues (v/c ratio > 1.0) were identified on some road segments in the next 35 years and summarized in ***Table N.1***.

Table N.1 Capacity Issues for Parallel Routes of Highway 1

Roadway	Segments	v/c Ratio		
		2021	2031	2051
Yale Road	Highway 1 Interchange – Sumas Prairie Road	<0.6	<0.6	**>1.0**
	Sumas Prairie Road – Lickman Road	<0.6	<0.6	<0.85
	Lickman Road – East of Atchelitz Road	<0.6	<0.6	**>1.0**
	East of Atchelitz Road – Evans Road	<0.85	**>1.0**	**>1.0**
	Evans Road – Vedder Road	<0.6	<0.85	**>1.0**
Luckakuck Way	Lickman Road – Evans Road	<0.85	<0.85	<1.0
	Evans Road – Vedder Road	**>1.0**	**>1.0**	**>1.0**
	Railway Overpass – Young Road	<1.0	**>1.0**	**>1.0**

N.7 Recommendations

After reviewing the traffic volumes and capacity issues for all Highway 1 interchanges, the City of Chilliwack may consider the following recommendations:

- Continue to conduct traffic counts at the major interchange locations between Lickman Road and Prest Road to monitor the change in traffic patterns;
- Consider capacity improvements to the Lickman Road (preliminary design completed in 2015), Prest Road and Young Road corridors (to be designed) at the highway interchanges;
- Review construction schedule and budget for any improvements to the interchanges with the scheduled capitol projects in the latest *Comprehensive Municipal Plan*

This Page is Intentionally Left Blank

O Railway Plan

O.1 Existing Rail Services

Canadian National (CN) and Southern Railway of British Columbia Limited (SRY) are the two railway companies that have tracks situated in Chilliwack. Chilliwack is a major interchange point between CN Rail and SRY. It is noted that this Railway Plan focuses on CN railway in Chilliwack while SRY railway (12 crossings) is not discussed as part of this Plan due to the low train speeds and volumes. The alignments and crossings of existing CN and SRY railway tracks in the City are shown in ***Figure O.1***.

The CN railway system in Chilliwack is made up of the following components:

- Mainline railway with tracks crossing the City from west to east, totalling approximately 22 kilometres; and,
- Interchange with SRY system in Chilliwack Proper, supported by sidings and a ramp track serving industries adjoining them.

Based on information provided by CN Rail, average annual daily railway traffic through Chilliwack is 26 train movements per day operating at a maximum speed of 70 miles per hour (about 110 kilometres per hour) with 50 miles per hour (about 80 kilometres per hour) at several locations.

O.2 Crossing Facilities

Except for a vehicular overpass provided at Yale Road West near Railway Avenue, all other CN rail crossings are at-grade. There are 15 CN at-grade crossings in total in Chilliwack. The CN Rail track intersects with several arterial roads in the City from west to east, which are Industrial Way, Lickman Road, Evans Road, Young Road, Broadway, Prest Road, Annis Road, and Yale Road. Based on information from the 2016 Traffic Count Program, the CN at-grade crossing at Evans Road has the highest motorized vehicle traffic volume of about 24,000 vehicles per day. Photographs of some railway crossings along CN tracks are shown in ***Figure O.2***.

Industrial Way CN Crossing


Evans Road CN Crossing


Young Road CN Crossing


Ford Road CN Crossing

Figure O.2: Existing CN Rail Crossings

O.3 Rail Crossing Collisions

The 2012 and 2013 ICBC reported collisions occurring at railway crossings were reviewed. A total of sixteen collisions occurred in the 24-month period with eleven reported in 2012 and five in 2013. The majority of the collisions are rear end collisions with the leading vehicles stopped and hit by the following vehicles. It may indicate that more advance warning measures may be required for coming trains.

Of those two studied years, eight casualty collisions were reported with no fatal collisions found. Details of injury collisions are summarized in ***Table O.1***. All reported injury collisions were vehicle-vehicle rear-end collisions. One collision (property damage only) at Airport Road was reported as a collision between a vehicle and train.

Table O.1 2012 and 2013 Injury Collisions at Railway Crossing Locations

Month - Year	Time	Railway Crossing	Type
Dec-13	10:30	Lickman Road	Rear End
May-13	15:30	Prest Road	Rear End
Jan-13	20:00	Broadway	Rear End
Nov-12	12:30	Young Road	Rear End
Aug-12	17:35	Vedder Road	Rear End
Aug-12	12:00	Evans Road	Rear End
Jan-12	15:00	Young Road	Rear End
Jan-12	11:10	Broadway	Rear End

O.4 Grade Crossing Regulations

The new *Railway Crossings Regulations (GCR)* were put into enforcement through the *Railway Safety Act* by Transport Canada in November 2014. These regulations were formed in part to improve railway crossing safety by establishing comprehensive and enforceable safety standards for at-grade crossings, clarifying the roles and responsibilities of railway companies and road authorities, and ensuring that they share key safety information.

The regulations took effect immediately for new rail grade crossings and are being phased in for all existing crossings from 2016 to 2021. The extended timeline for implementation allows time to gather data, undertake safety reviews, and make any necessary safety improvements so that all rail at-grade crossings are expected to be fully compliant with the legislation by November 2021.

As per Section 12 of the new *Grade Crossings Regulation*, key information for all 15 CN at-grade crossings was summarized and submitted to the City of Chilliwack in a separate document. This assessment reviewed each rail crossing to assist the City to identify necessary improvements to comply with the new *Grade Crossings Regulations* related to surface, signs, sightlines, and warning systems. It is noted that the detailed railway crossing assessment will be conducted in a separate study, including the potential anti-whistling improvements.

O.5 Recommendations

- Conduct the detailed railway crossing assessment in accordance with the new *Grade Crossings Regulations* as early as possible. Therefore, relevant safety reviews are being undertaken for all existing CN rail at-grade crossings to determine cost estimate for required safety improvements so that all CN rail at-grade crossings to be fully compliant with the legislation by November 2021.
- Consider to review and improve safe railway crossing facilities for pedestrians, including persons using assisted devices and cyclists, at the existing and future at-grade railway crossings. This could include repairing or replacing failing crossing surfaces, providing smooth separated pedestrian / cyclist crossing surfaces across rails, ensuring adequate visibility of warning system and updated signage according to MUTCD.

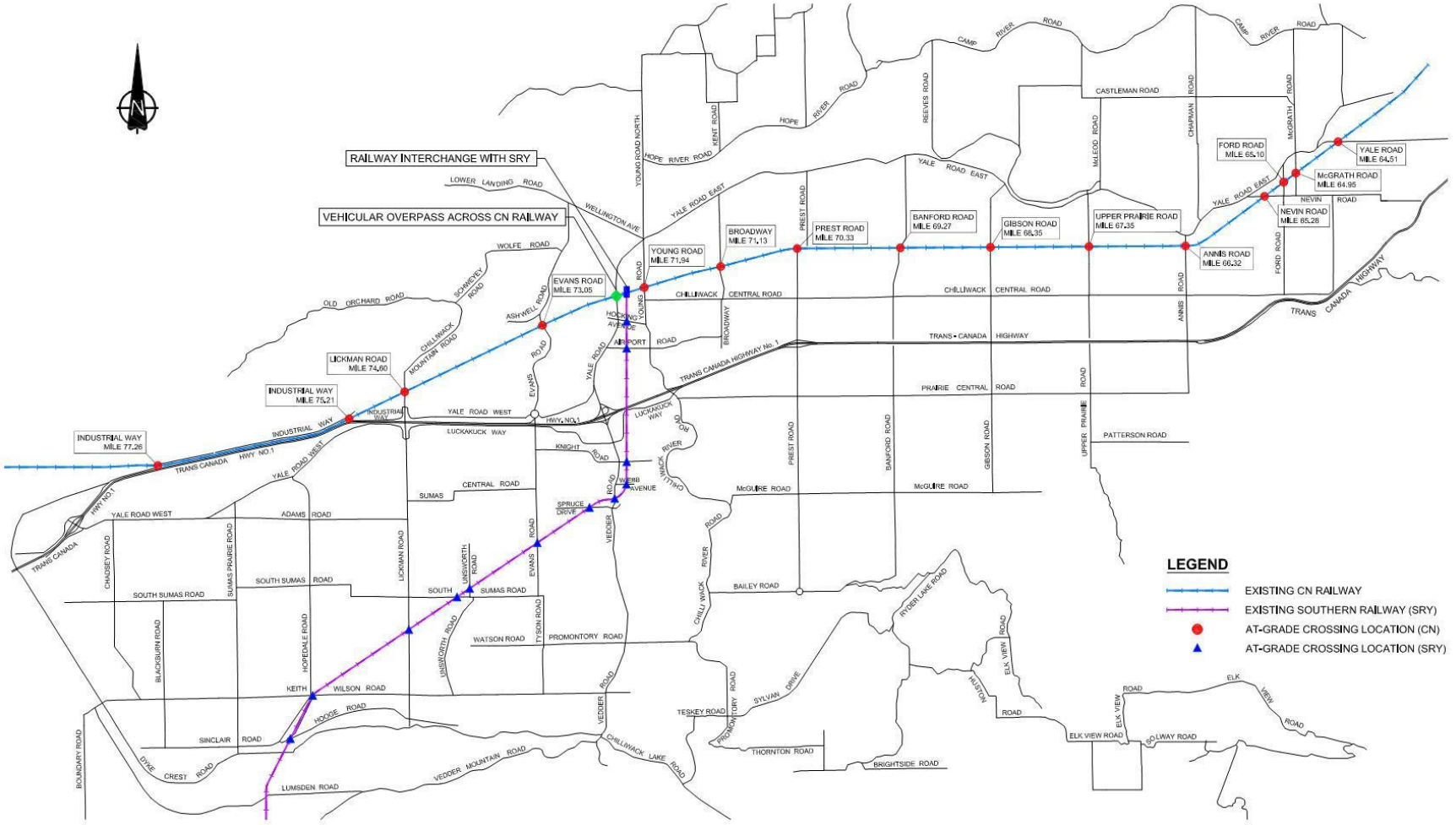


Figure O.1: CN and Southern Railway Crossing Locations

P
Airport Plan

The Chilliwack Municipal Airport provides air transit for the City of Chilliwack. The airport is located on Airport Road, east of Young Road, north of Highway 1 and is situated on 130 acres with 1,219 metres (3,990 feet) paved and lit runway that includes a parallel taxiway, as shown in ***Figure P.1***. The airport is owned by the City of Chilliwack but managed and operated by Magnum Management Inc. (Magnum Management) through a 50-year ground lease initiated in 1997.

Figure P.1 *Aerial Photograph of Chilliwack Airport*

P.1 Land Use Designations and Zoning

The 1999 Official Community Plan (OCP) designated the entire airport property with its own category (Airport or AP). The intent of the AP zoning is to: Support the airport's role in the City's economic development; Facilitate airport operation and its development plan; and promote aerospace service and manufacturing industries. The airport zoning permits aviation-related activities as well as light manufacturing, tourist accommodation, open storage, parking and loading. The OCP includes one transportation infrastructure projects related to the airport, which is the extension of Airport Road to connect Yale Road to Evans Road, such a connection may increase traffic on the Airport Road corridor in general

An airport land use plan illustrates the designation of airport land to each use. The land designated for the runway system is required to maintain the physical restrictions required by the Federal Government (Transport Canada). The airside, meaning accessible to aircraft, and groundside commercial designations (yellow and orange) illustrate locations where land is typically leased to tenants.

The current land use for the Chilliwack Airport is not expected to change in the near future. Some of the vacant greenfield land surrounding the Airport is designated as Agricultural Land Reserve. The land use for such areas can be rezoned in the Airport category if it will be appropriately utilized. This land can only be purchased under Airport designation if it will be used for Airport facilities.

The aeronautical zoning affects land outside the airport property to ensure development does not interfere with flight path requirements, measures are required to ensure that property owners do not construct outside of required height limits. The Zoning Bylaw stipulates that "Within the flight path of the Chilliwack Municipal Airport, the maximum height of buildings and structures permitted elsewhere in the BYLAW shall be controlled by Transport Canada Regulations." It was recommended that the aeronautical zoning be superimposed into the City's zoning/planning map to ensure the information is readily available. It can provide the information to the applications of future development or redevelopment to ensure understanding of the height restrictions along the flight paths.

P.2 Airport Airside Facilities

The airport has a single, paved, and lit 3,990-foot runway (75 feet wide) with a parallel taxiway. The terminal building is designed to accommodate aircraft with up to 19 passengers. Air traffic control is currently not provided at the Chilliwack Airport but information is available to pilots through the Abbotsford Airport Flight Service Station.

Chilliwack Airport currently supports general and business aviation. Typical operators include several approved maintenance organizations, flight training schools, recreational clubs, helicopter services, private pilots, and charter services. Aircraft movements are not currently recorded at the airport, but it is estimated by the airport management that there are between 40,000 and 50,000 movements annually. Scheduled air service is currently not operating at the Chilliwack Airport.

Magnum Management sub-leases land to the airports tenants, with the leases approved by the City. It also manages the airport under a separate agreement, with the City retaining responsibility for capital improvements.

It is planned that the Chilliwack Airport will continue to serve business and general aviation. Some growth in demand can be expected from general population growth in the Fraser Valley. With increasing pressure on the neighbourhood airports to Chilliwack, including Abbotsford, Langley, and Boundary Bay, the Chilliwack Airport is expected to attract companies from these airports who are in need of expanding facilities or even relocating their offices and facilities.

Chilliwack Airport fueling operations provides Jet A for all turbine (helicopters, turbo-prop, military, medivac and executive jet aircraft) and 100 LL (Low Lead) fuel for piston applications. This self service is available 24 hours a day, seven days a week. Located on the apron in front of the ATB. Magnum Management also installed a Transport Canada approved aviation weather information collection and distribution system and providing a design GPS based instrument approach (WAAS).

It is understood that the Airport's 5 Year Plan is currently being updated and is expected to be available in December 2016.

P.3 Groundside Transportation Connections

Automobile and Goods Movement

Connections between the Chilliwack Airport and other transportation modes are currently provided through Airport Road. Both Airport Road and nearby Young Road are classified arterial roads and designated truck routes, providing good road access to the airport. Access is enhanced by the airport's location in the urban area, less than three kilometres from the Chilliwack downtown area and close to Sardis-Vedder urban areas, office buildings, and shopping malls. The airport is located just north of Highway 1 and close to the Young Road Interchange.

Vehicle parking is provided in a surface parking lot north of the terminal building accessed via a one-way loop road off Airport Road (as shown in ***Figure P.2***). Magnum Management reported that the existing parking lot has sufficient capacity for the existing and future operations.

Figure P.2 *Entrance and Exit from Airport Loop Road*

Pedestrians and Cyclists

Pedestrian access is provided via a sidewalk on the north side of Airport Road, however, no crossing provision is provided close to the airport, essentially requiring pedestrians to jaywalk to access the airport on foot.

Figure P.3 *Bike Lanes Ending at Cessna Drive*

Airport Road is a designated bicycle commuter route, with a wide travel lane for shared use by vehicles and bicycles (as shown ***Figure P.3***). The western section of Airport Road, west of Cessna Drive has been upgraded with painted bike lanes.

Transit

Transit service (Route 7) is provided past the airport, albeit somewhat infrequent. There are 12 buses that provide service between approximately 7am and 10pm. Route 7 (Broadway) provides service between downtown Chilliwack and Chilliwack Mall. While the westbound stop adjacent to the airport is located on and accessible via the existing sidewalk, the eastbound stop is situated on a grass boulevard on the south side with no safe connection to any facilities, nor any safe way to cross the Airport Road to access the sidewalk, as shown in ***Figure P.4***.

Figure P.4 *Airport Road Eastbound Bus Stop*

P.4 Recommendations

Most ground trips to and from the airport are made automobile, however, the following items could be considered to enhance accessibility to the airport:

- Provide a sidewalk on the south (Airport) side of Airport Road, at a minimum from the bus stop to the terminal building.
- Provide bicycle parking within the airport's parking lot.
- Prepare noise forecast contours in the zoning map to identify the noise impacts by the air traffic operations.

Q
Truck Plan

Q.1 Municipal Truck Routes

Trucks are defined as motor vehicles with a gross vehicle weight exceeding 10,000 kilograms in the *City of Chilliwack Highway and Traffic Bylaw 2004 (No. 3023)*. Municipal truck routes in Chilliwack are assigned in paragraphs 36, 37, and Schedule 6 of the *Bylaw 3023* (updated to January 31, 2011) and are shown in ***Figure Q.1*****,** and Trans-Canada Highway (Highway 1) through Chilliwack is designated as a provincial truck route. Under *Bylaw 3023*, trucks may not be allowed to use roads other than designated municipal and provincial truck route. The bylaw allows certain exemptions for emergency vehicles, government heavy vehicles, road construction or maintenance vehicles, and trucks making local deliveries.

Q.2 2016 Existing Truck Route Network

Since the 2007 Transportation Plan, there have been several changes on the truck route network in Chilliwack:

Four additions to the truck route network include:

- Cheam Avenue (Yale Road to First Avenue);
- First Avenue (Cheam Avenue to Young Road);
- Evans Road / Eagle Landing Parkway (Yale Road Roundabout to Ashwell Road); and,
- Tyson Road (Evans Road to South Sumas Road).

Four removals to the truck route network include:

- Chilliwack Central Road (Young Road to Annis Road);
- Prairie Central Road (Young Road to Annis Road);
- Evans Road (Tyson Road to South Sumas Road); and
- South Sumas Road (Evans Road to Tyson Road).

The new truck route along Cheam Avenue and First Avenue was mainly for the completion of east-west truck route along Wolfe Road and First Avenue while the new truck route along Evans Road (north of the roundabout at Yale Road) was primarily served for truck movements generated by the new commercial developments in the area. The new truck route on the short section of Tyson Road replaced the removal of original truck routes on Evans Road and South Sumas Road with the introduction of traffic signal at Tyson Road and South Sumas Road from the *2011 Traffic Signal Program*. It is expected that the removal of trucks routes on Chilliwack Central Road and Prairie Central Road moved truck traffic to Trans-Canada Highway as well as Yale Road East.

The most up-to-date (2016) truck routes are identified and shown in ***Table Q.1*** and ***Figure Q.1***.

Table Q.1 Existing Municipal Truck Routes

Road	Section
Airport Road	Yale Road to Broadway
Annis Road	Highway No. 1 to Yale Road
Ashwell Road	Deans Avenue to Wolfe Road
Bailey Road	Chilliwack River Road to Prest Road
Boundary Road	No. 3 Road to Keith Wilson Road
Broadway	Airport Road to Yale Road
Cheam Avenue	Yale Road to First Avenue
Chilliwack Mountain Road	Lickman Road to Schweyey Road
Chilliwack River Road	Prairie Central Road to Promontory Road
Corbould Street	Hodgins Avenue to Lewis Avenue
Eagle Landing Parkway	Chilliwack Creek to Deans Avenue
Evans Road	Tyson Road to Chilliwack Creek
First Avenue	Cheam Avenue to Prest Road
Higginson Road	Stevenson Road (West End) to Stevenson Road (East End)
Hodgins Avenue	Ashwell Road to Corbould Street
Hope River Road	Young Road to Menzies Street
Industrial Way	Yale Road West to Lickman Road
Keith Wilson Road	Boundary Road to Vedder Road
Lewis Avenue	Corbould Street to Young Road
Lickman Road	Keith Wilson Road to Chilliwack Mountain Road
Luckakuck Way	Lickman Road to Young Road
Menzies Street	Hope River Road to Yale Road
No. 3 Road	Boundary Road to Yarrow Central Road
Prest Road	Yale Road to Bailey Road
Progress Way	Industrial Way to Lickman Road
Promontory Road	Vedder Road to Sylvan Drive
Schweyey Road	Chilliwack Mountain Road to Wolfe Road
Stevenson Road	Evans Road to Higginson Road (Southwest End) Higginson Road (Northeast End) to Chilliwack River Road
Sumas Prairie Road	Keith Wilson Road to Yale Road
Teskey Way	Bailey Road to Promontory Road
Tyson Road	Keith Wilson Road to Evans Road
Vedder Mountain Road	Vedder River to Yarrow Central Road
Vedder Road	Vedder River to Highway No. 1
Wolfe Road	Schweyey Road to Ashwell Road
Yale Road	Industrial Way (West End) to Eastern City Boundary
Yarrow Central Road	Vedder Mountain Road to No. 3 Road
Young Road	Prairie Central Road to Tower Road

Q.3 Proposed Changes to Truck Route

Aiming to best serve the commercial and industrial land uses within the City, minimize the number of at-grade rail crossings on the network, minimize the intrusion of trucks in residential areas, and avoid school zones where possible, the following changes could be considered (which are also shown in ***Figure Q.1***):

- Remove Higginson Road from the truck route as Higginson Road is a local road serving the nearby residential area;
- Designate Stevenson Road between Evans Road and Chilliwack River Road as truck route, due to the removal of Higginson Road from truck route; and
- Designate South Sumas Road between Lickman Road and Tyson Road as truck route as an industrial area of approximately 500,000 m^2 is situated along South Sumas Road.
- Designate Progress Way between Industrial Way and Lickman Road as truck route

- Designate Ashwell Road between Deans Avenue and Wolfe Road / Hodgins Avenue as truck route in order to accommodate future growth
- Remove Hodgins Avenue between Corbould Street and Yale Road as truck route, except for hospital related traffic, due to hospital zone, 30km/hr zone, quiet zone and high number of vulnerable road users in the area.

Q.4 Other Issues

Signing for municipal truck routes is not mandated in *Bylaw 3023*, and it is understood that no signs are provided to identify the truck routes in Chilliwack. The standard British Columbia R-121 "Truck Route" sign, showing the silhouette of a truck inside a green circle, could be used with directional tabs to indicate to truck drivers what routes to follow in Chilliwack. It is expected that a well-signed truck route network could distribute non-local truck traffic along preferred routes and minimize intrusion in residential area. Alternatively, the standard British Columbia R-120 "No Trucks" sign could be used to prohibit trucks using certain road segments.

It is noted that Chilliwack does not explicitly control the movements of dangerous goods on its municipal roadways. Currently Highway 1 serves as the main dangerous goods route in Chilliwack. A dangerous goods route study could be conducted to identify the most appropriate municipal dangerous goods routes within the City in consultation with the BC Ministry of Transportation and Infrastructure.

It is understood that no new truck volume information is available since the *District of Chilliwack Truck Route Study Conceptual Design Report Study* conducted by ISL in 1998. New truck traffic data could be included in traffic counts with classification in the annual traffic count program. Truck routes and roadways that have received truck movement related complaints from the public can be prioritized. Additionally, the City may need to update the *1998 Truck Route Study to* review existing truck route network in consultation with trucking industry and business association, analyze existing operation and safety conditions, and identify required upgrades along designated truck routes.

Q.5 Recommendations

- Present the proposed changes to truck routes (listed in *Section Q.3*) could be presented to City Council and adopted / amended as necessary. Subsequently, the *Traffic Bylaw Schedule 6* could be updated to reflect the most up-to-date municipal truck routes and include a truck route map.
- Post standard "Truck Route" and "No Trucks" signs on the relevant road sections and decision points, such as intersections to provide the effective wayfinding to motor vehicle drivers.
- Conduct a dangerous goods route study to identify the most appropriate municipal dangerous goods routes within the City in consultation with the BC Ministry of Transportation and Infrastructure.
- Undertake a compressive truck route study to update the information and outcomes found in the *1998 Truck Route Study*.

This Page is Intentionally Left Blank

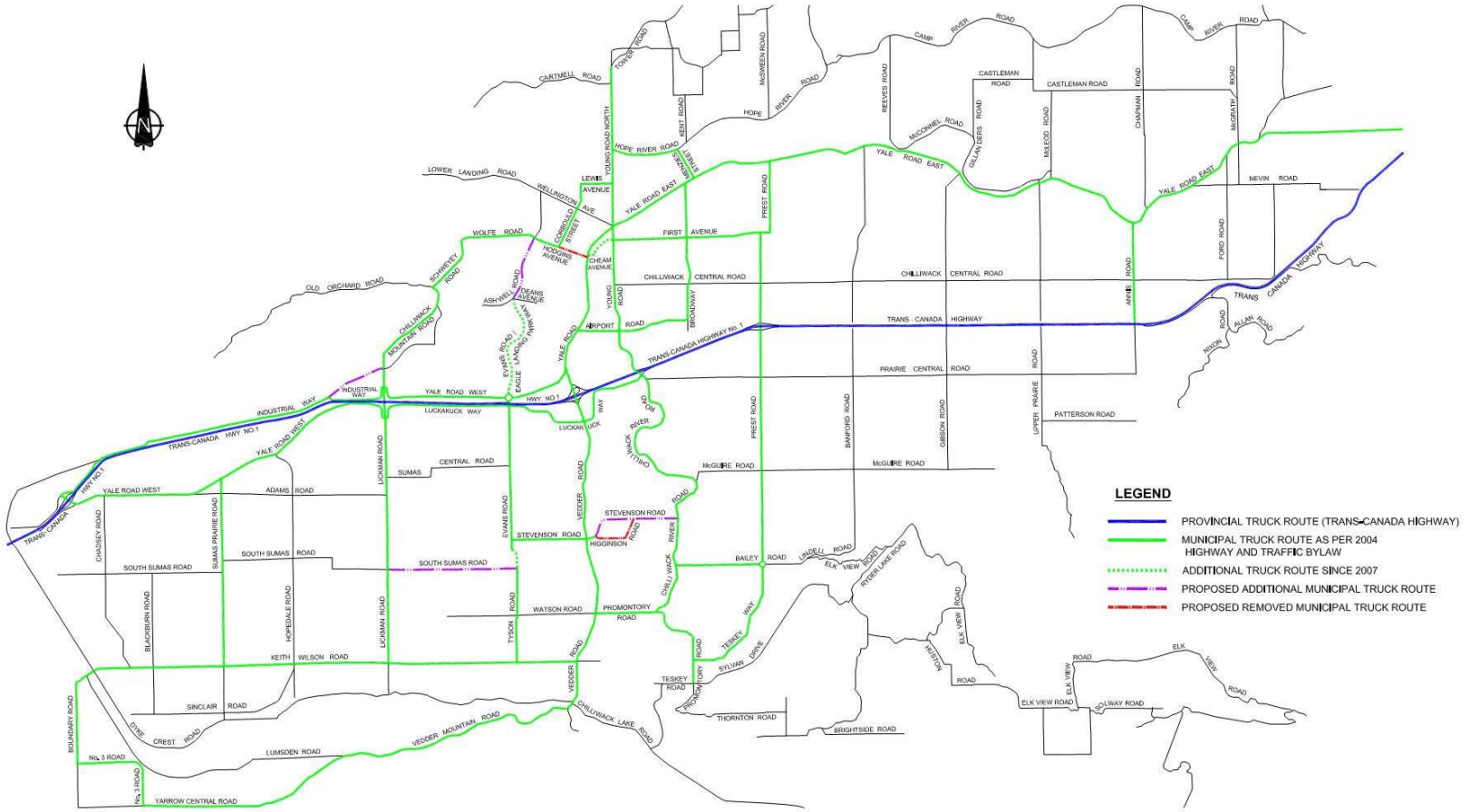


Figure Q.1: Truck Route

R
Financial Plan

R.1 Recommendations as Proposed in Transportation Plan Update

The *Transportation Plan Update* has made the following recommendations, grouped between in-house and future work / follow-up study projects. The title of the relevant Plan section is referred to in parentheses.

In-House

1. Consider the signal timing improvements identified in ***Table B.6*** (Signal Plan)
2. Continue to work with ICBC on road safety improvements with the support of funding and investment through the Road Improvement Program (Safety Plan)
3. Continue to operate *Safer City Program* to raise public awareness of road safety (Safety Plan)
4. Continue to collaborate with RCMP enforcement activities to address traffic offences (Safety Plan)
5. Continue to coordinate with other transportation agencies and committees/boards to enhance driver behavior (Safety Plan)
6. Consider incrementally increasing the annual road rehabilitation budget to $5.2M for pavement rehabilitation (Pavement Rehabilitation)
7. Review construction costs yearly to adjust budgets for industry increases/decreases and market fluctuations to maintain the target PQI. (Pavement Rehabilitation)
8. Monitor the proposed work from the PMS and the actual work completed and note the field conditions. (Pavement Rehabilitation)
9. Consider consulting with the relevant stakeholders in the downtown area to investigate the feasibility of implementing parking demand management strategies (Downtown Parking)
10. Provide marked parking spaces for all public off-street parking lots (Downtown Parking)
11. Provide effective and convenient wayfinding measures for the Landing Centre area such as maps of available parking near the accesses (Downtown Parking)
12. Review Capital Plan to confirm City spending reflects Vision and Goals of the *Chilliwack 2040 OCP*. (Zoning Setback & Bylaws)
13. Include example of cycle facilities and their space requirements in line with *CycleVision Chilliwack Cycle Plan* that accompanies this Transportation Plan (Zoning Setbacks & Bylaws)
14. Reduce acceptable lane widths to 3m in areas intended for low speeds and with low truck volumes (Zoning Setbacks & Bylaws)
15. Set design speed equal to posted speed (Zoning Setbacks & Bylaws)
16. Review Cycling Plan and develop example cross-sections for various bicycle facilities. (Zoning Setbacks & Bylaws)
17. Work with BC Transit to monitor and review ridership data, to identify locations that may benefit from additional transit service or future developments that could benefit from transit access. (Transit Plan)
18. Promote changes and improvements to the transit system using social media and maximize the effectiveness of the promotion by partnering with neighborhood and advocacy groups (Transit Plan)
19. Consider the network functionality perspectives when conducting work (Bridge Plan)
20. Continue the practice of conducting *Inspection Reports* at regular intervals, and of acting on the recommendations of these reports to ensure that these critical network links remain functional and safe (Bridge Plan)

21. Alternate traffic counts at all signalized intersections at least every 2 years and traffic counts at selected unsignalized intersections at least every 3 years (Traffic Volumes)
22. Continue to include newly installed signalized intersections and selected unsignalized intersections that the City intends to conduct intersection upgrade in the near future (Traffic Volumes)
23. Continue to conduct continuous traffic count data collection at permanent count stations along major transportation corridors (such as Vedder Road, Evans Road and Yale Road) for a complete year (Traffic Volumes)
24. Consider adding the permanent count stations at Yale Road, Eagle Landing Parkway and Young Road (Traffic Volumes)
25. Review development-related applications and collect traffic count data from any traffic impact assessment study conducted and add into traffic data count inventory (Traffic Volumes)
26. Review and conduct traffic data collection for locations with unusual traffic peak patterns, such as a nearby school, sports field or provincial park (Traffic Volumes)
27. Continue to generate a City-wide traffic volume data map (11x17) for data collected within the last three years – both intersection and links (Traffic Volumes)
28. Identify areas with high development activities and select key intersections and corridors for future data collection, similar to those listed in **Section L.4** (Traffic Volumes)
29. Consult and collaborate with *MoTI* for data collections at highway intersections (Traffic Volumes)
30. Consider the 25 highest-ranking priority sidewalk and crossing projects, ***Table M.5,*** to be implemented in the next 5 years or more, using the methodology discussed in the *Transportation Plan Update*. (Pedestrian Plan)
31. Continues to conduct traffic counts at the major interchange locations between Lickman Road and Prest Road to monitor the change in traffic patterns. (Regional Connections to Highway 1)
32. Review construction schedule and budget for any improvements to the interchanges with the scheduled capital projects in the latest *Comprehensive Municipal Plan*. (Regional Connections to Highway 1)
33. Provide a sidewalk on the south (Airport) side of Airport Road, at a minimum from the bus stop to the terminal building. (Airport Plan)
34. Provide bicycle parking within the airport's parking lot. (Airport Plan)
35. Present the proposed changes to truck routes to City Council and adopt / amend as necessary and subsequently, update the *Traffic Bylaw Schedule 6* to reflect the most up-to-date municipal truck routes. (Truck Plan)
36. Post standard "Truck Route" and "No Trucks" signs on the relevant road sections and decision points, such as intersections to provide the effective wayfinding to motor vehicle drivers. (Truck Plan)

Future Study / Follow-up Work

1. Include roundabout traffic operation analysis in future intersection improvement studies (Signal Plan)
2. Consider signal coordination along major north-south transportation corridors such as Vedder Road, Yale Road and Young Road to reduce congestion (Signal Plan)
3. Consider evaluate the traffic operations and safety for the Vedder Road and Luckakuck Way intersection (Signal Plan)
4. Consider and categorize (improvement type and implementation timing) the City-wide and site-specific recommendations from the *2014 Network Screening Study* (Safety Plan)
5. Develop Traffic Calming Policy to provide an alternative option of traffic calming tool (Safety Plan)
6. Consider road capacity improvements focused on several major north-south and east-west corridors, shown in ***Figure D.5*** (Traffic Growth)
7. Generate additional field data collection (visual and structural) and a new report in 2019 to update the current PQI and to develop and update the yearly candidate roads for the next 5-year pavement rehabilitation plan. (Pavement Rehabilitation)
8. Collect structural data (FWD) and subsurface information to improve the accuracy of the PMS data. (Pavement Rehabilitation)
9. To determine if upgrades other than the travel surface should be considered, other factors such as traffic volumes, and local improvement / upgrading requirements should be studied (Pavement Rehabilitation)
10. Update the Road Network Classification Strategy every three to five years to assist land developments within the City boundary (Road Network)
11. Develop Pedestrian and Cycle Plans to inform all new road projects (Zoning Setbacks & Bylaws)
12. Review bylaw setbacks upon finalization of *Transportation Plan Update*, accompanying *CycleVision Chilliwack Cycle Plan* and future revision to cross-sections in *Land Development Bylaw* (Zoning Setbacks & Bylaw)
13. Develop specific laning examples for a given pavement width (Zoning Setbacks & Bylaws)
14. Review and evaluate the results from the proposed improvements in the next 3 years and report in the next transportation plan (Transit Plan)
15. Consider repairing or replacing bridges recommended in ***Section K.1***. (Bridge Plan)
16. Complete medium and low priority items at bridges requiring high priority upgrades at the same time as this will increase cost-effectiveness and reduce traffic disruption and plan and budget the other medium and low improvements. (Bridge Plan)
17. Prepare effective traffic management plans when doing any bridge works, to minimize delays and ensure safety for the bridge users and the workers (Bridge Plan)
18. Upgrade or replace the bridges located along high traffic routes or bicycle routes as the bridge inventory of numerous bridges found that becoming functionally obsolete and the decks are generally narrower than current standards, lack proper transition barriers and have railing systems that do not meet current standards. (Bridge Plan)
19. Consider warrant analysis studies for additional high profile pedestrian crossing locations as identified by the public and/or the City. (Pedestrian Plan)
20. Consider capacity improvements on Lickman Road (preliminary design completed in 2015), Prest Road and Young Road corridors (to be designed) near the highway interchanges (Regional Connections to Highway 1)

21. Conduct the detailed railway crossing assessment in accordance with the new *Grade Crossings Regulations* as early as possible to undertake relevant safety reviews for all existing CN rail at-grade crossings to determine cost estimate for required safety improvements so that all CN rail at-grade crossings to be fully compliant with the legislation by November 2021. Assessment report is being completed at the time of the completion of this report. (Railway Plan)
22. Consider to review and improve safe railway crossing facilities for pedestrians, including persons using assisted devices and cyclists, at the existing and future at-grade railway crossings. (Railway Plan)
23. Prepare noise forecast contours in the zoning map to identify the noise impacts by the air traffic operations (Airport Plan)
24. Conduct a dangerous goods route study to identify the most appropriate municipal dangerous goods routes within the City in consultation with the BC Ministry of Transportation and Infrastructure (Truck Plan)
25. Undertake a compressive truck route study to update the information and outcomes found in the 1998 Truck Route Study (Truck Plan)

R.2 Review of the Latest Capital Management Plan

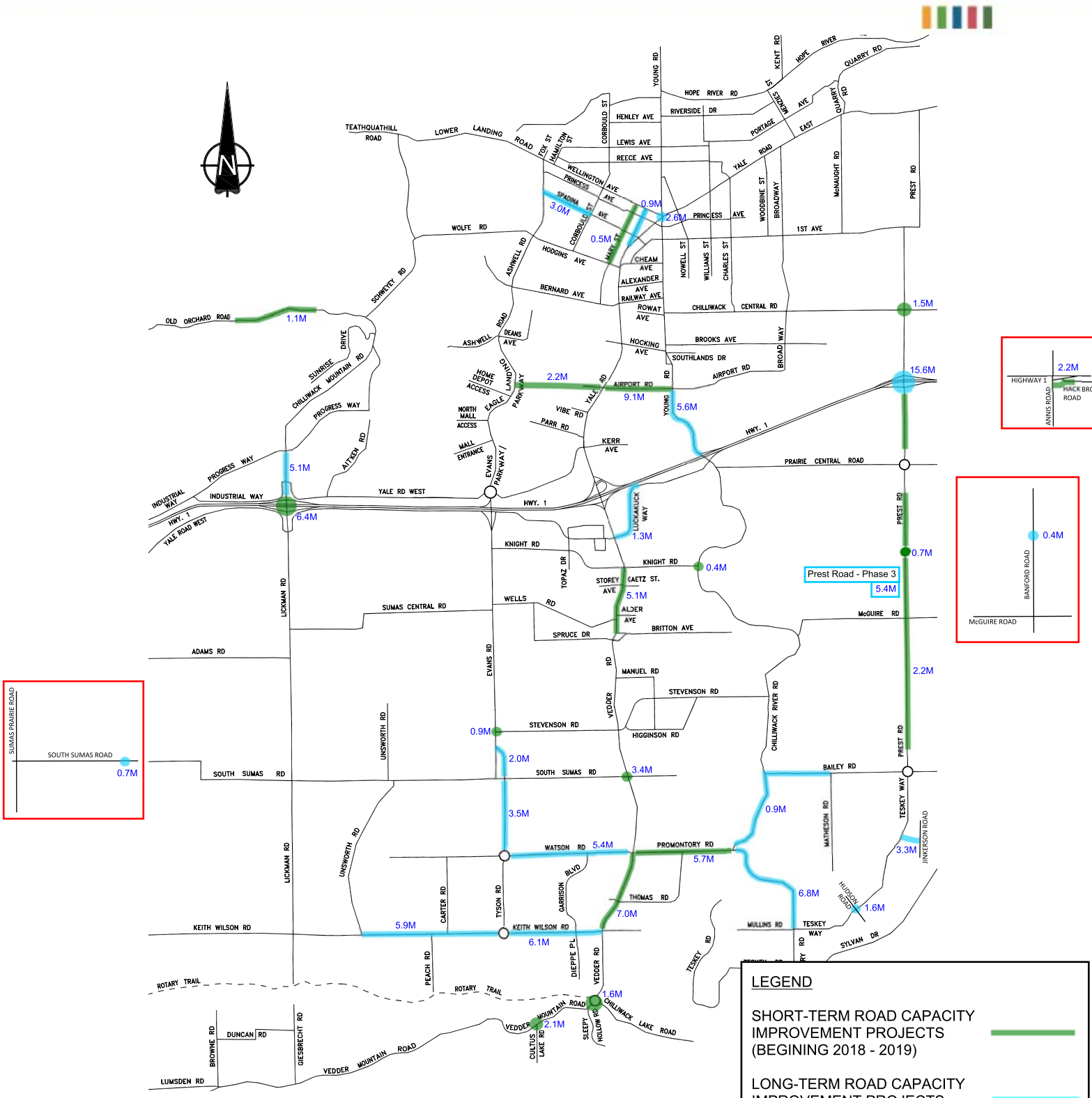
The *2018 Comprehensive Municipal Plan* (outline expenditure from 2018 to 2027) as provided by the City of Chilliwack and has been reviewed. The transportation related projects were summarized and shown in ***Figure R.1***. The results of review, as shown in the New Capital Work as listed in last section, indicated that the following capital road capacity improvement projects scheduled to begin for full or partial completion in 2018 conform with recommended or desirable capital program described in ***Section D (Traffic Growth)***. The improvement projects beginning in 2018 and continuing in 2019 as also listed. Figures in brackets show the budget amounts of these capital projects for 2018 or 2019.

Year 2018

- Widening of Vedder Road, Promontory Road to Keith Wilson ($7,020,000)
- Widening of Promontory Road, Vedder Road to Chilliwack River Road ($2,680,000)
- Intersection improvements at Vedder Road and South Sumas Road ($3,420,000)
- Evans Road Phase IV ($275,000)
- Prest Road Phase 1 ($1,540,000) and Phase 2 ($2,245,000)
- Intersection improvements at Chilliwack River Road and Knight Road ($355,000)
- Hack Brown / Annis Road Intersection improvements ($2,215,000)
- Capacity Improvements for Knight Road ($235,000)
- Prest Road Bridge Upgrade at Semiult ($685,000)
- Vedder Road Bridge Replacement ($1,600,000)
- Intersection improvements at Vedder Mountain Road and Cultus Lake Road ($2,110,000)
- Intersection improvements at Evans Road and Stevenson Road ($900,000)
- Capacity Improvements at the Lickman Road Interchange ($6,400,000)
- Implementation of Pedestrian Signals ($325,000)

Year 2019 (continuation of Year 2018 works)

- Widening of Promontory Road, Vedder Road to Chilliwack River Road ($2,925,000).
- Implementation of Pedestrian Signals ($50,000 per year, continuous).



LEGEND

SHORT-TERM ROAD CAPACITY IMPROVEMENT PROJECTS (BEGINING 2018 - 2019)

LONG-TERM ROAD CAPACITY IMPROVEMENT PROJECTS (BEGINING 2020 AND BEYOND)

ESTIMATED IMPROVEMENT IN MILLION DOLLARS #.#M

Figure R.1: Short- and Long-Term Road Capacity Improvement Projects (Based on the 2018 Comprehensive Municipal Plan)

This Page is Intentionally Left Blank