TRANSPORTATION MUNICIPAL/ENVIRONMENTAL LAND DEVELOPMENT

City of Chilliwack

FINAL Report

2007 Transportation Plan

ISL Engineering and Land Services

December 2008

January 7, 2009

Our Project# 30357

City of Chilliwack
8550 Young Road
Chilliwack, BC V2P 8A4

Attention: Mr. Frank Van Nynatten, Supervisor – Road & Drainage

Re: 2007 Transportation Plan

Dear Frank,

ISL is pleased to submit three hard copies (two bound and one unbound) of the 2007 Chilliwack Transportation Plan for your consideration and use. A CD containing all digital files is also enclosed for future reference.

This 2007 Transportation Plan provides an update to the 2001 Transportation Plan and establishes the framework for multi-modal upgrades to the City's transportation network. It summarizes the existing and potential issues associated with each transportation component as well as the possible recommendations for the City of Chilliwack to consider. These transportation components include a signal plan, a safety plan, traffic growth, pavement rehabilitation, downtown parking, road network, zoning setback and bylaws, a transit plan, a cycle plan, a bridge plan, traffic volumes, a pedestrian plan, regional connections to Highway 1, a railway plan, an airport plan, a truck plan and a financial plan.

We thank you for the opportunity to participate in this challenge project and look forward to working with you in the future.

Sincerely,

Ed Kolla, P.Eng.
Manager, BC Operations

Borg Chan, P.Eng., PTOE
Senior transportation Engineer

BC/ak
Encls.

Executive Summary

The City of Chilliwack is located 100 kilometres east of Vancouver, British Columbia, marking the start 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 transportation challenges facing the community, the City has recognized the need to consolidate the transportation priorities in one document to be known as the Transportation Plan. The first City of Chilliwack Transportation Plan was completed in June 2001. The document guided the efforts of the City in the delivery of an efficient and cost-effective multi-modal transportation network.

With increasing population, economic activity, and growth in the last six years, the City of Chilliwack is facing several transportation challenges. The demand for improved road capacity needs to be balanced with the provision of services for pedestrians, cyclists, and transit. The economic benefits of providing parking need to be balanced with the impact of parking on mobility. 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 remain consistent with the *2001 Transportation Plan*, the following components have been included in the 2007 Transportation Plan:

- Signal Plan;
- Safety Plan;
- Traffic Growth;
- Pavement Rehabilitation;
- Downtown Parking;
- Road Network;
- Zoning Setbacks and Bylaws;
- Transit Plan;
- Cycle Plan;
- Bridge Plan;
- Traffic Volumes;
- Pedestrian Plan;
- Regional Connections to Highway 1;
- Railway Plan;
- Airport Plan;
- Truck Plan; and
- Financial Plan.

Current conditions and proposed or committed related developments for each of the above transport components were reviewed, discussed and presented. The changes since the *2001 Transportation Plan* is emphasised in this report. Existing and potential issues associated with each transport component were identified and possible recommendations have also been suggested for the City to consider.

The recommendations proposed in the 2007 Transportation Plan were grouped by the potential level of budgetary commitment in the Financial Plan, including:

- New Capital Project;
- Maintenance Work; and,
- Future Study / Follow-up Work

The 2008 Comprehensive Municipal Plan (outlining expenditure from 2008 to 2017), and descriptions of major capital projects for 2008 and 2009 have been reviewed with reference to the recommendations of the 2007 Transportation Plan.

Therefore, this document establishes an update to the *2001 Transportation Plan*, which established the framework for multi-modal upgrades to the City's transportation network, to support struc10000tured and sustainable growth of the City.

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Appendices

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A Introduction

The City of Chilliwack is located 100 kilometres east of Vancouver, British Columbia, marking the start of the 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.

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To complete the 2007 Transportation Plan, 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. Plans and documents that required updating have been revised on the basis of surveys and analyses conducted in 2007 for this purpose. For easy reference and comparison with the *2001 Transportation Plan,* the 2007 Transportation Plan consists of the following similar sections:

A. **Introduction**: This Introduction provides an overview of the topics discussed in the 2007 Transportation Plan.

B. **Signal Plan**: This section updates the signal timing plans that were provided in the 2001 Transportation Plan. The efficiency of signal operations including overall and individual movement capacity deficiencies, the existing amber and all-red clearance intervals have been reviewed and compared with the recommended values in the 2001 Transportation Plan. Guidance for establishing the operating and geometric parameters of signals has been provided. Existing signal installations have been reviewed to identify those requiring hardware upgrades.

C. **Safety Plan**: About 4,050 collisions were reported in 2005 and 2006. A network screening analysis has been conducted to identify and prioritize the locations where the collision risk is highest, based on collision data, the existing ICBC Road Safety Strategic initiatives were reviewed. General countermeasures were recommended.

D. **Traffic Growth**: Historic count data has been reviewed to determine past growth trends in Chilliwack, and the update to the City's EMME/2 model 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 over the next ten years.

E. **Pavement Rehabilitation**: The pavement life cycle and the results and recommendations from the 2004 Pavement Assessment Report were reviewed. Recommendations to improve the existing system were developed.

F. **Downtown Parking**: This section includes an update of the downtown parking study conducted in 1989 and 2001, and addresses parking supply, demand, management, and pricing. Results of public and private parking surveys are discussed including a summary of the parking questionnaire survey, complied with the Downtown Chilliwack Business Improvement Association.

G. **Road Network**: The existing road network and functional classifications were described and the planned future enhancements were identified. Recommendations related to the existing and future road network were discussed.

H. **Zoning Setbacks and Bylaws**: Current zoning and bylaws related to the transportation network performance were summarized. The setback requirements were compared with the requirements of other municipalities. The subdivision and land development bylaw and official community plan were also reviewed.

I. **Transit System**: Existing transit facilities in Chilliwack have been identified. The results collected from the Chilliwack Transit System Performance Ridership and Performance Survey (2006) were reviewed and summarized to determine the long-range strategy for making transit service a more important part of the City's transportation network.

J. **Cycle Plan**: Existing bicycle routes and facilities, as well as future upgrades, have been identified and summarized. Planned road projects have been reviewed to determine how bicycle facilities can be economically incorporated into other projects.

K. **Bridge Plan**: The road network and traffic on existing bridges has been reviewed to prioritize rehabilitation and upgrade works. Results and recommendations of the 2007 Bridge Inspection Report have been reviewed and summarized.

L. **Traffic Volumes**: The 2007 traffic counts were reviewed to determine current traffic volumes, and to estimate changes in traffic volume by time, day, and month.

M. **Pedestrian Plan**: Existing pedestrian facilities, as well as future upgrades, have been identified and summarized. Planned road projects have been reviewed to determine how pedestrian facilities can be economically incorporated into other projects.

N. **Regional Connections to Highway 1**: Six interchanges currently connect the municipal roads to Highway I within the City. The reconstructed Vedder Road Interchange and the proposed Evans Road Interchange with Highway 1 were discussed.

O. **Railways**: At-grade railway crossings have the potential to disrupt road traffic. The issues related to train movements in the City have been identified and summarized in this section. The recent Anti-Whistling improvements were also discussed and reviewed. CN Rail and SRY staff were consulted.

P. **Airport**: Air traffic and the role of the airport on the City's roadside network were discussed. A meeting with senior staff from the airport management company was arranged and the 5- and 10-year capital work plans were also reviewed. Recommendations to support the viability of the airport in the future were made.

Q. **Truck Routes**: The latest Chilliwack truck routes are identified, and issues relating to their use are 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.

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B Signal Plan

The Signal Plan provides the updates of the 2001 Chilliwack Transportation Plan and is modified with the latest traffic and signal information. A total of 51 traffic signals are found within Chilliwack, compared to 37 in the 2001 Study. Among these intersections, 48 traffic signals are operated by the City and the other three signals at the Highway 1 interchanges are managed by the BC Ministry of Transportation and Infrastructure (MoT). The additional 14 signals, since the 2001 Study, included:

- Two traffic signals at the Highway 1/Vedder Road Interchange (MoT);
- Three traffic signals at the Highway 1/Lickman Road/Luckakuck Way/Industrial Way interchange (the MoT signal is located at the Lickman Overpass across Highway 1);
- Two traffic signals along Cheam Avenue in the downtown area at First Avenue and Young Road and traffic signal at Mary Street and Hodgins Avenue;
- Two traffic signals for new developments (Thomas/Promontory and Yale/Vibe);
- Two traffic signals near the new stadium (Ashwell/Hodgins and Corbould/Hodgins); and
- Two pedestrian signals: one at Keith Wilson Road and Peach Road and another one at Tyson Road near Mt. Slesse Middle School.

Also, two pedestrian signals (Vedder/South Sumas and Knight/Topaz) have been converted to the full signals since the 2001 Study. The locations of traffic signals are shown in FIGURE B.1.

B.1 Site Inventory

A site inventory survey was conducted on several site visits in October and November 2007 by a Traffic Engineer and Highway Designer to identify any changes in traffic operations and geometric features since the 2001 Study including:

- Travel lane designations;
- Signal phasing;
- Number and size of signal heads;
- Existence and colour of backplates;
- Left-turn and right-turn storage lanes; and
- Existing pedestrian facilities.

An inventory of external signal hardware was also undertaken to identify signals at which upgrades are required to meet modern municipal standards. On-site photos and videos were also taken.

At the time of the site visit, the following intersections were under modification or reconstruction:

- Vedder Road and Keith Wilson Road – addition of a southbound travel lane and widening of the eastbound approach;
- Vedder Road and Stevenson Road – installation of a westbound right-turn channelized island;
- Yale Road West and Vibe Road – the new eastbound approach is used as access for construction traffic;
- Yale Road West and Vedder Road – an east leg (Kerr Avenue) was added.

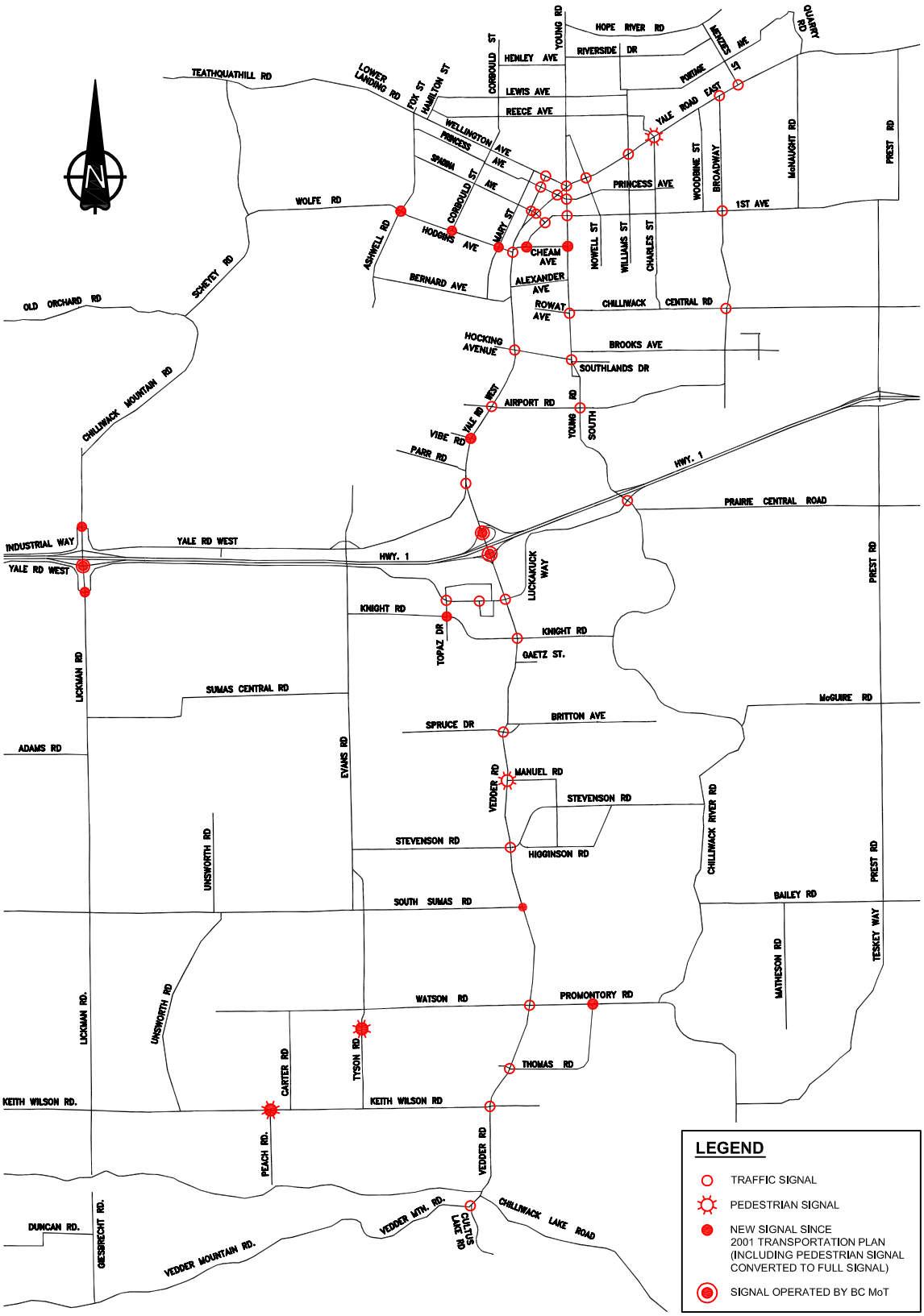


FIGURE B.1 LOCATION OF TRAFFIC SIGNALS
(AS IN OCTOBER 2007)

It was also noted that Young Road, between First Avenue and Brooks Avenue, has been widened to five-lanes (two lanes in each direction and a centre two-way left-turn lane). The same widening has taken place on Yale Road, between Parr Road and Airport Road. The two-lane section of Vedder Road, between Keith Wilson Road and Chilliwack Lake Road, has been widen to add a two-way left-turn lane.

B.2 Efficiency of Signal Operations

Similar to the 2001 Study, the levels of service and intersection delays were calculated based on the traffic volumes from the 2007 Traffic Count Program and the available signal timings found in the 2001 Study and provided by the City.

The capacity performance of signalized intersections was analyzed using the Synchro Version 6 software, which is based on the Highway Capacity Manual (HCM) published by Transportation Research Board. The Levels of Service (LOS) for the individual turning movements, intersection approaches and overall intersections can range from a LOS A to LOS F. TABLE B.1 shows the LOS criteria for signalized intersections with corresponding average delay.

In general, LOS A or B signifies excellent traffic condition with no or minimal delay. LOS C or D indicates average condition with some delay and traffic queue. LOS E or F means over-saturated condition with significant delay and long traffic queues and improvement options should be considered.

TABLE B.1 SYNCHRO (HCM) SIGNALIZED INTERSECTION LOS CRITERIA

LOS CRITERIA	CONTROL AVERAGE DELAY (seconds per vehicle)
A	Less than or equal to 10
B	Greater than 10 and less than or equal to 20
C	Greater than 20 and less than or equal to 35
D	Greater than 35 and less than or equal to 55
E	Greater than 55 and less than or equal to 80
F	Greater than 80

The City of Chilliwack threshold for programming improvements is level of service D or worse. TABLE B.2 summarizes the intersections with an overall LOS D or worse, and identifies the individual movements encountering capacity deficiencies. TABLE B.3 indicates the signalized intersections operating at LOS C or better, however there are some individual turning movements operating at LOS D or worse.

TABLE B.2 INTERSECTIONS WITH OVERALL CAPACITY DEFICIENCIES (2007 PM PEAK)

INTERSECTION	OVERALL LOS (DELAY)	MOVEMENT(S) ENCOUNTERING LEVEL OF SERVICE D OR WORSE
Vedder Rd & Luckakuck Way	D (46.6)	Eastbound left-turn and through, Westbound left-turn and through, Northbound left-turn and through, Southbound left-turn and through
Vedder Rd & Watson Rd	D (36.9)	Eastbound through and right, Westbound through, Southbound left-turn

TABLE B.3 INTERSECTIONS WITH CAPACITY DEFICIENCIES FOR INDIVIDUAL MOVEMENTS (2007 PM PEAK)

INTERSECTION	OVERALL LOS (DELAY)	MOVEMENT(S) ENCOUNTERING LEVEL OF SERVICE D OR WORSE
Yale Rd & Hodgins Ave	C (32.2)	Eastbound left/through, Westbound left-turn, Northbound left-turn, Southbound left-turn
Young Rd & Airport Rd	C (31.9)	Eastbound through and right
Yale Rd & Airport Rd	C (28.9)	Eastbound left-turn, Westbound left-turn (with dual left-turn lanes), Northbound through and right
Vedder Rd & Knight St	C (28.1)	Eastbound through and right, Westbound
Yale Rd & Hocking Ave	C (27.2)	Eastbound left-turn, Westbound left-turn, Southbound left-turn
Mall Entrances & Luckakuck Way	C (21.3)	Northbound left-turn
Princess Ave & Main St	B (19.5)	Eastbound, Westbound
Vedder Rd & Thomas Rd	B (17.2)	Eastbound left-turn, Westbound left-turn
Yale Rd & Vedder Rd	B (15.8)	Eastbound left-turn, Northbound left-turn
Vibe Rd & Yale Rd	A (9.3)	Eastbound
Vedder Rd & Spruce Dr/Britton Ave	A (7.9)	Eastbound, Westbound

The overall intersection delay was also calculated to identify the ranking of signalized intersections with overall capacity deficiencies. This ranking is shown in TABLE B.4. The average delay for each signalized intersection, in units of seconds per vehicle, was extracted from the Synchro output. The overall intersection delay, in units of vehicle-minutes per hour, was then calculated by multiplying the average vehicle delay by the total entering vehicles in the peak hour.

B.3 Review of Intergreen Times

According to the *ITE Traffic Engineering Manual*, the purpose of the yellow change (or amber) interval, which is required to be the first interval following every circular green or green arrow indication, is to warn approaching traffic of the imminent change in the assignment of right-of-way. The amber intervals normally have duration of 3 to 6 seconds. Long amber intervals will reduce the intersection efficiency and may encourage drivers to use it as part of green time. If it is too short, drivers may not have enough time to stop and rear end collisions may result.

The red clearance interval is used to provide additional time following the amber interval before conflicting traffic is released. The duration of red clearance interval is typically in the order of 2 seconds but longer intervals may be used. The decision of the use and length of the red clearance is determined by intersection geometrics, collision experience, pedestrian activities, approach speeds, local practices and engineering judgment.

TABLE B.4 RANKING OF INTERSECTIONS WITH CAPACITY DEFICIENCIES

RANKING	INTERSECTION	AVERAGE PEAK HOUR DELAY (seconds per vehicle)	TOTAL PEAK HOUR DELAY (vehicle-minutes per hour)
1	Vedder Rd & Luckakuck Way	46.6	3,602
2	Yale Rd & Airport Rd	28.9	1,771
3	Vedder Rd & Watson Rd/Promontory Rd	36.9	1,707
4	Yale Rd & Hocking Ave	27.2	1,574
5	Vedder Rd & Knight Rd	28.1	1,568
6	Yale Rd & Hodgins Ave/First Ave	32.2	1,549
7	Young Rd & Airport Rd	31.9	1,527
8	Vedder Rd & Yale Rd	15.8	986
9	Young St & Luckakuck Way	22.1	841
10	Luckakuck Way & Mall Entrances	21.3	729
11	Yale Rd E & Young Rd/Wellington Ave	27.1	670
12	Vedder Rd & Stevenson Rd	16.0	652
13	Young Rd & Hocking Ave	16.5	607
14	Young Rd & First Ave	19.9	600
15	Yale Rd & Vibe Rd	9.3	550

Based on the formula recommended in the *ITE Manual*, the intergreen interval is based on the sum of the following three parts:

- t – perception-reaction time (usually 1 second)
- V / (2*a + 2 *G *g) – approach speed in metres per second (V), deceleration rate (a) at 3.1 m/s^2, gravity (G) at 9.8 m/s^2 and percent grade (g)
- (W + L) / V – width of intersection in metre (W), length of vehicle (L) at 6m and approach speed (V).

Usually the first two items considered are the amber change interval while the last item considered as roadway width adjustment or red clearance interval. Higher approach speeds (usually consider posted speeds) provide longer amber intervals while steeper downhill slopes gave the same trend. For the flat approach, the calculated amber intervals were 3.3 and 3.8 seconds for the intersection approach with posted speeds of 50 and 60 kilometres per hour respectively. On the other hand, a wider intersection needs a longer red clearance interval but higher approach speed provides a shorter red clearance interval. The red clearance interval usually ranged from 1 to 2 seconds.

Based on information provided by City staff, the City's signalized intersections generally adopted 3.5 seconds for amber time and 1.5 seconds for red clearance time. These values generally fall into the acceptable range provided by the ITE formula. It was noted that the following signalized intersections currently have longer amber and all-red clearance intervals, compared to the standard City's intergreen time:

- Vedder and Promontory - 2 seconds all-red for both directions
- Vedder and Spruce – 2 seconds all-red for north-south directions
- Vedder and Knight – 2 seconds all-red for east-west directions
- Vedder and Luckakuck – 2 seconds all-red for north-south directions
- Vedder and Yale – 2 seconds all-red for north-south directions
- Yale and Airport - 2 seconds all-red for both directions

- Yale and Hodgins – 2.5 seconds all-red for north-south directions and 2 seconds all-red for east-west directions
- Vedder and Thomas – 2 seconds all-red for north-south directions
- Young and Yale (5 corners) – 4 seconds amber for north-south directions
- First and Cheam – 4.5 seconds amber for north-south directions and 4 seconds for eastbound direction.

Long all-red clearance intervals are generally required for intersections crossing major streets with four through lanes or more, such as Vedder Road, Young Road, Yale Road West, Luckakuck Way and Airport Road. Therefore, the all-red times (2 seconds) for east-west directions across Vedder Road, Young Road and Yale Road West are reasonable and acceptable.

For the amber time, the City of Chilliwack should consider providing standard times of 3.5 seconds for all signalized intersections. The amber times for the Young and Yale intersection and; the First and Cheam intersection are considered to be higher than the standard amber times.

B.4 Review of External Signal Hardware

Five elements of external signal hardware were reviewed for each signalized intersection to identify whether hardware upgrading is required:

- Signal poles;
- Signal arms;
- Signal heads;
- Pedestrian signal heads; and,
- Pedestrian push buttons.

The results of the site review of signal hardware are summarized in TABLE B.5. Most of the suggestions, such as updating pedestrian signal heads and signal pole/arms, in the 2001 Study have been implemented. Provision of a pedestrian signal pole may be considered for the Yale/Menzies and Yale/Broadway. A long signal arm at the southbound approach of the Broadway/Chilliwack Central intersection was also noted.

The number of vehicular signal heads at each intersection was also reviewed. In general, one signal head should be provided for each through travel lane. All signalized intersections follow this guideline except where an inadequacy of signal heads was noted on the eastbound and westbound approaches to the Vedder/Luckakuck intersection.

B.5 Recommendations

Improve Intersection Capacity
At each intersection where at least one movement was found to operate at level of service D or worse (listed in TABLE B.1 and TABLE B.2), the following improvement concepts were considered:

- Signal timing improvements – change signal green time and/or cycle time
- Signal phasing improvements – add protected phases
- Geometric improvements – add through, left-turn and right-turn lanes.

TABLE B.5 RESULTS OF SIGNAL HARDWARE SURVEY (OCTOBER AND NOVEMBER 2007)

NO.[1]	SIGNALIZED INTERSECTION		SIGNAL POLE	SIGNAL ARM	SIGNAL HEAD	PEDESTRIAN		NOTES
	NORTH-SOUTH ROAD	EAST-WEST ROAD				HEAD	PUSH BUTTON	
1	Vedder Rd	Keith Wilson Rd	√	√	√	√	√	under reconstruction
2	Vedder Rd	Promontory Rd	√	√	√	√	√	
3	Vedder Rd	Stevenson Rd	√	√	√	√	√	under reconstruction
4	Vedder Rd	Spruce Dr	√	√	√	√	√	
5	Vedder Rd	Knight St	√	√	√	√	√	
6	Vedder Rd	Luckakuck Way	√	√	√	√	√	insufficient signal heads
7	Vedder Rd	Yale Rd	√	√	√	√	√	add Kerr Ave leg
8	Yale Rd	Airport Rd	√	√	√	√	√	
9	Yale Rd	Hocking Ave	√	√	√	√	√	
10	Yale Rd	Hodgins Ave	√	√	√	√	√	
11	Yale Rd	Spadina Ave	√	√	√	√	√	
12	Yale Rd	Princess Ave	√	√	√	√	√	
13	Young Rd	Yale Rd	√	√	√	√	√	
14	Nowell St	Yale Rd	√	√	√	√	√	
15	Williams St	Yale Rd	√	√	√	√	√	
16	Main St	Spadina Ave	√	√	√	√	√	
17	Main St	Princess Ave	√	√	√	√	√	
18	Main St	Wellington Ave	√	√	√	√	√	
19	Young Rd	Luckakuck Way	√	√	√	√	√	
20	Young Rd	Airport Rd	√	√	√	√	√	
21	Young Rd	Hocking Ave	√	√	√	√	√	
22	Young Rd	Chilliwack Central Rd	√	√	√	√	√	
23	Young Rd	First Ave	√	√	√	√	√	
24	Young Rd	Princess Ave	√	√	√	√	√	
25	Broadway St	Chilliwack Central Rd	√	√	√	√	√	
26	Broadway St	First Ave	√	√	√	√	√	
27	Menzies St	Yale Rd	-	√	√	√	√	need pole for ped. Signal
28	Broadway St	Yale Rd	-	√	√	√	√	need pole for ped. Signal
29	Mall Entrance	Luckakuck Way	√	√	√	√	√	
30	Vedder Mountain Rd	Cultus Lake Rd	√	√	√	N.A.	N.A.	
31	Topaz Dr	Luckakuck Way	√	√	√	√	√	
32	Vedder Rd	Thomas Rd	√	√	√	√	√	
33	Spadina Ave	First Ave	√	√	√	√	√	
34	Vedder Rd	South Sumas Rd	√	√	√	√	√	Modified as full signal
35	Corbould St	Hodgins Ave	√	√	√	√	√	New Signal
36	Lickman Rd	Yale Rd	√	√	√	√	√	
37	Lickman Rd	Luckakuck Way	√	√	√	√	√	
38	Knight Rd	Topaz Dr	√	√	√	√	√	Modified as full signal
39	Mary St	Hodgins Ave	√	√	√	√	√	New Signal
40	Young Rd	Cheam Ave	√	√	√	√	√	New Signal
41	First Ave	Cheam Ave	√	√	√	√	√	New Signal
42	Ashwell Rd	Hodgins Ave	√	√	√	√	√	New Signal
43	Thomas Rd	Promontory Rd	√	√	√	√	√	New Signal
44	Yale Rd	Vibe Rd	√	√	√	√	√	New Signal
P1	Vedder Rd	Manuel Rd	√	√	√	√	√	
P2	Charles Rd	Yale Rd	√	√	√	√	√	
P3	Peach Rd	Keith Wilson Rd	√	√	√	√	√	New Pedestrian Signal
P4	Tyson Rd	Mid-block	√	√	√	√	√	New Pedestrian Signal
62 [2]	Vedder Rd	Hwy 1 WB off	√	√	√	N.A.	N.A.	New Highway Signal
63 [2]	Vedder Rd	Hwy 1 EB off	√	√	√	N.A.	N.A.	New Highway Signal
67 [2]	Lickman Rd	Hwy 1 EB off	√	√	√	N.A.	N.A.	New Highway Signal

1. Intersection Numbers follow City of Chilliwack Documentation.
2. Intersection Numbers follow the 2007 Traffic Count Program.
√ denotes "Checked" and N.A. denotes "Not Applicable".

Using the above concepts, the recommended improvements are summarized in TABLE B.6. With these improvements, the intersection operational performance is expected to be an overall level of service C or better. Synchro outputs of the recommended signal timings are shown in APPENDIX S3. Some turning movements are still expected to operate at level of service D. Although the west leg (Kerr Avenue) at the intersection of Yale Road and Vedder Road is included, no development is completed at the leg during late 2007. It is recommended that the City may review the intersection again once traffic volumes are provided on Kerr Avenue.

TABLE B.6 RECOMMENDED SIGNALIZED INTERSECTION IMPROVEMENTS

INTERSECTION	LOS	IMPROVEMENTS		
		SIGNAL TIMING	SIGNAL PHASING	GEOMETRY
Vedder Rd & Watson Rd	C	Increase southbound left-turn green time	None	None
Yale Rd & Hodgins Ave	C	Optimize signal splits	Provide protected-permissive left-turn phases for eastbound and westbound	Re-paint the westbound shared left/through lane as through-only lane and add eastbound left-turn only lane
Vedder Rd & Luckakuck Way	C	Optimize signal splits	None	Provide an additional northbound through lane
Yale Rd & Young Rd/Wellington Ave	C	Optimize signal splits	None	Add exclusive northbound left turn lane
Vedder Rd & Knight St	C	None	None	Add exclusive eastbound right-turn lane
Yale Rd & Vedder Rd	B	Re-assess after the opening of the east leg at Kerr Avenue		
Yale Rd & Airport Rd	C	Optimize signal splits	None	Provide additional northbound and southbound through lanes
Young Rd & Airport Rd	C	Reduce cycle time and optimize signal splits	None	None
Yale Rd & Hocking Ave	C	Increase southbound, eastbound and westbound left-turn green times	None	None
Mall Entrances & Luckakuck Way	C	Increase northbound left-turn green time	None	None
Vedder Rd & Thomas Rd	B	Optimize signal splits	Provide protected-permissive left-turn phases for eastbound and westbound	None
Princess Ave & Main St	B	Increase eastbound and westbound green times	None	None
Vibe Rd & Yale Rd	A	Increase eastbound green time	None	None

Upgrade External Signal Hardware

The upgrading of the external signal hardware as indicated in TABLE B.4 should be considered including:

- Provision of pedestrian signal poles for Yale/Menzies and Yale/Broadway
- Provision of additional signal heads (one for each through lane) for the east-west approach at Vedder/Luckakuck.

Review of traffic signal hardware should be considered for the improved intersections at Vedder/Keith Wilson and Vedder/Stevenson. It is also recommended that the City review external signal hardware at regular intervals.

Review Signal Timing for Signal Progression

It was understood that several signal progressions are currently provided in Chilliwack including Vedder Road, Yale Road, Luckakuck Way, Young Road and Main Street. With the future change in traffic volumes, particularly after the introduction of the Evans Overpass, it is recommended that the City review the efficiency of signal progression along the above corridors, such as common cycle lengths and off-set times.

C Safety Plan

The purpose of the safety plan is to identify locations and intersections where collision risk is the greatest. A screening analysis of ICBC-reported collisions and police-reported collisions was conducted and a prioritized list of collision locations was prepared.

The analysis also focused on severity, cost, collision location, frequency, and collision rates. Collision data was analyzed for a 2-year period, from January 1, 2005 to December 31, 2006. A total of 4,047 collisions were reported to ICBC, and 1,780 collisions were reported to the Police. From the ICBC data, parking lot collisions were not included. For the majority of the analysis, ICBC data was used as specified by the City of Chilliwack. Police data was combined with ICBC data for the fatal collision analysis.

C.1 Collision Frequency and Collision Location

The reported crashes within the City were reviewed and the locations were broken down into six categories:

- Signalized - represents all collisions that occurred at a signalized intersection.
- Un-signalized - represents all collisions that occurred at a STOP-controlled intersection.
- Mid-block - represents all collisions that occurred in-between intersections.
- Highway Interchange - represents all collisions that occurred at the following interchanges along Highway 1 (Trans-Canada Highway): Lickman, Yale, Vedder, Young and Prest.
- Railway Crossing - represents all collisions that occurred at a railway crossing.
- Pedestrian Signal - represents all collisions that occurred at pedestrian signalized intersections.

The distribution of collisions between categories is summarized in FIGURE C.1.

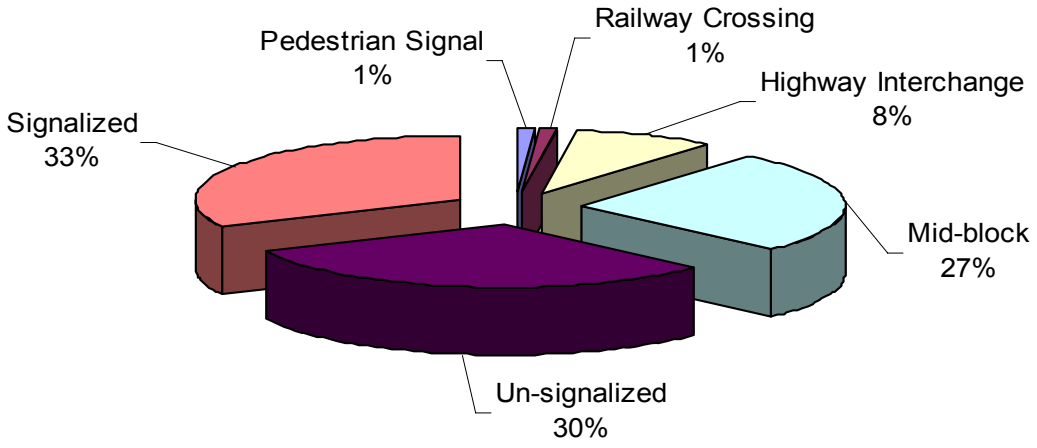


FIGURE C.1 DISTRIBUTION OF COLLISION LOCATIONS

A total of 2,282 collisions were reported as intersection collisions in the 2-year period which included signalized, un-signalized, and pedestrian signalized intersections. These account for approximately 64 percent of the total collisions. The highest number of collisions is occurring at signalized intersections with approximately 1,156 collisions for the two-year study period, or 51 percent of all collisions. Only 43 collisions were reported at railway crossings and 950 collisions were reported at mid-block locations.

C.2 Collision Severity

During 2005 and 2006, twelve fatal collisions were reported to ICBC and/or the police. Four occurred in 2005 and eight occurred in 2006. This is a considerable increase from the four fatal collisions reported between January 1999 and August 2000 (listed in the 2001 Transportation Plan). The twelve fatal collisions are summarized in TABLE C.1.

TABLE C.1 FATAL COLLISION CHARACTERISTICS

TIME AND DATE	LOCATION	TYPE	WEATHER CONDITION	ROAD SURFACE	PEDESTRIAN INVOLVED	CYCLIST INVOLVED	MAJOR CONTRIBUTING CAUSE	DESCRIPTION
April 19,05 6:30PM	Off road near Cultus Lake	Off-road right	Clear	Dry			Alcohol involved, speeding	Vehicle lost control and driver was ejected from vehicle
September 22,05 7:50AM	Industrial Way east of Yale Rd	Off-road left	Clear	Dry			Alcohol involved	Vehicle hit a road sign and flipped over
November 11,05 3:21AM	Hwy 1 and Lickman Rd I/C	Off-road right	Cloudy	Dry			Fell asleep	Vehicle lost control and went into ditch
December 17,05 4:50AM	4th Avenue and Nowell St	Pedestrian Involved	Unknown	Unknown	√		Crossing	Crossing pedestrian was killed by a hit-and-run vehicle
January 6,06 4:55PM	45904 Yale Rd	Pedestrian Involved	Raining	Wet	√		Crossing	Pedestrian was hit by vehicle coming out from gas station
May 2,06 5:16PM	Luckakuck Way	Bicycle Involved	Clear	Dry		√	Unknown	Cyclist was hit by a hit-and-run vehicle on shoulder
May 21,06 1:15PM	Vedder Mnt Rd and Forest Service Rd	Off-road right	Clear	Dry			Speeding	Vehicle swerved left to avoid a pot hole and ran off road
June 1,06 12:01PM	Railway Ave and Young Rd	Pedestrian Involved	Cloudy	Dry	√		Crossing	Crossing pedestrian was hit by vehicle
June 25,06 5:00AM	Chilliwack Lake Rd	Off-road left	Clear	Dry			Speeding	Vehicle lost control and went into ditch
June 28,06 9:00AM	Hocking Ave and Young Rd	Pedestrian Involved	Clear	Dry	√		Crossing	Crossing pedestrian hit by vehicle turning left at signal
November 11,06 6:00PM	Ballam Rd near McDonald Rd	Off-road right	Cloudy	Wet			Alcohol involved	Vehicle swerved to avoid an animal and went into the ditch
December 24,06 9:26PM	Wolfe Rd and Ashwell Rd	Off-road left	Raining	Wet			Alcohol involved	Vehicle lost control and went into ditch

The majority of fatal collisions (7 out of 12) were single vehicle, off-road collisions, which were related to high vehicle speed, alcohol and fatigue. Four pedestrians and one cyclist were killed within this 24-month period.

From January 2005 to December 2006, 1,362 injury collisions were reported and 2,667 property damage only collisions were reported. The severity distribution between fatal, injury, and property damage within the six different categories are summarized in FIGURE C.2.

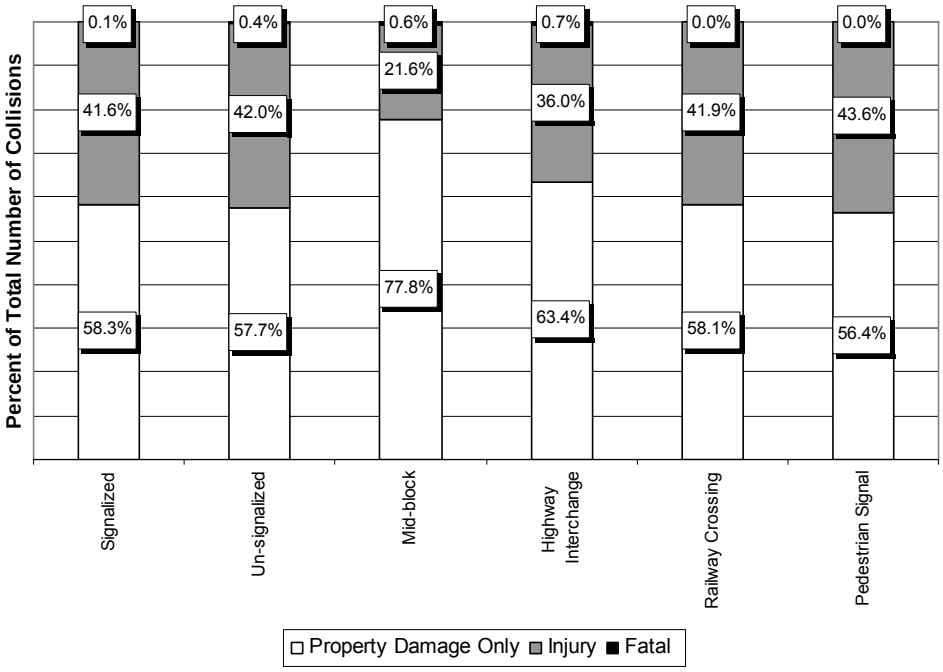


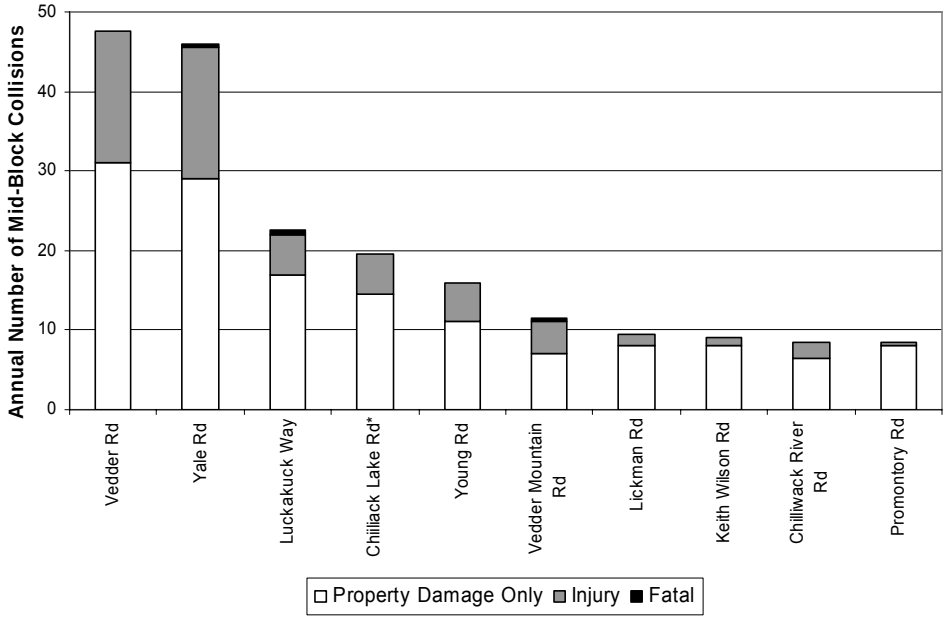
FIGURE C.2 SEVERITY COLLISION DISTRIBUTION (2005 AND 2006)

Collisions at pedestrian signals have the highest proportion of injury collisions as would be expected, since pedestrians could be injured with a minimal amount of impact compared to a vehicle. Injury collisions at unsignalized, signalized, and railway crossings all have proportions about 40 percent. Compared with the 2001 Transportation Plan, the percentages of injury collisions generally decreased for all location categories.

C.3 Mid-block Collisions

Collision Frequency

The top ten corridors with the highest mid-block collisions during the study period are shown in FIGURE C.3. The figure also shows the breakdown of the severity of mid-block collisions. The three corridors with the highest numbers of collisions are Vedder Road, Yale Road, and Luckakuck Way, which were also the three highest collision corridors in the 2001 Transportation Plan. They represent 10, 10 and 5 percent of the total reported mid-block collisions respectively. The high frequency of mid-block collisions on these corridors is expected due to the high traffic volumes and lengths of the corridors. The mid-block collisions reported on Chilliwack Lake Road may include the collisions occurred outside the City of Chilliwack, however no information indicated the actual locations for the majority of reported collisions.



**Include reported collisions outside the City of Chilliwack.*

FIGURE C.3 TEN CORRIDORS WITH THE HIGHEST NUMBER OF MID-BLOCK COLLISIONS (2005 AND 2006)

Collision Density

Block numbers were not included in most of the reported ICBC mid-block collisions. It was therefore assumed that the number of collisions was distributed evenly throughout the entire corridor. TABLE C.2 shows the three road corridors that have the highest number of collisions. They also have the highest collision density.

The highest mid-block collision density corridor is Yale Road with a density of 8.1 collisions per kilometre per year, followed by Vedder Road and Luckakuck Way. Yale Road extends from Vedder Road to the Agassiz-Rosedale Highway; however, there were few collisions reported east of Prest Road.

TABLE C.2 COLLISION DENSITY FOR THE THREE MAJOR ROAD CORRIDORS

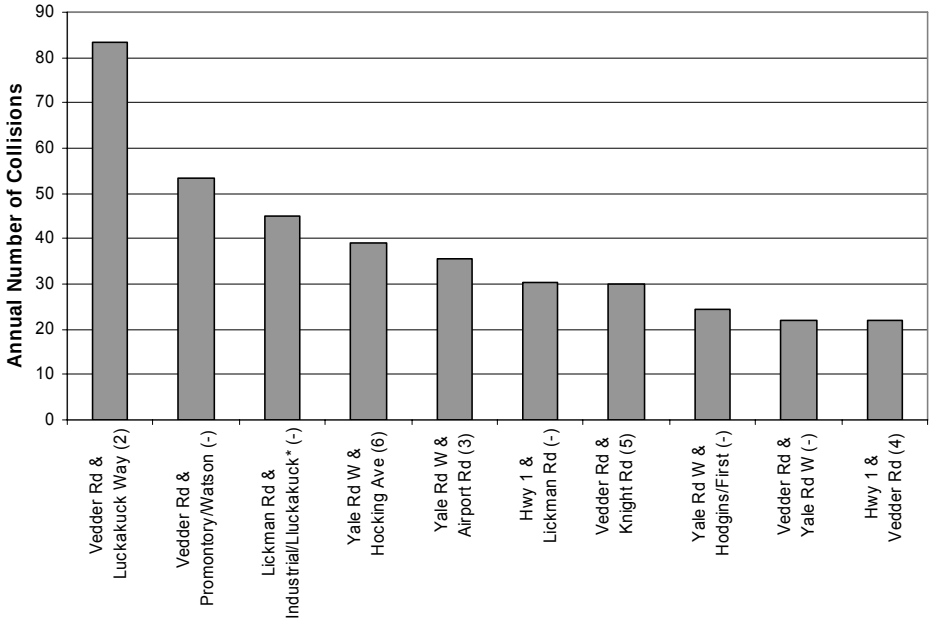
CORRIDOR	NUMBER OF MID-BLOCK COLLISIONS (2005-2006)	LENGTH OF CORRIDOR (km)	COLLISION DENSITY (collisions/km/year)
Yale Rd Vedder Rd to Prest Rd	92	5.7	8.1
Vedder Rd Yale Rd to Cultus Lake Rd	95	6.6	7.2
Luckakuck Way Lickman Rd to Young Rd	45	4.9	4.6

C.4 Intersection Collisions

This section includes all collisions at signalized, pedestrian-controlled, and un-signalized intersections. Highway 1 interchanges were also included; however, they are under the jurisdiction of the BC Ministry of Transportation. Collisions at railway crossing intersections were also included.

Collision Frequency

The ten intersections with the highest number of collisions are summarized in FIGURE C.4.



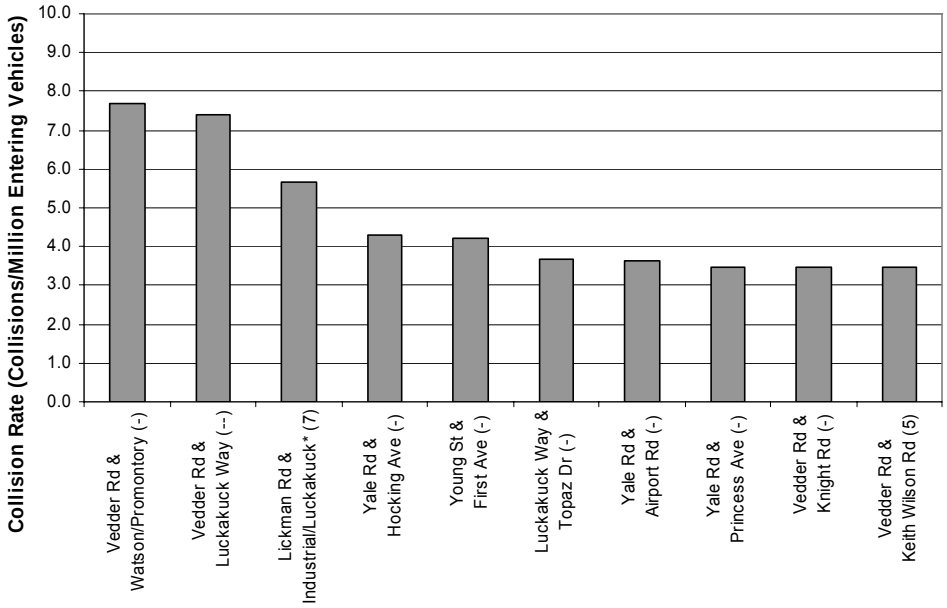
** Two intersections combined*
Figures in brackets show the rank number of the intersection calculated in the 2001 Transportation Study.

FIGURE C.4 TEN INTERSECTIONS WITH THE HIGHEST ANNUAL NUMBER OF COLLISIONS (2005 AND 2006)

The highest number of annual collisions was recorded at Luckakuck Way and Vedder Road with 84 collisions per year. The number of annual collisions at Luckakuck Way and Vedder Road is over six times higher that the values found in the 2001 Transportation Report. However, as the police reported data was used in 2001, it can not be directly compared to the 2005/06 ICBC claim data. In 2001, Vedder Road and Stevenson Road had the highest number of collisions with 12. The number of annual collisions at the same intersection has increased to 19 annual collisions, which is approximately a 27% increase but fall out of the 10 highest collision locations in the 2005 to 2006 data. Collisions recorded at Lickman Road intersections with Industrial Way / Yale Road and Luckakuck Way / Yale Road were combined in the ICBC record but separated from Highway 1 interchange at Lickman Road.

Collisions Rates

Collision rates per million entering vehicles indicate the comparison between collision risk and traffic volumes at intersections. The 10 intersections with the highest collision rates are summarized in FIGURE C.5.



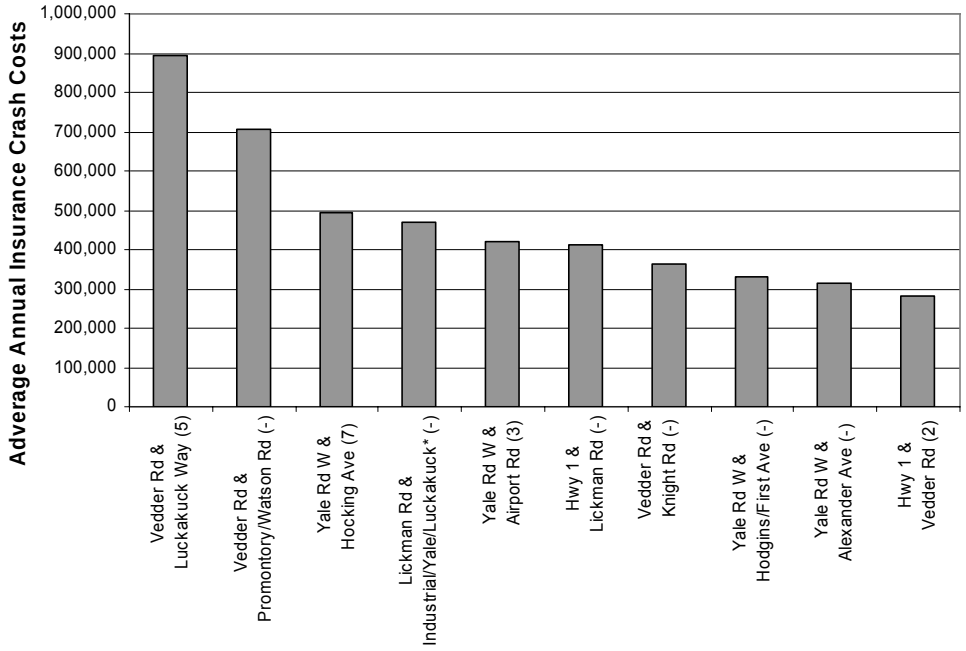
** Two intersections combined*
Figures in brackets show the rank number of the intersection calculated in the 2001 Transportation Study.

FIGURE C.5 INTERSECTIONS WITH THE HIGHEST COLLISION RATES (2005 AND 2006)

Only traffic volumes at signalized intersections were recorded in the 2007 Traffic Count Program, therefore, no collision rates were determined for the un-signalized and Highway 1 intersections. Vedder Road / Watson Road / Promontory Road intersection has the highest collision rate of 7.7 collisions per million entering vehicles. Vedder Road and Luckakuck Way intersection has a collision rate of 7.4. This intersection also has the highest number of annual collisions. In the 2001 Transportation Plan, the intersection with the highest collision rate was Evans Road and Knight Road (2.00 collisions per million entering vehicles), followed by Vedder/Stevenson (1.65) and Prest/Bailey (1.45). All three intersections are not in the top 10 list in the 2007 Study.

Collision Cost

The collision costs are based on annual insurance-reported crash costs. Collision cost is determined by the severity of the collision. There are three values given, namely property damage only (PDO) claims, injury claims, and fatal claims. ICBC has provided the estimated costs for each collision type for the period prior to 2007 which corresponds to the 2005 and 2006 data. Fatal cost is an estimated $282,000, injury approximately $25,000 and property damage approximately $1,600. The fatal collision costs stayed similar to the 2001 Plan, where injury and property damage only costs both decreased by 57 and 36 percent, respectively. Annual collisions were averaged between 2005 and 2006 and the intersections with the highest collisions costs are shown in FIGURE C.6.



** Two intersections combined*
Figures in brackets show the rank number of the intersection calculated in the 2001 Transportation Study.

FIGURE C.6 INTERSECTIONS WITH HIGHEST ANNUAL INSURANCE CRASH COSTS (2005 AND 2006)

Combined Ranking

Based on the analyzed ICBC 2005 and 2006 data and assuming equal weighting to each of the factors, the combined ranking of the highest collision intersections is shown in TABLE C.3. 7The three factors used to determine the ranking are:

- Collision Frequency;
- Collision Rate; and
- Collision Cost.

The potential collision reduction is not used in this study as the values were based on the collision rate for each intersection compared with the provincial average. To avoid duplication in the estimating the ranking of high collision locations, only the above three collision characteristics were considered in this study.

FIGURE C.7 shows the locations of high collision intersections with ranking.

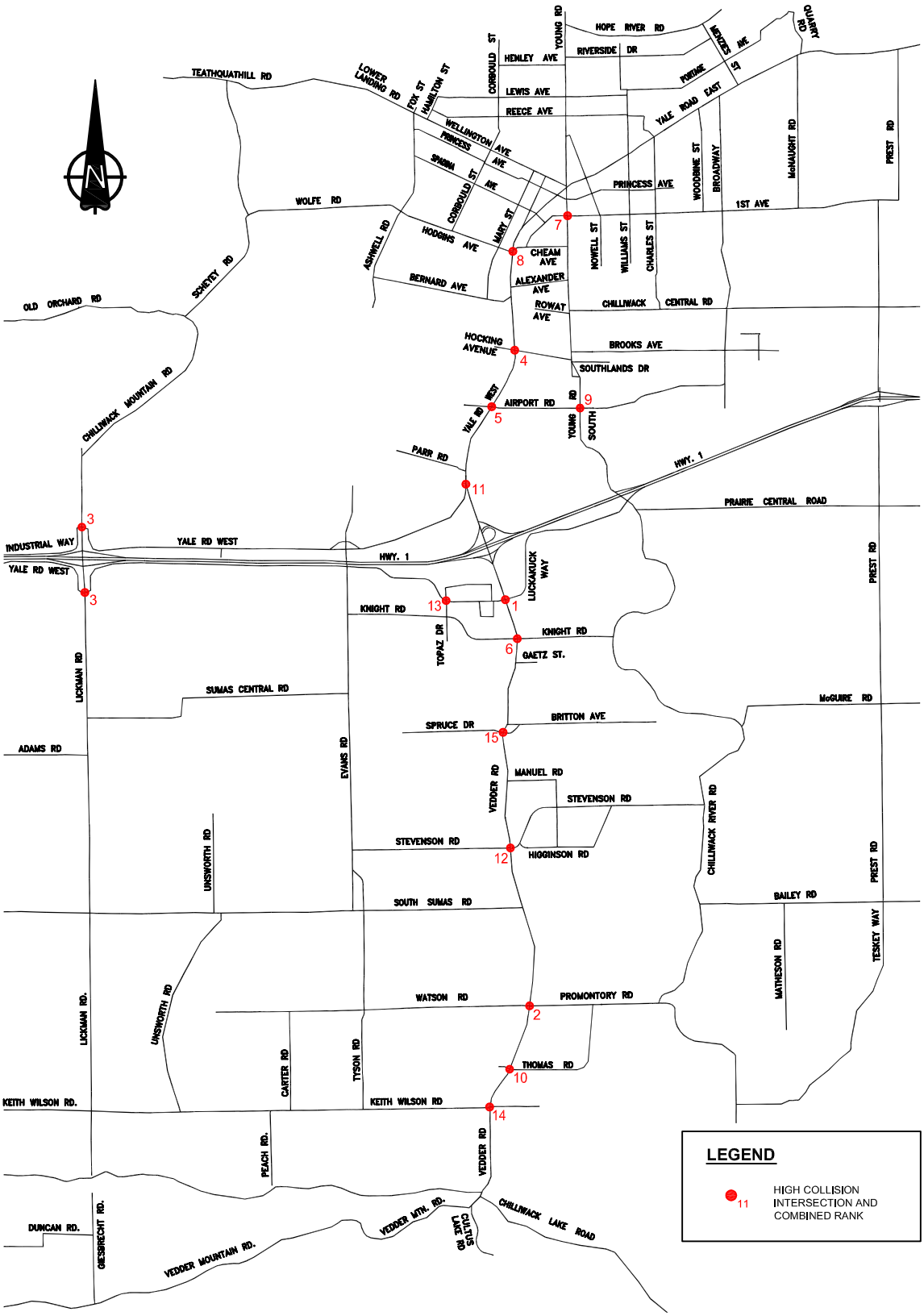


FIGURE C.7 LOCATION OF HIGH COLLISION INTERSECTION

TABLE C.3 RANKING OF HIGH COLLISION INTERSECTIONS (2005 & 2006)

2005/06 RANK NUMBER	INTERSECTION	TYPE	2001 RANK NUMBER
1	Luckakuck Way & Vedder Rd	Signalized	4
2	Vedder Rd & Promontory/Watson	Signalized	-
3	Lickman Rd & Industrial/Luckakuck Way[1]	Signalized	14
4	Hocking Ave & Yale Rd W	Signalized	11
5	Yale Rd W & Airport Rd	Signalized	2
6	Knight Rd & Vedder Rd	Signalized	8
7	Young Rd & First Ave	Signalized	-
8	Yale Rd W & Hodgins/First Ave	Signalized	-
9	Airport Rd & Young Rd	Signalized	10
10	Vedder Rd & Thomas Rd	Signalized	-
11	Vedder Rd & Yale Rd W	Signalized	-
12	Vedder Rd & Stevenson Rd	Signalized	1
13	Luckakuck Way & Topaz Dr	Signalized	-
14	Vedder Rd & Keith Wilson Rd	Signalized	-
15	Vedder Rd & Britton Dr/Spruce Ave	Signalized	-

NOTES: *1. Lickman Rd & Industrial/Luckakuck include both intersections*
- Denotes intersections not in a top 15 ranking position
The 2005/06 Ranking was based on the analysis of 2005 and 2006 collision data

Highway 1 intersections and the un-signalized ones are not included in the list as collision rates can not be determined without latest traffic counts at those intersections.

Differences in 2001 Transportation Plan

The remaining eight intersections that were in the top 15 ranking in the previous transportation plan are:

- Young Road & Yale Rd (Five Corners) [3]
- Evans Road & Knight Road [5]
- Vedder Road & Gaetz Street [6]
- Highway 1 & Vedder Road [7]
- Spadina Avenue & Yale Road [9]
- Menzies Street & Portage Avenue [12]
- Vedder Mountain Road & Cultus Lake Road [13]
- Bailey Road & Prest Road [15]

Square brackets denotes previous 2001 Transportation Plan ranking; for example Five Corners intersection had a previous ranking of three [3].

2007 Top Crash Locations

A list of top crash locations, including Highway 1 interchanges, reported in 2007 was also provided by City staff and indicated in TABLE C.4.

TABLE C.4 2007 TOP CRASH LOCATIONS

Rank	Top Crash Location
1	Luckakuck Way & Vedder Rd
2	Vedder Rd & Promontory/Watson
3	Highway 1 at Lickman Rd Interchange
4	Highway 1 at Vedder Rd Interchange
5	Cheam Ave & Hodgins Ave & Yale Rd
6	Yale Rd W & Airport Rd
7	Highway 1 at Prest Rd Interchange
8	Highway 1 at Yale Rd Interchange
9	Knight Rd & Vedder Rd
9	Vedder Rd & Stevenson Rd
9	Highway 1 at Young/Luckakuck Interchange
9	Hocking Ave & Yale Rd W
9	Vedder Rd & Yale Rd & Kerr Ave
10	Lickman Rd & Industrial/Luckakuck Way

C.5 Safer City

The Safer City report (Chilliwack Safer City, The Chilliwack Safer City Working Group 2006), was provided by the City for review. The objective of the Safer City program is to establish a sustainable process for significantly improving road safety in B.C. cities. Safer City is creating and increasing road safety by integrating the following initiatives:

- Police enforcement
- Engineering practices
- ICBC Road Improvement Program
- Autoplan Broker programs geared towards youth and communities
- BC Safety Council and BCAA programs
- Volunteer work (Speed watch, etc.).

They are targeting current drivers, future drivers and providing education and awareness of road safety. The Integration program is based on the “3 E’s” Enforcement, Education and Engineering. Past projects include:

- A new road network classification system
- An integrated corridor program targeting aggressive driving at intersections
- Conducting a community questionnaire
- Developing a local webpage
- Promoting ICBC road safety curriculum materials in SST schools
- Developing road form guidelines and processes.

Some future projects provided by the Safer City Coordinator are summarized in TABLE C.5.

The Safer City program focuses on immediate (existing changes) that provide concern and action for the long term (future changes). The Chilliwack Safer City Working Group is coordinating efforts of Chilliwack Engineering, Chilliwack RCMP, and the similar ICBC program.

TABLE C.5 FUTURE SAFER CITY PROJECTS

PROJECT	DATE
Network Classification Strategy	1st quarter of 2008
Road Form	2009
Safer School Travel	Ongoing
2008 Road Safety Review	1st quarter of 2008
Road Improvement Program	Ongoing
TIA Registry	2009
Integrated Corridor Project	Yearly Initiative
Establish speed monitoring corridors	2008
Develop Road Safety Satisfaction Survey	First done in 2003 and redo if needed
Hey Neighbour, Please Slow Down! Campaign	Ongoing

C.6 ICBC Road Safety Strategic Initiatives

The ICBC Road Safety Strategic Initiatives has utilized ICBC for participation and implementation of future and planned road improvement projects in Chilliwack. Since 2001, four traffic operations and safety review studies have been completed for the ICBC Road improvement Program, including (bracket number shows the completion year):

- Vedder Road Corridor (2002)
- Yale Road Corridor (2002)
- Evans Overpass/Connector (2006)
- Promontory Road and Chilliwack River Road (2007)

In addition, numerous road upgrading/improvement projects have been implemented in Chilliwack based on cost sharing strategy between ICBC, BC Ministry of Transportation and the City of Chilliwack. Major upgrading/improvement projects, project cost over $200,000, included (bracket number shows the completion year):

- Vedder Road corridor, Keith Wilson Road to Chilliwack Lake Road (2003)
- Highway 1 intersections at Lickman Road and Yale Road West / Luckakuck Way (2003)
- Young Road and Hocking Road intersection (2003)
- Vedder Road and Watson Road Intersection (2004)
- Young Road Corridor (2004)
- Highway 1, Vedder Road Interchange (2004)
- Yale Road and Highway 9 Roundabout (2004)
- Young Road , Railway Avenue to First Avenue (2005)
- Majuba Hill Road, Railway to Nikada (2005)
- First Avenue and Cheam Avenue Signalization (2006)
- Highway 1, shoulder widening, Vedder Canal to Vedder Road (2006)
- Highway 1, median cable barrier (2006 and 2007)
- Yale Road and Airport Road intersection (2007)
- Yale Road, Airport Road to Parr Road (2007)
- No.3 Road, Boundary Road to Yarrow Central Road (2007)

The total project costs involved in the road safety strategic initiatives was estimated as $32.5 Million from 2002 to 2007, including cost sharing of $1.3 Million from ICBC, $22.3 Million from BC MoT and $8.9 Million from the City of Chilliwack.

C.7 Recommendations

The analysis results identified that the number of collisions, collision rates and collision costs for the highest collision intersections are generally higher when compared to the 2001 Study. The top five high collision intersections are:

1. Luckakuck Way and Vedder Road
2. Vedder Road and Promontory Road (Watson Road)
3. Lickman Road and Industrial Way / Luckakuck Way / Yale Road West
4. Hocking Avenue and Yale Road West
5. Yale Road West and Airport Road

It was noted that all above intersections are located along Vedder Road and Yale Road corridors. The Vedder Road corridor is also determined as a corridor with the highest collision density in Chilliwack. Traffic operations and safety review studies for the Vedder Road and Yale Road corridors have been completed in 2002. Some road improvements were implemented in 2003 on Vedder Road between Luckakuck Way and Thomas Road and on Yale Road between Hodgins Avenue and Airport Road.

However, with a substantial increase in collision density (43 percent since the 2001 Study) and many high collision locations along these two corridors, it is recommended that traffic operations and safety review studies for Vedder Road and Yale Road corridors should be updated - safety analysis could be re-calculated and the recommendations could be re-assessed to provide a better picture for the City of the potential reason for increasing collision densities along these corridors. A safety review study for the Luckakuck Way corridor should also be considered.

It is recommended that the City continue to work with ICBC on road safety to help with funding and in providing project ideas. Potential opportunities for ICBC to participate in the safety review studies and the implementation of improvements may be considered.

The analysis results also indicated that there is a considerable increase in the number of fatal collisions since the 2001 Study. Most of the fatal collisions were related to high vehicle speed, alcohol involvement and driver fatigue. High proportion of pedestrian fatalities should also be addressed. It is recommended that police enforcement in vehicle speed and drinking-driving activities should be enhanced. In addition, education campaigns from the Safer City program should also be encouraged.

It was suggested in the 2001 Transportation Plan to include safety audits for major road building projects. Chilliwack has taken this into consideration and the three phase Evans Road connector and interchange project that is due to start construction in 2008 / 2009 will have a safety review study done prior to construction. A road safety audit will also be conducted for the proposed upgrading of Chilliwack Mountain Road. The completed road safety audit works included:

- Vedder Road Interchange Project (2002-2004)
- Yale Road, Airport Road to Parr Road (2004)
- Evans Road Connector Project (2007)
- Chilliwack Mountain Road and Sunrise Drive Intersection (2008)

A road safety audit will consider the safety of all road users and identify safety concerns with the design drawings, which are then passed on to the design team. An independent engineer conducts the safety review outside of the design consultation. Safety audits should continue to be a part of the design process for Chilliwack's major road projects to ensure the safety of the network.

Similar to the 2001 Study, a summary of the engineering countermeasures typically used to reduce the crash risk at intersections and along corridors has been established and is provided in TABLE C.5.

TABLE C.5 TYPICAL COUNTERMEASURE EXAMPLES

DEFICIENCY	SHORTER TERM / LOWER COST	LONGER TERM / HIGHER COST
Traffic Signal Operations / Capacity	Optimize signal timing Provide signal actuation Add all-red phase Optimize inter-green time Protect left-turn Add right-turn arrow Enhance signal progression Re-designate lane use Restrict movements Improve sight distance	Upgrade controller Add lanes Roundabout Grade Separation
Traffic Signal Visibility	Add signal backplates Upgrade signal lens size Modify visors Add signal heads Provide signal ahead sign Trim foilage	Re-build signal
Pavement Marking and Signing	Upgrade / refresh markings Upgrade / optimize signing Add overhead street name signs Provide raised pavement markers	
Access Management	Restrict access movements	Relocate, close, or consolidate access points Provide frontage roads
Pedestrian Facilities	Provide / upgrade marked crosswalks, sidewalk ramps, pedestrian signal Increase pedestrian signal timing Improve pedestrian-related signage	Provide pavement narrowing Provide sidewalk and sidewalk connections
Geometric Deficiencies	Provide warning signs Review posted speed limits Provide pavement overlay/grooving Delineate deficiencies Provide guardrail	Re-build deficient features to meet desirable standards
Driver Behaviour Issues	Provide advance warning flashers Add self-explaining road features Provide shoulder rumble strips Increase traditional enforcement Introduce automated enforcement	Education and training programs

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D Traffic Growth

D.1 Historic Traffic Growth

Historic growth trends were estimated from two-way traffic volumes provided in the *2007 Traffic Count Program*. Data was provided from 1995 to 2005 and summarized in TABLE D.1. The average annual growth rates are an average of the entire road network and do not identify individual growth along road corridors and segments. The maximum and minimum growth percentages at any particular count station in the averaged 3, 5, and 10 year time frames are also included.

TABLE D.1 HISTORIC TRAFFIC GROWTH

YEARS		AVERAGE ANNUAL GROWTH RATE		
FROM	TO	ALL ROADS IN CHILLIWACK	MIN VALUE	MAX VALUE
1995	2005	2.4% over 10 years	-9.83% Vedder Mtn Rd west of Cultus Lake Rd	14.23% Promontory Rd east of Vedder Rd
2000		2.1% over 5 years	-6.56% Vedder Mtn Rd west of Cultus Lake Rd	12.85% Teskey Way south of Bailey Rd
2002		2.0% over 3 years	-6.08% Luckakuck Way west of Young Rd	17.18% Teskey Way south of Bailey Rd

D.2 Future Traffic Growth

Recent traffic volumes and output from the 2007 EMME/2 Model Update prepared for this study, were reviewed to identify traffic growth expectations over 10 and 20 year periods. Forecasted traffic growth assumptions in the 2007 EMME/2 were compared with assumptions contained in two other planning documents, the *2004 EMME/2 Model Update* (Delcan) and the *1999 City of Chilliwack Official Community Plan*. The 1998 EMME/2 model update which the *2001 Transportation Plan* was based on is also included for comparison. See TABLE D.2 for comparison.

Residential Growth

Results from TABLE D.2 indicate that the population / household data from years 2007 to 2027 found in the 2007 EMME/2 model update expect to double in residential areas of the new communities. The populated areas are expected to increase by 72 percent, where rural areas are expected to increase by 19 percent. Overall the land use data from the two other EMME/2 models and the OCP have similar expected growths in the downtown area, but vary significantly in the new community and rural areas. The population / household data in the 2004 EMME/2 model update is substantially different from any of the other sources.

Commercial Growth

The employment data from years 2007 to 2027 found in the 2007 EMME/2 model update is expected to increase by 174 percent in the rural areas. The populated areas are expected to increase by 48 percent, where the new communities are expected to increase by 18 percent. Overall the employment data from the two other EMME/2 models and the OCP have similar expected growths in the downtown area, but vary significantly in the new community and rural areas.

TABLE D.2 COMPARISON OF GROWTH ASSUMPTIONS

SOURCE	PROPORTION OF INCREASED TRAFFIC ACCOMMODATED IN:		
	DESIFICATION AREAS: Chililwack Proper, Sardis-Vedder	NEW COMMUNITIES: Promontory, Chilliwack Mountain, Eastern Hillsides, Ryder Lake	RURAL/FARMING AREAS: Rosedale, East Chilliwack, Yarrow-Majuba Hill, Greendale-Lickman
RESIDENTIAL			
2007 EMME/2 model update[1]	72%	100%	19%
2004 EMME/2 model update[2]	50%	241%	110%
1998 EMME/2 model update[3]	69%	33%	-2%
Offical Community Plan[4]	63%	34%	4%
COMMERICAL / INDUSTRIAL			
2007 EMME/2 model update[1]	48%	18%	174%
2004 EMME/2 model update[2]	270%	36%	15%
1998 EMME/2 model update[3]	69%	31%	0%
Offical Community Plan[4]	no stated proportions; commerical redevelopment anticipated in Chilliwack Proper, Sardis-Vedder, and in Hillside Communities		

NOTES:
1. Compares increase between 2007 and 2027.
2. Compares increase between 2003 and 2025.
3. Compares increase between 1998 and 2010.
4. Based on 85,000 population.

D.3 Areas of Concern

FIGURES D.1, D.2, and D.3 show results from the 2007 EMME/2 model update of links that have expected volume-to-capacity (v/c) ratios in each direction in years 2007, 2017, and 2027 respectively. The significance of the v/c ratios is explained in the *2000 Highway Capacity Manual*.

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

0.60 < V/C < 0.85 (green colour shown): Traffic experiences some congestion with travel speeds 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 acceptances gaps in the through traffic decrease. Lane changing along the corridor becomes difficult. Delays at intersections increase with the average delay approximately in the range of 25 to 40 seconds which relates to a Level of Service (LOS) “D”.

0.85 < V/C < 1.00 (blue colour shown): Traffic flow becomes congested with long queues forming at intersections. Travel speeds are well below the posted speed limits. Un-signalized access to and from the corridor is difficult as gaps become infrequent – consideration for right in and right out access only. Intersection delays, on average, in range of 40 to 60 seconds which related to a Level of Service (LOS)"E".

V/C > 1.00 (red colour shown): Operations are generally at or near capacity, and usually occurred at breakdown or bottleneck. Traffic flow becomes heavily congested with significant queues forming at intersections. Vehicles are slow with lots of delays (stop-and-go condition). Intersection delays, on average, exceed 60 seconds which related to a Level of Service (LOS)"F".

The historic growth and anticipated traffic growth (relative to the 2007 base year used in the 2007 EMME/2 model update) on links with an anticipated v/c ratio of 0.6 or more are shown in TABLE D.3.

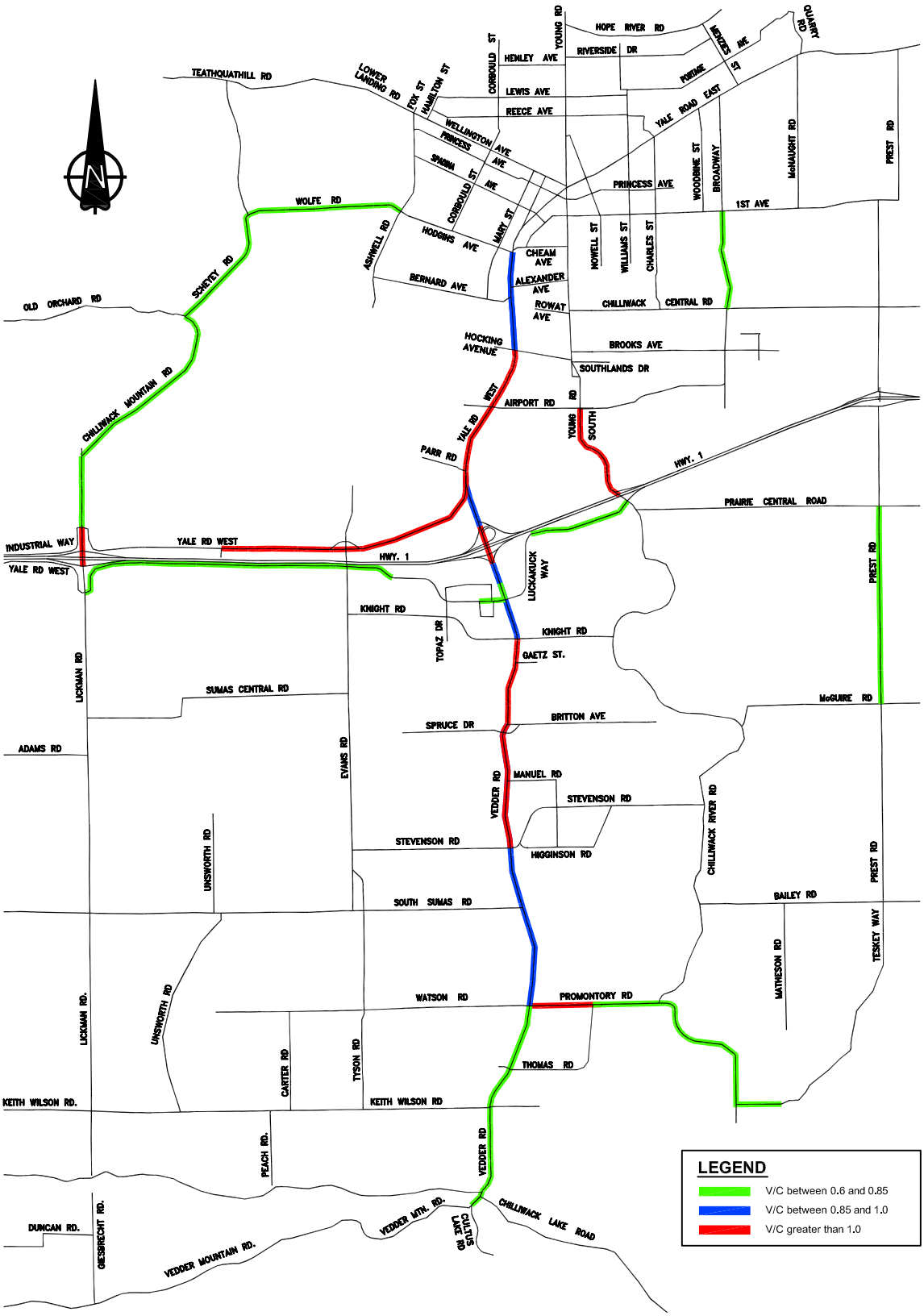

FIGURE D.1 LINKS WITH V/C RATIOS OVER 0.6 (YEAR 2007)

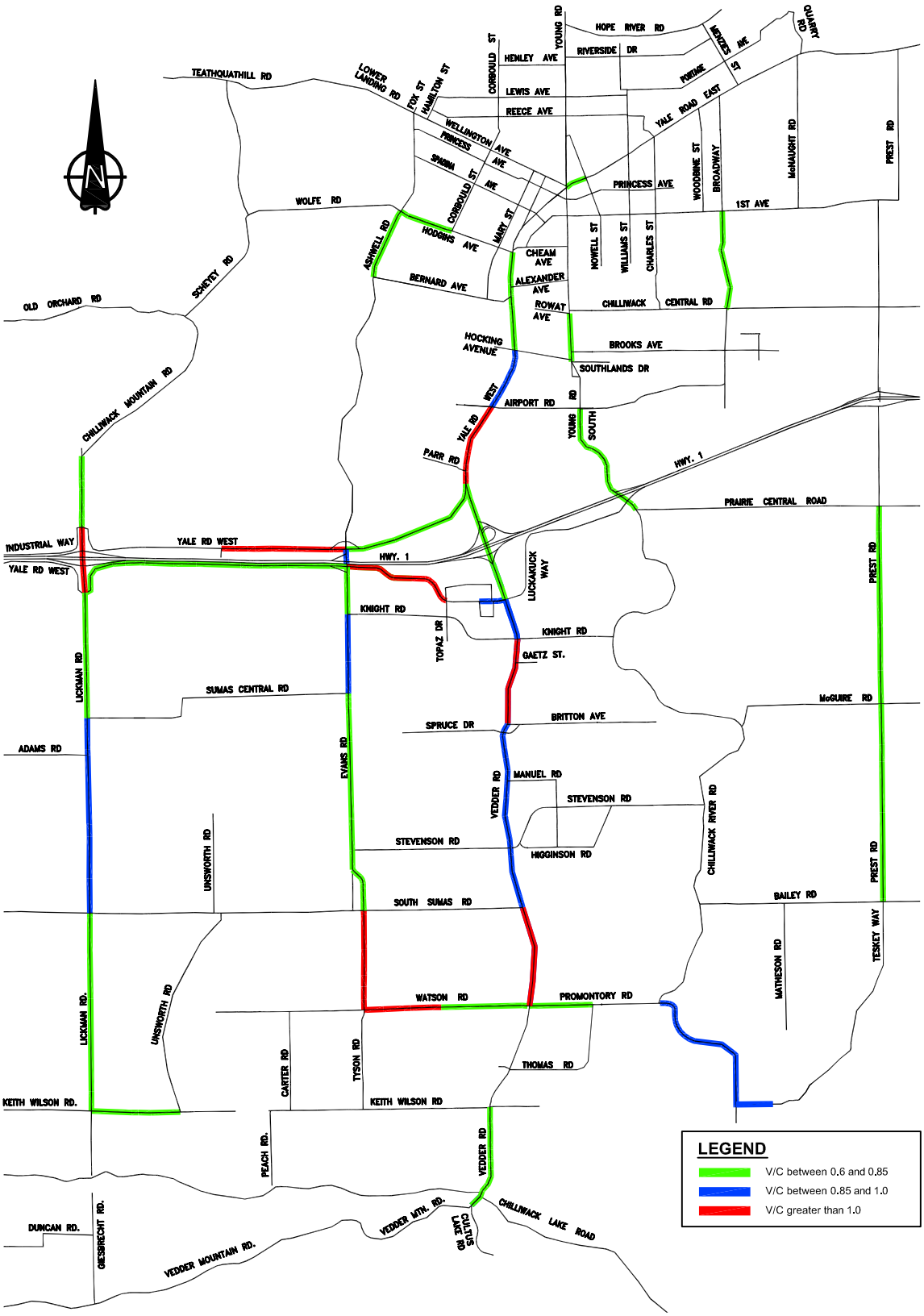

FIGURE D.2 LINKS WITH V/C RATIOS OVER 0.6
(YEAR 2017)

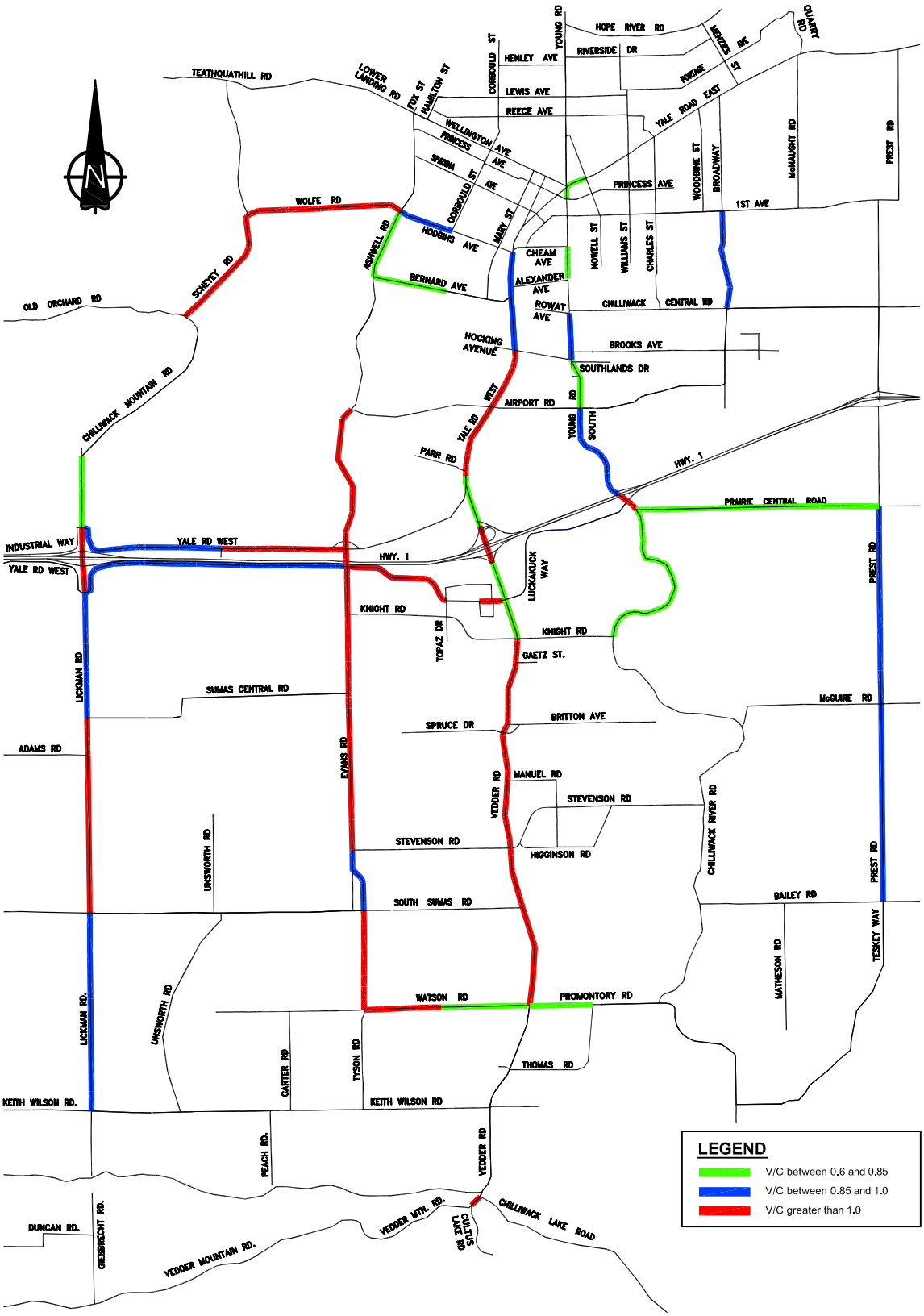

FIGURE D.3 LINKS WITH V/C RATIOS OVER 0.6
(YEAR 2027)

TABLE D.3 EMME/2 LINKS WITH V/C RATIOS OF 0.60 OR MORE

LINK		AVERAGE ANNUAL COMPOUNDED TRAFFIC GROWTH			V/C RATIO[2]		
		HISTORIC[1]	ANTICIPATED				
			to 2017	to 2027	2007	2017	2027
Airport Road	between Yale Rd W and Kierman St	2.8%	4.3%	5.2%	<0.6	<0.6	<0.6
	between Kierman St and Young Rd	2.8%	4.7%	3.5%	<0.6	<0.6	<0.6
Broadway	between Chilliwack Central Rd and First Ave	1.9%	1.2%	1.5%	0.6	0.7	0.9
Evans Road	between Bernard Ave and Airport Rd	-	-	-	-	0.6	0.6
	between Airport Rd and Hwy 1	-	-	-	-	0.6	1.1
	between Knight Rd and Sumas Central Rd	2.5%	7.4%	4.9%	<0.6	0.9	1.2
	between Sumas Central Rd and South Sumas Rd	2.5%	7.0%	4.7%	<0.6	0.8	1.1
Hodgins Avenue	between Yale Rd W and Corbould St	6.0%	1.8%	1.8%	<0.6	<0.6	<0.6
	between Corbould St and Ashwell Rd	6.0%	4.7%	3.1%	<0.6	0.8	1.0
Lickman Road	between Chilliwack Mnt Rd and Luckakuck Way	7.2%	2.0%	2.7%	0.8	0.8	0.7
	between Luckakuck Way and Adams Rd	2.1%	10.3%	6.2%	<0.6	0.8	0.9
Luckakuck Way	between Lickman Rd and Evans Rd	5.9%	-0.8%	0.2%	0.8	0.8	0.9
	between Evans Rd and Topaz Dr	5.8%	8.3%	4.5%	0.6	1.4	1.5
Vedder Road	between Yale Rd W and Hwy 1	0.5%	-3.9%	-0.9%	0.9	0.6	0.7
	between Knight Rd and Wells Rd	0.5%	-0.1%	0.3%	1.1	1.1	1.1
	between Wells Rd and Stevenson Rd	0.9%	-0.5%	0.6%	1.0	1.0	1.1
	between Stevenson Rd and South Sumas Rd	0.9%	0.5%	0.7%	1.0	1.0	1.1
	between South Sumas Rd and Promontory Rd	2.9%	1.7%	1.4%	0.9	1.1	1.3
	between Promontory Rd and Keith Wilson Rd	2.9%	1.4%	1.2%	0.7	<0.6	<0.6
	Chilliwack Lake Rd to Cultus Lake Rd	-0.2%	1.4%	1.0%	0.7	0.8	<0.6
Watson Road	between Tyson Rd and Coquitlam Rd	2.7%	6.1%	3.3%	0.6	1.0	1.1
	between Coquitlam Rd and Vedder Rd	2.7%	1.2%	0.9%	0.7	0.8	0.8
Yale Road East	between Five Corners and Williams St	-0.4%	0.9%	1.0%	0.6	0.6	0.7
Yale Road West	between Hodgins Ave and Hocking Ave	-0.4%	-1.6%	0.1%	0.9	0.8	0.9
	between Hocking Ave and Airport Rd	1.9%	-1.0%	0.3%	1.0	0.9	1.1
	between Airport Rd and Vedder Rd	1.9%	-0.5%	-0.8%	1.0	1.1	1.1
	between Vedder Rd and Evans Rd	4.9%	-3.9%	-12.3%	1.1	0.7	<0.6
	between Evans Rd and Atchelitz Rd	4.9%	4.4%	3.5%	1.1	1.1	2.2
	between Atchelitz Rd and Lickman Rd	4.9%	0.4%	5.8%	<0.6	<0.6	0.9
Young Road	between Knight Rd and Luckakuck Way	-0.1%	2.7%	2.3%	<0.6	<0.6	0.6
	between Luckakuck Way and Airport Rd	-0.1%	2.4%	2.1%	1.1	0.7	0.9
	between Airport Rd and Hocking Ave	0.3%	1.7%	2.1%	<0.6	<0.6	0.7
	between Hocking Ave and Chilliwack Central Rd	0.3%	2.5%	2.7%	<0.6	0.7	0.9
	between Hodgins Ave and Yale Rd/Wellington	0.1%	2.3%	2.3%	<0.6	0.6	0.7

NOTES: *1. Historical Growth shows average annual growth over a five-year period from 2000 to 2005*
2. V/C Ratios are from 2007 EMME/2 model update; shows the worse of the two directions
- Denotes unavailable connection

D.4 Recommendations

Based on the 2007 EMME/2 model results, the following road corridors/segments, with v/c ratios over 1.0, may be considered priority candidates for growth-related transportation improvements over the next 20 years:

Up to 2017

- Luckakuck Way between Evans Road and Topaz Drive
- Vedder Road between Knight Road and South Sumas Road
- Waston Road between Tyson Road and Vedder Road
- Yale Road West between Airport Road and Vedder Road
- Yale Road West between Atchelitz Road and Evans Road

Up to 2027

- Yale Road West between Hocking Avenue and Vedder Road
- Evans Road between Airport Road and South Sumas Road

With the introduction of the Evans Road Overpass and its interchange with Highway 1, it was found that some v/c ratios along a few road segments were reduced from greater than 1.0 to less than 1.0. These segments include Yale Road between Hocking Avenue and Airport Road, Yale Road West between Vedder Road and Evans Road and Vedder Road between Luckakuck Way and Airport Road. The v/c ratio of the Yale Road corridor between Vedder Road and Evans Road is expected to reduce in 2017 and increase over 1.0 by 2027.

The road segments with the highest v/c ratios are estimated at Luckakuck Way between Evans Road and Topaz Drive in 2017 (v/c ratio of 1.4) and Yale Road West between Evans Road and Atchelitz Road in 2027 (v/c ratio of 2.2).

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 20 years. The riding surface generally remains in good condition for about fifteen years, with preventative maintenance carrying the pavements through to the 20 year life. After this, the process of deterioration accelerates quickly. The pavement reaches a critical point at which the materials 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.

Generally, the practice should be that the highest priority for the street maintenance budget should be to apply it to those streets in good to fair condition. Rehabilitation of streets rated poor to very poor should be part of a planned program to bring those streets up to standard without cutting into the preventive maintenance budget. Over a period of years, this will result in an overall higher quality of pavement condition.

This is sometimes challenging as public perception may be that the wrong roads are getting 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 1,040 lane-kilometres), except the provincial highways. The total replacement value of the City's road pavement is in excess of $750 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 data collection program to evaluate the existing road conditions and to provide multi year 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 and 1996. 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 6.2. The minimum acceptable PQI is 3.5 and 4.5 for local roads and arterial / collector roads respectively.

E.3 2004 Pavement Assessment Report

The most recent report from the City of Chilliwack Super PMS program was produced in 2004 (*2004 Pavement Assessment Report by Stantec*). The results indicated that the 2005-network average PQI is predicated to be 6.2, implying 16.5 percent (171-lane kilometres) of the roadways were below the minimum PQI requirements. The 2000 network average PQI was 6.5 with 12.8 percent of network backlog.

The 2004 Report reviewed the annual pavement rehabilitation as recommended in the 2004 Capital Budget, the annual expenses varied between $1 Million and $2 Million from 2005 to 2014. The 2004 Capital Budget was also broken down to reflect the actual allocation of the funds - $100,000 to the Local network and the remaining funds to the Arterial/Collector network. Five other scenarios were also reviewed with an annual equally amount of $1 Million to $2.5 Million.

The study findings indicated the Local network will deteriorate substantially in the next 10-year period if funding remains at $100,000 annually. A funding stream of $750,000 annually would be needed to maintain the network at their present PQI and backlog. The Report also recommended increasing the Arterial/Collector network budget funding to at least the $1.75 Million annual level, preferably $2 Million.

E.4 Recommendations

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

- The estimated shelf life of PMS field data is 3 to 5 years. On this basis, additional field data collection (visual and structural) and a new report should be generated in 2009 to update the current PQI and to develop and update the yearly candidate roads for the next 5 year pavement rehabilitation plan.

- The City has been trying to maintain a PQI of 6.2. Based on the increase in oil prices, construction labour and material costs from 2004, it is estimated that the recommended yearly capital budget of $2.5 Million will not meet the requirements to maintain an average PQI of 6.2.

- A review of 2007 construction costs indicates that an increase of 15 percent should be applied to the 2004 capital cost budget to account for this escalation. A yearly review of construction cost should be conducted and capital budgets adjusted for escalating costs. This will help mitigate budget shortfalls in future year while trying to maintain an acceptable PQI.

- A review of the road rehabilitation work completed since 2004 should be done. The results should be summarized to determine if the proposed road rehabilitation in the 2004 report was followed. Any shortfalls to the 2004 candidate road list should be incorporated into the 2009 report and factored into the overall PQI report.

- The City should consider separating the candidate roads into the two categories: “poor to very poor” and “fair to good”. Capital Budgets should be allocated so that the rehabilitation dollars are spent on the “fair to good” roads as a priority which will ultimately increase the overall network PQI over the long term.

- Roads that are in “poor to very poor” condition, no longer fall under rehabilitation, and now are required to be reconstructed. These roads may require sub surface geotechnical reviews and pavement structure reviews. In conjunction with the structural assessment of these failed roads, other factors such as local improvements requirements, traffic volumes and upgrading requirements should be considered to determine if upgrades other than the travel surface should be considered at the same time.

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F Downtown Parking Study

This downtown parking study was conducted to determine the supply and demand characteristics for both public and private parking facilities in the downtown area; identify the effectiveness of current parking regulations and enforcement efforts; and formulate future parking management, control and pricing options.

This study updates information presented in the Chilliwack Downtown Parking Study in the 2001 Transportation Study. Three types of parking surveys were conducted, including a parking inventory survey, public parking usage survey, and private parking usage survey. The results of a parking questionnaire survey, undertaken by the Downtown Chilliwack Business Improvement Association (BIA), were also summarized and analyzed.

F.1 Study Area

FIGURE F.1 shows the study area which includes the historical downtown area consisting of commercial, retail and institutional developments, the residential area adjacent to downtown, the light industrial area north of Railway Avenue, the Chilliwack District Hospital and Exhibition Park. The off-street parking lot at the new Prospera recreation centre is outside the study area and was not included in this study. The study area is the same as that in the 2001 study.

Based on site observations, the following roads have been revised:

- the intersection of Bole Avenue and Young Road is closed and a new north-south street connecting Bole Avenue and Victoria Avenue; and,
- a section of Birch Street, between Alexander Avenue and Chesterfield Avenue, is closed.

The traffic surveys and analysis are based on the new street arrangement.

F.2 Parking Inventory Survey

To update data on the current parking supply and regulations in the Chilliwack downtown area, a parking inventory survey was conducted on Tuesday, October 30, 2007. A follow-up inventory review was conducted on Monday, November 5, 2007 to clarify and summarize the data collected during the parking usage surveys. Three categories of parking facilities were examined in this study, including public on-street, public off-street and privately-owned off-street parking spaces.

Public parking spaces, both on-street or off-street, are defined as those provided, maintained and enforced by the City and designed for the use of the general public. Private parking spaces (all off-street) are defined as those provided within private properties and reserved for private use. TABLE F.1 summarizes the parking inventory data requirements for the public and private parking facilities study. For the public on-street parking spaces, the term “block curb face” defines a portion of the surveyed curb delineated between two intersections. Details of the data obtained from the parking inventory are discussed in the following sections.

TABLE F.1 PARKING INVENTORY DATA REQUIREMENT

DATA	PUBLIC PARKING		PRIVATE PARKING OFF-STREET
	ON-STREET	OFF-STREET	
Location	Street name and block curb face	Street number and name	Street number and name
Supply	Number of spaces	Number of space	Number of space (excluding space within secure garages)
Regulation	Time limit, hours of operation and no parking zone	Time limit and hour of operation	Parking space users (tenant parking, customer/employee, visitor/employee or reserved parking)
Type of Facility	Parallel, angle or 90 degree	Surface lot	Surface lot and/or garage

Public Parking Inventory

The number of on-street parking spaces was counted for each block curb face within the study area where parking spaces were marked on the pavement. On a block curb face with unmarked parking spaces, the parking supply was estimated based on the length of curb available for parking and by applying the parking dimensions of seven metres, as recommended by the *Traffic Engineering Handbook* published by the Institute of Transportation Engineers, 1999.

As in the 2001 study, the parking stalls along the south side of Spadina Avenue between Ashwell Avenue and Corbould Street were considered off-street parking. These 273 parking stalls mainly serve Exhibition Park and the occupancy rates are heavily related to the schedule of local sports events such as hockey games. With the opening of the off-street parking lot for the Prospera Centre, it could be the overflow parking lot for any major/sell-out events. To avoid affecting the occupancy rate of on-street parking in the downtown area, the parking stalls near Exhibition Park were excluded from the on-street parking supply in this study and are considered as public off-street parking supply.

A total of 1,387 on-street parking spaces were counted in the study area. This figure compares with a total of 1,507 on-street parking spaces reported in the 2001 Study (both excluding the parking spaces for Exhibition Park), representing an 8 percent reduction. FIGURE F.2 shows the location of on-street parking in the area.

The public off-street parking facilities within the study area were also surveyed. A new public gravel parking lot with 32 spaces (estimate only as no pavement markings shown for each stall) was located at the corner of Court Lane and Young Road, as well as a 60 to 70 space gravel lot along Yale Road East between Young Road and Nowell Street. There are no time limits for these gravel lots. Including the parking stalls near Exhibition Park, a total of 686 to 696 off-street parking spaces were counted within the study area. TABLE F.2 shows the summary of off-street public parking lots which is also shown in FIGURE F.2.

The public on-street parking was primarily parallel curb parking, with the exception of angle parking adjacent to Chilliwack District Hospital on Menholm Road, some road sections along the west side of Mary Street and on the south side of Wellington Avenue between Main Street and Yale Road West. 90-degree parking spaces were observed on the north side of Bole Avenue between College Street and Young Road.

December, 2008

LEGEND

- NO PARKING
- 15 or 30 MINUTE
- 1 HOUR
- 2 HOUR
- 3 HOUR
- NO TIME LIMIT
- OFF-STREET PARKING AREA
- 00 - OFF-STREET PARKING SPACES

FIGURE F.2 PUBLIC PARKING INVENTORY

December, 2008

TABLE F.2 SUMMARY OF OFF-STREET PARKING LOTS

NAME	LOCATION	SUPPLY	REGULATION	
			TIME LIMIT	TIME LIMIT EFFECTIVE
Library	45860 First Ave.	39	2-hour	Anytime
Princess	45915 Princess Ave.	73	3-hour	9am - 5pm
Empress Lane	46027 To 46055 Princess Ave.	58	2-hour	Anytime
Open Gravel Lot	46190 Yale Road East	60 to 70	No Time Limit	Anytime
Spadina	Spadina Ave.	273	No Time Limit	Anytime
Victoria	46006 to 9355 Victoria Ave	151	3-hour	Anytime
Open Lot	9347 to 9343 Young Road North	32	No Time Limit	Anytime
	Total	686 to 696		

All public off-street parking facilities consisted of surface lots with marked parking spaces. On-street parking and public parking lots were generally free-of-charge, with the exception of the public pay lot along Main Street.

Parking regulations for public parking were indicated by regulatory signage. The time limits for public parking within the study area were three hours, two hours, one hour, 30 minutes or 15 minutes. “No Parking” zones were present on some road sections due to the road geometry and traffic volumes. TABLE F.3 provides an overall summary of the public parking supply of on-street and off-street facilities. The time limit of public parking is also shown in FIGURE F.2.

TABLE F.3 PUBLIC PARKING INVENTORY SUMMARY

REGULATIONS	2007 STUDY				2001 STUDY			
	ON-STREET		OFF-STREET		ON-STREET		OFF-STREET	
	Spaces	Percent	Spaces	Percent	Spaces	Percent	Spaces	Percent
No Time Limit	522	37.6%	383	54.4%	666	44.2%	600	69.4%
Three Hours	287	20.7%	224	31.8%	225	14.9%	265	30.6%
Two Hours	534	38.5%	97	13.8%	577	38.3%	0	0.0%
One Hour	25	1.8%	0	0.0%	22	1.5%	0	0.0%
30 Minutes	9	0.6%	0	0.0%	8	0.5%	0	0.0%
15 Minutes	10	0.7%	0	0.0%	9	0.6%	0	0.0%
TOTAL	1387	100.0%	704	100.0%	1507	100.0%	865	100.0%

In general, the time limits for public parking adjacent to commercial, retail and office developments range from 15 minutes to three hours. Public parking spaces near residential developments usually have a longer time limit or no time restriction. It was found that 38 percent of the on-street parking spaces within the study area have no time restrictions, while three-hour and two-hour restrictions comprised 21 and 39 percent, respectively.

Only 3.1 percent of the total on-street parking spaces within the study have a time limit of one hour or less, generally along Hodgins Avenue (adjacent to the hospital), Nowell Street (adjacent to the cinema), and Yale Road East (near the post office).

In addition to the new gravel and pay lots, a two-hour time limit is imposed for the public off-street parking lots located at the Chilliwack Library and on Empress Lane. For the public off-street parking stalls along Spadina Avenue, there are no time restrictions. 45925 Victoria Avenue, Breezeway parking lot and parking along Corbould Avenue, as indicated in the 2001 study, no longer exist.

The details of the public on-street and off-street parking inventory are listed in APPENDIX S3.

Private Parking Inventory

The private parking inventory is summarized and tabulated in APPENDIX S3. The private parking inventory data is referenced alphabetically by street name and the civic address of the private development.

A parking inventory survey was conducted for parking spaces located on private properties within the study area. Similar to the 2001 study, parking spaces within single-family residential properties were excluded from this study. It was noted that multi-family developments with secure parking could not be accessed, and were therefore not surveyed. However, visitor parking spaces outside the secure parking garages were counted and are indicated as "Garage + Surface Lot" in APPENDIX S3. A total of 5,187 privately owned parking spaces were counted in the study area. Compared with 5,150 spaced in the 2001 study, the number of private parking stalls are constant in the last six years.

All private off-street parking for commercial, retail and office developments in the study area consisted of surface lots. The parking facilities for multi-family dwelling units were either surface lots or parking garages. An hourly or daily parking charge is required for use of the parking lots near the hospital.

F.3 Land Use Sectors

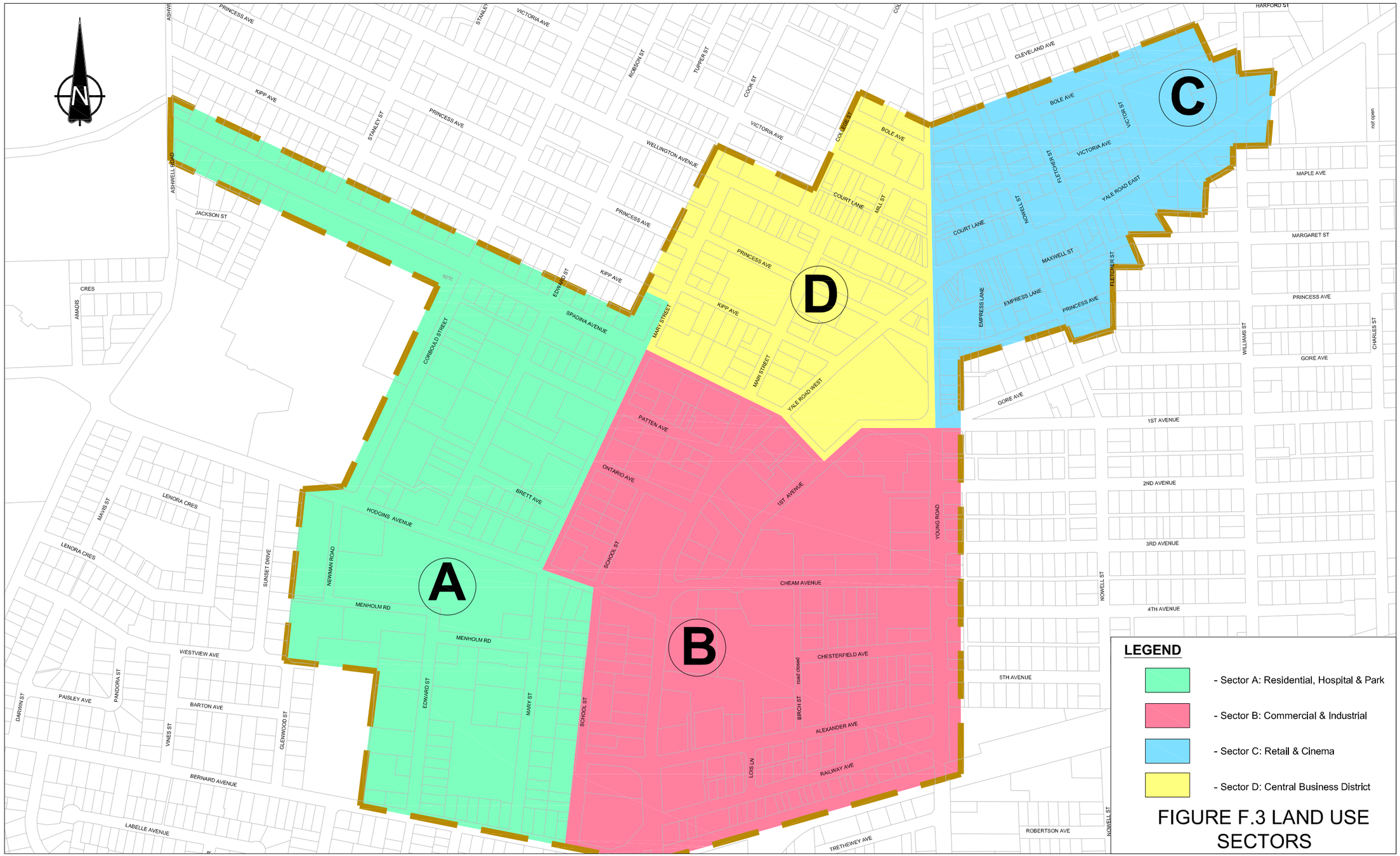
Similar to the 2001 study, parking usage characteristics were summarized for four land use sectors based on their land use characteristics. The four land use sectors are shown in FIGURE F.3 and described below:

- Sector A (Residential, Hospital and Park) – western part of the study area, mainly residential and institutional developments, including Chilliwack District Hospital, Exhibition Park, St. Mary Church and schools. Public on-street parking spaces generally have 2-hour restrictions. Public off-street parking areas are located along Spadina Avenue. The major private off-street parking lots are associated with the hospital.

- Sector B (Commercial and Industrial) – southeastern part of the study area, mainly commercial and industrial developments. Public on-street parking restrictions range from two to three hours in the north to no time restrictions in the south. Numerous no parking zones were located along Yale Road, First Avenue, School Street, Cheam Avenue and Young Road. A public off-street parking lot is located on First Avenue adjacent to the Chilliwack Library. Major private off-street parking lots include the parking lot for the Rhombus Hotel, Safeway and Southgate Shopping Centre.

ISL Engineering and Land Services

City of Chilliwack
2007 Transportation Plan



LEGEND

- Sector A: Residential, Hospital & Park
- Sector B: Commercial & Industrial
- Sector C: Retail & Cinema
- Sector D: Central Business District

FIGURE F.3 LAND USE SECTORS

December, 2008

- Sector C (Retail and Cinema) – northeastern part of the study area, mainly commercial and retail developments which include the cinema on Yale Road East. Public on-street parking restrictions are mainly two or three hours. Parking spaces with 15-minute and 30-minute restrictions are located along Nowell Street and Yale Road East. No parking zones are found along Nowell street and Princess Avenue. Public off-street parking lots are located on Yale Road East, Victoria Avenue and Princess Avenue. Major private off-street parking lots are located at the post office and First Heritage.

- Sector D (Central Business District) – northern part of the study area, mainly commercial and office developments. The majority of public on-street parking spaces are marked and restricted to two or three hours. Public off-street parking spaces are located on Victoria Avenue, Princess Avenue, and the converted pay lot on Main Street. Most of the private parking spaces are located behind the commercial developments and are accessed through the back lanes. Major private off-street parking lots are located at Salish Plaza.

TABLE F.4 PARKING INVENTORY BY SECTOR

SECTOR	PUBLIC ON-STREET	PUBLIC OFF-STREET	PRIVATE PARKING	TOTAL PARKING FOR SECTOR
A	553	273	1,328	2,154
B	114	39	2,344	2,497
C	368	279	693	1,340
D	352	258	822	1,432
TOTAL	1,387	704	5,332	7,423

Table F.4 above shows the total public and private parking inventory for each sector. The majority of parking in the downtown Chilliwack area is located in sectors A and B. In each of those two sectors, there is generally more private parking available than public parking, as opposed to sectors C and D, which have about the same amount of private parking as they do public parking. This may be because the properties in sectors C and D have fewer spaces to provide private parking.

F.4 Public Parking Usage Survey

The usage of public parking spaces is characterized by the occupancy rate, parking duration and turnover rate. Violations of the time limit restrictions are also an indication of the current parking usage characteristics. Parking deficiencies were identified by analyzing these parking usage characteristics in conjunction with current parking regulations and levels of parking supply.

The public parking usage survey was conducted between 0900 and 2000 hours on Tuesday, November 20, 2007 to determine the usage characteristics of public parking spaces in the study area. Data was collected at each block curb face to determine the occupancy rate. The surveyors followed established routes and counted the number of parked vehicles at each block curb face. The routes were designed such that the turn-around time was one hour.

Occupancy Rate

The parking occupancy rate is defined as the proportion of the parking supply that is occupied by parked vehicles. A high parking occupancy rate indicated the parking spaces are well utilized. The occupancy rate varied throughout the day and was surveyed hourly. The hourly variation, as shown in FIGURE F.4, indicates the peak occupancy rate and period of peak occupancy.

FIGURE F.4 shows a relatively stable average occupancy rate between 1000 and 1500 hours, followed by a gradual decrease after 1500 hours. The occupancy rate then increases slightly at 1900 hours due to evening activities such as restaurant dining and attending the cinema.

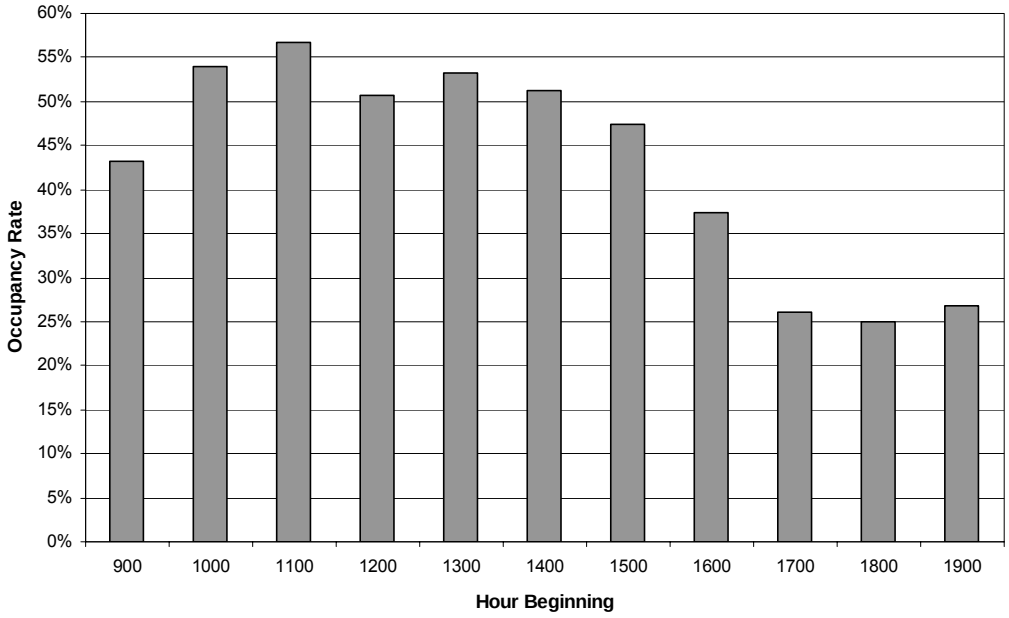


FIGURE F.4 HOURLY PUBLIC PARKING OCCUPANCY RATE

Compared to the 2001 study, the average occupancy rates in 2007 are generally higher. The high occupancy rates are due to the increase of parked vehicles and the reduction of available on-street parking stalls from year 2001 to year 2007. Based on the 2001 report, FIGURE F.5 shows the surveyed number of public parking spaces identified during the survey period in 2001 and 2007.

To identify the existing public parking usage characteristics, average public parking occupancy rates were determined for each block curb face and public parking lot. The peak period between 1000 and 1600 hours was used to determine the average occupancy rate since these are the hours of operation for most businesses and offices in the study area. The average parking occupancy rate for each land use sector is shown in FIGURE F.6.

The results in FIGURE F.6 indicate that the parking occupancy rate for Sector A (residential, hospital and park) varied between 35 and 60 percent in the peak period. The average occupancy rate for the public off-street parking along Spadina Avenue was about 5 percent. Relatively high average occupancy rates (over 75 percent) were recorded adjacent to the hospital and along Hodgins Avenue, Menholm Avenue and Newman Street. The high occupancy rate along Edward Street can be attributed to the many construction projects along that street.

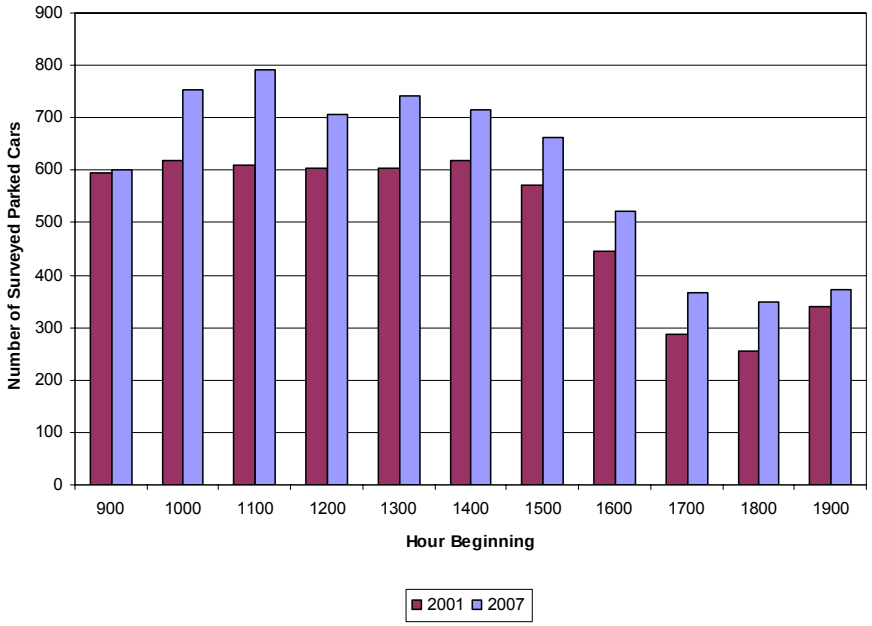


FIGURE F.5 NUMBER OF PARKED VEHICLES SURVEYED

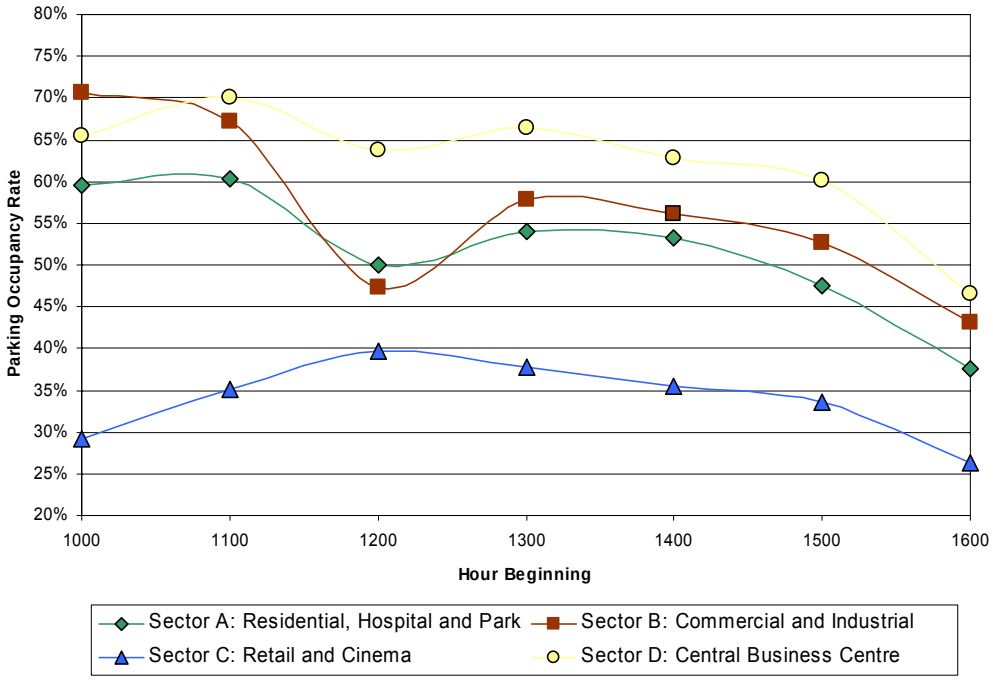


FIGURE F.6 HOURLY PUBLIC PARKING OCCUPANCY RATES FOR LAND USE SECTORS

The parking occupancy rate for Sector B (commercial and industrial) was as high as 70 percent and as low as 43 percent during the peak period. The average occupancy rate for the public off-street parking on First Avenue (for the Library) was 48 percent. Lower occupancy rates were recorded within the industrial area, where private parking spaces are usually located right in front of the developments. Higher occupancy rates were determined for the commercial developments in the north part of Sector B, such as on Patten Avenue and Ontario Avenue.

The parking occupancy rate for Sector C (retail and cinema) was about 35 percent during the peak period. The average occupancy rate for the public off-street parking on Victoria Avenue was 35 percent. However, the average occupancy rate for the public parking lot on Princess Avenue was only 24 percent during the survey period. Relatively low occupancy rates were recorded along the north-south streets such as Victor Street and Fletcher Street, and relatively high occupancy rates were observed along the east-west avenues such as Yale Road East and Victoria Avenue. The higher occupancy rates may be attributed to the higher traffic volumes on the east-west roads. The high occupancy rate at Yale Road East and Victoria Avenue may be attributed to construction workers parking on the street while working on a large multi-family housing development under construction. There is an increase in the public parking occupancy rate after 1800 hours which is attributed to the cinema and local restaurants. The large gravel lot on Yale Road East had an occupancy rate of about 25 percent.

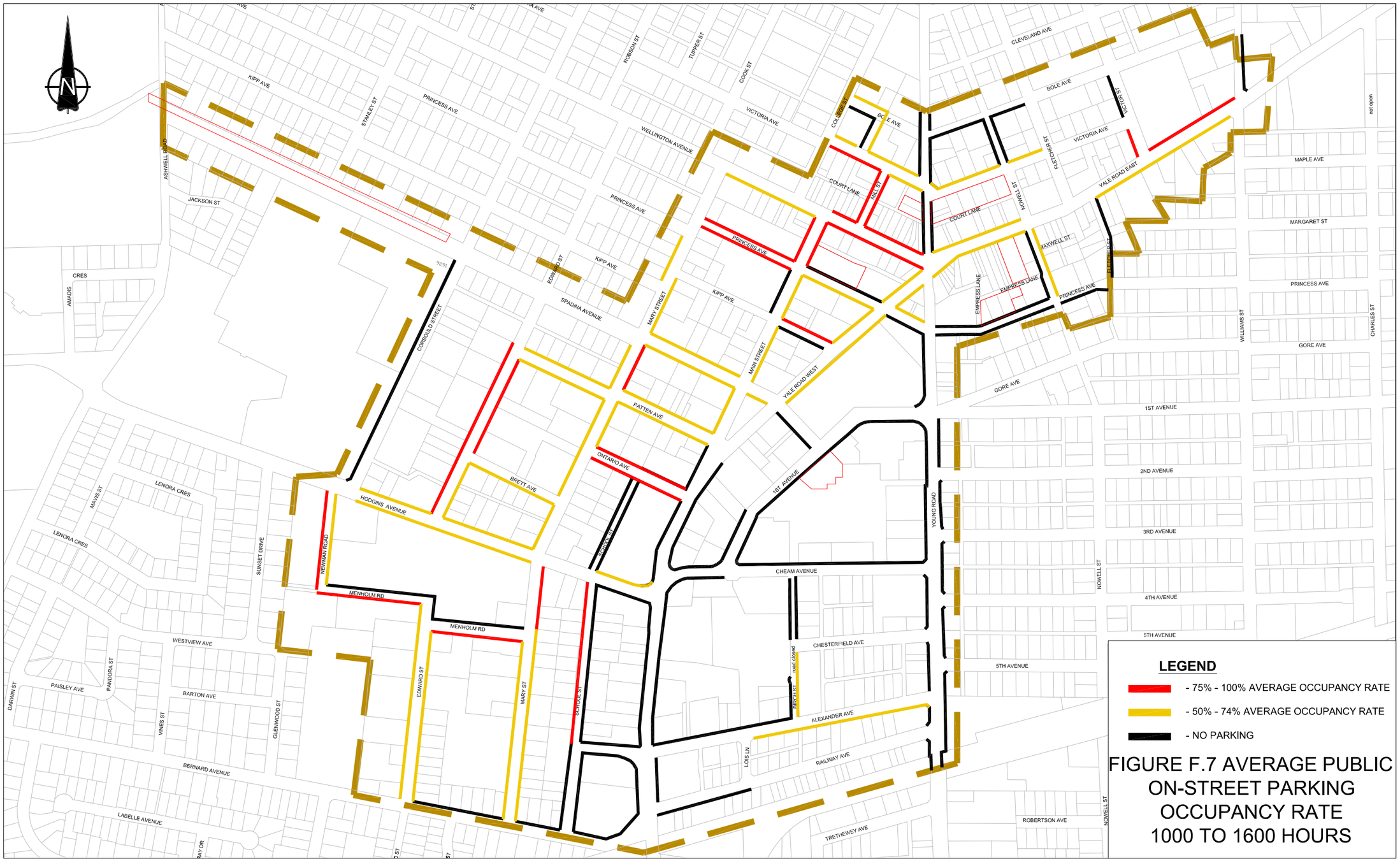
The parking occupancy rate for Sector D (Central Business District) was the highest in the study area, at approximately 65 percent during the peak period. Several block curb faces recorded occupancy rates of 100 percent during the peak period. The average occupancy rate for public off-street parking on Princess Avenue, west of Young Road, was 88 percent. However, the occupancy rate was reduced by almost half after the normal office and commercial operating hours. The pay lot (near Main Street) and gravel lot on Young Road had lower occupancy rates of 30 percent and 40 percent, respectively.

The average public on-street parking occupancy rates were divided into three groups: over 75 percent, 50 to 74 percent, and less than 50 percent. FIGURE F.7 shows the average occupancy rates between 1000 and 1600 hours. At a block curb face with an average parking occupancy rate over 75 percent, there is a relatively low probability that a motorist will be able to find a parking space closer to their destinations. It may be desirable to explore parking management options in these areas.

Parking Duration and Turnover Rate

Parking duration is defined as the length of time that a vehicle is parked in one space. For this study, parking duration was broken down into less than 1.5 hours, between 1.5 hours and 3 hours, and over 3 hours. Parking less than 3 hours is generally found adjacent to commercial developments. Residential areas are generally provided with parking over 3 hours for residents.

The turnover rate is defined as the number of vehicles that are parked in a space within an hour. The combination of short-term parking limits and appropriate enforcement would result in a higher turnover rate. A location with a low parking turnover rate indicates that a proportion of the parking spaces are being occupied by long-duration users. Reducing the proportion of long-duration users would increase the turnover rate, thus increasing the supply of parking for short duration users. For this study the turnover rate is simply considered as the reciprocal of the parking duration.



LEGEND

- 75% - 100% AVERAGE OCCUPANCY RATE
- 50% - 74% AVERAGE OCCUPANCY RATE
- NO PARKING

FIGURE F.7 AVERAGE PUBLIC ON-STREET PARKING OCCUPANCY RATE 1000 TO 1600 HOURS

December, 2008

To determine the parking duration and turnover rate, a vehicle licence plate survey was conducted for each block curb face and public parking lot between 0900 and 2000 hours on Tuesday, November 20, 2007. A sample size of approximately 20 percent was used in this study. The surveyors followed established routes and recorded the licence plates of vehicles parked in selected spaces at one-hour intervals. The results are summarized in FIGURE F.8.

For Sector A, the average parking duration was 2.0 hours, compared to 2.8 hours in 2001. However, the average parking durations at different locations ranged between short-term and long-term. Along Hodgins Avenue and Mary Street, which have parking time restrictions of one or two hours, the average parking duration was generally less than two hours. The average parking durations along Edwards Street, Patten Avenue and Brett Avenue, where no time restriction is posted for on-street parking, were over three hours.

For Sector B, the average parking duration was 1.4 hours compared to 0.9 hours in 2001. Customers and employees tend to use the private parking lots for long-term parking. Long-term on-street parking was identified along First Avenue, Spadina Avenue, Railway Avenue, Chesterfield Avenue and Birch Street.

For Sector C, the average overall parking duration was 2.1 hours, which was double the duration observed during the 2001 survey. The average parking duration at different locations ranged from less than one hour to over three hours. The average parking duration for the east-west roads was generally lower than that for the north-south roads. On Bole Avenue between William Street and Victor Street, parking duration was over three hours, mainly due to the construction site nearby.

For Sector D, the average parking duration was 1.6 hours compared to 1.3 hours in 2001. With 2-hour or 3-hour time restrictions, the on-street parking usually had a higher turnover rate and shorter parking duration. However, the average parking durations along Bole Avenue and Kipp Avenue were 3.9 hours and 4.6 hours, respectively.

Parking Violation

A parking violation is defined as a vehicle parked in the same spot longer than the regulated time limit or a vehicle parking in a “No Parking” zone. FIGURE F.9 indicates the locations of vehicles observed violated the parking time limit during the parking duration survey as well as the locations where people have parked in the “No Parking” zones.

On-street parking violations were identified along the south side of Menholm Road, on the north side of Hodgins Avenue between School Street and Yale Road West, and on both sides of Mary Street adjacent to the hospital. Parking violations were also observed along Yale Road West, Kipp Avenue, Victoria Avenue, Young Road, and Spadina Avenue and may be attributed to insufficient employee parking for some small retail shops in the area. There were also parking violations noted on Bole Avenue, Edward Street, Victor Street and Brett Avenue, but these violations were most likely due to the workers doing construction on new multi-family developments being built.

Vehicles parked in “No Parking” zones were also observed along the south of Ontario Avenue; both sides of Mary Street intermittently between Brett Avenue and Princess Avenue; the north sides of Patten Avenue, Princess Avenue, and First Avenue; Young Street, Mill Street and Main Street; and both sides of Yale Road East.

F.5 Private Parking Usage Survey

Since private parking spaces are not maintained or enforced by the City, only the parking occupancy rate was determined. The parking occupancy rate is defined as the proportion of parking spaces that are occupied by parked vehicles. Private parking occupancy rates were calculated to determine parking utilization and to form a basis for review of the current City Bylaws.

A private parking usage survey was conducted between 0900 and 1800 hours on November 27 and November 28, 2007 (Tuesday and Wednesday). The number of parked vehicles within the private parking lots was recorded at one hour intervals. Single-family residential properties were not surveyed and multi-family developments with secure parking areas that could not be accessed were not surveyed. The observed hourly parking occupancy rate is shown in FIGURE F.10. The hourly variation shows an increase in parking occupancy rate from 0900 to 1100 hours, and a sudden decrease from 1600 hours. The percentages are similar to the 2001 study, which has the percentages ranged from 45 to 58 percent and dropped to 38 percent at 1700 hours.

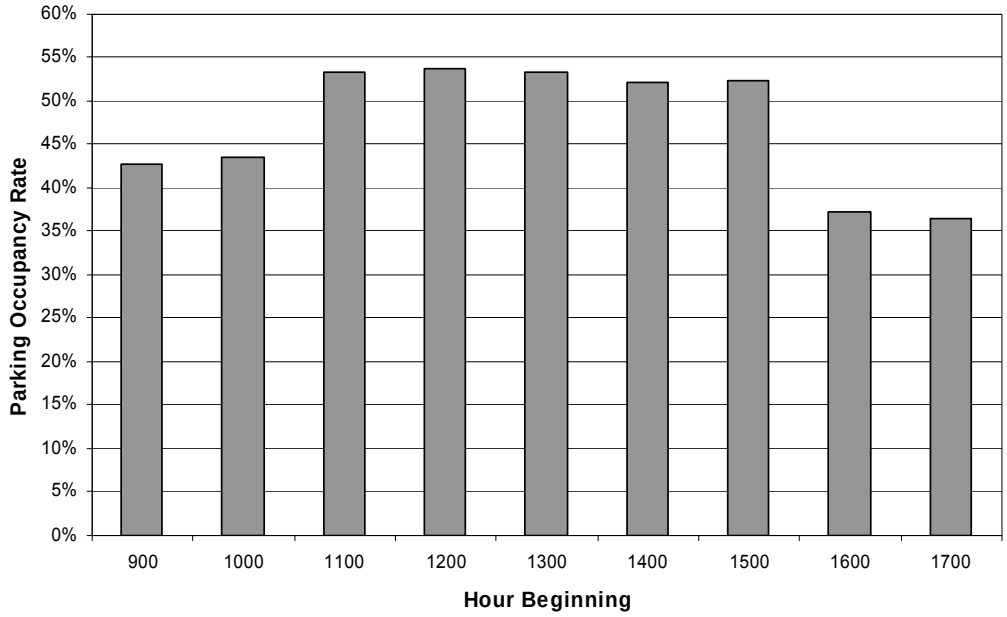


FIGURE F.10 HOURLY PRIVATE PARKING OCCUPANCY RATE

An average occupancy rate was determined for each private parking lot between 0900 and 1800 hours, and the results are summarized in APPENDIX S3. Similar to the public parking usage survey, the average private on-street parking occupancy rates were subdivided into three groups: over 75 percent, 50 to 74 percent, and less than 50 percent. The results are shown in FIGURE F.11. At a private parking lot with an average parking occupancy rate over 75 percent, there is a higher probability that motorists will tend to use nearby public on-street parking rather than the private lots.

For the study area, the average occupancy rate was observed to be 45 percent. The average occupancy rates on a lot-by-lot basis ranged between zero and 100 percent. Approximately 87 percent of the private parking lots have an average parking occupancy rate of less than 75 percent.

LEGEND

- OVER 3 HOURS PARKING DURATION
- 1.5 TO 3 HOURS PARKING DURATION
- LESS THAN 1.5 HOURS PARKING DURATION
- NO PARKING

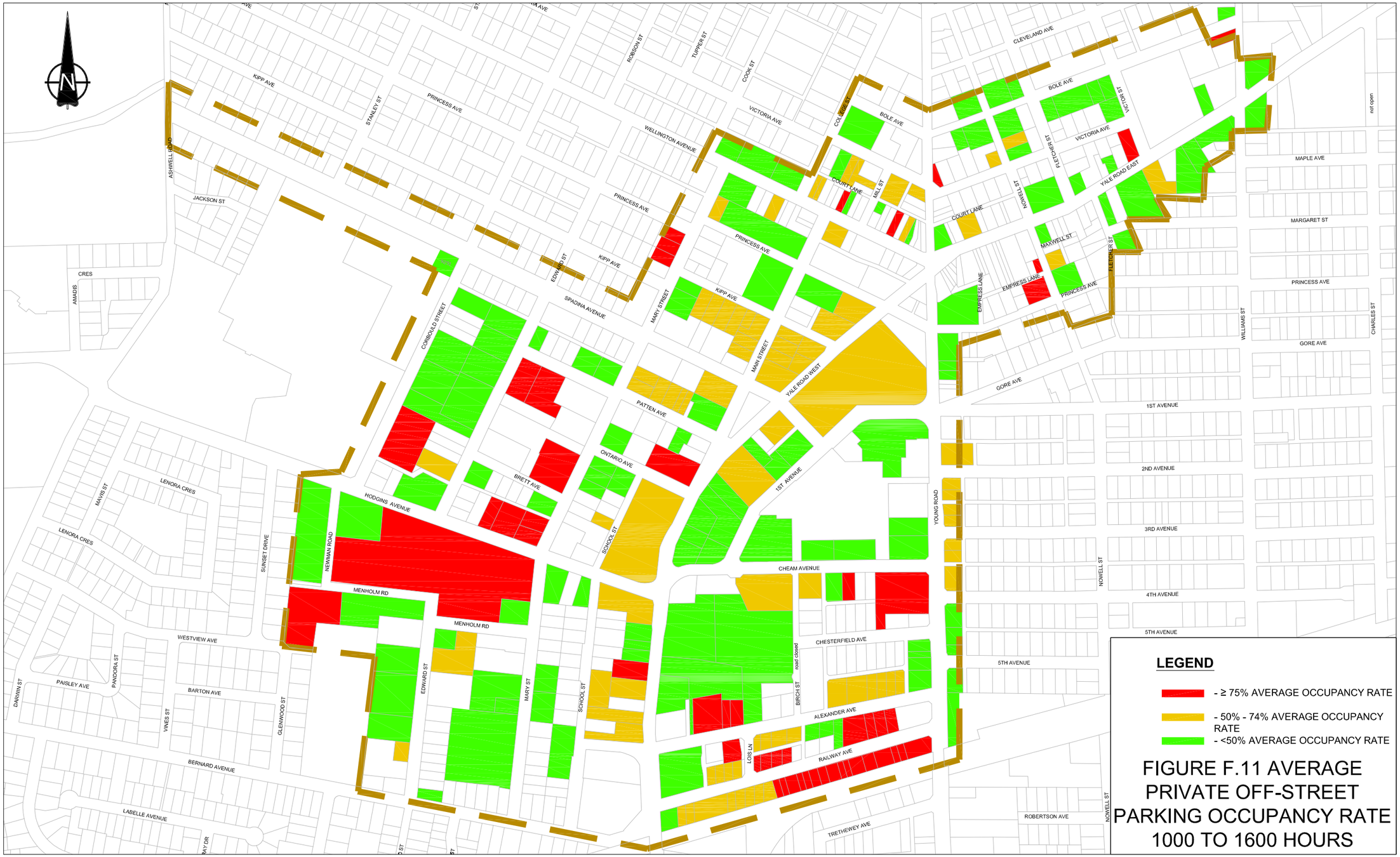
FIGURE F.8 AVERAGE PUBLIC ON-STREET PARKING DURATION 1000 TO 1600 HOURS

LEGEND

- PUBLIC ON-STREET PARKING WITH VEHICLES VIOLATING THE PARKING TIME LIMIT, OR PARKING ILLEGALY

FIGURE F.9 PARKING VIOLATIONS

December, 2008



LEGEND

- ≥ 75% AVERAGE OCCUPANCY RATE
- 50% - 74% AVERAGE OCCUPANCY RATE
- <50% AVERAGE OCCUPANCY RATE

FIGURE F.11 AVERAGE PRIVATE OFF-STREET PARKING OCCUPANCY RATE 1000 TO 1600 HOURS

December, 2008

For private parking in multi-family developments, the average occupancy rates ranged between zero percent and 86 percent. The average occupancy rates of commercial developments varied with each business, and were observed to range between zero percent and 100 percent. The average occupancy rate of the Chilliwack District Hospital was observed to be 78 percent for the combined parking lots of the hospital and daycare center.

F.6 Parking Questionnaire Survey

A parking questionnaire survey was conducted to elicit data on the parking characteristics relating to businesses located within the study area. Information was collected on specific parking related factors such as number of employees and their parking requirements. Additional data with respect to gross floor area, type of business, and perceived effectiveness of local parking regulations was also collected.

The questionnaire was distributed by the Downtown Chilliwack BIA to all businesses in the study area in November/December 2007. A total of 125 valid responses were returned by the deadline, compared to only 44 from the 2001 study. A sample questionnaire sheet and a summary of the responses are shown in APPENDIX S4. The summarized results of the questionnaire are shown below in TABLE F.5.

The results of the questionnaire indicated that the estimated proportion of employees who drive to work was 89 percent, compared to 83 percent in the 2001 study. However, based on the perception of the respondents, the number of available employee parking spaces was increased to 0.79 spaces per employee from 0.45 space per employee in the 2001 study. This significant increase might be due to the much larger sample size of the survey for the 2007 study.

The questionnaire responses indicated that 58 percent of respondents perceive that customer parking is inadequate, which was also the major concern for the 2001 study. The survey also indicated that 41 percent of the respondents perceive that employee parking is inadequate and 36 percent of respondents are concerned about safety in public parking lots. Compared to the 2001 study, a much higher proportion of respondents identified safety in public parking lots and unreasonable time limit regulations as one of their major concerns. A slightly higher proportion identified lighting within public parking lots as a major concern. On the other hand, a lower proportion of respondents perceived that parking was too far away or that the signage for public parking lots was poor. The proportion of respondents who perceived parking as a problem near their business increased from 66 percent in the 2001 study to 68 in the current parking study.

Some common comments made by respondents were that employees often had to compete heavily with other businesses' employees for parking, and those that did get parking, abused time limits. Respondents also commented that they wished the public pay lot was free. The detailed summary results for the parking questionnaire surveyed in November/December 2007 are included in APPENDIX S4.

TABLE F.5 PARKING QUESTIONNAIRE SUMMARY

PARKING CONCERNS	PERCENT OF RESPONSES		
	2007 STUDY	2000 STUDY	1989 STUDY
Inadequate parking spaces for customers	58%	50%	49%
Inadequate parking spaces for employees	41%	43%	38%
Available parking located too far away	19%	32%	16%
Unreasonable parking regulation / time limits	30%	14%	21%
Inadequate enforcement of parking regulation	10%	2%	8%
Safety within public parking lots	36%	23%	n/a
Insufficient lighting for public parking lots	35%	30%	n/a
Poor signage for public parking lots	19%	27%	n/a
Poor pedestrian access between businesses and public parking lots	2%	7%	n/a
Other	25%	9%	11%
Parking is a problem near my business	68%	66%	75%

NOTES: *n/a – not available*

F.7 Rental Parking Spaces in Public Off-Street Parking Lots

Based on information provided by the City, a maximum of 185 public parking spaces can be leased to monthly users. Spaces are located in four public lots (Ebcon, Courthouse, Empress Breezeway and Vault parking lots) for $0 - $35 per month with no time restrictions. The current rental information for these four public lots in the downtown area is summarized in TABLE F.6

Since the 2001 study, the City has introduced a new public parking lot behind the Vault Pub along Young Road. The public parking lot at 45911 Princess Avenue has had its capacity reduced by almost half, from 114 to 76 spaces. The City has also changed the monthly rental charges for each public parking lot by various amounts per lot. TABLE F.7 below shows the comparison of the 2001 parking rental system and the current 2007 parking rental system for the public off-street parking lots.

TABLE F.6 RENTAL INFORMATION FOR PUBLIC PARKING LOTS

PUBLIC PARKING LOT	NUMBER OF PARKING SPACES		
	TOTAL CAPACITY	RENTAL CAPACITY	CURRENTLY RENTED
Victoria Ave (Ebcon)	151	65	25
Princess Ave (Courthouse)	76	40	40
Young Road (Vault)	n/a	20	30
Princess Ave (Empress)	60	60	53
Total	287	185	148

NOTES: *n/a – not available*

TABLE F.7 COMPARISON OF 2001 AND 2007 PARKING RENTAL SYSTEM

PUBLIC PARKING LOT	TOTAL CAPACITY		RENTAL CAPACITY		MONTHLY RENTAL CHARGE	
	2001	2007	2001	2007	2001	2007
Victoria Ave (Ebcon)	151	151	65	65	$30	$35
Princess Ave (Courthouse)	114	76	34	40	$30	$25
Young Road (Vault)	n/a	n/a	n/a	20	n/a	$20
Princess Ave (Empress)	58	60	17	60	$30	Free
Total	323	287	116	185		

NOTES: *n/a – not available*

Based on the results of the parking survey, the average occupancy rate of the Victoria Avenue (Ebcon) parking lot dropped from 61% in 2001 to 35% in 2007. The Princess Avenue (Empress) parking lot's average occupancy rate rose slight from 18% to 24% in 2007. These low occupancy rates indicate that sufficient spaces should be available for monthly pass holders. However, the Princess Avenue (Courthouse) public parking lot had an average occupancy rate of 87%, suggesting that monthly pass holders will have a hard time finding parking in that lot.

F.8 Recommendations

The parking usage characteristics of the on-street and off-street public parking facilities were reviewed to identify areas of concern and to formulate improvement policies. The effects of various combinations of usage characteristics were analyzed to determine public improvement strategies and policies.

On-street parking with a high occupancy rate and long average duration indicates that parking spaces are being occupied by long-term users. If a higher turnover rate with shorter parking time is desirable, then a shorter time limit could be considered and augmented by appropriate enforcement.

A high occupancy rate and short parking duration indicates that parking demand is heavy and an increase in the supply of parking spaces may be required. A high proportion of vehicles violating the time limit indicates that enforcement may be needed and the provision of the long-term parking facilities may be necessary. A low occupancy rate indicates that the parking supply is adequate, and that no further action is required.

Blocks with on-street occupancy rates above 75 percent have been identified as candidates for parking improvements. New parking regulation may be explored, with consideration given to maintaining the consistency with the current parking time limit regulations in the surrounding area. The proposed improvement options are presented below for four land use sectors.

Sector A – Residential, Hospital and Park

Since the 2001 study, the City has implemented some new parking time limit regulations along Newman Road, Edward Street, Hodgins Avenue, Corbould Street, and Mary Street. Blocks with high on-street parking occupancy rates were observed near the Chilliwack General Hospital, including Menholm Road, Newman Road, Mary Street, and Edward Street. Part of Menholm Road and the section of Mary Street directly adjacent to the hospital have 2-hour limits. The part of Edward Street directly in front of the hospital has a 3-hour time limit, and the rest of the blocks with 75% occupancy rates had no time limit. The survey results indicate that the average parking duration on these blocks ranged between 1.5 and 5.1 hours. The high occupancy rates on Edward Street between Patten Avenue and Brett Avenue might have been a result of the construction of a multi-family housing complex being built in that area.

During the survey period, vehicles violating the “No Parking” regulations were also observed along Mary Street. It was noted that some of the off-street parking spaces may be occupied by hospital employees or visitors who want to avoid paying for parking in the hospital lot. The average occupancy rate for the off-street hospital parking lots was estimated as 78 percent, indicating an inadequate off-street parking supply.

To increase the on-street parking supply, it is recommended that parking time limit regulations be imposed along these blocks to limit long-term users and thereby increase supply for short-term users. To provide long-term parking spaces for local residents, parking spaces for the exclusive use of nearby local residents may be introduced. The recommended on-street parking time limits for each block adjacent to the hospital are shown in FIGURE F.12.

Sector B – Commercial and Industrial

In response to the recommendations proposed in the 2001 study, new parking time limit regulations along sections of Spadina Avenue and the Public parking lot near the library were introduced by the City. The City has also revised some of the roads within the study area since the 2001 study. The intersection of Birch Street and Chesterfield Avenue has now been closed off, and no more on-street parking is allowed on Birch street except for 5 spots directly in front of the condominiums on the corner of Alexander Avenue and Birch Street. Young Road has also been revised since the last study, and on-street parking is not allowed until north of First Avenue.

LEGEND

- 1 HOUR TIME LIMIT ON-STREET PARKING REGULATION
- 2 HOUR TIME LIMIT ON-STREET PARKING REGUALTION

FIGURE F.12 PUBLIC PARKING RECOMMENDED IMPROVEMENTS FOR CONSIDERATION

December, 2008

High occupancy rates and short-duration on-street parking were still observed along Ontario Avenue between Mary Street and Yale Road West, and along Mary Street between Patten Avenue and Spadina Avenue. The parked vehicles may be associated with the customers and employees of the nearby commercial uses. Most of the private parking lots in the area were observed to have occupancy rates below 75 percent. Overall, the total parking supply in the area was considered to be adequate. If further improvement is needed, time limit regulations along Ontario Avenue between Mary Street and Yale Road West could be considered as to reduce a 3-hour limit to a 2-hour limit as shown in FIGURE F.12. To reduce illegal parking and increase the parking supply, enforcement may be considered.

Sector C – Retail and Cinema

The survey results indicate that there were occupancy rates over 75 percent on the north sides of Yale Road East between Victor Street and Williams Street, and the west side of Victor Street between Yale Road East and Victoria Avenue. The average observed parking durations for these blocks were over 3 hours. The high occupancy rate and long parking durations were more likely due to construction workers working on a very large multi-family housing project.

There are two public off-street parking lots along Princess Avenue and Victoria Avenue, and a new gravel lot on Yale Road East, all with a combined total of 280 parking spaces. The average combined occupancy rate was approximately 30 percent for these three parking lots. The surplus public off-street parking spaces could help to satisfy the high parking demand along Victoria Avenue and Yale Road East. It is recommended that additional signage and information be provided to encourage drivers to use the off-street parking lots, and that access to the new gravel lot be provided off of Yale Road East. No change in on-street parking is recommended.

Sector D – Central Business District

The survey results indicate on-street parking occupancy rates over 75 percent around Five Corners, including along Wellington Avenue, Mill Street, Yale Road West, Princess Avenue, Victoria Avenue and Main Street. The average parking durations were generally less than the two-hour time limit that is common in the area and indicate that a shorter time limit could be considered. A reduction in the time limit could increase parking turnover and thereby increase the supply of parking.

Since 2001, the capacity of the public parking lot at 45911 Princess Avenue has been cut in half due to the construction of the courthouse, and had an average observed occupancy rate of 87.4 percent. The new private pay lot on Main Street and Kipp Avenue, and the new gravel lot along Young Road had a combined average occupancy rate of around 30 percent. On-street parking was relatively high adjacent to these lots, suggesting that people may not know about the parking or are reluctant to park in these lots. Putting up new signage and lighting may encourage people to use these new lots, thereby increasing overall parking supply in the area. The recommended parking time limit regulations for each block in the Central Business District are shown in FIGURE F.12. In general, it is recommended the on-street parking be changed from 2 or 3-hour time limits to 1-hour time limits to reduce the long term on street parking in the commercial/office area.

In addition, enforcement may be considered to reduce the numbers of vehicles violating time limits and thereby increasing the available parking supply. The results of the parking survey questionnaire indicate that issues relating to safety, adequate lighting, appropriate signage, parking supply for customers, and long-term parking for employees are important concerns of businesses in the downtown Chilliwack area.

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 land uses. Highway 1, under provincial control, is a freeway providing regional connections.

The functional classification and roles of the road classes are described in TABLE G.1. Reference to the table shows that road classification reflects a road's purpose and design, but is independent of the traffic volume on it. The road classification reflects the intended purpose of the roadway, which in turn indicates appropriate connections and access controls. The *Network Classification Strategy: Final Report* (Urban Systems, 2006) has noted that, roads of one classification should connect only with roads of the same or adjoining classifications to achieve efficient traffic service. Recommendations regarding connections are summarized in TABLE G.1.

In February, 2008, the City Council approved the updated Road Network Classification System as follow:

- Arterial becomes Major Arterial and Minor Arterial
- Collector becomes Major Collector and Minor Collector
- Local remains as Local.

The range of roadways classes for the City of Chilliwack will need to reflect thee many roles and functions expected of the network. According to the City of Chilliwack Staff Report date February 22, 2008, the definitions of the new 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 centres.*
- *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.*

Some roads in the new network classification have a lesser classification to improve the liveability of neighbourhoods and manage quality of life for residents. The new road classification is shown in FIGURE G.1.

TABLE G.1 ROAD FUNCTIONAL CLASSIFICATION AND ROLES (BEFORE 2008)

PARAMETER		OBJECTIVES AND CHARACTERISTICS							
		FREEWAY		ARTERIAL		COLLECTOR		LOCAL	
Purpose		accommodate long distance trips		accommodate mostly through traffic on trips between important activities or population centres		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]			
Connections[2]		*Normal:* arterial, freeway		*Normal:* collector, arterial, freeway		*Normal:* local, collector, arterial		*Normal:* local, collector	
		Less preferable: collector		*Less preferable:* local		*Less preferable:* freeway		*Less preferable:* arterial	
Design Level of Service[3]	Rural	B	flat	B	flat	C	flat	C	flat
		B	rolling	B	rolling	C-D	rolling	C-D	rolling
	Urban	C	flat	C	flat	C	flat	C	flat
		C	rolling	C	rolling	D	rolling	D	rolling
Typical Collision Rates[4]		1.0		2.2 (rural)		--		3.7 (rural)	
				1.2 (urban)				1.4 (urban)	
Commercial Traffic Use		movement of goods between centres				limited to local deliveries			

NOTES: *1. Access to public roads is controlled in Chilliwack through paragraphs 52 and 53 of the Highway and Traffic Bylaw 2004, No. 3023.*

2. From Table 5, British Columbia Highway Functional Classification Study (Ministry of Transportation and Highways, 1992).

3. Shows recommended ASSHTO (American Association of State Highway and Transportation Officials) design level of service for each road classification, as provided by the Institute of Transportation Engineers (ITE) in the Traffic Engineering Handbook (5th Edition, 1999). The City of Chilliwack requires and overall intersection level of service of "C" or better when intersection improvements are made, as well as a level of service of "C" or better on each approach leg.

4. Shows collision rates per 100 million vehicle miles traveled, compiled by the US Department of Transportation (1996) and reported in the Traffic Engineering Handbook (5th Edition, ITE, 1999). Dashed line indicated that no collision rate was available.

G.2 Existing Road Network

In the Chilliwack road network, north-south connectors spanning Highway 1 accommodate the highest daily traffic flows. *The 2007 Traffic Count Program* (Transtech, 2007) shows the traffic corridors with the highest volume and approximate two-way daily traffic flows as counted in April 2007 to be:

North-South Roads

- Vedder Road between Highway 1 and Keith Wilson Road (between 17,500 and 41,500 vehicles per day, with the highest flows around the Highway 1 interchange),
- Yale Road between Highway 1 and Victor Street west of Williams Street (between 10,000 and 40,000 vehicles per day, with the highest flows around the Highway 1 interchange), and
- Young Road between Luckakuck Way and First Avenue (between 19,000 and 20,000 vehicles per day).

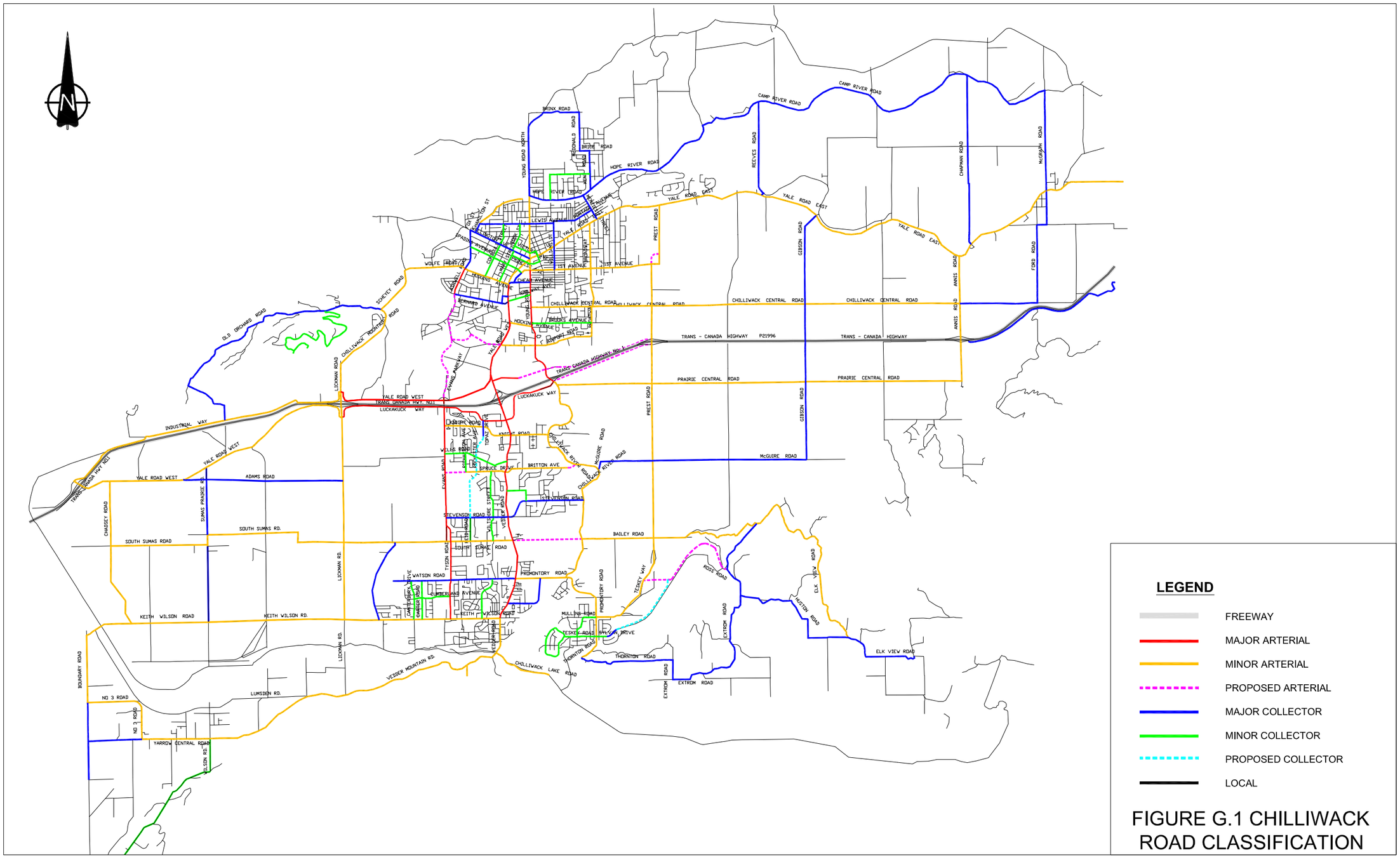


FIGURE G.1 CHILLIWACK ROAD CLASSIFICATION

December, 2008

East-West Roads

- Luckakuck Way between Evans Road and Young Road (between 9,000 and 22,000 vehicles per day, peaking around the Vedder Road intersection),
- Promontory Road, which provides access to the Promontory and Ryder Lake areas (17,500 vehicles per day),
- Airport Road (between 10,200 and 14,000 vehicles per day),
- First Avenue (between 10,000 and 12,000 vehicles per day),
- Watson Road (west of the Vedder Road intersection 11,800 vehicles per day),
- Wolfe Road (west of the Ashwell Road intersection 10,000 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. Connections to Highway 1 are discussed in Section N.

Variations in Traffic

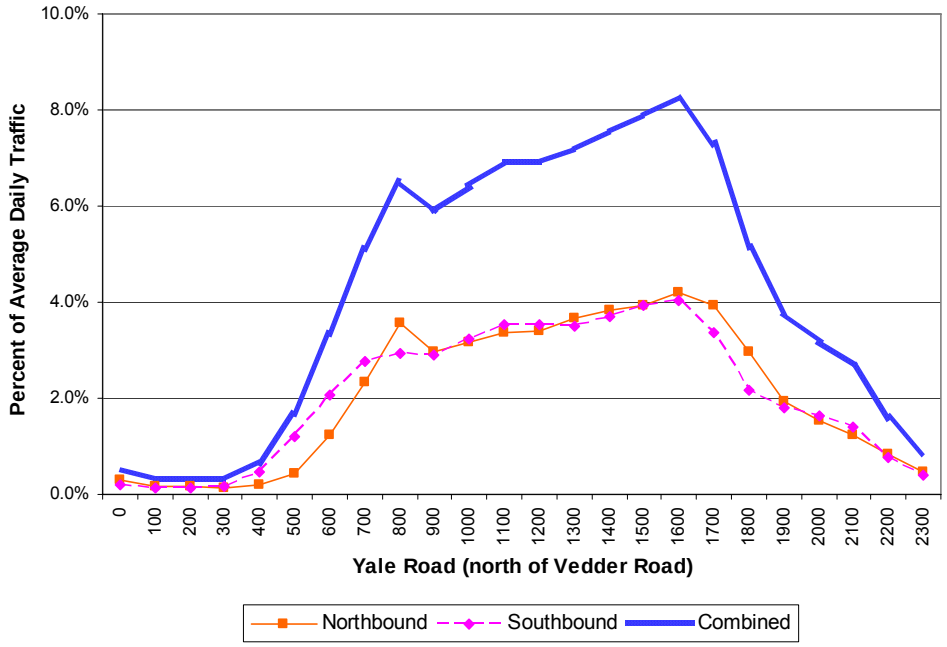
Hourly variations in traffic on roads of varying classifications are shown in FIGURES G.2 and G.3. Monthly and daily variations in traffic are discussed in Section L.

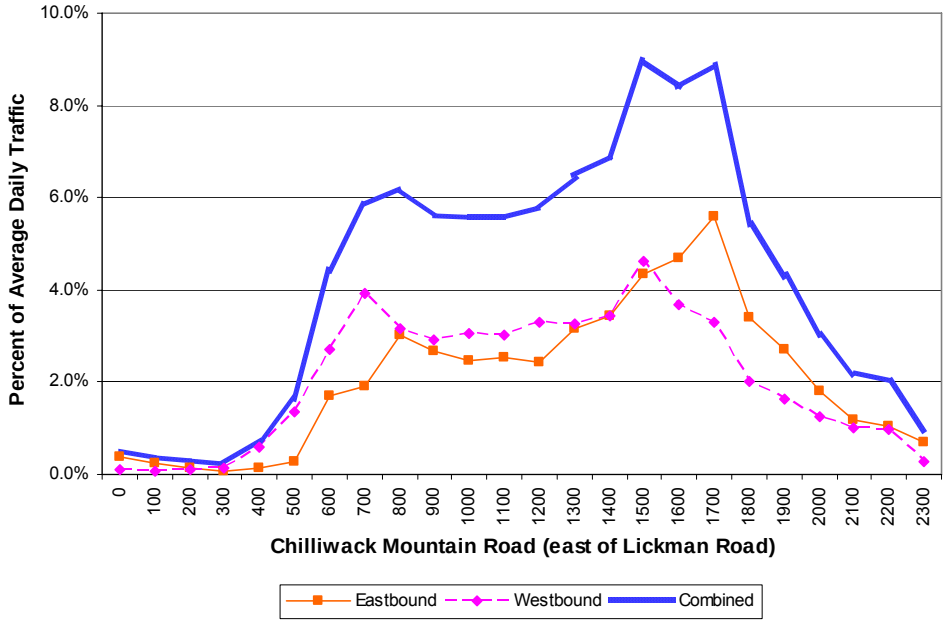
FIGURE G.2 shows the variations in average weekday counts conducted on Yale Road (count station number 4) and Chilliwack Mountain Road (station number 9) north of the Highway 1 interchange on April 18 and 19, 2007 respectively. Traffic counts are summarized in the *2007 Traffic Count Program.* Both are arterial roads. A morning peak, likely attributable to work and school trips, is apparent between 0800 and 0900 hours. After a slight dip in volume during the hour beginning at 0900, midday hourly flows were generally higher than the morning peak hour flow only for Yale Road. The two-way flow reached its peak between 1600 and 1700 hours for Yale Road, and then it declined progressively. The two-way traffic flow peaked twice for Chilliwack Mountain Road, once between 1500 and 1600 hours and again between 1700 and 1800 hours, after which it declined steadily. Between 1600 and 1700 hours Chilliwack Mountain Road saw a decrease in traffic numbers compared to the afternoon peaks.

For comparison, hourly variations on a collector road (Chilliwack Central Road, station number 7), a minor collector road (Chilliwack River Road, station number 128), and a local road (No. 3 Road, station number 62) are shown in FIGURE G.3. The hourly variations are based on traffic counts from *the 2007 Traffic Count Program* on April 17, 18 and 19, 2007 respectively. Generally, hourly variations and peaks were more pronounced than those on the arterials shown in FIGURE G.2. On these three lower-classification roads, midday two-way traffic flows were lower than the morning and afternoon peak hour flows. Two-way traffic flows peaked at varying times between 1600 and 1800 hours on the lower-classification roads. FIGURES G.2 and G.3 also indicate the peak hour factors (peak hour volume divided by daily volume), summarized in TABLE G.2, for the roads shown.

TABLE G.2 PEAK HOUR FACTORS

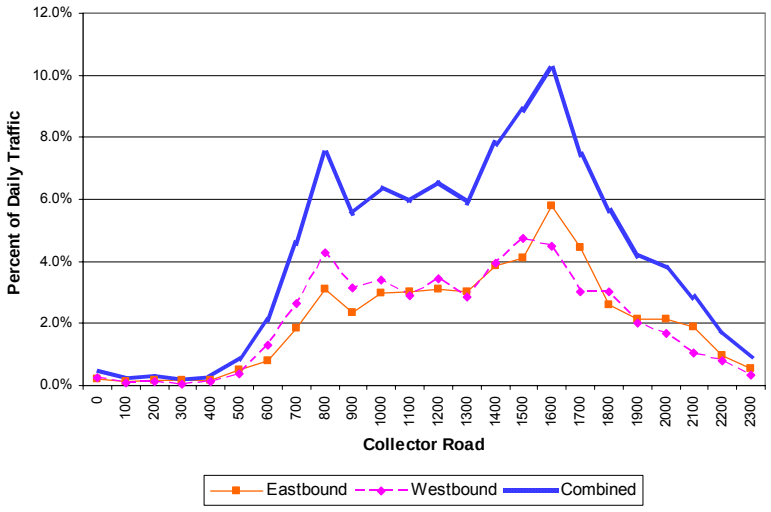
ROAD NAME	CLASSIFICATION	PEAK HOUR FACTOR
Yale Rd	Arterial	8.2%
Chilliwack Mountain Rd	Arterial	9.0%
Chilliwack Central Rd	Collector	10.2%
Chilliwack River Rd	Minor Collector	10.6%
No. 3 Rd	Local	8.9%

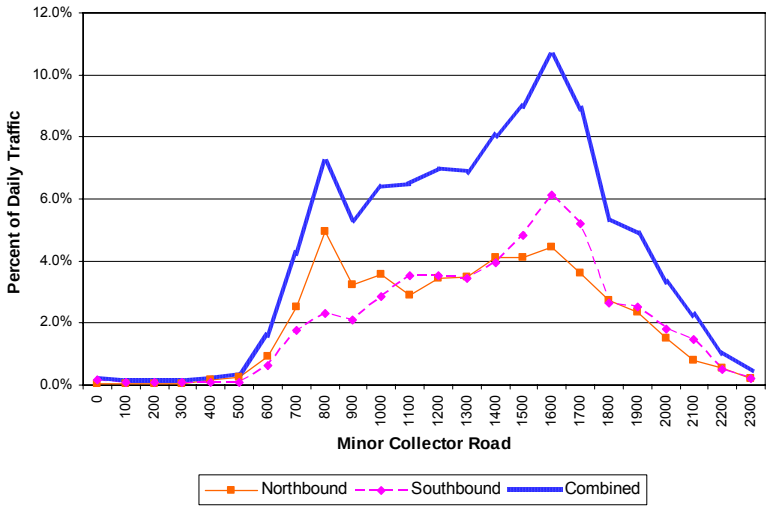


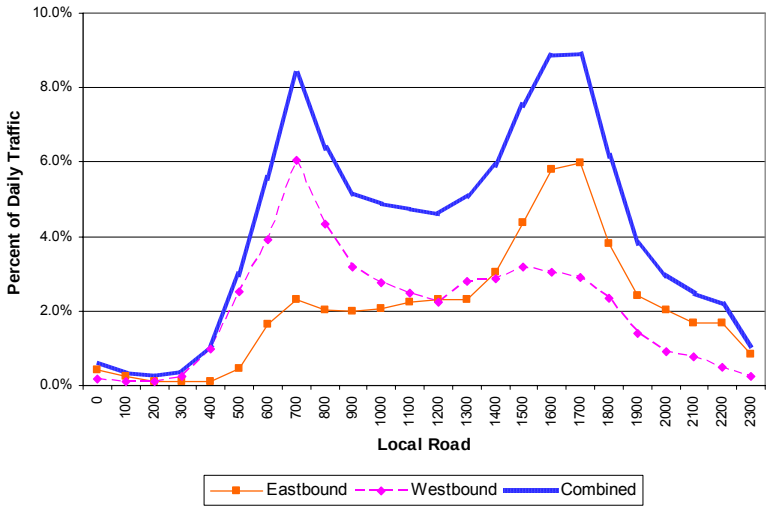


Horizontal axis shows *Hour Beginning*

FIGURE G.2 HOURLY TRAFFIC DISTRIBUTIONS (ARTERIAL ROADS)







Horizontal axis shows *Hour Beginning*

FIGURE G.3 HOURLY TRAFFIC DISTRIBUTIONS (NON-ARTERIAL ROADS)

G.3 Future Improvements

Planned future enhancements to the road network were provided by the City for EMME/2 modelling and are listed in TABLE G.3. FIGURE G.4 shows the proposed road/intersection improvements for years 2008 to 2017. Most of the long term (2027) improvements are only conceptual and are not shown in FIGURE G.4.

The City of Chilliwack identified and described the following road projects, which can help to alleviate potential congestion on critical north-south corridors.

Evans Road Flyover and Ashwell Connector
There are three parts to this project:

- Evans Interchange (over Highway 1),
- Evans Connector (Knight Road to Yale Road West), and
- Ashwell Connector (Evans Road to Hodgins Road).

All parts are scheduled to be completed in years 2008 and 2009. The Evans Interchange will become the eighth north-south connection across Highway 1 in Chilliwack, relieving demand on the parallel connecting corridors (Lickman Interchange, Vedder Interchange and Young Interchange). The interchange will have an eastbound off ramp and a westbound on ramp to minimize conflicts at the Vedder Interchange. The Evans Connector will also cross the CN Rail at an at-grade crossing, and the Chilliwack River. The upgrade is expected to entail widening the existing two-lane Ashwell Road cross section to a four-lane cross section that will initially provide:

- A 3.5 metre travel lane in each direction,
- Parking adjacent to the curb on both sides, and
- A 1.5 metre bike lane next to the parking lane in each direction.

Parking will be prohibited on the approaches to the intersections at Hodgins Avenue, Bernard Avenue, and Dean Avenue to provide for left-turn channelization. Sufficient right-of-way is expected to be provided to permit future upgrading to a five-lane cross section with left-turn lanes and bike lanes by 2017.

Future development of the Evans-Ashwell Connector to connect with Airport Road and provide an east-west connection is described below. Improved connections to Highway 1 at the new Evans Road interchange are discussed in Section N.

Young Road Upgrade (Highway 1 to Airport Road)
This section of Young Road is currently two lanes, including a wide shoulder, with exclusive left-turn lanes and an exclusive right-turn lane in the southbound direction. The upgrade is expected to entail widening the current cross section to five lanes that will provide:

- Two travel lanes in each direction,
- A raised median or left-turn lane in the centre,
- A 1.5 metre bike lane in each direction, and
- A pedestrian sidewalk on each side.

Parking will be prohibited along the upgraded corridor. Left-turn lanes using raised channelization are proposed at the intersection. Widening of the intersection is proposed to achieve additional capacity. Upgrades are scheduled for year 2014.

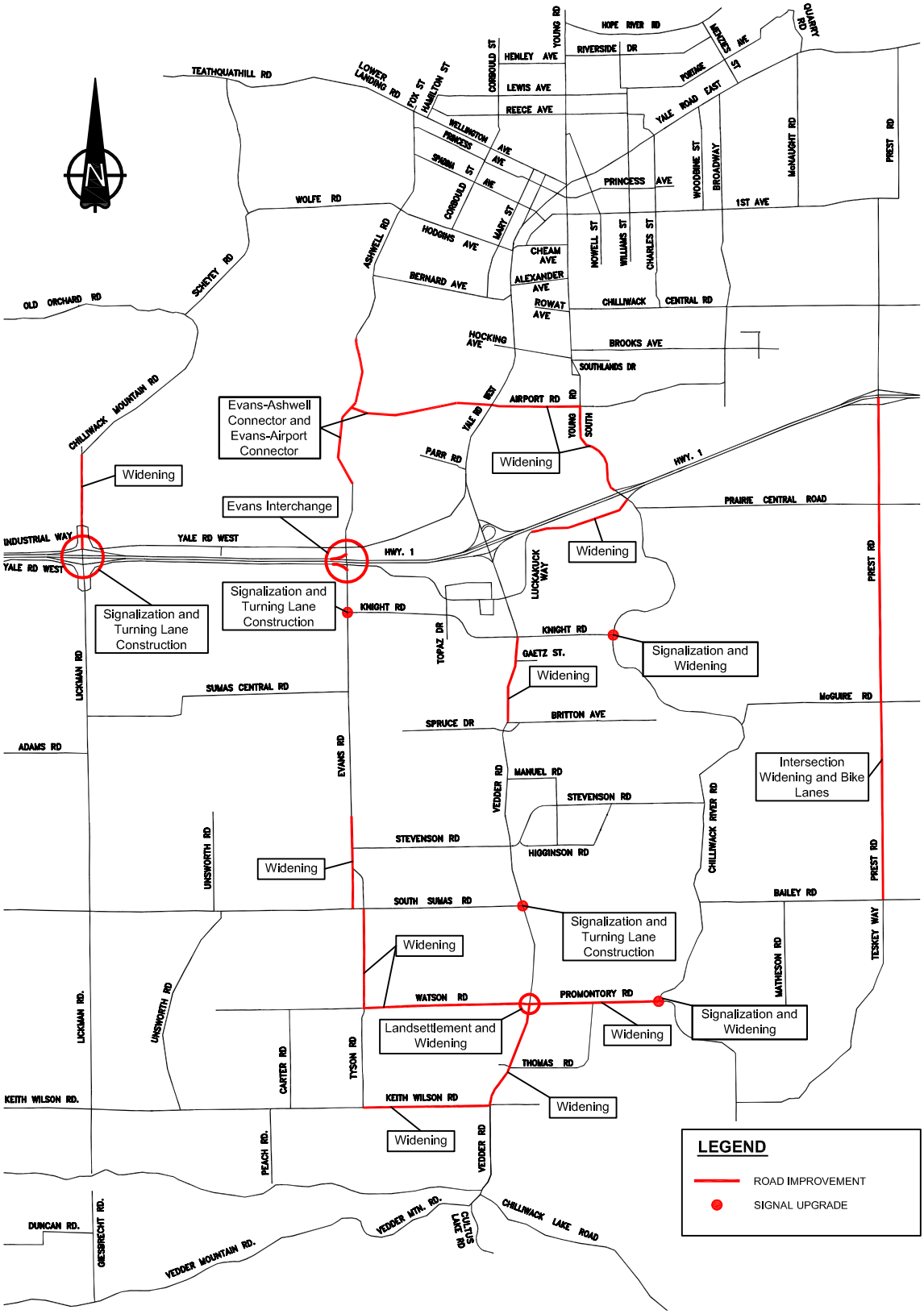


FIGURE G.4 PLANNED IMPROVEMENTS TO ROAD NETWORK (2008-2017)

Promontory Road (Vedder Road to Chilliwack River Road)
This section of Promontory Road is currently one to two lanes, including a wide shoulder, with exclusive left-turn lanes and an exclusive right-turn lane in the westbound direction at the Vedder Road intersection. The upgrade is expected to entail widening the current cross section to five lanes that will provide:

- Two travel lanes in each direction,
- A raised median or left-turn lane in the centre,
- A 1.5 metre bike lane in each direction, and
- A pedestrian sidewalk on each side.

The Promontory Road and Chilliwack River Road intersection will be upgraded to a signal control and widened to potentially allow for additional capacity. All improvements are scheduled for years 2008 and 2009.

Knight Road Signalizations
The Evans Road and Knight Road intersection is expected to be upgraded in 2010 to a signal operation. The intersection will also be modified to allow for a turning lane control.

The Chilliwack River Road and Knight Road intersection is expected to be upgraded in 2012 to a signal control. The intersection will also be widened to potentially allow for additional capacity.

Corridors Upgraded to Urban Sections
Approximately ten corridors are expected to be upgraded from a current 2 or 3 lane cross section to a five lane urban cross section, and approximately two corridors will be upgraded to a five lane cross section from a four lane cross section. The cross section will follow these features along most upgraded corridors:

- Two travel lanes in each direction,
- A raised median or left-turn lane in the centre,
- A 1.5 metre bike lane in each direction, and
- A pedestrian sidewalk on each side.

Upgraded from a 2 or 3 lane section

- Evans Connector (Evans Parkway to Ashwell),
- Promontory Road (Vedder Road to Chilliwack River Road),
- Vedder Road (Promontory Road to Keith Wilson Road),
- Keith Wilson Road (Vedder Road to Tyson Road),
- Evans Road (Railway to Tyson Road),
- Luckakuck Way (Rail crossing to Young Road),
- Young Road (Highway 1 to Airport Road),
- Lickman Road (Highway 1 to Chilliwack Mountain Road),
- Tyson Road (South Sumas Road to Watson Road), and
- Airport Road (Yale Road to Young Road).

Upgraded from a 4 lane section

- Yale Road (Hocking Avenue to CNR), and
- Vedder Road (Knight Road to Britton Avenue).

G.4 Recommendations

For roadways to maintain their mobility and ability to effectively distribute traffic, proper management of land use designation and access controls should be considered. Access controls are stated in TABLE G.1. One of the guidelines is commercial traffic should only be delivered by collector or local roads. By coordinating the road network with land use designations you provide appropriate access to and from urban and rural areas, as well as, within those areas, to commercial, industrial, educational, recreational, and residential areas.

The road network was reviewed in 2006 and summarized in the *Network Classification Strategy: Final Report* (Urban Systems, 2006). Studies similar to the *Network Classification Strategy* should be completed approximately every two to five years to assist current developments in placement of access locations, new roads, and connections to existing roadways.

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H Zoning Setbacks & Bylaws

In land use, a setback is the zoning application requirement for providing sufficient distance which a building or other structure is set back from a street or road, a river or stream, a shore of flood plan, or any other place which needs protection. Setbacks also allow for road widening when through traffic volumes increase. The minimum setback requirements are essential to provide a certain comfort for homeowners away from the roadways, and sufficient road width for commercial/industrial users for parking and loading/unloading activities in front of the buildings.

Zoning setback requirements reviewed in the 2001 Transportation Plan, were based on the Zoning Bylaw (1993) and Subdivision and Development Control bylaw (1995) when developed in 2000/2001. An explicit reference to the Zoning Bylaw and to modify the content of the Subdivision Bylaw was recommended.

Since the 2001 Study, both bylaws have been revised by the following:

- *Zoning Bylaw 2001, No. 2800*; and,
- *Subdivision and Land Development Bylaw 2004, No. 3055.*

The main objective of this section is to update the findings in the 2001 Transportation Plan using the above latest available City bylaws. Other reference materials, such as the City of Chilliwack Official Community Plan, 1999, were also reviewed.

H.1 Zoning Bylaw Review

Similar to the 2001 Transportation Plan, a general review of the zone categories within *City of Chilliwack Zoning Bylaw 2001, No.2800* was conducted and summarized in TABLE H.1. The setback requirements as shown in TABLE H.1 were based on the following land use zones:

- Agricultural – AL Agriculture Lowland
- Residential (Low) – R1A One Family Residential
- Residential (Medium) – R5 Medium Design Multi-family Residential
- Residential (High) – R6 High Density Multi-family Residential
- Commercial – C1 Neighborhood Commercial
- Industrial – M3 General Industrial

The current zoning setback requirements for similar land uses in other municipalities in the Fraser Valley, Lower Mainland, Vancouver Island and Sunshine Coast were summarized and compared to the City of Chilliwack in TABLE H.1. The results show the setback for five zone categories in the City of Chilliwack and six other municipalities.

The comparisons indicated that the setback requirements varied among land use zones and British Columbia municipalities. The setbacks that would affect future road widening are principally the front yard and the exterior side yard. The Town of Gibsons has the highest front yard setback requirements while the City of Abbotsford has the lowest. For the exterior side yard set back requirements, the Corporation of Delta has the highest while the District of Mission has the lowest. In general, the setback requirements in Chilliwack are similar to the average of the other surveyed requirements. The District of Saanich has the closest in exterior side yards while the District of Mission has the closest in front yard setback requirement

TABLE H.1 SETBACK COMPARISONS

MUNICIPALITY	SOURCE (NO. AND YEAR)	ITEM	SETBACK REQUIREMENT (m)					
			AGRI - CULTURAL	RESIDENTIAL			NEIGHBOUR - HOOD COMMERCIAL	GENERAL INDUSTRIAL
				LOW DENSITY	MEDIUM DENSITY	HIGH DENSITY		
City of Chilliwack	**Zoning Bylaw #2800 (2001)**	**Front Yard**	**7.5**	**6.0**	**6.0**	**6.0**	**6.0**	**6.0**
		Interior Side	**3.0**	**1.2**	**1.3**	**3.0**	**1.5**	**6.0**
		Exterior Side	**7.5**	**4.5**	**6.0**	**6.0**	**6.0**	**6.0**
City of Abbotsford	Zoning Bylaw #1565 (1996)	Front Yard	3.0	5.0	6.0	7.5	n/a	n/a
		Interior Side	3.0	1.8	1.8	7.5	7.5	0.0
		Exterior Side	9.0	4.5	7.5	6.0	6.0	3.0
District of Mission	Zoning Bylaw #3143 (1998)	Front Yard	7.5	6.0	7.5	7.5	7.5	6.0
		Interior Side	4.5	1.5	1.5	1.5	1.5	0.0
		Exterior Side	7.5	4.5	4.5	4.5	4.5	6.0
Township of Langley	Zoning Bylaw #2500 (1987)	Front Yard	9.8	9.8	7.5	9.0	7.5	10.0
		Interior Side	3.0	3.0	1.5	4.5	3.0	0.0
		Exterior Side	7.5	4.5	7.5	9.0	7.5	5.0
Corporation of Delta	Zoning Bylaw #2750 (2007)	Front Yard	6.0	6.5	6.0	7.5	0.0	7.5
		Interior Side	6.0	1.5	1.8	4.5	3.0	7.5
		Exterior Side	15.0	3.5	3.0	4.5	1.5	4.5
District of Saanich	Zoning Bylaw #8200 (2003)	Front Yard	7.5	7.5	7.5	7.5	7.5	7.5
		Interior Side	3.0	1.5	7.5	7.5	3.0	6.0
		Exterior Side	7.5	3.5	7.5	7.5	7.5	3.0
Town of Gibsons	Zoning Bylaw #1065 (2007)	Front Yard	10.0	7.5	7.5	7.5	0.0	6.0
		Interior Side	10.0	1.5	1.5	4.5	3.0	4.5
		Exterior Side	10.0	3.0	3.0	4.5	3.0	3.0

Based on the findings in the 2001 Study, an increase in the setbacks for both the front yard and exterior side yard may alleviate some of the difficulties that the City has experienced in the past, when addressing road widening. In addition, the consistency in requiring the supplementary setback should be provided.

Section 5.09 of the zoning bylaw, *Supplementary Setback Regulations*, provides consistent setback requirements from various road types:

- Arterial or Collector Roads (less than 25 metres wide),
- Arterial, Collector or Local Road (less than 20 metres wide),
- Minor Local Road (less than 15 or 17.5 metres wide).

It also indicated the minimum setback requirement (4.5 metres) to the property line fronting Highway 1 and Chilliwack Lake Road (Vedder Road to City Boundary). The minimum 30 metre setback from the right-of-way of Highway 1 and the Mainline of CN Rail was provided as well as the minimum setback of 15 metres from the right-of-way of the Southern Railway of BC.

It was suggested that the sentence *"Supplementary setback shall be provided in accordance with the requirements of Section 5.09 of this bylaw"* could be added within Clause 8 of each land use zone category. However, the revision was not found in the current Zoning Bylaw #2800 (2001). It is recommended that the City may re-consider adding a similar sentence when the Zoning Bylaw is due to be updated or revised. It can draw attention for people unfamiliar with the bylaw to understand that they may or may not request all the regulations that would apply to a particular zone.

It was also suggested that City staff may consider an examination of the front yard and exterior side yard setbacks and whether the dimensions should be revised. If the setback requirement is inadequate, the land requirement issues may be raised for future road widening. If the setback requirement is too extensive, the available land or land use type for future developments will be limited and the economic development will be affected. It is recommended that the setback requirements for each zone category be reviewed, based on experiences from the past development applications and the views from both City staff and applicants.

H.2 Subdivision and Land Development Bylaw Review

The most frequent collision types for mid-block collisions were usually off-road collisions. Many drivers were running off the roadway and colliding with man-made design features. Based on the *Geometric Design Guides for Canadian Roads, Transportation Association of Canada, 1999* (TAC Design Guides), the roadside collisions could be mitigated by:

- Reducing the possibility that the run-off will occur;
- Providing opportunities for drivers of the vehicles to recover and return to the road without incident; and,
- Providing design elements to reduce the severity of the collisions.

Clear zone for highways, including shoulder, recoverable slope, non-recoverable slope and clear runout area, was introduced to provide minimum roadside recovery area for a given design situation. The concept enables designers to estimate the safety impact more precisely.

The City of Chilliwack's *Subdivision and Land Development Bylaw No. 3055 (2004),* Clause 2.5.12 Roadside Safety and Clear Zones indicated that the roadside safety guidelines and the Clear Zone concept should be used to establish safety setback provisions for roadside features. These roadside features may include utility poles, street lights, sign supports, culverts, ditches and vegetation/trees. It also stated that, where safety setbacks cannot be provided, the appropriate traffic barriers should be designed to provide an alternative road safety design method. In urban roads with curbs, the minimum setback from the edge of the travel lane to an obstruction shall be 0.5 metres for new construction.

H.3 Official Community Plan Review

From the Section 3-A Downtown Historic Core in Appendix A of the *City of Chilliwack Official Community Plan ,1999 (OCP)*, setback guidelines show that the building setback should be determined by the Zoning Plan and by requirements of the BC Provincial Building Code. The setback for heritage buildings should respect the precedent of the historic patterns of setback as evidenced within the designated heritage area. The 1999 OCP also encouraged exploring the potential for developing pedestrian amenity through the creative use of setback from the property line. The allowance of on-street parking for building setback in the Downtown Historic Core area is not permitted by the City of Chilliwack.

From the Section 4-A Contemporary Commercial Area, the requirements of the building setback is similar to that in the Downtown Historic Area. The City also encouraged for development of pedestrian amenities in the setback area. The on-street parking in the setback area is permitted but not encouraged.

H.4 Recommendations

As recommended in the 2001 Transportation Plan, an explicit reference to the need to provide the supplementary setbacks specified in Section 5.09 of the zoning bylaw should be added to Clause 8 of each zone category in the latest Zoning Bylaw.

It is also suggested that City staff re-consider an examination of the front yard and exterior side yard setbacks and whether the dimensions should be revised. The review could be conducted based on experiences from past development applications and views from both City staff and applicants.

I Transit Plan

I.1 Existing Transit System

The Chilliwack Transit System is operated by Township Transit Services Inc. and monitored by BC Transit. The Chilliwack transit service fleet will be expanded in 2008 to eight buses from six to accommodate for the expanded Promontory Shuttle Route that will be extended in 2008 to provide service north of Highway 1. Some of the eight buses operate as stand-by. Buses run on a daily basis to cover the eight regular scheduled routes and two non-regular scheduled routes. Routes are summarized in TABLE I.1.

TABLE I.1 CHILLIWACK TRANSIT ROUTES

NUMBER AND NAME		DESCRIPTION
REGULARLY SCHEDULED ROUTES		
1	Fairfield	service between downtown Chilliwack and Fairfield Island
2	McNaught	service from downtown Chilliwack to First Avenue, Broadway, and Yale Road
3	Chilliwack Central	service from downtown Chilliwack to City Hall and the Chilliwack Municipal Airport
4	Hospital	service from downtown Chilliwack to Chilliwack General Hospital
5	Downtown to Luckakuck	service between downtown Chilliwack and the shopping malls on Luckakuck Way
6	Sardis via Wiltshire	outbound service from downtown Chilliwack to University College, Cottonwood and Chilliwack malls, Sardis, and the former CFB Chilliwack; inbound service from Sardis to Cottonwood and Chilliwack Malls, University College, and downtown Chilliwack
7	Sardis via Higginson	
10	Promontory Shuttle	service between Sylvan/Promontory and downtown Chilliwack to Vedder, Cottonwood and Chilliwack Malls, Luckakuck Way, and Young Road
11	Agassiz-Harrison Transit	service between Chilliwack, Rosedale, Popkum, Agassiz and Harrison Hot Springs
NON - REGULARLY SCHEDULED ROUTES		
8	Yarrow and Greendale	Saturday-only service between Yarrow, Greendale, and Cottonwood Mall
9	Cultus Lake	summer-only service (July and August) between downtown Chilliwack, Cottonwood Mall and Cultus Lake

NOTES: *Chilliwack Transit System buses operate 0630 to 1800 hours Monday through Wednesday, 0630 to 2130 hours on Thursday and Friday, 0800 to 2130 hours on Saturday, and 0930 to 1800 hours on Sunday. Transit buses do not operate on statutory holidays.*

In the fall of 2006, the regularly scheduled Promontory Shuttle route was introduced; at that time the Chilliwack Transit Service had six buses in their fleet, with an average of four and a half running on a daily basis. This route originally stayed south of Highway 1 and primarily served the Sardis-Vedder area which extended to Sylvan Drive. It was expanded on January 2, 2008 to serve Luckakuck Way, Young Road and to start/terminate at the transit exchange on Main Street along with the remaining seven regularly scheduled routes. A total of three routes now provide service from Downtown Chilliwack to the Sardis – Vedder area.

The Communities of Yarrow and Greendale are served by a limited Monday to Friday route and a Saturday route. Rosedale is served by the Agassiz-Harrison Transit Service, which terminates at transit exchange in downtown Chilliwack. Township Transit Services Inc. also operates the Agassiz-Harrison Transit Service; therefore, transfers can be made between the Agassiz-Harrison Service to the Chilliwack Service.

Complementing the conventional transit systems are handyDART and vanpool services. The handyDART system is also operated by Township Transit Services Inc. They provide a door to door (taxi) service for registered people with disabilities who are unable to use the regular transit system. Registration is free. If no HandyDART buses are available, local taxis are used. The hours of operation are Monday to Friday between 0730 and 1700 hours, Saturdays from 0900 to 2100 hours, and Sundays between 0930 and 1430 hours. No services are available on holidays.

The handyDART system is supplemented by the Taxi Saver program, introduced in 1997. It provides a 50% subsidy toward the cost of taxi rides for registered users.

Vanpool services are sponsored by The Jack Bell Foundation. Regular commuters throughout the Lower Mainland, including Chilliwack can sign up for these van pool services to lower their transportation costs and decrease travel time by using HOV lanes. Each vanpool minivan accommodates a drivers and up to seven passengers. Each van goes to and from a single location and operates on a fixed Monday to Friday schedule. The cost of the service is determined based on trip mileage and number of commuters in that vehicle. Jack Bell will also help individuals establishing a carpool using their private vehicle.

I.2 Review of Demand, Supply, and Routing

Some information is deemed to be unchanged since the 2001 Transportation Plan and will remain as previously presented in 2001. This information was based on the *Chilliwack Comprehensive Municipal Transit Plan 1999-2017*.

Transit Demand

As stated in the 2001Transportation Plan, an increase in ridership was noticed after 1988 which resulted in an increase of service hours. In 1997, service hours and ridership increased after the introduction of evening services from Thursday to Saturday, and a Sunday daytime service.

The majority of transit trips are for the purpose of shopping. School and work trips only account for approximately 18 percent of transit trips.

The handyDART system in 2001 served approximately 1,600 registered users the majority being seniors and approximately 28 percent are in wheelchairs.

Transit Supply and Routing

FIGURE I.1 shows the average weekday, Saturday, and Sunday demand by route for October 2006. Data was provided by the City of Chilliwack from the *Chilliwack Transit System Ridership and Performance Summary* (October 2006). Limited data was available for the Promontory Shuttle route as it was first introduced in the fall of 2006. Information was only provided for the eight regularly scheduled routes as outlined in TABLE I.1.

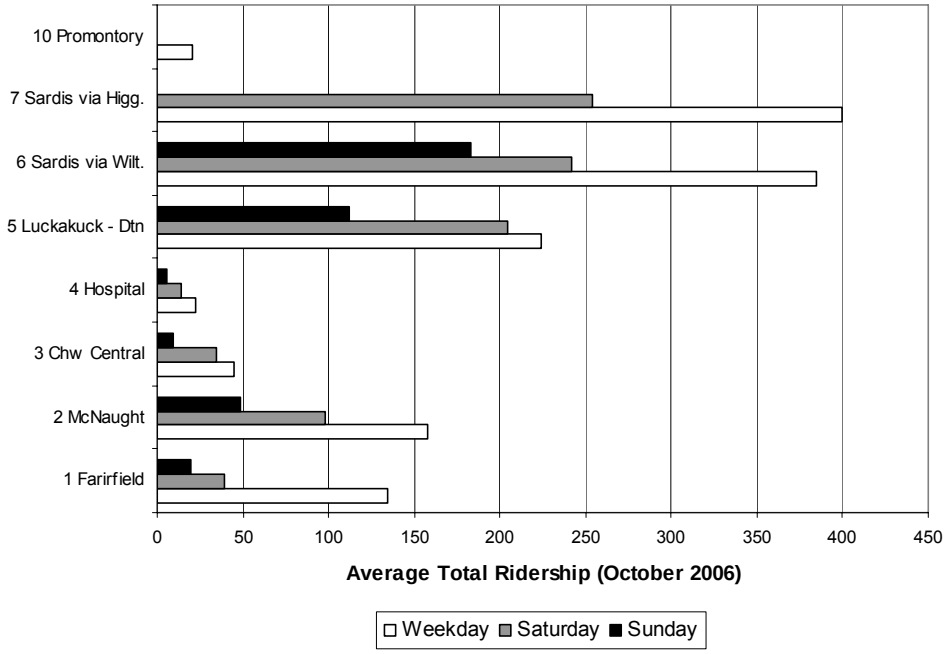

FIGURE I.1 AVERAGE TOTAL RIDERSHIP

Results are similar to those seen in the 2001 Transportation Plan, with routes 5, 6, and 7 having the highest productivity which serve areas south of Highway 1. Routes 3 and 4 which serve the southern part of Chilliwack Proper have the lowest productivity. The Promontory Shuttle Route is expected to carry higher productivity levels similar to other Sardis-Vedder routes.

Transit Revenues and Costs

Total cost per ride data was provided by the City of Chilliwack. It was outlined in the *Chilliwack Transit System Performance Ridership and Performance Summary* (October 2006). Daily average total cost per ride includes both capital and operating costs. Data for the eight regularly scheduled routes are shown in FIGURE I.2.

The bus fare in October 2006 for an adult pass was a $1.25. The adult fare was used to compare the cost of a trip to the amount paid by the user. Senior (aged over 65), Student (up to Grade 12), and Children (age 5-11) bus fares were $1.00. Students are the largest passenger group using the bus system. FIGURE I.3 shows the proportion of the four different types of passenger groups that use Chilliwack's Transit System. Data is from October 2006.

Adults and Students account for approximately 75 percent of people who use the Chilliwack Transit System on a regular basis. Seniors account for approximately 10 percent and people who have BC Passes account for the remaining 15 percent. BC Passes are annual passes that are administered by the Provincial Government for seniors and persons with disabilities on restricted incomes.

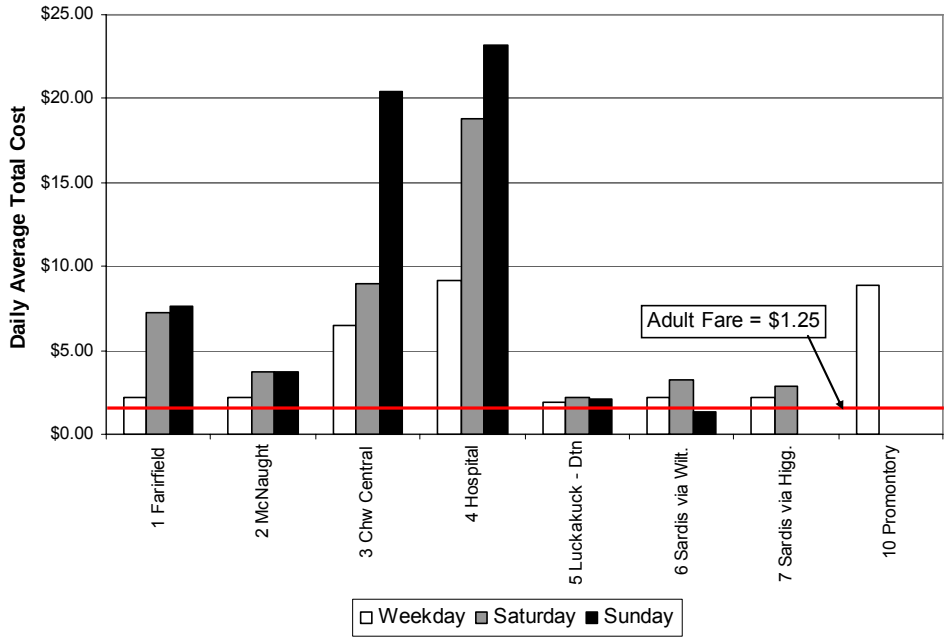

FIGURE 1.2 AVERAGE DAILY TOTAL COST PER RIDE

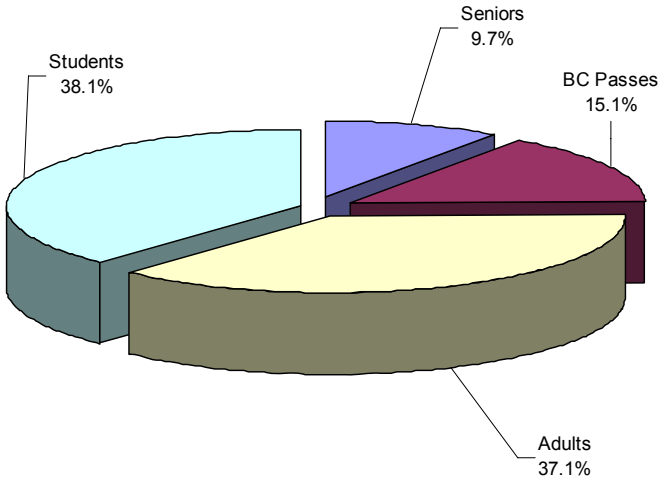

FIGURE I.3 AVERAGE DAILY RIDERSHIP BY PASSENGER GROUP

Transit System Performance

The *Chilliwack Comprehensive Municipal Transit Plan 1999-2017* concluded that the 1999 transit system in Chilliwack was performing relatively poorly in comparison with systems in similar-size municipalities. Based on the Average Daily Total Cost information provide by the City of Chilliwack it appears that the transit system is still operating at a below average level. The eight regularly scheduled routes on weekdays, Saturdays, and Sundays are operating at higher costs than the amount of fare revenue they are generating, with the exception of route number 6 Sardis via Wiltshire, operating at lower costs than the average adult fare on Sundays. The *Transit Plan* noted that the handyDART system in 1999 was operating well compared to similar-size systems across Canada.

I.3 Plans for Future Transit Growth

All information remains as presented in the 2001 Transportation Plan. The addition and expansion of the Promontory Shuttle route has been the major upgrade to the transit system since the 2001 Transportation Plan. Also to accommodate the new Promontory Route, two new buses were added to the existing fleet of six.

I.4 Recommendations

The *Chilliwack Comprehensive Municipal Transit Plan 1999-2017* could be updated to include current numbers and goals. Currently a portion of the information remains the same as presented in the 2001 Transportation Plan; however, the transit system has changed significantly with the addition of a new route and more buses. Planned reviews of the Transit Plan could be done every two to five years to allow the City to identify changes to transit services in response to changes in the OCP or in population distribution.

Currently transit routes are underutilized, and the City of Chilliwack could try to further promote transit use. Some ideas could be:

- Display a direct link icon to BC Transit web-page on the City of Chilliwack's front page of their web-site,
- Give limited time deals on month passes, for example 25% off, and/or
- Incorporate coupons for local stores into transit passes.

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J Cycle Plan

A well planned and designed bicycle network can play an important role in the overall transportation system. Chilliwack has demonstrated a commitment to the addition of bicycle facilities in current and future road upgrade projects, including works along Promontory Road, Watson Road, and Vedder Road. The *Application for 2007/2008 Cycling Infrastructure Partnerships Program* includes three different installations of bicycle facilities; along Yale Road, Sumas Prairie Road and No. 3 Road. City staff has completed the *Bicycle Transportation Plan 1999-2010: Summary Report*, a comprehensive guide to planning, encouragement and education to promote bicycle use.

J.1 Bicycle Network

Existing and planned facilities reflect the City's emphasis on integrating commuter bicycle facilities into existing roadways rather than establishing a network of off-street bicycle paths. Chilliwack's bicycle network is composed of commuter routes, recreational routes and school routes. Shared use roads can also be designed to accommodate substantial bicycle traffic. Usually it is not necessary to make special provisions for cyclists on local roads unless the speed or quantity of motor vehicle traffic renders it unsafe for cyclists to share the roadway with other users, or unless young cyclists are the majority of users (example, school areas).

Existing Routes and Facilities
FIGURE J.1 shows the existing cycling routes and facilities; which are divided into commuter, recreational and school routes. The figure has been extracted from the *Bicycle Transportation Plan 1999-2010: Summary Report* and has been modified to encompass existing (2007) cycling facilities. Most of the cycling facilities are shoulders delineated for cyclists. FIGURE J.1 shows each route type and distinguishes if facilities have been developed (solid line) or if they are just a designated cycle route (dotted line). Cyclists may also use Highway 1 east of Lickman Road.

Existing Trails
The five existing trails that accommodate bicycle traffic among others are listed in brief detail below. They were extracted from the City of Chilliwack Website.

Heritage Wagon Trail
The Heritage Wagon Trail begins on Wilson Road and ends on Yarrow Central. The trail runs parallel to the Southern Railway tracks and is approximately 1 kilometre long.

Hope River Trail
The Hope River Trail is 6.2 kilometres long, starting at Townsend Park on Ashwell Road and ending at the Kinsmen Hope River Park on Fairfield Island. It is a very scenic trail with portions running along the Hope River. This trail will eventually loop through the Fairfield Island area.

Luckakuck Trail
The Luckakuck Trail is a 1 kilometre walk/cycle from Luckakuck Way that ends on Sapphire Drive. This nature trail runs along the Luckakuck Creek and is a great little shortcut to the malls and other shops in the area.

Rotary Vedder River Trail
The Rotary Vedder River Trail was a joint venture with the Rotary Club of Chilliwack, the Canadian Forces Base of Chilliwack and the City of Chilliwack. This beautiful trail runs along the Vedder River and is 15.5 kilometres long. Great for running, biking, walking and horseback riding, many outdoor enthusiasts find this trail wonderful not only for the scenery but for the great accessibility to the Vedder River for fishing.

Teskey Trail
The Teskey Trail is still in the initial stages but does have portions to walk that end up in Promontory Park West. When completed, the trail will loop through the Promontory community.

Road Segments Designated for Cyclists and Trucks
Roadways that act as truck and cycle routes should have cross-sections and intersection geometries that are capable of safely accommodating these two vehicle types. For designated truck routes refer to Section Q. The affected road segments are:

Designated School Bicycle Routes

- Stevenson Road (Evans Road to Vedder Road)
- Stevenson Road (formerly Higginson Road) (Vedder Road to Chilliwack River Road)

Designated Commuter Bicycle Routes

- Bailey Road (Chilliwack River Road to Prest Road)
- Vedder Mountain Road
- Teskey Way
- Prest Road (Bailey Road to First Avenue)
- Promontory Road
- Chilliwack River Road (Promontory Road to Highway 1)
- Young Road (Highway 1 to Hope River Road)
- Hope River Road (Young Road to Menzies Street)
- Menzies Street (Hope River Road to Yale Road East)
- Yale Road East (East of Broadway)
- Airport Road
- Vedder Road (South of Promontory Road)
- Scheyey Road
- Wolfe Road
- First Avenue (Young Road to Prest Road)
- Keith Wilson Road
- Tyson Road
- Evans Road
- Luckakuck Way (Lickman Road to Chilliwack River Road)
- Chilliwack Mountain Road (Highway 1 to Scheyey Road).

J.2 Planned Upgrades

Bicycle routes and facilities are developed in two ways, through planned road upgrade projects, or through the Cycling Infrastructure Partnerships Program.

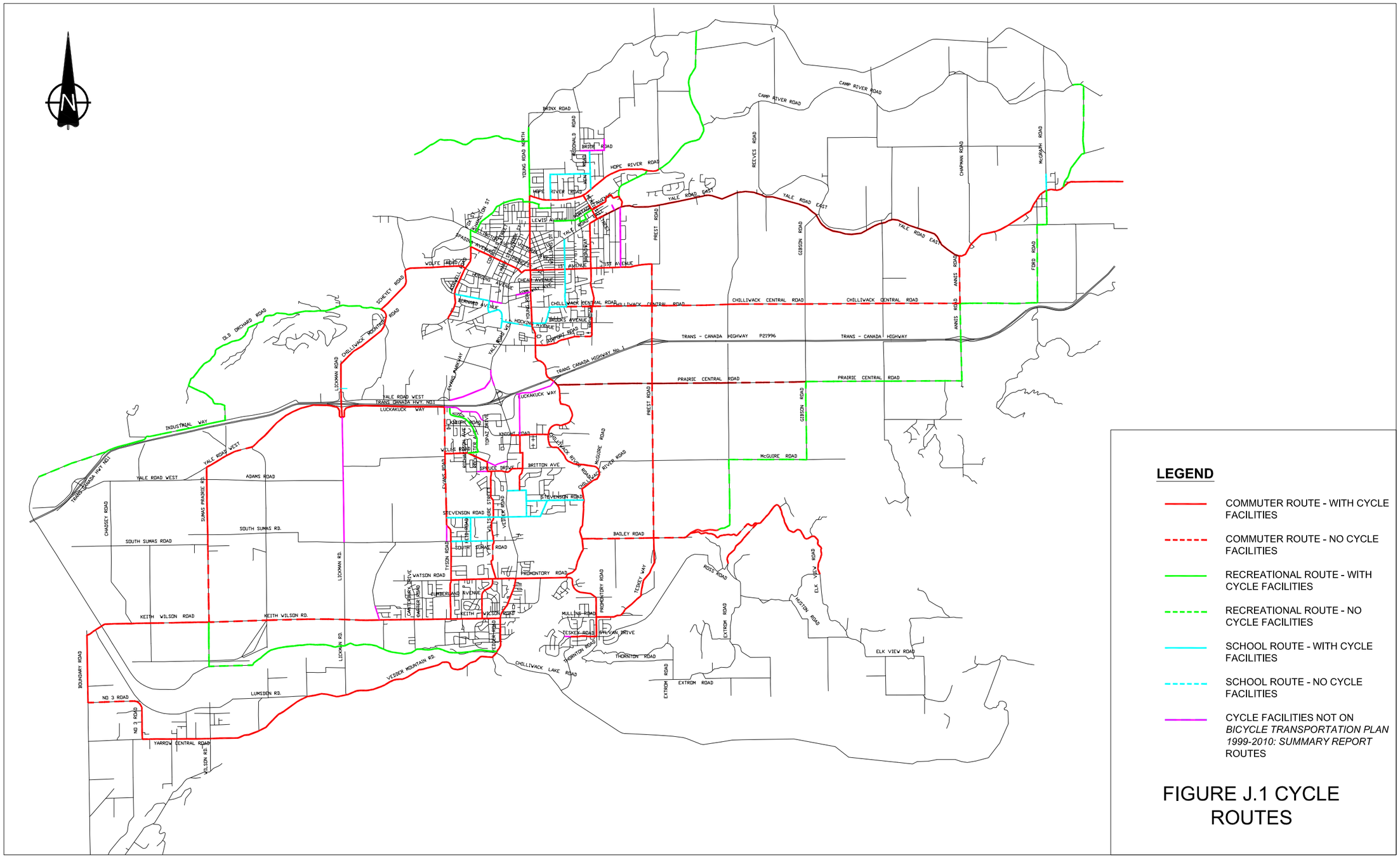


FIGURE J.1 CYCLE ROUTES

December, 2008

Planned Upgrades along Chilliwack's Road Network

TABLE J.1 shows planned upgrades to the road network that are also designated bicycle routes. Future road upgrades were extracted from TABLE G.3 which was provided by the City of Chilliwack. Cycling facilities can be incorporated into many of these planned roadworks.

TABLE J.1 PLANNED ROAD UPGRADES ALONG BICYCLE ROUTES

ANTICIPATED YEAR OF ROADWORKS[1]	BICYCLE ROUTE		ROADWORKS FUNCTION
2008-2009	C[2]	Promontory Rd at Chilliwack River Rd	Signalization and widing
2008-2010	C	Promontory Rd (Vedder Rd to Chilliwack River Rd)	Widen to urban section
2009	C	Watson Rd (Vedder Rd to Tyson Rd)	Widen to urban section
2010	C	Lickman Rd at Interchange Phase 2	Signalization and turning lanes
	C	Vedder Rd at Promontory Rd	Land settlement and widen
2011	C	Vedder Rd (Promontory Rd to Keith Wilson Rd)	Widen to urban section
	C	Prest Rd Phase 1 (TCH[3] to Bailey Rd)	Intersection widing
2012	C	Keith Wilson Rd (Vedder Rd to Tyson Rd)	Widen to urban section
	C	Evans Phase IV (Rail to Tyson Rd)	Widen to urban section
	C	Chilliwack River Rd at Knight Rd	Signalization and widing
2013	C	Prest Rd Phase 2 (TCH[3] to Bailey Rd)	Intersection widing and bike lanes
2014	C	Young Rd (TCH[3] to Airport Rd)	Widen to urban section
	C	Lickman Rd (TCH[3] to Chilliwack Mountian Rd)	Widen to urban section
2015	C	Tyson Rd (S Sumas Rd to Watson Rd)	Widen to urban section
2016	C	Airport Rd (Yale Rd to Young Rd)	Widen to urban section
2017	C	Spruce Dr (Vedder Rd to Railway)	Upgrade to urban section with turning lanes

NOTES:
1. Anticipated year of roadworks from Transportation DCC 2008-2017
2. "C" denotes commuter route
3. "TCH" denotes Trans-Canada Highway

Cycling Infrastructure Partnerships Program

The CIPP develops a few bicycle projects every two years. The 2007/2008 Application for the CIPP includes three sites where bicycle facilities will be constructed.

Yale Road and Sumas Prairie Road
The Yale Road site extends from Hopedale Road to Sumas Prairie Road. The Sumas Prairie Road site extends from Yale Road to Adams Road. Both projects will extend the existing shoulder bikeway from Hopedale Road toward the town of Greendale. Cyclists will be able to use this proposed facility to commute to the retail, commercial and industrial zones on Yale Road West, shopping malls, exhibition grounds, and commercial zones on Luckakuck Way or into downtown Chilliwack. These road improvements will enhance safety and enjoyment of a popular route to the Great Blue Heron Reserve.

No. 3 Road
The No. 3 Road site extends the existing shoulder bikeway from Yarrow Central Road to Boundary Road to the Abbotsford boundary. This is a major route for motorists and cyclists to access Cultus Lake from the western Fraser Valley and Vancouver area. It is also a key connection between the rural area and the community of Yarrow where commuters may access schools, grocery stores, restaurants, a credit union, post office, etc. This extension completes the bike shoulder east of Yarrow.

J.3 Bicycle Facilities

Cycling facilities incorporated in the new or upgraded roads in Chilliwack consist of a 1.5 metre bicycle lane adjacent to the shoulder or parking lane. The *Geometric Design Guide for Canadian Roads* (Transportation Association of Canada, 1999) advises lane widths of 1.5 to 2.0 metres for one-way exclusive lanes. The *Bikeway Traffic Control Guidelines for* Canada (Transportation Association of Canada, 1998) and the Institute of Transportation Engineers (ITE) suggests a minimum lane width of 1.2 metres, and is only to be used where road width is limited. The minimum width is consistent with that specified in the *Bicycle Transportation Plan 1999-2010: Summary Report* for shoulder bikeways on low-volume rural roads or for bicycle lanes where the available lane width is severely constricted.

A width of 1.5 metres is generally suitable for roadways on which a low level of bicycle traffic is anticipated, including during peak hours and on peak days. However, a minimum width of 2 metres is appropriate under the following conditions as per the *Geometric Design Guide for Canadian Roads* (Transportation Association of Canada, 1999):

- An AADT of over 6,000 vehicles in the shared or adjacent lane, such as sections of Yale Road, Young Road, Vedder Road, Luckakuck Way, Promontory Road and First Avenue. Proposed Evans-Ashwell Connector is also expected to have over 6,000 AADT volumes.
- Over 10 percent of the traffic is composed of trucks, such as along Promontory Road and Chilliwack River Road accessing the gravel pits.
- On roads used by maintenance vehicles.
- Where there is expected/substantial bicycle volume.
- Where cyclists are expected to cycle two abreast, such as along recreational routes.
- Where vehicle speeds exceed 55 kilometres per hour.
- Where the facility is intended for shared use by cyclists and pedestrians.
- On roads with steeper grades.

For shared-use lanes between vehicles and bicycles, minimum lane widths are advised to be 4.3 metres on roads with an AADT greater than 1,000. This complies with the *Geometric Design Guide for Canadian Roads* (Transportation Association of Canada, 1999). The *Bicycle Transportation Plan 1999-2010: Summary Report* advises a curb lane of 4.0 metres where the posted speed is 50 kilometres per hour, and 4.2 metres where the posted speed is 60 kilometres per hour.

Adding or improving shoulders is often the best way to accommodate cyclist traffic in rural areas. If a shoulder upgrade cannot be completed fully, it is suggested that uphill sections be improved first to accommodate for manoeuvring space and cyclists walking their bikes. Bicycle facilities should follow these design and implementation strategies:

- On shoulder bikeways, an edge line should be marked between the shoulder and traffic lane to clearly separate bicycle and vehicular traffic.
- Bicycle lanes should always be one-way facilities that carry bicycle traffic in the same direction as adjacent vehicle traffic.
- At intersections, careful consideration should be given to the appropriate treatment for bicycle lanes to minimize the conflict between bicycles and turning vehicles.

Bicycle facilities promote bicycle use and increase the safety of the cyclists. Not all roads have bicycle facilities and cyclists can be expected to travel on these un-marked routes, therefore, these general road improvements should always factor into roadway design:

- Drainage grates should have bars that are transverse to the direction of bicycle travel, and be flush with the road surface.
- The pavement surface should be free of wide gaps between pavement slabs or overlay drop-offs that are parallel to the direction of travel. The pavement surface should be maintained to keep debris from accumulating.
- Railroad crossings are difficult for cyclists to negotiate. Measures to accommodate cyclists at level crossings are provided in the City's *Bicycle Transportation Plan 1999-2010: Summary Report*.
- At signalized intersections, the adequacy of signal clearance intervals for signal timing may be checked using standard values of 16 kilometres per hour for bicycle speed and 2.5 seconds for perception, reaction and bicycle braking.
- Shoulder rumble strips make shoulder cycling difficult. The impact of this device on cyclists should be considered when the introduction of shoulder rumbles strips are being considered.

J.4 Bicycle Parking Facilities

Secure bicycle parking facilities encourage the use of bicycles. There are two different types of parking facilities:

Type A Parking Devices
Secure long-term parking facilities are needed where bicycles are parked for more than a few hours or where bicycles are parked on a daily basis. They are appropriate in school and office areas. Two common forms of these facilities are bicycle lockers and supervised or secure bike racks.

Type B Parking Devices
Short-term parking facilities are more appropriate for commercial areas and community facilities. These facilities are bike racks that permit both bicycle wheel and frame to be secured. They are generally positioned close to building entrances or at regular intervals along commercial and shopping streets.

The 2001 Zoning Bylaw separates parking facility requirements into three designated land uses, namely commercial, civic and residential. The breakdown is summarized in TABLE J.2.

TABLE J.2 BICYCLE PARKING REQUIREMENTS

LAND USE	BICYCLE PARKING REQUIREMENTS[1]		
	FACILITY TYPE	MINIMUM NUMBER OF SPACES	BYLAW REFERENCE
Neighbourhood Commercial Zones (C1) in residential areas (suitable for convenience stores)	B	1 space per 30m^2	¶ 10.01(11)
Neighbourhood Commercial Centre Zones (C1A) in residential areas, oriented to pedestrians	B	1 space per 30m2	¶ 10.01A(11)
Civic Exhibition Zones (P4) for recreation, sports, and exhibitions	B	1 space per 10 vehicle spaces	¶ 12.04(11)
Outdoor Recreation Zones (OR) including campgrounds, water parks, marinas, equestrian parks, and golf courses	B	1 space per 20 vehicle spaces	¶ 13.04(11)
Outdoor Recreation/Residential Zones (OR-1) for comprehensive development mixing outdoor recreation and residential uses	B	1 space per 20 vehicle spaces	¶ 13.05(11)

NOTES: *1. All requirements are contained in the City of Chilliwack Zoning Bylaw 2001. Bicycle parking facilities are required in areas zoned residential, local commercial, town centre commercial, industrial, or civic assembly, or in comprehensive development zones.*

J.5 Recommendations

The *Bicycle Transportation Plan 1999-2010: Summary Report* was completed in 2000. The Plan could be updated to include more detailed information about the Cycling Infrastructure Partnerships Program, provide a current list of bicycle facilities, and discuss the updated bicycle parking requirements.

Bicycle facilities should be incorporated into scheduled road work projects. It will be cost effective in the long term and will provide for a dynamic roadway. Higher priority could be given to corridors that connect existing routes or trails or corridors that are near bicycle generators (ex. Recreational facilities).

Detailed studies of corridors that are designated bicycle and truck routes could be individually analyzed to determine if they can safety accommodate these two vehicle types.

K Bridge Plan

The City of Chilliwack retained McElhanney Consulting Services Ltd. to perform the biennial condition survey of the City's bridge inventory. The survey results, analysis and recommendations were documented in the 2007 Bridge Inspection Report.

The City's inventory consists of 21 bridge structures see FIGURE K.1. Except for the CN Rail Overpass at Yale Road (No. 30), the remaining 20 bridges currently cross over a creek or river. All bridges are used by general vehicular traffic except the footbridge over Hope Slough (No. 10).

Major improvements completed since the last inspection included the replacement of the McLeod Road Bridge (No. 26) and the Gillanders Road Bridge (No. 28) with plate culvert structures. Work has also begun on widening the existing Yale Road West Bridge to five lanes.

The main objective of this section of the Transportation Plan is to summarize the information collected in the 2007 Bridge Inspection Report, to compare the findings in the 2001 Transportation Plan to identify the upcoming prioritized needs for rehabilitation and upgrades.

K.1 Summary of the 2007 Bridge Inspection Report

The Inspection Report included a bridge inventory, condition survey report, and maintenance report. Photographs indicating the elements requiring maintenance or replacement were also provided. 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 provided the identification, structural, seismic and waterway data. The identification data included bridge location, year built, load capacity, number of lanes, daily traffic volumes and possible bypass detour length. The structural data included the number of spans, length, width, alignment and materials for the different bridge components. Seismic data provided the soil type and ratings while waterway data indicated information on navigability, channel stability and bank protection.

The bridges investigated in the Inspection Report are listed in TABLE K.1. Total length, roadway width, number of vehicular lanes and the daily two-way traffic volume (2001 and 2007) for each bridge are also included in TABLE K.1.

From TABLE K.1, it was noted that the longest bridge is Keith Wilson at Vedder Canal (No. 20) of 180.11 m, which was not included in the 2001 Transportation Plan. The bridge with the highest daily traffic volume is found as No. 12 – Yale Road West at Chilliwack Creek. The 2007 two-way traffic volumes were 40,400 vehicles compared to 37,000 vehicles in 2000, an approximate annual growth of 1.5 percent.

The other bridges have similar traffic volumes or small increases, except the Yale Road East at Dunville Creek (No. 7). The traffic volumes crossing this bridge increased from 4,000 to 7,000 vehicles per day, approximately a 10 percent annual growth.

TABLE K.1 BRIDGE INVENTORY SUMMARY

NO.[1]	BRIDGE NAME[1]	LENGTH (meters)	WIDTH (metres)	NUMBER OF LANES	DAILY VOLUME (vehicles/day)		Existing Traffic Volume Level*
					2000	2007	
2	Chilliwack Central Road at Banford Ditch	6.10	9.66	2	<500	<500	Low
6	Chapman Road at Hope River	18.28	6.50	2	<100	<100	Low
7	Yale Road East at Dunville Creek	20.42	7.92	2	*4,000	*7,000	Medium
8	Yale Road East at Big Ditch	20.78	7.30	2	*4,200	*4,500	Medium
9	Chartwell Drive at Hope Slough	51.00	7.60	2	<100	<100	Low
10	Footbridge over Hope Slough	18.30	2.08	-	0	0	-
11	Luckakuck Way at Atchelitz Creek	36.60	9.35	2	*6,500	*7,200	Medium
12	Yale Road West at Chilliwack Creek	21.64	14.63	4	*37,000	*40,400	High
13	Haig Drive at Luckakuck Creek	5.80	3.80	1	<10	<10	Low
14	Boundary Road at Stewart Creek	6.70	6.50	2	100	100	Low
15	Vedder Bridge at Chililwack River	70.70	5.99	2	12,500	12,500	High
16	Eckert Road at Stewart Creek	6.68	6.60	2	<100	<100	Low
18	South Sumas Road at McGillivray Slough	8.23	6.59	2	<100	<100	Low
20	Keith Wilson at Vedder Canal	180.11	8.40	2	-	3,600	Medium
21	Young Street at Hope Slough	9.60	7.90	2	13,000	13,000	High
22	Menzies Street at Hope Slough	22.21	8.00	2	6,000	*7,700	Medium
23	Banford Road at Semiault Creek	4.06	7.31	2	*<500	*<500	Low
24	Parker Road at Big Ditch	4.70	5.62	1	<10	<10	Low
25	Pelly Road at Hope River	4.19	6.10	2	<100	<100	Low
27	Prest Road at Semiault Creek	6.70	6.70	2	3,000	3,000	Medium
30	CN Rail Overpass at Yale Road	16.40	6.10	4	40,000	40,000	High

Notes: *1. Bridge numbers and names were supplied by the City of Chilliwack*

**Two-way traffic volumes were based on traffic counts from the 2000 and 2007 Traffic Count Program recorded at the nearest station, prepared by Transtech*

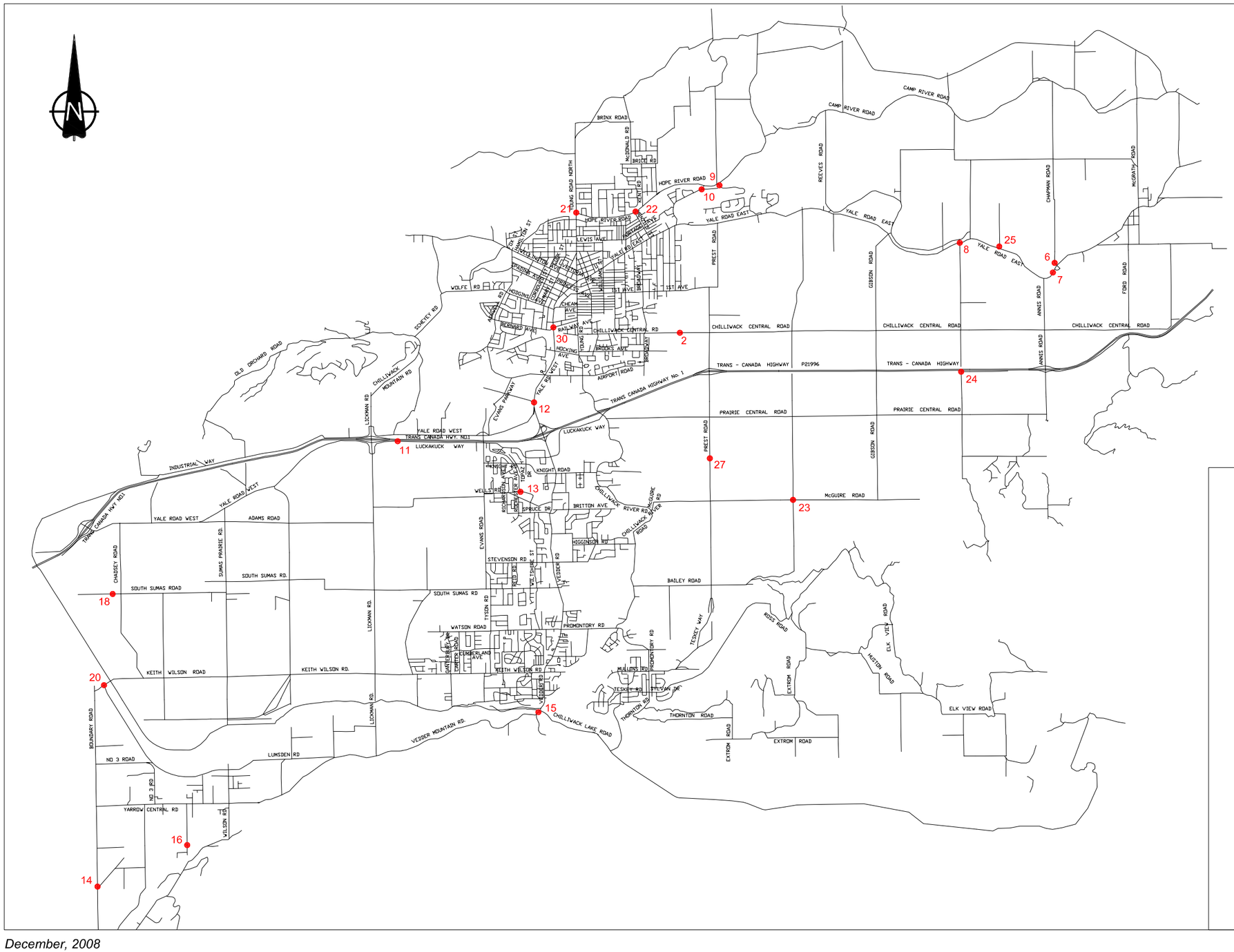
- denotes bridge's not included in that year's survey

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).

The material used and the City's rating was provided for the above items. The City's rating ranged between 1 and 5 corresponding to "excellent condition" (no repair required) and "critical condition" (repair urgent, closure may be necessary). The identified issues and/or latest improvements were listed in the "Comment" column of the condition survey report.



LEGEND

2 CHILLIWACK CENTRAL RD - BANFORD DITCH
6 CHAPMAN ROAD - HOPE RIVER
7 YALE ROAD EAST - DUNVILLE CREEK
8 YALE ROAD EAST - BIG DITCH
9 CHARTWELL DRIVE - HOPE SLOUGH
10 FOOT BRIDGE - HOPE SLOUGH
11 LUCKAKUCK WAY - ATCHELITZ CREEK
12 YALE ROAD WEST - CHILLIWACK CREEK
13 HAIG DRIVE - LUCKAKUCK CREEK
14 BOUNDARY ROAD - STEWART CREEK
15 VEDDER ROAD - CHILLIWACK RIVER
16 ECKERT ROAD - STEWART CREEK
18 SOUTH SUMAS ROAD - McGILLIVRAY SLOUGH
20 KEITH WILSON ROAD - VEDDER CANAL
21 YOUNG STREET - HOPE RIVER
22 MENZIES STREET - HOPE RIVER
23 BANFORD ROAD - SEMIAULT CREEK
24 PARKER ROAD - BIG DITCH
25 PELLY ROAD - HOPE RIVER
27 PREST ROAD - SEMIAULT CREEK
30 YALE ROAD - CN RAIL OVERPASS

FIGURE K.1 BRIDGE LOCATION PLAN

December, 2008

Maintenance Report

Based on the results of the condition survey report, the items in "FAIR", "POOR" or "CRITICAL" condition were identified and summarized. The proposed improvement works to be funded either as normal maintenance or as capital investment were suggested in the report.

The 2007 Inspection Report discussed the general maintenance and assessment issues for all the surveyed bridges. The items discussed include:

- Annual Bridge Cleaning
- Vegetation removal
- Timber Lagging replacement
- Bridge approach barriers retrofitting
- Precast concrete girders cracking and spalling
- Erosion protection of abutments
- Bridge signing additions
- Bridge replacements
- Future inspections

Required Improvement Priorities

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

- High - Non-recurring maintenance items requiring action within the next work season (i.e. 2008);
- Medium - Items requiring ongoing regular maintenance; and,
- Low - Items with non-urgent actions required.

TABLE K.2 summarizes the suggested maintenance / repair cost estimates as prepared by the Inspection Report. The levels of existing traffic using these bridges are also indicated as high (over 10,000 vehicles/day), medium (between 1,000 and 10,000 vehicles/day) and low (less than 1,000 vehicles/day).

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 five bridge are considered the most important:

- C.N. Rail Overpass at Yale Road (No. 30);
- Yale Road West at Chilliwack Creek (No. 12);
- Young Road at Hope Slough (No. 21);
- Vedder Road at Chilliwack River (No. 15); and,
- Luckakuck Way at Atchelitz Creek (No. 11).

Notwithstanding essential safety improvements at other bridges, it is recommended that these five bridges be given priority for the implementation of maintenance and upgrades. Bridges on other routes, particularly with low traffic volumes, are not "unimportant" but generally service local areas that typically have alternative access, and are therefore a lower priority from a network functionality perspective.

TABLE K.2 SUMMARY OF THE SUGGESTED MAINTENANCE / REPAIR COST ESTIMATES

NO.	BRIDGE NAME	EXISTING TRAFFIC VOLUME LEVEL[1]	ESTIMATED COST ($)[2] FOR VARIOUS PRIORITIES			
			HIGH	MEDIUM	LOW	TOTAL
2	Chilliwack Central Road at Banford Ditch	Low	5,000	500	8,000	13,500
6	Chapman Road at Hope River	Low	41,000	6,000	13,500	60,500
7	Yale Road East at Dunville Creek	Medium	1,000	8,500	4,500	14,000
8	Yale Road East at Big Ditch	Medium	0	6,500	15,500	22,000
9	Chartwell Drive at Hope Slough	Low	500	2,500	10,000	13,000
10	Footbridge over Hope Slough	-	0	500	2,000	2,500
11	Luckakuck Way at Atchelitz Creek	Medium	40,000	1,000	3,000	44,000
12	Yale Road West at Chilliwack Creek	High	0	0	20,500	20,500
13	Haig Drive at Luckakuck Creek	Low	0	7,500	2,500	10,000
14	Boundary Road at Stewart Creek	Low	0	3,000	7,000	10,000
15	Vedder Bridge at Chililwack River	High	0	10,500	49,500	60,000
16	Eckert Road at Stewart Creek	Low	0	23,000	9,500	32,500
18	South Sumas Road at McGillivray Slough	Low	Consider for Replacement			
20	Keith Wilson at Vedder Canal	Medium	0	5,000	9,000	14,000
21	Young Street at Hope Slough	High	0	8,000	1,500	9,500
22	Menzies Street at Hope Slough	Medium	0	500	32,000	32,500
23	Banford Road at Semiault Creek	Low	Consider for Replacement			
24	Parker Road at Big Ditch	Low	Consider for Replacement			
25	Pelly Road at Hope River	Low	0	5,500	4,000	9,500
27	Prest Road at Semiault Creek	Medium	15,000	21,000	1,000	37,000
30	CN Rail Overpass at Yale Road	High	0	0	1,500	1,500

Notes: *1. Refer to Table K.1*
2. Source: City of Chilliwack 2007 Bridge Inspection Report by McElhanney Consulting Services Ltd. (Oct 2007)

The Inspection Report also indicated that the overall condition of the South Sumas Road Bridge (No. 18), Banford Road Bridge (No. 23), and Parker Road Bridge (No. 24) should be considered for replacement and should be continually monitored by City maintenance crews until they are replaced. These bridges are showing significant signs of deterioration and it is likely more economical to replace these structures than it would be to perform rehabilitation and continue maintenance.

Seismic Vulnerability

As the surveyed bridges had been 'screened' for potential seismic vulnerabilities in the 1997 Bridge Inspection Report, prepared by J.W. Wedler & Associates Ltd, the screening was not repeated for the 2000 Bridge Inspection Report. However, a seismic assessment for selected bridges was performed. The report suggested that prior to undertaking the soil improvements recommended by the previous inspection report, the City should consider having the recommendations "Peer Reviewed", to ensure that such works are necessary, the routes serviced are essential or non-redundant, that the methods suggested are appropriate, and that the work represents the best value for the City's money.

At the time of the 2001 Transportation Plan, the City was acting on the seismic upgrading recommendation of the 1997 and 2000 reports and that "Peer Reviews" were being undertaken as part of the design-build process. It is therefore assumed that this work has been completed. The 2007 Bridge Inspection Report did not perform either a potential seismic vulnerabilities screening or a seismic assessment on the bridge inventory.

K.2 Recommendations

It is recommended that all high priority bridge upgrades not already completed be conducted immediately. Medium and low priority items at bridges requiring high priority upgrades should be completed at the same time as this will increase cost-effectiveness and reduce traffic disruption. Other medium and low priority improvements should be planned and budgeted as necessary.

It is recommended that the network functionality perspectives outlined above be taken into consideration when conducting this work.

When doing any bridge works, especially along high volume roads, effective traffic management plans should be prepared to minimize delays and ensure safety for the bridge users and the workers.

The bridge inventory in Chilliwack consists of numerous bridges that are becoming functionally obsolete. The decks are generally narrower than current standards, lack proper transition barriers and have railing systems that do not meet current standards. Refer to the 2007 Bridge Inspection Report for costs and details for upgrade work.

It is also recommended that the City 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.

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L Traffic Volumes

Traffic counts are conducted regularly for the City of Chilliwack by Transtech Data Services. In 2007, automatic, two-way 24-hour counts were conducted at 75 stations, and manual turning movements were conducted at 49 stations. This compared to the 2000 counts, 24-hour counts were conducted at 122 stations and manual counts at 64 intersections. The drop in surveyed corridors and intersections results in different roads and intersections for analysis in Sections G and L. Counts were conducted during April and May of 2007, and are summarized in the *City of Chilliwack 2007 Traffic Count Program* (Transtech, 2007).

L.1 Variations in Traffic Volumes

To estimate monthly and daily variations of traffic volumes in Chilliwack, traffic counts on Yale Road and Vedder Road were reviewed. These traffic counts were provided by the City of Chilliwack. The Yale Road traffic counts were recorded at a permanent count station south of Parr Road (north of Highway 1), and the Vedder Road traffic counts were taken south of Stevenson Road. Both Yale Road and Vedder Road are classified arterial roads in these corridors. Twenty-four hour count variations are shown in Section G.

Monthly Variations
Monthly variations are shown for Yale Road and Vedder Road in FIGURE L.1. The most recent data is from November 1, 2001 to October 31, 2002. Vedder Road average daily traffic volumes were highest during the summer months and lowest during the winter months, similar to the results found in the 2001 Transportation Plan. Yale Road average daily traffic volumes were highest during the months of April, May and October, and lowest during the winter, but they decreased marginally during the summer months. Monthly variations are typically more severe on a rural route or those serving high volumes of recreational traffic. Both Yale Road and Vedder Road are considered urban routes.

Daily Variations
Daily two-way traffic counts were conducted at the same locations on Yale Road and Vedder Road as the monthly counts. Daily variations are shown in FIGURE L.2. The week analyzed for daily variation was October 20 to 26, 2002. Traffic counts were the highest on weekdays, peaking on Friday. This is probably due to people arriving at and leaving work earlier on a Friday and therefore travelling separately; whereas during the week carpooling might be common. The lowest daily flows were counted on the weekend, in-particular Sunday. These patterns may not be typical for routes serving high volumes of recreational traffic.

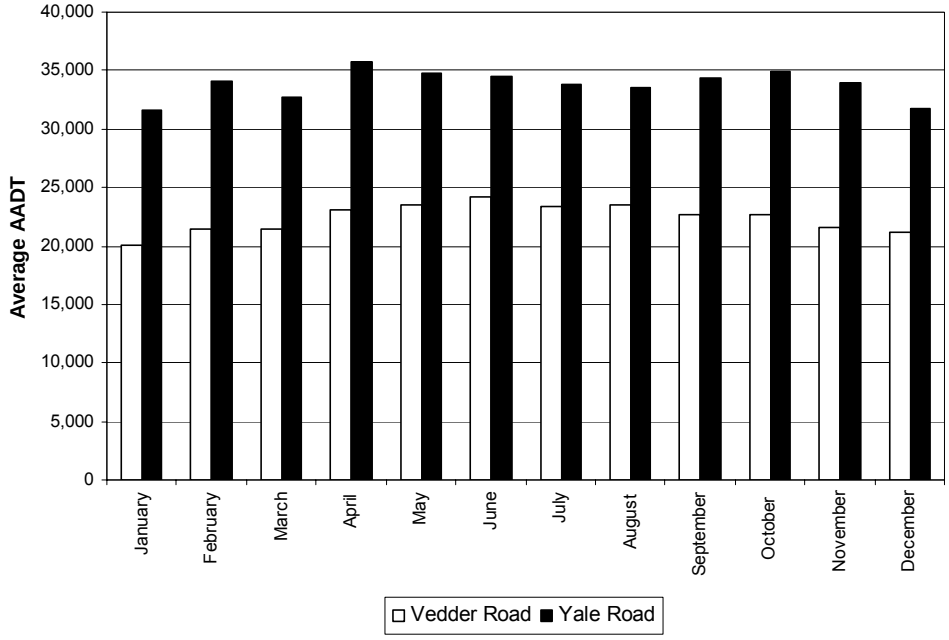


FIGURE L.1 MONTHLY TRAFFIC VARIATION

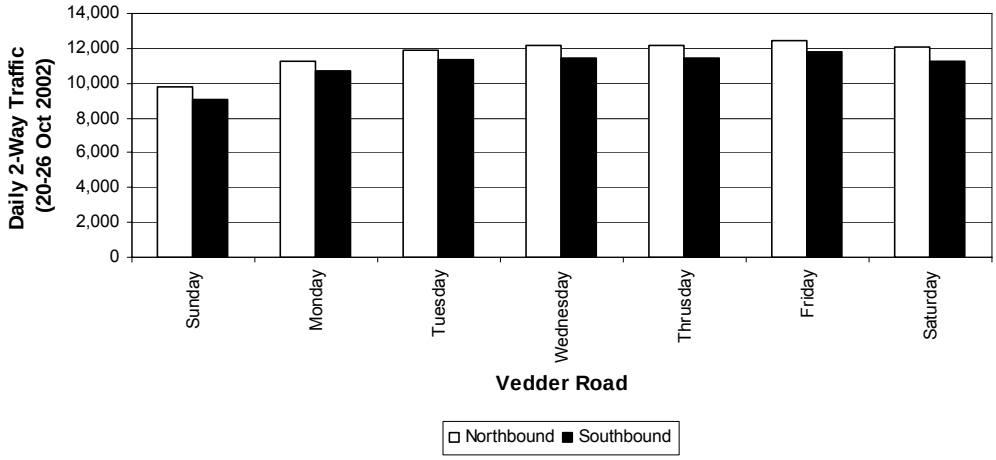


FIGURE L.2 DAILY TRAFFIC VARIATIONS

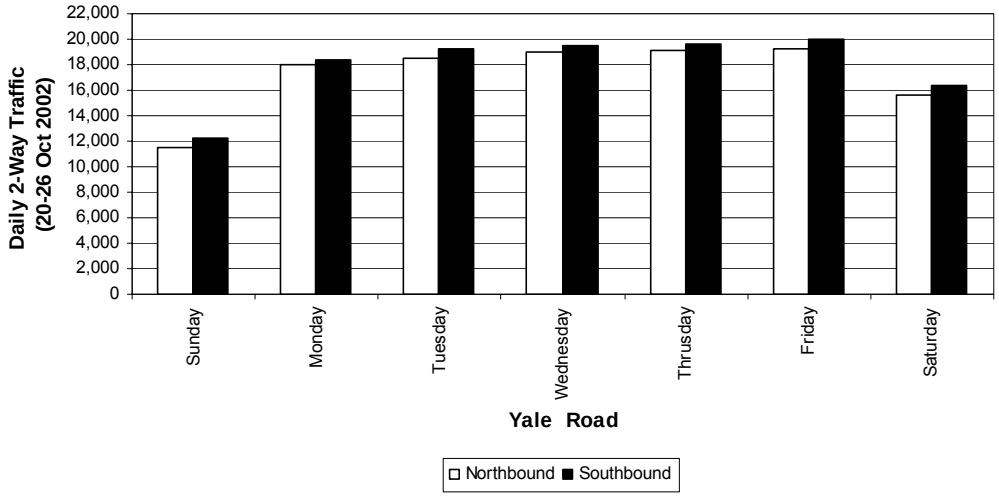


FIGURE L.2 DAILY TRAFFIC VARIATIONS (CON'T)

Variation factors based on the data shown in FIGURES L.1 and L.2 are shown in TABLE L.1, and indicate the proportion of the daily volume counted during the specified day or month to the average daily volume. For example, the variation factor of 0.96 for Vedder Road in March is derived from the ratio of the average daily traffic in March (21,380 vehicles per day) to the AADT over all twelve months (22,375). FIGURE L.1 and TABLE L.1 indicate that the traffic counts reported in the *City of Chilliwack 2007 Traffic Count Program*, which were conducted during April and May of 2007, represent conditions in a peak (Yale Road) or near-peak month (Vedder Road).

TABLE L.1 VARIATION FACTORS

MONTHLY VARIATION FACTORS[1]					
	Yale Rd	Vedder Rd		Yale Rd	Vedder Rd
January	0.94	0.90	July	1.00	1.04
February	1.01	0.96	August	0.99	1.05
March	0.97	0.96	September	1.02	1.02
April	1.06	1.03	October	1.03	1.01
May	1.03	1.05	November	1.00	0.97
June	1.02	1.08	December	0.94	0.95
DAILY VARIATION FACTORS[2]					
	Yale Rd	Vedder Rd		Yale Rd	Vedder Rd
Sunday	0.67	0.83	Thrusday	1.10	1.04
Monday	1.04	0.97	Friday	1.12	1.07
Tuesday	1.07	1.02	Saturday	0.91	1.03
Wednesday	1.09	1.04			

NOTES: *1. Based on continuous counts summarized in FIGURE L.1.*
2. Based on control counts summarized in FIGURE L.2.

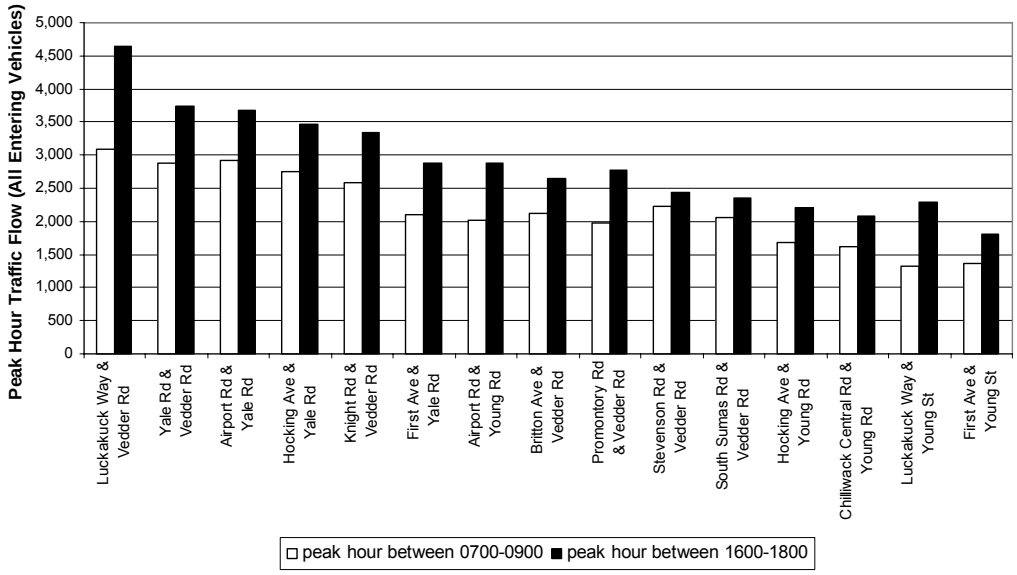
L.2 24-Hour Counts

A summary of the two-way 24-hour counts, taken from the City of Chilliwack 2007 Traffic Count Program report, is provided in FIGURES L.3 and L.4. The highest 24-hour volumes are found on the main north-south corridors of Yale Road, Vedder 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.

L.3 Intersection Counts

As part of the annual traffic counts 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. During the survey year 2007, the morning peak hours occurred between 0800 and 0900 hours, and the afternoon peak hour occurred between 1600 and 1700 hours on Yale Road and between 1700 and 1800 hours on Chilliwack Mountain Road.

The 15 intersections at which both the highest morning and the highest afternoon peak hour flows were recorded are summarized in FIGURE L.5. These intersections are all located in the same north-south corridors that showed the highest 24-hour count, namely the Yale Road, Vedder Road, and Young Road corridors. These three corridors connect Chilliwack Proper to Sardis/Vedder and provided access to Highway 1.



Counts conducted by Transtech Data Services (April and May 2007)

FIGURE L.5 INTERSECTIONS WITH HIGHEST TRAFFIC COUNTS

L.4 Recommendations

The City's program of yearly traffic counts 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. It was noticed that there has been a decrease in the number of intersections surveyed by Transtech since 2000, and no un-signalized intersections were surveyed. It is recommended to increase the number of surveyed intersections to include the major un-signalized intersections. If budget restricts surveying un-signalized intersections every year, considerations could be given to rotation options such as the one proposed in TABLE L.2.

TABLE L.2 PROPOSED ROTATION OPTION FOR TRAFFIC COUNT COLLECTION

YEAR 1	YEAR 2	YEAR 3	YEAR 4
Pack A - 25 major signalized intersections	Pack A - 25 major signalized intersections	Pack A - 25 major signalized intersections	Pack A - 25 major signalized intersections
Pack B - 13 minor signalized intersections and 10 major unsignalized intersections	Pack C - 13 minor signalized intersections and 10 major unsignalized intersections	Pack B - 13 minor signalized intersections and 10 major unsignalized intersections	Pack C - 13 minor signalized intersections and 10 major unsignalized intersections

The number of signalized intersections counted per year was chosen by the total number of signals (51). It is recommended to continue a pattern, so you will be able to see variation trends.

Daily traffic counts at chosen locations should also be integrated into the City of Chilliwack's annual traffic count program. The data used in this study is from years 2001 and 2002. It is understood that the City of Chilliwack currently has a contractor working on some new data numbers. Daily data for a complete year is important to be able to understand variations in annual, monthly, and daily traffic patterns.

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M Pedestrian Plan

The City of Chilliwack currently has no specific pedestrian master plan. According to the 2001 Transportation Plan, City staff followed the relevant guidelines and standards of the Transportation Association of Canada when designing pedestrian facilities.

This section summarizes current bylaws relating to pedestrian facilities. Further measures aimed at promoting walking as a mode of transportation are subsequently identified and prioritized.

M.1 Current Bylaw Requirements

Sidewalks and Walkways

The Subdivision and Development Control Bylaw 2004 No. 3055 schedule requires sidewalks to be provided in new developments as follows:

- Sidewalks shall be provided on both sides of all urban streets. Two sidewalks are required on any urban road that provides a pedestrian link to a school, community centre, walkway, park, or similar facility, or that is adjacent to lands zoned for multi-family, commercial, or institutional use.
- One sidewalk on one side of the access road to the bulb of a cul-de-sac, and the sidewalk is to be extended around and connected if a pedestrian-generating route intersects it.
- One walkway on arterial and collector rural roads.

Sidewalks are not necessarily required on non-arterial and non-collector rural roads, although paved sidewalks shall be provided if requested by the Engineering Director. The bylaw (from standard drawings) requires that sidewalks in new developments should have a minimum width of 1.5 metres, and that wheelchair ramps should be provided at all intersections.

Sidewalks and walkways (restricted access pedestrian pathways with chain link fencing on both sides and off-set gates at both ends) are reserved in Chilliwack for the sole use of pedestrians by paragraph 40 of *Highway and Traffic Bylaw 2004 No. 3023* a Bylaw to Regulate the Use of Highways. This bylaw prohibits cycling on sidewalks and walkways. This has been applied in general, except at two locations: Vedder Road between Keith Wilson Road and Luckakuck Way and Yale Road from Yale Road West to Alexander Street.

The City's Comprehensive Municipal Plan includes a budget of about $150,000 per year for pedestrian facilities, including sidewalks, and a budget of about $20,000 per year to install ramps. The 2001 Transportation Plan indicated that $225,000 per year be budgeted for pedestrian facilities, which indicates a 33 percent reduction. The CMP also shows a one time fee of $5,900 for Luckakuck Pedestrian facilities in 2007.

Pedestrian Crossings

In paragraphs 43-45, *Chilliwack's Highway and Traffic Bylaw 2004 No. 3023* provides for the establishment of pedestrian crossings and associated traffic control devices on municipal roadways. The Bylaw specifies that pedestrians may not cross within one block or 200 metres (whichever is less) of a pedestrian crossing if a pedestrian crossing exists across a highway. School crossing guards (adult or student) are provided with the authority to stop vehicles at pedestrian crossings.

M.2 Pedestrian Counts

Pedestrian counts are conducted regularly for the City of Chilliwack. In 2007, manual counts were conducted at 48 intersections during April, May and June. The most recent counts are summarized in a report titled City of Chilliwack 2007 Traffic Count Program (TransTech, 2007).

A review of the counts indicates that the four highest peak-hour pedestrian flows were counted at or near the Five Corners intersection in downtown Chilliwack. The 15 highest peak-hour pedestrian flows occurred in Chilliwack Proper, of which 12 are located in the downtown area. The intersections at which these flows were observed are all signalized. The intersections with the highest peak-hour pedestrian crossing flow are summarized in FIGURE M.1. It was also noted that 27 signalized intersections have peak-hour pedestrian crossing flows (either morning or afternoon) of over 15 on any single leg. This value represents the lower threshold at which pedestrian crossing facilities are warranted in British Columbia.

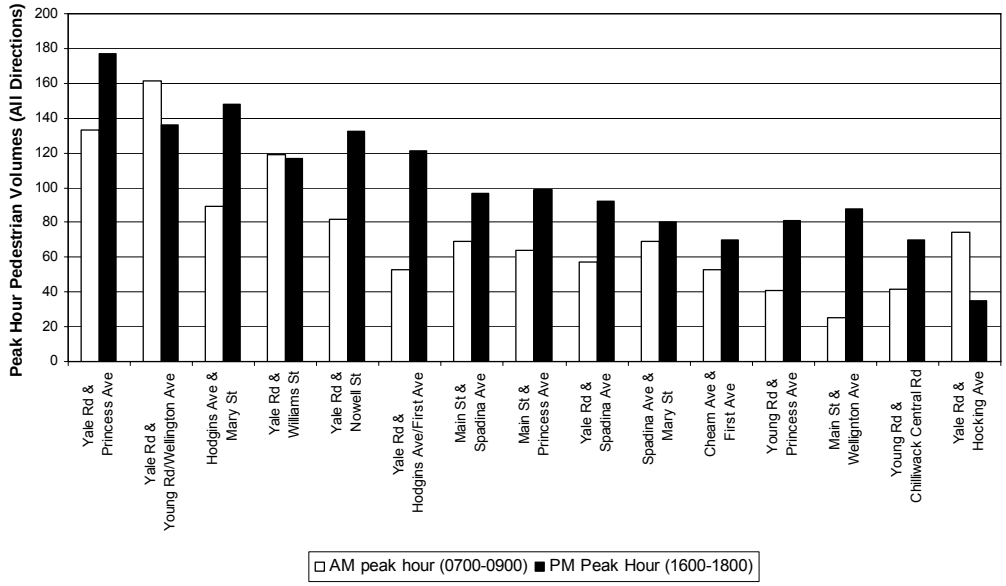

FIGURE M.1 INTERSECTIONS WITH HIGHEST PEDESTRIAN VOLUMES

M.3 Guidelines for Pedestrian Facilities

Chilliwack has two main urban centres that are linked by the Vedder Road/Yale Road corridor, a relatively auto-dependent land use pattern outside these centres, and a transit system with limited service outside the urbanized areas. These factors can affect the viability of walking as a mode of transportation outside the urban areas.

Two reports were reviewed for the requirements of sidewalk installation and existing sidewalk width within Chilliwack. These are *Network Clarification Strategy Final Report (Urban Systems, 2006)* and *City Road Form (CH2M Hill, 2005)*. Both reports were prepared for the Insurance Corporation of British Columbia (ICBC).

It is important to note that the effective sidewalk width in urban environments can be reduced by parking meters, planters, utility poles, newspaper boxes, and other street furniture. Where feasible, planting strips or boulevards are recommended between the sidewalk and the roadway to increase safety and the comfort of pedestrians.

According to *Network Clarification Strategy Final Report*, the "vulnerable pedestrian uses" was defined as the locations that attracts significant volumes of pedestrians and/or vulnerable road users, such as schools and senior facilities. The Report suggested that vulnerable pedestrian uses should be discouraged along major roadways for safety purposes. If the facilities with vulnerable pedestrians uses are already located adjacent to higher order roadway lanes, specific safety measures may be considered.

The *Network Clarification Strategy Final Report* shows the proximity of vulnerable users to higher order roads and mainly covers the arterial roads/major connector with primary and secondary schools. The Report shows the sidewalk inconsistencies within Chilliwack, indicating lack of sidewalks on one side or both sides along arterial and collector roads.

The *Safer City Road Form Report* suggested the desirable clear sidewalk width based on two pedestrians passing side by side without touching is 1.8 m in urban areas. It may be widened to 2.0 m (adjacent to the curb), 2.4 m (in commercial areas with high pedestrian volumes) and 3.0 m (at bus stops to accommodate waiting passengers). In other specific locations such as schools, parks, hospitals and recreational facilities, sidewalks of 2.4 m to 3.0 m should be considered. In addition, greater width should be provided where significant numbers of seniors or wheelchair users are anticipated as well as allowance for the presence of adjacent retaining walls and fences.

The Report also suggested the stamped concrete or similar "hard" landscaping boulevard area should be considered in Chilliwack's urban areas. Curb extensions at intersections and mid-block could be another safety measure for crossing pedestrians.

For the rural area, the Report suggested wide shoulders be provided on both sides of a road. Paved 1.5 m wide shoulders are the minimum requirement for pedestrians along low-volume, rural highways. Greater width, up to 2.5 m to 3.0 m is desirable along high-speed roadways, particularly with a large number of trucks.

Pedestrian Crossings

The Pedestrian Crossing Control Manual (Transportation Association of Canada, 1998) provides guidelines for pedestrian crossings. The Manual includes warrants that provide guidance concerning when pedestrian crosswalks, special crosswalks, and pedestrian signals are appropriate. The Manual also incorporates general information on the use of school programs involving safe routing and crossing guards.

When evaluating the need for crosswalks, TAC warrants take into account pedestrian and vehicle traffic flows. Application of the warrants may be supplemented by considering the following factors:

- vehicle gaps and vehicle speeds,
- sight distance,
- lighting levels,
- collision history,
- distance to the nearest crosswalk or intersection,
- the number of lanes that pedestrians must cross, and whether there is a viable refuge opportunity,
- special factors such as school walking routes, concentration of elderly pedestrians, the presence of well-used bus stops, and whether the road is on a designated truck route,
- the number and location of nearby driveways and their level of use.

M.4 Recommendations

An effective and encouraging pedestrian network consists of sidewalks, crosswalks, walkways, trails, good connections to transit, and a pedestrian friendly streetscape.

The *Safer City Road Form Report* suggested that the minimum sidewalk widths be widened to:

- 1.8m – in urban areas
- 2.0m – when adjacent to curb
- 2.4m – at commercial areas with high pedestrian volumes
- 3.0m – at bus stops.

The *Road Form* also suggests that at schools, parks, hospitals, and recreational facilities, the recommended sidewalk width is 2.4m to 3.0m. The *Subdivision and Development Control Bylaw* may be revised to include these requirements.

The *Pedestrian Crossing Control Manual* (Transportation Association of Canada) can help identify locations at which pedestrian crossing facilities would be valuable. Intersections with high pedestrian counts may be reviewed to determine if sufficient crossing facilities are in place.

The City of Chilliwack may consider developing a pedestrian master plan to prioritize improvements to pedestrian policies and facilities; similar to the *Bicycle Transportation Plan 1999-2010*). The Pedestrian Plan could address sidewalks and sidewalk ramps, pedestrian crossing facilities, pedestrian control traffic signals, and funding issues. It could prioritize improvements and schedule around 2 – 5 improvements per year, and could include sidewalk construction, installation and upgrading of crossing facilities, and/or other improvements.

N Regional Connections to Highway 1

Six interchanges currently connect the following municipal roads to Highway 1 (Trans Canada Highway) within the City of Chilliwack (from west to east):

- Yale Road West (simple diamond, full movements)
- Lickman Road (simple diamond, full movements)
- 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)
- Annis Road (simple diamond, full movements)

Based on information provided by the City, a half-diamond interchange (access to and from the west only) will be constructed with the proposed Evans Road extension. The details of the new interchange will be discussed in Section N.3.

N.1 Traffic Volumes

Since 2004, the BC MoT reduced the scale of the traffic data collection. Only one permanent count station along Highway 1 was found in the City of Chilliwack, compared to five locations found in the 2001 Study. The count station is P-17-9EW, located at 1.3 kilometres west of Vedder Road. To compare the traffic volumes along Trans-Canada Highway, the daily traffic volumes at the count stations in Langley, Abbotsford and Hope were reviewed.

FIGURE N.1 shows that the two-way traffic volumes along Highway 1 generally decreases from west to east, The annual average daily traffic (AADT) volumes was estimated at 36,000 vehicles near the Vedder Road Interchange.

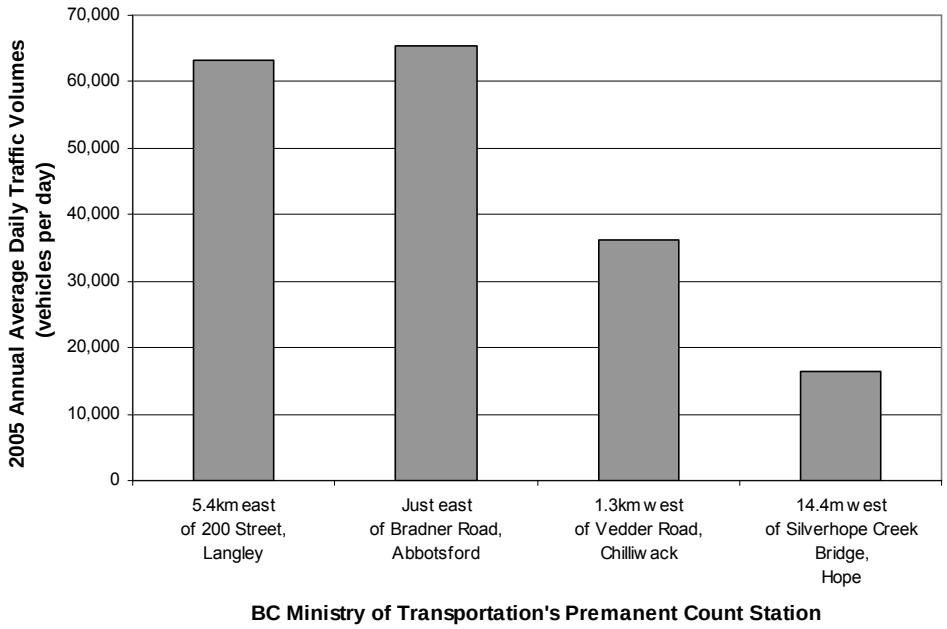

FIGURE N.1 DAILY TRAFFIC VOLUMES ALONG HIGHWAY 1

N.2 Vedder Road Interchange

The Vedder Road Interchange at Highway 1 has been rebuilt since the 2001 Study. The original cloverleaf interchange has been changed to a half-diamond (south of the interchange) and partial cloverleaf (north of the interchange). The new interchange opened in summer 2004 and FIGURE N.2 shows the aerial photograph of the modified interchange.

FIGURE N.2 AERIAL PHOTOGRAPH OF THE MODIFIED VEDDER ROAD INTERCHANGE

According to the City's information, the improvements include:

- A new four-lane Vedder Road Overpass, expandable to six lanes in future, to reduce the congestion during hours of heavy traffic and expected high growth of traffic volumes;
- Reconstruction of the ramps to provide longer merge and exit lanes at the highway;
- Provision of the improved pedestrian and cycle lanes on the overpass;
- Widening of Vedder Road north and south of the overpass, and improved intersections at Old Yale Road and Luckakuck Way; and,
- Coordinated traffic signals in the interchange, at Old Yale Road and at Luckakuck Way.

FIGURE N.3 shows the daily traffic volumes along Vedder Road, north of Luckakuck Way. Due to the lack of traffic data, the 2006 traffic volumes were estimated as the average of the 2005 and 2007 traffic volumes. Traffic volumes were constant from year 2000 to 2003 due to the capacity of the two-lane bridge. Traffic volume generally increases after the introduction of the four-lane overpass across Highway 1.

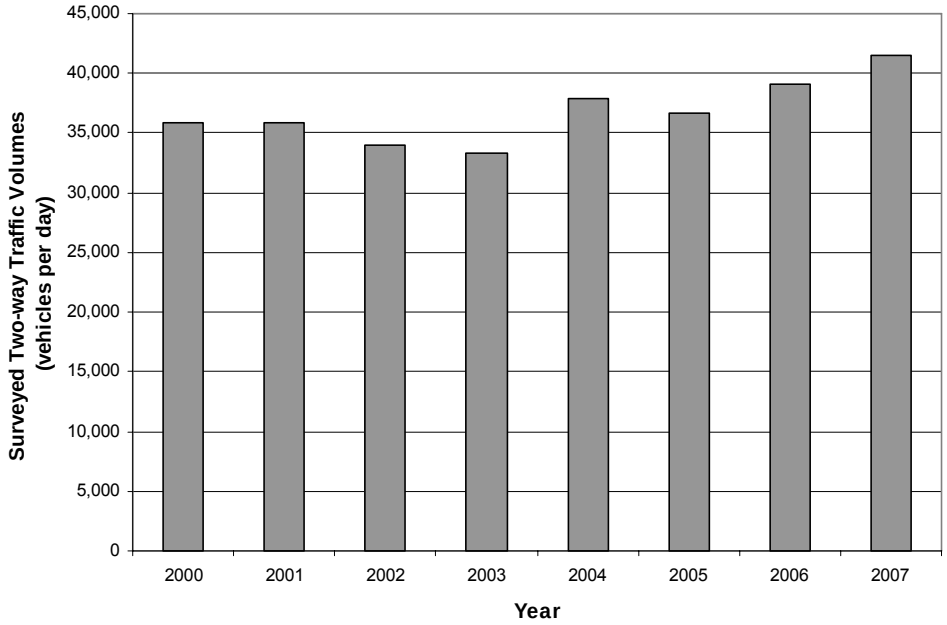

FIGURE N.3 DAILY TRAFFIC VOLUMES ALONG VEDDER ROAD

N.3 Evans Road Interchange

The Evans Road Connector and Interchange Project is scheduled to begin in spring 2008 and completed in 2009. The project costs about $40.5 Million including $21 Million for the Connector Road and $19.5 Million for the Highway 1 Interchange. The Connector and Interchange will link with Evan Parkway to the south, with Ashwell Road to the north – a distance of approximately 2.5 kilometres. A two-lane arterial road with turn lanes at intersections will be provided. The roadways and Interchange will be constructed to accommodate future expansion to five lanes. The half diamond interchange will be designed with access only to the west. The posted speed limit is 50 kilometres per hour. FIGURES N.4 and N.5 shows the alignment and layout for the Evan Road Interchange. The recommended improvement option from the 2000 Chilliwack Trans Canada Highway Study (FIGURE N.6) is also attached for reference.

It is expected that the introduction of the modified Vedder Road interchange will improve access for Chilliwack residents on both sides of the Trans-Canada Highway for employment, recreation, culture and commercial services. It will also affect the traffic patterns for the Lickman Interchange and Chilliwack Mountain Road. Eastbound highway traffic heading to the east of Chilliwack downtown area may use the new Evans Road Interchange instead of traveling through the Lickman Road Interchange, Chilliwack Mountain Road and Schweyey Road. The EMME/2 model results show that, during the 2027 PM peak hour, the northbound and southbound traffic volumes on Vedder Road or Evans Road are estimated as 680 and 1,580 vehicles per hour respectively.

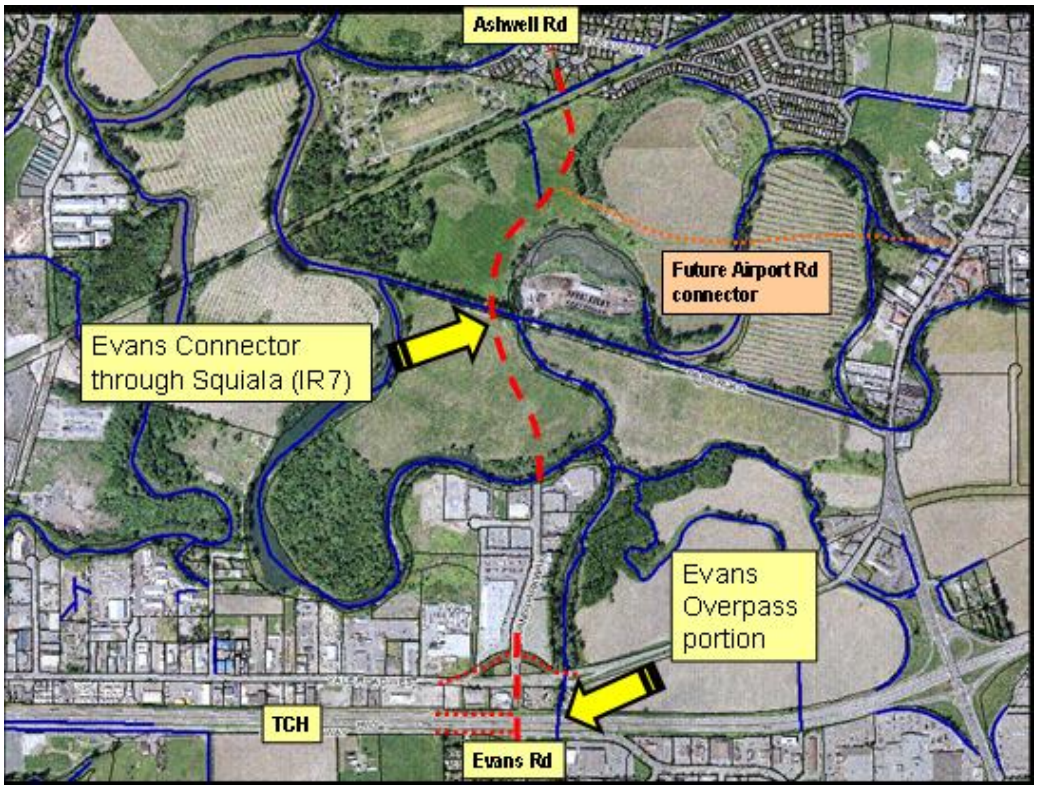

FIGURE N.4 EVANS ROAD CONNECTOR AND INTERCHANGE PROJECT

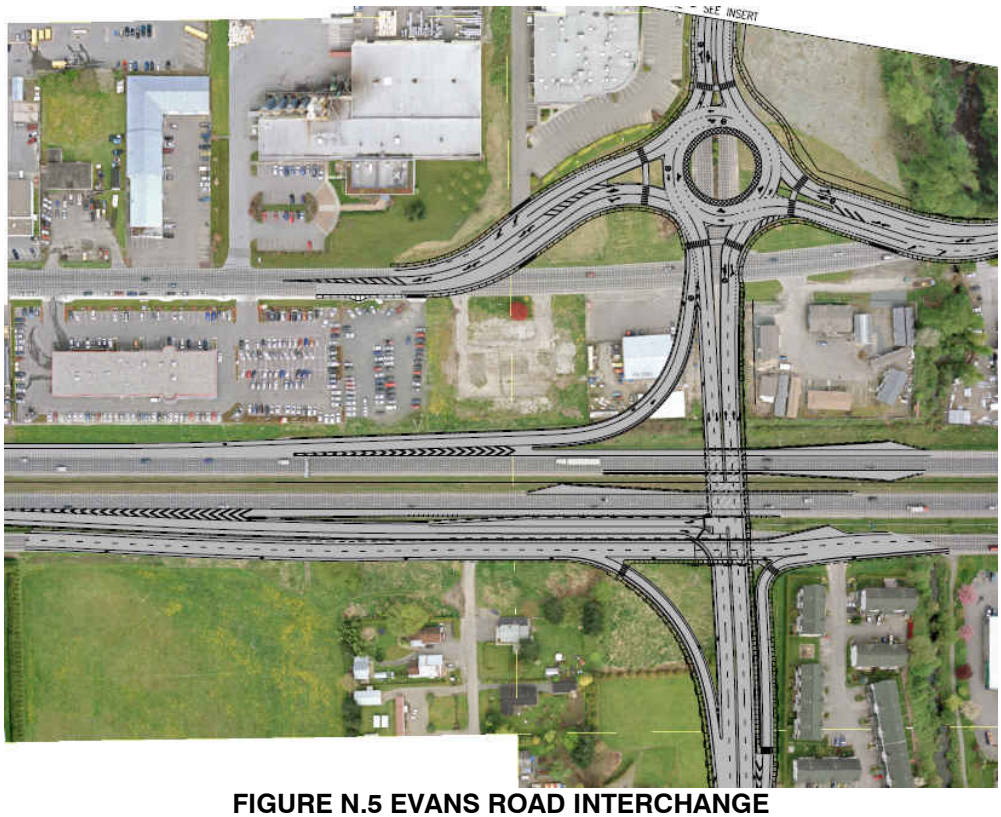

FIGURE N.5 EVANS ROAD INTERCHANGE

N.4 Recommendations

It is recommended that the City should conduct traffic counts and undertake traffic analysis after about one year of the Evans Road Interchange completion. The resultant traffic impact on the Vedder Road and the Lickman Road Interchanges should also be reviewed. The change in traffic patterns will affect the efficient operation of all relevant traffic signals, particularly the coordinated signal timings along the Vedder Road corridor.

The staging of future improvements should be consistent with the proposed capital projects indicated in the latest Comprehensive Municipal Plan and Development Charge Cost (DCC) Bylaw Project Cost Schedule. A summary of the proposed capital projects is included in Section R (Financial Plan) of this Transportation Plan. Construction time and required budget for any improvements to the interchanges should be reviewed with the scheduled capital projects.

For all improvements to the Highway 1 interchanges, the City should work closely with the Ministry and collect the latest information from the Ministry, including up-to-date traffic counts if they are available. Any related project along Highway 1 which may affect the future traffic patterns in the City should be reviewed with the Ministry.

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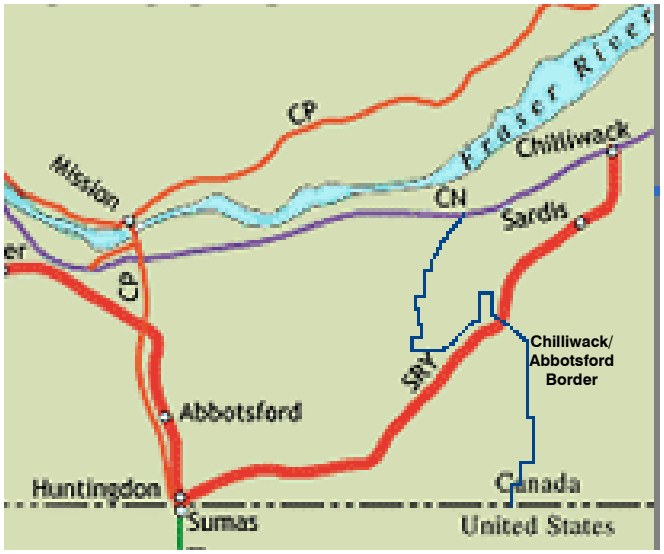
O Railway Plan

O.1 Existing Train Service

Canadian National (CN) and Southern Railway of British Columbia Limited (SRY) are the two rail companies that have tracks situated in Chilliwack. Chilliwack is a major interchange point between CN Rail and SRY. The alignments of existing tracks in the City are shown in FIGURE O.1.



Extracted from Southern Railway of British Columbia Limited Website

FIGURE O.1 EXISTING ALIGNMENTS OF RAIL TRACKS IN CHILLIWACK

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

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

It appears that the increased train traffic has resulted in increased wear and tear on the tracks, so that track maintenance activities (which sometimes require road closures at at-grade crossings) are now more frequent. CN Rail tracks are situated through Chilliwack's populated area.

The Southern Railway of BC system enters Chilliwack through Yarrow and stops at an interchange with CN Rail west of Young Road. It has a spur line running parallel to the main track just north of Airport Road, which is used for interchange manoeuvres. It also includes a ramp track just south of the Hocking Avenue crossing, used for the re-shipment of lumber products.

Based on information provided by CN Rail, current train traffic through Chilliwack consists of one passenger train per day operating at a maximum speed of 70 miles per hour and 27 freight trains per day operating at a maximum speed of 65 miles per hour. Train crossing waits at-grade crossings vary from two to five minutes. The typical freight train length is two miles. CN Rail indicated no major change in the number of trains or operating speed in the foreseeable future. No train counts were provided by SRY.

O.2 Crossing Facilities

The CN Rail track crosses the City from east to west and intersects with several major roads, including Industrial Way and Lickman Road to the west, Prest Road and Yale Road to the east, and Young Road and Broadway in the downtown area. Except for a vehicle overpass provided at Yale Road West near Railway Avenue, all crossings are at-grade. A new at grade CN railway crossing is being proposed for the new Evans Road connector at mile 73.05 Yale Sub.

The SRY crosses the City from south to north and intersects with these major roads: Lickman Road, Vedder Road, Knight Road, Airport Road and Hocking Avenue. A railway overpass is provided at Trans-Canada Highway (Highway 1) and at Luckakuck Way east of the Vedder Road interchange.

Similar to the 2001 Transportation Plan, the CN Rail at-grade crossing at Young Road has the highest motor vehicle traffic volume, while the intersection at Vedder Road has the highest traffic volumes crossing the SRY tracks. Compared to the 2001 Study, the daily traffic volumes across the CN Rail at Young Road increased by 27 percent (from 15,800 to 20,000 vehicles per day); the traffic volumes across the SRY tracks at Young Road increased by almost 50 percent (from 27,900 to 41,500 vehicles per day). It is expected the total vehicles delays by crossing trains are increased. Photographs of the railway crossings along CN tracks and SRY tracks are shown in FIGURE O.2 and FIGURE O.3 respectively.

Northbound Lickman Road North Crossing

Westbound Airport Road Crossing

FIGURE O.2 LICKMAN ROAD AND AIRPORT ROAD RAIL CROSSINGS (CN RAIL)

Northbound Lickman Road South Crossing

Southbound Vedder Road Crossing

FIGURE O.3 VEDDER ROAD RAIL CROSSING (SRY RAIL)

O.3 Rail Crossing Collisions

The 2005 and 2006 ICBC reported collisions occurring at railway crossings were reviewed. A total of 38 collisions occurred in the 24-month period, 21 railway crossing collisions were reported in 2005 and 17 in 2006. Railway crossing collisions, usually occurred on the major roads in Chilliwack. Collisions at railway crossings account for approximately one percent of the ICBC recorded collisions. Of those two studied years, no fatal collisions were reported but 13 injury collisions were reported. Details of injury collisions are summarized in TABLE O.1.

TABLE O.1 2005 / 2006 INJURY COLLISIONS AT RAILWAY CROSSINGS

DATE	RAILWAY CROSSING	TYPE	DESCRIPTION
11-Feb-05	Prest Rd	Rear End	Vehicle was rear-ended while stopped at train crossing
8-Mar-05	Lickman Rd	Rear End	Vehicle was rear-ended while stopped at train crossing
23-Mar-05	Broadway	Rear End	Vehicle was rear-ended while stopped at train crossing
31-May-05	Lickman Rd	Rear End	Vehicle was rear-ended while stopped at train crossing
4-Aug-05	Lickman Rd	Rear End	Vehicle was rear-ended while stopped at train crossing
25-Aug-05	Banford Rd	Conflicted	Vehicle went over railroad tracks, heard a bang, lost control and hit a tree
16-Sep-05	Airport Rd	Undetermined	Vehicle was rear-ended while stopped at train crossing
3-Mar-06	Young Rd	Rear End	Vehicle was rear-ended while stopped at train crossing
25-Mar-06	Hocking Ave	Rear End	Vehicle was rear-ended while stopped at train crossing
26-Apr-06	Young Rd	Rear End	Vehicle was rear-ended while stopped at train crossing
16-May-06	Broadway	Rear End	Vehicle was rear-ended while stopped at train crossing
10-Jul-06	Young Rd	Side Impact	Vehicle was stuck in traffic on the railway tracks, when hit from the side
11-Nov-06	Young Rd	Rear End	Hit and Run vehicle was stopped waiting at a train crossing when rear-ended

All reported injury collisions were vehicle-vehicle collisions, no train-vehicle collisions were reported. The majority of the collisions are due to the leading vehicles stopped and then hit by the following vehicles, resulting in rear-end collisions. It may indicate that more advance warning measures are required for coming trains.

O.4 Anti-whistling Improvements

Elimination of train whistling at properly equipped at-grade crossings has been a focus for the City of Chilliwack for a number of years. An eligible crossing for anti-whistling must have warning lights, safety signals and gates. It was understood that CN Rail will not approve an anti-whistle application if the crossing has a trespassing problem, train whistles will continue in order to improve safety at these locations.

Based on information provided by the City, four non-whistle locations were indicated as part of the 1984 bylaw. More anti-whistling locations at CN Rail crossings are also approved or proposed at a number of at-grade crossings in Chilliwack. FIGURE O.4 shows the existing, approved and applied-for locations for anti-whistling.

As of December 14, 2007 CN trains will no longer whistle at three at-grade crossings: Yale Road East, Annis Road and Lickman Road. Anti-whistling applications, pavement marking and signage improvements were provided to each location. TABLE O.2 shows the issues and mitigation measures taken by the City of Chilliwack. In early 2008, the City of Chilliwack plans to begin safety assessments at four other rail crossings: McGrath Road, Ford Road, Nevin Road and Yale Road West.

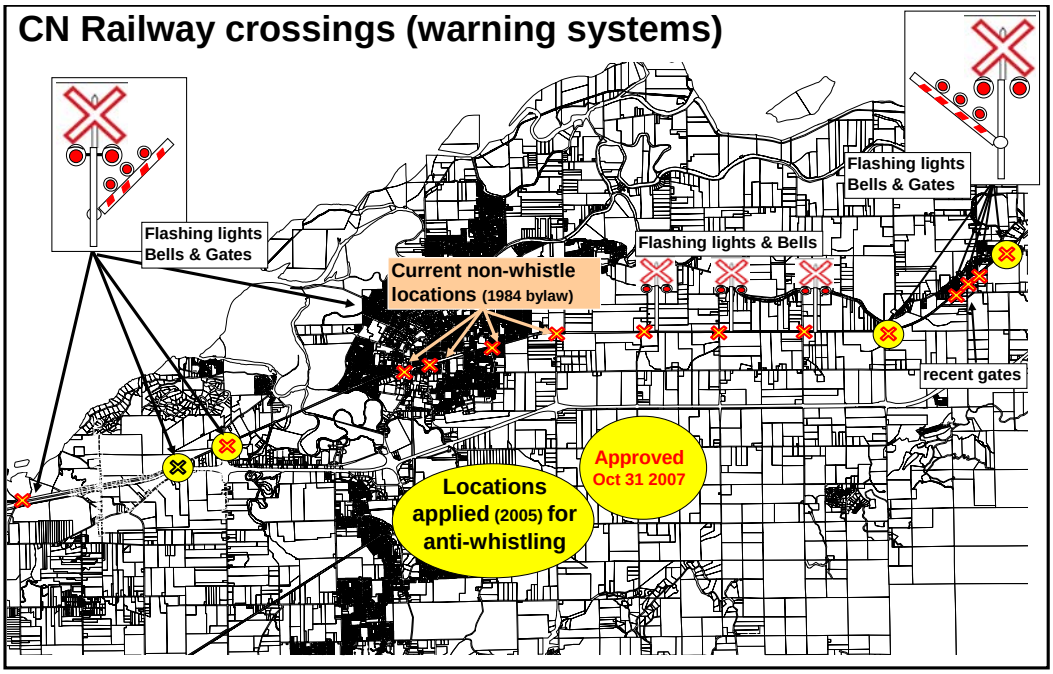


FIGURE O.4 EXISTING, PROPOSED AND APPLIED-FOR ANTI-WHISTLING AT CN RAIL CROSSINGS

TABLE O.2 ISSUES AND MITIGATION MEASURES FOR ANTI-WHISTLING APPLICATIONS

Mitigation Measure	Cost	Comments
Yale Road East		
Provide a "DO NOT STOP ON TRACKS" sign for the vehicles approaching from the east	$250	
Correct track/road alignment on overhead sign on westbound approach	$500	Sign symbol to be overlaid
Provide double stop bar	$500	Thermoplastic marking
Provide "X" on pavement	$750	Thermoplastic marking
Provide double centre line	$1,000	Length 160m on each approach
Provide "No Trespassing" signs	$1,000	Four signs - See below
Cost	**$4,000**	
Annis Road		
Provide "No Trespassing" signs	$1,000	Four signs - see below
Provide a "DO NOT STOP ON TRACKS" sign in the northbound direction	$250	
Provide double stop bar	$500	Thermoplastic marking
Provide "X" on pavement	$750	Thermoplastic marking
Provide double centre line	$1,000	Length 160m on each approach
Cost	**$3,500**	
Lickman Road		
Provide a "DO NOT STOP ON TRACKS" sign in the southbound direction	$250	See below
Provide double stop bar	$500	Thermoplastic marking
Provide "X" on pavement	$750	Thermoplastic marking
Provide double centre line	$1,000	Length 160m on each approach
Cost	**$2,500**	

O.5 Recommendations

It is recommended that the City should improve advanced warning measures at at-grade crossings by implementing more effective signage and pavement markings. These improvements are necessary for anti-whistling applications and will potentially reduce collisions at or near at-grade crossings.

The City's current strive to achieve anti-whistling at selected locations is believed to be a step in the right direction. As the City of Chilliwack grows, the whistling of passing trains disturbs a larger number of residents. An Anti-Whistling Train Crossing Study could take place to assess each at-grade location to determine whether or not the anti-whistling application should be placed. This study would also look at what improvements and associated costs are needed at specific locations to achieve all requirements prior to applying for anti-whistling.

Pedestrian crossing facilities are important at at-grade railway crossings and should be considered for existing and proposed crossings. The Evans Road Connector project has a proposed at-grade crossing; pedestrian facilities could also be provided in this design.

Long term transportation improvements to the Chilliwack downtown core would include grade separating at-grade crossings, or relocating the conflicting roads or train tracks. Since relocation is not a desirable option, grade separating crossings similar to the Yale Road West grade separated crossing is a better option. These improvements will be necessary as the City's population grows.

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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. 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 and FIGURE P.2 show the aerial photo of the Chilliwack Airport and the photograph of the entrance to the airport parking lot.

This section describes the current planned and future components for both airside and roadside traffic facilities. Land use designations and zoning are also discussed as well as the 10-year capital work plan for the Chilliwack Airport. The airport operation review was mainly based on the updated information provided by recent discussions with the senior staff from Magnum Management. The *5-year Marketing Plan* (July 2007) and the *10-year Capital Work Plan* (October 2007), provided by Magnum Management, are the major source for this review.

P.1 Airside Traffic Facilities

The airport is designated as a Class 'B' airport rated to a Beech 1900 – code aircraft with a runway of 75 feet wide. A single, paved and lit 3,990-foot runway is provided 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 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 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.

The *5-year Development Plan* outlines that Magnum Management has recently installed a new 24 hour upgraded fuel dispensing system offering competitively priced 100LL Avgas for small aircraft and helicopters. The Magnum Management also stated that they are currently in the process of installing a Transport Canada approved aviation weather information collection and distribution system and providing a design GPS based instrument approach (WAAS).

Approximately 40 additional hangers, located just west of the Airport on a 5 acre parcel, are proposed to operate in 2009. These new hangers will serve existing and potential leasers for private or commercial uses. With these 40 more hangers, the total number of annual aircraft movements is expected to increase by 20 percent up to the range of 50,000 to 60,000 movements annually.

Although scheduled passenger service is not expected to be provided at the Chilliwack Airport in near future plans, the charted flight service will be considered by the Magnum Management, if there is a demand.

FIGURE P.1 AERIAL PHOTOGRAPH OF CHILLIWACK AIRPORT

FIGURE P.2 ENTRANCE TO AIRPORT

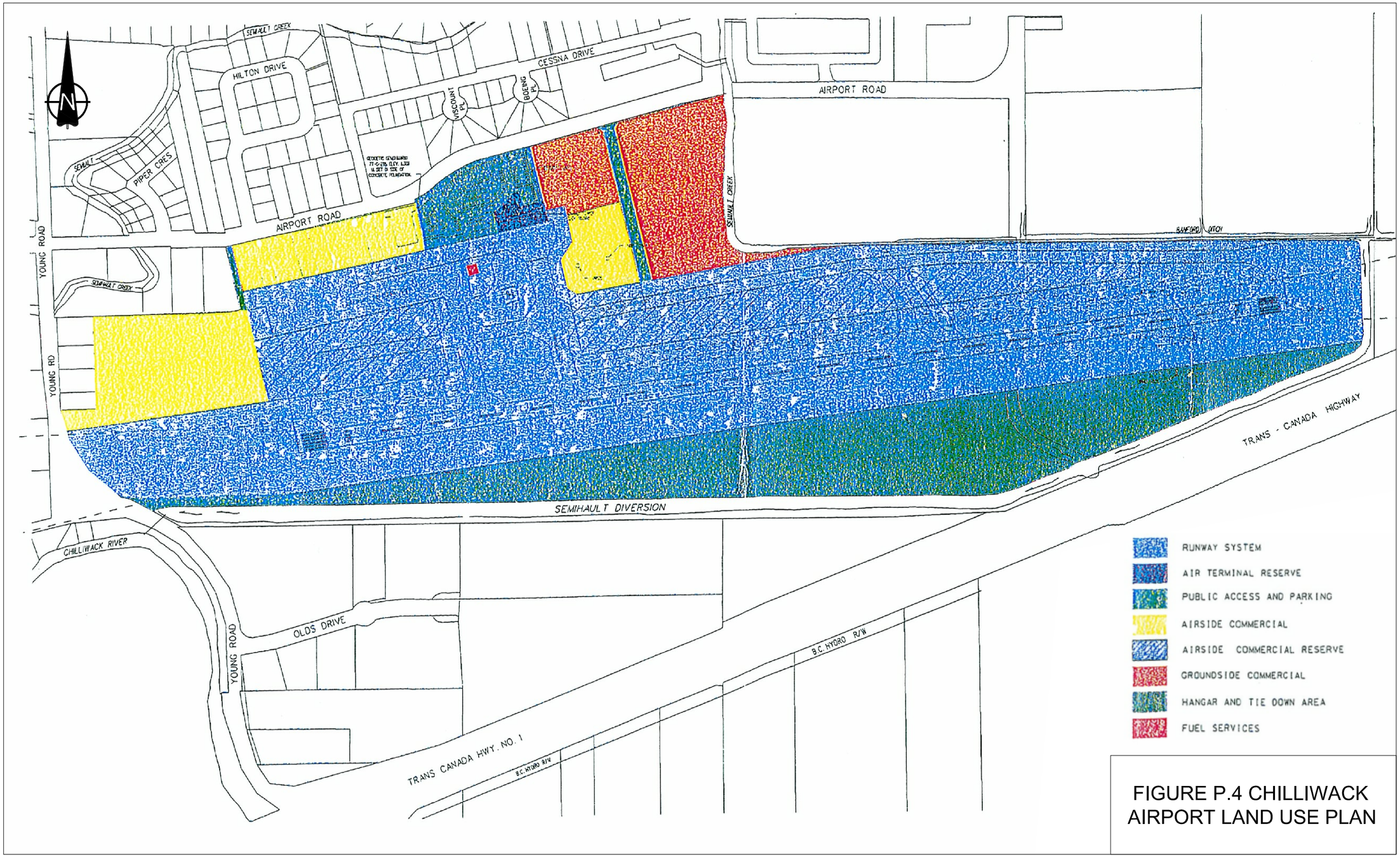

FIGURE P.4 CHILLIWACK AIRPORT LAND USE PLAN

P.2 Roadside Traffic Facilities

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 with two one-way accesses off Airport Road. Magnum Management reported that the existing parking lot has sufficient capacity for the existing and future operations. Pedestrian access is supported by a sidewalk on the north side of Airport Road. Airport Road is a designated bicycle commuter route, a wide travel lane for shared use by vehicles and bicycles is provided along Airport Road. Limited transit service (Route 3) is provided by about 15 buses in a weekday. Route 3 (Chilliwack Central Loop) is a circular bus service traveling to/from Downtown Exchange, City Hall, University College and Chilliwack Airport. The bus stop (only westbound direction because of the circular route) is located north of Airport Road, in front of the airport. FIGURE P.3 shows the photograph of Airport Road outside the Chilliwack Airport.

FIGURE P.3 AIRPORT ROAD (OUTSIDE CHILLIWACK AIRPORT)

With the majority of airport users travelling by car, the existing pedestrian/bicycles/transit services are adequate. However, the following items could be considered if the airport usage is increased:

- continuing to ensure adequate road capacity, as appropriate, on Airport Road and at the intersection of Airport Road and Young Road;
- providing a sidewalk on the south (Airport) side of Airport Road;
- providing mid-block crosswalk across Airport Road in front of the airport;
- providing a designated cycling lane along Airport Road as well as bicycle parking within the airport's parking lot.

P.3 Land Use Designations and Zoning

The *1999 Official Community Plan (OCP)* designated the entire airport property with its own category (Airport or AP). The airport zoning permits aviation-related activities as well as light manufacturing, tourist accommodation, open storage, parking and loading.

An airport land use plan illustrates the designation of airport land to each use, as shown in FIGURE P.4. The land designated for the runway system (shown in blue on FIGURE P.4) 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. Magnum Management stated that some of the vacant land surrounding the Airport is designated as Agricultural Land Reserve. This land use could be rezoned in the Airport category if it will be utilized. This land can only be purchased under Airport designation if it will be used for Airport facilities.

The 2001 Transportation Plan found that, as aeronautical zoning affects land outside the airport property, 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.

In addition, as the airport traffic grows and noise increases, it is recommended that the City should prepare noise forecast contours in the zoning map to identify the noise impacts by the air traffic operations. The local residents and the application of future developments will be aware what is expected in the future.

P.4 10-Year Capital Work Plan

The *10-year Capital Work Plan* (October 2007) outlines projects that Magnum Management has specified. TABLE P.1 provides the summary of these improvements with budget period descriptions of improvements estimated cost. It was expected that 30 percent of the capital contribution will be funded by the Ministry of Transport (TPP Grant).

TABLE P.1 FUTURE AIRPORT UPGRADES / PROJECTS

BUDGET PERIOD	PROJECT		ESTIMATED COST
2008 - 2009	Terminal Building	renovation, upgrading, and decoration to include roof, air conditioning, heating, interior renovation and decoration, exterior painting	$195,000
2011 - 2012	Northwest Ramp Area	This is the concrete area in front of the north hangers. It is a heavily used are being approx. 50,000 sq.ft. It is beginning to show signs of deterioration and will require refurbishing work	$62,500
2012 - 2013	Airport Operation Signage	directional signage and lighting will require upgrading, repair and some replacement work as required by Ministry of Transportation regulations	$95,000
2013 - 2014	Taxiway Resurfacing	The taxiway represents an area of 240,000 sq.ft. and is showing signs of wear and cracking which will require asphalt overlay	$300,000
2014 - 2015	Runway Resurfacing	The runway comprises an area of 300,000 sq.ft. and allowing for the current usage and the increased projected usage this area will require asphalt overlay work.	$375,000

In addition to the future airport updates shown in TABLE P.1, Magnum Management is considering introducing a user fee for assessing and using airport facilities. This will likely result in a two-tier charge as it relates to those accessing airport property for airport use and those for other uses. The new generated income will be used to enable the retaining of additional service for security and ongoing maintenance.

P.5 Recommendations

As no scheduled passenger services are planned in the near future, the additional requirement for roadside transportation services is expected to be minimal. However, with increasing pressure on the neighbourhood airports, the Chilliwack airport has an opportunity to attract more companies who wish to expand or relocate. To accommodate the increase in airside and related roadside traffic in the long term, the City may consider the following recommendations:

- Review capacity of Airport Road and the intersection of Airport Road and Young Road;
- Enhance pedestrian and cyclist access by providing a south sidewalk, crosswalks and designated bike lanes;
- Review requirements for aeronautical zoning, noise forecast contours and height restrictions for future updates of the zoning map or OCP.

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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 33, 34, and Schedule 6 of the *Bylaw 3023* and are shown in FIGURE Q.1. Trans-Canada Highway (Highway 1) through Chilliwack is also designated as a provincial truck route. Under the *Bylaw 3023*, trucks may not allow to use roads other than designated truck routes. The bylaw allows certain exemptions for emergency vehicles, government vehicles, road maintenance vehicles, and vehicles making local deliveries.

Q.2 Truck Volume Proportions

The truck volume proportions reported in the *District of Chilliwack Truck Route Study Conceptual Design Report* (Infrastructure Systems Ltd, 1998) are summarized in TABLE Q.1. No further studies were conducted by the City since 1998. The results of this report were also the main source for the *2001 Transportation Plan*. Results in the current plan are similar. The number of trucks counted on municipal streets was generally similar during the morning and afternoon peaks, forming 7.4 percent of total morning traffic and 5.8 percent of total afternoon traffic. High truck volumes were reported on Young Road near Highway 1, Airport Road around the SRY railway crossing, and Yale Road East between Chilliwack Proper and Rosedale.

TABLE Q.1 TRUCK PROPORTIONS IN CHILLIWACK

VEHICLE TYPE	VEHICLE PROPORTIONS[1]	
	MORNING PEAK	AFTERNOON PEAK
Passenger Vehicles[2]	92.6%	94.2%
Light Trucks[3]	5.1%	4.4%
Heavy Trucks[4]	2.3%	1.4%
Total	100%	100%

Notes:
1. Vehicle proportions are from Truck Route Study Conceptual Design Report (Infrastructure Systems Ltd, 1998). Counts conducted on Thrusday, 2 April 1998, at 20 stations throughout Chilliwack. Morning counts were conducted from 0700 to 0900 hours, and afternoon counts were conducted from 1500 to 1800 hours.
2. Passenger vehicles includes-passenger cars, pickup trucks, regular vans, and taxis.
3. Light trucks includes-oversize cube vans and straight trucks.
4. Heavy trucks includes-all trucks with at least one trailer.

Q.3 Changes to Truck Route Network

There have been three additions and one deletion to the truck network presented in the *2001 Transportation Plan*. Broadway Street no longer serves as a truck route; trucks used to be permitted along Broadway Street between Airport Road and Yale Road East. The three additions to the truck route network are:

- First Avenue (Young Road to Cheam Avenue),
- Bailey Road (Chilliwack River Road to Prest Road), and
- Vedder Mountain Road (Vedder River to Yarrow Central Road).

Q.4 Possible Changes to Truck Routes

The *1989 Truck Route Study* noted the benefits of a well-signed truck route network, which can distribute non-local truck movements along preferred routes and minimize intrusion in residential area.

Revised Truck Route Designation
The study identified a truck route network based on the 1998 level of trucking activity, existing and future areas of industrial activity, minimizing the number of at-grade rail crossings on the network, minimizing the intrusion of trucks in residential areas, and avoiding school zones where possible. Using these criteria, changes to the truck route network were proposed, consisting primarily of deleting redundant network links to concentrate truck traffic on preferred links.

Dangerous Goods Route
The study noted that Chilliwack does not explicitly control the movements of dangerous goods (mostly gasoline) on its municipal roadways, and, like all Lower Mainland municipalities, relies on the provincial highway network as the default network for the transport of dangerous goods. The study recommended that Highway 1 serve as the dangerous goods route for Chilliwack, and that dangerous goods be delivered within Chilliwack via the shortest route to or from Highway 1.

Q.5 Trucking Services

Currently there are four types of trucking facilities that are located in Chilliwack.

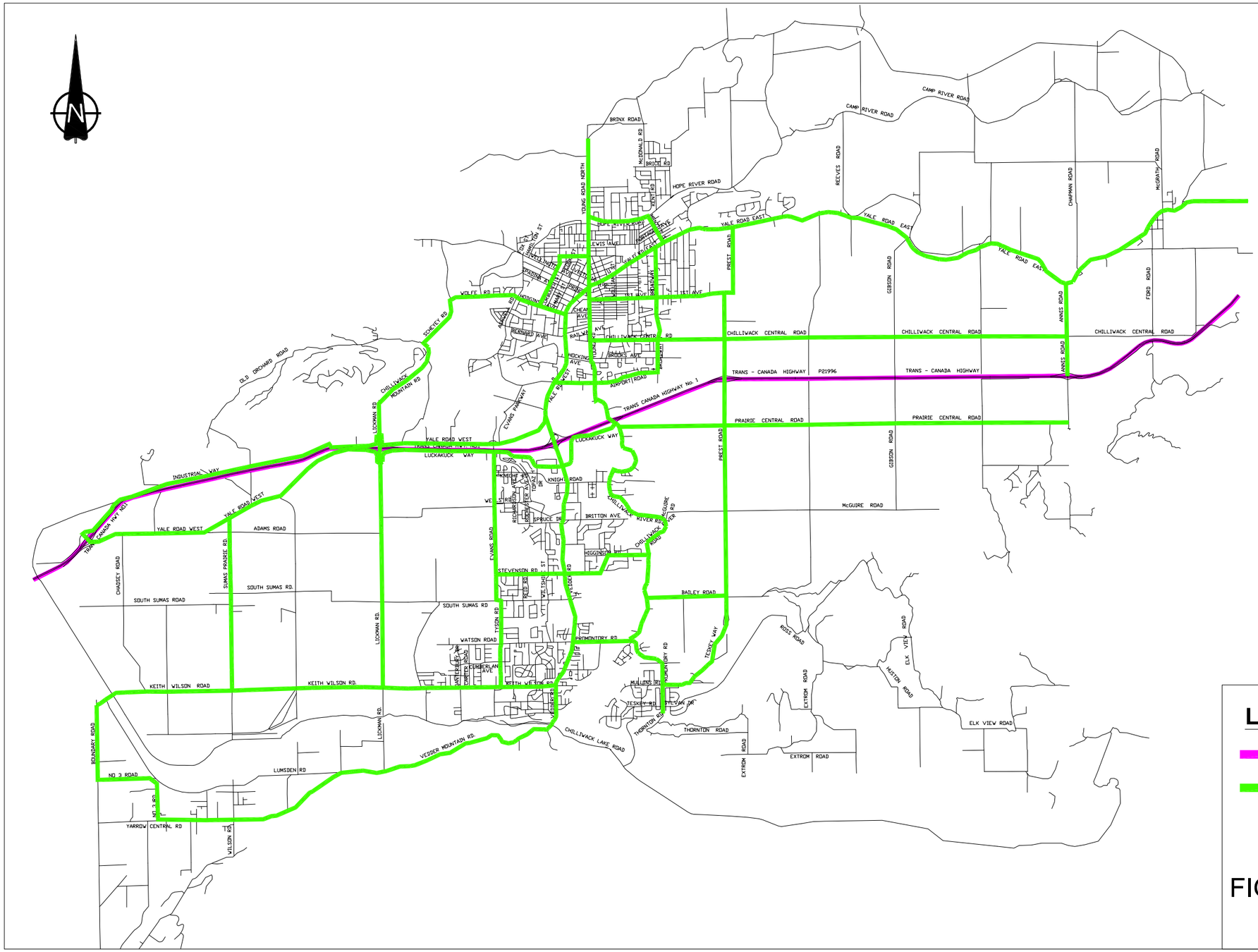
- Two fully equipped truck stops,
- Two card-locks,
- An electronic brake testing facility, and
- A maintenance and repair location.

The TransCanada Truck Stop is located on 7985 Lickman Road which is very close to the Chilliwack Shell Card Lock which is located on 7970 Lickman Road. The Husky Car and Truck Stop and Card Lock is located on 7620 Vedder Road.

Q.6 Recommendations

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.

The City may need to review existing truck routes to ensure that they meet the needs of truck traffic with respect to characteristics such as lane widths, turning radii, and turn lane storage lengths. It is suggested that an updated *Chilliwack Truck Route Study* be conducted to determine how the existing facilities are operating.



LEGEND

PROVINCIAL TRUCK ROUTE

MUNICIPAL TRUCK ROUTE AS PER 2004 HIGHWAY & TRAFFIC BYLAW

FIGURE Q.1 MUNICIPAL TRUCK ROUTES

December, 2008

The study should identify any upgrades along designated truck routes that would enable them to operate at an optimal level of safety, mobility, and efficiency. Some operational and safety issues that may need to be addressed are:

- Adequacy of signal displays when trucks block views for other vehicles;
- Adequacy of signal clearance intervals where trucks form a substantial proportion of the traffic;
- Impacts of trucks on signal progression;
- Improvements to signage and pavement markings;
- Improvements to bicycle facilities;
- Improvements to pedestrian facilities; and,
- Adequacy of turn lane storage lengths.

The study could include detailed analysis of special generators, and of daily and seasonal volume variations and should work towards creating a safety orientated truck network to improve safety for all road users.

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R Financial Plan

R.1 Recommendations Proposed by Transportation Plan

The 2007 Transportation Plan has made the following recommendations, grouped by the potential level of budgetary commitment. The title of the relevant Plan section is referred to in parentheses.

New Capital Project

1. Undertake local geometric improvements as indicated in Table B.6 (Signal Plan).

2. Over the short and long term, undertake the following road projects that are cited in the 2007 EMME/2 model update (Traffic Growth):

    - Construction of the Evan Road Overpass (Knight Road to Yale Road West) and Ashwell connector (Evans Road to Hodgins Road), currently included as short-term (2008 to 2009) capital work in the 2008 Comprehensive Municipal Plan (CMP).

    - Upgrading of the Vedder Road Corridor between Knight Street and South Sumas Road – Improvements to the Vedder Road Corridor between Knight Street and Britton Avenue and the intersection Vedder Road and South Sumas Road, currently included as long-term (2014 to 2016) capital work in the 2008 Comprehensive Municipal Plan.

    - Upgrading of the Yale Road Corridor between Hocking Avenue and Atchelitz Road – Improvements to Yale Road West between Airport Road and Parr Road (introduction of Two-way Left-turn Lane), currently included as short-term (2008) capital work in the 2008 Comprehensive Municipal Plan.

    - Upgrading of the Young Road Corridor between Luckakuck Way and Airport Road - Improvements to Young Road between Highway 1 and Airport Road, currently included as long-term (2014) capital work in the 2008 Comprehensive Municipal Plan.

Maintenance Work

1. Modify signal timings and signal phasing as indicated in Table B.6 (Signal Plan).

2. Continue use of the Super PM model (Pavement Rehabilitation).

3. Modify on-street and off-street parking regulations as indicated in Figure F.12 (Downtown Parking).

4. Undertake the high priority maintenance work as indicated in Table K.2 (Bridge Plan).

5. Provide Truck Route road signs (R-121) along the existing truck routes (Truck Plan).

Future Study / Follow-up Work

1. Review the requirement of external signal hardware (Signal Plan).

2. Review the current signal timings for signal progression (Signal Plan).

3. Undertake detailed safety reviews for selected segments and intersections indicated in Section C.6 (Safety Plan), including Vedder Road, Yale Road and Luckakuck Road corridors.

4. Enhance the police enforcement in speeding and drink-and-driving (Safety Plan).

5. Include safety audit review for all major capital works (Safety Plan).

6. Conduct additional field data collection (visual and structural) and prepare a new pavement assessment report in 2009 (Pavement Rehabilitation).

7. Examine the possibility of increasing the annual pavement management system review budget to include maintenance analysis (Pavement Rehabilitation).

8. Devise a corridor preservation strategy to maintain the roadway capacity of arterial road through zoning and access controls (Road Network).

9. Consider conducting the Network Classification Strategy study every two to five years (Road Network).

10. Review the need to provide the supplementary setback (Zoning Setback).

11. Reconsider an examination of the front yard and exterior side yard setback requirements (Zoning Setback).

12. Update the Chilliwack Comprehensive Municipal Transit Plan to reflect the latest transit information and requirements (Transit Plan).

13. Promote the use of transit by enhancing communications and providing discounts to passengers (Transit Plan).

14. Update the Bicycle Transportation Plan, the latest version completed in 2000, to include more detailed information about Cycling Infrastructure Partnership Program (Cycle Plan).

15. Promote bicycle facilities (shared or dedicated bike lanes) into scheduled road work projects (Cycle Plan).

16. Examine the safety for roadways that are part of both the designated and truck routes (Cycle Plan).

17. Consider bridge inspections on a regular basis (Bridge Plan).

18. Consider network functionality perspective when conducting the bridge maintenance work (Bridge Plan).

19. Consider rotation option for traffic count collection program (Traffic Volumes).

20. Consider installation of permanent count stations to understand variation in annual, monthly, and daily traffic patterns (Traffic Volumes).

21. Review the adequacy of pedestrian crossing facilities at intersection with high pedestrian volumes (Pedestrian Plan).

22. Develop a Pedestrian Master Plan to prioritize improvements to pedestrian policies and facilities (Pedestrian Plan).

23. Conduct traffic counts and undertake traffic analysis after about one year of the Evans Road Interchange completion (Regional Connection to Highway 1).

24. Improve advance warning measures at at-grade rail crossings by implementing more effective signage and pavement markings (Railway Plan).

25. Prepare an Anti-Whistling Train Crossing Study (Railway Plan).

26. Review requirements of aeronautical zoning, noise forecast contours and height restrictions for future updates of zoning map or OCP (Airport Plan).

27. Prepare a Chilliwack Truck Study to review the current operational and safety issues of truck routes and assess the suitability of the existing and future truck routes (Truck Plan).

R.2 Review of Existing Capital Management Plan

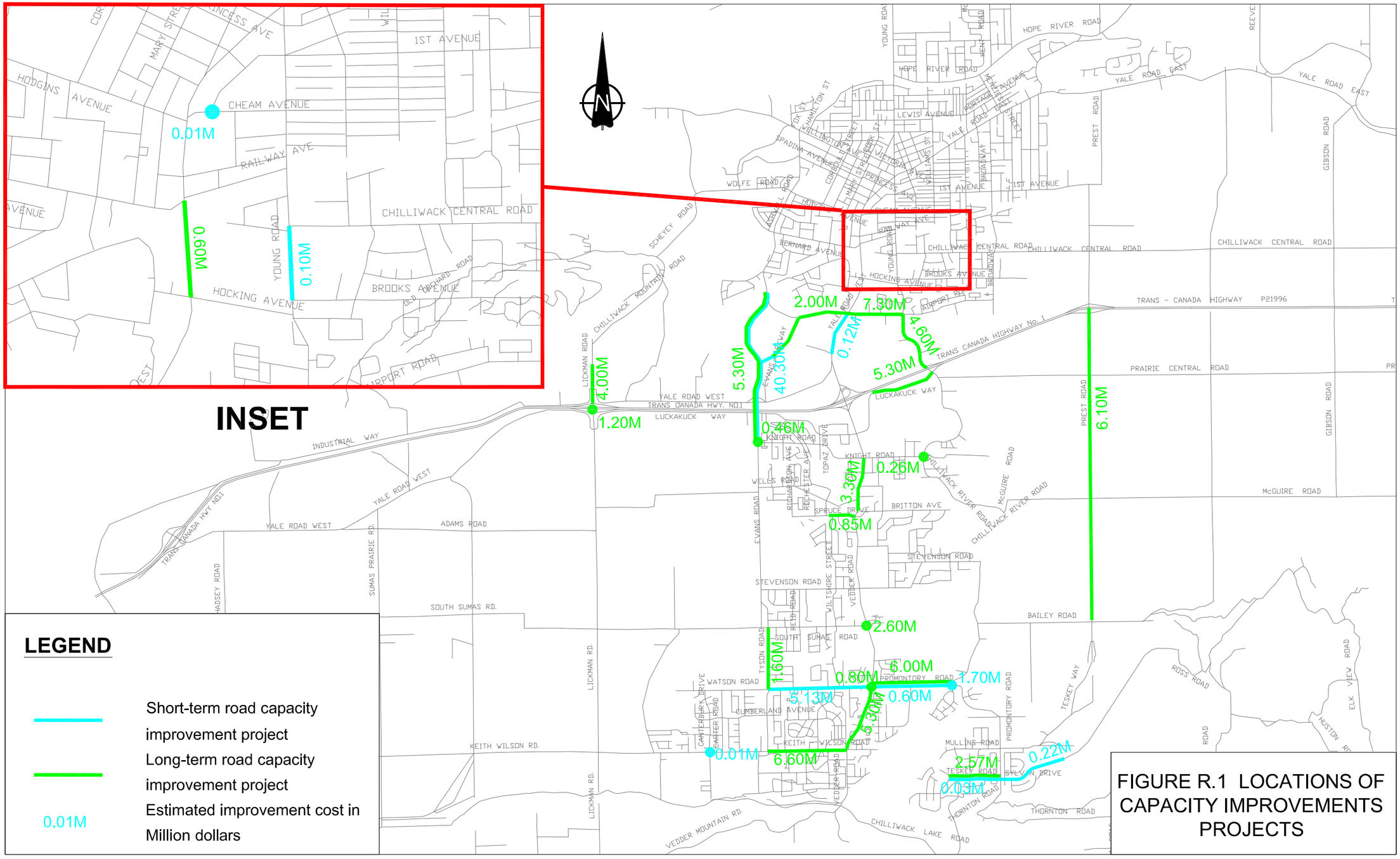
The 2008 Comprehensive Municipal Plan (outline expenditure from 2008 to 2017) has been reviewed. The transportation related projects were summarized and shown in Figure R.1. The results of review, as shown in the New Capital Work as listed in last section, indicated that the following capital or road upgrade projects scheduled for full or partial completion in 2008 and 2009 conform with recommended or desirable capital program described in Section D (Traffic Growth). Figures in brackets show the budget amounts (in million dollars) of the these capital projects.

Year 2008

- Construction of the Evans Road Overpass and Interchange with Highway 1 (23.30M).
- Signalization and widening of Promontory Road and Chilliwack River Road intersection (1.00M).
- Widening Promontory Road, Vedder Road to Chilliwack River Road (0.60M).
- Widening Watson Road between Vedder Road and Tyson Road (0.32M).
- Upgrading Sylvan Drive (0.22M).
- Construction of two-way left-turn lane along Yale Road between Airport Road and Parr Road (0.12M).
- Widening Young Rd between Brooks Avenue and Chilliwack Central Road (0.10M).
- Upgrading Teskey Road to Sylvan Drive (0.03M).
- Improvements to Cheam Avenue and First Avenue intersection (0.01M).
- Widening Keith Wilson Road and Peach Avenue (0.01M).

Year 2009 (continuation of Year 2008 works)

- Construction of the Evans Road Overpass and Interchange with Highway 1 (17.00M).
- Widening Watson Rd between Vedder Road and Tyson Road (4.8M).
- Signalization and widening of Promontory Road and Chilliwack River Road intersection (0.70M).



LEGEND

	Short-term road capacity improvement project
	Long-term road capacity improvement project
0.01M	Estimated improvement cost in Million dollars

FIGURE R.1 LOCATIONS OF CAPACITY IMPROVEMENTS PROJECTS

December, 2008