City of Prince George

Transportation Network Planning Study

Prepared by:

Edwin Hull Associates Ltd.
402 – 3290 West Fourth Avenue
Vancouver, BC V6K 1R9
Tel: 604.739.6765

AECOM Canada Ltd.
275 – 3001 Wayburne Drive
Burnaby, BC V5G 4W3
Tel: 604.438.5311

Project Number: C613-037-00
Date: October 27, 2009

Disclaimer

The attached Report (the "Report") has been prepared by AECOM Canada Ltd. ("Consultant") for the benefit of the client ("Client") in accordance with the agreement between Consultant and Client, including the scope of work detailed therein (the "Agreement").

The information, data, recommendations and conclusions contained in the Report:

- **are subject to the budgetary, time, scope, and other constraints and limitations in the Agreement and the qualifications contained in the Report (the "Limitations");**
- **represent Consultants' professional judgement in light of the Limitations and industry standards for the preparation of similar reports;**
- **may be based on information provided to Consultant which has not been independently verified;**
- **have not been updated since the date of issuance of the Report and their accuracy is limited to the time period and circumstances in which they were collected, processed, made or issued;**
- **must be read as a whole and sections thereof should not be read out of such context;**
- **were prepared for the specific purposes described in the Report and the Agreement;**
- **in the case of subsurface, environmental or geotechnical conditions, may be based on limited testing and on the assumption that such conditions are uniform and not variable either geographically or over time.**

Unless expressly stated to the contrary in the Report or the Agreement, Consultant:

- **shall not be responsible for any events or circumstances that may have occurred since the date on which the Report was prepared or for any inaccuracies contained in information that was provided to Consultant;**
- **makes no representations whatsoever with respect to the Report or any part thereof, other than that the Report represents Consultant's professional judgement as described above, and is intended only for the specific purpose described in the Report and the Agreement;**
- **in the case of subsurface, environmental or geotechnical conditions, is not responsible for variability in such conditions geographically or over time.**

Except as required by law or otherwise agreed by Consultant and Client, the Report:

- **is to be treated as confidential;**
- **may not be used or relied upon by third parties.**

Any use of this Report is subject to this Statement of Qualifications and Limitations. Any damages arising from improper use of the Report or parts thereof shall be borne by the party making such use.

This Statement of Qualifications and Limitations is attached to and forms part of the Report.

Revision Log

REVISION	DATE	ISSUE / REVISION DESCRIPTION
First Draft	Oct 3, 2008	For Client Review
Second Report	Nov 12, 2008	For Client Review
Third Report	Mar 24, 2009	For Client Review
Final Report	Aug 26, 2009	Final
Final Revised Report	October 27, 2009	At Client's Request

Signature Page

REPORT PREPARED BY:

EDWIN HULL, P.ENG.

TRANSPORTATION ENGINEER
EDWIN HULL ASSOCIATES LTD.

REPORT PREPARED BY:

BILLY KWOK, EIT

TRANSPORTATION PLANNER
AECOM CANADA LTD.

REPORT REVIEWED BY:

LEAH LIBSEKAL

PROJECT MANAGER
AECOM CANADA LTD.

Table of Contents

List of Appendices

List of Tables

List of Figures

Executive Summary

Introduction

This report describes the updating and refinement of the 2001 Prince George Transportation System Planning Study prepared by UMA Engineering Ltd. for the City of Prince George and the BC Ministry of Transportation.. The objectives of the upgrade were to:

- Refine and recalibrate the traffic forecasting model based on current (2006) data and traffic conditions
- Develop mid-term (2016) and long term (2026) network recommendations to achieve specific operational objectives
- Identify the network improvements required to service a number of planned major developments
- Address specific network issues identified by the staffs of the sponsoring agencies; and
- Undertake High Level Multiple Account Evaluation of the recommended 2026 network elements

Model Upgrade

The City of Prince George Transportation Model was developed by the City, in conjunction with the Ministry of Transportation in 2001. The model was a typical four-stage urban travel demand model based on the EMME software. The model was "state-of-the art" at the time of its development and application but only produced reliable traffic forecasts at the broad corridor level. Development of traffic forecasts for operational analysis required considerable "post-processing" of raw model output data and required considerable professional judgment based on "reasonable" assumptions.

Improvements in the EMME software, improvements in the power, speed and memory of computer technology and the introduction of more sophisticated network analysis procedures developed by the project team have allowed the model to be refined to provide reliable explicit forecasts of traffic movements at intersections. This allowed the rigorous analysis of traffic operations based on raw model output.

Consequently, the model upgrade included:

- Updating the input demographic and network data to a 2006 Base Year,
- Calibrating and validating to PM peak hour intersection traffic counts at 91 intersections and to PM peak hour transit passenger counts on scheduled bus service in the City,
- Expanding the zone system used for traffic assignment,
- Explicitly modelling truck demand based on available truck counts and assigning truck traffic as a separate vehicle class; and
- Applying new procedures in traffic assignment to explicitly synthesise delays and capacities for individual turning movements at intersections and ramp terminals.

Demographic Assumptions

The demographic data used for the 2016 and 2026 traffic forecasts assumed that the study area population would increase from 73,565 in 2006 to 91,289 in 2016 and to 108,224 in 2026. Over the same period, total employment would increase from 41,130 in 2006 to 51,041 in 2016 and to 60,508 in 2026. These demographic totals were distributed among the study area traffic zones based on direction from City staff.

As a result of these demographic assumptions and the validated demand forecasting coefficients used in the model, total PM peak hour person trips is forecast to increase from 40,812 in 2006 to 50,182 in 2016 and to 61,637 in 2026. Total PM peak hour vehicle trips are forecast to increase from 30,045 in 2006 to 37,995 in 2016 and to 47,270 in 2026 while PM peak hour transit passenger trips are forecast to increase from 2,056 in 2006 to 2,466 in 2016 and to 2,894 in 2026.

Analysis

A "do-minimum" network was evaluated against forecast 2016 and 2026 demand. The "do-minimum" network comprised the existing 2006 network plus projects regarded as firmly committed and budgeted at that time. Not surprisingly, the analysis showed unsatisfactory operational performance in both 2016 and 2026. In 2026, 8 signalized intersections would be experiencing significant traffic congestion with unacceptable average vehicle delays. The recommended 2026 network addresses all the operational issues identified in the analysis of the "do-nothing" network and addresses all traffic needs arising from the major urban development projects expected to be implemented by 2026.

The recommended network includes 15 major road improvement projects and 8 additional links to access development areas and connect the network together.. The recommended network also includes a new transit route to serve the Fraser Bench, University Heights and Ospika South.

The forecast mean network operating speed is 41.7 kph in 2016 and 42.2 kph in 2026 compared with the estimated mean network speed of 41.3 kph in 2006.

Multiple Accounts Evaluation

The evaluation of network elements employed the use of a Multiple Account Evaluation methodology, which considered a wide range of factors including agency costs, traveler benefits, community and economic impacts and environmental issues. The analysis made use of the EMME model developed for this study.

For the high-level economic evaluation, a benefit cost ratio was estimated for each proposed network improvement based on a 20-year life cycle. The capital cost was based on estimated unit construction costs and was assigned to Year Zero of the project's assumed 20-year life. Annual maintenance costs were estimated by factoring construction cost. User benefits were travel time savings at an assumed value of time of $9.1 per non-business person hour, $21.8 per business person hours, and $51.2 per truck hour. Operating costs were assumed at $0.125 per KM for private vehicles and $0.459 per KM for trucks. Maintenance costs, user benefits and vehicle operating costs were projected over the assumed 20-year life cycle and future costs and benefits were discounted to Year Zero based on a social discount rate of 3.5%

The benefit/cost ratios for individual projects comprising the recommended 2026 network range from 0.8 for Boundary Road (Hwy 16 - Domano) and 11.6 for Cranbrook Drive. The capital cost of the above projects is estimated at $359 million. The NPV of the recommended 2026 major road improvements is estimated at $816 million. The overall benefit/cost ratio of the recommended improvements was estimated at 3.4.

Results

The final major recommended network improvements are listed in Table ES-1.

Table ES-1 2026 Recommended Network Net Present Value and Benefit/Cost Ratio

Element	Scenario	Description	Net Present Value ($M)	Benefit / Cost Ratio
Element 1	3611	Lansdowne Extension to Cowart & Upland Realignment	79.0	10.2
Element 3	3621	Massey Extension, Ospika to Tyner	18.5	1.5
Element 4	3622	Massey Extension, Tyner to Hwy 16W	34.0	4.3
Element 5	3623	University Way Extension, Tyner to Hwy 16W	3.6	1.3
Element 6	3624	Cranbrook Drive, University Way to Massey Extension	31.9	11.6
Element 7	3631	Ospika Extension, Tyner to Hwy 16W	17.7	2.5
Element 8	3632	Glen Lyon Extension, St Patrick to Domano	5.3	3.7
Element 11	3643	Rec Place connection to Athlone	11.6	5.9
Element 12	3651	Hwy 16 six-lane widening, Hwy 97 to Vance/Cowart	28.8	6.7
Element 13	3671	Boundary Road, Hwy 16W to Domano	-7.7	0.8
Element 14	3672	Boundary Road , Domano to Hwy 97S	199.8	2.7
Element 15	3673	Boundary Road, Hwy 97S to Hwy 16E	67.9	3.3
Element 16	3681	Blueberry Extension, Hwy 97 to Foothills	17.9	2.8
Element 20	3685	Willow Cale Extension to Hwy 97/Railway	290.6	9.6
Element 22	3699	Foothills S Extension,18th Ave to Ferry	16.7	2.5

In addition to the major network improvements above, the following additional links would provide access to the identified development areas, and complete the network connections:

- Continental Way Extension to Boundary (Airport Logistics Park)
- Malaspina Extension to Cowart (Fraser Bench)
- Ospika Blvd, Hwy 16W to Boundary Road (Ospika South)
- Glen Lyon, Hwy 16 to St Patrick (Ospika South)
- Westgate Extension to Glen Lyon (Ospika South)
- Southridge, St Lawrence to Glen Lyon (Ospika South)
- St Lawrence, Domano to Hwy 16/Henry (Ospika South)
- Wiebe Extension, Range to Ferry/Rec Place (PGGCC)

All recommended links, and their estimated timing, are shown in Figure ES-8.1

The upgraded of the Prince George Transportation Model is a powerful tool by which to examine transportation demands and priorities within the City resulting from large-scale development projects. However, the model is calibrated and validated to the PM peak hour only. It is recommended that the City of Prince George consider developing and calibrating an AM peak hour model to complement the PM peak hour model. This will allow more comprehensive operational and MAE analysis of network elements. In any event, it is recommended that the EMME model should be updated and revalidated within five years, reflecting updated data collected by the City.

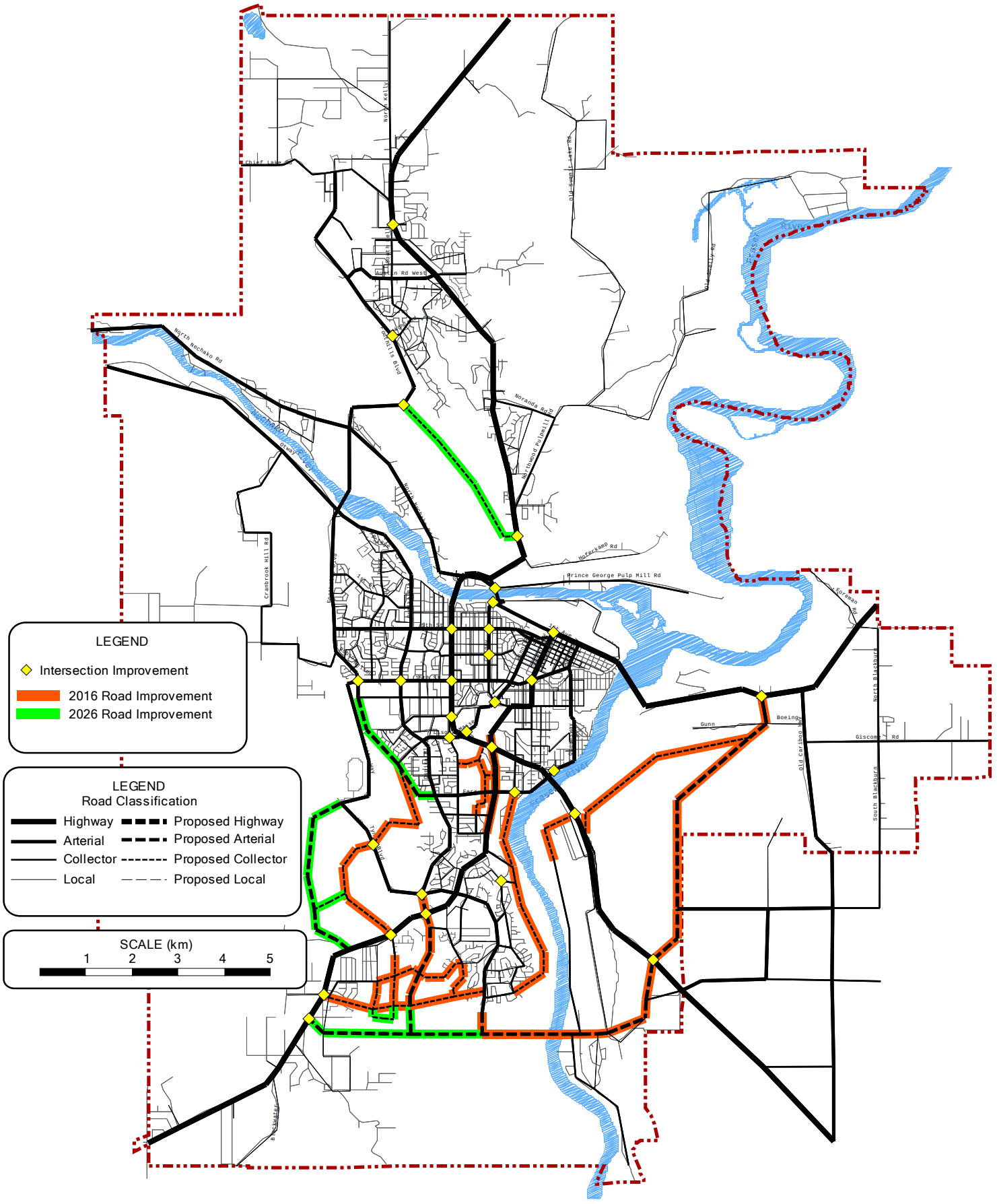


Figure ES-8.1: 2026 Recommended Network

1.0 Introduction

The *Prince George Transportation Network Planning Study* is a result of the City of Prince George and the BC Ministry of Transportation and Infrastructure (MoTI) interest in a comprehensive upgrade of the current Prince George Transportation Model developed in 2000. The objective of this work was to upgrade the original 2000 model, and to develop recommendations for the long-term provincial and municipal road networks, and was conducted in association with Edwin Hull Associates. In addition, this work addresses a number of network issues identified in consultation with City staff. These issues were specific questions about the need, timing or function of specific improvements.

The study's base horizon year was 2006. 2016 and 2026 were selected as horizon years based on the City's OCP. All forecasts and traffic analyses were based on the afternoon peak hour. This study highlights network needs and identifies potential solutions at the concept level only. It does not indicate official support by the City and the Ministry to any of the individual improvements recommended.

This report describes the application of the updated model to identify and address a number of network issues, and to develop recommendations for the long-term road networks. Following this introductory section (Section 1), Section 2 provides background information leading to the decision to update the model and the issues to be addressed. Section 3 documents the base year network and its representation in the model. Section 4 describes the land use and demographic inputs to the modelling analyses. Section 5 describes the criteria for identifying network problems, analyzes Base Year conditions, and identifies committed improvements approved by the City and Ministry of Transportation and Infrastructure. Section 6 documents the model results for the horizon years, and identifies candidate solutions to both general network problems and specific network issues for consideration later in the analysis. Section 7 discusses the preliminary model results for the specific development-related issues identified in the Study Terms of Reference. Section 8 describes the Multiple Accounts (Economic) Evaluation, and provides the remaining analyses and considerations that lead to the final report conclusions and recommendations. Section 9 outlines the recommendations for follow-up analysis and next steps.

2.0 Background Information

The original model in 2000 was developed by UMA, and funded almost entirely by the Ministry. The City was invited to provide additional funding to increase the resolution of the model and analyze City issues.

The original model was a typical four-stage urban travel demand model based on the EMME software. There were no comprehensive behavioural travel survey data against which to calibrate the model. Consequently, the initial model calibration relied on coefficients "borrowed" from other studies. The model was then validated against available screenline traffic and transit passenger counts. This involved adjusting the model coefficients to provide the best fit between base year model volumes and available counts. The model calibration and validation, together with model results for horizon year 2020, were documented in the *Prince George Transportation System Planning Study*.

The need to update the model was determined in response to the following:

- The existing model data and calibration are more than five years old;
- Developments in the EMME software;
- The need to evaluate a number of major transportation network issues;
- The need to address the transportation needs of a significant number of development proposals and neighbourhood plans anticipated to 2026; and
- The opportunity to apply new procedures to significantly enhance the reliability of model forecasts, especially at the intersection level.

Nevertheless, the updated model remains as a 4-stage urban transportation demand model based on the weekday PM peak hour.

2.1 2000 Model

The 2000 model was a typical 4-stage urban transportation demand model based on the weekday PM peak hour. It was based on trip generation, trip distribution and model split coefficients "borrowed" from other urban models in BC cities and on assignment procedures and parameters also taken from other models. It was then "validated" to Canada Census place of work data and to 2000 screenline counts undertaken on major arterial and collector roads in the City of Prince George.

The model attempts to synthesise the transport decision-making behaviour, values and preferences at the time of validation. The coefficients used to synthesise these characteristics are assumed to be a valid basis for forecasting the travel choices of future populations. The forecasts generated by the model are not "etched in stone". They represent "most likely" future conditions rather than a "certified" forecast of such conditions. In addition to the validated model coefficients, they assume a specific development pattern represented by demographic forecasts, forecast economic conditions and assumptions about transportation policy.

The factors that influence the travel choices evolve over time. Similarly, development and economic conditions often do not exactly follow earlier forecasts and transportation policy changes over time. Consequently, model forecasts become less reliable as the time between validation and application increases.

Most practitioners consider it desirable to revalidate urban transportation demand models every three to five years and to undertake a major recalibration every five to ten years. On this basis, it is considered appropriate to revalidate the model to 2006 traffic counts and 2006 Canada Census demographic data.

2.2 EMME Software

This Canadian software, developed and maintained by INRO Consultants in Montreal, is perhaps the most successful and widely used software of its type and is used in several hundred countries spanning all the populated continents in the world. However, many competing software packages, which are analytically less versatile and robust, have offered users superior graphics and better integration with other software including micro-simulation and GIS packages.

INRO responded to these developments by completely revamping the EMME platform together with an update of the analytical capability of the algorithms in 2006 with the introduction of EMME3. This has streamlined many of the data input and editing procedures, improved the integration with Windows operating systems, and significantly improved the creation of model outputs and their graphical quality.

The revalidation of the model reported in this report also allowed the model to migrate from EMME/2 to EMME3.

2.3 Development Issues

The 2006 population of 73,565 is projected to grow to 90,792 in 2016 and to 109,807 in 2026. Over the same period, employment is forecast to increase from 41,130 in 2006 to 49,501 by 2016 and to 59,898 in 2026.[1] Much of the growth is expected to occur in new urban developments currently at the planning stage. Identifying the transportation needs of these developments is a significant issue to be addressed in the City's mid-term (2016) and long-term (2026) transport plan.

2.4 Model Refinements

Urban transportation models were originally developed to assess long term strategic planning issues in large metropolitan areas. Software and hardware limitations, together with the lack of reliable local demographic data for base years and horizon years limited the number of traffic zones in early metropolitan area models. These considerations also mitigated against detailed network representation. Consequently, the forecast traffic and transit passenger volumes resulting from most models are reliable only at the corridor and screenline level.

The "trickling down" of demand modelling from large metropolitan areas to smaller self-contained cities has led to limited changes in modelling approach. The 2000 Prince George model was typical of the "state-of-the-art" in modelling medium-sized cities at that time. It was validated primarily to screenline traffic volumes and comparisons of model output to intersection counts were undertaken only as a supplement to the model validation. Consequently, the 2000 model was most reliable when applied to address area-wide transportation policy issues and major facility planning at the broad urban corridor level.

[1] Population and employment projections were developed in concert with City planning staff. The projections are further explained in Section 4 and in Appendix B.

These broad policy and corridor issues are important in all cities regardless of size. However, in medium-sized cities, they are usually more straightforward and less far-reaching than in large metropolitan areas. For cities like Prince George, operational issues requiring detailed forecasts of intersection traffic movements are the focus of the day-to-day attention of the City's transport planning and engineering staff.

To this date, despite significant advances in the size and speed of inexpensive computers and advances in the capability of the EMME software, few modellers have attempted to achieve a satisfactory fit to observed traffic counts at urban intersections. Moreover, most attempts to do so met with limited success. This arises partly because demand modelling is based on assigning a forecast (usually hourly) traffic demand based on "static" relationships between link and turn volumes and delay. By contrast, micro-simulation models explicitly model travel times and delays by simulating the behaviour of each vehicle driver in constantly changing "dynamic" traffic conditions.

The 2006 model update allowed the opportunity to introduce new traffic assignment techniques that synthesise the relationship between turning volumes at intersections and the resulting delay. These techniques are based on a "dynamic" representation of intersection capacities and, in particular, the effect of conflicting movements on individual movement capacities. This requires intersections in the base and horizon year networks to be represented in considerably more detail than in the 2000 model and in most other urban models. This includes:

- Detailed representation of laning, including lane sharing among movements;
- Signal phasing and timing data at signalized intersections;
- Number of lanes at roundabouts; and
- Allocation of priority among movements at stop/yield controlled intersections.

The result is a model which is validated to provide an excellent fit to observed afternoon peak hour traffic count data at 91 intersections within the city boundary and which, assuming the validity of the demographic and other model inputs, generates very reliable forecasts of intersection volumes and delays for individual turning movements for a typical weekday afternoon peak hour. The model is also validated to base year afternoon peak hour transit ridership and trip time to generate reliable forecasts for each transit route for a typical weekday afternoon peak hour. The model structure, validation and goodness of fit are documented in detail in the separate *Model Documentation* report.

With the validation of the base model to intersection turn volumes, transit ridership and trip times achieved, and with the base model established and future horizons defined, the model was used to identify problems and conduct network assessments in future horizons arising from changes in land use, economic or network options.

3.0 Transportation Network

The transportation network within the City of Prince George consists of infrastructure and services. The primary infrastructure is the road network system and the dominant service is the transit system.

The road network comprises arterial, collector and local roads maintained by the City and two provincial highways, Highway 16 and Highway 97, which criss-cross the City and provide for the majority of trips with origins and/or destinations outside the City. The classification of the existing major roadways in the City is illustrated in Figure 3.1.

The City of Prince George has 11 bus routes serviced by BC Transit at the time of model development.

3.1 Modelled Road Network

The modelled road network, developed by importing the City's roadway centerlines into EMME, includes both provincial highways and all City-maintained arterial and collector roads. It also includes the majority of through local roads and some other local roads used to provide access to local neighbourhoods or new developments, as illustrated in Figure 3.1. Roadway characteristics represented in the coded network include:

- Roadway free-flow travel speed;
- Intersection control type;
- Major direction;
- Approach direction and direction of exit;
- Mid-block and intersection laning;
- Signal green time and cycle length;
- Phase type (protected, permitted, or both); and
- Pedestrian interference.

Modelling of new facilities in future horizon years involves coding the associated inputs to the road network.

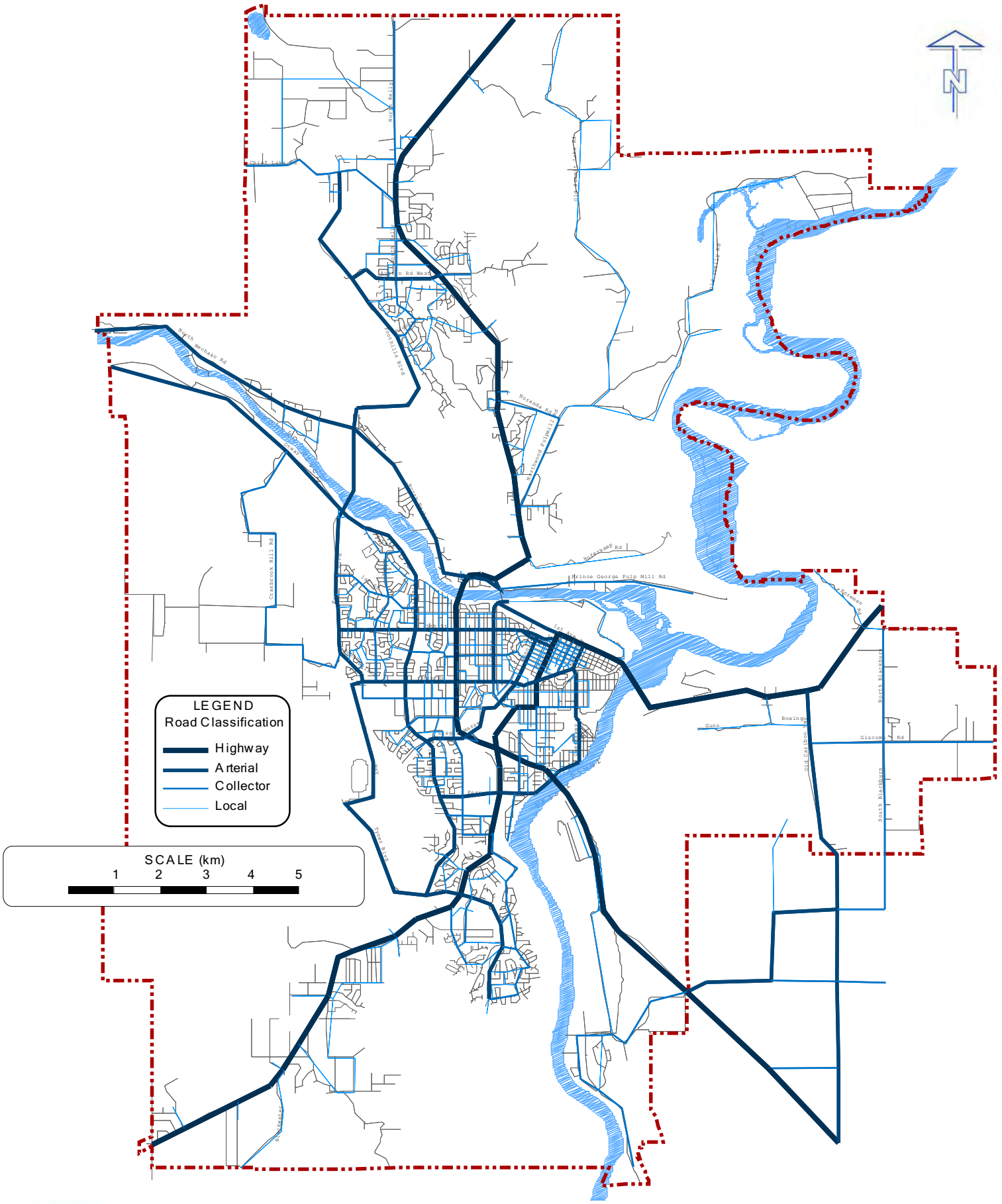
3.2 Modelled Transit Network

The modelled transit network defines a set of transit routes each of which comprises a connected set of transit segments between the beginning and end of the route. It includes all 11 bus routes serviced by BC Transit illustrated in Figure 3.2. Inputs to the modelled transit network are:

- Transit fares;
- Bus capacities;
- Route;
- Headway; and
- Dwell/layover times.

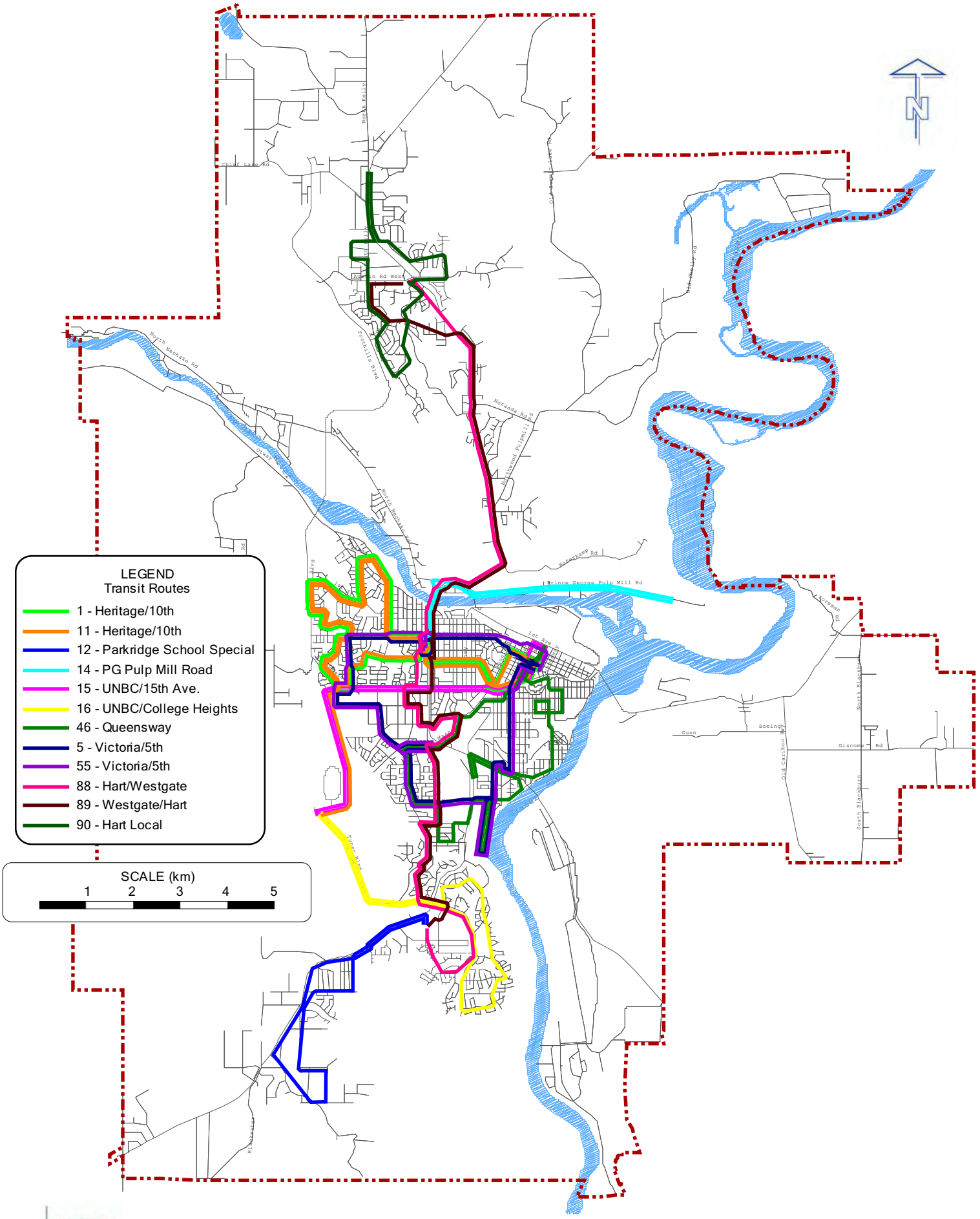
Modelling of transit service improvements in future horizon years involves coding the associated inputs to the transit network.

Further information on the structural framework and development procedures of the Prince George Transportation Model is provided in the separate *Model Documentation* report.



AECOM

Figure 3.1: 2006 Existing and Modelled Road Network



AECOM

Figure 3.2: 2006 Existing and Modelled Transit Network

4.0 Land Use

The development of the 2006 base year model was based on existing demographic and land use data for each traffic zone within the City of Prince George created from 2006 Census data. Consequently, the 234 internal zone system has remained generally consistent with census tract boundaries. The base year land use information was assembled and vetted by City planning staff for use in the modelling process. Following the calibration to 2006 conditions, the model was supplied with future projections for the study horizon years. The development of land use projections was based on iterative discussion with the City's planning department.

Population is forecast to increase by 23% between 2006 and 2016 and by a further 21% by 2026. Comparable increases in total employment are 20% by 2016 and a further 21% by 2026. Population by age group, employment and school enrolment by classification are shown by internal traffic zone in Appendix A. Further information on the traffic zone structure is provided in the separate *Model Documentation* report.

4.1 Horizon Years

As the study is designed to identify medium and long term problems and requirements, two model horizons were selected ("2016" and "2026"). The approach and assumptions for each model horizon year are summarized below, and are based on projections from 2006 forward. These assumptions and projections were developed in concert with City planning staff.

The "2016" model represents growth as either:

- a 2% per annum population growth within the City for the next 10 years, and the corresponding employment and school enrolment growth, or
- a 1% per annum population growth within the City for the next 20 years, and the corresponding employment and school enrolment growth.

The second scenario thus represents a "slow growth" longer term scenario for the City, should the growth rate be lower than expected.

The "2026" model represents growth as follows:

- a 2% per annum population growth within the City for the next 20 years, and the corresponding employment and school enrolment growth.

Current population and employment projections by quadrant and for major development proposals are summarized in Tables 4.1 and 4.2. A map of the City quadrants is included in Figure 4.1. Figure 4.2 illustrates these new development demographics. Further information on the derivation of land use values for all years is provided in Appendix B.

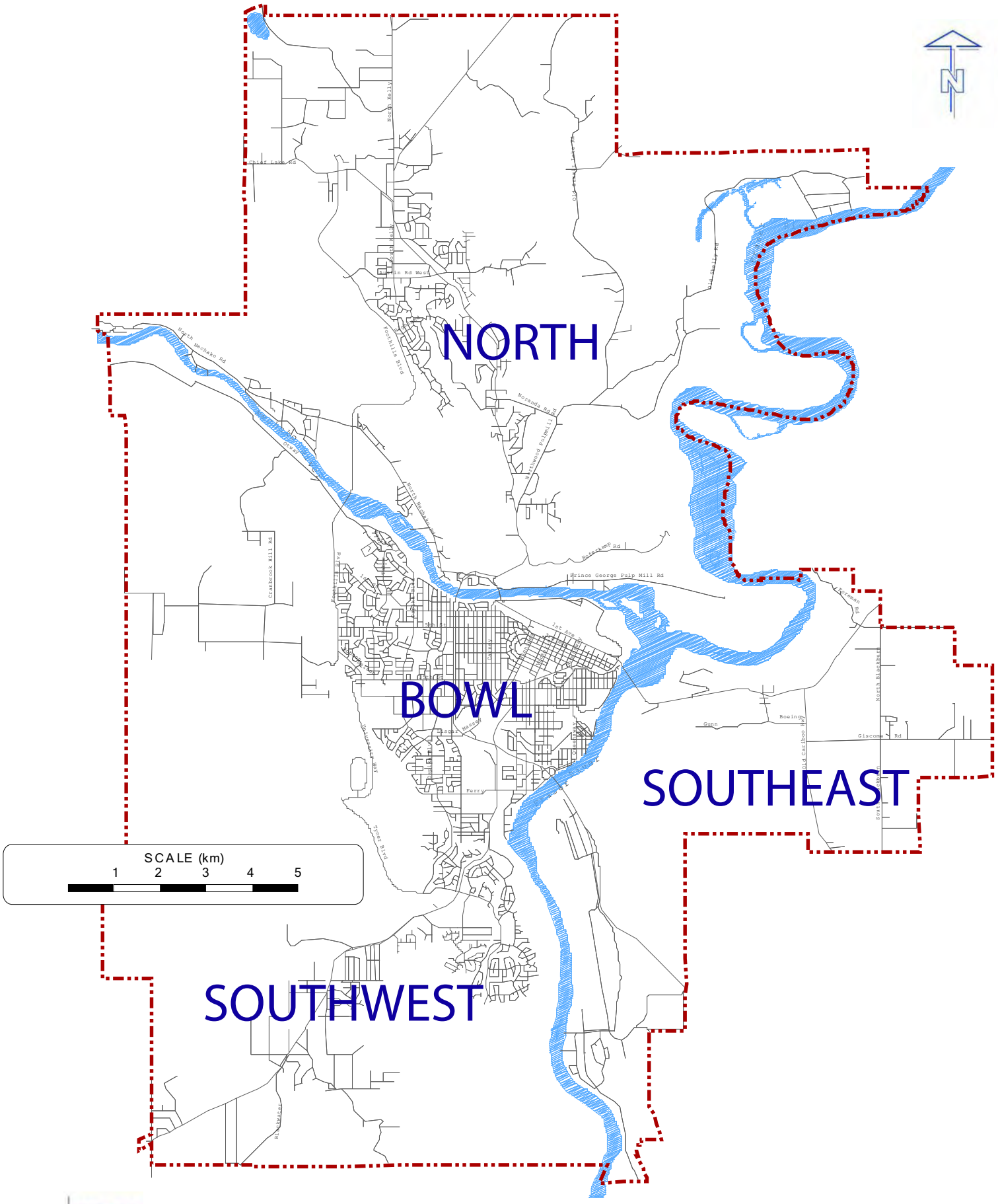
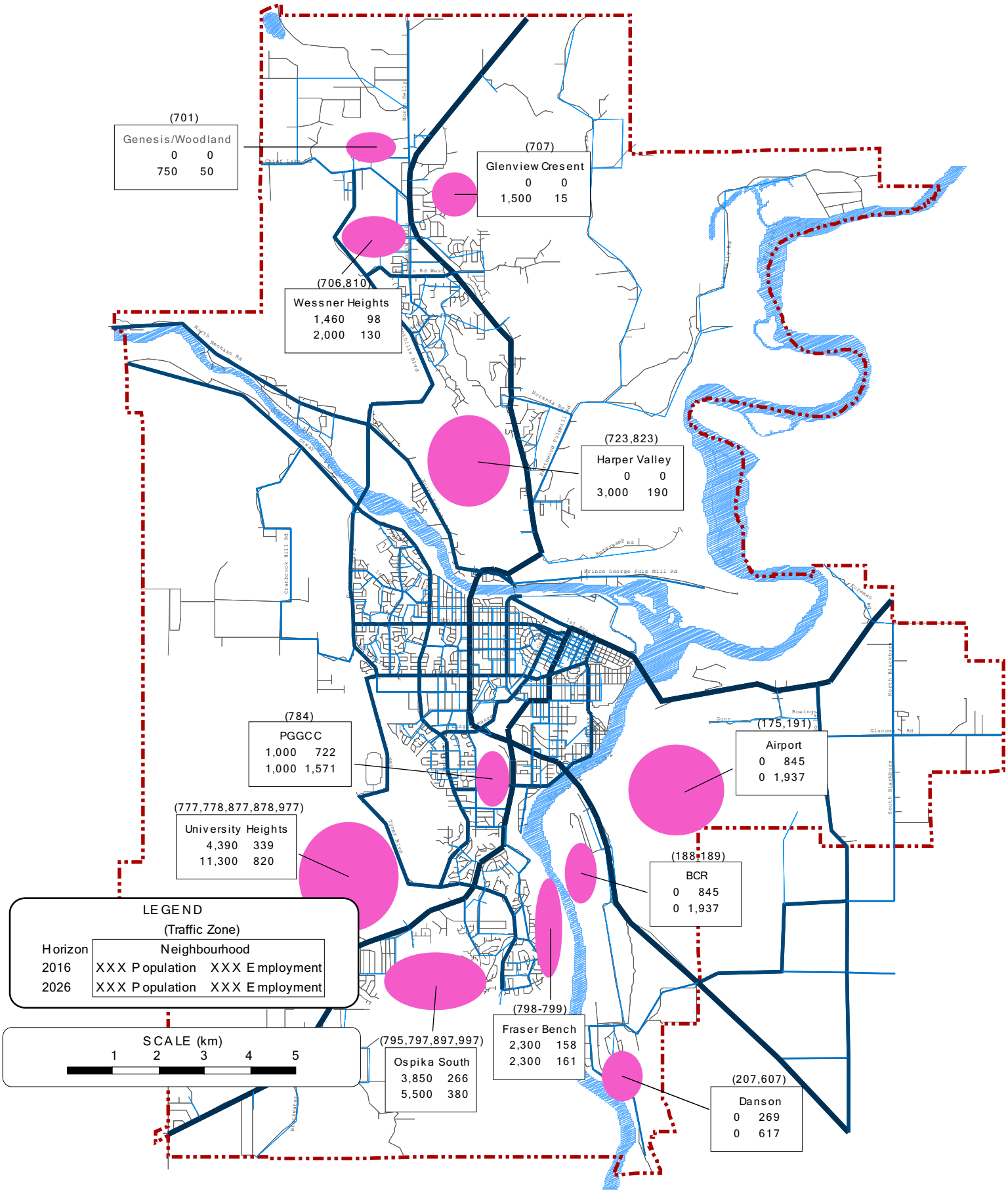


Figure 4.1: City of Prince George Quadrants



AECOM

Figure 4.2: New Development Demographics

Table 4.1: Land Use Projections by Quadrant

Horizon	Area	Employment				Population							
		Retail	Industry	Other	Total	Age 0-4	Age 5-12	Age 13-17	Age 18-24	Age 25-44	Age 45-64	Age 65+	Total
2006	Bowl	8,394	7,472	14,236	30,102	2,242	3,702	2,703	4,789	11,234	10,134	4,500	39,304
	North	906	3,052	972	4,930	908	1,858	1,300	1,443	4,466	4,736	1,360	16,071
	Southwest	311	350	1,397	2,058	980	1,750	1,102	1,298	4,275	4,015	805	14,225
	Southeast	241	3,531	268	4,040	185	427	297	326	1,105	1,245	380	3,965
	Total	9,853	14,405	16,873	41,130	4,315	7,737	5,402	7,856	21,080	20,130	7,045	73,565
2016	Bowl	9,845	8,462	17,020	35,327	2,327	3,749	2,605	4,460	11,829	11,034	6,403	42,407
	North	978	3,155	1,046	5,178	1,013	2,002	1,337	1,472	5,060	5,507	2,138	18,529
	Southwest	664	403	1,806	2,874	1,597	2,795	1,742	2,170	7,407	7,188	2,508	25,407
	Southeast	412	5,271	440	6,122	201	451	298	316	1,208	1,411	566	4,449
	Total	11,899	17,291	20,311	49,501	5,138	8,996	5,982	8,418	25,504	25,139	11,615	90,792
2026	Bowl	11,659	9,722	20,591	41,972	2,446	3,926	2,732	4,699	12,468	11,612	6,825	44,709
	North	1,140	3,270	1,210	5,620	1,393	2,684	1,796	2,094	6,959	7,470	3,028	25,424
	Southwest	939	421	2,165	3,525	2,122	3,718	2,351	3,014	10,013	9,766	3,689	34,673
	Southeast	631	7,492	659	8,781	226	506	334	354	1,352	1,588	641	5,002
	Total	14,368	20,906	24,625	59,898	6,188	10,834	7,213	10,162	30,791	30,435	14,184	109,807

Table 4.2: Land Use Projections by Proposed Development

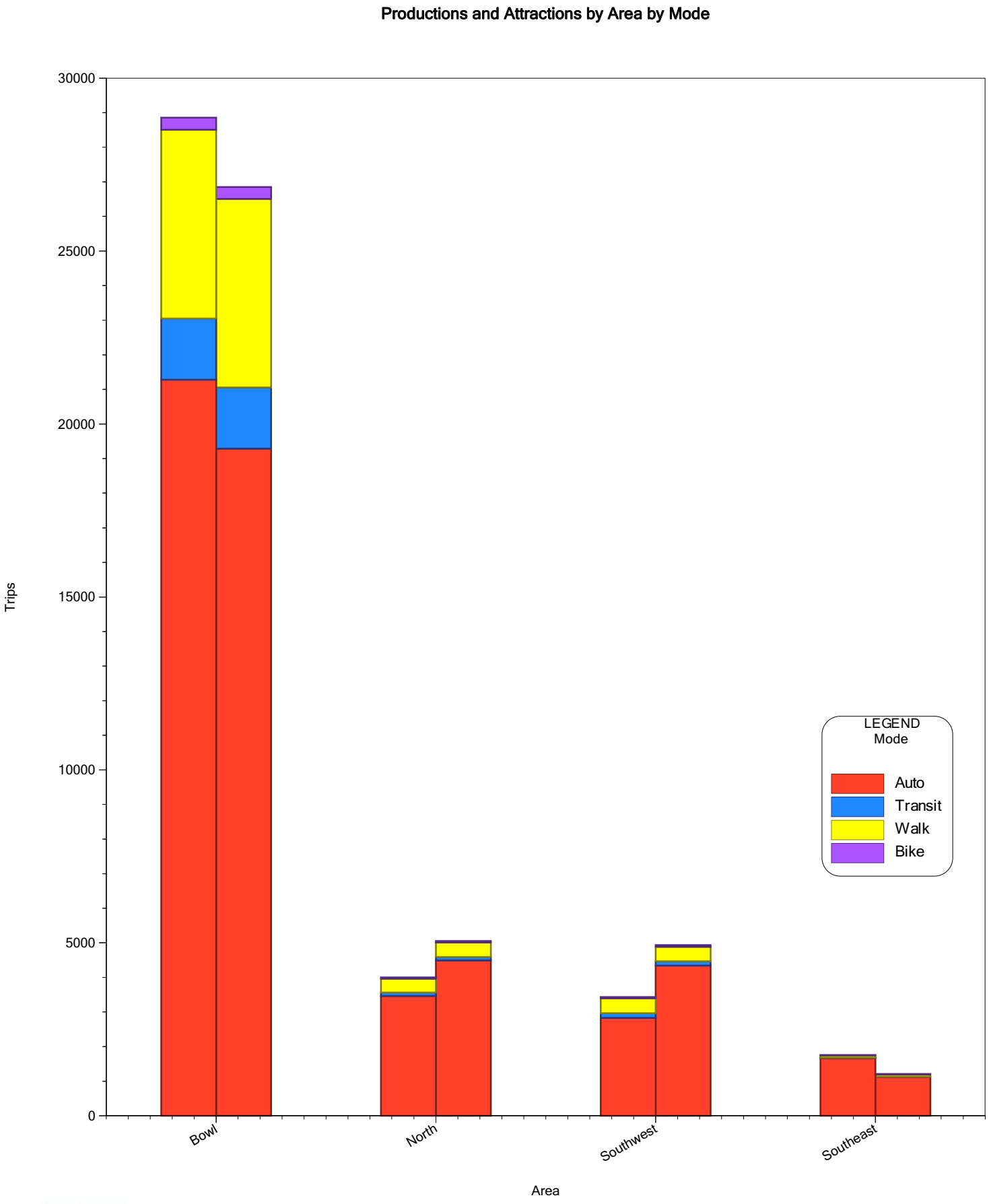
Horizon	Area	Employment				Population							
		Retail	Industry	Other	Total	Age 0-4	Age 5-12	Age 13-17	Age 18-24	Age 25-44	Age 45-64	Age 65+	Total
2016	University Height	147	20	173	339	248	435	289	407	1,233	1,216	562	4,390
	Ospika South	126	15	126	266	218	381	254	357	1,081	1,066	493	3,850
	Fraser Bench	74	10	74	158	130	228	152	213	646	637	294	2,300
	PGGCC	30	5	30	65	57	99	66	93	281	277	128	1,000
	Wessner Heights	44	10	44	98	83	145	96	135	410	404	187	1,460
	Genesis/Woodland	-	-	-	-	-	-	-	-	-	-	-	-
	Harper Valley	-	-	-	-	-	-	-	-	-	-	-	-
	Glenview Crescent	-	-	-	-	-	-	-	-	-	-	-	-
	Total	420	60	446	926	736	1,288	856	1,205	3,652	3,600	1,663	13,000
	BCR	70	704	70	845	-	-	-	-	-	-	-	-
	Danson	22	224	22	269	-	-	-	-	-	-	-	-
	Airport	70	704	70	845	-	-	-	-	-	-	-	-
	PGGCC	438	-	219	657	-	-	-	-	-	-	-	-
	Total	601	1,632	382	2,615	-	-	-	-	-	-	-	-
2026	University Height	359	25	436	820	637	1,115	742	1,046	3,169	3,132	1,460	11,300
	Ospika South	180	20	180	380	310	543	361	509	1,542	1,524	710	5,500
	Fraser Bench	74	10	77	161	130	227	151	213	645	637	297	2,300
	PGGCC	30	5	30	65	56	99	66	93	280	277	129	1,000
	Wessner Heights	60	10	60	130	113	197	131	185	561	554	258	2,000
	Genesis/Woodland	23	5	23	50	42	74	49	69	210	208	97	750
	Harper Valley	90	10	90	190	169	296	197	278	841	832	388	3,000
	Glenview Crescent	5	5	5	15	85	148	99	139	421	416	194	1,500
	Total	821	90	901	1,811	1,541	2,699	1,797	2,531	7,669	7,581	3,533	27,350
	BCR	161	1614	161	1937	-	-	-	-	-	-	-	-
	Danson	51	515	51	617	-	-	-	-	-	-	-	-
	Airport	161	1614	161	1937	-	-	-	-	-	-	-	-
	PGGCC	1004	-	502	1506	-	-	-	-	-	-	-	-
	Total	1,378	3,743	876	5,997	-	-	-	-	-	-	-	-

4.2 Implications for Trip Generation

The demographic assumptions lead to a significant increase in trip making over the planning period of the study. The number of PM peak hour internal person trips is forecast to increase from 38,000 in 2006 to 46,000 in 2016 and 56,000 in 2026. The number of PM peak hour internal vehicle trips is forecast to increase from 26,200 in 2006 to 32,200 in 2016 and 39,500 in 2026.[2]

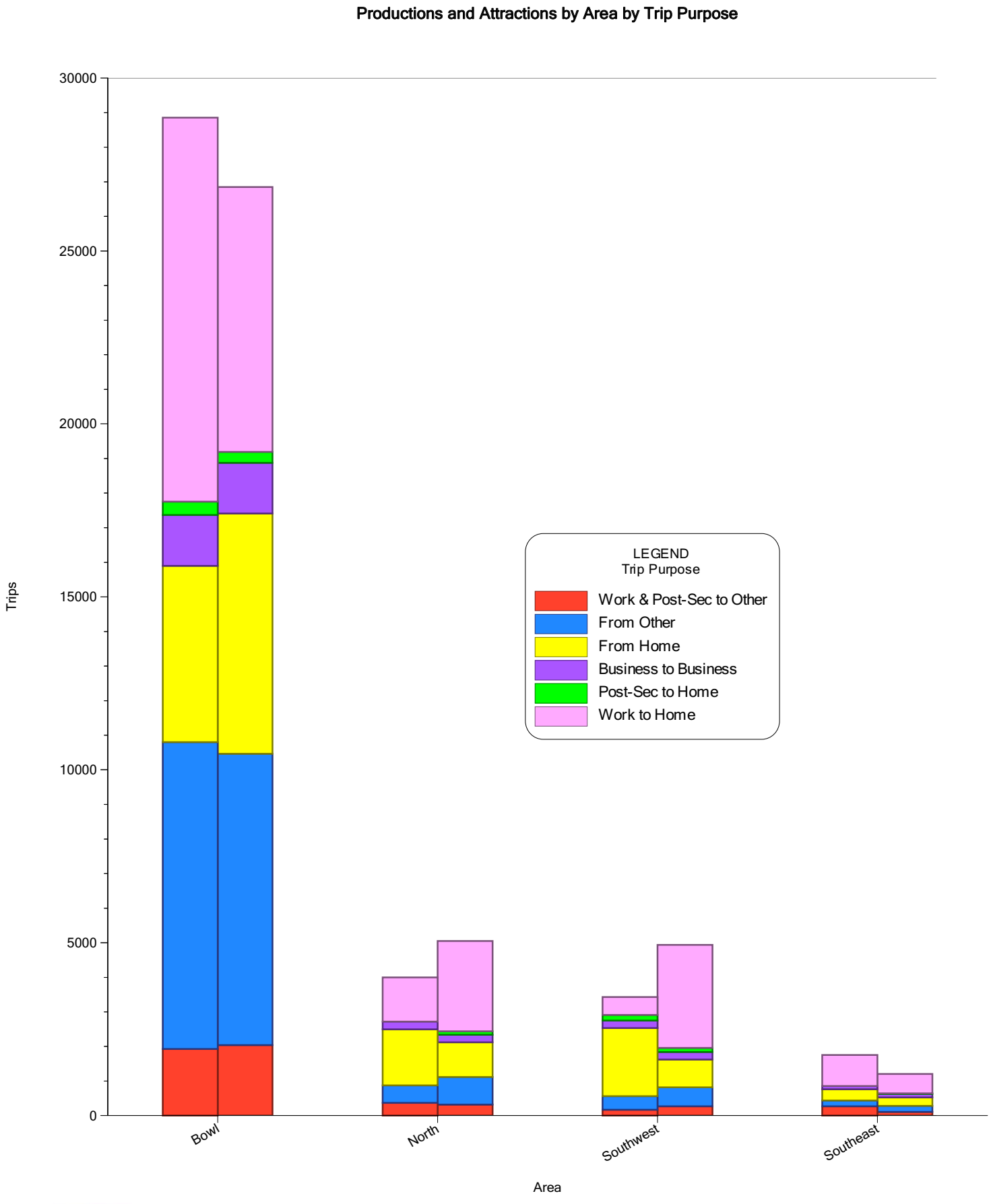
The breakdown of internal person trip productions and attractions by mode, by trip purpose for the four major quadrants are illustrated for 2006 in Figures 4.3 to 4.4, for 2016 in Figures 4.5 to 4.6 and for 2026 in Figures 4.7 to 4.8. The distribution of total auto vehicle trip productions and attractions is illustrated by zone for 2016 and 2026 in Figures 4.9 and 4.10 respectively. In each graphic the first column represents the production and the second column represents the attractions by mode. These figures are model forecast results after going through the trip generation, trip distribution, and mode split procedures. Details of which are documented in the separate *Model Documentation* report.

[2] The conversion factor to convert person trips to vehicle trips is 1.12 person trips per vehicle trip. This is based on the average vehicle occupancy of 1.12 from the 2000 Model.



AECOM

Figure 4.3: 2006 Person Trip Productions and Attractions by Mode for each Quadrant



AECOM

Figure 4.4: 2006 Person Trip Productions and Attractions by Purpose for each Quadrant

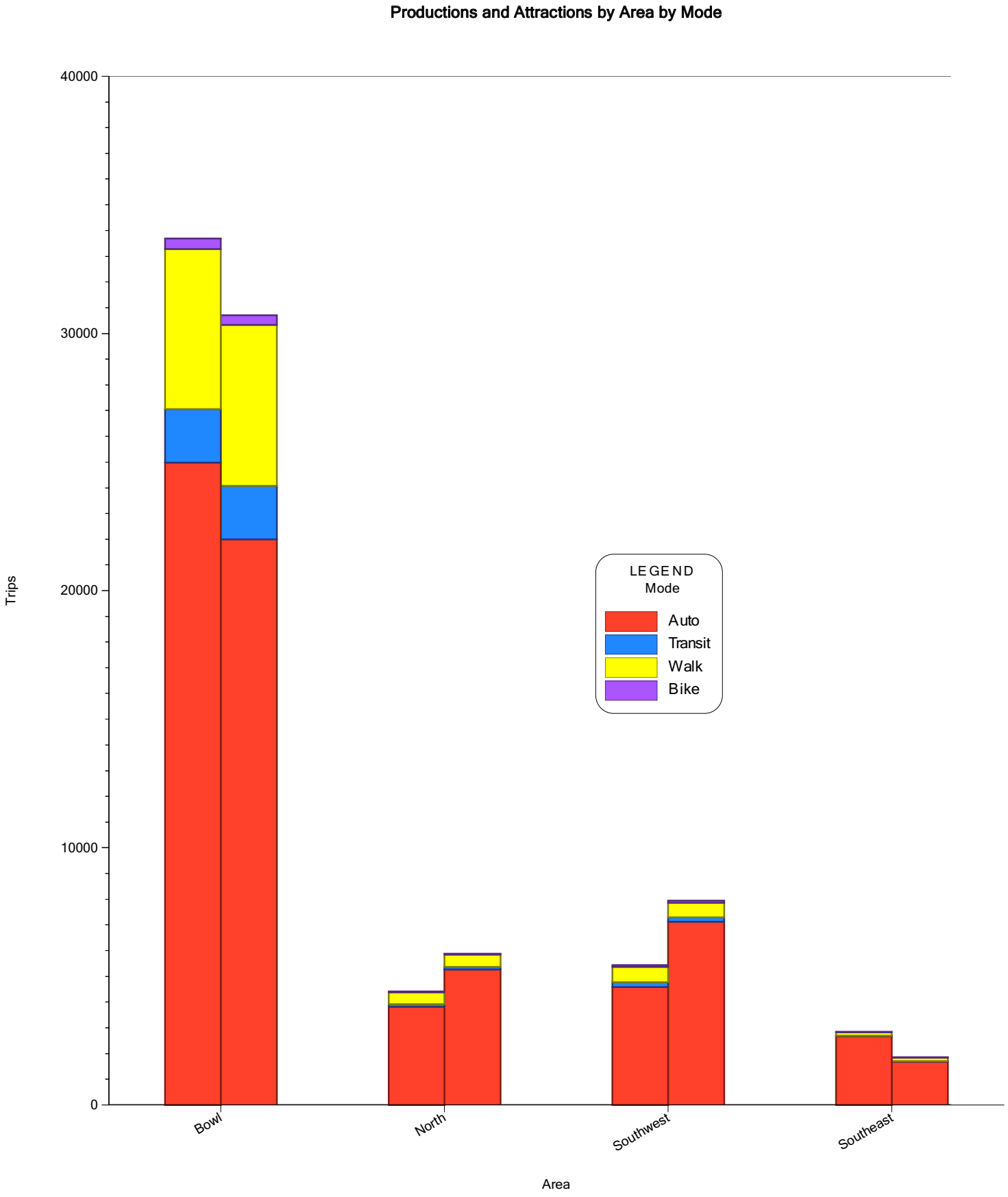
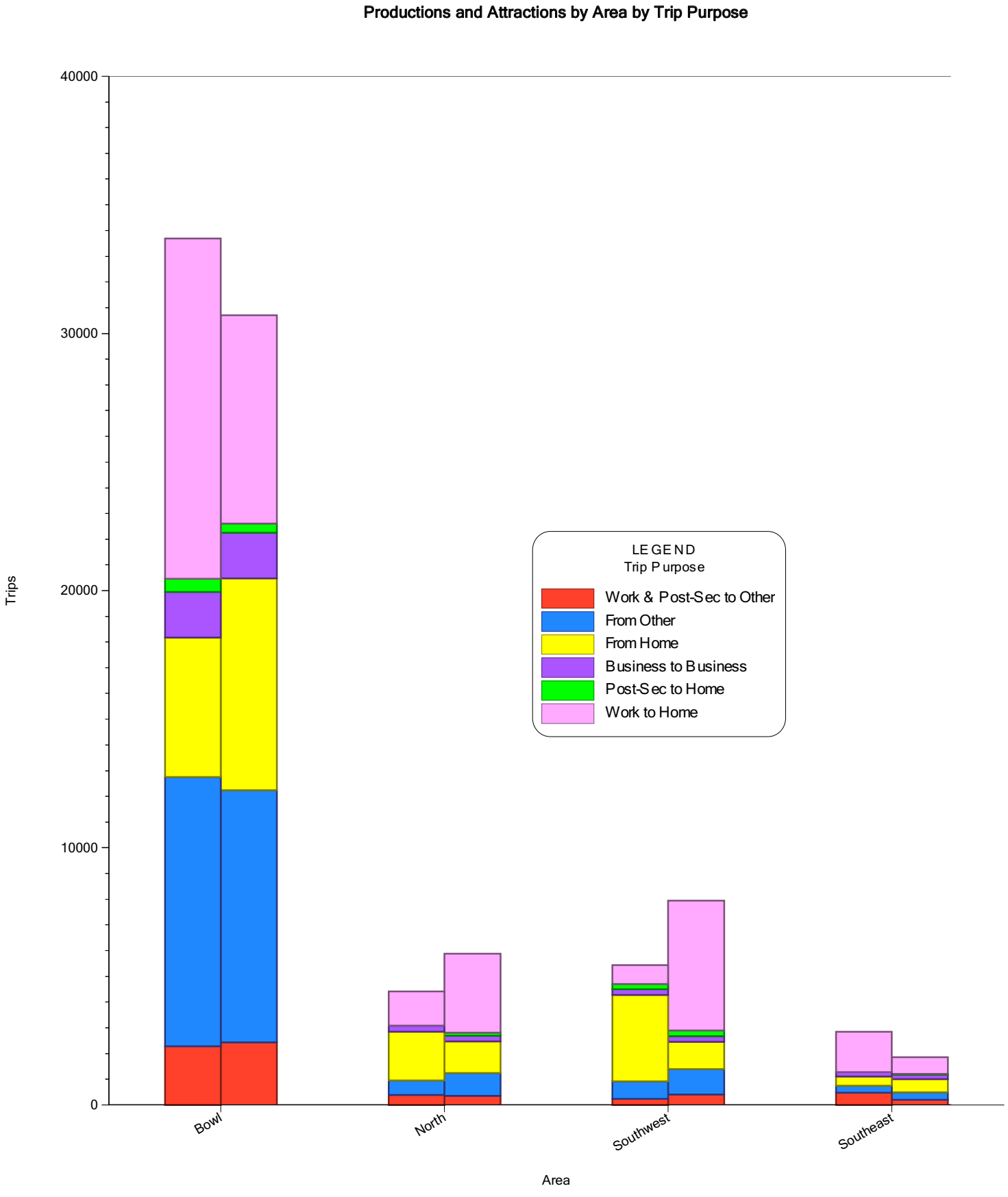


Figure 4.5: 2016 Person Trip Productions and Attractions by Mode for each Quadrant



AECOM

Figure 4.6: 2016 Person Trip Productions and Attractions by Purpose for each Quadrant

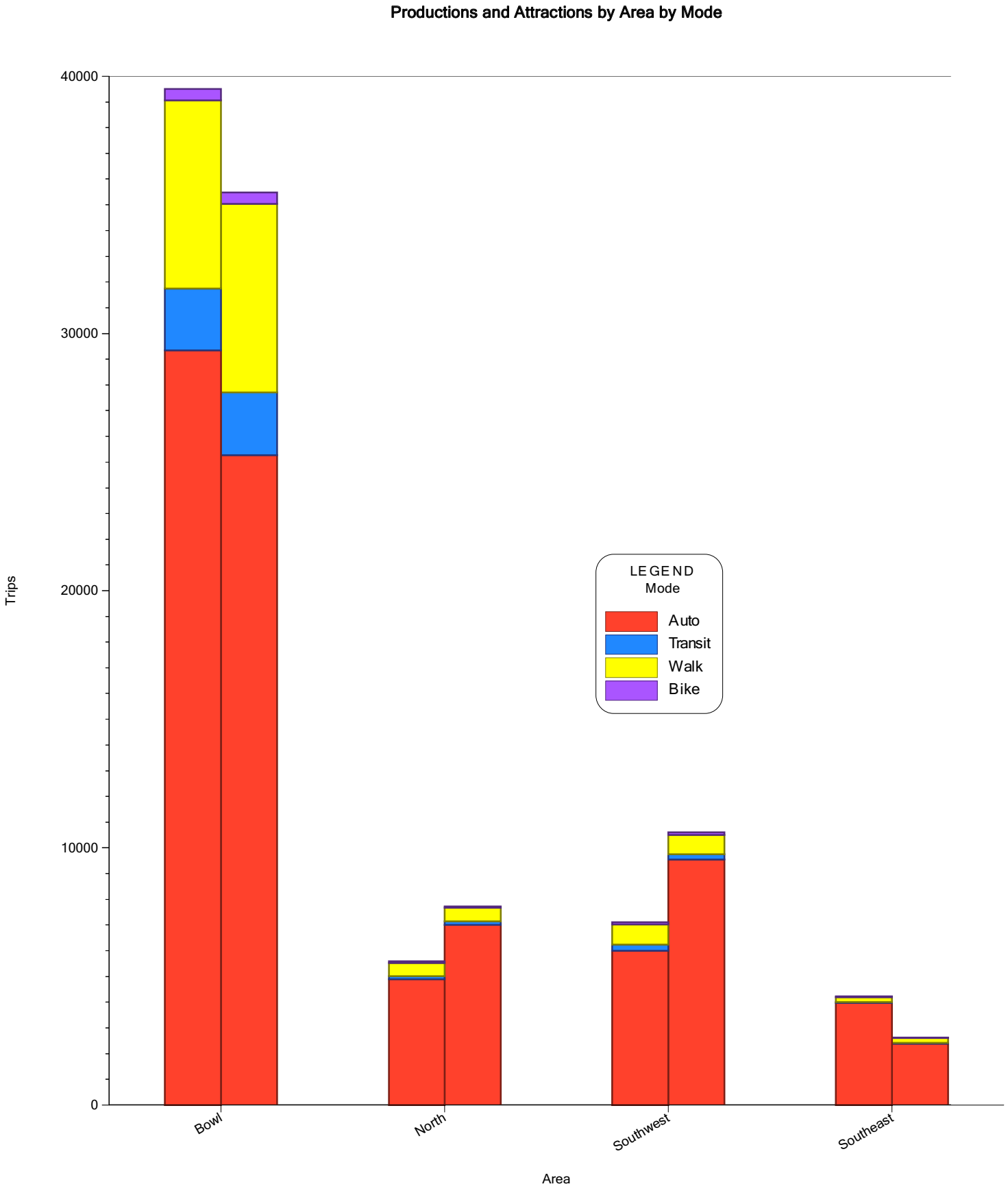


Figure 4.7: 2026 Person Trip Productions and Attractions by Mode for each Quadrant

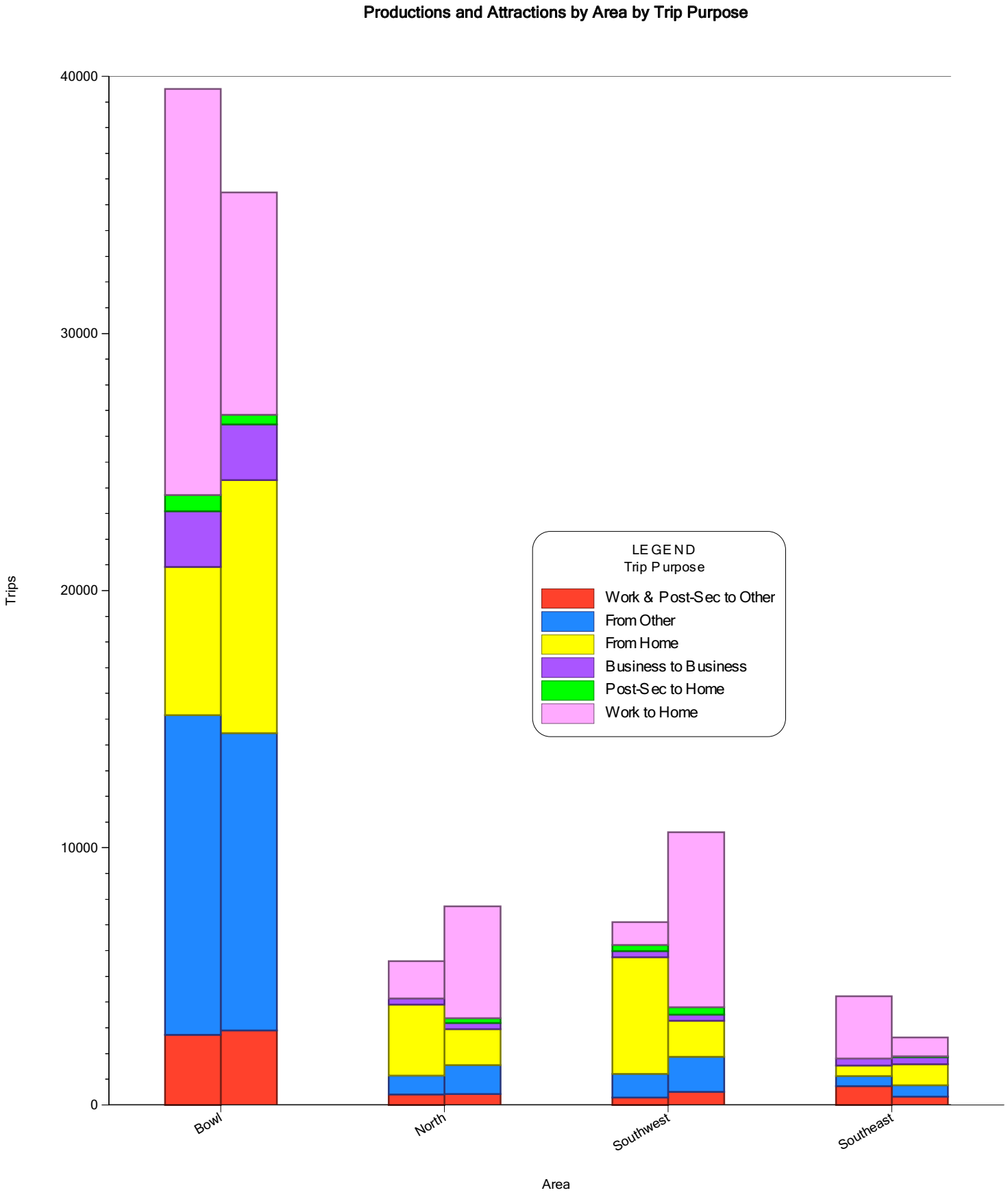
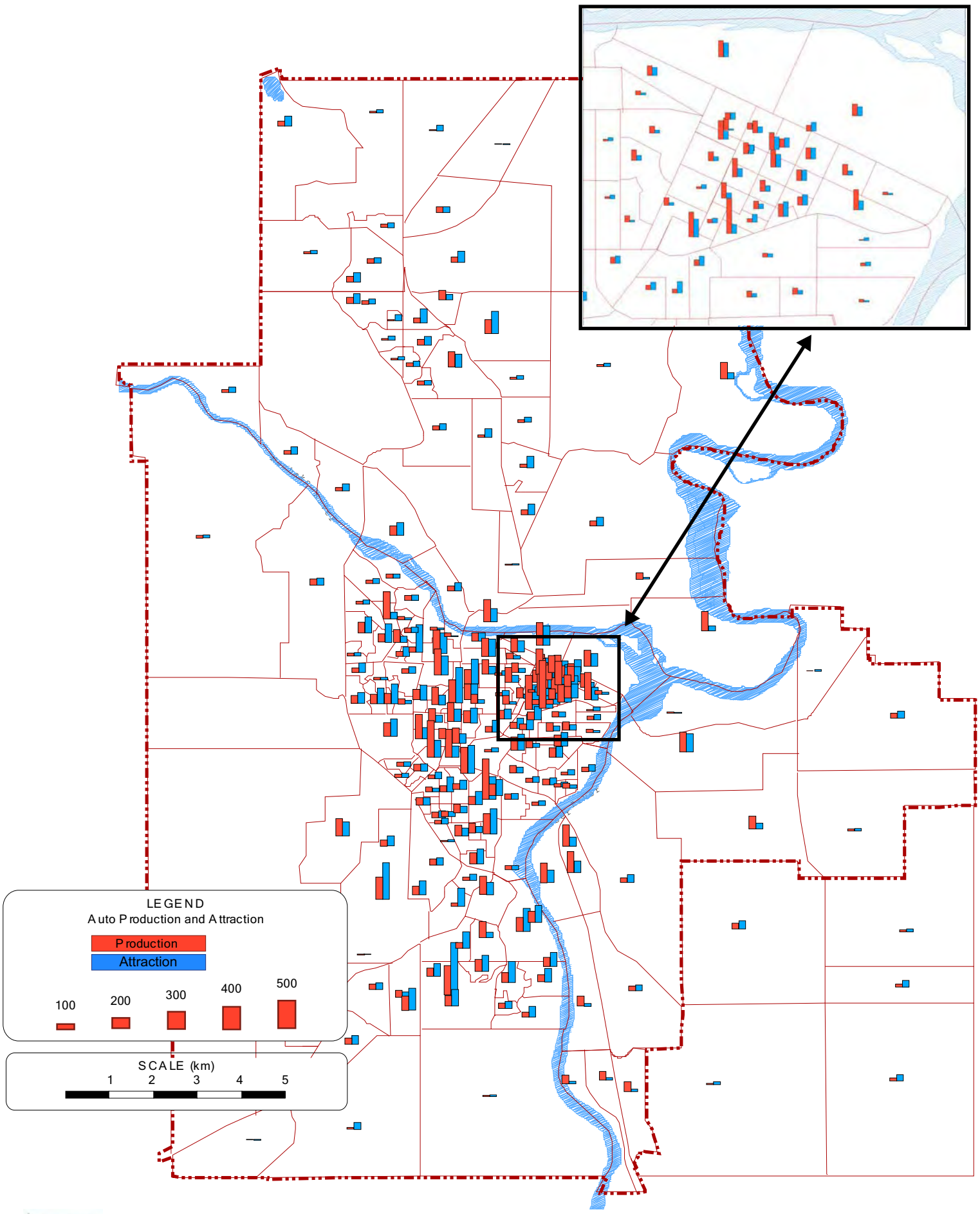
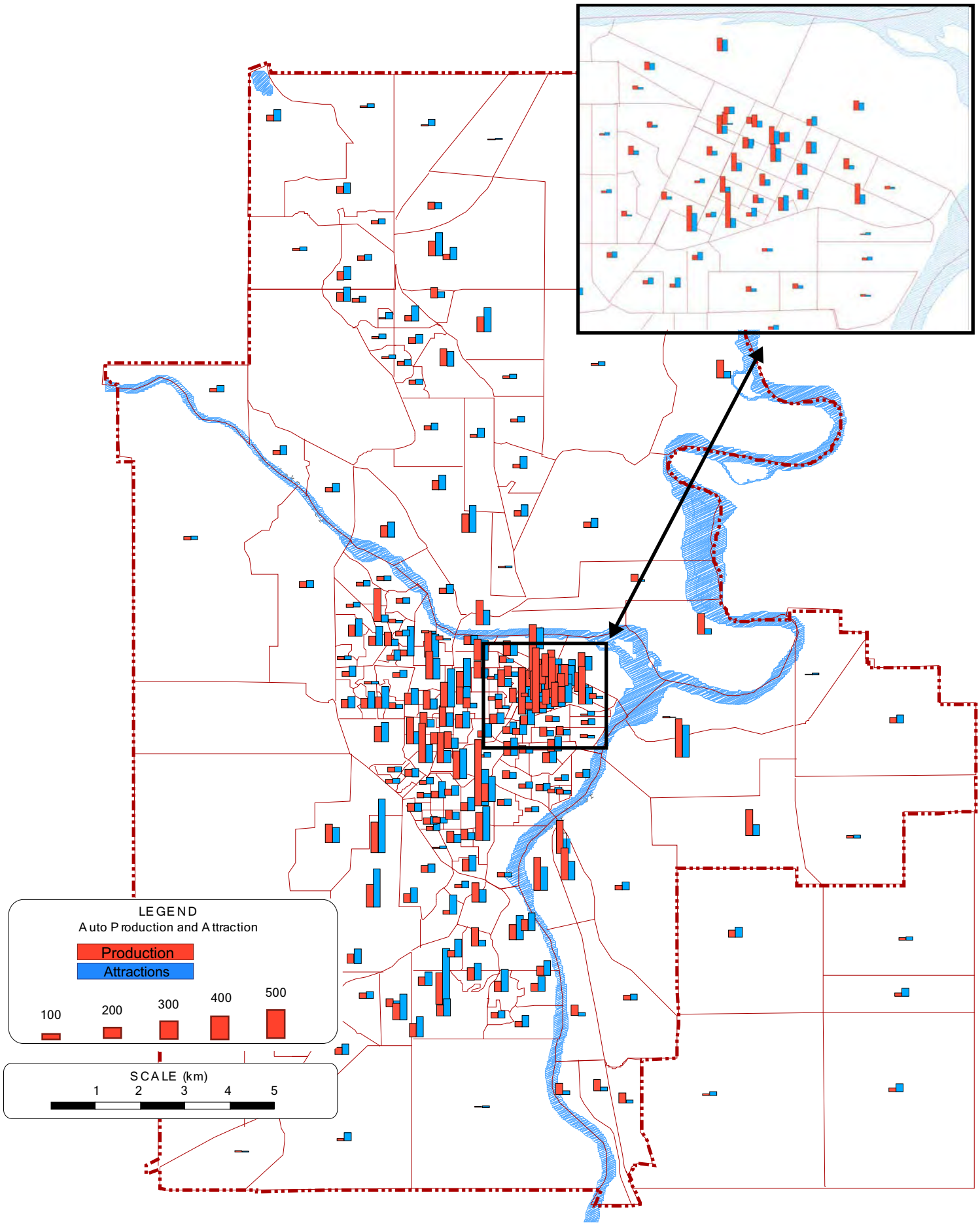


Figure 4.8: 2026 Person Trip Productions and Attractions by Purpose for each Quadrant



AECOM

Figure 4.9: 2016 Auto Vehicle Trip Productions and Attractions by Zone



AECOM

Figure 4.10: 2026 Auto Vehicle Trip Productions and Attractions by Zone

5.0 Problem Definition

Innovations to EMME modelling techniques enable capacities and associated delays at all signalized and stop/yield sign controlled intersections to be explicitly modelled. The procedure is developed to be capable of producing reliable traffic operations and levels of service (LOS) results that closely resemble that from Highway Capacity Manual (HCM) 2000 Edition. Although the method used in EMME is of necessity a simplified procedure, a comparison of forecast delays from the EMME procedure with more detailed analysis using HCM showed that the EMME delays were generally within 10% of the HCM calculated delays. These results serve as a tool to assess existing and future traffic operations at various intersections in Prince George and drive the development and evaluation of improvement projects.

Seven criteria were defined to assist in the identification of definite problems requiring mitigation, namely network improvements. These include:

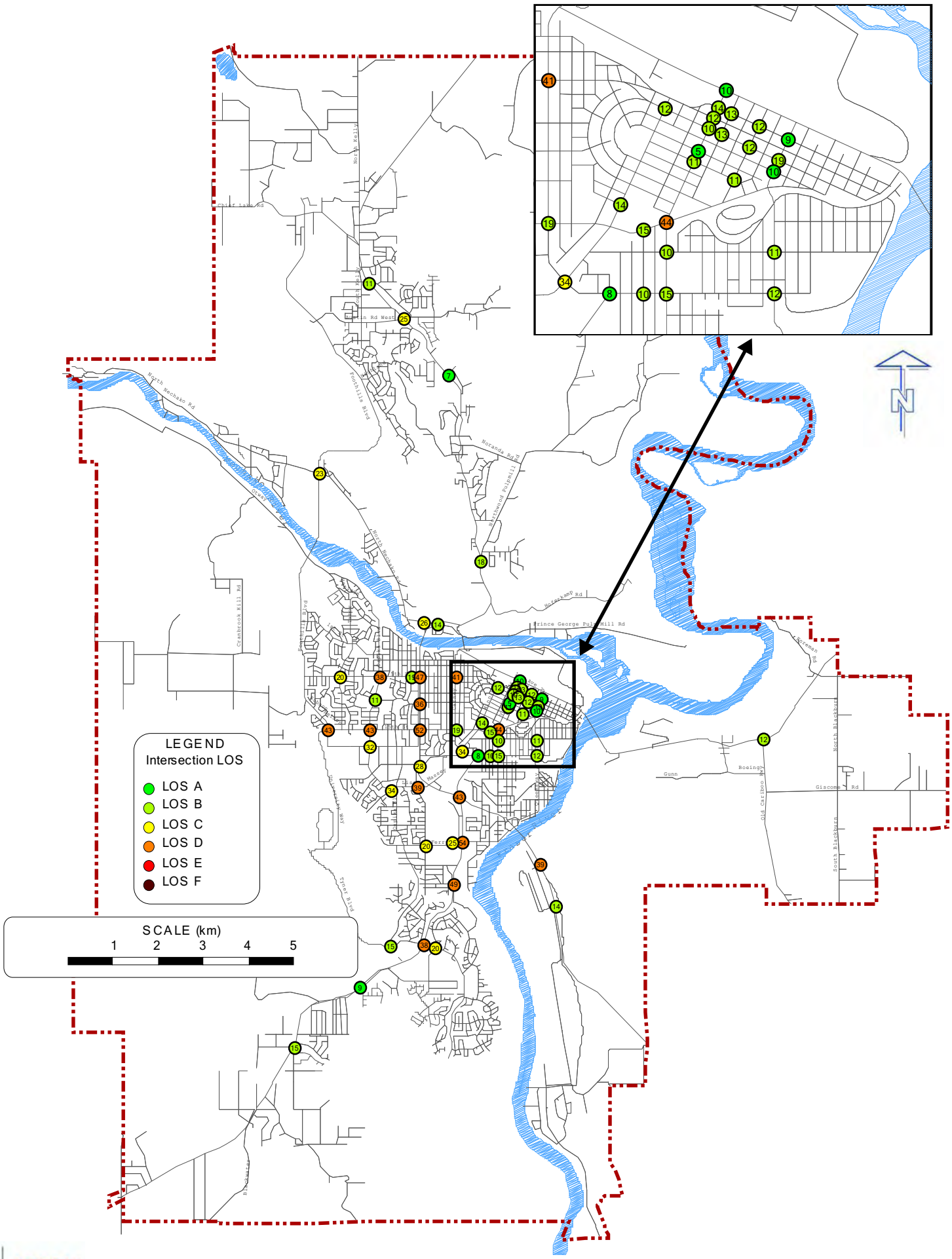
1. For signalized intersections:
   - The average overall vehicle delay shall not exceed 80 seconds (LOS "E");
   - The average vehicle delay shall not exceed 80 seconds for more than one individual movement; and
   - No individual movement shall be forecast to have a volume to capacity (v/c) ratio greater than 1.
2. For unsignalized intersections:
   - No minor approach delay or left turn delay from the through street shall be greater than 50 seconds (except for movements of less than 100 vehicles per hour).
3. For roadway links:
   - Roadways shall be provided to access new and emerging residential neighbourhood; and
   - No roadway shall be forecast to operate with a v/c ratio greater than 1.
4. For transit service:
   - Transit passenger load shall not exceed capacity.

5.1 2006 Conditions

The existing road network is constrained by the rivers and bluffs that cut through the City, dividing it up into four quadrants. As a result, there are often only one or two viable routes from one quadrant to another. In the afternoon peak, traffic tends to be concentrated on the river crossing highways and the downtown residential through routes, namely Highway 16, Highway 97, 5th Avenue, 15th Avenue, Ospika Boulevard, Queensway Street, and Ferry Avenue. Consequently, the existing afternoon peak hour congestion develops at a few of the highway-arterial intersections.

In order to establish an accurate portrait of current (2006) levels of service, the analysis of existing conditions incorporated the available information without modification. Existing levels of service at all modelled intersections were examined and shown in Figure 5.1.[3]

[3] The intersection of 15th Avenue and Foothills Boulevard was modelled as a fixed time signal with maximum green time for all movements. Further analysis at this intersection with more realistic green times demonstrated that it is operating within the LOS "C" range. Nevertheless, all model scenarios were developed using maximum green time at this intersection. It should be noted that all subsequent figures regarding traffic operating conditions at this intersection should show shorter delays and a better LOS then what is shown.



AECOM

Figure 5.1: 2006 Existing Network Traffic Operation Conditions

Traffic operation results at signalized intersections are summarized in Appendix C. Most of the intersections operate at acceptable LOS. Poorly operating movements or approaches (LOS below "E") are:

- Northbound left at Ospika Boulevard and 15th Avenue (F);
- Southbound left at Highway 16 and Cowart/Vance Road (F);
- Westbound left at Highway 97 and 5th Avenue (F);
- Northbound left at Highway 97 and 5th Avenue (F);
- Westbound through at Carney and 5th Avenue (F);
- Westbound left at Highway 16 and Ferry Avenue (F);
- Eastbound left at Highway 97 and 22nd Avenue (F);
- Eastbound left at Highway 97 and 10th Avenue (F); and
- Northbound left at Highway 16 and Tyner Boulevard (F).

The City and Ministry have committed to implement a number of short-term network improvement projects. These are:

- New Cameron Street Bridge connected on the north end at a single roundabout and on the south end at a signalized intersection;
- Twinning of Simon Fraser Bridge and four-lane widening of Highway 97 Cariboo Connector; and
- One-way streets turning into two-way streets on 2nd Avenue and 4th Avenue in Downtown.

These elements are included as part of the base condition for the next horizon period, as the improvements are committed and will be in place by then.

6.0 Preliminary Network Assessment & Evaluation

This section of the report provides an evaluation of network improvement elements focusing on model output and travel pattern changes resulting from the introduction of an improvement. Network improvement recommendations and results are summarized for each horizon year. The objective of the network evaluation was to develop a preferred network of improvements to support the forecast population and employment distributions to 2016 and 2026 horizon years, representing the medium to long term.

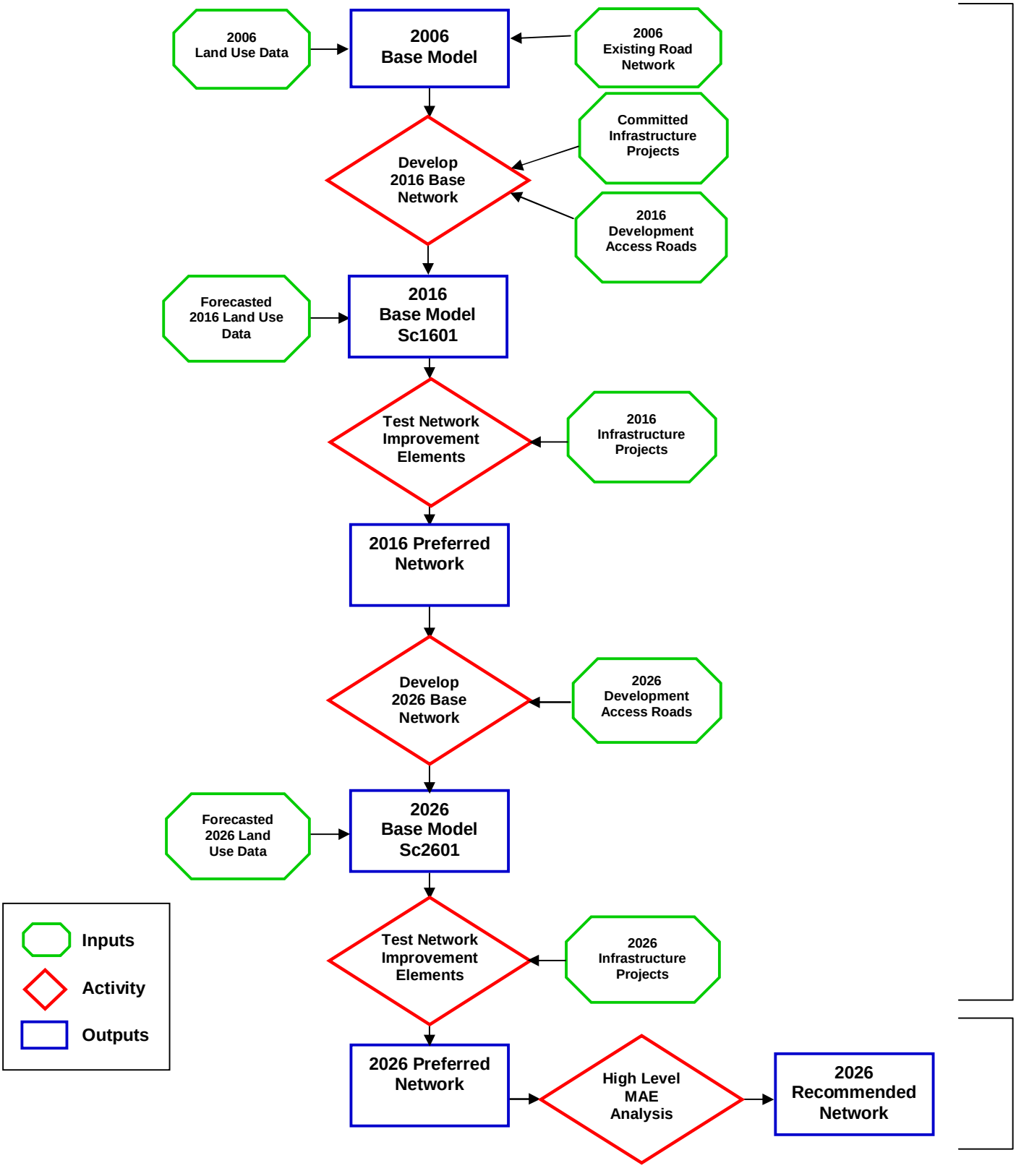
6.1 Methodology

The analysis of the model outputs and development of recommended network strategies followed several stages listed below and depicted on Figure 6.1:

1. The base year "existing" network was used for model development.
2. Completed projects were added to the base year network and the updated base network was analyzed to identify existing problems.
3. Committed projects together with roads required to provide access to new developments in 2016 were added to the updated base network and this was assumed as the base network for 2016.
4. The 2016 base network was modelled with the forecast 2016 demographic and land use data.
5. Network improvement elements associated with the 2016 base network were identified, developed and tested.
6. The preferred 2016 network was identified.
7. The preferred 2016 together with roads required to provide access to new developments in 2026 was assumed as the base network for 2026.
8. The 2026 base network was modelled with the forecast 2026 demographic and land use data.
9. Network improvement elements associated with the 2026 base network were identified, developed and tested.
10. The preferred 2026 network was identified.
11. A subsequent high level multiple account evaluation was conducted on the preferred 2026 network, resulting in a recommended 2026 network, detailed in Section 8.

The methodology employed was to identify those network improvements that are deemed beneficial, eliminate the remainder from further analysis, and ultimately structure the recommended network for each horizon year. Network improvement elements that were analyzed comprise improvements currently being considered by the City or the Ministry, and improvements identified specifically as part of this study to address each anticipated operational issue. Many of the City/Ministry improvement proposals have been developed to accommodate traffic generated by specific development proposals. These, and other network issues, were specifically identified in the study terms of reference and work plan. These are discussed explicitly and are cross-referenced to the study work plan in Section 7.

Figure 6.1: Methodology Flow Diagram



For specific issues related to particular development proposals and for new roads or improvements identified in the work programme, the following criteria were applied:

- Is the forecast volume of traffic significant?
- What volume diverts from other routes? And does this relieve any anticipated network operation issues?
- What is the impact on network-wide statistics including vehicle km travelled, vehicle hours, mean network speed, bus passenger km travelled, bus passenger hours?

For each horizon year, each operational issue identified was defined as an improvement project. These projects consist of network improvement elements to address each issue.

For "failing" signalized intersections, the following prioritized hierarchy of improvements were considered and tested:

1. Re-optimization of signal timing based on forecast volumes;
2. Revision of the signal phasing plan together with optimization;
3. Geometric improvements to add auxiliary lanes on one or more intersection approach;
4. Broader geometric improvements (widening) to one or more intersecting roads; and
5. Grade-separation.

For "failing" unsignalized intersections, the following prioritized hierarchy of improvements were considered and tested:

1. Re-allocation of priority including conversion of All-Way Stop to Two-Way Stop;
2. Geometric improvements where feasible within existing right-of-way to add auxiliary lanes on one or more intersection approaches; and
3. Signalization.

It should be noted that these improvements considered were not exclusive and have been included to ensure that workable improvements could be developed to meet the level of service objectives. They were not intended to limit the viabilities of any alternative improvement methods (such as roundabouts) which may be worthwhile solutions to some of these operational issues.

The operational analyses provided were based on EMME travel forecasts for the afternoon peak hour. The analysis of morning peak hour conditions was outside the scope of this study. It is likely, however, the reverse movements for the morning peak hour will require improvements as well. It is recommended the traffic management plans for each network improvement element include separate analysis for the morning peak hour and scheduled monitoring.

Sections 6.2 and 6.3 describe the 2016 and 2026 preliminary network assessments.

6.2 Horizon 2016

6.2.1 2016 Base Network (Sc.1601)

To provide a basis for comparison, a 2016 base network was developed. The base network (Sc.1601) builds upon the 2006 network, and includes the following committed road improvements which would be expected to be in place by 2016:

- New Cameron Street Bridge connected on the north end at a single roundabout and on the south end at a signalized intersection;
- Twinning of Simon Fraser Bridge and four-lane widening of Highway 97 Cariboo Connector; and
- One-way streets turning into two-way streets on 2nd Avenue and 4th Avenue in Downtown.

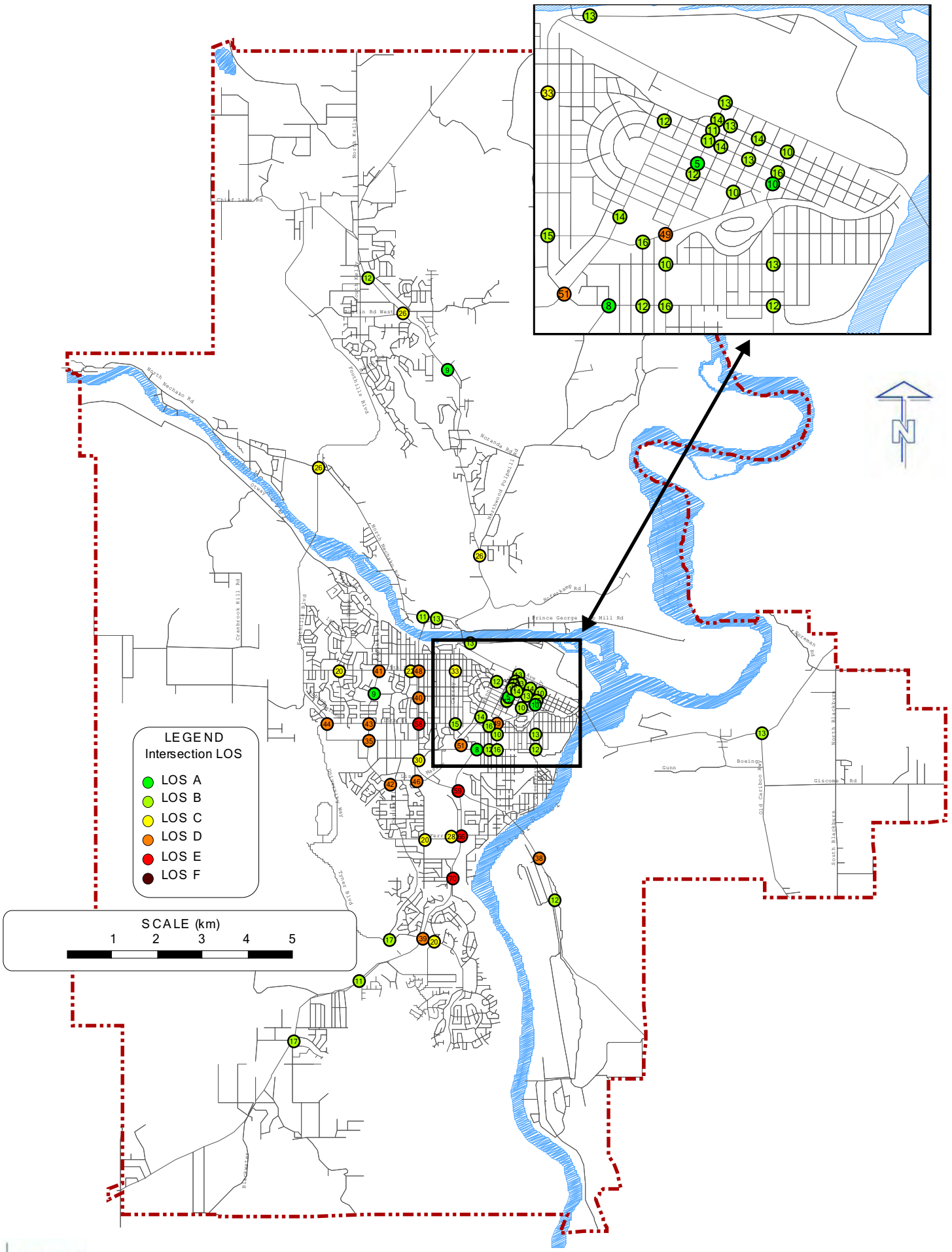
The 2016 base network also includes the addition of those collector and local roads required to service new development in areas such as Fraser Bench, University Heights, Ospika South, Prince George Golf & Curling Club (PGGCC), Wessner Heights, and BC Rail lands. Development driven links as identified in relevant planning documentation as being concomitant elements of development, often provide the sole access to the development. They are not expected to be warranted until adjacent development is built, and /or may be of little use to traffic outside the specific development area they serve. These include:

- Malaspina Avenue extension to Cowart Road;
- Ospika Boulevard extension to Glen Lyon Way;
- Aldeen Road extension to Glen Lyon Way;
- Westgate Avenue extension to Glen Lyon Way;
- Southridge Avenue extension to Glen Lyon Way;
- St Lawrence Avenue extension to Henry Road;
- Athlone Avenue connection between Westwood Drive and Rec Place Drive Extension;
- Wiebe Road extension to Rec Place Drive; and
- Handlen Road extension to Foothills Boulevard.

In addition, the following links, required to service development (some as secondary access), were included in the 2016 base. These links have the potential to provide additional benefits to the general network. They include;

- Lansdowne Road extension to Cowart Road;
- Massey Drive extension to Highway 16
- Glen Lyon Way connection between St Patrick Avenue and Domano Boulevard;
- Wiebe Rec Place Drive Road extension to Pine Frontage Road; and
- Willow Cale Road north extension.

Traffic controls for new intersections were based on a subjective review of the existing and proposed roadway classification hierarchy, with considerations of traffic volumes and delays at the approaches. Traffic operation conditions at the intersections for the 2016 Base Network (Sc.1601) are demonstrated in Figure 6.2.



AECOM

Figure 6.2: 2016 Base Network Traffic Operation Conditions

6.2.2 Network Improvement Elements

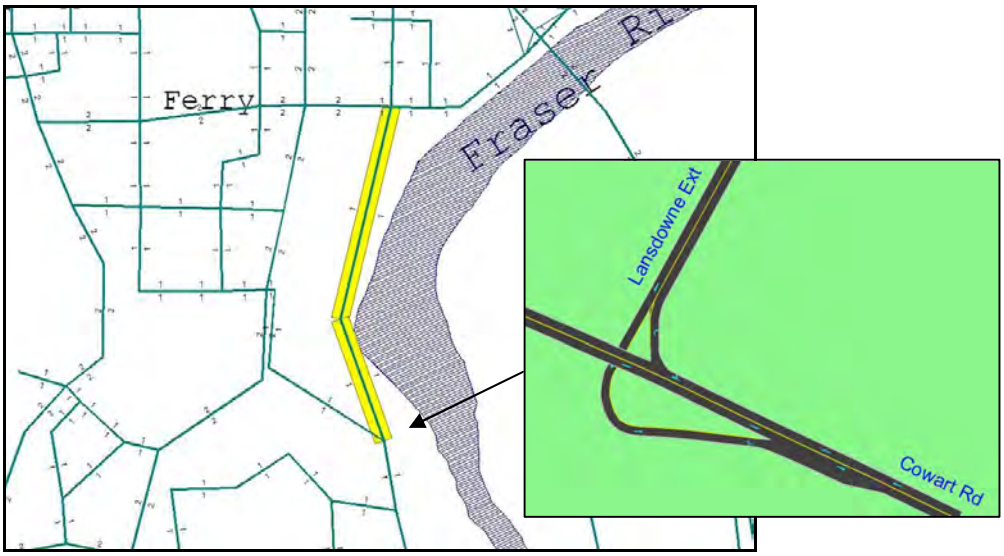
The 2016 base identified "pressure points[4]" in the network, which require mitigation. To assess the individual impact of each improvement element, a series of scenarios were developed and tested. The element was coded and incorporated into the EMME model with the results examined to determine if the improvement addressed the problem it was identified to resolve, and if there was any benefit to its retention. Given the potential for project synergies (i.e. benefit of two or more projects exceeds the sum of each project by itself), a layering approach to network analysis was utilized. Beginning with the 2016 base, each improvement scenario built upon the preceding scenarios' retained elements, ultimately resulting in a recommended network for the horizon. Figure 6.3 illustrates the approximate location of each element while Table 6.1 summarizes the results from the analysis. A summary of the automobile travel times between major places of interest in the City is attached in Appendix D.

The incremental analysis approach, the results of which are summarized in Table 6.1, indicates that not all elements examined are beneficial or required in this horizon year. The following section describes the elements that are beneficial in 2016 and retained for inclusion in the preliminary 2016 recommended network.

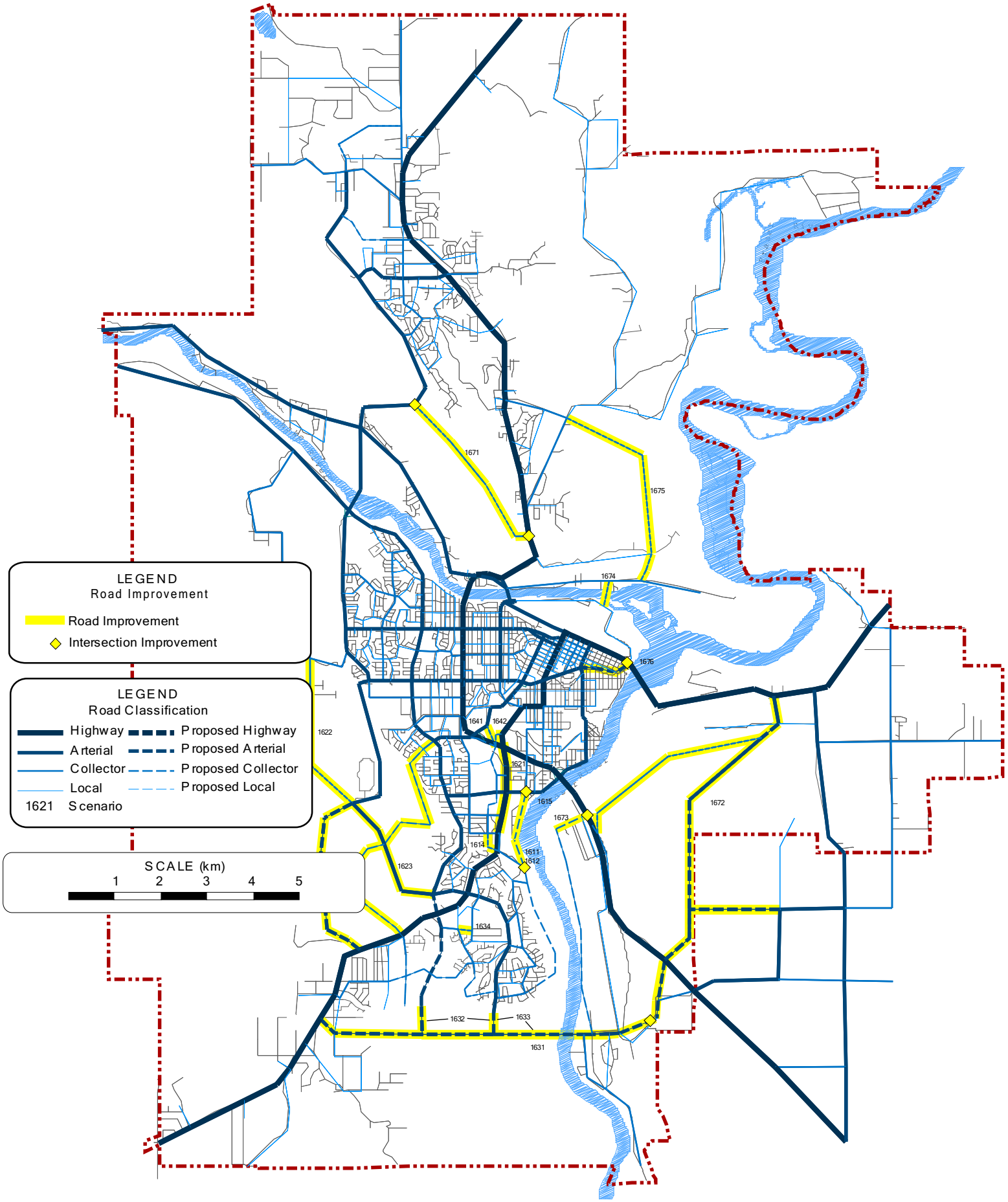
Cowart Road/Lansdowne Road Interchange (Sc.1612)

Lansdowne Road is proposed to be extended with partial interchange with grade-separated ramps to Cowart Road to eliminate at-grade conflicts in all movements. A rough alignment was developed and illustrated in the Fraser Bench neighbourhood plan, and is shown in Figure 6.4. The primary function of this extension is to provide access for the new Fraser Bench development. Results indicate that the interchange will be well used and would be beneficial in relieving congestions at the Highway 16 intersections. Automobile travel times from Pine Centre to Westgate Exchange reduce by approximately 1 minute. This option is retained for inclusion in the recommended network.

Figure 6.4: Laning – Cowart Road/Lansdowne Road Interchange



[4] Pressure points are areas of traffic congestion or a transit service deficiency in the network as defined by the application of the analytical criteria in Section 5 of this report.



AECOM

Figure 6.3: 2016 Network Elements Analyzed

Table 6.1: 2016 Network Evaluation Summary

Horizon	2016																					
Scenario	1600	1601	1611	1612	1613	1614	1615	1621	1622	1623	1631	1632	1633	1634	1641	1642	1671	1672	1673	1674	1675	1676	1699
Network Description	copy of 602	+Basic Reqs	+Cowart/ Lansdowne Signal	+Cowart/ Lansdowne Interchange	+Transit Line "A"	+Cowart-Wiebe Connector	+Ferry/ Lansdown Signal	+Hwy16 6-lane	+Tyner-Kueng Connector	+Tyner 4-lane	+Boundary (Hwy16W-Hwy97S)	+Boundary (Hwy16W-Hwy97S) Connectors	+Boundary (Domano-Hwy97S)	+Marleau Connector	+Rec Place Ext to Massey	+Rec Place Ext to Hwy16	+Blueberry Ext to Foothills	+Boundary (Hwy97S-Hwy16E)	+Willlow Cale-Railway Connector	+Cottonwood Island Crossing	+Northwood-PG Pulp Mill Connector	+River Ext to Patricia	2016 Recommended
Is Traffic using the element	n/a	n/a	Nominal	Yes	n/a	Nominal	Yes	Yes	Nominal	Nominal	Yes	Yes	Yes	Nominal	Yes	Yes	Nominal	Yes	Yes	Nominal	Nominal	Yes	n/a
Is this element mainly driven by background or development traffic	n/a	Devlp't	Devlp't	Devlp't	Devlp't	Devlp't	Devlp't	Both	Devlp't	Devlp't	Bkgrnd	Bkgrnd	Bkgrnd	Bkgrnd	Devlp't	Devlp't	Devlp't	Devlp't	Devlp't	Bkgrnd	Bkgrnd	Bkgrnd	n/a
Is there an increase in transit passengers	n/a	n/a	No	No	Line A (100)	No	No	No	No	No	No	No	No	No	No	No	No	No	No	No	No	No	n/a
Volumes NB or EB	n/a	n/a	Nominal	Nominal	n/a	NB (120)	Nominal	Nominal	Nominal	Nominal	EB (170)	EB (270)	EB (250)	Nominal	NB (200)	NB (120)	NB (230)	NB (230)	NB (260)	Nominal	NB (170)	EB (450)	n/a
Volumes SB or WB	n/a	n/a	SB (420)	SB (630)	n/a	SB (240)	SB (710)	SB (430)	Nominal	Nominal	WB (490)	WB (840)	WB (780)	Nominal	SB (230)	SB (420)	SB (110)	SB (300)	SB (280)	SB (110)	n/a	WB (320)	n/a
Is there a shift from other corridors	n/a	n/a	Yes, from WB Ferry, SB Ospika, Cowart & Domano	Yes, from WB Ferry, SB Ospika, Hwy16, Cowart & Domano	No	Yes, from NB & SB Cowart	Yes, from SB Queensway	Yes, from SB Ospika, WB Massey	Nominal	Nominal	Yes, from NB Industrial, Continental & Hwy97, SB Ospika & Hwy16	Yes, from NB Indust'l, Continental & Hwy97, SB Industrial, Ospika & Hwy16	Yes, from NB Industrial, Continental & Hwy97, SB Indust'l Ospika & Hwy16	Nominal	Yes, from SB Massey, EB & WB Pine Frontage	Yes, from WB Massey, SB Hwy16, EB Pine Frontage	Yes, from NB Hwy97, SB N.Nechako, WB 5th	Yes, from EB & WB Sintich, NB & SB Ellis, EB & WB Hwy16	Yes, from SB Hwy97, NB & SB Willow Cale, WB Boundary	Yes, from WB 5th	Yes, from NB Hwy97, WB PG Pulp Mill & 5th	Yes, from EB & WB Hwy16, NB & SB Queensway, WB 5th	n/a
Is there a shift to other corridors	n/a	n/a	Yes, to SB Queensway, Cowart & Simon Fraser	Yes, to SB Queensway, Cowart & Simon Fraser	No	Nominal	Yes, to SB Upland & Victoria, WB Milburn & 20th	Nominal	Nominal	Nominal	Yes, to SB Queensway, EB Henrey, NB & SB Hwy97	Yes, to NB Domano & Ospika, SB Domano & Queensway	Yes, to NB Domano & Southridge, SB Domano & Queensway, EB & WB Glen Lyon	Nominal	Nominal	Yes, to SB Hwy16	Yes, to NB Foothills, WB 1st	Yes, to NB & SB Hwy97	Yes, to WB Railway	Yes, to WB 1st	Yes, to WB Noranda & 1st	Yes, to WB 1st	n/a
Auto Veh-Km	258,481	259,278	259,127	259,174	258,808	258,849	258,536	258,564	258,537	258,528	256,949	255,057	255,570	255,624	255,548	255,599	255,433	254,714	253,858	253,957	253,586	253,970	253,677
Auto Veh-Hr	6,648	6,362	6,312	6,291	6,278	6,276	6,280	6,234	6,232	6,244	6,092	6,011	6,060	6,051	6,052	6,046	6,079	6,043	6,042	6,028	6,018	6,026	6,007
Auto Mean Speed (kph)	38.9	40.8	41.1	41.2	41.2	41.2	41.2	41.5	41.5	41.4	42.2	42.4	42.2	42.2	42.2	42.3	42.0	42.1	42.0	42.1	42.1	42.1	42.2
Transit Pers-Km	3,973	3,891	3,898	3,884	4,440	4,451	4,423	4,426	4,429	4,426	4,510	4,505	4,498	4,502	4,497	4,504	4,495	4,486	4,492	4,517	4,534	4,496	4,507
Transit Pers-Hr	191	181	181	181	202	203	202	201	201	201	203	202	202	202	202	202	202	202	202	203	203	202	202
Transit Mean Speed (kph)	20.8	21.5	21.5	21.5	22.0	22.0	21.9	22.0	22.0	22.0	22.2	22.3	22.2	22.3	22.3	22.3	22.2	22.2	22.2	22.3	22.3	22.2	22.3
Recommendation	n/a	n/a	Retain for Further Analysis -> Eliminate	Retain	Retain	Eliminate	Retain	Retain	Eliminate	Eliminate	Retain for Further Analysis -> Eliminate	Retain for Further Analysis -> Eliminate	Retain	Eliminate	Eliminate	Eliminate	Eliminate	Eliminate	Retain	Eliminate	Eliminate	Retain	Retain

New Transit Route "A" (Sc.1613)

To accommodate the developing neighbourhood of Fraser Bench, University Heights, and Ospika South, a preliminary concept of a new Transit Route "A" with 60-minutes headway is introduced. The preliminary concept of the new transit route, as shown in Figure 6.12 will provide service to Fraser Bench, University Heights, Ospika South, and Downtown after a review of the passenger volumes and layover time. Results indicate that forecast ridership is about 100 passengers in the peak hour by 2016. This option is retained for inclusion in the recommended network.

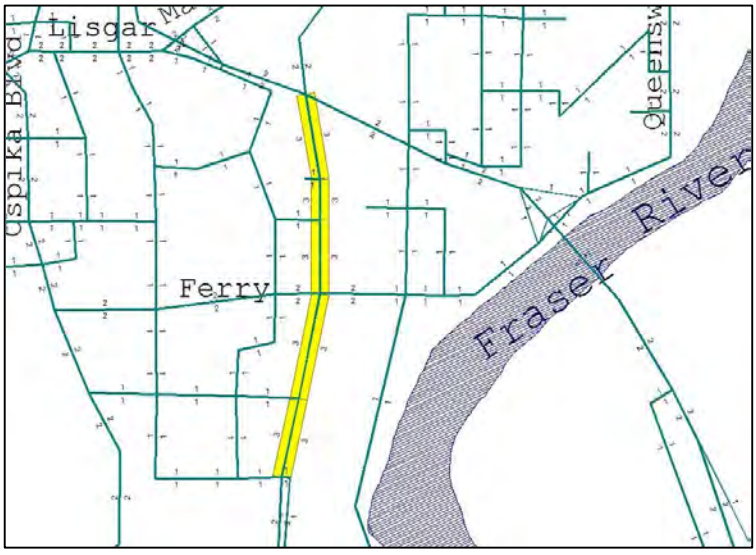
Lansdowne Road-Upland Street/Ferry Avenue Signalization (Sc.1615)

Lansdowne Road is proposed to be realigned with Upland Street at the junction with Ferry Avenue. The primary function of this extension is to provide access for the new Fraser Bench development. Results indicate that this intersection will be well used and would be beneficial in relieving congestion at the Highway 16 intersections. Automobile travel times from the Airport to Westgate Exchange reduce by approximately 1 minute. This option is retained for inclusion in the recommended network.

Highway 16 Six-Lane Widening (Sc.1621)

Highway 16 is proposed to be widened to six lanes between Highway 97 and Cowart/Vance Road. Intersections in this segment will be widened for an extra through lane on the highway approaches. The primary function of the widening is to provide better traffic flow given that volumes are anticipated to increase due to new developments in Fraser Bench and Ospika South. Results indicate that widening will be most beneficial in relieving congestion at the Highway 16 intersections. Automobile travel times from City Hall to Westgate Exchange reduce by approximately 1 minute. This option is retained for inclusion in the recommended network.

Figure 6.5: Laning – Highway 16 Six-Lane Widening

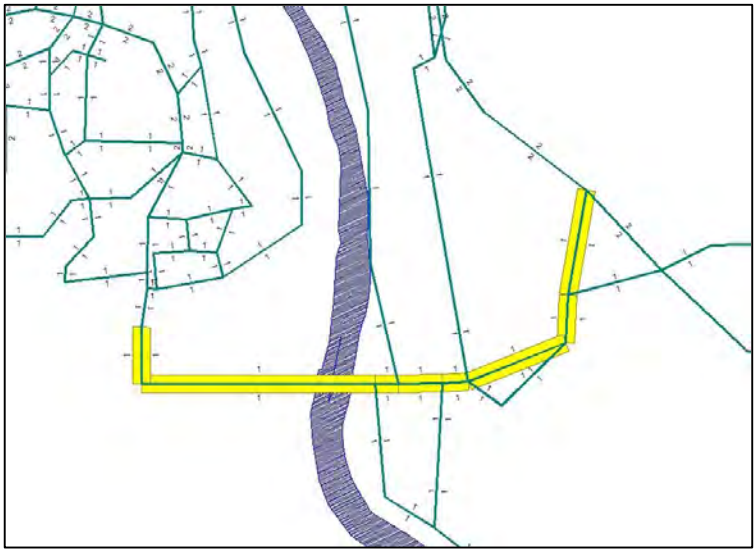


Boundary Road (Domano Boulevard to Highway 97 S) (Sc.1633)

The proposed new two-lane arterial connects Highway 16 W and Highway 97 S via a new river crossing, and ultimately to Highway 16 E. The primary function of the connector is to provide another option to cross Fraser River and as a bypass route connecting Highway 16 W and Highway 97 S. Results indicate that the section between Domano Boulevard and Highway 97 will be well used and will be beneficial in relieving congestion at the Highway 16 intersections. Automobile travel times from the Airport to

Westgate Exchange reduce by approximately 5 minutes. Consequently, Phase 1 of Boundary Road is suggested to connect Domano Boulevard and Highway 97 S and it is retained for inclusion in the recommended network.

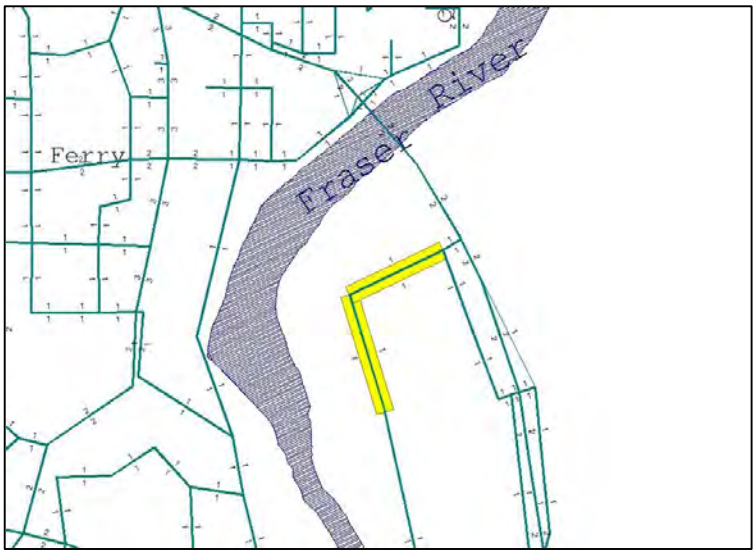
Figure 6.6: Laning – Boundary Road (Domano Boulevard to Highway 97 S)



Willow Cale Road Extension and Railway Road Connector (Sc.1673)

Willow Cale Road is proposed to connect to Railway Road via a new overpass. The primary function of the connector is to provide access to new BCR development to the west of the railway tracks. Results indicate that the connector will be well used and will be most beneficial in reducing travel times to access this area. This option is retained for inclusion in the recommended network.

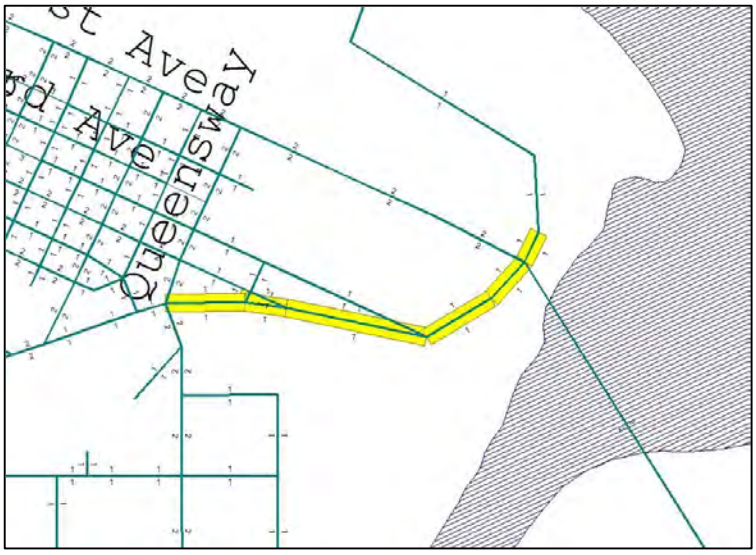
Figure 6.7: Laning – Willow Cale Road Extension and Railway Road Connector



River Road Extension to Patricia Boulevard (Sc.1676)

River Road is proposed to connect to Patricia Boulevard crossing Highway 16 via a new overpass. The primary function of the connector is to provide alternative routes to Downtown, River Road, and Yellowhead Bridge. Results indicate that the connector will be well used and will be most beneficial in reducing travel time. This option is retained for inclusion in the recommended network.

Figure 6.8: Laning – River Road Extension to Patricia Boulevard



6.2.3 Operational Problems Mitigation

The analysis indicated a number of "failing" intersections because of the overall increase in traffic volumes independent of any specific development proposals. Signalized intersections failing the operational criteria, are identified below; signals are expected to operate acceptably after reo-optimization of the signal timing:

Signal Timing Changes

- Highway 97/5th Avenue;
- Highway 97/15th Avenue;
- Highway 97/22nd Avenue;
- Highway 16/15th Avenue;
- Ospika Boulevard/15th Avenue; and
- Highway 97/Railway Road.

Unsignalized intersections failing the operational criteria, together with recommended solutions are listed below:

Monitoring

- Carney Road/2nd Avenue: monitor for potential signalization; and
- Ahbau Street/10th Avenue: monitor for potential signalization.

6.2.4 Transit Service Improvements

In addition to the road network improvements noted above, it is recommended that the following options be investigated for improving the transit network by this horizon:

- New Transit Route "A" at a 60-minutes headway.

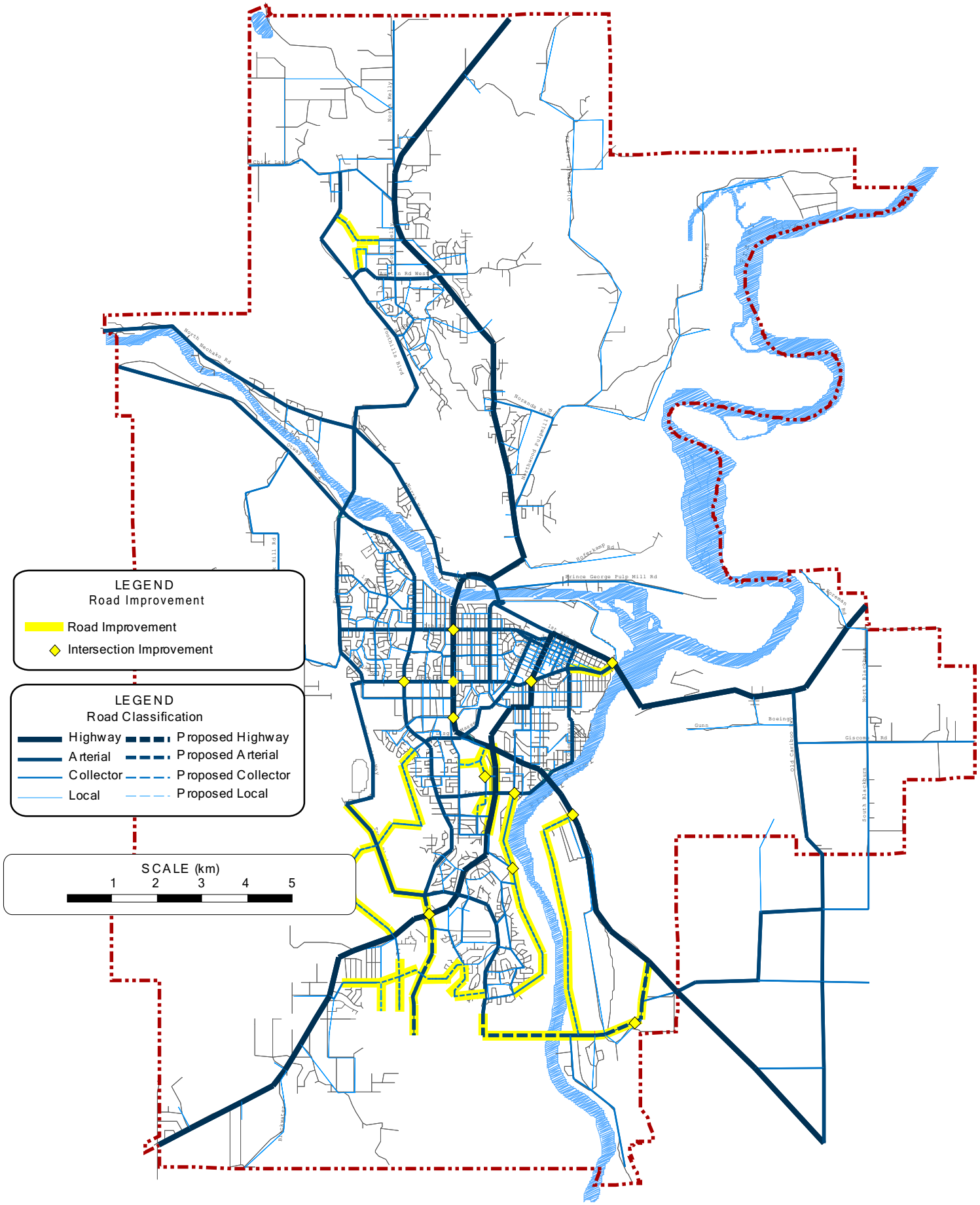
These recommendations are based on good transit practices of providing regular service, expanding into un-serviced and developing areas, and taking advantage of new road construction.

6.3 2016 Preliminary Preferred Network (Sc.1699)

The preliminary 2016 network comprise the network improvements indicated by the analysis of development-related and road network issues together with the intersection improvements recommended in Section 6.2.3. The 2016 Preliminary Preferred Network is illustrated in Figure 6.9 and the recommended improvements are listed in Table 6.2. Afternoon peak hour volumes are demonstrated in Figure 6.10. Traffic operations are illustrated in Figure 6.11 and summarized at signalized intersections by movement in Appendix C.

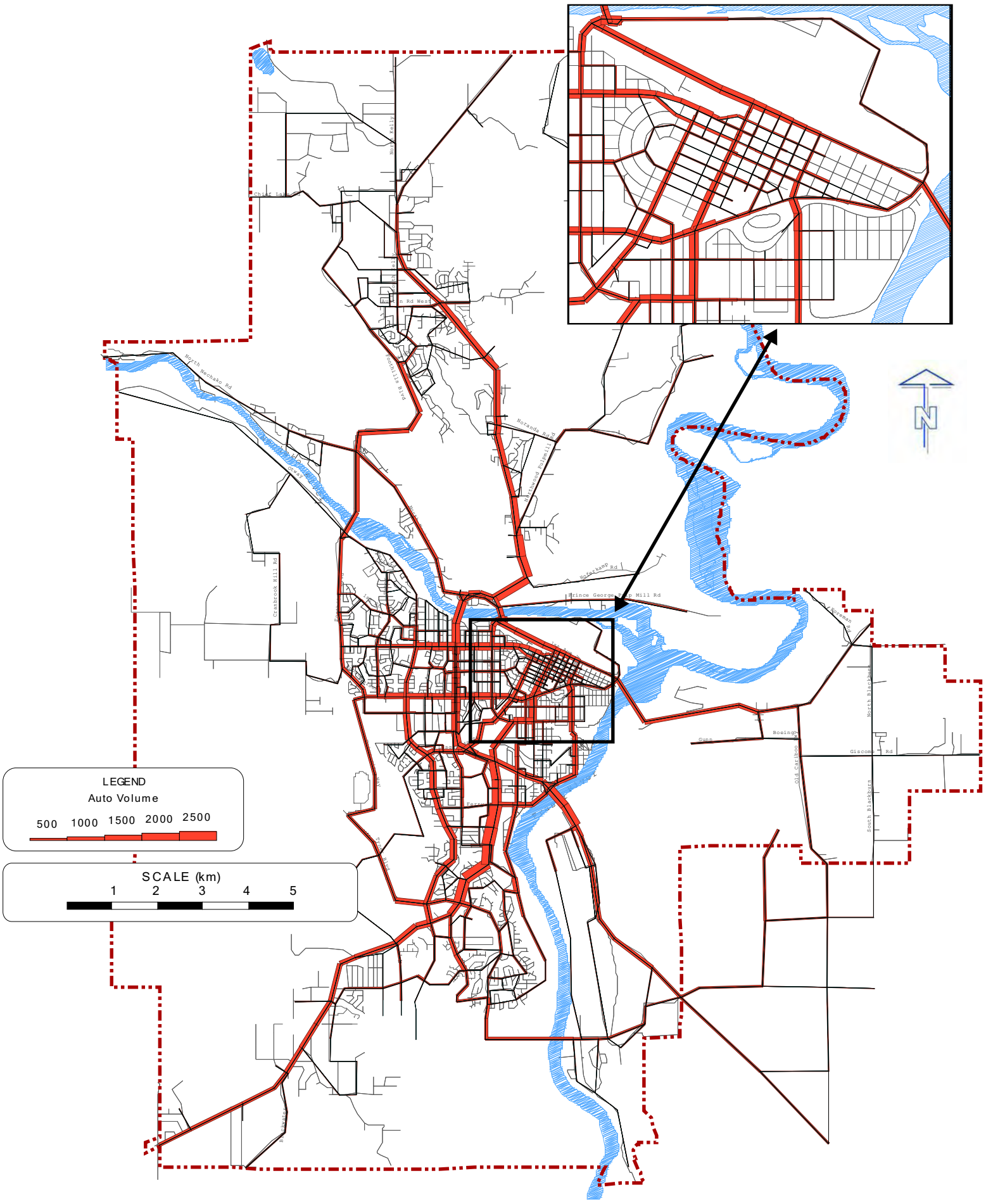
The preferred transit route "A" profile and the anticipated passenger volumes in 2016 are illustrated in Figure 6.12. The profile indicates the ridership levels for each segment of the transit route, including boardings and alightings, as well as through passengers (i.e., those remaining on the bus). The profile illustrates the transit line operations from origin to terminus. The routing begins in the downtown, services the developing neighbourhoods of Fraser Bench University Heights and Ospika South, ultimately terminating in the downtown.

All preferred elements are based on the results of model analysis, which, in turn, is highly dependent on demographic and economic assumptions. Some improvements are required primarily to service traffic demand generated by specific developments. In the event that population, employment and economic growth are less than currently expected, and in the event that some major new developments proceed more slowly than planned or not at all, the recommendations should be reviewed.



AECOM

Figure 6.9: 2016 Preliminary Preferred Network

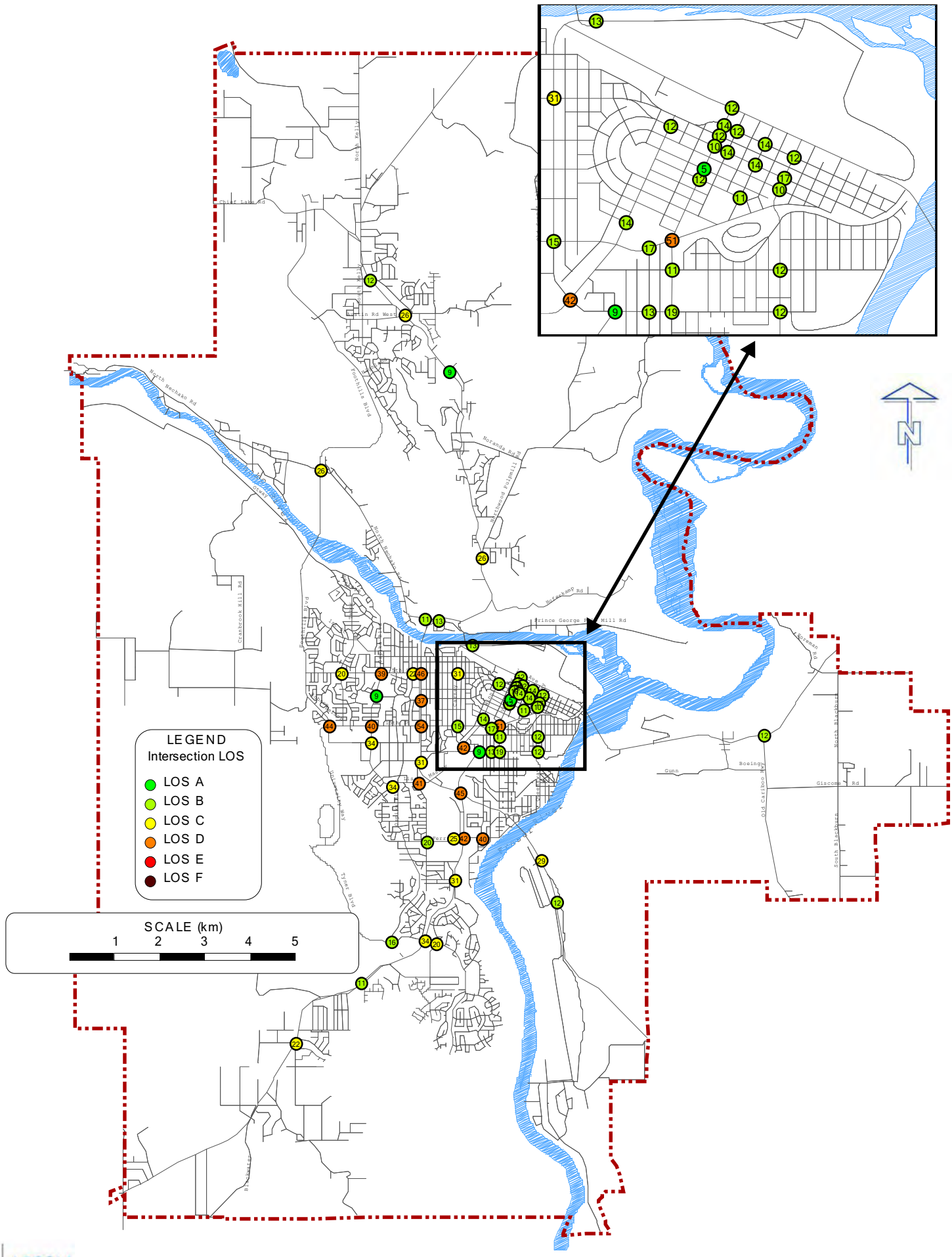


AECOM

Figure 6.10: 2016 Preliminary Preferred Network Auto Volumes

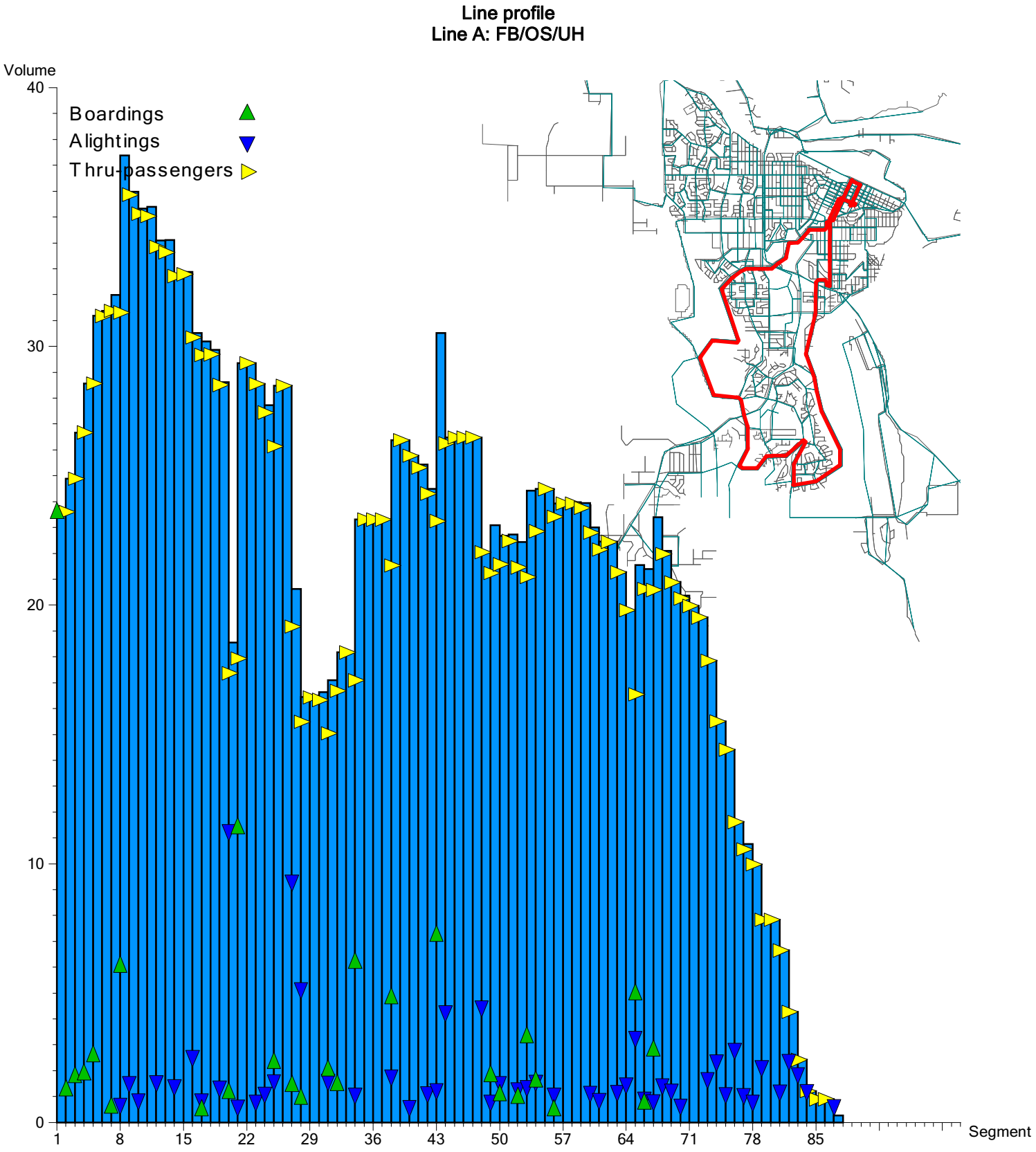
Table 6.2: 2016 Preliminary Preferred Improvements

Horizon	Area	Links	Intersection	Transit	Recommendations	Driven By
2016				New Route	60-min Headway services Fraser Bench, Ospika South, University Heights and Downtown	Development
	Fraser Bench	Malaspina (2-lane collector)			Extension to Cowart	Development
		Lansdowne (2-lane collector)			Extension to Cowart	Development
		Lansdowne (2-lane collector)			Realign with Upland	Development
			Cowart/Malaspina		Stop controlled on Cowart eastbound approach leg	Development
			Cowart/Lansdowne		Interchange - grade separated directional ramps	Development
			Lansdowne-Upland/Ferry		Signalize	Development
	University Heights	Massey (2-lane collector)			Extension to Hwy16	Development
			Tyner/Massey		Stop controlled on Massey approach legs	Development
	Ospika South	Ospika (4-lane arterial)			Extension to Glen Lyon	Development
		Aldeen (2-lane local)			Extension to Glen Lyon	Development
		Westgate (2-lane collector)			Extension to Glen Lyon	Development
		Southridge (2-lane collector)			Extension to Glen Lyon	Development
		St Lawrence (2-lane collector)			Extension to Henrey	Development
		Glen Lyon (2-lane collector)			Connect St Patrick and Domano	Development
			Ospika/Tyner		New south approach leg	Development
			Ospika/Hwy16		Diamond Interchage	Development
			Ospika/Marleau		Stop controlled on Marleau westbound approach leg	Background
			Southridge/Marleau		Stop controlled on Marleau eastbound approach leg	Background
			Ospika/St Lawrence		Stop controlled on St Lawrence approaches	Development
			Aldeen/St Lawrence		Stop controlled on Aldeen approaches	Development
			Westgate/St Lawrence		Stop controlled on St Lawrence approaches	Development
			Southridge/St Lawrence		Stop controlled on St Lawrence approaches	Development
			Domano/Glen Lyon		Stop controlled on Glen Lyon eastbound approach leg	Development
	PGGCC	Rec Place (2-lane collector)			Extension to Pine Frontage	Development
		Athlone (2-lane local)			Extension to Rec Place	Development
		Wiebe (2-lane collector)			Extension to Rec Place	Development
			Rec Place/Playhouse Access		New single roundabout	Development
			Rec Place/Athlone		Stop controlled on Athlone eastbound approach leg	Development
			Westwood/Athlone		New east approach leg, Stop controlled on Athlone approach legs	Development
			Hwy16/Playhouse Access		Stop controlled on Playhouse Access eastbound approach leg, banned eastbound left turn	Development
			Wiebe/Range		New north approach leg, Stop controlled on Wiebe approach legs	Development
	Wessner Heights	Handlen (2-lane collector)			Extension to Foothills	Development
			Foothills/Handlen		Stop controlled on Handlen westbound approach leg	Development
			Heather Park/Handlen		New west approach leg, Stop controlled on Heather Park northbound approach leg	Development
	BCR	Willow Cale (2-lane collector)			Extension to Railway, new overpass on railway tracks	Development
	BC MoT	Hwy16 (6-lane highway)			Road widens to 6 lanes between Hwy97 and Cowart	Both
			Hwy16/Hwy97		3 northbound and 3 southbound through lanes	Both
			Hwy16/Ferry		3 northbound and 3 southbound through lanes	Both
			Hwy16/Range		3 northbound and 3 southbound through lanes	Both
			Hwy16/Cowart		3 northbound and 3 southbound through lanes	Both
	Boundary	Boundary (2-lane arterial)			Connects Domano and Hwy97 via new crossing	Background
		Domano (2-lane collector)			Extension to Boundary	Background
			Sintich/Boundary		New Boundary overpass, Stop controlled on Sintich northbound approach leg	Background
			Sintich/Boundary		Stop controlled on Sintich westbound approach leg	Background
			Hwy97/Boundary		Stop controlled on Boundary approach leg	Background
	Lower Patricia	Lower Patricia (2-lane collector)			Extension to River Road	Background
			River/Hwy16		New River overpass, Stop controlled on Hwy16 ramps	Background
			Queensway/ Lower Patricia		New east approach leg, Stop controlled on Patricia approach legs	Background
			Lower Patricia/2nd		Stop controlled on 2nd eastbound approach leg	Background
			Lower Patricia/3rd		Stop controlled on 3rd eastbound approach leg	Background
			Lower Patricia/4th		Stop controlled on 4th eastbound approach leg	Background
			Lower Patricia/5th		Stop controlled on 5th eastbound approach leg	Background
			Lower Patricia/Ontario		Stop controlled on Ontario southbound approach leg	Background
			Lower Patricia/Scotia		Stop controlled on Scotia southbound approach leg	Background
			Lower Patricia/Ottawa		Stop controlled on Ottawa southbound approach leg	Background
			Lower Patricia/London		Stop controlled on London southbound approach leg	Background
	Others		Carney/2nd		Monitor	Background
			Ahbau/10th		Monitor	Background



AECOM

Figure 6.11: 2016 Preliminary Preferred Network Traffic Operation Conditions



AECOM

Figure 6.12: 2016 Transit Route "A" Profile and Passenger Volume

6.4 Horizon 2026

6.4.1 2026 Base Network (Sc.2601)

To provide a basis for comparison, a 2026 base network was developed. The base network (Sc.2601) included those road improvement projects that are listed in the 2016 Preliminary Preferred Network. In addition, the base network includes the addition of those collector and local roads required to service new development in areas such as University Heights, Ospika South, and Glenview Crescent[5]. These include:

- Cranbrook Drive connection between University Way and Massey Drive extension;
- Glen Lyon Way extension to Park Drive;
- Aldeen Road and Westgate Avenue connection; and
- Nordic Drive north extension and upgrade to two-lane collector.

Traffic controls for new intersections were based on a subjective review of the existing and proposed roadway classification hierarchy, with considerations of traffic volumes and delays at the approaches. Traffic operation conditions for the 2026 Base Network (Sc.2601) are demonstrated in Figure 6.13.

6.4.2 Network Improvement Elements

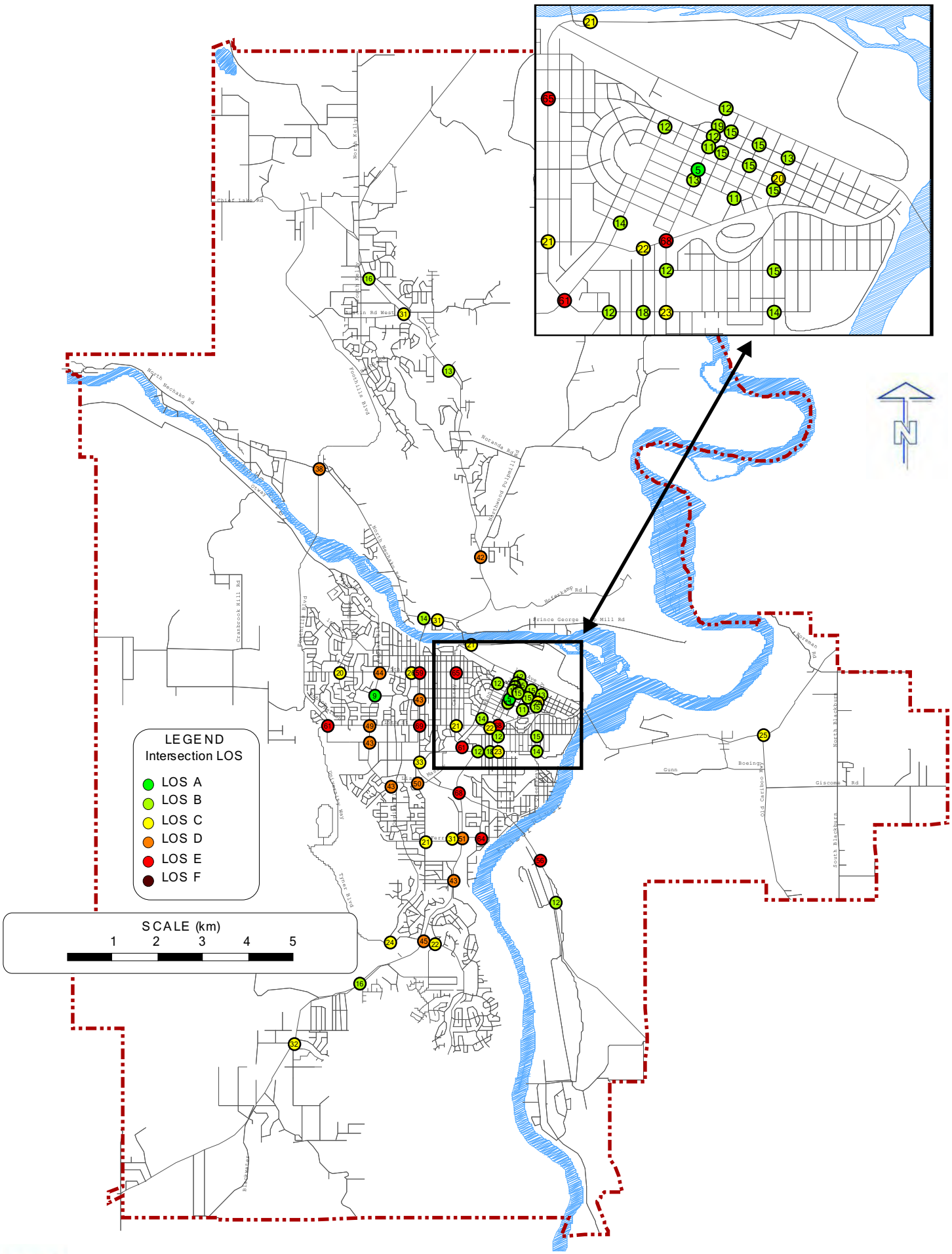
Similar to the approach utilized in assessing network improvements in 2016, the 2026 base scenario was modelled and examined to identify potential problems. Figure 6.14 illustrates the approximate location of each element.

Network evaluation results are summarized in Table 6.3.

[5] Glenview Crescent covers the area west of Wapiti/Knight.

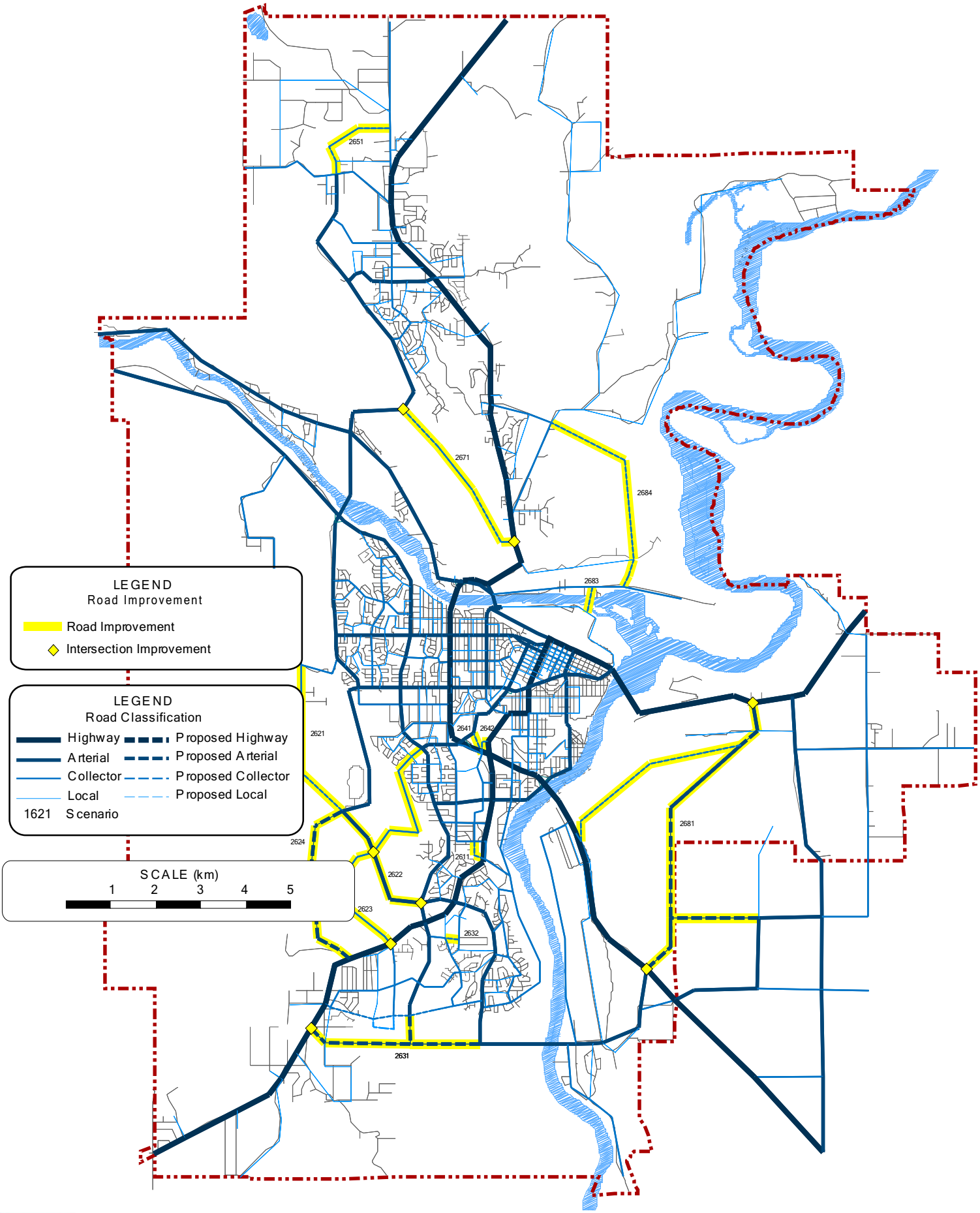
Table 6.3: 2026 Network Evaluation Summary

Horizon		2026															
Scenario		2600	2601	2611	2621	2622	2623	2624	2631	2632	2641	2642	2651	2671	2681	2683	2684	2699
Network Description		copy of 1699	+Basic Reqs	+Cowart-Wiebe Connector	+Tyner-Kueng Connector	+Tyner 4-lane	+Massey Ext 4-lane	+University Way Ext	+Boundary (Hwy16W-Domano)	+Marleau Connector	+Rec Place Ext to Massey	+Rec Place Ext to Hwy16	+Foothills Ext to N. Kelly	+Blueberry Ext to Foothills	+Boundary Ext (Hwy97S-Hwy16E)	+Nechako Crossing	+Northwood-PG Pulp Mill Connector	2026 Recommended
Is Traffic using the element		n/a	n/a	Nominal	Nominal	Nominal	Yes	Yes	Yes	Nominal	Yes	Yes	Nominal	Nominal	Yes	Yes	Yes	n/a
Is this element mainly driven by background or development traffic		n/a	Devlp't	Devlp't	Devlp't	Devlp't	Devlp't	Devlp't	Bkgrnd	Bkgrnd	Devlp't	Devlp't	Devlp't	Devlp't	Devlp't	Bkgrnd	Bkgrnd	n/a
Is there an increase in transit passengers		No	No	No	No	No	No	No	No	No	No	No	No	No	No	No	No	No
Volumes NB or EB		n/a	n/a	Nominal	Nominal	Nominal	NB (470)	NB (210)	EB (230)	Nominal	NB (250)	NB (210)	Nominal	Nominal	NB (290)	NB (230)	NB (300)	n/a
Volumes SB or WB		n/a	n/a	SB (270)	Nominal	Nominal	SB (940)	SB (240)	WB (620)	Nominal	SB (280)	SB (560)	Nominal	SB (310)	SB (400)	SB (190)	SB (170)	n/a
Is there a shift from other corridors		n/a	n/a	Yes, from SB Hwy16	Nominal	Nominal	Yes, from SB University, Tyner, Ospika & Hwy16, NB Tyner & Hwy16	Yes, from NB & SB Massey & Hwy16	Yes, from EB & WB Glen Lyon, NB Domano, SB Hwy16	Nominal	Yes, from NB & SB Massey, EB & WB Pine Frontage	Yes, from SB Massey & Hwy16, EB Pine Frontage	Nominal	Yes, from NB Hwy97, SB N.Nechako	Yes, from EB & WB Sintich, NB & SB Ellis	Yes, from NB Hwy97, SB Cameron	Yes, from NB & SB Hwy97, SB Cameron	n/a
Is there a shift to other corridors		n/a	n/a	Nominal	Nominal	Nominal	Yes, to SB Ospika	Yes, to SB University	Yes, to NB Ospika	Nominal	Nominal	Yes, to SB Hwy16	Nominal	Yes, to NB Foothills	Yes, to NB & SB Hwy97	Yes, to EB & WB River	Yes, to EB & WB Noranda	n/a
Auto	Veh-Km	335,514	335,265	335,240	335,339	335,289	335,015	334,358	334,152	334,306	334,065	334,070	334,261	333,867	332,375	332441	332076	331581
	Veh-Hr	8,559	8,541	8,542	8,546	8,547	8,508	8,480	8,421	8,427	8,429	8,411	8,386	8,571	8,531	8505	8434	8020
	Mean Speed (kph)	39.2	39.3	39.2	39.2	39.2	39.4	39.4	39.7	39.7	39.6	39.7	39.9	39.0	39.0	39.1	39.4	41.3
Transit	Pers-Km	4,982	4,967	4,957	4,955	4,958	4,925	4,938	4,944	4,944	4,941	4,949	4,951	4,947	4,930	4933	4951	5058
	Pers-Hr	234	233	233	233	233	233	234	233	233	233	233	234	234	233	234	234	232
	Mean Speed (kph)	21.3	21.3	21.3	21.3	21.3	21.1	21.1	21.2	21.2	21.2	21.2	21.2	21.1	21.1	21.1	21.2	21.8
Recommendation		n/a	n/a	Eliminate	Eliminate	Eliminate	Retain	Retain	Retain	Eliminate	Eliminate	Retain	Eliminate	Retain	Retain	Retain	Retain	Retain



AECOM

Figure 6.13: 2026 Base Network Traffic Operation Conditions



AECOM

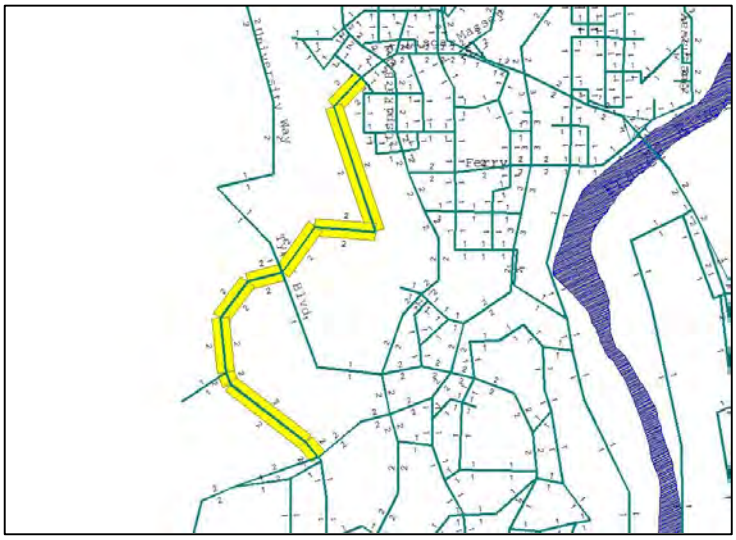
Figure 6.14: 2026 Network Elements Analyzed

The following section describes the elements that are beneficial in this horizon and retained for inclusion in the recommended network.

Massey Drive Extension Four-Lane Widening (Sc.2623)

Massey Drive extension is proposed to be widened to four lanes between Ospika Boulevard and Highway 16. Intersections in this segment will include an extra through lane on the Massey Drive approaches. The primary function of the widening is to provide access for the new University Heights development. Results indicate that this segment will be well used and will divert traffic from Tyner Boulevard, Ospika Boulevard, and Highway 16. Automobile travel times from Pine Centre to UNBC reduce by approximately 3 minutes. This option is retained for inclusion in the recommended network.

Figure 6.15: Laning – Massey Drive Extension Four-Lane Widening



University Way Extension (Sc.2624)

University Way is proposed to be extended to Highway 16 at Kimball Road. The primary function of the extension is to provide access for the new University Heights development. Results indicate that this segment will be well used. Automobile travel times from Hart Centre to Westgate Exchange reduce by approximately 1 minute. This option is retained for inclusion in the recommended network.

Figure 6.16: Laning – University Way Extension

Boundary Road (Highway 16 W to Domano Boulevard) (Sc.2631)

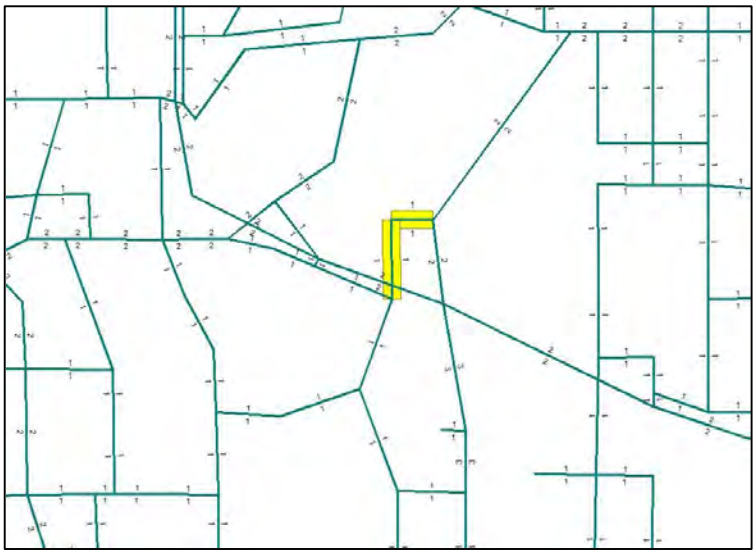
The proposed new two-lane arterial connects Highway 16 W and Highway 97 S via a new river crossing, and ultimately to Highway 16 E. Phase 2 Boundary Road is suggested to extend from Domano Boulevard west resulting in a connection between Highway 16 W and Highway 97 S. Also, Ospika Boulevard is suggested to extend further south to connect to this extension. The primary function of the Boundary Road connection is to provide another option to cross Fraser River and as a bypass route connecting Highway 16 E, and Highway 97 S. Results indicate that the connector will be well used and will be beneficial in reducing travel times and relieving congestion in the bowl. Automobile travel times from the Airport to UNBC reduce by approximately 1 minute. This option is retained for inclusion in the recommended network.

Figure 6.17: Laning – Boundary Road (Highway 16 W to Domano Boulevard)

Rec Place Drive Extension to Highway 16 (Sc.2642)

Rec Place Drive is proposed to be extended to Highway 16 crossing Highway 16 via an overpass. The primary function of the extension is to provide access for the new PGGCC development. Results indicate that this extension will be well used and will be beneficial in reducing travel times to this area and relieving congestions at the Highway 16/Highway 97 intersection. Automobile travel times from City Hall to Pine Centre reduce by approximately 1 minute. This option is retained for inclusion in the recommended network.

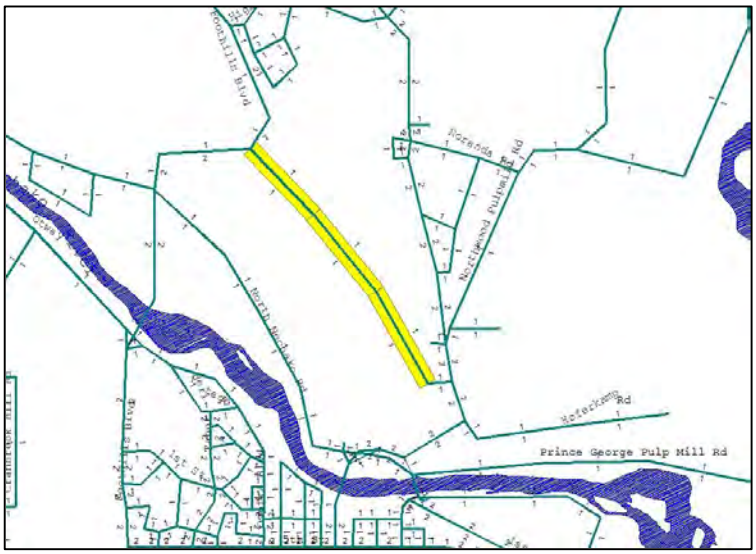
Figure 6.18: Laning – Rec Place Drive Extension to Highway 16



Blueberry Road Extension to Foothills Boulevard (Sc.2671)

Blueberry Road is proposed to be extended to Foothills Boulevard at a signalized intersection. Highway 97/Blueberry Road is also proposed to be signalized. The primary function of the extension is to provide access for the new Harper Valley development. Results indicate that this extension will be well used and will be beneficial in reducing travel times to this area. This option is retained for inclusion in the recommended network.

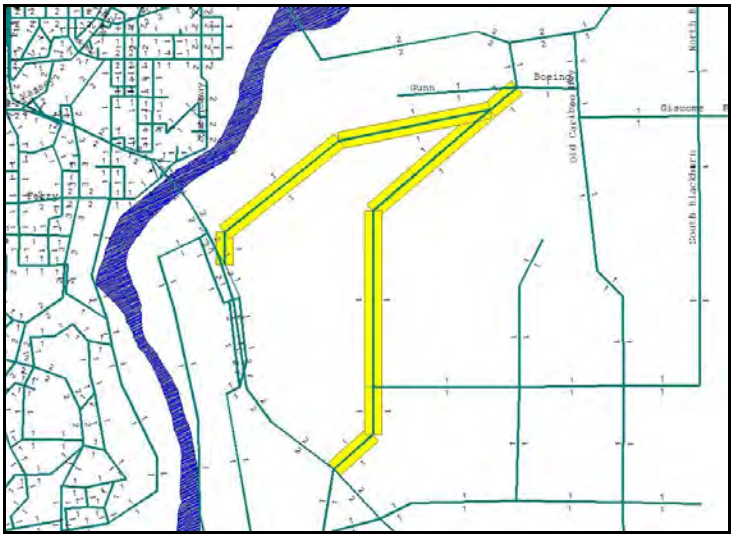
Figure 6.19: Laning – Blueberry Road Extension to Foothills Boulevard



Boundary Road (Highway 97 S to Highway 16 E) (Sc.2681)

As part of the proposed new two-lane arterial connects between Highway 16 W and Highway 97 S, and ultimately to Highway 16 E, Phase 3 of Boundary Road is suggested to connect Highway 97 S and Highway 16 E. The primary function of the connector is to provide access for the new the Airport Industrial development. Results indicate that the connector will be well used and will be beneficial in reducing travel times to the Airport. Automobile travel times from the Airport to Westgate Exchange reduce by approximately 1 minute. This option is retained for inclusion in the recommended network.

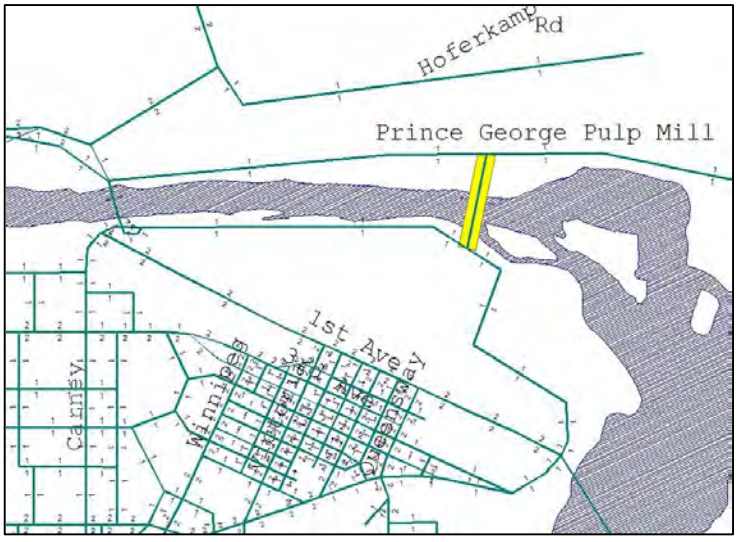
Figure 6.20: Laning – Boundary Road (Highway 97 S to Highway 16 E)



New Cottonwood Island Crossing (Sc.2683)

The proposed new Cottonwood Island Crossing connects River Road and the PG Pulp Mill Road via a new Cottonwood Island Crossing. The primary function of this element is to provide an alternative route to cross the Nechako River. Results indicate that the extension will be well used and will be beneficial in reducing travel times to the PG Pulp Mill area. Automobile travel times from the Airport to Hart Centre (at the junction of Austin Road and Highway 97) reduce by approximately 1 minute. This option is retained for inclusion in the recommended network.

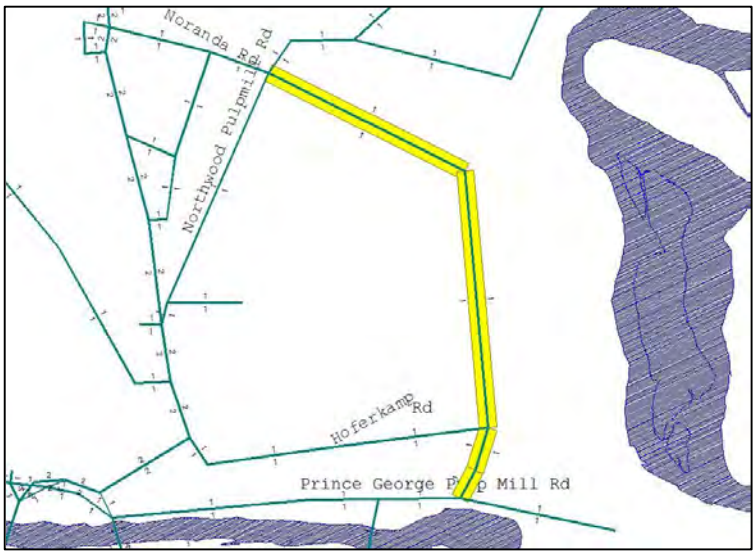
Figure 6.21: Laning – New Cottonwood Island Crossing



Northwood Pulp Mill – PG Pulp Mill Connector (Sc.2684)

The proposed new two-lane collector connects the PG Pulp Mill Road and Northwood Pulp Mill Road at Noranda Road. The primary function of the extension is to provide a connection to the new Cottonwood Island Crossing, thereby increasing the attractiveness of the crossing. Results indicate that the extension will be well used and will be beneficial in reducing travel times to the PG Pulp Mill. Automobile travel times from Hart Centre to the Airport reduce by approximately 3 minutes. This option is retained for inclusion in the recommended network.

Figure 6.22: Laning – Northwood Pulp Mill – PG Pulp Mill Connector



6.4.3 Operational Problems Mitigation

Signalized intersections failing the operational criteria listed below, are expected to operate acceptably after , re-optimization of the signal timing.

Signal Timing Changes

- Highway 97/Blueberry Road;
- Foothills Boulevard /Blueberry Road;
- Highway 16/15th Avenue;
- Highway 16/Massey Drive;
- Ospika Boulevard/Tyner Boulevard;
- Highway 16/Gauthier Road-Bunce Road;
- Carney Road /5th Avenue;
- Foothills Boulevard/University Way;
- Highway 16/Highway 97;
- Westwood Drive/Massey Drive; and
- Highway 16/1st Avenue: re-optimize signal timing.

In addition to signal timing re-optimization, the following intersections require geometric improvements to bring the intersections to acceptable levels of operation:

Geometric Improvements (with re-optimized signal timing)

- Highway 97/5th Avenue: provide dual westbound left turn lanes;
- Highway 97/Railway Road: widen Highway 97 approaches to provide three through lanes; and
- Carney Road/Massey Drive: provide dedicated westbound and southbound right turn lanes.

Unsignalized intersections failing the operational criteria, together with recommended solutions are listed below:

Geometric Improvements

- Simon Fraser Avenue/Cowart Road: change priority to make north leg the minor road or new single roundabout.
- Cameron Street/PG Pulp Mill Road: widen single lane roundabout to two-lane roundabout.

Signalize

- Carney Road/10th Avenue: signalize;
- Highway 97/Nordic Drive: signalize;
- Carney Road/1st Avenue: signalize;
- Highway 97 off-ramp/ Ferry Avenue: signalize;
- Foothills Boulevard/Highland Drive: signalize; and
- Massey Drive / Highway 97 Off-ramp: signalize.

Monitoring

- Carney Road/2nd Avenue: monitor for potential signalization;
- Ahbau Street/15th Avenue: monitor for potential signalization;
- Nicholson Street/Massey Drive: monitor for potential signalization;
- Westwood Drive/Athlone Avenue: monitor for potential signalization; and
- Ospika Boulevard/Range Road: monitor for potential signalization.

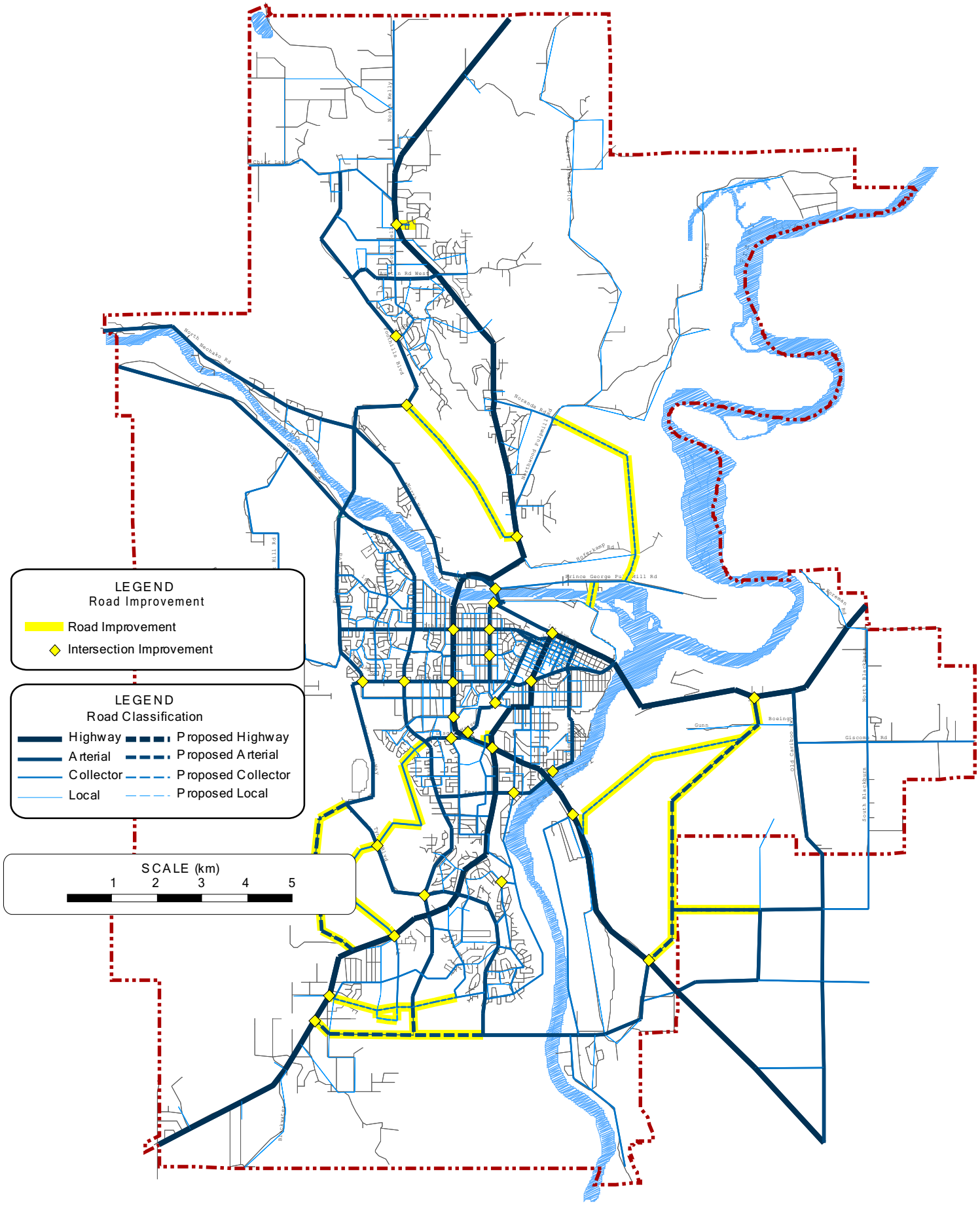
6.5 2026 Preliminary Preferred Network (Sc.2699)

The 2026 Preliminary Preferred Network is illustrated in Figure 6.23 and the recommended improvements are listed in Table 6.4. Afternoon peak hour volumes are demonstrated in Figure 6.24. Traffic operations are illustrated in Figure 6.25 and summarized at signalized intersections by movements in Appendix C.

The recommended transit route “A” profile and the anticipated passenger volumes in 2026 are illustrated in Figure 6.26.

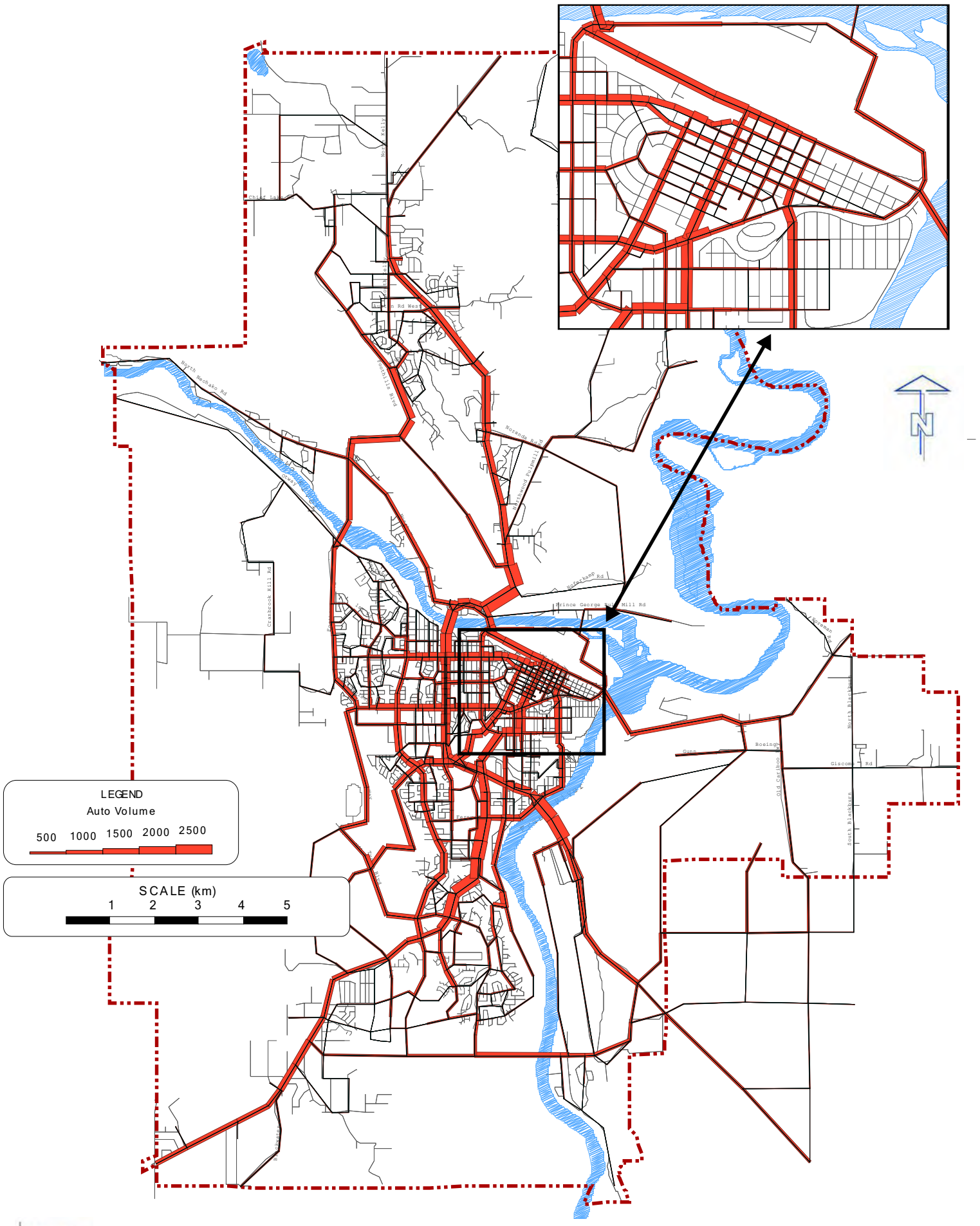
Table 6.4: 2026 Preliminary Preferred Improvements

Horizon	Area	Links	Intersection	Transit	Recommendations	Driven By
2026	**Fraser Bench**		Lansdowne/Ferry		Widen Ferry approaches to 2 through lanes and optimize timing	Both
			Simon Fraser/Cowart		Stop controlled on Simon Fraser southbound approach leg or New single roundabout	Background
	University Heights	University Way (2-lane collector)			Extension to Kimball	Development
		Cranbrook (2-lane collector)			New connection between University extension and Massey extension	Development
		Massey (4-lane arterial)			Road widens to 4 lanes between Ospika and Hwy16	Development
			Massey/Cranbrook		Stop controlled on Cranbrook eastbound approach leg	Development
			University/Cranbrook		Stop controlled on Cranbrook westbound approach leg	Development
			Tyner/University		New west approach leg, Stop controlled on University eastbound approach leg	Development
			Tyner/Massey		Signalize	Development
			Ospika/Tyner		Add advance northbound left turn phase and optimize timing	Development
	Ospika South	Glen Lyon (2-lane collector)			Extension to Park	Development
		Aldeen (2-lane local)			South extension	Development
		Westgate (2-lane collector)			South extension	Development
			Aldeen/Glen Lyon		Stop controlled on Aldeen approach legs	Development
			Westgate/Glen Lyon		Stop controlled on Glen Lyon approach legs	Development
			Ospika/Glen Lyon		Stop controlled on Glen Lyon approach legs	Development
			Southridge/Glen Lyon		Stop controlled on Southridge southbound approach leg	Development
	PGGCC	Rec Place (2-lane collector)			Extension to Hwy16 via underpass	Development
			Hwy16/Rec Place		Stop controlled on Rec Place eastbound approach leg	Development
			Rec Place/Pine Frontage		Stop controlled on Pine Frontage eastbound approach leg	Development
			Westwood/Athlone		Monitor	Development
			Ospika/Range		Monitor	Background
	Glenview	Nordic (2-lane collector)			Upgrade to collector	Development
			Hwy97/Nordic		Signalize	Development
	Harper Valley	Blueberry (2-lane arterial)			Extension to Foothills	Development
			Hwy97/Blueberry		Signalize	Development
			Foothills/Blueberry		Signalize	Development
	Boundary	Boundary (2-lane arterial)			Connects Hwy16W and Domano	Background
		Ospika (4-lane arterial)			Extension to Boundary	Background
		Boundary (2-lane arterial)			Connect Hwy16 W and Highway 16 E	Development
		Johnson (2-lane collector)			Extension to Boundary	Background
		Continental connector (2-lane collector)			Connect Continental and Boundary	Development
			Hwy16/Boundary		Signalize	Background
			Hwy97/Boundary		Signalize	Development
			Bunce/Boundary		Stop controlled on Bunce approach legs	Background
			Ospika/Boundary		Stop controlled on Ospika southbound approach leg	Background
			Domano/Boundary		Stop controlled on Domano southbound approach leg	Both
			Boundary/Continental connector		Stop controlled on Continental connector eastbound approach leg	Development
			Boundary/Johnson		Stop controlled on Johnson westbound approach leg	Background
			Continental/Continental connector		Stop controlled on Continental connector westbound approach leg	Development
	Others	Cottonwood Island Crossing			New Cottonwood Island Crossing at Cotton Island that connects River and PG Pulp Mill	Background
		Northwood-PG Pulp Mill Connector			New connection between Northwood Pulp Mill and PG Pulp Mill	Background
			Cameron/PG Pulp Mill		Upgrade to Double Roundabout	Background
			Carney/1st		Signalize	Background
			Carney/10th		Signalize	Background
			Hwy97 Off-ramp/Ferry		Signalize	Background
			Foothills/Highland		Signalize	Development
			Massey/Hwy97 Off-ramp		Signalize	Development
			Boeing/Hwy16		Signalize	Development
			Hwy97/5th		Widen Hwy97 approaches to 3 through lanes and optimize timing	Background
			Hwy97/Railway		Provide dual westbound left turn lane	Development
			Carney/Massey		Provide dedicated westbound and southbound right turn lanes and optimize timing	Development
			Westwood/Massey		Remove advance eastbound left turn phase and optimize timing	Development
			Carney/2nd		Monitor	Background
			Ahbau/10th		Monitor	Background
			Nicholson/Massey		Monitor	Development



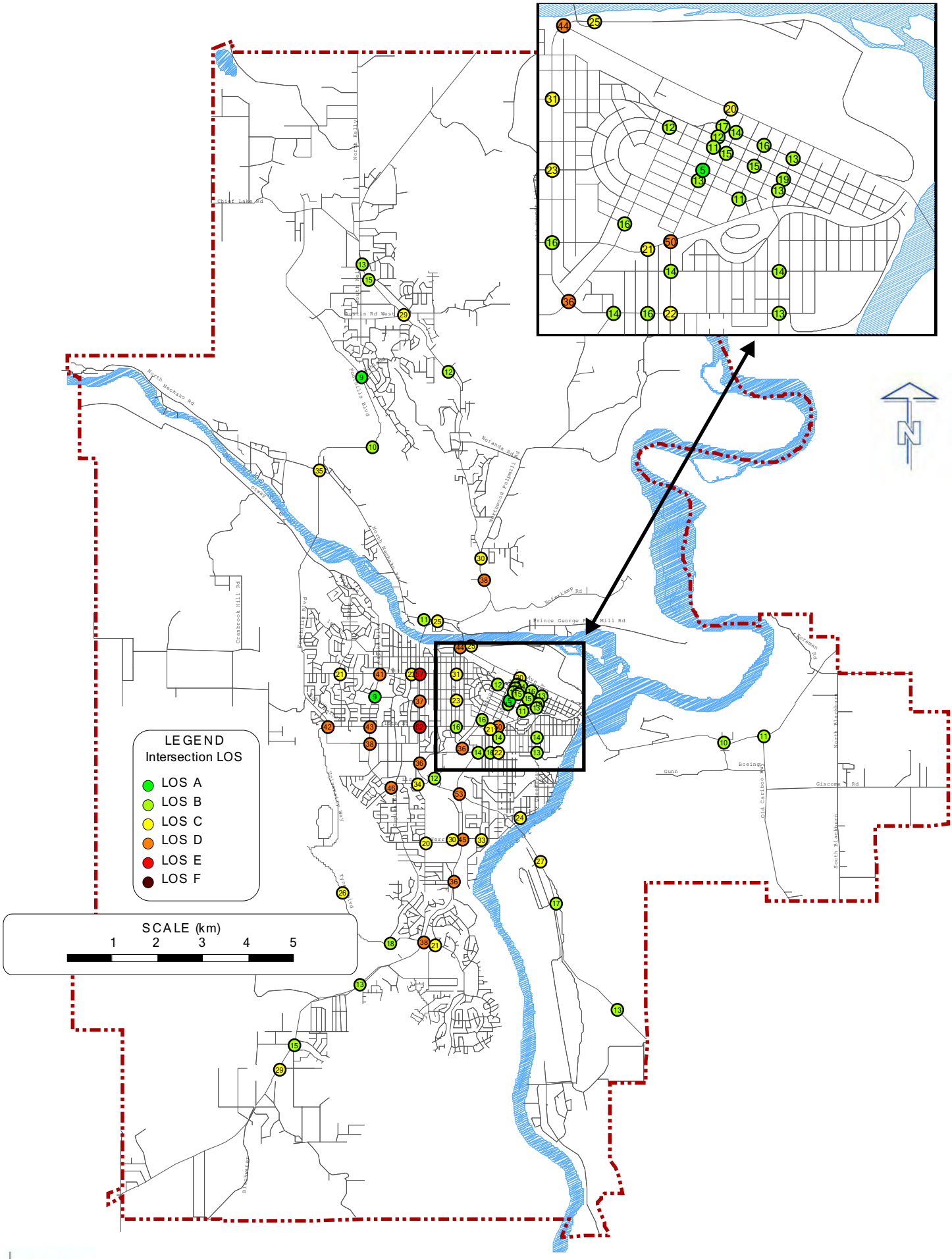
AECOM

Figure 6.23: 2026 Preliminary Referred Network



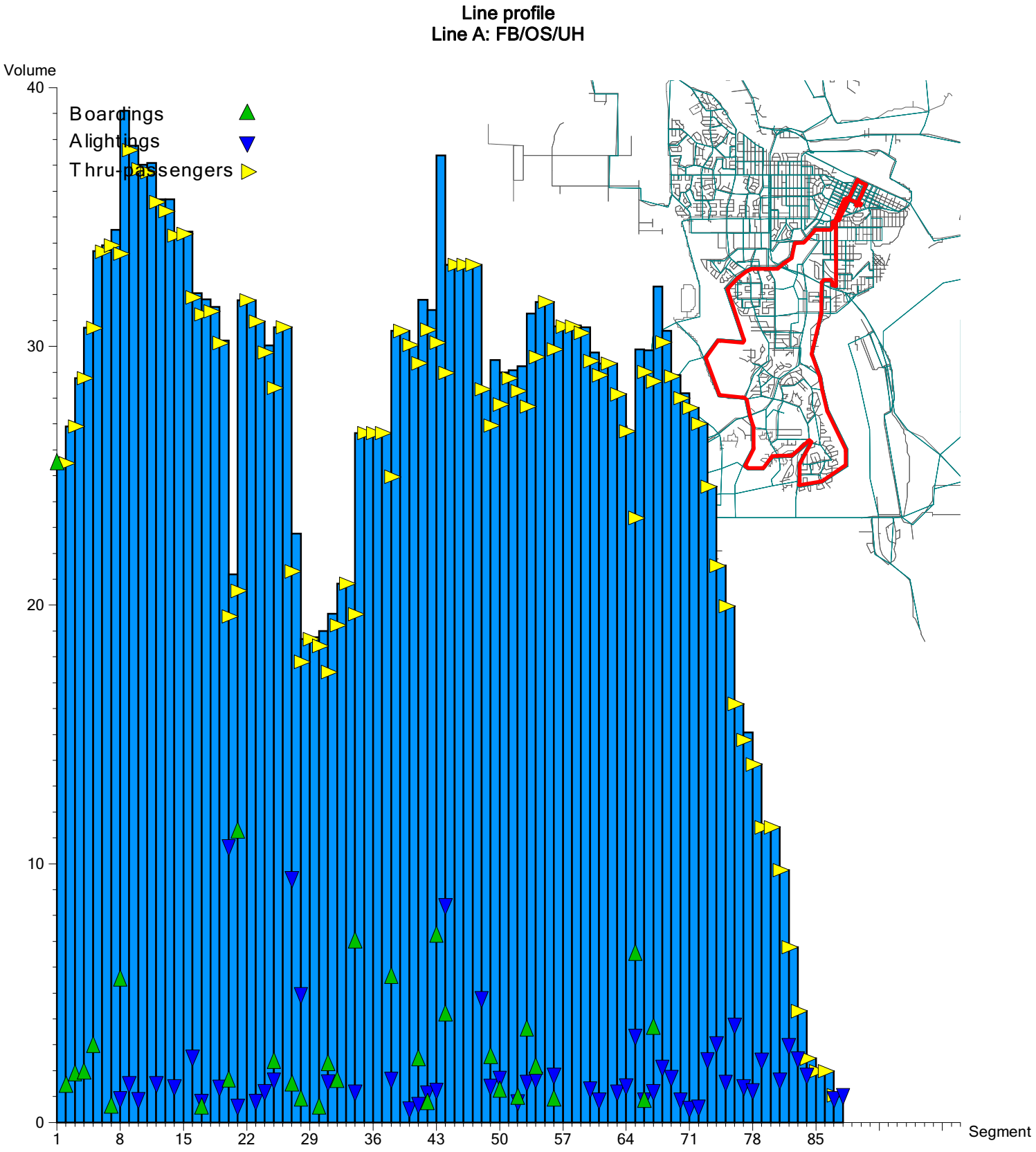
AECOM

Figure 6.24: 2026 Preliminary Preferred Network Auto Volume



AECOM

Figure 6.25: 2026 Preliminary Preferred Network Traffic Operation Conditions



AECOM

Figure 6.26: 2026 Transit Route "A" Profile and Passenger Volumes

7.0 Analysis of Network Issues

The Preliminary Evaluation focused on operational benefit of improvement projects to identify the Network improvement elements currently being considered by the City or the Ministry, and improvements identified specifically as part of this study to address each anticipated operational issue. This section documents the specific development-related and network issues identified in the study scope and work program.

7.1 Land Use Generated Issues

7.1.1 Fraser Bench Lands

What transportation improvements are required to accommodate this neighbourhood? Specifically, what will the development generated impacts be on Cowart Road, the proposed Cowart and Malaspina Avenue intersection, and the existing Highway 16/Cowart Road/Vance Road, and what improvements are necessary to mitigate the impacts? Will there be required improvements to the connections to Domano Boulevard?

On Cowart Road south of the intersection with the Lansdowne extension, the development generates approximately 400 vehicles per hour in the peak direction in 2016 and 2026. The forecast total volume is about 1,070 vehicles per hour in 2016 increasing to about 1,430 in 2026. On Cowart Road north of the Lansdowne extension, development traffic drops to about 150 vehicles per hour in the peak direction out of about 340 in 2016 and 140 vehicles per hour out of about 470 in 2026.

The most significant impact in 2016 on the Cowart/Malaspina intersection is to increase delay for eastbound traffic to 39 seconds with the proposed stop control and v/c ratio of 0.83. However, with the cumulative improvements proposed in the recommended 2016 network, the delay reduces to about 26 seconds with a v/c ratio of 0.71. In 2026, with the recommended network improvements, forecast delay for this movement is about 37 seconds with a v/c ratio of 0.82. This data suggests that signalization or other intersection improvements will not be required by 2026. However, AM peak hour conditions have not been analysed. Consequently, it is recommended that conditions at the intersection be monitored as development proceeds in order that improvement may be planned and implemented as and when required.

Development traffic contributes 190 vehicles per hour to the southbound left turn at Highway 16/Cowart-Vance in the 2016 base network. Without intersection improvement, this movement would be congested with v/c of 1.26 and vehicle delay of 1.97. The development also creates significant delay (greater than 4 minutes above free-flow conditions) with stop control at Cowart/Lansdowne extension. The impact on Domano is insignificant.

Signalization at Cowart/Lansdowne extension significantly increases volumes on Lansdowne but delay for traffic from Lansdowne Extension to Cowart remains greater than 1.5 minutes. The recommended directional ramp to grade separate north-south movements eliminates delays and all movements operate at close to free-flow speed. This improvement also diverts traffic from the congested Highway 16/Ferry and Highway 16/Cowart/Vance intersections and reduces delay to the southbound left turn to about 40 seconds in 2016 and about 45 seconds in 2026. A signal is also recommended at the intersection of Lansdowne/Ferry by 2016. The intersection satisfactorily accommodates forecast 2016 traffic volumes with the existing two-lane configuration on Ferry Avenue. However, by 2026, the intersection is overloaded without geometric improvements. The congestion at the intersection in 2026 can be eliminated by providing an additional through lane in each direction on Ferry Avenue. An improvement of

Ferry Avenue to a four-lane configuration from Highway 16 to Spruce Street has been included in the 2026 recommended network.

Beyond Highway 16 what is the impact of extending Cowart Road west under Highway 16 and through the existing neighbourhood to Wiebe Road, and further to Ferry Avenue (via the Pine Valley Golf Course)?

Extending Cowart west under Highway 16 to Wiebe and Ferry diverts about 210 southbound vehicles per hour and about 120 northbound vehicles per hour from Cowart Road at Highway 16 in 2016. Similar reductions are forecast for 2026. The extension would further reduce delays at the intersection by a modest amount. There does not appear to be a need for the underpass by 2026.

Will Cowart Road be able to sufficiently handle the additional traffic, and will there be induced/diverted trips from Malaspina Avenue to the new Malaspina Avenue Connector? What will be the impact of the Glen Lyon Way connection (St. Patrick Boulevard to Domano Boulevard) at Malaspina, and should this improvement be considered?

Subject to the intersection improvement at Lansdowne extension, Cowart Road appears able to accommodate forecast PM peak hour development generated traffic to 2026 without serious congestion. However, some channelization may be required at the Cowart/ Malaspina Connector intersection.

The Malaspina Connector is forecast to carry up to 350 vehicles per hour northbound and up to 630 vehicles per hour southbound in 2016 and up to 360 vehicles per hour northbound and 610 vehicles per hour southbound in 2026. In 2016 and 2026, about 300 vehicles per hour northbound and about 460 vehicles per hour southbound are generated by the development. In 2016, about 50 vehicles per hour and about 170 southbound vehicles per hour divert from other routes. In 2026 the diverted traffic volumes are about 60 vehicles per hour and about 150 vehicles per hour respectively.

The Glen Lyon Way connector is forecast to attract about 390 vehicles per hour westbound and about 200 vehicles per hour eastbound in 2016. These volumes increase to about 430 vehicles per hour and about 130 vehicles per hour respectively by 2026. Volumes generated by the proposed Fraser Bench development are negligible. However, this improvement is a required access for the Ospika South development and should be considered by 2016.

What transit routing may be required to support this area?

The Fraser Bench development does not generate significant transit passenger volumes. However, a minimum service to connect the development to downtown with 60-minute headway is desirable. Considering proposed developments in adjacent neighbourhoods, a new dedicated route with connection to downtown should be considered by 2016.

What is the potential for a Lansdowne Road connection to Ferry Avenue or Queensway Street, given that the connection faces strong topographic and environmental constrains as well as significant neighbourhood impacts? The connection will include the realignment of Lansdowne Road to align with Upland Street at the junction with Ferry Avenue.

As discussed earlier, the Lansdowne connection will divert significant volumes from Cowart Road and other north-south routes. A grade-separated directional ramp at Cowart and signalization at Lansdowne/Ferry are desirable by 2016 to maximize the benefit of the route and, in particular, to relieve the Highway 16 intersections.

7.1.2 University Heights

Will the development of University Heights contribute to the requirement for the Highway 16 and Ospika Boulevard interchange, as well as six-laning on Highway 16?

Forecast 2026 University Heights development generated traffic volumes using Highway 16/Ospika Boulevard interchange are about 700 vehicles per hour out of a total volume of almost 3140 vehicles per hour. The proposed interchange includes diamond-style ramps on all four quadrants, with loops inside the northwest and southeast quadrants to enable free left turn movements from Highway 16 eastbound to Ospika northbound, and from Highway 16 westbound to Ospika southbound. The interchange is clearly a desirable improvement by 2016 to accommodate heavy left turn movements. The University Heights Development and the anticipated population increase in other nearby developments contribute significantly to the need for the proposed interchange.

Other intersections on Highway 16 are congested in the 2016 base network with delay for several movements exceeding 1 minute and in one instance exceeding 2 minutes. University Heights traffic contributes to Highway 16 volumes at these intersections but not significantly. Widening Highway 16 to six lanes by 2016 and re-optimizing signal timings reduces these delays considerably although delays for westbound left turns would continue to exceed one minute at some intersections. In addition, the proposed Lansdowne extension to Cowart, also recommended by 2016, will divert much of the westbound left turn traffic away from the congested intersections on Highway 16.

Is the Massey Drive extension from Ospika Boulevard to Tyner Boulevard, and Tyner Boulevard to Highway 16 required?

These improvements are required to provide access to the development and therefore are included in the recommended 2016 Network. Massey Drive extension volumes to 2026 are about 1090 vehicles per hour southbound and 430 vehicles per hour northbound. Widening to four lanes should be considered by 2026.

Will a connection from Tyner Boulevard to Kueng Road, and/or from Tyner Boulevard to Kimball Road be required in the future to service development?

Forecast volumes using the Tyner Boulevard to Kueng Road connector are negligible. It is not required before 2026. Forecast volumes using the Tyner Boulevard to Kimball Road connector (Massey Drive Extension) are also negligible in 2016 but amount to about 350 vehicles per hour northbound and about 490 vehicles per hour southbound in 2026. This improvement is recommended to service the proposed development by 2016.

Will improvement/widening of Tyner Boulevard be required, and if so when?

Widening of Tyner Boulevard is not required by 2026. However, signalization of the Tyner Boulevard / Massey extension is recommended by 2026.

7.1.3 Ospika South

What improvements are required to the street network to accommodate this neighbourhood, and in particular, what is the required timing of the following proposed links:

Ospika Boulevard: Extension from Tyner Boulevard to Highway 16 (with a parclo design), Highway 16 to St. Lawrence Avenue, south to Glen Lyon Way, and ultimately to Parkridge Boulevard?

The extension of Ospika Boulevard to Highway 16, St. Lawrence Avenue and Glen Lyon Way are desirable to serve the new development by 2016. However, the extension to Parkridge Boulevard (Boundary Road) is forecast to carry a two-way volume of about 320 vehicles per hour and therefore is not required by this date. By 2026, the forecast two-way volume exceeds 480 vehicles per hour as traffic diverts from Domano Boulevard and a number of east-west routes. The extension is recommended for consideration by 2026 and has been included in the 2026 recommended network.

Parkridge /Boundary connector from Highway 16 to Highway 97 via new bridge crossing?

The Parkridge/Boundary connector will provide considerable relief to Highway 16 and delays for westbound left turn traffic at Highway 16 intersections at Highway 97 and Ferry Avenue. It would also significantly reduce east-west travel times to and from the airport and the industrial lands in the southeast section of the City. Forecast two-way traffic volumes are about 1,120 vehicles per hour in 2016 and 1,460 vehicles per hour in 2026. However, the connection is forecast to carry only 200-400 vehicles per hour west of Domano Boulevard in 2016. Eliminating the section of the proposed connector west of Domano reduces forecast volumes on the proposed bridge by about 25% in 2016. Consequently, the section of the proposed connector east of Domano, including the new bridge is recommended for construction by 2016 with the western extension to Highway 16 recommended for construction by 2026.

Connection to the Parkridge Boulevard to Domano Boulevard and the extension of Ospika Boulevard?

The connection to Domano Boulevard is a critical component of the first stage of the project recommended for construction by 2016. The extension of Ospika Boulevard would not be required until the proposed connector is extended west of Domano by 2026.

The initial phase of Glen Lyon Way from St Patrick Boulevard to Domano Boulevard, followed by the extension of Glen Lyon Way west to Highway 16 via Park Drive?

As stated earlier in the Fraser Bench section, there is little traffic need for the initial phase of Glen Lyon Way. However, traffic starts to fully utilize this section of Glen Lyon Way to access Ospika South after completion of Boundary/Parkridge with Domano connection. It is forecast to attract about 390 vehicles per hour westbound and about 200 vehicles per hour eastbound in 2016 and it has been included in the 2016 recommended network.

Glen Lyon Way west to Highway 16 via Park Drive?

The extension of Glen Lyon Way to Park Drive is not required in 2016 based on the current construction schedule for Ospika South. The proposed extension has been included in the recommended 2026 network based on the assumption that the Ospika South development will be completed by this date.

Marleau Road between Southridge Avenue and O'Grady Road, and well as St Lawrence Avenue to Henry Road Connector?

Marleau Road connector is forecast to attract less than 100 vehicles per hour in both horizon years. In addition, the intersection of Southridge/O'Grady operates satisfactorily in 2026. Therefore, the connection does not appear to be required by 2026. The proposed St Lawrence Avenue extension improves traffic circulation in the southern part of the City and should be constructed to complement the first phase of the Ospika South development. It has been included in the 2016 recommended network.

In addition, consideration will be given to the evaluation of both Glen Lyon Way and the St Lawrence Avenue to Henry Road Connector, to determine their ability to provide effective transit corridors without drawing through traffic from the major arterials.

Transit services on Glen Lyon Way and the St Lawrence to Henry Road connector appear to provide reasonable transit service without diverting significant volumes of general purpose traffic from other routes.

What is the impact of the development generated traffic on the Malaspina and Domano intersection, and what is the potential diversion of traffic to Domano Boulevard, and Cowart Road to Highway 16?

The Ospika South development has negligible impact on the Malaspina/Domano intersection. Similarly, the volume of development traffic diverted to Domano Boulevard, Cowart Road and Highway 16 is negligible.

7.1.4 Prince George Golf and Curling Club

If and when does Westwood Drive need to be four-laned between Ferry Avenue and Pine Centre Mall (Lorne Crescent)?

Westwood Drive is forecast to be uncongested to 2026. Widening to four lanes will not be required on traffic grounds in the medium term.

What is the timing and impact of the following:

Rec Place Drive and Wiebe Road Extension (west side connector, collector road with potential connection to Pine Centre Mall) from Range to Massey Drive? What will the connection option be (Pine Centre Mall via a frontage road, a connection to Highway 16 East, and/or Massey via an underpass under Highway 97)?

Rec Place Drive extension to Pine Centre Mall is forecast to carry a two-way volume greater than 670 vehicles per hour in 2016. It will be desirable to complete the project by 2016. The connection to Massey Drive via the proposed Highway 97 underpass is forecast to attract a two-way volume of about 430 vehicles per hour. It also would reduce left turns at Massey and the Pine Centre Frontage Road but does not significantly relieve congestion at the Highway 97/Highway 16 intersection. It does not appear to be justified by 2016.

Connecting to Highway 16 via the proposed underpass of Highway 97 is forecast to attract a two-way volume of about 540 vehicles per hour. This connection reduces left turns at Massey and the Pine Centre Frontage Road. However, it provides insignificant relief to the borderline congestion at the Highway 97/Highway 16 intersection. Consequently, neither underpass option is recommended for construction by 2016.

In 2026, without the underpass, the extension to Pine Centre Mall is forecast to carry a two-way volume of about 1010 vehicles per hour. The underpass connection to Massey Drive is forecast to attract a two-way volume of about 590 vehicles per hour. The underpass connection to Highway 16 is forecast to attract a two-way volume of about 760 vehicles per hour. Even with the improvement of Highway 16 six lane widening, the average vehicle delay at the Highway 97/Highway 16 intersection with neither underpass option is forecast to be 64 seconds. Delays for three movements are forecast to exceed 90 seconds and v/c ratios for these movements are greater than 1. The underpass connection to Massey

Drive has little effect on the operation of the intersection. The average delay is 63 seconds and the delays to the most congested movements are only marginally relieved. The underpass connection to Highway 16 reduces the overall delay to 57 seconds with three movements having delays between 80 and 100 seconds. Only one movement is forecast to have a v/c ratio greater than 1.

The underpass connection to Highway 16 is recommended for construction and was included in the recommended 2026 network. Further analysis of this option, indicates that optimizing the signal timing at the Highway 97/Highway 16 intersection based on forecast 2026 volumes could reduce average overall vehicle delay to 53 seconds (LOS "D") with no movement with v/c greater than 1 and no movement delay exceeding 80 seconds (LOS "E").

Testing of the alternate connection for Cowart Road at Vance Road as an underpass of Highway 16, with a connection to both Westwood Drive and Wiebe Road? (This configuration may support the development of the Fraser Bench area.)

This issue was addressed as part of the analysis of Fraser Bench and it is not recommended by 2026.

7.1.5 Wessner Heights

Austin Road is the major access into the area, with a connection at Foothills Boulevard. What links in the network are required for this area? Will an extension of Handlen Road from Heather Park Road to Foothills Boulevard be needed?

The roads proposed as part of the development plan operate satisfactorily. The development includes the Handlen Road extension. No additional links are required that are not part of the current development plan.

7.1.6 Woodlands/Genesis

What network connections are required to service the area, i.e. future arterials? Current thinking is the site will have its main access from Foothills Boulevard, with a connection to North Kelly Street.

Traffic volumes generated by the Woodland/Genesis development are modest — a two-way volume of about 300 vehicles per hour by 2026. The existing accesses to Foothills Boulevard and to Greenwood Street operate satisfactorily. No additional improvements are necessary.

7.1.7 BCR Lands

What public road improvements are required to accommodate the proposed future developments in this area, especially given the challenges of the close proximity of the rail line, multiple crossings required to access the area, and lack of public infrastructure? What will the impact be on adjacent public roads if the existing private roads are not available to service the BC Rail lands? Is there a need to dedicate the existing private Industrial Way link?

Willow Cale Road extension was assumed to be a 2-lane collector with only connection to Highway 97 via an overpass to Railway Avenue. No other connections from Willow Cale Road extension to Terminal or Continental Way were assumed. The Willow Cale Road extension is forecast to carry around 530 vehicles per hour in 2016 and is desirable by 2016 to provide an alternative access/egress to the proposed development. With this infrastructure in place, a delay of 120 seconds is forecast for the eastbound left turn at the intersection of Highway 97/Railway Road. Signal timing optimization of the intersection is recommended by 2016 and a dual left turn lane will be desirable by 2026. Since most of

the new development locates to the west of the railway tracks with access from Willow Cale Road Extension, existing public roads in this area are forecast to operate satisfactorily by 2026. However, because the roads of interest are highly localized, a separate Transportation Impact Study should be completed to confirm these recommendations.

What is the required timing and impact of the following proposed major city links:

Parkridge Boulevard Crossing of the Fraser River (Highway 16 to Highway 97 connector)?

Boundary Road Connection to new crossing (potential for a phased approach)?

Parkridge Boulevard Crossing and the Boundary Road Connector are desirable by 2016 to serve the BC Rail Lands and other developments, and are addressed as part of the Ospika South analysis.

Willow Cale Road extension by the City (connection to Boundary Road and Highway 97 via Railway Avenue)?

This issue was addressed above and it is recommended by 2016.

7.2 BC MoT Scope Elements

The following elements, as raised by BC MoT staff, have been included, but will require clarification and refinement, pending the availability of land use information:

7.2.1 Harper Valley

There is no growth in Harper Valley by 2016. The proposed Highway 97 to Foothills connection at Blueberry Road would attract less than 350 vehicles per hour by 2016. It is therefore not required in the medium term. In 2026, the proposed Blueberry connector would attract a two-way volume of about 1,250 vehicles per hour. It is also required to provide access to the Harper Valley development. It is included in the recommended 2026 network.

7.3 Road Network Issues

7.3.1 New Cottonwood Island Crossing

What is the timing of the Option 3B - Cottonwood Island Crossing, with a connection from River Road to PG Pulpmill Road?

The new Cottonwood Island Crossing is not required by 2016. Forecast two-way volumes are less than 200 vehicles per hour in 2016. In 2026, forecast volumes are about 420 vehicles per hour without Northwood Pulp Mill – PG Pulp Mill Connector.

If and when will the Northwood Pulp Mill – PG Pulp Mill Connector, extending from PG Pulpmill Road north through Hofferkamp Road, and terminating at Northwood Pulpmill Road at Noranda Road and or Old Summit Lake Road intersection(s), be required?

As noted above, the Cottonwood Island Crossing is not required by 2016. The Northwood Pulp Mill – PG Pulp Mill connector increases the forecast two-way volume using the proposed crossing to almost 800 vehicles per hour by 2026. In this option, the new crossing relieves congestion on, and on the approaches to, the Cameron Street and John Hart Bridges. The Cottonwood Island Crossing and Northwood Pulp Mill – PG Pulp Mill Connector are both recommended for construction before 2026.

7.3.2 Cameron Bridge

Examine a connection to Noranda/Old Summit Lake Road with the Cameron Street Bridge option to determine requirements and timing.

The Cameron Street Bridge is a committed project. This allows construction of the Cottonwood Island Crossing and Northwood Pulp Mill – PG Pulp Mill Connector to be delayed until after 2016.

7.3.3 River Road

Examine an overpass connection to the Lower Patricia Boulevard (Queensway Street to 1st Avenue/River Road), currently being evaluated in the Downtown Transportation Study.

The proposed overpass connection to Lower Patricia Boulevard is recommended for inclusion by 2016. It attracts approximately 800 vehicles per hour, relieves other roads in the immediate area, and reduces travel time.

7.3.4 Boundary Road Connector

The proposed development of the Airport industrial lands generates two-way volumes of about 1,000 vehicles per hour in 2026. The Boundary Road connection between Highway 97 S and Highway 16 E, as well as connections to Continental Way and Johnson Road are desirable to accommodate this traffic without conflicting with the Airport terminal traffic. It is therefore included in the recommended 2026 network. The proposed connection serves a primarily local function and the volume of external traffic with both origin and destination outside the City is negligible (less than 10 vehicles per hour in 2026).

8.0 Network Evaluation and MAE

The Preliminary Evaluation generated Preliminary Preferred networks for 2016 and 2026 based on the analysis of development-related and road network issues and associated intersection improvements. Major road improvements considered for the 2026 horizon were further tested using a full Multiple Account Evaluation (MAE) to develop a Recommended Network.

8.1 Network Evaluation Strategy

To assist the City in prioritizing options contained in the long-term preferred network, a combined network evaluation strategy was employed. The 2026 network was first tested against a "do-minimum" network, with economic results examined to determine if the network provided a positive benefit. Then each element in this network was tested individually with each element removed one at a time, and the economic results examined to ascertain if the option was beneficial and therefore should be retained in the network. This approach is reflected in the following sections where evaluation criteria for the network as a whole is provided together with criteria for each network element. The resulting recommended network for 2026 contains those elements which provide a network and economic benefit. Detailed information on the MAE is provided in Appendix E.

8.1.1 Multiple Account Evaluation Criteria

Using the MAE process, each option contained in the recommended network was evaluated using both quantitative and qualitative criteria, described below. The evaluation was divided into five main categories called accounts.

Financial Account

Capital Cost: Order-of-magnitude cost estimates were prepared using the Ministry of Transportation and Infrastructure "per metre" costs for road construction, "per square metre" costs for bridges and unit costs for traffic signals noted below. The estimates do not include costs for retaining structures, traffic control, engineering and contract administration, soil remediation, environmental mitigation or relocation of underground utilities. However, more accurate construction cost estimates were used where available.

Road:

- 2 Lane Low Volume Highway Construction
  - Easy Conditions $800,000/km
  - Medium Conditions $1,500,000/km
  - Difficult Conditions $2,000,000/km
- 2 Lane High Volume Highway Construction
  - Easy Conditions $1,400,000/km
  - Medium Conditions $2,200,000/km
  - Difficult Conditions $3,000,000/km
- 4 Lane High Volume Highway Construction
  - Easy Conditions $2,200,000/km
  - Medium Conditions $2,600,000/km
  - Difficult Conditions $10,000,000/km

Bridge:

- Low level River Crossings and Road Overpass Crossings:
  - Regions 1,2 $3,000/m^2
- High level River Crossings:
  - Regions 1,2 $4,000/m^2

Interchange:

- Rural Interchange $7,700,000/unit
- Urban Interchange $32,300,000/unit

Roundabout:

- Single Roundabout $200,000/unit

Traffic Signal:

- Capital Cost
  - Urban Traffic Signal $240,000/unit
  - Rural Traffic Signal $200,000/unit
- Maintenance
  - Urban Traffic Signal $3,100/unit
  - Rural Traffic Signal $3,100/unit

Property Cost: Property costs were calculated based on the assumptions listed below. Wherever possible an existing right-of-way was used for a new roadway. Unit costs were based on values contained within the 2001 study by land type, adjusted to reflect inflation between 2001 and 2007 using the Bank of Canada CPI index.

- Highway Commercial $120/m^2
- Highway Industrial $ 50/m^2
- Residential (single-family vacant residential lot) $ 45/m^2
- Vacant (with residential subdivision potential) $ 5/m^2
- Collector roads were based on 25 metres of right-of-way width
- Arterial roads were based on 37 metres of right-of-way width

Maintenance and Rehabilitation: These costs are proportional to the increase in lane-kilometres for each option. The values for unit costs were based on the Ministry of Transportation and Infrastructure's 2007 Cost Guide. Maintenance was $17,400 per lane-kilometre, and rehabilitation was $69,400 per lane-kilometre.

It was assumed that roads would be rehabilitated once every ten years. The costs associated with rehabilitating bridge decks were not specifically calculated, however the additional length of each structure was incorporated into the calculations for road maintenance and rehab purposes.

Revenues: Gas tax was considered as a form of revenue. It was estimated from the EMME model. Gas taxes were estimated from total vehicle-kilometres, which were converted to tax revenue using fuel consumption of 0.13-0.30 litres / kilometre depending on the travel speed (based on values for Greater Vancouver) and average taxes of $0.15 / litre (based on values for BC).

Salvage Value: Since the analysis period for the MAE is 20 years, but the proposed road improvements have a useful lifetime of longer than 20 years, there is still some of the initial investment left "unused" at the end of 20 years. This is referred to as the salvage value. It is calculated by first, taking the initial investment and expressing it as a series of equal annual payments, extending over the actual lifetime of the improvement, which can range from 40 to 100 years. Then, those annual payments which begin after 20 years, and continue to the end of the lifetime, represent the salvage value. For inclusion in the MAE, these are discounted back to the year of the initial investment. Road, major structures and property lifetimes were used to determine the salvage values for this study.

Customer Service Account

Travel Time, Operating Costs, and Accident Costs: These criteria were calculated using consumer surplus theory. The criteria calculates, travel time costs (or savings), out-of pocket costs associated with operating the vehicle and the cost of accidents resulting from a trip. Travel time savings were based on an assumed value of time of $9.1 per non-business person hour, $21.8 per business person hours, and $51.2 per truck hour. Operating costs were assumed at $0.125 per KM for private vehicles and $0.459 per KM for trucks.

Goods Movement: Improvements to truck routes were qualitatively assessed. If a network improvement provided a bypass versus travelling through the city or increased capacity across a major river crossing, the option was favorably evaluated.

Financial Summary

Costs: Costs were calculated by adding together all of the costs of the project, which included: capital costs, property costs and maintenance costs. From this total the revenues and salvage costs are subtracted, leaving the net cost that the road owner has invested.

Benefits: Project benefits were calculated by summing the travel time, vehicle operating, and accident reduction benefits.

Net Present Value: The net present value (NPV) is the value of the total benefits minus the total costs. The higher the NPV the better value the option provides. When a NPV is negative it means that the option has more costs than benefits. The NPV is the primary measure in assessing the net benefits of a project.

Benefit/Cost Ratio: The benefit/cost ratio was calculated as benefits divided by costs. It is thus a similar measure to NPV. A stronger option will have a higher B/C ratio. If the B/C ratio is less then 1.0 then the costs are greater than the measurable financial benefits.

Social/Community Account

Property Impacts: This category identified the number of full and/or partial properties that would be impacted by the improvement identified in the option.

Neighbourhood Impact: Impacts to neighbourhoods occur when an option either traverses residential properties or where traffic volumes through a neighbourhood are expected to significantly increase.

Community Plans : This account indicates whether an option enhances, supports or is contained within the Official Community Plan (2001) or Neighborhood Plans.

Economic

The Economic account assessed whether an option improved access to key commercial and industrial areas, thus stimulating the growth of business.

Environmental

Land Requirements: This category estimated the number of hectares required for specific improvements identified in each option.

Fuel and Emissions: The annual change in fuel and emissions is indicated by the number of vehicle-km and is calculated across the network. A negative number indicates that compared to the base network there is a reduction in fuel and emissions.

Wildlife Impacts: Wildlife impacts were assessed based on the severance of undeveloped lands and proximity to identified habitat areas.

Watercourses: This category indicates major river crossings, as well as crossings of fish-and non-fish bearing creeks and streams required to construct the improvement.

Agricultural Land Reserve: Impacts are noted where an improvement severed the ALR.

8.1.2 Network Findings

A summary of the MAE can be found in Table 8.1. Details regarding each option are provided below.

Option: Lansdowne Road Extension

Two alignment options were examined for the Lansdowne Extension between Cowart Road and Ferry Avenue. The two alignments share a common path from Cowart to the bend in Lansdowne; at the northern connection the original option retains the existing Lansdowne right-of-way. The Upland Realignment option swings the road to the east to permit a full intersection at Uplands Street, and thereby eliminating the Upland offset intersection on Ferry Avenue.

Highlights from the high level economic and MAE analysis are as follows:

- Both options off-load traffic from Highway 16 thus improving goods movement capabilities along the Highway.
- Neighbourhood impacts are considered high, as both options will increase traffic on existing roads in residential areas, as well as resulting in property impacts within an established neighborhood.
- The original alignment produced a NPV of $31.7 million and a Benefit/Cost ratio of 8.1, whilst the Upland realignment produces a NPV of $79 million and a Benefit/Cost ratio of 10.2.
- The ease or difficulty of constructing a new alignment up the bluffs, and of developing suitable intersections at either end of Lansdowne, is unknown.

The proposed Extension and Upland Realignment option was included in the future recommended network for its consumer and operational benefits. Additional detailed study of this option is required to determine if this improvement is feasible.

AECOM

Table 8.1: Multiple Account Evaluation of 2026 Recommended Improvements

Criteria	MAE	Unit	All	Element 1	Element 2	Element 3	Element 4	Element 5	Element 6	Element 7	Element 8	Element 9	Element 10	Element 11	Element 12	Element 13	Element 14	Element 15	Element 16	Element 17	Element 18	Element 19	Element 20	Element 21	Element 22
			3698	3611	3612	3621	3622	3623	3624	3631	3632	3641	3642	3643	3651	3671	3672	3673	3681	3682	3683	3684	3685	3686	3699
			2026 Preliminary Preferred	Lansdowne Extension and Upland Realignment	Lansdowne Extension	Massey Extension, Ospika to Tyner	Massey Extension, Tyner to Hwy 16W	University Way Extension	Cranbrook Drive	Ospika Extension, Tyner to Hwy 16W	Glen Lyon Extension, St Patricks to Domano	RecPlace connection to Pine Frontage	RecPlace connection to Hwy 16W	RecPlace connection to Athlone	Hwy 16 6-lane widening	Boundary, Hwy 16W to Domano	Boundary, Domano to Hwy 97S	Boundary, Hwy 97S to Hwy 16E	Blueberry Extension	Handlen Extension	Cottonwood Island Crossing	Northwood-PG Pulp Mill connection	Willow Cale Extension	Lower Patricia Connector	Foothills S Extension
Financial Account																									
Capital Cost	Cost estimate	$M	384.8	5.8	4.4	44.5	8.0	11.7	1.6	13.6	1.6	0.4	9.1	1.1	4.8	43.7	144.72	28.0	7.7	2.0	27.7	12.5	32.1	15.3	10.4
Property Cost	Calculated from hectares bought, unit cost	$M	69.2	0.9	0.4	5.5	4.3	5.3	0.9	0.7	0.1	0.3	0.4	1.3	0.9	4.2	2.3	6.4	4.3	1.2	0.0	0.5	6.0	0.4	1.3
Maintenance Cost	Calculated from new lane-km, unit cost	$M	4.0	0.0	0.0	0.3	0.3	0.2	0.0	0.0	0.0	0.0	0.0	0.0	0.3	0.2	0.2	0.3	0.2	0.1	0.0	0.2	0.2	0.1	0.3
Revenues	From gas tax	$M	-45.1	-3.7	-1.1	-1.8	-1.0	-0.7	-1.1	-1.9	-0.7	-0.4	-0.5	-0.6	-0.6	-1.0	-9.7	-4.2	-1.1	-0.1	-1.1	-1.1	-6.4	-0.9	-1.4
Salvage Value	Calculated from capital cost	$M	126.9	1.9	1.4	12.8	3.3	4.6	0.7	4.2	0.4	0.2	2.8	0.7	1.5	12.2	40.3	9.0	3.3	0.9	8.3	3.3	11.1	4.6	2.6
Customer Service Account																									
Value of Travel Time & Operating Cost Savings	Calculated using consumer surplus theory	$M	2627.3	84.1	35.3	56.1	42.9	16.9	31.4	28.8	7.3	19.6	9.9	11.9	28.0	30.8	318.6	87.3	23.7	3.0	28.2	27.2	299.4	41.7	26.4
Accident Cost Savings	Calculated using consumer surplus theory	$M	2.8	3.5	0.9	1.7	1.3	0.1	3.6	0.9	0.0	0.0	0.4	2.0	5.9	-1.6	-2.1	10.5	4.3	0.6	0.9	-0.7	24.9	0.8	1.1
Goods Movement	Based on improvements to truck routes		n/a	Fair	Fair	Fair	Fair	Fair	Fair	Good	Fair	Good	Good	Fair	Very Good	Good	Very Good	Good	Good	Fair	Good	Good	Very Good	Very Good	Fair
Net Present Value and Benefit / Cost Ratio																									
Net Present Value	Calculated from above accounts	$M	2253.9	79.0	31.7	18.5	34.0	3.6	31.9	17.7	5.3	18.8	3.1	11.6	28.8	-7.7	199.8	67.9	17.9	1.1	8.5	15.4	290.6	30.4	16.7
Benefit / Cost Ratio	Calculated from above accounts		7.0	10.2	8.1	1.5	4.3	1.3	11.6	2.5	3.7	24.1	1.4	5.9	6.7	0.8	2.7	3.3	2.8	1.4	1.4	2.4	9.6	3.5	2.5
Social / Community Account																									
Property	Number of full/partial property takings	No.	206	19	2	5	5	4	2	2	2	4	1	2	7	12	10	21	9	3	2	9	6	28	24
Neighbourhood Impact	Focused on residential areas		n/a	High	High	Low	Low	Low	Low	Low	Medium	High	Low	Low	Low	Low	Low	Low	Low	Medium	Low	Low	Low	High	High
Community Plans	Based on OCP work		n/a	Good	Good	Good	Good	Good	Good	Good	Good	Good	Good	Good	Low	Good	Good	Good	Good	Good	Good	Poor	Good	Good	Fair
Economic																									
Economic Development	Based on improved business access		n/a	Fair	Fair	Good	Good	Good	Poor	Good	Poor	Good	Good	Good	Good	Good	Good	Good	Fair	Poor	Good	Poor	Good	Fair	Fair
Environmental																									
Fuel	Annual Change in Fuel Consumed	kL	-21.1	-1.8	-0.5	-0.8	-0.5	-0.3	-0.5	-0.9	-0.3	-0.2	-0.2	-0.3	-0.3	-0.5	-4.6	-2.0	-0.5	-0.1	-0.5	-0.5	-3.0	-0.4	-0.7
Emissions	Annual Change in Veh-km	M	-84.3	-3.9	-1.3	-4.0	-2.5	-1.1	-3.1	-2.7	-0.9	-0.3	-0.1	-0.8	-1.0	-1.2	-19.5	-12.1	-3.6	-0.5	-1.5	-2.0	-17.9	-1.3	-3.0
Wildlife	Based on severance of undeveloped lands		n/a	None	None	Some	Some	Some	None	Some	Some	None	None	None	None	Some	Some	Traverses Ungulate territory	Adjacent to Ungulate territory	Some	None	Adjacent to Ungulate territory	None	None	None
Watercourses	Based on proximity to watercourses		n/a	In Flood Plain of Fraser River	In Flood Plain of Fraser River	Crossing non-fish bearing streams	Crossing non-fish bearing streams	Crossing non-fish bearing streams	None	Crossing non-fish bearing streams	Crossing non-fish bearing streams	None	None	None	None	Crossing fish bearing streams	Crossing non-fish bearing streams and Fraser River	Crossing non-fish bearing streams and Fraser River	None	None	Crossing fish bearing streams and Fraser River, in flood plain	Crossing non-fish bearing streams	None	In floodplain	Crossing non-fish bearing streams
Agricultural Land Reserve	Based on severance of ALR		n/a	None	None	None	None	None	None	None	None	None	None	None	None	None	None	None	None	None	Traverses ALR	Traverses ALR	None	None	None

While the results of the MAE indicate that the re-alignment option provides better benefits, there are significant issues associated with the entire alignment including, topographic concerns, issues with constructing through the Fraser River flood plain, OCP Riparian protection area and existing neighborhoods, property impacts including impact to the Lansdowne Wastewater Treatment Plant, all of which affect the constructability of the facility.

Option: Massey Extension: Ospika Blvd to Highway 16 (Ospika - Tyner and Tyner to Highway 16W)

The Massey Extension was tested in two discrete options: Ospika Boulevard to Tyner Boulevard, and Tyner Boulevard to Highway 16W. The first component extends Massey Drive from Ospika up the ridge to Tyner, the second extends from Tyner through the planned University Heights residential neighbourhood, terminating at Highway 16 near Westgate.

Highlights of the MAE are:

- Both options achieve good benefits, providing good access to the new University Heights development. The facilities result in traffic relief for Tyner Boulevard, Ospika Boulevard and Highway 16.
- Tyner to Highway 16 Option produced a NPV of $34 million and a Benefit/Cost ratio of 4.3, whereas the Ospika to Tyner Extension produced a NPV of $18.5 million and Benefit/Cost ratio of 1.5, largely due to the high cost of construction relative to the benefits generated.
- Both facilities are proposed within the University Heights Neighborhood Plan, and thus opportunities may exist to acquire the road right-of-ways through the land development process.
- Due to the challenging terrain, there are risks associated with the Massey Extension. Previous works indicates that the section from Ospika Boulevard to Tyner may be feasible as an arterial route with adequate grades. It should be noted that additional work would be required to clarify the impacts, including questions regarding slope stability and resulting costs associated with this option. In addition the link between Tyner and Highway 16 may potentially impact Lheidhi T'enneh Lands (subject to final treaty).

Both elements were included in the future recommended network for their consumer and operational benefits.

Option: University Way Extension

This option extends University Way southwards, continuing in a south-westerly manner to Highway 16 near Kimball.

Highlights of the MAE are:

- This option provides accessibility for the University Heights development. The facility is identified as a proposed future roadway in the University Heights Neighborhood Plan, and provides good travel time and accident savings.
- University Extension produced a NPV of $3.6 million and a Benefit/Cost ratio of 1.3, largely due to the cost of construction and property.
- While the option requires full/partial property takings, it is likely that road right-of-ways could be protected through land development process.

While this option was included in the recommended network given its inclusion in the University Heights NP, it is likely that it may be required to support the development of the neighbourhood, and not the overall network.

Option: Cranbrook Drive

This option connects University Way with the Massey extension, between Tyner Blvd and Highway 16.

Highlights of the MAE are:

- This option provides accessibility for the University Heights development, and is identified as a proposed future collector roadway in the University Heights Neighborhood Plan. The facility is forecast to provide good travel time and accident savings.
- Cranbrook Drive produced a NPV of $31.9 million and a Benefit/Cost ratio of 11.6
- While the option requires full/partial property takings, it is likely that road right-of-ways could be protected through land development process.
- The Option has relatively low environmental impacts with no watercourse crossings.

Based primarily on operational improvements and positive NPV, this option was included in the Recommended Network.

Option: Ospika Extension, Tyner to Highway 16W

This option extends Ospika Blvd southwards from Tyner to Highway 16 near Marleau Road with a new interchange. The proposed interchange includes diamond-style ramps on all four quadrants, with loops inside the northwest and southeast quadrants to enable free left turn movements from Highway 16 eastbound to Ospika northbound, and from Highway 16 westbound to Ospika southbound. This was originally included as a base element to service the South Ospika Neighbourhood from Tyner to Glen Lyon Way.

Highlights of the MAE are:

- The $13.6 Million capital cost estimate was provided by the City of Prince George, and produces a NPV of $17.7 Million, and a Benefit/Cost Ratio of 2.5." The facility provides good accessibility and traveler benefits for the future South Ospika Neighbourhood.

This option was included in the Recommended Network.

Option: Glen Lyon Extension, St Patrick to Domano

Identified in the South Ospika Neighbourhood Plan, this option extends from St Patrick Avenue to Domano Blvd and was originally included as a base element to service the future South Ospika Neighbourhood.

Highlights of the MAE are:

- This option provides a NPV of $5.3 million, with a Benefit/Cost ratio of 3.7
- The construction costs for this option was based on a on a functional design commissioned by the City, and is estimated at $1.6 Million.

Based primarily on operational improvements and positive NPV, this option was included in the Recommended Network.

Option: Access to Future Prince George Golf and Country Club (PGGCC) Lands:

The proposed re-development of the PGGCC lands includes three alternative connections: via Pine Street Frontage, via Highway 16W and via Athlone Avenue.

A comparison of the MAE results is provided below:

- All options achieve good benefits, indicating the value of a connection to the serviceability of the lands
- Pine Street Frontage option produced a NPV of $18.8 million and a Benefit/Cost ratio of 24.1 given the low property and capital costs, and the excellent connectivity proffered by the option. However, this option would have significant impacts on an existing commercial development. Resolution of these issues through consultation and negotiation with the affected business operators would be required before this option can be recommended.
- The Highway 16W connection includes an underpass connection, and produces a nominal NPV of $3.1 million and a Benefit/Cost ratio of 1.4, largely due to the high cost of construction. There are significant issues associated with this option including major geometric challenges such as spacing of ramps, grades, merging and sightline concerns. Furthermore, this option was not supported by the Ministry of Transportation and Infrastructure due to the impact on the highway..
- The Athlone Avenue option produced a NPV of $11.6 million and a Benefit/Cost ratio of 5.9. The link to Athlone was supported by a recent Traffic Impact Study by the City.

Based on the results of the evaluation and the position of the BC Ministry of Transportation and Infrastructure, it is recommended that only the Athlone Avenue option be included in the Recommended Network.

Option: Highway 16 6-lane widening

This option proposes the 6 laning of Highway 16 between Highway 97 and Cowart/Vance Road

Highlights of the MAE are:

- This option provides network relief and better traffic flow into the future with the future developments of the Fraser Bench and Ospika South neighborhoods.
- The option provided a NPV of $28.8 million with a Benefit/Cost ratio of 6.7.
- The construction costs, property acquisition, and land requirements are expected to be low, but potential impacts to the adjacent cemetery need to be quantified

Based primarily on the positive NPV and significant congestion relief the facility will provide, this option was included in the Recommended Network.

Option: Boundary Road

The Boundary Road Connector from Highway 16W to Highway 16E consisted of three discrete elements consisting of 2 lanes of arterial roadway: Highway 16W to Domano Boulevard, Domano Boulevard to

Highway 97S, and Highway 97S to Highway 16E. Highlights from the MAE analysis for each is presented below:

Highway 16W to Domano Boulevard: This option extends from Highway 16 W south of Leland Road to the southern end of Domano Boulevard.

Highlights from the MAE analysis are as follows:

- This option provides the least amount of benefit of the three components, with a NPV of -$7.7 million and Benefit/Cost ratio of 0.8, largely due to the high construction costs for the option.
- This option provides good connectivity and access to the planned Ospika South Neighborhood.

Domano Boulevard to Highway 97S: This option extends from the south end of Domano Boulevard eastward across the Fraser River to Highway 97 at/via Sintich Road, generally following the existing utility corridor.

Highlights from the MAE analysis are as follows:

- This option achieved the highest travel benefits of all the options, leading to a NPV of $200 million and a Benefit/Cost ratio of 2.7.
- Permits the staging of the Boundary Road between Highway 16 and 97.
- From an environmental perspective, the route crosses the Fraser River, Parkridge Creek and other smaller non-fish bearing streams, and the OCP Riparian Protection Area.

Highway 97S to Highway 16E. This option extends Boundary Road from Sintich Road northeastwardly connecting to Gunn Road and ultimately Highway 16. It provides access to the proposed Airport Light industrial development.

Highlights of the MAE are:

- This option provided a NPV of $67.7 million with a Benefit/Cost ratio of 3.3.
- The construction cost of this link (including lighting, sidewalk, and utilities) has been estimated at $28.0 Million in a recent preliminary design.
- Property acquisition and land requirements are significant.
- This route may impact ungulate wildlife habitat.

The connection of all three elements of Boundary Road:

- Provides a bypass and dangerous goods route for truck movements (as envisioned in the Prince George Dangerous Goods Route Study) between Highway 97 and Highway 16
- Increases the accessibility of major existing and planned industrial areas of the City including the Airport Lands.
- Provides a bypass route for traffic that does not need to traverse through the downtown to points north of the Nechako River.
- Collectively, the projects yield a very high NPV and B/C ratio.

Based primarily on the positive NPV and the understanding that this facility will benefit the future Airport Industrial lands, all three options were included in the Recommended Network.

Option: Blueberry Extension

This option extends Blueberry Road in a northwesterly manner from Highway 97 to Foothills Boulevard, with signalized intersections at each end.

Highlights of the MAE are:

- This option provides a NPV of $18 million with a Benefit/Cost ratio of 2.8.
- Construction and property costs are significant, but the option creates accessibility to the future Harper Valley development, as well as to points north on Foothills Boulevard.
- This route may impact a portion of ungulate wildlife habitat and may potentially impact Lheidhi T'enneh Lands (subject to final treaty).

Based primarily on the positive NPV, this option was included in the Recommended Network.

Option: Handlen Extension

This option extends Handlen Road west of Kelly Road in a northwesterly manner to Foothills Boulevard. The facility is expected to provide residential access to the future Wessner Heights neighborhood.

Highlights of the MAE are:

- The value of travel-time and accident savings were calculated to be nominal, suggesting that the route was seen to provide little to no perceived benefits to the road users of the network. This suggests that the facility is required to service development and provides little benefit to the overall network.
- This option provided a NPV of $1.1 million with a Benefit/Cost ratio of 1.4

Based on the nominal perceived benefit, this option was eliminated from further consideration, though it may still be constructed for land development purposes.

Option: Cottonwood Island Crossing

This option includes a new crossing of the Nechako River to provide two travel lanes, one in each direction, with junctions to River Road on the south side, and PG Pulp Mill Road north of the river.

Highlights of the MAE are:

- This option created a NPV of $8.5 million and a Benefit/Cost ratio of 1.4.
- Construction and property costs are estimated at approximately $28 million.
- The provision of additional capacity in this area would improve business access to the downtown core, however the upgrade of the Cameron Street Bridge may mitigate the need for a new crossing.

- The new route requires an additional crossing of the Nechako River.

Although the evaluation indicates appealing economic benefits, it appears that the link is duplicating the purpose of Cameron Street Bridge and may not be required by 2026. Consequently, this option was not included in the Recommended Network. However, it is recommended that the need for this improvement be monitored and re-evaluated in future network studies.

Option: Northwood-PG Pulp Mill connection

This option provides a new two lane collector facility extending northwesterly from the PG Pulp Mill Road to a connection to Noranda Road at Northwood Pulp Mill Road. The facility functions to provide a connection from the new Cottonwood Island Crossing to Highway 97.

Highlights of the MAE are:

- The facility provides good travel time savings for road users, resulting in a NPV of $15.4 million, and a Benefit/Cost ratio of 2.4
- The facility provides connectivity to the proposed Cottonwood Island Crossing, thereby increasing the attractiveness of the facility and providing an alternate bypass route to Highway 97, while increasing accessibility for industrial lands in the Northwest parts of the City.
- The facility traverse through large areas of undeveloped lands, several non-fish bearing streams, and has the potential to impact a portion of ungulate wildlife habitat and the ALR.

The option serves little useful purpose unless the Cottonwood Island Crossing is constructed. Consequently, this option was not included in the Recommended Network. However, it is recommended that the need for this improvement, together with the proposed Cottonwood Island Crossing, be monitored and re-evaluated in future network studies.

Option: Willow Cale Extension

While the extension of Willow Cale Road northwards is provided as a base network required to facilitate the development of the BCR lands, an option was tested to examine a possible northern access. This option is proposed to provide an extension of the Willow Cale Road eastwardly via an overpass of the railyard to connect to Railway Road. The facility functions to provide another access to the BCR lands west of the railway track and would serve to facilitate goods movement associated with the inland port.

Highlights of the MAE are:

- This option created a NPV of $291 million and a Benefit/Cost ratio of 9.6.
- Construction and property costs are estimated at approximately $38 million.
- The new overpass and provision of additional capacity in this area would improve goods movement access and viability of the inland port.
- The new route does not appear to have any significant environmental impacts.

Based on the results of the evaluation, this option was included in the Recommended Network. However, this option requires detailed consultation with the Ministry of Transportation and CN Rail, as well as more study to determine the feasibility of construction.

Option: Lower Patricia Connector

This option proposed a connection to Patricia Boulevard crossing Highway 16 via a new overpass to River Road. As the preliminary results indicated the attractiveness for this route as an alternative route to Downtown, River Road and the Yellowhead Bridge, the option was included for high level testing.

Highlights of the MAE are:

- This option provided a NPV of $30.4 million and a Benefit/Cost ratio of 3.5.
- The route provides improved goods movement opportunities particularly between CN's Prince George Intermodal Yard, which is expected to see an increase in container capacity and throughput, and major transportation facilities.
- Constructability may be impacted as the facility would be in Fraser River flood plain. There are also severe geometric challenges connecting Lower Patricia safely to Queensway in the middle of a curve on a steep grade
- There are significant community impacts and there will likely be considerable public opposition to the proposed construction.

While this option provided network benefits, the constructability concerns and the community impacts led to its exclusion from the Recommended Network.

Option: Foothills South Extension

The Foothills Extension connects 18th Avenue to Ferry Avenue along the bottom of Cranbrook Hill, and completes an arterial road connection at this western part of the City.

Highlights of the MAE are:

- Based on a functional design of this alignment, the construction cost is estimated to be $10.4 Million.
- This option provided an NPV of $16.7 Million, and the Benefit/Cost Ratio is 2.5.
- Results indicate that the extension will be well-used and will divert traffic from Ospika Boulevard. Automobile travel times from Hart Centre to Westgate Exchange reduce by approximately 1 minute.

This option was added to the Recommended Network.

8.1.3 2026 Recommended Network

The 2026 Recommended Network incorporates the following improvements to the existing provincial and municipal road network, and is illustrated in Figure 8.2:

- Lansdowne Extension and Upland Realignment
- Massey Extension, Ospika to Tyner
- Massey Extension, Tyner to Highway 16W
- University Way Extension
- Cranbrook Drive
- Ospika Extension, Tyner to Highway 16W
- Glen Lyon Extension, St Patricks to Domano
- RecPlace connection to Athlone
- Highway 16 6-lane widening
- Boundary, Highway 16W to Domano
- Boundary, Domano to Highway 97S
- Boundary, Highway 97S to Highway 16E
- Blueberry Extension
- Willow Cale Extension
- Foothills South Extension

The capital cost of the above projects is estimated at $359 million. The NPV of the recommended 2026 major road improvements is estimated at $816 million. The overall benefit/cost ratio of the recommended improvements was estimated at 3.4. The rate for individual projects range between 0.8 for Boundary Road (Hwy 16 - Domano) and 11.6 for Cranbrook Drive.

In addition to the major network improvements above, the following additional links would provide access to the identified development areas, and complete the network connections:

- Continental Way Extension to Boundary (Airport Logistics Park)
- Malaspina Extension to Cowart (Fraser Bench)
- Ospika Blvd, Hwy 16W to Boundary Road (Ospika South)
- Glen Lyon, Hwy 16 to St Patrick (Ospika South)
- Westgate Extension to Glen Lyon (Ospika South)
- Southridge, St Lawrence to Glen Lyon (Ospika South)
- St Lawrence, Domano to Hwy 16/Henry (Ospika South)
- Wiebe Extension, Range to Ferry/Rec Place (PGGCC)

A number of improvements were omitted from the 2026 network, but are consistent with the Prince George Major Street Network Plan. The following links would consequently be candidate projects beyond the 20 year horizon:

- Handlen Extension to Foothills
- Tyner Extension to Keung
- Marleau Connection, Southridge to O'Grady
- Nechako River Crossing at Cottonwood Island
- Northwood-PG Pulpmill Connector
- Noranda Extension to Hart Highlands

The only identified transit improvement was the potential for a route in 2016 to the Ospika South, Fraser Bench, and University Heights neighbourhoods.

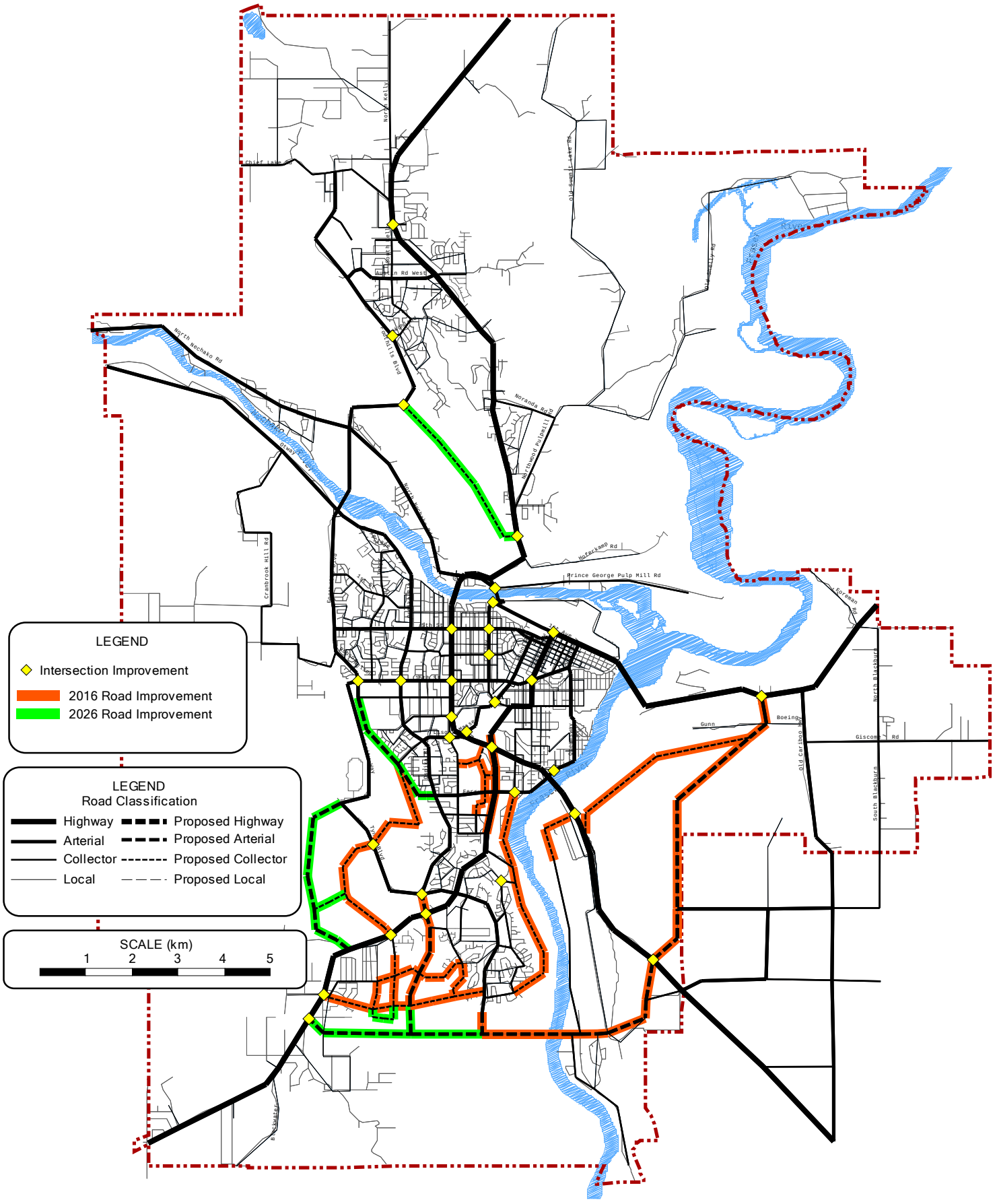


Figure 8.1: 2026 Recommended Network

9.0 Follow Up Analysis & Next Steps

The upgrade of the Prince George Transportation Model provides the City with a powerful tool by which to examine transportation demands and priorities within the City resulting from large-scale development projects.

It is recommended that the following activities be undertaken to build on the work documented in this study:

- **Development of Morning Peak Hour Model -** As the model is built on the basis of the afternoon peak hour only, there is opportunity to develop an AM Peak hour model to complement the PM peak hour model. This will allow more comprehensive operational and MAE analysis of network elements.
- **Travel Demand Management** – The model is built and calibrated on the basis of a generalized cost, which is a function of travel times and out of pocket costs and is represented in the model as time units (minutes). A significant increase in fuel costs may encourage trip-makers to make fewer and/or shorter trips while a major highway improvement may encourage more and longer trip-making. With the cost of petroleum forecast to exceed $1.50/L in the near future, a review of what the future generalized cost may be would be appropriate. As noted in the model documentation report, the effect of this exponent on elasticity on a 5% increase in the base year auto generalized cost because of (say) a 15% increase in vehicle fuel costs would be to reduce the travel demand between affected zones by approximately 2%. Therefore this coefficient could be reviewed and adjusted in future model upgrades as more comprehensive data becomes available.

The calibration of the EMME model should be updated within five years, reflecting updated data collected by the City.

Appendix A
Base Year Demographics

Zone	Parking	Employment				Population									Education (FTEs)			Area
	($)	Retail	Industry	Other	Total	Age 0-4	Age 5-12	Age 13-17	Age 18-24	Age 25-44	Age 45-64	Age 65+	Total	Empld. Age 15+	Elemen-tary	Secon-dary	Post Sec.	(ha)
101	0	0	9	9	17	23	45	42	48	105	138	20	420	224	0	0	0	418
102	0	0	0	0	0	3	8	8	9	19	30	4	80	45	0	0	0	404
103	0	0	3	0	3	4	6	4	5	16	16	5	54	28	0	0	0	267
104	0	0	24	0	24	15	24	15	18	63	62	19	216	114	0	0	0	1,147
105	0	0	0	0	0	15	26	23	27	58	63	10	220	113	0	0	0	301
106	0	58	26	53	137	9	22	19	18	51	60	18	197	105	0	966	0	163
107	0	47	29	38	115	15	24	15	18	63	62	19	216	114	0	0	0	178
108	0	0	0	0	0	2	2	4	4	16	22	6	56	35	0	0	0	506
109	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	974
110	0	16	11	30	57	9	22	19	18	51	60	18	197	105	400	400	0	97
111	0	3	6	11	21	24	54	32	37	108	75	18	348	172	355	0	0	36
112	0	116	26	88	230	17	38	29	31	77	94	43	327	175	0	0	0	54
113	0	91	14	48	154	27	49	36	39	117	98	27	392	200	0	0	0	50
114	0	15	79	57	152	77	132	97	108	383	289	89	1,175	618	145	0	0	320
115	0	0	0	48	48	11	18	12	14	47	47	14	162	85	52	0	0	1,017
116	0	0	1,078	0	1,078	1	1	1	1	4	6	2	14	9	0	0	0	1,112
117	0	5	0	11	16	17	50	34	35	81	183	34	434	235	0	0	0	265
118	0	2	0	13	15	31	64	44	58	149	225	74	644	352	0	0	0	134
119	0	6	32	20	59	49	119	94	115	239	332	55	1,002	534	0	0	0	194
120	0	0	60	13	72	32	73	52	66	178	182	40	622	331	0	0	0	180
121	0	13	99	20	132	18	36	24	26	74	83	25	286	148	0	0	0	120
122	0	6	15	35	56	26	78	65	70	162	268	119	786	438	190	0	0	215
123	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	501
124	0	37	63	5	105	34	60	46	62	197	186	57	640	350	0	0	0	113
125	0	21	45	27	93	36	81	46	53	206	247	84	752	411	0	0	0	989
126	0	53	135	126	314	5	14	11	12	29	47	21	139	77	0	0	0	116
127	0	64	365	93	522	0	0	0	1	2	3	1	7	4	0	0	0	189
128	0	0	180	0	180	9	18	12	14	57	81	29	221	126	0	0	0	317
129	0	0	451	0	451	1	1	1	1	4	6	2	14	9	0	0	0	579
130	0	0	17	0	17	14	27	20	23	70	86	32	270	147	0	0	0	1,897
131	0	0	17	0	17	2	3	2	3	8	10	4	30	16	0	0	0	626
132	0	11	16	38	64	10	65	38	52	124	138	16	442	234	0	0	0	68
133	0	0	0	1	1	31	64	45	49	150	144	36	518	269	0	0	0	46
134	0	8	9	37	54	46	92	102	121	262	341	86	1,050	585	420	725	0	52
135	0	0	42	53	95	32	68	40	37	135	99	41	450	221	0	0	0	14
136	0	31	3	34	68	16	27	17	37	60	58	14	229	120	252	0	0	10
137	0	7	60	178	245	67	112	86	169	370	240	110	1,154	623	305	0	0	41
138	0	10	14	0	24	21	29	17	37	113	108	47	371	210	235	0	0	32
139	0	85	16	66	166	65	80	61	145	323	256	107	1,037	580	0	0	0	33
140	0	113	490	147	751	0	0	0	1	2	3	1	7	4	0	0	0	72
141	0	44	123	62	229	2	2	2	3	10	11	4	34	20	0	0	0	22
142	0	34	27	15	76	12	19	16	19	66	60	105	297	174	0	0	0	10
143	0	43	122	62	226	0	0	0	1	2	3	1	7	4	0	0	0	11
144	0	129	730	185	1,044	0	0	0	1	2	3	1	7	4	0	0	0	259
145	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	703
146	0	1	5	17	23	23	42	31	47	128	128	116	514	292	0	0	0	21
147	0	16	8	52	75	27	40	33	56	123	113	31	423	229	0	470	0	29
148	0	281	17	119	416	46	90	58	132	230	170	119	844	458	0	0	0	38
149	0	16	13	49	78	40	37	33	101	203	155	54	622	358	0	0	0	23
150	0	62	9	42	112	40	56	32	71	181	157	92	628	346	0	0	0	25
151	0	14	51	542	607	2	2	2	4	10	15	29	62	39	0	0	0	11
152	0	16	8	286	310	8	17	13	23	72	60	45	238	139	0	0	0	10
153	0	216	148	237	601	1	4	4	5	19	17	13	63	38	0	0	0	9
154	0.95	216	148	710	1,074	0	1	1	1	6	6	2	18	11	0	0	0	7
155	0.95	108	74	355	537	0	1	1	1	4	5	2	13	8	0	0	0	5
156	0.95	81	81	266	428	0	1	1	1	6	6	2	18	11	0	0	0	4
157	0	19	183	28	230	0	0	0	1	2	3	1	7	4	0	0	0	10
158	0	0	51	31	82	2	3	3	3	10	7	2	29	16	0	0	0	374
159	0	0	0	0	0	2	3	3	3	10	7	2	29	16	0	0	0	254
160	0	0	0	0	0	6	9	6	7	22	25	5	81	42	0	0	0	2,342
161	0.71	38	14	484	535	3	6	4	5	16	19	7	60	33	0	0	2,275	347
162	0	109	0	449	558	0	0	1	4	4	2	1	11	6	0	0	0	129
163	0	0	0	10	10	18	36	21	25	83	59	14	255	127	0	0	0	16
164	0	73	221	79	373	1	1	2	11	11	5	2	32	19	0	0	0	28
165	0	269	539	288	1,097	1	2	2	15	14	6	2	42	26	0	0	0	21
166	0	56	0	34	90	45	63	62	104	152	120	97	642	343	0	0	0	32
167	0	0	0	68	68	5	5	3	6	16	24	8	67	37	0	1,284	0	68
168	0	67	5	16	88	18	17	20	44	117	84	66	366	215	0	0	0	13
169	0	108	94	47	249	59	78	52	148	227	136	18	717	376	0	0	0	14
170	0	164	0	87	251	26	28	17	40	102	131	46	388	219	201	0	0	47
171	0	75	8	130	213	7	17	10	36	59	65	38	232	136	223	0	0	19
172	0	31	39	23	93	68	94	77	95	268	281	115	999	538	0	0	0	31
173	0	27	31	37	95	39	38	24	53	178	132	80	543	305	0	0	0	48
174	0	20	9	33	61	18	29	22	38	96	94	43	340	189	0	0	0	23
175	0	11	69	20	100	9	18	16	19	57	42	12	173	94	0	0	0	510
176	0	8	69	27	104	40	107	72	90	304	280	70	963	524	0	0	0	836
177	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	489
178	0	11	7	30	48	41	56	38	41	126	140	14	455	227	0	0	0	168
179	0	10	2	12	24	44	85	67	97	228	227	63	809	436	0	0	0	17
180	0	2	2	5	8	6	12	8	19	43	43	23	153	87	0	0	0	24
181	0	13	6	14	33	36	84	50	63	205	167	95	701	369	0	0	0	30
182	0	14	6	5	25	30	55	34	74	151	131	26	503	270	0	0	0	28
183	0	5	3	13	21	64	99	59	93	256	273	70	914	483	0	0	0	68
184	0	363	5	142	510	1	2	2	2	5	6	2	21	11	0	0	0	75
185	0	309	0	20	330	1	2	2	2	5	6	2	21	11	0	0	0	30
186	0	5	0	23	28	23	30	23	44	117	109	50	397	223	0	0	0	40
187	0	110	27	87	224	41	57	40	63	163	180	84	627	342	0	0	0	120
188	0	17	301	11	330	0	0	0	0	0	0	0	0	0	0	0	0	178
189	0	34	603	23	660	0	0	1	2	2	21	19	46	30	0	0	0	103
190	0	0	0	0	0	2	3	3	3	10	7	2	29	16	0	0	0	828
191	0	43	51	51	145	2	3	3	3	10	7	2	29	16	0	0	0	581
192	0	8	17	27	52	10	25	18	16	72	75	10	224	121	425	0	0	678
193	0	5	21	24	50	8	18	14	16	49	43	10	158	84	217	0	0	575
194	0	0	0	7	7	6	15	12	13	41	34	6	128	68	0	0	0	147
195	0	11	0	18	29	83	141	83	95	346	327	86	1,160	599	261	0	0	120
196	0	114	39	266	419	26	54	30	26	122	74	18	350	172	0	0	0	80
197	0	5	14	61	80	93	205	115	116	431	418	75	1,453	737	0	0	0	229
198	0	21	41	46	108	66	121	105	106	295	355	53	1,100	583	352	0	0	81
199	0	7	27	62	96	43	69	48	64	189	183	32	628	331	0	0	0	76
200	0	43	531	28	602	0	0	0	0	0	0	0	0	0	0	0	0	228
201	0	17	452	11	481	0	0	0	1	1	6	6	13	9	0	0	0	367
202	0	0	25	0	25	44	95	58	59	218	236	70	779	412	0	0	0	1,019

203	0	0	20	0	20	12	27	20	20	67	88	26	259	141	0	0	0	939
204	0	0	21	24	45	13	30	25	26	83	68	13	255	136	0	0	0	303
205	0	0	0	0	0	33	65	35	35	143	132	29	471	237	201	0	0	823
206	0	0	15	0	15	0	0	0	0	0	0	0	0	0	0	0	0	1,226
207	0	21	341	14	376	0	0	1	2	1	15	14	33	22	0	0	0	108
208	0	17	603	11	631	0	0	0	0	0	3	3	7	4	0	0	0	144
209	0	0	25	0	25	16	35	22	21	80	87	25	287	151	0	0	0	1,496
210	0	0	25	0	25	27	59	43	43	144	188	55	559	304	0	0	0	1,318
301	0	0	1	1	2	21	41	28	30	97	95	24	334	173	0	0	0	553
307	0	4	3	3	10	70	123	85	91	341	299	128	1,137	603	0	0	0	681
310	0	3	2	5	10	15	36	30	29	82	97	32	320	171	0	0	0	14
311	0	2	4	8	14	32	64	41	28	144	112	21	441	216	0	0	0	20
313	0	30	5	16	51	38	66	41	33	150	121	27	475	234	0	0	0	29
314	0	4	20	14	38	4	8	5	6	17	19	6	64	33	0	0	0	114
318	0	3	0	19	23	28	56	38	52	135	193	68	568	311	0	0	0	167
320	0	0	60	13	72	8	18	13	16	45	46	10	156	83	0	0	0	93
324	0	86	146	11	244	22	44	23	26	106	82	16	318	161	0	0	0	63
333	0	0	0	1	1	28	77	51	54	148	176	32	564	291	0	0	0	72
334	0	17	18	73	108	47	91	74	95	266	253	91	917	500	0	0	0	35
335	0	0	48	60	108	19	56	43	47	145	211	65	585	331	0	0	0	44
336	0	37	4	40	81	39	68	41	91	145	143	35	561	291	0	0	0	16
337	0	0	4	13	18	29	61	51	60	121	160	76	557	298	0	0	0	42
346	0	0	1	4	6	22	57	33	48	144	144	58	504	272	0	0	0	20
347	0	12	6	41	60	42	62	51	68	177	168	71	638	344	0	0	0	46
348	0	168	10	71	250	30	63	42	80	135	120	50	520	276	335	0	0	23
349	0	10	8	29	47	35	39	31	75	167	131	56	534	300	0	0	0	22
350	0	123	18	83	225	35	58	52	114	198	116	61	634	348	211	0	0	20
351	0	14	51	542	607	20	29	19	36	106	92	88	390	223	0	883	0	21
352	0	6	3	114	124	7	15	12	20	65	53	43	214	126	0	0	0	10
353	0	108	74	118	300	2	4	3	5	16	14	8	52	30	0	0	0	3
354	0.95	162	111	532	806	0	1	1	1	6	6	2	18	11	0	0	0	8
355	0.95	81	56	266	403	0	1	1	1	4	5	2	13	8	0	0	0	4
356	0.95	81	81	266	428	0	1	1	1	4	5	2	13	8	0	0	0	4
357	0	32	304	46	383	0	0	0	1	2	3	1	7	4	0	0	0	20
363	0	0	0	27	27	30	62	38	46	143	104	23	445	223	190	0	0	18
364	0	147	441	157	745	1	1	1	8	7	3	1	21	13	0	0	0	13
365	0	220	441	236	897	1	1	2	11	11	5	2	32	19	0	0	0	21
366	0	90	0	54	144	15	24	18	58	115	145	75	450	269	0	0	0	21
368	0	67	5	16	88	12	11	13	30	78	56	44	244	144	0	0	0	11
369	0	58	51	25	134	35	41	23	40	101	93	29	362	184	0	0	0	19
370	0	41	0	22	63	52	110	57	74	243	187	64	787	399	0	0	0	25
371	0	45	5	78	128	9	18	12	37	71	79	41	266	157	0	0	0	31
372	0	93	117	70	280	26	41	33	46	116	130	64	456	251	0	0	0	29
373	0	18	20	25	63	19	19	12	27	90	66	40	273	154	0	0	0	16
374	0	20	9	33	61	23	25	23	35	105	120	49	379	214	0	0	0	70
379	0	19	5	25	49	32	60	50	82	172	160	35	590	319	0	0	0	22
381	0	30	14	33	78	37	51	35	39	135	103	33	432	219	0	0	0	15
382	0	22	9	7	37	49	74	49	125	266	221	101	885	494	0	0	0	33
383	0	5	3	13	21	16	26	16	22	64	72	30	246	132	0	0	0	36
384	0	444	6	173	624	1	2	2	2	5	6	2	21	11	0	0	0	12
385	0	133	0	9	141	1	2	2	2	5	6	2	21	11	215	450	0	11
386	0	11	0	54	65	22	52	44	51	137	129	59	493	268	233	0	0	42
394	0	0	0	17	17	9	18	13	15	47	57	21	180	98	0	0	0	353
395	0	9	0	16	26	55	92	44	51	225	189	53	708	361	0	0	0	128
396	0	38	13	89	140	45	121	84	88	243	225	50	855	437	0	0	0	66
397	0	5	14	61	80	25	67	41	41	134	137	27	471	241	390	0	0	29
398	0	17	34	38	88	93	131	85	107	353	346	51	1,166	608	0	879	0	177
399	0	5	19	44	68	91	138	74	115	416	254	45	1,132	581	0	0	0	49
401	0	0	12	12	24	24	44	24	25	102	75	27	321	160	165	0	0	56
407	0	34	21	28	83	21	53	35	42	126	119	46	441	235	0	0	0	51
413	0	152	24	80	256	81	162	102	118	397	356	88	1,304	676	0	0	0	152
433	0	6	2	16	24	27	51	28	29	118	91	21	364	181	0	0	0	21
434	0	8	9	37	54	3	6	4	6	17	17	16	69	39	0	0	0	18
435	0	0	30	38	68	100	133	80	127	310	155	30	935	446	0	0	0	21
436	0	56	6	60	122	16	26	20	39	70	64	16	250	134	0	0	0	12
437	0	2	21	64	88	14	15	9	18	54	35	19	165	87	0	0	0	16
446	0	2	13	42	56	25	35	28	72	135	120	40	455	256	340	0	0	24
447	0	34	17	114	164	46	87	52	63	236	220	98	801	428	0	0	0	8
448	0	112	7	47	166	32	46	38	147	154	120	82	618	354	0	0	0	21
449	0	6	5	19	31	11	17	15	30	68	63	30	233	134	0	0	0	11
450	0	62	9	42	112	14	22	14	29	80	73	44	276	156	0	0	0	11
451	0	19	69	722	810	18	22	18	38	104	126	188	513	312	0	0	0	17
452	0	10	5	171	186	6	9	10	17	50	61	104	256	158	0	0	0	9
453	0	162	111	177	451	0	1	1	1	4	5	2	13	8	0	0	0	5
454	0.95	162	111	532	806	0	1	1	1	4	5	2	13	8	0	0	0	7
455	0.95	108	74	355	537	0	1	1	1	4	5	2	13	8	0	0	0	5
456	0.95	162	162	532	857	0	0	1	1	3	3	1	9	5	0	0	0	3
457	0	13	122	19	153	0	0	0	1	2	3	1	7	4	0	0	0	18
463	0	0	0	12	12	32	51	41	65	190	178	49	605	335	0	0	0	20
464	0	147	441	157	745	1	1	2	11	11	5	2	32	19	0	0	0	20
466	0	79	0	47	126	5	11	11	15	28	35	28	133	76	0	0	0	11
471	0	120	13	208	341	4	10	6	21	35	39	22	138	81	0	0	0	11
473	0	46	51	62	158	27	24	18	31	115	98	55	366	205	0	0	0	27
474	0	39	17	65	121	8	8	8	12	35	40	16	126	71	0	0	0	9
479	0	19	5	25	49	15	22	20	31	68	82	23	260	145	0	0	0	13
481	0	13	6	14	33	30	36	29	42	117	97	25	375	199	0	0	0	9
495	0	7	0	12	18	51	96	50	51	212	194	39	693	348	0	0	0	134
499	0	5	19	44	68	42	60	31	52	151	118	14	466	235	250	0	0	20
513	0	30	5	16	51	40	81	54	44	175	165	20	578	289	317	0	0	31
546	0	1	6	21	28	45	87	64	99	295	285	65	940	519	0	0	0	40
548	0	562	33	237	832	23	27	21	89	121	120	74	476	279	0	0	0	33
553	0	54	37	59	150	0	0	1	1	3	3	1	9	5	0	0	0	4
555	0.95	135	93	444	671	0	1	1	1	4	5	2	13	8	0	0	0	5
556	0.95	162	162	532	857	0	0	1	1	3	3	1	9	5	0	0	0	3
564	0.36	122	368	131	621	1	2	2	15	14	6	2	42	26	0	0	2,259	27
571	0	60	6	104	171	12	19	16	40	96	105	45	333	198	0	0	0	9
574	0	20	9	33	61	18	28	20	34	84	59	19	261	138	0	0	0	9
581	0	30	14	33	78	23	46	33	55	111	94	33	393	207	283	0	0	21
599	0	3	12	27	41	56	86	68	88	237	240	27	800	422	0	0	0	100
603	0	0	5	0	5	22	49	36	38	122	162	49	478	262	0	0	0	285
607	0	21	341	14	376	0	0	1	2	1	15	14	33	22	0	0	0	150
655	0.95	108	74	355	537	0	1	1	1	4	5	2	13	8	0	0	0	4
656	0.95	54	54	177	286	0	0	0	0	2	2	1	7	4	0	0	0	3
Total	0	9,853	14,405	16,873	41,130	4,315	7,737	5,402	7,856	21,080	20,130	7,045	73,565	39,544	7,163	6,057	4,534	37,797

Appendix B
Future Demographics Validation

UMA Engineering Ltd.
275 – 3001 Wayburne Drive
Burnaby, British Columbia V5G W3
T 604.438.5311 F 604.438.5587 www.uma.aecom.com

UMA | AECOM

Transmittal

To:	**City of Prince George** 1100 Patricia Blvd. Prince George, BC V2L 3V9	Project/File No:	C613-035-00-01
		Date:	May 8, 2008
Att'n:	**Dan Milburn**	Routing:	**E-Mail**
cc:	Glenn Stanker, P.Eng., PTOE	From:	**Billy Kwok, E.I.T.**

☐ Urgent ☐ For Your Use ☒ For Review ☐ For Your Information ☐ Confidential

RE: Prince George Model Update, Future Demographics Validation

We are sending you the following:

NO. OF COPIES:	DESCRIPTION:
1	Memo on the above referenced Task

Comments/Instructions:

Please review the information. We will be running the future scenarios next week, so if you have any comments, please provide them to me as soon as possible.

Yours truly,

UMA ENGINEERING LTD.

Billy Kwok, E.I.T.
Transportation Planner

Important Note:
If quantities or numbers do not match, please call the sender immediately at 604.438.5311.

UMA Engineering Ltd.
275 – 3001 Wayburne Drive
Burnaby, British Columbia V5G 4W3
T 604.438.5311 F 604.438.5587 www.uma.aecom.com

Memorandum

Date:	May 8, 2008
To:	Dan Milburn, City of Prince George
From:	Billy Kwok, E.I.T., UMA
Subject:	**Prince George Model Update** **Future Demographics Validation**

Distribution: Glenn Stanker, City of Prince George
Leah Libsekal, UMA

1.0 Introduction

As input into the development of the 2006 base year model, existing demographic and land use data for each traffic zone within the City of Prince George was created based on 2006 Census data. As the model is intended to be used to forecast future horizon years (2016 and 2026), the next step was the development of requisite future demographics and land use data by horizon year. This memo describes the methodology, assumptions and process engaged to establish the future inputs.

A teleconference call (April 3, 2008) was convened to determine an approved method by which to develop future inputs from existing demographics and land use. The process and results are contained herein, and are provided to the City for confirmation and validation.

1.1 Horizon Years

The project intent is the modelling of two horizon years (2016 and 2026). Based on discussions during the teleconference call, we have developed the following approach and assumptions for each model horizon year.

The 2016 model can be interpreted as follows:

- Low growth scenario in 20 years, with a total population growth of 1%/annum within the city based on current population growth and lot absorption rates, and the corresponding employment and enrolment growth. Half of the full-build population in new residential development will be absorbed.
- High growth scenario in 10 years, with a total population growth of 2%/annum within the city based on 1.5 times current population growth and 2 times current lot absorption rates, and the corresponding employment and enrolment growth. Half of the full-build population in new residential development will be absorbed.

The 2026 model can be interpreted as follows:

- High growth scenario in 20 years, with a total population growth of 2%/annum within the city based on 1.5 times current population growth rates and 2 times current lot absorption rates, and the corresponding employment and enrolment growth. Full-build population in new residential development will be absorbed.

Having determined the two horizon "controls" (i.e. 1% growth required to achieve each), the next step was the development of the future demographic forecasts as outlined in Section 1.2 below.

1.2 Methodology and Assumptions

The first stage was the application of an age shift to the Prince George population. Information about the BC age profile projections was obtained from the BC Statistics website (April 9, 2008) for Population Forecast in a table entitled "British Columbia Population Distribution by Age". Factors were calculated for 2006 and 2026. These factors were applied to the 2006 Census data by Dissemination Blocks and used to develop a "Future Base" for further refinement (i.e. application of population growth).

The second stage involved building the population growth. 18 empty traffic zones were assigned to 8 new residential developments according to development zoning and phasing in the neighbourhood plans such that each new zone consists of a sizable population:

- 5 zones for University Heights
- 2 zones for Fraser Bench
- 4 zones for Ospika South
- 1 zone for Prince George Golf and Curling Club (PGGCC)
- 2 zones for Wessner Heights
- 1 zone for Genesis
- 2 zones for Harper Valley
- 1 zone for the area west of Knight/Wapiti

Population capacities in each new traffic zone were calculated with full-build new residential developments. The proportional distribution was calculated using the same proportion of the area of the zone to the total area of the new development. In 2016, half of the full-build population (13,000) was distributed with a preference weight among new residential developments (e.g. University Heights and Ospika South have a higher preference) and applied to new zones according to development phasing. This is illustrated in Figure 1. The preference weighting was used to prioritize the likely order of development and absorption of new areas. In 2026, full-build population (27,350) was applied to all new zones, and illustrated in Figure 2. Targets were then set for the increase of population with 1% and 2% annual total population growth in 20 years representing 2016 and 2026 conditions respectively.

In 2016, the increased population (17,224) was distributed among:

1. existing annual percentage growth rates of 0%, 0.2%, and 1% in existing traffic zones totalling (4,224) based on the City's urban phasing structure

2. half of the full-build population (13,000) in new traffic zones

In 2026, the increased population (34,659) was distributed among:

1. 1.5 times existing annual percentage growth rates which is the equivalent of 0%, 0.3%, and 1.5% in existing traffic zones totalling (7,309) based on the City's urban phasing structure

2. full-build population (27,350) in new traffic zones.

The third stage involved building the employment growth. New employment capacities for each new industrial and commercial development were determined using the area and scale of developments, and standard rates in the ITE trip generation handbook. Then, targets for the increase of employment were set for each employment category using the same rates as total population growth in 2016 and 2026. This is to say that if there is an increase in population of x%, there is a corresponding x% increase in each category of employment.

In 2016, the total increase in employment (9,909) was distributed in existing areas (background) and new development areas, and illustrated in Figure 3. There are 3 areas of growth in existing areas totalling (4,365) as follows:

1. The Downtown area has an annual percentage growth rate of 1.5%.

2. Areas with 0% population growth have a corresponding 0% growth in employment.

3. All remaining areas have an annual percentage growth rate of 0.2%.

For employment growth in the new development areas, the total increase was distributed as follows:

1. In new residential development areas, total increase in employment (926) corresponds to 6% of total new population with 3% "retail employment" and 3% "other employment". Employment is located in traffic zones representing commercial areas according to Neighbourhood Plans

2. In new industrial and commercial development areas, the increase in employment (4,618) is the difference between the total employment control (9,909) and the sum of the anticipated background and new residential employment increases (5,291). This is distributed equally without preference among these areas. In the absence of detailed plans for new industrial development areas, this method provides a means of accounting for growth in these lands.

In 2026, the total increase in employment (19,378) illustrated in Figure 4, was distributed in existing areas (background) and new development areas. There are 3 areas of growth in existing areas totalling (9,122) as follows:

1. The Downtown area has an annual percentage growth rate of 3.0%

2. Area with 0% population growth have corresponding 0% employment growth

3. All the remaining area has an annual percentage growth rate of 0.3%

For employment growth in the new development areas, the total increase was distributed as follows:

1. In new residential development areas, total increase in employment (1811) corresponds to 6% of total new population with 3% “retail employment” and 3% “other employment”. Employment is located in traffic zones according to Neighbourhood Plans

2. In new industrial and commercial development areas, the increase in employment (8445) is the difference between total employment control (19,378) and the sum of background and new residential employment increase (10,933). This is distributed equally without preference among these areas. In the absence of detailed plans for new industrial development areas, this method provides a means of accounting for growth in these lands.

In areas where we have assumed new industrial employment, an additional 10% were allocated each to “retail employment”, and “other employment” for supporting business. In this way the increase in employment by category is consistent with the targets.

The fourth stage applied population and employment growth to the “Future Base” at each traffic zone. Employment in new residential development is applied to the traffic zone containing the commercial land use according to neighbourhood plans.

The fifth stage involved calculating school enrolment. School enrolment totals for each category are calculated using the same enrolment percentage in the associated age groups as in 2006. School enrolment in new residential development with a proposed new school was calculated using the population in the development, and existing traffic zones was calculated using the rest of the population.

The sixth and final stage involved iterating through the previous steps, re-adjusting the above assumptions on growth rates and distribution rates such that the final totals satisfied the control targets. The results for individual employment categories were found to be within -3.3% to 1.3%, but as the total employment control targets were met, these inconsistencies were deemed acceptable.

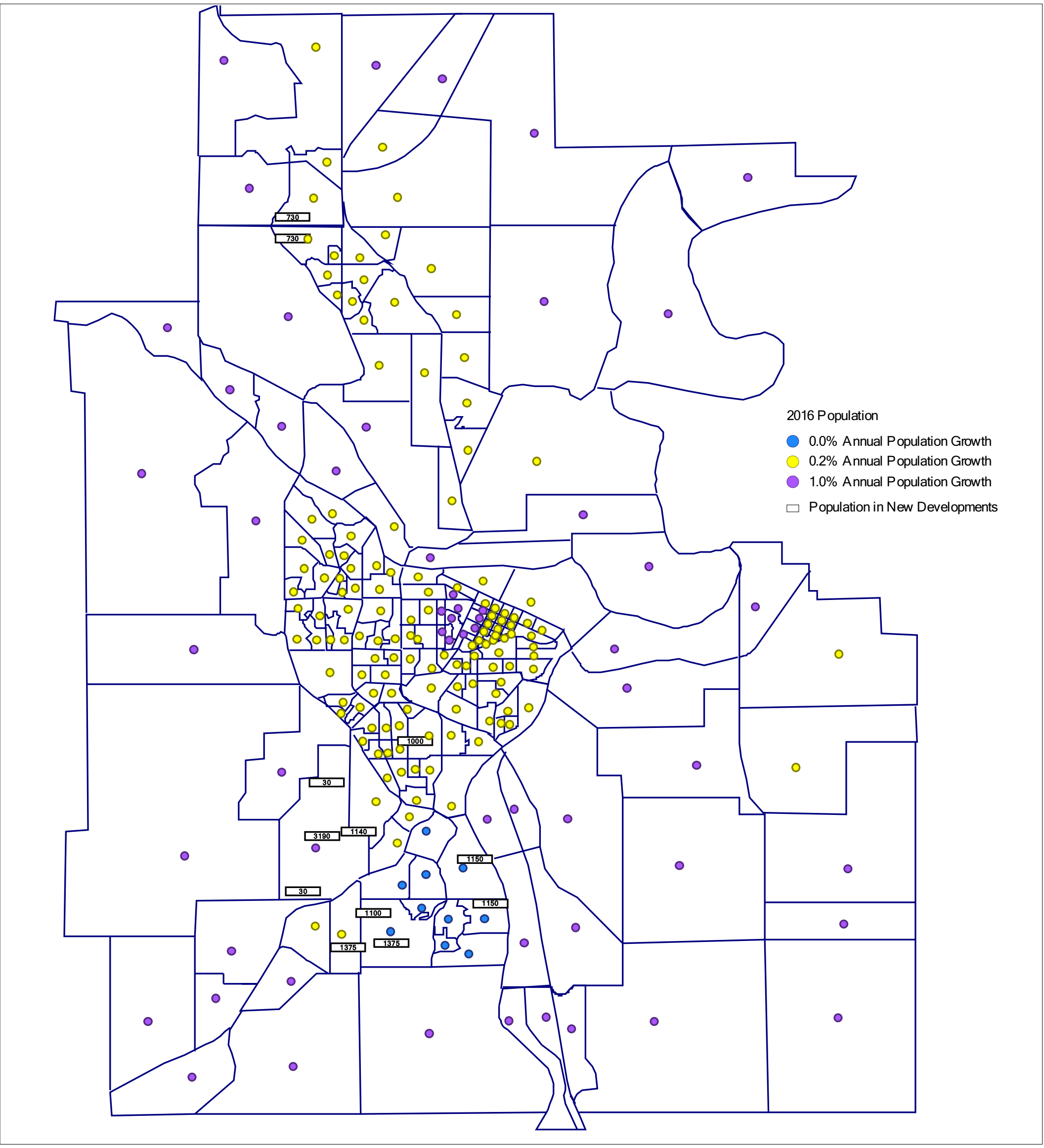


Figure 1 - 2016 Population Growth

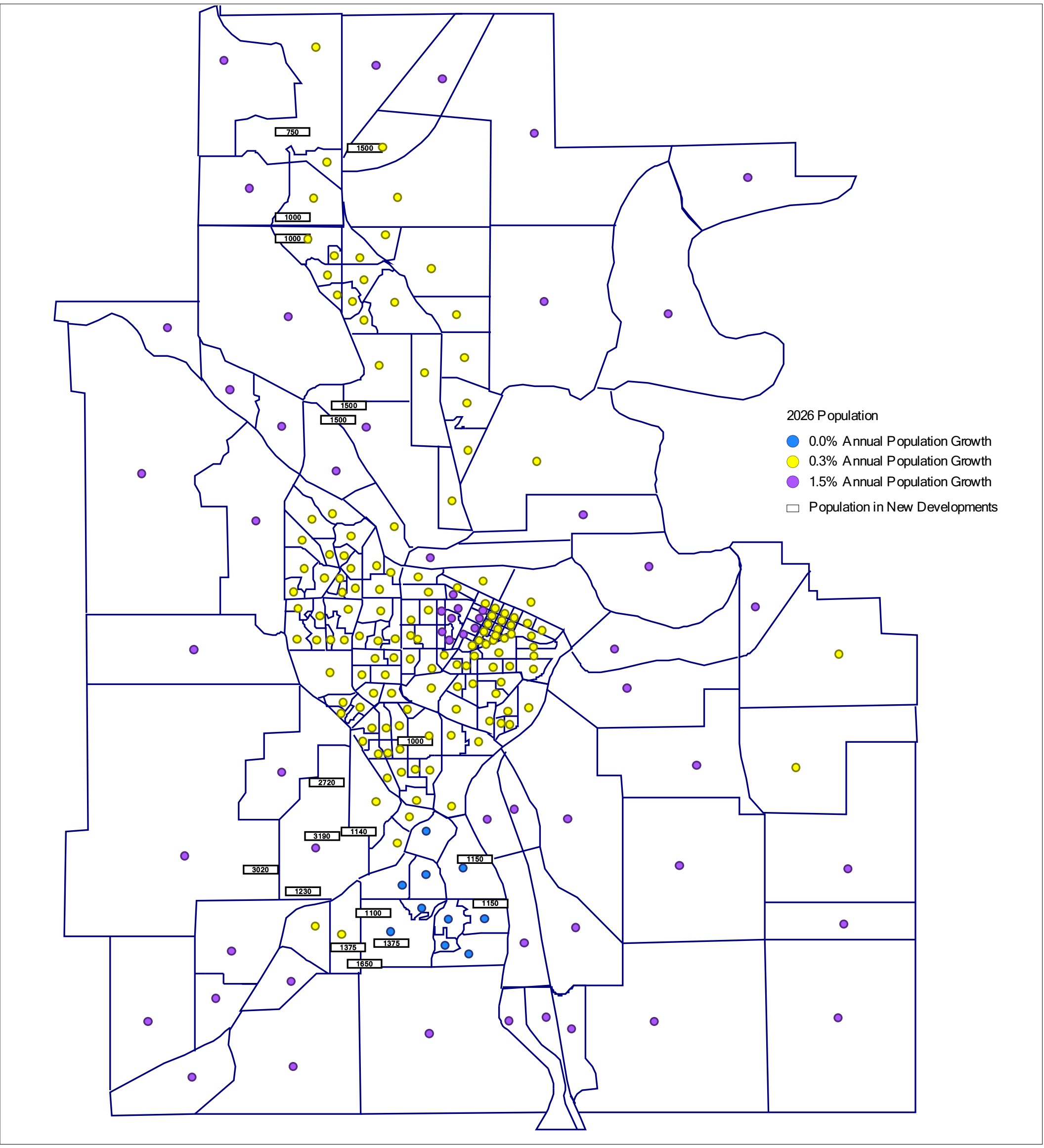


Figure 2 - 2026 Population Growth

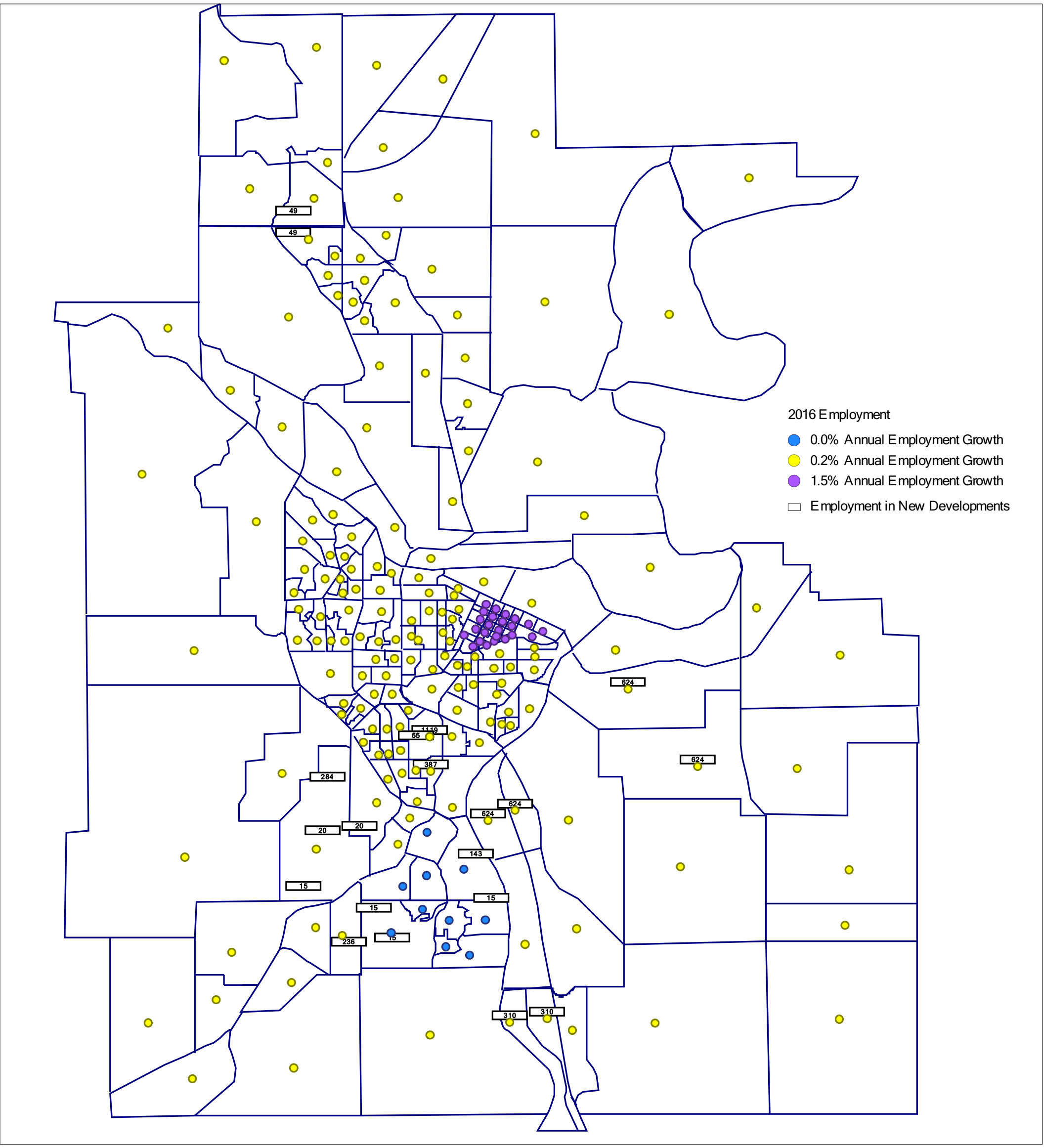


Figure 3 - 2016 Employment Growth

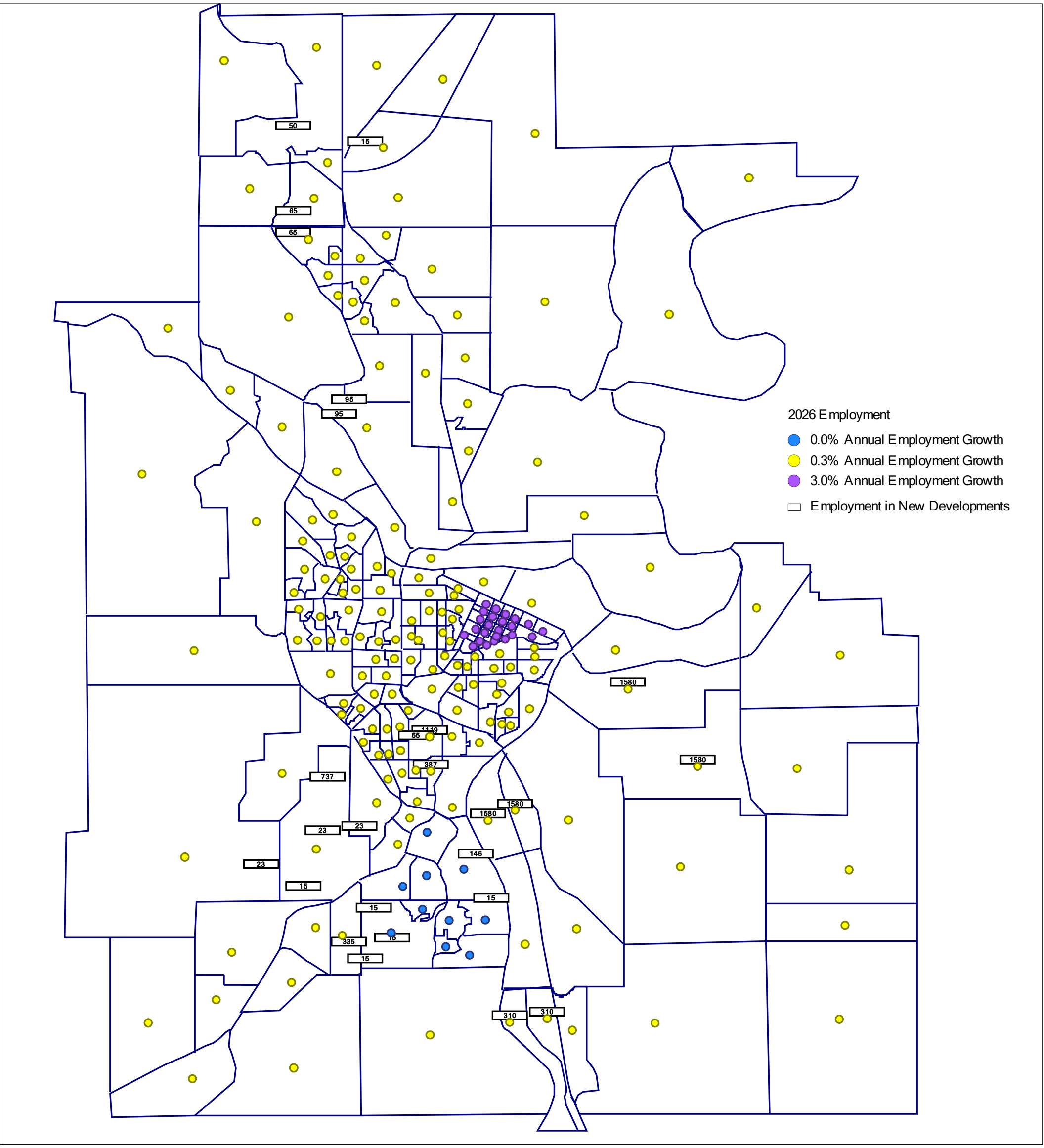


Figure 4 - 2026 Employment Growth

Appendix C
Traffic Operations at Signalized Intersections[6]

[6] The model volume is zero at some low volume intersections. We understand that actual base year volumes at these locations were small. Attempting to model them would be unrealistic. Movements with "N/A" means that there are no such movement, or the movement is restricted in PM peak hour.

2006 Traffic Operations Summary

NS Street	EW Street	Dir	Volume	v/c	Delay (s)	LOS	Int Delay (s)	Int LOS
Old Cariboo Highway	Highway 16	NBL	165	0	26	C	11.9	B
		NBT	#N/A	#N/A	#N/A	#N/A		
		NBR	31	0	18	B		
		SBL	#N/A	#N/A	#N/A	#N/A		
		SBT	#N/A	#N/A	#N/A	#N/A		
		SBR	#N/A	#N/A	#N/A	#N/A		
		EBL	#N/A	#N/A	#N/A	#N/A		
		EBT	203	0	8	A		
		EBR	186	0	5	A		
		WBL	20	0	14	B		
		WBT	119	0	8	A		
		WBR	#N/A	#N/A	#N/A	#N/A		
Highway 16	1st Avenue	NBL	218	0.6	26	C	9.7	A
		NBT	#N/A	#N/A	#N/A	#N/A		
		NBR	217	0.4	14	B		
		SBL	#N/A	#N/A	#N/A	#N/A		
		SBT	#N/A	#N/A	#N/A	#N/A		
		SBR	#N/A	#N/A	#N/A	#N/A		
		EBL	#N/A	#N/A	#N/A	#N/A		
		EBT	465	0.2	5	A		
		EBR	183	0.2	5	A		
		WBL	132	0.3	12	B		
		WBT	380	0.2	5	A		
		WBR	#N/A	#N/A	#N/A	#N/A		
Highway 16	2nd Avenue	NBL	59	0.1	26	C	14.5	B
		NBT	303	0.1	8	A		
		NBR	#N/A	#N/A	#N/A	#N/A		
		SBL	#N/A	#N/A	#N/A	#N/A		
		SBT	199	0.2	17	B		
		SBR	137	0.3	17	B		
		EBL	#N/A	#N/A	#N/A	#N/A		
		EBT	#N/A	#N/A	#N/A	#N/A		
		EBR	#N/A	#N/A	#N/A	#N/A		
		WBL	87	0.2	15	B		
		WBT	391	0.3	16	B		
		WBR	40	0.1	9	A		
Highway 16	3rd Avenue	NBL	201	0.4	15	B	11.9	B
		NBT	310	0.2	7	A		
		NBR	108	0.1	7	A		
		SBL	0	0.0	13	B		
		SBT	286	0.1	7	A		
		SBR	0	0.0	7	A		
		EBL	52	0.2	24	C		
		EBT	90	0.3	17	B		
		EBR	54	0.4	18	B		
		WBL	69	0.3	24	C		
		WBT	106	0.2	17	B		
		WBR	0	0.0	17	B		
Highway 16	4th Avenue	NBL	#N/A	#N/A	#N/A	#N/A	10.3	B
		NBT	501	0.2	5	A		
		NBR	35	0.0	4	A		
		SBL	78	0.2	11	B		
		SBT	312	0.1	4	A		
		SBR	#N/A	#N/A	#N/A	#N/A		
		EBL	104	0.3	22	C		
		EBT	242	0.2	22	C		
		EBR	171	0.3	15	B		
		WBL	#N/A	#N/A	#N/A	#N/A		
		WBT	#N/A	#N/A	#N/A	#N/A		
		WBR	#N/A	#N/A	#N/A	#N/A		
Highway 16	6th Avenue	NBL	9	0.0	11	B	4.1	A
		NBT	454	0.1	4	A		
		NBR	0	0.0	4	A		
		SBL	0	0.0	11	B		
		SBT	494	0.1	4	A		
		SBR	0	0.0	4	A		
		EBL	0	0.0	27	C		
		EBT	0	0.0	22	C		
		EBR	0	0.0	22	C		
		WBL	0	0.0	27	C		
		WBT	0	0.0	22	C		
		WBR	0	0.0	22	C		

Highway 16	7th Avenue	NBL	0	0.0	17	B	11.1	B
		NBT	451	0.2	10	B		
		NBR	44	0.1	10	B		
		SBL	3	0.0	17	B		
		SBT	492	0.2	10	B		
		SBR	0	0.0	10	B		
		EBL	0	0.0	19	B		
		EBT	84	0.0	13	B		
		EBR	0	0.0	13	B		
		WBL	85	0.2	19	B		
		WBT	98	0.1	13	B		
		WBR	12	0.0	13	B		
Highway 16	15th Avenue	NBL	115	0.3	32	C	43.4	D
		NBT	342	0.4	25	C		
		NBR	94	0.2	24	C		
		SBL	0	0.0	36	D		
		SBT	616	0.8	49	D		
		SBR	261	0.2	5	A		
		EBL	229	0.7	43	D		
		EBT	310	0.6	37	D		
		EBR	48	0.2	31	C		
		WBL	297	0.8	55	E		
		WBT	523	0.9	73	E		
		WBR	16	0.1	31	C		
Highway 16	17th Avenue	NBL	4	0.0	15	B	10.2	B
		NBT	453	0.2	6	A		
		NBR	11	0.0	6	A		
		SBL	42	0.1	13	B		
		SBT	887	0.3	7	A		
		SBR	32	0.0	6	A		
		EBL	43	0.2	26	C		
		EBT	97	0.1	18	B		
		EBR	34	0.1	11	B		
		WBL	15	0.1	24	C		
		WBT	205	0.5	22	C		
		WBR	55	0.5	22	C		
Highway 16	20th Avenue	NBL	39	0.2	28	C	14.4	B
		NBT	171	0.5	25	C		
		NBR	42	0.5	25	C		
		SBL	87	0.6	38	D		
		SBT	167	0.4	23	C		
		SBR	681	0.2	0	A		
		EBL	207	0.2	18	B		
		EBT	110	0.3	18	B		
		EBR	38	0.3	18	B		
		WBL	19	0.0	19	B		
		WBT	168	0.5	23	C		
		WBR	91	0.5	23	C		
Spruce Street	Highway 16	NBL	75	0.3	26	C	10.2	B
		NBT	93	0.2	18	B		
		NBR	0	0.0	18	B		
		SBL	17	0.1	24	C		
		SBT	92	0.4	19	B		
		SBR	107	0.4	19	B		
		EBL	100	0.3	15	B		
		EBT	338	0.2	6	A		
		EBR	0	0.0	6	A		
		WBL	0	0.0	13	B		
		WBT	862	0.3	7	A		
		WBR	27	0.0	6	A		
Carney Street	Highway 16	NBL	#N/A	#N/A	#N/A	#N/A	7.7	A
		NBT	#N/A	#N/A	#N/A	#N/A		
		NBR	#N/A	#N/A	#N/A	#N/A		
		SBL	199	0.4	20	C		
		SBT	#N/A	#N/A	#N/A	#N/A		
		SBR	241	0.4	12	B		
		EBL	183	0.4	16	B		
		EBT	264	0.1	0	A		
		EBR	#N/A	#N/A	#N/A	#N/A		
		WBL	#N/A	#N/A	#N/A	#N/A		
		WBT	641	0.3	7	A		
		WBR	338	0.2	0	A		

Highway 16	Highway 97	NBL	362	0.7	52	D	44.1	D
		NBT	316	0.3	30	C		
		NBR	#N/A	#N/A	#N/A	#N/A		
		SBL	102	0.4	40	D		
		SBT	780	0.8	53	D		
		SBR	0	0.0	8	A		
		EBL	24	0.2	46	D		
		EBT	460	0.7	51	D		
		EBR	641	0.7	22	C		
		WBL	103	0.5	44	D		
		WBT	662	0.8	59	E		
		WBR	107	0.1	7	A		
Highway 16	Ferry Avenue	NBL	96	0.5	65	E	54.6	D
		NBT	532	0.4	30	C		
		NBR	310	0.3	4	A		
		SBL	45	0.1	59	E		
		SBT	1216	0.9	58	E		
		SBR	#N/A	#N/A	#N/A	#N/A		
		EBL	137	0.6	67	E		
		EBT	199	0.6	62	E		
		EBR	151	0.7	66	E		
		WBL	694	1.0	99	F		
		WBT	205	0.2	37	D		
		WBR	192	0.2	9	A		
Highway 16	Vance/ Cowart Road	NBL	58	0.3	45	D	48.8	D
		NBT	737	0.6	28	C		
		NBR	0	0.0	22	C		
		SBL	461	1.1	107	F		
		SBT	1477	0.9	53	D		
		SBR	112	0.1	3	A		
		EBL	116	0.5	50	D		
		EBT	96	0.3	28	C		
		EBR	146	0.3	28	C		
		WBL	0	0.0	44	D		
		WBT	33	0.1	40	D		
		WBR	186	0.2	11	B		
Highway 16	Tyner/Domano Boulevard	NBL	224	0.8	82	F	38.6	D
		NBT	600	0.6	39	D		
		NBR	64	0.1	12	B		
		SBL	451	0.8	57	E		
		SBT	1050	0.6	24	C		
		SBR	1	0.0	4	A		
		EBL	16	0.1	52	D		
		EBT	355	0.6	52	D		
		EBR	369	0.5	25	C		
		WBL	127	0.6	59	E		
		WBT	242	0.4	45	D		
		WBR	178	0.2	8	A		
Highway 16	Westgate Avenue	NBL	0	0.0	14	B	9.6	A
		NBT	585	0.3	9	A		
		NBR	12	0.0	3	A		
		SBL	148	0.3	29	C		
		SBT	726	0.3	4	A		
		SBR	0	0.0	3	A		
		EBL	0	0.0	33	C		
		EBT	0	0.0	29	C		
		EBR	0	0.0	29	C		
		WBL	63	0.3	34	C		
		WBT	0	0.0	29	C		
		WBR	83	0.1	11	B		
Highway 16	Gauthier/ Bunce Road	NBL	3	0.0	27	C	14.9	B
		NBT	439	0.3	11	B		
		NBR	15	0.0	10	B		
		SBL	108	0.2	27	C		
		SBT	592	0.4	11	B		
		SBR	61	0.1	10	B		
		EBL	35	0.2	37	D		
		EBT	7	0.1	31	C		
		EBR	13	0.1	31	C		
		WBL	28	0.2	36	D		
		WBT	13	0.1	31	C		
		WBR	64	0.4	32	C		

Highway 97	Handlen Road	NBL	99	0.2	13	B	10.7	B
		NBT	492	0.3	7	A		
		NBR	45	0.1	7	A		
		SBL	24	0.1	14	B		
		SBT	307	0.2	7	A		
		SBR	74	0.1	7	A		
		EBL	61	0.2	25	C		
		EBT	19	0.2	19	B		
		EBR	56	0.2	19	B		
		WBL	65	0.2	25	C		
		WBT	25	0.2	19	B		
		WBR	57	0.2	19	B		
Highway 97	Austin Road	NBL	233	0.5	38	D	24.9	C
		NBT	503	0.4	22	C		
		NBR	192	0.2	5	A		
		SBL	23	0.1	35	D		
		SBT	364	0.3	21	C		
		SBR	51	0.1	5	A		
		EBL	120	0.4	41	D		
		EBT	122	0.5	38	D		
		EBR	88	0.1	10	B		
		WBL	101	0.3	40	D		
		WBT	83	0.3	36	D		
		WBR	13	0.0	10	B		
Highway 97	Monterey Road	NBL	41	0.1	12	B	7.1	A
		NBT	899	0.4	7	A		
		NBR	11	0.0	2	A		
		SBL	15	0.0	13	B		
		SBT	538	0.3	5	A		
		SBR	0	0.0	2	A		
		EBL	0	0.0	25	C		
		EBT	4	0.0	20	C		
		EBR	32	0.1	20	C		
		WBL	6	0.0	25	C		
		WBT	2	0.0	20	C		
		WBR	29	0.1	20	C		
Highway 97	Northwood Pulp Mill Road	NBL	16	0.0	17	B	17.7	B
		NBT	1129	0.6	20	C		
		NBR	239	0.2	0	A		
		SBL	16	0.1	27	C		
		SBT	464	0.3	11	B		
		SBR	3	0.0	10	B		
		EBL	6	0.0	22	C		
		EBT	1	0.0	16	B		
		EBR	11	0.0	16	B		
		WBL	263	0.7	35	D		
		WBT	1	0.0	16	B		
		WBR	9	0.0	16	B		
Highway 97 NB Ramp	North Nechako Road	NBL	432	0.6	16	B	14.0	B
		NBT	0	0.0	10	B		
		NBR	228	0.2	5	A		
		SBL	#N/A	#N/A	#N/A	#N/A		
		SBT	#N/A	#N/A	#N/A	#N/A		
		SBR	#N/A	#N/A	#N/A	#N/A		
		EBL	37	0.1	22	C		
		EBT	63	0.1	14	B		
		EBR	#N/A	#N/A	#N/A	#N/A		
		WBL	#N/A	#N/A	#N/A	#N/A		
		WBT	479	0.4	16	B		
		WBR	5	0.0	0	A		
Highway 97 SB Ramp	North Nechako Road	NBL	16	0.0	20	C	25.8	C
		NBT	63	0.1	14	B		
		NBR	35	0.0	8	A		
		SBL	26	0.1	20	C		
		SBT	20	0.0	14	B		
		SBR	33	0.0	8	A		
		EBL	34	0.1	17	B		
		EBT	40	0.0	10	B		
		EBR	177	0.2	10	B		
		WBL	429	0.9	58	E		
		WBT	444	0.3	10	B		
		WBR	38	0.1	10	B		

Highway 97	5th Avenue	NBL	233	1.0	100	F	46.5	D
		NBT	764	0.8	52	D		
		NBR	125	0.1	9	A		
		SBL	338	0.8	65	E		
		SBT	708	0.7	49	D		
		SBR	219	0.2	10	B		
		EBL	270	1.0	99	F		
		EBT	449	0.5	42	D		
		EBR	157	0.2	13	B		
		WBL	220	0.8	67	E		
		WBT	657	0.8	59	E		
		WBR	711	0.4	2	A		
Highway 97	10th Avenue	NBL	254	0.7	47	D	35.9	D
		NBT	897	0.7	34	C		
		NBR	89	0.1	14	B		
		SBL	140	0.4	36	D		
		SBT	828	0.6	31	C		
		SBR	0	0.0	23	C		
		EBL	87	0.9	90	F		
		EBT	99	0.2	34	C		
		EBR	95	0.1	9	A		
		WBL	141	0.7	53	D		
		WBT	277	0.6	44	D		
		WBR	68	0.1	9	A		
Highway 97	15th Avenue	NBL	274	0.8	67	E	52.0	D
		NBT	796	0.8	48	D		
		NBR	71	0.1	28	C		
		SBL	207	0.7	56	E		
		SBT	744	0.7	46	D		
		SBR	113	0.1	10	B		
		EBL	165	0.7	62	E		
		EBT	488	0.6	47	D		
		EBR	119	0.1	10	B		
		WBL	170	0.9	79	E		
		WBT	633	0.9	77	E		
		WBR	141	0.2	13	B		
Highway 97	22nd Avenue	NBL	100	0.8	71	E	28.5	C
		NBT	801	0.4	12	B		
		NBR	29	0.0	10	B		
		SBL	53	0.4	52	D		
		SBT	929	0.4	13	B		
		SBR	100	0.1	5	A		
		EBL	305	1.0	94	F		
		EBT	106	0.5	45	D		
		EBR	80	0.5	45	D		
		WBL	48	0.5	57	E		
		WBT	48	0.2	40	D		
		WBR	0	0.0	40	D		
Highway 97	Railway Road	NBL	6	0.0	15	B	38.5	D
		NBT	945	1.0	64	E		
		NBR	#N/A	#N/A	#N/A	#N/A		
		SBL	#N/A	#N/A	#N/A	#N/A		
		SBT	658	0.3	8	A		
		SBR	172	0.1	0	A		
		EBL	421	0.9	48	D		
		EBT	#N/A	#N/A	#N/A	#N/A		
		EBR	35	0.0	0	A		
		WBL	#N/A	#N/A	#N/A	#N/A		
		WBT	#N/A	#N/A	#N/A	#N/A		
		WBR	#N/A	#N/A	#N/A	#N/A		
Highway 97	Terminal Boulevard	NBL	15	0.0	18	B	13.8	B
		NBT	444	0.5	14	B		
		NBR	2	0.0	6	A		
		SBL	95	0.5	29	C		
		SBT	496	0.3	11	B		
		SBR	102	0.1	6	A		
		EBL	52	0.1	22	C		
		EBT	32	0.1	16	B		
		EBR	21	0.0	10	B		
		WBL	13	0.0	22	C		
		WBT	33	0.1	16	B		
		WBR	0	0.0	10	B		

Foothills Boulevard	North Nechako Road	NBL	187	0.3	29	C	23.2	C
		NBT	534	0.5	29	C		
		NBR	38	0.1	14	B		
		SBL	71	0.1	28	C		
		SBT	196	0.4	27	C		
		SBR	22	0.0	14	B		
		EBL	22	0.1	34	C		
		EBT	60	0.1	27	C		
		EBR	77	0.1	0	A		
		WBL	28	0.1	33	C		
		WBT	124	0.3	27	C		
		WBR	214	0.2	4	A		
Foothills Boulevard	15th Avnenue	NBL	24	0.1	41	D	42.5	D
		NBT	215	0.3	38	D		
		NBR	24	0.1	37	D		
		SBL	116	0.2	37	D		
		SBT	128	0.2	33	C		
		SBR	139	0.4	34	C		
		EBL	172	0.4	43	D		
		EBT	176	0.3	37	D		
		EBR	20	0.1	37	D		
		WBL	30	0.1	41	D		
		WBT	148	0.3	38	D		
		WBR	274	0.8	64	E		
Tabor Boulevard	5th Avenue	NBL	76	0.1	23	C	20.1	C
		NBT	258	0.4	24	C		
		NBR	56	0.2	23	C		
		SBL	99	0.2	23	C		
		SBT	145	0.2	23	C		
		SBR	16	0.1	23	C		
		EBL	25	0.1	22	C		
		EBT	136	0.1	16	B		
		EBR	22	0.0	16	B		
		WBL	90	0.3	22	C		
		WBT	259	0.3	16	B		
		WBR	156	0.3	16	B		
Ospika Boulevard	5th Avenue	NBL	100	0.2	30	C	38.1	D
		NBT	378	0.4	24	C		
		NBR	113	0.3	23	C		
		SBL	249	0.4	29	C		
		SBT	212	0.2	19	B		
		SBR	17	0.0	19	B		
		EBL	0	0.0	42	D		
		EBT	312	0.3	23	C		
		EBR	0	0.0	23	C		
		WBL	144	0.6	38	D		
		WBT	548	0.9	65	E		
		WBR	374	0.8	50	D		
Ospika Boulevard	Rainbow Drive	NBL	31	0.1	17	B	10.8	B
		NBT	418	0.3	11	B		
		NBR	48	0.1	10	B		
		SBL	3	0.0	17	B		
		SBT	349	0.2	10	B		
		SBR	3	0.0	10	B		
		EBL	5	0.0	20	C		
		EBT	29	0.0	13	B		
		EBR	22	0.0	7	A		
		WBL	62	0.2	19	B		
		WBT	69	0.1	13	B		
		WBR	168	0.2	7	A		
Ospika Boulevard	15th Avenue	NBL	408	1.1	118	F	42.9	D
		NBT	380	0.5	28	C		
		NBR	146	0.3	27	C		
		SBL	89	0.3	41	D		
		SBT	305	0.3	27	C		
		SBR	56	0.1	26	C		
		EBL	33	0.1	41	D		
		EBT	309	0.4	27	C		
		EBR	168	0.4	27	C		
		WBL	220	0.6	48	D		
		WBT	579	0.6	33	C		
		WBR	174	0.3	17	B		

Ospika Boulevard	18th Avenue	NBL	157	0.5	44	D	32.1	C
		NBT	715	0.7	35	D		
		NBR	32	0.1	23	C		
		SBL	30	0.1	39	D		
		SBT	572	0.6	29	C		
		SBR	92	0.2	23	C		
		EBL	116	0.4	41	D		
		EBT	45	0.2	17	B		
		EBR	94	0.2	17	B		
		WBL	129	0.4	33	C		
		WBT	136	0.5	31	C		
		WBR	103	0.5	31	C		
Ospika Boulevard	Massey Drive	NBL	0	0.0	42	D	33.4	C
		NBT	561	0.6	37	D		
		NBR	114	0.1	7	A		
		SBL	192	0.5	41	D		
		SBT	644	0.6	33	C		
		SBR	8	0.0	7	A		
		EBL	44	0.1	42	D		
		EBT	47	0.1	38	D		
		EBR	13	0.0	14	B		
		WBL	312	0.7	48	D		
		WBT	108	0.1	34	C		
		WBR	199	0.2	9	A		
Ospika Boulevard	Tyner Boulevard	NBL	#N/A	#N/A	#N/A	#N/A	15.2	B
		NBT	#N/A	#N/A	#N/A	#N/A		
		NBR	#N/A	#N/A	#N/A	#N/A		
		SBL	364	0.4	27	C		
		SBT	#N/A	#N/A	#N/A	#N/A		
		SBR	12	0.0	5	A		
		EBL	16	0.0	29	C		
		EBT	262	0.1	7	A		
		EBR	#N/A	#N/A	#N/A	#N/A		
		WBL	#N/A	#N/A	#N/A	#N/A		
		WBT	186	0.2	21	C		
		WBR	216	0.1	0	A		
Lyon Street	5th Avenue	NBL	141	0.5	36	D	18.6	B
		NBT	67	0.4	25	C		
		NBR	112	0.4	25	C		
		SBL	74	0.3	33	C		
		SBT	31	0.1	24	C		
		SBR	24	0.1	24	C		
		EBL	10	0.0	24	C		
		EBT	691	0.5	22	C		
		EBR	34	0.0	9	A		
		WBL	66	0.2	32	C		
		WBT	1036	0.5	11	B		
		WBR	5	0.0	7	A		
Westwood Drive	Massey Drive	NBL	206	0.4	47	D	38.4	D
		NBT	140	0.2	31	C		
		NBR	100	0.2	31	C		
		SBL	99	0.2	50	D		
		SBT	173	0.2	35	D		
		SBR	53	0.1	35	D		
		EBL	0	0.0	49	D		
		EBT	269	0.4	38	D		
		EBR	86	0.2	37	D		
		WBL	173	0.4	47	D		
		WBT	352	0.4	34	C		
		WBR	28	0.1	33	C		
Westwood Drive	Ferry Avenue	NBL	34	0.1	22	C	20.0	C
		NBT	242	0.6	22	C		
		NBR	126	0.6	22	C		
		SBL	111	0.3	32	C		
		SBT	244	0.3	9	A		
		SBR	29	0.3	9	A		
		EBL	3	0.0	27	C		
		EBT	152	0.2	20	C		
		EBR	32	0.1	20	C		
		WBL	97	0.3	27	C		
		WBT	231	0.3	20	C		
		WBR	185	0.4	21	C		

Carney Street	5th Avenue	NBL	83	0.4	37	D	41.4	D
		NBT	121	0.3	28	C		
		NBR	0	0.0	27	C		
		SBL	2	0.0	35	D		
		SBT	182	0.2	27	C		
		SBR	399	0.4	6	A		
		EBL	232	0.5	30	C		
		EBT	580	0.3	7	A		
		EBR	16	0.0	7	A		
		WBL	20	0.1	28	C		
		WBT	1072	1.0	81	F		
		WBR	13	0.0	24	C		
Carney Street	15th Avenue	NBL	94	0.5	30	C	18.8	B
		NBT	192	0.4	14	B		
		NBR	35	0.0	6	A		
		SBL	54	0.5	39	D		
		SBT	191	0.3	13	B		
		SBR	24	0.0	6	A		
		EBL	39	0.2	27	C		
		EBT	586	0.4	13	B		
		EBR	46	0.1	12	B		
		WBL	66	0.2	20	C		
		WBT	976	0.7	23	C		
		WBR	18	0.0	12	B		
Carney Street	Massey Drive	NBL	196	0.6	46	D	34.6	C
		NBT	213	0.4	30	C		
		NBR	88	0.1	7	A		
		SBL	31	0.1	40	D		
		SBT	166	0.5	32	C		
		SBR	105	0.5	33	C		
		EBL	75	0.2	40	D		
		EBT	433	0.6	40	D		
		EBR	113	0.3	32	C		
		WBL	82	0.3	40	D		
		WBT	383	0.5	34	C		
		WBR	43	0.1	9	A		
Winnipeg Street	4th Avenue	NBL	#N/A	#N/A	#N/A	#N/A	12.0	B
		NBT	115	0.1	12	B		
		NBR	81	0.1	12	B		
		SBL	6	0.0	18	B		
		SBT	160	0.1	12	B		
		SBR	#N/A	#N/A	#N/A	#N/A		
		EBL	30	0.0	12	B		
		EBT	490	0.2	12	B		
		EBR	65	0.1	12	B		
		WBL	#N/A	#N/A	#N/A	#N/A		
		WBT	#N/A	#N/A	#N/A	#N/A		
		WBR	#N/A	#N/A	#N/A	#N/A		
Winnipeg Street	13th Avenue	NBL	22	0.1	22	C	14.4	B
		NBT	234	0.2	17	B		
		NBR	99	0.2	17	B		
		SBL	84	0.3	29	C		
		SBT	294	0.2	10	B		
		SBR	91	0.1	10	B		
		EBL	41	0.1	20	C		
		EBT	98	0.2	14	B		
		EBR	35	0.2	14	B		
		WBL	104	0.3	20	C		
		WBT	89	0.1	14	B		
		WBR	108	0.1	3	A		
Brunswick Street	2nd Avenue	NBL	77	0.2	16	B	12.8	B
		NBT	61	0.0	10	B		
		NBR	#N/A	#N/A	#N/A	#N/A		
		SBL	#N/A	#N/A	#N/A	#N/A		
		SBT	75	0.1	10	B		
		SBR	0	0.0	10	B		
		EBL	#N/A	#N/A	#N/A	#N/A		
		EBT	#N/A	#N/A	#N/A	#N/A		
		EBR	#N/A	#N/A	#N/A	#N/A		
		WBL	59	0.1	13	B		
		WBT	441	0.1	13	B		
		WBR	0	0.0	13	B		

Brunswick Street	4th Avenue	NBL	#N/A	#N/A	#N/A	#N/A	12.8	B
		NBT	23	0.1	11	B		
		NBR	21	0.1	11	B		
		SBL	31	0.1	17	B		
		SBT	68	0.1	11	B		
		SBR	#N/A	#N/A	#N/A	#N/A		
		EBL	0	0.0	13	B		
		EBT	355	0.1	13	B		
		EBR	0	0.0	13	B		
		WBL	#N/A	#N/A	#N/A	#N/A		
		WBT	#N/A	#N/A	#N/A	#N/A		
		WBR	#N/A	#N/A	#N/A	#N/A		
Dominion Street	2nd Avenue	NBL	83	0.2	14	B	12.0	B
		NBT	184	0.1	8	A		
		NBR	#N/A	#N/A	#N/A	#N/A		
		SBL	#N/A	#N/A	#N/A	#N/A		
		SBT	93	0.1	8	A		
		SBR	55	0.1	4	A		
		EBL	#N/A	#N/A	#N/A	#N/A		
		EBT	#N/A	#N/A	#N/A	#N/A		
		EBR	#N/A	#N/A	#N/A	#N/A		
		WBL	0	0.0	16	B		
		WBT	351	0.2	16	B		
		WBR	0	0.0	16	B		
Dominion Street	4th Avenue	NBL	#N/A	#N/A	#N/A	#N/A	12.2	B
		NBT	182	0.1	10	B		
		NBR	37	0.1	10	B		
		SBL	4	0.0	16	B		
		SBT	102	0.0	10	B		
		SBR	#N/A	#N/A	#N/A	#N/A		
		EBL	37	0.1	14	B		
		EBT	166	0.1	14	B		
		EBR	106	0.2	15	B		
		WBL	#N/A	#N/A	#N/A	#N/A		
		WBT	#N/A	#N/A	#N/A	#N/A		
		WBR	#N/A	#N/A	#N/A	#N/A		
Dominion Street	7th Avenue	NBL	13	0.0	15	B	10.3	B
		NBT	145	0.1	9	A		
		NBR	0	0.0	9	A		
		SBL	0	0.0	15	B		
		SBT	281	0.1	9	A		
		SBR	49	0.1	9	A		
		EBL	24	0.1	16	B		
		EBT	74	0.0	11	B		
		EBR	42	0.1	11	B		
		WBL	58	0.1	16	B		
		WBT	55	0.0	11	B		
		WBR	0	0.0	11	B		
Queensway	2nd Avenue	NBL	154	0.3	12	B	9.7	A
		NBT	246	0.1	6	A		
		NBR	62	0.1	6	A		
		SBL	7	0.0	11	B		
		SBT	261	0.1	6	A		
		SBR	10	0.0	6	A		
		EBL	#N/A	#N/A	#N/A	#N/A		
		EBT	#N/A	#N/A	#N/A	#N/A		
		EBR	#N/A	#N/A	#N/A	#N/A		
		WBL	70	0.2	20	C		
		WBT	98	0.1	20	C		
		WBR	6	0.0	13	B		
Queensway	4th Avenue	NBL	#N/A	#N/A	#N/A	#N/A	19.1	B
		NBT	346	0.3	19	B		
		NBR	0	0.0	18	B		
		SBL	46	0.2	25	C		
		SBT	326	0.2	18	B		
		SBR	#N/A	#N/A	#N/A	#N/A		
		EBL	24	0.1	19	B		
		EBT	52	0.1	19	B		
		EBR	93	0.1	8	A		
		WBL	117	0.4	25	C		
		WBT	#N/A	#N/A	#N/A	#N/A		
		WBR	91	0.3	24	C		

Queensway	5th Avenue	NBL	77	0.2	13	B	9.5	A
		NBT	346	0.2	6	A		
		NBR	37	0.0	6	A		
		SBL	0	0.0	13	B		
		SBT	473	0.2	7	A		
		SBR	62	0.1	6	A		
		EBL	0	0.0	22	C		
		EBT	30	0.0	16	B		
		EBR	91	0.2	17	B		
		WBL	102	0.3	22	C		
		WBT	51	0.1	16	B		
		WBR	0	0.0	16	B		
Queensway	17th Avenue	NBL	29	0.1	18	B	11.4	B
		NBT	416	0.2	10	B		
		NBR	0	0.0	10	B		
		SBL	36	0.1	17	B		
		SBT	632	0.3	11	B		
		SBR	60	0.1	10	B		
		EBL	33	0.1	19	B		
		EBT	42	0.1	13	B		
		EBR	38	0.1	13	B		
		WBL	0	0.0	19	B		
		WBT	34	0.1	13	B		
		WBR	27	0.1	13	B		
Queensway	20th Avenue	NBL	40	0.1	18	B	11.3	B
		NBT	352	0.2	10	B		
		NBR	11	0.0	10	B		
		SBL	14	0.0	17	B		
		SBT	530	0.2	10	B		
		SBR	126	0.2	10	B		
		EBL	79	0.2	19	B		
		EBT	19	0.1	13	B		
		EBR	41	0.1	13	B		
		WBL	24	0.1	19	B		
		WBT	29	0.1	13	B		
		WBR	15	0.1	13	B		
Spruce Street	15th Avenue	NBL	155	0.5	24	C	15.1	B
		NBT	129	0.2	12	B		
		NBR	12	0.2	12	B		
		SBL	82	0.2	19	B		
		SBT	175	0.4	13	B		
		SBR	114	0.4	14	B		
		EBL	68	0.2	21	C		
		EBT	436	0.3	14	B		
		EBR	104	0.2	13	B		
		WBL	45	0.1	20	C		
		WBT	645	0.5	15	B		
		WBR	69	0.1	6	A		
O'Grady Road	Domano Boulevard	NBL	283	0.5	31	C	19.7	B
		NBT	37	0.1	8	A		
		NBR	26	0.1	8	A		
		SBL	38	0.1	24	C		
		SBT	138	0.3	20	C		
		SBR	18	0.3	20	C		
		EBL	72	0.3	27	C		
		EBT	496	0.5	22	C		
		EBR	303	0.3	4	A		
		WBL	47	0.2	28	C		
		WBT	245	0.2	20	C		
		WBR	9	0.0	20	C		
RecPlace Drive	Ferry Avenue	NBL	145	0.5	33	C	24.8	C
		NBT	1	0.0	23	C		
		NBR	92	0.2	24	C		
		SBL	169	0.6	37	D		
		SBT	1	0.0	23	C		
		SBR	215	0.5	29	C		
		EBL	66	0.1	27	C		
		EBT	226	0.2	17	B		
		EBR	98	0.2	17	B		
		WBL	201	0.3	28	C		
		WBT	153	0.1	17	B		
		WBR	140	0.2	17	B		

2016 Traffic Operations Summary

NS Street	EW Street	Dir	Volume	v/c	Delay (s)	LOS	Int Delay (s)	Int LOS
Old Cariboo Highway	Highway 16	NBL	210	0	27	C	11.9	B
		NBT	#N/A	#N/A	#N/A	#N/A		
		NBR	40	0	18	B		
		SBL	#N/A	#N/A	#N/A	#N/A		
		SBT	#N/A	#N/A	#N/A	#N/A		
		SBR	#N/A	#N/A	#N/A	#N/A		
		EBL	#N/A	#N/A	#N/A	#N/A		
		EBT	254	0	8	A		
		EBR	271	0	5	A		
		WBL	27	0	14	B		
		WBT	145	0	8	A		
		WBR	#N/A	#N/A	#N/A	#N/A		
Highway 16	1st Avenue	NBL	295	0.8	40	D	11.8	B
		NBT	#N/A	#N/A	#N/A	#N/A		
		NBR	232	0.4	15	B		
		SBL	#N/A	#N/A	#N/A	#N/A		
		SBT	#N/A	#N/A	#N/A	#N/A		
		SBR	#N/A	#N/A	#N/A	#N/A		
		EBL	#N/A	#N/A	#N/A	#N/A		
		EBT	701	0.4	6	A		
		EBR	178	0.2	5	A		
		WBL	206	0.5	16	B		
		WBT	783	0.4	6	A		
		WBR	#N/A	#N/A	#N/A	#N/A		
Highway 16	2nd Avenue	NBL	75	0.2	26	C	14.3	B
		NBT	398	0.2	8	A		
		NBR	#N/A	#N/A	#N/A	#N/A		
		SBL	#N/A	#N/A	#N/A	#N/A		
		SBT	252	0.3	17	B		
		SBR	170	0.3	17	B		
		EBL	#N/A	#N/A	#N/A	#N/A		
		EBT	#N/A	#N/A	#N/A	#N/A		
		EBR	#N/A	#N/A	#N/A	#N/A		
		WBL	62	0.1	15	B		
		WBT	351	0.3	16	B		
		WBR	19	0.0	9	A		
Highway 16	3rd Avenue	NBL	159	0.3	14	B	12.0	B
		NBT	387	0.2	7	A		
		NBR	174	0.2	7	A		
		SBL	0	0.0	14	B		
		SBT	313	0.1	7	A		
		SBR	0	0.0	7	A		
		EBL	61	0.2	24	C		
		EBT	96	0.3	18	B		
		EBR	70	0.4	19	B		
		WBL	111	0.4	26	C		
		WBT	112	0.2	17	B		
		WBR	25	0.4	19	B		
Highway 16	4th Avenue	NBL	#N/A	#N/A	#N/A	#N/A	10.3	B
		NBT	559	0.3	5	A		
		NBR	14	0.0	4	A		
		SBL	31	0.1	11	B		
		SBT	452	0.1	4	A		
		SBR	#N/A	#N/A	#N/A	#N/A		
		EBL	159	0.5	24	C		
		EBT	238	0.2	22	C		
		EBR	184	0.3	15	B		
		WBL	#N/A	#N/A	#N/A	#N/A		
		WBT	#N/A	#N/A	#N/A	#N/A		
		WBR	#N/A	#N/A	#N/A	#N/A		
Highway 16	6th Avenue	NBL	17	0.0	11	B	5.1	A
		NBT	574	0.2	5	A		
		NBR	0	0.0	4	A		
		SBL	0	0.0	11	B		
		SBT	600	0.2	5	A		
		SBR	0	0.0	4	A		
		EBL	0	0.0	27	C		
		EBT	0	0.0	22	C		
		EBR	0	0.0	22	C		
		WBL	0	0.0	27	C		
		WBT	0	0.0	22	C		
		WBR	0	0.0	22	C		

2016 Traffic Operations Summary

NS Street	EW Street	Dir	Volume	v/c	Delay (s)	LOS	Int Delay (s)	Int LOS
Highway 16	7th Avenue	NBL	0	0.0	17	B	12.2	B
		NBT	567	0.2	10	B		
		NBR	48	0.1	10	B		
		SBL	7	0.0	17	B		
		SBT	593	0.2	10	B		
		SBR	0	0.0	10	B		
		EBL	0	0.0	20	C		
		EBT	154	0.1	13	B		
		EBR	0	0.0	13	B		
		WBL	202	0.5	24	C		
		WBT	158	0.1	13	B		
		WBR	24	0.0	13	B		
Highway 16	15th Avenue	NBL	114	0.4	35	D	51.0	D
		NBT	472	0.6	34	C		
		NBR	229	0.5	28	C		
		SBL	0	0.0	36	D		
		SBT	817	0.9	63	E		
		SBR	314	0.3	5	A		
		EBL	218	0.7	52	D		
		EBT	284	0.7	49	D		
		EBR	72	0.3	35	D		
		WBL	400	1.0	81	F		
		WBT	614	0.9	67	E		
		WBR	22	0.1	29	C		
Highway 16	17th Avenue	NBL	0	0.0	23	C	10.8	B
		NBT	702	0.2	7	A		
		NBR	19	0.0	6	A		
		SBL	38	0.1	14	B		
		SBT	1247	0.5	9	A		
		SBR	4	0.0	6	A		
		EBL	59	0.3	26	C		
		EBT	121	0.2	18	B		
		EBR	6	0.0	11	B		
		WBL	43	0.2	25	C		
		WBT	189	0.5	21	C		
		WBR	54	0.5	21	C		
Highway 16	20th Avenue	NBL	51	0.4	35	D	19.2	B
		NBT	226	0.7	34	C		
		NBR	56	0.7	34	C		
		SBL	84	0.6	42	D		
		SBT	319	0.8	43	D		
		SBR	893	0.3	0	A		
		EBL	376	0.4	20	C		
		EBT	168	0.5	20	C		
		EBR	70	0.5	21	C		
		WBL	95	0.2	19	B		
		WBT	178	0.6	27	C		
		WBR	119	0.6	26	C		
Carney Street	Highway 16	NBL	#N/A	#N/A	#N/A	#N/A	8.9	A
		NBT	#N/A	#N/A	#N/A	#N/A		
		NBR	#N/A	#N/A	#N/A	#N/A		
		SBL	254	0.6	24	C		
		SBT	#N/A	#N/A	#N/A	#N/A		
		SBR	325	0.5	14	B		
		EBL	206	0.6	21	C		
		EBT	487	0.1	0	A		
		EBR	#N/A	#N/A	#N/A	#N/A		
		WBL	#N/A	#N/A	#N/A	#N/A		
		WBT	870	0.4	8	A		
		WBR	329	0.2	0	A		
Highway 16	Highway 97	NBL	275	0.5	43	D	45.6	D
		NBT	503	0.3	30	C		
		NBR	1	0.0	7	A		
		SBL	128	0.5	42	D		
		SBT	1067	0.7	46	D		
		SBR	0	0.0	8	A		
		EBL	59	0.4	47	D		
		EBT	571	0.9	72	E		
		EBR	542	0.6	16	B		
		WBL	173	0.8	66	E		
		WBT	680	0.8	62	E		
		WBR	131	0.1	7	A		

2016 Traffic Operations Summary

NS Street	EW Street	Dir	Volume	v/c	Delay (s)	LOS	Int Delay (s)	Int LOS
Highway 16	Ferry Avenue	NBL	0	0.0	61	E	42.5	D
		NBT	803	0.4	30	C		
		NBR	336	0.3	4	A		
		SBL	32	0.1	59	E		
		SBT	1669	0.8	49	D		
		SBR	53	0.1	9	A		
		EBL	20	0.1	61	E		
		EBT	199	0.4	55	E		
		EBR	0	0.0	53	D		
		WBL	556	0.8	66	E		
		WBT	121	0.1	37	D		
		WBR	71	0.1	15	B		
Highway 16	Vance/ Cowart Road	NBL	81	0.3	45	D	31.1	C
		NBT	993	0.5	26	C		
		NBR	7	0.0	22	C		
		SBL	225	0.5	39	D		
		SBT	1889	0.8	35	D		
		SBR	114	0.1	3	A		
		EBL	125	0.4	46	D		
		EBT	105	0.3	28	C		
		EBR	131	0.3	28	C		
		WBL	9	0.0	44	D		
		WBT	16	0.1	40	D		
		WBR	161	0.2	11	B		
Highway 16	Tyner/Domano Boulevard	NBL	16	0.1	52	D	33.9	C
		NBT	639	0.6	41	D		
		NBR	44	0.1	12	B		
		SBL	351	0.6	41	D		
		SBT	1188	0.7	29	C		
		SBR	313	0.3	4	A		
		EBL	143	0.7	63	E		
		EBT	324	0.6	49	D		
		EBR	6	0.0	20	C		
		WBL	108	0.5	56	E		
		WBT	324	0.6	49	D		
		WBR	298	0.3	9	A		
Highway 16	Westgate Avenue	NBL	22	0.1	14	B	11.4	B
		NBT	613	0.3	9	A		
		NBR	10	0.0	3	A		
		SBL	294	0.5	32	C		
		SBT	820	0.3	4	A		
		SBR	0	0.0	3	A		
		EBL	0	0.0	33	C		
		EBT	30	0.1	29	C		
		EBR	0	0.0	29	C		
		WBL	38	0.2	34	C		
		WBT	8	0.0	29	C		
		WBR	227	0.3	11	B		
Highway 16	Gauthier/ Bunce Road	NBL	3	0.0	27	C	22.1	C
		NBT	495	0.3	11	B		
		NBR	128	0.2	10	B		
		SBL	89	0.1	27	C		
		SBT	653	0.4	12	B		
		SBR	55	0.1	10	B		
		EBL	40	0.3	37	D		
		EBT	14	0.1	31	C		
		EBR	14	0.1	31	C		
		WBL	172	1.0	92	F		
		WBT	35	0.4	32	C		
		WBR	63	0.4	33	C		
Highway 97	Handlen Road	NBL	158	0.4	14	B	12.2	B
		NBT	572	0.3	8	A		
		NBR	46	0.1	7	A		
		SBL	22	0.1	14	B		
		SBT	366	0.2	7	A		
		SBR	101	0.1	7	A		
		EBL	146	0.5	29	C		
		EBT	25	0.2	19	B		
		EBR	86	0.2	19	B		
		WBL	75	0.3	25	C		
		WBT	28	0.2	19	B		
		WBR	58	0.2	19	B		

2016 Traffic Operations Summary

NS Street	EW Street	Dir	Volume	v/c	Delay (s)	LOS	Int Delay (s)	Int LOS
Highway 97	Austin Road	NBL	313	0.6	44	D	26.3	C
		NBT	637	0.5	24	C		
		NBR	202	0.2	5	A		
		SBL	27	0.1	35	D		
		SBT	457	0.4	21	C		
		SBR	61	0.1	5	A		
		EBL	120	0.4	41	D		
		EBT	137	0.5	39	D		
		EBR	118	0.1	10	B		
		WBL	113	0.4	41	D		
		WBT	84	0.3	36	D		
		WBR	20	0.0	10	B		
Highway 97	Monterey Road	NBL	63	0.2	12	B	8.8	A
		NBT	1125	0.5	9	A		
		NBR	13	0.0	2	A		
		SBL	43	0.2	19	B		
		SBT	645	0.3	6	A		
		SBR	0	0.0	2	A		
		EBL	0	0.0	25	C		
		EBT	10	0.1	20	C		
		EBR	39	0.1	20	C		
		WBL	7	0.0	25	C		
		WBT	5	0.1	20	C		
		WBR	26	0.1	20	C		
Highway 97	Northwood Pulp Mill Road	NBL	18	0.1	18	B	25.6	C
		NBT	1403	0.8	34	C		
		NBR	279	0.2	0	A		
		SBL	17	0.1	31	C		
		SBT	532	0.3	11	B		
		SBR	3	0.0	10	B		
		EBL	6	0.0	22	C		
		EBT	1	0.0	16	B		
		EBR	12	0.0	16	B		
		WBL	273	0.7	38	D		
		WBT	1	0.0	16	B		
		WBR	9	0.0	16	B		
Highway 97 NB Ramp	North Nechako Road	NBL	391	0.5	14	B	13.0	B
		NBT	2	0.0	10	B		
		NBR	156	0.2	4	A		
		SBL	#N/A	#N/A	#N/A	#N/A		
		SBT	#N/A	#N/A	#N/A	#N/A		
		SBR	#N/A	#N/A	#N/A	#N/A		
		EBL	37	0.1	22	C		
		EBT	312	0.2	15	B		
		EBR	#N/A	#N/A	#N/A	#N/A		
		WBL	#N/A	#N/A	#N/A	#N/A		
		WBT	459	0.4	15	B		
		WBR	70	0.0	0	A		
Highway 97 SB Ramp	North Nechako Road	NBL	#N/A	#N/A	#N/A	#N/A	12.2	B
		NBT	#N/A	#N/A	#N/A	#N/A		
		NBR	#N/A	#N/A	#N/A	#N/A		
		SBL	#N/A	#N/A	#N/A	#N/A		
		SBT	#N/A	#N/A	#N/A	#N/A		
		SBR	#N/A	#N/A	#N/A	#N/A		
		EBL	37	0.1	17	B		
		EBT	177	0.1	10	B		
		EBR	183	0.2	10	B		
		WBL	215	0.5	19	B		
		WBT	588	0.4	11	B		
		WBR	46	0.1	10	B		
Highway 97	10th Avenue	NBL	263	0.7	49	D	36.6	D
		NBT	923	0.7	36	D		
		NBR	73	0.1	14	B		
		SBL	48	0.1	35	D		
		SBT	770	0.6	29	C		
		SBR	1	0.0	23	C		
		EBL	85	0.9	95	F		
		EBT	107	0.3	34	C		
		EBR	100	0.1	9	A		
		WBL	137	0.7	53	D		
		WBT	303	0.7	47	D		
		WBR	84	0.1	9	A		

2016 Traffic Operations Summary

NS Street	EW Street	Dir	Volume	v/c	Delay (s)	LOS	Int Delay (s)	Int LOS
Highway 97	15th Avenue	NBL	290	0.9	74	E	54.1	D
		NBT	864	0.8	50	D		
		NBR	77	0.2	27	C		
		SBL	156	0.7	59	E		
		SBT	719	0.8	52	D		
		SBR	132	0.2	12	B		
		EBL	154	0.7	64	E		
		EBT	498	0.7	50	D		
		EBR	174	0.2	11	B		
		WBL	226	0.9	82	F		
		WBT	726	0.9	71	E		
		WBR	103	0.1	12	B		
Highway 97	22nd Avenue	NBL	130	0.8	76	E	30.5	C
		NBT	915	0.5	16	B		
		NBR	35	0.0	13	B		
		SBL	35	0.3	51	D		
		SBT	1017	0.5	18	B		
		SBR	110	0.1	5	A		
		EBL	282	1.0	91	F		
		EBT	116	0.6	45	D		
		EBR	119	0.6	46	D		
		WBL	51	0.6	57	E		
		WBT	106	0.3	38	D		
		WBR	0	0.0	37	D		
Highway 97	Railway Road	NBL	48	0.3	31	C	29.0	C
		NBT	653	0.6	29	C		
		NBR	#N/A	#N/A	#N/A	#N/A		
		SBL	#N/A	#N/A	#N/A	#N/A		
		SBT	581	0.6	25	C		
		SBR	461	0.3	0	A		
		EBL	834	0.9	51	D		
		EBT	#N/A	#N/A	#N/A	#N/A		
		EBR	93	0.1	0	A		
		WBL	#N/A	#N/A	#N/A	#N/A		
		WBT	#N/A	#N/A	#N/A	#N/A		
		WBR	#N/A	#N/A	#N/A	#N/A		
Highway 97	Terminal Boulevard	NBL	16	0.0	18	B	11.9	B
		NBT	551	0.3	11	B		
		NBR	3	0.0	6	A		
		SBL	127	0.4	19	B		
		SBT	536	0.3	11	B		
		SBR	12	0.0	6	A		
		EBL	0	0.0	22	C		
		EBT	8	0.0	16	B		
		EBR	44	0.1	10	B		
		WBL	12	0.0	22	C		
		WBT	6	0.0	16	B		
		WBR	0	0.0	10	B		
Foothills Boulevard	North Nechako Road	NBL	197	0.3	29	C	25.8	C
		NBT	669	0.6	35	D		
		NBR	44	0.1	14	B		
		SBL	173	0.3	29	C		
		SBT	233	0.4	28	C		
		SBR	27	0.0	14	B		
		EBL	27	0.1	35	D		
		EBT	89	0.2	27	C		
		EBR	82	0.1	0	A		
		WBL	28	0.1	34	C		
		WBT	178	0.4	28	C		
		WBR	286	0.3	5	A		
Foothills Boulevard	15th Avnenue	NBL	33	0.1	41	D	44.0	D
		NBT	211	0.3	38	D		
		NBR	23	0.1	37	D		
		SBL	115	0.2	37	D		
		SBT	133	0.2	33	C		
		SBR	193	0.5	36	D		
		EBL	229	0.6	51	D		
		EBT	211	0.3	38	D		
		EBR	41	0.1	37	D		
		WBL	31	0.1	41	D		
		WBT	261	0.6	44	D		
		WBR	273	0.8	64	E		

2016 Traffic Operations Summary

NS Street	EW Street	Dir	Volume	v/c	Delay (s)	LOS	Int Delay (s)	Int LOS
Tabor Boulevard	5th Avenue	NBL	78	0.1	23	C	20.2	C
		NBT	260	0.4	24	C		
		NBR	58	0.2	23	C		
		SBL	120	0.2	23	C		
		SBT	187	0.3	23	C		
		SBR	20	0.1	23	C		
		EBL	25	0.1	23	C		
		EBT	160	0.1	16	B		
		EBR	19	0.0	16	B		
		WBL	87	0.3	22	C		
		WBT	272	0.3	16	B		
		WBR	162	0.3	16	B		
Ospika Boulevard	5th Avenue	NBL	146	0.3	31	C	38.6	D
		NBT	396	0.5	25	C		
		NBR	137	0.3	23	C		
		SBL	399	0.7	41	D		
		SBT	345	0.3	20	C		
		SBR	15	0.0	19	B		
		EBL	0	0.0	43	D		
		EBT	387	0.4	24	C		
		EBR	0	0.0	23	C		
		WBL	153	0.7	44	D		
		WBT	541	0.9	64	E		
		WBR	382	0.8	53	D		
Ospika Boulevard	Rainbow Drive	NBL	39	0.1	17	B	11.3	B
		NBT	448	0.3	11	B		
		NBR	57	0.1	10	B		
		SBL	18	0.1	17	B		
		SBT	479	0.3	11	B		
		SBR	0	0.0	10	B		
		EBL	#N/A	#N/A	#N/A	#N/A		
		EBT	#N/A	#N/A	#N/A	#N/A		
		EBR	#N/A	#N/A	#N/A	#N/A		
		WBL	#N/A	#N/A	#N/A	#N/A		
		WBT	#N/A	#N/A	#N/A	#N/A		
		WBR	#N/A	#N/A	#N/A	#N/A		
Ospika Boulevard	15th Avenue	NBL	410	1.0	100	F	40.1	D
		NBT	403	0.5	27	C		
		NBR	146	0.3	27	C		
		SBL	146	0.4	42	D		
		SBT	400	0.5	30	C		
		SBR	94	0.2	26	C		
		EBL	46	0.2	42	D		
		EBT	323	0.4	27	C		
		EBR	163	0.4	27	C		
		WBL	198	0.6	50	D		
		WBT	624	0.6	35	D		
		WBR	203	0.3	17	B		
Ospika Boulevard	18th Avenue	NBL	158	0.6	45	D	33.9	C
		NBT	729	0.7	36	D		
		NBR	44	0.1	23	C		
		SBL	30	0.1	39	D		
		SBT	637	0.6	33	C		
		SBR	93	0.2	23	C		
		EBL	116	0.4	41	D		
		EBT	47	0.2	17	B		
		EBR	94	0.2	17	B		
		WBL	198	0.6	38	D		
		WBT	129	0.5	31	C		
		WBR	114	0.5	31	C		
Ospika Boulevard	Massey Drive	NBL	0	0.0	42	D	33.4	C
		NBT	514	0.5	35	D		
		NBR	220	0.2	7	A		
		SBL	191	0.5	41	D		
		SBT	697	0.6	35	D		
		SBR	56	0.1	7	A		
		EBL	92	0.2	42	D		
		EBT	74	0.1	38	D		
		EBR	14	0.0	14	B		
		WBL	361	0.8	58	E		
		WBT	356	0.4	36	D		
		WBR	288	0.3	10	B		

2016 Traffic Operations Summary

NS Street	EW Street	Dir	Volume	v/c	Delay (s)	LOS	Int Delay (s)	Int LOS
Ospika Boulevard	Tyner Boulevard	NBL	248	0.8	45	D	15.9	B
		NBT	486	0.3	12	B		
		NBR	12	0.0	11	B		
		SBL	134	0.4	20	C		
		SBT	612	0.4	13	B		
		SBR	132	0.2	12	B		
		EBL	160	0.5	22	C		
		EBT	326	0.2	12	B		
		EBR	248	0.4	12	B		
		WBL	3	0.0	18	B		
		WBT	526	0.3	12	B		
		WBR	56	0.1	11	B		
Lyon Street	5th Avenue	NBL	148	0.6	36	D	22.7	C
		NBT	45	0.3	25	C		
		NBR	134	0.4	26	C		
		SBL	85	0.4	34	C		
		SBT	83	0.2	24	C		
		SBR	5	0.1	24	C		
		EBL	0	0.0	29	C		
		EBT	930	0.7	31	C		
		EBR	3	0.0	9	A		
		WBL	65	0.2	32	C		
		WBT	1109	0.5	12	B		
		WBR	7	0.0	7	A		
Westwood Drive	Massey Drive	NBL	237	0.5	49	D	40.5	D
		NBT	115	0.1	31	C		
		NBR	232	0.5	35	D		
		SBL	106	0.2	50	D		
		SBT	138	0.2	35	D		
		SBR	53	0.1	35	D		
		EBL	0	0.0	49	D		
		EBT	324	0.5	39	D		
		EBR	102	0.3	37	D		
		WBL	246	0.6	53	D		
		WBT	475	0.5	37	D		
		WBR	28	0.1	33	C		
Westwood Drive	Ferry Avenue	NBL	36	0.1	22	C	19.7	B
		NBT	355	0.6	24	C		
		NBR	34	0.5	21	C		
		SBL	65	0.2	32	C		
		SBT	132	0.3	9	A		
		SBR	134	0.3	9	A		
		EBL	6	0.0	26	C		
		EBT	118	0.1	20	C		
		EBR	29	0.1	20	C		
		WBL	44	0.1	26	C		
		WBT	106	0.1	20	C		
		WBR	110	0.2	20	C		
Cameron Street	Carney Street/ River Road	NBL	425	0.6	20	C	13.0	B
		NBT	#N/A	#N/A	#N/A	#N/A		
		NBR	96	0.1	6	A		
		SBL	#N/A	#N/A	#N/A	#N/A		
		SBT	#N/A	#N/A	#N/A	#N/A		
		SBR	#N/A	#N/A	#N/A	#N/A		
		EBL	#N/A	#N/A	#N/A	#N/A		
		EBT	250	0.3	12	B		
		EBR	1011	0.6	10	B		
		WBL	50	0.2	19	B		
		WBT	392	0.5	15	B		
		WBR	#N/A	#N/A	#N/A	#N/A		
Carney Street	5th Avenue	NBL	64	0.4	37	D	30.8	C
		NBT	140	0.3	28	C		
		NBR	0	0.0	27	C		
		SBL	7	0.0	35	D		
		SBT	214	0.3	28	C		
		SBR	322	0.3	5	A		
		EBL	167	0.4	28	C		
		EBT	809	0.4	8	A		
		EBR	30	0.0	7	A		
		WBL	47	0.1	28	C		
		WBT	706	1.0	73	E		
		WBR	225	0.5	26	C		

2016 Traffic Operations Summary

NS Street	EW Street	Dir	Volume	v/c	Delay (s)	LOS	Int Delay (s)	Int LOS
Carney Street	15th Avenue	NBL	#N/A	#N/A	#N/A	#N/A	21.6	C
		NBT	#N/A	#N/A	#N/A	#N/A		
		NBR	#N/A	#N/A	#N/A	#N/A		
		SBL	#N/A	#N/A	#N/A	#N/A		
		SBT	#N/A	#N/A	#N/A	#N/A		
		SBR	#N/A	#N/A	#N/A	#N/A		
		EBL	33	0.2	27	C		
		EBT	539	0.4	13	B		
		EBR	87	0.1	12	B		
		WBL	81	0.3	20	C		
		WBT	1048	0.7	27	C		
		WBR	24	0.0	12	B		
Carney Street	Massey Drive	NBL	190	0.6	47	D	42.3	D
		NBT	207	0.4	29	C		
		NBR	105	0.1	7	A		
		SBL	48	0.1	40	D		
		SBT	202	0.7	44	D		
		SBR	167	0.7	45	D		
		EBL	127	0.4	41	D		
		EBT	484	0.8	50	D		
		EBR	170	0.5	34	C		
		WBL	164	0.5	44	D		
		WBT	616	0.7	49	D		
		WBR	50	0.1	9	A		
Winnipeg Street	4th Avenue	NBL	#N/A	#N/A	#N/A	#N/A	12.1	B
		NBT	148	0.1	12	B		
		NBR	96	0.2	12	B		
		SBL	26	0.1	18	B		
		SBT	411	0.2	12	B		
		SBR	#N/A	#N/A	#N/A	#N/A		
		EBL	50	0.1	12	B		
		EBT	531	0.2	12	B		
		EBR	146	0.2	12	B		
		WBL	#N/A	#N/A	#N/A	#N/A		
		WBT	#N/A	#N/A	#N/A	#N/A		
		WBR	#N/A	#N/A	#N/A	#N/A		
Winnipeg Street	13th Avenue	NBL	23	0.1	26	C	14.3	B
		NBT	327	0.3	17	B		
		NBR	105	0.2	17	B		
		SBL	105	0.4	30	C		
		SBT	628	0.4	11	B		
		SBR	97	0.1	10	B		
		EBL	42	0.2	21	C		
		EBT	134	0.3	14	B		
		EBR	63	0.3	14	B		
		WBL	123	0.4	22	C		
		WBT	132	0.2	14	B		
		WBR	149	0.1	3	A		
Brunswick Street	2nd Avenue	NBL	98	0.2	17	B	12.3	B
		NBT	88	0.2	10	B		
		NBR	75	0.0	10	B		
		SBL	0	0.0	17	B		
		SBT	138	0.2	10	B		
		SBR	0	0.0	10	B		
		EBL	#N/A	#N/A	#N/A	#N/A		
		EBT	#N/A	#N/A	#N/A	#N/A		
		EBR	#N/A	#N/A	#N/A	#N/A		
		WBL	16	0.0	13	B		
		WBT	334	0.1	13	B		
		WBR	0	0.0	13	B		
Brunswick Street	4th Avenue	NBL	#N/A	#N/A	#N/A	#N/A	14.1	B
		NBT	33	0.1	11	B		
		NBR	34	0.1	11	B		
		SBL	65	0.2	17	B		
		SBT	68	0.1	11	B		
		SBR	#N/A	#N/A	#N/A	#N/A		
		EBL	0	0.0	13	B		
		EBT	283	0.4	15	B		
		EBR	0	0.0	13	B		
		WBL	14	0.1	21	C		
		WBT	#N/A	#N/A	#N/A	#N/A		
		WBR	118	0.2	13	B		

2016 Traffic Operations Summary

NS Street	EW Street	Dir	Volume	v/c	Delay (s)	LOS	Int Delay (s)	Int LOS
Dominion Street	2nd Avenue	NBL	101	0.2	14	B	14.2	B
		NBT	178	0.1	8	A		
		NBR	0	0.0	8	A		
		SBL	74	0.2	14	B		
		SBT	91	0.0	8	A		
		SBR	5	0.0	8	A		
		EBL	0	0.0	28	C		
		EBT	43	0.1	16	B		
		EBR	1	0.0	16	B		
		WBL	0	0.0	22	C		
		WBT	283	0.5	20	C		
		WBR	0	0.0	16	B		
Dominion Street	4th Avenue	NBL	29	0.1	16	B	14.1	B
		NBT	219	0.1	10	B		
		NBR	82	0.1	10	B		
		SBL	5	0.0	16	B		
		SBT	106	0.0	10	B		
		SBR	24	0.0	14	B		
		EBL	25	0.1	20	C		
		EBT	250	0.5	18	B		
		EBR	76	0.5	19	B		
		WBL	6	0.0	27	C		
		WBT	19	0.0	14	B		
		WBR	0	0.0	14	B		
Dominion Street	7th Avenue	NBL	16	0.0	15	B	10.4	B
		NBT	209	0.1	9	A		
		NBR	0	0.0	9	A		
		SBL	0	0.0	15	B		
		SBT	258	0.1	9	A		
		SBR	49	0.1	9	A		
		EBL	31	0.1	17	B		
		EBT	77	0.0	11	B		
		EBR	54	0.1	11	B		
		WBL	54	0.1	16	B		
		WBT	175	0.1	11	B		
		WBR	0	0.0	11	B		
Queensway	2nd Avenue	NBL	113	0.2	11	B	11.7	B
		NBT	194	0.1	6	A		
		NBR	68	0.1	6	A		
		SBL	17	0.0	11	B		
		SBT	184	0.1	6	A		
		SBR	12	0.0	6	A		
		EBL	0	0.0	27	C		
		EBT	3	0.0	20	C		
		EBR	0	0.0	20	C		
		WBL	106	0.4	26	C		
		WBT	92	0.3	20	C		
		WBR	42	0.3	21	C		
Queensway	4th Avenue	NBL	0	0.0	25	C	16.7	B
		NBT	241	0.2	18	B		
		NBR	59	0.1	18	B		
		SBL	13	0.1	24	C		
		SBT	368	0.3	18	B		
		SBR	1	0.0	18	B		
		EBL	20	0.1	15	B		
		EBT	153	0.3	9	A		
		EBR	119	0.3	9	A		
		WBL	266	0.7	28	C		
		WBT	91	0.2	8	A		
		WBR	114	0.2	8	A		
Queensway	5th Avenue	NBL	126	0.3	14	B	10.2	B
		NBT	300	0.2	6	A		
		NBR	0	0.0	6	A		
		SBL	0	0.0	12	B		
		SBT	699	0.4	7	A		
		SBR	55	0.1	6	A		
		EBL	0	0.0	23	C		
		EBT	92	0.1	16	B		
		EBR	188	0.4	18	B		
		WBL	41	0.1	22	C		
		WBT	105	0.2	17	B		
		WBR	0	0.0	16	B		

2016 Traffic Operations Summary

NS Street	EW Street	Dir	Volume	v/c	Delay (s)	LOS	Int Delay (s)	Int LOS
Queensway	17th Avenue	NBL	33	0.2	25	C	12.1	B
		NBT	626	0.3	11	B		
		NBR	0	0.0	10	B		
		SBL	0	0.0	18	B		
		SBT	1000	0.4	12	B		
		SBR	83	0.1	10	B		
		EBL	69	0.2	19	B		
		EBT	39	0.1	13	B		
		EBR	29	0.1	13	B		
		WBL	0	0.0	19	B		
		WBT	27	0.1	13	B		
		WBR	30	0.1	13	B		
Queensway	20th Avenue	NBL	31	0.2	24	C	12.2	B
		NBT	522	0.3	10	B		
		NBR	15	0.0	10	B		
		SBL	16	0.1	18	B		
		SBT	780	0.4	12	B		
		SBR	234	0.3	11	B		
		EBL	119	0.3	19	B		
		EBT	17	0.1	13	B		
		EBR	45	0.1	13	B		
		WBL	27	0.1	19	B		
		WBT	35	0.1	13	B		
		WBR	18	0.1	13	B		
Upland Street/ Lansdowne Road	Ferry Avenue	NBL	42	0.4	35	D	39.6	D
		NBT	179	0.5	16	B		
		NBR	151	0.5	16	B		
		SBL	38	0.1	22	C		
		SBT	509	0.9	48	D		
		SBR	121	0.9	49	D		
		EBL	114	0.8	60	E		
		EBT	425	0.7	24	C		
		EBR	29	0.4	15	B		
		WBL	254	1.0	90	F		
		WBT	586	0.8	32	C		
		WBR	0	0.0	11	B		
Spruce Street	15th Avenue	NBL	114	0.7	37	D	17.0	B
		NBT	216	0.3	13	B		
		NBR	22	0.3	13	B		
		SBL	69	0.2	20	C		
		SBT	288	0.6	18	B		
		SBR	138	0.6	19	B		
		EBL	79	0.4	28	C		
		EBT	414	0.3	13	B		
		EBR	112	0.2	13	B		
		WBL	58	0.2	20	C		
		WBT	736	0.5	17	B		
		WBR	92	0.1	6	A		
O'Grady Road	Domano Boulevard	NBL	296	0.6	34	C	19.9	B
		NBT	52	0.1	8	A		
		NBR	44	0.1	8	A		
		SBL	40	0.1	24	C		
		SBT	143	0.4	22	C		
		SBR	89	0.4	22	C		
		EBL	114	0.5	30	C		
		EBT	266	0.3	20	C		
		EBR	339	0.3	4	A		
		WBL	58	0.2	27	C		
		WBT	346	0.3	20	C		
		WBR	16	0.0	20	C		
RecPlace Drive	Ferry Avenue	NBL	117	0.6	41	D	25.0	C
		NBT	85	0.3	24	C		
		NBR	52	0.3	24	C		
		SBL	40	0.2	30	C		
		SBT	186	0.5	27	C		
		SBR	33	0.5	27	C		
		EBL	38	0.1	27	C		
		EBT	127	0.1	16	B		
		EBR	51	0.1	16	B		
		WBL	65	0.1	27	C		
		WBT	110	0.1	16	B		
		WBR	0	0.0	16	B		

2026 Traffic Operations Summary

NS Street	EW Street	Dir	Volume	v/c	Delay (s)	LOS	Int Delay (s)	Int LOS
Old Cariboo Highway	Highway 16	NBL	204	0	27	C	10.9	B
		NBT	#N/A	#N/A	#N/A	#N/A		
		NBR	22	0	18	B		
		SBL	#N/A	#N/A	#N/A	#N/A		
		SBT	#N/A	#N/A	#N/A	#N/A		
		SBR	#N/A	#N/A	#N/A	#N/A		
		EBL	#N/A	#N/A	#N/A	#N/A		
		EBT	335	0	8	A		
		EBR	327	0	5	A		
		WBL	14	0	15	B		
		WBT	190	0	8	A		
		WBR	#N/A	#N/A	#N/A	#N/A		
Boundary Road	Highway 16	NBL	293	0.4	14	B	10.2	B
		NBT	#N/A	#N/A	#N/A	#N/A		
		NBR	97	0.1	7	A		
		SBL	#N/A	#N/A	#N/A	#N/A		
		SBT	#N/A	#N/A	#N/A	#N/A		
		SBR	#N/A	#N/A	#N/A	#N/A		
		EBL	#N/A	#N/A	#N/A	#N/A		
		EBT	564	0.4	12	B		
		EBR	249	0.2	0	A		
		WBL	64	0.2	18	B		
		WBT	330	0.2	11	B		
		WBR	#N/A	#N/A	#N/A	#N/A		
Highway 16	1st Avenue	NBL	449	1.0	74	E	20.2	C
		NBT	#N/A	#N/A	#N/A	#N/A		
		NBR	365	0.5	17	B		
		SBL	#N/A	#N/A	#N/A	#N/A		
		SBT	#N/A	#N/A	#N/A	#N/A		
		SBR	#N/A	#N/A	#N/A	#N/A		
		EBL	#N/A	#N/A	#N/A	#N/A		
		EBT	756	0.4	8	A		
		EBR	198	0.2	7	A		
		WBL	180	0.5	18	B		
		WBT	870	0.4	8	A		
		WBR	#N/A	#N/A	#N/A	#N/A		
Highway 16	2nd Avenue	NBL	256	0.5	29	C	16.3	B
		NBT	660	0.4	9	A		
		NBR	#N/A	#N/A	#N/A	#N/A		
		SBL	#N/A	#N/A	#N/A	#N/A		
		SBT	238	0.3	17	B		
		SBR	262	0.5	21	C		
		EBL	#N/A	#N/A	#N/A	#N/A		
		EBT	#N/A	#N/A	#N/A	#N/A		
		EBR	#N/A	#N/A	#N/A	#N/A		
		WBL	128	0.2	15	B		
		WBT	589	0.5	18	B		
		WBR	86	0.1	9	A		
Highway 16	3rd Avenue	NBL	39	0.1	13	B	11.9	B
		NBT	775	0.3	7	A		
		NBR	160	0.2	7	A		
		SBL	0	0.0	15	B		
		SBT	331	0.1	7	A		
		SBR	35	0.0	7	A		
		EBL	81	0.3	25	C		
		EBT	106	0.3	18	B		
		EBR	83	0.5	20	C		
		WBL	146	0.6	30	C		
		WBT	135	0.4	18	B		
		WBR	59	0.5	20	C		
Highway 16	4th Avenue	NBL	#N/A	#N/A	#N/A	#N/A	11.0	B
		NBT	810	0.4	5	A		
		NBR	2	0.0	4	A		
		SBL	31	0.1	12	B		
		SBT	527	0.2	5	A		
		SBR	#N/A	#N/A	#N/A	#N/A		
		EBL	182	0.5	26	C		
		EBT	384	0.3	22	C		
		EBR	225	0.4	16	B		
		WBL	#N/A	#N/A	#N/A	#N/A		
		WBT	#N/A	#N/A	#N/A	#N/A		
		WBR	#N/A	#N/A	#N/A	#N/A		

2026 Traffic Operations Summary

NS Street	EW Street	Dir	Volume	v/c	Delay (s)	LOS	Int Delay (s)	Int LOS
Highway 16	6th Avenue	NBL	34	0.1	11	B	5.6	A
		NBT	856	0.3	5	A		
		NBR	0	0.0	4	A		
		SBL	0	0.0	12	B		
		SBT	663	0.2	5	A		
		SBR	10	0.0	4	A		
		EBL	0	0.0	27	C		
		EBT	0	0.0	22	C		
		EBR	0	0.0	22	C		
		WBL	0	0.0	27	C		
		WBT	44	0.1	22	C		
		WBR	0	0.0	22	C		
Highway 16	7th Avenue	NBL	0	0.0	18	B	12.7	B
		NBT	835	0.3	11	B		
		NBR	70	0.1	10	B		
		SBL	2	0.0	23	C		
		SBT	661	0.3	10	B		
		SBR	0	0.0	10	B		
		EBL	7	0.0	20	C		
		EBT	181	0.1	13	B		
		EBR	1	0.0	13	B		
		WBL	219	0.6	27	C		
		WBT	157	0.1	13	B		
		WBR	47	0.1	13	B		
Highway 16	15th Avenue	NBL	134	0.3	22	C	49.9	D
		NBT	621	0.7	28	C		
		NBR	289	0.5	20	C		
		SBL	17	0.1	26	C		
		SBT	933	1.0	69	E		
		SBR	452	0.5	12	B		
		EBL	306	0.7	40	D		
		EBT	425	0.7	35	D		
		EBR	86	0.3	23	C		
		WBL	538	1.0	91	F		
		WBT	744	1.0	74	E		
		WBR	92	0.2	20	C		
Highway 16	17th Avenue	NBL	0	0.0	31	C	13.4	B
		NBT	931	0.3	7	A		
		NBR	20	0.0	6	A		
		SBL	51	0.2	15	B		
		SBT	1493	0.6	14	B		
		SBR	13	0.0	6	A		
		EBL	40	0.2	26	C		
		EBT	132	0.2	18	B		
		EBR	4	0.0	11	B		
		WBL	144	0.6	30	C		
		WBT	165	0.5	20	C		
		WBR	73	0.5	21	C		
Spruce Street	Highway 16	NBL	94	0.7	45	D	15.9	B
		NBT	194	0.6	23	C		
		NBR	91	0.6	23	C		
		SBL	38	0.2	29	C		
		SBT	215	0.7	32	C		
		SBR	152	0.7	34	C		
		EBL	109	0.7	35	D		
		EBT	654	0.5	9	A		
		EBR	0	0.0	6	A		
		WBL	1	0.0	22	C		
		WBT	1444	0.5	10	B		
		WBR	49	0.1	6	A		
Carney Street	Highway 16	NBL	#N/A	#N/A	#N/A	#N/A	14.0	B
		NBT	#N/A	#N/A	#N/A	#N/A		
		NBR	#N/A	#N/A	#N/A	#N/A		
		SBL	301	0.7	29	C		
		SBT	#N/A	#N/A	#N/A	#N/A		
		SBR	376	0.6	17	B		
		EBL	147	0.8	45	D		
		EBT	616	0.2	0	A		
		EBR	#N/A	#N/A	#N/A	#N/A		
		WBL	#N/A	#N/A	#N/A	#N/A		
		WBT	1294	0.6	16	B		
		WBR	305	0.2	0	A		

2026 Traffic Operations Summary

NS Street	EW Street	Dir	Volume	v/c	Delay (s)	LOS	Int Delay (s)	Int LOS
Highway 16	Highway 97	NBL	261	0.6	49	D	52.8	D
		NBT	547	0.4	33	C		
		NBR	1	0.0	7	A		
		SBL	215	0.8	67	E		
		SBT	1022	0.7	45	D		
		SBR	127	0.1	9	A		
		EBL	88	0.6	50	D		
		EBT	683	0.9	75	E		
		EBR	585	0.7	20	C		
		WBL	230	0.9	68	E		
		WBT	993	1.0	82	F		
		WBR	128	0.1	8	A		
Highway 16	Ferry Avenue	NBL	0	0.0	61	E	44.9	D
		NBT	851	0.4	30	C		
		NBR	443	0.4	5	A		
		SBL	51	0.1	59	E		
		SBT	1722	0.8	52	D		
		SBR	112	0.1	9	A		
		EBL	36	0.2	61	E		
		EBT	219	0.6	59	E		
		EBR	90	0.4	55	E		
		WBL	614	0.9	77	E		
		WBT	144	0.1	37	D		
		WBR	59	0.1	15	B		
Highway 16	Vance/ Cowart Road	NBL	81	0.3	45	D	35.6	D
		NBT	1140	0.6	29	C		
		NBR	8	0.0	22	C		
		SBL	292	0.7	47	D		
		SBT	2023	0.8	41	D		
		SBR	121	0.1	3	A		
		EBL	128	0.4	46	D		
		EBT	165	0.6	36	D		
		EBR	225	0.5	31	C		
		WBL	5	0.1	48	D		
		WBT	15	0.1	40	D		
		WBR	156	0.2	11	B		
Highway 16	Tyner/ Domano Boulevard	NBL	18	0.1	52	D	38.1	D
		NBT	746	0.7	48	D		
		NBR	41	0.1	12	B		
		SBL	248	0.5	34	C		
		SBT	1430	0.8	43	D		
		SBR	367	0.3	4	A		
		EBL	162	0.6	62	E		
		EBT	275	0.5	46	D		
		EBR	1	0.0	20	C		
		WBL	84	0.3	53	D		
		WBT	278	0.5	46	D		
		WBR	321	0.3	9	A		
Highway 16	Westgate Avenue	NBL	87	0.2	15	B	12.8	B
		NBT	520	0.3	9	A		
		NBR	12	0.0	3	A		
		SBL	90	0.2	32	C		
		SBT	692	0.3	5	A		
		SBR	73	0.1	4	A		
		EBL	62	0.5	38	D		
		EBT	79	0.5	29	C		
		EBR	85	0.5	29	C		
		WBL	21	0.1	32	C		
		WBT	150	0.3	26	C		
		WBR	199	0.3	11	B		
Highway 16	Gauthier/Bunce Road	NBL	4	0.0	34	C	14.7	B
		NBT	710	0.4	12	B		
		NBR	43	0.1	10	B		
		SBL	0	0.0	34	C		
		SBT	810	0.5	13	B		
		SBR	62	0.1	10	B		
		EBL	47	0.2	30	C		
		EBT	11	0.1	25	C		
		EBR	21	0.1	25	C		
		WBL	116	0.5	33	C		
		WBT	43	0.1	25	C		
		WBR	2	0.1	25	C		

2026 Traffic Operations Summary

NS Street	EW Street	Dir	Volume	v/c	Delay (s)	LOS	Int Delay (s)	Int LOS
Highway 16	Boundary Road	NBL	#N/A	#N/A	#N/A	#N/A	28.4	C
		NBT	687	0.8	28	C		
		NBR	168	0.8	29	C		
		SBL	94	0.6	33	C		
		SBT	852	0.8	29	C		
		SBR	#N/A	#N/A	#N/A	#N/A		
		EBL	#N/A	#N/A	#N/A	#N/A		
		EBT	#N/A	#N/A	#N/A	#N/A		
		EBR	#N/A	#N/A	#N/A	#N/A		
		WBL	255	0.6	28	C		
		WBT	#N/A	#N/A	#N/A	#N/A		
		WBR	71	0.2	19	B		
Highway 97	Nordic Drive	NBL	#N/A	#N/A	#N/A	#N/A	12.5	B
		NBT	664	0.5	9	A		
		NBR	550	0.6	14	B		
		SBL	41	0.1	15	B		
		SBT	519	0.2	6	A		
		SBR	#N/A	#N/A	#N/A	#N/A		
		EBL	#N/A	#N/A	#N/A	#N/A		
		EBT	#N/A	#N/A	#N/A	#N/A		
		EBR	#N/A	#N/A	#N/A	#N/A		
		WBL	290	0.6	28	C		
		WBT	#N/A	#N/A	#N/A	#N/A		
		WBR	59	0.1	18	B		
Highway 97	Handlen Road	NBL	119	0.3	15	B	15.4	B
		NBT	912	0.5	10	B		
		NBR	23	0.0	7	A		
		SBL	25	0.1	16	B		
		SBT	588	0.3	8	A		
		SBR	196	0.2	7	A		
		EBL	238	0.9	56	E		
		EBT	26	0.2	19	B		
		EBR	93	0.2	19	B		
		WBL	79	0.3	26	C		
		WBT	29	0.2	19	B		
		WBR	64	0.2	19	B		
Highway 97	Austin Road	NBL	273	0.7	50	D	29.2	C
		NBT	861	0.7	32	C		
		NBR	246	0.2	5	A		
		SBL	36	0.1	35	D		
		SBT	653	0.5	24	C		
		SBR	79	0.1	5	A		
		EBL	165	0.5	44	D		
		EBT	139	0.5	39	D		
		EBR	133	0.2	10	B		
		WBL	123	0.5	42	D		
		WBT	86	0.3	36	D		
		WBR	27	0.0	10	B		
Highway 97	Monterey Road	NBL	81	0.2	13	B	11.8	B
		NBT	1353	0.6	14	B		
		NBR	13	0.0	2	A		
		SBL	50	0.3	21	C		
		SBT	859	0.4	7	A		
		SBR	0	0.0	2	A		
		EBL	0	0.0	25	C		
		EBT	11	0.1	20	C		
		EBR	32	0.1	20	C		
		WBL	8	0.0	25	C		
		WBT	5	0.1	20	C		
		WBR	28	0.1	20	C		
Highway 97	Blueberry Road	NBL	710	1.2	132	F	37.5	D
		NBT	1792	0.7	17	B		
		NBR	#N/A	#N/A	#N/A	#N/A		
		SBL	#N/A	#N/A	#N/A	#N/A		
		SBT	887	0.6	19	B		
		SBR	40	0.1	11	B		
		EBL	36	0.2	29	C		
		EBT	#N/A	#N/A	#N/A	#N/A		
		EBR	461	0.5	10	B		
		WBL	#N/A	#N/A	#N/A	#N/A		
		WBT	#N/A	#N/A	#N/A	#N/A		
		WBR	#N/A	#N/A	#N/A	#N/A		

2026 Traffic Operations Summary

NS Street	EW Street	Dir	Volume	v/c	Delay (s)	LOS	Int Delay (s)	Int LOS
Highway 97 NB Ramp	North Nechako Road	NBL	657	0.9	44	D	24.2	C
		NBT	2	0.0	10	B		
		NBR	157	0.2	4	A		
		SBL	#N/A	#N/A	#N/A	#N/A		
		SBT	#N/A	#N/A	#N/A	#N/A		
		SBR	#N/A	#N/A	#N/A	#N/A		
		EBL	35	0.1	21	C		
		EBT	443	0.4	15	B		
		EBR	#N/A	#N/A	#N/A	#N/A		
		WBL	#N/A	#N/A	#N/A	#N/A		
		WBT	366	0.3	15	B		
		WBR	93	0.1	0	A		
Highway 97 SB Ramp	North Nechako Road	NBL	#N/A	#N/A	#N/A	#N/A	12.8	B
		NBT	#N/A	#N/A	#N/A	#N/A		
		NBR	#N/A	#N/A	#N/A	#N/A		
		SBL	#N/A	#N/A	#N/A	#N/A		
		SBT	#N/A	#N/A	#N/A	#N/A		
		SBR	#N/A	#N/A	#N/A	#N/A		
		EBL	39	0.1	19	B		
		EBT	223	0.2	10	B		
		EBR	185	0.3	10	B		
		WBL	175	0.4	18	B		
		WBT	799	0.5	13	B		
		WBR	48	0.1	10	B		
Highway 97	5th Avenue	NBL	327	0.9	82	F	56.7	E
		NBT	1028	0.8	55	E		
		NBR	61	0.2	33	C		
		SBL	346	0.9	80	F		
		SBT	892	0.7	49	D		
		SBR	173	0.4	34	C		
		EBL	361	1.0	91	F		
		EBT	653	0.7	51	D		
		EBR	184	0.2	11	B		
		WBL	244	0.8	59	E		
		WBT	734	0.9	71	E		
		WBR	331	0.4	16	B		
Highway 97	10th Avenue	NBL	259	0.7	48	D	36.8	D
		NBT	1009	0.7	41	D		
		NBR	109	0.1	14	B		
		SBL	241	0.6	44	D		
		SBT	845	0.6	32	C		
		SBR	10	0.0	23	C		
		EBL	81	0.9	86	F		
		EBT	132	0.3	35	D		
		EBR	112	0.1	9	A		
		WBL	132	0.7	54	D		
		WBT	293	0.7	46	D		
		WBR	278	0.3	9	A		
Highway 97	15th Avenue	NBL	331	1.0	87	F	62.5	E
		NBT	950	0.9	68	E		
		NBR	76	0.2	28	C		
		SBL	169	0.7	63	E		
		SBT	760	0.9	70	E		
		SBR	160	0.2	14	B		
		EBL	171	0.8	72	E		
		EBT	579	0.8	59	E		
		EBR	194	0.2	11	B		
		WBL	246	0.8	70	E		
		WBT	821	0.9	70	E		
		WBR	128	0.2	12	B		
Highway 97	22nd Avenue	NBL	168	0.8	68	E	36.0	D
		NBT	1010	0.6	20	C		
		NBR	48	0.1	13	B		
		SBL	33	0.2	45	D		
		SBT	1141	0.7	28	C		
		SBR	45	0.0	7	A		
		EBL	316	1.0	88	F		
		EBT	165	0.7	49	D		
		EBR	137	0.7	51	D		
		WBL	64	0.7	63	E		
		WBT	103	0.3	33	C		
		WBR	0	0.0	32	C		

2026 Traffic Operations Summary

NS Street	EW Street	Dir	Volume	v/c	Delay (s)	LOS	Int Delay (s)	Int LOS
Highway 97 NB Ramp	Massey Drive	NBL	274	0.7	31	C	12.1	B
		NBT	#N/A	#N/A	#N/A	#N/A		
		NBR	19	0.0	0	A		
		SBL	#N/A	#N/A	#N/A	#N/A		
		SBT	#N/A	#N/A	#N/A	#N/A		
		SBR	#N/A	#N/A	#N/A	#N/A		
		EBL	#N/A	#N/A	#N/A	#N/A		
		EBT	1019	0.5	9	A		
		EBR	138	0.1	0	A		
		WBL	#N/A	#N/A	#N/A	#N/A		
		WBT	1225	0.6	12	B		
		WBR	#N/A	#N/A	#N/A	#N/A		
Highway 97 SB Ramp	Ferry Avenue	NBL	#N/A	#N/A	#N/A	#N/A	24.5	C
		NBT	#N/A	#N/A	#N/A	#N/A		
		NBR	#N/A	#N/A	#N/A	#N/A		
		SBL	198	0.9	73	E		
		SBT	#N/A	#N/A	#N/A	#N/A		
		SBR	357	0.8	50	D		
		EBL	15	0.1	21	C		
		EBT	490	0.4	4	A		
		EBR	#N/A	#N/A	#N/A	#N/A		
		WBL	#N/A	#N/A	#N/A	#N/A		
		WBT	918	0.7	17	B		
		WBR	67	0.0	0	A		
Highway 97	Railway Road	NBL	116	0.4	19	B	26.8	C
		NBT	1102	0.6	20	C		
		NBR	#N/A	#N/A	#N/A	#N/A		
		SBL	#N/A	#N/A	#N/A	#N/A		
		SBT	791	0.5	12	B		
		SBR	727	0.5	3	A		
		EBL	1119	1.0	64	E		
		EBT	#N/A	#N/A	#N/A	#N/A		
		EBR	155	0.1	0	A		
		WBL	#N/A	#N/A	#N/A	#N/A		
		WBT	#N/A	#N/A	#N/A	#N/A		
		WBR	#N/A	#N/A	#N/A	#N/A		
Highway 97	Terminal Boulevard	NBL	26	0.1	18	B	17.0	B
		NBT	658	0.4	12	B		
		NBR	42	0.0	6	A		
		SBL	281	0.8	47	D		
		SBT	646	0.4	11	B		
		SBR	19	0.0	6	A		
		EBL	0	0.0	22	C		
		EBT	35	0.1	16	B		
		EBR	102	0.1	10	B		
		WBL	12	0.0	22	C		
		WBT	6	0.0	16	B		
		WBR	0	0.0	10	B		
Highway 97	Boundary Road	NBL	0	0.0	18	B	13.3	B
		NBT	316	0.2	12	B		
		NBR	0	0.0	11	B		
		SBL	193	0.5	22	C		
		SBT	392	0.3	12	B		
		SBR	175	0.3	12	B		
		EBL	173	0.5	22	C		
		EBT	98	0.1	11	B		
		EBR	0	0.0	6	A		
		WBL	2	0.0	17	B		
		WBT	205	0.3	12	B		
		WBR	236	0.3	7	A		
Foothills Boulevard	Highland Drive	NBL	#N/A	#N/A	#N/A	#N/A	9.3	A
		NBT	838	0.4	7	A		
		NBR	713	0.5	2	A		
		SBL	12	0.0	13	B		
		SBT	408	0.4	7	A		
		SBR	#N/A	#N/A	#N/A	#N/A		
		EBL	#N/A	#N/A	#N/A	#N/A		
		EBT	#N/A	#N/A	#N/A	#N/A		
		EBR	#N/A	#N/A	#N/A	#N/A		
		WBL	300	0.7	36	D		
		WBT	#N/A	#N/A	#N/A	#N/A		
		WBR	15	0.0	13	B		

2026 Traffic Operations Summary

NS Street	EW Street	Dir	Volume	v/c	Delay (s)	LOS	Int Delay (s)	Int LOS
Foothills Boulevard	North Nechako Road	NBL	223	0.4	30	C	35.1	D
		NBT	919	0.9	60	E		
		NBR	52	0.1	14	B		
		SBL	194	0.4	30	C		
		SBT	327	0.6	34	C		
		SBR	51	0.1	14	B		
		EBL	41	0.2	36	D		
		EBT	108	0.2	27	C		
		EBR	94	0.1	0	A		
		WBL	29	0.1	34	C		
		WBT	216	0.4	29	C		
		WBR	442	0.4	6	A		
Foothills Boulevard	15th Avnenue	NBL	41	0.1	42	D	42.1	D
		NBT	304	0.4	31	C		
		NBR	22	0.1	30	C		
		SBL	117	0.3	43	D		
		SBT	160	0.3	30	C		
		SBR	258	0.7	42	D		
		EBL	359	0.9	69	E		
		EBT	274	0.4	31	C		
		EBR	62	0.2	30	C		
		WBL	31	0.1	34	C		
		WBT	373	0.7	41	D		
		WBR	261	0.7	43	D		
Tyner Boulevard	Massey Drive	NBL	2	0.0	28	C	25.9	C
		NBT	431	0.7	27	C		
		NBR	118	0.7	27	C		
		SBL	143	0.9	74	E		
		SBT	474	0.7	29	C		
		SBR	97	0.7	30	C		
		EBL	172	0.5	24	C		
		EBT	173	0.1	11	B		
		EBR	3	0.0	11	B		
		WBL	259	0.6	27	C		
		WBT	387	0.4	13	B		
		WBR	439	0.6	22	C		
Tabor Boulevard	5th Avenue	NBL	91	0.2	23	C	20.6	C
		NBT	271	0.4	25	C		
		NBR	54	0.2	23	C		
		SBL	122	0.2	23	C		
		SBT	244	0.3	24	C		
		SBR	20	0.1	23	C		
		EBL	25	0.1	23	C		
		EBT	149	0.1	16	B		
		EBR	26	0.1	16	B		
		WBL	90	0.3	22	C		
		WBT	284	0.3	16	B		
		WBR	164	0.3	16	B		
Ospika Boulevard	5th Avenue	NBL	173	0.3	31	C	41.0	D
		NBT	404	0.5	26	C		
		NBR	168	0.4	24	C		
		SBL	409	0.7	43	D		
		SBT	347	0.3	20	C		
		SBR	15	0.0	19	B		
		EBL	0	0.0	43	D		
		EBT	353	0.4	23	C		
		EBR	0	0.0	23	C		
		WBL	172	0.8	49	D		
		WBT	542	1.0	71	E		
		WBR	393	0.9	57	E		
Ospika Boulevard	Rainbow Drive	NBL	35	0.1	17	B	11.2	B
		NBT	490	0.3	11	B		
		NBR	61	0.1	10	B		
		SBL	13	0.0	17	B		
		SBT	506	0.3	11	B		
		SBR	0	0.0	10	B		
		EBL	#N/A	#N/A	#N/A	#N/A		
		EBT	#N/A	#N/A	#N/A	#N/A		
		EBR	#N/A	#N/A	#N/A	#N/A		
		WBL	#N/A	#N/A	#N/A	#N/A		
		WBT	#N/A	#N/A	#N/A	#N/A		
		WBR	#N/A	#N/A	#N/A	#N/A		

2026 Traffic Operations Summary

NS Street	EW Street	Dir	Volume	v/c	Delay (s)	LOS	Int Delay (s)	Int LOS
Ospika Boulevard	15th Avenue	NBL	422	0.9	78	E	42.6	D
		NBT	420	0.4	25	C		
		NBR	161	0.3	24	C		
		SBL	215	0.6	47	D		
		SBT	411	0.7	46	D		
		SBR	113	0.4	33	C		
		EBL	58	0.3	43	D		
		EBT	366	0.5	31	C		
		EBR	171	0.4	29	C		
		WBL	225	0.7	60	E		
		WBT	692	0.7	46	D		
		WBR	230	0.4	19	B		
Ospika Boulevard	18th Avenue	NBL	183	0.7	51	D	38.3	D
		NBT	779	0.7	40	D		
		NBR	43	0.1	23	C		
		SBL	29	0.1	39	D		
		SBT	693	0.7	36	D		
		SBR	86	0.2	23	C		
		EBL	114	0.4	41	D		
		EBT	52	0.2	17	B		
		EBR	123	0.2	17	B		
		WBL	246	0.8	51	D		
		WBT	204	0.7	39	D		
		WBR	109	0.7	39	D		
Ospika Boulevard	Massey Drive	NBL	3	0.0	42	D	45.5	D
		NBT	556	0.6	37	D		
		NBR	220	0.2	7	A		
		SBL	194	0.5	41	D		
		SBT	688	0.6	35	D		
		SBR	246	0.2	7	A		
		EBL	107	0.4	43	D		
		EBT	399	0.6	47	D		
		EBR	37	0.1	14	B		
		WBL	340	0.9	79	E		
		WBT	788	1.0	89	F		
		WBR	404	0.4	11	B		
Ospika Boulevard	Tyner Boulevard	NBL	223	0.8	54	D	17.7	B
		NBT	651	0.4	13	B		
		NBR	15	0.0	11	B		
		SBL	19	0.1	21	C		
		SBT	700	0.6	20	C		
		SBR	101	0.2	15	B		
		EBL	127	0.4	20	C		
		EBT	374	0.2	12	B		
		EBR	175	0.3	12	B		
		WBL	8	0.0	18	B		
		WBT	536	0.4	12	B		
		WBR	56	0.1	11	B		
Lyon Street	5th Avenue	NBL	132	0.5	36	D	22.9	C
		NBT	55	0.4	26	C		
		NBR	135	0.4	26	C		
		SBL	116	0.5	37	D		
		SBT	49	0.1	24	C		
		SBR	1	0.0	24	C		
		EBL	0	0.0	30	C		
		EBT	944	0.7	31	C		
		EBR	44	0.1	9	A		
		WBL	0	0.0	32	C		
		WBT	1219	0.6	14	B		
		WBR	11	0.0	7	A		
Westwood Drive	Massey Drive	NBL	311	0.7	52	D	34.2	C
		NBT	130	0.2	27	C		
		NBR	239	0.5	31	C		
		SBL	117	0.3	44	D		
		SBT	275	0.3	32	C		
		SBR	87	0.2	31	C		
		EBL	0	0.0	43	D		
		EBT	543	0.6	37	D		
		EBR	62	0.1	30	C		
		WBL	258	0.7	49	D		
		WBT	1197	0.7	27	C		
		WBR	28	0.0	14	B		

2026 Traffic Operations Summary

NS Street	EW Street	Dir	Volume	v/c	Delay (s)	LOS	Int Delay (s)	Int LOS
Westwood Drive	Ferry Avenue	NBL	33	0.1	23	C	20.2	C
		NBT	372	0.6	26	C		
		NBR	40	0.6	24	C		
		SBL	105	0.3	32	C		
		SBT	194	0.4	10	B		
		SBR	188	0.4	10	B		
		EBL	6	0.0	26	C		
		EBT	131	0.1	20	C		
		EBR	28	0.1	20	C		
		WBL	35	0.1	26	C		
		WBT	110	0.1	20	C		
		WBR	169	0.4	21	C		
Cameron Street	Carney Street/ River Road	NBL	448	0.7	22	C	25.4	C
		NBT	#N/A	#N/A	#N/A	#N/A		
		NBR	114	0.1	6	A		
		SBL	#N/A	#N/A	#N/A	#N/A		
		SBT	#N/A	#N/A	#N/A	#N/A		
		SBR	#N/A	#N/A	#N/A	#N/A		
		EBL	#N/A	#N/A	#N/A	#N/A		
		EBT	207	0.3	12	B		
		EBR	1374	0.9	33	C		
		WBL	208	0.6	26	C		
		WBT	392	0.5	15	B		
		WBR	#N/A	#N/A	#N/A	#N/A		
Carney Street	1st Avenue	NBL	#N/A	#N/A	#N/A	#N/A	44.1	D
		NBT	583	0.9	55	E		
		NBR	366	0.2	0	A		
		SBL	464	0.8	51	D		
		SBT	375	0.3	5	A		
		SBR	#N/A	#N/A	#N/A	#N/A		
		EBL	#N/A	#N/A	#N/A	#N/A		
		EBT	#N/A	#N/A	#N/A	#N/A		
		EBR	#N/A	#N/A	#N/A	#N/A		
		WBL	235	0.7	46	D		
		WBT	#N/A	#N/A	#N/A	#N/A		
		WBR	998	1.0	65	E		
Carney Street	5th Avenue	NBL	66	0.6	47	D	30.7	C
		NBT	191	0.5	30	C		
		NBR	0	0.0	27	C		
		SBL	21	0.1	36	D		
		SBT	234	0.3	28	C		
		SBR	285	0.3	5	A		
		EBL	132	0.4	37	D		
		EBT	889	0.4	9	A		
		EBR	45	0.0	7	A		
		WBL	77	0.2	29	C		
		WBT	955	0.9	61	E		
		WBR	397	0.6	25	C		
Carney Street	10th Avenue	NBL	30	0.2	25	C	22.3	C
		NBT	319	0.5	14	B		
		NBR	29	0.4	13	B		
		SBL	19	0.1	20	C		
		SBT	377	0.5	16	B		
		SBR	26	0.3	12	B		
		EBL	33	0.2	29	C		
		EBT	400	0.6	18	B		
		EBR	43	0.6	17	B		
		WBL	97	0.6	31	C		
		WBT	548	0.8	34	C		
		WBR	52	0.7	24	C		
Carney Street	15th Avenue	NBL	#N/A	#N/A	#N/A	#N/A	23.5	C
		NBT	#N/A	#N/A	#N/A	#N/A		
		NBR	#N/A	#N/A	#N/A	#N/A		
		SBL	#N/A	#N/A	#N/A	#N/A		
		SBT	#N/A	#N/A	#N/A	#N/A		
		SBR	#N/A	#N/A	#N/A	#N/A		
		EBL	36	0.2	28	C		
		EBT	558	0.4	13	B		
		EBR	125	0.2	12	B		
		WBL	183	0.6	28	C		
		WBT	1066	0.7	30	C		
		WBR	62	0.1	12	B		

2026 Traffic Operations Summary

NS Street	EW Street	Dir	Volume	v/c	Delay (s)	LOS	Int Delay (s)	Int LOS
Carney Street	Massey Drive	NBL	167	0.5	38	D	36.4	D
		NBT	222	0.6	34	C		
		NBR	34	0.0	5	A		
		SBL	59	0.2	34	C		
		SBT	226	0.6	34	C		
		SBR	370	0.4	9	A		
		EBL	175	0.6	41	D		
		EBT	743	0.8	43	D		
		EBR	199	0.2	6	A		
		WBL	217	0.7	47	D		
		WBT	821	0.8	53	D		
		WBR	107	0.1	5	A		
Winnipeg Street	4th Avenue	NBL	#N/A	#N/A	#N/A	#N/A	12.5	B
		NBT	178	0.1	12	B		
		NBR	180	0.3	12	B		
		SBL	24	0.1	18	B		
		SBT	734	0.3	13	B		
		SBR	#N/A	#N/A	#N/A	#N/A		
		EBL	67	0.1	12	B		
		EBT	660	0.3	12	B		
		EBR	234	0.4	13	B		
		WBL	#N/A	#N/A	#N/A	#N/A		
		WBT	#N/A	#N/A	#N/A	#N/A		
		WBR	#N/A	#N/A	#N/A	#N/A		
Winnipeg Street	13th Avenue	NBL	5	0.0	29	C	16.0	B
		NBT	445	0.3	18	B		
		NBR	132	0.3	17	B		
		SBL	95	0.4	30	C		
		SBT	1001	0.5	15	B		
		SBR	6	0.0	10	B		
		EBL	51	0.3	27	C		
		EBT	180	0.4	15	B		
		EBR	61	0.4	15	B		
		WBL	153	0.5	25	C		
		WBT	189	0.3	14	B		
		WBR	200	0.2	3	A		
Brunswick Street	2nd Avenue	NBL	224	0.6	24	C	14.2	B
		NBT	73	0.2	10	B		
		NBR	98	0.0	10	B		
		SBL	0	0.0	17	B		
		SBT	173	0.2	10	B		
		SBR	0	0.0	10	B		
		EBL	#N/A	#N/A	#N/A	#N/A		
		EBT	#N/A	#N/A	#N/A	#N/A		
		EBR	#N/A	#N/A	#N/A	#N/A		
		WBL	19	0.0	13	B		
		WBT	579	0.2	13	B		
		WBR	0	0.0	13	B		
Brunswick Street	4th Avenue	NBL	#N/A	#N/A	#N/A	#N/A	14.6	B
		NBT	35	0.1	11	B		
		NBR	72	0.1	11	B		
		SBL	76	0.2	17	B		
		SBT	50	0.0	11	B		
		SBR	#N/A	#N/A	#N/A	#N/A		
		EBL	85	0.1	13	B		
		EBT	332	0.5	17	B		
		EBR	0	0.0	13	B		
		WBL	0	0.0	25	C		
		WBT	#N/A	#N/A	#N/A	#N/A		
		WBR	181	0.3	13	B		
Dominion Street	2nd Avenue	NBL	168	0.4	15	B	15.7	B
		NBT	169	0.1	8	A		
		NBR	0	0.0	8	A		
		SBL	94	0.2	14	B		
		SBT	118	0.1	8	A		
		SBR	84	0.1	8	A		
		EBL	0	0.0	29	C		
		EBT	62	0.1	16	B		
		EBR	6	0.1	16	B		
		WBL	0	0.0	22	C		
		WBT	338	0.6	25	C		
		WBR	1	0.0	16	B		

2026 Traffic Operations Summary

NS Street	EW Street	Dir	Volume	v/c	Delay (s)	LOS	Int Delay (s)	Int LOS
Dominion Street	4th Avenue	NBL	39	0.1	16	B	15.2	B
		NBT	263	0.1	10	B		
		NBR	144	0.2	10	B		
		SBL	23	0.1	16	B		
		SBT	136	0.1	10	B		
		SBR	26	0.1	14	B		
		EBL	35	0.1	20	C		
		EBT	334	0.6	22	C		
		EBR	53	0.6	23	C		
		WBL	0	0.0	28	C		
		WBT	31	0.1	14	B		
		WBR	0	0.0	14	B		
Dominion Street	7th Avenue	NBL	30	0.1	15	B	10.8	B
		NBT	281	0.1	9	A		
		NBR	0	0.0	9	A		
		SBL	0	0.0	15	B		
		SBT	276	0.1	9	A		
		SBR	61	0.1	9	A		
		EBL	86	0.2	17	B		
		EBT	25	0.0	11	B		
		EBR	86	0.2	11	B		
		WBL	79	0.2	16	B		
		WBT	184	0.1	11	B		
		WBR	0	0.0	11	B		
Queensway	2nd Avenue	NBL	114	0.2	11	B	13.0	B
		NBT	230	0.1	6	A		
		NBR	84	0.1	6	A		
		SBL	27	0.1	11	B		
		SBT	168	0.1	6	A		
		SBR	32	0.0	6	A		
		EBL	0	0.0	27	C		
		EBT	5	0.0	20	C		
		EBR	7	0.0	20	C		
		WBL	138	0.5	28	C		
		WBT	109	0.4	22	C		
		WBR	79	0.4	22	C		
Queensway	4th Avenue	NBL	47	0.2	26	C	19.3	B
		NBT	214	0.2	18	B		
		NBR	73	0.2	18	B		
		SBL	17	0.1	24	C		
		SBT	446	0.3	18	B		
		SBR	2	0.0	18	B		
		EBL	35	0.1	15	B		
		EBT	198	0.4	10	B		
		EBR	197	0.4	10	B		
		WBL	284	0.8	45	D		
		WBT	98	0.3	9	A		
		WBR	177	0.3	9	A		
Queensway	5th Avenue	NBL	118	0.3	15	B	12.8	B
		NBT	334	0.2	6	A		
		NBR	38	0.0	6	A		
		SBL	0	0.0	13	B		
		SBT	865	0.4	9	A		
		SBR	62	0.1	6	A		
		EBL	0	0.0	23	C		
		EBT	156	0.1	16	B		
		EBR	244	0.5	20	C		
		WBL	181	0.6	30	C		
		WBT	137	0.3	17	B		
		WBR	0	0.0	16	B		
Queensway	17th Avenue	NBL	33	0.2	29	C	13.7	B
		NBT	660	0.3	11	B		
		NBR	0	0.0	10	B		
		SBL	0	0.0	19	B		
		SBT	1182	0.5	15	B		
		SBR	167	0.2	10	B		
		EBL	88	0.2	19	B		
		EBT	38	0.1	13	B		
		EBR	42	0.1	13	B		
		WBL	0	0.0	19	B		
		WBT	27	0.1	13	B		
		WBR	31	0.1	13	B		

2026 Traffic Operations Summary

NS Street	EW Street	Dir	Volume	v/c	Delay (s)	LOS	Int Delay (s)	Int LOS
Queensway	20th Avenue	NBL	26	0.2	27	C	13.0	B
		NBT	545	0.3	11	B		
		NBR	18	0.0	10	B		
		SBL	17	0.1	18	B		
		SBT	897	0.5	13	B		
		SBR	310	0.4	12	B		
		EBL	132	0.4	20	C		
		EBT	18	0.1	13	B		
		EBR	52	0.1	13	B		
		WBL	29	0.1	19	B		
		WBT	43	0.1	13	B		
		WBR	16	0.1	13	B		
Upland Street/ Lansdowne Road	Ferry Avenue	NBL	40	0.4	36	D	33.0	C
		NBT	169	0.4	12	B		
		NBR	220	0.4	12	B		
		SBL	55	0.2	19	B		
		SBT	712	0.9	48	D		
		SBR	102	0.9	48	D		
		EBL	165	0.7	39	D		
		EBT	520	0.5	27	C		
		EBR	28	0.1	22	C		
		WBL	283	0.9	65	E		
		WBT	675	0.5	18	B		
		WBR	0	0.0	15	B		
Spruce Street	15th Avenue	NBL	117	0.7	41	D	20.3	C
		NBT	277	0.4	14	B		
		NBR	18	0.3	13	B		
		SBL	129	0.4	22	C		
		SBT	289	0.6	20	C		
		SBR	166	0.6	20	C		
		EBL	90	0.6	35	D		
		EBT	596	0.5	15	B		
		EBR	100	0.2	13	B		
		WBL	91	0.3	22	C		
		WBT	952	0.7	24	C		
		WBR	120	0.1	6	A		
O'Grady Road	Domano Boulevard	NBL	340	0.7	39	D	21.2	C
		NBT	52	0.1	8	A		
		NBR	44	0.1	8	A		
		SBL	39	0.1	24	C		
		SBT	143	0.5	22	C		
		SBR	106	0.5	23	C		
		EBL	68	0.3	27	C		
		EBT	194	0.2	20	C		
		EBR	302	0.3	4	A		
		WBL	31	0.1	26	C		
		WBT	237	0.2	20	C		
		WBR	15	0.0	20	C		
RecPlace Drive	Ferry Avenue	NBL	85	0.7	53	D	29.5	C
		NBT	125	0.5	26	C		
		NBR	84	0.5	27	C		
		SBL	123	0.6	42	D		
		SBT	234	0.7	37	D		
		SBR	74	0.7	40	D		
		EBL	41	0.1	27	C		
		EBT	138	0.1	16	B		
		EBR	97	0.2	17	B		
		WBL	100	0.2	27	C		
		WBT	157	0.1	17	B		
		WBR	0	0.0	16	B		

Appendix D
Automobile Travel Times

2006 Travel Time (min)

From \ To	Airport	Hart Centre	UNBC	Westgate Exchange	Pine Centre	City Hall	Airport	Hart Centre	UNBC	Westgate Exchange	Pine Centre	City Hall
	Scenario 600											
Airport	0.0	31.0	24.2	22.7	17.1	16.9						
Hart Centre	29.6	0.0	15.7	20.8	15.9	17.0						
UNBC	21.2	15.1	0.0	6.1	9.6	11.8						
Westgate Exchange	18.9	20.7	6.6	0.0	9.1	11.5						
Pine Centre	14.7	16.4	9.6	9.0	0.0	5.4						
City Hall	16.1	17.6	13.1	13.0	6.5	0.0						
	Scenario 601											
Airport	0.0	30.6	24.1	22.6	17.0	16.9						
Hart Centre	29.3	0.0	15.6	20.7	15.6	16.7						
UNBC	21.2	15.1	0.0	6.1	9.2	11.8						
Westgate Exchange	18.9	20.7	6.6	0.0	9.1	11.5						
Pine Centre	14.6	16.1	9.6	8.9	0.0	5.4						
City Hall	16.1	17.7	13.1	13.0	6.5	0.0						
	Scenario 602						Scenario 602 - Scenario 601					
Airport	0.0	29.9	23.2	21.8	16.2	16.5	0.0	-0.7	-0.9	-0.8	-0.8	-0.4
Hart Centre	29.3	0.0	15.6	20.7	15.7	16.7	0.0	0.0	0.0	0.0	0.1	0.0
UNBC	21.2	15.1	0.0	6.1	9.2	11.8	0.0	0.0	0.0	0.0	0.0	0.0
Westgate Exchange	18.9	20.7	6.6	0.0	9.1	11.5	0.0	0.0	0.0	0.0	0.0	0.0
Pine Centre	14.6	16.1	9.6	8.9	0.0	5.4	0.0	0.0	0.0	0.0	0.0	0.0
City Hall	16.1	17.0	13.1	13.0	6.5	0.0	0.0	-0.7	0.0	0.0	0.0	0.0

2016 Travel Time (min)

To / From	Airport	Hart Centre	UNBC	Westgate Exchange	Pine Centre	City Hall	Airport	Hart Centre	UNBC	Westgate Exchange	Pine Centre	City Hall	Airport	Hart Centre	UNBC	Westgate Exchange	Pine Centre	City Hall
	Scenario 1600																	
Airport	0.0	31.0	25.9	29.5	19.5	17.1												
Hart Centre	29.6	0.0	16.0	22.0	15.8	16.8												
UNBC	22.6	15.2	0.0	7.0	9.2	11.9												
Westgate Exchange	20.9	22.3	8.1	0.0	10.8	13.1												
Pine Centre	14.9	16.7	9.9	12.7	0.0	5.5												
City Hall	16.4	18.3	14.0	17.1	7.4	0.0												
	Scenario 1601																	
Airport	0.0	31.0	25.4	25.2	18.9	17.3												
Hart Centre	29.7	0.0	15.9	21.1	16.1	16.8												
UNBC	22.1	15.3	0.0	6.2	8.0	11.9												
Westgate Exchange	19.6	20.7	6.3	0.0	8.8	12.0												
Pine Centre	15.1	16.6	8.7	10.3	0.0	5.6												
City Hall	16.5	18.3	14.0	15.0	7.5	0.0												
	Scenario 1611						Scenario 1611 - Scenario 601						Scenario 1611 - Scenario 1601					
Airport	0.0	31.0	25.4	25.0	19.1	17.4	0.0	0.4	1.3	2.4	2.1	0.5	0.0	0.0	0.0	-0.2	0.2	0.1
Hart Centre	29.7	0.0	15.9	21.1	16.1	16.8	0.4	0.0	0.3	0.4	0.5	0.1	0.0	0.0	0.0	0.0	0.0	0.0
UNBC	22.1	15.3	0.0	6.2	8.0	11.9	0.9	0.2	0.0	0.1	-1.2	0.1	0.0	0.0	0.0	0.0	0.0	0.0
Westgate Exchange	19.6	20.7	6.3	0.0	8.8	12.0	0.7	0.0	-0.3	0.0	-0.3	0.5	0.0	0.0	0.0	0.0	0.0	0.0
Pine Centre	15.0	16.5	8.5	9.9	0.0	5.6	0.4	0.4	-1.1	1.0	0.0	0.2	-0.1	-0.1	-0.2	-0.4	0.0	0.0
City Hall	16.6	18.3	13.9	14.5	7.4	0.0	0.5	0.6	0.8	1.5	0.9	0.0	0.1	0.0	-0.1	-0.5	-0.1	0.0
	Scenario 1612						Scenario 1612 - Scenario 601						Scenario 1612 - Scenario 1601					
Airport	0.0	31.0	25.3	24.7	19.2	17.4	0.0	0.4	1.2	2.1	2.2	0.5	0.0	0.0	-0.1	-0.5	0.3	0.1
Hart Centre	29.8	0.0	15.9	21.1	16.2	16.8	0.5	0.0	0.3	0.4	0.6	0.1	0.1	0.0	0.0	0.0	0.1	0.0
UNBC	22.1	15.3	0.0	6.2	8.0	11.9	0.9	0.2	0.0	0.1	-1.2	0.1	0.0	0.0	0.0	0.0	0.0	0.0
Westgate Exchange	19.6	20.7	6.3	0.0	8.8	12.0	0.7	0.0	-0.3	0.0	-0.3	0.5	0.0	0.0	0.0	0.0	0.0	0.0
Pine Centre	15.1	16.5	8.4	9.6	0.0	5.6	0.5	0.4	-1.2	0.7	0.0	0.2	0.0	-0.1	-0.3	-0.7	0.0	0.0
City Hall	16.6	18.3	13.9	14.2	7.3	0.0	0.5	0.6	0.8	1.2	0.8	0.0	0.1	0.0	-0.1	-0.8	-0.2	0.0
	Scenario 1613						Scenario 1613 - Scenario 601						Scenario 1613 - Scenario 1612					
Airport	0.0	31.0	26.1	24.6	18.4	17.4	0.0	0.4	2.0	2.0	1.4	0.5	0.0	0.0	0.8	-0.1	-0.8	0.0
Hart Centre	29.8	0.0	15.9	21.1	16.2	16.8	0.5	0.0	0.3	0.4	0.6	0.1	0.0	0.0	0.0	0.0	0.0	0.0
UNBC	22.1	15.3	0.0	6.2	8.0	11.9	0.9	0.2	0.0	0.1	-1.2	0.1	0.0	0.0	0.0	0.0	0.0	0.0
Westgate Exchange	19.6	20.7	6.3	0.0	8.8	11.9	0.7	0.0	-0.3	0.0	-0.3	0.4	0.0	0.0	0.0	0.0	0.0	-0.1
Pine Centre	15.1	16.5	8.5	9.6	0.0	5.6	0.5	0.4	-1.1	0.7	0.0	0.2	0.0	0.0	0.1	0.0	0.0	0.0
City Hall	16.6	18.3	13.9	14.2	7.3	0.0	0.5	0.6	0.8	1.2	0.8	0.0	0.0	0.0	0.0	0.0	0.0	0.0
	Scenario 1614						Scenario 1614 - Scenario 601						Scenario 1614 - Scenario 1613					
Airport	0.0	31.0	25.3	24.7	19.2	17.4	0.0	0.4	1.2	2.1	2.2	0.5	0.0	0.0	-0.8	0.1	0.8	0.0
Hart Centre	29.8	0.0	15.9	21.1	16.1	16.8	0.5	0.0	0.3	0.4	0.5	0.1	0.0	0.0	0.0	0.0	-0.1	0.0
UNBC	22.1	15.3	0.0	6.2	8.0	11.9	0.9	0.2	0.0	0.1	-1.2	0.1	0.0	0.0	0.0	0.0	0.0	0.0
Westgate Exchange	19.6	20.7	6.3	0.0	8.8	11.9	0.7	0.0	-0.3	0.0	-0.3	0.4	0.0	0.0	0.0	0.0	0.0	0.0
Pine Centre	15.1	16.5	8.4	9.5	0.0	5.6	0.5	0.4	-1.2	0.6	0.0	0.2	0.0	0.0	-0.1	-0.1	0.0	0.0
City Hall	16.6	18.3	13.9	14.2	7.3	0.0	0.5	0.6	0.8	1.2	0.8	0.0	0.0	0.0	0.0	0.0	0.0	0.0
	Scenario 1615						Scenario 1615 - Scenario 601						Scenario 1615 - Scenario 1613					
Airport	0.0	31.0	25.3	23.9	18.2	17.0	0.0	0.4	1.2	1.3	1.2	0.1	0.0	0.0	-0.8	-0.7	-0.2	-0.4
Hart Centre	29.9	0.0	15.9	21.1	16.2	16.8	0.6	0.0	0.3	0.4	0.6	0.1	0.1	0.0	0.0	0.0	0.0	0.0
UNBC	22.4	15.3	0.0	6.2	8.0	11.9	1.2	0.2	0.0	0.1	-1.2	0.1	0.3	0.0	0.0	0.0	0.0	0.0
Westgate Exchange	19.9	20.7	6.3	0.0	8.7	12.0	1.0	0.0	-0.3	0.0	-0.4	0.5	0.3	0.0	0.0	0.0	-0.1	0.1
Pine Centre	15.2	16.5	8.5	9.6	0.0	5.6	0.6	0.4	-1.1	0.7	0.0	0.2	0.1	0.0	0.0	0.0	0.0	0.0
City Hall	16.3	18.3	13.9	15.1	7.4	0.0	0.2	0.6	0.8	2.1	0.9	0.0	-0.3	0.0	0.0	0.9	0.1	0.0
	Scenario 1621						Scenario 1621 - Scenario 601						Scenario 1621 - Scenario 1615					
Airport	0.0	31.0	24.4	23.1	18.1	17.0	0.0	0.4	0.3	0.5	1.1	0.1	0.0	0.0	-0.9	-0.8	-0.1	0.0
Hart Centre	30.0	0.0	15.9	21.1	16.2	16.8	0.7	0.0	0.3	0.4	0.6	0.1	0.1	0.0	0.0	0.0	0.0	0.0
UNBC	22.2	15.3	0.0	6.2	8.0	11.9	1.0	0.2	0.0	0.1	-1.2	0.1	-0.2	0.0	0.0	0.0	0.0	0.0
Westgate Exchange	19.6	20.7	6.4	0.0	8.4	11.6	0.7	0.0	-0.2	0.0	-0.7	0.1	-0.3	0.0	0.1	0.0	-0.3	-0.4
Pine Centre	15.2	16.5	8.3	8.9	0.0	5.6	0.6	0.4	-1.3	0.0	0.0	0.2	0.0	0.0	-0.2	-0.7	0.0	0.0
City Hall	16.2	18.3	13.8	14.2	7.2	0.0	0.1	0.6	0.7	1.2	0.7	0.0	-0.1	0.0	-0.1	-0.9	-0.2	0.0

	Scenario 1622						Scenario 1622 - Scenario 601						Scenario 1622 - Scenario 1621					
Airport	0.0	31.0	24.4	23.0	18.1	17.0	0.0	0.4	0.3	0.4	1.1	0.1	0.0	0.0	0.0	-0.1	0.0	0.0
Hart Centre	30.0	0.0	15.9	21.0	16.2	16.8	0.7	0.0	0.3	0.3	0.6	0.1	0.0	0.0	0.0	-0.1	0.0	0.0
UNBC	22.2	15.3	0.0	6.2	8.0	11.9	1.0	0.2	0.0	0.1	-1.2	0.1	0.0	0.0	0.0	0.0	0.0	0.0
Westgate Exchange	19.6	20.7	6.3	0.0	8.4	11.6	0.7	0.0	-0.3	0.0	-0.7	0.1	0.0	0.0	-0.1	0.0	0.0	0.0
Pine Centre	15.2	16.5	8.3	8.9	0.0	5.6	0.6	0.4	-1.3	0.0	0.0	0.2	0.0	0.0	0.0	0.0	0.0	0.0
City Hall	16.2	18.3	13.9	14.2	7.2	0.0	0.1	0.6	0.8	1.2	0.7	0.0	0.0	0.0	0.1	0.0	0.0	0.0
	Scenario 1623						Scenario 1623 - Scenario 601						Scenario 1623 - Scenario 1621					
Airport	0.0	30.8	24.4	23.1	18.1	17.0	0.0	0.2	0.3	0.5	1.1	0.1	0.0	-0.2	0.0	0.0	0.0	0.0
Hart Centre	29.9	0.0	15.9	21.0	16.2	16.8	0.6	0.0	0.3	0.3	0.6	0.1	-0.1	0.0	0.0	-0.1	0.0	0.0
UNBC	22.1	15.3	0.0	6.2	8.0	11.9	0.9	0.2	0.0	0.1	-1.2	0.1	-0.1	0.0	0.0	0.0	0.0	0.0
Westgate Exchange	19.6	20.7	6.3	0.0	8.4	11.6	0.7	0.0	-0.3	0.0	-0.7	0.1	0.0	0.0	-0.1	0.0	0.0	0.0
Pine Centre	15.2	16.6	8.3	8.9	0.0	5.6	0.6	0.5	-1.3	0.0	0.0	0.2	0.0	0.1	0.0	0.0	0.0	0.0
City Hall	16.2	18.5	13.9	14.3	7.3	0.0	0.1	0.8	0.8	1.3	0.8	0.0	0.0	0.2	0.1	0.1	0.1	0.0
	Scenario 1631						Scenario 1631 - Scenario 601						Scenario 1631 - Scenario 1621					
Airport	0.0	30.3	23.3	21.9	17.4	16.8	0.0	-0.3	-0.8	-0.7	0.4	-0.1	0.0	-0.7	-1.1	-1.2	-0.7	-0.2
Hart Centre	29.9	0.0	15.9	21.0	16.2	16.8	0.6	0.0	0.3	0.3	0.6	0.1	-0.1	0.0	0.0	-0.1	0.0	0.0
UNBC	21.8	15.3	0.0	6.2	8.0	11.9	0.6	0.2	0.0	0.1	-1.2	0.1	-0.4	0.0	0.0	0.0	0.0	0.0
Westgate Exchange	19.4	20.7	6.4	0.0	8.4	11.6	0.5	0.0	-0.2	0.0	-0.7	0.1	-0.2	0.0	0.0	0.0	0.0	0.0
Pine Centre	15.2	16.5	8.1	8.6	0.0	5.6	0.6	0.4	-1.5	-0.3	0.0	0.2	0.0	0.0	-0.2	-0.3	0.0	0.0
City Hall	16.3	18.3	13.8	13.1	7.1	0.0	0.2	0.6	0.7	0.1	0.6	0.0	0.1	0.0	0.0	-1.1	-0.1	0.0
	Scenario 1632						Scenario 1632 - Scenario 601						Scenario 1632 - Scenario 1621					
Airport	0.0	30.0	20.7	18.4	16.9	16.7	0.0	-0.6	-3.4	-4.2	-0.1	-0.2	0.0	-1.0	-3.7	-4.7	-1.2	-0.3
Hart Centre	29.9	0.0	15.8	21.0	16.2	16.8	0.6	0.0	0.2	0.3	0.6	0.1	-0.1	0.0	-0.1	-0.1	0.0	0.0
UNBC	20.2	15.4	0.0	6.2	8.0	11.9	-1.0	0.3	0.0	0.1	-1.2	0.1	-2.0	0.1	0.0	0.0	0.0	0.0
Westgate Exchange	18.2	20.7	6.3	0.0	8.4	11.6	-0.7	0.0	-0.3	0.0	-0.7	0.1	-1.4	0.0	-0.1	0.0	0.0	0.0
Pine Centre	15.1	16.4	8.0	8.4	0.0	5.6	0.5	0.3	-1.6	-0.5	0.0	0.2	-0.1	-0.1	-0.3	-0.5	0.0	0.0
City Hall	16.3	18.3	13.7	12.6	7.0	0.0	0.2	0.6	0.6	-0.4	0.5	0.0	0.1	0.0	-0.1	-1.6	-0.2	0.0
	Scenario 1633						Scenario 1633 - Scenario 601						Scenario 1633 - Scenario 1621					
Airport	0.0	30.2	21.7	18.2	17.0	16.7	0.0	-0.4	-2.4	-4.4	0.0	-0.2	0.0	-0.8	-2.7	-4.9	-1.1	-0.3
Hart Centre	29.9	0.0	15.8	21.0	16.2	16.8	0.6	0.0	0.2	0.3	0.6	0.1	-0.1	0.0	-0.1	-0.1	0.0	0.0
UNBC	21.2	15.4	0.0	6.2	8.0	11.9	0.0	0.3	0.0	0.1	-1.2	0.1	-1.0	0.1	0.0	0.0	0.0	0.0
Westgate Exchange	18.0	20.7	6.4	0.0	8.4	11.6	-0.9	0.0	-0.2	0.0	-0.7	0.1	-1.6	0.0	0.0	0.0	0.0	0.0
Pine Centre	15.1	16.5	8.0	8.4	0.0	5.6	0.5	0.4	-1.6	-0.5	0.0	0.2	-0.1	0.0	-0.3	-0.5	0.0	0.0
City Hall	16.3	18.6	13.8	12.8	7.0	0.0	0.2	0.9	0.7	-0.2	0.5	0.0	0.1	0.3	0.0	-1.4	-0.2	0.0
	Scenario 1634						Scenario 1634 - Scenario 601						Scenario 1634 - Scenario 1633					
Airport	0.0	30.1	21.6	18.2	17.0	16.7	0.0	-0.5	-2.5	-4.4	0.0	-0.2	0.0	-0.1	-0.1	0.0	0.0	0.0
Hart Centre	29.9	0.0	15.9	21.0	16.2	16.8	0.6	0.0	0.3	0.3	0.6	0.1	0.0	0.0	0.1	0.0	0.0	0.0
UNBC	21.2	15.3	0.0	6.2	8.0	11.9	0.0	0.2	0.0	0.1	-1.2	0.1	0.0	-0.1	0.0	0.0	0.0	0.0
Westgate Exchange	18.0	20.7	6.4	0.0	8.4	11.6	-0.9	0.0	-0.2	0.0	-0.7	0.1	0.0	0.0	0.0	0.0	0.0	0.0
Pine Centre	15.2	16.5	8.0	8.4	0.0	5.6	0.6	0.4	-1.6	-0.5	0.0	0.2	0.1	0.0	0.0	0.0	0.0	0.0
City Hall	16.3	18.3	13.7	12.7	7.0	0.0	0.2	0.6	0.6	-0.3	0.5	0.0	0.0	-0.3	-0.1	-0.1	0.0	0.0
	Scenario 1641						Scenario 1641 - Scenario 601						Scenario 1641 - Scenario 1633					
Airport	0.0	30.0	21.6	18.2	16.4	16.7	0.0	-0.6	-2.5	-4.4	-0.6	-0.2	0.0	-0.2	-0.1	0.0	-0.6	0.0
Hart Centre	29.9	0.0	15.8	21.0	16.2	16.8	0.6	0.0	0.2	0.3	0.6	0.1	0.0	0.0	0.0	0.0	0.0	0.0
UNBC	21.2	15.3	0.0	6.2	8.0	12.1	0.0	0.2	0.0	0.1	-1.2	0.3	0.0	-0.1	0.0	0.0	0.0	0.2
Westgate Exchange	18.0	20.7	6.4	0.0	8.6	11.6	-0.9	0.0	-0.2	0.0	-0.5	0.1	0.0	0.0	0.0	0.0	0.2	0.0
Pine Centre	15.1	16.3	8.0	8.4	0.0	5.8	0.5	0.2	-1.6	-0.5	0.0	0.4	0.0	-0.2	0.0	0.0	0.0	0.2
City Hall	16.3	18.2	13.7	12.7	7.0	0.0	0.2	0.5	0.6	-0.3	0.5	0.0	0.0	-0.4	-0.1	-0.1	0.0	0.0
	Scenario 1642						Scenario 1642 - Scenario 601						Scenario 1642 - Scenario 1633					
Airport	0.0	30.1	21.6	18.2	16.3	16.7	0.0	-0.5	-2.5	-4.4	-0.7	-0.2	0.0	-0.1	-0.1	0.0	-0.7	0.0
Hart Centre	29.8	0.0	15.8	21.0	16.2	16.8	0.5	0.0	0.2	0.3	0.6	0.1	-0.1	0.0	0.0	0.0	0.0	0.0
UNBC	21.2	15.3	0.0	6.2	8.0	12.0	0.0	0.2	0.0	0.1	-1.2	0.2	0.0	-0.1	0.0	0.0	0.0	0.1
Westgate Exchange	18.0	20.7	6.4	0.0	8.6	11.6	-0.9	0.0	-0.2	0.0	-0.5	0.1	0.0	0.0	0.0	0.0	0.2	0.0
Pine Centre	15.0	16.4	8.0	8.4	0.0	5.7	0.4	0.3	-1.6	-0.5	0.0	0.3	-0.1	-0.1	0.0	0.0	0.0	0.1
City Hall	16.3	18.2	13.8	12.7	6.6	0.0	0.2	0.5	0.7	-0.3	0.1	0.0	0.0	-0.4	0.0	-0.1	-0.4	0.0
	Scenario 1671						Scenario 1671 - Scenario 601						Scenario 1671 - Scenario 1633					
Airport	0.0	30.4	21.7	18.2	17.0	16.7	0.0	-0.2	-2.4	-4.4	0.0	-0.2	0.0	0.2	0.0	0.0	0.0	0.0
Hart Centre	30.2	0.0	16.1	21.2	16.5	17.1	0.9	0.0	0.5	0.5	0.9	0.4	0.3	0.0	0.3	0.2	0.3	0.3
UNBC	21.2	15.7	0.0	6.2	8.0	11.9	0.0	0.6	0.0	0.1	-1.2	0.1	0.0	0.3	0.0	0.0	0.0	0.0
Westgate Exchange	18.0	21.1	6.4	0.0	8.4	11.6	-0.9	0.4	-0.2	0.0	-0.7	0.1	0.0	0.4	0.0	0.0	0.0	0.0
Pine Centre	15.1	16.7	8.0	8.4	0.0	5.6	0.5	0.6	-1.6	-0.5	0.0	0.2	0.0	0.2	0.0	0.0	0.0	0.0
City Hall	16.3	18.4	13.7	12.7	7.0	0.0	0.2	0.7	0.6	-0.3	0.5	0.0	0.0	-0.2	-0.1	-0.1	0.0	0.0

	Scenario 1672						Scenario 1672 - Scenario 601						Scenario 1672 - Scenario 1633					
Airport	0.0	30.0	21.5	18.1	16.9	16.4	0.0	-0.6	-2.6	-4.5	-0.1	-0.5	0.0	-0.2	-0.2	-0.1	-0.1	-0.3
Hart Centre	30.1	0.0	15.8	21.0	16.2	16.8	0.8	0.0	0.2	0.3	0.6	0.1	0.2	0.0	0.0	0.0	0.0	0.0
UNBC	21.2	15.4	0.0	6.2	8.0	11.9	0.0	0.3	0.0	0.1	-1.2	0.1	0.0	0.0	0.0	0.0	0.0	0.0
Westgate Exchange	17.9	20.7	6.4	0.0	8.4	11.6	-1.0	0.0	-0.2	0.0	-0.7	0.1	-0.1	0.0	0.0	0.0	0.0	0.0
Pine Centre	15.3	16.5	8.0	8.4	0.0	5.6	0.7	0.4	-1.6	-0.5	0.0	0.2	0.2	0.0	0.0	0.0	0.0	0.0
City Hall	16.4	18.2	13.7	12.8	7.0	0.0	0.3	0.5	0.6	-0.2	0.5	0.0	0.1	-0.4	-0.1	0.0	0.0	0.0
	Scenario 1673						Scenario 1673 - Scenario 601						Scenario 1673 - Scenario 1633					
Airport	0.0	30.3	21.5	18.1	17.2	16.8	0.0	-0.3	-2.6	-4.5	0.2	-0.1	0.0	0.1	-0.2	-0.1	0.2	0.1
Hart Centre	29.9	0.0	15.8	21.0	16.2	16.8	0.6	0.0	0.2	0.3	0.6	0.1	0.0	0.0	0.0	0.0	0.0	0.0
UNBC	21.2	15.4	0.0	6.2	8.0	11.9	0.0	0.3	0.0	0.1	-1.2	0.1	0.0	0.0	0.0	0.0	0.0	0.0
Westgate Exchange	17.9	20.7	6.4	0.0	8.4	11.6	-1.0	0.0	-0.2	0.0	-0.7	0.1	-0.1	0.0	0.0	0.0	0.0	0.0
Pine Centre	15.2	16.5	8.1	8.4	0.0	5.6	0.6	0.4	-1.5	-0.5	0.0	0.2	0.1	0.0	0.1	0.0	0.0	0.0
City Hall	16.3	18.5	13.8	12.9	7.0	0.0	0.2	0.8	0.7	-0.1	0.5	0.0	0.0	-0.1	0.0	0.1	0.0	0.0
	Scenario 1674						Scenario 1674 - Scenario 601						Scenario 1674 - Scenario 1673					
Airport	0.0	30.2	21.5	18.1	17.2	16.8	0.0	-0.4	-2.6	-4.5	0.2	-0.1	0.0	-0.1	0.0	0.0	0.0	0.0
Hart Centre	29.9	0.0	15.8	21.0	16.2	16.8	0.6	0.0	0.2	0.3	0.6	0.1	0.0	0.0	0.0	0.0	0.0	0.0
UNBC	21.2	15.3	0.0	6.2	8.0	11.9	0.0	0.2	0.0	0.1	-1.2	0.1	0.0	-0.1	0.0	0.0	0.0	0.0
Westgate Exchange	17.9	20.7	6.4	0.0	8.4	11.6	-1.0	0.0	-0.2	0.0	-0.7	0.1	0.0	0.0	0.0	0.0	0.0	0.0
Pine Centre	15.2	16.5	8.1	8.4	0.0	5.6	0.6	0.4	-1.5	-0.5	0.0	0.2	0.0	0.0	0.0	0.0	0.0	0.0
City Hall	16.3	18.2	13.7	12.9	7.0	0.0	0.2	0.5	0.6	-0.1	0.5	0.0	0.0	-0.3	-0.1	0.0	0.0	0.0
	Scenario 1675						Scenario 1675 - Scenario 601						Scenario 1675 - Scenario 1673					
Airport	0.0	30.2	21.5	18.1	17.2	16.8	0.0	-0.4	-2.6	-4.5	0.2	-0.1	0.0	-0.1	0.0	0.0	0.0	0.0
Hart Centre	29.8	0.0	15.8	21.0	16.2	16.8	0.5	0.0	0.2	0.3	0.6	0.1	-0.1	0.0	0.0	0.0	0.0	0.0
UNBC	21.2	15.3	0.0	6.2	8.0	11.9	0.0	0.2	0.0	0.1	-1.2	0.1	0.0	-0.1	0.0	0.0	0.0	0.0
Westgate Exchange	17.9	20.7	6.4	0.0	8.4	11.6	-1.0	0.0	-0.2	0.0	-0.7	0.1	0.0	0.0	0.0	0.0	0.0	0.0
Pine Centre	15.1	16.4	8.1	8.4	0.0	5.6	0.5	0.3	-1.5	-0.5	0.0	0.2	-0.1	-0.1	0.0	0.0	0.0	0.0
City Hall	16.3	18.1	13.7	12.9	7.0	0.0	0.2	0.4	0.6	-0.1	0.5	0.0	0.0	-0.4	-0.1	0.0	0.0	0.0
	Scenario 1676						Scenario 1676 - Scenario 601						Scenario 1676 - Scenario 1673					
Airport	0.0	30.2	21.5	18.1	17.2	16.8	0.0	-0.4	-2.6	-4.5	0.2	-0.1	0.0	-0.1	0.0	0.0	0.0	0.0
Hart Centre	29.9	0.0	15.9	21.0	16.2	16.8	0.6	0.0	0.3	0.3	0.6	0.1	0.0	0.0	0.1	0.0	0.0	0.0
UNBC	21.2	15.3	0.0	6.2	8.0	11.9	0.0	0.2	0.0	0.1	-1.2	0.1	0.0	-0.1	0.0	0.0	0.0	0.0
Westgate Exchange	17.9	20.7	6.4	0.0	8.4	11.6	-1.0	0.0	-0.2	0.0	-0.7	0.1	0.0	0.0	0.0	0.0	0.0	0.0
Pine Centre	15.2	16.5	8.1	8.5	0.0	5.6	0.6	0.4	-1.5	-0.4	0.0	0.2	0.0	0.0	0.0	0.1	0.0	0.0
City Hall	16.0	18.0	13.8	13.6	7.1	0.0	-0.1	0.3	0.7	0.6	0.6	0.0	-0.3	-0.5	0.0	0.7	0.1	0.0
	Scenario 1699						Scenario 1699 - Scenario 601						Scenario 1699 - Scenario 1676					
Airport	0.0	30.8	21.5	18.1	17.4	17.0	0.0	0.2	-2.6	-4.5	0.4	0.1	0.0	0.6	0.0	0.0	0.2	0.2
Hart Centre	30.4	0.0	15.9	21.0	16.4	17.0	1.1	0.0	0.3	0.3	0.8	0.3	0.5	0.0	0.0	0.0	0.2	0.2
UNBC	21.2	15.3	0.0	6.2	8.0	12.1	0.0	0.2	0.0	0.1	-1.2	0.3	0.0	0.0	0.0	0.0	0.0	0.2
Westgate Exchange	17.9	20.7	6.4	0.0	8.4	11.6	-1.0	0.0	-0.2	0.0	-0.7	0.1	0.0	0.0	0.0	0.0	0.0	0.0
Pine Centre	15.4	16.4	8.1	8.4	0.0	5.7	0.8	0.3	-1.5	-0.5	0.0	0.3	0.2	-0.1	0.0	-0.1	0.0	0.1
City Hall	16.1	18.0	13.7	13.5	7.1	0.0	0.0	0.3	0.6	0.5	0.6	0.0	0.1	0.0	-0.1	-0.1	0.0	0.0

2026 Travel Time (min)

From \ To	Airport	Hart Centre	UNBC	Westgate Exchange	Pine Centre	City Hall	Airport	Hart Centre	UNBC	Westgate Exchange	Pine Centre	City Hall	Airport	Hart Centre	UNBC	Westgate Exchange	Pine Centre	City Hall
	Scenario 2600																	
Airport	0.0	34.4	23.4	19.2	19.1	18.0												
Hart Centre	31.2	0.0	17.0	22.3	17.1	18.2												
UNBC	21.6	16.8	0.0	6.3	8.2	12.4												
Westgate Exchange	18.0	22.7	6.9	0.0	8.8	12.3												
Pine Centre	16.1	18.3	9.6	9.3	0.0	6.5												
City Hall	16.8	21.7	15.7	15.9	8.3	0.0												
	Scenario 2601																	
Airport	0.0	34.2	23.1	19.2	19.0	17.8												
Hart Centre	31.3	0.0	17.1	22.4	17.1	18.2												
UNBC	21.7	16.7	0.0	6.3	8.2	12.4												
Westgate Exchange	18.1	22.4	6.8	0.0	8.8	12.3												
Pine Centre	16.1	18.3	10.6	9.2	0.0	6.4												
City Hall	16.8	21.6	16.2	15.7	8.2	0.0												
	Scenario 2611						Scenario 2611 - Scenario 601						Scenario 2611 - Scenario 2601					
Airport	0.0	34.3	23.1	19.2	18.9	17.9	0.0	3.7	-1.0	-3.4	1.9	1.0	0.0	0.1	0.0	0.0	-0.1	0.1
Hart Centre	31.3	0.0	17.1	22.4	17.1	18.2	2.0	0.0	1.5	1.7	1.5	1.5	0.0	0.0	0.0	0.0	0.0	0.0
UNBC	21.7	16.6	0.0	6.2	8.2	12.5	0.5	1.5	0.0	0.1	-1.0	0.7	0.0	-0.1	0.0	-0.1	0.0	0.1
Westgate Exchange	18.0	22.4	6.8	0.0	8.8	12.3	-0.9	1.7	0.2	0.0	-0.3	0.8	-0.1	0.0	0.0	0.0	0.0	0.0
Pine Centre	16.1	18.3	10.5	9.1	0.0	6.5	1.5	2.2	0.9	0.2	0.0	1.1	0.0	0.0	-0.1	-0.1	0.0	0.1
City Hall	16.9	21.7	16.3	15.7	8.3	0.0	0.8	4.0	3.2	2.7	1.8	0.0	0.1	0.1	0.1	0.0	0.1	0.0
	Scenario 2621						Scenario 2621 - Scenario 601						Scenario 2621 - Scenario 2601					
Airport	0.0	34.3	23.1	19.2	19.0	18.0	0.0	3.7	-1.0	-3.4	2.0	1.1	0.0	0.1	0.0	0.0	0.0	0.2
Hart Centre	31.2	0.0	17.1	22.4	17.1	18.2	1.9	0.0	1.5	1.7	1.5	1.5	-0.1	0.0	0.0	0.0	0.0	0.0
UNBC	21.7	16.6	0.0	6.3	8.3	12.5	0.5	1.5	0.0	0.2	-0.9	0.7	0.0	-0.1	0.0	0.0	0.1	0.1
Westgate Exchange	18.1	22.4	6.8	0.0	8.8	12.3	-0.8	1.7	0.2	0.0	-0.3	0.8	0.0	0.0	0.0	0.0	0.0	0.0
Pine Centre	16.1	18.3	10.5	9.2	0.0	6.5	1.5	2.2	0.9	0.3	0.0	1.1	0.0	0.0	-0.1	0.0	0.0	0.1
City Hall	16.8	21.7	16.2	15.7	8.2	0.0	0.7	4.0	3.1	2.7	1.7	0.0	0.0	0.1	0.0	0.0	0.0	0.0
	Scenario 2622						Scenario 2622 - Scenario 601						Scenario 2622 - Scenario 2601					
Airport	0.0	34.3	23.1	19.2	19.0	18.0	0.0	3.7	-1.0	-3.4	2.0	1.1	0.0	0.1	0.0	0.0	0.0	0.2
Hart Centre	31.2	0.0	17.1	22.4	17.1	18.2	1.9	0.0	1.5	1.7	1.5	1.5	-0.1	0.0	0.0	0.0	0.0	0.0
UNBC	21.7	16.7	0.0	6.3	8.2	12.5	0.5	1.6	0.0	0.2	-1.0	0.7	0.0	0.0	0.0	0.0	0.0	0.1
Westgate Exchange	18.1	22.4	6.8	0.0	8.8	12.3	-0.8	1.7	0.2	0.0	-0.3	0.8	0.0	0.0	0.0	0.0	0.0	0.0
Pine Centre	16.1	18.3	10.5	9.2	0.0	6.5	1.5	2.2	0.9	0.3	0.0	1.1	0.0	0.0	-0.1	0.0	0.0	0.1
City Hall	16.8	21.6	16.2	15.7	8.2	0.0	0.7	3.9	3.1	2.7	1.7	0.0	0.0	0.0	0.0	0.0	0.0	0.0
	Scenario 2623						Scenario 2623 - Scenario 601						Scenario 2623 - Scenario 2601					
Airport	0.0	34.3	23.8	19.2	18.7	17.9	0.0	3.7	-0.3	-3.4	1.7	1.0	0.0	0.1	0.7	0.0	-0.3	0.1
Hart Centre	30.8	0.0	16.6	24.7	17.3	18.3	1.5	0.0	1.0	4.0	1.7	1.6	-0.5	0.0	-0.5	2.3	0.2	0.1
UNBC	24.2	16.6	0.0	8.8	9.6	12.7	3.0	1.5	0.0	2.7	0.4	0.9	2.5	-0.1	0.0	2.5	1.4	0.3
Westgate Exchange	18.0	23.2	7.6	0.0	8.7	12.2	-0.9	2.5	1.0	0.0	-0.4	0.7	-0.1	0.8	0.8	0.0	-0.1	-0.1
Pine Centre	16.0	18.6	8.2	9.0	0.0	6.5	1.4	2.5	-1.4	0.1	0.0	1.1	-0.1	0.3	-2.4	-0.2	0.0	0.1
City Hall	16.8	21.7	14.9	15.4	8.4	0.0	0.7	4.0	1.8	2.4	1.9	0.0	0.0	0.1	-1.3	-0.3	0.2	0.0
	Scenario 2624						Scenario 2624 - Scenario 601						Scenario 2624 - Scenario 2623					
Airport	0.0	34.2	23.6	19.1	18.8	17.9	0.0	3.6	-0.5	-3.5	1.8	1.0	0.0	-0.1	-0.2	-0.1	0.1	0.0
Hart Centre	30.9	0.0	16.7	24.1	17.3	18.2	1.6	0.0	1.1	3.4	1.7	1.5	0.1	0.0	0.1	-0.6	0.0	-0.1
UNBC	23.8	16.7	0.0	8.4	9.2	12.6	2.6	1.6	0.0	2.3	0.0	0.8	-0.4	0.1	0.0	-0.4	-0.4	-0.1
Westgate Exchange	18.0	23.2	7.4	0.0	8.7	12.2	-0.9	2.5	0.8	0.0	-0.4	0.7	0.0	0.0	-0.2	0.0	0.0	0.0
Pine Centre	16.1	18.6	8.1	9.0	0.0	6.5	1.5	2.5	-1.5	0.1	0.0	1.1	0.1	0.0	-0.1	0.0	0.0	0.0
City Hall	16.8	21.7	15.2	15.4	8.5	0.0	0.7	4.0	2.1	2.4	2.0	0.0	0.0	0.0	0.3	0.0	0.1	0.0
	Scenario 2631						Scenario 2631 - Scenario 601						Scenario 2631 - Scenario 2624					
Airport	0.0	34.1	22.8	19.2	18.6	17.7	0.0	3.5	-1.3	-3.4	1.6	0.8	0.0	-0.1	-0.8	0.1	-0.2	-0.2
Hart Centre	31.1	0.0	16.7	24.1	17.3	18.2	1.8	0.0	1.1	3.4	1.7	1.5	0.2	0.0	0.0	0.0	0.0	0.0
UNBC	22.4	16.8	0.0	8.4	9.1	12.6	1.2	1.7	0.0	2.3	-0.1	0.8	-1.4	0.1	0.0	0.0	-0.1	0.0
Westgate Exchange	18.0	23.2	7.4	0.0	8.7	12.2	-0.9	2.5	0.8	0.0	-0.4	0.7	0.0	0.0	0.0	0.0	0.0	0.0
Pine Centre	16.0	18.6	8.0	8.9	0.0	6.5	1.4	2.5	-1.6	0.0	0.0	1.1	-0.1	0.0	-0.1	-0.1	0.0	0.0
City Hall	16.8	21.6	15.1	15.2	8.4	0.0	0.7	3.9	2.0	2.2	1.9	0.0	0.0	-0.1	-0.1	-0.2	-0.1	0.0

	Scenario 2632						Scenario 2632 - Scenario 601						Scenario 2632 - Scenario 2631					
Airport	0.0	34.2	22.8	19.2	18.6	17.9	0.0	3.6	-1.3	-3.4	1.6	1.0	0.0	0.1	0.0	0.0	0.0	0.2
Hart Centre	31.1	0.0	16.7	24.0	17.3	18.2	1.8	0.0	1.1	3.3	1.7	1.5	0.0	0.0	0.0	-0.1	0.0	0.0
UNBC	22.4	16.8	0.0	8.4	9.1	12.6	1.2	1.7	0.0	2.3	-0.1	0.8	0.0	0.0	0.0	0.0	0.0	0.0
Westgate Exchange	18.0	23.2	7.4	0.0	8.7	12.2	-0.9	2.5	0.8	0.0	-0.4	0.7	0.0	0.0	0.0	0.0	0.0	0.0
Pine Centre	16.0	18.6	8.1	8.9	0.0	6.5	1.4	2.5	-1.5	0.0	0.0	1.1	0.0	0.0	0.1	0.0	0.0	0.0
City Hall	16.8	21.6	15.1	15.2	8.4	0.0	0.7	3.9	2.0	2.2	1.9	0.0	0.0	0.0	0.0	0.0	0.0	0.0
	Scenario 2641						Scenario 2641 - Scenario 601						Scenario 2641 - Scenario 2631					
Airport	0.0	34.1	22.8	19.2	18.4	17.7	0.0	3.5	-1.3	-3.4	1.4	0.8	0.0	0.0	0.0	0.0	-0.2	0.0
Hart Centre	31.3	0.0	16.7	24.0	17.2	18.2	2.0	0.0	1.1	3.3	1.6	1.5	0.2	0.0	0.0	-0.1	-0.1	0.0
UNBC	22.3	16.7	0.0	8.3	9.1	12.6	1.1	1.6	0.0	2.2	-0.1	0.8	-0.1	-0.1	0.0	-0.1	0.0	0.0
Westgate Exchange	18.0	23.1	7.4	0.0	8.9	12.1	-0.9	2.4	0.8	0.0	-0.2	0.6	0.0	-0.1	0.0	0.0	0.2	-0.1
Pine Centre	16.0	18.5	8.0	9.0	0.0	6.6	1.4	2.4	-1.6	0.1	0.0	1.2	0.0	-0.1	0.0	0.1	0.0	0.1
City Hall	16.8	21.7	15.1	15.1	8.4	0.0	0.7	4.0	2.0	2.1	1.9	0.0	0.0	0.1	0.0	-0.1	0.0	0.0
	Scenario 2642						Scenario 2642 - Scenario 601						Scenario 2642 - Scenario 2631					
Airport	0.0	34.0	22.8	19.2	18.6	17.6	0.0	3.4	-1.3	-3.4	1.6	0.7	0.0	-0.1	0.0	0.0	0.0	-0.1
Hart Centre	31.6	0.0	16.7	24.1	17.2	18.2	2.3	0.0	1.1	3.4	1.6	1.5	0.5	0.0	0.0	0.0	-0.1	0.0
UNBC	22.4	16.7	0.0	8.4	9.1	12.6	1.2	1.6	0.0	2.3	-0.1	0.8	0.0	-0.1	0.0	0.0	0.0	0.0
Westgate Exchange	18.0	23.2	7.4	0.0	9.0	12.2	-0.9	2.5	0.8	0.0	-0.1	0.7	0.0	0.0	0.0	0.0	0.3	0.0
Pine Centre	15.8	18.6	8.1	8.9	0.0	6.5	1.2	2.5	-1.5	0.0	0.0	1.1	-0.2	0.0	0.1	0.0	0.0	0.0
City Hall	16.9	21.3	15.0	15.1	7.8	0.0	0.8	3.6	1.9	2.1	1.3	0.0	0.1	-0.3	-0.1	-0.1	-0.6	0.0
	Scenario 2651						Scenario 2651 - Scenario 601						Scenario 2651 - Scenario 2642					
Airport	0.0	34.0	22.8	19.2	18.7	17.7	0.0	3.4	-1.3	-3.4	1.7	0.8	0.0	0.0	0.0	0.0	0.1	0.1
Hart Centre	31.6	0.0	16.8	24.2	17.2	18.3	2.3	0.0	1.2	3.5	1.6	1.6	0.0	0.0	0.1	0.1	0.0	0.1
UNBC	22.4	16.8	0.0	8.4	9.1	12.6	1.2	1.7	0.0	2.3	-0.1	0.8	0.0	0.1	0.0	0.0	0.0	0.0
Westgate Exchange	18.0	23.2	7.4	0.0	9.0	12.2	-0.9	2.5	0.8	0.0	-0.1	0.7	0.0	0.0	0.0	0.0	0.0	0.0
Pine Centre	15.9	18.6	8.1	8.9	0.0	6.5	1.3	2.5	-1.5	0.0	0.0	1.1	0.1	0.0	0.0	0.0	0.0	0.0
City Hall	16.8	21.6	15.0	15.1	7.8	0.0	0.7	3.9	1.9	2.1	1.3	0.0	-0.1	0.3	0.0	0.0	0.0	0.0
	Scenario 2671						Scenario 2671 - Scenario 601						Scenario 2671 - Scenario 2642					
Airport	0.0	36.6	22.8	19.2	18.7	17.7	0.0	6.0	-1.3	-3.4	1.7	0.8	0.0	2.6	0.0	0.0	0.1	0.1
Hart Centre	32.0	0.0	17.3	24.6	17.7	18.7	2.7	0.0	1.7	3.9	2.1	2.0	0.4	0.0	0.6	0.5	0.5	0.5
UNBC	22.4	19.6	0.0	8.4	9.1	12.6	1.2	4.5	0.0	2.3	-0.1	0.8	0.0	2.9	0.0	0.0	0.0	0.0
Westgate Exchange	18.0	26.1	7.4	0.0	9.0	12.2	-0.9	5.4	0.8	0.0	-0.1	0.7	0.0	2.9	0.0	0.0	0.0	0.0
Pine Centre	15.8	21.4	8.1	8.9	0.0	6.5	1.2	5.3	-1.5	0.0	0.0	1.1	0.0	2.8	0.0	0.0	0.0	0.0
City Hall	16.8	24.1	15.0	15.1	7.8	0.0	0.7	6.4	1.9	2.1	1.3	0.0	-0.1	2.8	0.0	0.0	0.0	0.0
	Scenario 2681						Scenario 2681 - Scenario 601						Scenario 2681 - Scenario 2671					
Airport	0.0	36.1	21.8	18.3	19.2	17.1	0.0	5.5	-2.3	-4.3	2.2	0.2	0.0	-0.5	-1.0	-0.9	0.5	-0.6
Hart Centre	32.4	0.0	17.3	24.6	17.7	18.7	3.1	0.0	1.7	3.9	2.1	2.0	0.4	0.0	0.0	0.0	0.0	0.0
UNBC	22.3	19.6	0.0	8.4	9.1	12.6	1.1	4.5	0.0	2.3	-0.1	0.8	-0.1	0.0	0.0	0.0	0.0	0.0
Westgate Exchange	18.0	26.0	7.4	0.0	9.0	12.1	-0.9	5.3	0.8	0.0	-0.1	0.6	0.0	-0.1	0.0	0.0	0.0	-0.1
Pine Centre	16.2	21.4	8.1	8.9	0.0	6.4	1.6	5.3	-1.5	0.0	0.0	1.0	0.4	0.0	0.0	0.0	0.0	-0.1
City Hall	16.6	23.9	15.0	15.0	7.7	0.0	0.5	6.2	1.9	2.0	1.2	0.0	-0.2	-0.2	0.0	-0.1	-0.1	0.0
	Scenario 2683						Scenario 2683 - Scenario 601						Scenario 2683 - Scenario 2681					
Airport	0.0	35.4	21.8	18.3	19.2	17.1	0.0	4.8	-2.3	-4.3	2.2	0.2	0.0	-0.7	0.0	0.0	0.0	0.0
Hart Centre	32.3	0.0	17.3	24.6	17.6	18.5	3.0	0.0	1.7	3.9	2.0	1.8	-0.1	0.0	0.0	0.0	-0.1	-0.2
UNBC	22.3	19.5	0.0	8.3	9.1	12.6	1.1	4.4	0.0	2.2	-0.1	0.8	0.0	-0.1	0.0	-0.1	0.0	0.0
Westgate Exchange	18.0	25.9	7.4	0.0	9.0	12.1	-0.9	5.2	0.8	0.0	-0.1	0.6	0.0	-0.1	0.0	0.0	0.0	0.0
Pine Centre	16.2	21.3	8.1	8.9	0.0	6.4	1.6	5.2	-1.5	0.0	0.0	1.0	0.0	-0.1	0.0	0.0	0.0	0.0
City Hall	16.8	23.6	14.9	15.0	7.7	0.0	0.7	5.9	1.8	2.0	1.2	0.0	0.2	-0.3	-0.1	0.0	0.0	0.0
	Scenario 2684						Scenario 2684 - Scenario 601						Scenario 2684 - Scenario 2683					
Airport	0.0	33.9	21.8	18.3	19.1	17.2	0.0	3.3	-2.3	-4.3	2.1	0.3	0.0	-1.5	0.0	0.0	-0.1	0.1
Hart Centre	29.8	0.0	17.0	24.4	17.3	18.2	0.5	0.0	1.4	3.7	1.7	1.5	-2.5	0.0	-0.3	-0.2	-0.3	-0.3
UNBC	22.3	18.7	0.0	8.3	9.1	12.6	1.1	3.6	0.0	2.2	-0.1	0.8	0.0	-0.8	0.0	0.0	0.0	0.0
Westgate Exchange	18.0	25.0	7.3	0.0	9.0	12.1	-0.9	4.3	0.7	0.0	-0.1	0.6	0.0	-0.9	-0.1	0.0	0.0	0.0
Pine Centre	16.0	20.3	8.1	8.9	0.0	6.4	1.4	4.2	-1.5	0.0	0.0	1.0	-0.2	-1.0	0.0	0.0	0.0	0.0
City Hall	16.8	22.6	14.9	15.0	7.7	0.0	0.7	4.9	1.8	2.0	1.2	0.0	0.0	-1.0	0.0	0.0	0.0	0.0
	Scenario 2699						Scenario 2699 - Scenario 601						Scenario 2699 - Scenario 2684					
Airport	0.0	31.9	21.4	18.1	16.6	17.5	0.0	1.3	-2.7	-4.5	-0.4	0.6	0.0	-2.0	-0.4	-0.2	-2.5	0.3
Hart Centre	29.9	0.0	16.2	21.8	17.3	17.8	0.6	0.0	0.6	1.1	1.7	1.1	0.1	0.0	-0.8	-2.6	0.0	-0.4
UNBC	20.6	16.3	0.0	6.6	8.2	12.0	-0.6	1.2	0.0	0.5	-1.0	0.2	-1.7	-2.4	0.0	-1.7	-0.9	-0.6
Westgate Exchange	18.0	22.1	6.8	0.0	8.9	11.8	-0.9	1.4	0.2	0.0	-0.2	0.3	0.0	-2.9	-0.5	0.0	-0.1	-0.3
Pine Centre	15.5	17.4	7.8	8.6	0.0	5.6	0.9	1.3	-1.8	-0.3	0.0	0.2	-0.5	-2.9	-0.3	-0.3	0.0	-0.8
City Hall	17.3	20.1	14.3	14.2	7.2	0.0	1.2	2.4	1.2	1.2	0.7	0.0	0.5	-2.5	-0.6	-0.8	-0.5	0.0

Appendix E
MAE Cost Estimates

	Unit	All	Element 1	Element 2	Element 3	Element 4	Element 5	Element 6	Element 7	Element 8	Element 9	Element 10	Element 11	Element 12	Element 13	Element 14	Element 15	Element 16	Element 17	Element 18	Element 19	Element 20	Element 21	Element 22
		3698	3611	3612	3621	3622	3623	3624	3631	3632	3641	3642	3643	3651	3671	3672	3673	3681	3682	3683	3684	3685	3686	3687
		2026 Preliminary Preferred	Lansdowne Extension and Upland Realignment	Lansdowne Extension	Massey Extension, Ospika to Tyner	Massey Extension, Tyner to Hwy 16W	University Way Extension	Cranbrook Drive	Ospika Extension, Tyner to Hwy 16W	Glen Lyon Extension, St Patricks to Domano	RecPlace connection to Pine Frontage	RecPlace connection to Hwy 16W	RecPlace connection to Athlone	Hwy 16 6-lane widening	Boundary, Hwy 16W to Domano	Boundary, Domano to Hwy 97S	Boundary, Hwy 97S to Hwy 16E	Blueberry Extension	Handlen Extension	Nechako River Crossing	Northwood-PG Pulp Mill connection	Willow Cale Extension	Lower Patricia Connector	Lower Patricia Connector
Components																								
Centreline km length	km	73.4	0.9	0.3	3.4	2.8	4.1	0.9	0.5	0.4	0.2	0.6	0.6	2.1	3.9	4.7	6.8	3.9	1.1	0.6	4.7	4.8	1.2	2.8
Road Classification		-	collector	collector	arterial	arterial	arterial	collector	arterial	collector	collector	collector	local	highway	arterial	arterial	arterial	collector	collector	collector	collector	collector	arterial	arterial
RoW assumed	m	-	25	25	37	37	30	25	37	25	25	25	20	45	37	37	37	25	25	25	25	25	30	37
No of lanes		-	2	2	4	4	2	2	4	2	2	2	2	6	2	2	2	2	2	2	2	2	2	4
Bridge	No.	-	1overpass	1overpass	0	0	0	0	1interchange	0	0	1overpass	0	0	0	1overpass, 1bridge	0	0	0	2bridges	0	1overpass	1overpass	0
Bridge Size (length & width assumed)	m x m	-	36 x 25	36 x 25	n/a	n/a	n/a	n/a	77 x 37	n/a	n/a	82 x 25	n/a	n/a	n/a	(79 + 296) x 37	n/a	n/a	n/a	(44+ 161) x 25	n/a	240 x 25	112 x 30	n/a
Hwy Conditions Assumed		-	Easy-Moderate	Moderate	Difficult	Easy	Moderate	Easy	Moderate	Moderate	Easy	Easy	Easy	Easy	Moderate-Difficult	Easy	Easy	Easy	Easy	Easy	60%Easy, 40%Difficult	Easy	Easy	Easy
Traffic Control	No.&Location	-	1signal @ Ferry, 1 overpass @ Cowart	1overpass @ Cowart	1signal @ Tyner	0signal	0signal	0signal	1interchange @ H16W	0signal	0signal	0signal	0signal	3signals @ H97S,Ferry,Vance	1signal @ H16W	1signal @ H97S	1signal @ H16E	2signals @ H97N,Foothills	0signal	0signal	0signal	0signal	0signal	2signals @ Massey,Ferry
No of Properties affected	Full	39	11	0	1	0	0	0	0	0	2	0	0	0	1	2	10	0	0	1	0	0	6	3
	Parital	191	8	2	4	5	4	2	2	2	2	1	2	7	11	8	11	9	3	1	9	6	22	21
	Type of Prop	-	100% Urban Development	100% Urban Development	100% Urban Development	100% Urban Development	60% Urban Development, 40% Public Facilities	100% Urban Development	100% Urban Development	100% Urban Development	100% Commercial	100% Urban Development	100% Commercial	60% Urban Development, 40% Commercial	0	70% Vacant, 30% Industrial	50% Industrial, 50% Vacant	100% Urban Development	100% Urban Development	100% Vacant	100% Vacant	100% Industrial	100% Urban Development	100% Urban Development
Size of Prop taking	ha	184.158	2.103	0.814	12.299	9.539	11.682	2.097	1.488	0.178	0.572	0.781	1.124	1.181	14.139	12.638	23.209	9.602	2.737	0.797	10.945	11.989	0.826	2.879
ALR Impact	km	-	No	No	No	No	No	No	No	No	No	No	No	No	0.7	1.9	3	No	No	0.3	3.5	No	No	No
FloodPlain	km	-	0.3	0.3	No	No	No	No	No	No	No	No	No	No	No	No	No	No	No	0.3	No	No	1.1	No

Financial Account																								
Capital Cost																								
Road	$	$157,256,000	$1,500,000	$660,000	$34,000,000	$6,160,000	$9,020,000	$1,260,000	$1,300,000	$880,000	$280,000	$840,000	$840,000	$2,940,000	$9,780,000	$6,580,000	$9,520,000	$5,460,000	$1,540,000	$840,000	$9,588,000	$6,720,000	$1,680,000	$6,160,000
Bridge	$	$142,307,000	$2,700,000	$2,700,000	$0	$0	$0	$0	$32,300,000	$0	$0	$6,150,000	$0	$0	$0	$52,577,000	$0	$0	$0	$20,500,000	$0	$18,000,000	$10,080,000	$0
Traffic Signal	$	$3,080,000	$240,000	$0	$240,000	$0	$0	$0	$0	$0	$0	$0	$0	$720,000	$240,000	$240,000	$240,000	$480,000	$0	$0	$0	$0	$0	$480,000
Contingency	$	$90,792,900	$1,332,000	$1,008,000	$10,272,000	$1,848,000	$2,706,000	$378,000	$10,080,000	$264,000	$84,000	$2,097,000	$252,000	$1,098,000	$3,006,000	$17,819,100	$2,928,000	$1,782,000	$462,000	$6,402,000	$2,876,400	$7,416,000	$3,528,000	$1,992,000
Total	$	$393,435,900	$5,772,000	$4,368,000	$44,512,000	$8,008,000	$11,726,000	$1,638,000	$43,680,000	$1,144,000	$364,000	$9,087,000	$1,092,000	$4,758,000	$13,026,000	$77,216,100	$12,688,000	$7,722,000	$2,002,000	$27,742,000	$12,464,400	$32,136,000	$15,288,000	$8,632,000
Property Cost	$	$70,456,880	$946,350	$366,300	$5,534,550	$4,292,550	$5,256,900	$943,650	$669,600	$80,100	$257,400	$351,450	$1,348,800	$885,750	$4,157,750	$2,338,030	$6,382,475	$4,320,900	$1,231,650	$39,850	$547,250	$5,994,500	$371,700	$1,295,550
Maintenance Cost																								
Road/Bridge	$	$4,269,236	$43,812	$14,604	$331,024	$272,608	$199,588	$43,812	$48,680	$19,472	$9,736	$29,208	$29,208	$306,684	$189,852	$228,796	$331,024	$189,852	$53,548	$29,208	$228,796	$233,664	$58,416	$272,608
Traffic Signal	$	$37,200	$3,100	$0	$3,100	$0	$0	$0	$0	$0	$0	$0	$0	$9,300	$3,100	$3,100	$3,100	$6,200	$0	$0	$0	$0	$0	$6,200
Total	$	$4,306,436	$46,912	$14,604	$334,124	$272,608	$199,588	$43,812	$48,680	$19,472	$9,736	$29,208	$29,208	$315,984	$192,952	$231,896	$334,124	$196,052	$53,548	$29,208	$228,796	$233,664	$58,416	$278,808
Salvage Value	$	$129,450,563	$1,911,869	$1,381,053	$12,843,711	$3,332,691	$4,561,139	$702,032	$13,227,076	$310,831	$170,794	$2,780,450	$691,128	$1,464,083	$4,545,403	$23,446,319	$5,150,567	$3,269,979	$882,312	$8,280,354	$3,285,748	$11,062,295	$4,592,427	$2,559,621