City of Cold Lake
Transportation Master Plan
Final Report

July 2025

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

At ISL, your identity is part of our identity. Diversity, Equity, and Inclusion (DEI) speaks to our core values and provides space for our teams to bring their authentic selves to work. ISL believes DEI creates the best outcomes for our clients while sustaining a happy and thriving work environment that allows for career development opportunities for all staff. ISL is committed to a focused effort on continuous improvement and development of a respectful and safe workplace.

Corporate Authorization

This document entitled “Transportation Master Plan” has been prepared by ISL Engineering and Land Services Ltd. (ISL) for the use of the City of Cold Lake. The information and data provided herein represent ISL’s professional judgment at the time of preparation. ISL denies any liability whatsoever to any other parties who may obtain this report and use it, or any of its contents, without prior written consent from ISL.

2025-07-10

PROFESSIONAL ENGINEER ALBERTA
DAN ZEGGELAAR
ID: 98374

Daniel Zeggelaar, **P.Eng., PTOE, PTP, RSP1**
Sustainable Transportation Lead

Permit to Practice
ISL Engineering and Land Services Ltd.
RM Signature:
RM APEGA ID: 66635
Date: Jul. 10 2025
Permit Number P4741
The Association of Professional Engineers and Geoscientists of Alberta

Table of Contents

APPENDICES

TABLES

FIGURES

EXHIBITS

1.0 Introduction

The City of Cold Lake is embarking on an important initiative to develop a comprehensive Transportation Master Plan. This plan will serve as a guide for the transportation network both now and in the future as the community continues to grow. The existing Transportation Study, prepared in 2012, has served the city well, but with the passage of time, certain sections have become outdated and require revision to accurately reflect current and future needs. By developing this Transportation Master Plan (TMP), the City of Cold Lake aims to ensure that its transportation network can meet the increasing demands for the movement of people, goods, and services, thereby supporting the city's continued growth and prosperity.

Purpose

The goal of this document is to provide guidance on how to enhance and expand the City's transportation network for the next 25 years. The TMP considered the existing transportation network as well as the future needs for the 5-, 10-, 15-, 20-, and 25-year horizons. The plan recommends a transportation network designed to meet both short-term and long-term needs, proposing a prioritized works program and associated costs. It identifies optimal roadway networks and improvements that align with various population milestones. The Transportation Master Plan was developed to align with the growth and functions outlined in the City of Cold Lake Municipal Development Plan (MDP) adopted in May 2021, the updated Intermunicipal Development Plan (IDP) with the MD of Bonnyville, and the City's various other plans.

2.0 Existing Land Use and Modeling Inputs

The development of a travel demand model for the Transportation Master Plan provides significant benefits as it evaluates travel pattern changes as they relate to changes in land use and regional and local transportation network links. This is valuable to Cold Lake as any potential changes to the road network, including provincial projects on Highway 28 and Highway 55, could significantly alter traffic patterns within Cold Lake, and it is helpful to understand what transportation infrastructure may be required to accommodate these changes in addition to the normal outward expansion of the roadway network through planned future development areas. The following sections summarize the land use assumptions that form the basis for the recommendations in this report, as well as the process of developing and calibrating the travel demand model.

2.1 Existing Zone Setup

For modelling purposes, Cold Lake and the surrounding area were subdivided into various transportation zones, as shown in **Exhibit 2.1**. The zone boundaries generally follow road boundaries and reflect natural and man-made divisions such as major roads, section lines, and separate land use types. Generally, the zone system provides a good breakout of the areas within Cold Lake's boundaries, and provides a reasonably fine definition of land uses and zone connections to the road network for transportation modelling. The existing model for Cold Lake consists of 67 internal zones; with 25 zones within Cold Lake North (100 series zones in Exhibit 2.1), 40 zones within Cold Lake South (200 series zones), and 2 Annex zones (Zone 401 & 402).

Located within the Municipal District of Bonnyville No.87 and along the Highway 28 and Highway 55 corridors, Cold Lake services many external trips (external to internal, internal to external, and external to external). With the external trips, the interaction between residential and employment zones within Cold Lake and the external municipalities is a key consideration. To provide a reasonable snapshot of transportation requirements and their impact on roadways within Cold Lake, the transportation demand model was developed with 10 external zones (10,000 series zone in Exhibit 2.1) to account for the external trips. External zones are used in the model to represent traffic passing into and out of Cold Lake's transportation system from regional destinations (**Table 2.1**).

Table 2.1 External Zones

External Zone	Roadway	External Zone	Roadway
10001	English Bay Rd (North)	10006	Range Road 424 (North)
10002	16 Avenue (East)	10007	Range Road 423 (North)
10003	50 Avenue (East)	10008	Township Road 632 (West)
10004	Highway 28 (South)	10009	Highway 55 (West)
10005	Kingsway (West)	10010	Township Road 634 (West)

2.2 Existing Population and Employment

Exhibit 2.2 shows existing land uses within the City, focusing exclusively on absorbed land – those areas that are either built-up or readily available for development. The current development pattern of the City is still somewhat disjointed, with development contiguity and urban densities concentrated

around three major areas: Cold Lake North, Cold Lake South, and the Canadian Force Base (CFB) 4 Wing. This spatial arrangement stems largely from the historical processes of amalgamation and annexation, which shaped the City's current boundaries. Highway 28 and Highway 55 serve as connectors for these three areas but remain largely undeveloped.

Highway 28 has the greatest development potential, being the only existing connection between Cold Lake North and Cold Lake South. There is some existing development on the east side of the Highway. Notably, the Cold Lake Energy Centre and Imperial Park form a multi-use institutional and recreational hub that serves as the City's main gathering place. Further south, the Tri-City Mall accommodates highway commercial uses, such as drive-in businesses and large-scale retail. The surrounding area includes three residential neighborhoods—Tri-City Estates, Fontaine Village Manufactured Homes Park, and Meadows—located to the east, southeast, and south of the mall. In contrast, the west side of Highway 28 remains undeveloped.

Both Cold Lake North and Cold Lake South have distinct centers, each offering a blend of small-scale retail and residential uses. The influence of Highway 28 is more pronounced in Cold Lake South, which houses most of the City's large-scale commercial, business industrial, and industrial land. Cold Lake North, in contrast, is predominantly residential, supported by institutional and recreational uses. Additionally, there are environmentally and topographically constrained lands, particularly near the lake, that are undevelopable.

Current dwelling and population distribution was estimated using the land use data displayed in **Exhibit 2.2** and the results from the 2022 municipal census are shown in below. Since the geographical scope of this project is limited to Cold Lake North and Cold Lake South, the baseline dwelling count used was 6,081 and the baseline population count used was 14,986.

Table 2.2 City of Cold Lake 2022 Municipal Census Population Count

Area	Dwellings	Population
Cold Lake North	3,209	8,016
Cold Lake South	2,846	6,970
Cold Lake North and South Subtotal	**6,081**	**14,986**
CFB (4 Wing)	723	1,316
City Total	**6,804**	**16,302**

The following statistics were calculated based on available data:

- **Average residential density:**
  - 11.35 dwellings/net residential hectare (nrha) in predominantly low-density residential areas
  - 28 dwellings/nrha in predominantly high-density residential areas
- **Average household size:** 2.48 people per dwelling

These averages were uniformly applied across the City to estimate dwelling and population distribution by TAZ (refer to **Table 2.3**). Based on these calculations, the City's estimated current population is approximately 15,020, which is consistent with the baseline population of 14,986.

Table 2.3 Current Dwellings and Population Counts by Traffic Analysis Zone (TAZ) – Cold Lake North and Cold Lake South

TAZ	Dwellings	Population
101	16	40
102	58	144
103	116	288
104	0	0
105	147	364
106	78	194
107	0	0
108	0	0
109	427	1,058
110	540	1,339
111	266	658
112	4	0
113	107	266
114	0	0
115	0	0
116	0	0
117	0	0
118	129	319
119	664	1,647
120	85	210
121	0	0
122	0	0
123	0	0
124	281	697
125	236	586
126	0	0
127	0	0
128	0	0
129	0	0
130	0	0
201	0	0
202	0	0
203	0	0
204	0	0
205	0	0
206	429	1,064
207	0	0
208	0	0
209	0	0
210	395	980
211	0	0
212	382	947
213	155	385
214	325	807
215	406	1,007
216	366	909
217	0	0
218	0	0
219	126	313
220	0	0
221	19	48
222	8	19
223	236	586
224	0	0
225	0	0
226	0	0
227	0	0
228	0	0
229	0	0
230	0	0
231	0	0
232	48	120
233	0	0
234	0	0
235	0	0
401	0	0
402	0	0
TOTAL	**6,049**	**14,995**

Since there is no detailed employment by zone available, the existing employment by zone was determined based on the following steps:

Step 1: Identify Places of Work

The first step is understanding where residents work. **Table 2.4** summarizes the place of work for residents currently living in Cold Lake, which includes 4 Wing, Cold Lake North and Cold Lake South based on the 2022 Municipal Census.

Table 2.4 Place of Work (Cold Lake Residents, 2022 Municipal Census)

Place of Work	2022 Municipal Census
4 Wing	23%
Cold Lake North	17%
Cold Lake South	27%
Outside Cold Lake	25%
No Answer	8%

Step 2: Allocation of Jobs

The percentage of jobs in 4 Wing, Cold Lake North and Cold Lake South were applied to the Federal Commute data. In the 2021 Federal census, the City had an approximate 6,460 jobs. From the 2016 Federal census, over 78% of those employed in Cold Lake are local residents, while the remaining 22% reside outside the City. The number of jobs in each of the areas is summarized in **Table 2.5** below.

Table 2.5 Allocation of Jobs

Data Description	Number of Employment	Source/Assumption
Living in Cold Lake and Commuting within Cold Lake	**5,055**	**2021 Federal Census**
Living in Cold Lake, 4 Wing	1,735	Proportions Based on Municipal Census (Table 2.4)
Living in Cold Lake, Cold Lake North	1,283	
Living in Cold Lake, Cold Lake South	2,037	
Living outside Cold Lake and Working within Cold Lake	**1,405**	**2021 Federal Census**
Living outside Cold Lake, 4 Wing	482	Proportions Based on Municipal Census (Table 2.4)
Living outside Cold Lake, Cold Lake North	356	
Living outside Cold Lake, Cold Lake South	566	

Table 2.5 summarizes the number of jobs in Cold Lake in bold, from the Federal Census for people commuting within Cold Lake and people commuting from outside Cold Lake. The proportions of jobs allocated to Cold Lake North, South and 4 Wing are based on **Table 2.4.** The allocations of jobs for

commuters travelling from outside Cold Lake is assumed to be the same as those travelling within Cold Lake, from the municipal census.

Step 3: Total Job Allocation

The total job allocation for the TMP areas is summarized in **Table 2.6** below:

Table 2.6 Total Job Allocation

Location	Total
4 Wing	2,218
Cold Lake North	1,639
Cold Lake South	2,603
Total	6,460
Total (within TMP)	**4,242**

Step 4: Job allocations by Industry

The employment data by zone and employment categories was estimated and confirmed with the City prior to use in the model. Based on the 2021 Federal Census, the type of employment was consolidated to four employment categories:

- Retail Employment – employment at Retail, Wholesale, Accommodation and Food Service businesses
- Non-Retail Employment – employment at Information and Cultural Services, Finance, Real Estate, Professional Services, Management and Support, Administration businesses
- Industrial Employment – employment at Agricultural, Mining, Oil/Gas, Utilities, Construction, Manufacturing, Transportation and Warehousing sites
- Institutional Employment – employment at Educational Services, Health Care, Social Assistance, Arts, Entertainment and Recreational jobs

Table 2.7 provides the correlating job industries between the TMP job types and federal job types. The total number of jobs for each sector are from the 2021 Federal Census for all residents.

Table 2.7 Job Allocations by Industry to TMP Inputs

TMP Industries	Number of Jobs (Federal Census)	Jobs %
Retail	1,525	17.7%
Non-Retail	3,465	40.2%
Industrial	2,130	24.7%
Institutional	1,500	17.4%
Total	**8,620**	**100%**

Step 5: Number of Jobs by Employment Categories

Based on the total number of jobs within the TMP area in **Table 2.6** and the job percentage for each type of employment in **Table 2.7**, the number of jobs for each type of employment were calculated and summarized in **Table 2.8** below.

Table 2.8 Federal Census by Industry, Allocations by Municipal Census

TMP Industries	Cold Lake North	Cold Lake South
Retail	270	1,187
Non-Retail	364	584
Industrial	339	324
Institutional	668	510
Sub-Total	1,641	2,605
Total	**4,246**	

Step 6: Employment distribution to TAZ

The number of jobs for each type of employment were distributed proportionally to each of the TAZ based on the land use type of each TAZ. The population and employment data for the TAZ are summarized in **Appendix A** and is shown graphically in **Exhibit 2.3**.

Traffic Zones And City Boundary

Traffic Zones and City Boundary

Zones

Abc Internal

Abc External

Abc Annex

City Boundary

City Boundary

Roadway

0 400 800 1200 1600 2000 m

10001 401 101 402 102 103 104 105 106 10010 107 109 110 111 108 115 117 112 113 114 116 118 119 120 10009 10002 121 122 123 124 125 201 202 203 204 205 10008 206 207 208 209 10006 10007 210 211 212 213 214 215 216 10005 217 218 219 220 221 222 10003 227 224 223 226 228 229 230 225 231 232 233 234 235 236 237 238 239 240 10004

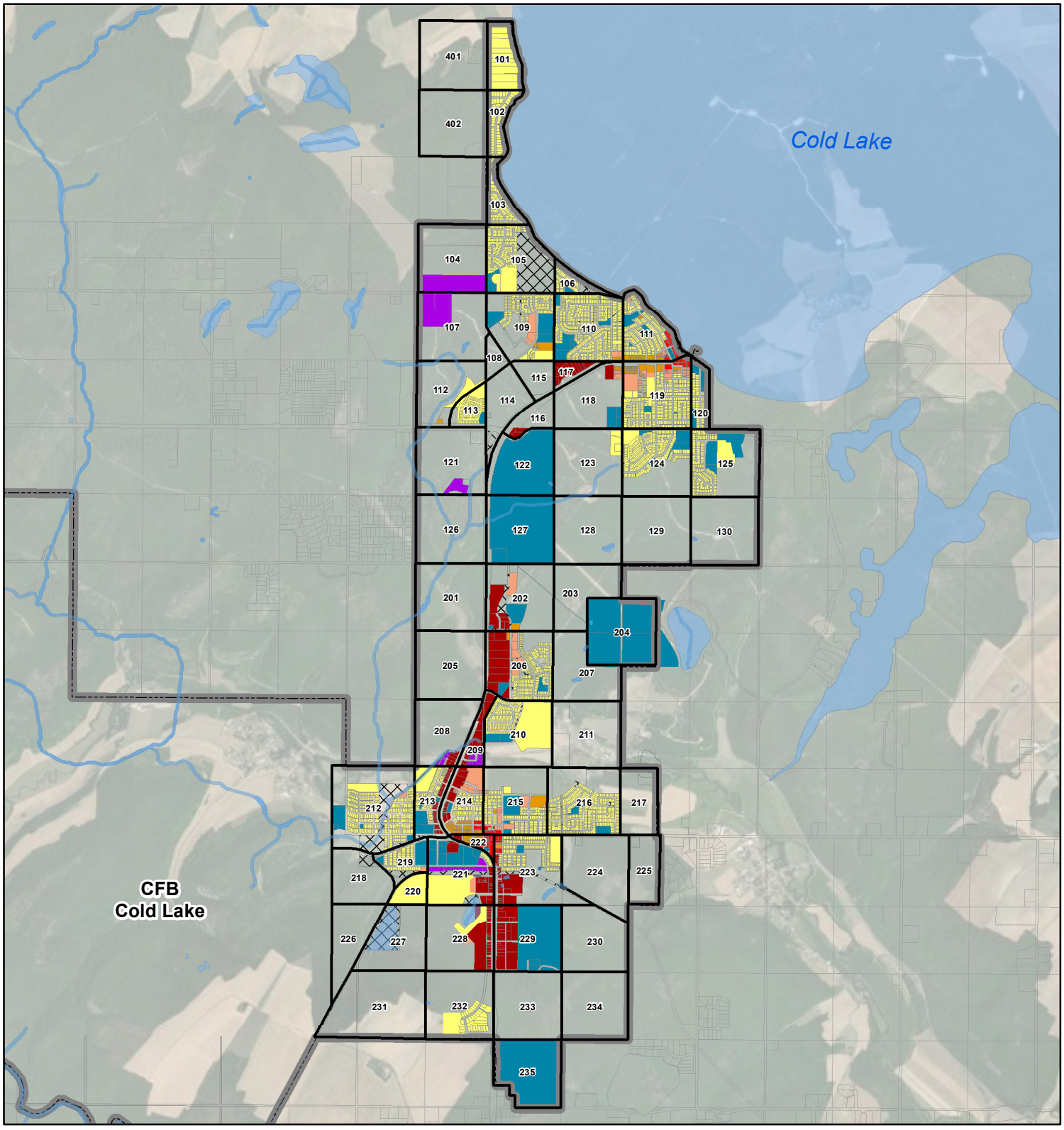
ISL Integrated Expertise. Locally Delivered.

City of Cold Lake

CITY OF COLD LAKE TMP

TRANSPORTATION ANLAYSIS ZONES

EXHIBIT 2.1



0 0.4 0.8 1.6 2.4 Km

1:64,000

- City of Cold Lake
- Transportation Zone
- Water Body
- Water Course
- Parcel

Land Use*

- Single Family
- Mixed Single and Multi Family
- Mixed Res/Comm
- Retail
- Non-Retail
- Industrial
- Institutional
- Undevelopable

* Land uses have been defined at a district level rather than at a parcel level. Thus, the land use classes shown in this map represent the predominant land use and do not intend to imply that other land uses are not present. The characterization of transportation zone by population and number of jobs takes into consideration the mix of uses that may be present within each of the land use classes shown in this map.

City of Cold Lake

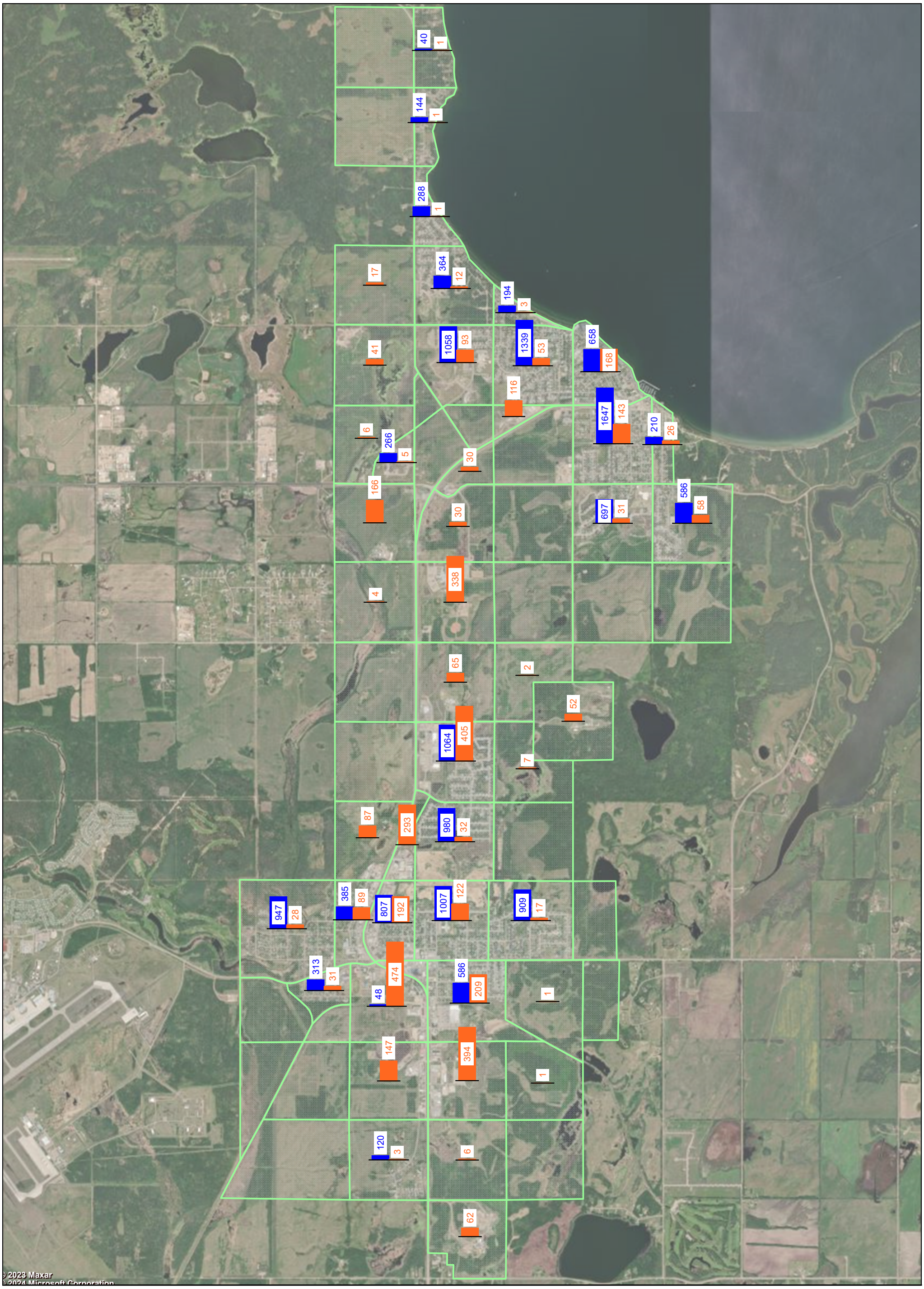
CITY OF COLD LAKE TMP

LAND USES ABSORBED LAND AS OF 2024

EXHIBIT 2.2

ISL

Integrated Expertise. Locally Delivered.



ISL Integrated Expertise. Locally Delivered.

Population

Employment

City of Cold Lake

CITY OF COLD LAKE TMP

EXISTING POPULATION AND EMPLOYMENT

EXHIBIT 2.3

3.0 Existing Travel Demand Model and Calibration

3.1 Travel Demand Modelling Process

The travel demand model development and the analysis undertaken in this study used the VISUM 24 transportation planning software suite developed by PTV Group. This GIS-based travel forecasting model is a state-of-the-art transportation planning tool that can efficiently estimate changes in travel patterns and utilization of transportation systems in response to changes in land use, population, employment, and transportation infrastructure. It integrates mapping, land use planning, development projections, future traffic demand, and transportation networks to produce realistic traffic forecasts that can be interpreted easily and presented in effective visual format. It is also a commonly-used modelling platform for municipalities of Cold Lake's size in Alberta.

The traditional four-step travel demand modelling process was used for this study, as shown in **Figure 3.1** and summarized as follows:

- **Trip Generation** – residential, commercial, and industrial land uses are used to determine the number of peak hour trips being generated for the study area;
- **Trip Distribution** – zone-to-zone trip distribution is based on the road network impedance (i.e., travel time) and travel pattern data from StreetLight Data. From the trip distribution, a zone-to-zone origin-destination (OD) trip estimation matrix is developed;
- **Mode Split** – the OD trip matrix is split into various travel modes, such as driving, walking, and transit. For this study, 100% of trips were assumed to be by passenger vehicle, with no additional mode split analysis;
- **Trip Assignment** – the estimated OD trip matrix is assigned onto the established road network to derive link volumes for the existing and future traffic scenarios;

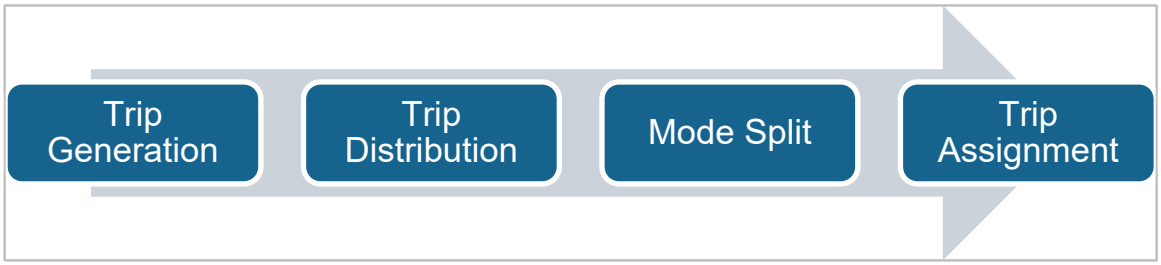


Figure 3.1 Traditional Four-Step Travel Demand Modelling Process

The existing travel demand model captures the existing travel patterns, including trip generation, trip distribution, trip assignment, and pass-by traffic through Cold Lake. With a model calibrated to existing conditions, these characteristics can then be applied to the growth areas of Cold Lake to forecast the future traffic volumes. The future transportation demand model provides Cold Lake with a scalable, flexible platform that can be readily adapted over time to include additional scenarios or transportation complexity as Cold Lake grows. The flow chart in **Figure 3.2** is a general representation of the four-step travel demand modelling process implemented for this study.

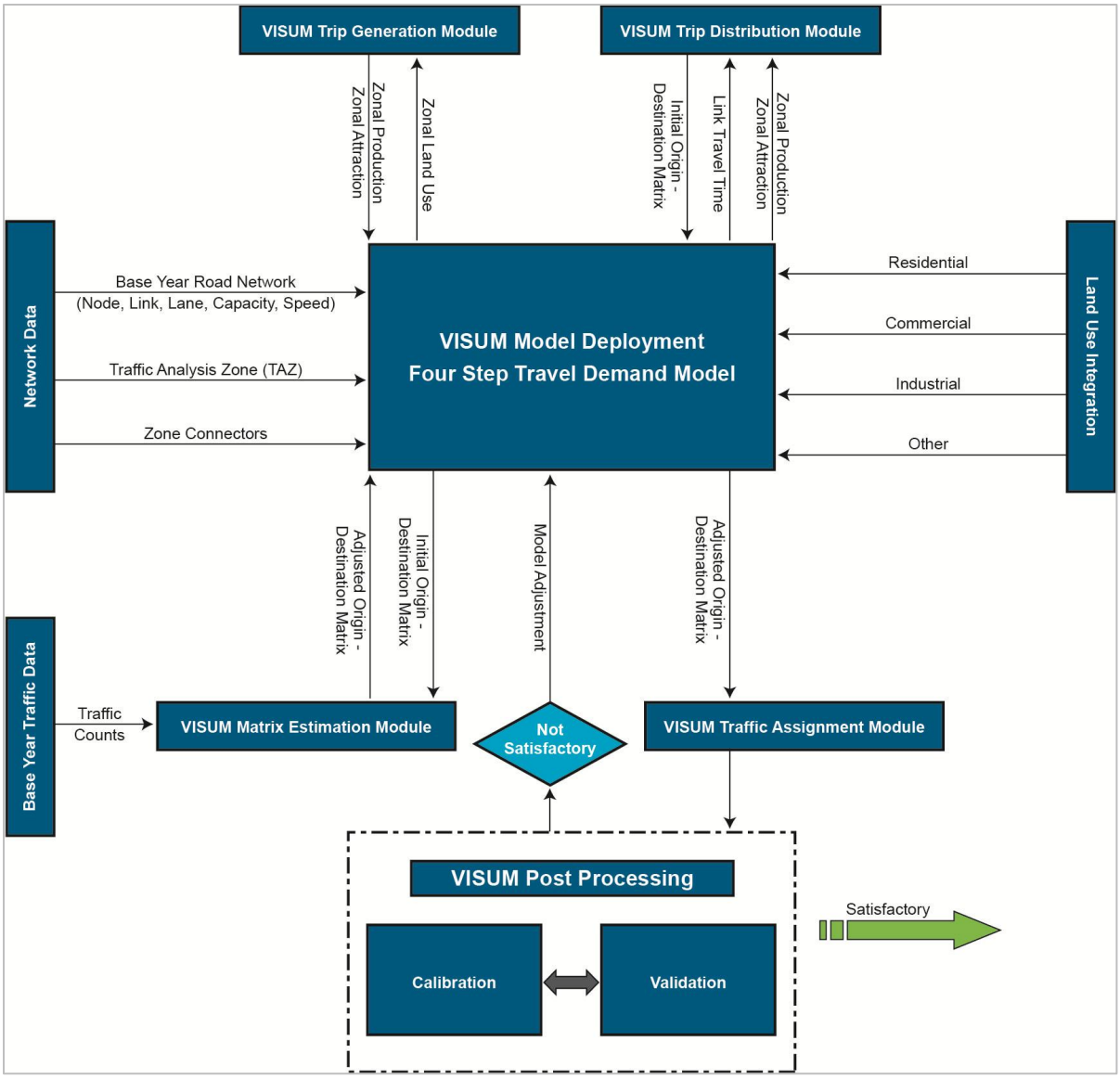


Figure 3.2 General Representation of Base Year Model Development

3.2 StreetLight Data

Traditionally when developing a new travel demand model, a household travel survey is conducted to understand the existing travel patterns of a representative sample of City residents. The data is then used for the trip distribution component of the travel demand model.

For this, ISL utilized travel pattern data from StreetLight Data in this TMP. StreetLight Data is a data analysis company that processes mobility data from smart phones and navigation devices (Big Data) to generate aggregated travel pattern analytics. This approach has become more common in recent years and is generally replacing the traditional travel surveys as the technology becomes more fine-grained.

StreetLight data does not report specific user devices but instead general trip trends. StreetLight work exclusively with non re-identifiable data that then put through their model (which is trained on many data sets including external volume counters) and further organized into groups of trips to provide accurate volume estimates for total trips (cars/bikes/pedestrians) in an area. StreetLight also have further privacy 'safeguards' built into their platform based around sample size and number of trips in an area. An example is if someone lives in the only house on a road, StreetLight will not report on the trips they take on the road to and from the home because the number of trips on the road would be too small to protect the privacy of the individuals.

Typical travel patterns from March 2020 to April 2022 (latest data available in StreetLight at the time of this study) have been altered by the COVID-19 pandemic due to increased work-from-home activity, periodic school closures, and disruption of typical tourist and business activity. As such, StreetLight Data during this time period is not considered as a valid data set to calibrate the model. Therefore, pre-COVID StreetLight Data in 2019 was used for the analysis and would be more reflective of post-COVID conditions (which in the context of Cold Lake, has been observed to have largely returned to the pre-pandemic “norm”).

For this TMP, StreetLight Data’s pre-COVID external-to-external traffic demand of all external gates listed in **Table 2.1** and internal-to-external / external-to-internal traffic demand were used for the development and calibration of the travel demand model. These data are important for VISUM model building and differentiating future traffic volumes related to the City versus the wider region.

As this TMP is undertaken using pre-COVID data, the recommendations of this TMP and the TMP model may need to be updated if daily routines during the COVID-19 pandemic become the normal daily routines and there is less traffic on the roads. These include more residents or out of town employees working from home, less trips to retailers due to online shopping, online schooling, etc.

3.3 Existing Roadway Classification

For modelling purposes, the existing road classifications and related roadway capacities were based on the practical function of each roadway, while considering the local context. The modelled road classifications for Cold Lake’s transportation network are shown in **Exhibit 3.1.**

3.4 Roadway Capacity

Roadway capacities within the VISUM model are based on their functional classification, shown in **Exhibit 3.1.** Link capacities used in the TMP model are summarized in **Table 3.1**. The link capacities are generally conservative, in that they are based on the capacity of a single traffic lane, multiplied out to the total number of lanes on the road in a given scenario.

Table 3.1 Link Capacities

Road Classification	Capacity (Veh/hr/lane)
Highway	2,000
Arterial	1,100
Rural Road	1,400
Rural Road - Gravel	500
Collector	800
Local	400

Model outputs for scenario planning are based on the volume-to-capacity (v/c) ratio of each roadway, with ranges defined in **Table 3.2**. Given the conservative ranges for the link capacities, the macro-level planning is targeted toward achieving a capacity ranging from 85% to 100% of link capacity. For example, the link capacities do not provide for channelized turn bays at intersections, which in practice will increase total capacity through a traffic signal on an arterial. The acceptance of certain higher-volume links in some cases has either been proven via more detailed micro-level Synchro analysis (see **Section 3.5**) or is an acceptable level of congestion given the existing constraints and limitations of the specific roadway.

Table 3.2 Volume-to-Capacity Ratio Ranges

Colour	v/c Ratio	Notes
Light Green	<=0.70	Effective operations with light / normal traffic
Orange	>0.70 to <=0.85	Normal operations, urban traffic conditions
Red	>0.85 to <=1.00	At or near capacity
Dark Red	>1.00	Above capacity

3.5 Existing Horizon Calibration

A 2023 baseline model was developed for the transportation network, using existing land use and traffic counts within Cold Lake to develop and calibrate the travel demand model. Pre-COVID (2019) traffic count data at 18 locations was obtained from TEC's website and was also provided by the City. Pre-COVID travel demands are preferred instead over volumes collected during or shortly after. ISL also conducted 9 additional traffic counts. The traffic counts were balanced to higher intersection volumes as traffic counts were undertaken on different days and the PM peak traffic volumes are shown in **Appendix B**.

The calibration plot of the existing network model for PM peak is provided in **Appendix C**. A regression value (R^2) of 0.95 was obtained for the network in the PM peak. This value represents strong convergence with the existing traffic data; the typical R^2 value for acceptance is 0.75 for a TMP in a small to medium size municipality.

The v/c ratio plot for Cold Lake's existing network in the PM peak is provided in **Exhibit 3.1**. The v/c ratio plot indicates that all existing roadways within Cold Lake show good operations with moderate volumes in the PM peak period, and it does not indicate any major network congestion locations or bottlenecks.

Note: An AM peak model is not built as the PM peak volumes are higher and governs the recommended upgrades of the model. Also, only PM peak traffic counts were collected.

3.6 Existing Intersection Analysis

3.6.1 Intersection Analysis Methodology

The PM peak intersection capacity analysis was completed using Synchro 11. This software is used to evaluate the performance of intersections on the roadway network using the Highway Capacity Manual (HCM) techniques. Like the network level assessment, the V/C ratio is calculated. Intersection performance is categorized by its "Level of Service", or LOS. There are six levels of service as follows:

- LOS A represents the highest level of service, or generally "free flowing conditions"
- LOS F generally represents a "breakdown" or "gridlock" condition in vehicular flow. At signalized intersections drivers will experience waits of two or more cycles.
- Levels of service B, C, D and E are intermediate levels of performance between each extreme
- LOS D reflects "normal" peak hour congestion, generally accepted criterion for design analysis.
- LOS E reflects an intersection or movement experiencing congestion and high delays. It may be accepted for certain movements only (such as low volume or low v/c ratio movements).

Table 3.3 shows average delay per vehicle corresponding with the six service levels.

Table 3.3 LOS Criteria for Signalized and Unsignalized intersections

	Average Delay Per Vehicle (s)	
LOS	Signalized	Unsignalized
A	< 10	< 10
B	10 – 20	10 – 15
C	20 – 35	15 – 25
D	35 – 55	25 – 35
E	55 – 80	35 – 50
F	> 80	> 50

Performance Thresholds

The following thresholds were used to determine whether geometric or control changes were needed for each scenario:

- Overall Intersection LOS: D
- Movement LOS: D
  - LOS E for low volume minor roads or turning movements may be acceptable.
- V/C Ratio: 0.85

Determining the Need for Traffic Signals

The need for traffic signal control were assessed using Transportation Association of Canada's (TAC) Traffic Signal Warrant Analysis spreadsheet. The spreadsheet calculates a warrant score based on the average six-hour peak traffic volumes and pedestrian volumes, intersection geometry, area demographics, and distance from an upstream traffic signal. A minimum warrant score (W) of 100 and average hour side-street traffic volume (Vs) of 75 is required for a traffic signal to be warranted. This assessment was used as a guideline, although it is noted that the warrant requires mid-day and AM peak hour traffic which was approximated from the PM peak hour volumes.

Synchro Traffic Model Design Criteria

A Synchro traffic model requires several inputs to ensure it closely resembles what drivers would experience. The design criteria for the Synchro model were developed based on the previous Transportation Study, and are provided in detail in **Appendix D**.

One important input is the Peak Hour Factor (PHF). This factor represents how the traffic demand changes during the peak hour. It compares the busiest 15-minute period during the PM peak hour with the total traffic during that hour. The PHF ranges from 0 to 1. A PHF of 1 indicates a consistent flow of traffic during the peak hour, whereas a PHF less than one means that there was some level of traffic demand fluctuation. The following was used for the intersection capacity analysis:

- Existing to 15-Year Horizons: PHF = 0.86. This is consistent with the 2012 Transportation Study.
- 20 to 25 Year Horizons: PHF = 0.92. This was used in the Highway 28 Functional Study and is reasonable as the City grows and densifies.

3.6.2 Existing Intersection Analysis Results

The existing conditions Synchro analysis indicates that the City's roadway network is working well overall. All intersections are operating at LOS C or better, as shown in the figure below. The Level of Service (LOS) quickly shows how well an intersection is operating. LOS A means traffic is moving freely with no delays, while LOS F means there's a traffic jam or major delays. Usually, a city aims for an overall LOS of E/D or better. Similar to the VISUM model, only the PM peak Synchro model was prepared.

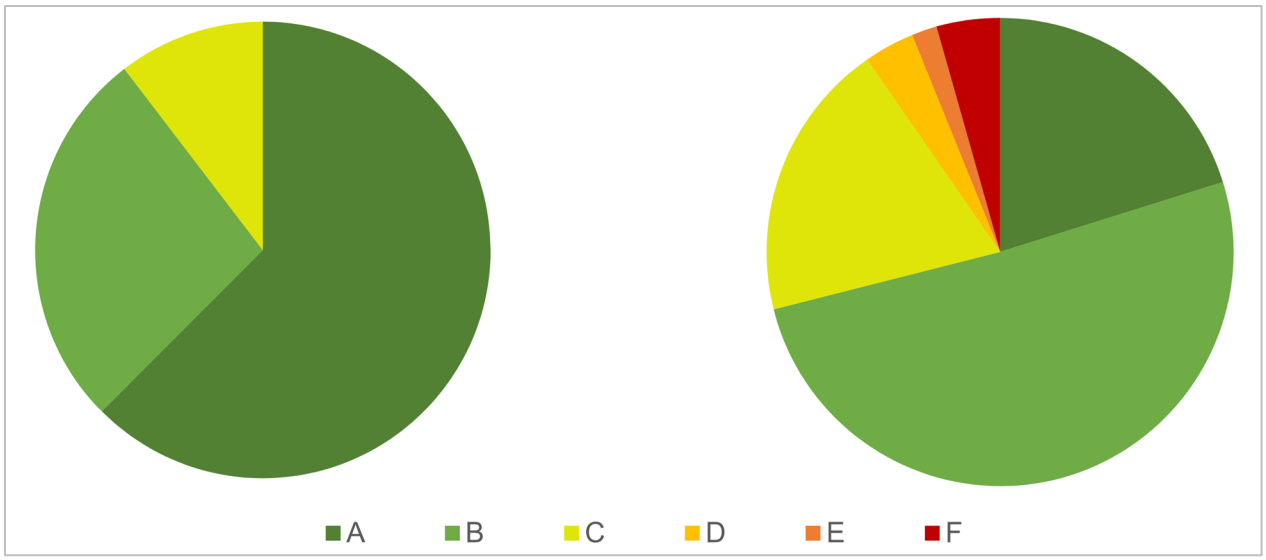


Figure 3.3 LOS Summary by Intersection (Left) and Approach (Right)

The table below provides further context, comparing the approaches with LOS F and the volumes at that approach. This shows that all the intersections with LOS E and F have very low volumes and are at the minor road of two-way stop-controlled intersections on arterial roads, making it a low concern.

Table 3.4 Overall Intersection LOS F and E

LOS	Intersection	Control	Approach	Volume
F	57 Street & Centre Avenue	Two Way Stop	SB	30
	59 Street & Centre Avenue		SB	17
	Highway 28/55 Street & 55 Avenue		EB	10
			WB	10
	Highway 28/55 Street & 75 Avenue		WB	10
E	57 Street & Centre Avenue		NB	5
	59 Street & Centre Avenue		NB	5

The City's roadways are sufficient for the existing vehicle demand. The v/c value shows how much of the road's capacity is being used. A v/c of 0.5 means half the road's capacity is being used by vehicles, and a v/c of 1 or more means the road is full and can't handle any more vehicles. Most of the City's roadways have over 50 percent spare capacity based on the existing conditions review, as illustrated in the chart below.

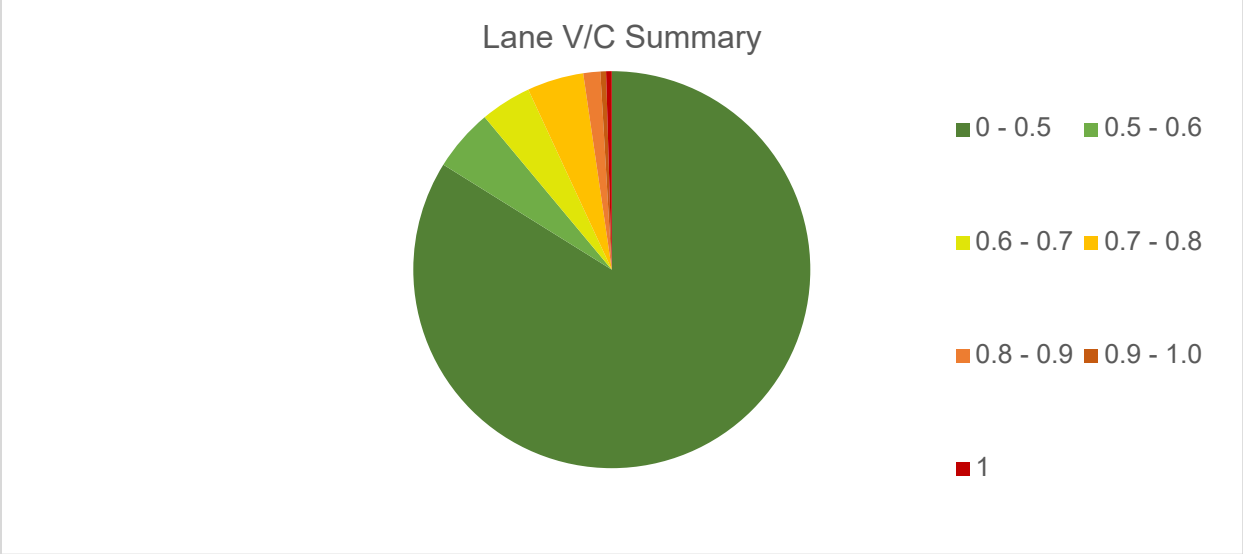


Figure 3.4 Lane v/c Summary

The table below outlines the top ten intersection movements, ranked by the highest v/c ratios. All of these movement operate at LOS D or better. The eastbound and westbound lane at 55 Street & 55 Avenue and southbound movement at 57 Street & Centre Street is the only over-capacity movement in the city. However, due to its low volume on a minor two-way stop-controlled road, it is not a significant concern.

Table 3.5 Top 10 Highest Movement V/C

#	Intersection	Control	Movement	V/C Ratio	Volume (veh/h)	LOS	Delay (s)
1	**Highway 28/55 Street & 55 Avenue**	Two Way Stop	WBT	1.22	10	F	285.2
2	**Highway 28/55 Street & 55 Avenue**	Two Way Stop	EBT	0.94	10	F	293
3	**Highway 28/55 Street & 54 Avenue**	Signal	NBT	0.89	940	D	36.2
4	**57 Street & Centre Avenue**	Two Way Stop	SBT	0.83	10	F	141.9
5	**Highway 28/55 Street & Tri-City Mall Access**	Signal	NBT	0.81	990	C	23.6
6	**Highway 28/55 Street & 62/61 Avenue**	Signal	NBT	0.79	1160	C	21.1
7	**Timberline Drive & Kingsway**	Signal	EBT	0.79	570	B	19.7
8	**Highway 28/55 Street & 52 Avenue**	Signal	NBT	0.76	940	C	21.3
9	**52 Street & 50 Avenue**	Four Way Stop	EBT	0.75	300	C	24.1
10	**Highway 28/55 Street & Centre Avenue/50 Avenue**	Signal	NBT	0.74	500	D	36.7

Table 3.6 below presents the top ten intersection movements based on the highest 95th percentile queue length. Most of the top queues occur on Highway 28/ 55 Street for through movements and all operate at LOS D or better. An additional consideration is whether queuing is blocking access to the turn lanes. The table below also includes a comparison of the queue and storage length, noting whether access to a turn lane is blocked by long through queues.

Table 3.6 Top 10 Highest Movement Queues

#	Intersection	Approach	Through Movement			Turning Movement	
			95th %ile Queue (m)	Volume	LOS	Storage (m)	Turn Lane Blocked?
1	**Hwy 28/55 Street & 54 Ave**	NB	159.1	940	D	60 (L) 60 (R)	Yes
2	**Hwy 28/55 Street & 52 Ave**	NB	128.8	940	C	60 (L)	Yes
3	**Hwy 28/55 Street & 62/61 Ave**	NB	111.9	1160	C	80 (L)	Yes
4	**Hwy 28/55 Street & 54 Ave**	SB	110.8	700	C	60 (L)	Yes
5	**Hwy 28/55 Street & Tri-City Mall Access**	NB	109.2	990	C	80 (R)	Yes
6	**Hwy 28/55 Street & Energy Centre**	NB	82.8	800	C	110 (L) 100 (R)	No
7	**Hwy 28/55 Street & 43 Ave**	NB	74.3	510	C	20 (L)	Yes
8	**Hwy 28/55 Street & Veteran's Way**	NB	71.8	500	D	90 (L) 60 (R)	No (L) Yes (R)
9	**Hwy 28/55 Street & Veteran's Way**	EB	69.7	330	B	60 (L) 120 (R)	Yes (L) No (R)
10	**Hwy 28/55 Street & 50 St**	SB	65	420	B	80 (R)	Yes

Based on the capacity analysis, the turning movements with blocked turn lanes operate at LOS D or better, so, while it is preferred to provide turn lanes equal to or greater than the anticipated queuing, no change to existing turn lanes is recommended.

The peak hour approach traffic volumes by intersection and approach delay by intersection are provided in the following charts. The peak hour traffic volumes chart provides additional context to the delays. Similar to previous performance criteria comparisons, many of the long delays are from low volume approaches on the minor road at a two-way stop-controlled intersection.

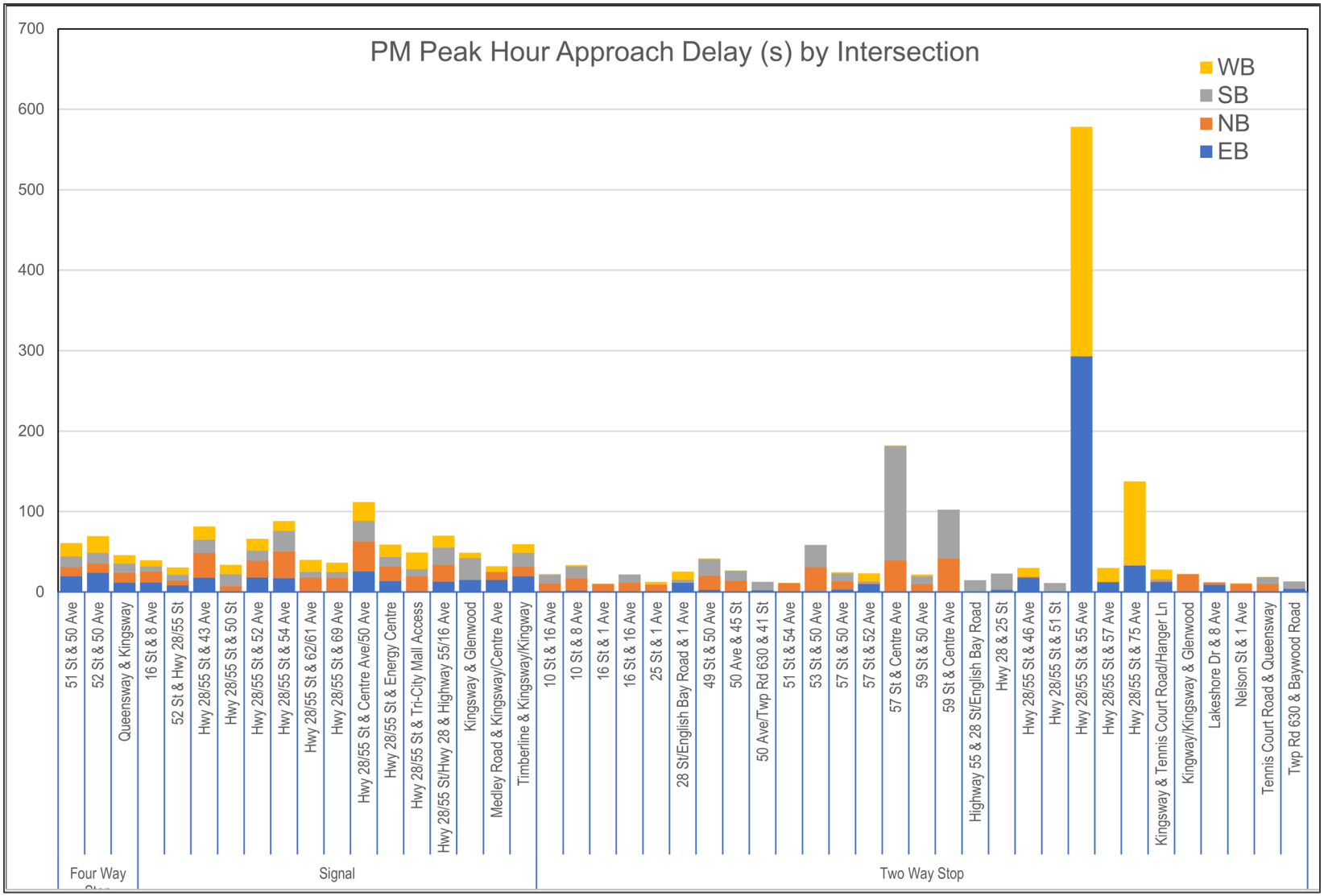


Figure 3.5 PM Peak Hour Approach Delay (s) by Intersection

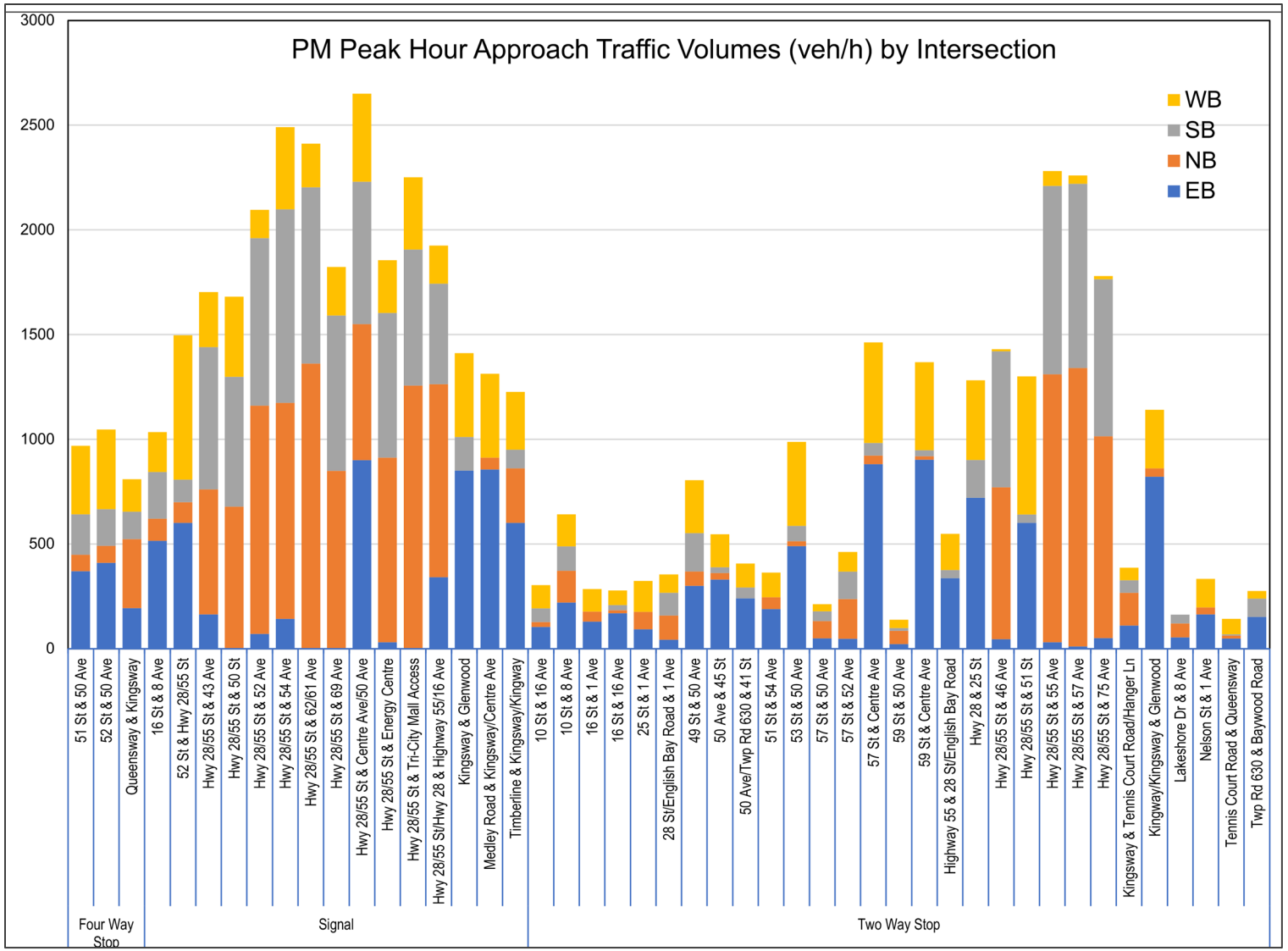
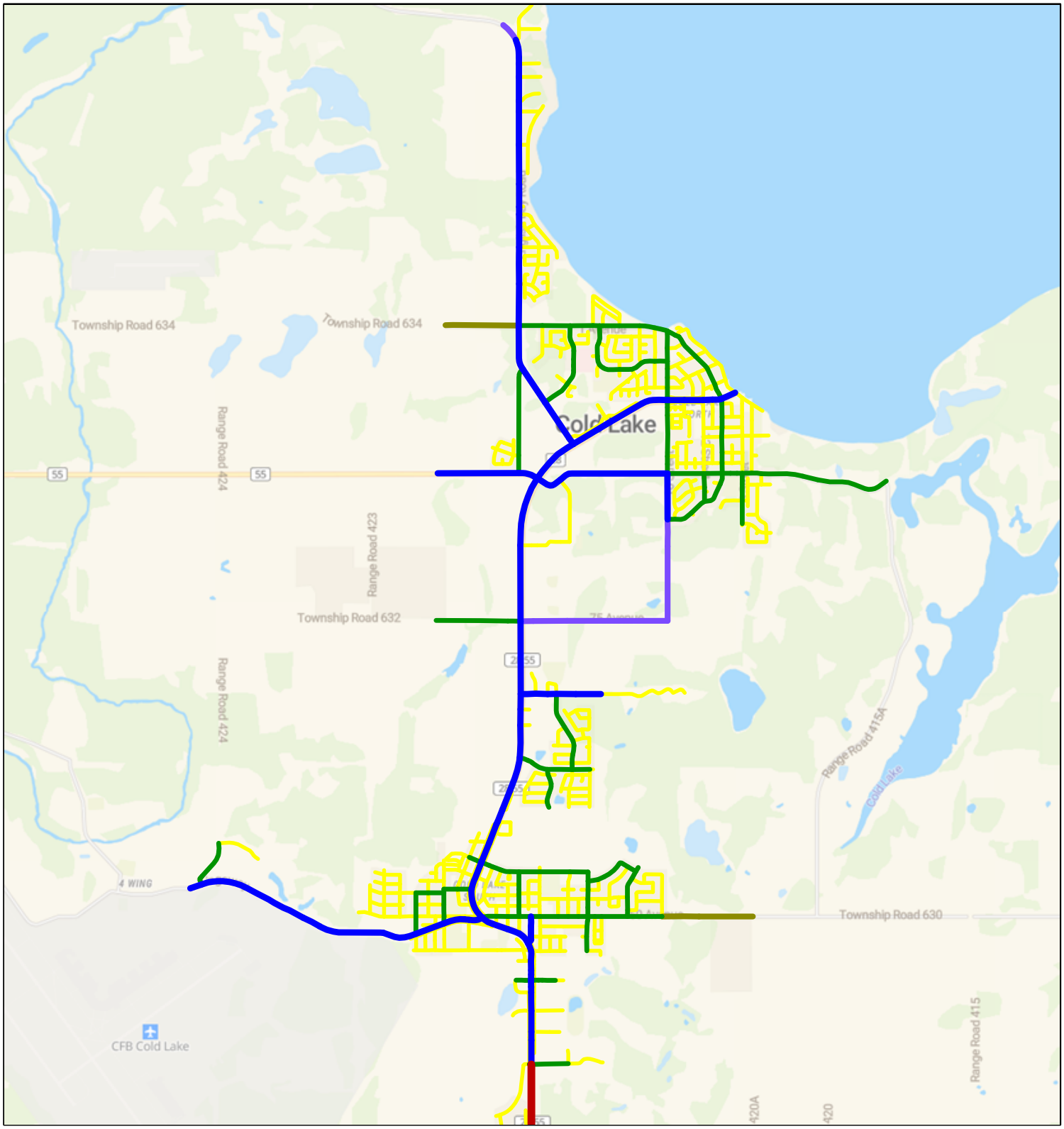


Figure 3.6 PM Peak Hour Approach Traffic Volume (Veh/h) Intersection



0 500 1000 1500 2000 2500 m

Road Classification (per lane capacity)

- Highways (2000)
- Arterial Roads (1100)
- Rural Roads (1400)
- Rural Roads - Gravel (500)
- Collector Roads (800)
- Local Roads (400)

City of Cold Lake

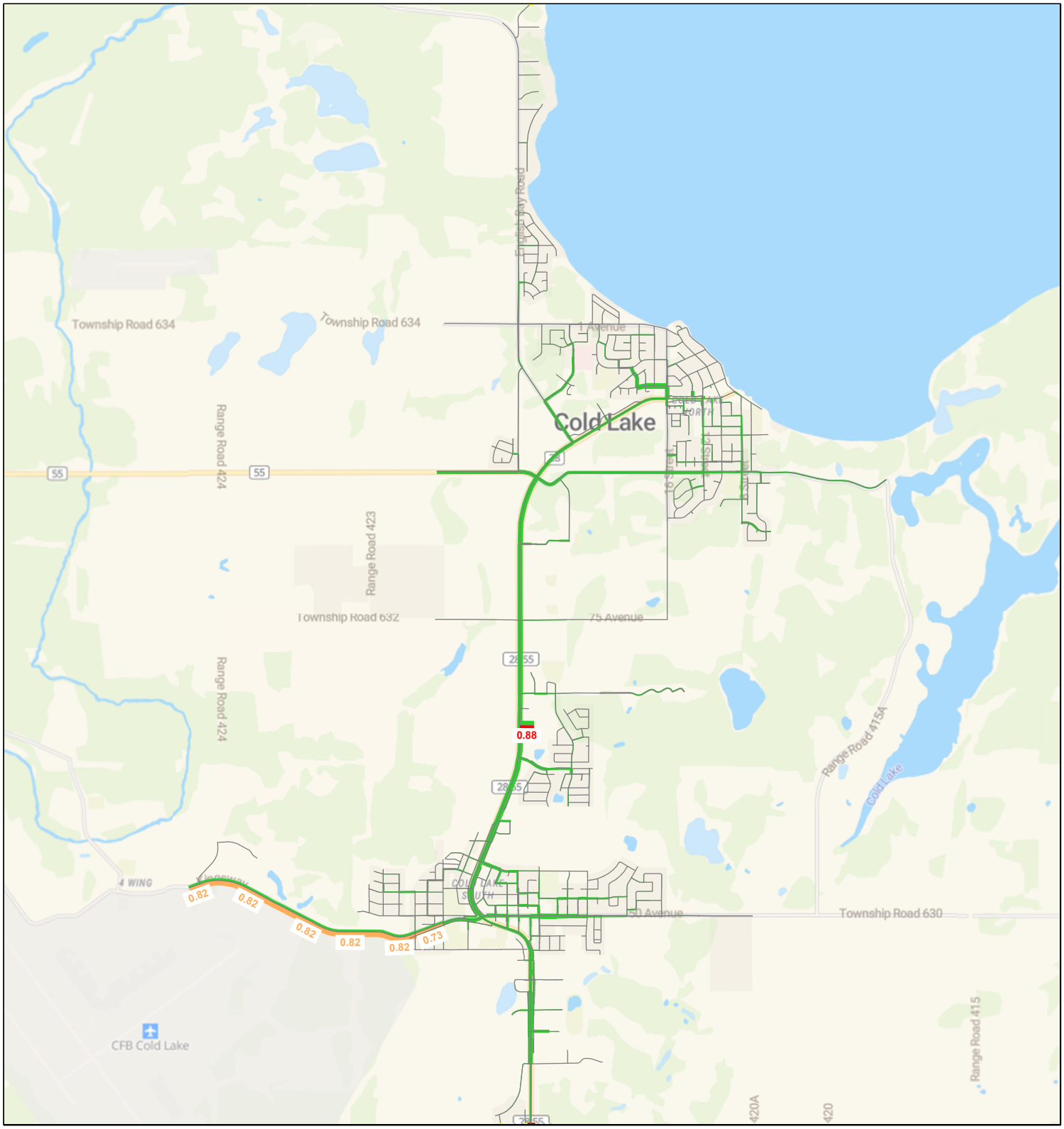
ISL

Integrated Expertise. Locally Delivered.

CITY OF COLD LAKE TMP

EXISTING ROAD NETWORK

EXHIBIT 3.1



0 500 1000 1500 2000 2500 m

City of Cold Lake

V/C ratio

- <= 0.70
- <= 0.85
- <= 1.00
- > 1.00

CITY OF COLD LAKE TMP

EXISTING VOLUME TO CAPACITY

EXHIBIT 3.2

ISL

Integrated Expertise. Locally Delivered.

4.0 Future Land Use

Exhibit 4.1 presents the City's land use concept over a 15-year horizon (2039). In addition to the existing land uses and development as discussed in **Section 2.2**, this map identifies areas that are most likely to be developed within the next 15 years. These areas were selected with input from the City, reflecting current policy directions, market trends, and anticipated large-scale projects, such as the planned expansion of CFB 4 Wing. It is important to note that while these areas are based on the best available data, the land use concept is not an endorsement of specific developments, nor does it guarantee future outcomes. The City's growth trajectory is only partially defined by policy; it is through active collaboration with industry, residents, and other stakeholders that these growth directions will be shaped and realized.

The City's Municipal Development Plan (MDP) and other recent policy documents highlight a key growth objective: to consolidate Cold Lake as a unified, complete community. Given the ongoing fragmentation between Cold Lake North and Cold Lake South, efforts are expected to focus on bridging these gaps and enhancing development continuity.

Building on this goal, **Exhibit 4.2** illustrates the land use concept for a 25-year horizon (2049). As with the 15-year concept, this projection is informed by City plans and servicing concepts, but it does not dictate or endorse specific development sites.

Exhibit 4.2 envisions further development along the Highway 28 corridor, continuing to strengthen the connection between the north and south. Future growth is anticipated primarily on the east side of the highway, catalyzed by the Energy Centre, Imperial Park, and Tri-City Mall, along with the surrounding residential areas. Servicing efficiencies on this side of the highway make it a more cost-effective option for development compared to the west side.

Nevertheless, the west side of Highway 28 still holds substantial potential for future growth, despite facing more environmental and topographical constraints. Both **Exhibit 4.1** and **Exhibit 4.2** emphasize the potential for southward expansion of Cold Lake North on the west side of the highway, which would allow the extension of services to the lands directly across from the Energy Centre and Imperial Park. The maps also show a transition from predominantly low-density residential areas to a more diverse housing mix, resulting in increased density.

The 2023 Growth Study, prepared by ISL in support of the City's recent annexation of 130 hectares from the M.D. of Bonnyville, served as a key input for the population projections for both the 15- and 25-year horizons. This study includes a 50-year population forecast, which informed the distribution of future dwellings and residents across the different Traffic Analysis Zones (TAZs).

4.1 Future Population and Employment

Future dwellings and population distribution was estimated using the land use data from **Exhibit 4.1** and **Exhibit 4.2,** and the population forecasts from the 2023 Growth Study. Since the geographical scope of this project is limited to Cold Lake North and Cold Lake South, **Table 4.1** only shows the population forecasts for these areas, excluding 4 Wing.

Table 4.1 City of Cold Lake 2023 Growth Study, Population Forecasts for Cold Lake North and Cold Lake South

2023 Growth Study – Growth Scenario	Population Forecast (Cold Lake North and South)
2039	
Low Scenario	20,984
Medium Scenario	22,803
High Scenario	24,770
2049	
Low Scenario	25,579
Medium Scenario	29,190
High Scenario	33,288

The following assumptions were derived from available data:

- **Average residential density:**
  - **15-Year Horizon:**
    - 12 dwellings/net residential hectare (nrha) in predominantly low-density residential areas
    - 35 dwellings/nrha in predominantly high-density residential areas
  - **25-Year Horizon:**
    - 14 dwellings/net residential hectare (nrha) in predominantly low-density residential areas
    - 35 dwellings/nrha in predominantly high-density residential areas
- **Average household size:** 2.48 people per dwelling (unchanged from current conditions).
- **Average overheads (roads, parks, utilities, reserves, etc.):**
  - 30% in predominantly residential areas
  - 30% in predominantly employment areas
  - 20% in institutional lands
  - 35% in mixed use areas

These averages were uniformly applied to the lands expected to be absorbed within the 15- and 25-year horizons. The results were then added to the current dwelling and population estimates to project future distribution by TAZ. Based on these calculations, the City's estimated future population is projected to reach 22,728 by 2039 (aligning with the Medium Scenario forecast from the 2023 Growth Study) and approximately 32,113 by 2049 (consistent with the High Scenario forecast from the same study).

Table 4.2 Future Dwellings and Population Counts by Traffic Analysis Zone (TAZ) – Cold Lake North and Cold Lake South

TAZ	2039 Dwellings	2039 Population	2049 Dwellings	2049 Population
101	32	95	79	197
102	67	166	94	233
103	125	310	152	377
104	0	0	316	783

TAZ	2039 Dwellings	2039 Population	2049 Dwellings	2049 Population
105	228	566	258	640
106	82	203	92	229
107	50	125	51	127
108	51	126	52	128
109	599	1,486	631	1,564
110	566	1,404	566	1,403
111	278	690	276	684
112	111	275	118	292
113	142	352	159	396
114	266	660	270	670
115	3	8	4	9
116	89	220	90	224
117	2	6	3	7
118	380	941	386	958
119	696	1,726	694	1,721
120	89	221	89	221
121	0	0	248	616
122	0	0	0	0
123	3	7	11	26
124	296	734	296	734
125	249	617	249	617
126	0	0	3	8
127	0	0	0	0
128	0	0	0	0
129	0	0	0	0
130	2	5	2	6
201	0	0	0	0
202	46	113	423	1,049
203	0	0	448	1,111
204	0	0	5	13
205	0	0	0	0
206	446	1,106	512	1,270
207	0	0	123	305
208	0	0	0	0
209	0	0	0	0
210	402	996	625	1,550
211	0	0	67	167
212	461	1,143	508	1,261
213	164	407	164	407

TAZ	2039 Dwellings	2039 Population	2049 Dwellings	2049 Population
214	340	844	338	839
215	422	1,047	672	1,668
216	385	956	445	1,104
217	0	0	0	0
218	0	0	0	0
219	126	313	140	347
220	126	313	143	354
221	212	525	238	590
222	8	20	8	20
223	290	720	287	711
224	3	6	3	7
225	0	0	0	0
226	0	0	0	0
227	0	0	0	0
228	57	141	63	156
229	0	0	0	0
230	0	0	0	0
231	0	0	0	0
232	189	469	214	530
233	0	0	0	0
234	0	0	0	0
235	0	0	0	0
401	558	1,384	584	1,448
402	561	1,391	587	1,456
TOTAL	**9,202**	**22,837**	**11,786**	**29,230**

Employment was calculated using a similar method as discussed in **Section 2.2**. Minor adjustments were made to ensure a similar distribution of employment to existing. The 15-year and 25-year horizon population and employment data for the TAZ are summarized in **Appendix E** and is shown graphically in **Exhibit 4.3 and Exhibit 4.4** respectively.

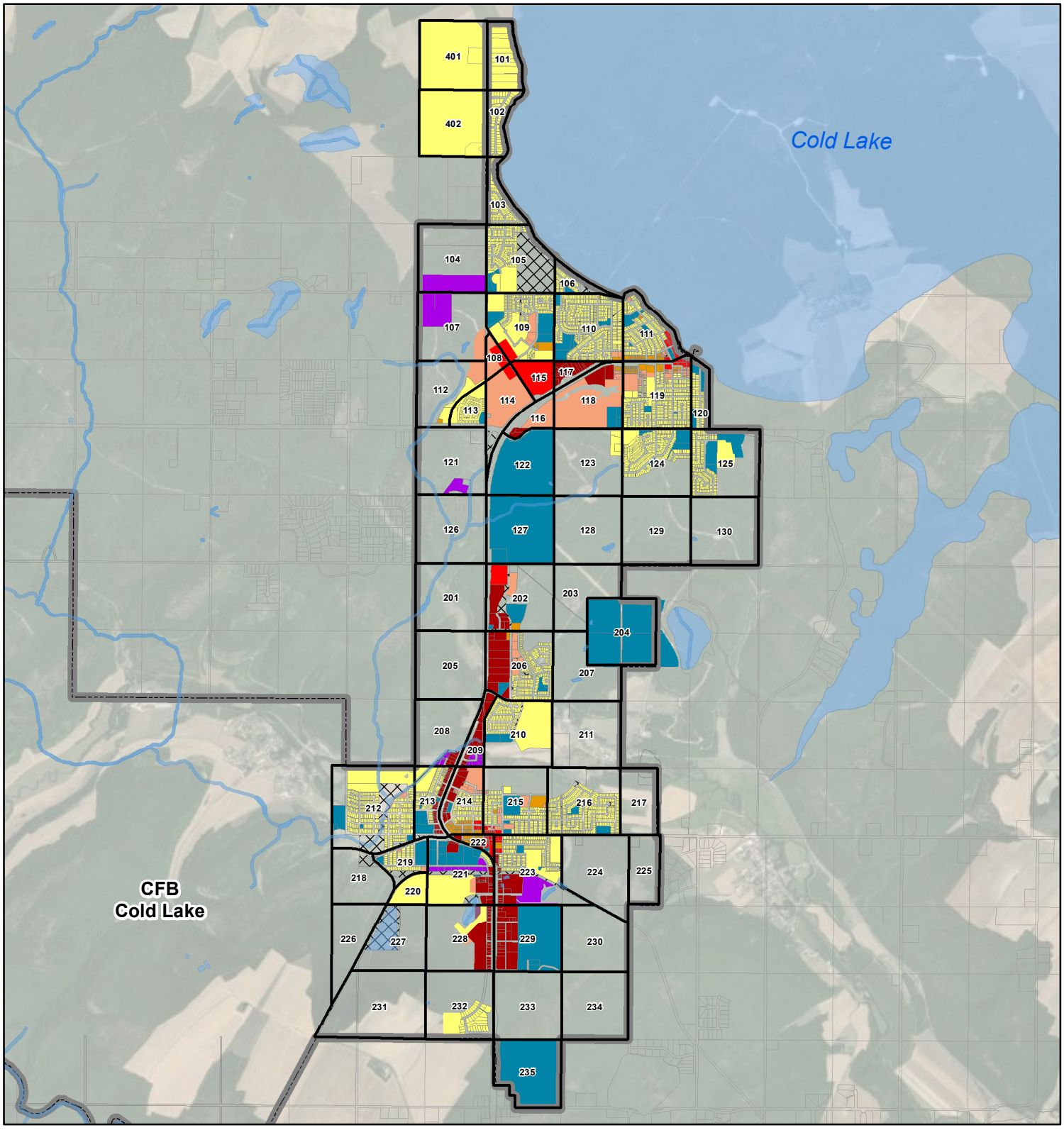
4.1 Land Use Projection Comparison – Existing and Previous Transportation Plan

Transportation plans are made using the best assumptions for growth at the time of writing, but often, land does not develop as initially assumed within a long-term plan. The 2012 Transportation Study land use assumptions for 2025 (the study's 15-year horizon) were compared with the current land use to understand the differences between what was expected and how the City grew. Growth was categorized by Area Structure Plan (ASP) or other defined plan areas in the previous study. The existing developed lands calculated in the previous section were approximately converted from TAZ

to the corresponding plan areas for comparison purposes. The resulting comparison shows that significantly more land was expected to be developed by 2025 than what occurred. As such, many of the infrastructure recommendations and timings will be different between this updated TMP and the previous study. Relevant excerpts from the 2012 Transportation Study are provided in **Appendix F**.

Table 4.3 Land Use Comparison – Existing and Previous Transportation Plan

ASP	Development Percentage	
	2025 (Previous Transportation Study 15-year Horizon)	Existing
Fischer Estates	25%	0%
Iron Horse	25%	0%
South East Area (Formerly Grand Centre)	75%	~25% (Minimal change since 2011)
Cold Lake Central	75%	~45%
Forest Heights	25%	0%
Northshore	75%	~ 10%
Horseshoe Bay	100%	~ 50%
Uplands	75%	0%
Lakewood Estates	75%	~75%
North Annexation Area (Hills of Cold Lake)	75%	0%



0 0.4 0.8 1.6 2.4 Km

1:64,000

- City of Cold Lake
- Transportation Zone
- Water Body
- Water Course
- Parcel

Land Use*

- Single Family
- Mixed Single and Multi Family
- Mixed Res/Comm
- Retail
- Non-Retail
- Industrial
- Institutional
- Undevelopable

* Land uses have been defined at a district level rather than at a parcel level. Thus, the land use classes shown in this map represent the predominant land use and do not intend to imply that other land uses are not present. The characterization of transportation zone by population and number of jobs takes into consideration the mix of uses that may be present within each of the land use classes shown in this map.

ISL

Integrated Expertise. Locally Delivered.

City of Cold Lake

CITY OF COLD LAKE TMP

LAND USES
15-YEAR HORIZON
(2039)

EXHIBIT 4.1

2049 Population & Employment

POP_25YR

TOTAL_EMP_25YR

0 300 600 900 1500 m

1448 154
197 1
1456 155
233 1
377 1
783 101
640 15
229 4
1564 210
127 55
1403 62
684 174
128 79
359
139
7
9
292 23
670 101
958 206
1721 145
221 31
224 56
616 744
36
26
734 38
617 70
8 6
413
6
1049 288
1111 102
13 93
1270 470
305 36
93 317
1550 86
167 16
1261 73
407 107
839 209
1668 185
1104 34
347 37
590 513
711 594
7 2
156 183
470
1
530 44
1982
76

ISL Integrated Expertise. Locally Delivered.

Population

Employment

City of Cold Lake

CITY OF COLD LAKE TMP
25 YEAR (2049) POPULATION AND EMPLOYMENT

EXHIBIT 4.4

2039 Population & Employment

POP_15YR

TOTAL_EMP_15YR

0 300 600 900 1500 m

1384 154
95 1
1391 155
166 1
310 1
17
566 15
203 4
125 55
1486 210
1404 62
690 174
126 79
359
139
6
275 23
660 101
8
941 206
1726 145
221 31
220 56
617 70
168
36
7
734 38
4
413
5
113 206
2
92
1106 455
8
93
317
996 36
1143 73
407 107
844 209
1047 130
956 20
313 37
313
525 513
720 594
6 2
470
141 183
1
469 3
7
76

ISL Integrated Expertise. Locally Delivered.

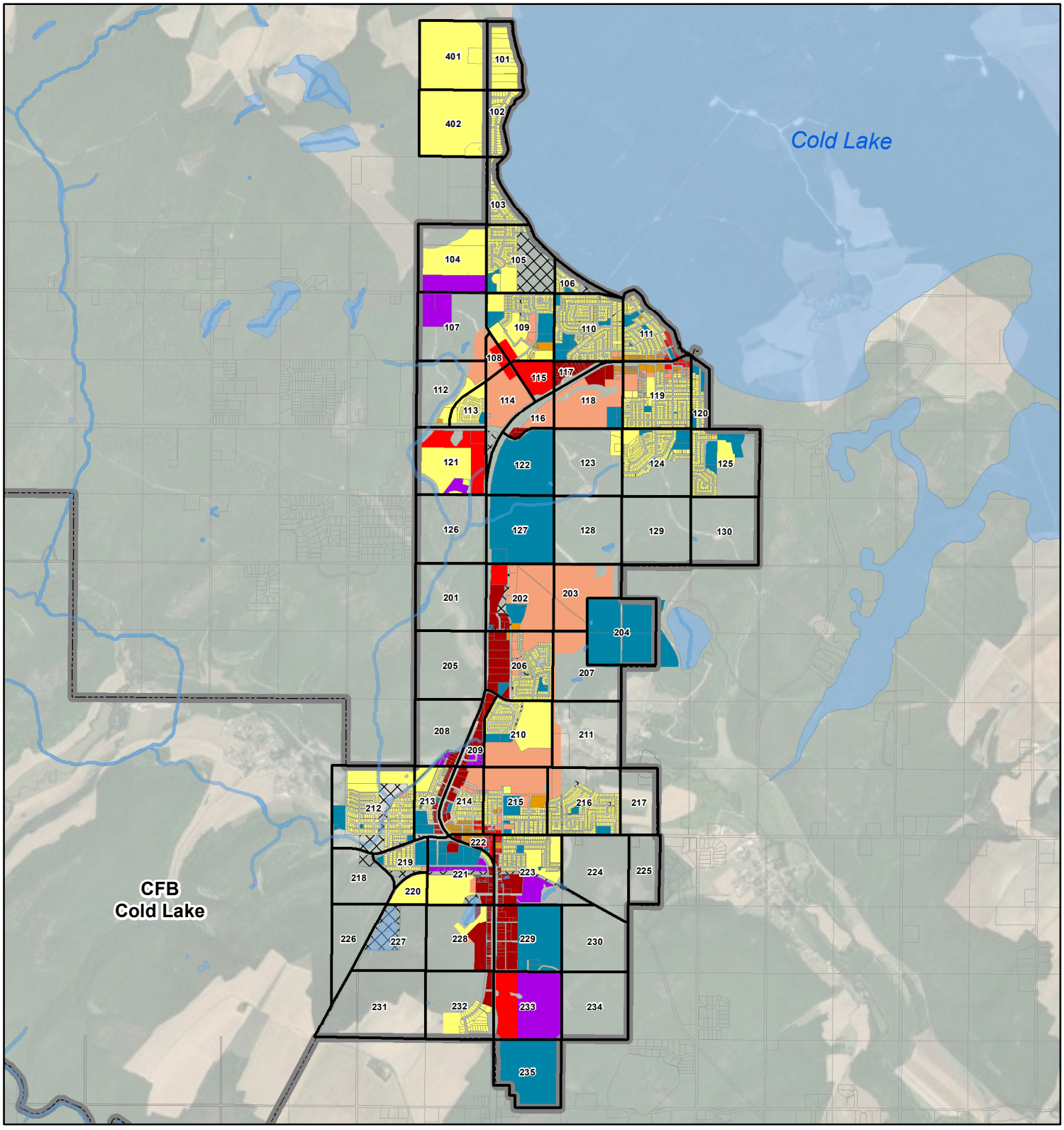
Population

Employment

City of Cold Lake

CITY OF COLD LAKE TMP
15 YEAR (2039) POPULATION AND EMPLOYMENT

EXHIBIT 4.3



0 0.4 0.8 1.6 2.4 Km

1:64,000

- City of Cold Lake
- Transportation Zone
- Water Body
- Water Course
- Parcel

Land Use*

- Single Family
- Mixed Single and Multi Family
- Mixed Res/Comm
- Retail
- Non-Retail
- Industrial
- Institutional
- Undevelopable

* Land uses have been defined at a district level rather than at a parcel level. Thus, the land use classes shown in this map represent the predominant land use and do not intend to imply that other land uses are not present. The characterization of transportation zone by population and number of jobs takes into consideration the mix of uses that may be present within each of the land use classes shown in this map.

ISL

Integrated Expertise. Locally Delivered.

City of Cold Lake

CITY OF COLD LAKE TMP

LAND USES
25-YEAR HORIZON
(2049)

EXHIBIT 4.2

5.0 Future Roadway Network

The future roadway network was established with a phased approach. First, the need for major network improvements was assessed for the 15-year and 25-year horizons. This includes projects that would significantly increase the overall roadway network's capacity, such as new arterial roadways or twinning existing roadways. Detailed intersection analysis was completed for the 5-, 10-, 15-, 20- and 25-year horizons once the major network improvements for the 15- and 25-year horizons were established. The intersection level analysis informed recommendations for geometric or traffic control changes, as well as when major network improvements would likely be needed.

Overall, the existing roadway network is expected to sufficiently support the City's growth up to the 15-year horizon without any major infrastructure expenditure to increase capacity. Some minor intersection improvements are recommended to improve traffic flow. Additional roadway capacity is needed by the 20-year horizon to support traffic demands. This includes:

- **West Bypass:** A new west bypass to alleviate congestion on Veterans Way,
- **16 Street:** extending 16 Street from 69 Avenue to 50 Avenue to reduce congestion on Highway 28 while also creating a more robust north-south arterial roadway network that is less dependent on Highway 28, and
- **Highway 28:** Twinning Highway 28 from 42 Avenue to approximately 200 m south of 34 Avenue to reduce congestion in that segment.

The 15-Year and 25-Year roadway networks are shown in **Exhibits 5.1 and 5.2.** Detailed discussion on how the future roadway networks were established and assessed are provided in the following sub-sections. A summary of the recommended roadway infrastructure projects to support the City's future growth is provided in the table below.

Table 5.1 Future Roadway Infrastructure Projects

Timing (Year)	Location	Recommendation	Discussion
0 – 5	Highway 28 and 25 Street	Separate southbound left lane	• Improves the stop controlled southbound approach from LOS F to LOS E with a delay of 40 s. • While LOS E is not preferred, alternate routes are available, and traffic signals are not warranted.
5 – 10	Highway 28 and 25 Street	Traffic Signal	Signal warranted.
5 – 10	Veterans Way and 59 Street	• Traffic Signal • Eastbound left turn lane • Westbound left turn lane	• Signal warranted. • Left turn lanes on Veterans Way help the through lanes move more efficiently.
5 – 10	Veterans Way and 57 Street	• Eastbound left turn lane • Westbound left turn lane	• Signal not warranted. • Left turn lanes on Veterans Way help the through lanes move more efficiently.
5 – 10	Highway 28 and 40 Avenue	• Northbound left turn lane • Southbound left turn lane	Left turn lanes on Highway 28 help the through lanes move more efficiently.
5 – 10	Highway 28 and 34 Avenue	• Northbound left turn lane • Southbound left turn lane	Left turn lanes on Highway 28 help the through lanes move more efficiently.
10 – 15	Veterans Way between 59 Street and 57 Street	Twinning	Increases capacity along Veterans Way and reduced side-street delays.
15 – 20	West Bypass	Two-lane bypass from 69 Avenue to Glenwood Drive	Reduces traffic demand on Veterans Way and Highway 28. This alignment is consistent with the previous Transportation Studies. A functional study is recommended in the 5–10-year horizon to confirm details related to the bypass.
15 – 20	16 Street extension	Two-lane extension from 75 Avenue to 50 Avenue	Reduces traffic demand on Highway 28. Also reduces reliance on Highway 28 and forms a more robust north/south arterial roadway grid. This alignment is consistent with the previous Transportation Studies. A functional study is recommended in the 5–10-year horizon to confirm details related to the extension.

Timing (Year)	Location	Recommendation	Discussion
15 – 20	Highway 28 South	Twinning from 42 Avenue - ~200 m south of 34 Avenue	Twinning is consistent with the Highway 28 Functional Study. Some modifications to intersection geometry are recommended. This is discussed further in Section 7.2.
15 – 20	Highway 55 and English Bay Road	Traffic Signal	Warranted, highly dependant on whether the northern residential areas are developed.
15 – 20	Highway 55/28 and 16 Avenue	• Northbound dual left turn lane • Westbound convert right turn lane to shared through right turn with channelization	The conversion of the right-turn lane to a channelized through-right is to accommodate
15 – 20	Highway 28 and Energy Centre	• Eastbound dedicated left turn lane • Westbound dedicated left turn lane	Left turn lanes on Highway 28 help the through lanes move more efficiently.
15 – 20	Highway 28 and 75 Avenue	• Traffic Signal • Eastbound dedicated left turn lane • Westbound dedicated left turn lane	Traffic signal warranted. Left turn lanes on Highway 28 help the through lanes move more efficiently.
15 – 20	Highway 28 and 40 Avenue	Traffic Signal	Traffic signal warranted.
15 – 20	Highway 28 and 34 Avenue	Traffic Signal	Traffic signal warranted.
15 – 20	Highway 28 and 46 Avenue	Remove east leg to convert to a 3-leg intersection with stop control on 46 Avenue. Construct a new right-in right-out access to the east commercial area between 43 Avenue and 46 Avenue.	Consistent with the Highway 28 Functional Study Auxiliary Lane Alternative (preferred option). Traffic signals not warranted. Alternatively, the intersection could be converted to right-in, right-out for the east and west approaches.
20 – 25	Highway 28 and 46 Avenue	Traffic Signal	Traffic signal warranted.

5.1 15- and 25-Year Roadway Network Capacity Review

The network-wide capacity review was completed using VISUM modeling software. Similar to the base model, only the PM peak VISUM model is prepared. The 25- and 15-year roadway network models were built on the calibrated PM peak hour existing model. “Do-nothing” scenarios were created, applying the future employment and growth projections from **Section 4.1** to the existing roadway network. Minor updates were made to the base model to account for new collector roadways or connections in currently undeveloped ASP lands that are expected to be developed by the 15-year or 25-year horizon. The City’s current ASP policies formed the basis for these minor network updates.

The main output from VISUM modeling is the v/c ratio, which shows how much of a roadway segment’s available capacity is being used. The general threshold for network improvements was a v/c above 0.85. This is a point where traffic can still flow relatively well but there is limited capacity to accommodate new growth. The “do nothing” volume to capacity plots for the 15-year and 25-year horizons were then reviewed to determine whether major network improvements would be needed.

The modeling results indicate that the current roadway network is sufficient to meet the traffic demands of the 15-year horizon without major network changes such as substantial twinning or new arterial roadways. Veterans Way westbound is expected to experience congestion during the PM peak hour west of 57 Street where the cross section narrows from two to four lanes. The v/c ratio along this corridor is 0.99 between 57 Street and 59 Street, then 1.2 west towards the base. While this indicates that the corridor is at capacity, it was determined that delays would be assessed and addressed at the intersection level for the 15-year horizon in **Section 5.2**. The existing roadway network will not be able to accommodate the traffic demands in the 25-year horizon. Major segments that are over a 0.85 v/c ratio capacity are summarized in the table below.

Table 5.2 Roadway Segments with v/c over 0.85 – 25 Year Horizon

Roadway	Segment	V/C Ratio	Lanes
Veterans Way	57 Street – CFB Cold Lake	1.6 – 1.64	2
Highway 28	42 Avenue - ~200 m south of 34 Avenue	0.86 – 0.92	2
Highway 28	54 Avenue – 16 Avenue	0.88 – 1.01	4

Additional roadways were added into the 25-year “do nothing” model to provide more capacity for the roadway network. The result of this is the ultimate 25-year roadway network. These future roadways are consistent with the future network established in the 2000 and 2012 Transportation Studies, and include:

- West bypass from 69 Avenue to Glenwood Drive,
- 16 Street extension from 75 Avenue to 50 Avenue, and
- Twinning Highway 28 from 42 Avenue - ~200 m south of 34 Avenue

The VISUM v/c plots for the 15- and 25-year roadway network are provided in **Exhibits 5.3. and 5.4.** The high v/c on Veterans Way in both horizons are addressed at the intersection level in **Section 5.2**. Additional model plots are provided in **Appendix G**.

5.2 Future Horizon Intersection Capacity Analysis

The need for intersection-level improvements in the various future horizon years was assessed using Synchro micro simulation. This traffic analysis tool is used to understand traffic operations at an intersection-level, whereas VISUM is primarily used to assess transportation networks at a network-level. Minor changes were made to the VISUM volumes. These modifications were primarily to account for VISUM's method of assigning traffic by the shortest route, which is reasonable for a network-level model but does not fully capture realistic turning volumes at an intersection-level. For example, VISUM will assign most traffic going to a certain destination to the closest access, whereas realistically, if there are multiple accesses, some drivers may choose to use an alternate option.

The traffic volumes for the 5-, 10- and 20- year horizons were extrapolated from the existing conditions as well as the 15- and 25-year horizon PM peak hour intersection volumes from VISUM. It is assumed that growth between the two VISUM modeled years will occur linearly. This is a reasonable approximation for this level of assessment.

5.2.1 5-, 10-, and 15-Year Intersection Capacity Analysis

The existing roadway network generally operates well with the 5- to 15- year horizons volumes. Some stop-controlled intersections experience LOS F on the minor road, but the volume of users on the minor road is low and there are alternate routes drivers could choose to take if they want to avoid this delay. Veterans Way is expected to be congested, but not to the point that the west bypass is needed. The congestion of Veterans Way could be reduced by:

- Twinning Veterans Way between 57 Street and 59 Street.
- Increasing the transit mode share along this route by making transit a more attractive for commuters. This is discussed in greater detail in **Section 7.1.**
- Collaborating with regional partners to identify and implement strategies to reduce demand.

A symptom of the congestion on Veterans Way is the potential to see increased shortcutting through residential communities. The VISUM traffic model for the 15-year horizon, which assigns traffic based on the shortest path, shows a portion of trips destined Highway 28 south are bypassing the congestion by traveling via 59 Street, then 47 Avenue, then accessing the Highway at 46 Avenue. Traffic calming in this area could reduce the amount of shortcutting. Options for traffic calming are discussed further in **Section 6.2.**

5-YEAR HORIZON CAPACITY ANALYSIS

Figure 5.1 below shows the share of intersection and approach LOS for the 5-year horizon. All intersections are expected to operate at LOS C or better with the improvements as outlined in **Table 5.1**. Some approaches operate at LOS F. These are low volume minor road approaches at stop controlled intersections with alternate route options. While traffic signals would provide dedicated time for these movements, they are not warranted based on the TAC traffic signal warrant criteria, and are not recommended. Intersections with approaches operating at LOS F should be monitored periodically to assess whether changes are required due to safety or operational concerns, including:

- Highway 28 and 75 Avenue (east/west),
- Veterans Way and 57 Street (north/south), and
- Veterans Way and 59 Street (north/south).

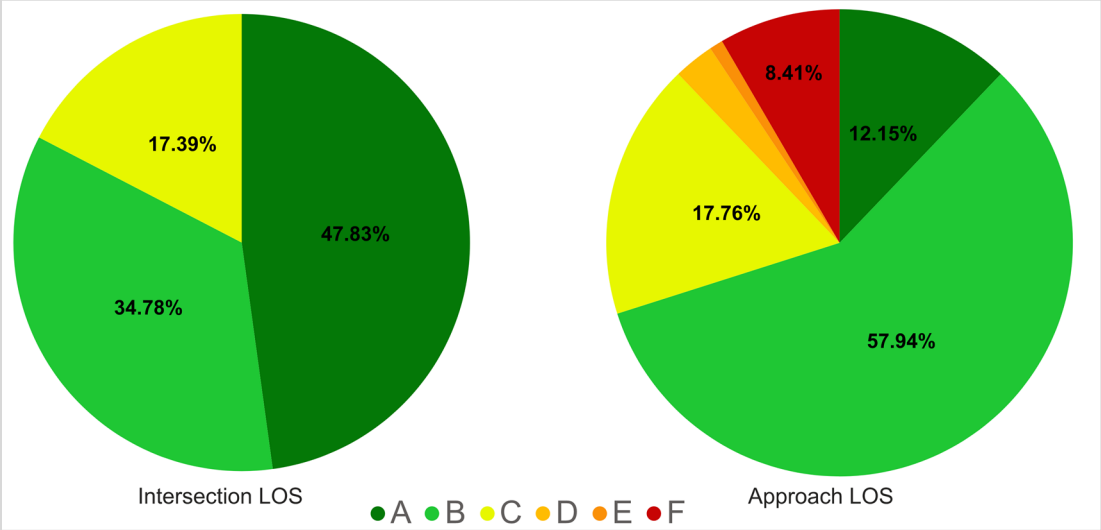


Figure 5.1 5-Year Horizon LOS Summary by Intersection (Left) and Approach (Right)

10-YEAR HORIZON CAPACITY ANALYSIS

Figure 5.2 below shows the intersection and approach LOS for the 10-year horizon. All intersections are expected to operate at LOS C or better. Despite traffic volumes increasing, less approaches are expected to operate at LOS F with the recommended intersection geometric and control changes as outlined in **Table 5.1**. Like the 5-year horizon, some low volume minor road approaches at stop-controlled intersections are expected to operate at LOS F. Periodic monitoring is advisable to ensure these intersections are operating safely. This includes:

- Highway 28 and 75 Avenue (east/west), and
- Veterans Way and 57 Street (north/south).

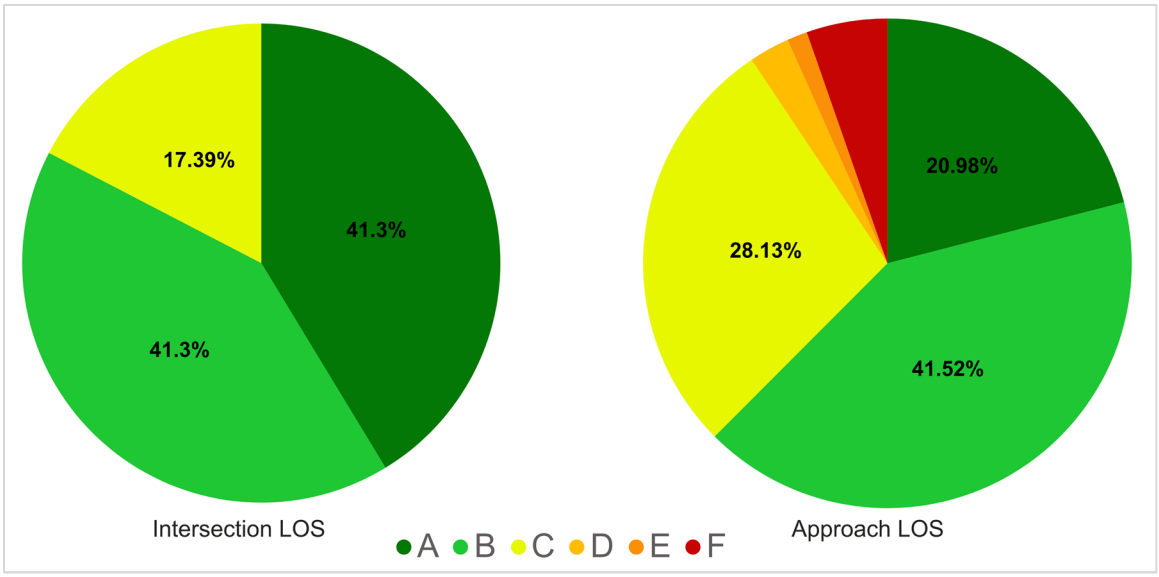


Figure 5.2 10-Year Horizon LOS Summary by Intersection (Left) and Approach (Right)

15-YEAR HORIZON CAPACITY ANALYSIS

Figure 5.3 below shows the intersection and approach LOS for the 15-year horizon. All intersections are expected to operate at LOS D or better with the improvements as outlined in **Table 5.1**. The following stop-controlled intersections have low traffic volumes approaches expected to operate at LOS F in the 15-year horizon and are recommended for monitoring:

- Highway 28 and 75 Avenue (east/west),
- Highway 28 and 46 Avenue (east/west),
- Highway 28 and 40 Avenue (east/west), and
- Veterans Way and 57 Street (north/south).

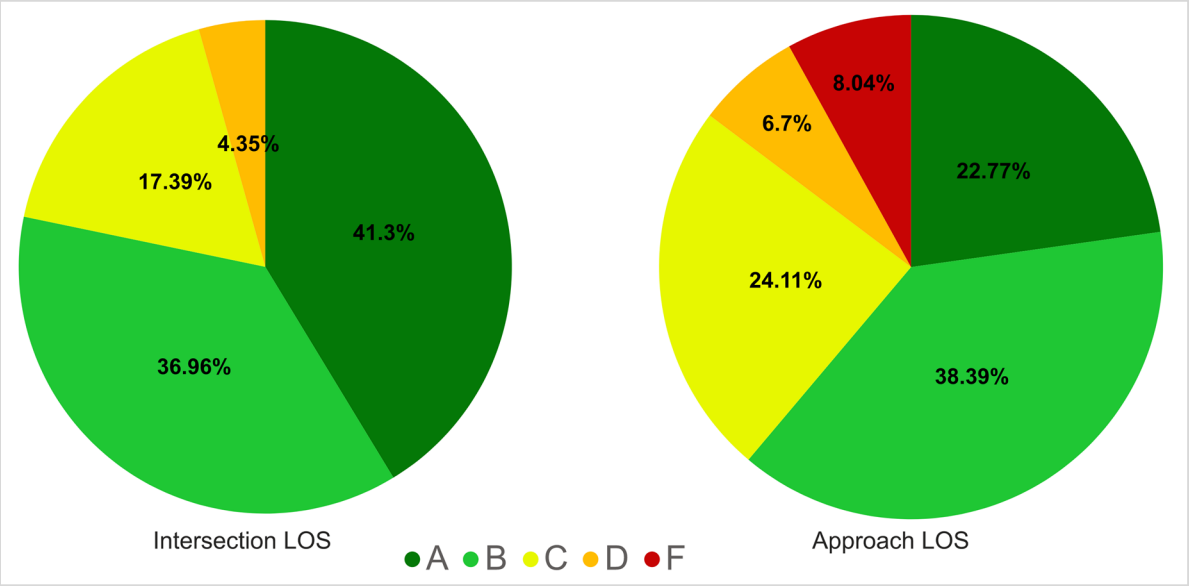


Figure 5.3 15-Year Horizon LOS Summary by Intersection (Left) and Approach (Right)

5.2.2 20- and 25-Year Intersection Capacity Analysis

Two variations of the 20-year horizon volumes were developed: one using the 25-year do-nothing volumes and the other using the 25-year ultimate volumes. This analysis aimed to determine if major network improvements, such as the west bypass, twinning Highway 28 south, and the 16 Street extension, would be necessary within the 20- or 25-year horizon. The results indicate that these improvements would be required by the 20-year horizon.

20-YEAR HORIZON CAPACITY ANALYSIS

Figure 5.4 below shows the intersection and approach LOS for the 20-year horizon. All intersections are expected to operate at LOS C or better with the improvements as outlined in **Table 5.1**. The only approach expected to operate at LOS F is eastbound Highway 28 at 46 Avenue. The intersection does not meet the criteria for traffic signal and it is noted that the approach delay only exceeds the LOS F threshold by a few seconds.

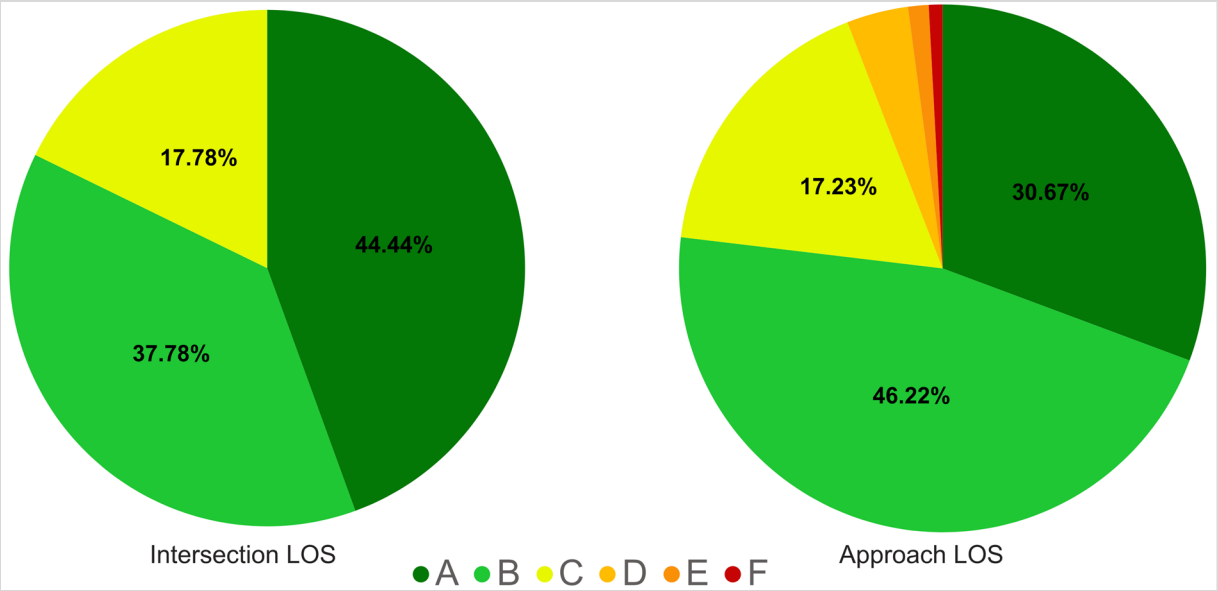


Figure 5.4 20-Year Horizon LOS Summary by Intersection (Left) and Approach (Right)

25-YEAR HORIZON CAPACITY ANALYSIS

Figure 5.5 below shows the intersection and approach LOS for the 20-year horizon. All intersections are expected to operate at LOS C or better with approaches operating at LOS E or better with the improvements as outlined in **Table 5.1**.

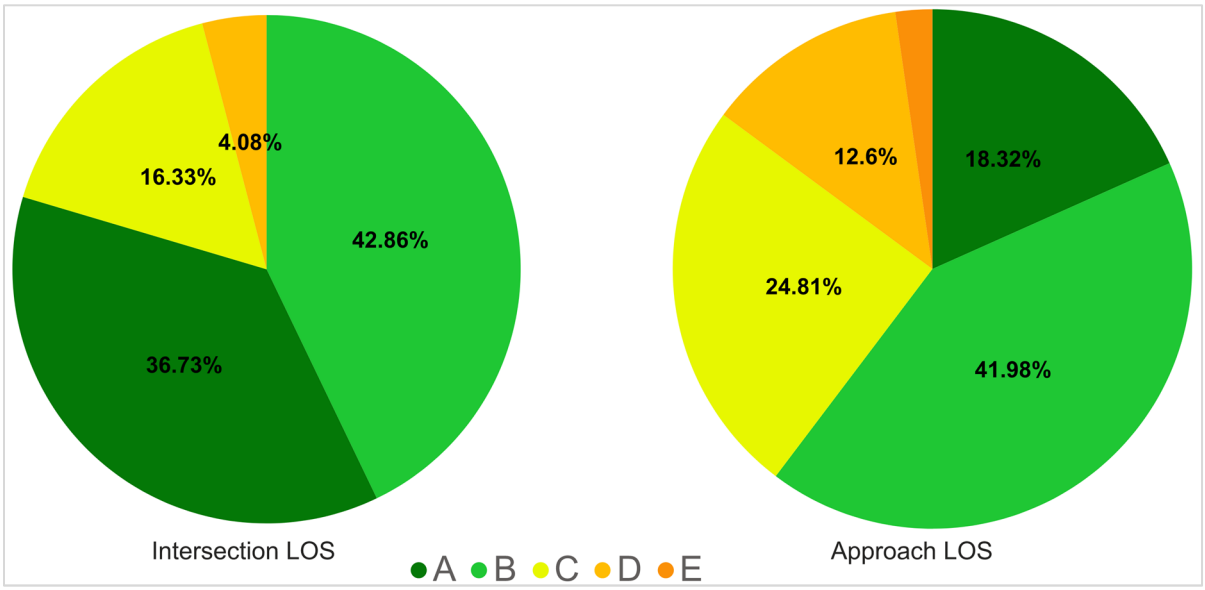
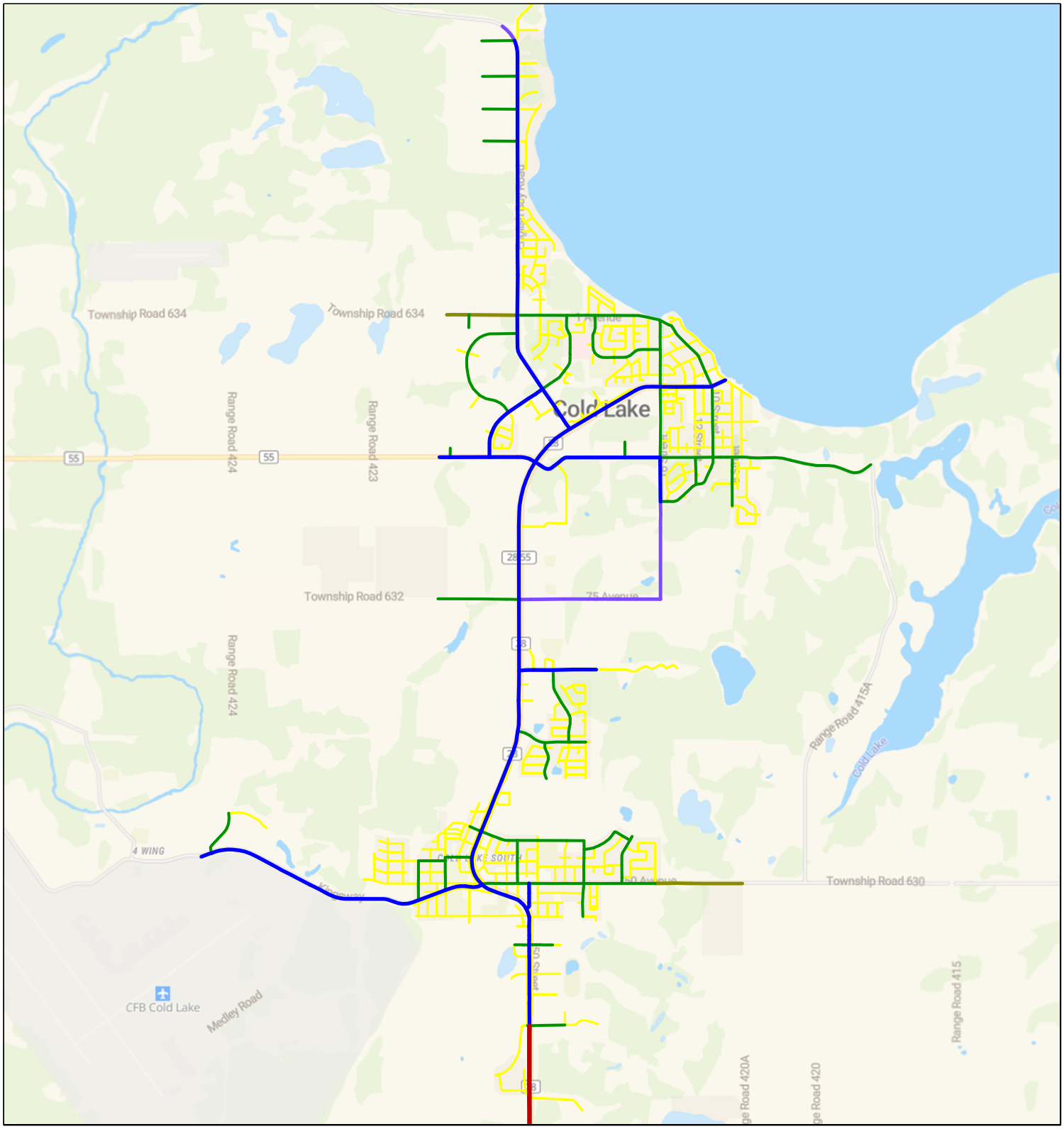


Figure 5.5 25-Year Horizon LOS Summary by Intersection (Left) and Approach (Right)



0 500 1000 1500 2000 2500 m

Road Classification (per lane capacity)

- Highways (2000)
- Arterial Roads (1100)
- Rural Roads (1400)
- Rural Roads - Gravel (500)
- Collector Roads (800)
- Local Roads (400)

City of Cold Lake

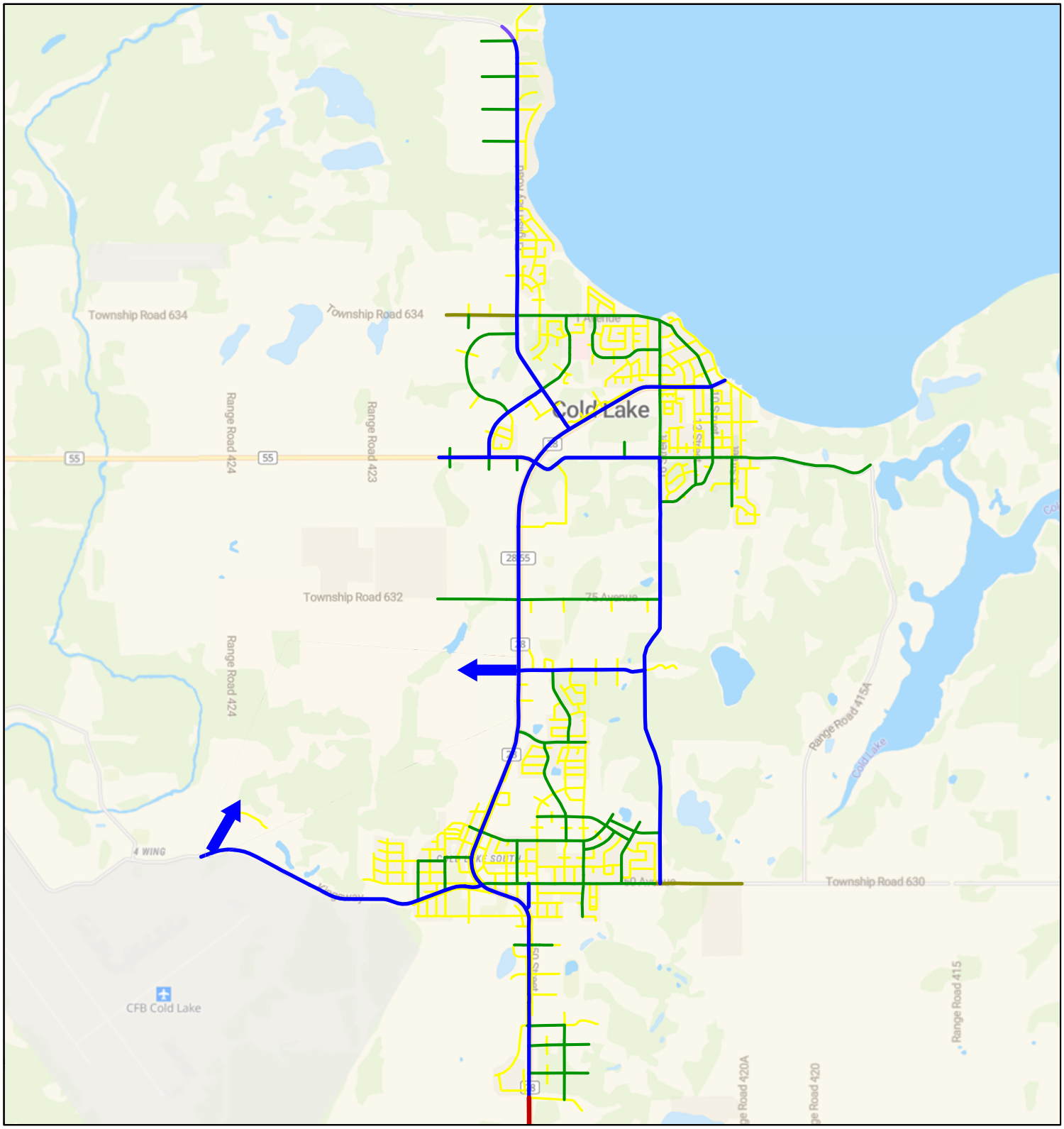
CITY OF COLD LAKE TMP

15 YEAR ROAD NETWORK

EXHIBIT 5.1

ISL

Integrated Expertise. Locally Delivered.



0 500 1000 1500 2000 2500 m

Road Classification (per lane capacity)

- Highways (2000)
- Arterial Roads (1100)
- Rural Roads (1400)
- Rural Roads - Gravel (500)
- Collector Roads (800)
- Local Roads (400)
- West Bypass

City of Cold Lake

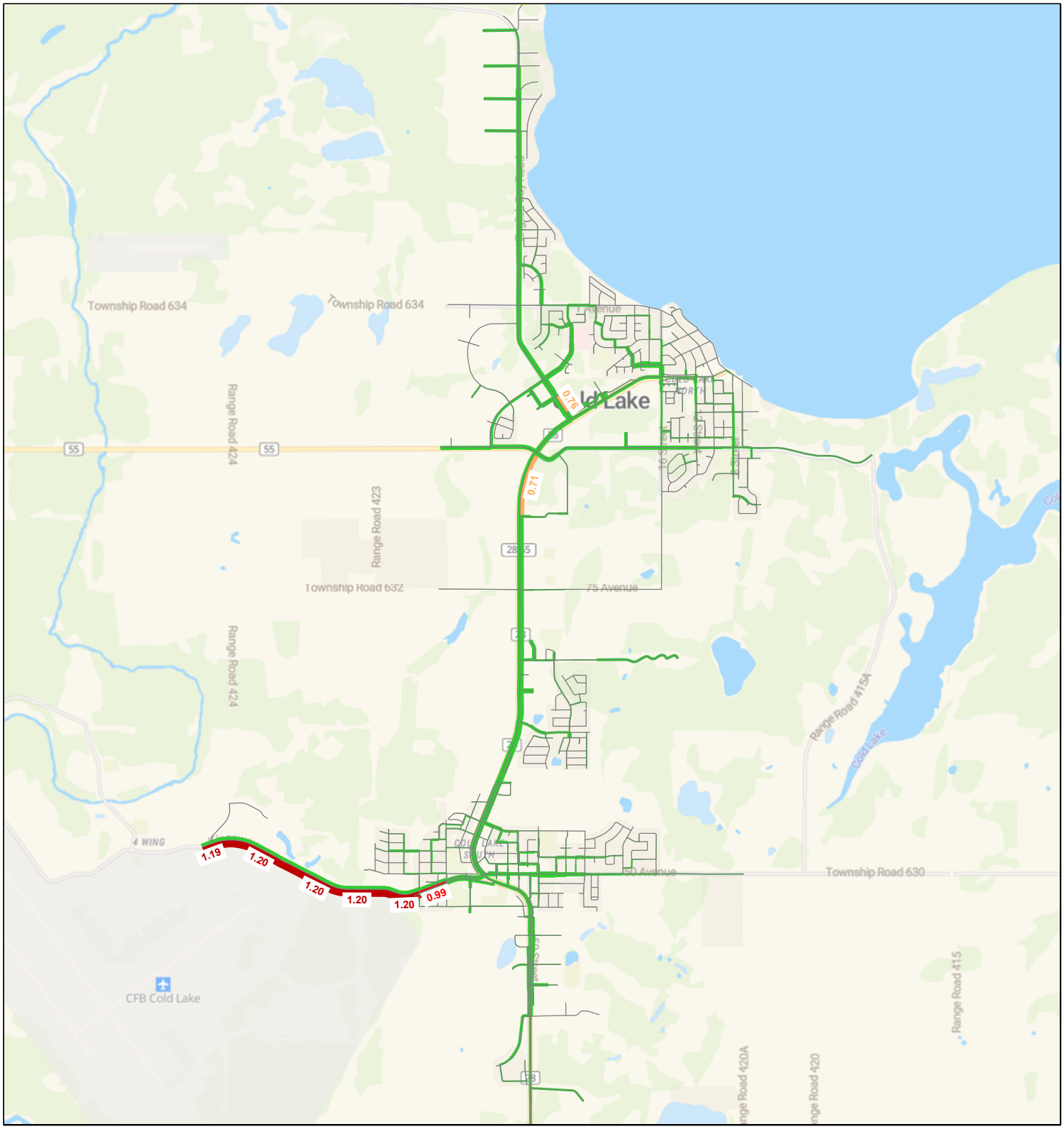
CITY OF COLD LAKE TMP

25 YEAR ROAD NETWORK

EXHIBIT 5.2

ISL

Integrated Expertise. Locally Delivered.



0 500 1000 1500 2000 2500 m

City of Cold Lake

V/C ratio

- <= 0.70
- <= 0.85
- <= 1.00
- > 1.00

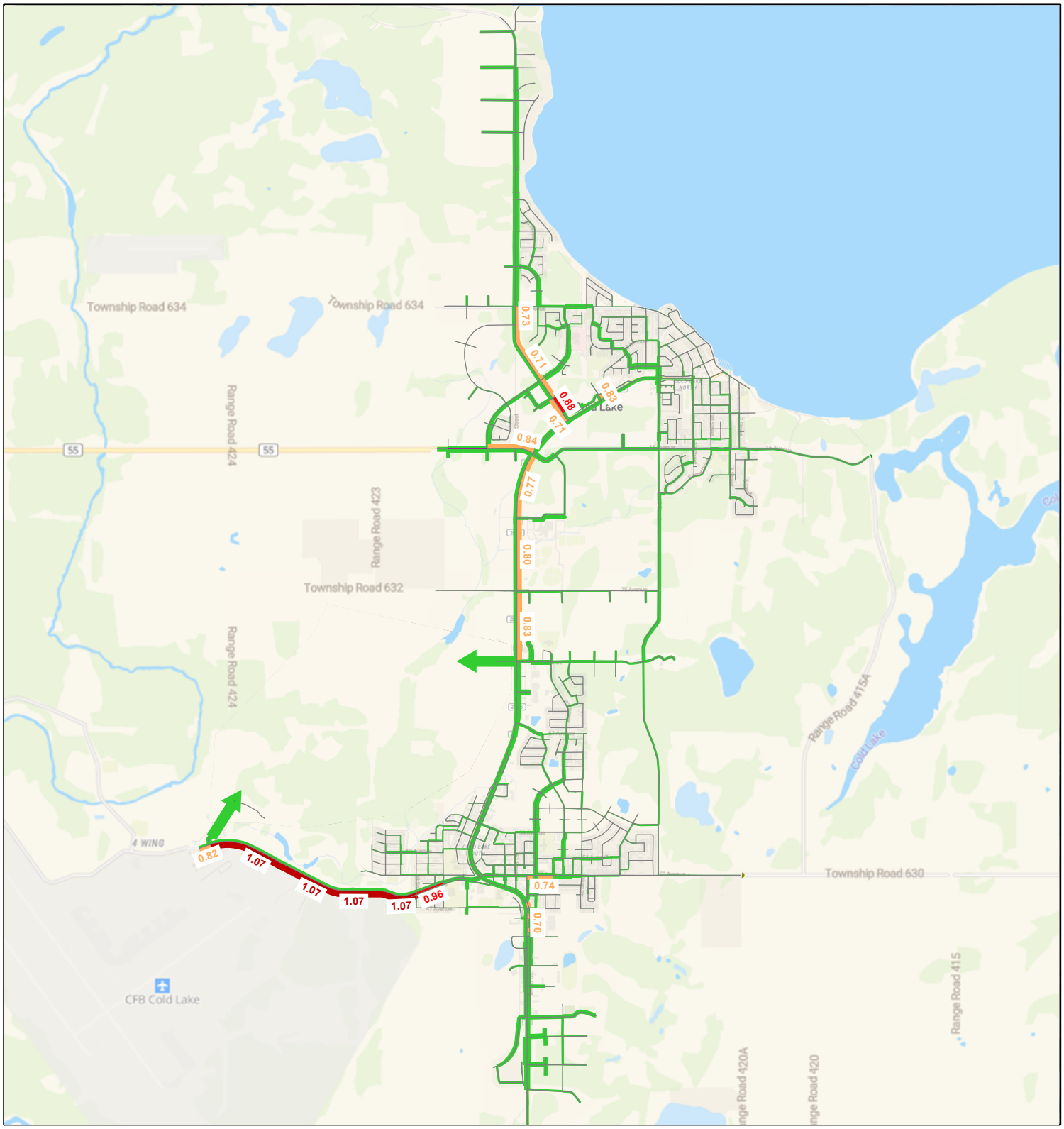
ISL

Integrated Expertise. Locally Delivered.

CITY OF COLD LAKE TMP

15 YEAR (2039) VOLUME TO CAPACITY

EXHIBIT 5.3



0 500 1000 1500 2000 2500 m

V/C ratio

- <= 0.70
- <= 0.85
- <= 1.00
- > 1.00

West Bypass

City of Cold Lake

ISL

Integrated Expertise. Locally Delivered.

CITY OF COLD LAKE TMP

25 YEAR (2039) VOLUME TO CAPACITY

EXHIBIT 5.4

6.0 Road Safety Review (Collisions, Speeds and Traffic Calming)

The following section provides a comprehensive review of collision history, speeds limits and traffic calming.

6.1 Collision History Review

This road safety review comprises of analyzing the collision history within the City of Cold Lake. The City of Cold Lake has supplied aggregated traffic collision reports covering the years between 2016 and 2021 (inclusive). Traffic collision reports have been digitized and consolidated into a shared data scheme, with standardized attributes, covering (for example) collision severity, date and time of collision, and primary events. Newer data beyond 2021 was not available for this project.

ISL compiled the data for all six (6) years of data resulting in a list of 2,488 collision objects involved in 1,236 different collision case reports; The figure below shows that most collisions (84%) involve exactly two vehicles with a small portion (14%) being single-vehicle collisions with the remaining (1.7%) involving three or more vehicles.

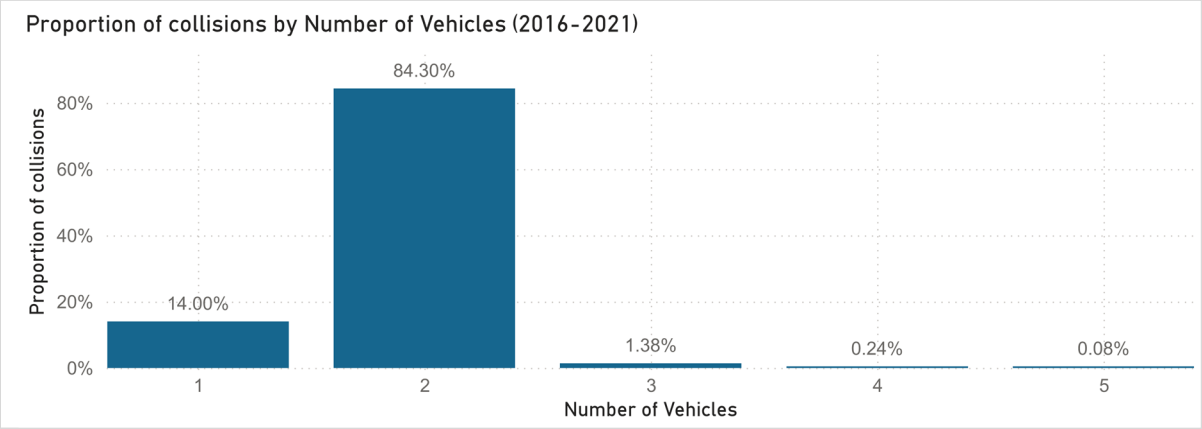


Figure 6.1 Proportion of Collisions by Number of Vehicles Involved (2016 to 2021)

Figure 6.2 shows how the total number of collisions has changed over the six year study period. Overall, total collisions per year have dropped by 40% since 2016 with a small “hump” in collisions in 2019, representing only a 16% net decrease compared to 2016. ISL cautions the reader against reaching firm conclusions about traffic safety with these numbers, because the traffic volumes across the province of Alberta dropped in 2020 and 2021 due to the varying health mandates related to the Covid-19 pandemic.

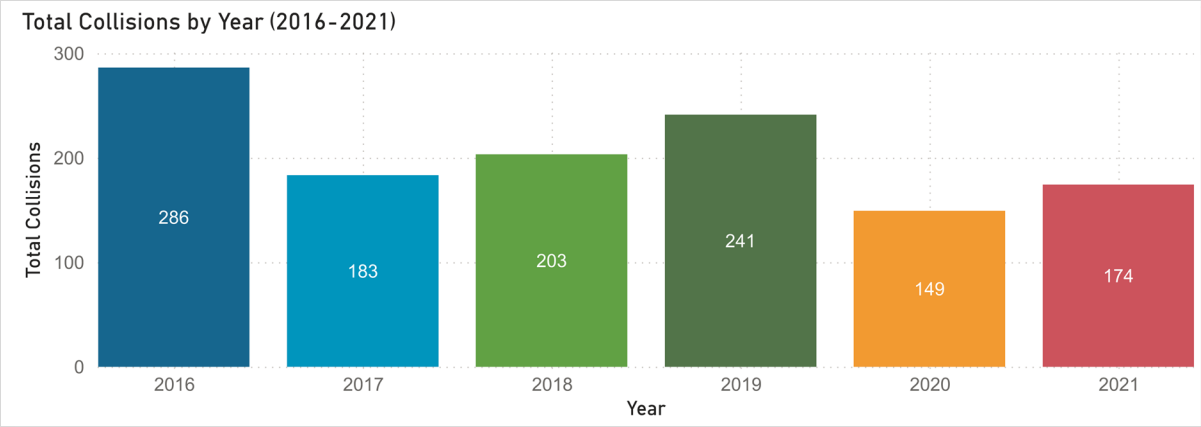


Figure 6.2 Collisions Per Year (2016 to 2021)

Figure 6.3 shows the same data as above, but split by the collision severity in addition to by year. A similar pattern is shown with an overall decrease in property damage and injury-related collisions with a moderate bump in 2019. This figure also shows that there was only a single fatality reported collision that occurred in 2017; the absence of vertical bars in the other years depicts zero collisions.

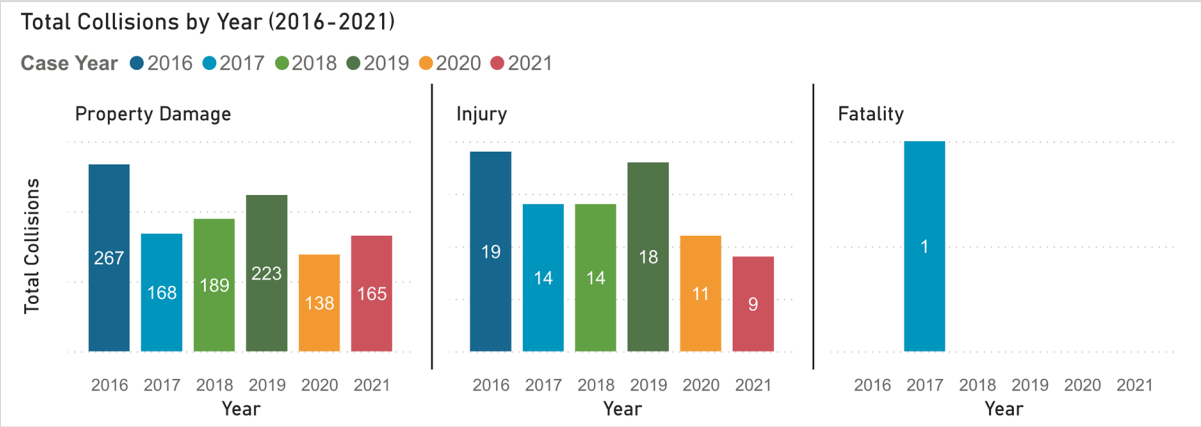


Figure 6.3 Collisions Per year, by Severity (2016 to 2021)

To depict how total collisions change throughout the year, **Figure 6.4** gathers all collisions in each month (regardless of year). This figure shows how total collisions are highest in the winter months (November through March) with between 113 and 137 collisions per month. The summer months show a flat trend (between April and October) with between 82 and 94 collisions per month. The summer months experience 31% fewer collisions than the winter months.

As before with collisions per year, caution is recommended when interpreting these numbers. Variations in traffic volumes throughout the year may be a factor in the total number of collisions per month.

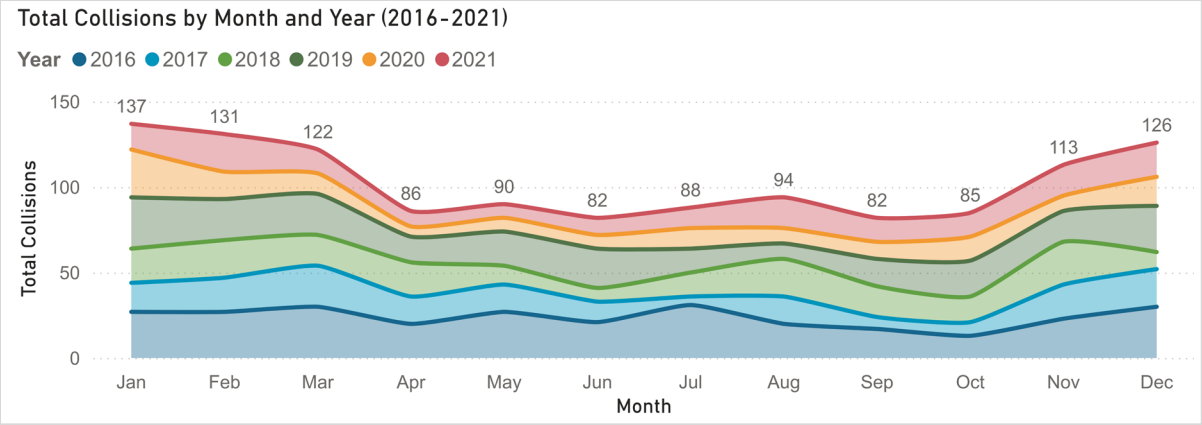


Figure 6.4 Collisions Per Month (2016 to 2021)

The increase in collisions in the winter months is primarily due to an increase in property-damage-related collisions as shown in **Figure 6.5**. The sole fatality collision occurred in April. Injury-related collisions occurred somewhat evenly across the year, with a low of 4 collisions in May and a high of 11 collisions in June. Winter months (November through March) averaged 6.4 injury collisions while summer months (April through October) averaged 7.6 injury collisions. The months with the most injury collisions are June and July.

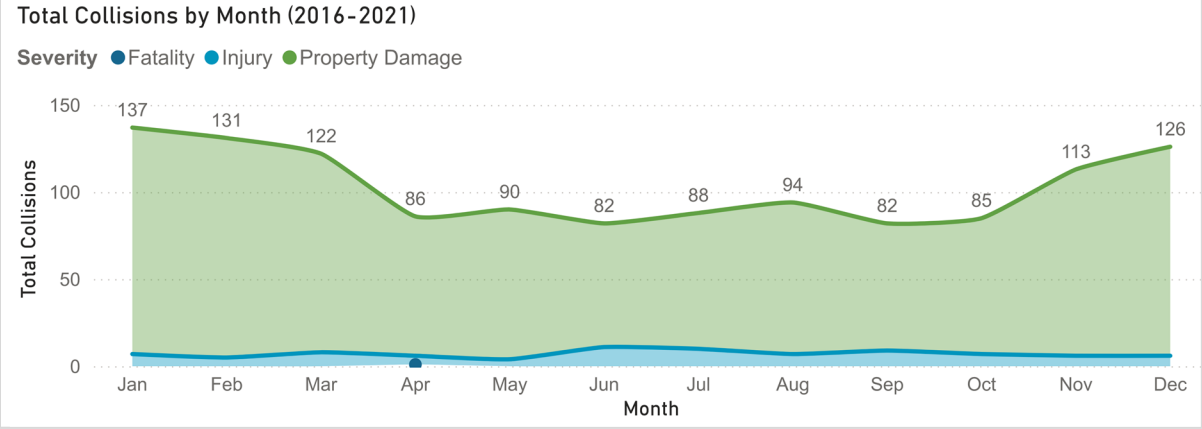


Figure 6.5 Collisions Per Monty and Severity (2016 to 2021)

The number of collisions also varies over the days of the week. **Figure 6.6** below shows that collisions are more frequent during the middle of the week than on the weekends. Across the 6 years of data, Tuesdays through Fridays vary between 186 and 200 collisions (average of 192 collisions per day) with Mondays and Saturdays being equal at 172 total collisions (10% lower than mid-week). Sundays are the day of the week with the lowest number of collisions with only 119 (38% lower than mid-week).

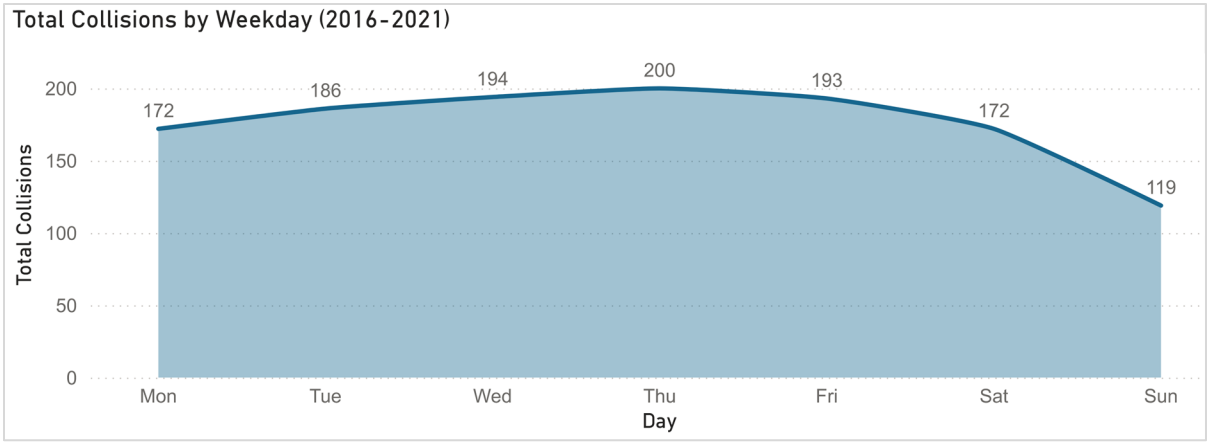
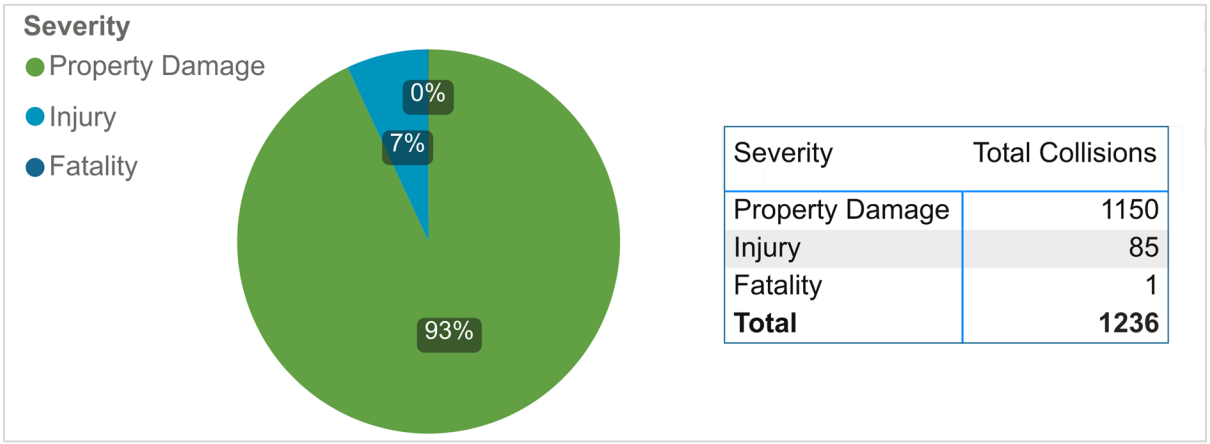


Figure 6.6 Total collisions per weekday between 2016 and 2021

Safety analysis regularly shows that the most severe incidents are also the least frequent, with lower severity incidents occurring more frequently. The collision history for Cold Lake also demonstrates this pattern, as shown in the figure below. Property Damage collisions account for 93% of all reported incidents between 2016 and 2021, with injuries accounting for 7% and the sole fatality is only 0.8% of all reported incidents.



Severity	Total Collisions
Property Damage	1150
Injury	85
Fatality	1
Total	**1236**

Figure 6.7 Collision Severity (2016 to 2021)

In addition to date, time and severity information, each collision report includes additional collision attributes, such as the roadway surface condition, the environmental (weather) conditions, the primary event (what the vehicle(s) were doing to cause a collision), driver/pedestrian age and gender amongst other attributes. These attributes are not always diligently gathered for every single reported incident, sometimes a blank result is entered or even an entry as “other” without further context. The attributes that had the best response rate and were able to be decoded by ISL are described further below.

A collisions “primary event” is a categorization of the type of collision, aiming to provide context for the geometry of the collision or the activities directly before a collision. **Figure 6.8** below shows the

most reported primary events within Cold Lake, showing that “Struck Object”, “Backing” and “Rear End” collisions are the most common.

The name “Struck Object” does not provide much context to describe the collision and is seemingly used as a catch-all bucket. The Struck Object designation is the most common primary event for single vehicle collisions (74%), suggesting it is a common entry when a single-vehicle strikes a roadside object. Furthermore, and in contrast to the previous point, most Struck Object collisions (63% of the 350 collisions) are multi-vehicle collisions since multi-vehicle collisions are 6 times more likely than single-vehicle collisions as shown in **Figure 6.1**.

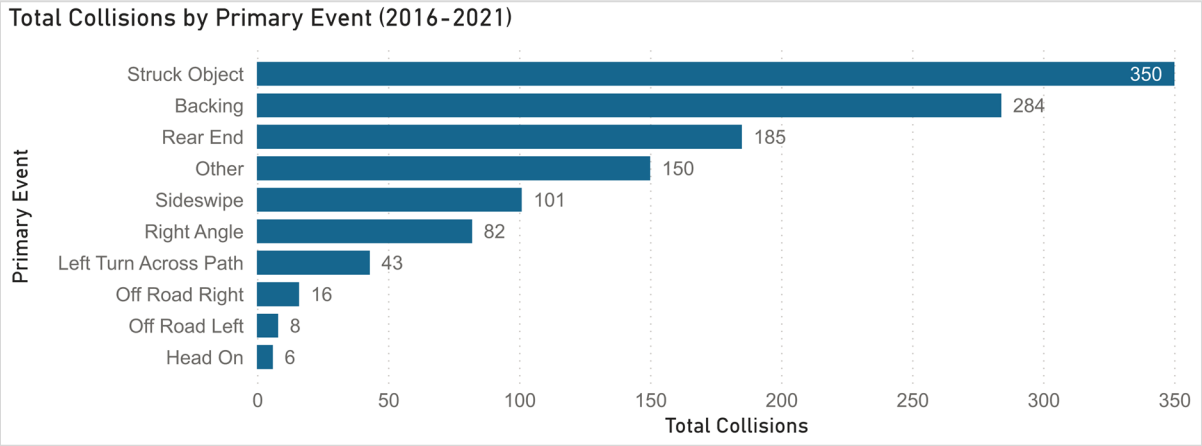
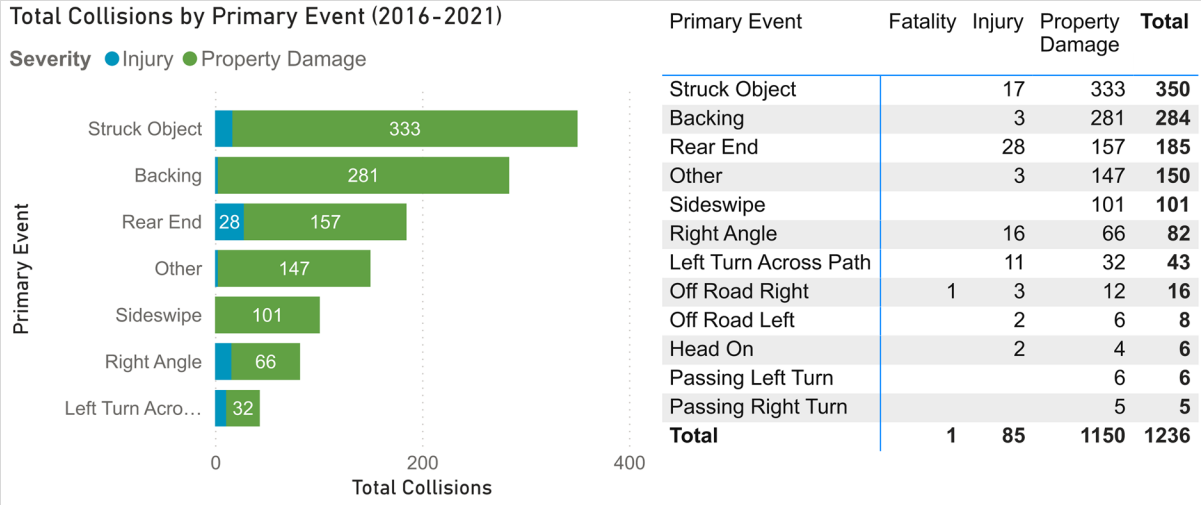


Figure 6.8 Number of Collisions Report (2016 to 2021)

Not all primary events have the same potential for injury. **Figure 6.9** shows the breakdown of severity for each primary event (all primary events are listed in the table but only the top 11 fit within the chart). Rear End collisions show the largest number of injury collisions (28) and account for one-third (33%) of all injury collisions; 15% of Rear-End collisions result in an injury.

Head-on collisions are infrequent (6 total at 0.5% of all collisions) but are the event that is most likely to result in an injury or worse (33% of Head-On collisions result in an injury). Other primary events that are likely to result in injuries are Left Turn Across Path collisions (3% of all collisions yet 26% of this collision type result in injury), Off Road Left collisions (0.6% and 25%), and Right Angle collisions (7% and 20%).



Primary Event	Fatality	Injury	Property Damage	Total
Struck Object		17	333	**350**
Backing		3	281	**284**
Rear End		28	157	**185**
Other		3	147	**150**
Sideswipe			101	**101**
Right Angle		16	66	**82**
Left Turn Across Path		11	32	**43**
Off Road Right	1	3	12	**16**
Off Road Left		2	6	**8**
Head On		2	4	**6**
Passing Left Turn			6	**6**
Passing Right Turn			5	**5**
Total	**1**	**85**	**1150**	**1236**

Figure 6.9 Collision Severity and Reported Event (2016 to 2021)

Another attribute provided by the collected collisions reports is the surface condition at the time of the collision. **Figure 6.10** shows that Dry surface conditions are the most frequent, followed by Slush / Snow / Ice and Wet conditions. **Figure 6.11** provides a breakdown by severity, showing that injury and fatality incidents are most frequent in dry conditions (69% of all injury-fatalities occur when the roadway is dry) and have the highest likelihood of resulting in the more severe outcomes; 8.5% of all collisions in the dry result in injury or fatality while only 4.8% of collisions in snowy, slushy or icy conditions result in severe outcomes.

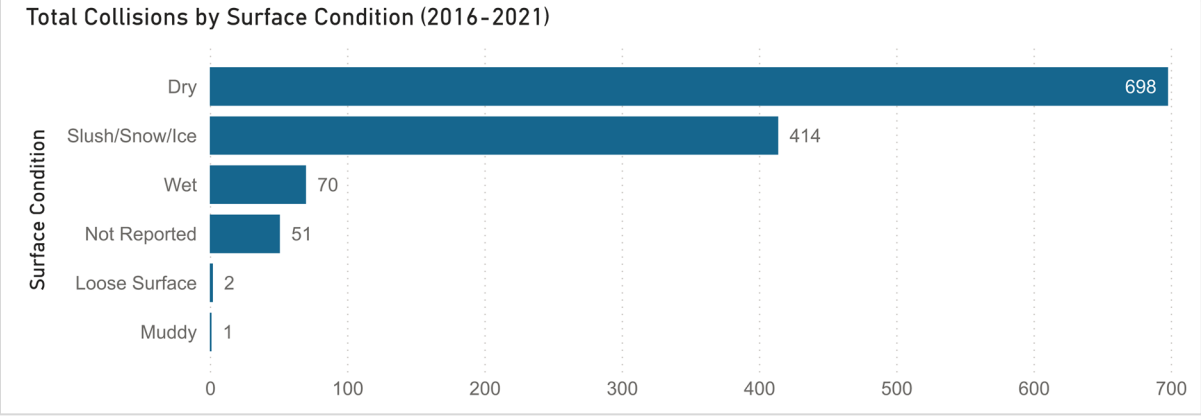
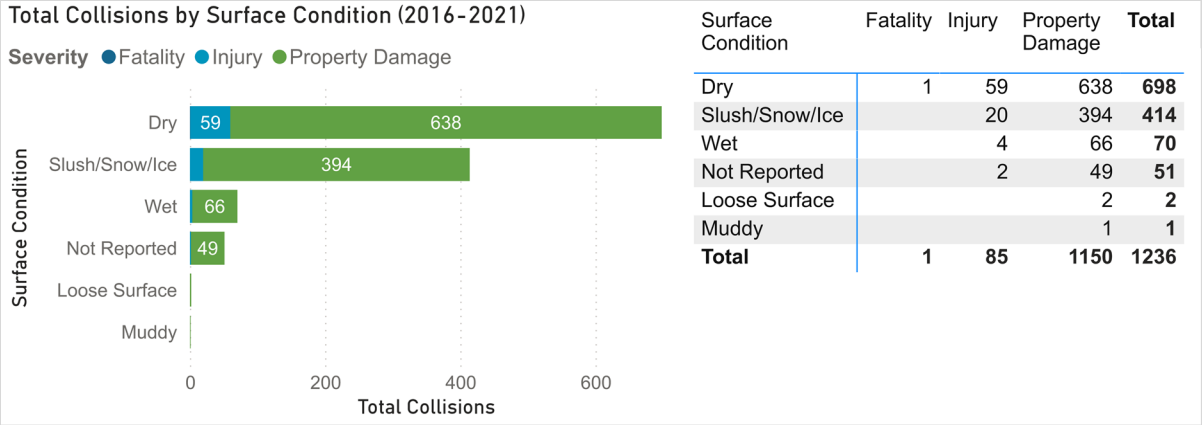


Figure 6.10 Collision Report Surface Condition (2016 to 2021)



Surface Condition	Fatality	Injury	Property Damage	Total
Dry	1	59	638	**698**
Slush/Snow/Ice		20	394	**414**
Wet		4	66	**70**
Not Reported		2	49	**51**
Loose Surface			2	**2**
Muddy			1	**1**
Total	**1**	**85**	**1150**	**1236**

Figure 6.11 Collision Severity and Surface Condition (2016 to 2021)

While road surface condition reports on the ground conditions during a collision, environmental condition reports on the weather or sky conditions at the time of collision**. Figure 6.12** shows that most collisions (80%) occur with a clear sky, with snowy and unreported weather conditions as second and third most in frequency. **Figure 6.13** further shows how severity relates with environmental conditions; most injury collisions occur with clear skies (85%) with snowy skies being the second most common.

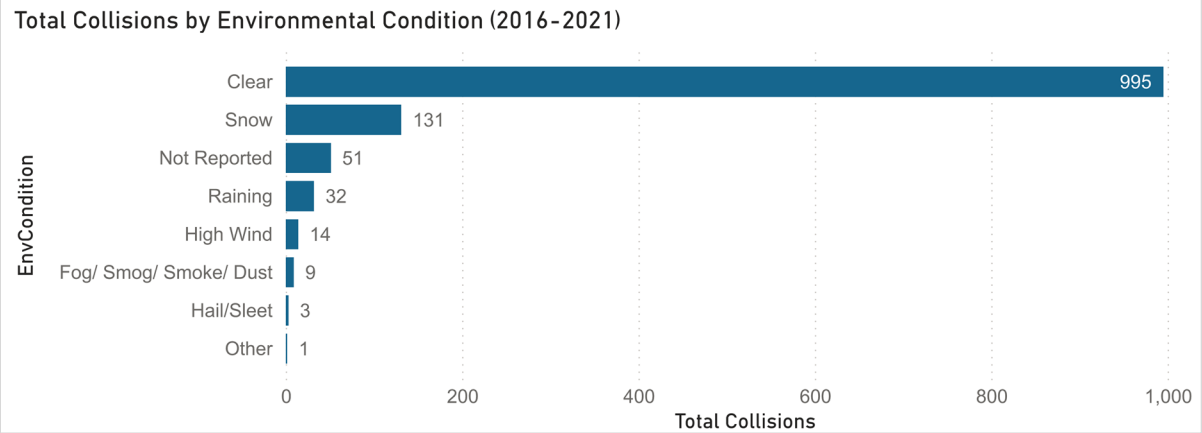
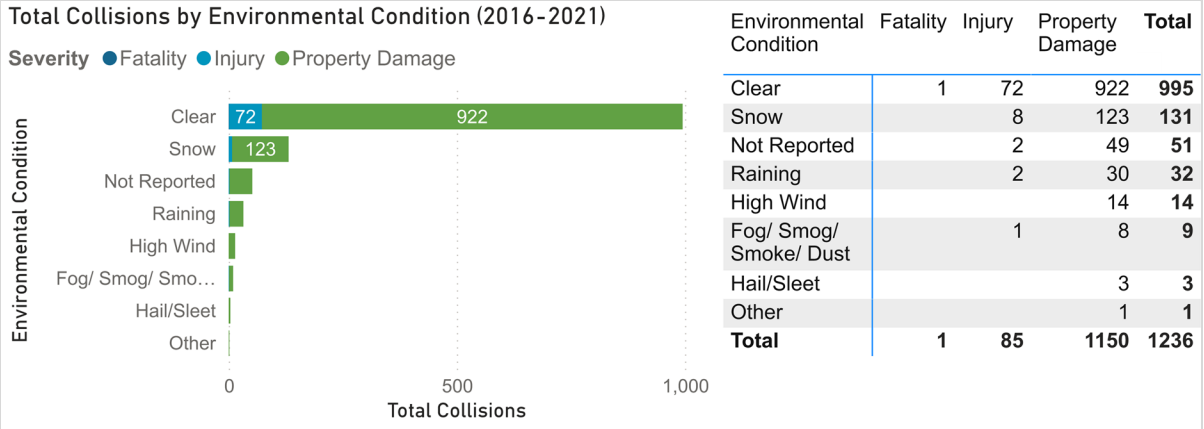


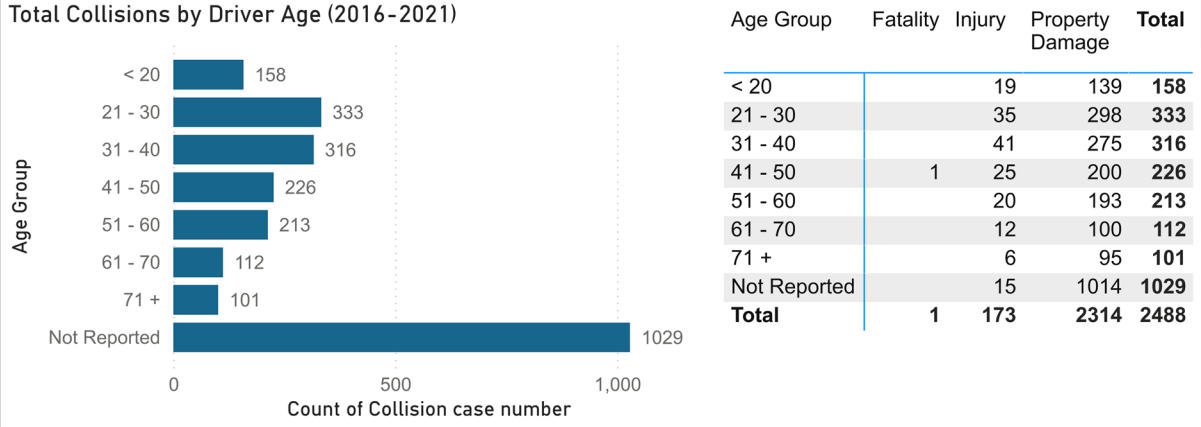
Figure 6.12 Environmental Condition for Collisions (2016 to 2021)



Environmental Condition	Fatality	Injury	Property Damage	Total
Clear	1	72	922	**995**
Snow		8	123	**131**
Not Reported		2	49	**51**
Raining		2	30	**32**
High Wind			14	**14**
Fog/ Smog/ Smoke/ Dust		1	8	**9**
Hail/Sleet			3	**3**
Other			1	**1**
Total	**1**	**85**	**1150**	**1236**

Figure 6.13 Collision Severity and Environmental Condition (2016 to 2021)

Lastly, attributes relating to the individuals involved have been collected for some collisions. Driver's age is one of these attributes, as shown in **Figure 6.14** below. Unfortunately, many collisions did not report driver's age (41%). Of those where age was reported, the ages between 21 and 40 have the highest frequency within the collision record. Note that the age reported could be related to either an at-fault or not-at-fault person; the collision record does not indicate fault as a separate attribute.



Age Group	Fatality	Injury	Property Damage	Total
< 20		19	139	**158**
21 - 30		35	298	**333**
31 - 40		41	275	**316**
41 - 50	1	25	200	**226**
51 - 60		20	193	**213**
61 - 70		12	100	**112**
71 +		6	95	**101**
Not Reported		15	1014	**1029**
Total	**1**	**173**	**2314**	**2488**

Figure 6.14 Age of people involved (at fault or not at fault) in collisions between 2016 and 2021

The likelihood of any specific age group being involved in a collision is somewhat evenly distributed; for all but the 71+ age group and the 31-40 age group, between 9% and 12% of collisions involving that age group were related to an injury. Within the 31-40 age group, 13% of collisions resulted in injury and while collisions involving the 71+ age group result in an injury only 5% of the time.

6.1.2 Location of Collisions

The collision data also includes location data for where each collision took place. Based on ISL's experience in previous Alberta-based projects, location data is often difficult to analyze. Historical data (before 2019) is often not geocoded (referenced via latitude and longitude coordinates), while

more recent data (2019 and later) does not provide consistent geocoded data; for example, some of the data is geocoded to be well outside the limits of the City of Cold Lake and instead match with the Cities of Edmonton and Calgary or other municipalities.

Furthermore, location data also comes in the form of written text strings that are not consistent across multiple reports. Some location information refers to a specific street address, others refer to intersecting street names, while others are more descriptive with local landmarks such as “near City Hall”. Precise geocoded data is critical for determining which locations within the city have a high propensity for roadway collisions.

GEO-CODING METHODOLOGY

Rather than encoding all 1,236 collision events by hand, ISL has used computer automation techniques to convert these text strings into a standardized “location text string”. Using these methods, 973 locations were standardized leaving, 263 (21%) that were not processed automatically.

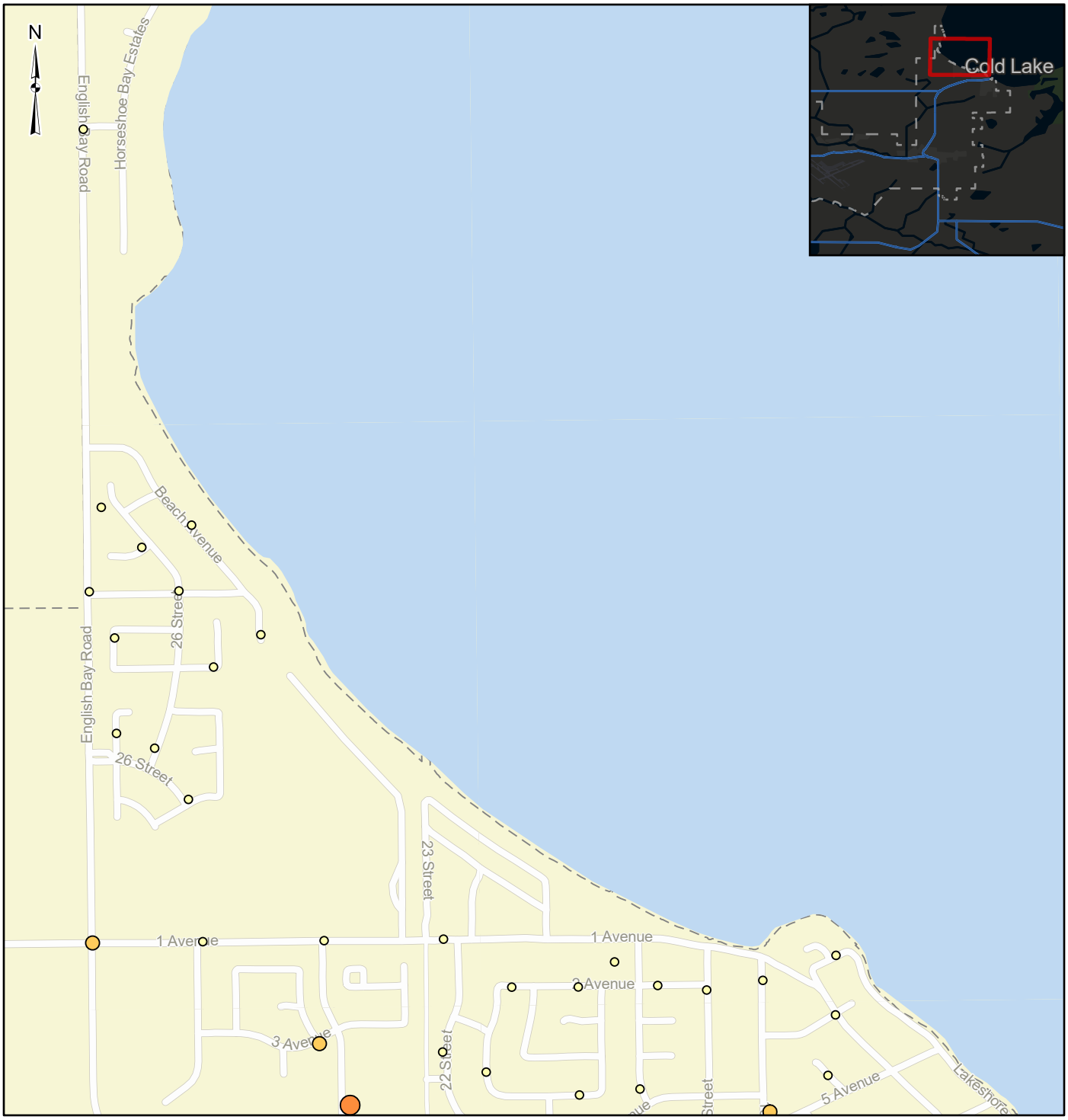
The 973 locations which were standardized were fed into the Google Maps API (similar to conducting a Google Maps search) to assign geo-reference coordinates. Within this process, 145 of these locations were not found by the Maps API (or defaulted to the center of the City of Cold Lake) and were discarded. This resulted in 828 locations (67%) that were geo-referenced via computer-aided methods.

Of the remaining unprocessed locations, 93 were geo-coded manually. Analysts used the available information attributed to each collision event to look up latitude and longitude coordinates. This resulted in 921 collisions that had some geographic coordinates assigned and 315 (25%) collisions that were not geo-referenced due to time and effort required or uncertainty in the available information.

The list of “found collision locations” was then transferred to ArcGIS pro to map the locations across the city of Cold Lake. The automated geocoding process produces highly precise latitude and longitude coordinates, not all of which align with the roadway network. For example, if a collision occured outside of a specific business or residential building, the report may provide the street address for that location. The geocoding process results in a latitude and longitude centered on the building, which then must be offset onto an adjacent roadway. Alternatively, the location information may specify a specific parking lot (“Tri-City Mall parking lot”) without additional context on whether the collision occurred within the parking lot itself, at the entrance to the parking lot, or even across the street from the parking lot.

Knowing all of these limitations and caveats to the collision mapping process, the 921 mapped collisions were fit onto the road network and nearby incidents (less than 50m apart) were clumped into more unified locations.

Exhibits 6.1 to 6.5 show the mapped locations of collisions across the City of Cold Lake, with the size of dots and darker colours of dots indicating a higher frequency of collisions at and around that location.



LEGEND

Total Collisions (2016-2021)

- 1 - 3
- 4 - 8
- 9 - 16
- 17 - 32
- 33 - 78

TITLE

COLLISION LOCATIONS: KINOSOO BEACH & LAKE AVE

PROJECT

COLD LAKE TRANSPORTATION MASTER PLAN

Document Path: Z:\Shared\Projects\16000\16500\16565_City_of_Cold_Lake_TMP\02_CADD\16565_25_GIS\16565_25_GIS.aprx

ISL

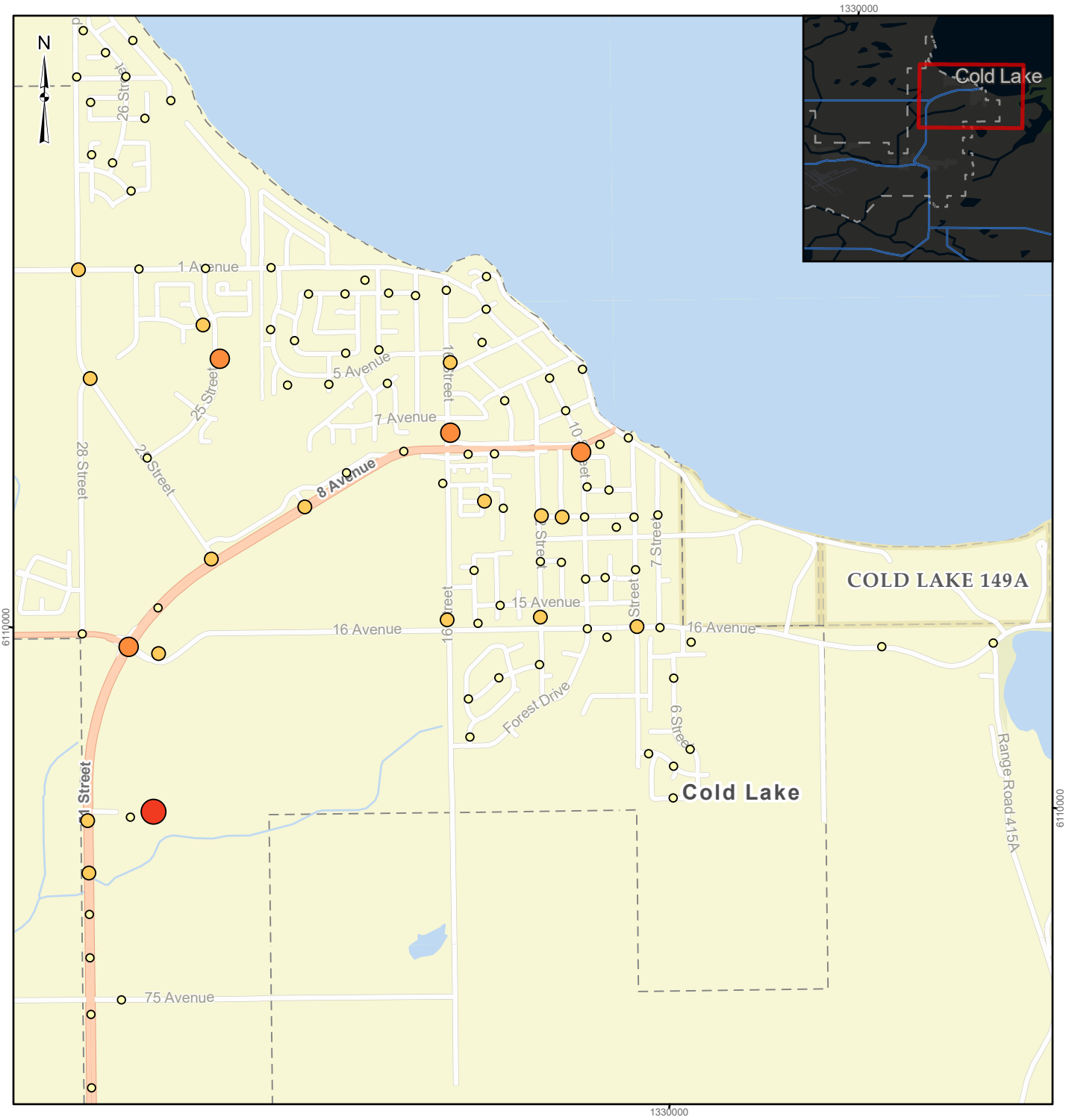
Integrated Expertise. Locally Delivered.

City of Cold Lake

CITY OF COLD LAKE TMP

COLLISION MAPPING 1

EXHIBIT 6.1



LEGEND

Total Collisions (2016-2021)

- 1 - 3
- 4 - 8
- 9 - 16
- 17 - 32
- 33 - 78

TITLE

COLLISION LOCATIONS: COLD LAKE NORTH

PROJECT

COLD LAKE TRANSPORTATION MASTER PLAN

Document Path: Z:\Shared\Projects\16000\16500\16565_City_of_Cold_Lake_TMP\02_CADD\16565_25_GIS\16565_25_GIS.aprx

ISL

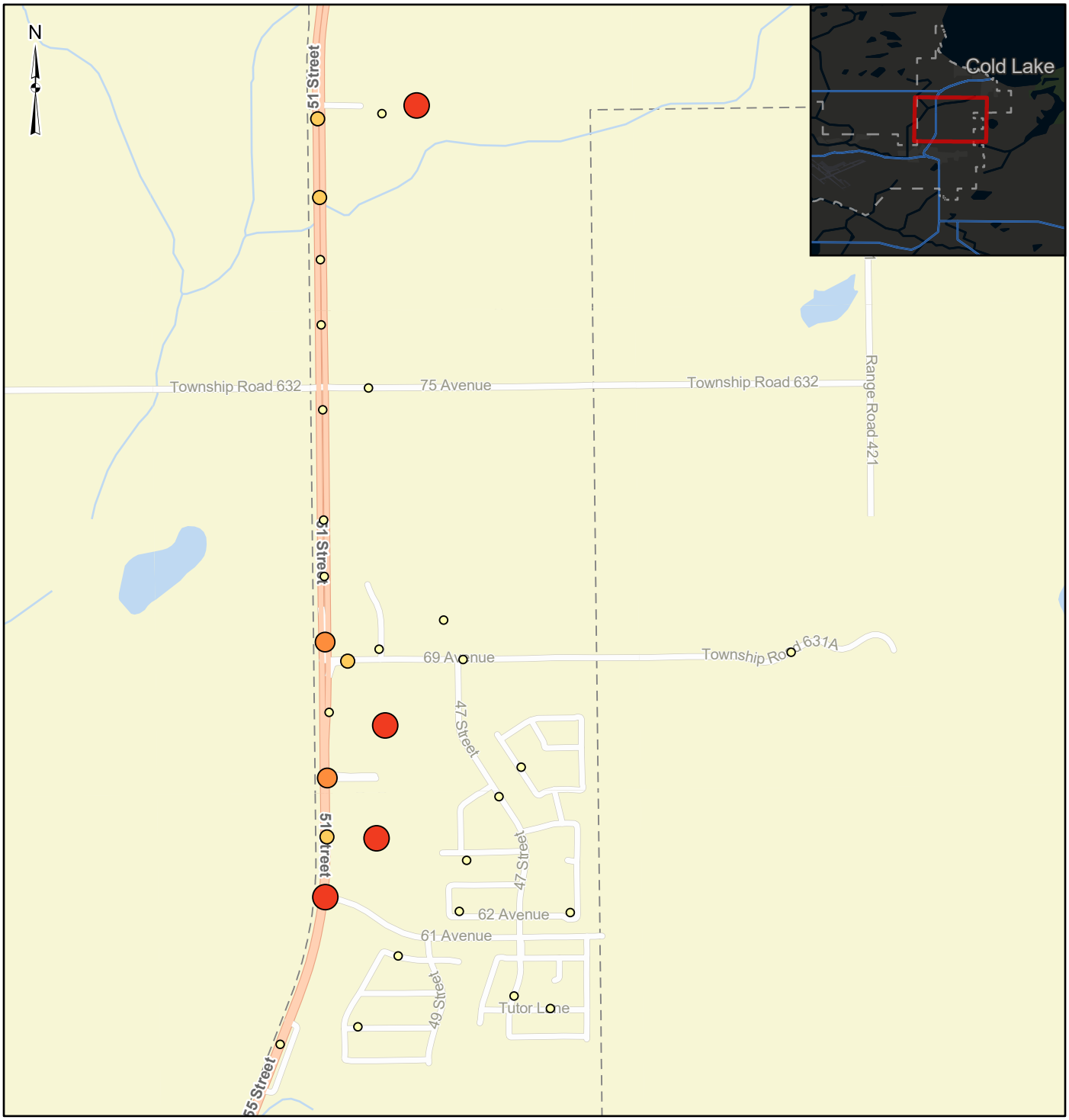
Integrated Expertise. Locally Delivered.

City of Cold Lake

CITY OF COLD LAKE TMP

COLLISION MAPPING 2

EXHIBIT 6.2



LEGEND

Total Collisions (2016-2021)

- 1 - 3
- 4 - 8
- 9 - 16
- 17 - 32
- 33 - 78

TITLE

COLLISION LOCATIONS: HIGHWAY 28 CENTRAL

PROJECT

COLD LAKE TRANSPORTATION MASTER PLAN

Document Path: Z:\Shared\Projects\16000\16500\16565_City_of_Cold_Lake_TMP\02_CADD\16565_25_GIS\16565_25_GIS.aprx

ISL

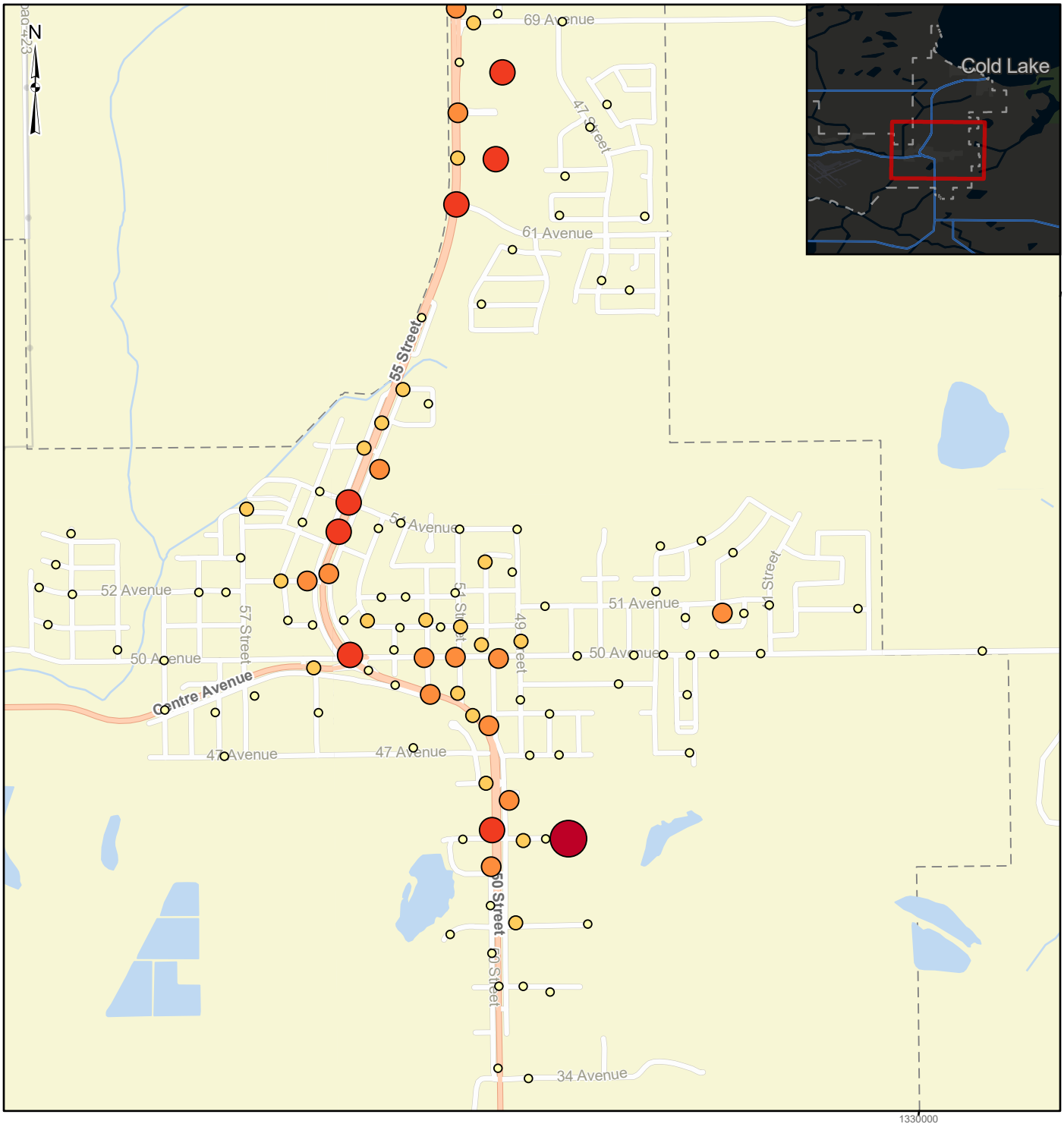
Integrated Expertise. Locally Delivered.

City of Cold Lake

CITY OF COLD LAKE TMP

COLLISION MAPPING 3

EXHIBIT 6.3



LEGEND

Total Collisions (2016-2021)

- 1 - 3
- 4 - 8
- 9 - 16
- 17 - 32
- 33 - 78

TITLE

COLLISION LOCATIONS: COLD LAKE SOUTH

PROJECT

COLD LAKE TRANSPORTATION MASTER PLAN

Document Path: Z:\Shared\Projects\16000\16500\16565_City_of_Cold_Lake_TMP\02_CADD\16565_25_GIS\16565_25_GIS.aprx

ISL

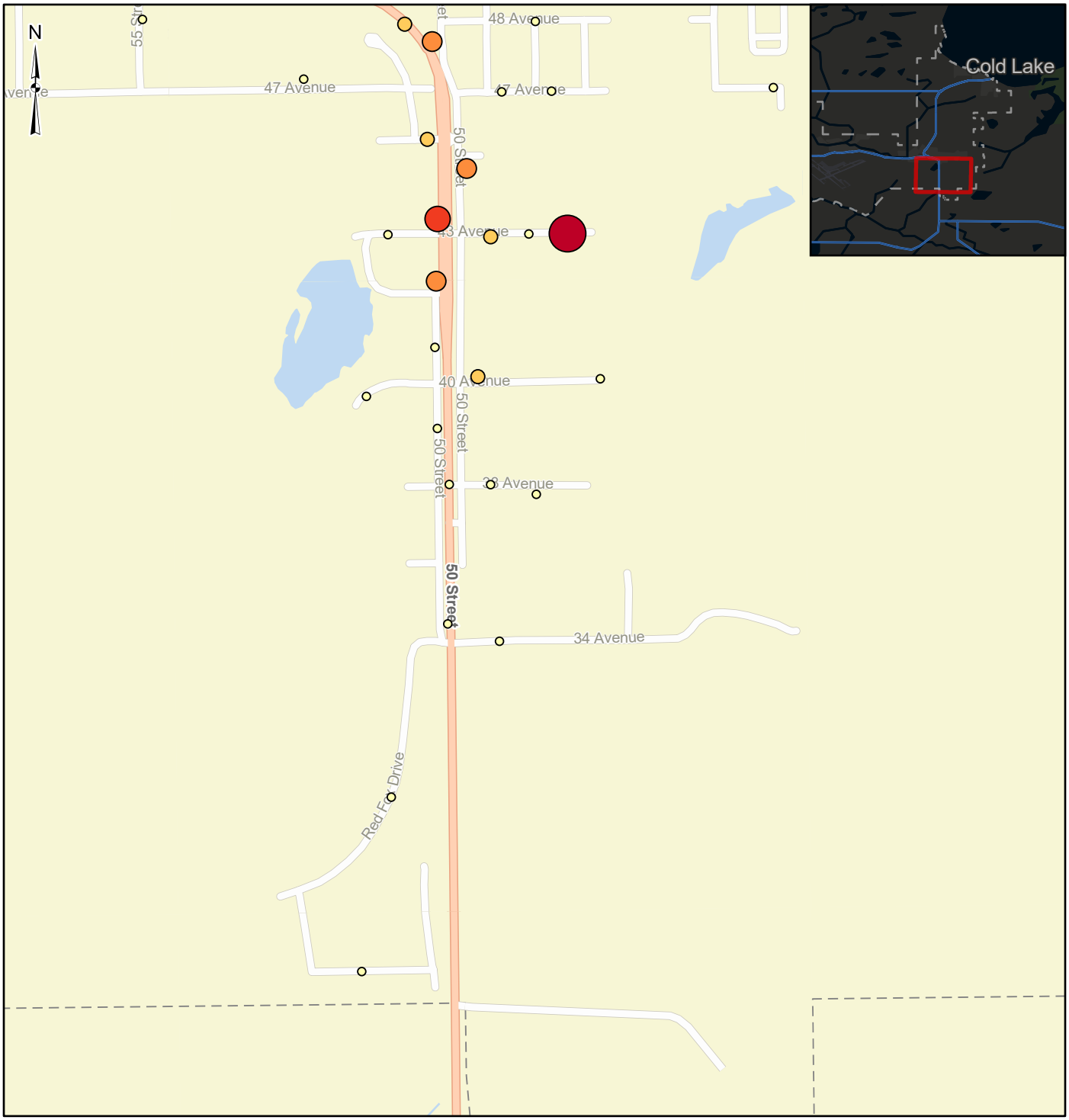
Integrated Expertise. Locally Delivered.

City of Cold Lake

CITY OF COLD LAKE TMP

COLLISION MAPPING 4

EXHIBIT 6.4



LEGEND

Total Collisions (2016-2021)

- 1 - 3
- 4 - 8
- 9 - 16
- 17 - 32
- 33 - 78

TITLE

COLLISION LOCATIONS: HIGHWAY 28 GATEWAY

PROJECT

COLD LAKE TRANSPORTATION MASTER PLAN

Document Path: Z:\Shared\Projects\16000\16500\16565_City_of_Cold_Lake_TMP\02_CADD\16565_25_GIS\16565_25_GIS.aprx

ISL

Integrated Expertise. Locally Delivered.

City of Cold Lake

CITY OF COLD LAKE TMP

COLLISION MAPPING 5

EXHIBIT 6.5

COLLISION LOCATION CONCLUSIONS

Cold Lake South shows a higher frequency of collisions than Cold Lake North. Some of the locations showing the largest number of collisions are associated with parking lots, rather than a location along a roadway. Location descriptions such as “Walmart Parking Lot”, “Tri-City Mall Parking Lot” and “Energy Centre” are seen regularly within the collision record. As discussed above, distinguishing between a collision within the parking lot itself and nearby to the parking lot cannot be done in an efficient and systematic manner without reviewing all 1,236 collisions manually in detail.

6.2 Speed Limit Review

6.2.1 Methods for Establishing Posted Speed Limits

The current state of practice for establishing posted speed limits has changed substantially across the province of Alberta over the previous five (5) years. There is an ongoing recognition by municipalities of the collision risk present for pedestrians, particularly the link between severity of injuries and the speed of the colliding motorized vehicle. In response, many jurisdictions are re-examining their speed limits across all roadway classifications as part of their Vision Zero[1] or other road safety programs.

One method for establishing the posted speed limit is to use the **Transportation Association of Canada's** (TAC) *Canadian Guidelines to Establishing Posted Speed Limits* (CGEPSL). This document provides a methodology and worksheet for assessing the road attributes for a given segment of roadway, using road classification, quantitative geometric measures and qualitative assessments of risk exposure. After assessing all required inputs, a Risk Score is assigned to the study road segment which is then compared against a table for a recommended posted speed limit. The potential speed limit recommendations per the CGEPSL risk score is summarized in the tables below.

Table 6.1 TAC Recommend Posted Speed Limit Criteria (Arterials)

Arterials	Recommended Posted Speed Limit (by risk level)					
Urban Divided Major (1 lane or 2+ lanes)	Speed	90 km/h	80 km/h	70 km/h	60 km/h	50 km/h
	Risk Score	<25	26 – 33	34 – 41	42 – 59	>60
Urban Undivided Major or Divided Minor (1 lane or 2+ lanes)	Speed	80 km/h	70 km/h	60 km/h	50 km/h	
	Risk Score	<29	30 – 48	49 – 64	>65	
Urban Undivided Minor (1 lane or 2+ lanes)	Speed	70 km/h	60 km/h	50 km/h		
	Risk Score	<33	34 – 56	>57		

Table 6.2 TAC Recommend Posted Speed Limit Criteria (Collectors)

Collectors	Recommended Posted Speed Limit (by risk level)				
Urban Divided Major (1 lane or 2+ lanes)	Speed	80 km/h	70 km/h	60 km/h	50 km/h
	Risk Score	<29	30 – 36	37 – 39	>40
Urban Undivided Major or Divided Minor (1 lane or 2+ lanes)	Speed	70 km/h	60 km/h	50 km/h	
	Risk Score	<33	34 – 37	>38	
Urban Undivided Minor (1 lane or 2+ lanes)	Speed	60 km/h	50 km/h	40 km/h	
	Risk Score	<33	34 – 50	>51	

The speed limit recommendations using the CGEPSL serve as an important tool for reviewing speed limits. It is important to note that the results do not constitute statutory requirements, as the CGEPSL

[1] A Vision Zero program is a safe transportation strategy towards eliminating all traffic fatalities and severe injuries, recognizing that no loss of life is acceptable. It is a comprehensive system-wide approach to reducing the risk of severe outcomes from collisions.

is a guideline and not a statutory document. Application of the results require interpretation and judgement before implementation. The following should be considered:

- The prevailing speeds on the subject roads,
- Consideration for the major and minor classifications for collector roadways, as only minor roadways may be recommended for a posted speed of 40 km/h per the CGEPSL,
- Consistency of posted speed along a corridor to avoid short segments with varying speed,
- Intended function of the roadway. For example, the recommendations from the CGEPSL does not consider the adjacent land use of an area, and areas intended for increased pedestrian traffic, such as a downtown, that may benefit from lower posted speeds than the CGESPL recommendation.
- Vision zero or safe systems approach, with the intent of minimising reducing the risk of severe outcomes from collisions.

6.2.2 Current Speed Limits

While a full review of the roadway network posted speeds was not included as part of the TMP, the current speed limits were reviewed based on the current classification and local conditions. The following is noted:

- Many of the roadways downtown would likely meet the CGESPL criteria for a posted speed of 40 km/h if they were considered minor collector roadways. Contributing risk factors include the density of 4-way stop controlled intersections, well utilized on-street parking, marked pedestrian crossings, and prevenance of roadside hazards such as utility poles, street lighting, trees, and other decorative features.
- Posted speeds on Highway 28, Highway 55, and Veterans Way are likely appropriate as access along these corridors is generally restricted to side-streets or access roads.

It is recommended that the City review the posted speeds downtown to ensure that they align with the use and infrastructure in the area.

6.2.3 Future Considerations

A City-wide posted speed limit review is recommended in the future once the City undergoes a significant portion of projected 15-year horizon development. One consideration is Cold Lake North, where significant growth is expected within the next 15 years. The City should consider lowering the posted speeds on 25 Street and English Bay Road from 60 km/h to 50 km/h or 40 km/h as appropriate with development.

6.3 Traffic Calming

Road authorities use traffic calming measures to reduce speed and shortcutting traffic. Traffic calming measures primarily focus on changes to the vertical and horizontal alignment of the road. Common examples are speed bumps and curb extensions, which narrow the lane causing drivers to be uncomfortable at higher speeds. Shortcutting is when nonlocal traffic uses the roadway as an unintended bypass. Traffic calming can result in a change in traffic patterns, lowering traffic volume on the road. There are two segments being reviewed for traffic calming, both in consideration for speed reduction. Reduced vehicle speeds increase the safety of the road by decreasing the fatal and serious injury collisions. This section uses TAC's Canadian Guide to Traffic Calming (2018) as reference.

6.3.1 51 Avenue between 41 Street and 45 Street

This segment is along 51 Avenue from 41 Street to 45 Avenue in a residential area. The segment has a vertical slope with 41 Avenue as the highest point and 45 Avenue as the lowest. Additionally, there is a curve in the horizontal alignment. There is street parking on this segment. Speed reduction while descending the hill is the focus of this review.

6.3.2 45 Street and 54 Avenue/47 Street

This segment of road is along 54 Avenue/47 Street to 45 Street and is frequently used as a bypass to/from downtown. There are no major alignment characteristics. There are no road markings for either road. While the bypass is not a concern of shortcutting for the City, speed is likely an issue for this segment. There is street parking on this segment. The area is primarily residential and there is an elementary school along 54 Avenue. The pickup location for the school is not in the review segment. The intersection of these two roads is a T-intersection. Traffic calming measures will focus on speed reduction for this review.

6.3.3 Traffic Calming Recommendations

The recommendations for these two roadways are focused on speed reduction. Traffic calming measures for speed reduction can be categorized as vertical or horizontal narrowing of the roadway to make higher speeds uncomfortable for drivers. Traditional methods focused on vertical measures such as speed bumps. However, these methods cause delays to emergency and transit vehicles and are hazards that slow snow removal. The recommendations mainly focus on horizontal narrowing and have been listed by increasing cost.

- **Lane Delineation:** Add a centerline to the roadway to decrease the available width of roadway to drivers.
- **Vertical centerline treatment:** This delineation of the lanes can reduce overall speed by 5 km/h. The roadway would be more likely to be perceived as less comfortable at higher speeds.
- **Speed display devices:** Devices that illuminate and display vehicle speeds to oncoming motorists can be installed easily along both roadways. Prime location for this measure would be the school along 54 Avenue and a specified length descending the grade on 51 Avenue.
- **Curb extensions**: A horizontal intrusion onto the roadway, can be introduced at intersections along the segments to reduce speed by up to 8 km/h. When installed near an intersection, this measure has the added benefit of reducing crossing distance for pedestrians and increasing their visibility to drivers. Curb extensions also prevent parking close to an intersection, improving the sightlines of the intersection. This traffic calming measure would be particularly useful for the 51 Avenue segment, as there are five intersections along the descent of the hill. Installing curb extensions at each intersection along both segments will naturally reduce the overall speed of the segment.
- **Raised crosswalks**: A traffic calming measure that can be used congruently with curb extensions at intersections to further reduce speed. Raised crosswalks decrease vehicle speed by up to 13 km/h while simultaneously increasing the number of vehicles yielding to pedestrians from 13% to 53%. When the CASP north of the school is developed with children crossing 54 Avenue, a set of raised crosswalks at the school could be installed to reduce speed and increase driver awareness of pedestrians.

- **Roadway Narrowing:** Narrowing the overall width of the road if revitalization occurs. Modern residential roads are designed to be narrowed to reduce speed and maintenance.

Figure 6.15 includes examples of traffic calming measures.

Figure 6.15 Traffic Calming Measure Examples

Additional guidance for traffic calming is provided in the TAC Traffic Calming Guide. **Figure 6.16** shows the geometric requirements for a curb extension from TAC.

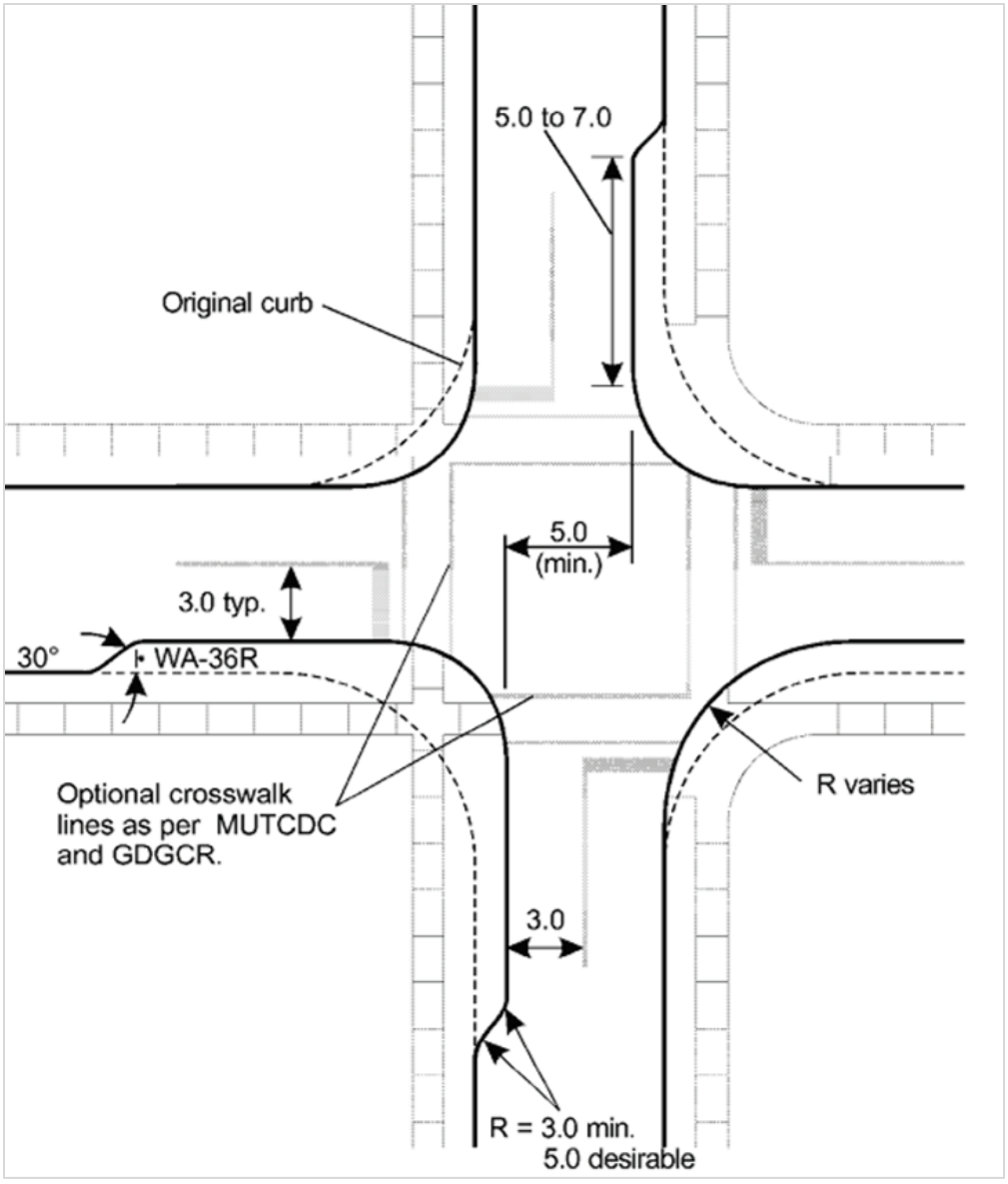


Figure 6.16 Curb Extension (Source: TAC Traffic Calming Guide)

7.0 Infrastructure Planning and Integration

7.1 Transit Service Review

The transit scope included a high-level review of the two existing transit services, which are provided free of charge, offering 50-minute headway and scheduled Monday through Friday with additional services on Saturday. Both routes are bidirectional loops that begin and end at the main transit terminal at Tri-City Mall.

Overall, the routes are highly connected across the network, matching existing travel patterns. Headways are quite long and may not be attractive to some users who want to rely on more frequent transit usage. With the projected growth of the City, there will be increased demand for transit services. The current routes may need to be adjusted, or new routes introduced to better serve the populace. Following a review of the travel demand model and the future land use, there are four (4) proposed improvements for the transit system based on the high-level review.

- **Add an express route:** The proposed express route would have two to three stops in both Cold Lake North and Cold Lake South as well as the Tri-City Mall then proceed to CFB. Frequency for the express route could be 10 to 20 minutes to make the route more attractive for more people. This route could also serve a commuter schedule with increased frequency during peak hours.
- **Expand current routes to serve the new areas of the City:** As the City grows, an expansion of the current transit routes to include new developments is a possible solution, depending on the demand for transit and travel time. Decreasing the headway of the bus route could increase ridership. Large headways between services can be a barrier to some people that would like to rely on transit at more frequent times. It could also be adjusted to be an on-demand service to reduce costs. This expansion would be a sufficient short-term solution.
- **North and south transit loops:** The current bus route could be split into two bidirectional route sets to avoid transfers, which can significantly impact on the attractiveness and cost of transit stops, particularly in cold climates. These routes would include all stops in that portion of the City in addition to the Tri-City Mall, the CFB, and a select number of stops in the other part of the City.
- **On-demand service:** In low ridership areas of the routes the City could also consider replacing these with on-demand service, which allows passengers to travel between a fixed route service and a virtual stop placed in the low ridership area.
- **Supporting Changes:** For all of the above, bus stop locations would need to be expanded for each of these routes as necessary. If possible, bus stops should be located close to multi-family units. The expansion should include each new residential CASP with walking distance limited to increase the attractiveness of the transit system. Community engagement will be essential to ensure the future success of the transit system by directly addressing the needs of the user base.
- **Comprehensive Review Recommended:** It is recommended the City complete a comprehensive transit services review. Funding may be available through the federal governments, Active Transportation Fund. A comprehensive terms of reference is provided in the following table.

Table 7.1 Comprehensive Transit Services Terms of Reference

Scope	Description
Existing Conditions Review	Review existing services including ridership, booking practices, costs, catchment areas, operating hours and others. Review the transportation network to understand existing barriers to servicing transit.
Generate Community Profiles	Review existing lands use types, demographics, social-economic and journey to work data to understand the community profile for existing and potential communities that could be served by transit. Travel patterns can be based on the Streetlight Data provided in this report.
Peer Review	Review peer municipalities that offer rural transit services and closely resemble the community make-up of Cold Lake.
Ridership Strategy	Review methods to increase ridership and reach based on the varying community profiles, methods used by peers and others.
Engagement	Conduct engagement with existing users to understand their experiences and barriers with the existing services. Engage with potential communities to understand their desire for transit. Engagement is expected to be done through the working committee.
Capital Planning	Generate a capital plan that includes replacement and maintenance timelines for existing assets, timelines for adding new assets (buses) depending on expansion and program these into a 10-year plan.

7.2 Highway 28 Functional Design Study Review

A Highway 28 Functional Design Study (FDS) from Township Road 624 to 54 Avenue was completed in 2015, setting the basis for future detailed design and construction on the Highway. At the time, the study was based on a 20-year (2030) design horizon, with assumed growth in travel demand up to 2030. It includes two alternative designs for the corridor, as follows:

- Auxiliary Lane Alternative, in which the current service roads are replaced with continuous auxiliary lanes separated from Highway 28. This is noted as the City's preferred option.
- Service Road Alternative, in which improvements are proposed to the existing service road configuration.

Traffic Volume Reviews

The basis for the traffic volumes used for traffic analysis in the Functional Design Study (FDS) is from the projected traffic volumes and distribution from the 2012 Transportation Study. The FDS cautions that the 2012 Transportation Study includes aggressive growth assumptions and that the timelines may need to be revisited if that growth does not occur. This is a similar observation to the discussion in **Section 3.6,** where it is noted that the growth assumptions in the previous Transportation Study do not align with the existing or currently expected growth patterns. In fact, volumes on Highway 28 are significantly lower in the 25-Year horizon for this TMP than in the FDS 20-Year horizon, especially between 52 Avenue and 54 Avenue.

Table 7.2 below compares the northbound and southbound PM Peak hour volumes on Highway 28 for the FDS 20-year horizon and this TMP's 25-year horizon. For ease of comparison, volumes are rounded to the nearest 50.

Table 7.2 Comparison of Highway 28 PM Peak Hour Traffic Volumes – Highway 28 FDS 20-Year Horizon vs TMP 25-Year Horizon

	Northbound Approach			Southbound Approach		
Intersecting Roadway	FDS	TMP	Difference	FDS	TMP	Difference
43 Avenue	1,050	1,450	400	1,750	1,150	-600
50 Street	1,450	1,650	200	1,300	850	-450
Veterans Way/ 50 Avenue	1,050	1,000	-50	2,200	550	-1,650
52 Avenue	2,050	1,200	-850	2,450	500	-1,950
54 Avenue	2,100	1,100	-1,000	2,900	600	-2,300

Geometry Review

The recommendations from the Highway 28 Functional Study were reviewed to understand whether they align with the findings of this TMP's capacity analysis. The FDS and this TMP's recommendations are compared in the table below.

Table 7.3 Highway 28 Intersection Summary

Intersection	FDS Geometry	TMP
52 Avenue	Upgrade completed (Modified from FDS)	No change from existing conditions.
50 Avenue/ 48 Avenue (Centre)	Upgrade completed (Modified from FDS)	No change from existing conditions.
52 Street	Upgrade completed (Modified from FDS)	No change from existing conditions.
51 Street	Right-in only	Either maintain as a right-in, right-out (existing conditions) or modify to a right-in only per FDS. Modeled in the TMP as a right-in right-out access with no operational issues noted. The TMP projects low usage of the right-out, therefore, no issues are anticipated should the City choose to move forward with the FDS recommendation to convert the access to right-in only.
50 Street/ 48 Avenue	Upgrade completed	No change from existing conditions.
46 Avenue	3-legged signalized intersection. Remove east leg and construct a new east right-in right-out between 46 Avenue and 43 Avenue.	Update the intersection per the recommendations in the FDS.
43 Avenue	Majority of upgrades completed. Separate northbound right turn lane not	No change from existing conditions.

Intersection	FDS Geometry	TMP
	constructed (currently shared through/right).	A separate northbound right turn lane is not required based on the 25-year capacity analysis.
42 Avenue	Access removed	Either remove access per FDS or maintain access. Existing right in, right out operates well at 25-year horizon. Access removal is not anticipated to be an issue, as less than 100 trips are projected at the 42 Avenue intersection in the PM peak 25-year horizon.
40 Avenue	Signalized all-directional intersection NB and SB lanes: one left turn, two through, one shared through-right EB and WB lanes: one shared right-through-left	Update the intersection per the recommendations in the FDS.
38 Avenue	Signalized all-directional intersection NB and SB lanes: one left turn, two through, one shared through-right EB and WB lanes: one shared right-through-left	3-legged intersection (as existing) with stop control at 38 Avenue. NB lanes: two through, one shared through-right SB lanes: one left turn, three through WB lanes: one shared right-left
34 Avenue	Signalized all-directional intersection NB lanes: one left turn, one through, one shared through-right SB lanes: one left turn, two through, one right EB and WB lanes: one shared right-through-left	The following modifications are recommended: SB lanes: one left turn, one through, one shared through-right EB and WB lanes: one left turn, one through-right

Overall, the FDS recommendations align with the findings of the TMP, with some minor geometric changes. Some upgrades have already been completed, which are slightly modified compared to the FDS, but no changes are needed as these accommodate projected traffic volumes. The Functional Study does not consider industrial growth in the Red Fox Commercial Outline Plan south of 34 Avenue. Given this is a significant employment growth area, it is recommended that the City revisit the plan to consider the access locations and configurations in the Red Fox development area.

7.3 Truck/Dangerous Goods Routes Review

There are currently no formal trucks and dangerous goods routes in the City. The current informal routes taken by the trucks transporting dangerous goods pass three schools along Highway 28 and Centre Avenue, one of which is close to the Highway. The Lakeland Catholic Schools is less than 20 m from Highway 28. An alternative route for the east entrance of the CFB was suggested in the ISP (2009). This route would require the construction of two roads that would bypass the southern part of the City. This route would be connected to Highway 28 at 34 Avenue and Centre Street, west of 59 Street. This would include the improvements required at three intersections to allow for proper truck movements. This is a critical improvement for the health and safety of residents. For the future

expansions of the City, the truck and dangerous goods routes allow developers to plan the appropriate buffer zones as well as the additional right-of-way required for truck movements. The figure below shows the possible truck and dangerous goods routes, with consideration for potential future connections.

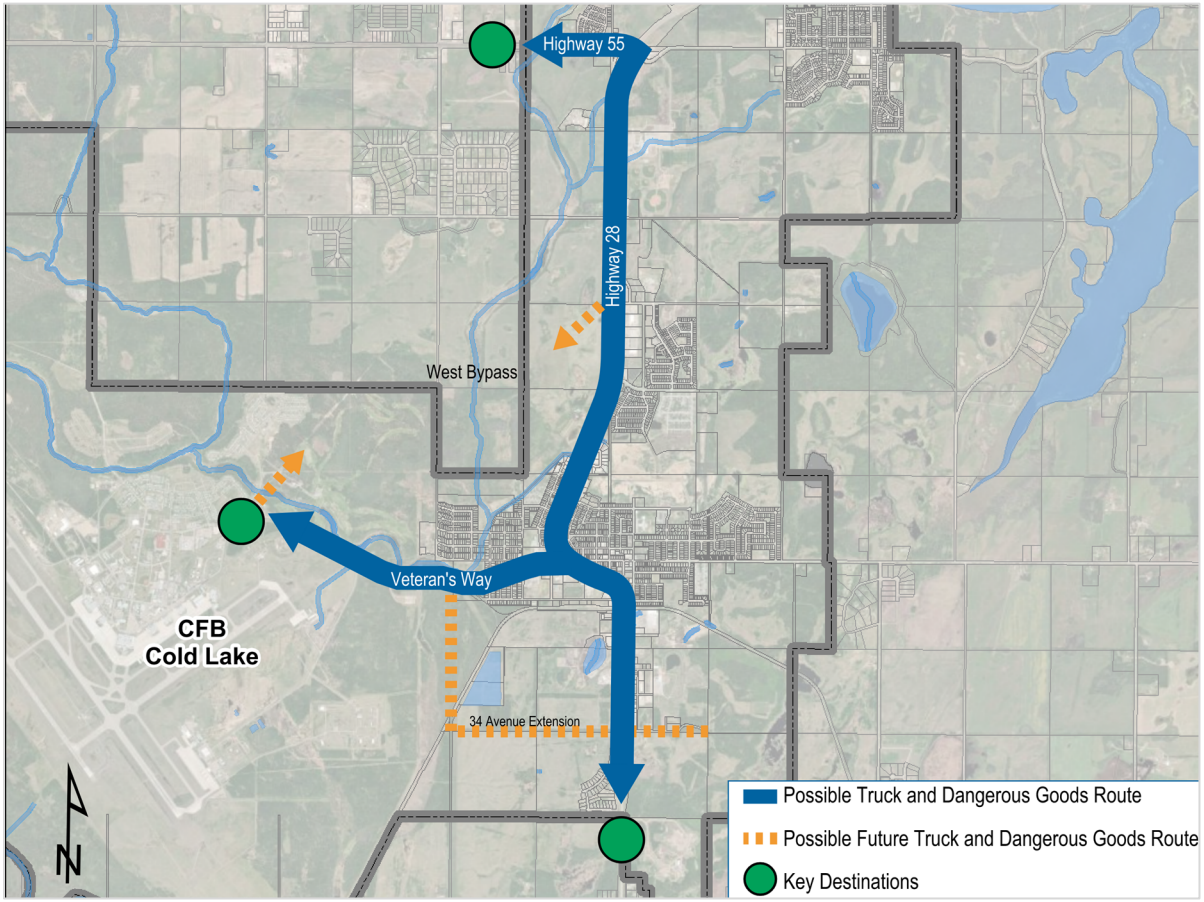


Figure 7.1 Potential Truck and Dangerous Goods Route

7.4 Urban Design Review

Downtown is the City's commercial core, centered around its only traditional high street, 50 Avenue. The Downtown Core is key for concentrated growth and economic activity and has potential for more vibrant community life, further support local businesses, services, and higher-density, mixed-use developments near jobs and amenities. A Downtown Area Redevelopment Plan was recommended in the City's Municipal Development Plan, to realize investment in the Downtown.

The focus of the urban design in the TMP is to review the Downtown Core areas defined in the MDP, with a focus to to create a balanced transportation environment in the Downtown Core that supports both increased commercial and residential growth while preserving a small-town, pedestrian-friendly character. For this, the following key objectives are summarized in the following sub-sections.

Sidewalk and Pathway Connectivity

To support improved mobility for all users, a gap analysis of the current sidewalk and pathway network is provided to identify missing links or barriers that could impede mobility movement. The goal is to ensure continuous, accessible routes that connect residential areas, businesses, and entertainment venues. A gaps assessment of sidewalk and pathway connectivity is provided in **Figure 7.2**.

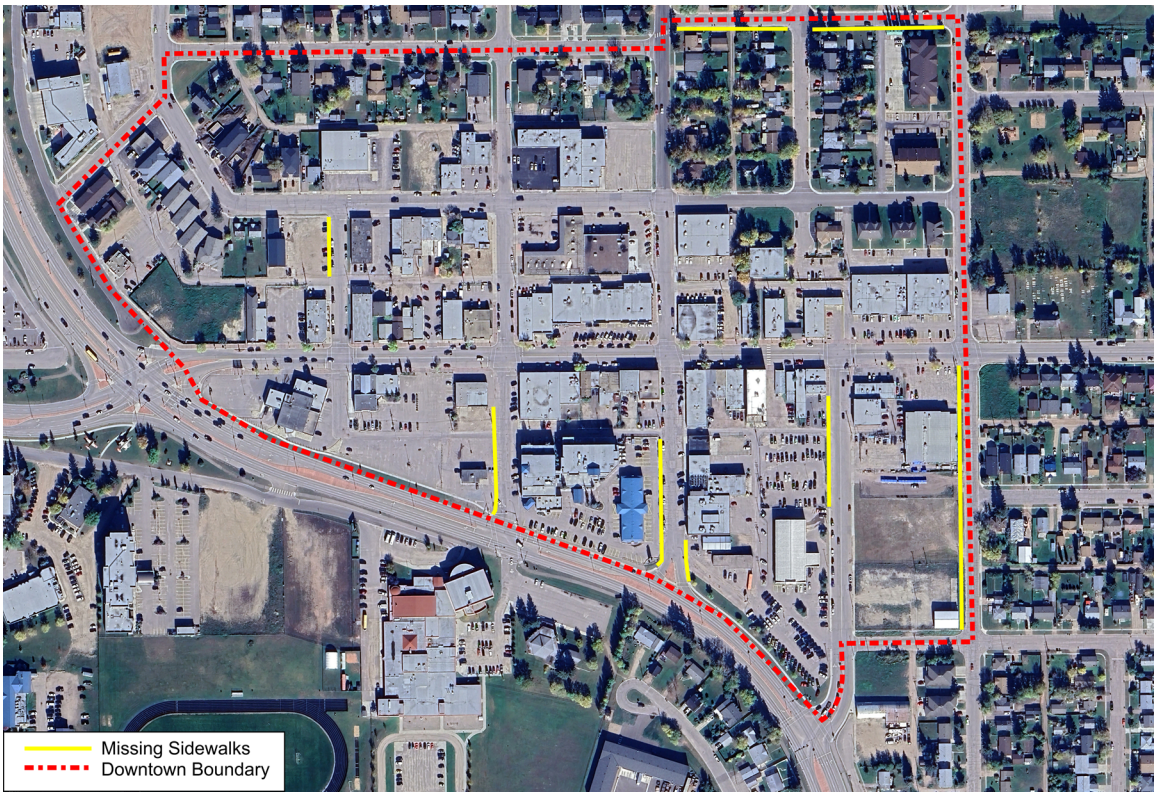


Figure 7.2 Missing Sidewalks

From the gaps assessment the following is observed:

- Sidewalk connectivity is provided for 85% of the Downtown Core area.
- Missing sidewalks could be added with redevelopment and/or with a future infrastructure improvement project.
- In some areas, sidewalks have limited mobility, obstructed by power poles and/or have limited surface width due to overgrown boulevards.

Pedestrian and Accessibility Design and Operational Requirements

Pedestrian and accessibility design and operational requirements to enhance the Downtown Core. Typical operating widths of pedestrian and wheelchair users are provided in the following figures.

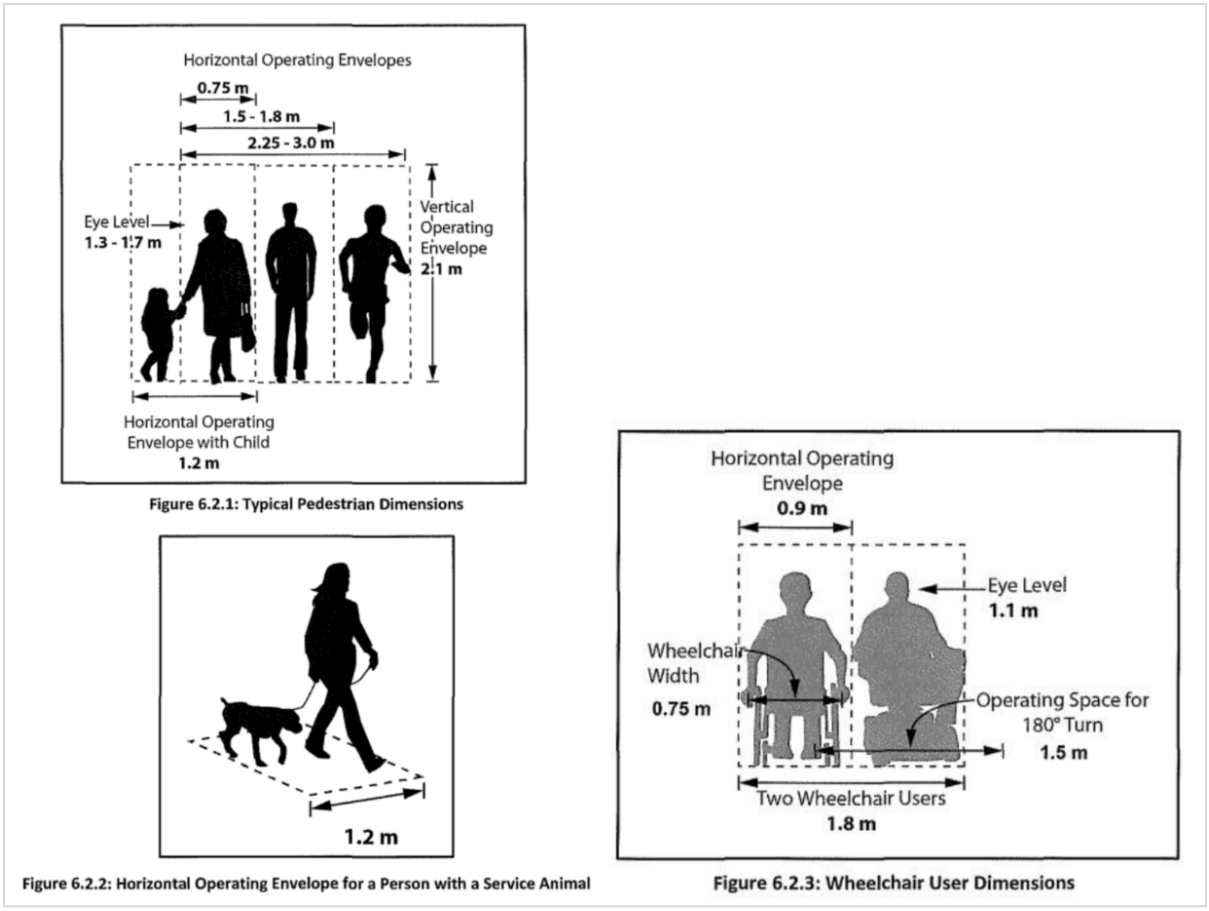


Figure 7.3 Operating Widths of Pedestrians and Wheelchair Users (Source: Transportation Association of Canada)

Key strategies for improving pedestrian and accessibility are in the following table:

Table 7.4 Pedestrian and Accessible Mobility Needs

Criteria	Strategies
Travel Path	• Straight and free of obstructions. • Obstructions (benches, garbage receptacles, sign posts etc.) should be clearly differentiated but within 60 cm of the travel path to be detectable. • Where should be 90 degrees, when needed.
Surface	• Hard surface with a constant texture that is slip resistant and free of tripping hazards. • Different surfaces could be used to differentiate paths. • Grates should be located outside of the accessible route. • Grades should be minimized to 5%, with cross slopes less than 2%. • Accessible ramps need to have a grade between 5 and 8%.

Criteria	Strategies
Width and Height Operating Envelope	• Minimum of 1.8 m width to allow passing of two wheelchair concurrently. Less width may be allowed in constrained locations, requiring wheelchair stop and let pass. 1.8 m is sufficient operating width for pedestrians. • Minimum of 2.1 m vertical clearance is needed for pedestrians.
Wheelchair Turning and Landing Area	• 2.1 m by 2.1 m is needed for a manual wheelchair, but larger landing areas can accommodate powered wheelchairs and scooters.

Tactile Walking Surface Indicators	• Used to inform people visually and by contact with a cane of foot the presence of a hazard, for example
	  • To differentiate between a sidewalk and a roadway
	  • To indicate a change in direction of the accessible route.

A detailed follow-up study is recommended to review the accessibility of the Downtown Core to ensure pedestrian and accessibility requirements are met, including:

- **Travel Path:** Widen and replace existing sidewalks and pathways that do not meet the minimum 1.8 m width. For reference the minimum city sidewalk standard is a 1.5 m for collectors and locals, except 2.5 m for sidewalks along bike path system.
- **Tactile Warning Surface Indicators (TWSI):** The City should consider reviewing the network to identify importation locations for implementing TWSIs. The City should engage with representatives of the accessible community to gather their feedback.
- **Curb Ramps:** Where there are missing curb ramps, these should be installed. The design and construction of ramps should direct people perpendicularly across the street through separate ramps for each direction (e.g. two on each corner) and the curb ramps should be built with a TWSI.

Optimize Parking Solutions

Parking strategies that support easier access for both residents and visitors are summarized as follows:

- **Shared Parking with New Development:** Encourage development to leverage the shared parking regulation of the Land Use Bylaw (C4.3) to allow more users to stop at more businesses from a single parking stall. Allowing shared parking for the Downtown Core can enhance parking efficiency, reduce the need for additional parking infrastructure, and support a pedestrian-friendly environment.
- **Conduct a Downtown Core Parking Study:** Conduct a parking study to understand the existing parking supply and demand and identify opportunities to improve parking utilization for the Downtown Core. A parking study typically includes the following scope items:
  - Parking Survey – Inventory current parking supply, demand and illustrate results on a map showing parking utilization geographically. Survey will also quantify the peak parking utilization, which is typically much lower than perceived because some areas are mode in demand.
  - Assess - Evaluate parking turnover to identify high-demand areas and any underutilized spaces. Analyze opportunities for shared and flexible parking arrangements to maximize resource use.
  - Recommend strategies for improved parking management, which could include the following

- Maximum time limits (to encourage turnover),
- Parking pricing,
- Improved connectivity between under utilized parking areas and high demand destinations,
- Developing a new off-street public parking area,
- Lowering parking requirements for new businesses (to reduce development costs) if there is a large parking surplus,
- Enhanced wayfinding using signage to direct drivers to available parking,
- Enhanced wayfinding for pedestrians to connect from parking areas further from the core to destinations,
- Additional bike parking, placed at secure locations and important destinations to encourage more people to travel to downtown by bike.

- Engagement - Consult with visitors and businesses to understand their input to any changes.

Intersection Improvements

Intersection traffic controls were reviewed and a summary of the results are as follows:

- **Signalization, Improvement Requirements:** The Downtown Core intersections were assessed as part of the future roadway network review at the 25-year horizon and no operational issues were found to warrant upgrades from the all-way stops to traffic signalization. The existing traffic controls, intersection geometry and number of lanes are sufficient to accommodate existing and future growth.
- **Pedestrian Crossings:** Options to improve pedestrian mobility in the Downtown Core include improving crossings at intersections. Through site observations it was found that pedestrian crossings at all-way stop are difficult to view from a driver's perspective and could be improved by adding a curb extension at these crossings.

8.0 Opinion of Probable Cost

Class 5 (order of magnitude) opinions of probable cost were prepared to provide an estimate order of magnitude for potential future transportation infrastructure costs. The Class 5 cost estimates can be used to update and coordinate with other infrastructure budgeting tools to assist in planning budgets on a City-wide scale for future transportation studies, designs, and capital construction projects. Future transportation studies and designs would provide the more detailed estimates required to continually review and update the off-site levy bylaw, or to budget and implement individual projects. The cost estimate of the recommended improvements, studies, and operational reviews for each horizon are summarized in the table below.

Table 8.1 Recommended Improvements, Studies, and Operational Review Costs by Horizon

Roadway / Location	#	Section / Study	Description	Cost Estimate
Recommended Improvements by 5-Year Horizon				
Highway 28	1	At 25 Street	Add SBL turn bay (rural)	$90,000
	2	At 75 Avenue	Monitor for safety and operations	$0
Veterans Way	3	At 57 Street	Monitor for safety and operations	$0
	4	At 59 Street	Monitor for safety and operations	$0
	5	Highway 28 to west boundary	Operational Review	$75,000
West Bypass	6	Functional Planning Study	Assessment of the timing, alignment, cost, and other items related to the west bypass.	$200,000
Downtown Core	7	Parking Study	Detailed assessment of parking downtown. Could be completed as a separate study or part of a future Downtown Redevelopment Plan.	$25,000
City-Wide	8	Transit Services Study	Comprehensive review of services (fares, revenue, ridership). Considerations for adding an express bus connecting existing routes to CFB.	$75,000
Location Varies	9	Varies	In-service road safety review (Assumed 1-2 per year, 8 for estimate, $20,000 each)	$160,000
			Total	**$625,000**
Recommended Improvements by 10-Year Horizon				
Highway 28	1	At 25 Street	Traffic Signal	$500,000
	2	At 40 Avenue	Add NBL and SBL turn bays (rural)	$180,000
	3	At 34 Avenue	Add NBL and SBL turn bays (rural)	$180,000
	4	At 75 Street	Monitor for safety and operations	$0
Veterans Way	5	At 59 Street	Traffic signal, add EBL and WBL turn bays. (rural)	$702,000
	6	At 57 Street	Add EBL and WBL turn bays. Monitoring for safety and operations - not included in cost. (rural EB, urban WB)	$149,000
	7	57 Street to 59 Street	Study to support future widening.	$100,000
Location Varies	8	Varies	In-service road safety review (Assumed 1-2 per year, 8 for estimate)	$160,000

Roadway / Location	#	Section / Study	Description	Cost Estimate
City-Wide	9	Transportation Master Plan Update	Recommended to be updated every 5-10 years.	$200,000
			Total	**$2,171,000**
Recommended Improvements by 15-Year Horizon				
Veterans Way	1	57 Street to 59 Street.	Widen from 2 lanes to four lanes (urban)	$840,000
Veterans Way	2	At 75 Avenue	Monitor for safety and operations	$0
Highway 28	3	At 46 Avenue	Monitor for safety and operations	$0
Highway 28	4	At 40 Avenue	Monitor for safety and operations	$0
Highway 28	5	At 57 Street	Monitor for safety and operations	$0
Location Varies	6	Varies	In-service road safety review (Assumed 1-2 per year, 8 for estimate)	$160,000
			Total	**$1,000,000**
Recommended Improvements by 20-Year Horizon				
16 Street	1	16 Avenue to 75 Avenue	Paving (urban)	$5,120,000
16 Street	2	75 Avenue to 50 Avenue	New 2 lane extension (rural)	$3,960,000
West Bypass	3	Extent of future bypass from 69 Avenue to west of 59 Street.	2 lane bypass (rural)	$4,200,000
Highway 28	4	42 Avenue - ~200 m south of 34 Avenue	Widen from 2 to 4 lanes (urban)	$4.200,000
Highway 28	5	At English Bay Road	Traffic signal	$500,000
Highway 28	6	At Energy Centre	Add EBL and WBL turn bays (rural)	$202,000
Highway 28	7	At 75 Avenue	Traffic signal, add EBL and WBL turn bays (rural)	$680,000
Highway 28	8	At 46 Avenue	Convert to 3-way intersection (remove east right-in right-out) and construct a right-in right-out to the south per FDS. (urban)	$486,000
Highway 28	9	At 40 Avenue	Traffic signal	$500,000
Highway 28	10	At 34 Avenue	Traffic signal	$500,000
Highway 55	11	English Bay Road	Traffic signal	$500,000
Location Varies	12	Varies	In-service road safety review (Assumed 1-2 per year, 8 for estimate)	$160,000
City-Wide	13	Transportation Master Plan Update	Recommended to be updated every 5-10 years.	$200,000
			Total	**$21,208,000**
Recommended Improvements by 25-Year Horizon				
Highway 28	1	At 46 Avenue	Traffic signal	$500,000
Location Varies	2	Varies	In-service road safety review (Assumed 1-2 per year, 8 for estimate)	$160,000
			Total	**$660,000**
			Grand Total All Improvements in All Horizons (Rounded)	**$25,664,000**

9.0 Engagement

9.1 How We Engaged

Engagement happened during Winter 2024 using two in-person open houses and an online survey. The following is a summary of engagement:

- **Open Houses:** Two open houses were hosted at the Cold Lake Energy Centre on December 5, 2024. The first ran from 1 – 3 p.m. for stakeholders and the second from 5 – 7 p.m. for the public. The project team shared information about community transportation problems, possible solutions, and the project process. Information was shared using display boards and in-person conversations. 10 participants attended the stakeholder open house. 10 participants attended the public open house.
- **Public Survey:** A survey sought to understand participant feelings about the adequacy of existing transportation infrastructure and any improvements they felt were necessary. The survey was online, with paper surveys available at the open houses. The survey was open between December 5 and 19, 2024. 14 people participated in the survey.

The open house and online survey were promoted through the following channels:

- The City's website
- The City's social media channels
- Local newspaper
- Direct letter/e-mail invitations sent by the City to local stakeholders

9.2 High-Level Themes

The following high-level themes were gathered from engagement.

- Moderate satisfaction with walking in Cold Lake.
- Pedestrian crossing safety was flagged as a significant issue.
- Personal safety was a concern when walking due to presence of community members who are unhoused.
- Desire for more trails for biking, scootering and rolling.
- Better trail maintenance needed, especially for those with mobility limitations.
- Pathway inclines might also be an issue for users with mobility issues.
- Desire for better transit service.
- Speeding, reckless drivers are a concern.
- Drivers are mostly satisfied with driving in Cold Lake.
- Concern about traffic on Veterans way impacting nearby schools.
- Connections between areas by sidewalk and other trails are sufficient.
- Minor concern about the impact free transit is having on tax revenue spending.

The detailed "What We Heard" report is provided in **Appendix H**.

10.0 Summary and Conclusions

The City of Cold Lake Transportation Master Plan serves as an update to the previous 2012 Transportation Plan, reflecting the City's current goals, values, and plans for future growth. It provides a framework for Council and Administration to plan for short- and long-term transportation network improvements to ensure residents continue to have a variety of reliable options for getting around as the City develops over the next 25 years. To this end, the study provides a framework of infrastructure improvements and studies recommended, including a detailed prioritization and implementation plan for projects in five year intervals. Specific subject areas are summarized below.

Land Use Projections

The development areas were selected with input from the City, reflecting current policy directions, market trends, and anticipated large-scale projects, such as the planned expansion of CFB 4 Wing. The City's Municipal Development Plan (MDP) and other recent policy documents highlight a key growth objective: to consolidate Cold Lake as a unified, complete community. Given the ongoing fragmentation between Cold Lake North and Cold Lake South, efforts are expected to focus on bridging these gaps and enhancing development continuity. Future development is concentrated east of Highway 28, continuing to strengthen the connection between the north and south while also being more cost effective than west of the Highway due to servicing constraints.

Traffic Analysis Summary

The existing and future traffic capacity analysis was completed in a two-phase approach using VISUM and Synchro traffic modeling software. First, VISUM travel demand models were created of the 15- and 25-year models. To develop the future travel demand models, existing trip generation rates were projected onto the future growth areas to estimate each future horizon's intersection traffic volumes. In is noted that a travel demand model was developed for the 15-year and 25-year horizons; the traffic volumes of the remaining three interim horizons were developed through interpolation of intersection turning volumes between the modelled existing, 15-year, and 25-year horizons.

Volume to capacity ratio outputs from the 15-year and 25-year VISUM models were used to identify the need for major network improvements, such as new arterial connections or twinning existing corridors. As a result, it was determined that no major network improvements would be required by the 15-year horizon. Partial twinning of Highway 28 south, a west bypass from 69 Avenue to Glenwood Drive, and the extension of 16 Street from 16 Avenue to 50 Avenue were added to the 25-year horizon model to accommodate future demands. These network improvements align with the City's previous Transportation Plan and/or other studies.

Intersection-level analysis was completed once the ultimate 15- and 25-year roadway networks were finalized. The need for improvements such as additional turning lanes or traffic signals in the 5-, 10-, 15-, 20-, and 25-year horizons were then identified using Synchro traffic modeling software.

10.1 Summary and Conclusions (Other Areas of Review)

Beyond the traffic analysis, the project included review of road safety, collisions, speeds, traffic calming, transit, trucks and dangerous goods routes, downtown urban design and the Highway 28 Functional Plan. The following summary and conclusions are provided in the following subsections.

Road Safety Review

A road safety review was completed, encompassing collision history, existing speed limits, and traffic calming. The data review ranged from 2016 to 2021, inclusive. Overall, the data represented 1,236 records involving 2,488 road users. A 40% reduction in collisions was noted since 2016, which could be related to reduced travel in 2020 and 2021. Collisions are 45% higher in November to March, compared to April to October, likely because of the roadway conditions changes. Overall, 93% of collisions are property damage only, while 7% involved injury. To understand specific causes of collisions and generate potential mitigation solutions, it is recommended that the City complete an in-service road safety review at two (2) intersections per year on an ongoing basis, starting where collisions were noted as higher.

Speed Limit Review

While a full review of the roadway network posted speeds was not included as part of the TMP, the current speed limits were reviewed based on the current classification and local conditions. The following is noted:

- Many of the roadways downtown would likely meet the CGESPL criteria for a posted speed of 40 km/h if they were considered minor collector roadways. Contributing risk factors include the density of 4-way stop controlled intersections, well utilized on-street parking, marked pedestrian crossings, and prevenance of roadside hazards such as utility poles, street lighting, trees, and other decorative features.
- Posted speeds on Highway 28, Highway 55, and Veterans Way are likely appropriate as access along these corridors is generally restricted to side-streets or access roads.

A City-wide posted speed limit review is recommended in the future once the City undergoes a significant portion of projected 15-year horizon development. One consideration is that Cold Lake North is expected to experience significant growth within the next 15 years. The City should consider lowering the posted speeds on 25 Street and English Bay Road from 60 km/h to 50 km/h or 40 km/h as appropriate with development.

Traffic Calming Review

Traffic calming work was focused on exploring potential strategies and identifying relevant guidance which could be applied to certain example streets in the City. Examples include 51 Avenue because of speed concerns due to the downhill grade, 45 Street because of potential demand for this route to function as a bypass around South Cold Lake and 47 Avenue because it offers a bypass around Veterans Way, especially because this area will become more congested and subject to future construction delays. Strategies for traffic calming are to control speeds, and guidance is provided from the Transportation Association of Canadian Traffic Calming Guide. Typical examples of traffic calming are curb extensions, which standardize lane widths at intersections (with a minor loss of parking), improve sightlines and produce an expected speed reduction. Another example is a raised crosswalk, which is an 80 mm vertical deflection over a 2 m length and considered suitable for emergency vehicles and snow clearings and have an expected speed reduction. These measures could be added (amongst others in the guide) to the noted routes and others as needed.

Transit Services Review

The transit scope included a high level review of the two existing transit services which are provided free of charge and offering 50 minutes' headway. Overall, our review found the routes to be highly connected across the network, matching existing travel patterns based on the travel information used in the travel demand modelling. Recommendations for transit include consideration for connecting the local transit routes with an express route connecting between North and South Cold Lake, with limited stop and higher frequency, such as 10 to 20 minutes. It is also suggested the City consider offering lower headways and higher frequency because the 50 minute headway can be a barrier to some people that would like to be able to travel at more frequent times. In low ridership areas of the routes the City could also consider replacing these with on-demand service, which allows passengers to travel between a fixed route service and a virtual stop placed in the low ridership area. Because the subject project only included a high level review of these items at a high level, it is recommended that the City complete a comprehensive transit services review and grant funding may be available from the Federal Government to complete the review and terms of reference are provided in **Table 7.1**.

Trucks and Dangerous Goods Routes Review

There is no formal truck and dangerous goods routes in the City. Potential routes for designation include the existing highways, including Veterans Way and Highway 28. A future route that connects from Range Road 23 to 34 Avenue was noted as a potential alternative to avoid developed areas of the downtown. Establishing a truck and dangerous goods routes formally is an important input for future growth of the city, such as allowing buffers and planning intersection geometry for truck movements.

Highway 28 Functional Design Study (FDS) Review

The FDS was reviewed using the projected volumes from this study. Overall, the FDS recommendations align with the findings of the TMP, with some minor geometric changes (adding turn lanes to side streets) as noted in **Table 7.3**. Some upgrades have already been completed, which are slightly modified compared to the FDS, but no changes are needed as these accommodate projected traffic volumes. The only change would be to the south since the Functional Study does not consider industrial growth in the Red Fox Commercial Outline Plan south of 34 Avenue. Given this is a significant employment growth area, we recommend that the City revisit the plan to consider the access locations and configurations in the Red Fox development area.

Urban Design Review

Urban Design Review was focused on Downtown as defined in the MDP, including a gaps review of the existing pedestrian network, accessibility, parking and traffic controls. The following is recommended:

- **Sidewalk Network:** 85% of the downtown is covered by an existing sidewalk network. The remaining 15% should be filled in and can be completed through a sidewalk program and/or with redevelopment. Missing sidewalks are shown on **Figure 7.2**.
- **Accessibility:** Accessibility requirements are provided in **Table 7.4**. To improve accessibility the following is recommended:
  - **Travel Path:** Widen and replace existing sidewalks and pathways that do not meet the minimum 1.8 m width. For reference the minimum city sidewalk standard is a 1.5 m for collectors and locals, except 2.5 m for sidewalks along bike path system.

- **Tactile Warning Surface Indicators (TWSI):** The City should consider reviewing the network to identify importation locations for implementing TWSIs. The City should engage with representatives of the accessible community to gather their feedback.
- **Curb Ramps:** Where there are missing curb ramps, these should be installed. The design and construction of ramps should direct people perpendicularly across the street through separate ramps for each direction (e.g. two on each corner) and the curb ramps should be built with a TWSI.

- **Parking:** Parking strategies that support easier access for both residents and visitors are summarized as follows:
  - **Shared Parking with New Development:** Encourage development to leverage the shared parking regulation of the Land Use Bylaw (C4.3) to allow more users to stop at more businesses from a single parking stall. Allowing shared parking for the Downtown Core can enhance parking efficiency, reduce the need for additional parking infrastructure, and support a pedestrian-friendly environment.
  - **Conduct a Downtown Core Parking Study:** The scope of work excluded a detailed parking study. Therefore, it is recommended that a detailed parking study be completed to understand the existing parking supply and demand and identify opportunities to improve parking utilization for the Downtown Core. Terms of reference for the parking study are provided in **Section 7.4**.
- **Traffic Controls:** The existing intersections in the downtown were reviewed based on the future travel demand projected in this study. They can be maintained as all-way stops and will support future needs. It is recommended these intersection be improved by adding intersection curb extensions to improve sightline conditions for drivers to observe the stop signs and pedestrian crossings, which were observed to be obstructed by parked vehicles.

10.2 Recommended Transportation Network Improvements

The recommended road network improvements from the capacity analysis, as well as studies to support future infrastructure investment following the recommendations of the various other TMP subject areas, are summarized in the table below.

Table 10.1 Recommended Transportation Improvements and Studies, Horizon and Cost

Roadway / Location	#	Section / Study	Description
Recommended Improvements by 5-Year Horizon - $625,000			
Highway 28	1	At 25 Street	Add SBL turn bay (rural)
	2	At 75 Avenue	Monitor for safety and operations
Veterans Way	3	At 57 Street	Monitor for safety and operations
	4	At 59 Street	Monitor for safety and operations
	5	Highway 28 to west boundary	Operational Review
West Bypass	6	Functional Planning Study	Assessment of timing, alignment, cost, and other items related to the west bypass.
Downtown Core	7	Parking Study	Detailed assessment of parking downtown. Could be completed as a separate study or part of a future Downtown Redevelopment Plan.
City-Wide	8	Transit Services Study	Comprehensive review of services (fares, revenue, ridership). Considerations for adding an express bus connecting existing routes to CFB.
Location Varies	9	Varies	In-service road safety review (Assumed 1-2 per year, 8 for estimate)
Recommended Improvements by 10-Year Horizon - $2,171,000			
Highway 28	1	At 25 Street	Traffic Signal
	2	At 40 Avenue	Add NBL and SBL turn bays (rural)
	3	At 34 Avenue	Add NBL and SBL turn bays (rural)
	4	At 75 Street	Monitor for safety and operations
Veterans Way	5	At 59 Street	Traffic signal, add EBL and WBL turn bays (rural)
	6	At 57 Street	Add EBL and WBL turn bays. Monitoring for safety and operations - not included in cost. (rural EB, urban WB)
	7	57 Street to 59 Street	Study to support future widening.
Location Varies	8	Varies	In-service road safety review (Assumed 1-2 per year, 8 for estimate)
City-Wide	9	Transportation Master Plan Update	Recommended to be updated every 5-10 years.
Recommended Improvements by 15-Year Horizon - $1,000,000			
Veterans Way	1	57 Street to 59 Street.	Widen from 2 lanes to four lanes (urban)
Veterans Way	2	At 75 Avenue	Monitor for safety and operations
Highway 28	3	At 46 Avenue	Monitor for safety and operations
Highway 28	4	At 40 Avenue	Monitor for safety and operations
Highway 28	5	At 57 Street	Monitor for safety and operations
Location Varies	6	Varies	In-service road safety review (Assumed 1-2 per year, 8 for estimate)
Recommended Improvements by 20-Year Horizon - $21,208,000			

Roadway / Location	#	Section / Study	Description
16 Street	1	16 Avenue to 75 Avenue	Paving (urban)
16 Street	2	75 Avenue to 50 Avenue	New 2 lane extension (rural)
Cold Lake South	3	Extent of future bypass from 69 Avenue to west of 59 Street.	2 lane bypass (rural)
Highway 28	4	42 Avenue - ~200 m south of 34 Avenue	Widen from 2 to 4 lanes (urban)
Highway 28	5	At English Bay Road	Traffic signal
Highway 28	6	At Energy Centre	Add EBL and WBL turn bays (rural)
Highway 28	7	At 75 Avenue	Traffic signal, add EBL and WBL turn bays (rural)
Highway 28	8	At 46 Avenue	Convert to 3-way intersection (remove east right-in right-out) and construct a right-in right-out to the south per FDS. (urban)
Highway 28	9	At 40 Avenue	Traffic signal
Highway 28	10	At 34 Avenue	Traffic signal
Highway 55	11	English Bay Road	Traffic signal
Location Varies	12	Varies	In-service road safety review (Assumed 1-2 per year, 8 for estimate)
City-Wide	13	Transportation Master Plan Update	Recommended to be updated every 5-10 years.
Recommended Improvements by 25-Year Horizon - $660,000			
Highway 28	1	At 46 Avenue	Traffic signal
Location Varies	2	Varies	In-service road safety review (Assumed 1-2 per year, 8 for estimate)
Grand Total All Improvements in All Horizons (Rounded) = $25,664,000			

APPENDIX A
Existing Population and Employment

Appendix A: Current Employment by Land Use and Traffic Analysis Zone (TAZ)

TAZ	SINGLE FAMILY RES (HA)	MULTI FAMILY RES (HA)	TOTAL DWELLINGS	SINGLE FAMILY DWELLINGS	MULTI FAMILY DWELLINGS	POPULATION
101	23.89	0.00	16	16	0	40
102	13.41	0.00	58	58	0	144
103	13.65	0.00	116	116	0	288
104	0.00	0.00	0	0	0	0
105	21.74	0.00	147	147	0	364
106	5.23	0.00	78	78	0	194
107	0.00	0.00	0	0	0	0
108	0.00	0.00	0	0	0	0
109	18.97	1.01	427	170	256	1,058
110	39.14	0.24	540	474	66	1,339
111	18.72	0.29	266	212	53	658
112	3.84	0.00	4	4	0	0
113	12.26	0.00	107	107	0	266
114	0.00	0.00	0	0	0	0
115	0.30	0.00	0	0	0	0
116	0.00	0.00	0	0	0	0
117	0.22	0.00	0	0	0	0
118	0.96	0.31	129	11	118	319
119	40.48	2.19	664	499	164	1,647
120	7.02	0.00	85	85	0	210
121	0.00	0.00	0	0	0	0
122	0.00	0.00	0	0	0	0
123	3.83	0.00	0	0	0	0
124	22.98	0.00	281	281	0	697
125	19.06	0.00	236	236	0	586
126	0.00	0.00	0	0	0	0
127	0.00	0.00	0	0	0	0
128	0.00	0.00	0	0	0	0
129	0.00	0.00	0	0	0	0
130	0.20	0.00	0	0	0	0
201	0.00	0.00	0	0	0	0
202	2.18	0.75	0	0	0	0
203	0.00	0.00	0	0	0	0
204	0.00	0.00	0	0	0	0
205	0.00	0.00	0	0	0	0
206	20.99	1.27	429	273	156	1,064
207	0.00	0.00	0	0	0	0
208	0.00	0.00	0	0	0	0
209	0.00	0.00	0	0	0	0
210	33.48	0.00	395	395	0	980
211	0.01	0.00	0	0	0	0
212	30.11	0.18	382	367	15	947
213	12.37	0.00	155	155	0	385
214	14.67	2.03	325	191	134	807

TAZ	SINGLE FAMILY RES (HA)	MULTI FAMILY RES (HA)	TOTAL DWELLINGS	SINGLE FAMILY DWELLINGS	MULTI FAMILY DWELLINGS	POPULATION
215	19.64	1.26	406	248	158	1,007
216	29.11	0.00	366	366	0	909
217	0.00	0.00	0	0	0	0
218	0.00	0.00	0	0	0	0
219	6.93	0.14	126	84	43	313
220	12.04	0.00	0	0	0	0
221	19.17	0.35	19	19	1	48
222	0.67	0.00	8	8	0	19
223	18.17	0.00	236	236	0	586
224	0.14	0.00	0	0	0	0
225	0.00	0.00	0	0	0	0
226	0.00	0.00	0	0	0	0
227	0.00	0.00	0	0	0	0
228	4.70	0.24	0	0	0	0
229	0.00	0.00	0	0	0	0
230	0.00	0.00	0	0	0	0
231	0.00	0.00	0	0	0	0
232	18.00	0.00	48	48	0	120
233	0.00	0.00	0	0	0	0
234	0.00	0.00	0	0	0	0
235	0.00	0.00	0	0	0	0
401	0.00	0.00	0	0	0	0
402	0.00	0.00	0	0	0	0
TOTAL	**508.30**	**10.26**	**6,049**	**4,886**	**1,163**	**14,995**

Appendix A: Current Employment by Land Use and Traffic Analysis Zone (TAZ)

TAZ	COMMERCIAL RETAIL (HA)	COMMERCIAL RETAIL (JOBS)	COMMERCIAL NON-RETAIL (HA)	COMMERCIAL NON-RETAIL (JOBS)	INDUSTRIAL (HA)	INDUSTRIAL (JOBS)	INSTITUTIONAL (HA)	INSTITUTIONAL (JOBS)	Jobs
101	0.00	0	0.00	0	0.00	0	0.04	1	1
102	0.00	0	0.00	0	0.00	0	0.06	1	1
103	0.00	0	0.00	0	0.00	0	0.03	1	1
104	0.00	0	0.00	0	0.33	17	0.00	0	17
105	0.00	0	0.00	0	0.00	0	2.11	12	12
106	0.00	0	0.00	0	0.00	0	0.53	3	3
107	0.00	0	0.00	0	0.81	41	0.00	0	41
108	0.00	0	0.00	0	0.00	0	0.00	0	0
109	1.13	40	0.00	0	0.00	0	9.56	53	93
110	0.32	12	0.00	0	0.00	0	7.35	41	53
111	4.18	146	0.00	0	0.00	0	3.96	22	168
112	0.15	6	0.00	0	0.00	0	0.00	0	6
113	0.00	0	0.00	0	0.00	0	0.84	5	5
114	0.00	0	0.00	0	0.00	0	0.00	0	0
115	0.00	0	0.00	0	0.00	0	0.00	0	0
116	0.37	13	1.47	17	0.00	0	0.00	0	30
117	1.44	50	5.75	65	0.00	0	0.11	1	116
118	0.58	21	1.35	16	0.00	0	4.65	26	63
119	3.95	138	0.00	0	0.00	0	0.80	5	143
120	0.00	0	0.00	0	0.00	0	4.58	26	26
121	0.00	0	0.00	0	3.29	166	0.00	0	166
122	0.00	1	0.01	1	0.00	0	4.99	28	30
123	0.00	0	0.00	0	0.00	0	0.00	0	0
124	0.00	0	0.00	0	0.00	0	5.61	31	31
125	0.00	0	0.00	0	0.00	0	10.45	58	58
126	0.00	0	0.00	0	0.07	4	0.00	0	4
127	0.00	0	0.00	0	0.00	0	61.71	338	338
128	0.00	0	0.00	0	0.00	0	0.00	0	0
129	0.00	0	0.00	0	0.00	0	0.00	0	0
130	0.00	0	0.00	0	0.00	0	0.00	0	0
201	0.00	0	0.00	0	0.00	0	0.00	0	0
202	2.11	14	6.69	24	0.00	0	4.81	27	65
203	0.00	0	0.00	0	0.00	0	0.29	2	2
204	0.00	0	0.00	0	0.00	0	9.37	52	52
205	0.00	0	0.00	0	0.00	0	0.00	0	0
206	3.56	184	13.53	205	0.00	0	2.86	16	405
207	0.00	0	0.00	0	0.00	0	1.17	7	7
208	0.34	12	1.37	16	1.14	58	0.00	1	87
209	1.66	58	6.62	75	3.17	160	0.00	0	293
210	0.07	3	0.29	4	0.12	7	3.11	18	32
211	0.00	0	0.00	0	0.00	0	0.00	0	0
212	0.00	0	0.00	0	0.00	0	5.09	28	28
213	0.71	25	2.83	32	0.00	0	5.84	32	89
214	4.00	139	4.34	49	0.00	1	0.53	3	192

TAZ	COMMERCIAL RETAIL (HA)	COMMERCIAL RETAIL (JOBS)	COMMERCIAL NON-RETAIL (HA)	COMMERCIAL NON-RETAIL (JOBS)	INDUSTRIAL (HA)	INDUSTRIAL (JOBS)	INSTITUTIONAL (HA)	INSTITUTIONAL (JOBS)	Jobs
215	2.58	90	0.00	0	0.00	1	5.55	31	122
216	0.00	0	0.00	0	0.00	0	2.94	17	17
217	0.00	0	0.00	0	0.00	0	0.00	0	0
218	0.00	0	0.00	0	0.00	0	0.00	0	0
219	0.00	0	0.00	0	0.08	5	4.65	26	31
220	0.00	0	0.00	0	0.00	0	0.00	0	0
221	1.52	83	6.08	109	4.08	206	13.77	76	474
222	3.53	123	0.32	4	0.00	0	0.18	1	128
223	3.27	114	7.80	89	0.00	0	0.96	6	209
224	0.00	0	0.00	0	0.00	0	0.03	1	1
225	0.00	0	0.00	0	0.00	0	0.00	0	0
226	0.00	0	0.00	0	0.00	0	0.00	0	0
227	0.00	0	0.00	0	0.00	0	0.00	0	0
228	2.71	64	10.82	83	0.00	0	0.00	0	147
229	3.53	123	14.13	160	0.00	0	20.23	111	394
230	0.00	0	0.00	0	0.00	0	0.06	1	1
231	0.00	0	0.00	0	0.00	0	0.00	0	0
232	0.01	1	0.05	1	0.00	0	0.07	1	3
233	0.00	0	0.00	0	0.00	0	0.92	6	6
234	0.00	0	0.00	0	0.00	0	0.00	0	0
235	0.00	0	0.00	0	0.00	0	11.25	62	62
401	0.00	0	0.00	0	0.00	0	0.00	0	0
402	0.00	0	0.00	0	0.00	0	0.00	0	0
TOTAL	**41.73**	**1,460**	**83.44**	**950**	**13.10**	**666**	**211.03**	**1,177**	**4,253**

APPENDIX B
PM Peak Volumes

Appendix B: Existing PM Peak Hour Traffic Volume

Intersection	Eastbound			Westbound			Northbound			Southbound		
	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
10 St & 8 Ave	50	110	60	37	100	17	40	52	60	15	51	50
16 St & 8 Ave	238	198	79	6	150	35	60	39	6	21	32	170
Hwy 28 & 25 St	220	500			320	60				30		151
Hwy 28/55/Hwy 28 & Highway 55/16 Ave	83	85	173	95	37	49	113	590	219	40	410	30
Hwy 28/55 & Energy Centre	10	10	10	131	10	111	10	800	72	61	620	10
Hwy 28/55 & 75 Ave	9	2	39	10	4	1	44	890	30	10	720	20
Hwy 28/55 & 69 Ave				70		162		803	46	161	581	
Hwy 28/55 & Tri-City Mall Access				233		112		990	266	60	590	
Hwy 28/55 & 62/61 Ave				103		105		1,160	201	82	760	
Hwy 28/55	0	0	10	0	0	40	0	1,320	10	0	870	10
Hwy 28/55 & 54 Ave	60	51	31	71	61	260	31	940	61	163	700	61
Hwy 28/55 & 52 Ave	30	30	10	50	30	55	70	940	80	140	600	60
Hwy 28/55 & Centre Ave/50 Ave	390	330	180	40	190	190	140	500	10	150	390	140
52 St & Hwy 28/55	40	510	50	98	550	42	23	10	66	40	8	60
Hwy 28/55 & 50 St				239		144		490	188	200	420	
Hwy 28/55 & 46 Ave	11	0	34	0	0	10	33	660	32	0	640	10
Hwy 28/55 & 43 Ave	100	29	35	114	49	100	19	510	67	150	430	100
Hwy 28/55 & 40 Ave	0	0	0	0	0	0	0	0	0	0	0	0
Hwy 28/55 & 34 Ave	0	0	0	0	0	0	0	0	0	0	0	0
50 Ave/Twp Rd 630 & 41 St	72	168			106	8				14		38
50 Ave & 45 St	34	261	35	7	146	4	14	3	14	9	4	15
51 St & 50 Ave	120	230	20	8	270	50	28	28	23	80	32	80
52 St & 50 Ave	80	300	30	20	290	70	26	31	24	50	35	90
57 St & Centre Ave	44	820	17	40	400	40	5	6	30	30	10	20
59 St & Centre Ave	45	840	17	1	390	30	5	5	7	17	5	6
Kingsway & Glenwood	170	680			280	120				160		1
Queensway & Kingsway	3	190	0	24	61	70	3	57	270	120	9	2

Appendix B: 15 Year PM Peak Hour Traffic Volume

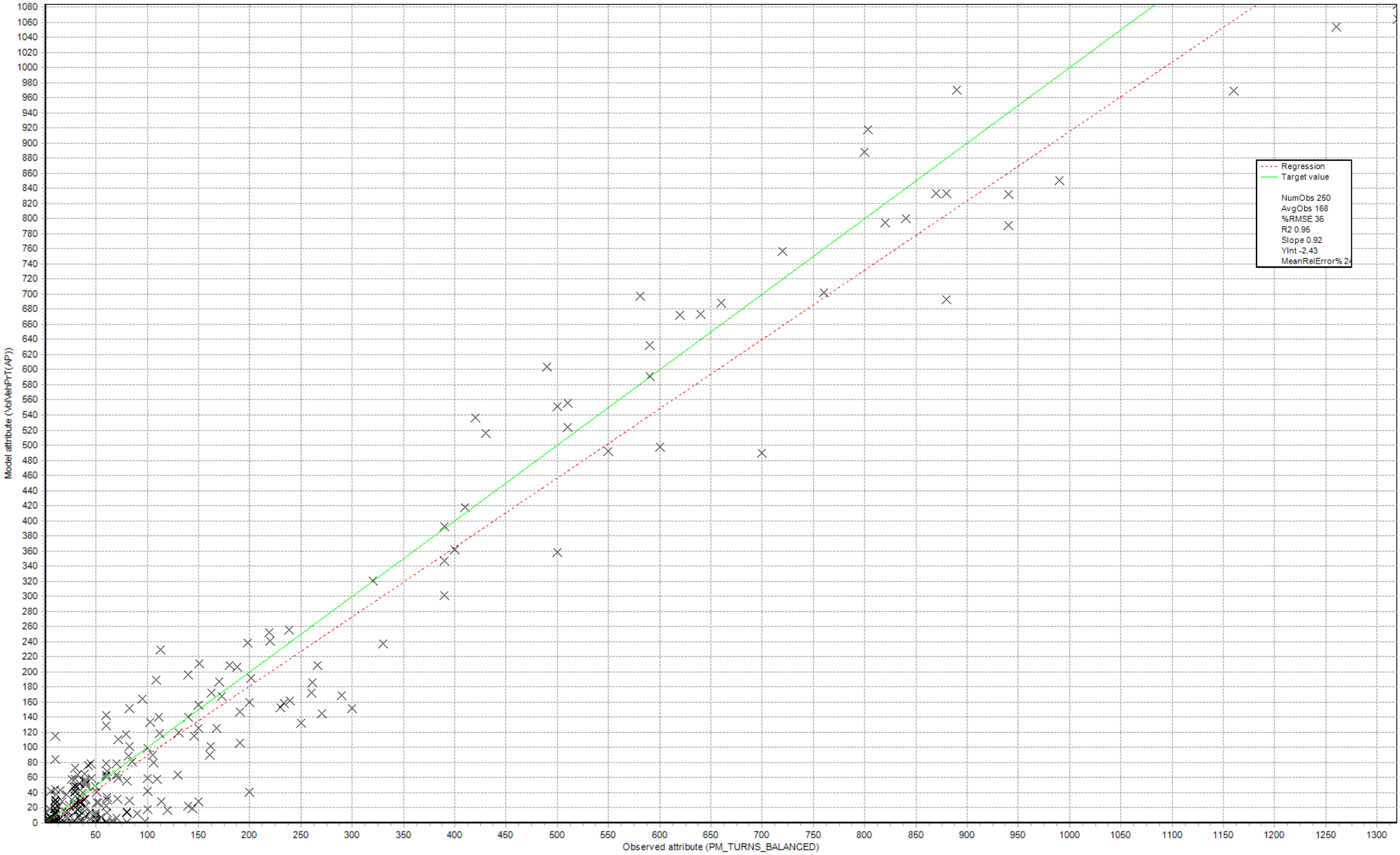
Intersection	Eastbound			Westbound			Northbound			Southbound		
	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
10 St & 8 Ave	20	62	150	10	47	10	83	21	10	10	25	10
16 St & 8 Ave	268	304	192	10	198	37	149	103	10	44	95	206
Hwy 28 & 25 St	372	714			268	209				173		522
Hwy 28/55/Hwy 28 & Highway 55/16 Ave	92	96	154	196	114	50	324	945	290	135	615	41
Hwy 28/55 & Energy Centre	51	0	11	122	0	197	4	1,310	107	108	849	9
Hwy 28/55 & 75 Ave	26	1	15	13	0	19	17	1,376	44	46	916	20
Hwy 28/55 & 69 Ave				167		199		1,239	155	184	764	
Hwy 28/55 & Tri-City Mall Access				154		142		1,241	194	168	762	
Hwy 28/55 & 62/61 Ave				126		101		1,334	177	93	822	
Hwy 28/55 & 57 Ave	0	0	0	0	0	85	0	1,414	16	0	951	0
Hwy 28/55 & 54 Ave	94	22	39	46	31	210	26	1,109	21	175	593	44
Hwy 28/55 & 52 Ave	2	13	63	17	19	7	69	1,147	8	27	605	46
Hwy 28/55 & Centre Ave/50 Ave	738	282	147	13	207	67	205	418	20	49	322	313
52 St & Hwy 28/55	18	594	8	5	629	81	9	4	5	57	3	5
Hwy 28/55 & 50 St				164		28		736	211	50	605	
Hwy 28/55 & 46 Ave	41	0	40	0	0	129	42	777	16	0	739	30
Hwy 28/55 & 43 Ave	71	5	6	45	3	140	3	624	20	162	598	23
Hwy 28/55 & 40 Ave	90	37	2	29	17	71	7	486	14	69	444	40
Hwy 28/55 & 34 Ave	29	2	54	4	2	14	72	400	2	13	408	28
50 Ave/Twp Rd 630 & 41 St	59	160			94	2				3		28
50 Ave & 45 St	50	218	34	2	131	6	36	10	7	9	5	41
51 St & 50 Ave	23	192	17	6	167	12	23	48	17	54	12	18
52 St & 50 Ave	19	200	47	8	192	7	58	47	22	9	30	16
57 St & Centre Ave	72	1,022	10	34	546	53	8	6	27	5	5	10
59 St & Centre Ave	59	1,094	173	10	544	10	27	6	5	5	7	64
Queensway & Kingsway	3	190	0	24	61	70	3	57	270	120	9	2

Appendix B: 25 Year PM Peak Hour Traffic Volume

Intersection	Eastbound			Westbound			Northbound			Southbound		
	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
10 St & 8 Ave	10	65	140	10	43	10	71	30	5	10	22	10
16 St & 8 Ave	294	324	207	10	189	10	211	188	10	37	104	218
Hwy 28 & 25 St	422	877			324	223				153		627
Hwy 28/55/Hwy 28 & Highway 55/16 Ave	148	186	388	141	399	13	402	1,138	156	123	705	122
Hwy 28/55 & Energy Centre	138	29	58	169	13	107	82	1,451	223	79	1,023	137
Hwy 28/55 & 75 Ave	27	4	18	124	3	78	22	1,661	146	133	1,088	22
Hwy 28/55 & West Bypass/69 Ave	340	226	65	136	59	189	46	1,301	154	237	742	252
Hwy 28/55 & Tri-City Mall Access				131		194		1,297	165	244	698	
Hwy 28/55 & 62/61 Ave				32		208		1,255	83	210	619	
Hwy 28/55 and 57 Avenue	0	0	5	0	0	88	0	1,231	22	0	648	10
Hwy 28/55 & 54 Ave	93	20	38	40	42	38	35	1,036	21	131	411	53
Hwy 28/55 & 52 Ave	3	20	74	15	23	7	100	1,083	19	12	435	42
Hwy 28/55 & Centre Ave/50 Ave	526	295	350	27	223	21	296	656	20	39	411	74
52 St & Hwy 28/55	23	804	7	7	962	102	9	5	5	55	4	10
Hwy 28/55 & 50 St				299		10		1,146	495	26	836	
Hwy 28/55 & 46 Ave	39		51				67	1,602			1,107	29
Hwy 28/55 & 43 Ave	75	3	8	55	2	97	5	1,405	20	128	1,009	22
Hwy 28/55 & 40 Ave	128	25	19	30	10	60	5	1,243	43	61	843	85
Hwy 28/55 & 34 Ave	18	94	52	16	51	232	107	990	10	172	636	57
Hwy 28/55 and Landfill Road				44		49		483	9	34	458	
50 Ave & 41 St	109	83			31	1				2		26
50 Ave & 45 St	80	189	23	2	63	7	25	28	5	11	16	72
51 St & 50 Ave	41	178	15	6	138	21	15	85	14	64	13	15
52 St & 50 Ave	29	196	43	8	153	7	78	62	33	5	34	14
57 St & Centre Ave	64	998	10	39	397	56	7	7	35	3	5	5
59 St & Centre Ave	53	1,052	62	18	365	20	23	6	10	5	7	64
Queensway & Kingsway	3	190	0	24	61	70	3	57	270	120	9	2
Hwy 28/55 and New SE Collector Road 1				54		400		697	34	180	523	
Hwy 28/55 and New SE Collector Road 2				92		285		446	87	178	400	

APPENDIX C
Calibration Plot

Appendix C: Calibration Plot



APPENDIX D
Synchro Design Criteria (Previous Model)

City of Cold Lake
Transportation Study
Project No: 2010-3050
Date: July 5, 2010

TRAFFIC ANALYSIS CRITERIA

A micro model using Synchro/SimTraffic 7.0 will be developed to identify and review intersection capacity needs. Level of service will be used as the common reference in terms of average delay times categorized into six general grades. Table 1.1 defines the LOS criteria for signalized intersections and unsignalized intersections.

Table 1.1 Level of Service Definitions

Level of Service (LOS)	Overall Average Delay at Unsignalized Intersection	Overall Average Delay at Signalized Intersection
A	≤ 10 seconds	≤ 10 seconds
B	> 10 and ≤ 15 seconds	> 10 and ≤ 20 seconds
C	> 15 and ≤ 25 seconds	> 20 and ≤ 35 seconds
D	> 25 and ≤ 35 seconds	> 35 and ≤ 55 seconds
E	> 35 and ≤ 50 seconds	> 55 and ≤ 80 seconds
F	> 50 seconds	> 80 seconds

The minimum LOS criteria recommended by Associated Engineering (AE) is LOS C for the overall intersection. Additionally, each specific movement is targeted to achieve a LOS C or better in all cases. To achieve improved levels of service, the following criteria are proposed where applicable in the traffic network model:

- Right turn channelization (yield condition) provided when turning movements exceed 60 vehicles per hour.
- Right turn bays provided to satisfy LOS E or queuing issues in right or through movements.
- Left and right turn bay lengths provided based on 95th queue lengths from Synchro with a minimum storage length of 60 meters.
- Double left turn lanes provided when turning volumes significantly exceed 300 vehicles per hour and LOS or v/c ratios are above the stated minimums.

Table 2.2 presents the recommended traffic analysis assumptions that will be used in the Synchro model. The table also presents assumptions used by four different municipalities within Alberta including the Regional Municipality of Wood Buffalo (RMWB), the City of Calgary, the City of Lethbridge and the City of Medicine Hat. The assumptions used by the RMWB were developed by AE for a specific project.

Table 2.2 Traffic Analysis Assumptions for Synchro

Traffic Analysis Parameters					
Parameter	**RMWB***	**City of Calgary**	**City of Lethbridge**	**City of Medicine Hat**	**Recommended**
Link Speed	Existing posted speed limits				Existing posted speed limits
Lane Widths	3.7m				3.7m
Storage Length	Minimum 60m				Minimum 60m
Adjacent Parking Lanes	Apply data where available				Apply data where available
Lane Window					
Ideal Saturation Flow (vphpl)	1900	1850	1750	1850 (through) 1650 (turning)	1850
Lost Time	-	Default	Default	Default	Default
Leading Detector	2m (turning) 10m (through)	8m (left turn) 4m (through)	Default	-	Default
Trailing Detector	0	2m	Default	-	Default
Turning Speed	-	Default	Default	Default	Default
Lane Utilization	-	Default	Default	Default	Default
Right Turn Factor	-	Default	Default	Default	Default
Left Turn Factor (protected)	-	Default	Default	Default	Default
Saturated Flow Rate (protected)	-	Default	Default	Default	Default

Left Turn Factor (permitted)	-	Default	Default	Default	Default
Saturated Flow Rate (permitted)	-	Default	Default	Default	Default
Saturated Flow Rate (RTOR)	-	Default	Default	Default	Default
Headway Factor	-	Default	Default	Default	Default
Volume Window					
Conflicting Pedestrian #	-	Apply data where available	Apply data where available	Apply data where available. Minimum = 5.	Apply data where available. Minimum = 5.
Conflicting Bikes #	-	Apply data where available	Apply data where available	Apply data where available. Minimum = 5.	Apply data where available. Minimum = 5.
Peak Hour Factor	1.00	1.00	0.88 1.00 (15 min data used)	0.95 – Congested Urban Conditions 0.92 – Current / Base Case Urban Conditions 0.88 – Current / Base Case Undeveloped areas 0.85 – Forecast Case, Local and Collector Roads 0.93 – Forecast Case, Congested Collectors and Minor Arterial Roads 0.95 – Forecast Case, Principal Arterials	**0.86**
Growth Factor	1.0	1.0	1.0	1.0	1.0

Heavy Vehicle (%)	5	Apply data where available. Default 5% (main street), 2% (side street) and 7.5% or greater in industrial areas.	Apply data where available. Default 5% (main street), 2% (side street) and 10% in industrial areas.	Apply data where available. Default 7.5% or greater in industrial areas.	Apply data where available. Default 5% (main street), 2% (side street) and 7.5% or greater in industrial areas.
Bus Blockage (#/hour)	0	Apply data where available	Apply data where available	Apply data where available	Apply data where available
Traffic from Mid-Block (%)	None	Apply data where available	Apply data where available	Apply data where available	Apply data where available
Link OD Volumes	-	Alterations must be documented in detail	Alterations must be documented in detail	Alterations must be documented in detail	Default
Lane Group Flow	-	Default	Default	Default	Default
Vehicle Clearance / Existing Timings	-	Contact City of Calgary - Traffic Signals	Contact City of Lethbridge – Traffic Operations	Minimum Green = 7 seconds on left turns, 10 seconds for through Maximum Time = 20 – 30 seconds on main road	Use existing signal timing where available
Timing Window					
Main Street Minimum Initial	-	20 seconds or pedestrian time, whichever is greater	20 seconds or pedestrian interval, whichever is greater	10 seconds or pedestrian time, whichever is greater	**15 seconds** or pedestrian interval, whichever is greater
Side Street Minimum Initial	-	10 seconds	10 seconds or minimum pedestrian interval, whichever is greater	10 seconds	**12 seconds**
Minimum Initial Arrows	-	5 seconds	5 seconds	7 seconds	**7 seconds**
Minimum Initial Split	-	Default	-	Default	Default

Recall	-	Main Street – Ped. / min. unless on fixed (pretimed) mode. Fixed mode generally used in Downtown / Beltline areas. Minor Street or Turns – No recall.	Main Street – Ped. / min. unless on fixed (pretimed) mode. Minor Street or Turns – No recall.	Main Street – Ped. / min. unless on fixed (pretimed) mode. Fixed mode generally used in Downtown area. Minor Street or Turns – No recall.	Main Street – Ped. / min. unless on fixed (pretimed) mode. Minor Street or Turns – No recall.
Phasing Window					
Pedestrian Walk Time	8 seconds	Minimum 8 seconds	Minimum 6 seconds	20 seconds	**7 seconds**
Pedestrian Clearance Time (Don't Walk)	11 seconds	Contact City of Calgary – Traffic Signals	Minimum value derived from actual crossing distance (m) divided by walking speed of 1.2 m/s. In areas with high senior citizens, walking speed of 1.0 m/s should be used.	Pedestrian walk time plus 7 seconds (27 seconds)	**17 seconds**
Pedestrian Calls (#/hr)	5	Apply data where available	Apply data where available	Apply data where available. Minimum = 5.	Apply data where available. Minimum = 5.
Minimum Splits for Arrows	-	10 seconds plus clearance. In extreme cases 8 seconds plus clearance for prot / perm arrows, 9 seconds plus clearance for prot only arrows.	10 seconds plus clearance. In extreme cases 8 seconds plus clearance for prot / perm arrows, 9 seconds plus clearance for prot only arrows.	10 seconds plus vehicle clearance	10 seconds plus vehicle clearance
Dual Entry	Yes	Yes	Yes	Yes	Yes

Inhibit Max	Yes	Contact City of Calgary – Traffic Signals	Default	No. Contact City of Medicine Hat – Municipal Engineering.	Yes

*Project specific to the West Loop Road Project

All other factors will be set at the default or calculated values.

General comments:

- If an arrow (protected) phase is found to be needed in one peak period, it will be included in the signal phasing in the analysis of all peak hours.

- Summary sheets will include v/c ratios, level of service values and 95th queue lengths.

APPENDIX E
15- and 25-Year Population and Employment by Land Use

Appendix D: 15 Year Employment by Land Use and Traffic Analysis Zone (TAZ)

TAZ	SINGLE FAMILY RES (HA)	MULTI FAMILY RES (HA)	TOTAL DWELLINGS	SINGLE FAMILY DWELLINGS	MULTI FAMILY DWELLINGS	POPULATION
101	23.89	0.00	32	32	0	95
102	13.41	0.00	67	67	0	166
103	13.65	0.00	125	125	0	310
104	0.00	0.00	0	0	0	0
105	21.74	0.00	228	228	0	566
106	5.23	0.00	82	82	0	203
107	1.39	1.16	50	15	36	125
108	1.41	1.18	51	15	36	126
109	25.37	3.42	599	266	333	1,486
110	39.14	0.24	566	500	66	1,404
111	18.72	0.29	278	225	54	690
112	6.15	1.51	111	65	46	275
113	12.87	0.23	142	135	7	352
114	7.38	6.15	266	78	188	660
115	0.30	0.00	3	3	0	8
116	2.47	2.06	89	26	63	220
117	0.22	0.00	2	2	0	6
118	10.96	8.64	380	115	265	941
119	40.48	2.19	696	526	170	1,726
120	7.02	0.00	89	89	0	221
121	0.00	0.00	0	0	0	0
122	0.00	0.00	0	0	0	0
123	3.83	0.00	3	3	0	7
124	22.98	0.00	296	296	0	734
125	19.06	0.00	249	249	0	617
201	0.00	0.00	0	0	0	0
202	0.00	0.00	0	0	0	0
203	0.00	0.00	0	0	0	0
204	0.00	0.00	0	0	0	0
205	0.20	0.00	2	2	0	5
206	0.00	0.00	0	0	0	0
207	2.18	0.75	46	23	23	113
208	0.00	0.00	0	0	0	0
209	0.00	0.00	0	0	0	0
210	0.00	0.00	0	0	0	0
211	20.99	1.27	446	287	159	1,106
212	0.00	0.00	0	0	0	0
213	0.00	0.00	0	0	0	0
214	0.00	0.00	0	0	0	0
215	33.48	0.00	402	402	0	996
216	0.01	0.00	0	0	0	0
217	36.44	2.55	461	383	78	1,143
218	12.39	0.01	164	164	0	407
219	14.67	2.03	340	201	139	844
220	19.64	1.26	422	261	161	1,047

221	29.11	0.00	385	385	0	956
222	0.00	0.00	0	0	0	0
223	0.00	0.00	0	0	0	0
224	6.93	0.14	126	83	43	313
225	12.04	0.00	126	126	0	313
226	19.17	0.35	212	201	11	525
227	0.67	0.00	8	8	0	20
228	21.25	1.15	290	255	35	720
229	0.19	0.02	3	2	1	6
230	0.00	0.00	0	0	0	0
231	0.00	0.00	0	0	0	0
232	0.00	0.00	0	0	0	0
233	4.70	0.24	57	49	7	141
234	0.00	0.00	0	0	0	0
235	0.00	0.00	0	0	0	0
236	0.00	0.00	0	0	0	0
237	18.00	0.00	189	189	0	469
238	0.00	0.00	0	0	0	0
239	0.00	0.00	0	0	0	0
240	0.00	0.00	0	0	0	0
401	25.38	9.52	558	266	291	1,384
402	25.52	9.57	561	268	293	1,391
TOTAL	**600.65**	**55.91**	**9,202**	**6,696**	**2,506**	**22,837**

Appendix D: 15 Year Employment by Land Use and Traffic Analysis Zone (TAZ)

TAZ	COMMERCIAL RETAIL (HA)	COMMERCIAL RETAIL (JOBS)	COMMERCIAL NON-RETAIL (HA)	COMMERCIAL NON-RETAIL (JOBS)	INDUSTRIAL (HA)	INDUSTRIAL (JOBS)	INSTITUTIONAL (HA)	INSTITUTIONAL (JOBS)	Jobs
101	0.00	0	0.00	0	0.00	0	0.04	1	1
102	0.00	0	0.00	0	0.00	0	0.06	1	1
103	0.00	0	0.00	0	0.00	0	0.03	1	1
104	0.00	0	0.00	0	0.33	17	0.00	0	17
105	0.00	0	0.00	0	0.00	0	2.11	15	15
106	0.00	0	0.00	0	0.00	0	0.53	4	4
107	0.23	9	0.00	0	0.81	42	0.46	4	55
108	2.13	75	0.00	0	0.00	0	0.47	4	79
109	3.85	135	0.00	0	0.00	0	11.16	75	210
110	0.32	12	0.00	0	0.00	0	7.35	50	62
111	4.18	147	0.00	0	0.00	0	3.96	27	174
112	0.50	18	0.00	0	0.00	0	0.69	5	23
113	0.08	3	0.00	0	0.00	0	0.99	7	10
114	2.38	84	0.00	0	0.00	0	2.46	17	101
115	10.26	359	0.00	0	0.00	0	0.00	0	359
116	0.78	28	1.47	22	0.00	0	0.82	6	56
117	1.53	54	5.75	84	0.00	0	0.11	1	139
118	2.99	105	3.20	47	0.00	0	7.98	54	206
119	3.95	139	0.00	0	0.00	0	0.80	6	145
120	0.00	0	0.00	0	0.00	0	4.58	31	31
121	0.00	0	0.00	0	3.29	168	0.00	0	168
122	0.00	1	0.01	1	0.00	0	4.99	34	36
123	0.00	0	0.00	0	0.00	0	0.00	0	0
124	0.00	0	0.00	0	0.00	0	5.61	38	38
125	0.00	0	0.00	0	0.00	0	10.45	70	70
201	0.00	0	0.00	0	0.07	4	0.00	0	4
202	0.00	0	0.00	0	0.00	0	61.71	413	413
203	0.00	0	0.00	0	0.00	0	0.00	0	0
204	0.00	0	0.00	0	0.00	0	0.00	0	0
205	0.00	0	0.00	0	0.00	0	0.00	0	0
206	0.00	0	0.00	0	0.00	0	0.00	0	0
207	5.33	127	6.69	46	0.00	0	4.81	33	206
208	0.00	0	0.00	0	0.00	0	0.29	2	2
209	0.00	0	0.00	0	0.00	0	9.37	92	92
210	0.00	0	0.00	0	0.00	0	0.00	0	0
211	3.56	185	13.53	250	0.00	0	2.86	20	455
212	0.00	0	0.00	0	0.00	0	1.17	8	8
213	0.34	13	1.37	21	1.14	58	0.00	1	93
214	1.66	58	6.62	97	3.17	162	0.00	0	317
215	0.07	3	0.29	5	0.12	7	3.11	21	36
216	0.00	0	0.00	0	0.00	0	0.00	0	0
217	0.79	28	0.00	0	0.00	0	6.67	45	73
218	0.71	25	2.83	42	0.00	0	5.85	40	107
219	4.00	140	4.34	64	0.00	1	0.53	4	209
220	2.58	91	0.00	0	0.00	1	5.55	38	130

221	0.00	0	0.00	0	0.00	0	2.94	20	20
222	0.00	0	0.00	0	0.00	0	0.00	0	0
223	0.00	0	0.00	0	0.00	0	0.00	0	0
224	0.00	0	0.00	0	0.08	5	4.65	32	37
225	0.00	0	0.00	0	0.00	0	0.00	0	0
226	1.52	84	6.08	129	4.08	208	13.77	92	513
227	3.53	124	0.32	5	0.00	0	0.18	2	131
228	3.66	129	7.80	114	6.66	339	1.73	12	594
229	0.01	1	0.00	0	0.00	0	0.04	1	2
230	0.00	0	0.00	0	0.00	0	0.00	0	0
231	0.00	0	0.00	0	0.00	0	0.00	0	0
232	0.00	0	0.00	0	0.00	0	0.00	0	0
233	2.71	65	10.82	118	0.00	0	0.00	0	183
234	3.53	124	14.13	207	0.06	3	20.23	136	470
235	0.00	0	0.00	0	0.00	0	0.06	1	1
236	0.00	0	0.00	0	0.00	0	0.00	0	0
237	0.01	1	0.05	1	0.00	0	0.07	1	3
238	0.00	0	0.00	0	0.00	0	0.92	7	7
239	0.00	0	0.00	0	0.00	0	0.00	0	0
240	0.00	0	0.00	0	0.00	0	11.25	76	76
401	3.17	111	0.00	0	0.00	0	6.34	43	154
402	3.19	112	0.00	0	0.00	0	6.38	43	155
TOTAL	**73.56**	**2,590**	**85.30**	**1,253**	**19.82**	**1,015**	**236.13**	**1,634**	**6,492**

Appendix D: 25 Year Employment by Land Use and Traffic Analysis Zone (TAZ)

TAZ	SINGLE FAMILY RES (HA)	MULTI FAMILY RES (HA)	TOTAL DWELLINGS	SINGLE FAMILY DWELLINGS	MULTI FAMILY DWELLINGS	POPULATION
101	23.89	0.00	79	79	0	197
102	13.41	0.00	94	94	0	233
103	13.65	0.00	152	152	0	377
104	13.72	5.15	316	163	153	783
105	21.74	0.00	258	258	0	640
106	5.23	0.00	92	92	0	229
107	1.39	1.16	51	17	35	127
108	1.41	1.18	52	17	35	128
109	25.37	3.42	631	301	329	1,564
110	39.14	0.24	566	500	66	1,403
111	18.72	0.29	276	222	53	684
112	6.15	1.51	118	73	45	292
113	12.87	0.23	159	153	7	396
114	7.38	6.15	270	88	183	670
115	0.30	0.00	4	4	0	9
116	2.47	2.06	90	29	61	224
117	0.22	0.00	3	3	0	7
118	10.96	8.64	386	130	256	958
119	40.48	2.19	694	526	168	1,721
120	7.02	0.00	89	89	0	221
121	10.79	4.05	248	128	120	616
122	0.00	0.00	0	0	0	0
123	3.83	0.00	11	11	0	26
124	22.98	0.00	296	296	0	734
125	19.06	0.00	249	249	0	617
201	0.14	0.05	3	2	2	8
202	0.00	0.00	0	0	0	0
203	0.00	0.00	0	0	0	0
204	0.00	0.00	0	0	0	0
205	0.20	0.00	2	2	0	6
206	0.00	0.00	0	0	0	0
207	12.42	9.28	423	147	275	1,049
208	12.24	10.20	448	145	303	1,111
209	0.14	0.12	5	2	4	13
210	0.00	0.00	0	0	0	0
211	22.82	2.80	512	309	203	1,270
212	3.36	2.80	123	40	83	305
213	0.00	0.00	0	0	0	0
214	0.00	0.00	0	0	0	0
215	39.70	5.18	625	471	154	1,550
216	1.85	1.53	67	22	46	167
217	36.44	2.55	508	433	76	1,261
218	12.39	0.01	164	164	0	407
219	14.67	2.03	338	201	137	839
220	26.49	6.96	672	343	330	1,668

221	30.74	1.35	445	405	40	1,104
222	0.00	0.00	0	0	0	0
223	0.00	0.00	0	0	0	0
224	6.93	0.14	140	97	43	347
225	12.04	0.00	143	143	0	354
226	19.17	0.35	238	228	10	590
227	0.67	0.00	8	8	0	20
228	21.25	1.15	287	252	34	711
229	0.19	0.02	3	2	1	7
230	0.00	0.00	0	0	0	0
231	0.00	0.00	0	0	0	0
232	0.00	0.00	0	0	0	0
233	4.70	0.24	63	56	7	156
234	0.00	0.00	0	0	0	0
235	0.00	0.00	0	0	0	0
236	0.00	0.00	0	0	0	0
237	18.00	0.00	214	214	0	530
238	0.00	0.00	0	0	0	0
239	0.00	0.00	0	0	0	0
240	0.00	0.00	0	0	0	0
401	25.38	9.52	584	301	282	1,448
402	25.52	9.57	587	303	284	1,456
TOTAL	**669.64**	**102.11**	**11,786**	**7,962**	**3,825**	**29,230**

Appendix D: 25 Year Employment by Land Use and Traffic Analysis Zone (TAZ)

TAZ	COMMERCIAL RETAIL (HA)	COMMERCIAL RETAIL (JOBS)	COMMERCIAL NON-RETAIL (HA)	COMMERCIAL NON-RETAIL (JOBS)	INDUSTRIAL (HA)	INDUSTRIAL (JOBS)	INSTITUTIONAL (HA)	INSTITUTIONAL (JOBS)	Jobs
101	0.00	0	0.00	0	0.00	0	0.04	1	1
102	0.00	0	0.00	0	0.00	0	0.06	1	1
103	0.00	0	0.00	0	0.00	0	0.03	1	1
104	1.72	61	0.00	0	0.33	17	3.43	23	101
105	0.00	0	0.00	0	0.00	0	2.11	15	15
106	0.00	0	0.00	0	0.00	0	0.53	4	4
107	0.23	9	0.00	0	0.81	42	0.46	4	55
108	2.13	75	0.00	0	0.00	0	0.47	4	79
109	3.85	135	0.00	0	0.00	0	11.16	75	210
110	0.32	12	0.00	0	0.00	0	7.35	50	62
111	4.18	147	0.00	0	0.00	0	3.96	27	174
112	0.50	18	0.00	0	0.00	0	0.69	5	23
113	0.08	3	0.00	0	0.00	0	0.99	7	10
114	2.38	84	0.00	0	0.00	0	2.46	17	101
115	10.26	359	0.00	0	0.00	0	0.00	0	359
116	0.78	28	1.47	22	0.00	0	0.82	6	56
117	1.53	54	5.75	84	0.00	0	0.11	1	139
118	2.99	105	3.20	47	0.00	0	7.98	54	206
119	3.95	139	0.00	0	0.00	0	0.80	6	145
120	0.00	0	0.00	0	0.00	0	4.58	31	31
121	15.90	557	0.00	0	3.29	168	2.70	19	744
122	0.00	1	0.01	1	0.00	0	4.99	34	36
123	0.00	0	0.00	0	0.00	0	0.00	0	0
124	0.00	0	0.00	0	0.00	0	5.61	38	38
125	0.00	0	0.00	0	0.00	0	10.45	70	70
201	0.02	1	0.00	0	0.07	4	0.03	1	6
202	0.00	0	0.00	0	0.00	0	61.71	413	413
203	0.00	0	0.00	0	0.00	0	0.00	0	0
204	0.00	0	0.00	0	0.00	0	0.00	0	0
205	0.00	0	0.00	0	0.00	0	0.00	0	0
206	0.00	0	0.00	0	0.00	0	0.00	0	0
207	7.04	187	6.69	46	0.00	0	8.23	55	288
208	2.04	72	0.00	0	0.00	0	4.37	30	102
209	0.02	1	0.00	0	0.00	0	9.41	92	93
210	0.00	0	0.00	0	0.00	0	0.00	0	0
211	3.87	196	13.53	250	0.00	0	3.47	24	470
212	0.56	20	0.00	0	0.00	0	2.29	16	36
213	0.34	13	1.37	21	1.14	58	0.00	1	93
214	1.66	58	6.62	97	3.17	162	0.00	0	317
215	1.11	39	0.29	5	0.12	7	5.18	35	86
216	0.31	11	0.00	0	0.00	0	0.61	5	16
217	0.79	28	0.00	0	0.00	0	6.67	45	73
218	0.71	25	2.83	42	0.00	0	5.85	40	107
219	4.00	140	4.34	64	0.00	1	0.53	4	209
220	3.72	131	0.00	0	0.00	1	7.83	53	185

221	0.27	10	0.00	0	0.00	0	3.48	24	34
222	0.00	0	0.00	0	0.00	0	0.00	0	0
223	0.00	0	0.00	0	0.00	0	0.00	0	0
224	0.00	0	0.00	0	0.08	5	4.65	32	37
225	0.00	0	0.00	0	0.00	0	0.00	0	0
226	1.52	84	6.08	129	4.08	208	13.77	92	513
227	3.53	124	0.32	5	0.00	0	0.18	2	131
228	3.66	129	7.80	114	6.66	339	1.73	12	594
229	0.01	1	0.00	0	0.00	0	0.04	1	2
230	0.00	0	0.00	0	0.00	0	0.00	0	0
231	0.00	0	0.00	0	0.00	0	0.00	0	0
232	0.00	0	0.00	0	0.00	0	0.00	0	0
233	2.71	65	10.82	118	0.00	0	0.00	0	183
234	3.53	124	14.13	207	0.06	3	20.23	136	470
235	0.00	0	0.00	0	0.00	0	0.06	1	1
236	0.00	0	0.00	0	0.00	0	0.00	0	0
237	0.59	21	1.50	22	0.00	0	0.07	1	44
238	13.65	478	0.00	150	29.43	1,347	0.92	7	1,982
239	0.00	0	0.00	0	0.00	0	0.00	0	0
240	0.00	0	0.00	0	0.00	0	11.25	76	76
401	3.17	111	0.00	0	0.00	0	6.34	43	154
402	3.19	112	0.00	0	0.00	0	6.38	43	155
TOTAL	**112.81**	**3,968**	**86.75**	**1,424**	**49.25**	**2,362**	**257.07**	**1,777**	**9,531**

APPENDIX F
Excerpts from 2015 Transportation Study

4 Traffic Forecast: Future Development Traffic Volumes

4.1 FUTURE DEVELOPMENTS

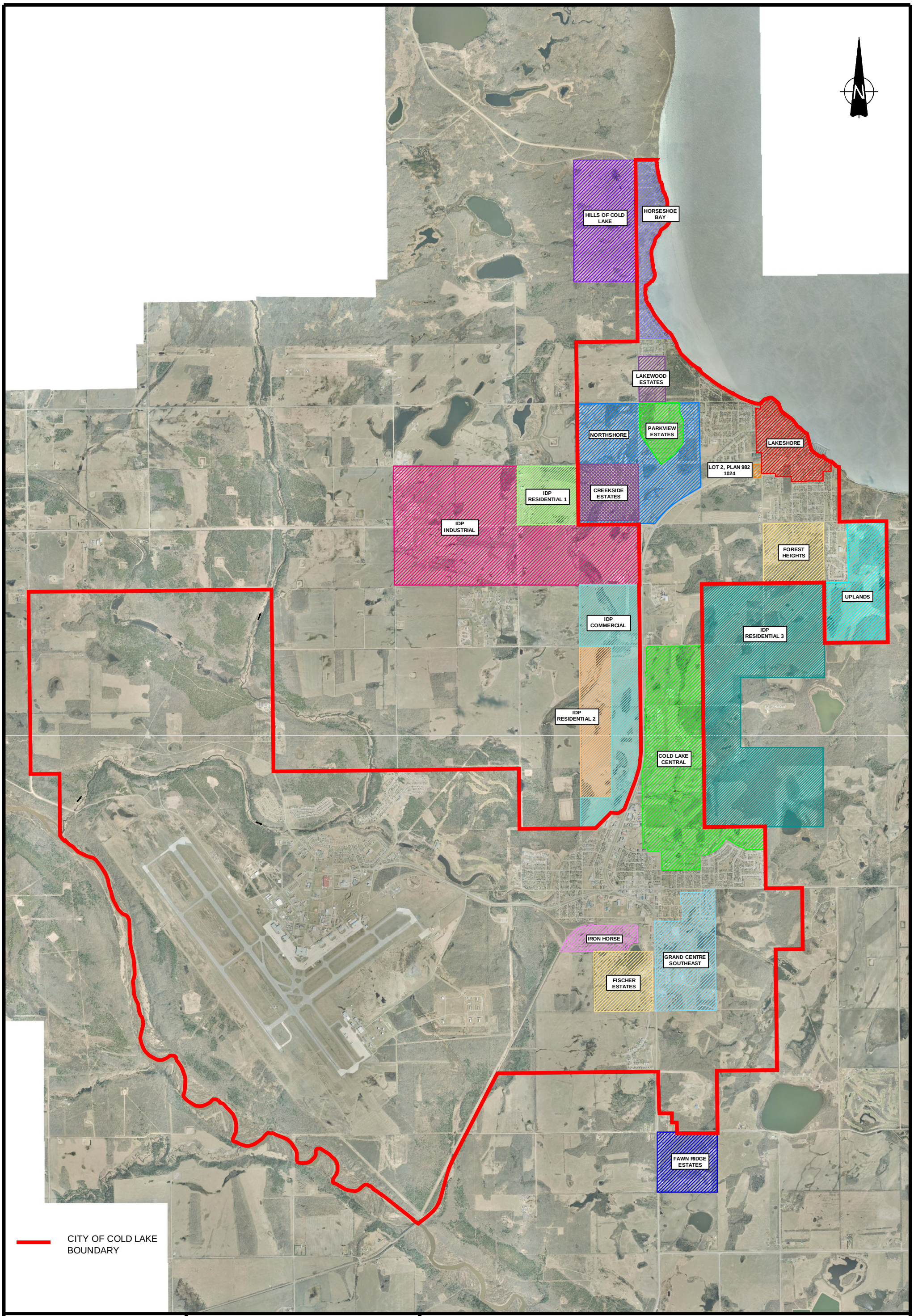
There are 20 development/redevelopment projects identified for the City and surrounding area in the next 20 years; 13 are located within the City and seven are located outside the City, in the MD of Bonnyville. The development/redevelopment projects are shown in Figure 4.1 and are discussed in the following sections.

AE contacted the Department of Defence in Medley to obtain information about future land use growth or change within the base, and was informed that there would be no expected changes or growth within the 20-year planning horizon of the transportation study.

4.1.1 City of Cold Lake

The 13 development/redevelopment projects expected within the City are:

- **Fischer Estates**: 63.5 hectares located in Cold Lake South (SE ¼ 34-62-2-4)
- **Iron Horse**: 30.77 hectares located in Cold Lake South (N ½ f 34-62-2-4)
- **Cold Lake Central**: 248.0 hectares located between Cold Lake North and Cold Lake South (W ½ 11-63-2-4, W ¼ 2-63-2-4, and S ½ 2-63-11-4)
- **Grand Centre SE:** 105.0 hectares located in Cold Lake South (W ½ 35-62-2-4)
- **Forest Heights**: 64.0 hectares located in Cold Lake North (NW ¼ o13-63-2-4)
- **Northshore**: 244.0 hectares located in Cold Lake North (NE ¼ 22-63-2-4, SE ¼ 22-63-2-4, SW ¼ 23-63-2-4, and NW ¼ 23-63-2-4)
- **Lot 2, Plan 982 1024**: 1.81 hectares located in Cold Lake North (SE ¼ 23-63-2-4)
- **Horseshoe Bay**: 77.7 hectares located in Cold Lake North (NW ¼ 26-63-2-4, SW ¼ 35-63-2-4, and NW ¼ 35-63-2-4)
- **Uplands**: 101.9 hectares located in Cold Lake north (NE 13-63-2-4 and SE 13-63-2-4)
- **Lakeshore Redevelopment**: 66.0 hectares located in Cold Lake North.
- **Lakewood Estates**: 21.3 hectares located in Cold Lake North (SW ¼ 26-63-2-4)
- **Creekside Estates**: 60.5 hectares located in Cold Lake North (SE ¼ 22-63-2-4)
- **Parkview Estates**: 36.8 hectares located in Cold Lake North (NW 23-63-2-4).



PROJECT NO: 2010-3050
DATE: FEBRUARY 2011
APPROVED:
SCALE: NTS
DWG NO:

CITY OF COLD LAKE
TRANSPORTATION STUDY

FIGURE 4.1
FUTURE DEVELOPMENT/REDEVELOPMENT PROJECTS
CITY OF COLD LAKE AND SURROUNDING AREA

4.1.2 MD of Bonnyville

The seven development projects expected outside the City, in the MD of Bonnyville are:

- **Hills of Cold Lake**: 119.3 hectares located northwest of Cold Lake North (SE, NE ¼ 34-63-2-4)
- **Fawn Ridge Estates**: 34.9 hectares located south of Cold Lake South (NW ¼ 23-62-2-4)
- **IDP Residential Development 1:** 63 hectares located along the north side of Highway 55, west of the City
- **IDP Residential Development 2:** 84 hectares located west of the IDP Commercial Development, from 75 Avenue and south of 61/62 Avenue
- **IDP Residential Development 3:** 418 hectares located east of Cold Lake Central, from Energy Centre and 55 Avenue
- **IDP Industrial Development:** 392 hectares located along both sides of Highway 55, west of the City
- **IDP Commercial Development:** 157 hectares located along the west side of Highway 28, from Energy Centre to 55 Avenue.

4.1.3 Development Phasing

The ASP, ARP and Outline Plans for the development/redevelopment projects provided by the City and the IDP did not discuss the expected timing or staging for the projects. Most of the documents stated that the timing would be dictated by market conditions and the availability of municipal servicing capacity.

To forecast the future development traffic volumes for each planning horizon, the following assumptions were made:

- Each development/redevelopment plan will experience 25% growth in each planning horizon with full build-out by 2030 except for Fischer Estates, Iron Horse, Forest Heights and the IDP developments
- Development of Fischer Estates, Iron Horse and Forest Heights will be delayed until 2020. By 2030, these three developments will be 50% developed
- Development of the residential land from the IDP will be delayed until 2015. By 2030, the three residential developments will be 30% developed
- Development of the industrial land from the IDP will be delayed until 2015. By 2030, the industrial development will be 20% developed
- Development of the commercial land from the IDP will be delayed until 2015. By 2030, the commercial development will be 30% developed.

The development phasing assumptions were established through discussions with the City's Planning Department. Table 4.1 summarizes the development phasing assumed for each planning horizon.

Table 4-1
Development Phasing Assumption

Development / Redevelopment	Land Use	5-year (2015) Horizon	10-year (2020) Horizon	15-year (2025) Horizon	20-year (2030) Horizon
Fischer Estates	Residential	0%	0%	25%	50%
	Commercial	0%	0%	25%	50%
Iron Horse	Residential	0%	0%	25%	50%
Cold Lake Central	Residential	25%	50%	75%	100%
	Commercial	50%	100%	100%	100%
Grand Centre Southeast	Residential	25%	50%	75%	100%
	Industrial	25%	50%	75%	100%
Forest Heights	Residential	0%	0%	25%	50%
Northshore	Residential	25%	50%	75%	100%
	Commercial	25%	50%	75%	100%
	Institutional	25%	50%	75%	100%
	School	0%	0%	100%	100%
Lot 2, Plan 982 1024	Commercial	100%	100%	100%	100%
Horseshoe Bay	Residential	50%	100%	100%	100%
Uplands	Residential	25%	50%	75%	100%
	Health Services & Mixed Use	25%	50%	75%	100%
Lakeshore Area Redevelopment	All	25%	50%	75%	100%

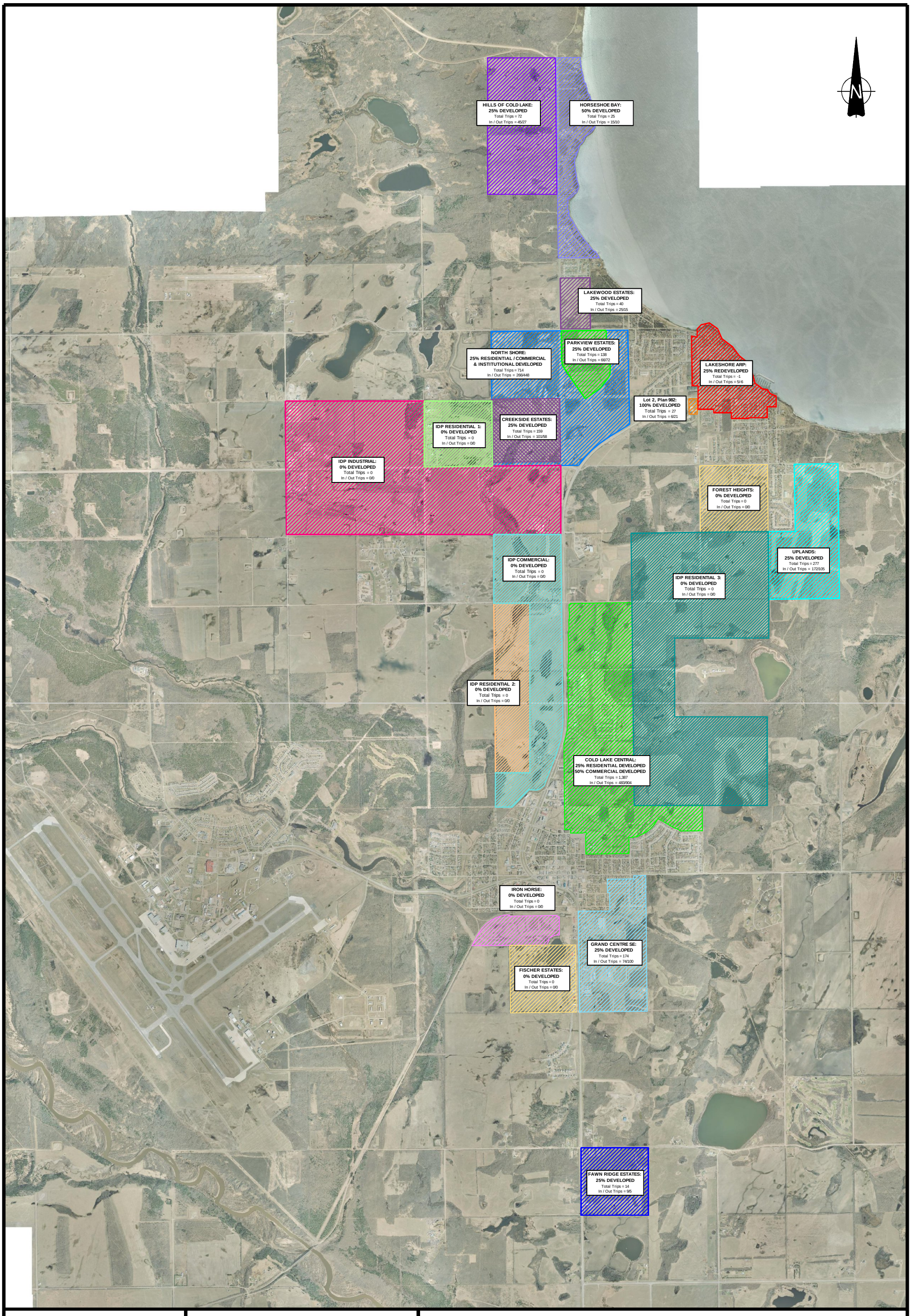
Development / Redevelopment	Land Use	5-year (2015) Horizon	10-year (2020) Horizon	15-year (2025) Horizon	20-year (2030) Horizon
Lakewood Estates	Residential	25%	50%	75%	100%
Creekside Estates	Residential	25%	50%	75%	100%
Parkview Estates	Residential	25%	50%	75%	100%
	Commercial	25%	50%	75%	100%
Hills of Cold Lake	Residential	25%	50%	75%	100%
Fawn Ridge Estates Development	Residential	25%	50%	75%	100%
IDP Residential Development 1	Residential	0%	10%	20%	30%
IDP Residential Development 2	Residential	0%	10%	20%	30%
IDP Residential Development 3	Residential	0%	10%	20%	30%
IDP Industrial Development	Industrial	0%	5%	10%	20%
IDP Commercial Development	Commercial	0%	10%	20%	30%

4.2 TRIP GENERATION

The ASP, ARP and Outline Plans for the development/redevelopment projects were reviewed to obtain information regarding the future land uses and the associated developable area. Of particular relevance was the residential, commercial, industrial and institutional land uses.

Portions of the above mentioned subdivisions are currently developed. Traffic volumes from the developed portions are captured by existing (2010) traffic volumes; therefore, these areas were not included in the forecast for the future development traffic volumes. The breakdown of the future land uses and areas for each development/redevelopment project are presented in Appendix A.

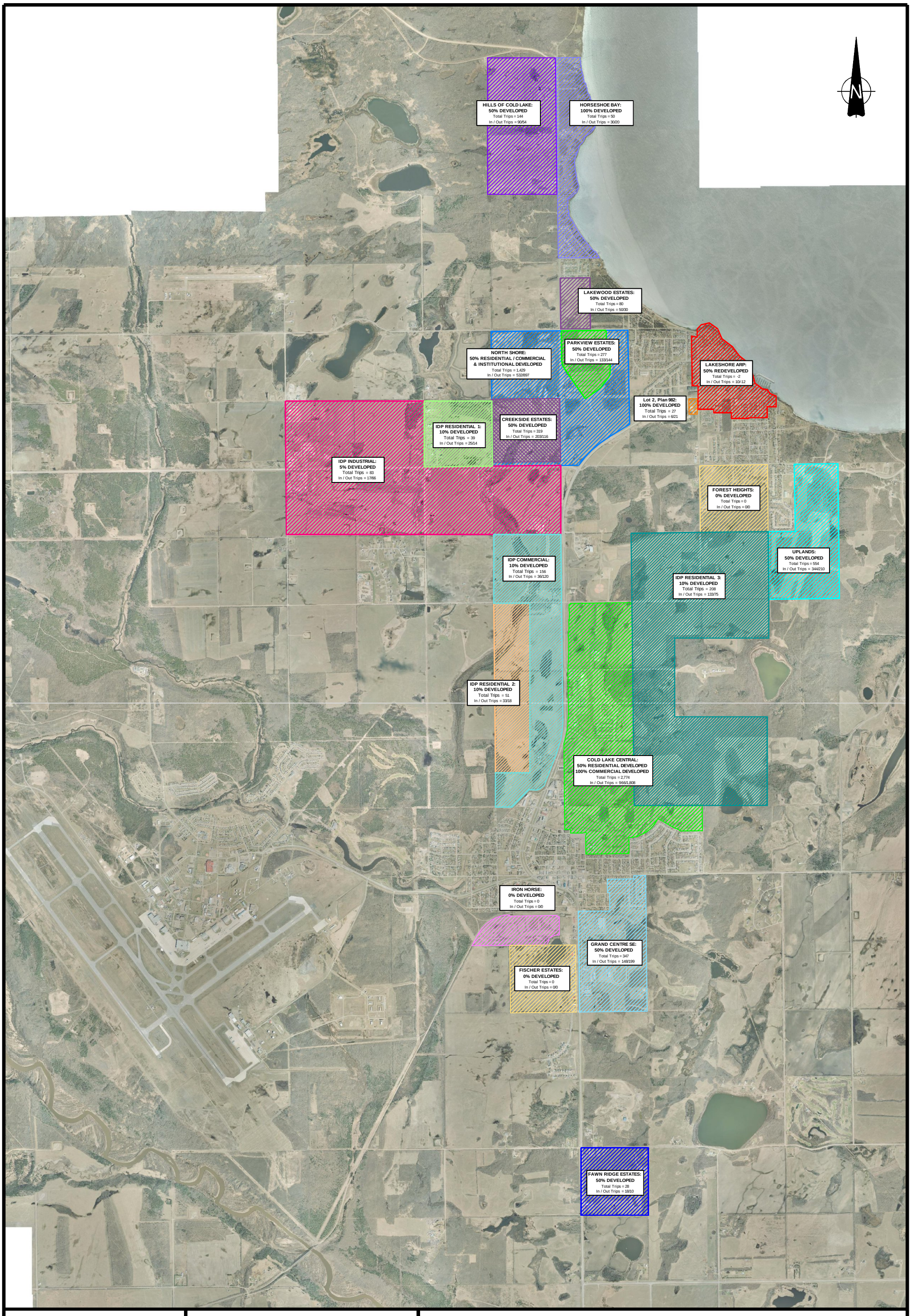
Table 4.2 summarizes the trip generation calculations for each development/redevelopment project. The Institute of Transportation Engineer (ITE) Trip Generation Handbook (7th Edition) was referenced to obtain trip rates for each land use. The maximum site coverage assumptions listed in Table 4.2 reflect those stated in the Traffic Demand Forecast Work Plan established at project initiation and attached in Appendix B. Some site coverage assumptions were revised using engineering judgement to reflect more practical trip estimates.



PROJECT NO: 2010-3050
DATE: APRIL 2011
APPROVED:
SCALE: NTS
DWG NO:

CITY OF COLD LAKE
TRANSPORTATION STUDY

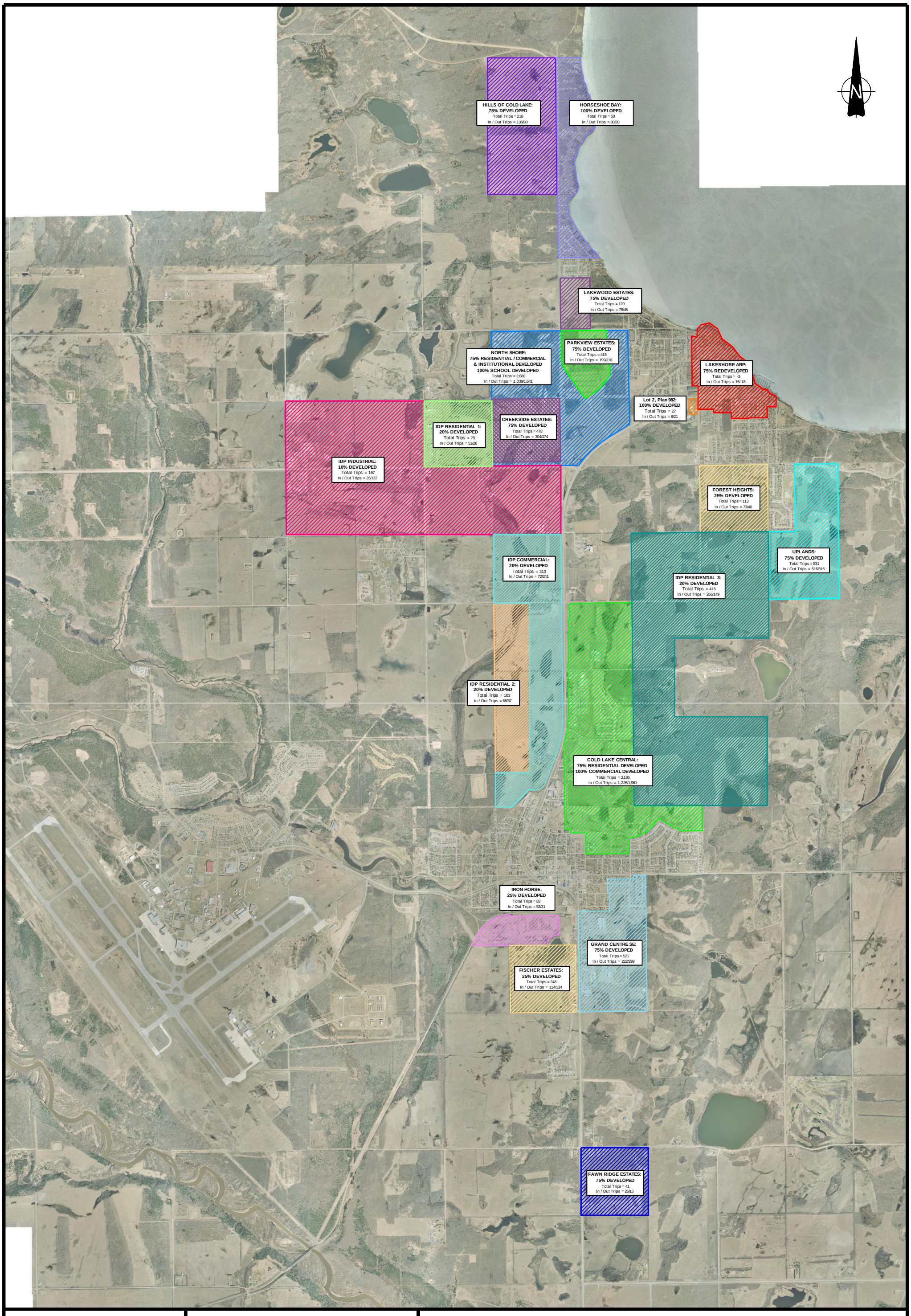
FIGURE 4.2
5 YEAR (2015) TRIP GENERATION FROM PLANNED DEVELOPMENT
PM PEAK



PROJECT NO: 2010-3050
DATE: APRIL 2011
APPROVED:
SCALE: NTS
DWG NO:

CITY OF COLD LAKE
TRANSPORTATION STUDY

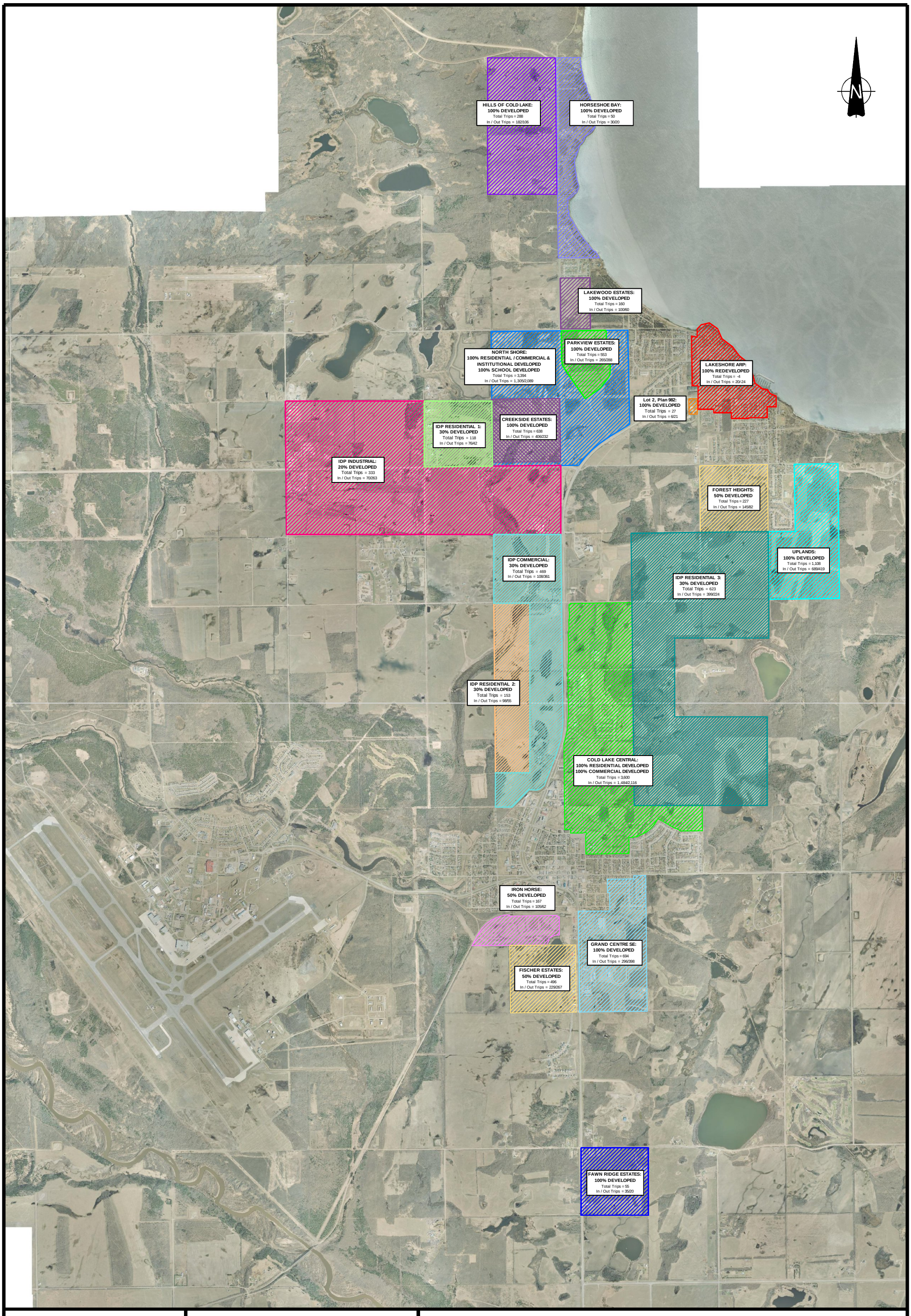
FIGURE 4.3
10 YEAR (2020) TRIP GENERATION FROM PLANNED DEVELOPMENT
PM PEAK



PROJECT NO: 2010-3050
DATE: APRIL 2011
APPROVED:
SCALE: NTS
DWG NO:

CITY OF COLD LAKE
TRANSPORTATION STUDY

FIGURE 4.4
15 YEAR (2025) TRIP GENERATION FROM PLANNED DEVELOPMENT
PM PEAK



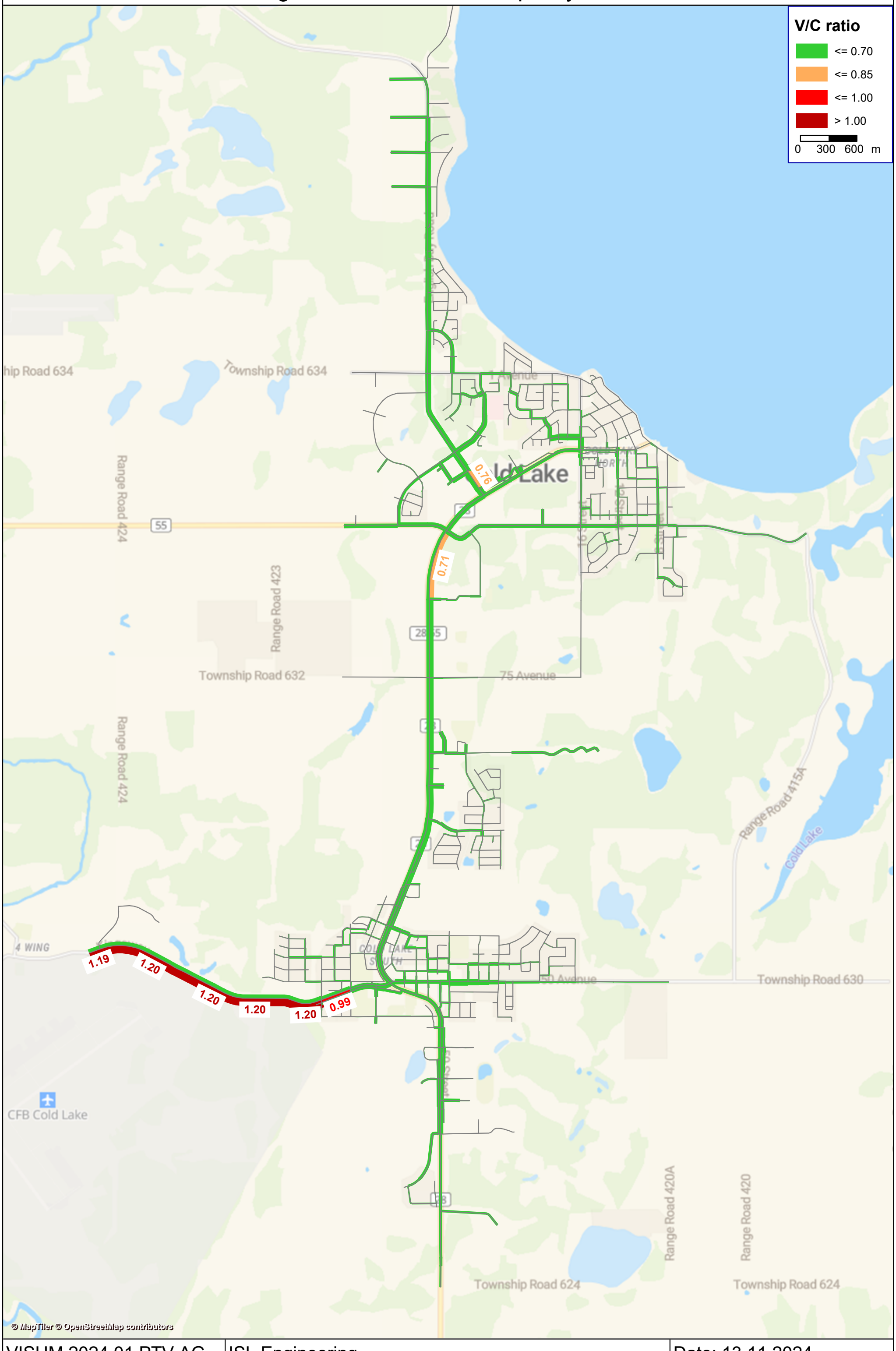
PROJECT NO: 2010-3050
DATE: APRIL 2011
APPROVED:
SCALE: NTS
DWG NO:

CITY OF COLD LAKE
TRANSPORTATION STUDY

FIGURE 4.5
20 YEAR (2030) TRIP GENERATION FROM PLANNED DEVELOPMENT
PM PEAK

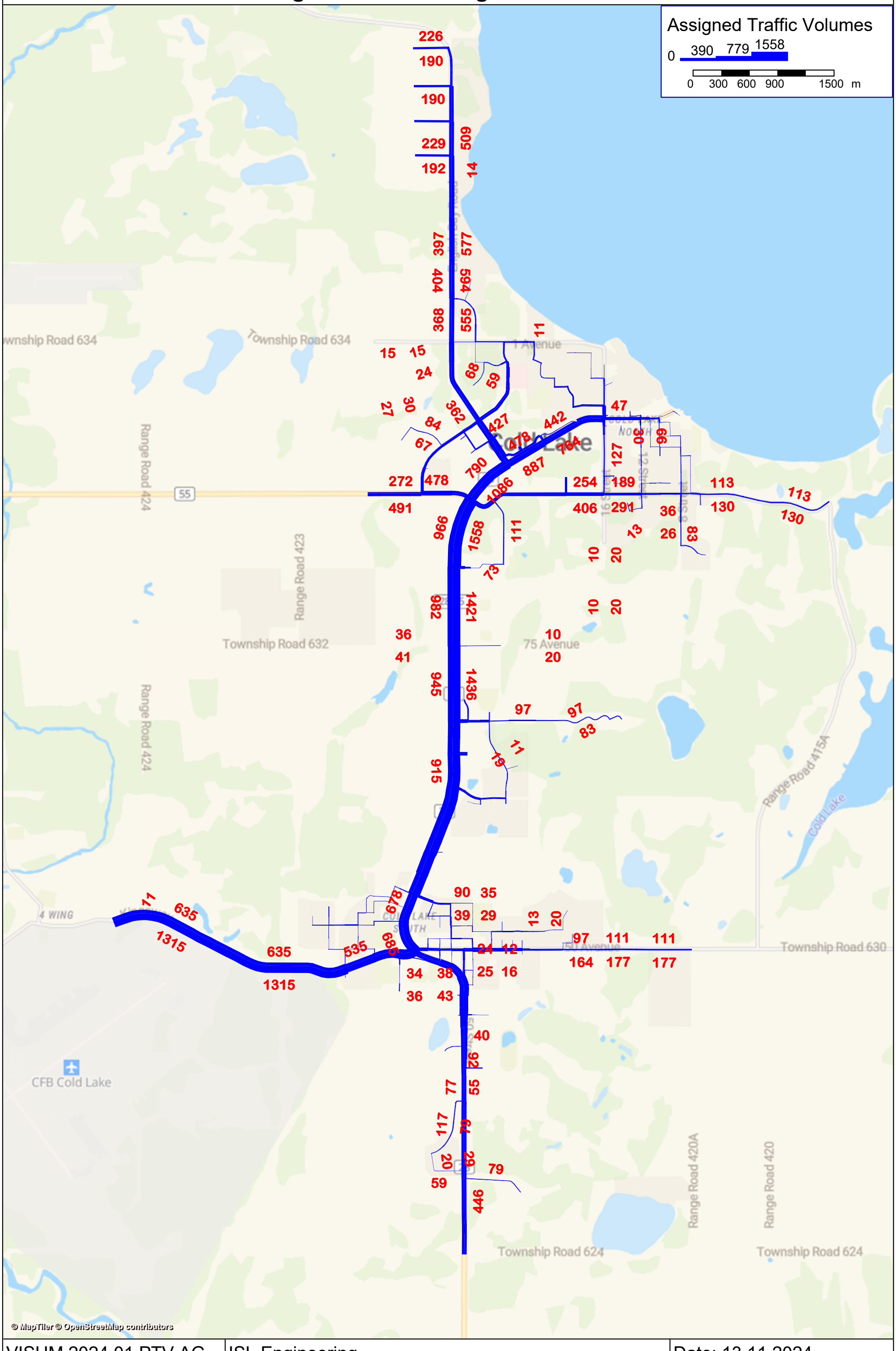
APPENDIX G
Additional Model Plots

15 Year Horizon Do Nothing Scenario - Volume/Capacity Ratio



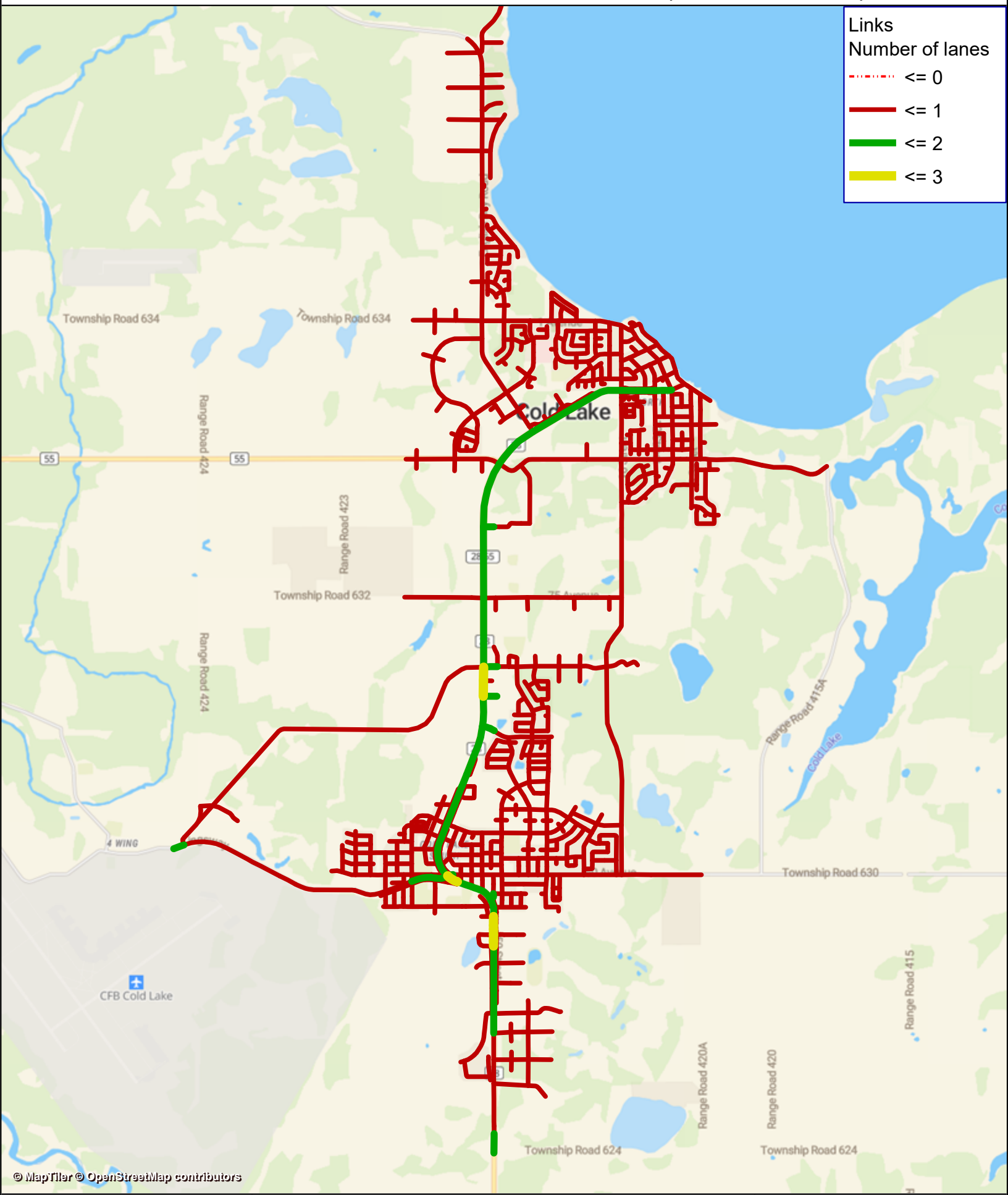
VISUM 2024.01 PTV AG	ISL Engineering	Date: 13.11.2024

15 Year Horizon Do Nothing Scenario - Assigned Traffic Volumes



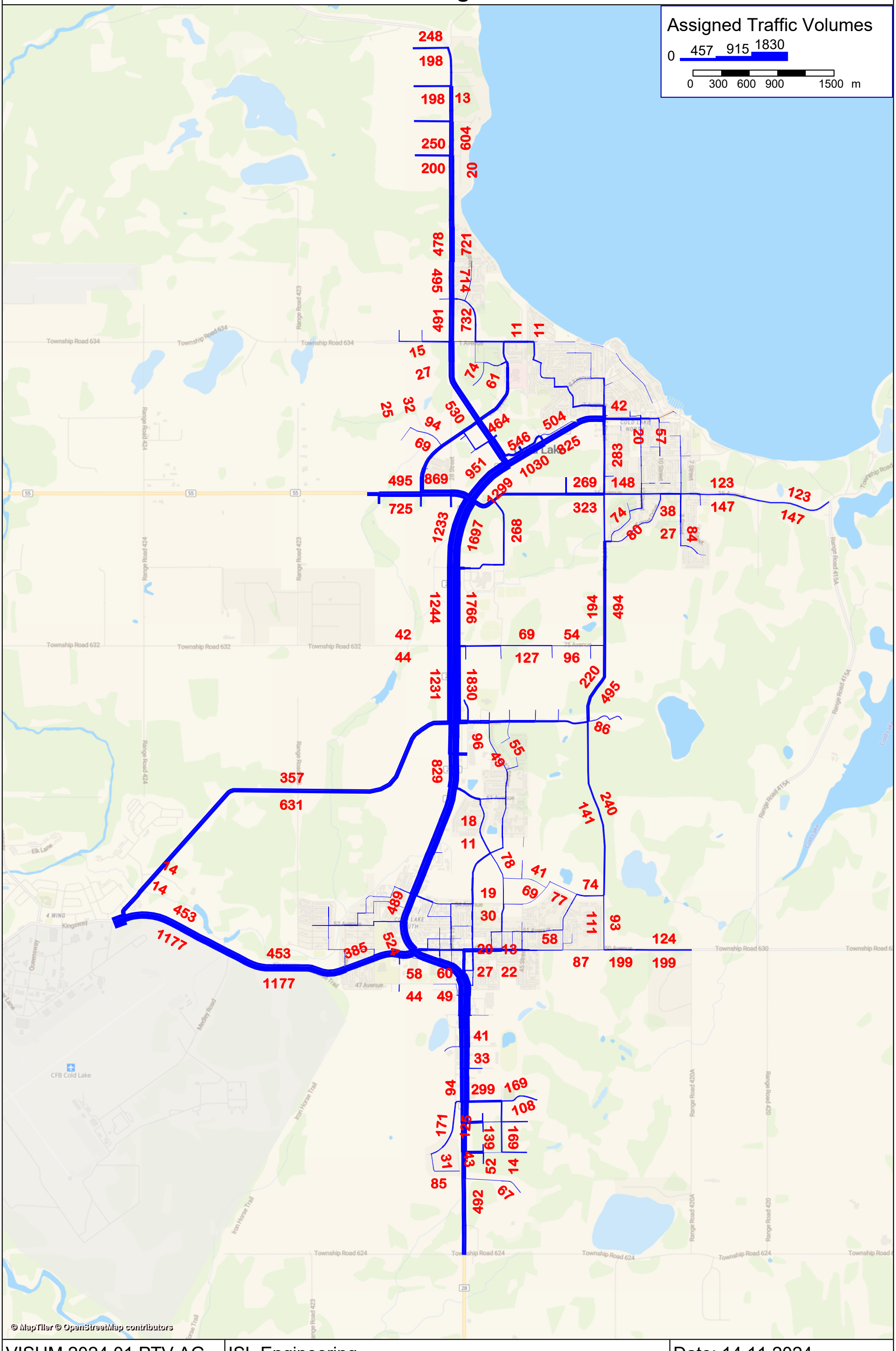
VISUM 2024.01 PTV AG	ISL Engineering	Date: 13.11.2024

25 Year Horizon - Ultimate - Number of Lanes (Per Direction)



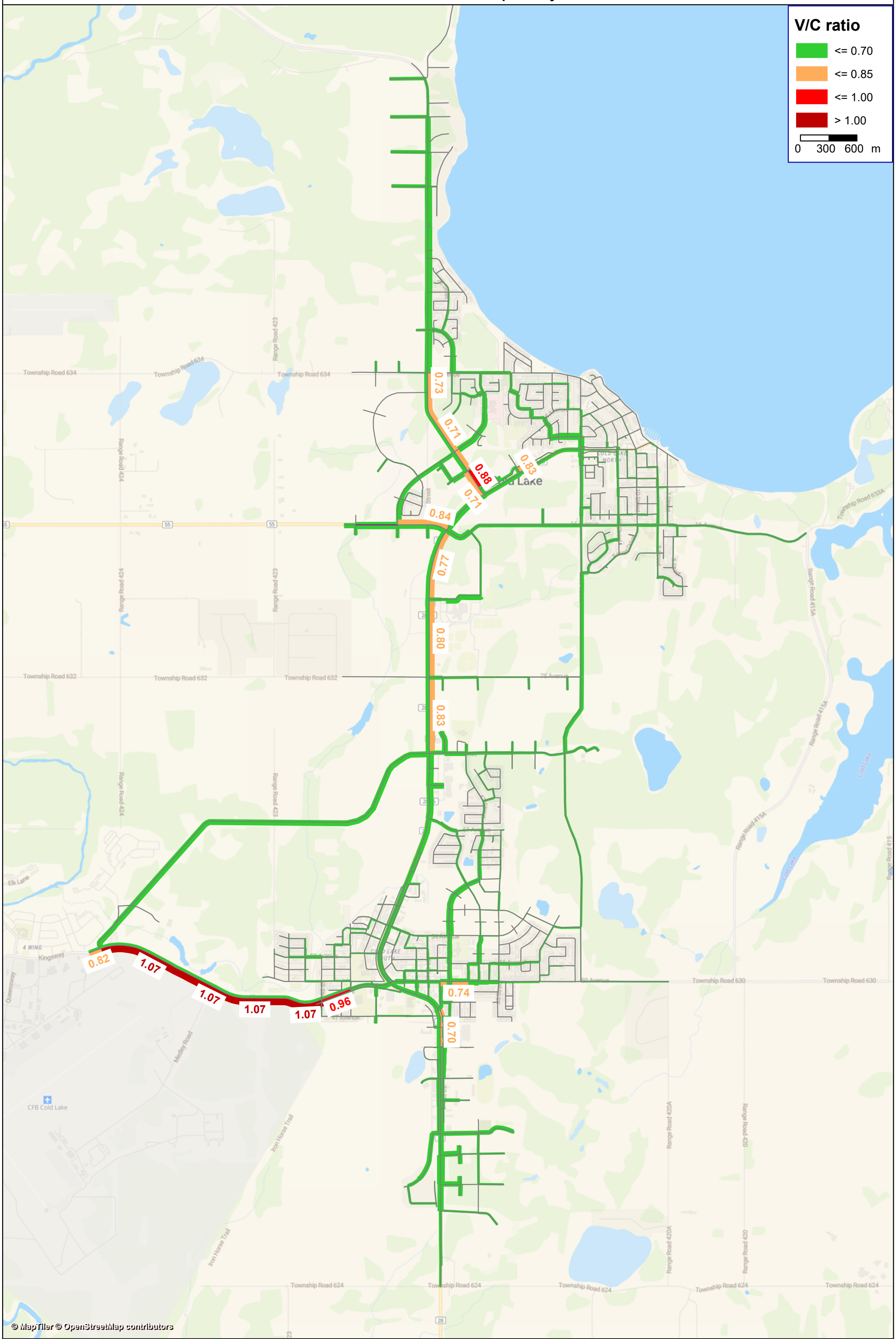
VISUM 2024.01 PTV	ISL Engineering	Date: 20.11.2024

25 Year Horizon Scenario - Ultimate - Assigned Traffic Volumes



VISUM 2024.01 PTV AG	ISL Engineering	Date: 14.11.2024

25 Year Horizon Scenario - Ultimate - Volume/Capacity Ratio



VISUM 2024.01 PTV AG	ISL Engineering	Date: 14.11.2024

25 Year Horizon Do Nothing Scenario - Assigned Traffic Volumes

Assigned Traffic Volumes
0 561 1121 2242
0 300 600 900 1500 m

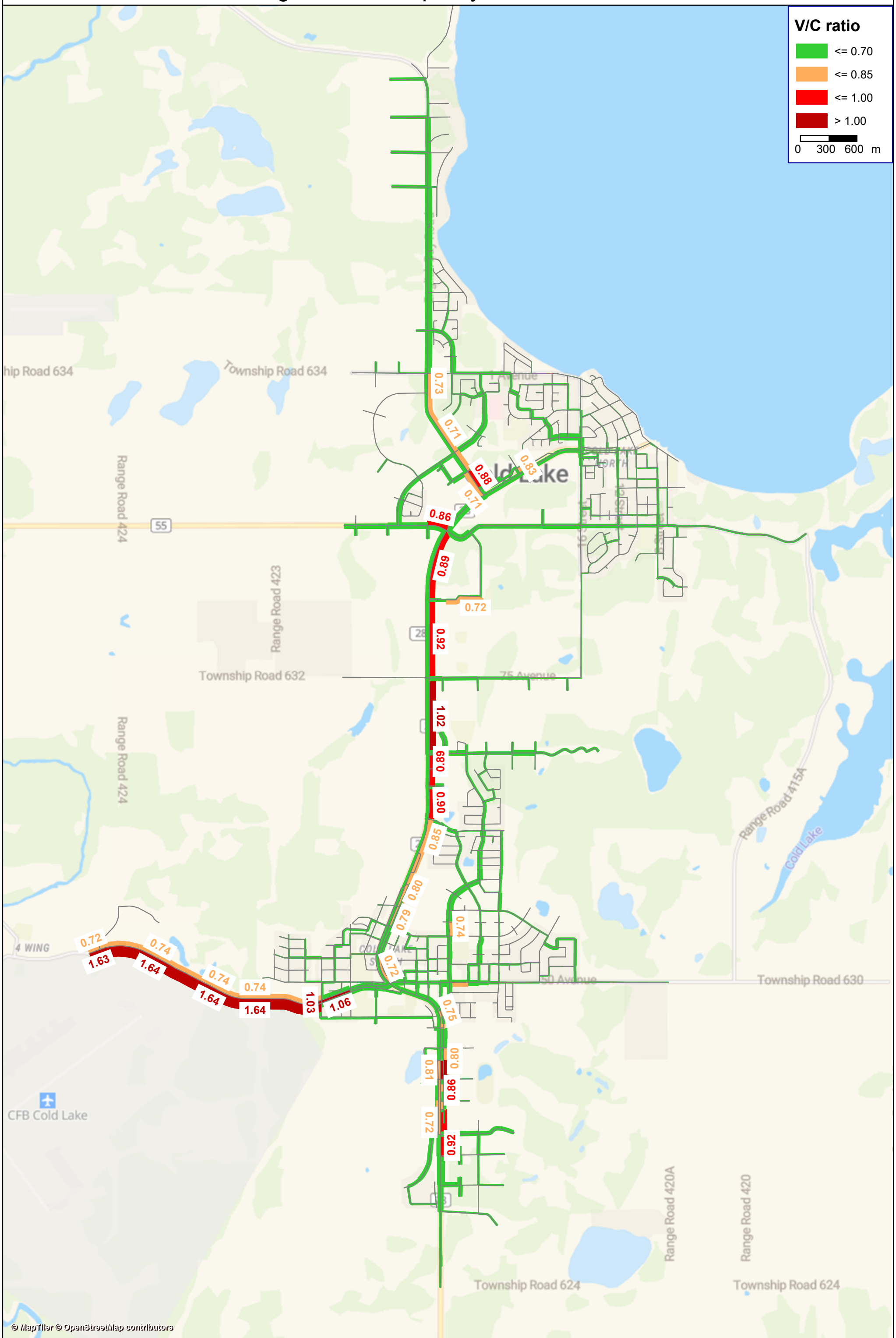
248 13 198 13 198 13 250 20 200 20 477 32 494 10 490 736 230 11 11 74 16 31 27 74 61 25 32 524 458 515 42 93 69 582 977 562 937 1147 166 121 45 34 344 1421 308 214 123 123 510 472 438 25 38 147 147 1331 1952 293 50 27 84 43 1328 2029 43 164 42 115 78 44 268 215 1369 2242 100 86 77 57 76 902 19 12 14 14 14 810 1808 810 1808 736 705 762 16 22 17 26 41 40 124 124 104 199 199 53 58 27 21 133 41 33 372 169 273 108 589 129 148 58 25 85 61 492

Township Road 634
Township Road 634
Township Road 632
Township Road 630
Township Road 624
Township Road 624
Range Road 424
Range Road 423
Range Road 424
Range Road 420A
Range Road 420
Range Road 415A
50 Avenue
75 Avenue
12 Street
55
4 WING
CFB Cold Lake
Cold Lake
COLD LAKE NORTH
COLD LAKE SOUTH
ColdLake

© MapTiler © OpenStreetMap contributors

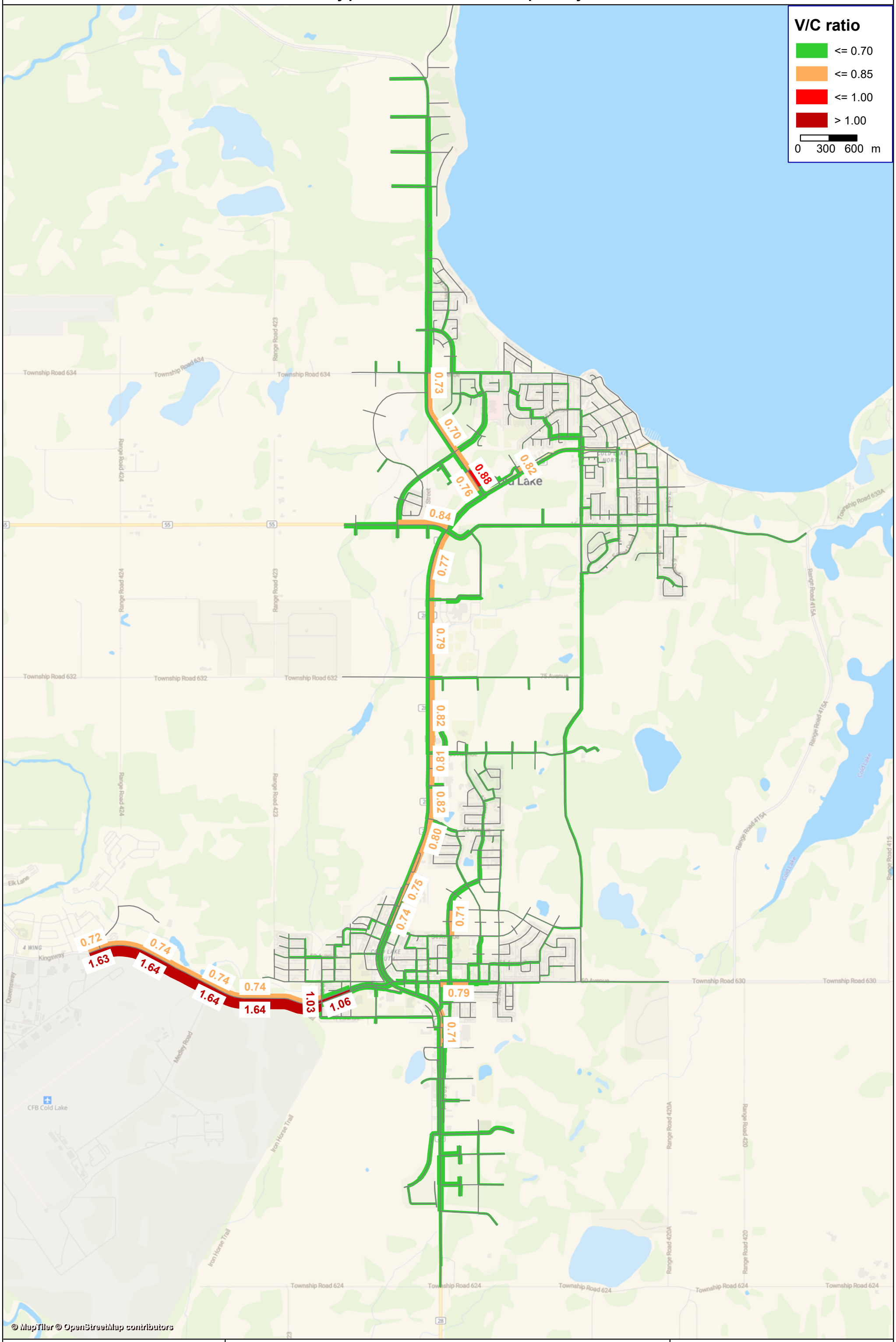
VISUM 2024.01 PTV AG	ISL Engineering	Date: 13.11.2024

25 Year Horizon Do Nothing - Volume/Capacity Ratio



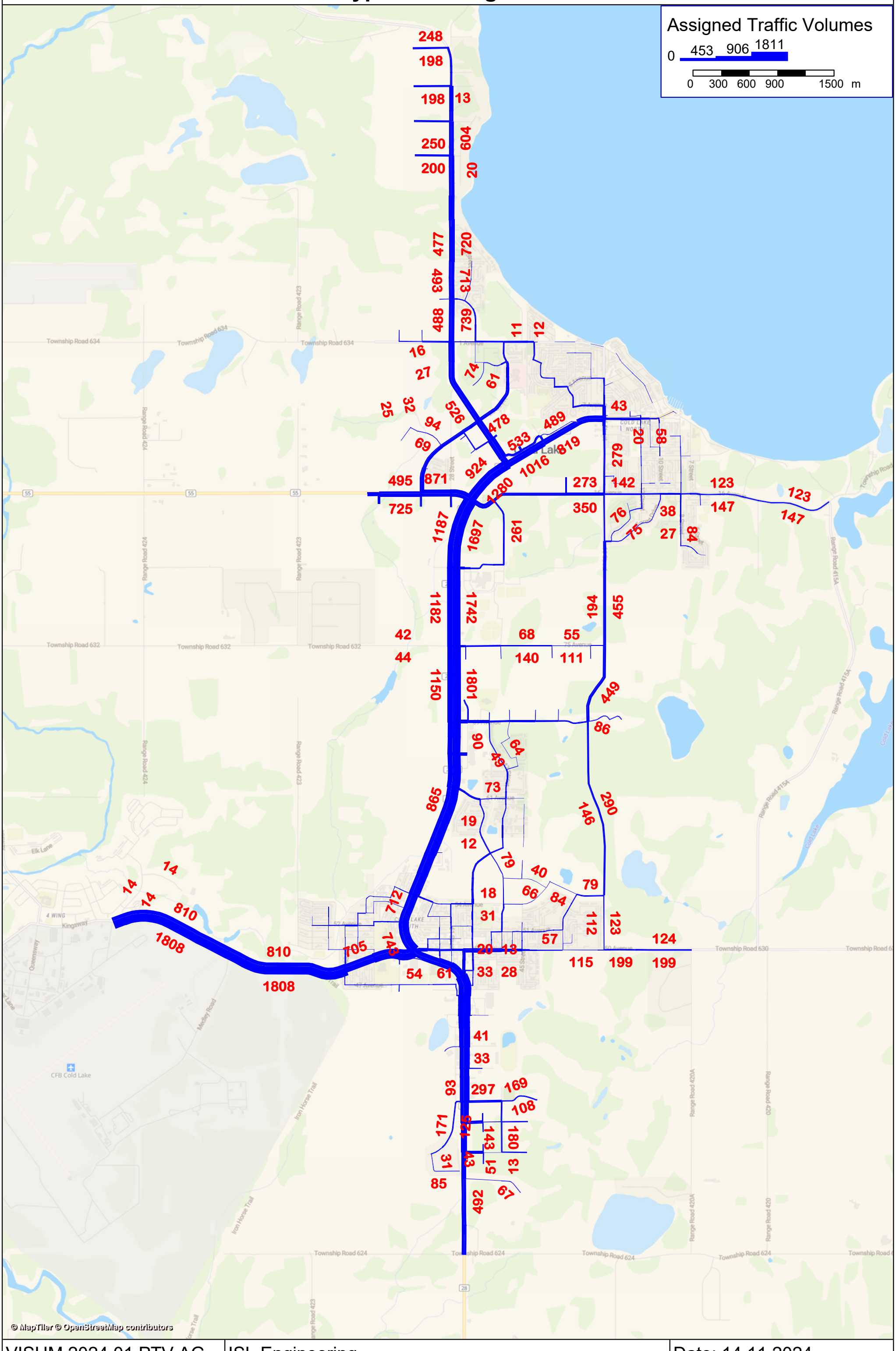
VISUM 2024.01 PTV AG	ISL Engineering	Date: 13.11.2024

25 Year Horizon Scenario - No Bypass - Volume/Capacity Ratio



VISUM 2024.01 PTV AG	ISL Engineering	Date: 14.11.2024

25 Year Horizon Scenario - No Bypass - Assigned Traffic Volumes



VISUM 2024.01 PTV AG	ISL Engineering	Date: 14.11.2024

APPENDIX H
What We Heard Report

City of Cold Lake Transportation Master Plan
What We Heard Report

Winter 2024 - 2025

Project Overview

The City of Cold Lake is undertaking a Transportation Study to plan for a transportation network that will provide service both now and in the future to a community that continues to grow.

The Transportation Master Plan (TMP) will recommend a transportation network with a program that prioritizes specific improvements to address the current and future transportation needs of the community. The TMP recommendations will align with the City's priorities, policies, funding, and technical best practices.

Engagement Overview

Stakeholders and residents were invited to provide input on how they felt existing transportation infrastructure was serving their needs and the needs of the community and where they felt improvements could be made.

This report summarizes the input received from these participants.

Project Area

The TMP will apply primarily to Cold Lake, though the effects of the surrounding area including Hwy 55 and Highway 28 play a vital role on the traffic dynamics and are also being considered.

How Decisions Are Made

The TMP will reflect the growth and functions provided in:

- The City of Cold Lake Municipal Development Plan (MDP) (May 2021) as adopted under the Bylaw #699-LU-21
- The City of Cold Lake Area Structure Plans (ASP's)
- The City of Cold Lake and Municipal District of Bonnyville no. 87 Intermunicipal Development Plan (IDP) (Draft Report, Sep 2022)
    - The Draft IDP Sep 2022 reflects the City's 2019 annexation, changes to the Municipal Government Act, and new growth opportunities for both City and the M.D.

Role of the Public

For this project, the public held a consulting role and shared perspectives, values, and feedback on the transportation issues of the community. This input is being considered by project decision-makers and incorporated, where possible, into the design of the TMP.

	INFORM	CONSULT	INVOLVE	COLLABORATE	EMPOWER
PUBLIC PARTICIPATION GOAL	To provide the public with balanced and objective information to assist them in understanding the problem, alternatives and/or solutions.	To obtain public feedback on analysis, alternatives and/or decision.	To work directly with the public throughout the process to ensure that public concerns and aspirations are consistently understood and considered.	To partner with the public in each aspect of the decision including the development of alternatives and the identification of the preferred solution.	To place final decision-making in the hands of the public.

Source: International Association for Public Participation (IAP2), Participation Spectrum

How We Engaged

Engagement happened during Winter 2024 using two in-person open houses and an online survey.

The Public Survey:

A survey sought to understand participant feelings about the adequacy of existing transportation infrastructure and any improvements they felt were necessary.

The survey was online, with paper surveys available at the open houses. The survey was open between December 5 and 19, 2024.

- 14 people participated in the survey.

Open Houses:

Two open houses were hosted at the Cold Lake Energy Centre on December 5, 2024. The first ran from 1 – 3 p.m. for stakeholders and the second from 5 – 7 p.m. for the public. The project team shared information about community transportation problems, possible solutions, and the project process. Information was shared using display boards and in-person conversations.

- 10 participants attended the stakeholder open house.
- 10 participants attended the public open house.
- Participants at the public open house also included a handful of teenagers who completed the survey.

How We Spread the Word

The open house and online survey were promoted through the following channels:

- The City's website
- The City's social media channels
- Local newspaper
- Direct letter/e-mail invitations sent by the City to local stakeholders

What We Heard

High-Level Themes

- Moderate satisfaction with walking in Cold Lake.
- Pedestrian crossing safety was flagged as a significant issue.
- Personal safety was a concern when walking due to presence of community members who are unhoused.
- Desire for more trails for biking, scootering and rolling.
- Better trail maintenance needed, especially for those with mobility limitations.
- Pathway inclines might also be an issue for users with mobility issues.
- Desire for better transit service.
- Speeding, reckless drivers are a concern.
- Drivers are mostly satisfied with driving in Cold Lake.
- Concern about traffic on Veterans way impacting nearby schools.
- Connections between areas by sidewalk and other trails are sufficient.
- Minor concern about the impact free transit is having on tax revenue spending.

Detailed Summary

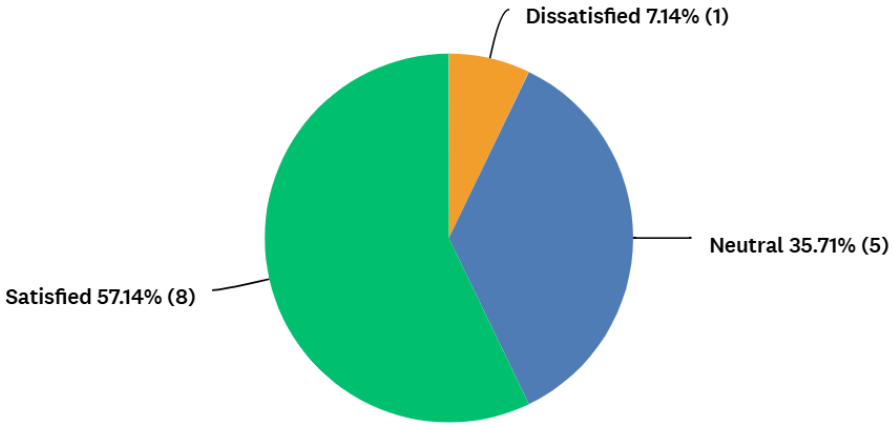
Online Survey

Each comment and piece of feedback includes a number shown as "(#)" to show how many participants shared this opinion.

Question 1

What we asked:

How satisfied are you with WALKING in Cold Lake?



Question 2

What we asked:

How can WALKING be made better in Cold Lake?

What we heard:

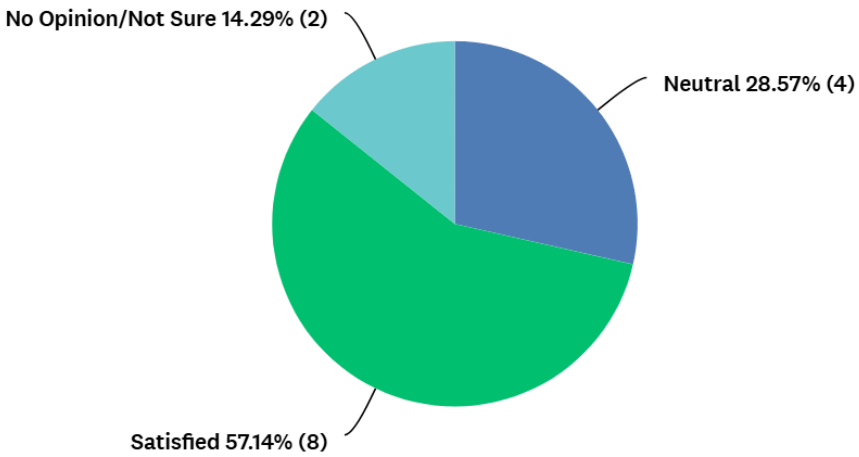
- Concerns about feeling unsafe around community members who are unhoused. (5)
- Make trails safer with better lighting. (3)
- More, good quality paths. (3)
- Improve crossing lights on route to the military base from the courthouse. (1)
- Improve snow and ice clearing on pathways/sidewalks to make them safer. (1)
- More trees around pathways to make it more relaxing. (1)

Question 3

What we asked:

How satisfied are you with BIKING and ROLLING (stroller, wheelchair, scooter etc.) be made better in Cold Lake?

What we heard:



Question 4

What we asked:

How can BIKING and ROLLING (stroller, wheelchair, scooter etc.) be made better in Cold Lake?

What we heard:

- Make trails smoother and better maintained. (3)
- More Trails. (2)
- Separate trails for different modes of transportation. (1)
- More lighting in small residential areas for safety. (1)
- Make paths more accessible. (1)
- Wider Trails. (1)

Question 5

What we asked:

Are there any missing sidewalk or trail links that the City should consider constructing to improve user experience? (E.g., to other routes or destinations)

What we heard:

- No. (8)
- 52 Avenue and 53 Avenue between 55 Street and 57 Street. (1)
- 16 Street from the Permanent Married Quarters south to the Town Shop. (1)
- Connect 49 Street all the way. (1)

Question 6

What we asked:

How do you think accessibility infrastructure could be improved in Cold Lake for residents with mobility challenges?

What we heard:

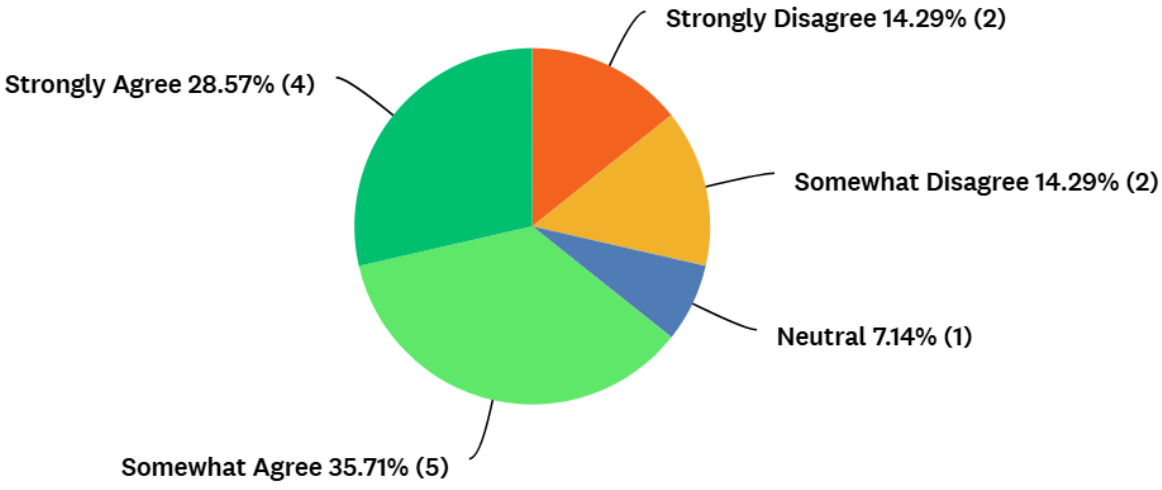
- Improve trail maintenance. (2)
- Free Transit. (1)
- Free handibus. (1)
- Expand adaptive Transit department. (1)
- Increase bus frequency or add more busses. (1)
- Hills are an issue for trails. (1)

Question 7

What we asked:

How much do you agree with the following statement: Cold Lake has a problem of drivers speeding and disobeying traffic signs.

What we heard:



Comments:

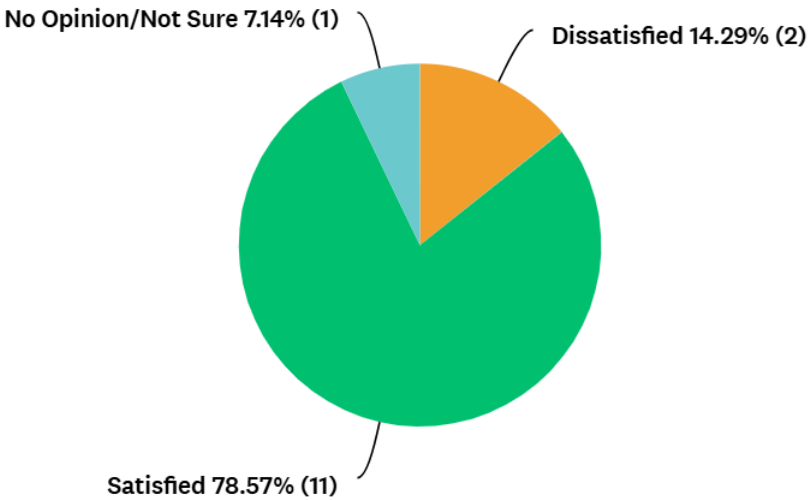
- People don't know the rules of the road and don't act safely. (2)
- It's been unsafe for me. (1)

Question 8

What we asked:

How satisfied are you with DRIVING in Cold Lake?

What we heard:



Question 9

What we asked:

How can DRIVING be made better in Cold Lake?

What we heard:

- More skilled and careful drivers. (3)
- Stronger police presence. (2)
- Better road maintenance and snow removal. (2)
- Better signage to deter excessive left lane driving. (1)
- Shorter stop times when crossing 55 Street at the traffic signals. (1)

Question 10

What we asked:

What safety issues should the City be aware of when people are WALKING, BIKING, or ROLLING? (E.g., a specific unsafe intersection, speed, crosswalks etc.)

What we heard:

- Add a crosswalk sign to 49 Street and 48 Avenue intersection to support increased adult and child pedestrian traffic. (1)
- Add an overhead pedestrian crossing light to the south side of the intersection of 28 Street and 61 Avenue. Pedestrians are hard to see. (1)
- Move crosswalk further down 69 Avenue from 51 Street. 69 Avenue and 51 Street intersection is dangerous for pedestrians. Other intersections have the same issue. (1)
- Drunk drivers hitting pedestrians on the sidewalk. (1)
- Jay walking. (1)
- Drivers ignoring crosswalks. (1)
- Drivers not following rules. (1)
- Need more awareness-raising signage. (1)

Question 10

What we asked:

Do you have anything else to share with the project team?

What we heard:

- No. (10)
- Extend transit service to midnight for people who get off work late. (1)

Next Steps

Feedback received will be considered alongside public policy and technical requirements by the project team as they finalize the TMP.

The TMP will be brought to City Council in early 2025 for approval. A final TMP will be published on the project webpage in Spring 2025.

Updates about the project can be found on the project website.