City of Prince Albert
Transportation Master Plan

Prepared For: Public Works Department, City of Prince Albert

Submitted By: Allnorth
100-2100 Airport Drive
Saskatoon, SK S7L 6M6

Allnorth Contact: Paul Nyirongo, M.Eng., P.Eng.
Phone: 306-242-4303
Email: pnyirongo@allnorth.com

Date: 3 April 2017

DOCUMENT INFORMATION

Project Number:	15SK0016
File Number:	1900
Filename:	
Document Revision:	

REVISION HISTORY

Rev.#	Date of Issue	Reviewed By	Approved By	Description
1	15-03-2017	PN	TG	Draft Report
2	24-03-2017	PN	TG	Final Report
3	03-04-2017	PN	TG	Final Report (Report Title changed at the request of MHI)
4				
5				
6				
7				

TABLE OF CONTENTS

APPENDICES

LIST OF FIGURES

LIST OF TABLES

EXECUTIVE SUMMARY

Allnorth Consultants (Allnorth) was retained by the City of Prince Albert (the City) to conduct a Transportation Master Plan (TMP). The study was a review of all aspects of current and future traffic flow within the City. It was partly an operational study and partly a travel modelling/forecasting study covering collector and arterial roadways. The intent was to identify current and future capacity deficiencies and develop ways of improving capacity and traffic flows. The study considered three planning horizons; 5 year (short-term), 10 year (medium-term) and 20 year (long-term). A 0.8% growth rate in City population and traffic was used over the planning horizons.

The study objectives were to:

- Quantify and document existing conditions of the arterial and collector roadway system;
- Review previous bridge crossing studies and update costs to 2017 dollars;
- Identify deficiencies in the existing system and develop ways of improving operations;
- Forecast future traffic based on planned growth and prepare a plan to accommodate future traffic volumes, including identification of new roadways;
- Prioritize all improvements based on need;
- Update roadway classifications based on the function of the roadway; and,
- Prepare an order of magnitude cost estimates of all proposed improvements.

The study was directed by a Project Management Team (PMT) composed of staff from the City of Prince Albert and the Ministry of Highways and Infrastructure (MHI).

The major findings of the study include:

- Generally, the existing transportation system (intersections and corridors) is operating at acceptable levels of service (LOS). The major capacity improvement required is the 4-laning of Marquis Drive between Central Avenue and 4th Avenue E;
- In the short-term there are a few intersections and corridors that will require improvements based on capacity and safety;
- The removal of the existing traffic signal from the intersection 15th Street E and 7th Avenue E would improve traffic flow at a critical intersection of 15th Street E and 6th Avenue E;
- Installation of a new traffic signal at 15th Street E and 8th Avenue E would improve signal spacing on the 15th Street E corridor and allow the corridor to operate efficiently;
- Traffic volumes at the intersection of Central Avenue and 22nd Street have grown to the point that the four-way stop control is insufficient and warrants the installation of traffic signals;
- In the long-term the development of both West Hill and Crescent Acres can be accommodated with proper improvements to the network;
- A new access from Highway 302 to Byars Street is required within five years to facilitate the development of Crescent Acres. If this access is not provided 15th Street E becomes overloaded and operates at unacceptable LOS.

Recommendations for each planning horizon are presented below:

Short-Term Recommendations

The short-term (0-5 years) recommendations are illustrated in **Table ES-1.** The estimated capital costs at all planning horizons do not include engineering or contingencies.

Table ES-1: Short-Term Recommendations

Recommended Improvement	Estimated Cost
Marquis Rd -Widen Marquis Road to 4 lanes between Central Ave and 4th Avenue E. Install sidewalks on both sides as part of the widening.	$900,000
Marquis Rd -Install sidewalks between 4th Avenue and 6th Avenue E. This work can be done as part of the Marquis Rd widening above.	$63,000
2nd Avenue W –Install sidewalk on the east side between 28th Street and 30th Street	$39,900
Central Ave & 22nd Street E –Install new traffic signal at this intersection	$180,000
15th Street E & 7th Avenue E –Remove and salvage traffic signal at 7th Avenue E and extend the storage length for the westbound left turn lane at 15th Street E and 6th Avenue E. Re-design the intersection to allow right-in right-out movements only.	$10,000
15th Street E & 8th Avenue E –Install the traffic signals salvaged from 7th Avenue at this intersection.	$90,000
15th Street E –Install sidewalk on the north side between 12th Avenue E and 15 Avenue E	$126,000
15th Street E –Remove a two-way left turn lane and install raised medians. The segments affected are from 1st Avenue E and 5th Avenue E and from 7th Avenue E to 10th Avenue E.	$977,400
6th Avenue E –Install raised medians, between Marquis Road to Southwood Drive	$480,000
6th Avenue W & 28th Street W –Install new traffic signals at this intersection	$180,000
15th Ave E & 22nd Street E -Install new traffic signals at this intersection.	$180,000
6th Avenue E near Carlton High School –Install new pedestrian flashing lights on a trial basis	$40,000
2nd Avenue W and 13th Street – Install new pedestrian flashing lights on a trial basis	$10,000
Marquis Rd –Extend Marquis Rd from 4th Ave W to 6th Avenue W	$620,000
21st Avenue –Construct a new segment of 21st Avenue from Highway 302 to Byars St E	$680,000
City Wide – Prepare access control/management guidelines	$15,000
Highway No. 2 Interchange –Conduct an operational study to develop options for accommodating the Highway No. 55 to Highway No. 2 loop/ramp	$25,000
TOTAL	**$4,616,300**

Medium-Term Recommendations

The short-term (5-10 years) recommendations are illustrated in **Table ES-2**.

Table ES-2: Medium-term Recommendations

Improvement	Estimated Cost
Marquis Rd -Extend Marquis Rd from 15th Avenue E to Bradbury Drive.	$2,720,000
Marquis Rd -Extend Marquis Rd from 6th Avenue W to 10th Avenue W.	$1,156,000
10th Avenue W – Extend 10th Avenue from 28th Street W to Marquis Rd	$1,360,000
TOTAL	**$5,236,000**

Long-Term Recommendations

The long-term (10-20 years) recommendations are illustrated in **Table ES-3**.

Table ES-3: Long-Term Recommendations

Improvement	Estimated Cost
15th Street E -Widen to 6 lanes between 10th Avenue E and 2nd Ave W	$7,000,000
15th Avenue E & Muzzy Drive –Intersection improvements to include turning lanes.	$150,000
15th Avenue E & Olive Diefenbaker Dr –Intersection improvements to include turning lanes.	$150,000
21st Avenue E –Extend 21st Avenue E from Bradbury Dr to Byars Street	$2,890,000
Sub-Total for the 20 Year Long-Term Planning Horizon	**$10,190,000**
Marquis Rd* –Extend Marquis Rd from 10th Ave W to 16th Avenue W	$1,360,000
Marquis Rd* –Extend Marquis Rd from 21st Ave E to Highway 302 E	$3,400,000
16th Avenue W* –Construct 16th Avenue from Marquis Rd to 15th Street W	$3,570,000
28th Street W* –Extend 28th Street W from 10th Avenue W to 16th Avenue W	$1,360,000
Sub-Total for Projects Beyond 20 Year Planning Horizon	**$19,880,000**

*Beyond 20 year planning horizon

Urban Highway Connector Program (UHCP)

Two of the short-term projects recommended are on roadways covered by the Framework Agreement between the City and the Ministry of Highways & Infrastructure under the Urban Highway Connector Program. As such, the projects may be eligible for funding from the UHCP. It is recommended that the City of Prince Albert make an application for funding to MHI. The projects and amounts that are eligible under the UHCP are illustrated in **Table ES-4**.

Table E-S4: UHCP Eligible Projects

Project Location	Description	Funding Application
15th Street E – 1st Av to 5th Ave E and 7th Ave to 10th Ave E	Raised Medians	$977,400
6th Avenue E – Marquis Rd to Southwood Dr	Raised Median and Widening	$520,000
TOTAL		**$1,497,400**

1 INTRODUCTION

Allnorth Consultants (Allnorth) was retained by the City of Prince Albert (the City) to conduct a Transportation Master Plan (TMP). The study was a review of all aspects of current and future traffic flow within the City. It was partly an operational study and partly a travel modelling/forecasting study covering collector and arterial roadways. The intent was to identify current and future capacity deficiencies and develop ways of improving capacity and traffic flows. The study considered three planning horizons; 5 year (short-term), 10 year (medium-term) and 20 year (long-term). A 0.8% growth rate in City population and traffic was used over the planning horizons.

The study objectives were to:

- Quantify and document existing conditions of the arterial and collector roadway system;
- Review previous bridge crossing studies and update costs to 2017 dollars;
- Identify deficiencies in the existing system and develop ways of improving operations;
- Forecast future traffic based on planned growth and prepare a plan to accommodate future traffic volumes, including identification of new roadways;
- Prioritize all improvements based on need;
- Update roadway classifications based on the function of the roadway; and,
- Prepare an order of magnitude cost estimates of all proposed improvements.

1.1 Background Information

The City of Prince Albert is the third largest city in Saskatchewan. It is located on the banks of the North Saskatchewan River and is bordered by the Rural Municipality of Prince Albert No. 461 and the Rural Municipality of Buckland No. 491. Due to its location, the City of Prince Albert is often referred to as the "Gateway to the North". It is the last major centre on the route to the resource-rich northern Saskatchewan.

There are several factors that affect the amount and flow of traffic in an urban setting. It was necessary to describe these factors briefly as they form the back drop on which the transportation study will be conducted. Some of the relevant factors are described below.

1.1.1 Population

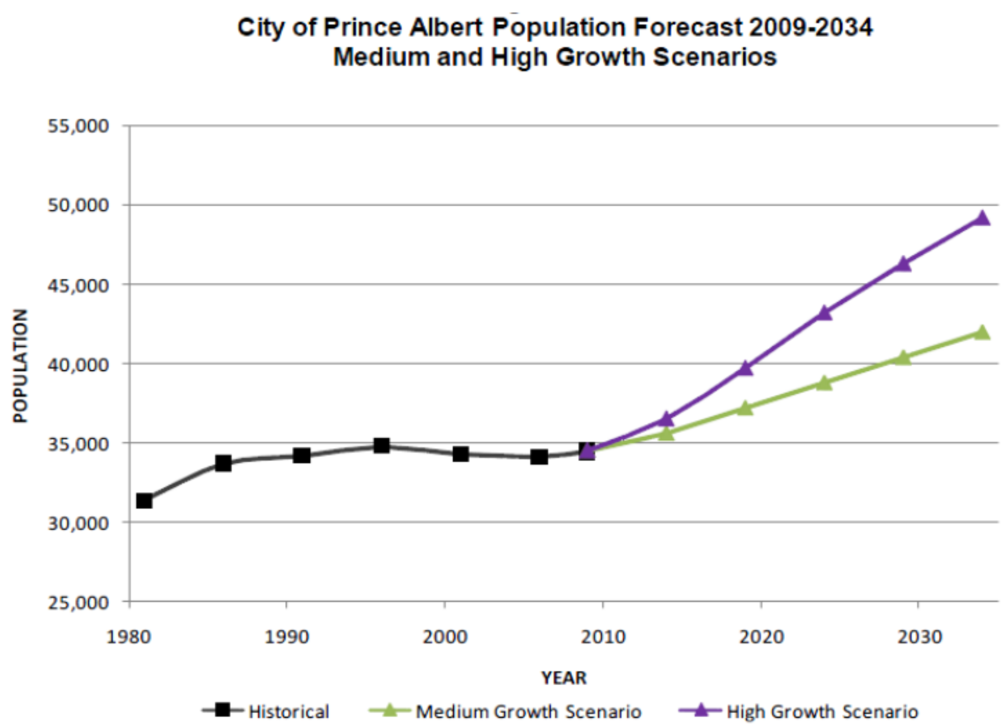
In the census of 2011 the population of the City of Prince Albert was 35,129 residents. The recently published 2016 census puts the population of the City of Prince Albert at 35,926. The City of Prince Albert, through previous studies had considered three growth scenarios; low growth, medium growth and high growth. The City has adopted a medium growth scenario. **Table 1-1** illustrates the projected growth based on the medium growth scenario. The bolded rows in **Table 1-1** represent the planning horizons for this study. A graphical representation of growth scenarios considered by the City is illustrated in a chart below.

Table 1-1: Projected Population Growth Under Medium Growth Scenario

Year	Growth Rate	Population
2011	0.6	35,129
2012	0.6	35,340
2013	0.6	35,552
2014	0.8	35,765
2015	0.8	36,051
2016	**0.8**	**36,340**
2017	0.8	36,630
2018	0.8	36,923
2019	0.8	37,219
2020	0.8	37,517
2021	**0.8**	**37,817**
2022	0.8	38,119
2023	0.8	38,424
2024	0.8	38,732
2025	0.8	39,041

Year	Growth Rate	Population
2026	**0.8**	**39,354**
2027	0.8	39,669
2028	0.8	39,986
2029	0.8	40,306
2030	0.8	40,628
2031	0.8	40,953
2032	0.8	41,281
2033	0.8	41,611
2034	0.8	41,944
2035	0.8	42,280
2036	**0.8**	**42,618**
2037	0.8	42,959
2038	0.8	43,302
2039	0.8	43,649
2040	0.8	43,998

Source: AECOM Water Hydraulics System Analysis, 2015



Source: Household and Employment Forecast Study 2009, Watson & Associates Economists Ltd

1.1.2 Demographics

The demographics of the population of the City of Prince Albert is illustrated in **Table 1-2**. For comparison purposes, the national averages are shown in the right column of the table.

Table 1-2: City of Prince Albert Demographics

Age Group	City of Prince Albert	National Averages
Over 65	13.5%	14.7%
15-64	65.6%	68.5%
0-14	21.0%	16.7%
Totals	~100%	~100%

1.1.3 Mode of Transportation

Residents of the City of Prince Albert have access to all modes of transportation available in an urban setting. **Table 1-3** is an illustration of the number and percentage of trips on each mode of transportation by residents of the City of Prince Albert in 2011. According to Statistics Canada, in 2011, 83.3% of all commuters used a private automobile as a means of going to and from work. Another 6% used a private automobile as a passenger. Only 1.8% of commuters within Prince Albert used public transit to get to work. The average commuting time to work in Prince Albert was 16.0 minutes, compared to the provincial average of 18.5 minutes. For comparison purposes, **Table 1-3** lists similar numbers on a province-wide basis. Generally, the mode shares of the City of Prince Albert are similar to that of the Province of Saskatchewan.

Table 1-3: Mode of Transportation

Mode of Transportation	City of Prince Albert		Saskatchewan	
	Number	Percentage	Number	Percentage
Private Automobile (Car, truck, van) as a driver	13,360	83.30%	382,000	81.4%
Private Automobile (Car, truck, van) as a passenger	955	6.00%	28,715	6.1%
Public Transit	295	1.80%	12,990	2.8%
Walked	890	5.50%	31,485	6.7%
Bicycle	125	0.80%	5,705	1.2%
Other	415	2.60%	8,185	1.7%

Source: Stats Canada 2011 Census Data

1.1.4 Trip Purposes

The *2008 Prince Albert Transportation Planning Study* conducted an origin-destination study of 714 participants. The objective of the survey was to determine the trip purpose of each participant. Although the study was conducted more than eight years ago in general, the trip purposes are still applicable today. The trip purpose provides an indication of the reason for transportation demand. **Table 1-4** is an illustration of the trip purposes.

Table 1-4: Summary of Trip Purposes

Trip Purpose	Total	Percentage
Work Related (To/From Work)	264	37.0%
Business	55	7.7%
Social/Personal	143	20.0%
Recreational	101	14.1%
Shopping	96	13.4%
Medical/Doctor’s Appointment	12	1.7%
School	2	0.3%
Lodging	1	0.1%
Meal	6	0.8%
Other	28	3.9%
Unrecorded	6	0.8%
TOTALS	714	~100%

Source: 2008 Prince Albert Transportation Planning Study

1.1.5 Vehicle Composition

A vehicle composition survey was conducted as part of the *2003 Prince Albert 6th Avenue East River Crossing Study*. A total of 1,261 vehicles were surveyed. The survey revealed that an overwhelming majority (96.2%) of vehicles on the Prince Albert major corridors were private passenger automobiles. In addition, only 12% of the traffic was what is referred to as external-to-external. Which means that this traffic was only passing through the City. The reverse of that is that 88% of all traffic is either local traffic or was destined/stopped in the City. The survey was conducted more than ten years ago but it is safe to assume that the traffic composition remains the same today. The traffic composition is illustrated in **Table 1-5**.

Table 1-5: 2003 City of Prince Albert Traffic Composition

Vehicle Type	Total Vehicles Surveyed	Percentage
Passenger Automobile, vans and half-ton Trucks	1,213	96.2%
Heavy Trucks	36	2.9%
Recreational Vehicles	10	0.8%
Bus	2	0.1%
Totals	1,261	100%

Source: 2003 Prince Albert 6th Avenue East River Crossing Study

In 2013 the City conducted a more comprehensive all day traffic composition survey at the Diefenbaker Bridge. A total of 23,012 vehicles were surveyed. The results of the survey are illustrated in **Table 1-6**. The comprehensive survey generally confirms what was observed in 2003 sample survey.

Table 1-6: 2013 City of Prince Albert Traffic Composition

Vehicle Type	Total Vehicles Surveyed	Percentage
Passenger Automobile, vans and half-ton Trucks	21,833	93.3%
Heavy Trucks –Multi Trailer	659	2.8%
Single Trailer Trucks	513	2.2%
Truck Unit Chassis	407	1.7%
Totals	23,412	100%

Source: 2014 Bridge Options Report to Prince Albert City Council

1.1.6 North Saskatchewan River and the Diefenbaker Bridge

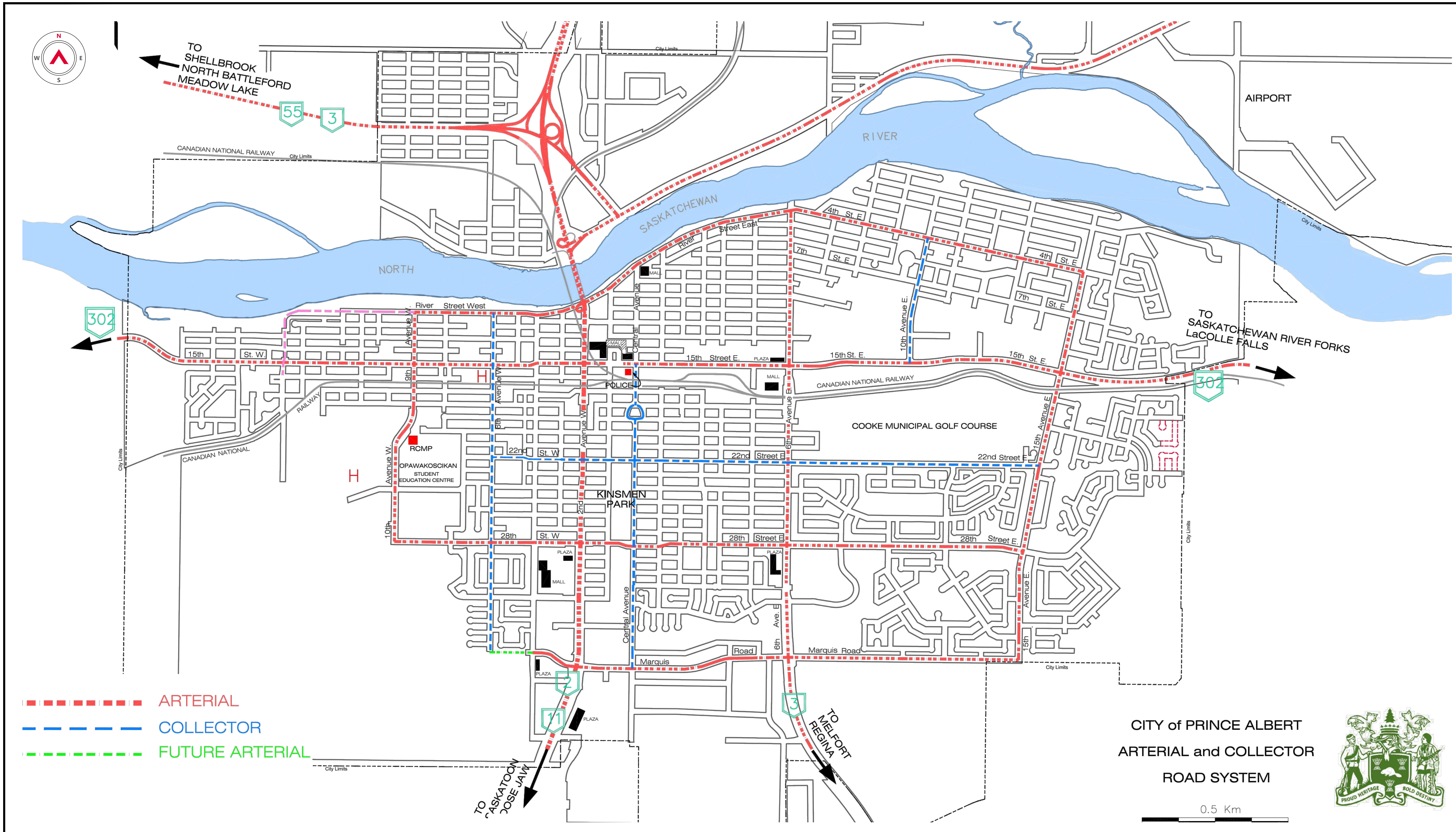
Although the river provides many benefits to the City; it also acts as a major impediment to the development of an efficient transportation network. The Diefenbaker Bridge which was built in 1960 is the only bridge in the City of Price Albert. It connects the City to all northern communities. The next available crossing is the Petrofka Bridge which is more than 120 km southwest of Prince Albert. The 2015 City of Prince Albert counts indicate that the Diefenbaker Bridge has an AADT of approximately 24,000 vehicles per day. However, during the summer months the Diefenbaker Bridge has recorded peak flows of 30,000 vehicles per day.

1.1.7 Public Transit

The City of Prince Albert operates six regular transit routes using eight buses. The service has routes into the downtown transfer point located at Central Avenue and 14th Street. All the routes run on one way loops, to give better coverage of the City with a limited number of vehicles. All buses transfer at 14th Street twice an hour (at 15 and 45 minutes of every hour) at the same time to allow passenger to transfer without having to wait. There is no transit service to the residential communities, industrial areas and airport on the north side of the North Saskatchewan River. Transit usage in the City is small, as previously stated in 2011 Stats Canada reported that on 1.8% of all commuters use transit. The transit system carries approximately 1,240 passengers per day.

1.2 Study Area

The Study Area for this project consisted of the entire City of Prince Albert. The analysis, however was limited to arterial and collector roadways. The total length of roadways by category are: 10.5 km collectors, 30.5 km arterials and 54.3 km highways. **Figure 1-1** is an illustration of the Study Area and the arterial and collector roadways that were analyzed.



City of Prince Albert

Allnorth

CITY OF PRINCE ALBERT
TRANSPORTATION MASTER PLAN

FIGURE. 1-1
2016 ARTERIAL ROADWAYS MAP

Date: 2017/03/29 | User: Tyler Dai | File: P:\SK\2015(0-99)\15SK0016 - City of Prince Albert - Master Transportation Study\1000-Drawings\1011-Civil\01-Production\170206_TD_15SK0016-Transportation Master Plan | Layout: FIG. 1-1 | Paper Size: 558.8mm x 431.8mm

1.3 Study Process

Based on the Terms of Reference, the bulk of the scope of the work was carried out under the three categories described below. A detailed Technical Memo was prepared at the end of each study category and presented to the Project Management Team (PMT). The major study categories are:

(a) Data Collection

The objective of this study subheading was to collect and analyze the traffic data, previous studies and reports in order to establish the chronology of events that lead to the current transportation system. All previous recommendations and how they have affected the transportation system were reviewed and documented.

(b) Existing Traffic Operations

The objective of this section was to analyze existing traffic conditions and document its operation in terms of levels of service for both intersections and corridors.

(c) Traffic Volume Forecast Analysis

The objective of this section was to forecast future traffic volumes at three planning horizons. Analysis on the forecasted volumes was conducted in order to identify deficiencies in capacity at each planning horizon. The planning horizons selected by the City were as follows:

2016 (Existing Conditions) – identification of deficiencies, recommendations for immediate implementation

5 year – identification of deficiencies, recommendations for short-term implementation

10 year – identification of deficiencies, recommendations for medium-term implementation

20 year – identification of deficiencies, recommendations for long-term implementation

1.4 Previous Reports and Studies

As part of the study the following past reports and studies were reviewed:

- 1977 Transportation Study
- 1980 New 6th Ave East River Crossing Study
- 2003 New 6th Ave East River Crossing Study Update
- 2008 Transit System Review & Design Report
- 2008 Prince Albert Transportation Planning Study
- 2010 Bridge Inspection, Testing and Assessments Reports
- 2012 Corridor Traffic Report
- 2012 West Hill Master Plan
- 2013 Crescent Acres Land Study
- 2013 Second Bridge River Crossing Study
- 2015 Bridge Inspection, Testing and Assessment Reports

1.5 Project Management Team (PMT)

The study was conducted jointly by the City of Prince Albert and the Ministry of Highways and Infrastructure (MHI) and was guided by the Project Management Team (PMT). The PMT was composed of members from the two agencies. The following were members of the PMT:

- Wes Hicks, City of Prince Albert;
- Keri Sapsford, City of Prince Albert;
- Umar Khattak, Ministry of Highways and Infrastructure;
- Bryce Komaike, Ministry of Highways and Infrastructure; and,
- Barry Gallivan, Ministry of Highways and Infrastructure

Depending on the discussion topics, the PMT meetings were also attended by the following:

- Nykol Miller, City of Prince Albert and
- Mike Lysitza, City of Prince Albert

2 EXISTING CONDITIONS REVIEW/DATA COLLECTION

2.1 Objective

The objective of this study phase was to collect and compile data regarding the existing conditions. The data was supplied by the City. **Figure 1-1** illustrates all the collector and arterial roadways that were analyzed. The roadway data analyzed and documented included:

- Traffic volumes;
- Historical traffic growth;
- Collisions;
- Current operating speeds;
- Existing roadway features;
- Roadway geometry;
- An inventory of traffic signal locations;
- Existing levels of service for intersections and corridors;
- Urban highway connector program routes and information;
- Truck routes and dangerous goods movement routes

The data for the above was assembled and presented as statistical summaries or graphs and charts and is presented below.

2.2 Statistical summaries – East-West Roadways

In order to systematically address the statistical summaries of the roadways, it was necessary to separate the roadways into two categories: east-west roadways and north-south roadways. East-west roadways are described below starting from the south end.

Marquis Road is an arterial roadway which is partly a four-lane divided roadway partly rural two-lane roadway. The divided sections of Marquis Road are; between 2nd Avenue W and Central Avenue and a section near 15th Avenue E. The general posted speed limit is 60 km/h, with no on-street parking. Currently, it terminates at 15 Avenue E with plans to extend it easterly in the future. Sidewalks are located on both the north and south sides of the road between 4th Avenue W and 2nd Avenue W and the south side only between 2nd Ave W and 6th Ave E. Additionally, a multi-use trail is located on the north side of Marquis Road between 6th Avenue E and 15th Avenue E. The segment of Marquis Road with the highest traffic volume is between 5th Avenue E and 6th Avenue E with an AADT of 16,793.

28th Street is an arterial roadway and provides direct access to Victoria Hospital to the west. 28th Street is primarily a four-lane undivided urban roadway. There is a small segment west of 2nd Avenue where 28th Street is divided. The entire length of roadway has sidewalk access. Sidewalk is located on the north side only between 4th Avenue W and 2nd Avenue W, as well as between 6th Avenue E and 12th Avenue E. Sidewalk is located on the south side only between 10th Avenue W and 7th Avenue W, while the remaining sections of road include sidewalk on both sides of 28th Street. The posted speed limit is 50 km/h, with on-street parking generally permitted. The segment of 28th Street with the highest traffic volume is between 4th Avenue W and 2th Avenue W with an AADT of 14,415.

22nd Street is a two-lane urban collector roadway with a general posted speed limit of 50 km/h. On the east 22nd Street terminates at 15th Avenue E. On the west side 22nd Street terminates just past 6th Avenue W. On-street parking is allowed on 22nd Street. Sidewalks are located along the entire length of the roadway. The sidewalk is located on both the north and south sides of 22nd Street between 7th Avenue W and 6th Avenue E. Between 6th Avenue E and 15th Avenue E, the sidewalk is located on the south side of the road only. The segment of 22th Street with the highest traffic volume is between 6th Avenue E and 12th Avenue E with an AADT of 10,239.

15th Street is a major commercial arterial roadway in the middle of the City of Prince Albert. From 2nd Avenue W to 15th Avenue E 15th Street is a four-lane divided roadway. From 2nd Avenue W westerly to the City limits, 15th Street is an undivided roadway with the number of lanes varying. It is two lanes between the west City limits and 9th Ave W as well as from 15th Ave E and the east City limits. The remaining segments are four lanes. The section from 15th Street E to the City limits is also undivided. On-street parking is permitted between 20th Avenue W and 1st Avenue E. The posted speed limit is 50 km/h between the West City limit and 10th Avenue E, while the section between 10th Avenue E and the East City limit is posted at 60 km/h. The sidewalk is located on both the north and south sides of 15th Street between 20th Avenue W and 10th Avenue E. The sidewalk is located on the north side of the road only between 10th Avenue E and 12th Avenue E and between 15th Avenue E and the east city limit. There is a stretch between 1st Street E and 6th Street E where the sidewalk is located on the south side only, as well as no sidewalk at all between 12th Street E and 15th Street E. The segment of 15th Street with the highest traffic volume is between 6th Avenue E and 10th Avenue E with an AADT of 26,703. This segment currently has the highest volume in the entire City.

River Street East and West is a scenic arterial roadway along the North Saskatchewan River. It is a two-lane undivided roadway with a posted speed limit of 50 km/h. River Street becomes 4th Street E east of 6th Avenue E. On-street parking is permitted on the entire length of River Street. Sidewalk is located on both sides of the road between 2nd Avenue W and 10th Avenue E, while it is located on the south side only between 9th Avenue W and 2nd Avenue W. The remaining segments of road do not have any sidewalks located on either side of the road. The segment of River Street with the highest traffic volume is between Central Avenue and 6th Avenue E with an AADT of 10,756.

Riverside Drive/Highway 55 is another scenic arterial roadway along the North Saskatchewan River. It is primarily a two-lane roadway with a rural cross-section. It provides access the Price Albert Airport. No on-street parking is permitted on Riverside Drive. The posted speed limit varies, with 40 km/h west of the bridge and 90 km/h on the east side of the bridge. There is a sidewalk located on both sides of the road between 3rd Avenue NW and 2nd Avenue NW. The remaining segments of road do not have any sidewalks located on either side of the road. The segment of Riverside Drive with the highest traffic volume is between 6th Avenue NE and the city limits with an AADT of 5,450.

Highway 3 is an arterial roadway on the north side of Prince Albert. Within the City limits it is primarily a four lane divided roadway with a posted speed limit of 70 km/h from Highway 55 to 5th Ave NW, which changes to 90 km/h from 5th Ave NW to the City limit. On-street parking is not permitted and there are no sidewalks located along the roadway. The segment with the highest observed traffic volume is between 5th Ave NW and the bridge with an AADT of 7,504.

Table 2-1 illustrates the roadway attributes of all east-west arterial roadways. Shaded areas in the table indicate roadway sections where the observed speeds are more than 10 km/h above the 85th percentile speed. Generally observed speeds of 10 km/h or more are an indication that the speed limit has been set arbitrary without regard to what motorists perceive as the reasonable speed to travel.

Photos can be found in **Appendix A** for each arterial and collector roadway.

Table 2-1: East-West Roadways Statistical Summary

Roadway Name	From	To	Type (Arterial or Collector, Divided or Undivided)	Length (m)	Number of Lanes	Sidewalks (side)	Current AADT	Speed Limit (km/h)	85th Percentile Speed (km/h)	Load Rating (kg)	On-Street Parking Allowed	Heavy Vehicle Route	Transit Route
Marquis Rd	4th Ave W	Canadian Tire Gas Access	Art/Un	349	2	South	4,654	50	37	52,500	No	No	Yes
	Canadian Tire Gas Access	2nd Ave W	Art/Un	349	2	Both	4,654	50	37	52,500	No	No	Yes
	2nd Ave W	Central Ave	Art/Div	399	4	South	15,302	60	60	52,500	No	Yes	Yes
	Central Ave	5 Ave E	Art/Un	1,016	2	South	14,238	60	59	52,500	No	Yes	Yes
	5 Ave E	6th Ave E	Art/Div	133	4	South	16,793	60	48	52,500	No	Yes	Yes
	6th Ave E	15th Ave E	Art/Un	1,680	2	Trail North	9,246	60	67	52,500	No	No	No
28th St	10th Ave W	7th Ave W	Art/Un	695	4	South	7,175	50	68	52,500	Yes	No	Yes
	7th Ave W	6th Ave W	Art/Un	695	4	Both	7,175	50	68	52,500	Yes	No	Yes
	6th Ave W	4th Ave W	Art/Un	315	4	Both	8,860	50	60	52,500	Yes	No	Yes
	4th Ave W	2nd Ave W	Art/Div	336	4	North	14,415	50	58	52,500	Yes	No	No
	2nd Ave W	Central Ave	Art/Un	390	4	Both	14,307	50	46	52,500	No	No	Yes
	Central Ave	3rd Ave E	Art/Un	522	2	Both	10,722	50	57	52,500	Yes	No	No
	3rd Ave E	6th Ave E	Art/Un	596	2	Both	9,477	50	49	52,500	Yes	No	Yes
	6th Ave E	Terry Simpson Ln	Art/Un	394	4	North	10,793	50	53	52,500	Yes	No	Yes
	Terry Simpson Ln	12th Ave E	Art/Un	761	2	North	10,226	50	59	52,500	Yes	No	Yes
	12th Ave E	15th Ave E	Art/Un	567	2	Both	6,429	50	48	52,500	Yes	No	Yes
22nd St	7th Ave W	2nd Ave W	Coll/Un	875	2	Both	3,158	40	38	52,500	Yes	No	Yes
	2nd Ave W	Central Ave	Coll/Un	381	2	Both	6,185	50	48	52,500	Yes	No	Yes
	Central Ave	3rd Ave E	Coll/Un	490	2	Both	6,185	50	45	52,500	Yes	No	No
	3rd Ave E	6th Ave E	Coll/Un	620	2	Both	8,148	50	53	52,500	Yes	No	Yes
	6th Ave E	12th Ave E	Coll/Un	1,196	2	South	10,239	50	60	52,500	Yes	No	Yes
	12th Ave E	15th Ave E	Coll/Un	638	2	South	3,211	50	68	52,500	Yes	No	Yes
15th St	W. City Limit	20th Ave W	Art/Un/Rural Cross-section	828	2	None	1,740	60	66	94,100	No	Yes	No
	20th Ave W	9th Ave W	Art/Un	1,680	2	Both	7,103	50	59	94,100	Yes	Yes	Yes
	9th Ave W	2nd Ave W	Art/Un	1,240	4	Both	12,738	50	53	94,100	Yes	Yes	Yes
	2nd Ave W	Central Ave	Art/Div	382	4	Both	21,658	50	57	94,100	Yes	Yes	No
	Central Ave	FCC Access	Art/Un	1,108	4	Both	24,037	50	58	94,100	No	Yes	Yes

Roadway Name	From	To	Type (Arterial or Collector, Divided or Undivided)	Length (m)	Number of Lanes	Sidewalks (side)	Current AADT	Speed Limit (km/h)	85th Percentile Speed (km/h)	Load Rating (kg)	On-Street Parking Allowed	Heavy Vehicle Route	Transit Route
	FCC Access	6th Ave E	Art/Un	1,108	4	South	24,037	50	58	94,100	No	Yes	Yes
	6th Ave E	7th Street E	Art/Un	878	4	North	26,703	50	59	94,100	No	Yes	Yes
	7th Street E	10th Ave E	Art/Un	878	4	Both	26,703	50	59	94,100	No	Yes	Yes
	10th Ave E	12th Ave E	Art/Un	1,110	4	North	11,832	60	53	94,100	No	Yes	Yes
	12th Ave E	15th Ave E	Art/Un	1,110	4	None	11,832	60	53	94,100	No	Yes	Yes
	15th Ave E	E. City Limits	Art/Un/Rural Cross-section	1,348	2	North	2,056	60*	102	94,100	No	Yes	No
River St	12th Ave W	9th Ave W	Art/Un	580	2	None	4,125	50	60	52,500	Yes	No	No
	9th Ave W	6th Ave W	Art/Un	580	2	South	4,125	50	60	52,500	Yes	No	No
	6th Ave W	Bridge	Art/Un	1,159	2	South	7,780	50**	57	52,500	Yes	No	Yes
	Bridge	Central Ave	Art/Un	1,159	2	Both	7,780	50**	57	52,500	Yes	No	Yes
	Central Ave	6th Ave E	Art/Un	1,188	2	Both	10,756	50**	59	52,500	Yes	No	No
	6th Ave E	10th Ave E	Art/Un	1,018	2	Both	5,666	50	56	52,500	Yes	No	Yes
	10th Ave E	14th Ave E	Art/Un	1,152	2	None	2,793	50	58	52,500	Yes	No	No
	14th Ave E	15th Ave E	Art/Un	1,152	2	North	2,793	50	58	52,500	Yes	No	No
Riverside Dr	W .City Limits	4th Ave NW	Art/Un/Rural Cross-section	2,641	2	None	844	40	66	52,500	No	No	No
	4th Ave NW	3rd Ave NW	Art/Un/Rural Cross-section	404	2	None	1,386	40	38	52,500	Yes	No	No
	3rd Ave NW	2nd Ave NW	Art/Un/Rural Cross-section	404	2	Both	1,386	40	38	52,500	Yes	No	No
	2nd Ave NW	Bridge	Art/Un/Rural Cross-section	189	2	None	1,675	40	53	52,500	No	No	No
Hwy 55	Bridge	Highway 3	Art/Un/Rural Cross-section	432	2	None	3,167	60	85	94,100	No	Yes	No
	Highway 3	6th Ave NE	Art/Un/Rural Cross-section	1,727	2	None	5,316	90	92	94,100	No	Yes	No
	6th Ave NE	Airport Dr	Art/Un/Rural Cross-	2,525	2	None	5,450	90	121	94,100	No	Yes	No

Roadway Name	From	To	Type (Arterial or Collector, Divided or Undivided)	Length (m)	Number of Lanes	Sidewalks (side)	Current AADT	Speed Limit (km/h)	85th Percentile Speed (km/h)	Load Rating (kg)	On-Street Parking Allowed	Heavy Vehicle Route	Transit Route
			section										
	Airport Dr	E. City Limits	Art/Un/Rural Cross-section	11,086	2	None	4,670	100	114	94,100	No	Yes	No
Hwy 3	8th Ave NW	5th Ave NW	Art/Un/Rural Cross-section	611	2	None	6,074	90	92	94,100	No	Yes	No
	5th Ave NW	Bridge	Art/Div/Rural Cross-section	589	4	None	7,504	70	89	94,100	No	Yes	No

Notes: The rows shaded in red represent sections where the 85th Percentile speed exceeds the posted speed limit by 10 km/h or more.

Speed limits shown in red are proposed changes that have yet to be implemented.

*There is a transition from 100km/h to 60km/h posted speed in this section.

**The posted speed limit is 40 km/h between 1st Ave E and 1st Ave

2.3 Statistical summaries – North-South Roadways

The statistical summaries of north-south roadways are described below starting from the west end.

10th Avenue W and 9th Avenue W are arterial roadways located on the west end of the City. They provide access to Victoria Hospital. The number of lanes varies between two and four. The posted speed limit of 50 km/h and on-street parking is permitted between 20th Street and River Street W. There is a sidewalk located on the west side of the road between 28th Street W and 18th Street W, while the remaining segment has sidewalk located on both sides of the road. The segment of 10th Avenue W with the highest traffic volume is between 28nd Street W and 15th Street W with an AADT of 6,638.

6th Avenue W is a two lane collector roadway which starts from 36th Street W to the south and terminates at River St W to the north. It has a posted speed limit of 50 km/h and on-street parking is permitted. There is a sidewalk located on both sides of the road between Marquis Road and 20th Street W as well as between 17th Street W and 13th Street W. The segment between 20th Street W and 17th Street W has sidewalk located on the east side of the road only, while the segment between 13th Street W and River Street has no sidewalk on either side of the road. The segment of 6th Avenue W with the highest traffic volume is between 28th Street E and 15th Street W with an AADT of 4,314.

4th Avenue W is a two lane collector roadway which starts from Marquis Road to the south and ends at River St W to the north. The posted speed limit is 40 km/h with on-street parking permitted along the entire length of the roadway. Sidewalks are located on the west side of the road between Marquis Road and 22nd Street W and on the east side between 20th Street W and 15th Street W. The sidewalk is located on both sides of the road between 15th Street W and River Street W, while the remaining sections of the roadway do not have sidewalk on either side of the road. The segment of 4th Avenue W with the highest traffic volume is between Marquis Road and 28th Street W with and AADT of 2,177.

2nd Avenue W is a north-south arterial roadway within the City. It is a major commercial street. It has provincial interest as it is referred to as Highway No. 2 and carries the majority of the through traffic headed to northerly destinations. 2nd Avenue is a divided roadway and generally has 6 lanes. There are some sections where six lanes have been installed in order to facilitate the transition at major intersections for instance. There is sidewalk located on both sides of the road between Marquis Road and 30th Street W as well as between 28th Street W and Riverside Drive. The remaining segments do not have sidewalk located on either side of the road. The posted speed limit is 50 km/h the only exception is between Riverside Drive and Highway No. 3 where the posted limit is 60 km/h. North of Highway No.3 has a posted speed of 100 km/h. On-street parking is not permitted on 2nd Avenue W. The segment of 2nd Avenue W with the highest traffic volume is between 22nd Street W and 15th Street W with an AADT of 25,478.

Central Avenue is a collector roadway. South of 15th Street E Central Avenue is mainly used to access local residences and businesses within the neighbourhood. North of 15th Street E, Central Avenue is part of the downtown road network. It is a two lane roadway with a posted speed limit of 50 km/h, except for the downtown portion where the speed limit is 40 km/h. On-street parking is permitted. There is a sidewalk located on both sides of the road between 21st Street E and River Street E. Segments between 31st Street E and 21st Street E as well as between 34th Street E and Southwood Drive have existing sidewalk on the east side of the road only. The remaining segments of Central Avenue do not have sidewalk located on either side of the road. The segment of Central Avenue with the highest traffic volume is between 22nd Street E and 15th Street E with an AADT of 6,783.

6th Avenue E is a four lane arterial roadway except for the section from Marquis Road to the south City limit which is a two lane roadway. It is for the most part a divided roadway. From Marquis Road northerly to River Street E, 6th Avenue has a posted speed limit of 50 km/h. From Marquis Road southerly to the City limit the speed limit is 60 km/h, with plans in the works to change the speed limit to 70 km/h. Except for the section between 28th Street E and 22nd Street E and between 13th Street E and River Street, on-street parking is not permitted on 6th Avenue E. There is a sidewalk on both sides of the road between 28th Street E and 19th Street E as well as between 10th Street E and River Street E. The segment between Southwood Drive and 28th Street E has an existing sidewalk on the east side of the road only, while the sidewalk is located on the west side only between 19th Street E and 10th Street E. The remaining segments of 6th Avenue E do not have sidewalk located on either side of the road. The segment of 6th Avenue E with the highest traffic volume is between 22nd Street E and 15th Street E with an AADT of 21,677.

10th Avenue E is a collector roadway north of 15th Street E. This road provides access to the Exhibition grounds and residential areas in the north part of the City. It is currently a two lane roadway starting at 15th Street E and ending at River Street E. The speed limit along this roadway is 40 km/h and on-street parking is not permitted between 15th Street E and 8th Street E. The remaining segments allow on-street parking. There is a sidewalk located on both sides of the road between 7th Street E and River Street E, while the segment between Exhibition Drive and 7th Street E has a sidewalk located on the east side of the road only. The remaining segment between 15th Street E and Exhibition Drive does not have a sidewalk located on either side of the road. The segment of road with the highest volume of traffic is between 15th Street E and 7th Street E with an AADT of 5,511.

15th Avenue E currently plays a major role as a north-south arterial roadway within the City. With the planned growth in the southeast sector 15 Avenue E will play an even greater role in the transportation network. It is currently a two lane roadway which starts from Marquis Road in the south and terminates at River Street E. It has a speed limit of 50 km/h with on-street parking permitted. There is a sidewalk located on both sides of the road between Marquis Road and 7th Street E, while the segment between 7th Street E and 1st Street E has a sidewalk located on the east side of the road only. The remaining segment between 1st Street E and River Street E does not have a sidewalk located on either side of the road. The segment of 15th Avenue E with the highest traffic volume is between 22nd Street E and 15th Street E with an AADT of 11,845.

Table 2-2 illustrates the roadway attributes of all east-west arterial roadways. Shaded areas in the table indicate roadway sections where the observed speeds are more than 10 km/h above the 85th percentile speed. Generally observed speeds of 10 km/h or more are an indication that the speed limit has been set arbitrary without regard to what motorists perceive as the reasonable speed to travel.

Photos can be found in **Appendix A** for each arterial and collector roadway.

Table 2-2: North-South Roadways Statistical Summary

Roadway Name	From	To	Type (Arterial or Collector, Divided or Undivided)	Length	Number of Lanes	Sidewalks (side)	Current AADT	Speed Limit (km/h)	85th Percentile Speed (km/h)	Load Rating (kg)	On-Street Parking Allowed	Heavy Vehicle Route	Transit Route
10th Ave W/9th Ave W	28th St	18th St W	Art/Un	1,318	4	East	6,638	50	64	52,500	No	No	Yes
	18th St	15th St W	Art/Un	1,318	4	Both	6,638	50	64	52,500	No	No	Yes
	15th St	River St W	Art/Un	385	2	Both	1,782	50	44	52,500	Yes	No	No
6th Ave W	Marquis Rd	28th St W	Coll/Un	798	2	Both	4,076	50	48	52,500	Yes	No	No
	28th St	20th St W	Coll/Un	1,295	2	Both	4,314	50	58	52,500	Yes	No	Yes
	20th St	17th St W	Coll/Un	1,295	2	East	4,314	50	58	52,500	Yes	No	Yes
	17th St	15th St W	Coll/Un	1,295	2	East	4,314	50	58	52,500	Yes	No	Yes
	15th St W	13th St W	Coll/Un	373	2	Both	1,464	50	49	52,500	Yes	No	No
	13th St W	River St W	Coll/Un	373	2	Both	1,464	50	49	52,500	Yes	No	No
4th Ave W	Marquis Rd	28th St W	Coll/Un	798	2	West	2,177	40	38	52,500	Yes	No	Yes
	28th St W	22nd St W	Coll/Un	1,309	2	West	1,886	40	38	52,500	Yes	No	No
	22nd St W	20th St W	Coll/Un	1,309	2	None	1,886	40	38	52,500	Yes	No	No
	20th St W	15th St W	Coll/Un	1,309	2	East	1,886	40	38	52,500	Yes	No	No
	15th St W	14th St W	Coll/Un	357	2	None	1,886	40	38	52,500	Yes	No	No
	14th St W	River St W	Coll/Un	357	2	Both	1,886	40	38	52,500	Yes	No	No
2nd Ave W	S. City Limits	Marquis Rd	Art/Div/Rural Cross-section	767	4	None	15,643	70	69	94,100	No	Yes	No
	Marquis Rd	34th St	Art/Un	292	6	Both	17,052	50	55	94,100	No	Yes	Yes
	34th St	30th St W	Art/Un	601	6	Both	24,280	50	66	94,100	No	Yes	Yes
	30th St	28th St W	Art/Un	601	6	None	24,280	50	66	94,100	No	Yes	Yes
	28th St W	22th St W	Art/Div	601	4	Both	25,348	50	61	94,100	No	Yes	No
	22th St W	15th St E	Art/Div	706	4	Both	25,478	50	60	94,100	No	Yes	No
	15th St E	River St W	Art/Div	439	4	Both	24,801	50	38	94,100	No	Yes	Yes
	River St W	Riverside Dr	Art/Div	445	4	Both	24,060	50	70	94,100	No	Yes	No
	Riverside Dr	Highway 3	Art/Div/Rural Cross-section	805	4	None	17,893	70	80	94,100	No	Yes	No
	Highway 3	N. City Limits	Art/Div/Rural Cross-section	1,773	4	None	11,700	90	103	94,100	No	Yes	No
Central Ave	Marquis Rd	34th St	Coll/Un	306	2	None	4,929	50	49	52,500	Yes	No	No

Roadway Name	From	To	Type (Arterial or Collector, Divided or Undivided)	Length	Number of Lanes	Sidewalks (side)	Current AADT	Speed Limit (km/h)	85th Percentile Speed (km/h)	Load Rating (kg)	On-Street Parking Allowed	Heavy Vehicle Route	Transit Route
	34th St	Southwood Dr	Coll/Un	588	2	East	6,282	50	57	52,500	Yes	No	No
	Southwood Dr	31st St W	Coll/Un	588	2	East	6,282	50	57	52,500	Yes	No	No
	31st St W	28th St W	Coll/Un	588	2	East	6,282	50	57	52,500	Yes	No	No
	28th St W	22th St W	Coll/Un	619	2	East	5,061	50	59	52,500	Yes	No	Yes
	22th St W	21st St W	Coll/Un	753	2	East	6,783	50	59	52,500	Yes	No	Yes
	21st St W	15th St W	Coll/Un	753	2	Both	6,783	50	59	52,500	Yes	No	Yes
	15th St W	River St W	Coll/Un	722	2	Both	3,799	40	49	52,500	Yes	No	Yes
Central Ave N	10th St NW	N. Industrial Dr	Coll/Un/Rural Cross-section	555	2	None	995	60	47	52,500	No	Yes	No
	N. Industrial Dr.	15th St NE	Coll/Un/Rural Cross-section	365	2	None	372	60	50	52,500	No	Yes	No
6th Ave E	S. City Limits	Marquis Rd	Art/Un/Rural Cross-section	724	2	None	4,984	70	60	94,100	No	Yes	No
	Marquis Rd	Southwood Dr	Art/Un	411	4	None	10,567	50	60	94,100	No	Yes	Yes
	Southwood Dr	Terry Simpson Ln	Art/Div	403	4	None	13,161	50	61	94,100	No	Yes	Yes
	Terry Simpson Ln	28th St W	Art/Div	403	4	East	13,161	50	61	94,100	No	Yes	Yes
	28th St W	22th St W	Art/Div	602	4	Both	21,173	50	56	94,100	Yes	Yes	Yes
	22th St W	19th St E	Art/Div	708	4	Both	21,677	50	57	94,100	No*	Yes	Yes
	19th St W	15th St E	Art/Div	708	4	West	21,677	50	57	94,100	No*	Yes	Yes
	15th St E	10th St E	Art/Div	1,128	4	West	15,614	50	56	52,500	Yes	Yes	No
	10th St E	River St E	Art/Div	1,128	4	Both	15,614	50	56	52,500	Yes	Yes	No
10th Ave E	15th St E	Ex Park South Access	Coll/Un	594	2	None	5,511	40	37	52,500	Yes	No	Yes
	Ex Park South	7th St E	Coll/Un	594	2	East	5,511	40	37	52,500	Yes	No	Yes

Roadway Name	From	To	Type (Arterial or Collector, Divided or Undivided)	Length	Number of Lanes	Sidewalks (side)	Current AADT	Speed Limit (km/h)	85th Percentile Speed (km/h)	Load Rating (kg)	On-Street Parking Allowed	Heavy Vehicle Route	Transit Route
	Access												
	7th St E	River St E	Coll/Un	763	2	Both	5,511	40	49	52,500	Yes	No	Yes
15th Ave E	Marquis Rd	Sherman Dr	Art/Un	167	2	Both	7,316	50	35	52,500	Yes	No	No
	Sherman Dr	28th St W	Art/Un	624	2	Both	6,435	50	58	52,500	Yes	No	No
	28th St W	22th St W	Art/Un	632	2	Both	9,978	50	58	52,500	Yes	No	Yes
	22th St W	15th St E	Art/Un	686	2	Both	11,845	50	57	52,500	Yes	No	Yes
	15th St E	7th St E	Art/Un	435	2	Both	6,480	50	54	52,500	Yes	Yes	Yes
	7th St E	4th St E	Art/Un	323	2	East	3,174	50	57	52,500	Yes	Yes	Yes
	4th St E	1st St E	Art/Un	442	2	East	868	50	50	52,500	Yes	Yes	Yes
	1st St E	River St E	Art/Un	442	2	None	868	50	50	52,500	Yes	Yes	Yes

Notes: The rows shaded in red represent sections where the 85th Percentile speed exceeds the posted speed limit by 10 km/h or more.

Speed limits shown in red are proposed changes that have yet to be implemented.

*Parking is allowed between 22nd St and 19th St for this section.

2.4 Review of Existing Reports

As part of the study, Allnorth was required to review past studies and reports in order to illustrate the past work conducted by the City of Prince Albert. A chronological listing of reports reviewed and their relevancy to the current study are illustrated in **Table 2-3**.

Table 2-3: City of Prince Albert Previous Report and Study Reviews

REPORT/STUDY NAME	YEAR	REPORT CONTENT	PLANNING HORIZON
Prince Albert Transportation Study Report	1977	This study was the first transportation study that the City of Prince Albert. The contents of this study outline the short term traffic and parking, transit operations and a transportation plan and railway relocation study. As this study was conducted in 1977, it has become outdated as it is now 40 years of age. The study considered one location for the new bridge: the 6th Avenue E option. The traffic volumes and other recommendations do not reflect the current conditions of the City and thus most data from this report will be of minimal value to the new Transportation Planning Study (TPS).	This study provided recommendations based on a City population of 50,000 residents.
City of Prince Albert New River Crossing at 6th Avenue East Functional Planning Study	1980	This is the first recorded study that the City of Prince Albert has on record regarding the need and location of a second bridge over the North Saskatchewan River. The purpose of this study was to provide a functional plan for the 6th Ave E bridge and to interconnect with Highways 55, 3, and 2. Additionally, the study would provide a staged program of development based on the traffic demands of the City. A capital cost estimate was provided based on the recommended route which was broken down into staged construction costs as well. This report is relevant to the existing study as it is identifies possible crossing location. The bridge location is still a valid option.	This study considered a City population of 50,000 residents.
West Hill Master Plan	1999	This study outlines a master plan land use for the southwest quadrant of the City referred to as West Hill. Included in the study are phases for development, proposed infrastructure such as water, sewer and storm water management, land use and population capacity. The study has been superseded as development has since occurred and assumptions may no longer be valid. An updated version of the report was conducted in 2012 which would have more relevance to the TPS.	Population projections in this study were given up to a 25 year time horizon (2024).
Prince Albert 6th Avenue East River Crossing Study	2003	The purpose of this study was to update the 1980 functional planning study of the same 6th Avenue East River Crossing. The study looked at the feasibility of a new bridge, what the capital cost would be for each of the planned phases, updating the phases of development if required. The study included public meetings with stakeholders. The outcome of the study was that a second bridge was not required at the time of the study. The study identified that a bridge would be required when the population of Prince Albert is between 40,680 and 50,680, however the timeframe of when this population will be reached is not yet known. The	The study provided a sensitivity analysis, concluding the second bridge is viable at a City population between 40,680 and 50,680.

REPORT/STUDY NAME	YEAR	REPORT CONTENT	PLANNING HORIZON
		timing of the bridge will also be affected by the capacity of intersections on 2nd Ave W, 15th St and 6th Ave E. At the time of this study they all had acceptable LOS, but may be deteriorating at the time of the current study. This study focused only on the 6th Ave river crossing. Subsequent reports have identified other locations for a second bridge.	
Public Transit System Review and Design	2008	This study is a detailed analysis of the existing public transit system with recommendations for improvement complete with an implementation plan. Some of the recommendations included new bus routes, extended operating hours and an increased number of bus shelters. These recommendations have all been implemented at the time of this study. Some other recommendations that were put forth include the purchase of accessible low-floor buses for new and replacement services, giving transit stops and routes priority during snow removal, providing bus mounted bicycle racks and improving the central transit terminal. It is unknown at this time if these recommendations have been put into effect at the time of this study. The information provided in this study along with the most recent transit brochure will be considered in the development of the current TPS.	This study provided recommendations based on the existing 2008 traffic conditions.
Prince Albert Area Transportation Planning Study	2008	This is the most recent transportation planning study for the City of Prince Albert. It is a useful document as it identifies issues which relate to current conditions of the transportation network, as well as provides recommendations for improvement with the future growth of the City. The study examined the existing conditions of the transportation network, and provided recommended areas of improvement without any future growth involved. It then estimated the growth for a 50 year planning horizon and identified where the areas of growth would be in the City, and the new infrastructure required, as well as upgrades for the existing infrastructure based on the 50 year growth. One of the key issues identified in this study for the existing conditions was the need for improvements at intersections along the 15th Street, 2nd Ave West and 6th Ave East corridors, as these are 3 of the major corridors of Prince Albert. A separate study was conducted in 2012 to analyze these corridors in further detail. Another feature included a review and analysis of the 6th Avenue river crossing, which provided the same conclusions as the 2003 study. One other feature includes the analysis of an external highway around the City to the east, which would provide a safer dangerous goods route. This was again analyzed in a separate study in 2013 titled	Based on a 50-year planning horizon.

REPORT/STUDY NAME	YEAR	REPORT CONTENT	PLANNING HORIZON
		Prince Albert Area Second Bridge River Crossing.	
Population, Household and Employment Forecast Study	2009	This study analyzed both the historic and projected population, household and employment statistics for the City of Prince Albert. While the purpose of the TPS is to analyze the road infrastructure, it is important to know population, household and employment trends for future growth within the City. The study forecasts the population to the year 2034 with both medium growth and high growth scenarios. During the TPS analysis, both the medium and high growth scenarios should be checked to determine if the assumptions are correct and if they can be used for the TPS.	The planning horizon of this study was the year 2034
Urban Highway Connector Program Framework Agreement	2011	This details the agreement between the Ministry of Highways and Infrastructure and the City of Prince Albert for future transportation projects. This includes funding for a Transportation Planning Study and rehabilitation for Urban Connectors or non-connector public streets. Five of the ten projects have been completed as of 2014. A new application has been submitted with updated projects to complete between 2015 and 2018. These projects can be found on separate spreadsheets entitled "UHCP Application Summary Sept 15, 2014", "UHCP Application Summary Sept 15, 2015" and "UHCP Application Summary Sept 30, 2016."	The planning horizon is on a short-term basis i.e. under 5 years
Corridor Level Traffic Signal Coordination Study	2012	The objective of this study was to analyze the 15 Street, 2nd Ave West and Central Ave corridors. The study was divided into three phases: data gathering, traffic analysis, and arterial timing optimization. The traffic analysis included intersection capacity analysis on existing conditions, queuing analysis and traffic signal warrants. From there the signalized intersections were optimized to produce the best level of service for each time frame, am, noon and pm peak as well as off-peak. Each intersection was given an optimized cycle and timing plan based on the current conditions. This study is relevant to the current TPS as it provides current cycle times for the intersections along each corridor, however the traffic count data is out of date and will need to be updated with current volumes. Additionally, the intersections will need to be analyzed to determine if upgrades to the lane arrangements are required, which was not addressed in the corridor study.	This study was based on existing 2012 conditions with no planning horizons.

REPORT/STUDY NAME	YEAR	REPORT CONTENT	PLANNING HORIZON
West Hill Master Plan	2012	This is an update to the 1999 study of the same name that was discussed in Section 2.3. Similar to the previous study, traffic information is not provided, nor any recommended road network improvements. This study updated the land use information, population projections and employment projections for the southwest quadrant of the City referred to as West Hill. The population and land use projections for this area are useful for forecasting the traffic volumes in the TPS where development has yet to take place in the West Hill section of the City.	Population projections in this study were given up to a 25 year time horizon (2024 based on 2009 populations).
Crescent Acres Neighbourhood – Stage V, VI and VII Land Development Study	2013	Similar to the West Hill Master Plan, this study provides concept planning for the Crescent Acres neighbourhood located in the southeast section of Prince Albert. Included are the projected land uses, sanitary, water and storm water preliminary concepts and designs and an environmental review. While the land use information can be used for the TPS, most of the information in this study is not relevant for the TPS.	This study used a planning horizon of 8 years (2021).
Traffic Impact Study for Crescent Acres Stages V-VII Land Development	2013	This study provides the traffic impact of the Crescent Acres neighbourhood. The roads analyzed in this study are 15th Ave East, 15th Street East, 21st Ave East and Marquis Drive. This study analyzed the existing conditions for each intersection along the roads, looking at capacity, traffic signal warrants, and any required improvements. From there, the traffic volumes were projected to the forecasted build out of each phase of the development, with a full build out expected in 2021. Based on the projected traffic volumes, recommended improvements were given at the following intersections: • 15th Ave East & Olive Diefenbaker Drive • 15th Ave East & Muzzy Drive • 21st Ave East & 15th St East • 15th Ave East & Marquis Road • Olive Diefenbaker Drive & Muzzy Drive Most of the recommendations provided in the report have been implemented at the corresponding intersections. The traffic signal timing and traffic volumes utilized in this study will be useful in the TPS, as well as the recommended improvements for planning purposes.	This study used a planning horizon of 8 years (2021).
Prince Albert Area Second Bridge River Crossing	2013	This purpose of this study was to provide an update to the need for a second bridge for the City of Prince Albert. Sections 2.2, 2.4 and 2.6 discussed the previous bridge studies completed for the City. This study provided more information than the previous studies as multiple alignments were analyzed for a second bridge, with the majority favoring	The planning horizon utilized in this study was the year 2040.

REPORT/STUDY NAME	YEAR	REPORT CONTENT	PLANNING HORIZON
		a crossing located on the east side of Prince Albert. However, similar to the previous studies, while the concept of a second bridge is favored by the local residents and business owners, it was concluded that the existing Diefenbaker Bridge, with 2 lanes in each direction has the capacity to accommodate traffic volumes until the year 2040. A second bridge was analyzed based on staged construction which included approximately 33.0 – 37.0 km of new highway. The probable cost estimate was approximately $154 million, which would have been shared between the Ministry of Highways and the City through the Urban Highway Connector Program. Upon further review, a second bridge would be underutilized based on the traffic projections of the Diefenbaker Bridge. The second bridge would have a minor impact on freight movement efficiency, traffic delays or harmful emissions. The issue with the existing bridge is functionality and service levels to 2040 and beyond. Thus, the implementation of a defined maintenance and rehabilitation program was recommended to prolong the service life of this structure. This information is relevant to the TPS as the conclusions have likely remained unchanged at the current time frame due to the low population growth of the City of Prince Albert.	
Traffic Bylaw No. 1	2013	This document outlines all the bylaws for the City of Prince Albert. They have been updated in 2015 and provide relevant information for the TPS in terms of parking, school zones, speed limits, etc.	Traffic bylaws are created for the existing (2013) conditions.

2.5 Historical Traffic Volumes (AADT)

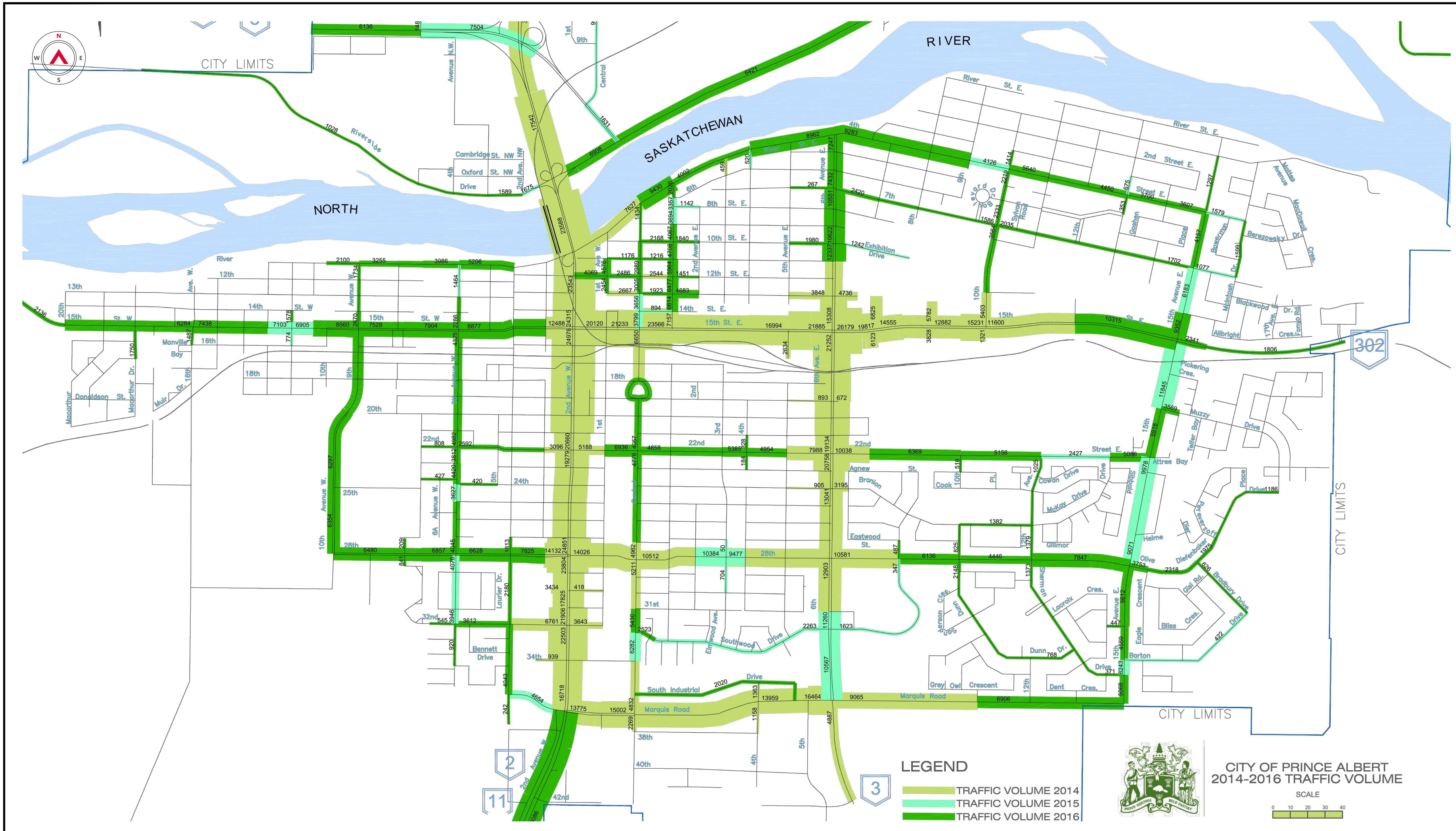
The City of Prince Albert counts average annual daily traffic (AADT) on most roadways. The City does not count each roadway every year. The counts that are available are however, represent the amount of traffic on those streets. This part of the study was focused on the traffic growth and trends over a five to ten year periods. The trends will provide a good indication of what traffic volumes the City can expect in the future. **Figure 2-1a** is an illustration of the traffic volume collected by the City.

Table 2-4 illustrates the traffic growth on segments for the east-west roadways. The same data is illustrated graphically in **Figures 2-1** to **2-3**. Although the data is available from 2000 to present, the analysis in terms of traffic growth will focus on the past five years (2011-2015).

Table 2-4: Average Annual Daily Traffic (AADT) 2000-2015 – East-West Roadways

Street	2000	2009	2010	2011	2012	2013	2014	2015
Marquis Road								
2nd Ave W - Central	11500	16135	16600	17065	16470	15874	15002	15302
Central - 6 Ave E	12830	15562	16010	16458	14494	12529	16464	16793
6th Ave E - 15 Ave E	8030	5667	5830	5993	6177	6361	9065	9246
28th Street								
10 Ave W - 6 Ave W	4170	5015	5159	5303	5231	5159	6167	7175
6 Ave W -2 Ave W	11870	11870	11870	11870	11870	11870	14132	14415
2 Ave W - Central	13330	13098	13475	13852	13664	13475	14026	14307
Central - 6 Ave E	12570	12218	12570	12922	11778	10634	10512	10722
6 Ave E - 15 Ave E	10810	8194	8430	8666	7705	6744	10581	10793
22nd Street								
6 Ave W - 2 Ave W	2594	4097	4215	4333	3681	3029	3096	3158
2 Ave W - Central	6290	5881	6050	6219	5254	4289	5188	6185
Central - 6 Ave E	5320	5313	5466	5619	4710	3800	7988	8148
6 Ave E - 10 Ave E	4670	4238	4360	4482	3774	3066	10038	10239
10 Ave E - 15 Ave E	3250	3350	3447	3544	3352	3160	3186	3211
15th Street								
City Limits - 10 Ave W	8330	6960	7160	7360	8195	9030	8067	7103
10 Ave W - 6 Ave W	8880	8719	8970	9221	9515	9809	10005	10205
6 Ave W - 2 Ave W	8880	12004	12350	12696	11253	9809	12488	12738
2 Ave W - 6 Ave E	19600	19732	20300	20868	22434	24000	23566	24037
6 Ave E - 10 Ave E	8670	14515	14933	15351	14957	14563	26179	26703
10 Ave E - 15 Ave E	6420	4223	4345	4467	4556	4645	11600	11832
15 Ave E - City Limits	1830	1747	1797	1847	2031	2215	2016	2056
River Street								
16 Ave W - 10 Ave W	2420	1280	1317	1354	2485	3616	2840	2063
10 Ave W - 6 Ave W	2700	1473	1515	1557	2816	4075	4100	4125
6 Ave W - 2 Ave W	4170	6969	7170	7371	6986	6600	5946	5291
2 Ave W - Central	8690	6176	6354	6532	11651	16770	7627	7780
Central - 6 Ave E	7680	6511	6699	6887	7969	9051	9286	10756

Street	2000	2009	2010	2011	2012	2013	2014	2015
6 Ave E - 10 Ave E	7130	7732	7955	8178	7996	7814	7814	5666
10 Ave E - 15 Ave E	3000	4065	4182	4299	3730	3160	2977	2793
Highway 55								
Hwy 3 - Bridge	1880	2127	2188	2249	2243	2236	1956	1675
Bridge - Hwy 3	7640	6726	6920	7114	7017	6920	5044	3167
Hwy 3 - 6 Ave NE	5960	4831	4970	5109	5110	5110	5212	5316
6 Ave NE - City Limits	6400	5293	5445	5597	5383	5169	5310	5450
Highway 3								
City Limits - Bridge	7330	8986	9245	9504	8441	7377	7441	7504
Bridge - Hwy 55	425	425	425	437	849	1261	1446	1631



Date: 2017/03/29 | User: Tyler Dai | File: P:\SK\2015\0-99\15SK0016 - City of Prince Albert - Master Transportation Study\1000-Drawings\1011-Civil\01-Production\170206_TD_15SK0016-Transportation Master Plan | Layout: FIG 2-1A | Paper Size: 558.8mm x 431.8mm

City of Prince Albert

Allnorth

CITY OF PRINCE ALBERT
TRANSPORTATION MASTER PLAN

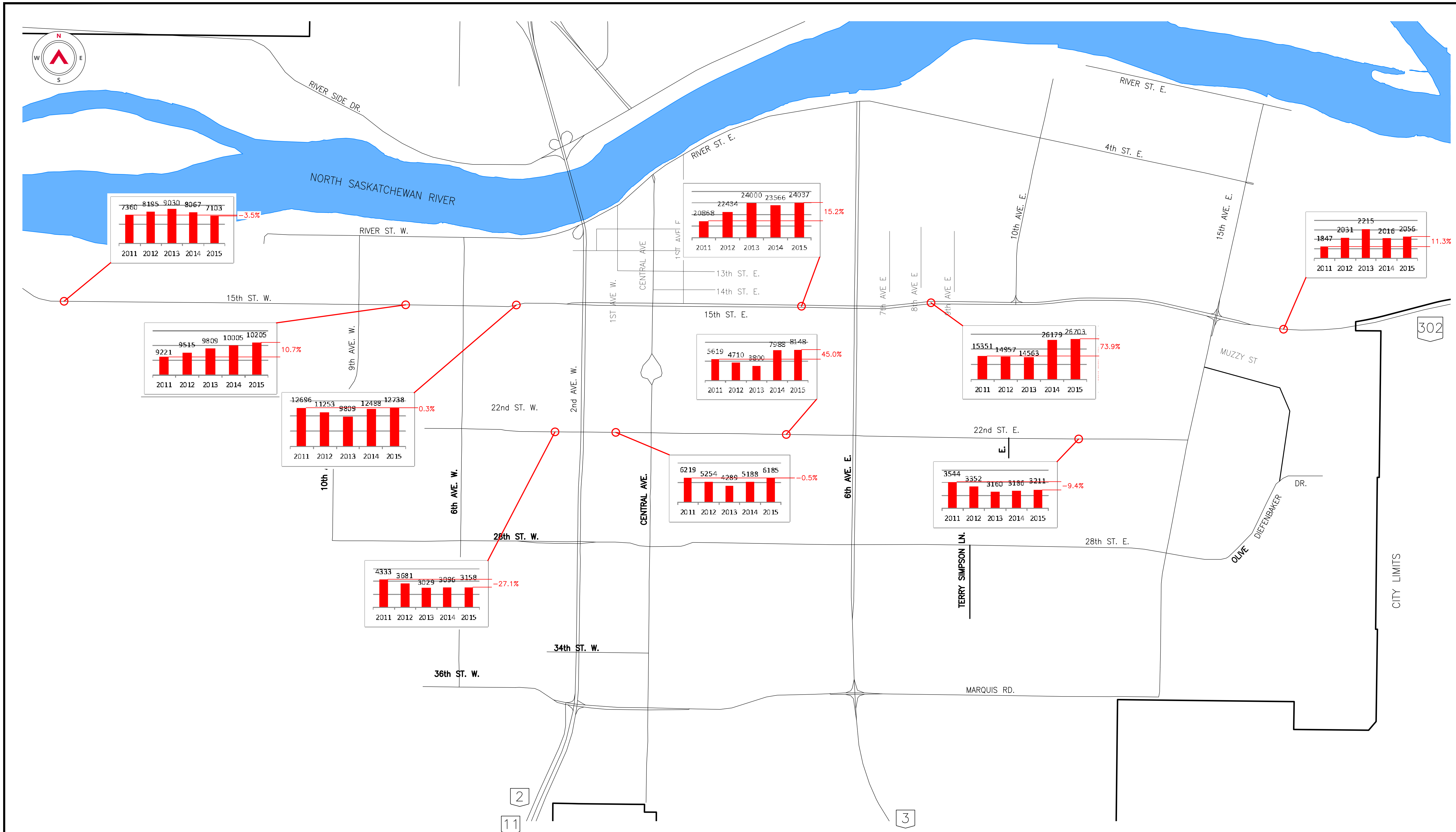
FIGURE. 2-1A
TRAFFIC VOLUME MAP

City of Prince Albert

Allnorth

CITY OF PRINCE ALBERT
TRANSPORTATION MASTER PLAN

FIGRURE. 2-1
2011-2015 AVERAGE ANNUAL DAILY TRAFFIC (AADT)
EAST-WEST ROADWAYS



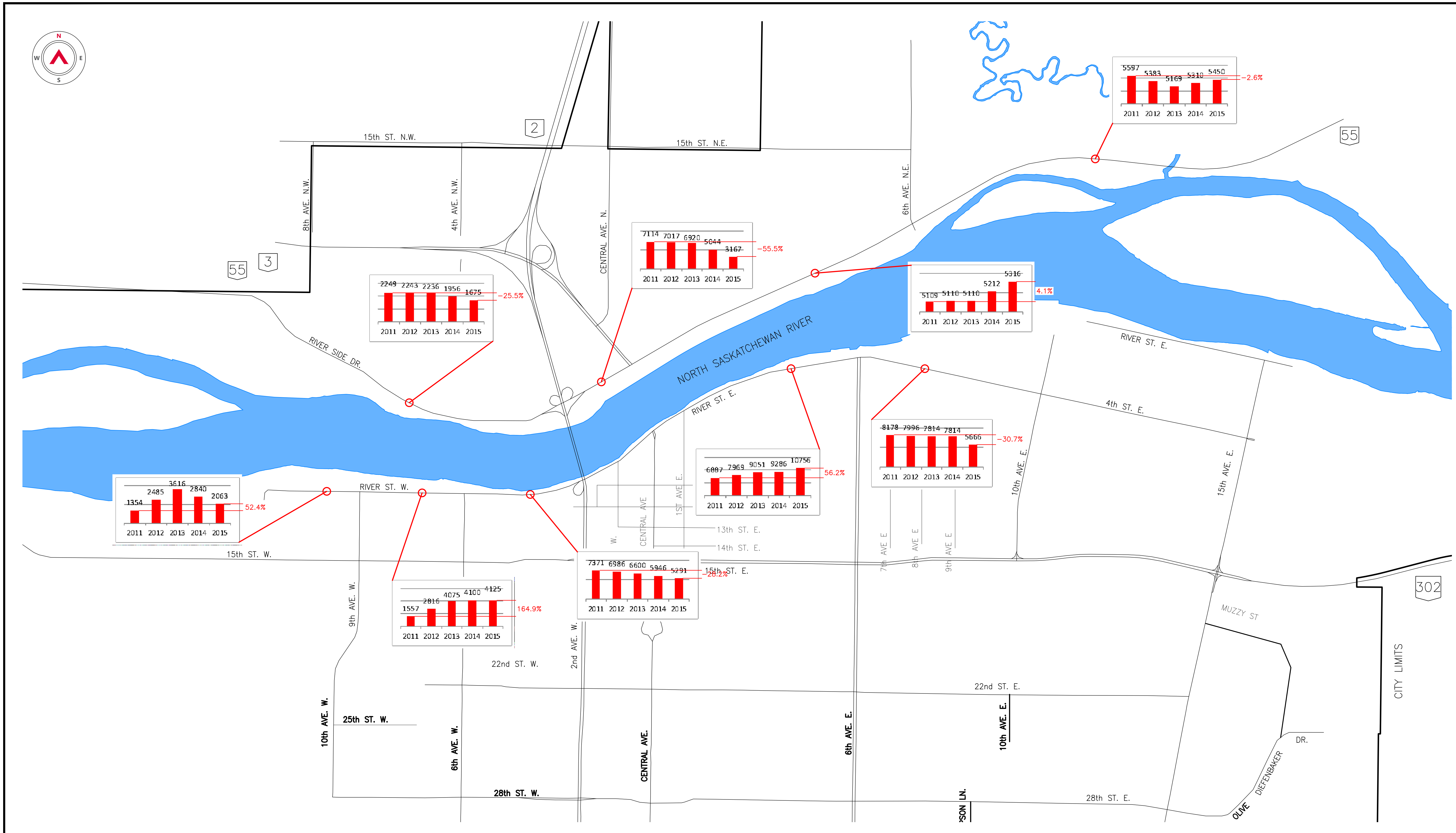
City of Prince Albert

Allnorth

CITY OF PRINCE ALBERT
TRANSPORTATION MASTER PLAN

FIGURE. 2-2
2011-2015 AVERAGE ANNUAL DAILY TRAFFIC (AADT)
EAST-WEST ROADWAYS

Date: 2017/03/29 | User: Tyler Dai | File: P:\SK\2015\0-99\15SK0016 - City of Prince Albert - Master Transportation Study\1000-Drawings\1011-Civil\01-Production\170206_TD_15SK0016-Transportation Master Plan | Layout: FIG. 2-2 | Paper Size: 558.8mm x 431.8mm



City of Prince Albert

Allnorth

CITY OF PRINCE ALBERT
TRANSPORTATION MASTER PLAN

FIGURE. 2-3
2011-2015 AVERAGE ANNUAL DAILY TRAFFIC (AADT)
EAST-WEST ROADWAYS

Date: 2017/03/29 | User: Tyler Dai | File: P:\SK\2015\0-99\15SK0016 - City of Prince Albert - Master Transportation Study\1000-Drawings\1011-Civil\01-Production\170206_TD_15SK0016-Transportation Master Plan | Layout: FIG. 2-3 | Paper Size: 558.8mm x 431.8mm

The following were observed from the traffic data:

- Marquis Road: Between 2011 and 2014 daily traffic volumes were in decline. The largest decrease was on the segment between Central Avenue and 6th Avenue E where there was a decrease of more than 4,000 vehicles per day (vpd). Traffic volumes started to grow again starting in 2014 and the trend is now upwards and has just surpassed the 2011 daily volumes.
- The traffic volume decrease was also observed 28th Street and 22nd Street east of 2nd Avenue W. A modest traffic growth on River Street W, west of 6th Avenue W was observed. It is important to note that the asphalt was in poor shape along this road which has now been repaved.
- Between 2011 and 2014 the only east-west roadway that had consistent growth in traffic volumes was 15th Street, both east and west of 2nd Avenue West. This has to do with the popularity of the Cornerstone commercial development that has been located on this corridor.

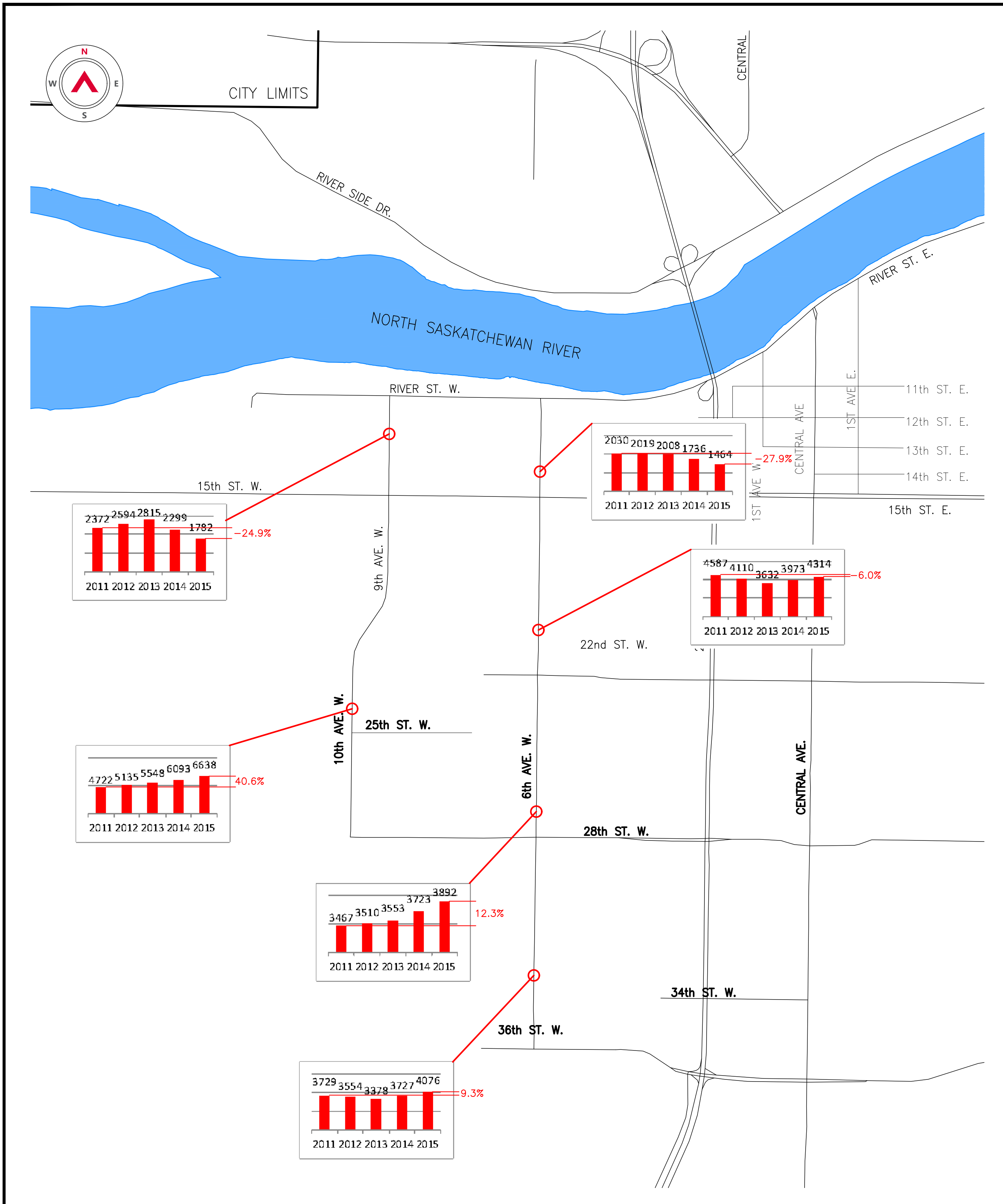
Table 2-5 illustrates the traffic growth on segments for the north-south roadways. The same data is illustrated graphically in **Figures 2-4 to 2-6**. Although the data is available from 2000 to 2015, the analysis in terms of traffic growth will focus on the past five years (2011-2015).

Table 2-5: Annual Average Daily Traffic (AADT) 2000-2015 – North-South Roadways

Avenue	2000	2009	2010	2011	2012	2013	2014	2015
10th Avenue W								
28 St W - 15 St W	4190	4464	4593	4722	5135	5548	6093	6638
15 St W - River St	2260	2242	2307	2372	2594	2815	2299	1782
6th Avenue W								
Marquis Road - 28 St W	3640	3525	3627	3729	3554	3378	3727	4076
28 St W - 22 St W	3980	3279	3373	3467	3510	3553	3723	3892
22 St W - 15 St W	4630	4337	4462	4587	4110	3632	3973	4314
15 St W - River St	1920	1920	1975	2030	2019	2008	1736	1464
2nd Avenue W								
City Limits – Marquis Road	12800	10854	11167	11480	12691	13901	15336	15643
Marquis Road - 28 St W	20030	19469	20030	20591	20311	20030	23804	24280
28 St W - 22 St W	24630	17461	17964	18467	16165	13863	24851	25348
22 St W - 15 St W	24870	21588	22210	22832	21630	20427	24978	25478
15 St W - Bridge	25410	18954	19500	20046	18098	16149	24315	24801
Bridge - Hwy 3	18500	20898	21500	22102	21801	21500	23588	24060
Hwy 3 - City Limits	9660	9660	9660	9660	7912	6164	11471	11700
Central Avenue								
Marquis Road - 28 St	2523	5764	5930	6096	5757	5418	5211	6282
28 St - 22 St	4710	6229	6408	6587	5530	4473	4932	5391
22 St - 15 St	5170	4845	4985	5125	4789	4452	6650	8848
6th Avenue E								
City Limits – Marquis Road	5000	4336	4461	4586	4964	5341	4887	4985
Marquis Road - 28 St E	11400	12393	12750	13107	11148	9188	12903	13161
28 St E - 22 St E	17790	17292	17790	18288	14734	11180	20758	21173
22 St E - 15 St E	17800	19246	19800	20354	20558	20761	21252	21677
15 St E - 13 St E	13010	13472	13860	14248	13565	12882	15308	15614
13 St E - River St	8000	11820	12160	12500	12330	12160	9856	10053

Avenue	2000	2009	2010	2011	2012	2013	2014	2015
15th Avenue E								
Marquis Road - 28 St E	4780	4667	4801	4935	4857	4778	6047	7316
28 St E - 22 St E	8770	7075	7279	7483	7961	8439	9209	9978
22 St E - 15 St E	9230	10498	10800	11102	10951	10800	10139	11845
15 St E - 4 St E	4920	7254	7463	7672	7049	6425	6480	6480
Central Avenue N								
10 St NW - 15 St NW	1700	1700	1700	1700	1433	1165	1080	995
6th Avenue NW								
Hwy 55 - City Limits	760	760	760	760	758	756	756	756

Date: 2017/03/29 | User: Tyler Dai | File: P:\SK\2015\0-99\15SK0016 - City of Prince Albert - Master Transportation Study\1000-Drawings\1011-Civil\01-Production\170206_TD_15SK0016-Transportation Master Plan | Layout: FIG. 2-4 | Paper Size: 279.4mm x 431.8mm



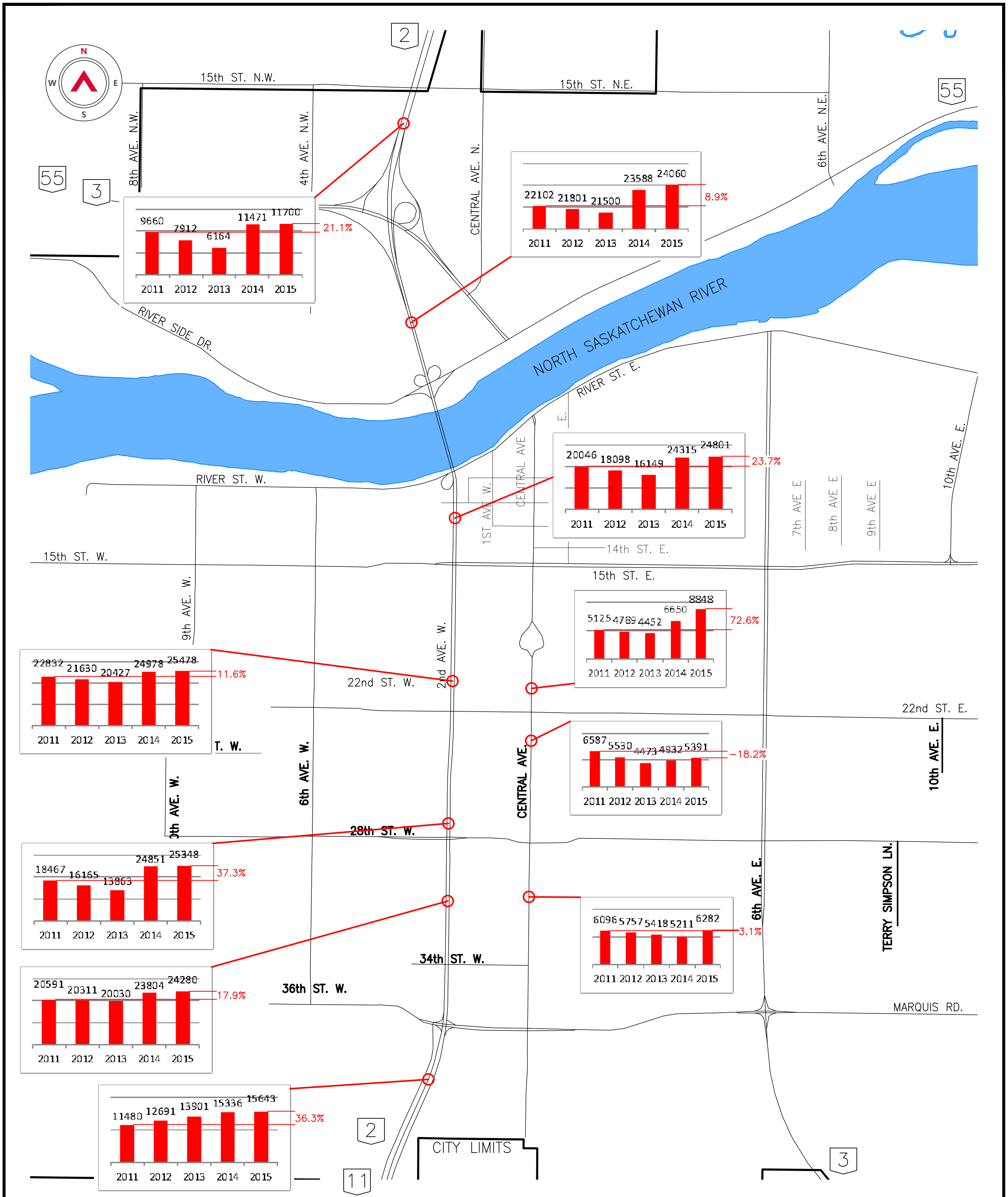
City of Prince Albert

Allnorth

CITY OF PRINCE ALBERT
TRANSPORTATION MASTER PLAN

FIGURE. 2-4
2011-2015 AVERAGE ANNUAL DAILY TRAFFIC (AADT)
NORTH-SOUTH ROADWAYS

Date: 2017/03/29 | User: Tyler Dai | File: P:\SK\2015\0-99\15SK0016 - City of Prince Albert - Master Transportation Study\1000-Drawings\1011-Civil\01-Production\170206_TD_15SK0016-Transportation Master Plan | Layout: FIG 2-5 | Paper Size: 279.4mm x 431.8mm



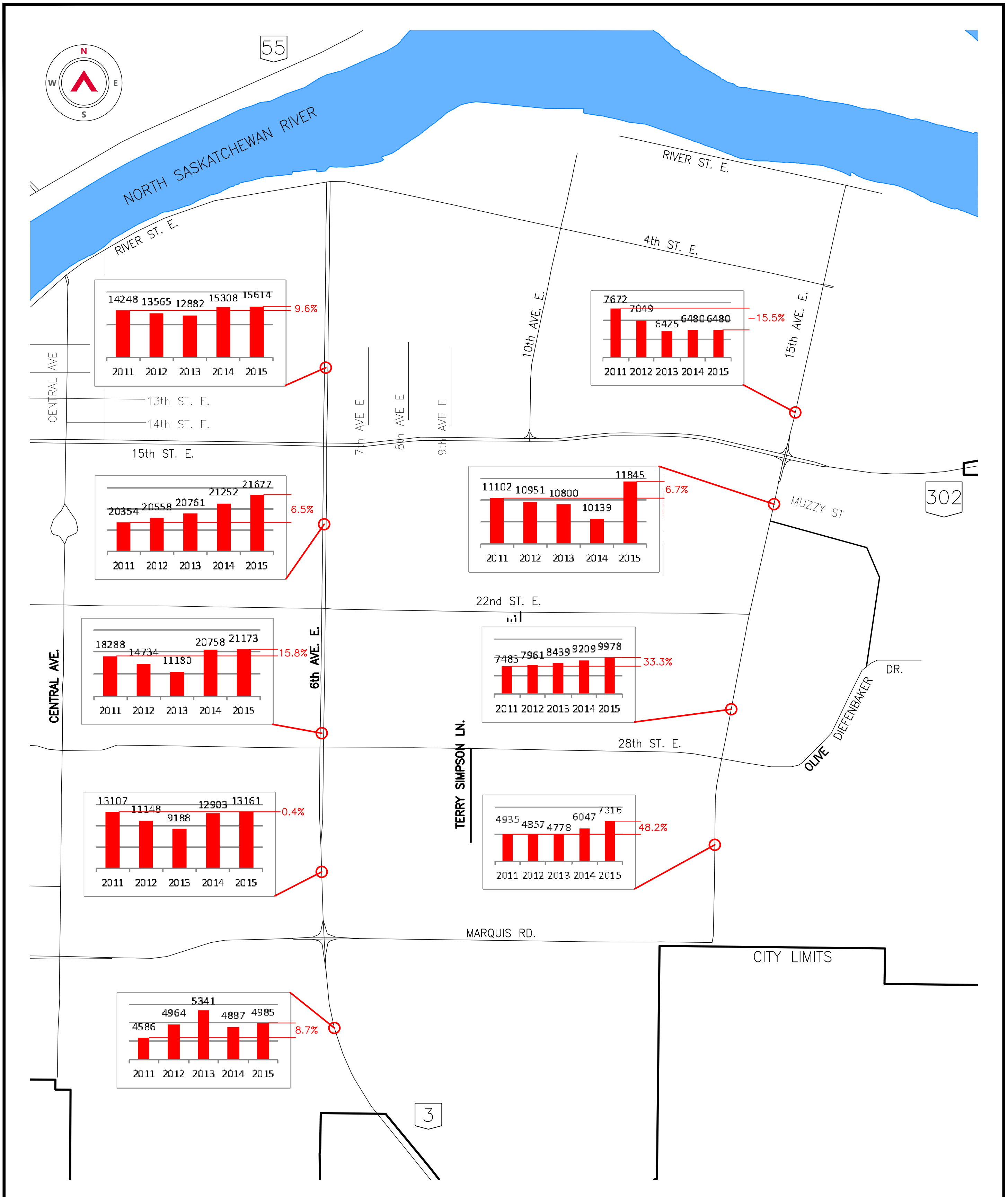
City of Prince Albert

Allnorth

CITY OF PRINCE ALBERT
TRANSPORTATION MASTER PLAN

FIGURE. 2-5
2011-2015 AVERAGE ANNUAL DAILY TRAFFIC (AADT)
NORTH-SOUTH ROADWAYS

Date: 2017/03/29 | User: Tyler Dai | File: P:\SK\2015\0-99\15SK0016 - City of Prince Albert - Master Transportation Study\1000-Drawings\1011-Civil\01-Production\170206_TD_15SK0016-Transportation Master Plan | Layout: FIG. 2-6 | Paper Size: 279.4mm x 431.8mm



City of Prince Albert

Allnorth

CITY OF PRINCE ALBERT
TRANSPORTATION MASTER PLAN

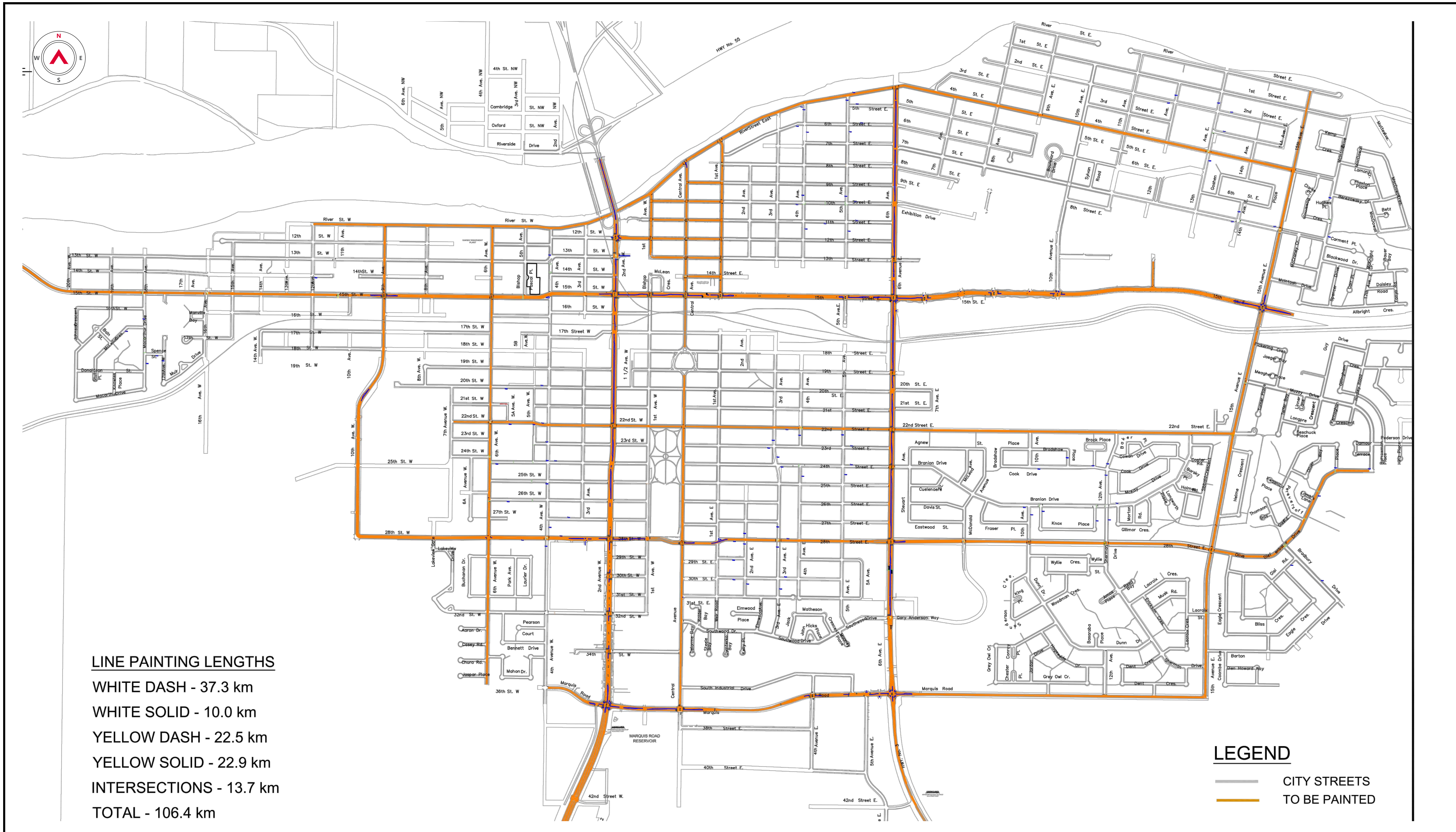
FIGURE. 2-6
2011-2015 AVERAGE ANNUAL DAILY TRAFFIC (AADT)
NORTH-SOUTH ROADWAYS

The following were observed from the traffic data:

- Between 2011 and 2015 2nd Avenue W has generally had some traffic volume growth. The trend is upwards on most segments of 2nd Avenue W. The highest growth was experienced between 28th Street and 22nd Street. This segment had a 37.3% growth in traffic over the past five years.
- Between 2011 and 2015, each of 10th Avenue W, 6th Avenue W, Central Avenue, 6th Avenue E and 15th Avenue E showed consistent traffic growth south of 15th Street. However, these aforementioned avenues all showed a traffic volume decrease north of 15th Street.

2.6 Pavement Markings

The City of Prince Albert maintains an annual pavement marking program. The City has a total length of 106.4 km of pavement markings within the roadway and at intersections. The lines are painted twice a year; early in the Spring and late Fall. **Figure 2-7** illustrates the pavement markings.



City of Prince Albert

Allnorth

CITY OF PRINCE ALBERT
TRANSPORTATION MASTER PLAN

FIGURE. 2-7
PAVEMENT MARKING PROGRAM

Date: 2017/03/29 | User: Tyler Dai | File: P:\SK\2015\0-99\15SK0016 - City of Prince Albert - Master Transportation Study\1000-Drawings\1011-Civil\01-Production\170206_TD_15SK0016-Transportation Master Plan | Layout: FIG. 2-7 | Paper Size: 558.8mm x 431.8mm

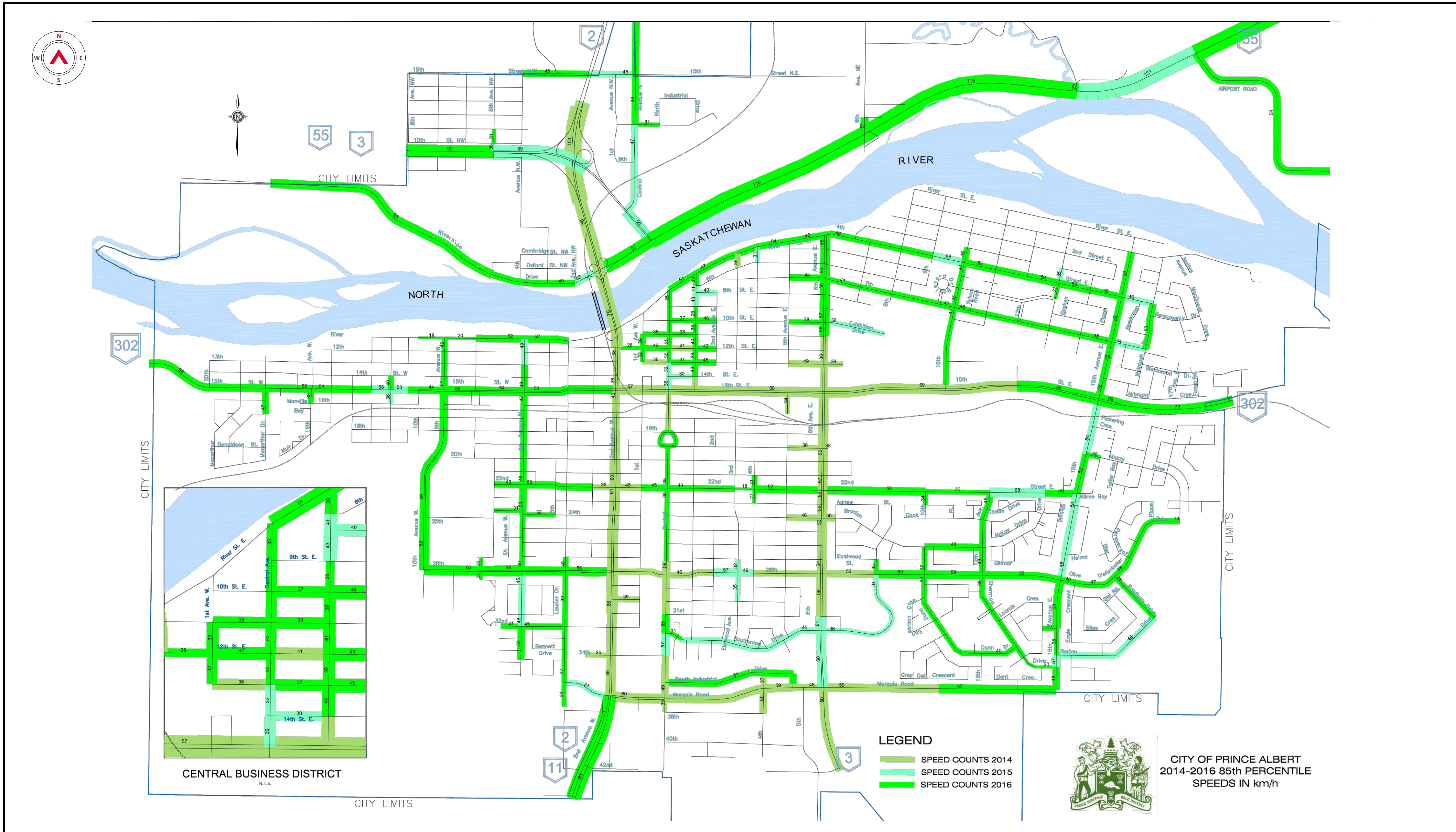
2.7 Travel Speeds

The City of Prince Albert records 85th percentile travel speeds on most roadways. Similar to the AADT counts, the travel speeds are not recorded each year. However, the travel times for each arterial roadway have been recorded in either 2014 or 2015, which allows for reasonably accurate analysis. The following were observed from the traffic data:

- The 85th percentile speed is at least 10 km/h over the posted speed limit at the following locations:
  - 28th Street – between 10th Avenue W and 6th Avenue W;
  - 22nd Street – between 12th Street E and 15th Street E;
  - Riverside Drive – between west city limits and 4th Ave NW;
  - Riverside Drive – between 2nd Avenue NW and the bridge;
  - Riverside Drive – between 6th Avenue NE and the east city limits;
  - Highway 3 – between 5th Avenue NW and the bridge;
  - 10th Avenue W – between 28th Street W and 20th Street W;
  - 2nd Avenue W – between 34th Street W and 22nd Street W;
  - 2nd Avenue W – between River Street W and Riverside Drive;
  - 6th Avenue E – between Southwood Drive and 28th Street W.
- There is also one location on 15th Street E near the east city limit where the 85th percentile speed greatly exceeds the posted speed limit. This is due to the speed limit change from 60 km/h to 100 km/h.

The 85th percentile travel speeds can be seen in **Figures 2-8A - 2-9** below.

Date: 2017/03/29 | User: Tyler Dai | File: P:\SK\2015\0-99\15SK0016 - City of Prince Albert - Master Transportation Study\1000-Drawings\1011-Civil\01-Production\170206_TD_15SK0016-Transportation Master Plan | Layout: FIG 2-8A | Paper Size: 558.8mm x 431.8mm

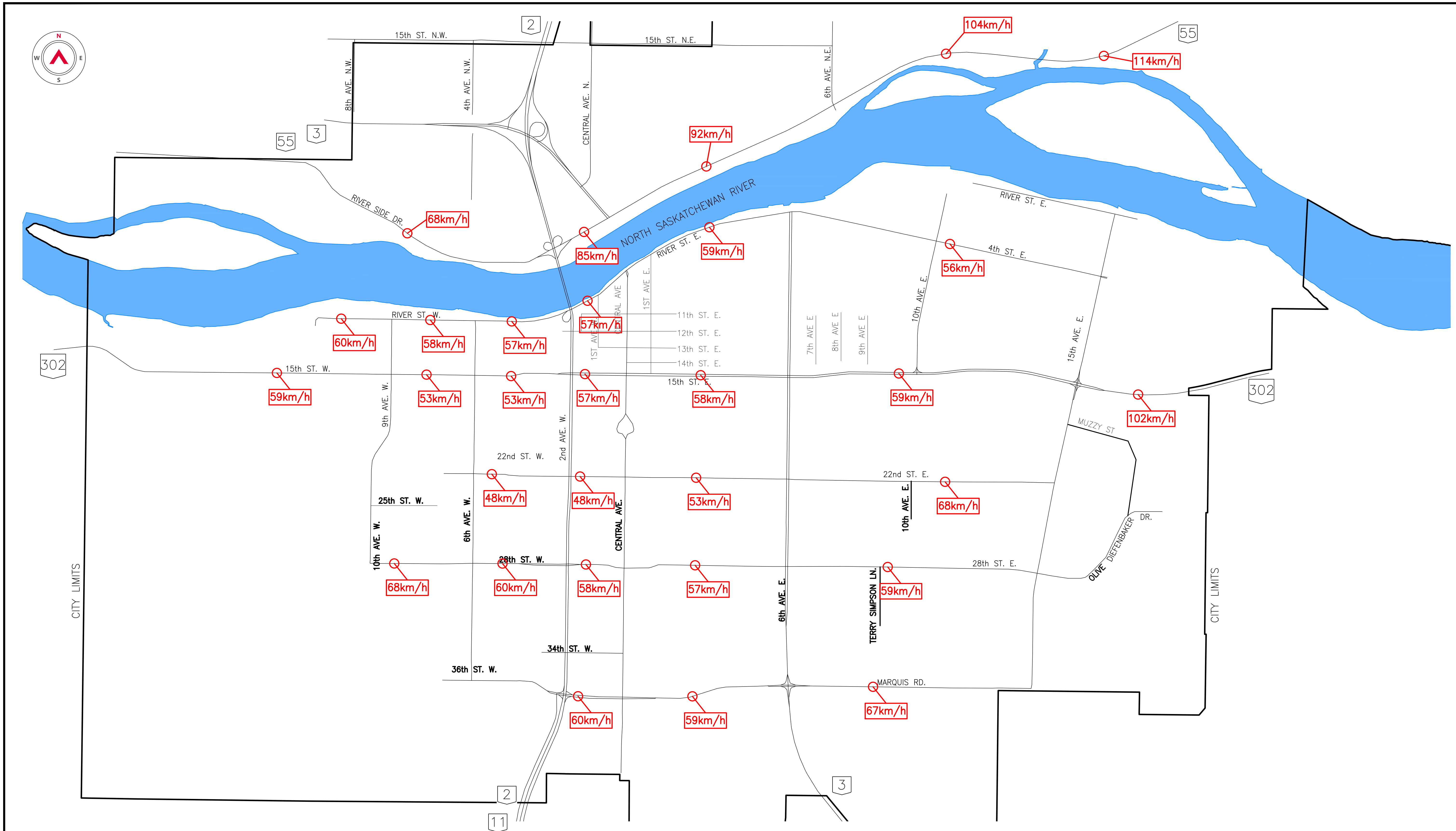


City of Prince Albert

Allnorth

CITY OF PRINCE ALBERT
TRANSPORTATION MASTER PLAN

FIGURE. 2-8A
85TH PERCENTILE TRAVEL SPEED



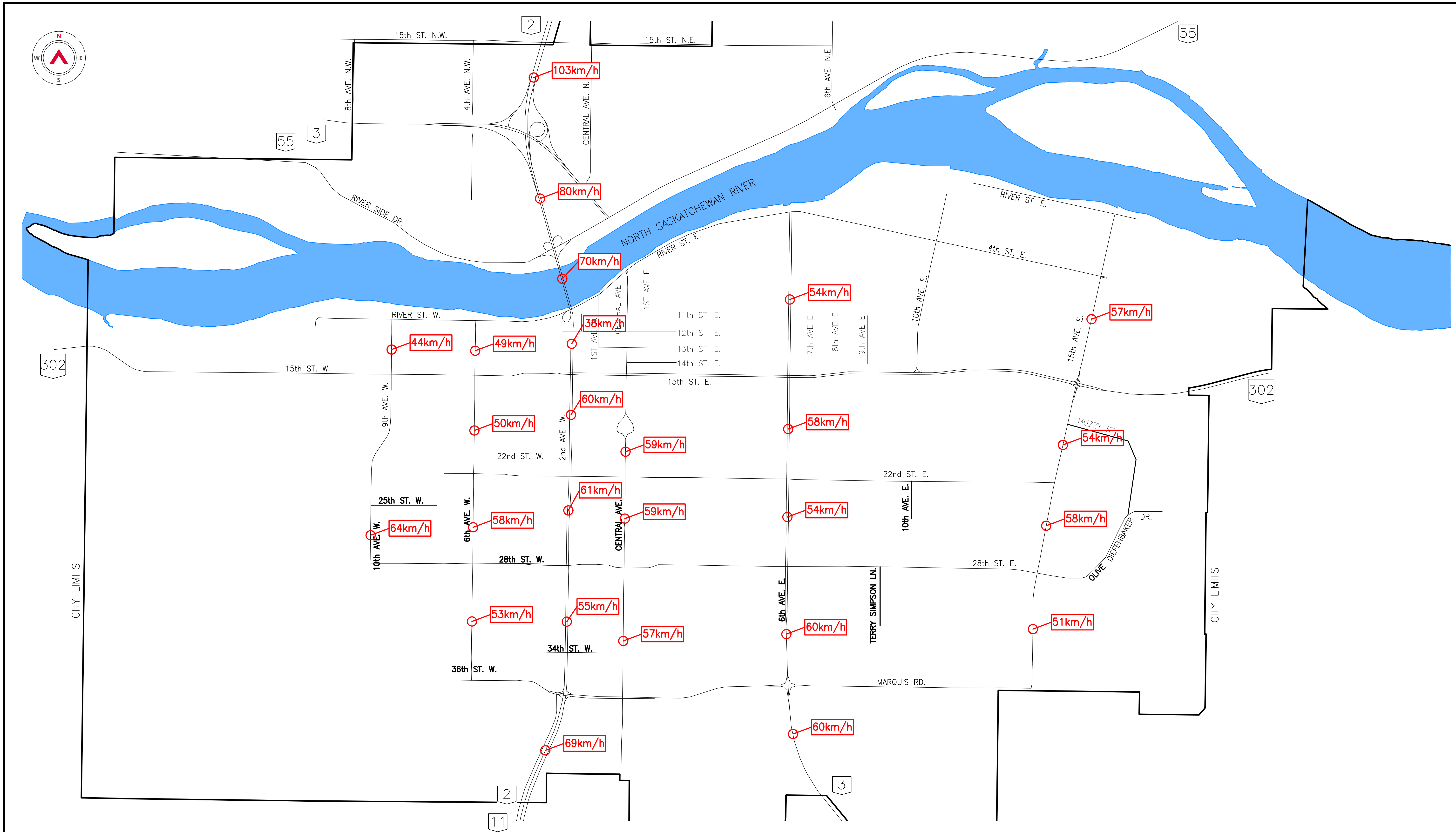
City of Prince Albert

Allnorth

CITY OF PRINCE ALBERT
TRANSPORTATION MASTER PLAN

FIGURE. 2-8
EAST-WEST ARTERIAL 85th PERCENTILE SPEED (km/h)

Date: 2017/03/29 | User: Tyler Dai | File: P:\SK\2015\0-99\15SK0016 - City of Prince Albert - Master Transportation Study\1000-Drawings\1011-Civil\01-Production\170206_TD_15SK0016-Transportation Master Plan | Layout: FIG 2-8 | Paper Size: 558.8mm x 431.8mm



City of Prince Albert

Allnorth

CITY OF PRINCE ALBERT
TRANSPORTATION MASTER PLAN

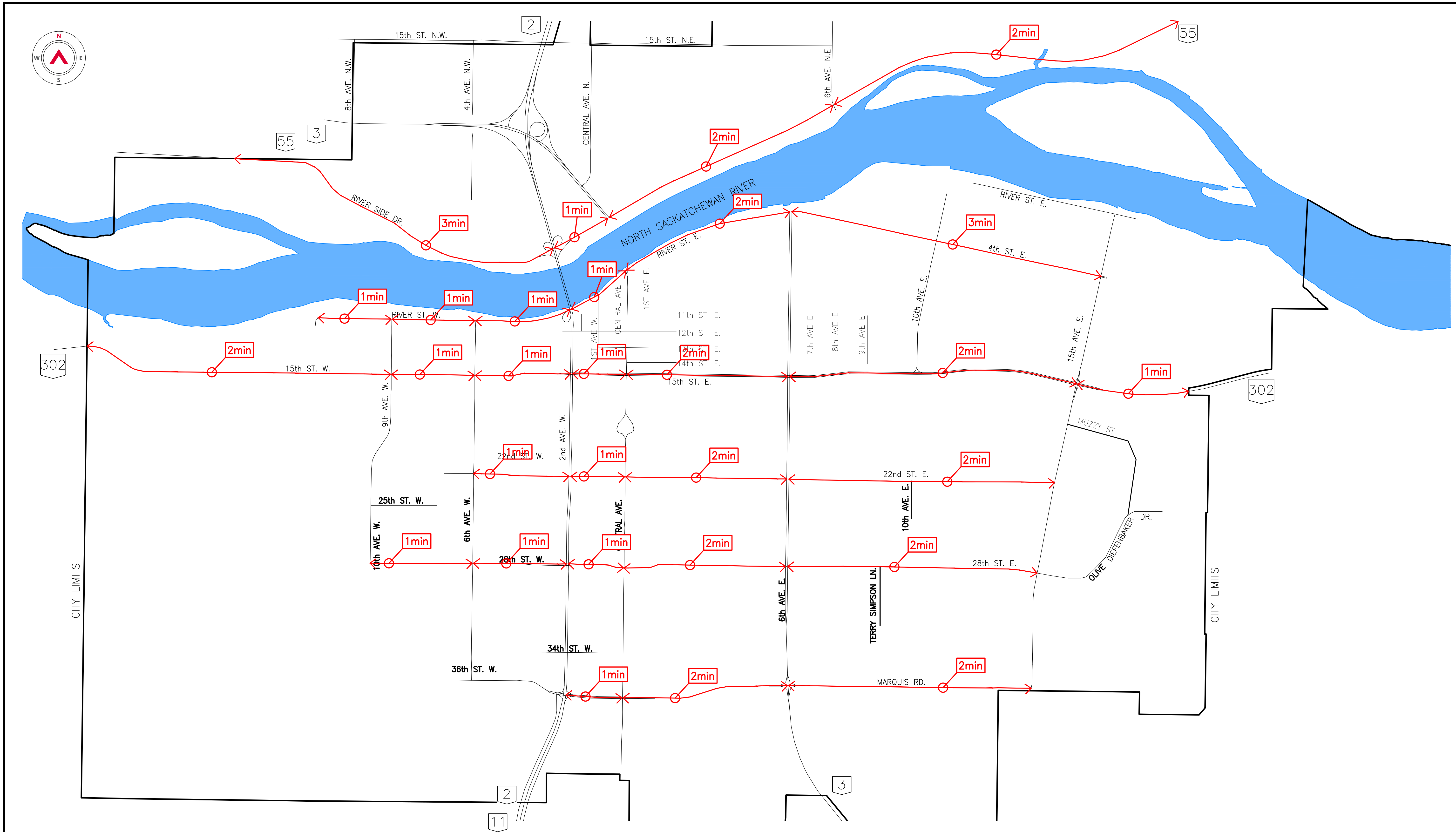
FIGURE. 2-9
NORTH-SOUTH ARTERIAL 85th PERCENTILE SPEED (km/h)

Date: 2017/03/29 | User: Tyler Dai | File: P:\SK\2015\0-99\15SK0016 - City of Prince Albert - Master Transportation Study\1000-Drawings\1011-Civil\01-Production\170206_TD_15SK0016-Transportation Master Plan | Layout: FIG 2-9 | Paper Size: 558.8mm x 431.8mm

2.8 Link Travel Times

Theoretical link travel times have been calculated based on the posted speed limits for each link, excluding intersection delays. The links were analyzed to determine travel times across the city.

The longest length of road in the east-west direction is 15^{th} Street, with a travel time of 10 minutes to get from one side of the city to the other, excluding delays from traffic signals. Conversely, the longest north-south road is 2^{nd} Avenue W, which has a travel time of 7 minutes from one end of the city to the other. All other roads, both in the east-west and north-south directions have theoretical travel times of less than 10 minutes. The link travel times can be seen in **Figures 2-10** and **2-11** below. It is important to note that when delays at intersections are taken into account the actual travel times for each route will be longer than what is illustrated in **Figures 2-10 and 2-11**.

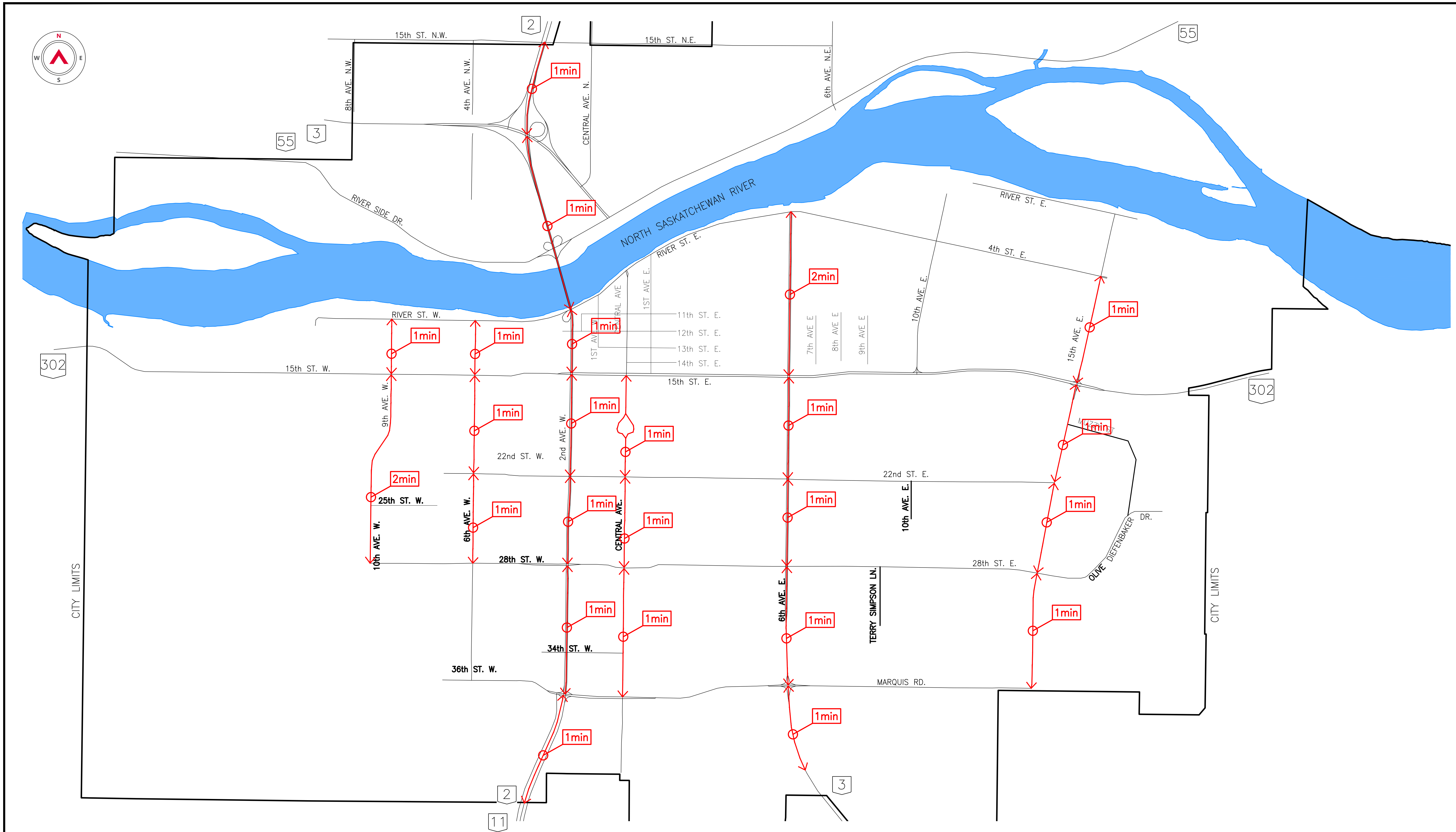


City of Prince Albert

Allnorth

CITY OF PRINCE ALBERT
TRANSPORTATION MASTER PLAN

FIGURE. 2-10
LINK TRAVEL TIME - EAST-WEST ROADS



CITY OF PRINCE ALBERT
TRANSPORTATION MASTER PLAN

FIGURE. 2-11
LINK TRAVEL TIMES - NORTH-SOUTH ROADS

2.9 Intersections

The City of Prince Albert has numerous intersections on arterial and collector roadways. The majority of the intersections are typical 4-legged intersections, with the exception of those along River Street and Riverside Drive that are 'T' intersections, due to each road running along the North Saskatchewan River.

In total, there are approximately 33 major intersections along the east-west and north-south roadways, some of which are signalized while others are un-signalized. Each intersection was analyzed for level of service (LOS) and delays, as well as any geometric constraints, such as the vicinity of signalized intersections to one another.

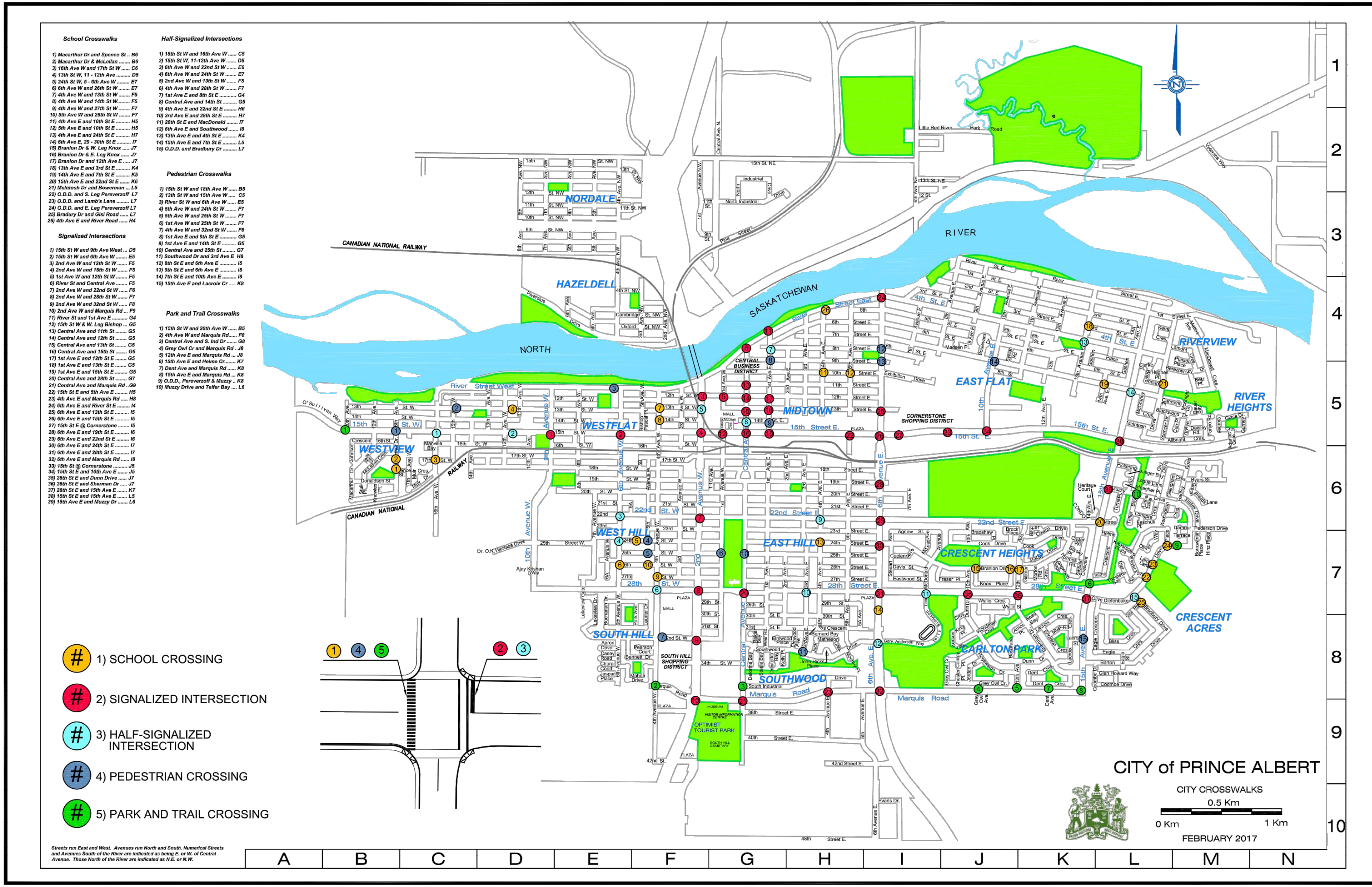
2.9.1 Signalized Intersection Location

Most intersections on arterial and collector roadways are controlled by traffic signals. **Table 2-6** is a description of the type of signal and their locations. **Figure 2-12** is a map of illustrating locations of the existing traffic signals. The City provides backup power at busy intersections in order to minimize traffic disruption (and improve safety) in an event that there is a power failure. The emergency power can last up 4 hours. This initiative is in the "best practice" category as it anticipates and plans for a possible detrimental event.

Table 2-6: Traffic Signal Location and Type

Roadway	Intersecting Road	Signal Type
9th Avenue W	15th Street W	1 Full Signal
6th Avenue W	24th Street W	1 Pedestrian Signal (half signal)
	22nd Street W	1 Pedestrian Signal (half signal)
	15th Street W	1 Full Signal
2nd Avenue W	Marquis Road	1 Full Signal
	32nd Street W	1 Full Signal
	28th Street W	1 Full Signal
	22nd Street W	1 Full Signal
	15th Street W	1 Full Signal
	13th Street W	1 Pedestrian Signal (half signal)
	12th Street W	1 Full Signal
Central Avenue	Marquis Road	1 Full Signal
	28th Street	1 Full Signal
	15th Street	1 Full Signal
	14th Street	1 Full Signal
	13th Street	1 Full Signal
	12th Street	1 Full Signal
	11th Street	1 Full Signal
	River Street	1 Full Signal
6th Avenue E	Marquis Road	1 Full Signal
	28th Street E	1 Full Signal
	24th Street E	1 Full Signal
	22nd Street E	1 Full Signal
	19th Street E	1 Full Signal
	15th Street E	1 Full Signal

Roadway	Intersecting Road	Signal Type
	13th Street E	1 Full Signal
	River Street E	1 Full Signal
15th Avenue E	28th Street E	1 Full Signal
	Muzzy Drive	1 Full Signal
	15th Street E	1 Full Signal
	7th Street E	1 Pedestrian Signal (half signal)
Marquis Road	2nd Avenue W	1 Full Signal
	Central Avenue	1 Full Signal
	4th Avenue E	1 Full Signal
	6th Avenue E	1 Full Signal
28th Street	4th Avenue W	1 Pedestrian Signal (half signal)
	2nd Avenue W	1 Full Signal
	Central Avenue	1 Full Signal
	3rd Avenue E	1 Pedestrian Signal (half signal)
	6th Avenue E	1 Full Signal
	McDonald Avenue	1 Pedestrian Signal (half signal)
	10th Ave E	1 Full Signal
	12th Ave E	1 Full Signal
	15th Avenue E	1 Full Signal
22nd Street	6th Avenue W	1 Pedestrian Signal (half signal)
	2nd Avenue W	1 Full Signal
	4th Avenue E	1 Half Signal
	6th Avenue E	1 Full Signal
15th Street	16th Avenue W	1 Pedestrian Signal (half signal)
	Queen Mary's Community School	1 Pedestrian Signal (half signal)
	9th Avenue W	1 Full Signal
	6th Avenue W	1 Full Signal
	2nd Avenue W	1 Full Signal
	1st Avenue W	1 Full Signal
	Central Avenue	1 Full Signal
	1st Avenue E	1 Full Signal
	5th Avenue E	1 Full Signal
	6th Avenue E	1 Full Signal
	7th Avenue E	1 Full Signal
	9th Avenue E	1 Full Signal
	10th Avenue E	1 Full Signal
	15th Avenue E	1 Full Signal
River Street	Central Avenue	1 Full Signal
	1st Avenue E	1 Full Signal
	6th Avenue E	1 Full Signal
	13th Avenue E	1 Pedestrian Signal (half signal)



CITY OF PRINCE ALBERT
TRANSPORTATION MASTER PLAN

FIGURE. 2-12
TRAFFIC SIGNAL LOCATIONS

City of Prince Albert

Allnorth

Date: 2017/03/29 | User: Tyler Dai | File: P:\SK2015(0-99)\15SK0016 - City of Prince Albert - Master Transportation Study\1000-Drawings\1011-Civil\01-Production\170206_TD_15SK0016-Transportation Master Plan | Layout: FIG. 2-12 | Paper Size: 558.8mm x 431.8mm

2.9.2 Traffic Signal Warrant Calculations

A warrant is a set of criteria used to define the relative need for, and. appropriateness of, a particular traffic control device. Warrants are usually expressed in the form of numerical requirements such as the volume of vehicular or pedestrian traffic. The Transportation Association of Canada (TAC) provides guidelines on how to conduct traffic signal warrant analysis.

The TAC warrant system is based on the formula below:

W = [(V) + (P x F x L)] x C

Where;

W = Cumulative warrant points

V = Function of individual vehicle/vehicle conflicts;

P = Function of individual vehicle/pedestrian conflicts;

F = Pedestrian Demographics;

L = Pedestrian Exposure Factor; and

C = Roadway Characteristics Factor

Factor F considers the proximity of intersection to elementary schools or senior complexes

Factor L considers the number of lanes a pedestrian has to cross

Factor C considers the roadway geometry

A value of 100 cumulative points is considered a minimum value required to warrant a traffic signal. If a location scores less than 100 cumulative points it is an indication that signals might not be necessary at that particular location.

The method outlined in the TAC *"Signal and Pedestrian Head warrant Handbook, June 2014"* recommends the following steps are:

- Obtain peak hour traffic volumes (am, noon and pm); these must be actual turning movement counts.
- Assume two consecutive am and pm peak hour traffic volumes to be equal to the am and pm peak hour traffic volumes obtained from the traffic model
- Assume two consecutive noon hours were to be 85% of the pm peak traffic volumes.
- Evaluate and consider additional factors for considering traffic signalization of intersections (e.g., congestion, approach conditions, proximity to schools).
- Perform traffic signal warrant analysis based on Transportation Association of Canada (TAC) guidelines to assess consideration for signalization of intersections.

A proper investigation of applicable factors should be carried including the following:

- Eight-Hour Vehicular Volume - The volumes of traffic should be the actual turning movement counts taken for the highest 8 to 12 hours in an average day. The chosen weekday should represent traffic volumes normally and repeatedly found at the location;
- Four-Hour Vehicular Volume – A four-hour vehicular volume count is intended to be applied where the volume of intersecting traffic is the principal reason to consider installing a traffic control signal;
- Peak Hour - The peak hour count is intended for use at a location where traffic conditions are such that for a minimum of 1 hour of an average day, the minor street traffic suffers undue delay when entering or crossing the major street;
- Pedestrian Volume – A pedestrian volume count is intended where the traffic volumes on a major street are so heavy that pedestrians experience excessive delays in crossing the major street;
- School Crossing - The school crossing count is intended for application where the fact that school children cross the major street is the principal reason to consider installing a traffic control signal;
- Coordinated Signal System - progressive movement in a coordinated signal system sometimes necessitates installing traffic signal at intersections where they would not otherwise be needed in order to maintain proper platooning of vehicles;
- Collision History – The collision history is intended for applications where the severity and frequency of collisions are the principal reasons to consider installing a traffic control signal;

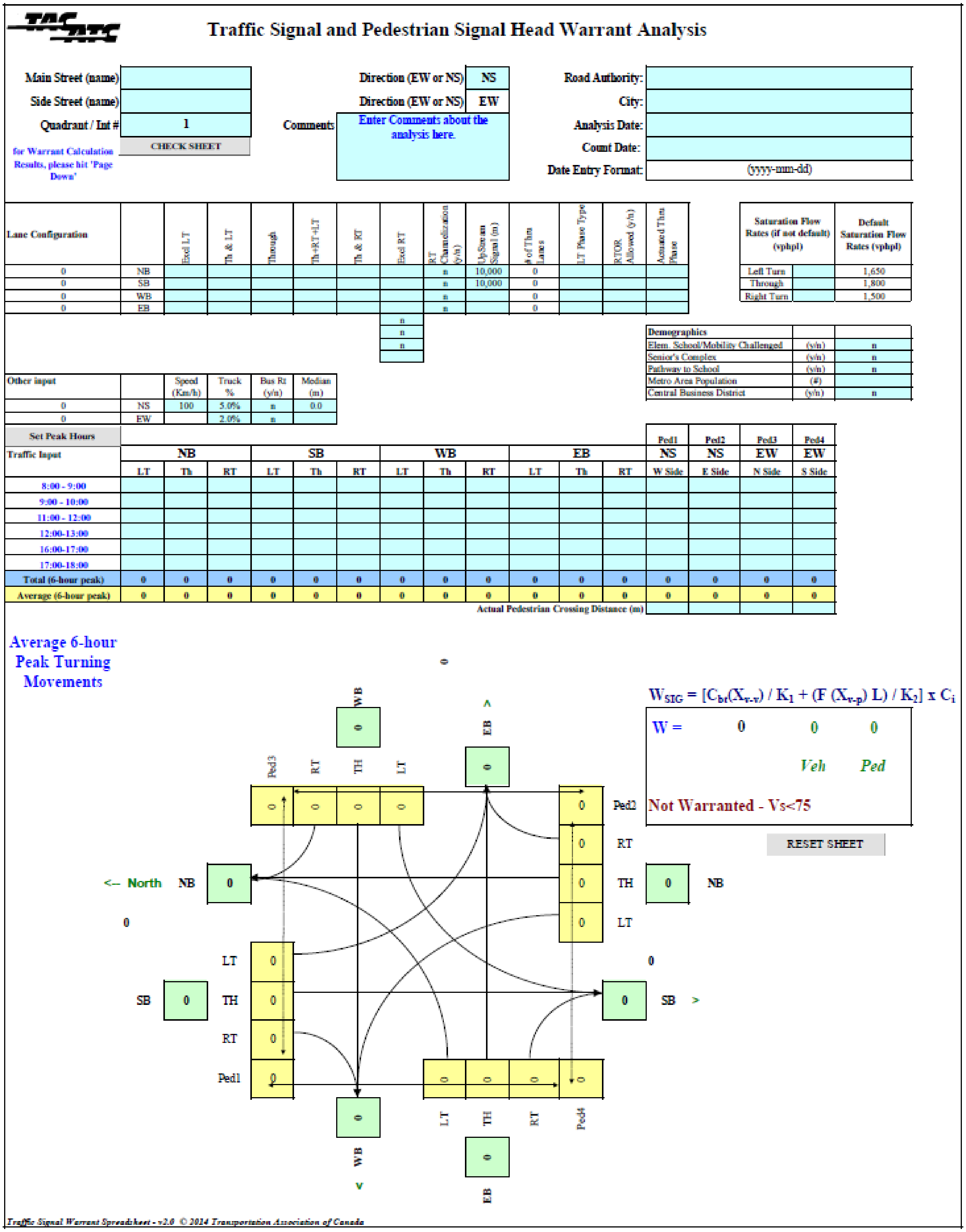
Roadway Network - traffic signal at some intersections may be justified to encourage concentration and organization of traffic flow on a roadway network

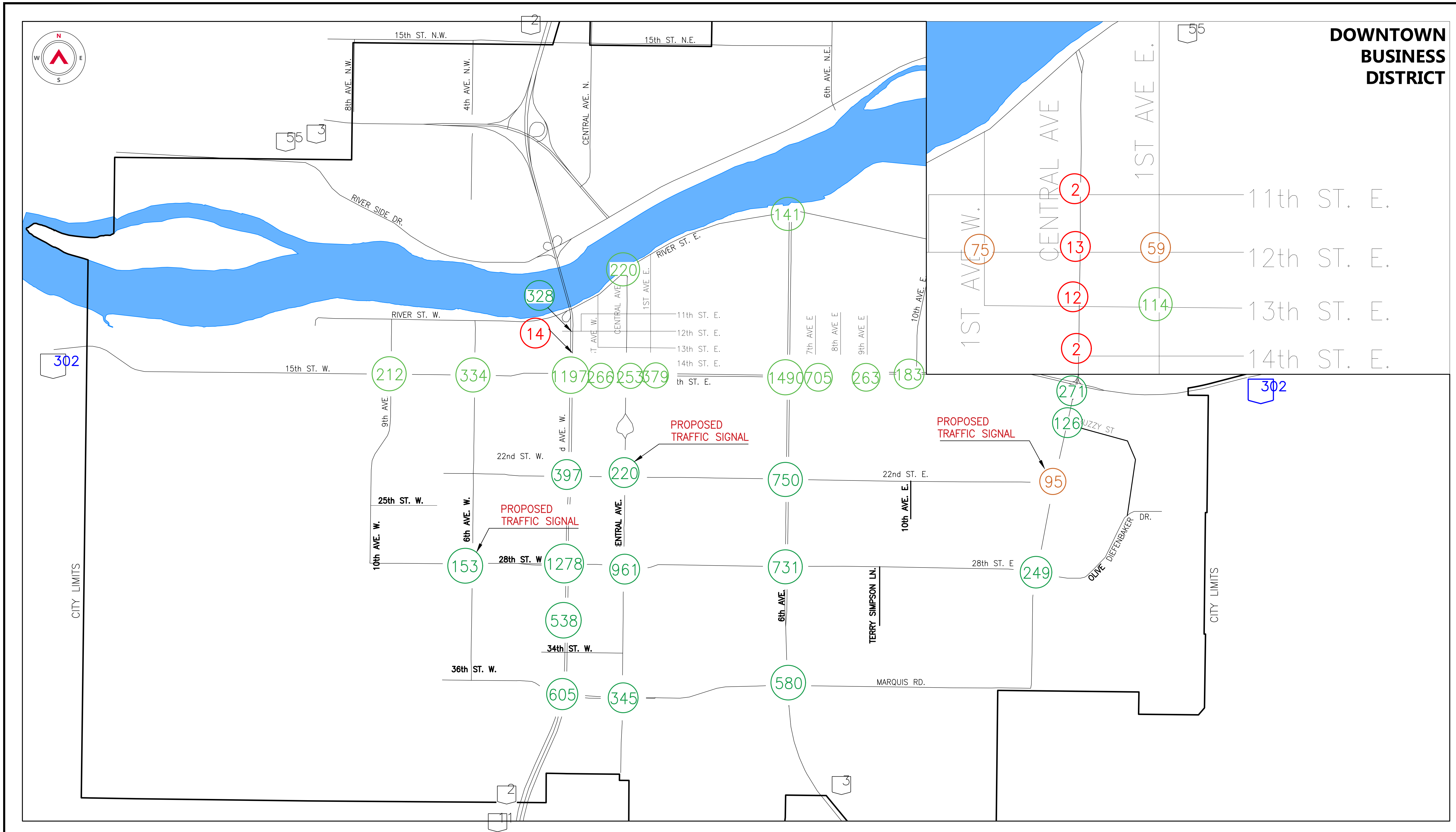
A warrant calculation was conducted on the existing signals to confirm that they meet the 100 point warrant system based on the current volumes. The majority of the existing traffic signals meet the minimum 100 point warrant except for the following mainly downtown locations:

- 13th Street and 2nd Avenue W. (pedestrian signal located at)
- Central Avenue and 11th Street E
- Central Avenue and 12th Street E
- Central Avenue and 13th Street E
- Central Avenue and 14th Street E
- 1st Avenue E and 12th Street E

The warrant calculation sample sheet is illustrated in **Figure 2-13A.** The warrant points achieved by each intersection are illustrated in **Figure 2-13**; the warrant calculation sheets are included in **Appendix B**.

Figure 2-13A: Sample Template for Traffic Signal and Pedestrian Signal Head Warrant Calculation





LEGEND

- 345 TRAFFIC SIGNAL WARRANT POINTS OVER 100
- 14 TRAFFIC SIGNAL WARRANT POINTS BELOW 20
- 95 TRAFFIC SIGNAL POINTS BELOW 100

City of Prince Albert

Allnorth

CITY OF PRINCE ALBERT
TRANSPORTATION MASTER PLAN

FIGURE. 2-13
TRAFFIC SIGNAL WARRANT POINTS

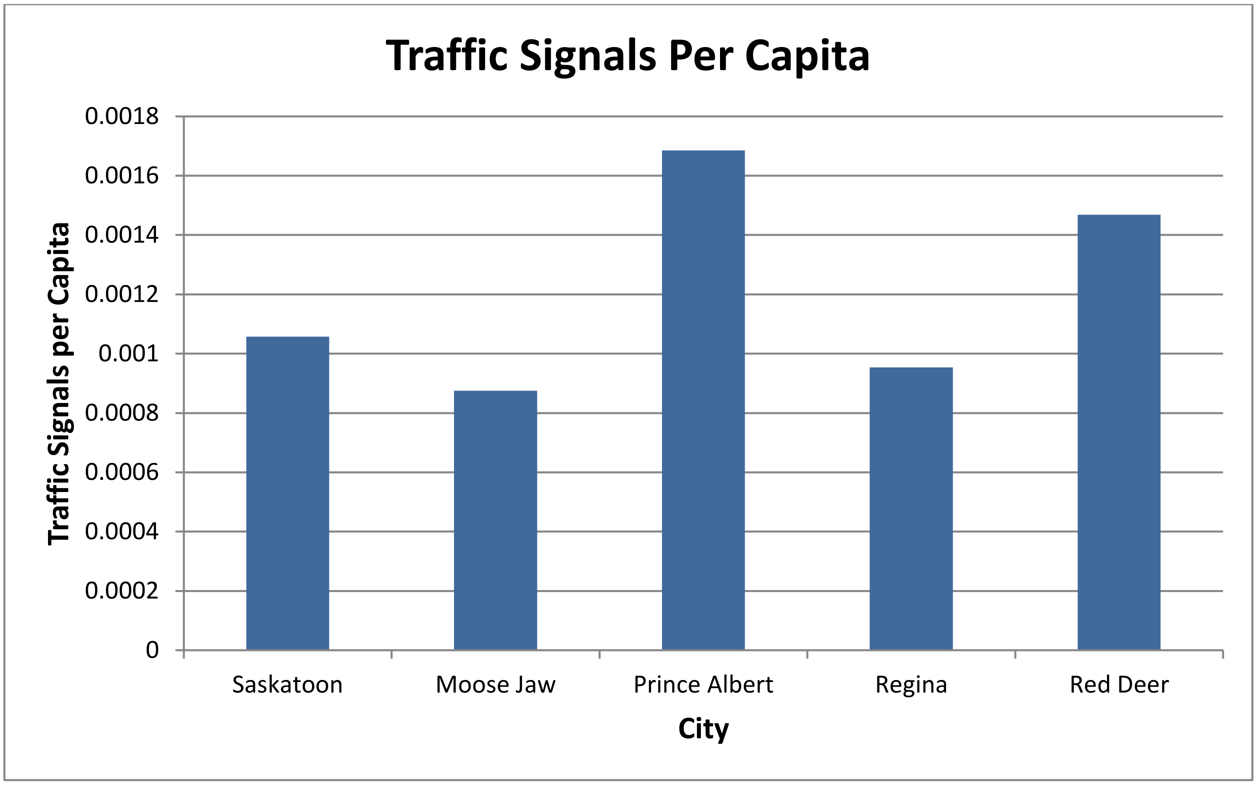
2.9.3 Signalized Intersection Per Capita

The City of Prince Albert with a population of 35,129 currently has 61 traffic signals. The City wanted to know if the traffic signal density or per capita was consistent with other cities with similar population. A survey of traffic signals per capita in other jurisdictions was conducted. In Saskatchewan Saskatoon, Regina, Prince Albert, and Moose Jaw were surveyed. In Alberta the City of Red Deer was surveyed. **Table 2-7** is a summary of the survey and results.

Table 2-7: Traffic Signals Per Capita

City	Population	Number of Signals	Signals/Capita
Saskatoon	260,900	276	0.00105
Regina	208,548	199	0.00095
Red Deer	100,807	148	0.00146
Moose Jaw	34,272	30	0.00087
Prince Albert	35,129	61	0.00174

Figure 2-14 is an illustration of the information in a graphical format. Based on the survey it was demonstrated that the City of Prince Albert does have more signals/capita than the four cities surveyed. The signal density for the City of Prince Albert translates to 1.74 signals for every 1,000 residents. For comparison purposes, the City of Saskatoon has a signal density of approximately 1.05 signals for every 1,000 residents.



2.10 Public Transit

The City of Prince Albert operates six regular transit routes, using 8 buses. The transit carries an average of 1,236 passengers per day. The maximum number of passengers recorded by the Prince Albert Transit is 2,590.

The number of transit trips per day are low compared to other modes of transportation. Because of the low usage, transit has no impact on the total number of trips forecasted and used in this study. The transit service has routes into the downtown transfer point located at Central Avenue and 14th Street. All the routes run on one way loops, to give better coverage of the City with a limited number of vehicles. All buses transfer at 14th Street twice an hour (at 15 and 45 minutes of every hour) at the same time to allow passenger to transfer without having to wait. There is no transit service to the residential communities, industrial areas and airport on the north side of the North Saskatchewan River. The routes are:

- 15th Street Shuttle
- All Day Express
- East Flat
- East Hill/Carlton
- West Hill/Hospital
- West Flat

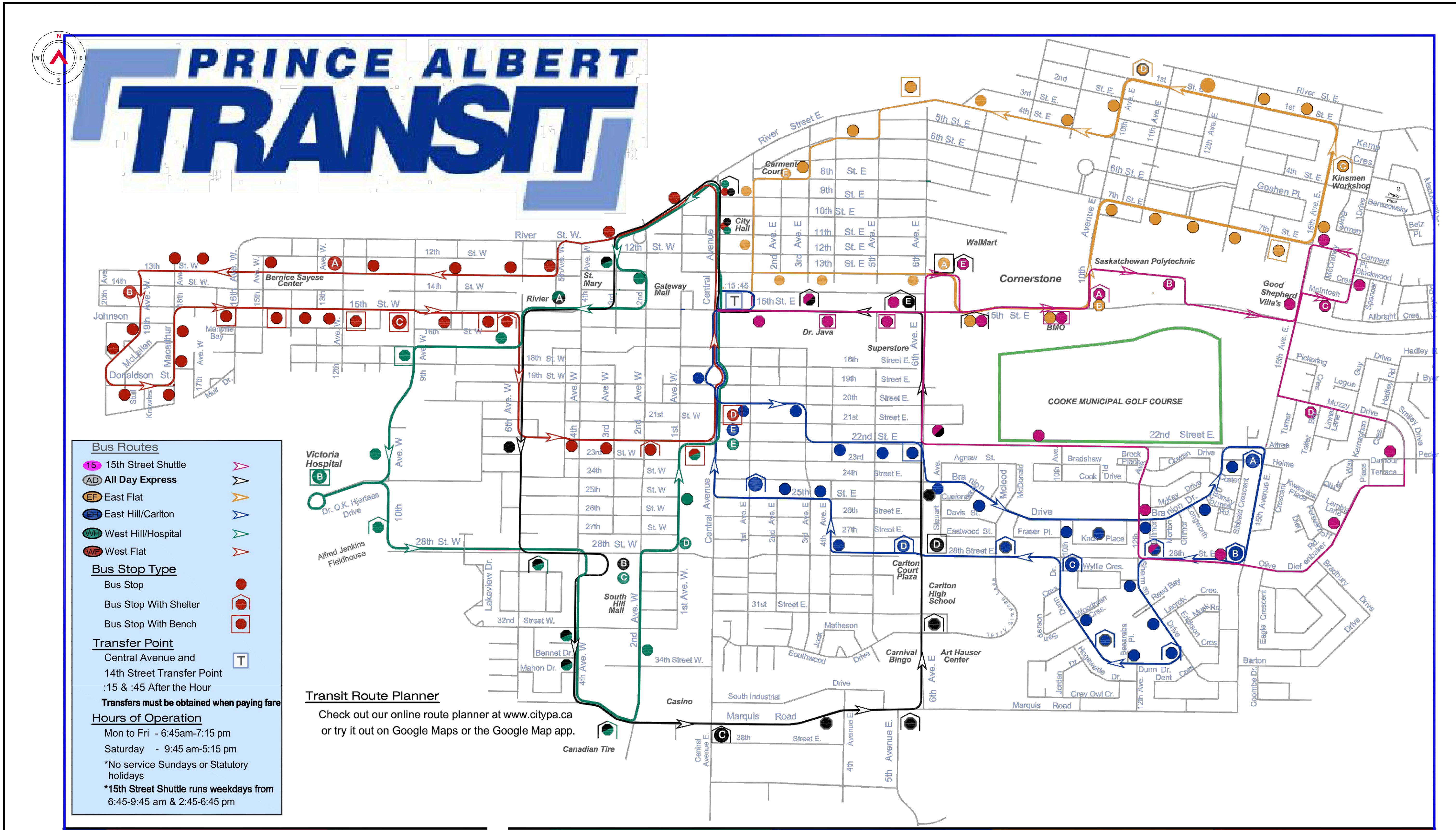
Transit service operates from Monday to Friday from 6:45 am to 7:15 pm and on Saturdays from 9:45 AM to 5:15 PM. There is no service on Sundays or statutory holidays. Transit service operates with extended-hours through the month of September.

The City is providing support and taking initiatives in order to see increase in ridership. It is assumed that when West Hill and Crescent Acres are developed, the City of Prince Albert will extend transit services to those areas. The transit routes can be seen in **Figure 2-15** below.

A fact sheet summary of Prince Albert Transit indicators are illustrated in **Table 2-8**

Table 2-8: Prince Albert Transit Statistics

Transit Operator	First Canada ULC
Mode of Operation	Single downtown transfer point located at Central Avenue
Number of Buses	8
Number of Routes	6
Average Daily Number of Passenger	1,236
Maximum Daily Number of Passengers Recorded	2,590
Hours of Operation	Mon- Fri 6:45 am to 7:15 pm Sat 9:45 AM to 5:15 PM
Fare	Graduated fares based on age group



Date: 2017/03/29 | User: Tyler Dai | File: P:\SK2015\0-99\15SK0016 - City of Prince Albert - Master Transportation Study\1000-Drawings\1011-Civil\01-Production\170206_TD_15SK0016-Transportation Master Plan | Layout: FIG 2-15 | Paper Size: 558.8mm x 431.8mm

SCHEDULES

15TH STREET SHUTTLE

	Bus Stop	Departs	
T	Central Avenue & 14th Street	:15	:45
A	Bank of Montreal	:20	:50
B	SIAST	:22	:52
C	McIntosh at Allbright Crescent	:25	:55
D	Muzzy Drive and Telfer Bay	:30	:00
E	Cornerstone	:40	:10

ALL DAY EXPRESS

	Bus Stop	Departs	
T	Central Avenue and 14th Street	:15	:45
A	15th Street and 5th Avenue W	:22	:52
B	South Hill Mall	:26	:56
C	Marquis Road & Central Ave	:32	:02
D	6th Avenue E & 28th Street E	:35	:05
E	15th Street E at 6th Avenue	:40	:10

WEST HILL

	Bus Stop	Departs	
T	Central Avenue & 14th Street	:15	:45
A	15th Street W & 4th Avenue W	:20	:50
B	Victoria Hospital	:27	:57
C	South Hill Mall	:30	:00
D	1st Avenue W & 28th Street W	:41	:11
E	Central Avenue & 21st Street E	:44	:14

EAST HILL

	Bus Stop	Departs	
T	Central Avenue & 14th Street	:15	:45
A	22nd Street E & 15th Avenue E	:27	:57
B	28th Street E & 15th Avenue E	:28	:58
C	Dunn Drive & 28th Street E	:34	:04
D	28th Street E & 6th Avenue E	:36	:06
E	Central Avenue & 21st Street E	:44	:14

EAST FLAT

	Bus Stop	Departs	
T	Central Avenue & 14th Street	:15	:45
A	Cornerstone	:19	:49
B	SIAST	:26	:56
C	Kinsmen Workshop	:30	:00
D	1st Street E & 10th Avenue E	:32	:02
E	230 8th St. E - Carment Court	:40	:10

WEST FLAT

	Bus Stop	Departs	
T	Central Avenue & 14th Street	:15	:45
A	13th Street W & 12th Avenue	:22	:52
B	19th Avenue W & 14th Street	:24	:54
C	15th Street W & 9th Avenue W	:32	:02
D	Central Avenue & 21st Street E	:44	:14

City of Prince Albert

Allnorth

CITY OF PRINCE ALBERT
TRANSPORTATION MASTER PLAN

FIGURE 2-15
PUBLIC TRANSIT ROUTES

2.11 Collisions

Traffic Accident Information System (TAIS) keeps detailed information on all collisions within the province of Saskatchewan. The TAIS was the source of all collision data listed in this report. Eight years of data from 2009 to 2016 were used in the analysis, representing the most current collision data from TAIS. It is important to note that the 2016 collision data does not cover a full year. The 2016 data is only for January to September. for A review and analysis of the collision data reveal the following:

- That the majority of the collisions occur along 2nd Avenue W, 6th Avenue E and 15th Street E, with 15th Street E assuming the greatest number of annual collisions;
- There are 57% fewer collisions in 2016 than there were in 2009;
- The most common collision type is rear end collision;
- Contrary to popular belief, most collisions occur during clear weather conditions and not during winter conditions;
- Heavy trucks 4500kg or more are involved in about 0.72% of all collisions; and,
- The percentage of collisions involving male driver is 52% while 33.5% of female drivers are involved in collisions. The numbers do not add up to 100% because the gender of 14.5% was not specified.

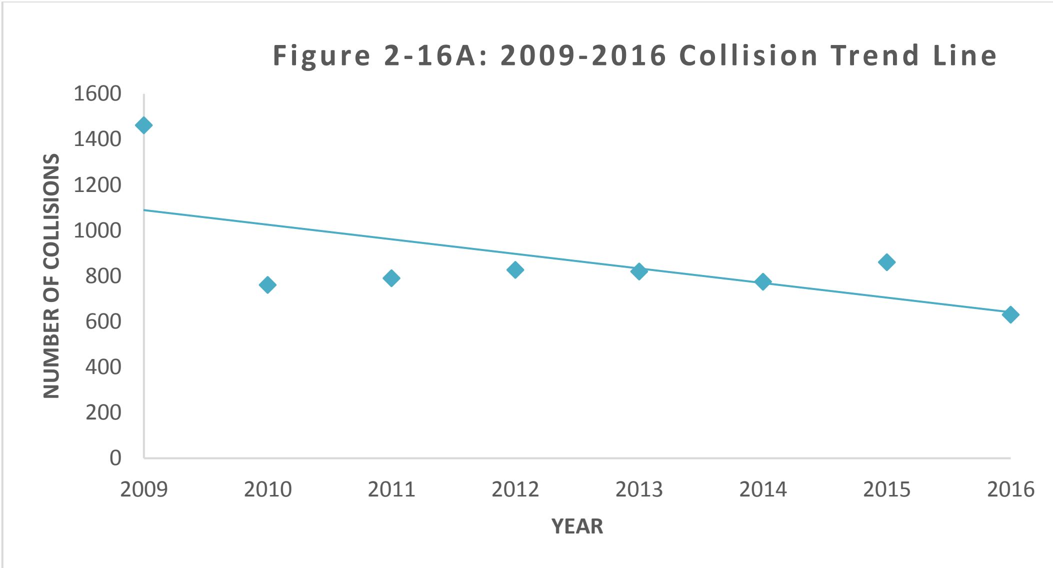
Figures 2-16 and Tables 2-9 below illustrates detailed analysis of the collisions data.

Table 2-9A: 2009-2016* Collision Summary

Year	PDO**	Injury	Fatal	Total
2009	1311	147	4	1462
2010	616	143	1	760
2011	603	185	2	790
2012	626	200	1	827
2013	616	202	2	820
2014	622	151	1	774
2015	701	159	0	860
2016	495	134	1	630
Totals	**5590**	**1321**	**12**	**6923**

*There is only partial data (e.g. January to September) for 2016.

**PDO=Property Damage Only



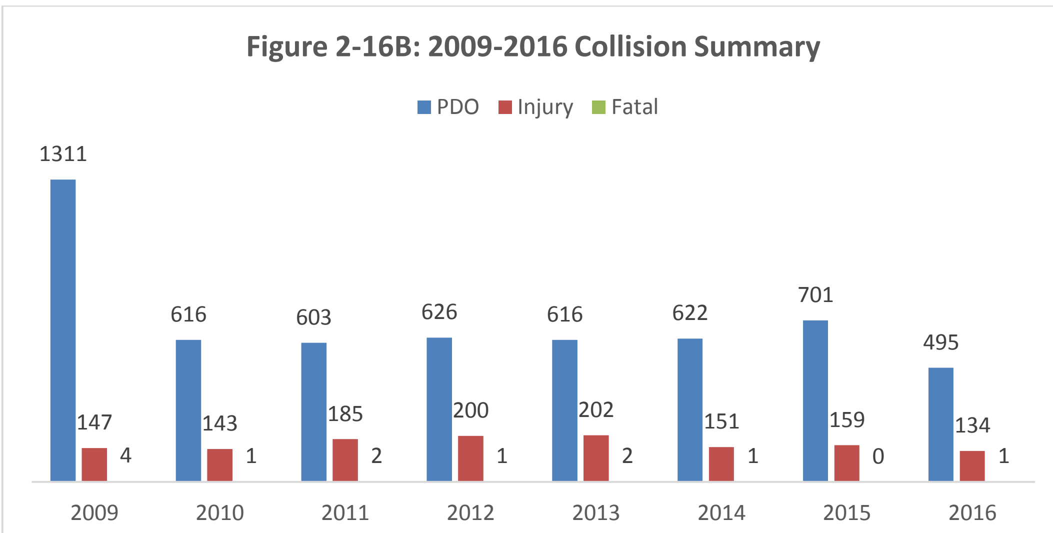


Table 2-9B- Collisions and Time of Day

Time of Day	Number of Collisions	Percentage
06:00-08:59	643	9.3%
09:00-14:59	2369	34.2%
15:00-18:59	2180	31.5%
19:00-05:59	1673	24.2%
Unspecified	58	0.8%
Totals	**6923**	**100.0%**

Table 2-9C: Collision Types

Crash Type	Number of Collision	Percentage
Fixed/Movable Object	530	7.7%
Lost Control - Left Ditch	124	1.8%
Lost Control - Right Ditch to Left Ditch	48	0.7%
Lost Control - Right Ditch	353	5.1%
Rear End	1833	26.5%
Side Swipe - Same Direction	500	7.2%
Side Swipe - Opposite Direction	83	1.2%
Head On	85	1.2%
Right Angle	1128	16.3%
Right Turn	114	1.6%
Left Turn/Straight	254	3.7%
Left Turn/Straight - Same Direction	97	1.4%
Left Turn/Straight - Opposite Direction	530	7.7%
Left Turn - Passing	44	0.6%
Right Turn - Passing	51	0.7%
Other	1149	16.6%
Totals	**6923**	**100.0%**

Table 2-9D: Collisions Weather Conditions

Crash Type	Number of Collision	Percentage
Clear	3724	53.8%
Cloudy	579	8.4%
Raining	181	2.6%
Snowing	209	3.0%
Sleet/Hail/Freezing Rain	17	0.2%
Fog/Smoke/Smog	15	0.2%
Drifting Snow/Dust	58	0.8%
Strong Winds	1	0.0%
Unspecified	2139	30.9%
Totals	**6923**	**~100.0%**

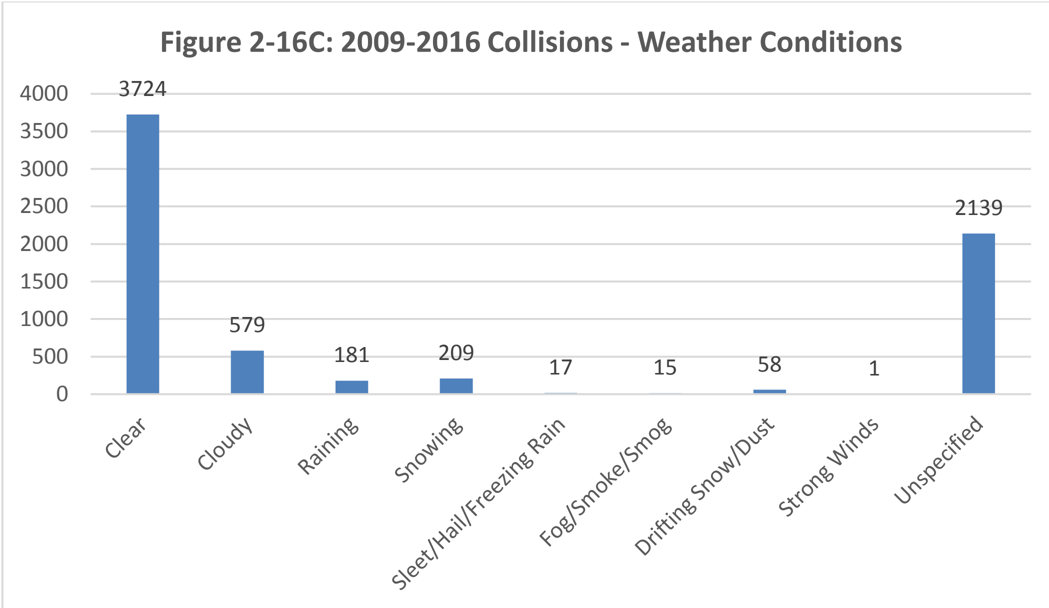


Table 2-9E: Collision Vehicle Types

Vehicle Type	Percentage
Automobile	54.71%
Pickup Truck	21.31%
Van 4500kg and under	16.49%
Truck over 4500kg	0.72%
Power Units	0.68%
Transit Bus	0.10%
Inter-City Bus	0.08%
School Bus - Standard	0.20%
School Bus - Van	0.05%
Other Bus	0.07%
Motorcycle	0.28%
Moped/Powered Bicycle	0.01%
Bicycle	0.50%
Ambulance/Police/Fire	0.16%
Snowmobile	0.02%
Unregistered Constructed Equipment	0.08%
Unregistered Farm Equipment	0.02%
Off Highway Vehicles	0.00%
Motor Homes	0.05%
Other Vehicle	0.17%
Unspecified	4.29%
Total	**~100.00%**

Table 2-9F: Collisions by Gender

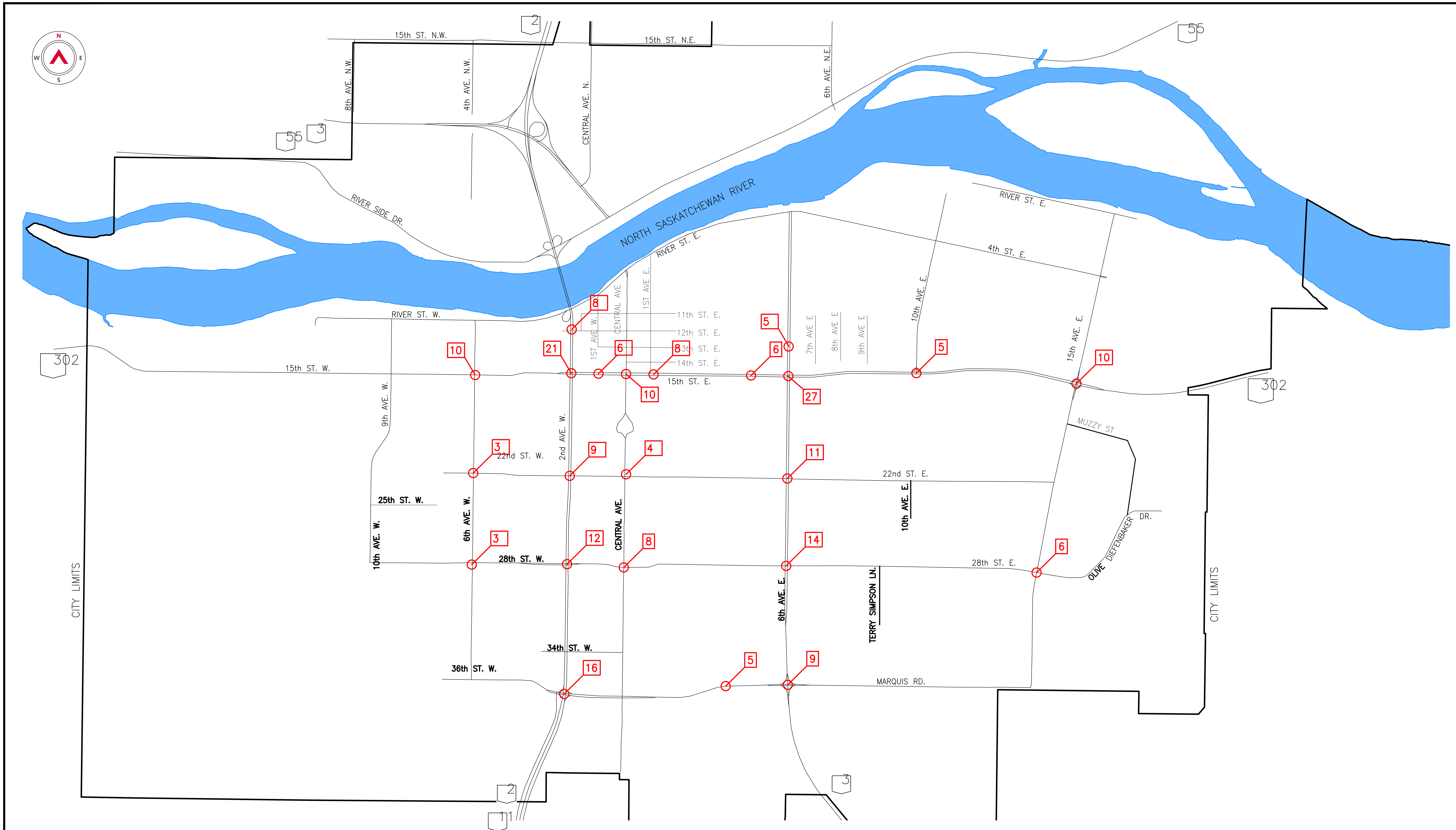
Gender of Driver	Percentage
Female	33.5%
Male	52.0%
Gender Not Specified	14.5%
Total	**100.00%**

The collision and traffic volume data analyzed reveal two trends: over the past 8 years collisions have decreased and over the same 8 years traffic volumes have increased. At first this may appear to be a contradiction in logic. However there are a number of possible reasons that may explain this trend including the following:

- *Traffic Volume-Collision Relationship:* Part of the collision reduction can be explained in terms of the relationship between traffic volumes and collisions. As roadways become congested the average travel speeds decrease. The theory is that drivers are better able to control vehicles at lower speeds. As a result there is a reduction in collisions as the road become congested. Traffic volumes have increased on most arterials and collectors within the City. It is possible that the major roadways in the City of Prince Albert are experiencing the reduction in collisions because of this relationship between congestion and collisions;
- *Better Roadway Maintenance*: There is a direct relationship between the number of collisions and poor road design and maintenance. There are fewer collisions on roadways that better designed and maintained. This emphasizes the relative importance and benefits of the Urban Highway Connector Program (UHCP). The agreement between the Ministry of Highways and the City results in well designed and maintained roadways and by extension –safer roadways. In addition, the City has increased funding for the paving program from $2.1 million in 2002 to $4.1 million in 2013. The increase in funding has resulted in better maintained and safer roadways;
- *Education*: More motorists are better educated on safe driving habits. The objective of education programs should be to provide road users with appropriate knowledge, skills and attitudes so that they choose to use the roads in a safe and responsible manner. The Saskatchewan Government Insurance (SGI) does conduct safe driving campaigns. This could also be part of the reasons for collision reduction;
- *Rigorous Police Enforcement:* Police enforcement should support and complement education measures and should specifically target irresponsible, dangerous and unlawful behaviour for it to be effective. When motorists know that there are police officers enforcing traffic laws they tend to drive slower or better. Furthermore, the City of Prince Albert Police Service has recently installed license plate reading technology in police vehicles. The police officers now have the capability to read license plates in motion. The technology has resulted in detecting unlicensed vehicles and removing them from the roadways. The enforcement frequency conducted by the City of Prince Albert Police could explain part of the reduction in collisions;

- *Improved Vehicle Technologies*: The vehicle technology has improved over the past few years. Improvements to vehicle technology such as the introduction of Antilock Braking System (ABS), Dynamic Stabilization Traction Control (DSTC), auto breaking and collision detection/avoidance systems have greatly reduced the chances for collisions. For instance, the ABS are designed to help drivers retain steering control by preventing wheels from locking up during an episode of heavy braking. DSTC are designed to help drivers retain steering control during slippery road conditions or during sudden maneuvers to avoid an obstacle or another vehicle. Today's vehicles have much shorter stopping distances compared to vehicles of twenty years ago. If the majority of drivers in the City drive newer vehicles this could explain part of the collision reduction; and,
- *Mild Weather Conditions*: The presence of precipitation (both rain and snow) has an impact on collisions. The majority of most weather-related collisions happen on wet pavement. Perhaps over the past few years the City of Prince Albert has experienced milder weather conditions resulting in a reduction in collisions.

The 2009-2016 average annual collisions at key intersections on the arterial and collector roadways are illustrated in **Figure 2-17**



City of Prince Albert

Allnorth

CITY OF PRINCE ALBERT
TRANSPORTATION MASTER PLAN

FIGURE. 2-17
2009 - 2016 AVERAGE ANNUAL INTERSECTION COLLISION

Date: 2017/03/29 | User: Tyler Dai | File: P:\SK\2015\0-99\15SK0016 - City of Prince Albert - Master Transportation Study\1000-Drawings\1011-Civil\01-Production\170206_TD_15SK0016-Transportation Master Plan | Layout: FIG 2-17 | Paper Size: 558.8mm x 431.8mm

2.12 Urban Highway Connector Program

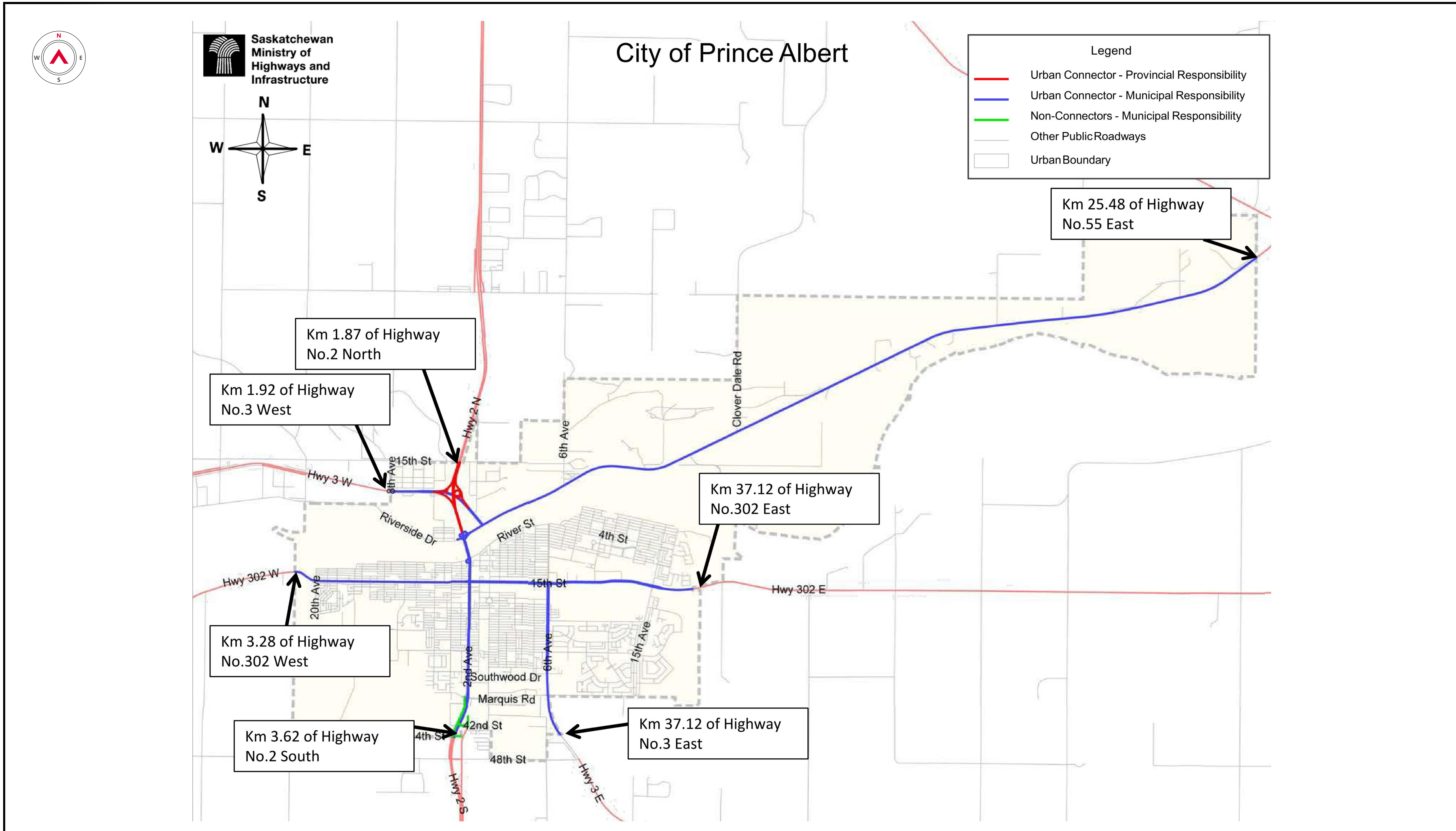
The Urban Highway Connector Program (UHCP) is an agreement between the Saskatchewan Ministry of Highways and Infrastructure and local municipalities. The program provides funding for urban highway connectors based on provincial interest and is built on several guiding principles such as:

- Equitable treatment of all municipalities;
- Transparent and consistent policy framework;
- Reduced traffic congestion in and around urban centers;
- Enhanced traffic safety in urban areas;
- Improved corridor continuity and level of service on urban connectors;
- Enhanced planning to meet future transportation demand; and,
- Targeted resources to maximize benefits for the provincial economy.

In the City of Prince Albert the UHCP is applicable to the following roadways:

- 2nd Avenue West
- 6th Avenue E
- 15th Street W&E
- Highway No. 55
- Highway No. 3

Figure 2-18 illustrates the roads that have been identified as part of the UHCP.



City of Prince Albert

Allnorth

CITY OF PRINCE ALBERT
TRANSPORTATION MASTER PLAN

FIGURE. 2-18
URBAN HIGHWAY CONNECTOR ROADS

Date: 2017/03/29 | User: Tyler Dai | File: P:\SK\2015\0-99\15SK0016 - City of Prince Albert - Master Transportation Study\1000-Drawings\1011-Civil\01-Production\170206_TD_15SK0016-Transportation Master Plan | Layout: FIG. 2-18 | Paper Size: 558.8mm x 431.8mm

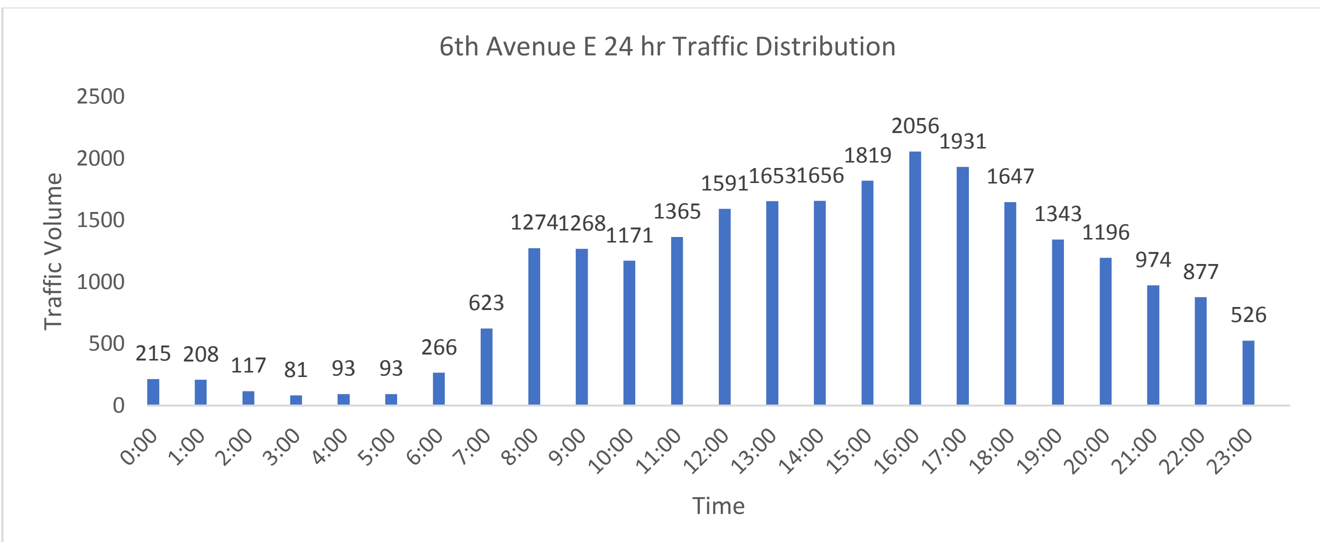
The City conducts regular long-term traffic counts on the UHCP roadways. In 2016 between June and October was the latest that the continuous count was conducted. Below is a description of peak traffic data on these roadways:

6th Avenue E

The land use along this corridor is a mix of institutional, commercial and residential. It also a transit route for the all-day express bus route. The City counted traffic on 6th Avenue from July to October 2016. The count location was located near 15 Street E. In all the counts peak volumes were observed on Friday, October 21, 2016. **Table 2-10** below is an illustration of data relating to the peak counts. A graphical representation of 24Hour traffic during the peak day is illustrated in a chart below.

Table 2-10: 6th Avenue Peak Traffic Characteristics

Peak Day	Friday, October 21, 2016
Peak Day Recorded Volume	24,043 vehicles
Peak Hour	4:15 PM – 5-15 PM
Peak Hour Recorded Volume	2,056 vehicles
Vehicle Composition	n/a
2014 AADT	20,785



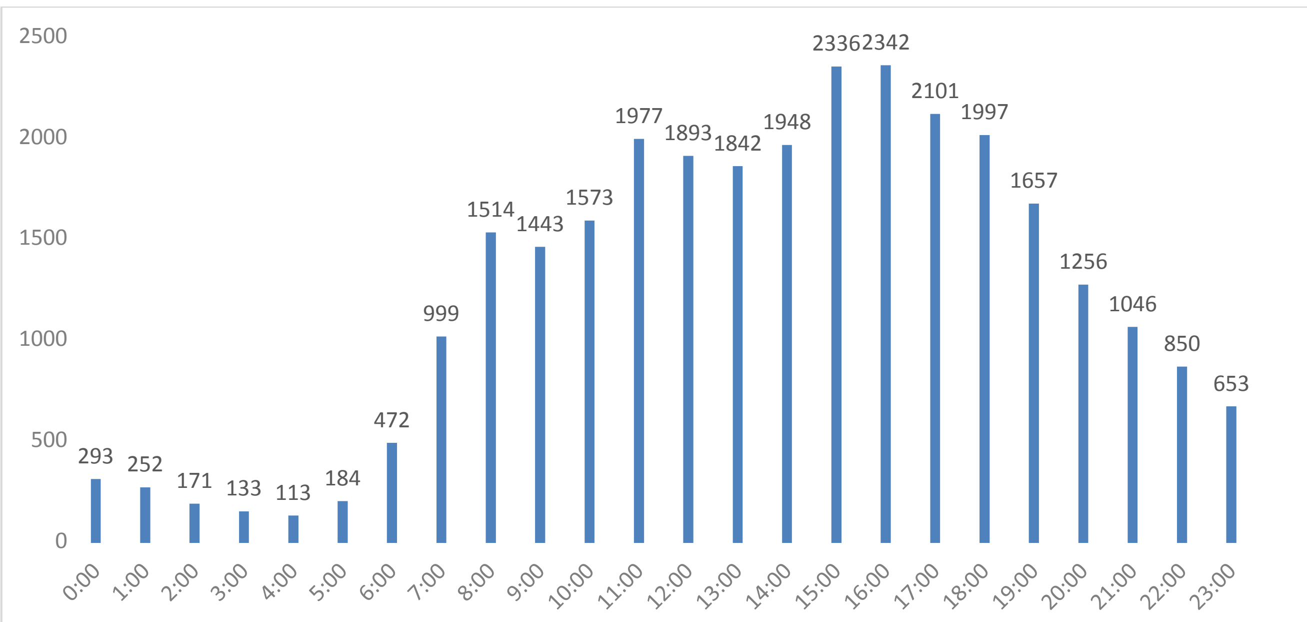
2nd Avenue W

The land use along this corridor is predominantly commercial with some residential north of 22nd Street. The section between Marquis Road and 28th Street is a transit route for the West Hill/Hospital bus route.

The City counted traffic on 2nd Avenue from June to October 2016. The count location was located near 15 Street E. In all the counts peak volumes were observed on Saturday, July 9, 2016. **Table 2-11** below is an illustration of data relating to the peak counts.

Table 2-11: 2nd Avenue W Peak Traffic Characteristics

Peak Day	Saturday, July 9, 2016
Peak Day Recorded Volume	29,045 vehicles
Peak Hour	16:00 PM – 17:00 PM
Peak Hour Recorded Volume	2,342 vehicles
Vehicle Composition	n/a
2014 AADT	24,315

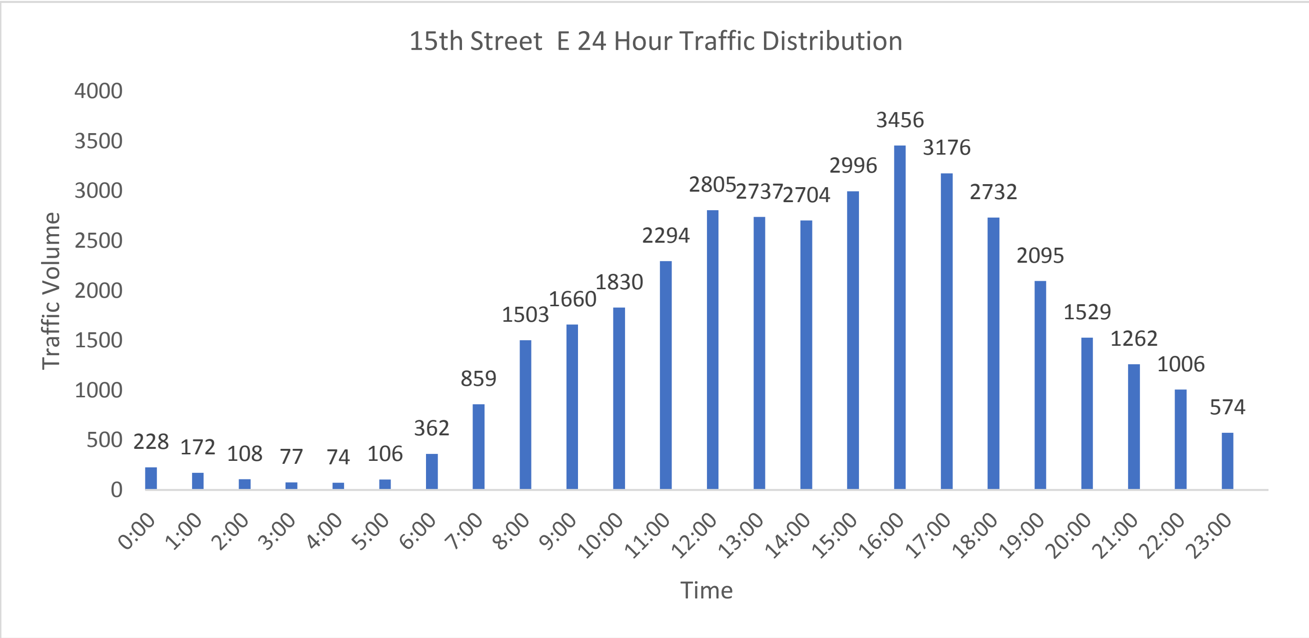


15th Street E

The land use along 15th Street E corridor is predominantly commercial. It is a transit route for the 15th Street Shuttle bus route. The City counted traffic on 6th Avenue from July to October 2016. The count location was located east of 6th Avenue E. In all the counts peak volumes were observed on Friday, October 21, 2016. **Table 2-12** below is an illustration of data relating to the peak counts. A graphical representation of 24Hour traffic during the peak day is illustrated in a chart below.

Table 2-12: 15th Street E Peak Traffic Characteristics

Peak Day	Friday, October 21, 2016
Peak Day Recorded 24-hr Volume	36,345 vehicles
Peak Hour	4:15 PM-5:15 PM
Peak Hour Recorded Volume	3,456 vehicles
Cars vs trucks based on a	n/a
2014 AADT	26,179



2.13 UHCP Roadway Condition

The conditions of the UHCP roadways were visual assessed. The general condition is illustrated in **Table 2-13**. Convert to flashing

Table 2-13: Observed Roadway Conditions

UHCP Roadway	From	To	Condition
2nd Avenue W	44th Street W	Diefenbaker Bridge	The section between Marquis Rd and 15th Street E shows some wear and potholes. Will require repaving in the near future.. Generally in fair to good condition. Minor pavement failures (e.g. rutting and cracking) spotted at/near major intersections such as at 2nd Ave W 15th St W; Potholes are spotted at various locations. Regular maintenance for signage, pavement markings, raised median, sidewalks are required.
6th Avenue E	Bartlett St	15th Street E	Minor pavement failures (e.g. rutting and cracking) spotted at/near major intersections and between 6th Ave E and 10th Ave E; Potholes are spotted at various locations. Regular maintenance for signage, pavement markings, raised median, sidewalks are required.
15th Street W/E	East City Limits	West City Limits	Minor pavement failures such as rutting and cracking spotted between 2nd Avenue W and 7th Street E. This section should be re-paved as soon as possible.
Highway 55	East City limits	Diefenbaker Bridge	Generally in good condition. Regular maintenances such as are required.
Highway 3	8th Ave NW	Highway 55	Generally in good condition. Minor pavement failures such as cracking and potholes were spotted at various locations. Regular maintenance required.

2.14 City of Prince Albert UHCP Applications

The City of Prince Albert made applications for the UHCP project funding in 2014, 2015 and 2016 as illustrated in **Tables 2-14 through 2-16.** Also included is the estimated cost for each project and the percentage of funding eligible for the UHCP.

Table 2-14: 2014 UHCP Application Summary

Year	Name	Cost	Funding
2015*	Transportation Master Plan (TMP)	$100,000	75%
2015	Rehabilitation 2nd Ave West (12 to 22)	$2,209,963	75%
2015	Rehabilitation 15th St West (2 to 6)	$1,729,675	50%
2016*	Rehabilitation Diefenbaker Bridge Splash & Metal Guard Rails	$3,000,000	100%
2016	Rehabilitation 2nd Ave West (22 to Marquis)	$1,901,825	75%
2017	Rehabilitation 15th St West (City Limit to 2)	$1,962,480	25%
2017	Rehabilitation 15th St East (6 to City Limits)	$2,249,040	25%
2018	Rehabilitation 6th Ave East (15 to 22)	$2,071,612	50%
2018	Rehabilitation 6th Ave East (22 to City Limit)	$1,151,395	50%
2018	Rehabilitation Diefenbaker Bridge Girder Painting	$2,667,000	100%
Total		**$17,267,990**	

*This project is now completed.

Table 2-15: 2015 UHCP Application Summary

Year	Name	Cost	Funding
2016*	Transportation Master Plan (TMP)	$161,500	100%
2016**	Diefenbaker Bridge W Guardrails Replacement	$185,000	75%
2016	CNR Bridge Expansion Joints & W Guardrail Replacement	$10,500	50%
Total		**$357,000**	

*This project is currently underway; **This project is now completed.

Some of the projects were not completed in 2015 and were deferred to 2016 such as the Transportation Planning Study.

Table 2-16: 2016 UHCP Application Summary

Year	Name	Cost	Funding
2017/2018	2nd Ave W Rehabilitation (15th St to 17th St)	$589,000	75%
2017/2018	15th St Surface Rehabilitation (Paving 2nd Ave W to 6th St E)	$1,729,675	50%
2017/2018	Diefenbaker Bridge Surface Rehabilitation (Paving)	$265,600	75%
2017/2018	Highway 2 South Service Roads Surface Rehabilitation (Substructure and Paving Marquis Road to City Limits)	$843,224	0%
2017/2018	Riverside Drive Overpass Highway 2 Rehabilitation (Repair Guardrail, Footings, Abutments & Embankment)	$197,000	100%
Total		**$3,624,499**	

A review of the agreement between the City and the Ministry of Highways and Infrastructure shows that both parties are adhering to the terms of the agreement. The City of Prince Albert has benefited from the program and completed some projects that the City wouldn't otherwise. This study will recommend improvements to some of the roadways under the UHCP and recommend that the City make necessary applications for funding.

2.15 Diefenbaker Bridge

The Diefenbaker Bridge was built in 1960 and is the only bridge in the City of Price Albert connecting the City to all northern communities. The next available crossing is the Petrofka Bridge which is more than 120 km southwest of Prince Albert. The 2015 City of Prince Albert counts indicate that the Diefenbaker Bridge has an AADT of approximately 24,000 vehicles per day. During the summer the Diefenbaker Bridge has recorded a peak flow of 30,000 vehicles per day. Twenty years from today, based on the 0.8% growth rate, the bridge is expected to have an AADT of 29,500 vehicles per day. Capacity for a 4-lane cross section is typically around 31,000 vehicles per day or more. By 2036 or twenty years from today, the Diefenbaker Bridge will be approaching capacity.

Since the Diefenbaker Bridge was constructed in 1960 a number of major maintenance activities have been undertaken. The maintenance activities, cost of the activity and funding arrangements are illustrated in **Table 2-17a.**

Table 2-17a: Diefenbaker Bridge Maintenance Activities

Year	Description of Work	City	Province	Federal	Total Amount
1960	Initial Bridge Construction	$219,938	$844,560	$695,002	$1,759,500
1980	Repaved work on the bridge deck	$39,960	$80,040	0	$120,000
1989	Diefenbaker Bridge & Riverside Drive Bridge repairs included deck restoration, first installation of traffic barriers, and some bridge maintenance	$647,758	$1,280,093	0	$1,927,852
2003	include deck and traffic barrier rehabilitation	$1,232,000	0	$368,000	$1,600,000
2011	Repairs to the West Main Girder for the southbound lane which was found to be cracked.	$174,363	$3,700,372	0	$3,874,736
2016	Repairs include traffic barriers, soffits, fascia, sidewalks and handrails. Also included was exit loop guardrails	$126,378	$3,033,093	0	$3,159,472
	Total ($)	**$2,439,360**	**$8,939,198**	**$1,0063,002**	**$12,441,560**
	Total (%)	**19.6%**	**71.9%**	**8.5%**	**100%**

The weight limits on Diefenbaker Bridge are controlled by the Ministry of Highways and Infrastructure. The current limits and conditions as listed below.

Diefenbaker Bridge weight limit with no permit required is as follows:

- Single Axle Limit is 13,750 kg
- Tandem Axle Limit is 27,500 kg
- Tridem Axle Limit is 31,800 kg
- 7 Axle B Train limit is 63,500 kg

Over weight permit for single trip limits are as follows:

- 5 Axle Single Trip Limit is 60,500 kg
- 7 Axle Single Trip Limit is 86,000 kg
- 8 Axle Single Trip Limit is 94,100 kg
- 9 Axle Single Trip Limit is 94,100 kg

The is absolutely no access for any load over 94,100 kg.

The City conducted a 24 hour traffic count on 2nd Avenue from June to October 2016. The count location was located near 12th Street W. Of all the counts, peak volumes were observed on Tuesday, October 25, 2016. **Table 2-17** below is an illustration of data relating to the peak counts.

Table 2-17: Diefenbaker Bridge Peak Traffic Characteristics

Peak Day	Tuesday, October 25, 2016
Peak Day Recorded Volume	25,587 vehicles
Peak Hour	4:30 PM – 5-30 PM
Peak Hour Recorded Volume	2,311 vehicles
Number of Trucks	640*
Number of Cars	24,947
2015 AADT	24,000

*No traffic classification was conducted; the number of trucks is estimated based on a 2.5% composition noted in previous reports.

It is important to make a distinction between the highest recorded daily volume and AADT. An AADT considers others factors in order to annualize the recorded short-term traffic counts. Factors such as: seasonal variations and day of the week. Therefore, the highest recorded count should only be considered as a count pertaining to that specific day when the count was taken and not as a representative of a roadway AADT.

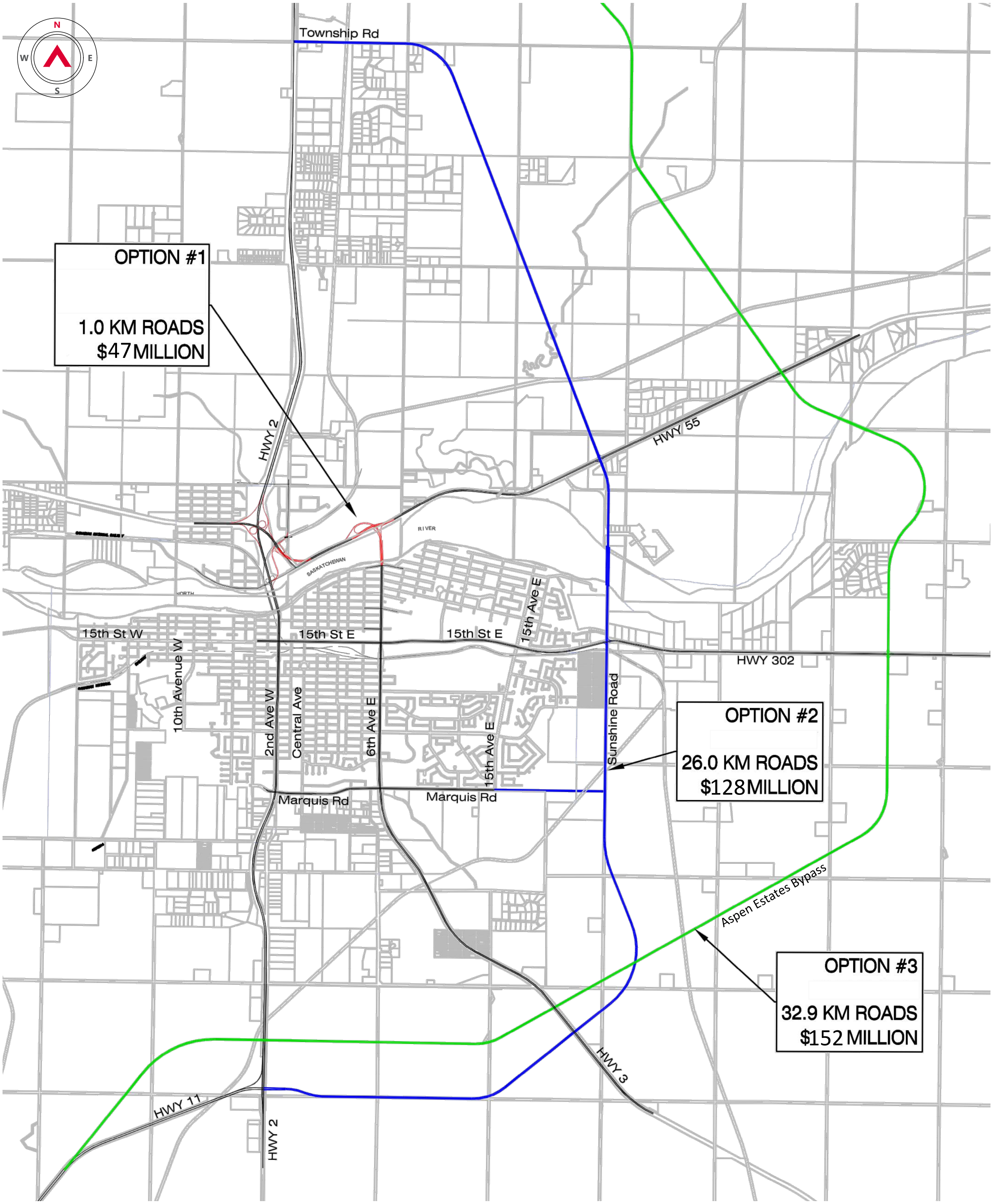
2.16 Second Bridge Discussion/Review

There have been five studies conducted regarding a second bridge in the City of Prince Albert. The first one was conducted in 1977 and the most recent was conducted in 2013. The 1977 study only considered internal options including the 6th Avenue E crossing location. The other studies, however considered two additional locations. The two additional locations were bypass options and are further east of the existing Diefenbaker Bridge. The three crossing locations are described below and illustrated in **Figure 2-19.**

- 6th Avenue East;
- Sunshine Road Bypass; and
- Aspen Estates Bypass

The scope of this study was not to determine the location of the second bridge but rather to review and discuss the studies that have been carried out to date. It is recommended that a separate study be conducted to determine or confirm the appropriate location of the second bridge. Once the location is confirmed, it should then be incorporated into future City of Prince Albert Transportation Master Plans.

Date: 2017/03/29 | User: Tyler Dai | File: P:\SK\2015\0-99\15SK0016 - City of Prince Albert - Master Transportation Study\1000-Drawings\1011-Civil\02-Sketches\170303_TD_15SK0016-Second Bridge Optione-Travel Time | Layout: FIG. 2-19 | Paper Size: 279.4mm x 431.8mm



REV	YY/MM/DD	DESCRIPTION	DRWN	APVD
-	-	-	-	-

CLIENT: City of Prince Albert

Allnorth

TITLE:

BRIDGE LOCATIONS

CLIENT NO: -	DRWN: -	DATE: -	
PROJECT NO: 15SK0016	DSGN: -	DATE: -	
DRAWING SIZE: ANSI "A"	CHKD: -	DATE: -	
SCALE: AS NOTED	APVD: -	DATE: -	

PROJECT:

CITY OF PRINCE ALBERT TRANSPORTATION MASTER PLAN

DWG NO: **FIGURE 2-19**

REV:

2.16.1 Bridge Related Studies

The five bridge related studies are discussed below.

(1) City of Prince Albert Transportation Study (1977)

The 1977 Transportation Study reviewed four internal options and concluded that the City of Prince Albert would be served well with a second bridge located at 6th Avenue E. The study concluded that in order to avoid congestion a new bridge should be constructed in 1986. Total estimated cost for the Bridge which did not include the Highway 55 interchange in 1977 dollars was $7,968,250.

(2) City of Prince Albert New River Crossing at 6th Avenue East Functional Planning Study (1980)

In 1980 The New River Crossing at 6th Avenue East Study further investigated a second bridge. The purpose of this study was to provide a functional plan for the 6th Ave E Bridge and to interconnect with Highways 55, 3, and 2. This was an in depth Study with detailed preliminary drawings of the proposed second bridge. Additionally, the study provided a staged program of development based on the traffic demands of the City. A capital cost estimate was provided based on the recommended route which was broken down into staged construction costs as well.

(3) Prince Albert 6th Avenue East River Crossing Study (2003)

In 2003 the 6th Avenue East River Crossing Study was conducted. The purpose of this study was to update the 1980 functional planning study of the same 6th Avenue East River Crossing. The study examined the feasibility of a new bridge, the capital costs for each of the planned phases and updated the phases of development. The study included public meetings with stakeholders. The study concluded that functional plan for the Bridge, roadways and interchanges for the 6th Avenue East location was still appropriate. The study identified that a bridge would be required when the population of Prince Albert is between 40,680 and 50,680, however the timeframe of when this population will be reached was not specified. The timing of the bridge will also be affected by the capacity of intersections on 2nd Ave W, 15th St and 6th Ave E. At the time of this study they all had acceptable Level of service (LOS). The total estimated cost for the Bridge and interchanges in 2003 dollars was $32,900,000

(4) City of Prince Albert Area Transportation Planning Study (2008)

In October 2008 Saskatchewan Highways and Transportation and the City of Prince Albert jointly conducted the Prince Albert Area Transportation Planning Study. The Study looked at the 6th Ave East internal route as well as eight external routes, two to the west and six to the east of the City. As with previous studies there was public consultation, and Council review. In the end the most desirable and financial supported route was still 6th Avenue East. The 2008 Study predicted 33.5% of the crossing traffic would use a bypass route The total estimated cost for the four lane bridge and interchanges in 2008 dollars $38,124,130.

(5) Prince Albert Area Second Bridge River Crossing (2013)

The purpose of this study was to provide an update to the need for a second bridge for the City of Prince Albert. This study provided more information than the previous studies as multiple alignments were analyzed for a second bridge, with the majority favoring a crossing located on the east side of Prince Albert. However, similar to the previous studies, while the concept of a second bridge is favored by the local residents and business owners, it was concluded that the existing Diefenbaker Bridge, with 2 lanes in each direction has the capacity to accommodate traffic volumes until the year 2040. A second bridge was analyzed based on staged construction which included approximately 33.0 – 37.0 km of new highway. The 2013 estimated cost was approximately $154 million. This did not include environmental mitigation, utility modifications, property acquisition, or grade widening of highway 376. Upon further review, it was determined that a second bridge would be underutilized based on the traffic projections of the Diefenbaker Bridge. The second bridge would have a minor impact on freight movement efficiency, traffic delays or harmful emissions. The issue with the existing bridge is functionality and service levels to 2040 and beyond. Thus, the implementation of a defined maintenance and rehabilitation program was recommended to prolong the service life of this structure.

2.16.2 Traffic Diversion

One way of measuring the attractiveness of the new bridge location is how well it will diverts traffic from the existing Diefenbaker Bridge. Previous studies have predicted a percentage diversion based on a number of factors. The diversion rates and the number of vehicles for each location are illustrated in **Table 2.18**. The numbers are based on the current (2015) bridge AADT of 24,000 vehicles per day.

Table 2-18: Traffic Diversion Rates

Option	Percentage Diversion	AADT Diverted From Diefenbaker Bridge
6th Street	33.5%	8,040 vpd
Sunshine	14.5%	3,480 vpd
Aspen Estate	7%	1,680 vpd

2.16.3 Emergency Response Times

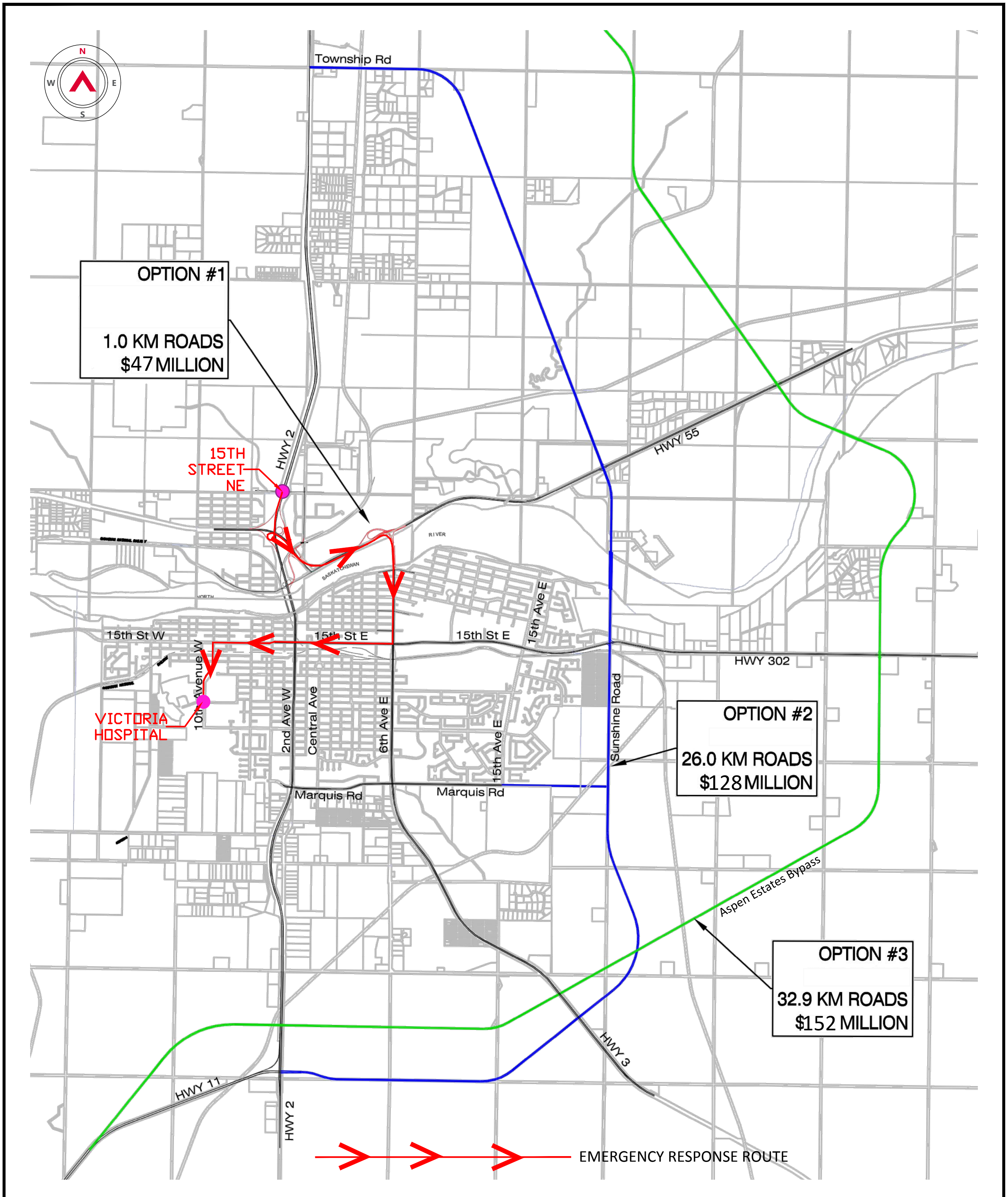
The Diefenbaker Bridge provides the only connection between the Prince Albert Victoria Hospital and the north side of the City of Prince Albert. Based on current City limits, 15th Street NE represents the furthest northern limit which is approximately 4.5 km away from Victoria Hospital. Under normal circumstances, the response time by road between Victoria Hospital and 15th Street NE using Diefenbaker Bridge is approximately 6 minutes. If Diefenbaker Bridge is blocked or out of service the response time by road increases substantially as the next available crossing is more than 120 km away to the southeast of the City. The response times between Victoria Hospital and 15th Street NE (with and without Diefenbaker Bridge) demonstrates the importance of the Diefenbaker Bridge to the EMS community as a whole.

One of the critical issues involves the response time from the north side of the City to Victoria Hospital. Since there is only one access from the north side to the hospital this represents the critical response time. Response times were calculated to demonstrate the differences in how well the new bridge location improve emergency response time. The emergency response routes for each of the three options are illustrated in **Figures 2-20-2-22**. The response times are illustrated in **Table 2-19**. Response times are based on the posted speed limits. It is understood that EMS vehicles can operate above the posted speed therefore the actual response times could be lower than those shown.

Table 2-19: Estimated EMS Response Times

Option	Description	Distance From 15th St NE to Victoria Hospital	Estimated Response Time
Existing	Diefenbaker Bridge	4.5 km	6 Minutes
1	6th Avenue E	8.5 km	9.0 Minutes
2	Sunshine Rd Bypass	16.6 km	14.8 Minutes
3	Aspen Estates Bypass	26.3 km	21.3 Minutes

Date: 2017/03/29 | User: Tyler Dai | File: P:\SK\2015\0-99\15SK0016 - City of Prince Albert - Master Transportation Study\1000-Drawings\1011-Civil\02-Sketches\170303_TD_15SK0016-Second Bridge Optione-Travel Time | Layout: FIG. 2-20 | Paper Size: 279.4mm x 431.8mm



REV	YY/MM/DD	DESCRIPTION	DRWN	APVD
-	-	-	-	-

CLIENT: City of Prince Albert

Allnorth

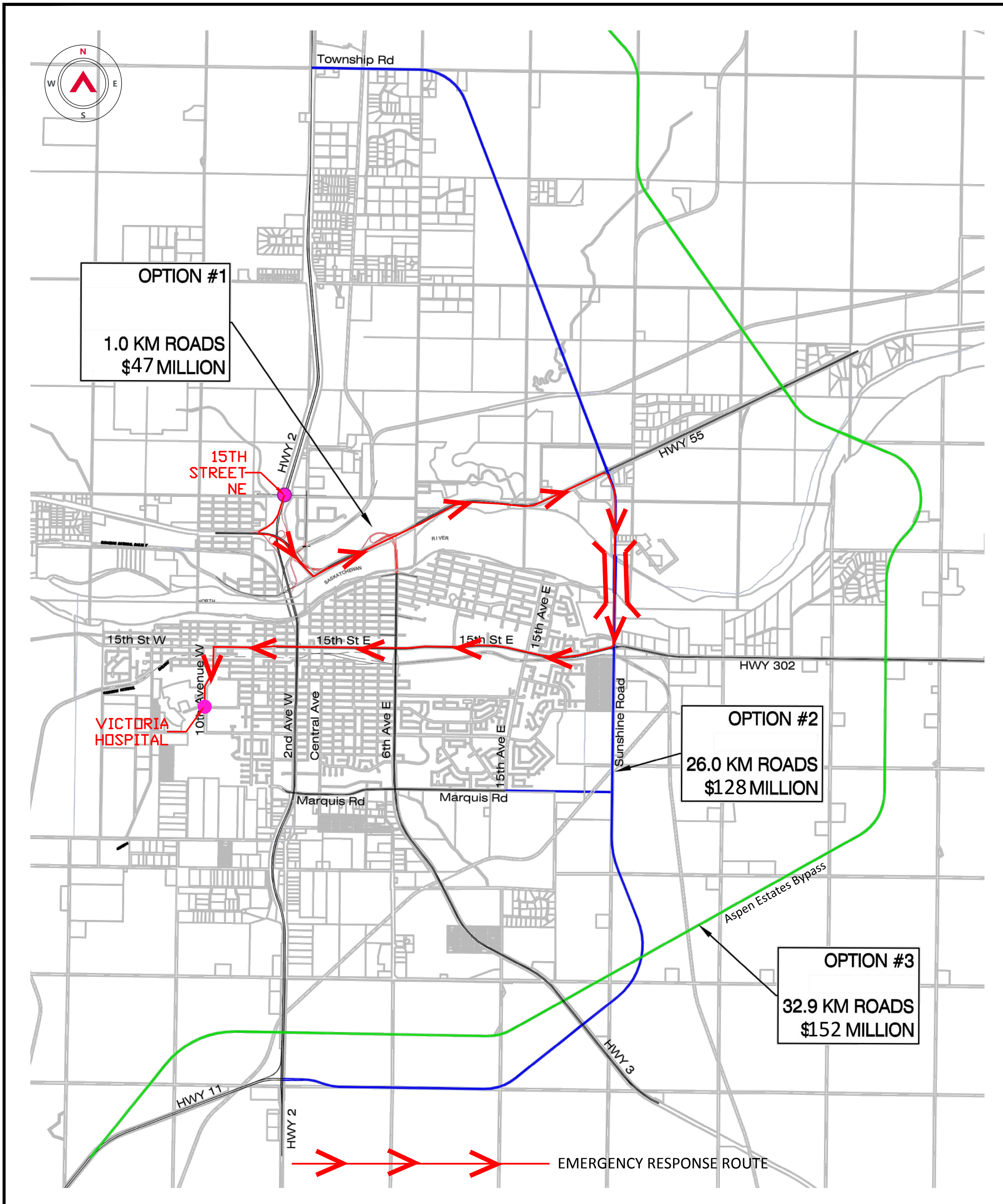
TITLE:
OPTION 1: EMS RESPONSE ROUTE TO VICTORIA HOSPITAL FROM 15TH ST NE

CLIENT NO:	-	DRWN:	-	DATE:	-
PROJECT NO:	15SK0016	DSGN:	-	DATE:	-
DRAWING SIZE:	ANSI "A"	CHKD:	-	DATE:	-
SCALE:	AS NOTED	APVD:	-	DATE:	-

PROJECT:
CITY OF PRINCE ALBERT TRANSPORTATION MASTER PLAN

DWG NO: **FIGURE 2-20**
REV:

Date: 2017/03/29 | User: Tyler Dai | File: P:\SK\2015\0-99\15SK0016 - City of Prince Albert - Master Transportation Study\1000-Drawings\1011-Civil\02-Sketches\170303_TD_15SK0016-Second Bridge Optione-Travel Time | Layout: FIG.2-21 | Paper Size: 279.4mm x 431.8mm



REV	YY/MM/DD	DESCRIPTION	DRWN	APVD
-	-	-	-	-

CLIENT: City of Prince Albert

Allnorth

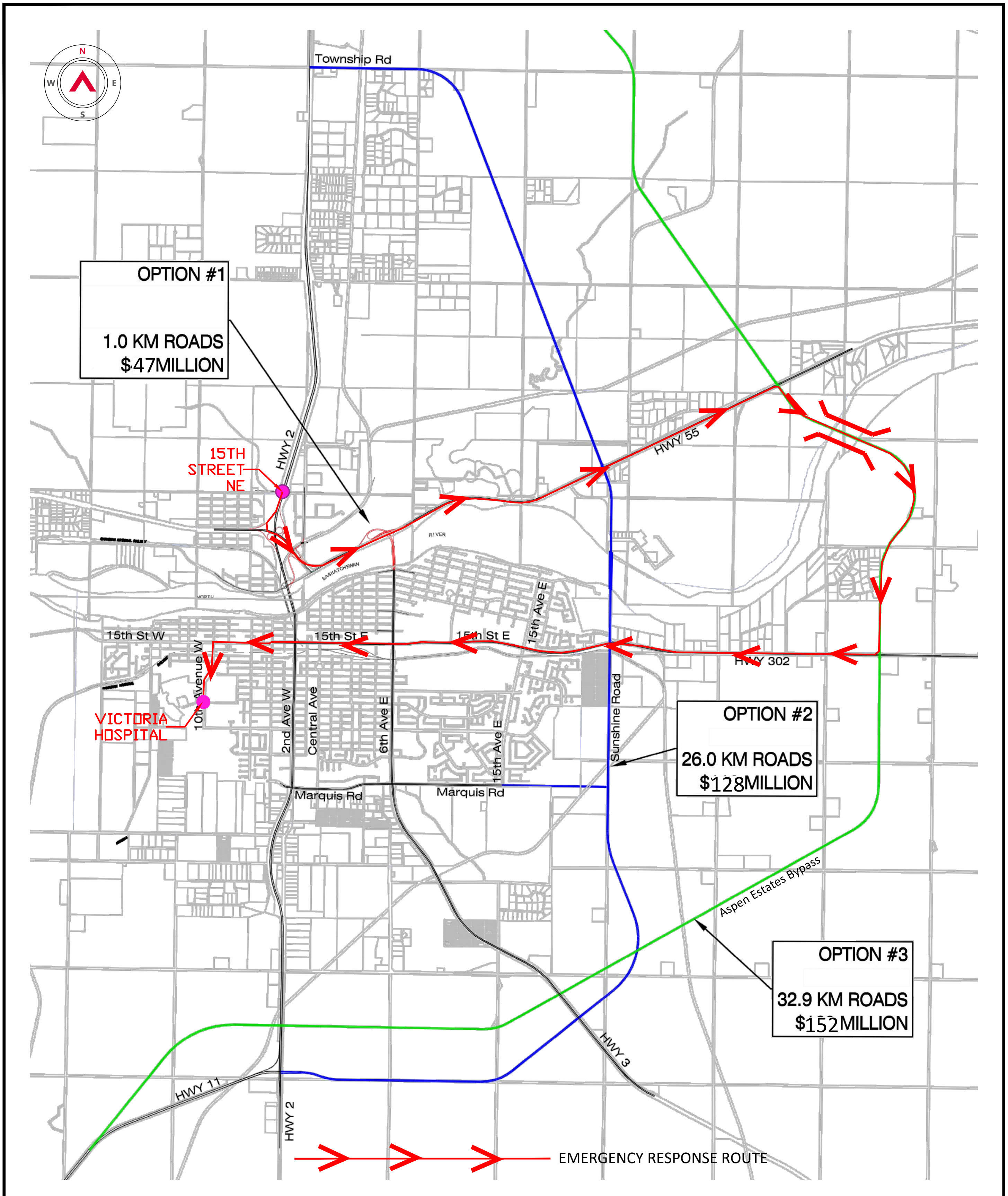
TITLE:
OPTION 2: EMS RESPONSE ROUTE TO VICTORIA HOSPITAL FROM 15TH ST NE

CLIENT NO:	-	DRWN:	-	DATE:	-
PROJECT NO:	15SK0016	DSGN:	-	DATE:	-
DRAWING SIZE:	ANSI "A"	CHKD:	-	DATE:	-
SCALE:	AS NOTED	APVD:	-	DATE:	-

PROJECT:
CITY OF PRINCE ALBERT TRANSPORTATION MASTER PLAN

DWG NO: **FIGURE 2-21**
REV:

Date: 2017/03/29 | User: Tyler Dai | File: P:\SK\2015\0-99\15SK0016 - City of Prince Albert - Master Transportation Study\1000-Drawings\1011-Civil\02-Sketches\170303_TD_15SK0016-Second Bridge Optione-Travel Time | Layout: FIG. 2-22 | Paper Size: 279.4mm x 431.8mm



REV	YY/MM/DD	DESCRIPTION	DRWN	APVD
-	-	-	-	-

CLIENT: City of Prince Albert

Allnorth

TITLE: **OPTION 3: EMS RESPONSE ROUTE TO VICTORIA HOSPITAL FROM 15TH ST NE**

CLIENT NO:	-	DRWN:	-	DATE:	-
PROJECT NO:	15SK0016	DSGN:	-	DATE:	-
DRAWING SIZE:	ANSI "A"	CHKD:	-	DATE:	-
SCALE:	AS NOTED	APVD:	-	DATE:	-

PROJECT: **CITY OF PRINCE ALBERT TRANSPORTATION MASTER PLAN**

DWG NO: **FIGURE 2-22** REV:

2.16.4 Qualitative Evaluation of the Three Bridge Locations

A qualitative evaluation of the three bridge location was conducted in order to determine the pros and cons of each option. The qualitative evaluation considered 17 factors. A qualitative evaluation does not rank the options but rather is a description of how well each option performs against each factor. The qualitative evaluation is illustrated in **Table 2-20.** The green shading represent pros, red shading represents cons. Yellow shading is neutral.

Table 2-20: Qualitative Evaluation Pros and Cons (**Green**=PRO, **Red**=CON, and **Yellow**=Neutral)

Factor	Option 1: 6th Avenue East	Option 2: Sunshine Road Bypass	Option 3: Aspen Estates Bypass
1. Distance from the existing Diefenbaker Bridge	• This bridge location is 1.7 km east of the Diefenbaker Bridge.	• This bridge location is 4.9 km east of the Diefenbaker Bridge.	• This bridge location is 8.5 km east of the Diefenbaker.
2. Traffic diversion from Diefenbaker Bridge	• 33.5% of the traffic would be diverted from the Diefenbaker Bridge.	• 14.5% of the traffic would be diverted from the Diefenbaker Bridge.	• 7% of the traffic would be diverted from the Diefenbaker Bridge.
3. Enhanced Emergency Response	• It provides the best value for enhancing emergency responses. • Provide the quickest hospital access, in the event if the existing bridge gets blocked. • Provides the shortest travel times to all parts of the City.	• The bridge is 4.9 km east of the Diefenbaker Bridge. Due to its location it does not improve emergency response times to the City of Prince Albert.	• The bridge is 8.5 km east of the Diefenbaker Bridge. Due to its location it does not improve emergency response times to the City of Prince Albert. This option provides the least benefits to the City in terms of emergency response times.
4. EMS response time from 15th Street NE to Victoria Hospital	• 9.0 Minutes	• 14.8 Minutes	• 21.3 Minutes
5. Bridge Capacity	• The proposed crossing has a 4-lane bridge. This is twice the capacity of the bypass bridges proposed in options 2 and 3.	• The proposed crossing has a 2-lane bridge which is half the capacity of the option 1 bridge.	• The proposed crossing has a 2-lane bridge which is half the capacity of the option 1 bridge.
6. Impact of dangerous goods movements	• Because of its proximity to inhabited section, this option poses severe consequences in the event of hazardous material spill. • However, the probability of the spill happening is very small given the few number of trucks that carry hazardous material.	• The severity of consequences due to hazardous material spill will be less than Option 1 since the roadway would be located in areas with fewer residents.	• The severity of consequences due to hazardous material spill will be less than Option 1 since the roadway would be located in areas with fewer residents.
7. Affordability/Cost	• The estimated cost is $47.5 million. This is the most cost effective option	• Second most expensive option. The estimated cost is $128.3 million.	• The most expensive option. The estimated cost is $152.4 million.
8. Connectivity to existing highway system	• This option offers connectivity to three provincial highways: Highway 3, 55 and 2	• This option provides good connectivity to Provincial Highways and offers good economic benefits for region. • This option can be considered as a long-term regional economic driver.	• This option provides good connectivity to Provincial Highways and offers good economic benefits for region. • This option is a long-term regional economic driver.
9. Compatibility with Long term plans	• This option is less compatible with future long-term regional development plans. • This option should be considered as a relief bridge not as a long-term regional economic driver.	• This option is very compatible with future long-term regional development plans. • This option can be considered as a long-term regional economic driver.	• This option is very compatible with future long-term regional development plans. • Can be considered as a long-term regional economic driver.
10. Constructability	• This option can easily be constructed using current construction methods.	• This option would have minimal to no impact on traffic operations during construction activities. • However it requires a longer lead time for environmental assessments and right-of-way purchases • This option has to be spanned for several construction seasons.	• This option would have minimal to no impact on traffic operations during construction activities. • However it requires a longer lead time for environmental assessments and right-of-way purchases • This option has to be spanned for several construction seasons.
11. Traffic Impacts to existing roadways	• This option Would impact the existing 6th Avenue, which will be approaching capacity in 20 years • Implementing this option will alter the operational characteristics of 6th Avenue East between 15th Street E and the River. This section would be classified as a heavy vehicle/dangerous goods route.	• This option provides minimal to no impact on traffic operations within the City of Prince Albert.	• Would have minimal to no impact on traffic operations within the City of Prince Albert
12. Land Requirements (ROW)	• This option would require less new right-of-way than options 2 and 3. Most of the r-o-w is currently owned by the City.	• This option will require a large amount of land purchase for right-of-way.	• This option will require a large amount of land purchase for right-of-way.
13. Schedule	• Can be constructed quickly after funding becomes available. • Construction activities for this option can be completed within a single construction season.	• This option will require a longer lead time to design and purchase right-of-way. • Requires extensive environmental assessments which would impact schedule. • Will require several construction seasons to complete.	• This option will require a longer lead time to design and purchase right-of-way. • Requires extensive environmental assessments which would impact schedule. • Will require several construction seasons to complete.
14. Environmental Impacts	• Environmental impacts would be minimal and manageable as this option involves the currently built-up areas of the City.	• Would require extensive environmental assessments	• Would require extensive environmental assessments
15. Pedestrian/Cyclists Use	• The pedestrian sidewalks can be accommodated into the bridge. • This option provides the best opportunity for pedestrians and cyclists. • The usage of sidewalks will be much higher than that of options 2 and 3.	• Due to its location it would be of very minimal use for pedestrians and/or cyclists	• Due to its location it would be of very minimal use for pedestrians and/or cyclists
16. Transit Use of Bridge	• The bridge will be available for transit use as soon as it will be opened.	• This option would not be beneficial to City of Prince Albert Transit based on the current transit routes.	• This option would not be beneficial to City of Prince Albert Transit based on the current transit routes.
17. Economic Development Benefits	• Due to its location, it option would bring fewer new economic benefits to the City.	• The bypass option is more suited as a regional economic driver.	• The bypass option is more suited as a regional economic driver.

2.16.5 Second Bridge Cost Updates

Each of the previous river crossing studies prepared a cost estimate for the bridge and the associated roadways connecting to the bridge. Because the studies were conducted a while ago, the cost estimates are outdated. This study reviewed and updated the estimates to 2017 equivalent dollars. The mandate of this study did is not include the calculation of new quantities but rather update the costs presented in previous studies. The 2017 estimate will therefore dependent on the accuracy of the estimates of the previous studies. Three options will be reviewed: Option 1, 6th Avenue East; Option 2, Sunshine Road Bypass and Option 3, the Aspen Estate Bypass. The routes of each option are illustrated in **Figure 2-19**. A summary of estimated costs for each option are illustrated in **Table 2-21 to 2-23.**

Table 2-21: Option 1 6th Avenue East Updated Estimated Costs

Item Description	1980 Unit Prices	1980 Estimated Cost	2017 Unit Prices	2017 Estimated Costs
Bridge Decks (4 bridges)	\$1000/ m^2	\$9,121,000	\$6000/ m^2	\$27,228,253
Earthworks	\$1.00/m^3	\$1,793,000	\$6.00/m^3	\$5,352,511
Paving	\$8.00/t	\$1,519,000	\$25/t	\$4,700,330
Drainage	Lump Sum	\$420,000	Lump Sum	\$1,299,631
Utilities	Lump Sum	\$27,000	Lump Sum	\$80,601
Traffic Signals	Lump Sum	\$40,000	Lump Sum	\$119,409
Signage	Lump Sum	\$125,000	Lump Sum	\$373,153
Lighting	Lump Sum	\$500,000	Lump Sum	\$1,492,613
Engineering	16%	\$2,303,000	16%	\$6,874,977
TOTALS		**\$15,848,000**		**47,521,479**

Table 2-22: Option 2 Sunshine Road (26 km Roadway) Updated Estimated Costs

Item Description	2008 Unit Price	2008 Estimated Cost	2017 Unit Price	2017 Estimated Cost
Cost per km (26 km)	$900,000/km	$23,238,000	$910,000/km	$23,660,000
Bridge Decks	$3,000/ m²	$19,410,000	$6000/m²	$38,820,000
Property Acquisition (138.9 ha)	$5,000/ha	$694,500	$6,000/ha	$833,400
Number of interchange (5)	$10,000,000	$50,000,000	$13,000,000	$65,000,000
Total		**$93,342,500**		**$128,313,400**

Table 2-23: Option 3 Aspen Estates (32 km Roadway) Updated Estimated Costs

Item Description	2013 Unit Prices	2013 Estimated Cost	2017 Unit Prices	2017 Estimated Cost
Site Clearing and Grubbing	$20,000/ha	$1,200,000	$21,253	$1,300,000
Topsoil and Subsoil Stripping	$4/ m³	$500,000	$4.50	$500,000
Prepare Subgrade First Layer	$7/ m³	$400,000	$7.50	$400,000
Common Excavation	$6/m³	$4,800,000	$6.50	$5,000,000
Overhaul	$1/m³-km	$400,000	$1.10	$400,000
Borrow Excavation	$10/ m³	$6,000,000	$10.60	$6,300,000
Overhaul borrow	$10/ m³	$600,000	$10/ m³	$6,000,000
GBC	$30/t	$12,400,000	$31.90	$13,000,000
ACP	$150/t	$24,200,000	$159.40	$25,300,000
Bridge Deck	$6000/m²	$41,100,000	$6,000	$41,100,000
Culverts	$30,000	$2,500,000	$31,000	$2,600,000
Creek diversion	$30,000	$300,000	$30,000	$300,000
Major Intersection Treatment	$250,000	$2,500,000	$3,187,856	$2,600,000
Level At-Grade Railway Crossing	$500,000	$1,5000,000	$531,310	$1,600,000
Road works	$3071875/km	$98,300,000		$102,900,000
Contingency	25%	$24,600,000	25%	$25,700,000
Engineering	10%	$12,300,000	10%	$12,900,000
Mobilization	10%	$13,300,000	10%	$12,900,000
TOTALS		**$147,300,000**		**$152,400,000**

2.17 Access Management/Control

The Institute of Transportation Engineers (ITE) defines access management as the process or development of a program intended to ensure that the major arterials, intersections will operate safely and efficiently while adequately meeting the access needs of the abutting land uses along the roadway. Currently the City of Prince Albert does not have explicit access management guidelines. The access control is conducted in an ad hoc manner. This ad hoc approach for example resulted in the installation of traffic signals on 15th Street E that have affected the integrity of 15th Street E as an arterial roadway. It is recommended that the City develop access control guidelines in order to effectively control access on collector and arterial roads in the future. The access control guidelines will form part of Section 6.4 of the *City of Prince Albert Design Guidelines*. The objective of the guidelines should be:

- Establish a basis for the provision of effective and safe vehicular access to all properties and reduce impacts to traffic flows;
- Maintain acceptable level of service on arterial and major collector roadways;
- Provide a consistent and equitable basis for the review and approval of access requests.

2.18 Heavy Vehicle/Truck Routes

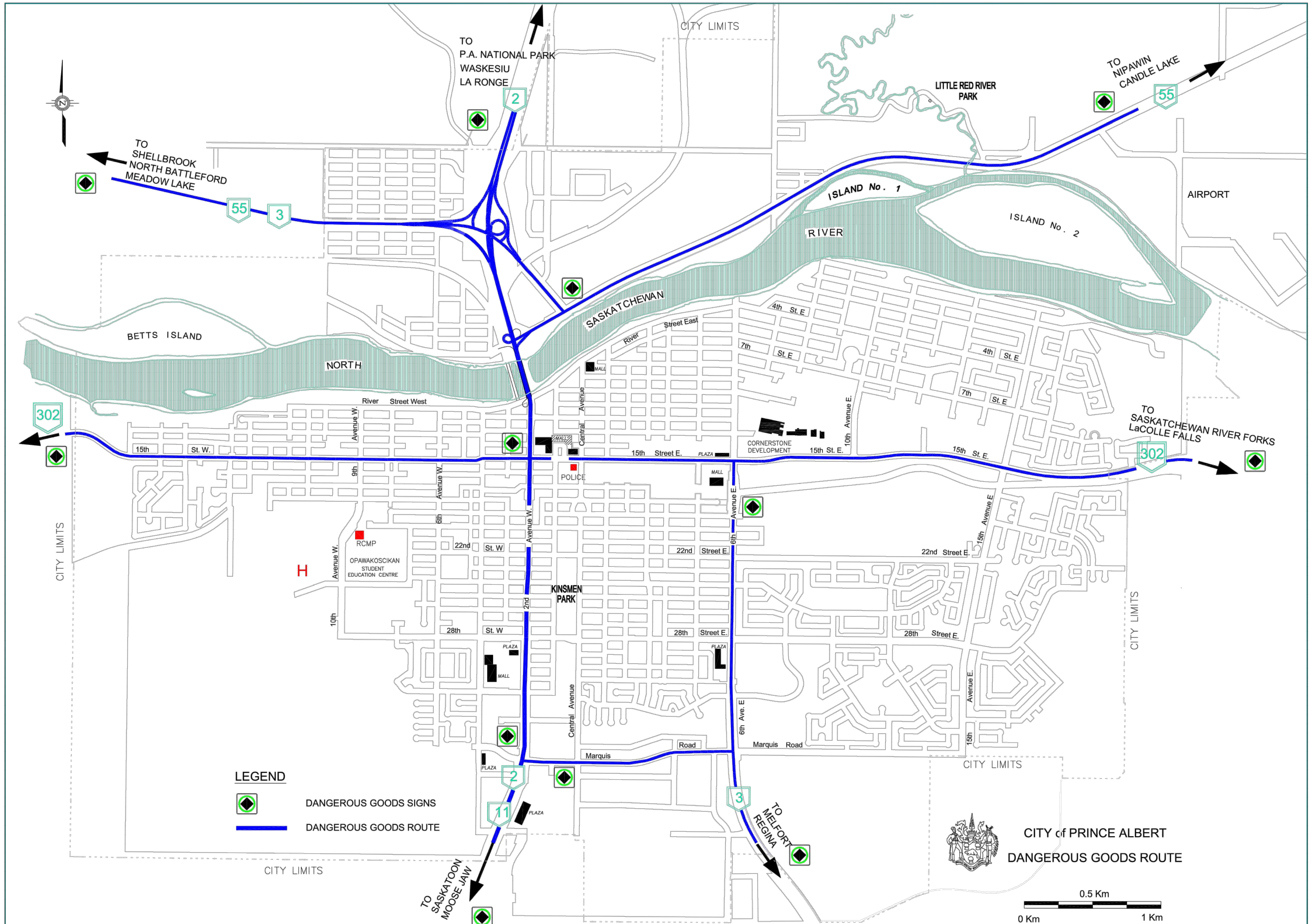
The City of Prince Albert has a weight restriction and dangerous goods movements on the roadways within the City. Heavy vehicles/trucks are permitted only on designated heavy vehicle routes. **Figure 2-23A** illustrates the dangerous good routes and **Figure 2-23** illustrates the heavy vehicle routes. The designated truck routes are:

- 2nd Avenue W (Highway No. 2)
- 6th Avenue E (from southern City limits to 15th Street E)
- 15th Avenue (from 15th Street E to 1st Street E)
- Central Avenue North
- Marquis Drive
- 15th Street (Highway No. 302)
- 17th Street W/18th Street E
- Highway No. 55 and
- Highway No. 3/55

Dangerous goods routes are:

- 2nd Avenue W (Highway No. 2)
- 6th Avenue E (from southern City limits to 15th Street E)
- 15th Street
- Highway No. 55 and
- Highway No. 3/55
- Marquis Drive

MHI has indicated that there appears to be an operational problem with heavy traffic movements on Highway No. 55 at the Highway No. 2 interchange. Specifically, the movement of heavy traffic coming from Highway No. 55 (East) and going onto Highway No. 2 (southbound). The heavy vehicle operational analysis was outside the scope of this study. It is therefore recommended that a separate operational study be conducted. The study should model the traffic and develop options for accommodating the Highway No. 55 to Highway No. 2 loop/ramp.



NO.	DATE	REVISION	BY
1	02/13	BYLAW NUMBER UPDATE	AMR

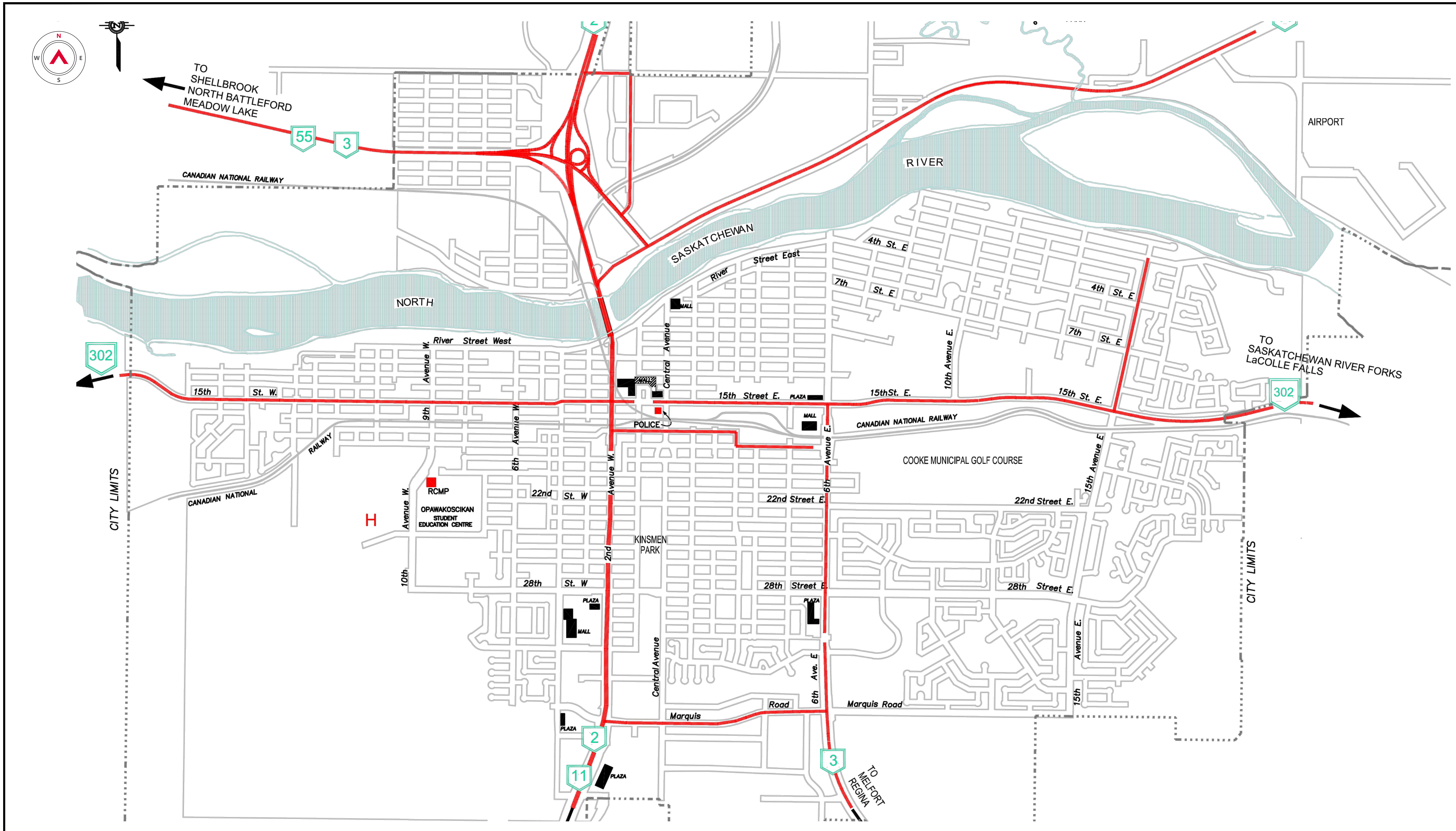
Bylaw No.1 of 2013

CITY OF PRINCE ALBERT
PUBLIC WORKS
DANGEROUS GOODS ROUTE

DESIGNED		DATE	MAY 2014
DRAWN	N.MILLER	DWG. FILE NO.	DANG-GDS-BYLAW 2013
CHECKED		SCALE HORIZ.	NTS
APPROVED		VERT.	

CITY OF PRINCE ALBERT
TRANSPORTATION MASTER PLAN

FIGURE. 2-23A
DANGEROUS GOOD ROUTE MAP



CITY OF PRINCE ALBERT
TRANSPORTATION MASTER PLAN

FIGURE. 2-23
HEAVY VEHICLE ROUTES

City of Prince Albert

Allnorth

Date: 2017/03/29 | User: Tyler Dai | File: P:\SK\2015\0-99\15SK0016 - City of Prince Albert - Master Transportation Study\1000-Drawings\1011-Civil\01-Production\170206_TD_15SK0016-Transportation Master Plan | Layout: FIG 2-23 | Paper Size: 558.8mm x 431.8mm

The 2008 *Prince Albert Transportation Planning Study* origin-destination survey determined that only 12% of all trips can be classified as having an origin and destination outside the City of Prince Albert. By extension, this means that the majority of the truck movements are Prince Albert related or do stop in Prince Albert for one reason or another. In terms of operations, trucks are slower than smaller vehicles, and will reduce the free flow speed of traffic. The speed variation can in some cases cause collisions. Within the City the variation in speed is less resulting in fewer conflicts between heavy vehicles and smaller vehicles. Similar to the EMS community, the Diefenbaker Bridge is extremely important to the Trucking Industry.

Collisions Involving Trucks

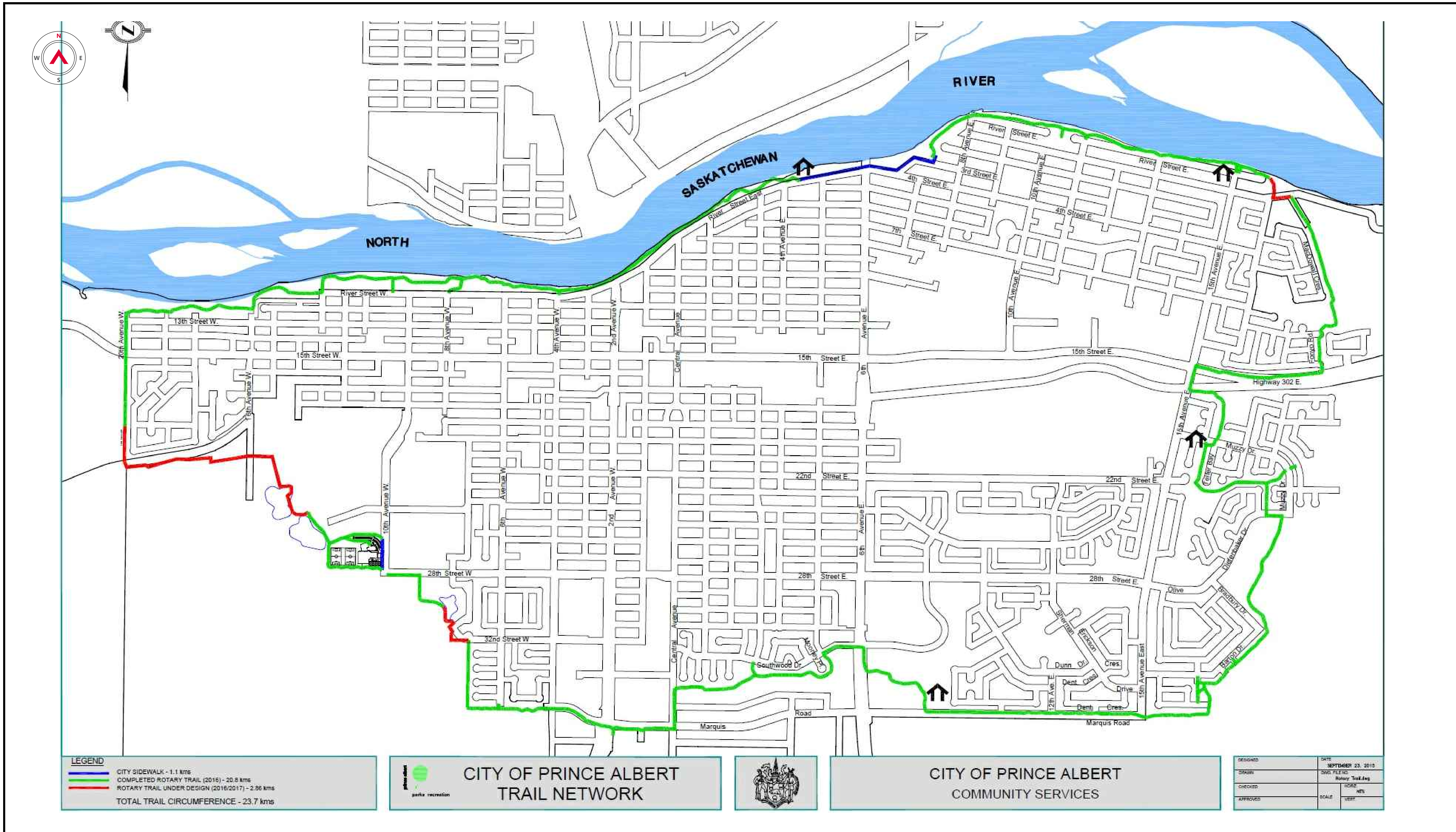
The collisions involving heavy trucks were filtered out of the collision TAIS collision data bank of 2009-20016. The data analysis showed that over the past 8 years there has been in collisions in general. The data also showed that about 0.72% of all collisions involve trucks over 4500 kg in weight. Based on the 0.72% involvement between 2009 and 2016 trucks were involved in 50 collisions or an average of about 6.25 times a year. A summary of truck collisions are illustrated in **Table 2-24**. As can be demonstrated the numbers are low indicating that the truck movements are operating in a relatively safe manner within the City of Prince Albert.

Table 2-24: Collisions Involving Heavy Trucks

Year	Total Collisions	Collisions Involving Trucks
2009	1462	11
2010	760	5
2011	790	6
2012	827	6
2013	820	6
2014	774	6
2015	860	6
2016	630	5
Totals	**6923**	**50**

2.19 Rotary Trail

The Rotary Trail is a 22.8 km multi-use trail within the City of Prince Albert. So far, more than 21.0 km have been completed. The purpose of the trail is to allow residents to be more active and improve the health of the community. Both Crescent Acres and West Hill will be connected to the Rotary Trail. The trail will form part of the transportation system and may help raise the mode share of alternative modes of transportation in the future. **Figure 2-24** is an illustration of the Rotary Trail

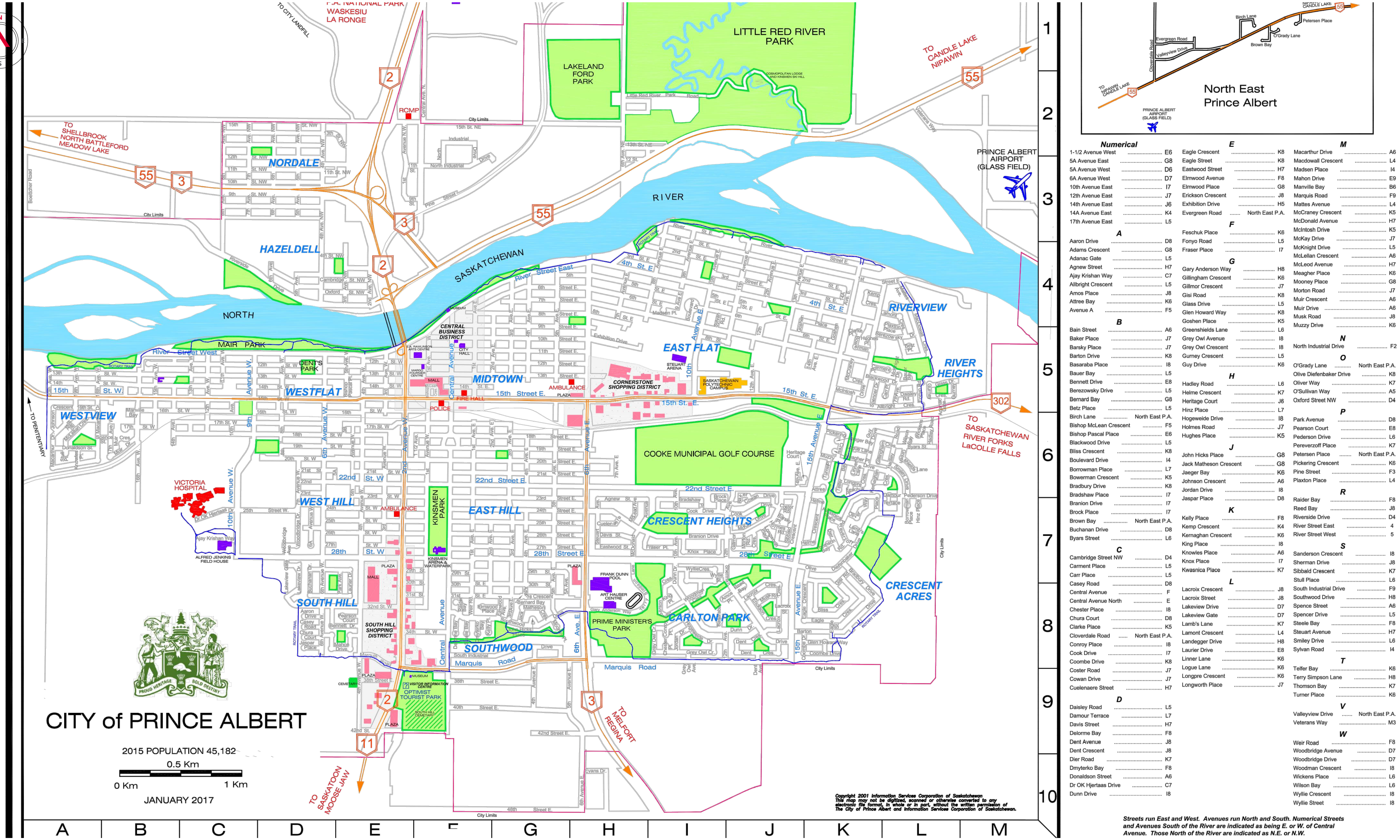


CITY OF PRINCE ALBERT
TRANSPORTATION MASTER PLAN

FIGURE. 2-24
TRAIL NETWORK

2.20 Tourism Map

Prince Albert is one of the first settlements in Saskatchewan incorporated in 1904. With over 100 years of development, there are many historic buildings and new developments that attract tourists and local residences to visit. To guide tourists the City produces a Tourism Map showing the locations of some points of interest (e.g. parks, shopping district, etc.) in the city of Prince Albert. The current Tourism Map is illustrated in **Figure 2-25**.



CITY OF PRINCE ALBERT
TRANSPORTATION MASTER PLAN

FIGURE. 2-25
TOURISM MAP

3 EXISTING TRAFFIC OPERATIONS

3.1 Objective

The objective of this study phase was to conduct traffic operational analysis of the existing roadway capacity using existing traffic. The intent was to determine how the system is currently operating and identify deficiencies. The findings of the analysis and recommended geometric and operational improvements was documented. **Figure 1-1** is an illustration of the Study Area and the collector and arterial roadways that were analyzed.

3.2 Design Criteria/Parameters

This section of the report developed and discussed the design criteria for the study in accordance with the terms of reference. For the most part the design criteria or study parameters were based on the City of Prince Albert Design Standards, Highway Capacity Manual (HCM2010) and Transportation Association of Canada (TAC) Design Guidelines. There are nine significant design parameters discussed below and summarised at the end in **Table 3-4.**

3.2.1 Peak Hour Factor

The Peak Hour Factor (PHF) is used to convert the hourly traffic volume into the flow rate that represents the busiest 15 minutes of the rush hour. The peak hour factor (PHF) is defined as the hourly volume during the maximum-volume hour of the day divided by the peak 15-minute flow rate within the peak hour. It is a measure of traffic demand fluctuations within the peak hour. The formula for calculating PHF is illustrated below:

$$PHF = V / (4 \times V_{15})$$

Where:
V = peak-hour volume (vph)
V_{15} = volume during the peak 15 minutes of flow (veh/15 minutes)

For the City of Prince Albert the PHF varies between 0.90 and 0.95. Previous studies by AECOM and Associated Engineering used a PHF of 0.92. To be consistent with previous work a PHF of 0.92 will be used in this study.

3.2.2 Control Delays

The overall performance of an intersection in an urban environment is measured by delays experienced by motorists. According to the Highway Capacity Manual (HCM) control delay is the primary performance measure for signalized and un-signalized intersections. **Table 3-1** below illustrates the relationships between control delays and the levels of service (LOS) for both signalized and un-signalized intersections. **Table 3-1** values were used in the analysis throughout this study.

Table 3-1: Relationship Between Control Delays and LOS.

LOS	Signalized Intersection	Un-signalized Intersection
A	≤10 sec	≤10 sec
B	10–20 sec	10–15 sec
C	20–35 sec	15–25 sec
D	35–55 sec	25–35 sec
E	55–80 sec	35–50 sec
F	>80 sec	>50 sec

Source: Highway Capacity Manual

3.2.3 Volume-to-Capacity Ratio (V/C Ratio) and Level of Service

The volume-to-capacity (V/C) ratio is a measure of capacity of intersection efficiency. The V/C ratio (V/C) is defined as the ratio of flow rate to capacity for a transportation facility. The higher the value, the more congestion is experienced by motorists. A V/C ratio less than 0.85 generally indicates that adequate capacity is available and vehicles are not expected to experience significant queues and delay. A V/C ratio between 0.85 and 0.95 generally indicates that intersection is operating near its capacity. Higher delays may be expected, but continuously increasing queues should not occur. As the V/C ratio approaches 1.0, traffic flow may become unstable, and delay and queuing conditions may occur. Once the demand exceeds the capacity (a V/C ratio greater than 1.0), traffic flow is unstable and excessive delay and queuing is expected. In general, the maximum acceptable volume-capacity ratio (V/C) is considered to be less than 0.85. The performance of an intersection is measured by delays experienced by motorists. The performance is referred to as level of service (LOS). Generally LOS C or better is preferred, however most jurisdictions consider an overall intersectional LOS D as the limiting LOS at which point improvements to the intersection are warranted. Individual movements can however have LOS of lower than D.

3.2.4 Cycle Length

Cycle length is defined as the time in seconds (sec) required for one complete iteration of colour sequence of signal indications. Depending upon the traffic volumes and co-ordination/synchronization requirements, a cycle length ranging between 60 to 120 seconds was utilized.

3.2.5 Saturation Flow

Saturation Flow Rate is defined as the number of vehicles that a single lane can carry in one hour, if it has the green indication continuously. A saturation flow rate of 1900 vehicles/hour is typically used for the analysis.

3.2.6 Signal Spacing

Proper spacing of roadway intersections (and driveways) is an important access management practice. The importance of proper intersection spacing is that as the number of intersections per km increase the flow of traffic is impeded. The existence of too many intersections per km also increases delay and congestion. Generally, 400m is the acceptable intersection spacing on arterial and collector roadways in an urban setting.

3.2.7 Signal Warrants

Traffic signal installation is based on a warrant system developed by the Transportation Association of Canada (TAC). Warrant point value of 100 is considered a threshold above which signals can be installed.

3.2.8 Corridor (or Segment) Level of Service

The level of service on a roadway segment or corridor is measured differently from the LOS at intersections. Corridor LOS is based on the average daily traffic and considers travel in both directions. Corridor level of service refers to the quality of traffic operations along a series of roadway segments. Factors that affect corridor level of service are the presence of traffic control along the corridor, traffic volumes, travel speeds, the number of through travel lanes and the presence and number of turn lanes, among other factors. The Highway Capacity Manual (HCM 2010) recommends the **Table 3-2** below be used as a guideline for planning purposes. **Table 3-2** and **Table 3-3** were used in this study to establish corridor and segment levels of service.

Table 3-2: Roadway Segment Capacities

Total Number of Lanes (Both Ways)	Description	Capacity* (Both Ways)
2	With left turn lanes at intersections	16,000 vpd
4	With left turn lanes at intersections	31,000 vpd
6	With left turn lanes at intersections	44,000 vpd

**Round numbers based on Level of Service D/E thresholds in HCM 2010, Exhibit 16-14*

Table 3-3: Relationship Between V/C Ratios and Corridor LOS.

LOS	V/C Ratio	Traffic Conditions
A	<0.50	Well below capacity with no congestion
B	0.50 -0.60	Below capacity generally with no congestion
C	0.6 – 0.80	Approaching capacity is becoming congested. Roadways in this regime may operate without congestion during non-peak periods
D	0.80 – 1.0	At capacity, operates in somewhat congested manner in non-peak periods
E	1.0 – 1.2	Slightly over capacity, congestion during peak periods and moderate congestion in non-peaks
F	>1.2	Full saturation

3.2.9 Heavy Vehicles

Traffic surveys from previous studies found that the percentage of heavy vehicles within the traffic stream substantially differ between the morning and afternoon peak hours. The variation was also observed from intersection to intersection. The percentage of heavy vehicles (HV) varies in the morning between 3.2% to 7% and in the afternoon between 1.5% to 3.2%. Therefore an average value of 5% was used as the percentage of heavy vehicles (HV) for the morning peak hour traffic analysis and an average value of 2.5% was utilized for the afternoon peak hour traffic analysis.

3.2.10 Design Criteria Summary

The design criteria described above are summarized in **Table 3-4.**

Table 3-4: Collisions Involving Heavy Trucks

Design Criteria	Value Used in the Study	Reference
1. Peak Hour Factor	0.92	HCM2010 and Synchro
2. Intersection Control Delays	LOS / Signalized Intersection / Un-signalized Intersection A ≤10 sec ≤10 sec B 10–20 sec 10–15 sec C 20–35 sec 15–25 sec D 35–55 sec 25–35 sec E 55–80 sec 35–50 sec F >80 sec >50 sec	HCM2010
3. Intersection Saturation Flow	1900 vph	HCM2010 and Synchro
4. Cycle Length	60-120 sec	HCM2010 and Synchro
5. Corridor AADT Capacities	Total Number of Lanes (Both Ways) / Capacity (Both Ways) 2 16,000 vpd 4 31,000 vpd 6 44,000 vpd	HCM2010
6. Corridor V/C Ratios	LOS V/C RATIO A <0.50 B 0.50 -0.60 C 0.6 – 0.80 D 0.80 – 1.0 E 1.0 – 1.2 F >1.2	HCM2010
7. Signal Spacing	400m	TAC
8. Signal Warrant	100 points	TAC
9. Heavy Vehicle Composition	2.5 - 5%	Previous Studies

3.3 Major Roadway Segment Analysis

Segments of all arterial and collector roadways were analyzed for level of service (LOS) based on the Highway Capacity Manual (HCM) methods. The LOS on a roadway segment is a qualitative measure used to relate the quality of traffic service. It is used to analyze highways by categorizing traffic flow and assigning quality levels of traffic progression. The LOS is represented by a letter grade as illustrated below:

A – Free flowing traffic
B –Reasonably free flow
C –Stable flow
D –Approaching unstable flow
E –Unstable flow
F –Forced or breakdown flow

The LOS of a roadway segment or corridor is mainly based on Annual Average Daily Traffic (AADT), speed and the total number of lanes. The analysis considers the number of lanes in both directions. The LOS is used to identify areas where volume exceeds available capacity which is an indication that the road segment needs to be upgraded. The V/C ratios and LOS for all segments of the arterial and collector roadways were analyzed and are presented below.

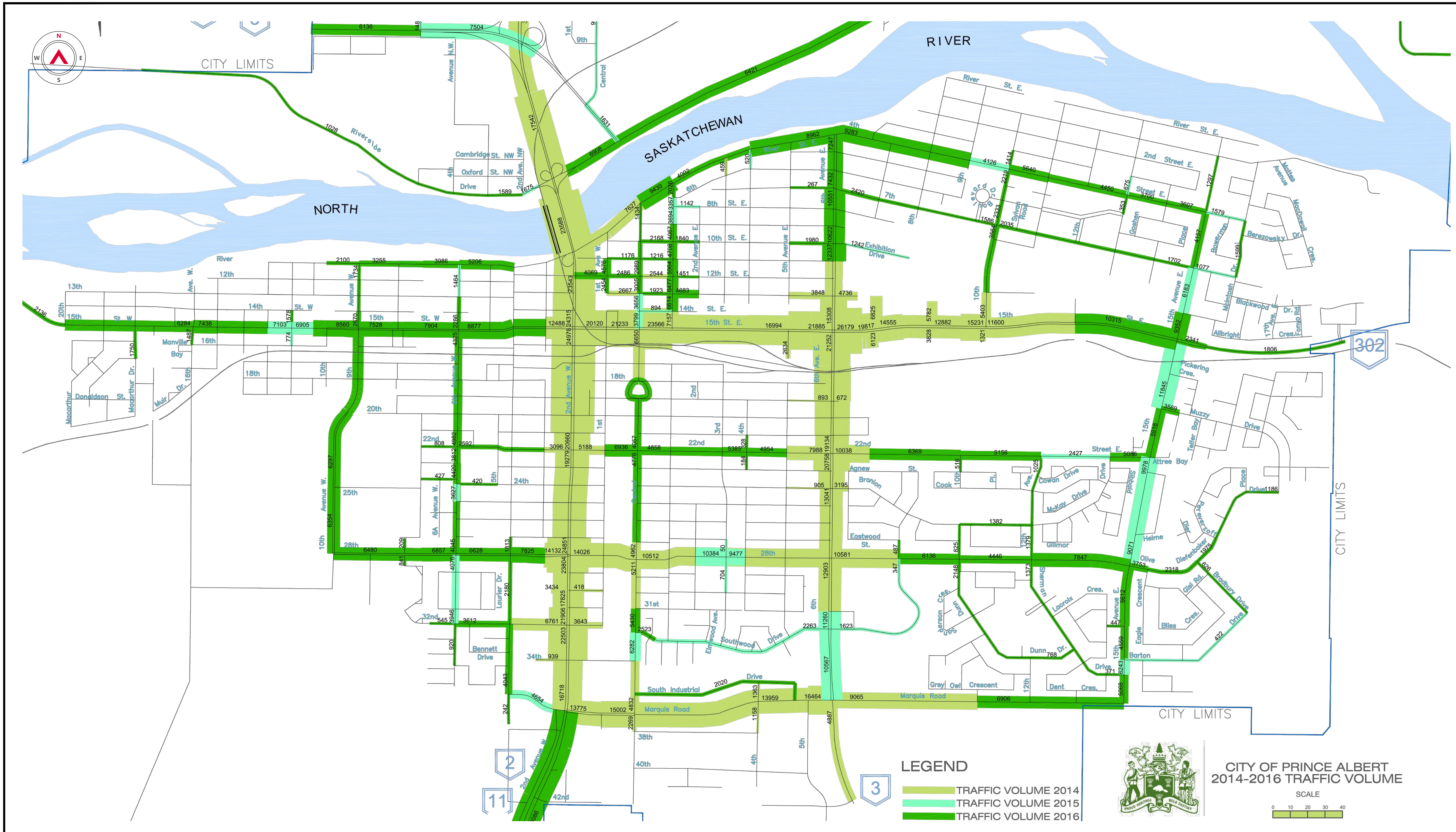
3.3.1 Volume/Capacity Ratios and Levels of Service

As previously stated, the LOS on roadway segments are based on annual average daily traffic (AADT). The AADT used in the analysis was part of the data supplied by the City of Prince Albert. **Figure 3-1** is an illustration of the AADT data supplied by the City. The analysis is based on the Highway Capacity Manual HCM2010. The capacities in **Table 3-2** and the V/C ratios in **Table 3-3** were used to determine the resulting LOS on each segment of the roadway. **Table 3-5** illustrates the V/C ratios and LOS on the east-west roadways while **Table 3-6** illustrates the V/C ratios and LOS on the north-south roads. The data is also illustrated in graphical format in **Figure 3-2** and **Figure 3-3.**

Table 3-5: East-West AADT's, V/C Ratios and LOS

Roadway	2015 AADT (vpd)	Number of Lanes	Capacity (vpd)	V/C Ratio	LOS
Marquis Road					
4th Ave W - 2nd Ave W	4654	2	16000	0.29	A
2nd Ave W - Central	15302	4	31000	0.49	A
Central - 6 Ave E	16793	2	16000	**1.05**	**E**
6th Ave E - 15 Ave E	9246	2	16000	0.58	B
28th Street					
10 Ave W - 6 Ave W	7175	4	16000	0.45	A
6 Ave W -2 Ave W	14415	5	31000	0.47	A
2 Ave W - Central	14307	5	31000	0.46	A
Central - 6 Ave E	10722	2	16000	0.67	C
6 Ave E - 15 Ave E	10793	2	16000	0.67	C
22nd Street					
6 Ave W - 2 Ave W	3158	2	16000	0.20	A
2 Ave W - Central	6185	2	16000	0.39	A
Central - 6 Ave E	8148	2	16000	0.51	B
6 Ave E - 10 Ave E	10239	2	16000	0.64	C
10 Ave E - 15 Ave E	3211	2	16000	0.20	A
15th Street					
City Limits - 10 Ave W	7103	2	16000	0.44	A
10 Ave W- 6 Ave W	10205	2	16000	0.64	C
6 Ave W- 2 Ave W	12738	2	16000	0.80	C
2 Ave W- 6 Ave E	24037	4	31000	0.78	C
6 Ave E- 10 Ave E	26703	4	31000	0.86	**D**
10 Ave E- 15 Ave E	11832	4	31000	0.38	A
15 Ave E- City Limits	2056	2	16000	0.13	A

Roadway	2015 AADT (vpd)	Number of Lanes	Capacity (vpd)	V/C Ratio	LOS
River Street					
16 Ave W- 10 Ave W	2063	2	16000	0.13	A
10 Ave W- 6 Ave W	4125	2	16000	0.26	A
6 Ave W- 2 Ave W	5291	2	16000	0.33	A
2 Ave W- Central	7780	2	16000	0.49	A
Central - 6 Ave E	10756	2	16000	0.67	C
6 Ave E- 10 Ave E	5666	2	16000	0.35	A
10 Ave E - 15 Ave E	2793	2	16000	0.17	A
Highway 55					
Hwy 3 - Bridge	1675	2	16000	0.10	A
Bridge - Hwy 3	3167	2	16000	0.20	A
Hwy 3 - 6 Ave NE	5316	2	16000	0.33	A
6 Ave NE - City Limits	5450	2	16000	0.34	A
Highway 3					
City Limits - Bridge	7504	2	16000	0.47	A
Bridge - Hwy 55	1631	2	16000	0.10	A



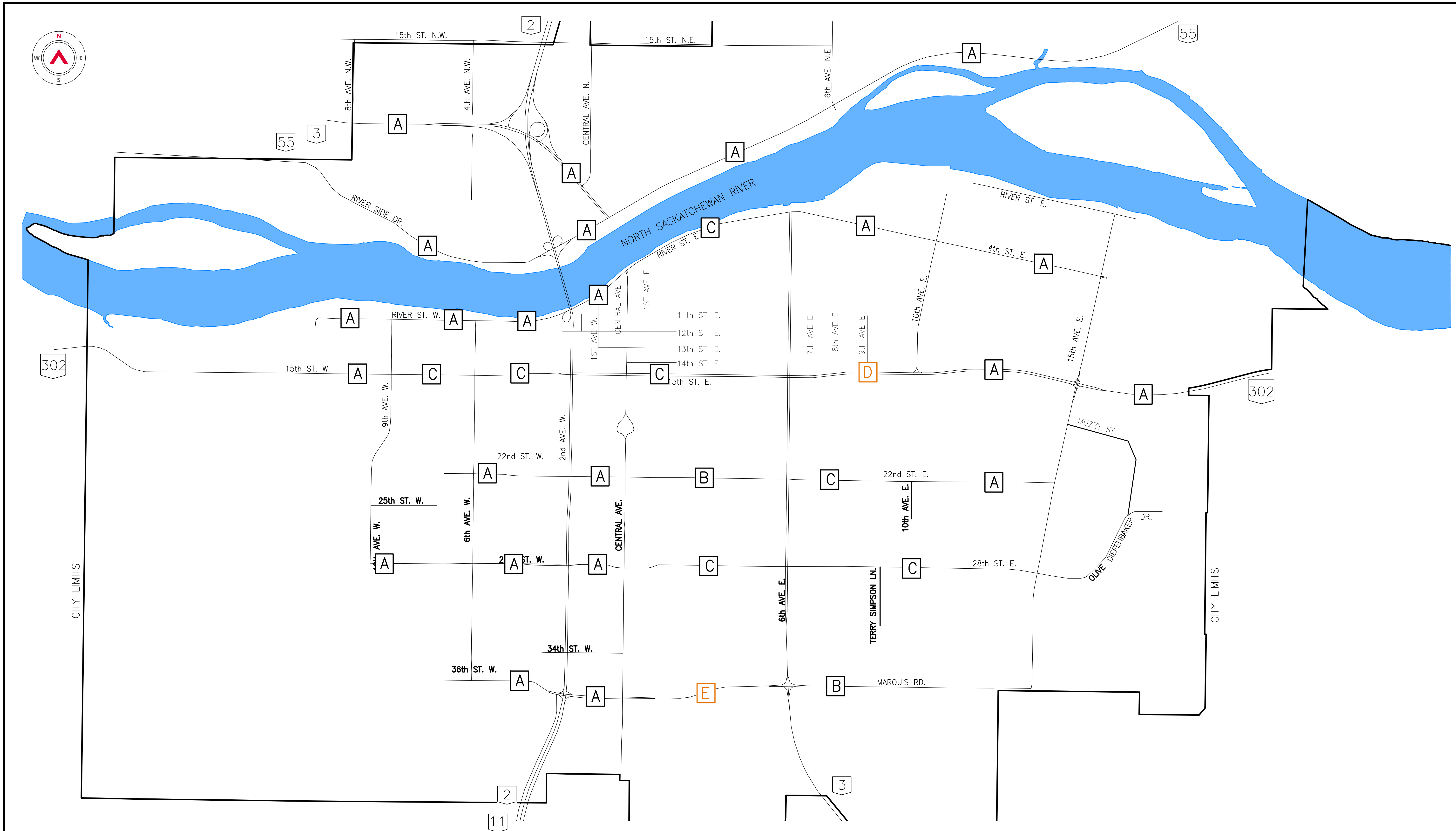
City of Prince Albert

Allnorth

CITY OF PRINCE ALBERT
TRANSPORTATION MASTER PLAN

FIGURE. 3-1
2014-2016 AADT

Date: 2017/03/29 | User: Tyler Dai | File: P:\SK\2015\0-99\15SK0016 - City of Prince Albert - Master Transportation Study\1000-Drawings\1011-Civil\01-Production\170206_TD_15SK0016-Transportation Master Plan | Layout: FIG 3-1 | Paper Size: 558.8mm x 431.8mm



Date: 2017/03/29 | User: Tyler Dai | File: P:\SK\2015\0-99\15SK0016 - City of Prince Albert - Master Transportation Study\1000-Drawings\1011-Civil\01-Production\170206_TD_15SK0016-Transportation Master Plan | Layout: FIG 3-2 | Paper Size: 558.8mm x 431.8mm

City of Prince Albert

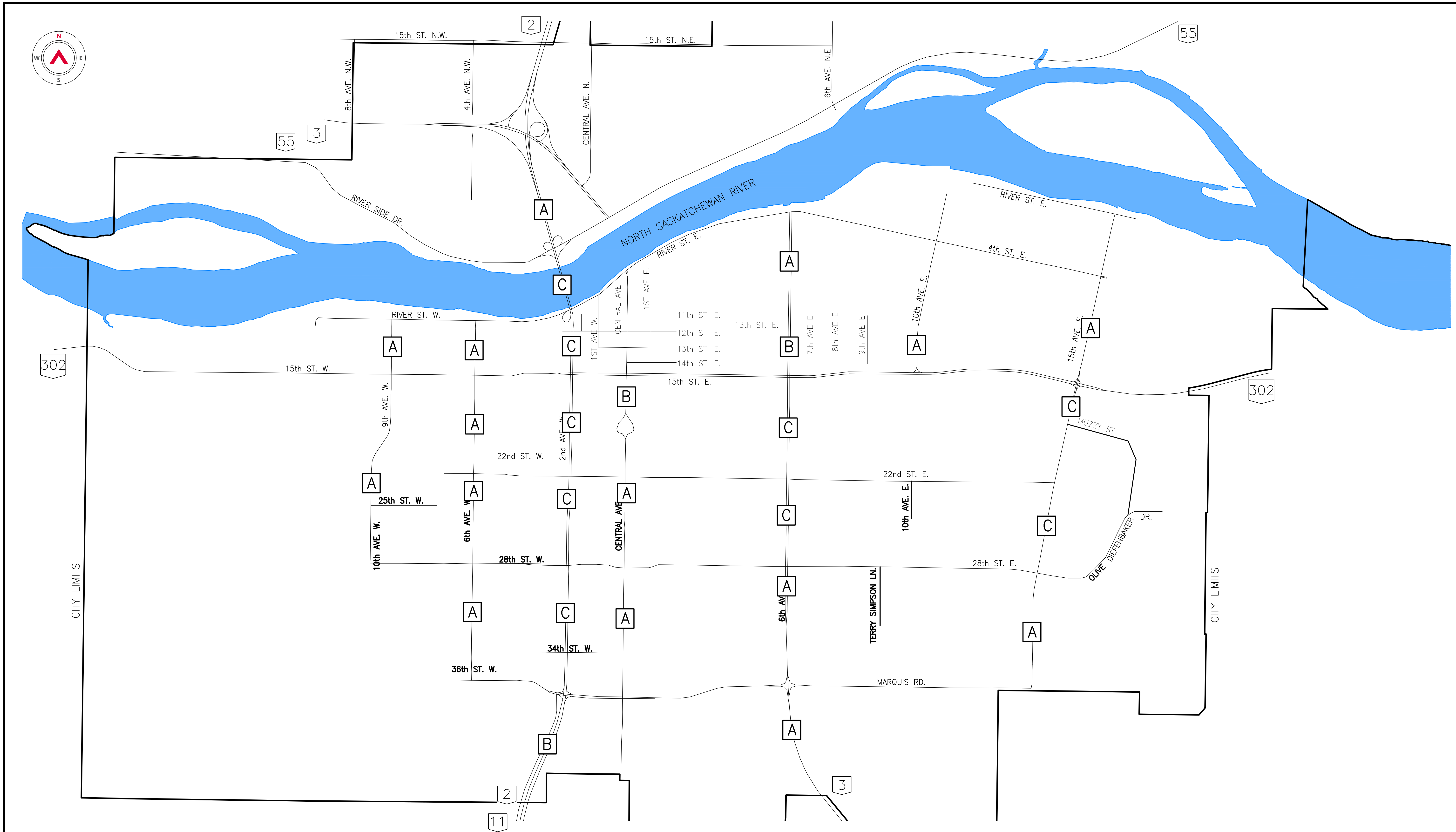
Allnorth

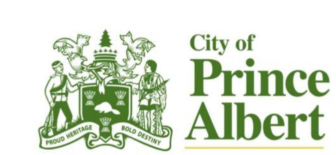
CITY OF PRINCE ALBERT
TRANSPORTATION MASTER PLAN

FIGURE. 3-2
CORRIDOR LOS
EAST/WEST ROADWAYS

Table 3-6: North-South AADT's, V/C Ratios and LOS

Roadway	2015 AADTs (vpd)	Number of Lanes	Capacity (vpd)	V/C Ratio	LOS
10th Avenue W					
28 St W - 15 St W	6638	2	16000	0.41	A
15 St W- River St W	1782	2	16000	0.11	A
6th Avenue W					
32 St W- 28 St W	4076	2	16000	0.25	A
28 St W- 22 St W	3892	2	16000	0.24	A
22 St W- 15 St W	4314	2	16000	0.27	A
15 St W- River St W	1464	2	16000	0.09	A
2nd Avenue W					
City Limits - Marquis	15643	4	31000	0.50	B
Marquis - 28 St W	24280	6	44000	0.59	C
28 St W- 22 St W	25348	6	44000	0.56	C
22 St W- 15 St W	25478	6	44000	0.58	C
15 St W- Bridge	24801	6	44000	0.56	C
Bridge - Hwy 3	24060	4	31000	0.78	A
Hwy 3 - City Limits	11700	4	31000	0.38	A
Central Avenue					
Marquis - 28 St	6282	2	16000	0.39	A
28 St - 22 St	5391	2	16000	0.34	A
22 St - 15 St	8848	2	16000	0.55	B
6th Avenue E					
City Limits - Marquis	4985	2	16000	0.31	A
Marquis - 28 St E	13161	4	31000	0.42	A
28 St E- 22 St E	21173	4	31000	0.68	C
22 St E- 15 St E	21677	4	31000	0.70	C
15 St E- 13 St E	15614	4	31000	0.50	B
13 St E- River St E	10053	4	31000	0.32	A
10th Avenue E					
15th St E- River St E	5403	2	16000	0.34	A
15th Avenue E					
Marquis - 28 St E	7316	2	16000	0.46	A
28 St E- 22 St E	9978	2	16000	0.62	C
22 St E- 15 St E	11845	2	16000	0.74	C
15 St E- 4 St E	6480	2	16000	0.41	A





CITY OF PRINCE ALBERT
TRANSPORTATION MASTER PLAN

FIGURE. 3-3
CORRIDOR LOS
NORTH/SOUTH ROADWAYS

Date: 2017/03/29 | User: Tyler Dai | File: P:\SK\2015\0-99\15SK0016 - City of Prince Albert - Master Transportation Study\1011-Civil\01-Production\1000-Drawings\170206_TD_15SK0016-Transportation Master Plan | Layout: FIG 3-3 | Paper Size: 558.8mm x 431.8mm

3.3.2 15th Street E Install Raised Medians

15th Street E is an arterial roadway which is a designated heavy truck route and a dangerous goods route. It also forms part of the Urban Highway Connector roadway system. It is a four lane divided roadway. It has raised medians on some segments while other segments of the same road are four lane but without a raised medians. Since the implementation of the popular Cornerstone Business district, traffic on 15th Street E has increased significantly. In order to improve safety, it is recommended that a raised medians be installed on two segments of 15th Street E; from 1st Avenue E to 5th Avenue E and from 7th Avenue E to 10th Avenue E. The raised medians will provide consistency throughout the roadway and will be coherent with driver expectations of an arterial roadway. Studies have shown that the installation of a raised medians is an effective technique to reduce the overall collision frequency and severity of collisions. **Figures 3-4A and 3-4B** illustrate the proposed improvements.

3.3.3 15th Street E and 7th Avenue E –Remove Existing Traffic Signals

The spacing between traffic signals located at 15th Street E and 6th Avenue E and the ones located at 15th Street E and 7th Avenue E are only 167m. The City has reported problems with accommodating westbound left turn traffic at the intersection of 15th Street E and 6th Avenue E. Last summer the City implemented a westbound dual lane operations as a way of managing traffic operations at 15th Street E and 6th Avenue E. Even with the new measures traffic queues causing back-ups which affect the operation of the 7th Avenue E signal. The current westbound left turn lane at 15th Street and 6th Avenue is only 95m long. Based on the current traffic volumes and queues the required length of the westbound left lane is 135m.

The current intersection spacing of 167m is below what is a desirable spacing of 400m. The spacing is of particular importance because of the possible future role of 6th Avenue E corridor. The 6th Avenue E corridor is being considered as a possible new bridge route, which means it will play an even larger role as a mobility corridor. To improve safety and traffic flow and to prepare for the future role of 6th Avenue E, it is recommended that the traffic signals at 7th Avenue E be removed in order to increase the intersection spacing. The 7th Avenue E intersection should be re-designed to allow right-in right-out movements only. **Figure 3-4A** illustrates the proposed improvements.

The traffic progression on 15th Street E was modelled with and without the signals at 7th Avenue. The upstream intersection (15th St E & 6th Ave E) and downstream intersection (15th St E & 8th Ave E) intersections were analyzed. The benefits of removing signal removal from 7th Avenue E and installing them on 8th Avenue E are:

- Provides a longer spacing of traffic signals between the major intersection of 15th Street E and 6th Avenue E and 15th Street E and 8th Avenue E. The spacing between 6th Avenue E and 8th Avenue E is approximately 360m which is closer to the desired 400m;
- Would permit the lengthening of the westbound left turn bay at 15th Street E and 6th Avenue E to accommodate the overflowing queues. The current left turn lane is only 95m and the required left turn lane is 135m. With the removal of the traffic signals at 7th Avenue it is possible to extend the left turn bay. In addition, with a longer westbound left turning lane it may be possible to remove the dual left turn operation and allow left turn traffic to be handled by a single left turn lane.

- The overall intersection delays at 15th Street E and 6th Avenue E are reduced, as more westbound left turning vehicles can be accommodated on a longer left turn lane. **Figure 3-4A** illustrates the closure concept including the right-in right out movements;

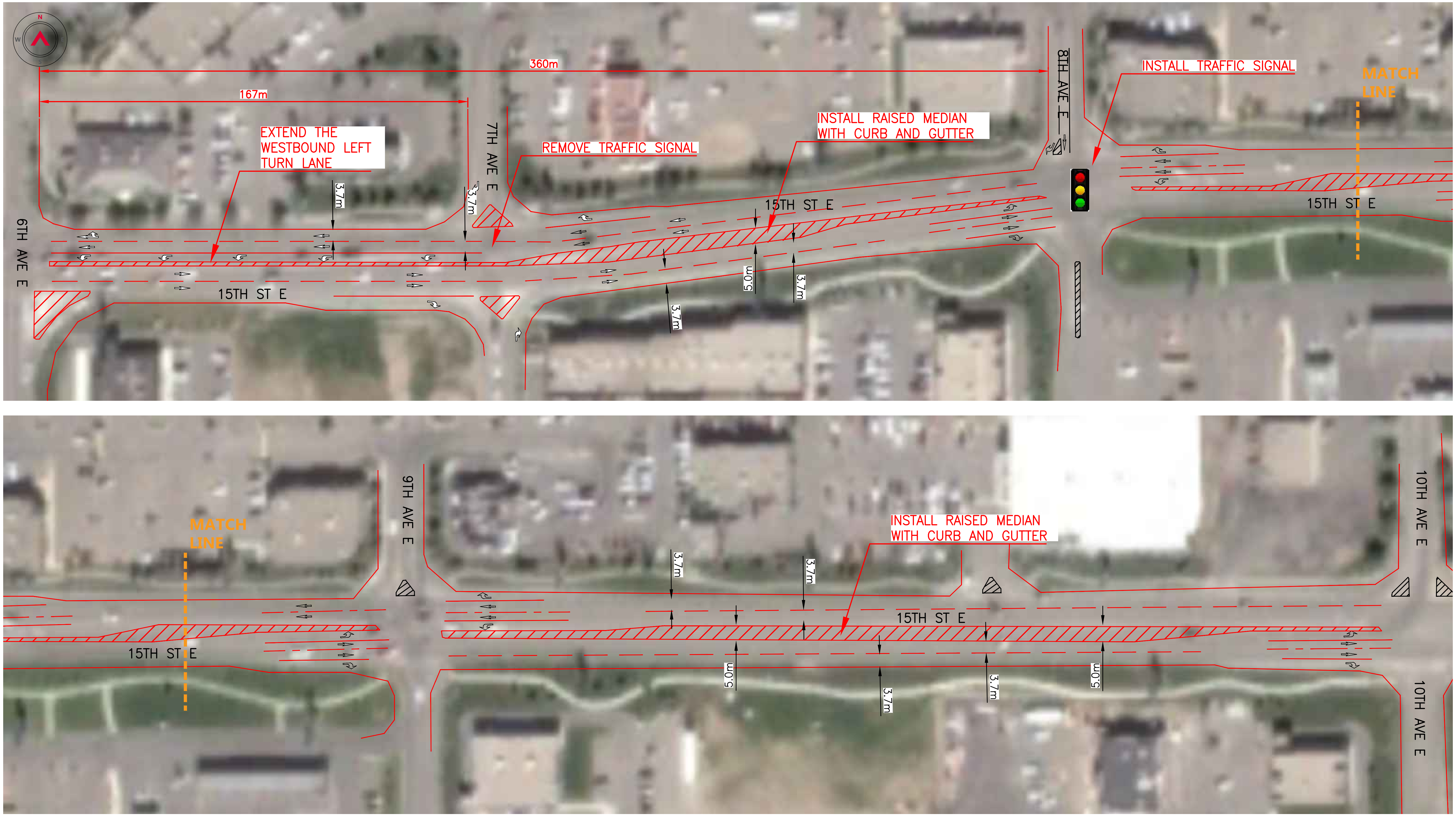
3.3.4 15th Street E and 8th Avenue E – Install New Traffic Signals

The removed (and salvaged) traffic signals at 7th Avenue E should be moved to the 15th Street E and 8th Avenue E intersection. **Figure 3-4A** illustrates the location of the new traffic signals. All the eastbound left turn traffic that were using the 7th Avenue E intersection will now migrate to the new 8th Avenue E signalized intersection. The intent is to maintain similar capacity access to lands and businesses in the Cornerstone Business Area. A traffic signal warrant calculation shows that the signal would be warranted. The intersection was modelled with volumes currently using this un-signalized intersection plus all the traffic that is currently using the signalized intersection at 15th Street E and 7th Avenue E. The benefits of installing signals at 15th Street and 8th Street are:

- It replaces the access capacity lost by removing the signals at 15th Street E and 7th Avenue E resulting in zero loss of access capacity;
- It provides a longer separation to the important upstream intersection of 15th Street E and 6th Ave E;
- The traffic signal at 8th Avenue E has the potential to service more land use as it is centrally located between 6th Avenue E and 10th Avenue E;
- It can accommodate all traffic that was using the 15th Street E and 7th Avenue E signal at an acceptable LOS.

3.3.5 6th Avenue E Install Raised Medians

Similar to 15th Street E, 6th Avenue E is an arterial roadway which is a designated heavy truck route and a dangerous goods route. It also forms part of the Urban Highway Connector roadway system. Most of the roadway is a four lane divided roadway with raised medians. The section between Marquis Drive and Southwood Drive has four lane but without a raised medians. In order to improve safety, it is recommended that a raised median be installed between Marquis Drive and Southwood Drive. The raised medians will provide consistency throughout the roadway and will be in line with driver expectation. **Figure 3-4C** illustrates the proposed improvements.



Date: 2017/03/29 11:48 AM | User: Tyler Dai | File: P:\SK\2015\0-99\15SK0016 - City of Prince Albert - Master Transportation Study\1000-Drawings\1011-Civil\01-Production\170214_TD_15SK0016-Corridor Improvement-Functional Plans | Layout: FIG 3-4A | Paper Size: 558.8mm x 431.8mm

REFERENCE DRAWINGS

DRAWING NO	DRAWING DESCRIPTION/TITLE	REF
-	-	1

REV	YY/MM/DD	DESCRIPTION	DRWN	APVD
-	-	-	-	-

CLIENT: City of Prince Albert

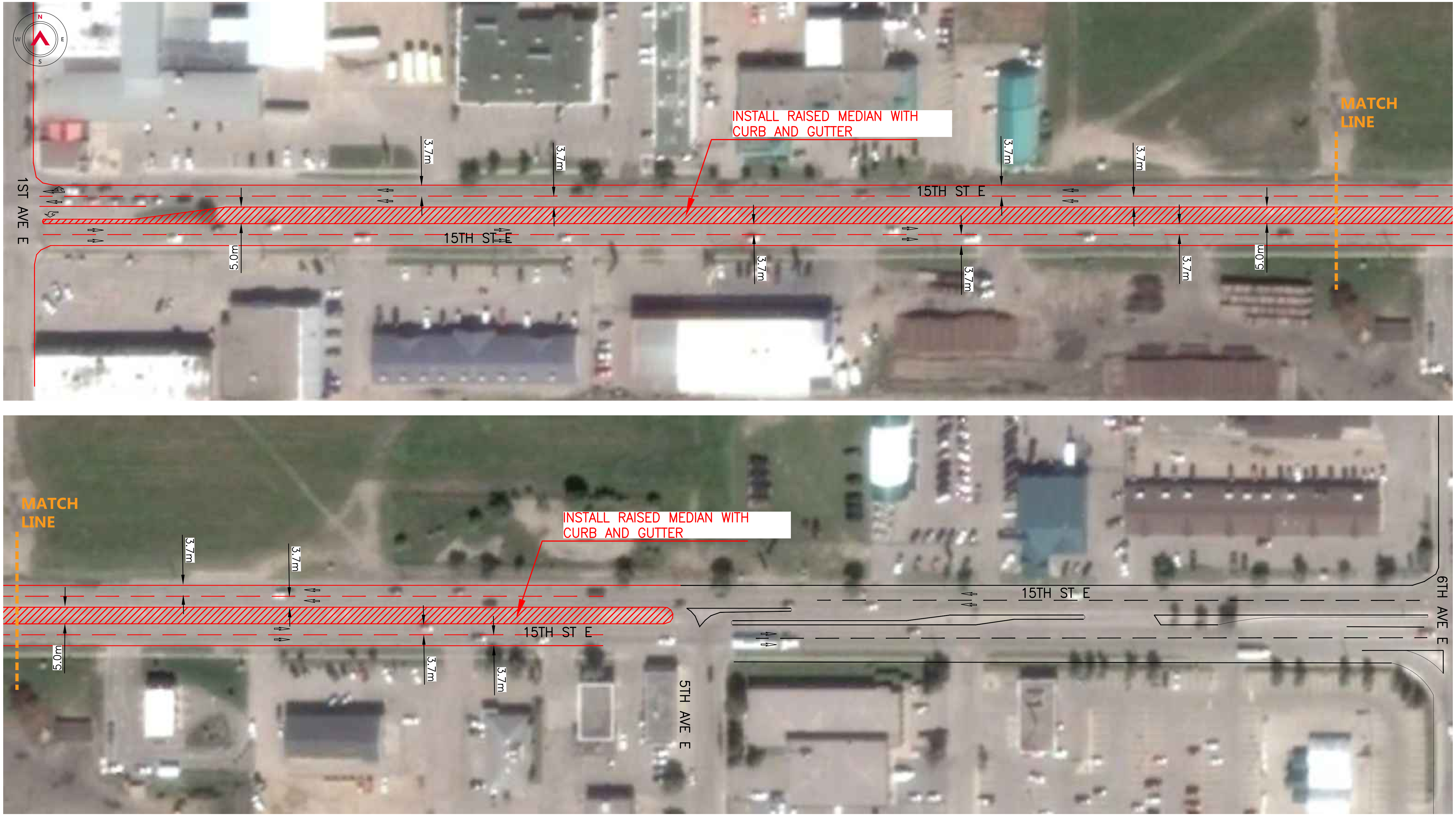
Allnorth

TITLE:
15TH STREET EAST IMPROVEMENTS 7TH AVE SIGNAL REMOVAL (CONCEPTUAL ONLY)

CLIENT NO:	-	DRWN:	-	DATE:	-
PROJECT NO:	-	DSGN:	-	DATE:	-
DRAWING SIZE:	ANSI "B"	CHKD:	-	DATE:	-
SCALE:	AS NOTED	APVD:	-	DATE:	-

PROJECT:
CITY OF PRINCE ALBERT TRANSPORTATION MASTER PLAN

DWG NO: **FIGURE 3-4A** REV: -



REFERENCE DRAWINGS		
DRAWING NO	DRAWING DESCRIPTION/TITLE	REF
-	-	1

REV	YY/MM/DD	DESCRIPTION	DRWN	APVD
-	-	-	-	-

CLIENT: City of Prince Albert

Allnorth

TITLE:
15TH STREET EAST IMPROVEMENTS 1ST AVE E TO 5TH AVE E (CONCEPTUAL ONLY)

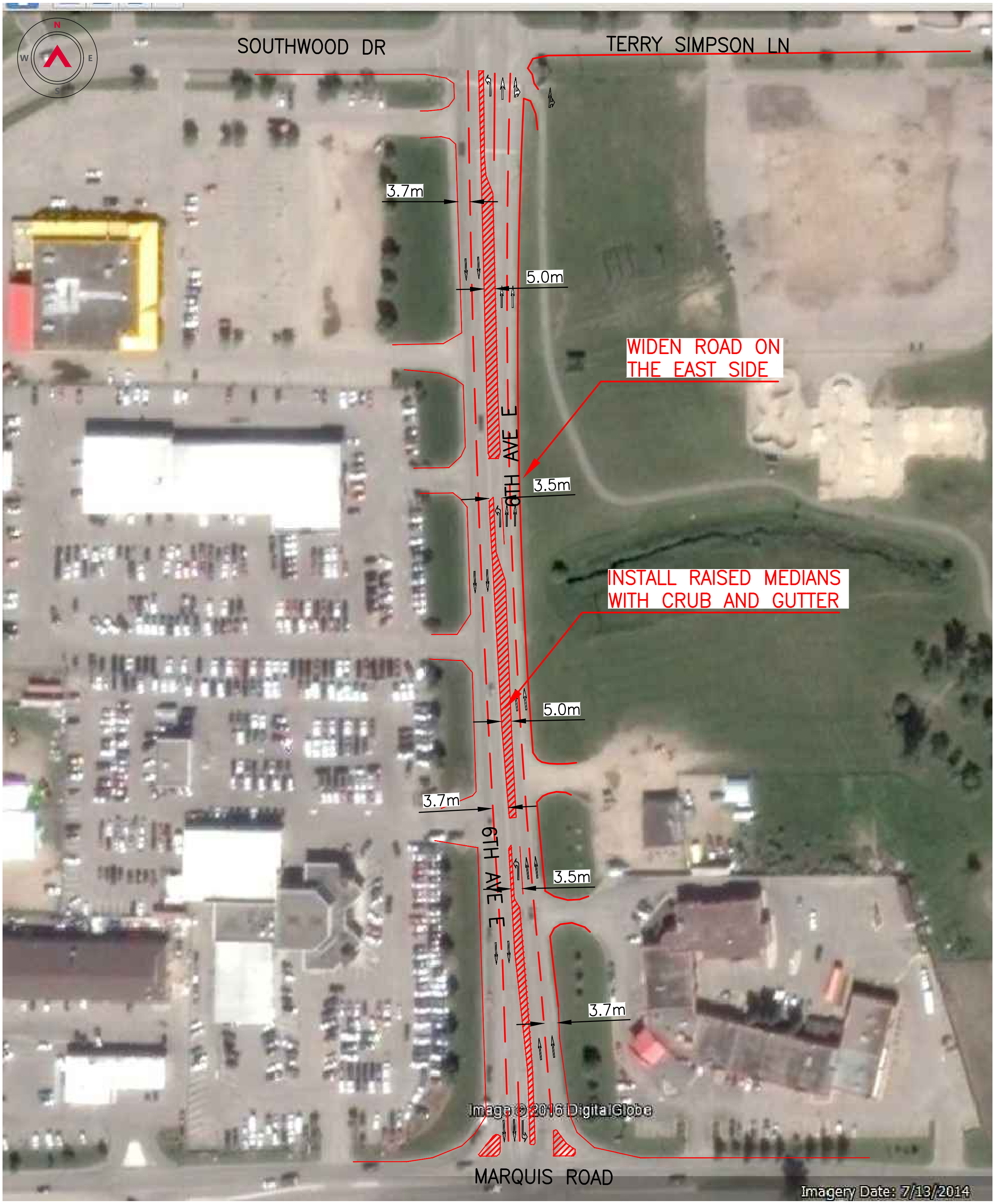
CLIENT NO:	-	DRWN:	-	DATE:	-
PROJECT NO:	-	DSGN:	-	DATE:	-
DRAWING SIZE:	ANSI "B"	CHKD:	-	DATE:	-
SCALE:	AS NOTED	APVD:	-	DATE:	-

PROJECT:
CITY OF PRINCE ALBERT TRANSPORTATION MASTER PLAN

DWG NO: **FIGURE 3-4B**
REV: -

Date: 2017/03/29 11:47 AM | User: Tyler Dai | File: P:\SK\2015\0-99\15SK0016 - City of Prince Albert - Master Transportation Study\1000-Drawings\1011-Civil\01-Production\170214_TD_15SK0016-Corrdior Improvement-Functional Plans | Layout: FIG. 3-4B | Paper Size: 558.8mm x 431.8mm

Date: 2017/03/29 | User: Tyler Dai | File: P:\SK\2015\0-99\15SK0016 - City of Prince Albert - Master Transportation Study\1000-Drawings\1011-Civil\01-Production\170214_TD_15SK0016-Corrdior Improvement-Functional Plans | Layout: FIG. 3-4C | Paper Size: 279.4mm x 431.8mm



REV	YY/MM/DD	DESCRIPTION	DRWN	APVD
-	-	-	-	-

CLIENT: City of Prince Albert

Allnorth

TITLE:

6TH AVENUE IMPROVEMENT SOTHWOOD DR TO MARQUIS RD (CONCEPTUAL ONLY)

CLIENT NO:	-	DRWN:	-	DATE:	-
PROJECT NO:	-	DSGN:	-	DATE:	-
DRAWING SIZE:	ANSI "A"	CHKD:	-	DATE:	-
SCALE:	AS NOTED	APVD:	-	DATE:	-

PROJECT:

CITY OF PRINCE ALBERT TRANSPORTATION MASTER PLAN

DWG NO: **FIGURE 3-4C** REV: **-**

3.3.6 Corridor Analysis Conclusions

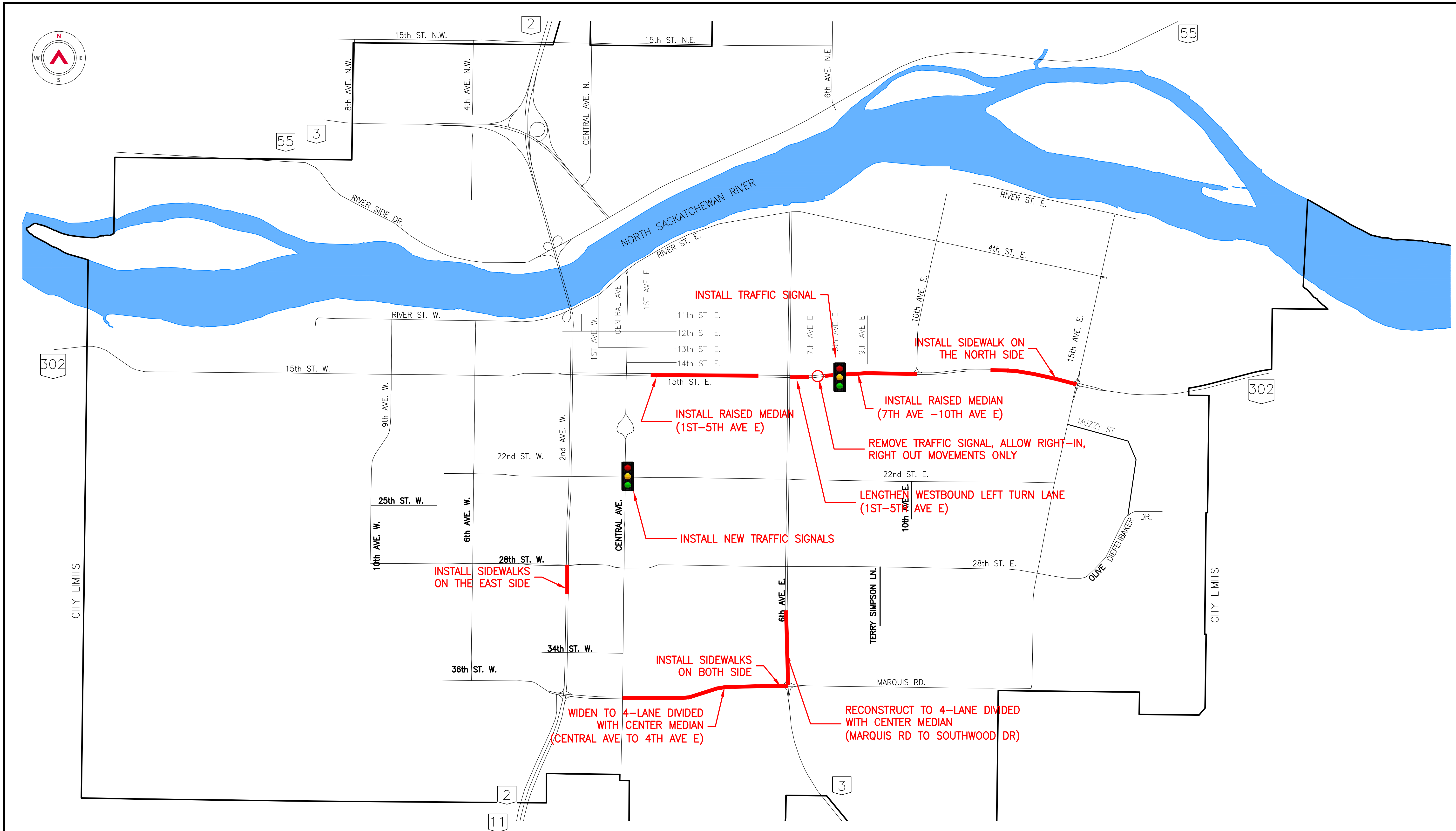
The corridor analysis has yielded the following conclusions:

- Marquis Road is the only roadway that has a failing LOS. The segment between Central Avenue and 4th Avenue East has an LOS of E. This segment currently has only two lanes.
- LOS D was observed on 15th Street East between 6th Avenue East and 10th Avenue E;
- The rest of the roadway segments on east-west roadways and on north-south roadways are operating at a LOS of C or better.
- There are locations where the sidewalks are not continuous. The missing sidewalks are at the following locations: Marquis Road, 2nd Avenue W and on 15th Street E. These roadways are bus routes with bus stops. To encourage transit use the City needs to provide sidewalks to the bus stops.
- The City does not have formal access control guidelines for review of development. The reviews are conducted on an ad hoc basis.

3.3.7 Recommended Geometric Improvements

The recommended geometric improvements are based on the analysis and conclusions listed above. **Figure 3-5** illustrates the location of the proposed improvements. **Table 3-7** illustrates the recommended improvements and the reasons why they are recommended. The cost estimates in **Table 3-7** are an order of magnitude only and should not be taken as actual construction costs. The estimates should be used for capital projects programming only. Cost estimate details are in **Appendix C.** The cost estimates are based on the following unit costs:

- Cost of widening from two lanes to four lanes $2,000/m
- 20m arterial with curb, gutter, median and asphalt roadway $2,000/m
- Median curb and gutter $125/m
- Median concrete infill at left turning lanes $144/m
- Relocate existing traffic signal supply and install $90,000
- 1.2m wide sidewalks $210/m
- Solid median concrete $96/m2
- 2UCU: two-lane urban collector undivided $1,510/m
- 2UAU: two-lane urban arterial undivided $1,700/m
- 4UAD: four-lane urban arterial divided $2,400/m
- Traffic signal control: $180,000/intersection
- Actuated and lighted flashing pedestrian corridor $40,000/location



City of Prince Albert

Allnorth

Copyright © Allnorth Consultants Limited and affiliated companies, all rights reserved.

CITY OF PRINCE ALBERT TRANSPORTATION MASTER PLAN

FIGURE. 3-5 RECOMMENDED GEOMETRIC IMPROVEMENTS

Date: 2017/03/29 | User: Tyler Dai | File: P:\SK\2015\0-99\15SK0016 - City of Prince Albert - Master Transportation Study\1000-Drawings\1011-Civil\01-Production\170206_TD_15SK0016-Transportation Master Plan | Layout: FIG 3-5 | Paper Size: 558.8mm x 431.8mm

Table 3-7: Recommended Geometric Improvements

Roadway Name	From	To	Length	Improvements	Project Rationale	Estimated Cost
Marquis Rd	Central Ave	4th Ave E	450m	• Widen to as a 4-lane, divided cross-section • Install sidewalks as part of the widening.	• Increase capacity to improve the failing LOS of E. • Lane continuity, the road is 4-lanes west of Central Ave and four lanes east of 5th Street. • This is a bus route with bus stops but without continuous sidewalks.	$900,000
Marquis Rd	5th Ave E	6th Ave E	300m	• Install a sidewalk on both sides, 140m on each side.	• This is a bus route, with bus stops but without sidewalks. • The pedestrian desire line is evident by the foot path created by pedestrians.	$63,000
6th Avenue E	Marquis Rd	Southwood Dr	400m	• Reconstruct as a 4-lane divided cross-section with center median.	• Cross-section consistency, the remainder of 6th Avenue northerly is a 4-lane divided roadway. • Improve Safety	$480,000
2nd Avenue W	30th St W	28th St W	190m	• Install a sidewalk on the east side	• This is a bus route, with bus stops but without continuous sidewalks. • The pedestrian desire line is evident by the foot path created by pedestrians.	$39,900
15th Street E	1st Ave E 7th Ave E	5th Ave E 10th Ave E	550 600 Total 1,150m	• Install raised medians • Install raised medians • Curb+ gutter	• Cross-section consistency, the remainder of 6th Avenue northerly is a 4-lane divided roadway. • Improve Safety	$980,000
15th Street E	7th Ave E	N/A	N/A	• Remove traffic signal • Re-design intersection to allow only right-in and right-out movements	• Improve traffic flow • Improve the operation of the intersection of 6th Ave E and 15th St E • Improve Safety	$10,000
15th Street E	8	8th Avenue E		• Install salvaged traffic signals	• Improve traffic signal spacing • Improve safety	$90,000
15th Street E	12th Street	15th Avenue E	600m	• Install sidewalk on the north side.	• There is a side walk on both east side of 15th Street and on the west side of 12th Street. This will allow sidewalk connect the two existing sidewalk and provide sidewalk continuity. • The pedestrian desire line is evident by the foot path created by pedestrians	$126,000
					TOTAL	**$2,688,900**

3.3.8 UHCP Eligible Projects

Two of the recommended projects are on the roadways covered by the Urban Highway Connector Program agreement between the City and the Ministry of Highways and Infrastructure (MHI). As such, the projects may qualify for funding from the UHCP. It is recommended that the City of Prince Albert make an application for funding to MHI. The projects and amounts that qualify under the UHCP are illustrated in **Table 3-8**.

Table 3-8: UHCP Eligible Projects

Project Location	Description	Funding Application
15th Street E	Install Raised Medians	$977,400
6th Avenue E	Install Raised Medians and Lane widening	$520,000
	Total	$1,497,400

3.4 Intersections Analysis

The traffic volume data was collected by the City of Prince Albert in September, 2016. The intersection analysis was based on PM peak hour volumes. The main measures of effectiveness at intersections are the control delay and queuing. Both of which are reflected by the volume/capacity ratio. A complete analysis was conducted at each intersection using Synchro Studio 9. Synchro software uses Highway Capacity Manual 2010 methods and parameters. SimTraffic, which is traffic simulation software, was used for more-detailed analysis of queuing and storage requirements at critical locations.

3.4.1 Traffic Signal Locations

The roadways within the study area contain signalized and un-signalized intersections. Locations of the traffic signals are illustrated in **Figure 2-12.**

3.4.2 Turning Movements Volumes

The City of Prince Albert collected turning movement counts used in the analysis. The counts were collected at the following locations:

- 10th Ave W / 25th St W
- 10th Ave W / 15th St W

- 6th Ave W / 28th St W
- 6th Ave W / 22th St W
- 6th Ave W/ 15th St W

- 2nd Ave W / Marquis Rd W
- 2nd Ave W / 28th Street W
- 2nd Ave W / 22nd Street W
- 2nd Ave W / 15th Street W

- Central Ave / Marquis Rd
- Central Ave / 28th Street
- Central Ave / 22th Street
- Central Ave / 11th Street
- Central Ave / 12th Street
- Central Ave / 13th Street
- Central Ave / 14th Street E

- 1st Ave W/ 12th St W

- 1st Ave E/ 12th St E
- 1st Ave E/ 13th St E

- 6th Ave E / Marquis Rd
- 6th Ave E / 28th St E
- 6th Ave E / 22th St E
- 6th Ave E / 15th St E
- 6th Ave E / River St E

- 15th St E / 7th Ave E
- 15th St E/ 8th Ave E
- 15th St E / 9th Ave E
- 15th St E / 10th St E

- 15th Ave E / 28th St E
- 15th Ave E / 22th St E
- 15th Ave E / 15th St E
- 15th Ave E / 4th St E

The counts were conducted between the hours 3:00pm and 7:00pm to coincide with the afternoon peak hour. Traffic count of Central Avenue intersection in downtown business district were conducted between the hours 7:00 AM and 10:00 AM. The analysis were conducted for PM/AM peak hour. The afternoon/morning peak hour turning movements on the existing lane geometries of intersections. The results of the analysis are presented in the next section of the report.

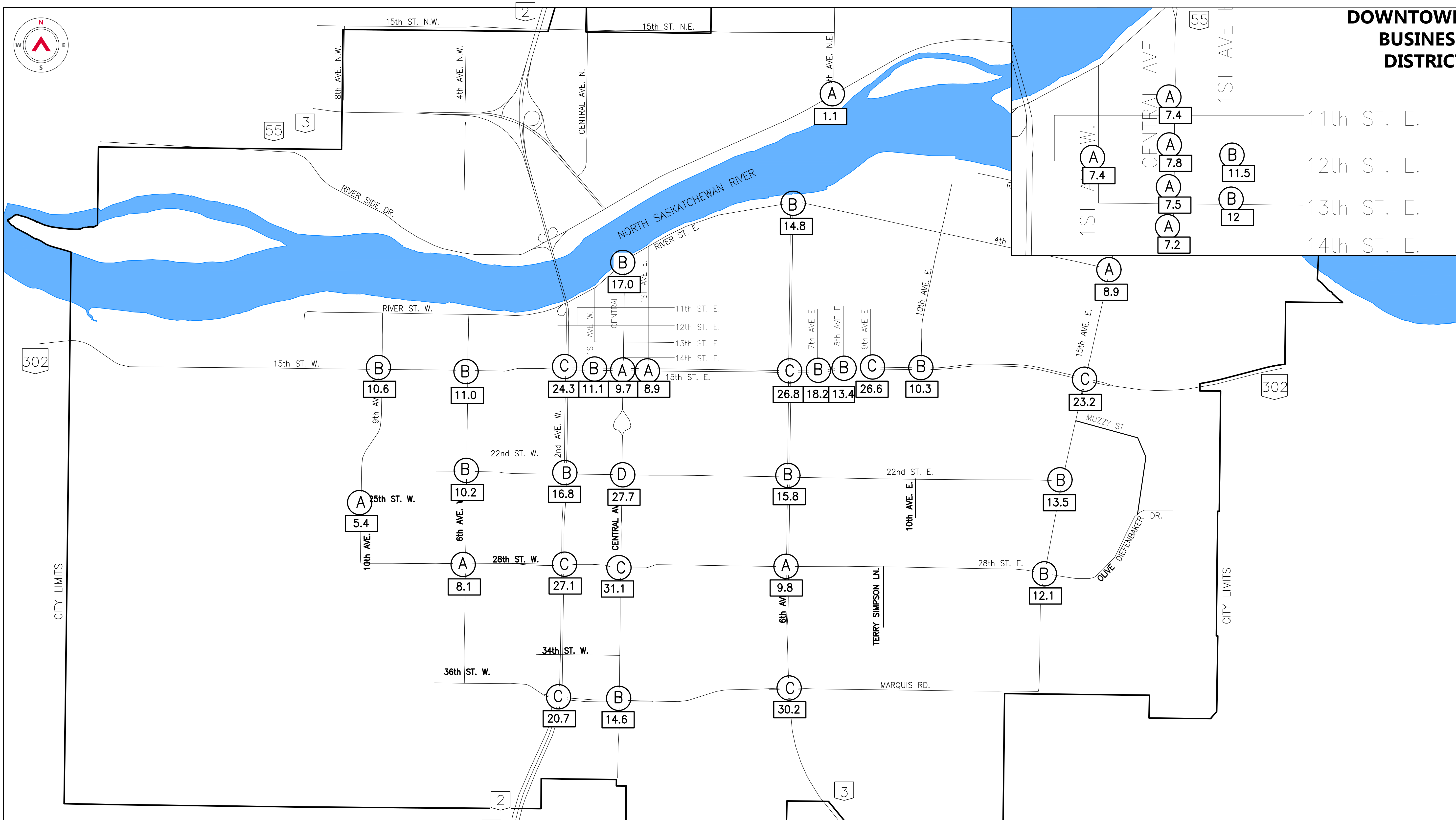
3.4.3 Intersection Level of Service

The overall performance of an intersection in an urban environment is measured by delays experienced by motorists. Synchro Studio version 9 software was used to determine intersection LOS and delays. Synchro software uses the Highway Capacity Manual (HCM) methodology for analyzing intersection performance. The 2016 turning movement volumes were used to analyze the intersections. The results of the analysis are illustrated in **Table 3-9.** The same results are illustrated graphically in **Figure 3-6.**

Table 3-9: Overall Intersection LOS and Delays

Intersection	Overall LOS	Overall Delay (Sec)
10th Ave W / 25th Street W	A	5.4
10th Ave / 15th Street W	B	10.6
6th Ave / 28th Street W	A	8.1
6th Ave / 22th Street W	B	10.2
6th Ave / 15th Street W	B	11.0
2nd Ave W / Marquis Rd W	C	20.7
2nd Ave W / 28th Street W	C	27.1
2nd Ave W / 22nd Street W	B	16.8
2nd Ave W / 15th Street W	C	24.3
1st Ave W / 12th Street W	A	7.4
Central Ave / Marquis Rd	B	14.6
Central Ave / 28th Street E	C	31.1
Central Ave / 22th Street E	**D**	**27.7**
Central Ave / 15th Street	A	9.7
Central Ave / 14th Street	A	7.2
Central Ave / 13th Street	A	7.5
Central Ave / 12th Street	A	7.4
Central Ave / 11th Street	A	7.4
Central Ave / River Street	B	17.0
1st Ave E / 12th Street E	B	11.5
1st Ave E/ 13th Street E	B	12
6th Ave E / Marquis Rd	C	30.2

Intersection	Overall LOS	Overall Delay (Sec)
6th Ave E / 28th Street E	A	9.8
6th Ave E / 22th Street E	B	15.8
6th Ave E / 15th Street E	C	26.8
6th Ave E / River Street E	B	14.8
15th Street E / 1st Ave W	B	11.1
15th Street E / 1st Ave E	A	8.9
15th Street E / 7th Ave E	B	18.2
15th Street E / 8th Ave E	B	13.4
15th Street E / 9th Ave E	C	26.6
15th Street E / 10th Street E	B	10.3
15th Ave E / 28th Street E	B	12.1
15th Ave E / 22th Street E	B	13.5
15th Ave E / 15th Street E	C	23.2
15th Ave E / 4th Street E	A	8.9
6th Ave NE / Hwy 55)	A	1.1



LEGEND

Ⓐ LOS

5.4 DELAY (SECONDS)

City of Prince Albert

Allnorth

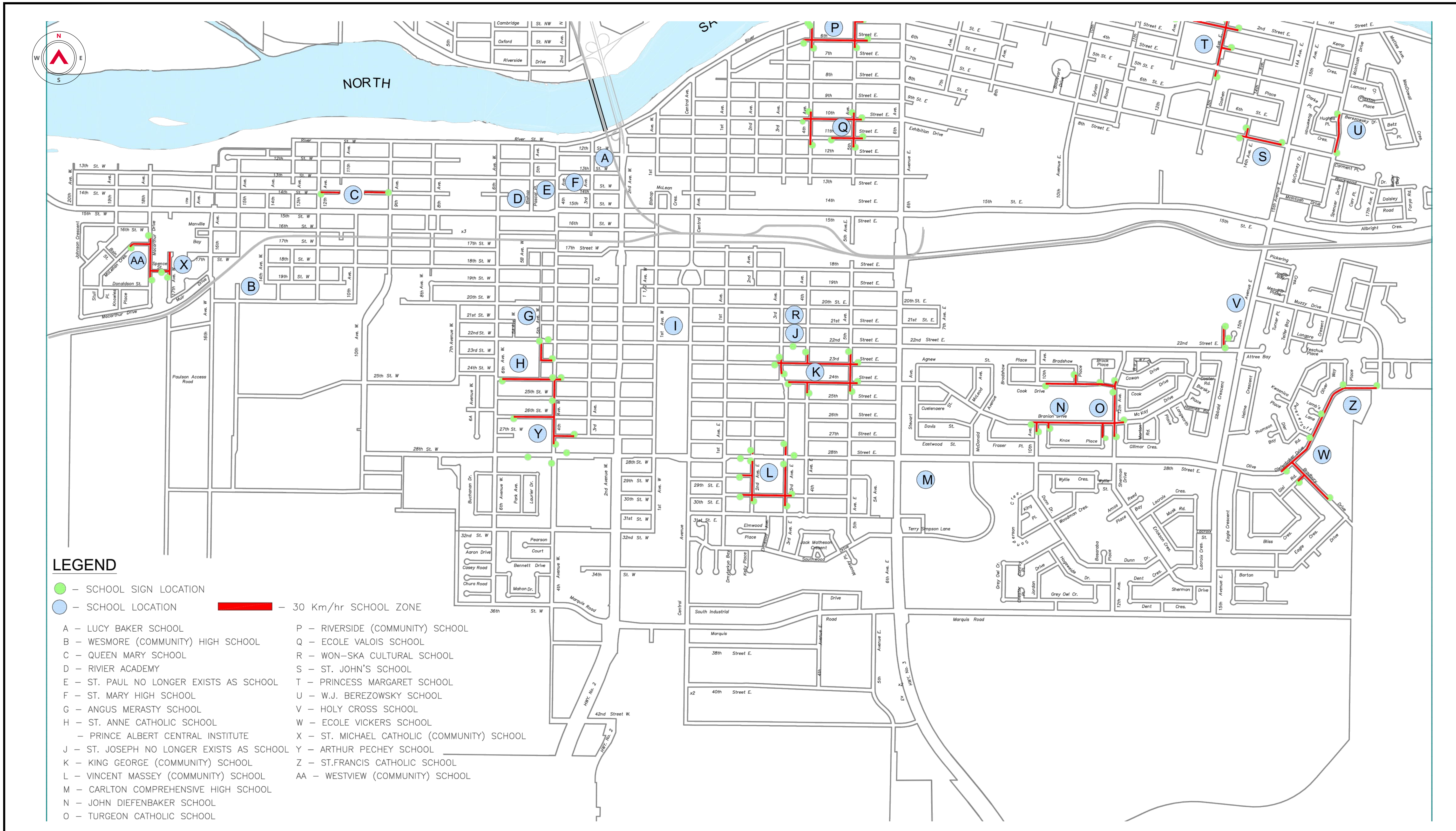
CITY OF PRINCE ALBERT
TRANSPORTATION MASTER PLAN

FIGURE. 3-6
PEAK HOUR
INTERSECTION LOS AND DELAYS

Date: 2017/03/29 | User: Tyler Dai | File: P:\SK\2015\0-99\15SK0016 - City of Prince Albert - Master Transportation Study\1000-Drawings\1011-Civil\01-Production\170206_TD_15SK0016-Transportation Master Plan | Layout: FIG 3-6 | Paper Size: 558.8mm x 431.8mm

3.4.4 6th Avenue E Carlton High School Crossing

There is a crosswalk at Carlton High School for pedestrians to cross 6th Avenue E. The crosswalk is located at mid-block south of 28th Street E. It is marked on the pavement and with an overhead lit sign but does not flash, as a result it is generally not respected by motorists. This location is of concern to the City in terms of safety. School Zone safety is of concern to the City and care is taken to make them as safe as possible. Measure to improve school zone include speed limit reduction in school zones. School zone locations in the city are illustrated in **Figure 3-7.**



File: P:\SK\2015\0-99\15SK0016 - City of Prince Albert - Master Transportation Study\1000-Drawings\1011-Civil\01-Production\170206_TD_15SK0016-Transportation Master Plan | Layout: FIG 3-7 | Paper Size: 558.8mm x 431.8mm

Date: 2017/03/29 | User: Tyler Dai

City of Prince Albert

Allnorth

CITY OF PRINCE ALBERT
TRANSPORTATION MASTER PLAN

FIGURE. 3-7
SCHOOL ZONE MAP

As part of the study a reviewed of standards and policies regarding school crossing safety measures was conducted. The proximity of the crosswalk to the 28th Street E intersection limits the options for improvements. One way of improving safety is to install pedestrian flashing lights. The flashing alert motorist of the presence of pedestrians at this location. Although there are warrants as to when a pedestrian crossing can be installed, there are no warrants regarding what type of pedestrian crossing devices should be installed. The implementation of flashing signals falls into this category. It appears that most safety measures are installed based on individual city policies.

Flashing crosswalk signs are used primarily on multi-lane roadways where one car may shield the view of a pedestrian from another car approaching in the neighboring lane. The flashing yellow lights advise drivers to slow down and prepare to stop for possible crosswalk users even if they can't see ahead of the cars in the neighboring lane. These crosswalks are equipped with overhead yellow lights that warn motorists and cyclists that pedestrians will be crossing when the overhead flashers are activated by a push button. Motorists and cyclists must yield the right-of-way to pedestrians in the crossover.

Vehicles are required to yield to pedestrians in a crosswalk whether there are flashing signs or not. The flashing signs are intended to provide additional warning to drivers that a pedestrian is present.

Studies have shown that these enhancements substantially increase the compliance of vehicles yielding to pedestrians and enable pedestrians to cross more quickly.

It is therefore recommended that flashing pedestrian lights be installed on a trial basis at this crossing. This would provide an added measure of safety for pedestrians as motorists will be prompted to stop. The effectiveness of the trial measures and impact on safety and traffic progression can be evaluated prior to making them permanent.

3.4.5 2nd Avenue W and 13th Street

There is an existing pedestrian signal at this location. The warrant calculation show that it does not meet the 100 point threshold. In addition it tends to delay motorists unnecessarily. Similar to the Carlton School crossing, it recommended that flashing pedestrian lights be installed on a trial basis at this crossing. This would provide an added measure of safety for pedestrians as motorists will be prompted to stop. The effectiveness of the trial measures and impact on safety and traffic progression can be evaluated prior to making them permanent.

3.4.6 28th Street W and Lakeside Drive

This is an access to a new residential development on 28th Street W. The City requested a review this access site. This is a typical residential development access. A review of traffic operations and visual assessment was conducted. The review considered issues such as: safety, sightlines, capacity, general geometry and access. A review of the site showed that the traffic is currently operating in a normal way no capacity issue and will do so in the future. No improvements or changes to the geometry or controls are required at this time.

3.4.7 Intersection Analysis Conclusions

The City of Prince Albert has been cautious about monitoring and improving timing and coordination on the major commercial corridors. This is evident by the current performance of intersections. Based on 2016 turning movements, all intersections are operating at acceptable LOS of D or better. The only LOS D was observed at the intersection of Central Avenue and 22nd Street E. This is un-signalized 4-way stop controlled intersection and the delays associated with the LOS D required further analysis. A traffic signal warrant calculation was conducted to determine if the signals were warranted. The City collected supplemental traffic counts and pedestrian counts for the signal warrant calculation. The signal warrant calculation showed that the intersection achieved a warrant number of over 100 points which implies that traffic signals are warranted using 2016 counts.

3.4.8 Intersection Improvements Recommendations

- Continue to monitor and review the signal timing plans in the heavy traffic corridors such as 2nd Avenue W and 15th Street E;
- Install traffic signals at the intersection of Central Avenue and 22nd Street E. The signal warrant calculation indicated that signals are warranted using 2016 traffic counts;
- Remove and salvage the traffic signals at 15th Street E and 7th Avenue E;
- Install traffic signals at 15th Street E and 8th Avenue E using the signals salvaged from the 7th Avenue E signals. The signal warrant calculation indicated that signals are warranted using 2016 traffic counts.
- On a trial basis, install flashing pedestrian lights on 6th Avenue E, at Carlton Crosswalk, mid-block south of 28th Street E. The flashing lights should be evaluated for a period of one year to determine their effectiveness.
- On a trial basis, install flashing pedestrian lights on 2nd Avenue W and 13th Street W. The flashing lights should be evaluated for a period of one year to determine their effectiveness.

3.5 Traffic Control Discussion

The purpose of traffic signals are to reduce overall delays by assigning the right of way between conflicting traffic flows in the most efficient manner possible. They are not primarily safety devices as they do not guarantee a reduction in collisions. Although when signals are installed at an intersection with a high number of pedestrian movements, they do improve pedestrian safety. The installation of traffic signals is governed by a warrants system. The warrant system is used to determine when conditions at a given intersection have reached to the point where signals would be both efficient and effective.

3.5.1 Traffic Signal Spacing

There are 61 traffic signals in the City of Prince Albert mostly on arterial and collector roadways. The normally accepted spacing of traffic signals is 400 m in an urban setting. For the most part the traffic signals are located appropriately. It is understandable that the signals in the downtown area can be closer together to accommodate pedestrians. However, there are some signals outside of the downtown that are located at a distance of less than 400m. **Table 3-10** illustrates the existing signals spacing.

Table 3-10: Existing Signal Spacing

Roadway Name	Intersection Traffic Signals		Distance between Signal Lights (m)	Is Distance ≥ 400m?
River Street	Central Ave	1st Ave E	223	NO
	1st Ave E	6th Ave E	992	YES
4th Street East	6th Ave E	13th Ave E	1709	YES
	13th Ave E	15th Ave E	465	YES
15th Street	16th Ave W	Queen Marry School	543	YES
	Queen Marry School	9th Ave W	386	NO
	9th Ave W	6th Ave W	570	YES
	6th Ave W	2nd Ave W	667	YES
	2nd Ave W	1st Ave W	191	NO
	1st Ave W	Central Ave	185	NO
	Central Ave	1st Ave E	186	NO
	1st Ave E	5th Ave E	670	YES
	5th Ave E	6th Ave E	253	NO
	6th Ave E	7th Ave E	167	NO
	7th Ave E	8th Ave E	252	NO
	9th Avenue E	10th Ave E	456	YES
	10th Ave E	15th Ave E	1109	YES
22nd Street	6th Ave W	2nd Ave W	661	YES
	2nd Ave W	4th Ave E	1003	YES
	4th Ave E	6th Ave E	490	YES
28th Street	4th Ave W	2nd Ave W	333	NO
	2nd Ave W	Central Ave	393	NO
	Central Ave	3rd Ave E	341	NO
	3rd Ave E	6th Ave E	779	YES
	6th Ave E	Terry Simpson Ln	642	YES
	Terry Simpson Ln	10th Ave E	316	NO
	10th Ave E	12th Ave E	364	NO
	12th Ave E	15th Ave E	398	NO
Marquis Road	2nd Ave W	Central Ave	392	NO
	Central Ave	4th Ave E	660	YES

Roadway Name	Intersection with Signal Light		Distance between Signal Lights	Is Distance [3] 400m?
6th Avenue West	15th St W	22nd St W	674	YES
	22nd St W	24th St W	267	NO
2nd Avenue West	12th St W	13th St W	119	NO
	13th St W	15th St W	181	NO
	15th St W	22nd St W	709	YES
	22nd St W	28th St W	609	YES
	28th St W	32nd St W	297	NO
	32nd St W	36th St W	601	YES
Central Avenue	River St	11th St	209	NO
	11th St	12th St	203	NO
	12th St	13th St	119	NO
	13th St	14th St	96	NO
	14th St	15th St	91	NO
	15th St	28th St	1377	YES
	28th St	36th St	887	YES
6th Avenue East	River St E	13th St E	927	YES
	13th St E	15th St E	204	NO
	15th St E	19th St E	385	NO
	19th St E	22nd St E	314	NO
	22nd St E	24th St E	222	NO
	24th St E	28th St E	373	NO
15th Avenue East	4th St E	7th St E	329	NO
	7th St E	15th St E	427	YES
	15th St E	Muzzy Dr	408	YES
	Muzzy Dr	28th St E	919	YES

3.6 Data Consistency

The City of Prince Albert and the Ministry of Highways and Infrastructure (MHI) independently collect traffic data on or near the city limits. The data collected by the two agencies should be similar within the tolerance limits. However, on some count stations a large discrepancy has been observed between the data collected by City and those collected MHI.
Possible reasons for the variation in data could include the following:

- The data was collected at different days;
- The counters used by either agency could be defective; and,
- There could be faulty interpretation/tabulation of results by either one of the agencies.

It is important that the data collected by the two agencies be consistent.

4 TRAFFIC VOLUME FORECAST ANALYSIS

4.1 Objective

The objective of this phase of the study was to forecast traffic volumes and analyze the transportation needs associated with each planning horizon. The three planning horizons as identified by the City were; 5-year, 10 year and 20-year. The findings of the analysis and recommendations were summarized and presented in this section of the report. **Figure 1-1** is an illustration of collector and arterial roadways that were analyzed.

4.2 Traffic Forecasting Projections

The traffic forecasting is based on the projected population of the City of Prince Albert. The population is expected to grow at a rate of 0.8% per year over the next 25 years. **Table 4-1** illustrates the projected population between 2011 and 2040 based on the medium growth scenario.

Table 4-1: 25 Year Medium Growth Rates

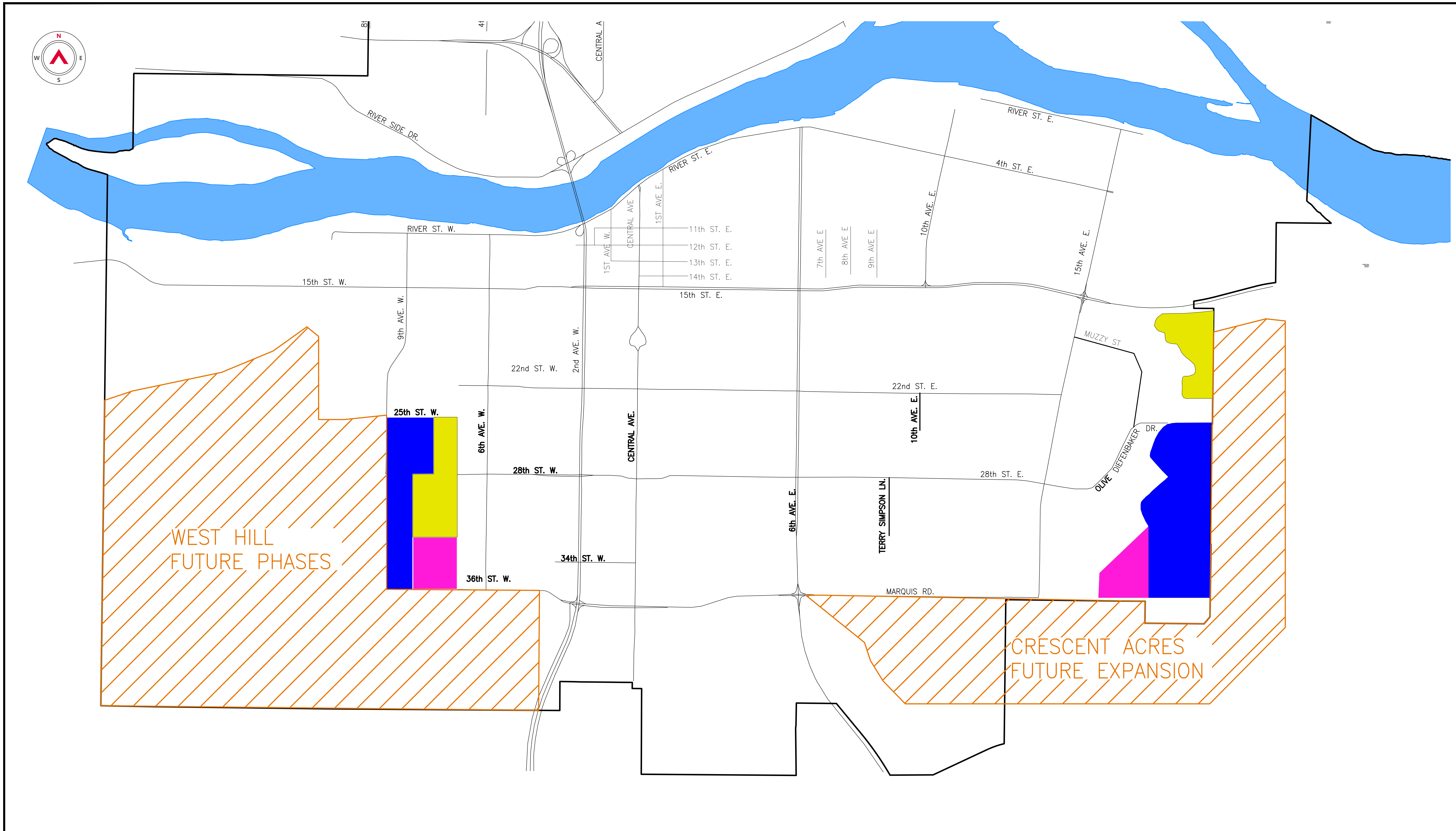
Year	Growth Rate	Population
2011	0.6	35,129
2012	0.6	35,340
2013	0.6	35,552
2014	0.8	35,765
2015	0.8	36,051
2016	**0.8**	**36,340**
2017	0.8	36,630
2018	0.8	36,923
2019	0.8	37,219
2020	0.8	37,517
2021	**0.8**	**37,817**
2022	0.8	38,119
2023	0.8	38,424
2024	0.8	38,732
2025	0.8	39,041

Year	Growth Rate	Population
2026	**0.8**	**39,354**
2027	0.8	39,669
2028	0.8	39,986
2029	0.8	40,306
2030	0.8	40,628
2031	0.8	40,953
2032	0.8	41,281
2033	0.8	41,611
2034	0.8	41,944
2035	0.8	42,280
2036	**0.8**	**42,618**
2037	0.8	42,959
2038	0.8	43,302
2039	0.8	43,649
2040	0.8	43,998

Source: AECOM Water Hydraulics System Analysis, 2015

4.2.1 Future Growth Areas

The majority of the population growth over the next 25 years will occur in two areas; West Hill on the west side and Crescent Acres on the east side. There are other minor infill areas; however, none of them will affect the outcome of this study. Future Growth Areas are illustrated in **Figure 4-1.** Both West Hill and Crescent Acres will be developed in phases.



LEGEND

5 YEAR BUILDOUT	FUTURE RESIDENTIAL AREA
10 YEAR BUILDOUT	
20 YEAR BUILDOUT	

City of Prince Albert

Allnorth

CITY OF PRINCE ALBERT
TRANSPORTATION MASTER PLAN

FIGURE. 4-1
FUTURE GROWTH AREAS

Date: 2017/03/29 | User: Tyler Dai | File: P:\SK\2015\0-99\15SK0016 - City of Prince Albert - Master Transportation Study\1000-Drawings\1011-Civil\01-Production\170206_TD_15SK0016-Transportation Master Plan | Layout: FIG 4-1 | Paper Size: 558.8mm x 431.8mm

4.2.2 Traffic Volume Forecasting

The projected traffic that will use the City of Prince Albert transportation network at the three planning horizons was based on the following:

1) Natural growth or background traffic: the natural growth of traffic is tied to the population growth projections of the City. The City of Prince Albert has adopted a medium growth scenario. Under this scenario, the City is expected to grow at a rate of 0.8%. This growth rate will be applied to the traffic volume forecasting over the planning horizon of 20 years. All existing (2016) AADTs and intersection turning movements will be increased at a rate of 0.8%.

2) Growth in surrounding areas: there are no known major developments within the surrounding areas that may impact the study. The future residential development on acreages and farms within the surrounding areas is minimal, such that it can be assumed that it is included within the natural growth of 0.8% of the City. No separate traffic forecasting for the surrounding areas will be conducted.

3) Future residential growth areas: There are two residential areas that will be partly completed within the planning horizons of this study. The West Hill Development located on the west side of the City and the Crescent Acres development located on the east side of the City. The development areas and the planning horizons are illustrated in **Figure 4-1**. The West Hill and Crescent Acres development phases will occur concurrently. The areas shown in yellow are expected to be developed within the 5-year planning horizon. The area in purple will be developed in the 10-year planning horizon. The area in blue will be developed in the 20-year planning horizon. The new trips generated by these developments at each planning horizon will be distributed and assigned to the road network. The trip generated will be based on the *Institute of Transportation Engineers (ITE), Trip Generation Manual*. The land applicable to the two development areas will be based on previous studies. The two studies referenced are: *2013 Crescent Acres Traffic Study Stages 5, 6 and 7* prepared by AECOM, and *2013 Crescent Acres Land Study Stages 5, 6 and 7* and *1999 West Hill Master Plan* also prepared by AECOM.

The next section will address the trip generation and distribution of new trips from the West Hill and Crescent Acres developments.

4.2.3 Trip Generation

The numbers of trips generated by the West Hill and Crescent Acres developments are based on the Trip Generation Manual, published by the Institute of Transportation Engineers (ITE). The anticipated number of units and densities are illustrated in **Table 4-2**. The AM and PM trips generated by the West Hill development are illustrated in **Table 4-3** and the trips for Crescent Acres are illustrated in **Table 4-4.**

Table 4-2: Estimated Residential Densities

Location	Units	Area	Density (Units/Hectare)
Single Unit - Crescent Acres	391	35.6	11.0
Multi-Unit - Crescent Acres	126	3.7	34.0

Source: *2013 Crescent Acres Traffic Study Stages 5, 6 and 7*

Table 4-3: West Hill Trip Generation

Planning Horizon	Land Use	Land Area (hectares)	Density (units / hectare)	# Units	AM Trip Rate			PM Trip Rate			Site Trips - AM			Site Trips - PM		
					In	Out	Total	In	Out	Total	In	Out	Total	In	Out	Total
5	Single Family (ITE 210 Single Unit Housing)	19	11.0	209	0.19	0.56	0.75	0.63	0.37	1.00	39	118	157	132	77	209
	Multi-Family (ITE Low-Rise Res. Condo/Townhouse)	5	34.0	170	0.17	0.50	0.67	0.45	0.33	0.78	28	85	114	77	56	133
	Sub Total										**68**	**203**	**271**	**209**	**133**	**342**
10	Single Family	10	11.0	110	0.19	0.56	0.75	0.63	0.37	1.00	21	62	83	69	41	110
20	Single Family	29	11.0	319	0.19	0.56	0.75	0.63	0.37	1.00	60	179	239	201	118	319
Total		**63**		**808**							**148**	**444**	**592**	**479**	**292**	**771**

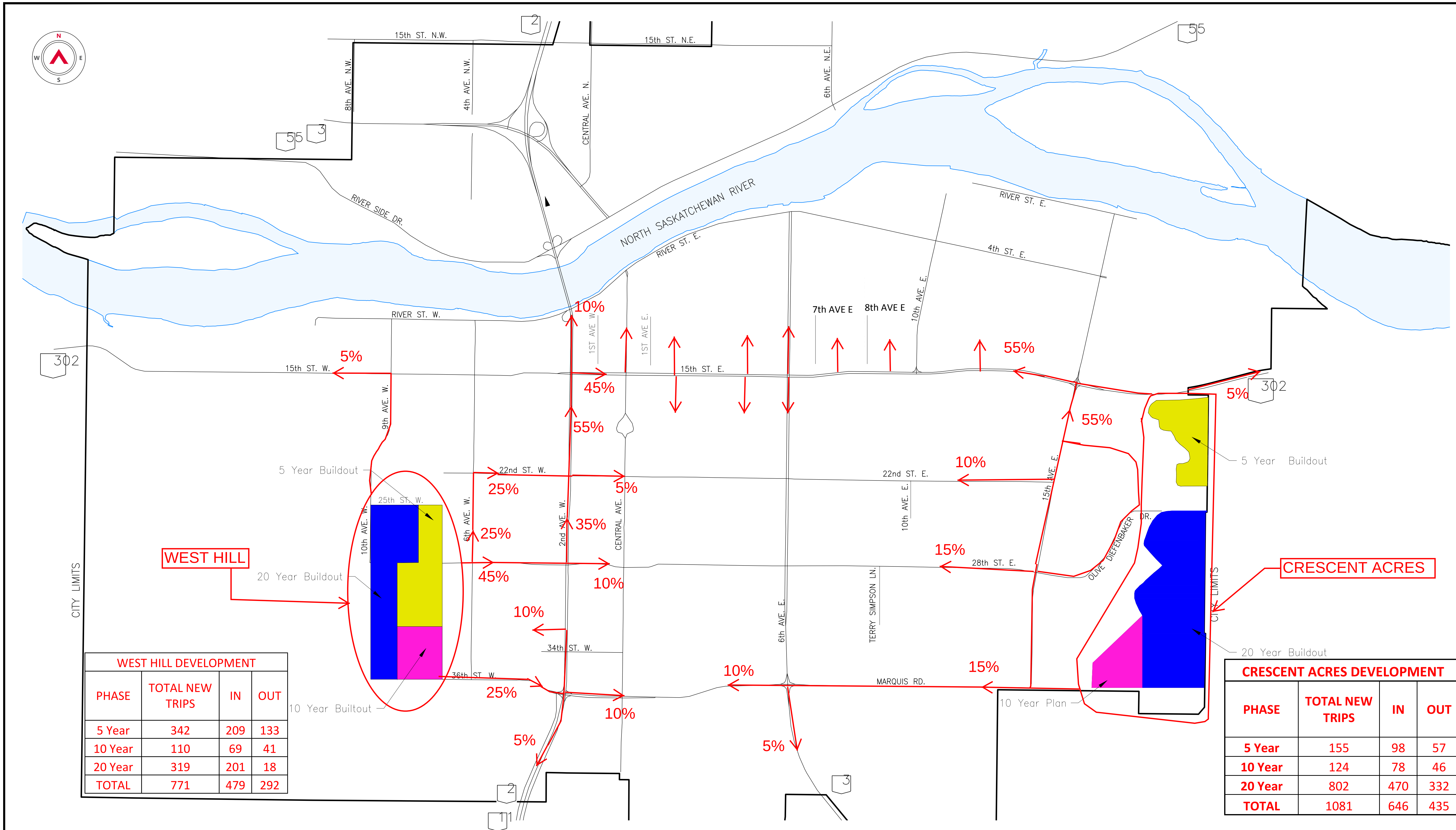
Table 4-4: Crescent Acres Trip Generation

Planning Horizon	Land Use	Land Area (hectares / sf)	Density (units / hectare)	# Units	AM Trip Rate			PM Trip Rate			Site Trips - AM			Site Trips - PM		
					In	Out	Total	In	Out	Total	In	Out	Total	In	Out	Total
5	Single Family (ITE 210 Single Unit Housing)			155	0.19	0.56	0.75	0.63	0.37	1.00	29	87	116	98	57	155
10	Single Family (ITE 210 Single Unit Housing)	-	-	124	0.19	0.56	0.75	0.63	0.37	1.00	23	70	93	78	46	124
20	Single Family			271	0.19	0.56	0.75	0.63	0.37	1.00	51	152	203	171	100	271
	Multi-Family (ITE Low-Rise Res. Condo/Townhouse)	1.5		245	0.17	0.50	0.67	0.45	0.33	0.78	41	123	164	111	80	191
	Apartment (ITE 220)			237	0.10	0.41	0.51	0.40	0.22	0.62	24	97	121	96	51	147
	Convenience Store (852 Convenience Market)	2152.78	-	1	15.51	15.51	31.02	16.94	17.63	34.57	33	33	67	36	38	74
	Hair Salon (918 Hair Salon)	2152.78	-	1	1.21	0.00	1.21	0.25	1.20	1.45	3	0	3	1	3	3
	Single Tenant Office (715)	2152.78	-	1	1.60	0.20	1.80	0.26	1.48	1.74	3	0	4	1	3	4
	Medical/Dental Office (720)	4305.56	-	2	1.89	0.50	2.39	1.00	2.57	3.57	8	2	10	4	11	15
	Pharmacy/Drugstore (880)	8611.12	-	2	1.91	1.03	2.94	4.12	4.28	8.40	16	9	25	35	37	72
	Drinking Place (925)	2152.78	-	1	0.00	0.00	0.00	7.48	3.86	11.34	0	0	0	16	8	24
	Sub Total	21527.8	-	8							**180**	**417**	**597**	**470**	**332**	**802**
Total		**43057.1**		**1048**							**232**	**574**	**806**	**646**	**435**	**1081**

4.2.4 Trip Distribution and Assignment

At full build out in 20 years, a total of 771 new trips will be generated by West Hill in the PM peak hour and another 1,081 trips will be generated by Crescent Acres. In order to determine the impacts of the newly generated traffic on the transportation system, the traffic must be distributed and assigned to the roadway system. The directions from which traffic will enter and exit the site can vary depending on many factors including: the size and type of the development, the location of major attractions such the downtown district, as entertainment districts and shopping areas. The trip assignments are based on existing traffic characteristics.

The new trips generated by the development were distributed and assigned to the transportation system based on the current City of Prince Albert attractions. For both West Hill and Crescent Acres the major attractions are to the north of the development so the majority of the trips will be destined to the north. Other attractions for West Hill are located to the east, so an appropriate percentage of trips were assigned to eastbound roadways. For Crescent Acres the other attractions are to the west of the development, so an appropriate percentage of trips were assigned to westbound roadways. **Figure 4-2** is a sample illustration of an iteration of the trip distribution used to assign trips to roadways. Several iterations were conducted to arrive at an acceptable percentage traffic distributions rates. The percentage distribution of traffic is illustrated in **Table 4-5** and **Table 4-6**.



WEST HILL DEVELOPMENT

PHASE	TOTAL NEW TRIPS	IN	OUT
5 Year	342	209	133
10 Year	110	69	41
20 Year	319	201	18
TOTAL	771	479	292

CRESCENT ACRES DEVELOPMENT

PHASE	TOTAL NEW TRIPS	IN	OUT
5 Year	155	98	57
10 Year	124	78	46
20 Year	802	470	332
TOTAL	1081	646	435

LEGEND

- 5 Year Buildout
- 10 Year Buildout
- 20 Year Buildout

CITY OF PRINCE ALBERT
TRANSPORTATION MASTER PLAN

FIGURE. 4-2

NEW TRIPS: GENERATION AND DISTRIBUTION

Date: 2017/01/10 | User: Ryan Wolfe | File: P:\SK\2015\0-99\15SK0016 - City of Prince Albert - Master Transportation Study\1000-Drawings\1011-Civil\01-Production\160310_SP_15SK0016-Transportation Master Plan | Layout: Fig. (18) | Paper Size: 558.8mm x 431.8mm

Table 4-5: West Hill Trip Distribution

Direction	5 Year		10 Year		20 Year	
	In	Out	In	Out	In	Out
Westbound on 15th Street W	5%	5%	5%	5%	5%	5%
Eastbound on 15th Street W	30%	30%	25%	25%	20%	20%
Eastbound on 15th St - N on 1st Ave W	5%	5%	5%	5%	5%	5%
Eastbound on 15th St - N on 1st Ave E	10%	10%	10%	10%	10%	10%
Northbound on 2nd Ave	10%	10%	10%	10%	10%	10%
Eastbound on 22nd Street	5%	5%	10%	10%	10%	10%
Eastbound on 28th Street	10%	10%	10%	10%	10%	10%
Eastbound on Marquis	10%	10%	10%	10%	10%	10%
Southbound on Marquis	5%	5%	5%	5%	10%	10%
2nd Ave Commercial	10%	10%	10%	10%	10%	10%
Northbound Destinations	**60%**	**60%**	**55%**	**55%**	**50%**	**50%**
Southbound Destinations	**40%**	**40%**	**45%**	**45%**	**50%**	**50%**
Total	**100%**	**100%**	**100%**	**100%**	**100%**	**100%**

Table 4-6: Crescent Acres Trip Distribution

Direction	5 Year		10 Year		20 Year	
	In	Out	In	Out	In	Out
Westbound on 15th Street E	20%	20%	15%	15%	15%	15%
Northbound on 6th Ave E	15%	15%	15%	15%	10%	10%
Northbound on 7th Ave E	10%	10%	10%	10%	10%	10%
Northbound on 9th Ave E	10%	10%	10%	10%	10%	10%
Eastbound on 15th Street E	5%	5%	5%	5%	5%	5%
Westbound on 22nd Street E	10%	10%	10%	10%	10%	10%
Westbound on 28th Street E	15%	15%	15%	15%	15%	15%
Westbound on Marquis Rd	10%	10%	10%	10%	15%	15%
Southbound on Marquis Rd	5%	5%	10%	10%	10%	10%
Northbound Destinations	**60%**	**60%**	**55%**	**55%**	**50%**	**50%**
Southbound Destinations	**40%**	**40%**	**45%**	**45%**	**50%**	**50%**
Total	**100%**	**100%**	**100%**	**100%**	**100%**	**100%**

4.2.5 Traffic Analysis Methodology

The following methodology was used to conduct the intersection and corridor analysis at each planning horizon:

- The existing (2016) traffic, both AADT's and intersection turning movements were increased using a growth rate of 0.8%. This represented background traffic at each planning horizon: 5 year, 10 year and 20 year;
- New trips generated by West Hill and Crescent Acres were added to the background traffic identified above, both AADTs and intersection turning movements. This represented the "analysis traffic" at each planning horizon;
- The analysis was carried out to determine the levels of service at intersections and on roadway corridors at each planning horizon. The analysis was conducted using the design criteria thresholds in **Table 4-7** in the next section;
- The failing intersections and roadway segments were identified;
- Mitigation measures at each planning horizon were identified;
- Recommendations were developed and prioritised; and
- The estimated costs of recommendations were prepared.

Intersection capacity analyses were conducted based on the afternoon PM peak turning movements using SYNCHRO software. Road segment capacity analyses were based on Highway Capacity Manual HCM2010. Section 3 of this technical memo illustrates the results of the analyses analysis for roadway corridors and Section 4 shows the results of intersections analyses.

4.2.6 Traffic Analysis Methodology

The capacity and operations analysis will be based on the design criteria summarized in **Table 4-7.** The design criterion in **Table 4-7** is consistent with the City of Prince Albert Design Standards, except for the minimum traffic signal cycle lengths. The City has used cycle lengths of less than 60 seconds at one or two intersections.

Table 4-7: Design Criteria Summary Table

Design Criteria	Value Used in the Study	Reference
1. Peak Hour Factor	0.92	HCM2010 and Synchro
2. Intersection Control Delays	LOS / Signalized Intersection / Un-signalized Intersection A ≤10 sec ≤10 sec B 10–20 sec 10–15 sec C 20–35 sec 15–25 sec D 35–55 sec 25–35 sec E 55–80 sec 35–50 sec F >80 sec >50 sec	HCM2010
3. Signalized Intersection Saturation Flow	1900 vph	HCM2010 and Synchro
4. Cycle Length	60-120 sec	HCM2010 and Synchro
5. Corridor AADT Capacities	Total Number of Lanes (Both Ways) / Capacity (Both Ways) 2 16,000 vpd 4 31,000 vpd 6 41,000 vpd	HCM2010
6. Corridor V/C Ratios	LOS V/C RATIO A <0.50 B 0.50 -0.60 C 0.6 – 0.80 D 0.80 – 1.0 E 1.0 – 1.2 F >1.2	HCM2010
7. Signal Spacing	400m	TAC
8. Signal Warrant	100 points	TAC

4.3 Major Roadway Segment Analysis

All arterial and collector road segments were analyzed at the 5 year, 10 year and 20 year planning horizons. The measure of effectiveness was the level of service (LOS) based on the Highway Capacity Manual (HCM) methods. The LOS on a roadway segment is a qualitative measure used to relate the quality of traffic service. It is used to analyze roadways by categorizing traffic flow and assigning quality levels of traffic progression. The LOS is represented by a letter grade as illustrated below:

A – Free flowing traffic
B –Reasonably free flow
C –Stable flow
D –Approaching unstable flow
E –Unstable flow
F –Forced or breakdown flow

Table 4-7, items 5 and 6 illustrates the relationship between volume/capacity ratio and the resulting LOS. The LOS of a roadway segment or corridor is mainly based on Annual Average Daily Traffic (AADT), operating speed and the total number of lanes. The analysis considers the number of lanes in both directions. The LOS was used to identify areas where volume exceeds available capacity which is an indication that the road segment needs to be upgraded. The V/C ratios and LOS for all segments of the arterial and collector roadways are presented below.

4.3.1 Volumes/Capacity Ratios and Levels of Services

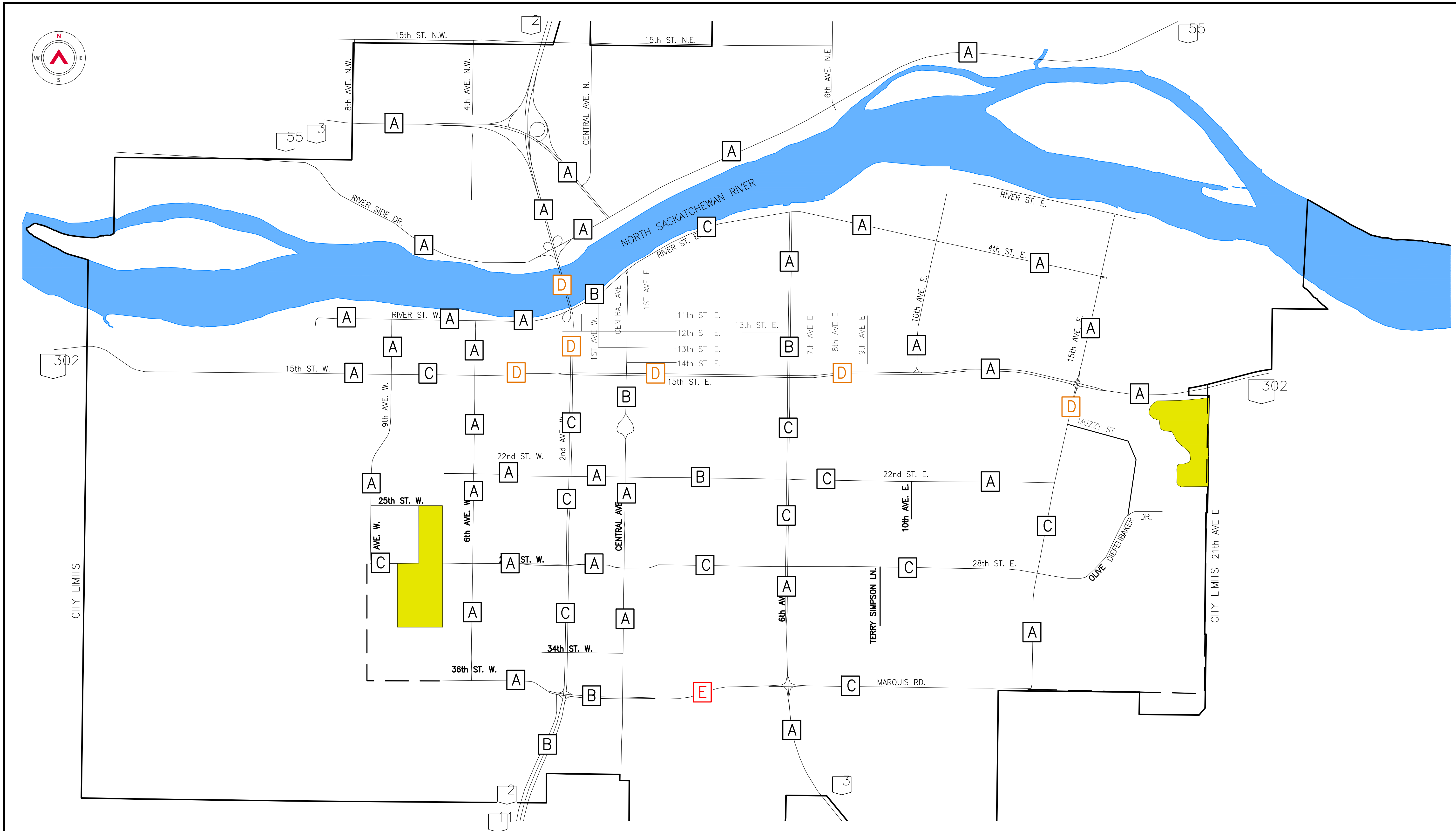
The roadway segment existing AADTs used in the analysis was supplied by the City of Prince Albert. The capacities and the V/C ratios in **Table 4-7** were used to determine the resulting LOS on each segment of the roadway. **Table 4-8** and **Table 4-9** illustrates the V/C ratios and LOS at each planning horizon: 5 year, 10 year and 20 year. The data is also illustrated in graphical format in **Figure 4-3, Figure 4-4** and **Figure 4-5**

Table 4-8: East-West AADT's, V/C Ratios and LOS at 5, 10 and 20 Year Planning Horizon

Roadway	Capacity (vpd)	2021 (5-Year Horizon)			2026 (10-Year Horizon)			2036 (20-Year Horizon)		
		AADT (vpd)	V/C Ratio	LOS	AADT (vpd)	V/C Ratio	LOS	AADT (vpd)	V/C Ratio	LOS
Marquis Road										
4th Ave W - 2nd Ave W	16000	5737	0.36	A	6212	0.39	A	7429	0.46	A
2nd Ave W - Central	31000	16394	0.53	B	17162	0.55	B	18858	0.61	C
Central – 4th Ave E	**16000**	**18113**	**1.13**	**E**	**19069**	**1.20**	**F**	**21701**	**1.36**	**F**
4th Ave E - 6 Ave E	31000	18113	0.58	B	19069	0.62	C	21701	0.7	C
6th Ave E - 15 Ave E	16000	9932	0.62	C	10516	0.66	C	12551	0.78	C
28th Street										
10 Ave W - 6 Ave W	16000	9921	0.62	C	10999	0.69	C	13878	0.87	D
6 Ave W -2 Ave W	31000	15463	0.5	A	16193	0.52	B	17810	0.57	B
2 Ave W - Central	31000	15350	0.5	A	16075	0.52	B	17682	0.57	B
Central - 6 Ave E	16000	11480	0.72	C	12127	0.76	C	14295	0.89	D
6 Ave E - 15 Ave E	16000	11555	0.72	C	12205	0.76	C	14379	0.9	D
22nd Street										
6 Ave W - 2 Ave W	16000	4168	0.26	A	4579	0.29	A	5661	0.35	A
2 Ave W - Central	16000	6659	0.42	A	6980	0.44	A	7697	0.48	A
Central - 6 Ave E	16000	8718	0.54	B	9124	0.57	B	10017	0.63	C
6 Ave E - 10 Ave E	16000	10896	0.68	C	11460	0.72	C	13183	0.82	D
10 Ave E - 15 Ave E	16000	3523	0.22	A	3785	0.24	A	4876	0.3	A
15th Street										
City Limits - 10 Ave W	16000	7622	0.48	A	7982	0.5	A	8782	0.55	B
10 Ave W- 6 Ave W	16000	10876	0.68	C	11370	0.71	C	12448	0.78	C
6 Ave W- 2 Ave W	16000	13362	0.84	D	13910	0.87	D	15056	0.94	D
2 Ave W- 6 Ave E	31000	26754	0.86	D	28282	0.91	D	31882	1.03	E
6 Ave E- 10 Ave E	31000	28864	0.93	D	30695	0.99	D	37509	1.21	F
10 Ave E- 15 Ave E	31000	13265	0.43	A	14456	0.47	A	19931	0.64	C
15 Ave E- City Limits	16000	3010	0.19	A	3780	0.24	A	8376	0.52	B
River Street										
16 Ave W- 10 Ave W	16000	2164	0.14	A	2253	0.14	A	2438	0.15	A
10 Ave W- 6 Ave W	16000	4327	0.27	A	4505	0.28	A	4876	0.3	A
6 Ave W- 2 Ave W	16000	5550	0.35	A	5778	0.36	A	6254	0.39	A
2 Ave W- Central	16000	8161	0.51	B	8496	0.53	B	9196	0.57	B
Central - 6 Ave E	16000	11283	0.71	C	11746	0.73	C	12714	0.79	C
6 Ave E- 10 Ave E	16000	5944	0.37	A	6187	0.39	A	6697	0.42	A
10 Ave E - 15 Ave E	16000	2930	0.18	A	3050	0.19	A	3301	0.21	A
Highway 55										
Hwy 3 - Bridge	16000	1757	0.11	A	1829	0.11	A	1980	0.12	A
Bridge - Hwy 3	16000	3322	0.21	A	3458	0.22	A	3743	0.23	A
Hwy 3 - 6 Ave NE	16000	5576	0.35	A	5805	0.36	A	6284	0.39	A
6 Ave NE - City Limits	16000	5717	0.36	A	5951	0.37	A	6442	0.4	A
Highway 3										
City Limits - Bridge	16000	7872	0.49	A	8194	0.51	B	8870	0.55	B
Bridge - Hwy 55	16000	1711	0.11	A	1781	0.11	A	1928	0.12	A

Table 4-9: North - South AADT's, V/C Ratios and LOS at 5, 10 and 20 Year Planning Horizon

Roadway	Capacity (vpd)	2021			2026			2036		
		AADTs (vpd)	V/C Ratio	LOS	AADTs (vpd)	V/C Ratio	LOS	AADTs (vpd)	V/C Ratio	LOS
10th Avenue W										
28 St W - 15 St W	16000	7134	0.45	A	7475	0.47	A	9774	0.61	C
15 St W- River St W	16000	1869	0.12	A	1946	0.12	A	2106	0.13	A
6th Avenue W		0								
32 St W- 28 St W	16000	4276	0.27	A	4451	0.28	A	4818	0.3	A
28 St W- 22 St W	16000	4938	0.31	A	5380	0.34	A	6528	0.41	A
22 St W- 15 St W	16000	4525	0.28	A	4711	0.29	A	5099	0.32	A
15 St W- River St W	16000	1536	0.1	A	1599	0.1	A	1730	0.11	A
2nd Avenue W		0								
City Limits - Marquis	31000	16581	0.53	B	17308	0.56	B	18876	0.61	C
Marquis - 28 St W	41000	25812	0.63	C	26966	0.66	C	29470	0.72	C
28 St W- 22 St W	41000	27787	0.68	C	29262	0.71	C	32660	0.8	C
22 St W- 15 St W	41000	28607	0.7	C	30308	0.74	C	34356	0.84	D
15 St W- Bridge	31000	26358	0.85	D	27535	0.89	D	30086	0.97	D
Bridge - Hwy 3	31000	25581	0.83	D	26726	0.86	D	29210	0.94	D
Hwy 3 - City Limits	31000	12615	0.41	A	13228	0.43	A	14600	0.47	A
Central Avenue		0								
Marquis - 28 St	16000	6590	0.41	A	6860	0.43	A	7425	0.46	A
28 St - 22 St	16000	5655	0.35	A	5887	0.37	A	6372	0.4	A
22 St - 15 St	16000	9282	0.58	B	9662	0.6	C	10458	0.65	C
6th Avenue E										
City Limits - Marquis	16000	5307	0.33	A	5584	0.35	A	6433	0.4	A
Marquis - 28 St E	31000	13806	0.45	A	14372	0.46	A	15556	0.5	B
28 St E- 22 St E	31000	22210	0.72	C	23121	0.75	C	25026	0.81	D
22 St E- 15 St E	31000	22739	0.73	C	23671	0.76	C	25622	0.83	D
15 St E- 13 St E	31000	16379	0.53	B	17050	0.55	B	18456	0.6	B
13 St E- River St E	31000	10546	0.34	A	10978	0.35	A	11883	0.38	A
10th Avenue E										
15th St E- River St E	16000	5668	0.35	A	5900	0.37	A	6386	0.4	A
15th Avenue E										
Marquis - 28 St E	16000	7674	0.48	A	7989	0.5	A	8648	0.54	B
28 St E- 22 St E	16000	10467	0.65	C	10896	0.68	C	11794	0.74	C
22 St E- 15 St E	16000	13278	0.83	D	14470	0.9	D	19947	1.25	F
15 St E- 4 St E	16000	6798	0.42	A	7076	0.44	A	7659	0.48	A



LEGEND

5 YEAR BUILDOUT

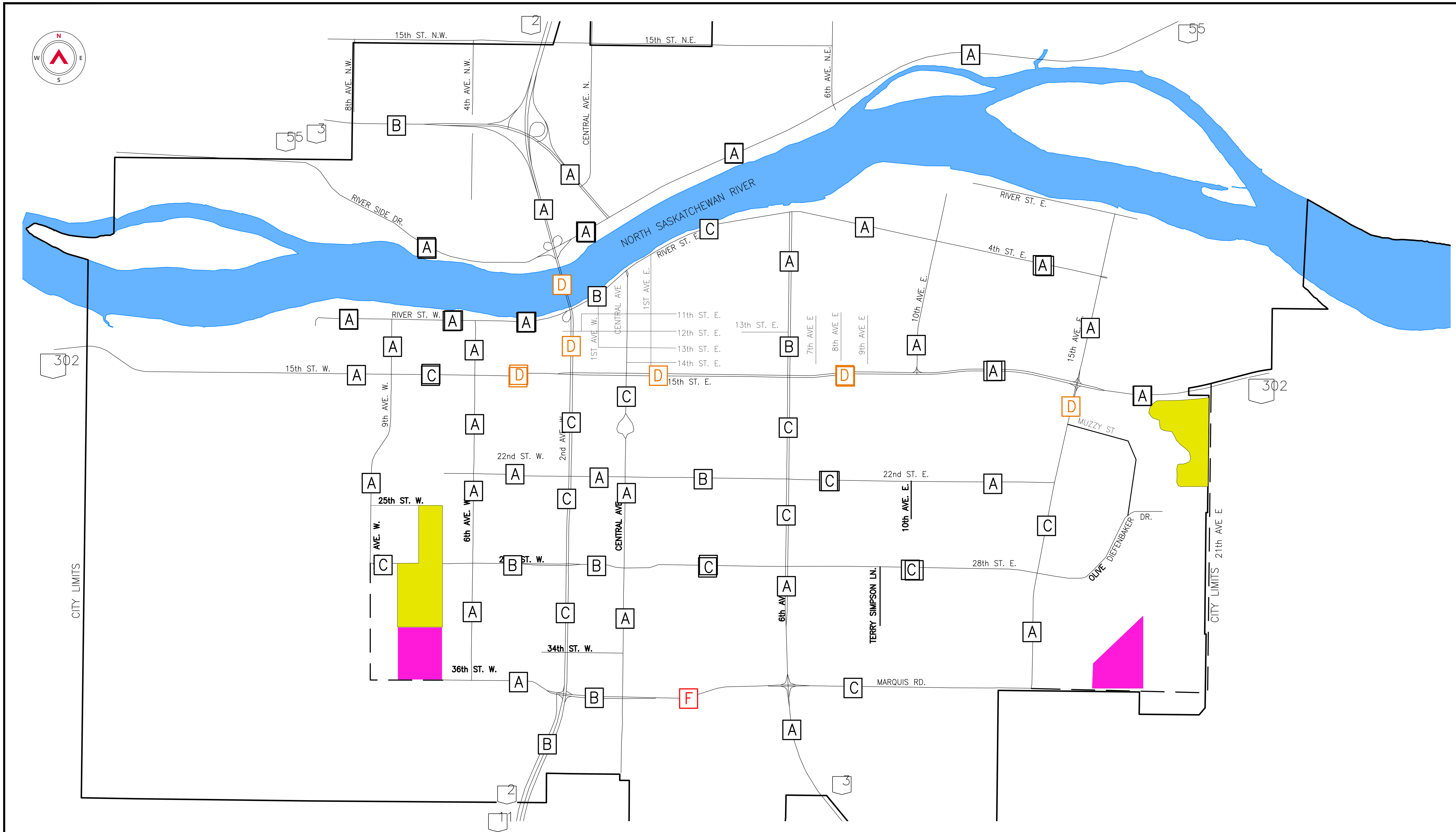
FUTURE ROAD

City of Prince Albert

Allnorth

CITY OF PRINCE ALBERT
TRANSPORTATION MASTER PLAN

FIGURE. 4-3
CORRIDOR LOS - 2021 (5 YEAR)



LEGEND

5 YEAR BUILDOUT

10 YEAR BUILDOUT

FUTURE ROAD

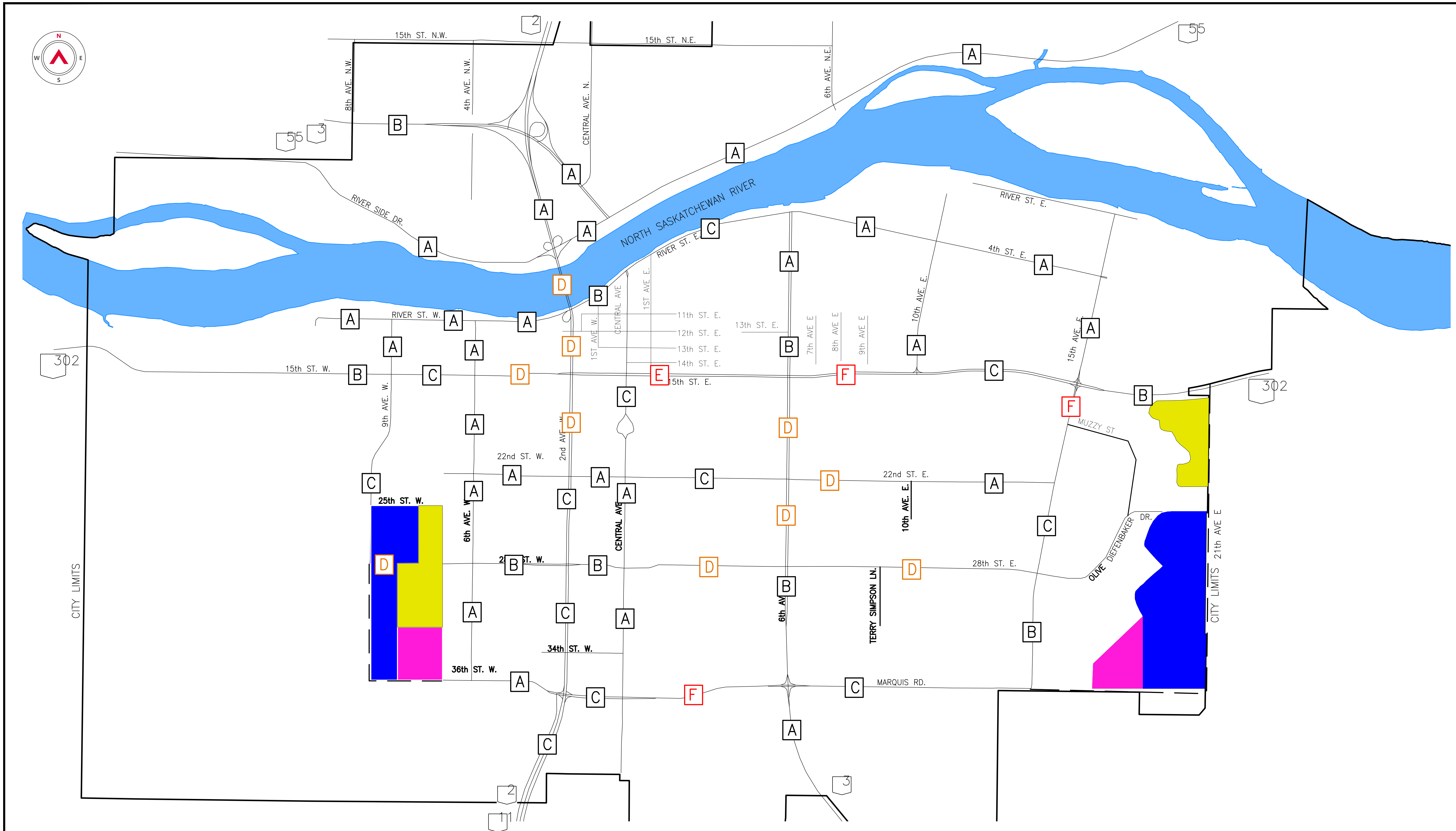
City of Prince Albert

Allnorth

CITY OF PRINCE ALBERT
TRANSPORTATION MASTER PLAN

FIGURE. 4-4
CORRIDOR LOS - 2026 (10 YEAR)

Date: 2017/03/29 | User: Tyler Dai | File: P:\SK\2015\0-99\15SK0016 - City of Prince Albert - Master Transportation Study\1000-Drawings\1011-Civil\01-Production\170206_TD_15SK0016-Transportation Master Plan | Layout: FIG 4-4 | Paper Size: 558.8mm x 431.8mm



LEGEND

5 YEAR BUILDOUT

10 YEAR BUILDOUT

20 YEAR BUILDOUT

FUTURE ROAD

City of Prince Albert

Allnorth

CITY OF PRINCE ALBERT
TRANSPORTATION MASTER PLAN

FIGURE. 4-5
CORRIDOR LOS - 2036 (20 YEAR)

4.3.2 Corridor Analysis Conclusions

The corridor analysis yielded the following conclusions:

- Marquis Road between Central Avenue and 4th Avenue E will operate at LOS E in 2021, LOS F in 2026 and LOS F in 2036 if that section of the road is not widened to 4 lanes in 2017. If it is widened as recommended the LOS will improve to LOS B and remain at an acceptable level of C up to 2036.

- 28th Street E operates at acceptable levels through the 10-year planning horizon. In 2036 there are some sections which will operated at LOS D which is still acceptable, however the City at that time should start planning for future improvements.

- Similarly, 22nd Street will operate at acceptable levels through the 10-year planning horizon. In 2036 there are some sections which will operated at LOS D which is still acceptable, however the City at that time should start planning for future improvements.

- 15th Street E will operate at a LOS of D for both the 5-year and 10-year planning horizons. This is still an acceptable LOS. By 2036 however, the segment of 15th Street E between 2nd Avenue W and 10th Street E will fail and operate at LOS E and F. The capacity of the road at that time will require an upgrade to six lanes.

- The segments of 2nd Avenue W between 15th Street E and the Diefenbaker Bridge will operate at an acceptable LOS D at planning horizons for 5-year through 20-year planning horizons. The City at that time should start planning for upgrades applicable beyond the 20-year planning horizon.

- 6th Avenue E will operate at acceptable LOS of C or better in the 5-year and 10-year planning horizons. At the 20-year planning horizon some segments will start to operate at a still acceptable LOS D. The City at that time should start planning for upgrades applicable beyond the 20-year planning horizon.

- 15th Avenue E between Muzzy Street and 15th Street E will operate at a LOS of D for both 5-year and 10-year planning horizons. This is still an acceptable LOS. By 2036 however, the segment of 15th Avenue E will fail and operate at LOS E and F. The capacity of the road at that time will require an upgrade to four lanes.

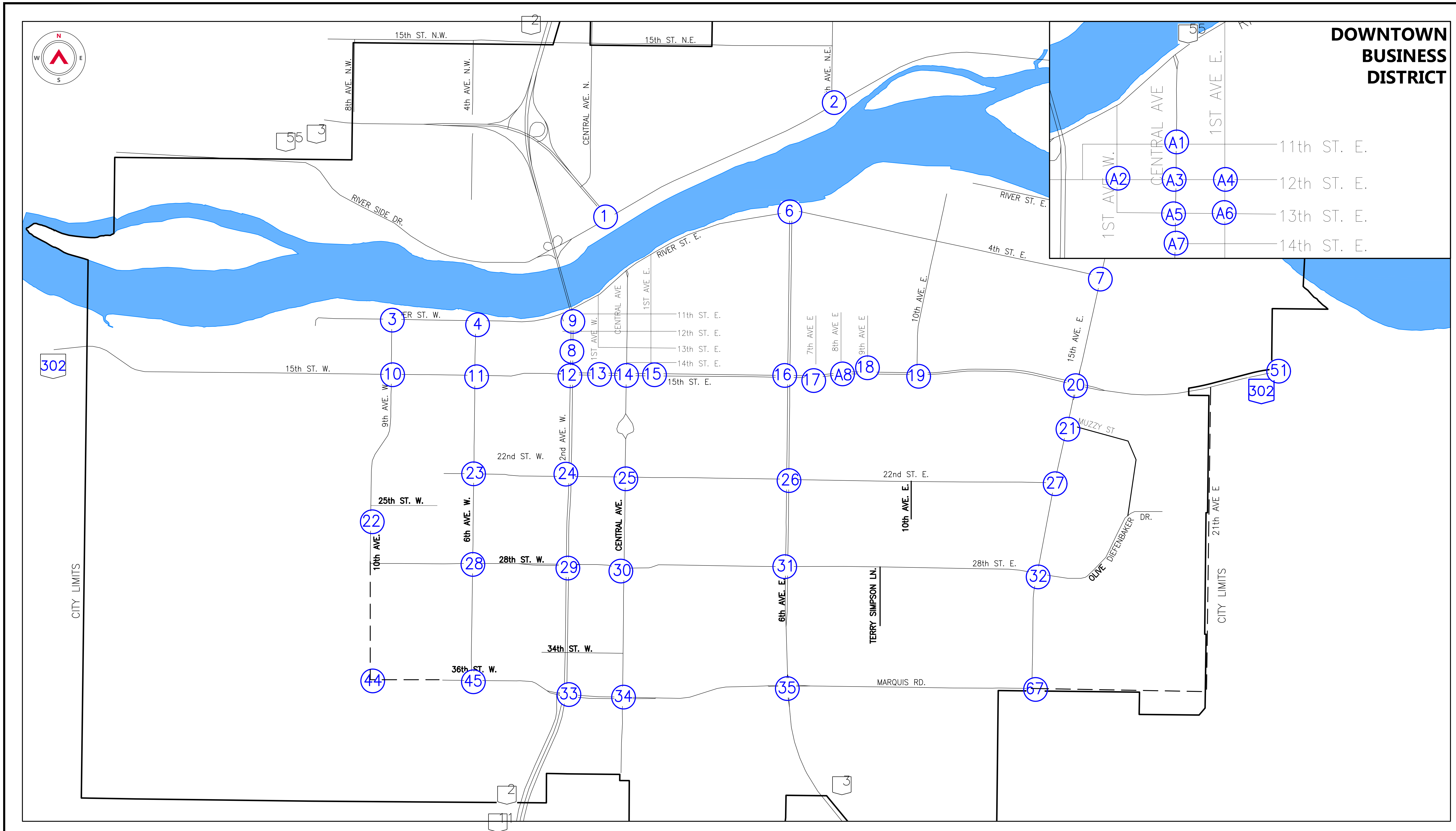
- If all immediate and 5-year recommendations are implemented, this would result in a decade where no major upgrades will be required.

4.4 Intersection Analysis

The traffic volume data was collected by the City of Prince Albert in September, 2016. The intersection analysis was based on PM peak volumes. The main measures of effectiveness at intersections are the control delay and queuing. Both of which are reflected by the volume/capacity ratio. A complete analysis was conducted at each intersection using Synchro Studio 9. Synchro software uses Highway Capacity Manual 2010 methods and parameters. SimTraffic, which is traffic micro simulation software, was used for more-detailed analysis of queuing and storage requirements at critical locations.

4.4.1 Traffic Signal Locations

The roadways within the study area contain signalized and un-signalized intersections. **Figure 4-6** illustrates all signalized intersections that were analyzed.



LEGEND

30 INTERSECTION NUMBER

FUTURE ROAD

City of Prince Albert

Allnorth

CITY OF PRINCE ALBERT
TRANSPORTATION MASTER PLAN

FIGURE. 4-6
INTERSECTIONS ANALYZED

Date: 2017/03/29 | User: Tyler Dai | File: P:\SK\2015\0-99\15SK0016 - City of Prince Albert - Master Transportation Study\1000-Drawings\1011-Civil\01-Production\170206_TD_15SK0016-Transportation Master Plan | Layout: FIG4-6 | Paper Size: 558.8mm x 431.8mm

4.4.2 Turning Movement Volumes

The City of Prince Albert collected turning movement counts used in the analysis. The counts were collected at the following locations are illustrated in **Section 3.4.2** of this report. However the City conducted supplemental counts on the downtown roadways. The new counts were at the following locations:

- Central Ave and 11th Street E
- Central Ave and 12th Street E
- Central Ave and 13th Street E
- Central Ave and 14th Street E
- 1st Ave W and 12th Street W
- 1st Ave E and 12th Street E
- 1st Ave E and 13th Street E
- 15th Street E and 8th Avenue E

Traffic count of Central Avenue intersection in downtown business district were conducted between the hours 7:00 AM and 10:00 AM. The analysis is conducted for PM/AM peak hour. The results of the analysis are presented in the next section of the report.

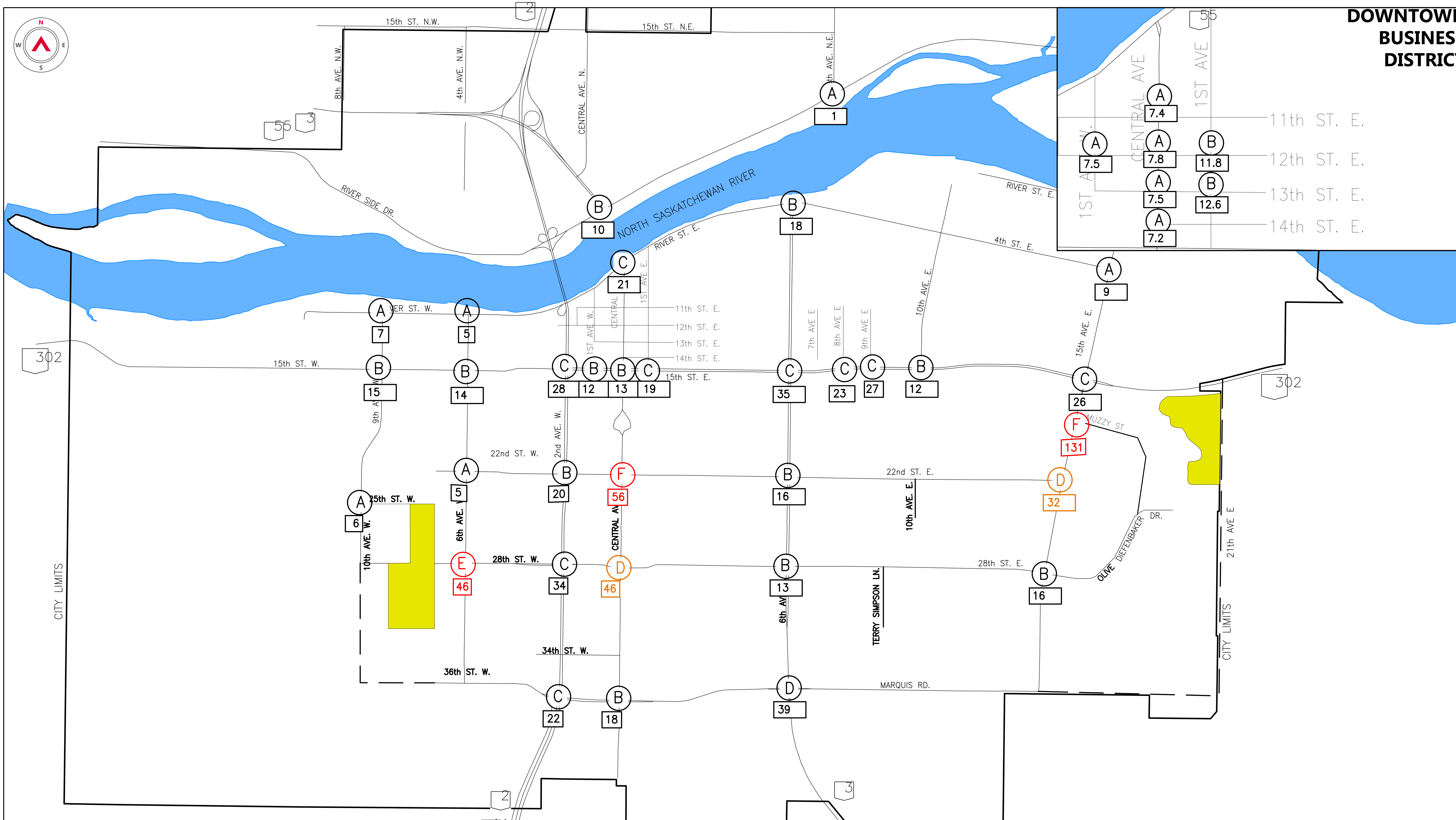
4.4.3 Intersection Level of Service

The overall performance of an intersection in an urban environment is measured by delays experienced by motorists. Synchro Studio version 9 software was used to determine intersection LOS and delays. Synchro software uses the Highway Capacity Manual (HCM) methodology for analyzing intersection performance. The 2021, 2026 and 2036 turning movements were used in the analysis, representing the 5 year, 10 year and 20 year planning horizons. The results of the analysis are illustrated in **Table 4-10.** The same results are illustrated graphically in **Figure 4-7, 4-8 and 4-9.**

Table 4-10: Overall Intersection LOS and Delays for 5, 10 and 20 Year Planning Horizons

ID	INTERSECTION	5 YEAR PLANNING HORIZON					10 YEAR PLANNING HORIZON			20 YEAR PLANNING HORIZON				
		V/C Ratio	LOS	DELAY (Sec)	MITIGATION MEASURES	LOS WITH MITIGATION	V/C Ratio	LOS	DELAY (Sec)	V/C Ratio	LOS	DELAY (Sec)	MITIGATION MEASURES	LOS WITH MITIGATION
1	Highway 3 & Highway 55 (Signalized)	0.38	B	10			0.39	B	11	0.42	B	11		
2	Highway 55 & 6 Ave NE (SB Stop)	0.16	A	1			0.17	B	11	0.18	A	1		
3	9 Ave W & River Street W (NB Stop)	0.11	A	7			0.11	A	7	0.12	A	7		
4	6 Ave W & River Street W (NB Stop)	0.17	A	5			0.18	A	5	0.20	A	5		
5	River Street W & River Street E & Central Ave (Signal)	0.94	C	21	Adjust the splits to 23 sec N, 52 sec E-W	B	0.85	B	15	0.91	B	18		
6	6 Ave E & River Street E & 4 Street E (Signal)	0.72	B	18			0.79	B	17	1.02	C	30		
7	15 Ave E & 4 Street E (EB / WB Stop)	0.39	A	9			0.41	A	9.5	0.46	B	10		
8	2 Ave W & 12 Street W (Signal)	0.50	A	9			0.52	A	7	0.57	A	6		
9	2 Ave W & 13 Street W (Ped Signal)	0.37	A	0			0.39	A	0	0.42	A	0		
10	9 Ave W & 15 Street W (Signal)	0.64	B	15			0.60	B	13	0.67	B	15		
11	6 Ave W & 15 Street W (Signal)	0.75	B	14			0.74	B	15	0.80	B	17		
12	2 Ave W & 15 Street W (Signal)	0.87	C	28			0.80	C	29	0.87	C	33		
13	1 Ave W & 15 Street W (Signal)	0.56	B	12			0.59	A	7	0.67	A	7		
14	Central Ave & 15 Street W / E (Signal)	0.93	B	13			0.76	B	18	0.85	C	21		
15	15 Street E & 1 Ave E (Signal)	0.54	B	19			0.62	B	10	0.69	B	11		
16	6 Ave E & 15 Street E (Signal)	0.92	C	35			0.87	C	31	**1.15**	**D**	**42**	**By removing the signals at 7th Avenue and 15th Street E it will allow this intersection to operate better will additional storage length**	C
17	7 Ave E & 15 Street E (Signal)	0.89	B	19	Traffic signals should be removed. By removing these signals it will allow the intersection of 6th Ave and 15th St to have additional storage lengths and improve operation		0.85	C	27	**0.93**	**D**	**43**	**Traffic signals should be removed from this location.**	A
18	9 Ave E & 15 Street E (Signal)	0.93	C	27			0.73	C	20	0.83	C	22		
19	10 Ave E & 15 Street E (Signal)	0.74	B	12			0.80	B	18	1.07	C	24		
20	15 Ave E & 15 Street E (Signal)	0.51	C	26	Change to 110 sec from the current 120 sec	B	0.70	B	19	0.78	C	22		
21	**15 Ave E & Muzzy Drive (Signal)**	**1.51**	**F**	**131**	**Change cycle length to 70 sec. Splits adjusted to 47 sec N-S, 23 sec E-W**	B	0.78	B	13	**1.30**	**F**	**87**	Intersection modifications to include turning lanes as illustrated in **Figure 11**	B
22	10 Ave W & 25 Street W (EB / WB Stop)	0.48	A	6			0.53	A	7	0.64	A	8		
23	6 Ave W & 22 Street W (Pedestrian Signal)	0.29	A	5			0.31	A	5	0.41	A	6		
24	2 Ave W & 22 Street W (Signal)	0.66	B	20			0.67	B	13	0.65	B	15		
25	**Central Ave & 22 Street W/E (4-way Stop)**	**1.0**	**F**	**56**	**Change from 4-way stop to a signal with 60 sec cycle length. Splits are 30 sec EB/WB, 30 sec NB/SB**	B	0.77	B	17	0.80	B	19		
26	6 Ave E & 22 Street E (Signal)	0.92	B	16			0.88	C	27	**1.06**	**D**	**38**	**Provide 50m of EBL storage if possible**	C
27	**15 Ave E & 22 Street E (EB / WB Stop)**	**1.23**	**D**	**32**	**Change from a 2-way stop control to a signal.**	B	0.68	B	14	0.82	C	21		

ID	INTERSECTION	5 YEAR PLANNING HORIZON					10 YEAR PLANNING HORIZON			20 YEAR PLANNING HORIZON				
		V/C Ratio	LOS	DELAY (Sec)	MITIGATION MEASURES	LOS WITH MITIGATION	V/C Ratio	LOS	DELAY (Sec)	V/C Ratio	LOS	DELAY (Sec)	MITIGATION MEASURES	LOS WITH MITIGATION
28	**6 Ave W & 28 Street W (4-way Stop)**	**1.1**	**E**	**46**	**Change from a 4-way stop to a signal with 60s cycle length. Splits are 35 sec NB/SB, 25 sec EB/WB**	B	0.72	B	15	0.87	B	20		
29	2 Ave & 28 Street W (Signal)	1.04	C	34			0.92	C	34	**1.07**	**D**	**46**	**Intersection is at capacity. Unlikely that new lanes can be added. As noted earlier, there is sufficient capacity at the EBL at 22nd St W & 2nd Ave W for the overflow traffic.**	**D**
30	**Central Ave & 28 Street W/E (Signal)**	**1.15**	**D**	**46**	Change to 60 sec cycle length, and adjust splits to 26 sec N-S, 34 sec E-W	B	0.81	B	19	0.85	C	21		
31	6 Ave E & 28 Street E (Signal)	0.68	B	13			0.73	B	13	0.86	B	17		
32	15 Ave E & 28 Street E/Olive Diefenbaker (Signal)	0.77	B	16			0.82	B	18	1.24	E	56	**Intersection modifications to include turning lanes as illustrated in Fig 12**	B
33	2 Ave W & Marquis Road (Signal)	0.79	C	22			0.82	C	23	0.82	C	25		
34	Central Ave & Marquis Road (Signal)	0.98	B	18			0.74	B	13	0.88	B	16		
35	**6 Ave E & Marquis Road (Signal)**	**1.23**	**D**	**39**	Increase cycle length to 100s. Adjust splits to 10s SBL, 24s NBT, 9s WBL, 57s EBT, 34s SBT, 31s EBL, 35s WBT	C	0.73	C	21	0.86	C	28		
41	16th Ave W & 15th St W (Signal)						0.63	B	14	0.69	B	15		
42	16th Ave W & 28th St W (WB Stop)						0.02	A	14	0.02	A	2		
43	10th Ave W & 28th St W (Signal)						0.41	A	9	0.45	A	10		
44	Marquis Rd & 10th Ave W (SB Stop)						0.02	A	2	0.02	A	2		
45	Marquis Rd & 6th Ave W						0.09	A	4	0.10	A	3		
51	Marquis Rd & 15th St E (NB/SB Stop)						0.06	A	2	0.09	A	3		
53	Marquis Rd & Byars St (EB Stop)						0.01	A	2	0.03	A	1		
67	Marquis Drive & 15 Ave E (SB Stop)						0.24	A	8	0.32	A	7		
A1	Central Ave& 11th St	0.16	A	7.4			0.16	A	7.4	0.18	A	7.4		
A2	1st Ave W& 12th St W	0.53	A	7.5			0.55	A	7.7	0.58	A	7.9		
A3	Central Ave& 12th St	0.24	A	7.8			0.25	A	7.8	0.26	A	7.9		
A4	1st Ave E & 12th St E	0.5	B	11.8			0.51	B	12.3	0.54	B	13.6		
A5	Central Ave & 13th St	0.24	A	7.5			0.24	A	7.6	0.25	A	7.6		
A6	1st Ave E & 13th St E	0.77	B	12.6			0.79	A	13.6	0.85	A	15.2		
A7	Central Ave & 14th St	0.17	A	7.2			0.18	B	7.2	0.18	B	7.3		
A8	8th Ave E & 15th St E	0.72	C	23			0.74	C	27	0.77	D	40		



LEGEND

5 YEAR BUILDOUT

FUTURE ROAD

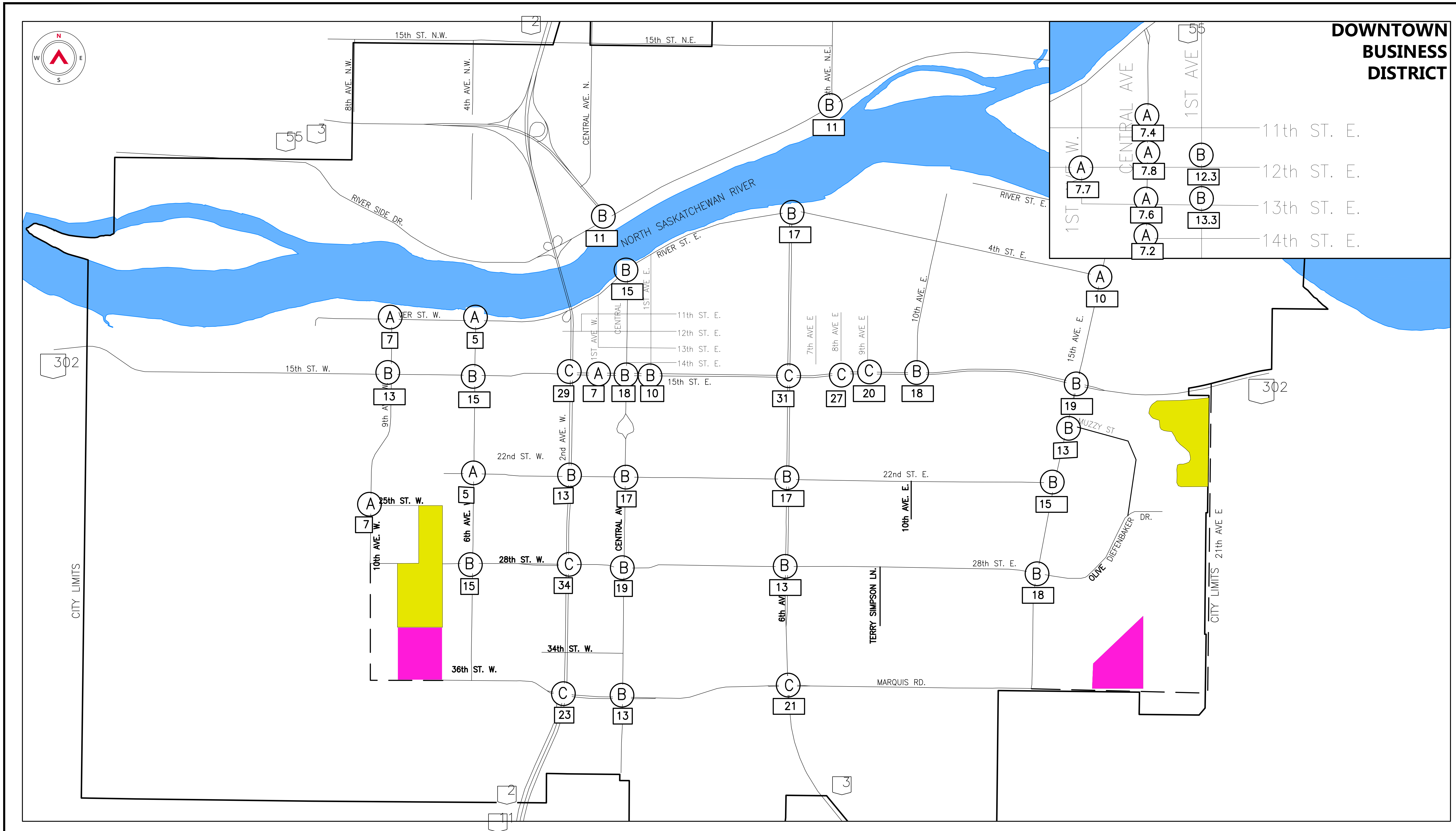
(A) LOS

[5] DELAY (SECONDS)

CITY OF PRINCE ALBERT
TRANSPORTATION MASTER PLAN

FIGURE. 4-7
2021 (5 YEAR) PEAK HOUR
INTERSECTION LOS AND DELAYS

Date: 2017/03/29 | User: Tyler Dai | File: P:\SK\2015\0-99\15SK0016 - City of Prince Albert - Master Transportation Study\1000-Drawings\1011-Civil\01-Production\170206_TD_15SK0016-Transportation Master Plan | Layout: FIG 4-7 | Paper Size: 558.8mm x 431.8mm



LEGEND

5 YEAR BUILDOUT

10 YEAR BUILDOUT

FUTURE ROAD

A LOS

5 DELAY (SECONDS)

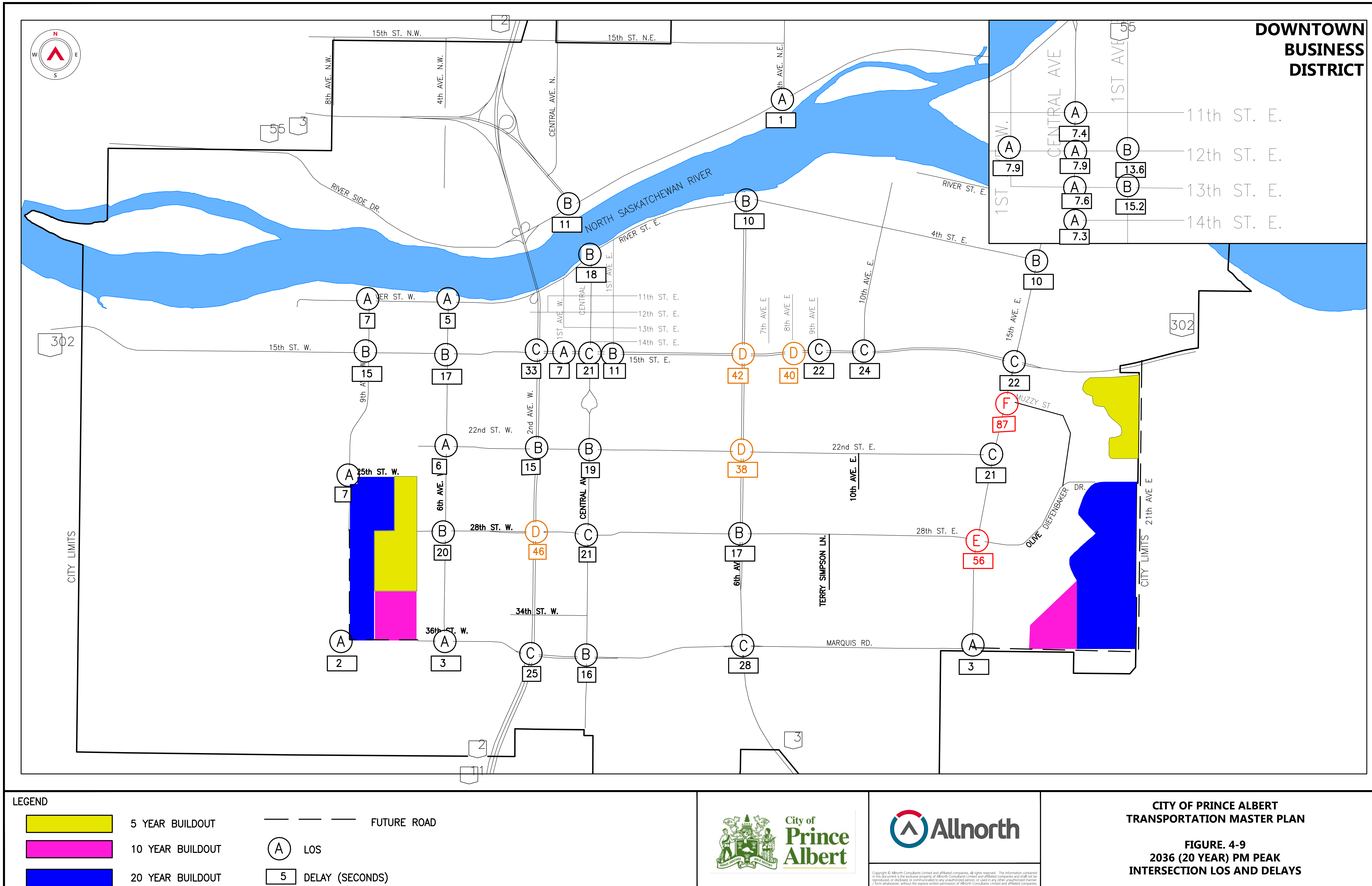
City of Prince Albert

Allnorth

CITY OF PRINCE ALBERT
TRANSPORTATION MASTER PLAN

FIGURE. 4-8
2026 (10 YEAR) PEAK HOUR
INTERSECTION LOS AND DELAYS

Date: 2017/03/29 | User: Tyler Dai | File: P:\SK\2015\0-99\15SK0016 - City of Prince Albert - Master Transportation Study\1000-Drawings\1011-Civil\01-Production\170206_TD_15SK0016-Transportation Master Plan | Layout: FIG 4-8 | Paper Size: 558.8mm x 431.8mm



CITY OF PRINCE ALBERT TRANSPORTATION MASTER PLAN

FIGURE. 4-9
2036 (20 YEAR) PM PEAK INTERSECTION LOS AND DELAYS

Date: 2017/03/29 | User: Tyler Dai | File: P:\SK\2015\0-99\15SK0016 - City of Prince Albert - Master Transportation Study\1000-Drawings\1011-Civil\02-Sketches\170203_SP_15SK0016-Intersection Improvement-Functional Plans | Layout: 15th and Muzzy | Paper Size: 279.4mm x 431.8mm

REV	YY/MM/DD	DESCRIPTION	DRWN	APVD
-	-	-	-	-

CLIENT: City of Prince Albert

Allnorth

TITLE:
15th STREET EAST AND MUZZY DRIVE INTERSECTION IMPROVEMENTS

CLIENT NO:	-	DRWN:	-	DATE:	-
PROJECT NO:	-	DSGN:	-	DATE:	-
DRAWING SIZE:	ANSI "A"	CHKD:	-	DATE:	-
SCALE:	AS NOTED	APVD:	-	DATE:	-

PROJECT:
CITY OF PRINCE ALBERT TRANSPORTATION MASTER PLAN

DWG NO: **FIGURE. 4-10**
REV: **-**

Date: 2017/03/29 | User: Tyler Dai | File: P:\SK\2015\0-99\15SK0016 - City of Prince Albert - Master Transportation Study\1000-Drawings\1011-Civil\02-Sketches\170203_SP_15SK0016-Intersection Improvement-Functional Plans | Layout: 15th and Olive | Paper Size: 279.4mm x 431.8mm

REV	YY/MM/DD	DESCRIPTION	DRWN	APVD
-	-	-	-	-

CLIENT: City of Prince Albert

Allnorth

TITLE: **15th STREET EAST AND OLIVE DIEFENBAKER DRIVE INTERSECTION IMPROVEMENTS**

CLIENT NO:	-	DRWN:	-	DATE:	-
PROJECT NO:	-	DSGN:	-	DATE:	-
DRAWING SIZE:	ANSI "A"	CHKD:	-	DATE:	-
SCALE:	AS NOTED	APVD:	-	DATE:	-

PROJECT: **CITY OF PRINCE ALBERT TRANSPORTATION MASTER PLAN**

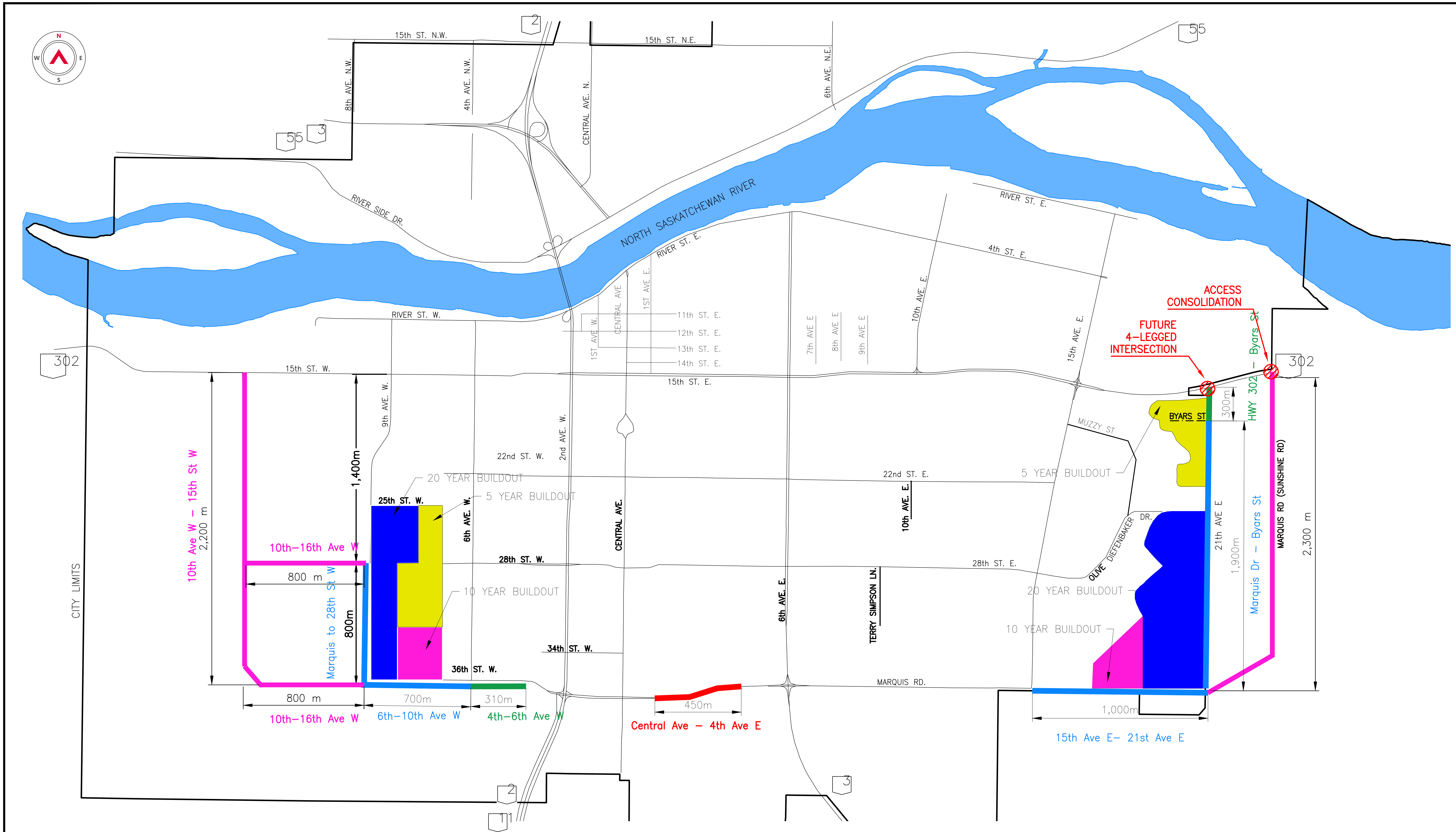
DWG NO: **FIGURE. 4-11** REV: -

4.4.4 21st Avenue E

21st Avenue E refers to a north-south roadway on the eastern edge of the City limits as illustrated in **Figure 4-12**. Currently this roadway does not have an official name. The roadway name of 21st Avenue E is only a working name for the purpose of the study. This roadway will be required prior to the Marquis Road extension and will run parallel to the future Marquis Road. An orderly phasing of 21st Avenue E has been developed to match the planning horizons considered in this study. It is important to note that a northerly section of 21st Avenue E between Highway 302 and Byars Street will be required at an early stage than the rest of 21st Avenue E. This segment will provide an additional access for the northern part of the Crescent Acres at a 5-year planning horizon. The intersection of 21st Avenue and Highway No. 302 should be a properly designed four-legged intersection with turning lanes to improve safety.

4.4.5 Marquis Road Phasing

Marquis Road is an arterial roadway which will play a major role in the orderly future development of both West Hill and Crescent Acres as it is extended to Highway No 302. There may be need for access consolidation in order to connect Marquis Road to Highway No. 302. The phasing of Marquis Road between Bradbury Drive and Highway No. 302 is beyond the 20-year planning horizon covered by this study. **Figure 4-12** illustrates the recommended phasing of Marquis Road.



LEGEND

IMMEDIATE 2017
SHORT TERM 5 YEARS
MEDIUM TERM 10 YEARS
BEYOND 20 YEARS

City of Prince Albert

Allnorth

CITY OF PRINCE ALBERT
TRANSPORTATION MASTER PLAN

FIGURE. 4-12
MARQUIS ROAD EXTENSION IMPLEMENTATION PHASING

4.4.6 Roadway Classification

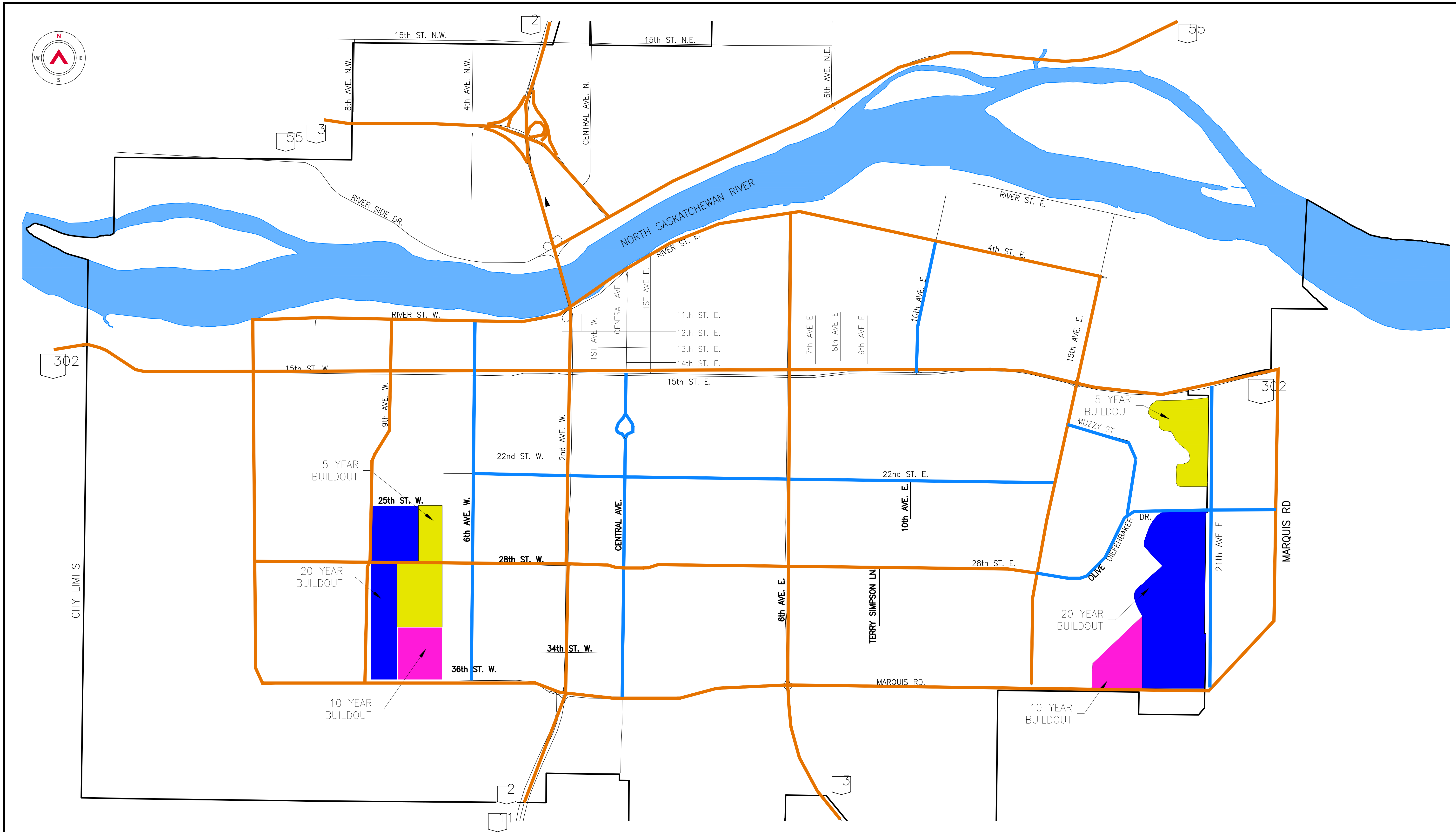
The classification of each existing and proposed roadway was reviewed for consistency and functionality. Based on the current function it is recommended that the roadways currently classified as arterials and collectors be maintained. There are two roadways that need to be changed to a different classification; Olive Diefenbaker Drive and Muzzy Drive. It is recommended that the classification of the two roadways be changed to a "collector" from its current "local" classification. Generally three conditions have to be met in order for a classification to be changed from local to collector. These conditions are:

- The function of the roadway has changed from being primarily used for accessing the land to a combination of accessing the land and providing mobility or traffic movement;
- The daily traffic volumes have increased to 3,000 vehicles per day or more; and,
- The roadway is being used as regular transit route.

Both Muzzy Drive and Olive Diefenbaker Drive meet these conditions. In addition, once Olive Diefenbaker Drive is connected to Marquis Road it will operate as a collector roadway even if it is not designated as such. **Table 4-11** illustrates the rest of the classification system for Olive Diefenbaker Drive and the rest of the new roadways. The proposed roadway classifications are illustrated in **Figure 4-13.**

Table 4-11: Roadway Classification System

Roadway	From	To	Current	Proposed Classification
Olive Diefenbaker Dr	15th Ave E	Marquis Road	Local	Collector
Muzzy Drive	15th Ave E	Olive Diefenbaker Dr	Local	Collector
21st Avenue E	Bradbury Dr E	Hwy 302	n/a	Collector
Marquis Rd	4th Ave W	16th Ave W	N/A	Arterial
16th Ave W	Marquis Rd	15th St W	n/a	Arterial
28th St W	10th Ave W	16th Ave W	n/a	Arterial
10th St W	Marquis Rd		n/a	Arterial



LEGEND

COLLECTOR

ARTERIAL

City of Prince Albert

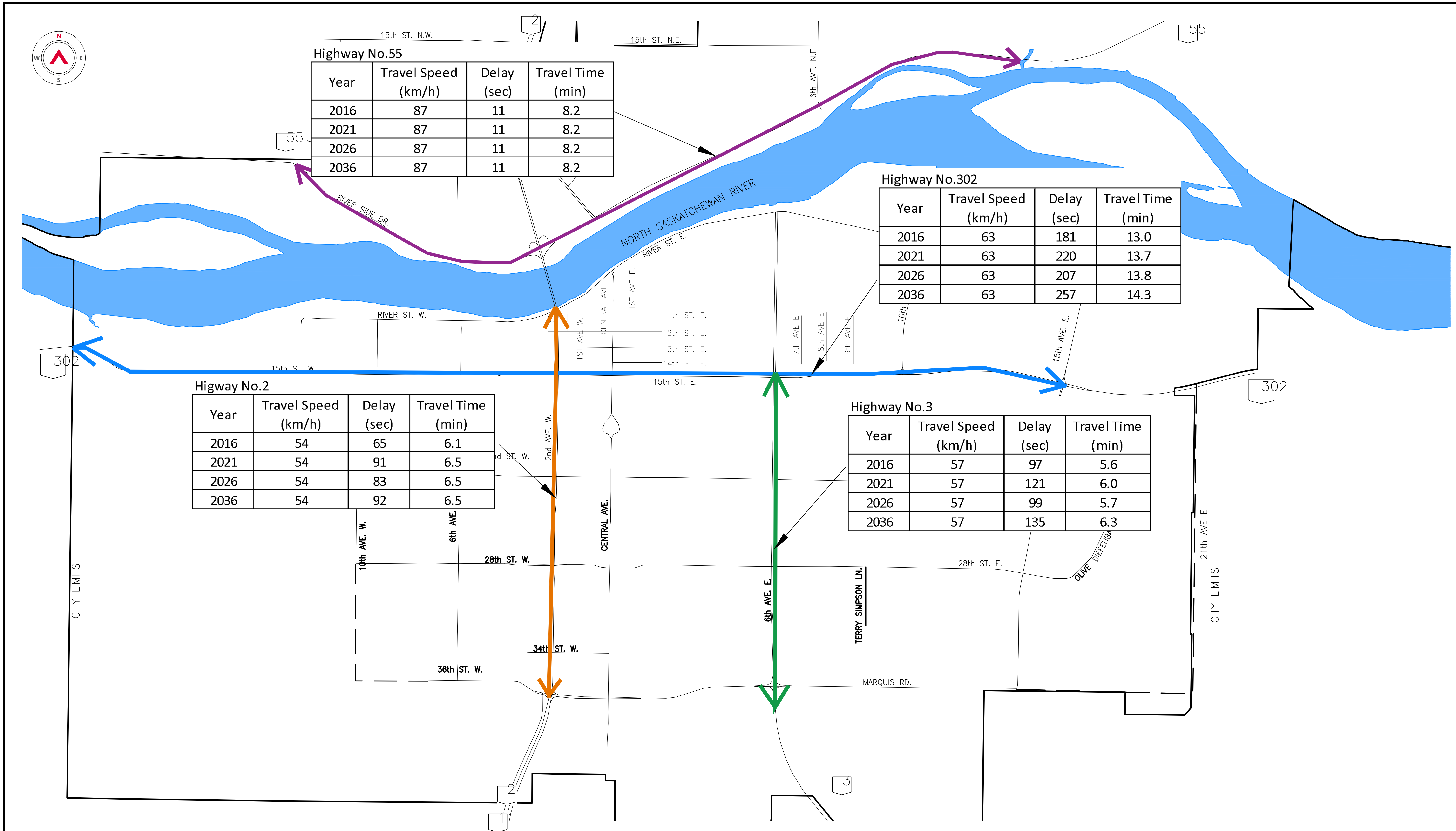
Allnorth

CITY OF PRINCE ALBERT
TRANSPORTATION MASTER PLAN

FIGURE. 4-13
ROADWAY CLASSIFICATION

4.4.7 UHCP Roadway Travel Times

The travel times on the UHCP roadways will be affected by the growth at each planning horizon. **Figure 4-14** illustrates the travel times on the UHCP roads with all mitigation measure. The travel times are based on the average 85th percentile speeds. The proposed mitigation measures have been effective in keeping the travel times within acceptable limits. There will be a small, manageable change in travel times between 2016 and 2036.



Highway No.55

Year	Travel Speed (km/h)	Delay (sec)	Travel Time (min)
2016	87	11	8.2
2021	87	11	8.2
2026	87	11	8.2
2036	87	11	8.2

Highway No.302

Year	Travel Speed (km/h)	Delay (sec)	Travel Time (min)
2016	63	181	13.0
2021	63	220	13.7
2026	63	207	13.8
2036	63	257	14.3

Higway No.2

Year	Travel Speed (km/h)	Delay (sec)	Travel Time (min)
2016	54	65	6.1
2021	54	91	6.5
2026	54	83	6.5
2036	54	92	6.5

Highway No.3

Year	Travel Speed (km/h)	Delay (sec)	Travel Time (min)
2016	57	97	5.6
2021	57	121	6.0
2026	57	99	5.7
2036	57	135	6.3

LEGEND

— — — FUTURE ROAD

CITY OF PRINCE ALBERT
TRANSPORTATION MASTER PLAN

FIGURE. 4-14
TRAVEL TIMES ON URBAN CONNECTOR HIGHWAYS

Date: 2017/03/29 | User: Tyler Dai | File: P:\SK\2015\0-99\15SK0016 - City of Prince Albert - Master Transportation Study\1000-Drawings\1011-Civil\01-Production\170206_TD_15SK0016-Transportation Master Plan | Layout: FIG 4-14 | Paper Size: 558.8mm x 431.8mm

4.4.8 Intersection Analysis Conclusions and Recommendations

Intersection Analysis Conclusions and Recommendations

The intersection analysis yielded the following conclusions:

- There is a need to improve spacing between traffic signals needs to be improved especially on major corridors such as 15th Street E which carries a large amount of traffic. For instance the separation between the signals at 6th Avenue E and the ones at 7th Avenue E is 167m. Based on the acceptable practice the signals should be spaced at least 400 m apart. Although the signals at 7th Avenue meet the warrant for installation, they do impact the flow of traffic upstream and downstream of the intersection. If the signals at 7th Avenue were removed it would allow the signals at 6th Avenue E to operate smoothly. First the westbound left turn storage lane would lengthen and allow more vehicles to be stored. Second with the additional storage, the need for a dual left would be reduced. Dual left lanes by nature are inefficient and it is always better to lengthen the storage and move the left turn vehicles through a single lane. For this reason it is recommended that the signals at 7th Avenue be removed, close the opening and allow only right-in and right-out movements at 7th Avenue. In order to maintain available access capacity to business in this area it is also recommended to install new traffic signals at 15th Street E and 8th Avenue E. The intersection at 8th Avenue will provide improved spacing between the 6th Avenue E signals and the proposed signals at 8th Avenue E and 15th Street E.

- The intersection of 15th Avenue E & Muzzy St will operate at LOS F under current timing plans. A revised plan which increases the cycle time to 70 seconds would improve the LOS to B. The intersection would operate at that LOS for the next 10 years. At the 20-year planning horizon the intersection would fail. This time it would require physical intersection modifications which would add turning lanes. Figure 11 is an illustration of the modifications.

- Central Ave & 22nd Street W/E is currently controlled by a 4-way stop will fail at the 5-year planning horizon with a LOS of F. A traffic signal warrant calculation shows that traffic signals are warranted using 2016 traffic volumes. It is recommended that new traffic signals be installed at this location. With traffic signals installed this intersection would operate at LOS B right through the 20-year planning horizon.

- 15th Avenue E & 22nd Street E is currently controlled by 2-way stop will operate at a LOS D in the 5-year planning horizon. A traffic signal warrant calculation shows that traffic signals are warranted using 2021 traffic volumes. It is recommended that new traffic signals be installed at this location. With traffic signals in place this intersection would operate at LOS B/C right through the 20-year planning horizon.

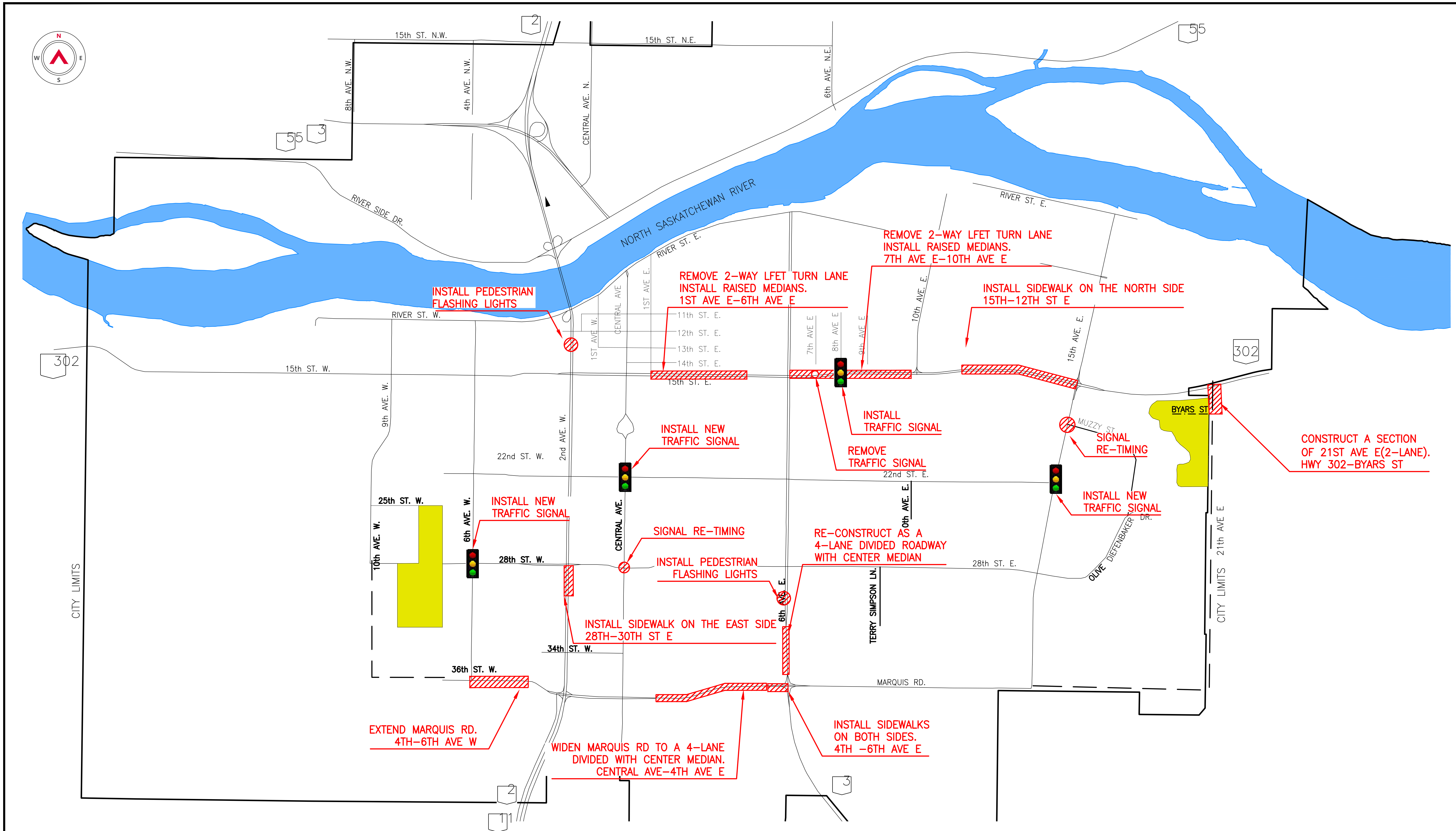
- 6th Avenue W & 28th Street W is currently controlled by a 4-way stop will fail at the 5-year planning horizon with a LOS of F. A traffic signal warrant calculation shows that traffic signals are warranted using 2021 traffic volumes. It is recommended that new traffic signals be installed at this location. With traffic signals in place this intersection would operate at LOS B right through the 20-year planning horizon.

- Central Avenue & 28th Street W/E only required signal retiming. With new timing plans this intersection would operate at LOS B/C right through the 20-year planning horizon.
- 15th Avenue E & 28th Street E/Olive Diefenbaker will operate at acceptable LOS in the 5-year and 10-year planning horizons. At 20-year however, the intersection will fail with a LOS of F. At time it would require physical intersection modifications which would add turning lanes. Figure 12 is an illustration of the modifications.
- 6th Avenue E & Marquis Road only required signal retiming. With new timing plans this intersection would operate at LOS C right through the 20-year planning horizon.
- The City of Prince Albert should prepare Access Control/Management Guidelines in order to assess access on arterial and collector roadways in a systematic manner.

- It is recommended that MHI conduct a separate operational study to address heavy vehicle movements using Highway No 55 (east) and connecting to Highway No. 2 (southbound). The study should model the traffic and develop options for accommodating the Highway No. 55 to Highway No. 2 loop/ramp.

- If all immediate and 5-year recommendations are implemented, this would result in a decade where no major upgrades will be required.

The recommended improvements at 5-year, 10-year and 20-year planning horizons are illustrated in **Figures 4-15 to 4-17.**



LEGEND

5 YEAR BUILDOUT

SHORT-TERM IMPROVEMENTS (0-5 YEARS)

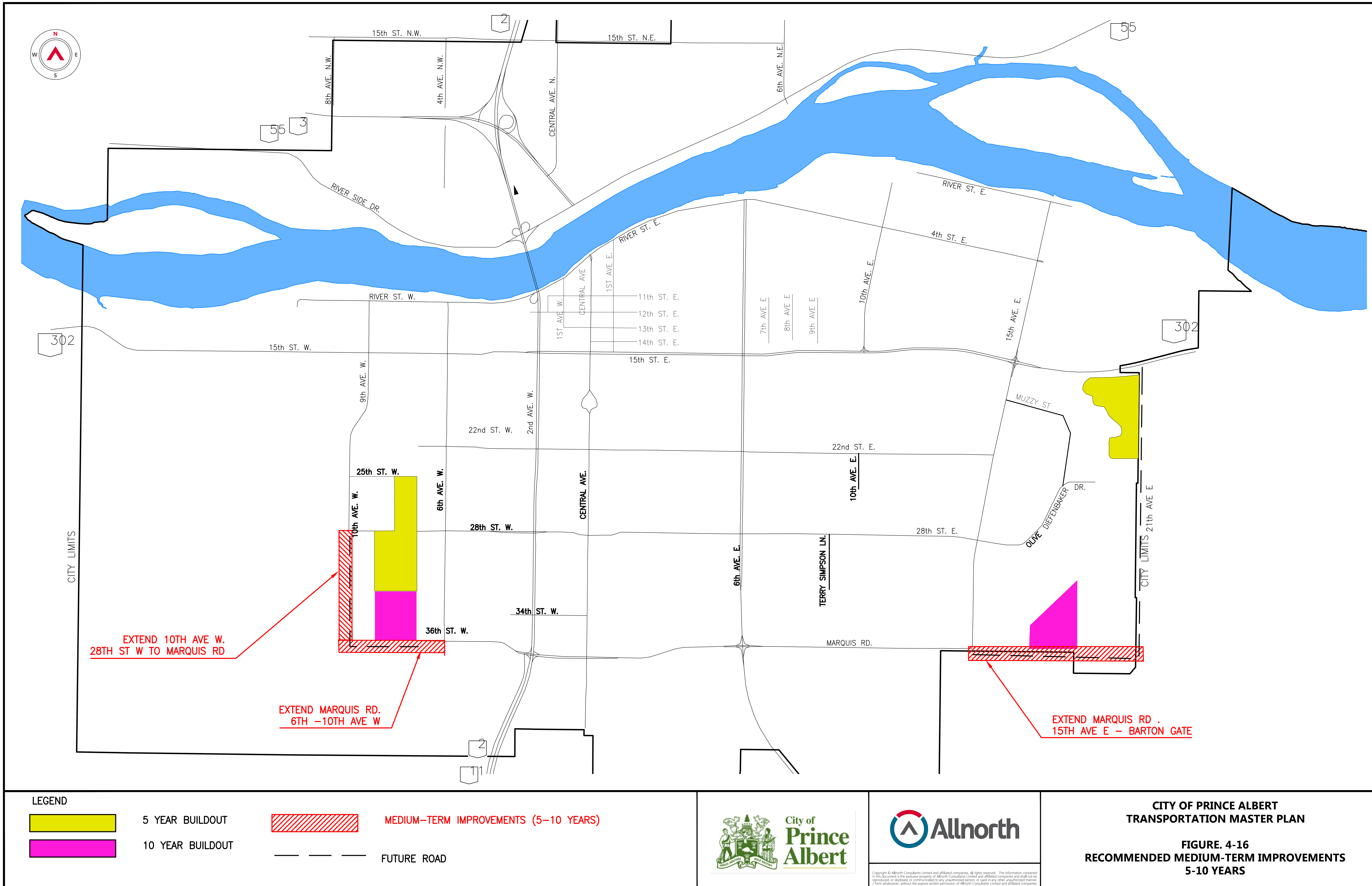
NEW TRAFFIC SIGNAL

FUTURE ROAD

CITY OF PRINCE ALBERT
TRANSPORTATION MASTER PLAN

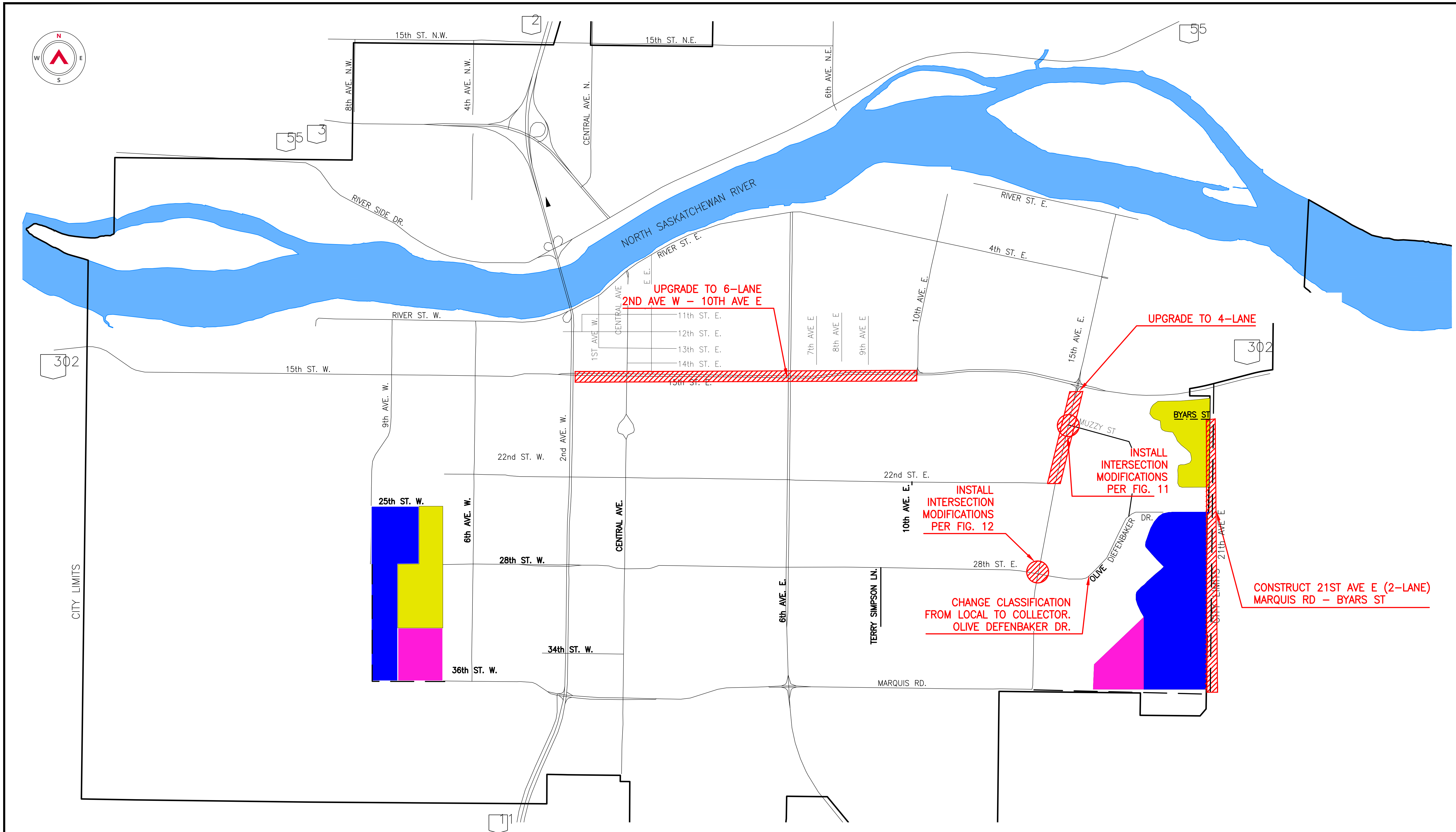
FIGURE. 4-15
RECOMMENDED SHORT-TERM IMPROVEMENTS
0-5 YEARS

Date: 2017/03/29 | User: Tyler Dai | File: P:\SK\2015\0-99\15SK0016 - City of Prince Albert - Master Transportation Study\1000-Drawings\1011-Civil\01-Production\170206_TD_15SK0016-Transportation Master Plan | Layout: FIG 4-15 | Paper Size: 558.8mm x 431.8mm



CITY OF PRINCE ALBERT
TRANSPORTATION MASTER PLAN

FIGURE. 4-16
RECOMMENDED MEDIUM-TERM IMPROVEMENTS
5-10 YEARS



LEGEND

(yellow)	5 YEAR BUILDOUT	(red hatch)	LONG-TERM IMPROVEMENTS (10-20 YEARS)
(magenta)	10 YEAR BUILDOUT	— — —	FUTURE ROAD
(blue)	20 YEAR BUILDOUT		

City of Prince Albert

Allnorth

CITY OF PRINCE ALBERT
TRANSPORTATION MASTER PLAN

FIGURE. 4-17
RECOMMENDED LONG-TERM IMPROVEMENTS
10-20 YEARS

Date: 2017/03/29 | User: Tyler Dai | File: P:\SK\2015\0-99\15SK0016 - City of Prince Albert - Master Transportation Study\1000-Drawings\1011-Civil\01-Production\170206_TD_15SK0016-Transportation Master Plan | Layout: FIG 4-17 | Paper Size: 558.8mm x 431.8mm

4.4.9 Prioritized List of Improvements

The recommended improvements at each planning horizon were prioritized based on when the improvement was required. The cost estimate details are in **Appendix C.** The prioritized list for short-term, medium-term and long-term needs are presented in tables below.

Table 4-12: Short-Term Improvements (0-5 Years) Prioritized List

Priority #	Improvement	Why it is Recommended	Estimated Cost
1	**Marquis Rd** -Widen Marquis Rd to 4 lanes between Central Ave and 4th Avenue E. Install sidewalks as part of the widening.	• Increase capacity to improve the failing level of service (LOS) of E. • Lane continuity, the road is 4-lanes west of Central Ave and 4 lanes east of 4th Street. • This is a bus route with bus stops but without continuous sidewalks.	$900,000
2	**Marquis Rd** -Install sidewalks between 4th Avenue and 6 Avenue E. This work can be done as part of the Marquis Rd widening above.	• This is a bus route, with bus stops but without sidewalks. • The pedestrian desire line is evident by the foot path created by pedestrians.	$63,000
3	**Central Ave & 22nd Street E** –Install new traffic signal at this intersection	• Improve traffic flow, increase intersection capacity and improve safety • The intersection is operating at LOS D which will deteriorate to LOS F in five years • Traffic signals are warranted	$180,000
4	**2nd Avenue W** –Install sidewalk on the east side between 28th Street and 30th Street	• This is a bus route, with bus stops but without continuous sidewalks. • The pedestrian desire line is evident by the foot path created by pedestrians.	$39,900
5	**15th Street E & 7th Avenue E** – Remove and salvage traffic signal at 7th Avenue E and extend the storage length for the westbound left turn lane at 15th Street E and 6th Avenue E. Re-design the intersection to allow right-in right-out movements only.	• The spacing between traffic signals is less than minimum standards • Its removal will improve traffic flow at the intersection of 6th Avenue E and 15th Street E. There will be additional storage length for westbound left turn traffic, which is significant	$10,000
6	**15th Street E & 8th Avenue E-** Install salvaged traffic signals	• Replace access capacity lost by removing signals at 7th Avenue E	$90,000
7	**15th Street E** –Install sidewalk on the north side between 12th Avenue E and 15 Avenue E	• There is a side walk on both the east side of 15th Street and on the west side of 12th Street. This will allow the sidewalk to connect the two existing sidewalks and provide sidewalk continuity. • The pedestrian desire line is evident by the foot path created by pedestrians	$126,000

Priority #	Improvement	Why it is Recommended	Estimated Cost
8	**15th Street E** – Remove two-way left turn lanes and install a raised medians. The segments affected are from 1st Avenue E and 5th Avenue E and from 7th Avenue E to 10th Avenue E.	• The two-way left turn is redundant, it does not serve any lands • Improve traffic flow and safety • Roadway consistence –15th Street E is a divided 4-lane roadway both on the east side and west side of this location.	$977,400
9	**6th Avenue E** –Install a raised median and widen roadway, between Marquis Road and a point 100m south of Southwood Drive	• Improve traffic flow and safety • Roadway consistence –6th Avenue E is a divided 4-lane roadway north of this location.	$480,000
	6th Avenue E near Carlton High School –install new pedestrian flashing lights on a trial basis	• Improve safety	$40,000
11	**2nd Avenue W & 13th Street W –**install new pedestrian flashing lights on a trial basis	• Improve safety	$10,000
11	**6th Avenue W & 28th Street W** –Install new traffic signals at this intersection	• Improve traffic flow, increase intersection capacity and improve safety • The LOS will deteriorate to LOS E in five years • Traffic signals are warranted	$180,000
12	**15th Ave E & 22nd Street E -**Install new traffic signals at this intersection.	• Improve traffic flow, increase intersection capacity and improve safety • The LOS will deteriorate to LOS F in five years due to the Crescent Acres development • Traffic signals are warranted at that planning horizon	$180,000
13	**Marquis Rd** –Extend Marquis Rd from 4th Ave W to 6th Avenue W	• Increase capacity to accommodate the West Hill development • Lane continuity, the road is 4- lanes east of 2nd Avenue W. • Serves as a bus route.	$620,000
14	**21st Avenue E** –Construct a new segment of 21st Avenue from Highway 302 to Byars Street E	• Provide an additional entry into the Crescent Acres 15th Street E/Hwy 302 • The traffic associated with Crescent Acres overloads 15th Avenue E between Muzzy Street and 15th Street E. The LOS deteriorates to D in five years and to F in 20 years if no additional access is provided • The intersection of 15th Avenue E and Muzzy Street is overloaded with Crescent Acres traffic, which lowers its LOS to LOS F	$680,000

Priority #	Improvement	Why it is Recommended	Estimated Cost
15	**City Wide –** Prepare access control guidelines	• To systematically review development access requests	$15,000
16	**Highway No.2 Interchange –** Conduct an operational study	• To improve safety • To improve traffic flow	$25,000
		TOTAL	**$4,616,300**

Table 4-13: Medium-Term Improvements (5-10 Years) Prioritized List

Priority #	Improvement	Why it is Recommended	Estimated Cost
1	**Marquis Rd** -Extend Marquis Rd from 15 Avenue E to Bradbury Drive.	• Increase capacity in order to accommodate Crescent Acres development and future developments.	$2,720,000
2	**Marquis Rd** -Extend Marquis Rd from 6th Avenue W to 10th Avenue W.	• Increase capacity in order to accommodate West Hill development and future developments	$1,156,000
3	**10th Avenue W** – Extend 10th Avenue from 28th Street W to Marquis Rd	• Increase capacity in order to accommodate West Hill development and future developments	$1,360,000
		TOTAL	**$5,236,000**

Table 4-14: Long-Term Improvements (10-20 Years) Prioritized List

Deficiency	Improvement	Why it is Recommended	Estimated Cost
1	**15th Street E** -Widen to 6 lanes between 10th Avenue E and 2nd Ave W	· The demand will exceed available capacity · Improve capacity due to traffic growth the LOS of this segment would deteriorate to LOS F/E · Improve traffic flow and safety · The widening will add capacity and improve the LOS which will allow traffic to operate efficiently	$7,000,000
2	**15th Avenue E & Muzzy Drive** –Intersection improvements to include turning lanes.	· The intersection will be overloaded, the LOS will deteriorate to LOS F · Improve traffic flow and minimize delays · Accommodate traffic associated with Crescent Acres development	$150,000
3	**15th Avenue E & Olive Diefenbaker Dr –** Intersection improvements to include turning lanes.	· The intersection will be overloaded, the LOS will deteriorate to LOS E · Improve traffic flow and minimize delays · Accommodate traffic associated with Crescent Acres development	$150,000
4	**21st Avenue E** –Extend 21st Avenue E from Bradbury Dr to Byars Street	· Increase capacity in order to accommodate Crescent Acres development and future developments.	$2,890,000
Sub-Total for the 20 Year Long-Term Planning Horizon			**$10,190,000**
6	**Marquis Rd*** –Extend Marquis Rd from 10th Ave W to 16th Avenue W	· Increase capacity in order to accommodate West Hill development and future developments	$1,360,000
7	**Marquis Rd*** –Extend Marquis Rd from 21st Avenue E to Highway 302 E	· Increase capacity in order to accommodate Crescent Acres development and future developments	$3,400,000
8	**16th Avenue W*** – Construct 16th Avenue from Marquis Rd to 15th Street W	· Increase capacity in order to accommodate West Hill development and future developments	$3,570,000
9	**28th Street W*** –Extend 28th Street W from 10th Avenue W to 16th Avenue W	· Increase capacity in order to accommodate West Hill development and future developments	$1,360,000
Sub-Total for Projects Beyond 20 Year Planning Horizon			**$19,880,000**

*Beyond 20 year planning horizon

5 CORPORATE AUTHORIZATION

This document was prepared by Allnorth for the exclusive use of the City of Prince Albert and its authorized agents. The material in it reflects Allnorth's best judgment in light of the information available at the time of preparation in March 2017. Should new information come to light, or should project assumptions change, conclusions and recommendations will be affected. Any use which a third party makes of this report, or reliance on or decisions made based on it, are the responsibilities of such third parties. Allnorth accepts no responsibility for damages, if any, suffered by any third party as a result of decisions made or actions based on this report.

Report Prepared By,

Allnorth

PROFESSIONAL ENGINEER
P. NYIRONGO
MEMBER
17 03 30
YR. MN DAY
SASKATCHEWAN

Paul Nyirongo, M.Eng, P.Eng.

Senior Transportation Engineer

Report Reviewed By,

Allnorth

Terry Gee, P.Eng,

Transportation Lead, Prairie Region

6 REFERENCE MATERIAL

- Trafficware. *Synchro Studio 9, Synchro plus SimTraffic and 3D Viewer*. 2010. Available at http://www.trafficware.com/synchro-store.html
- McTrans Moving Technology. *Highway Capacity Software*. 2010. Available at http://mctrans.ce.ufl.edu/hcs/.
- Transportation Association of Canada (TAC). *Geometric Design Guide for Canadian Roads Part 2*. 1999. Ottawa (ON): TAC.
- Transportation Association of Canada (TAC). *Illumination of Isolated Rural Intersections*. 2001. Ottawa (ON): TAC.
- Transportation Research Board (TRB). *HCM2010 Highway Capacity Manual*. 2010. Washington (DC): TRB.
- 1977 City of Prince Albert Transportation Study
- 1980 City of Prince Albert New 6th Ave East River Crossing Study
- 2003 City of Prince Albert New 6th Ave East River Crossing Study Update
- 2008 City of Prince Albert Transit System Review & Design Report
- 2008 Prince Albert Transportation Planning Study
- 2010 City of Prince Albert Bridge Inspection, Testing and Assessments Reports
- 2012 City of Prince Albert Corridor Traffic Report
- 2012 City of Prince Albert West Hill Master Plan
- 2013 City of Prince Albert Crescent Acres Land Study
- 2013 City of Prince Albert Second Bridge River Crossing Study
- 2015 City of Prince Albert Bridge Inspection, Testing and Assessment Reports

Appendix A Photo Album

East-West Roadways Statistical Summary

Roadway Name	Location	Photo Looking East
Marquis Rd	Between 2nd Ave W and Central Ave (2013 photo)	
	Between Central Ave and 5th Ave E (2013 photo)	
	Between 6th Ave E and 15th Ave E (2013 photo)	

Roadway Name	Location	Photo Looking East
28th St	Between 10th Ave W and 6th Ave W (2013 photo)	
	Between 4th Ave W and 2nd Ave W (2013 photo)	
	Between 6th Ave E and 15th Ave E (2013 photo)	

Roadway Name	Location	Photo Looking East
22nd St	Between 4th Ave W and 2nd Ave W (2013 photo)	
	Between 6th Ave E and 15th Ave E (2013 photo)	
15th St	Between 9th Ave W and 6th Ave W (2013 photo)	

Roadway Name	Location	Photo Looking East
	Between 2nd Ave W and Central Ave (2013 photo)	
	Between 6th Ave E and 10th Ave E (2013 photo)	
	Between 10th Ave E and 15th Ave E (2013 photo)	

Roadway Name	Location	Photo Looking East
River St	Between 9th Ave W and 6th Ave W (2013 photo)	
	Between 2nd Ave W and Central Ave	
	Between 6th Ave E and 10th Ave E	

Roadway Name	Location	Photo Looking East
Riverside Dr	Between 4th Ave NW and 2nd Ave NW	
	Between Highway 3 and 6th Ave NE	
Highway 3	Between 8th Ave NW and 5th Ave NW	

Roadway Name	Location	Photo Looking East
	Between Interchange and Highway 55	

Notes: All photos were taken in 2013.

North-South Roadways Statistical Summary

Roadway Name	Location	Photo Looking North
10^{th} Ave W/9^{th} Ave W	Between 28^{th} St and 15^{th} St W	
	Between 15^{th} St and River St W	
6^{th} Avenue W	Between 36^{th} St and 28^{th} St W	

Roadway Name	Location	Photo Looking North
	Between 28th St and 15th St W	
	Between 15th St W and River St W	
4th Avenue W	Between Marquis Rd and 28th St W	

Roadway Name	Location	Photo Looking North
	Between 28th St W and 15th St W	
	Between 15th St W and River St W	
2nd Avenue W	Between Marquis Rd and 28th St W	

Roadway Name	Location	Photo Looking North
	Between 28th St W and 15th St W	
	Between 15th St W and Riverside Dr	
	Between Riverside Dr and North City Limits	

Roadway Name	Location	Photo Looking North
Central Avenue	Between Marquis Rd and 28th St	
	Between 28th St and 15th St	
	Between 15th St and River St	

Roadway Name	Location	Photo Looking North
Central Ave N	Between Highway 3 and N. Industrial Dr.	
	Between N. Industrial Dr. and 15 St NE	
6th Avenue E	Between Marquis Rd and Southwood Dr	

Roadway Name	Location	Photo Looking North
	Between Southwood Dr and 28th St E	
	Between 28th St E and 15th St E	
	Between 15th St E and River St E	

Roadway Name	Location	Photo Looking North
10^{th} Ave E	Between 15^{th} St E and 7^{th} St E	
	Between 7^{th} St E and River St E	
15^{th} Avenue E	Between Marquis Rd and 28^{th} St E	

Roadway Name	Location	Photo Looking North
	Between 28th St E and 15th St E	
	Between 15th St E and River St E	

Notes: All photos were taken in 2013.

Appendix B Warrants Calculation

Intersection in Downtown Area

City of Prince Albert - Traffic Signal & Pedestrian Signal Head Warrant Analysis

Main Street (name)	**1st Ave E**	**Direction (EW or NS)**	**NS**	**Road Authority:**	**City of Prince Albert**
Side Street (name)	**12th St W**	**Direction (EW or NS)**	**EW**	**City:**	**City of Prince Albert**
Quadrant / Int #	**1**	**Comments**	**Enter Comments about the analysis here.**	**Analysis Date:**	**2017 Feb 27, Mon**
for Warrant Calculation Results, please hit 'Page Down'	**CHECK SHEET**			**Count Date:**	**2017 Feb 16, Thu**
				Date Entry Format:	(yyyy-mm-dd)

Lane Configuration		Excl LT	Th & LT	Through	Th+RT+LT	Th & RT	Excl RT	RT Channelization (y/n)	UpStream Signal (m)	# of Thru Lanes	LT Phase Type	RTOR Allowed (y/n)	Actuated Thru Phase
1st Ave E	NB				1			n	100	1			
1st Ave E	SB				1			n	500	1			
12th St W	WB				1			n	100	1			
12th St W	EB				1			n	5,000	1			

	Saturation Flow Rates (if not default) (vphpl)	**Default Saturation Flow Rates (vphpl)**
Left Turn		1,650
Through		1,800
Right Turn		1,500

Are the 12th St W WB right turns significantly impeded by through movements? (y/n)	n
Are the 12th St W EB right turns significantly impeded by through movements? (y/n)	n
Are the 1st Ave E NB right turns significantly impeded by through movements? (y/n)	n
Are the 1st Ave E SB right turns significantly impeded by through movements? (y/n)	

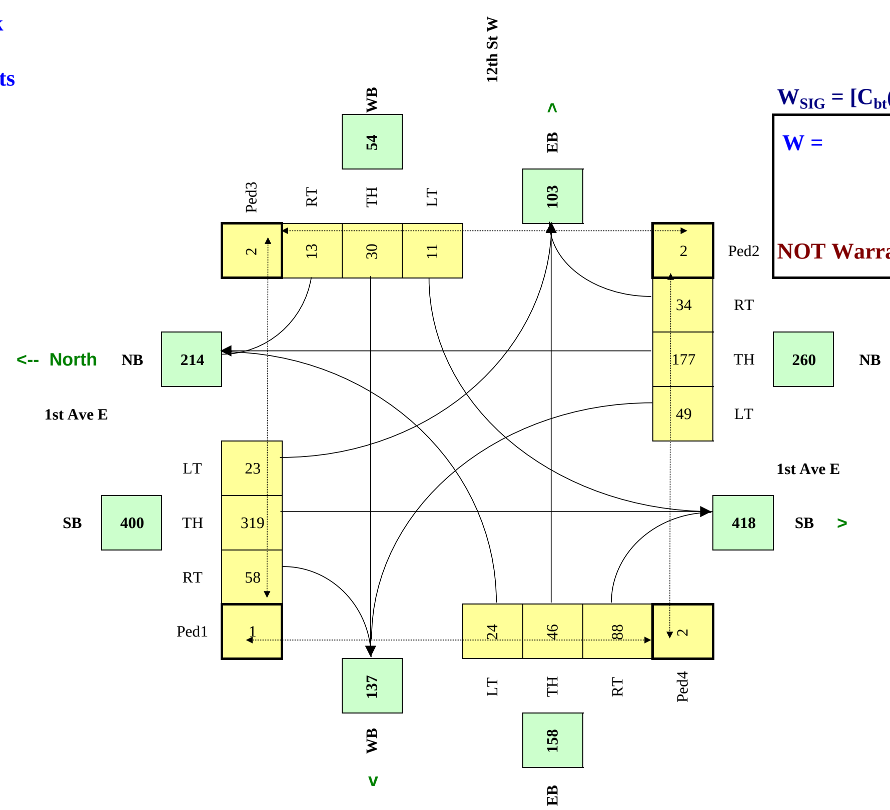
Demographics		
Elem. School/Mobility Challenged	(y/n)	n
Senior's Complex	(y/n)	n
Pathway to School	(y/n)	n
Metro Area Population	(#)	35,000
Central Business District	(y/n)	n

Other input		Speed (Km/h)	Truck %	Bus Rt (y/n)	Median (m)
1st Ave E	NS	50	5.0%	n	
12th St W	EW		2.0%	n	

Set Peak Hours

Traffic Input	**NB**			**SB**			**WB**			**EB**			**Ped1 NS**	**Ped2 NS**	**Ped3 EW**	**Ped4 EW**
	LT	**Th**	**RT**	**LT**	**Th**	**RT**	**LT**	**Th**	**RT**	**LT**	**Th**	**RT**	**W Side**	**E Side**	**N Side**	**S Side**
8:00 - 9:00																
9:00 - 10:00																
11:00 - 12:00																
12:00-13:00																
16:00-17:00	49	177	34	23	319	58	11	30	13	24	46	88	6	11	12	9
17:00-18:00																
Total (PM Peak Hour)	**49**	**177**	**34**	**23**	**319**	**58**	**11**	**30**	**13**	**24**	**46**	**88**	**6**	**11**	**12**	**9**
Average(PM Peak Hour)	**49**	**177**	**34**	**23**	**319**	**58**	**11**	**30**	**13**	**24**	**46**	**88**	**1**	**2**	**2**	**2**
Actual Pedestrian Crossing Distance (m)																

PM Peak Turning Movements



$$W_{SIG} = [C_{bt}(X_{v-v}) / K_1 + (F\ (X_{v-p})\ L) / K_2] \times C_i$$

W =	**59**	**57**	**2**
		Veh	***Ped***

NOT Warranted

RESET SHEET

City of Prince Albert - Traffic Signal & Pedestrian Signal Head Warrant Analysis

Main Street (name)	**1st Ave E**	**Direction (EW or NS)**	**NS**	**Road Authority:**	**City of Prince Albert**
Side Street (name)	**13th St W**	**Direction (EW or NS)**	**EW**	**City:**	**City of Prince Albert**
Quadrant / Int #	**1**	**Comments**	**Enter Comments about the analysis here.**	**Analysis Date:**	**2017 Feb 27, Mon**
	CHECK SHEET			**Count Date:**	**2017 Feb 16, Thu**
for Warrant Calculation Results, please hit 'Page Down'				**Date Entry Format:**	(yyyy-mm-dd)

Lane Configuration		Excl LT	Th & LT	Through	Th+RT+LT	Th & RT	Excl RT	RT Channelization (y/n)	UpStream Signal (m)	# of Thru Lanes	LT Phase Type	RTOR Allowed (y/n)	Actuated Thru Phase
1st Ave E	NB				1			y	200	1			
1st Ave E	SB				1			n	100	1			
13th St W	WB		1			1		y	5,000	2			
13th St W	EB				1			y	200	1			

Are the 13th St W WB right turns significantly impeded by through movements? (y/n)	n
Are the 13th St W EB right turns significantly impeded by through movements? (y/n)	n
Are the 1st Ave E NB right turns significantly impeded by through movements? (y/n)	n
Are the 1st Ave E SB right turns significantly impeded by through movements? (y/n)	

Saturation Flow Rates (if not default) (vphpl)		**Default Saturation Flow Rates (vphpl)**
Left Turn		1,650
Through		1,800
Right Turn		1,500

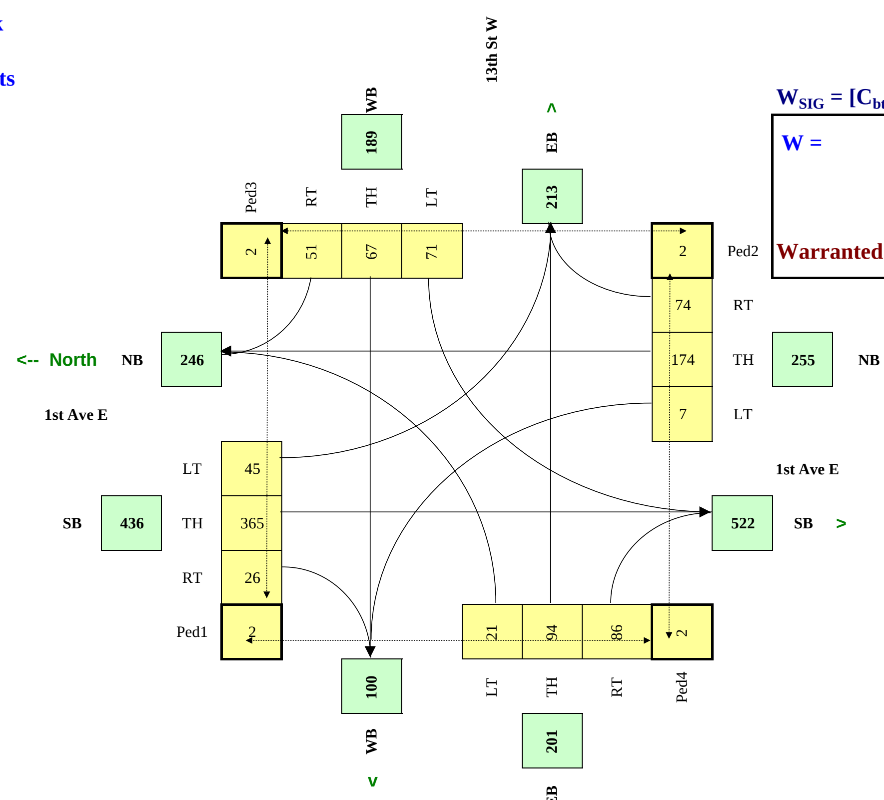
Demographics		
Elem. School/Mobility Challenged	(y/n)	n
Senior's Complex	(y/n)	n
Pathway to School	(y/n)	n
Metro Area Population	(#)	35,000
Central Business District	(y/n)	n

Other input		Speed (Km/h)	Truck %	Bus Rt (y/n)	Median (m)
1st Ave E	NS	50	5.0%	n	
13th St W	EW		2.0%	n	

Set Peak Hours

Traffic Input	**NB**			**SB**			**WB**			**EB**			**Ped1** **NS**	**Ped2** **NS**	**Ped3** **EW**	**Ped4** **EW**
	LT	**Th**	**RT**	**LT**	**Th**	**RT**	**LT**	**Th**	**RT**	**LT**	**Th**	**RT**	**W Side**	**E Side**	**N Side**	**S Side**
8:00 - 9:00																
9:00 - 10:00																
11:00 - 12:00																
12:00-13:00																
16:00-17:00	7	174	74	45	365	26	71	67	51	21	94	86	11	10	12	9
17:00-18:00																
Total (PM Peak Hour)	**7**	**174**	**74**	**45**	**365**	**26**	**71**	**67**	**51**	**21**	**94**	**86**	**11**	**10**	**12**	**9**
Average(PM Peak Hour)	**7**	**174**	**74**	**45**	**365**	**26**	**71**	**67**	**51**	**21**	**94**	**86**	**2**	**2**	**2**	**2**
Actual Pedestrian Crossing Distance (m)																

PM Peak Turning Movements



$W_{SIG} = [C_{bt}(X_{v-v}) / K_1 + (F\ (X_{v-p})\ L) / K_2] \times C_i$

W =	**114**	**112**	**2**
		Veh	***Ped***
Warranted			

RESET SHEET

Traffic Signal Warrant Spreadsheet - v2.0 © 2014 Transportation Association of Canada

City of Prince Albert - Traffic Signal & Pedestrian Signal Head Warrant Analysis

Main Street (name)	**1st Ave W**	**Direction (EW or NS)**	**NS**	**Road Authority:**	**City of Prince Albert**
Side Street (name)	**12th St W**	**Direction (EW or NS)**	**EW**	**City:**	**City of Prince Albert**
Quadrant / Int #	**1**	**Comments**	**Enter Comments about the analysis here.**	**Analysis Date:**	**2017 Feb 27, Mon**
for Warrant Calculation Results, please hit 'Page Down'	**CHECK SHEET**			**Count Date:**	**2017 Feb 22, Wed**
				Date Entry Format:	(yyyy-mm-dd)

Lane Configuration		Excl LT	Th & LT	Through	Th+RT+LT	Th & RT	Excl RT	RT Channelization (y/n)	UpStream Signal (m)	# of Thru Lanes	LT Phase Type	RTOR Allowed (y/n)	Actuated Thru Phase
1st Ave W	NB				1			n		1			
1st Ave W	SB				1			n		1			
12th St W	WB				1			n	120	1			
12th St W	EB				1			n	120	1			

Saturation Flow Rates (if not default) (vphpl)		**Default Saturation Flow Rates (vphpl)**
Left Turn		1,650
Through		1,800
Right Turn		1,500

Are the 12th St W WB right turns significantly impeded by through movements? (y/n)	n
Are the 12th St W EB right turns significantly impeded by through movements? (y/n)	n
Are the 1st Ave W NB right turns significantly impeded by through movements? (y/n)	n
Are the 1st Ave W SB right turns significantly impeded by through movements? (y/n)	

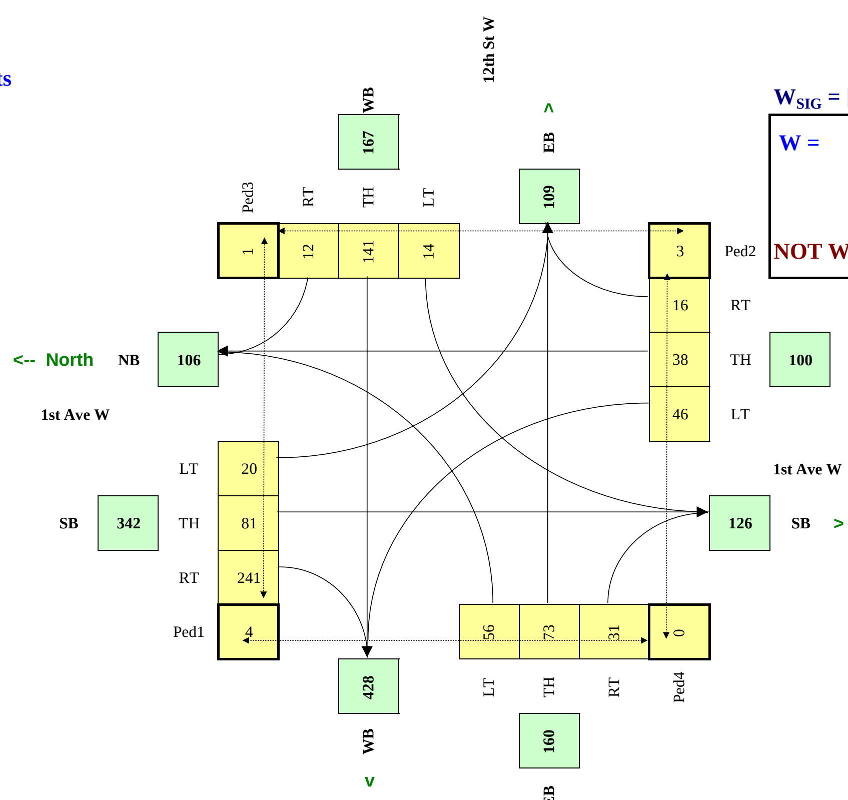
Demographics		
Elem. School/Mobility Challenged	(y/n)	n
Senior's Complex	(y/n)	n
Pathway to School	(y/n)	n
Metro Area Population	(#)	35,000
Central Business District	(y/n)	n

Other input		Speed (Km/h)	Truck %	Bus Rt (y/n)	Median (m)
1st Ave W	NS	50	5.0%	n	
12th St W	EW		2.0%	n	

Set Peak Hours

Traffic Input	**NB**			**SB**			**WB**			**EB**			**Ped1 NS**	**Ped2 NS**	**Ped3 EW**	**Ped4 EW**
	LT	**Th**	**RT**	**LT**	**Th**	**RT**	**LT**	**Th**	**RT**	**LT**	**Th**	**RT**	**W Side**	**E Side**	**N Side**	**S Side**
8:00 - 9:00																
9:00 - 10:00																
11:00 - 12:00																
12:00-13:00																
16:00-17:00	46	38	16	20	81	241	14	141	12	56	73	31	22	15	5	2
17:00-18:00																
Total (PM Peak Hour)	**46**	**38**	**16**	**20**	**81**	**241**	**14**	**141**	**12**	**56**	**73**	**31**	**22**	**15**	**5**	**2**
Average(PM Peak Hour)	**46**	**38**	**16**	**20**	**81**	**241**	**14**	**141**	**12**	**56**	**73**	**31**	**4**	**3**	**1**	**0**
Actual Pedestrian Crossing Distance (m)																

PM Peak Turning Movements



$$W_{SIG} = [C_{bt}(X_{v-v}) / K_1 + (F (X_{v-p}) L) / K_2] \times C_i$$

W =	**75**	**75**	**0**
		Veh	***Ped***

NOT Warranted

RESET SHEET

City of Prince Albert - Traffic Signal & Pedestrian Signal Head Warrant Analysis

Main Street (name)	15th St E		Direction (EW or NS)	NS	Road Authority:	City of Prince Albert
Side Street (name)	8th Ave E		Direction (EW or NS)	EW	City:	City of Prince Albert
Quadrant / Int #	1	Comments	Enter Comments about the analysis here.		Analysis Date:	2017 Feb 27, Mon
for Warrant Calculation Results, please hit 'Page Down'	CHECK SHEET				Count Date:	2017 Feb 23, Thu
					Date Entry Format:	(yyyy-mm-dd)

Lane Configuration		Excl LT	Th & LT	Through	Th+RT+LT	Th & RT	Excl RT	RT Channelization (y/n)	UpStream Signal (m)	# of Thru Lanes	LT Phase Type	RTOR Allowed (y/n)	Actuated Thru Phase
15th St E	NB		1				1	n		1			
15th St E	SB		1				1	y		1			
8th Ave E	WB	1		2			1	n	150	2			
8th Ave E	EB	1		2			1	n	150	2			
							n						
							n						
							n						

Saturation Flow Rates (if not default) (vphpl)		Default Saturation Flow Rates (vphpl)
Left Turn		1,650
Through		1,800
Right Turn		1,500

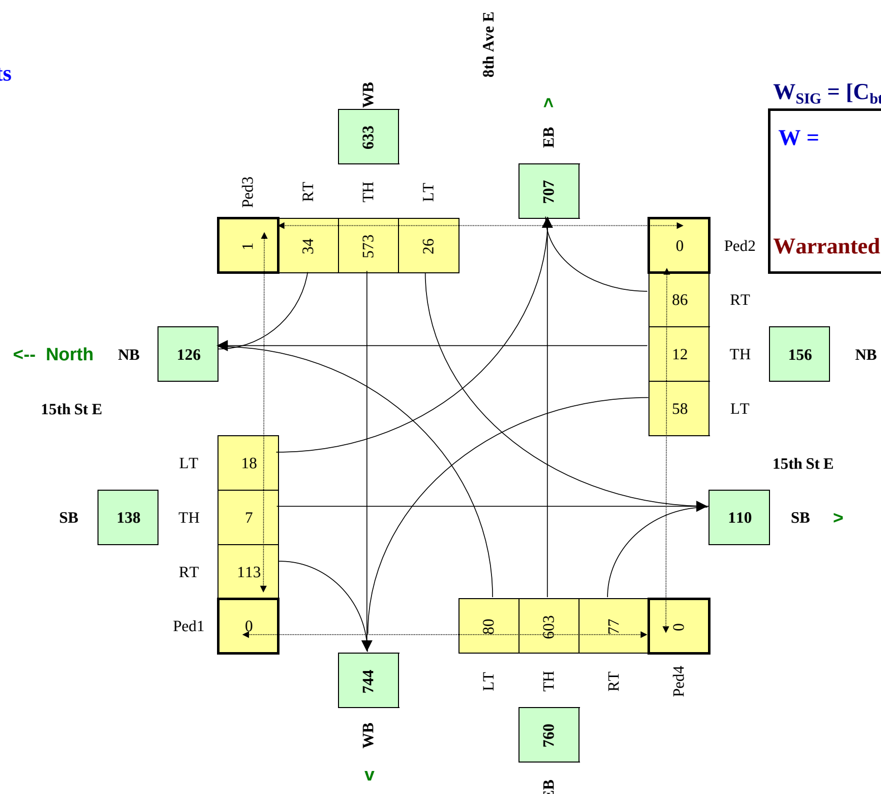
Demographics		
Elem. School/Mobility Challenged	(y/n)	n
Senior's Complex	(y/n)	n
Pathway to School	(y/n)	n
Metro Area Population	(#)	35,000
Central Business District	(y/n)	n

Other input		Speed (Km/h)	Truck %	Bus Rt (y/n)	Median (m)
15th St E	NS	50	5.0%	n	1.5
8th Ave E	EW		2.0%	n	1.5

Set Peak Hours

Traffic Input	NB			SB			WB			EB			Ped1 NS	Ped2 NS	Ped3 EW	Ped4 EW
	LT	Th	RT	LT	Th	RT	LT	Th	RT	LT	Th	RT	W Side	E Side	N Side	S Side
8:00 - 9:00																
9:00 - 10:00																
11:00 - 12:00																
12:00-13:00																
16:00-17:00	58	12	86	18	7	113	26	573	34	80	603	77	0	2	3	2
17:00-18:00																
Total (PM Peak Hour)	**58**	**12**	**86**	**18**	**7**	**113**	**26**	**573**	**34**	**80**	**603**	**77**	**0**	**2**	**3**	**2**
Average(PM Peak Hour)	**58**	**12**	**86**	**18**	**7**	**113**	**26**	**573**	**34**	**80**	**603**	**77**	**0**	**0**	**1**	**0**
Actual Pedestrian Crossing Distance (m)																

PM Peak Turning Movements



$W_{SIG} = [C_{bt}(X_{v-v}) / K_1 + (F\ (X_{v-p})\ L) / K_2] \times C_i$

W =	206	206	0
		Veh	Ped

Warranted

RESET SHEET

City of Prince Albert - Traffic Signal & Pedestrian Signal Head Warrant Analysis

Main Street (name)	Central Ave	Direction (EW or NS)	NS	Road Authority:	City of Prince Albert
Side Street (name)	11ST St	Direction (EW or NS)	EW	City:	City of Prince Albert
Quadrant / Int #	1	Comments	Enter Comments about the analysis here.	Analysis Date:	2017 Feb 27, Mon
	CHECK SHEET			Count Date:	2017 Feb 22, Wed
				Date Entry Format:	(yyyy-mm-dd)

for Warrant Calculation Results, please hit 'Page Down'

Lane Configuration		Excl LT	Th & LT	Through	Th+RT+LT	Th & RT	Excl RT	RT Channelization (y/n)	UpStream Signal (m)	# of Thru Lanes	LT Phase Type	RTOR Allowed (y/n)	Actuated Thru Phase
Central Ave	NB		1			1		n	150	2			
Central Ave	SB							n		0			
11ST St	WB		1					n		1			
11ST St	EB					1		n		1			

	Saturation Flow Rates (if not default) (vphpl)	Default Saturation Flow Rates (vphpl)
Left Turn		1,650
Through		1,800
Right Turn		1,500

	n
Are the 11ST St EB right turns significantly impeded by through movements? (y/n)	n
Are the Central Ave NB right turns significantly impeded by through movements? (y/n)	n

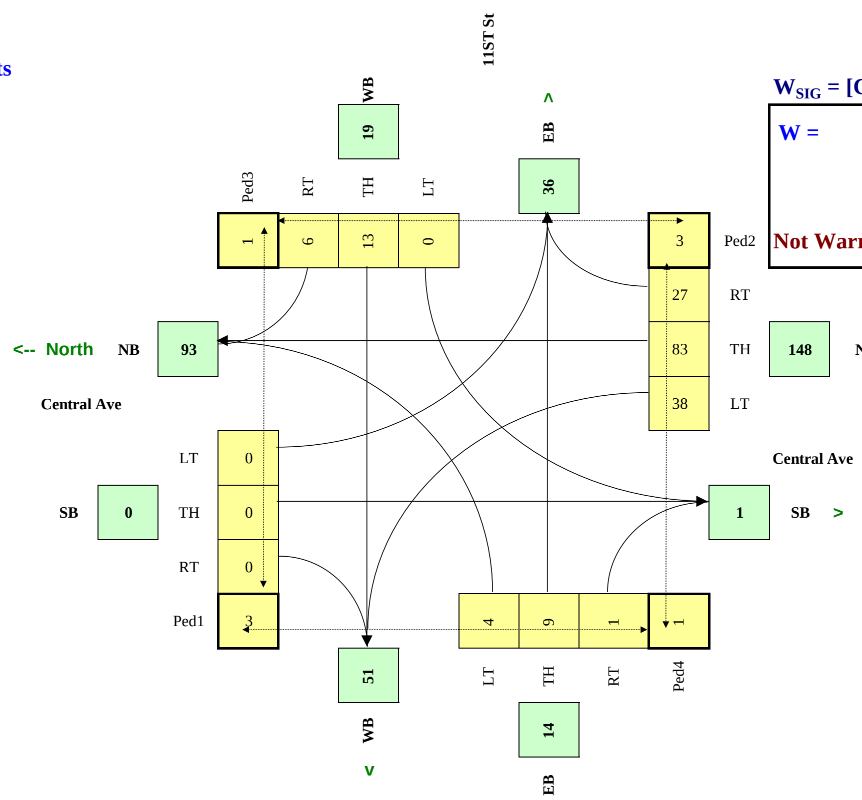
Demographics		
Elem. School/Mobility Challenged	(y/n)	n
Senior's Complex	(y/n)	n
Pathway to School	(y/n)	n
Metro Area Population	(#)	35,000
Central Business District	(y/n)	n

Other input		Speed (Km/h)	Truck %	Bus Rt (y/n)	Median (m)
Central Ave	NS	50	5.0%	n	
11ST St	EW		2.0%	n	

Set Peak Hours

Traffic Input	NB			SB			WB			EB			Ped1 NS	Ped2 NS	Ped3 EW	Ped4 EW
	LT	Th	RT	LT	Th	RT	LT	Th	RT	LT	Th	RT	W Side	E Side	N Side	S Side
8:00 - 9:00																
9:00 - 10:00	38	83	27	0	0	0	0	13	6	4	9	1	16	16	3	7
11:00 - 12:00																
12:00-13:00																
16:00-17:00																
17:00-18:00																
Total (AM Peak Hour)	38	83	27	0	0	0	0	13	6	4	9	1	16	16	3	7
Average(AM Peak Hour)	38	83	27	0	0	0	0	13	6	4	9	1	3	3	1	1
Actual Pedestrian Crossing Distance (m)																

PM Peak Turning Movements



$W_{SIG} = [C_{bt}(X_{v-v}) / K_1 + (F\ (X_{v-p})\ L) / K_2] \times C_i$

W =	2	2	0
		Veh	Ped

Not Warranted - Vs<75

RESET SHEET

City of Prince Albert - Traffic Signal & Pedestrian Signal Head Warrant Analysis

Main Street (name)	Central Ave	Direction (EW or NS)	NS	Road Authority:	City of Prince Albert		
Side Street (name)	12th St	Direction (EW or NS)	EW	City:	City of Prince Albert		
Quadrant / Int #	1	Comments	Enter Comments about the analysis here.	Analysis Date:	2017 Feb 28, Tue		
	CHECK SHEET			Count Date:	2017 Feb 22, Wed		
				Date Entry Format:	(yyyy-mm-dd)		

for Warrant Calculation Results, please hit 'Page Down'

Lane Configuration		Excl LT	Th & LT	Through	Th+RT+LT	Th & RT	Excl RT	RT Channelization (y/n)	UpStream Signal (m)	# of Thru Lanes	LT Phase Type	RTOR Allowed (y/n)	Actuated Thru Phase
Central Ave	NB		1			1		n	120	2			
Central Ave	SB							n		0			
12th St	WB		1					n	120	1			
12th St	EB					1		n	120	1			

Saturation Flow Rates (if not default) (vphpl)		Default Saturation Flow Rates (vphpl)
Left Turn		1,650
Through		1,800
Right Turn		1,500

	n
Are the 12th St EB right turns significantly impeded by through movements? (y/n)	n
Are the Central Ave NB right turns significantly impeded by through movements? (y/n)	n

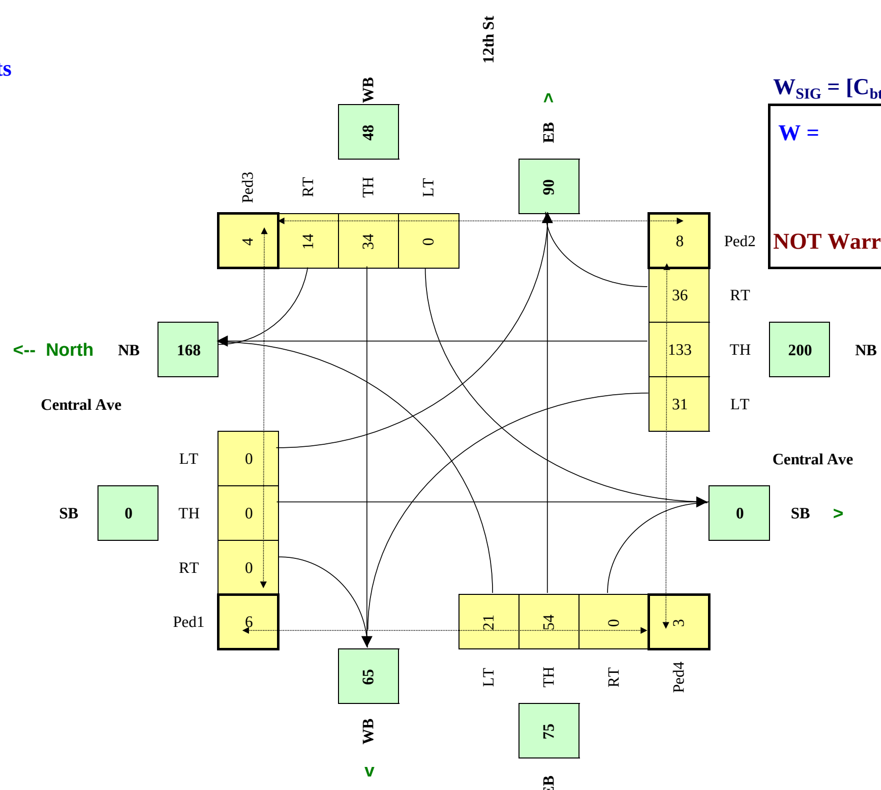
Demographics		
Elem. School/Mobility Challenged	(y/n)	n
Senior's Complex	(y/n)	n
Pathway to School	(y/n)	n
Metro Area Population	(#)	35,000
Central Business District	(y/n)	n

Other input		Speed (Km/h)	Truck %	Bus Rt (y/n)	Median (m)
Central Ave	NS	50	5.0%	n	
12th St	EW		2.0%	n	

Set Peak Hours

Traffic Input	NB			SB			WB			EB			Ped1 NS	Ped2 NS	Ped3 EW	Ped4 EW
	LT	Th	RT	LT	Th	RT	LT	Th	RT	LT	Th	RT	W Side	E Side	N Side	S Side
8:00 - 9:00																
9:00 - 10:00	31	133	36	0	0	0	0	34	14	21	54	0	35	47	21	15
11:00 - 12:00																
12:00-13:00																
16:00-17:00																
17:00-18:00																
Total (AM Peak Hour)	**31**	**133**	**36**	**0**	**0**	**0**	**0**	**34**	**14**	**21**	**54**	**0**	**35**	**47**	**21**	**15**
Average(AM Peak Hour)	**31**	**133**	**36**	**0**	**0**	**0**	**0**	**34**	**14**	**21**	**54**	**0**	**6**	**8**	**4**	**3**
Actual Pedestrian Crossing Distance (m)																

PM Peak Turning Movements



$W_{SIG} = [C_{bt}(X_{v-v}) / K_1 + (F\ (X_{v-p})\ L) / K_2] \times C_i$

W =	13	12	1
		Veh	*Ped*

NOT Warranted

RESET SHEET

Traffic Signal Warrant Spreadsheet - v2.0 © 2014 Transportation Association of Canada

City of Prince Albert - Traffic Signal & Pedestrian Signal Head Warrant Analysis

Main Street (name)	**Central Ave**	**Direction (EW or NS)**	**NS**	**Road Authority:**	**City of Prince Albert**
Side Street (name)	**13th St**	**Direction (EW or NS)**	**EW**	**City:**	**City of Prince Albert**
Quadrant / Int #	**1**	**Comments**	**Enter Comments about the analysis here.**	**Analysis Date:**	**2017 Feb 28, Tue**
for Warrant Calculation Results, please hit 'Page Down'	**CHECK SHEET**			**Count Date:**	**2017 Feb 16, Thu**
				Date Entry Format:	(yyyy-mm-dd)

Lane Configuration		Excl LT	Th & LT	Through	Th+RT+LT	Th & RT	Excl RT	RT Channelization (y/n)	UpStream Signal (m)	# of Thru Lanes	LT Phase Type	RTOR Allowed (y/n)	Actuated Thru Phase
Central Ave	NB		1			1		n	120	2			
Central Ave	SB							n		0			
13th St	WB		1					n		1			
13th St	EB					1		n	120	1			

Saturation Flow Rates (if not default) (vphpl)		**Default Saturation Flow Rates (vphpl)**
Left Turn		1,650
Through		1,800
Right Turn		1,500

	n
Are the 13th St EB right turns significantly impeded by through movements? (y/n)	n
Are the Central Ave NB right turns significantly impeded by through movements? (y/n)	n

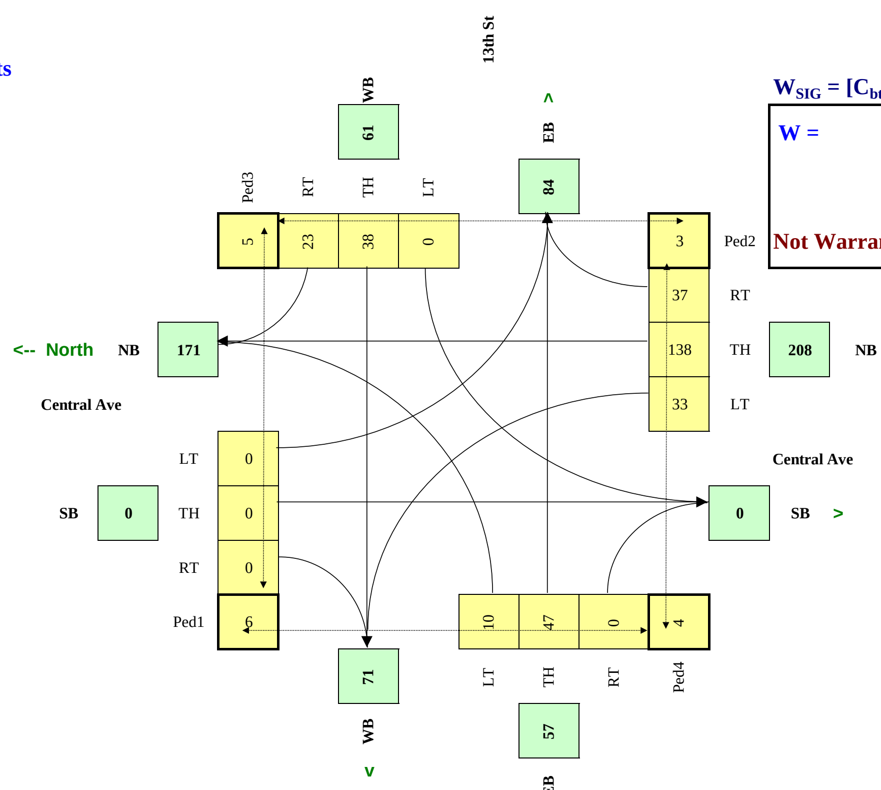
Demographics		
Elem. School/Mobility Challenged	(y/n)	n
Senior's Complex	(y/n)	n
Pathway to School	(y/n)	n
Metro Area Population	(#)	35,000
Central Business District	(y/n)	n

Other input		Speed (Km/h)	Truck %	Bus Rt (y/n)	Median (m)
Central Ave	NS	50	5.0%	n	
13th St	EW		2.0%	n	

Set Peak Hours

Traffic Input	**NB**			**SB**			**WB**			**EB**			**Ped1**	**Ped2**	**Ped3**	**Ped4**
													NS	**NS**	**EW**	**EW**
	LT	**Th**	**RT**	**LT**	**Th**	**RT**	**LT**	**Th**	**RT**	**LT**	**Th**	**RT**	**W Side**	**E Side**	**N Side**	**S Side**
8:00 - 9:00																
9:00 - 10:00	33	138	37	0	0	0	0	38	23	10	47	0	34	20	31	21
11:00 - 12:00																
12:00-13:00																
16:00-17:00																
17:00-18:00																
Total (AM Peak Hour)	**33**	**138**	**37**	**0**	**0**	**0**	**0**	**38**	**23**	**10**	**47**	**0**	**34**	**20**	**31**	**21**
Average(AM Peak Hour)	**33**	**138**	**37**	**0**	**0**	**0**	**0**	**38**	**23**	**10**	**47**	**0**	**6**	**3**	**5**	**4**
Actual Pedestrian Crossing Distance (m)																

PM Peak Turning Movements



$$W_{SIG} = [C_{bt}(X_{v-v}) / K_1 + (F\ (X_{v-p})\ L) / K_2] \times C_i$$

W =	12	11	1
		Veh	*Ped*

Not Warranted - Vs<75

RESET SHEET

City of Prince Albert - Traffic Signal & Pedestrian Signal Head Warrant Analysis

Main Street (name)	**Central Ave**	**Direction (EW or NS)**	**NS**	**Road Authority:**	**City of Prince Albert**
Side Street (name)	**14th St**	**Direction (EW or NS)**	**EW**	**City:**	**City of Prince Albert**
Quadrant / Int #	**1**	**Comments**	**Enter Comments about the analysis here.**	**Analysis Date:**	**2017 Feb 28, Tue**
	CHECK SHEET			**Count Date:**	**2017 Feb 23, Thu**
for Warrant Calculation Results, please hit 'Page Down'				**Date Entry Format:**	(yyyy-mm-dd)

Lane Configuration		Excl LT	Th & LT	Through	Th+RT+LT	Th & RT	Excl RT	RT Channelization (y/n)	UpStream Signal (m)	# of Thru Lanes	LT Phase Type	RTOR Allowed (y/n)	Actuated Thru Phase
Central Ave	NB		1			1		n	120	2			
Central Ave	SB							n		0			
14th St	WB		1					n		1			
14th St	EB					1		n	120	1			

Saturation Flow Rates (if not default) (vphpl)		**Default Saturation Flow Rates (vphpl)**
Left Turn		1,650
Through		1,800
Right Turn		1,500

	n
Are the 14th St EB right turns significantly impeded by through movements? (y/n)	n
Are the Central Ave NB right turns significantly impeded by through movements? (y/n)	n

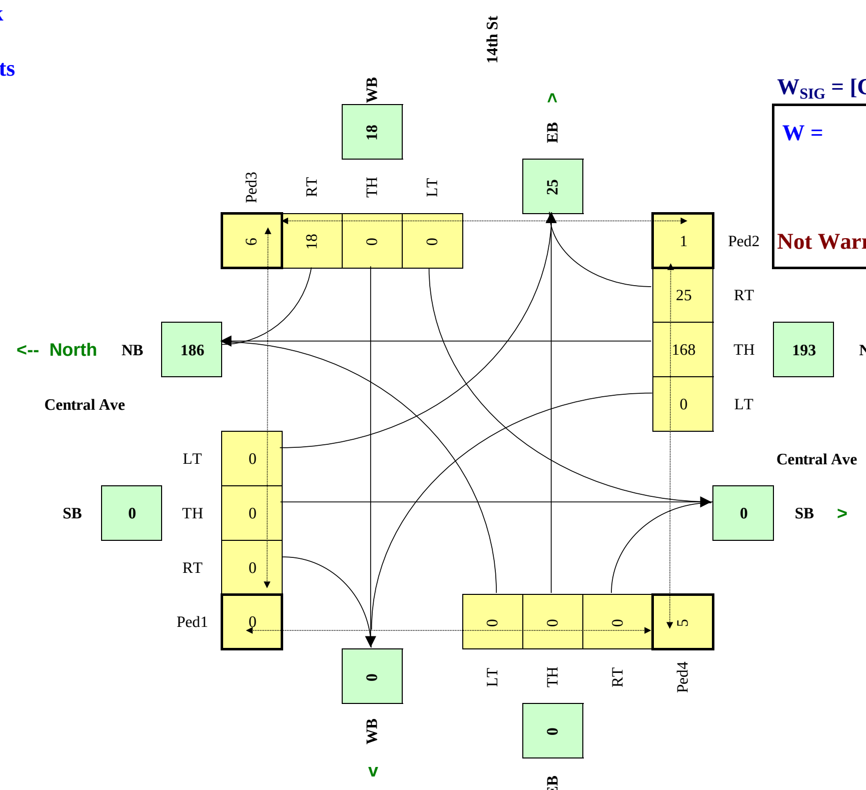
Demographics		
Elem. School/Mobility Challenged	(y/n)	n
Senior's Complex	(y/n)	n
Pathway to School	(y/n)	n
Metro Area Population	(#)	35,000
Central Business District	(y/n)	n

Other input		Speed (Km/h)	Truck %	Bus Rt (y/n)	Median (m)
Central Ave	NS	50	5.0%	n	
14th St	EW		2.0%	n	

Set Peak Hours

Traffic Input	**NB**			**SB**			**WB**			**EB**			**Ped1 NS**	**Ped2 NS**	**Ped3 EW**	**Ped4 EW**
	LT	**Th**	**RT**	**LT**	**Th**	**RT**	**LT**	**Th**	**RT**	**LT**	**Th**	**RT**	**W Side**	**E Side**	**N Side**	**S Side**
8:00 - 9:00																
9:00 - 10:00	0	168	25	0	0	0	0	0	18	0	0	0	1	5	38	31
11:00 - 12:00																
12:00-13:00																
16:00-17:00																
17:00-18:00																
Total (AM Peak Hour)	**0**	**168**	**25**	**0**	**0**	**0**	**0**	**0**	**18**	**0**	**0**	**0**	**1**	**5**	**38**	**31**
Average(AM Peak Hour)	**0**	**168**	**25**	**0**	**0**	**0**	**0**	**0**	**18**	**0**	**0**	**0**	**0**	**1**	**6**	**5**
Actual Pedestrian Crossing Distance (m)																

PM Peak Turning Movements



$W_{SIG} = [C_{bt}(X_{v\text{-}v}) / K_1 + (F\,(X_{v\text{-}p})\,L) / K_2] \times C_i$

W =	**2**	**0**	**2**
		Veh	***Ped***

Not Warranted - Vs<75

RESET SHEET

Intersection on 2^{nd} Avenue West

City of Prince Albert - Traffic Signal & Pedestrian Signal Head Warrant Analysis

Main Street (name)	**2nd Ave W**	**Direction (EW or NS)**	**NS**	**Road Authority:**	**City of Prince Albert**
Side Street (name)	**12th St W**	**Direction (EW or NS)**	**EW**	**City:**	**City of Prince Albert**
Quadrant / Int #	**1**	**Comments**	**Enter Comments about the analysis here.**	**Analysis Date:**	**2016 Dec 19, Mon**
	CHECK SHEET			**Count Date:**	
for Warrant Calculation Results, please hit 'Page Down'				**Date Entry Format:**	(yyyy-mm-dd)

Lane Configuration		Excl LT	Th & LT	Through	Th+RT+LT	Th & RT	Excl RT	RT Channelization (y/n)	UpStream Signal (m)	# of Thru Lanes	LT Phase Type	RTOR Allowed (y/n)	Actuated Thru Phase
2nd Ave W	NB	1		2			1	y	119	2			
2nd Ave W	SB	1		2			1	n	5,000	2			
12th St W	WB	1		1			1	n	5,000	1			
12th St W	EB	1		1			1	y	5,000	1			
							n						
							n						
							n						

	Saturation Flow Rates (if not default) (vphpl)	**Default Saturation Flow Rates (vphpl)**
Left Turn		1,650
Through		1,800
Right Turn		1,500

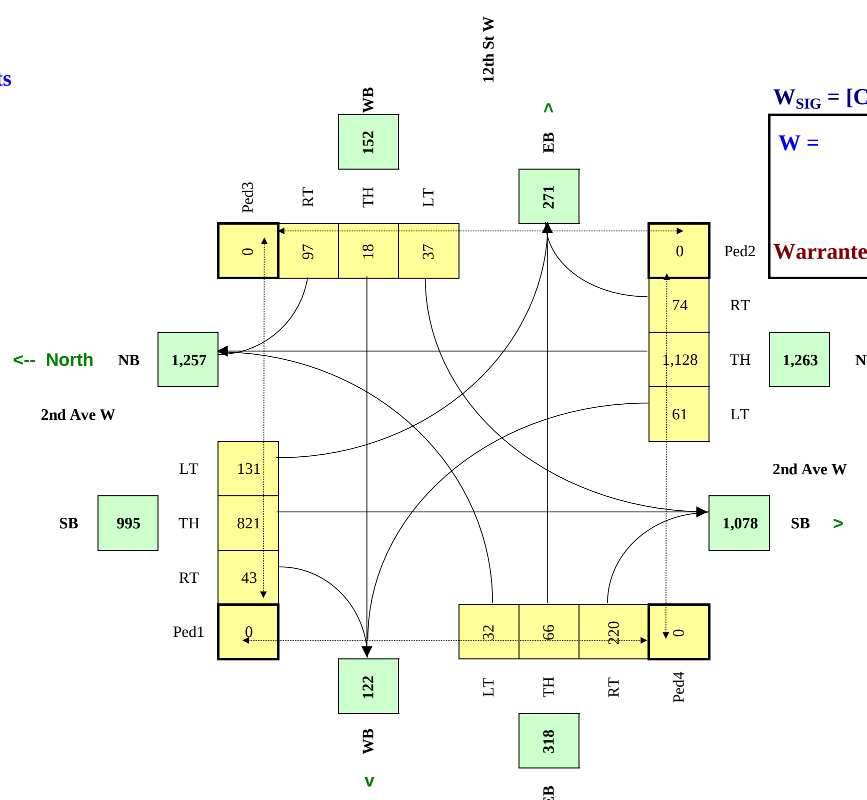
Demographics		
Elem. School/Mobility Challenged	(y/n)	n
Senior's Complex	(y/n)	n
Pathway to School	(y/n)	n
Metro Area Population	(#)	35,000
Central Business District	(y/n)	n

Other input		Speed (Km/h)	Truck %	Bus Rt (y/n)	Median (m)
2nd Ave W	NS	50	5.0%	n	1.5
12th St W	EW		2.0%	n	

Set Peak Hours

Traffic Input	**NB**			**SB**			**WB**			**EB**			**Ped1** **NS**	**Ped2** **NS**	**Ped3** **EW**	**Ped4** **EW**
	LT	**Th**	**RT**	**LT**	**Th**	**RT**	**LT**	**Th**	**RT**	**LT**	**Th**	**RT**	**W Side**	**E Side**	**N Side**	**S Side**
8:00 - 9:00																
9:00 - 10:00																
11:00 - 12:00																
12:00-13:00																
16:00-17:00	61	1128	74	131	821	43	37	18	97	32	66	220				
17:00-18:00																
Total (PM Peak Hour)	**61**	**1,128**	**74**	**131**	**821**	**43**	**37**	**18**	**97**	**32**	**66**	**220**	**0**	**0**	**0**	**0**
Average(PM Peak Hour)	**61**	**1,128**	**74**	**131**	**821**	**43**	**37**	**18**	**97**	**32**	**66**	**220**	**0**	**0**	**0**	**0**
												Actual Pedestrian Crossing Distance (m)				

PM Peak Turning Movements



$W_{SIG} = [C_{bt}(X_{v-v}) / K_1 + (F\ (X_{v-p})\ L) / K_2] \times C_i$

W =	**328**	**328**	**0**
		Veh	***Ped***
Warranted			

RESET SHEET

City of Prince Albert - Traffic Signal & Pedestrian Signal Head Warrant Analysis

Main Street (name)	2nd Ave W	Direction (EW or NS)	NS	Road Authority: City of Prince Albert
Side Street (name)	13th St W	Direction (EW or NS)	EW	City: City of Prince Albert
Quadrant / Int #	1	Comments	Enter Comments about the analysis here.	Analysis Date: 2016 Dec 19, Mon
for Warrant Calculation Results, please hit 'Page Down'	CHECK SHEET			Count Date: Projected 2016
				Date Entry Format: (yyyy-mm-dd)

Lane Configuration		Excl LT	Th & LT	Through	Th+RT+LT	Th & RT	Excl RT	RT Channelization (y/n)	UpStream Signal (m)	# of Thru Lanes	LT Phase Type	RTOR Allowed (y/n)	Actuated Thru Phase
2nd Ave W	NB			2			1	y		2			
2nd Ave W	SB			2			1	n		2			
13th St W	WB						1	y		0			
13th St W	EB						1	y		0			
							n						
							n						
							n						

	Saturation Flow Rates (if not default) (vphpl)	Default Saturation Flow Rates (vphpl)
Left Turn		1,650
Through		1,800
Right Turn		1,500

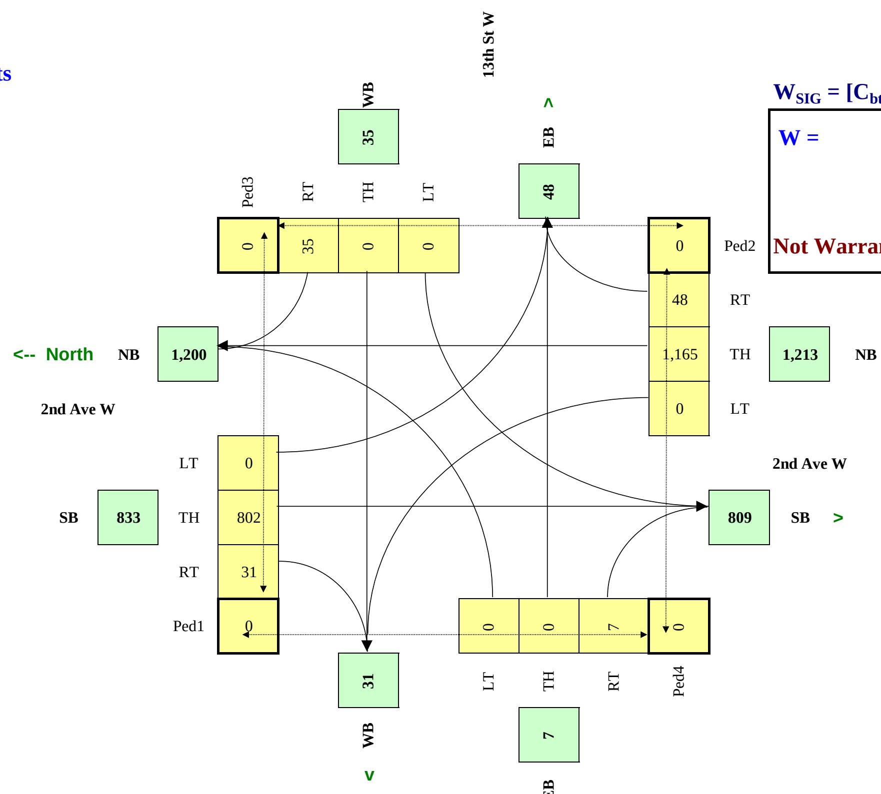
Demographics		
Elem. School/Mobility Challenged	(y/n)	n
Senior's Complex	(y/n)	n
Pathway to School	(y/n)	n
Metro Area Population	(#)	35,000
Central Business District	(y/n)	n

Other input		Speed (Km/h)	Truck %	Bus Rt (y/n)	Median (m)
2nd Ave W	NS	50	5.0%	n	1.5
13th St W	EW		2.0%	n	

Set Peak Hours

Traffic Input	NB			SB			WB			EB			Ped1 NS	Ped2 NS	Ped3 EW	Ped4 EW
	LT	Th	RT	LT	Th	RT	LT	Th	RT	LT	Th	RT	W Side	E Side	N Side	S Side
8:00 - 9:00																
9:00 - 10:00																
11:00 - 12:00																
12:00-13:00																
16:00-17:00	0	1165	48	0	802	31	0	0	35	0	0	7				
17:00-18:00																
Total (PM Peak Hour)	0	1,165	48	0	802	31	0	0	35	0	0	7	0	0	0	0
Average(PM Peak Hour)	0	1,165	48	0	802	31	0	0	35	0	0	7	0	0	0	0
Actual Pedestrian Crossing Distance (m)																

PM Peak Turning Movements



$W_{SIG} = [C_{bt}(X_{v\text{-}v}) / K_1 + (F\ (X_{v\text{-}p})\ L) / K_2] \times C_i$

W =	14	14	0
		Veh	Ped

Not Warranted - Vs<75

RESET SHEET

Traffic Signal Warrant Spreadsheet - v2.0 © 2014 Transportation Association of Canada

City of Prince Albert - Traffic Signal & Pedestrian Signal Head Warrant Analysis

Main Street (name)	**2nd Ave W**		**Direction (EW or NS)**	**NS**	**Road Authority:**	**City of Prince Albert**
Side Street (name)	**15th St W**		**Direction (EW or NS)**	**EW**	**City:**	**City of Prince Albert**
Quadrant / Int #	**1**	**Comments**	**Enter Comments about the analysis here.**		**Analysis Date:**	**2016 Dec 19, Mon**
for Warrant Calculation Results, please hit 'Page Down'	**CHECK SHEET**				**Count Date:**	**2016 Oct 27, Thu**
					Date Entry Format:	(yyyy-mm-dd)

Lane Configuration		Excl LT	Th & LT	Through	Th+RT+LT	Th & RT	Excl RT	RT Channelization (y/n)	UpStream Signal (m)	# of Thru Lanes	LT Phase Type	RTOR Allowed (y/n)	Actuated Thru Phase
2nd Ave W	NB	1		2			1	n	709	2			
2nd Ave W	SB	1		2			1	y	181	2			
15th St W	WB	2		2			1	n	191	2			
15th St W	EB	1		2			1	n	667	2			
							n						
							n						
							n						

Saturation Flow Rates (if not default) (vphpl)		**Default Saturation Flow Rates (vphpl)**
Left Turn		1,650
Through		1,800
Right Turn		1,500

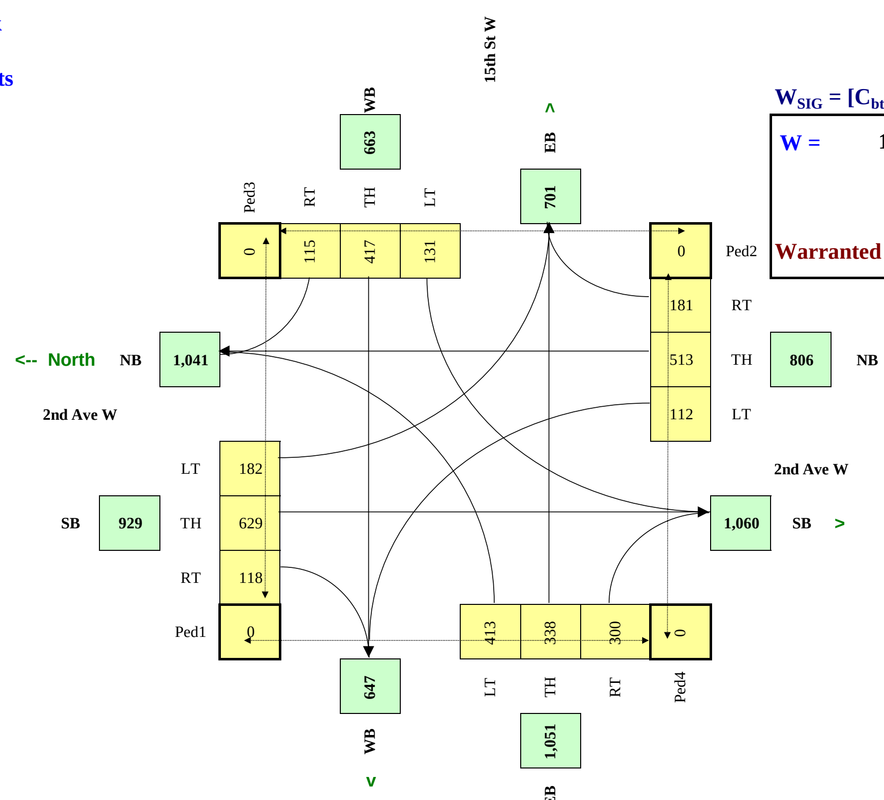
Demographics		
Elem. School/Mobility Challenged	(y/n)	n
Senior's Complex	(y/n)	n
Pathway to School	(y/n)	n
Metro Area Population	(#)	35,000
Central Business District	(y/n)	n

Other input		Speed (Km/h)	Truck %	Bus Rt (y/n)	Median (m)
2nd Ave W	NS	50	5.0%	n	1.5
15th St W	EW		2.0%	n	

Set Peak Hours

Traffic Input	**NB**			**SB**			**WB**			**EB**			**Ped1 NS**	**Ped2 NS**	**Ped3 EW**	**Ped4 EW**
	LT	**Th**	**RT**	**LT**	**Th**	**RT**	**LT**	**Th**	**RT**	**LT**	**Th**	**RT**	**W Side**	**E Side**	**N Side**	**S Side**
8:00 - 9:00																
9:00 - 10:00																
11:00 - 12:00																
12:00-13:00																
16:00-17:00	112	513	181	182	629	118	131	417	115	413	338	300				
17:00-18:00																
Total (PM Peak Hour)	**112**	**513**	**181**	**182**	**629**	**118**	**131**	**417**	**115**	**413**	**338**	**300**	**0**	**0**	**0**	**0**
Average(PM Peak Hour)	**112**	**513**	**181**	**182**	**629**	**118**	**131**	**417**	**115**	**413**	**338**	**300**	**0**	**0**	**0**	**0**
Actual Pedestrian Crossing Distance (m)																

PM Peak Turning Movements



$$W_{SIG} = [C_{bt}(X_{v-v}) / K_1 + (F (X_{v-p}) L) / K_2] \times C_i$$

W =	**1,197**	**1,197**	**0**
		Veh	***Ped***

Warranted

RESET SHEET

City of Prince Albert - Traffic Signal & Pedestrian Signal Head Warrant Analysis

Main Street (name)	**2nd Ave W**	**Direction (EW or NS)**	**NS**		**Road Authority:**	**City of Prince Albert**
Side Street (name)	**22nd St W**	**Direction (EW or NS)**	**EW**		**City:**	**City of Prince Albert**
Quadrant / Int #	**1**	**Comments**	**Enter Comments about the analysis here.**		**Analysis Date:**	**2016 Dec 19, Mon**
	CHECK SHEET				**Count Date:**	**Projected 2016**
for Warrant Calculation Results, please hit 'Page Down'					**Date Entry Format:**	(yyyy-mm-dd)

Lane Configuration		Excl LT	Th & LT	Through	Th+RT+LT	Th & RT	Excl RT	RT Channelization (y/n)	UpStream Signal (m)	# of Thru Lanes	LT Phase Type	RTOR Allowed (y/n)	Actuated Thru Phase
2nd Ave W	NB	1		2			1	n	709	2			
2nd Ave W	SB	1		2			1	y	181	2			
22nd St W	WB	2		2			1	n	191	2			
22nd St W	EB	1		2			1	n	667	2			
							n						
							n						
							n						

Saturation Flow Rates (if not default) (vphpl)		**Default Saturation Flow Rates (vphpl)**
Left Turn		1,650
Through		1,800
Right Turn		1,500

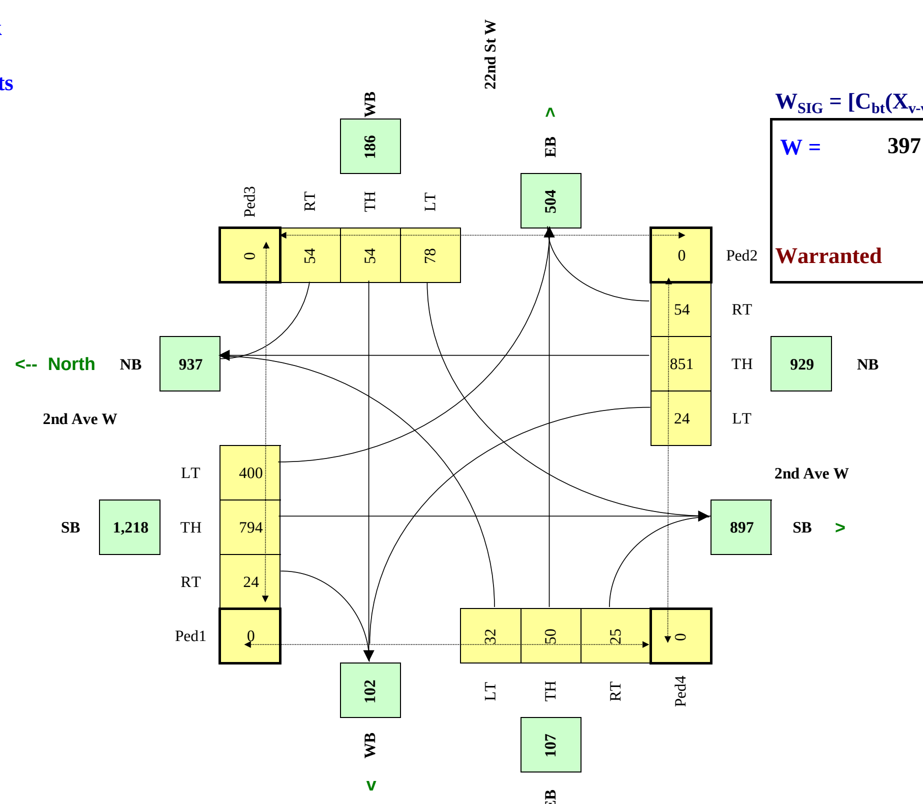
Demographics		
Elem. School/Mobility Challenged	(y/n)	n
Senior's Complex	(y/n)	n
Pathway to School	(y/n)	n
Metro Area Population	(#)	35,000
Central Business District	(y/n)	n

Other input		Speed (Km/h)	Truck %	Bus Rt (y/n)	Median (m)
2nd Ave W	NS	50	5.0%	n	1.5
22nd St W	EW		2.0%	n	1.5

Set Peak Hours

Traffic Input	**NB**			**SB**			**WB**			**EB**			**Ped1 NS**	**Ped2 NS**	**Ped3 EW**	**Ped4 EW**
	LT	**Th**	**RT**	**LT**	**Th**	**RT**	**LT**	**Th**	**RT**	**LT**	**Th**	**RT**	**W Side**	**E Side**	**N Side**	**S Side**
8:00 - 9:00																
9:00 - 10:00																
11:00 - 12:00																
12:00-13:00																
16:00-17:00	24	851	54	400	794	24	78	54	54	32	50	25				
17:00-18:00																
Total (PM Peak Hour)	**24**	**851**	**54**	**400**	**794**	**24**	**78**	**54**	**54**	**32**	**50**	**25**	**0**	**0**	**0**	**0**
Average(PM Peak Hour)	**24**	**851**	**54**	**400**	**794**	**24**	**78**	**54**	**54**	**32**	**50**	**25**	**0**	**0**	**0**	**0**
Actual Pedestrian Crossing Distance (m)																

PM Peak Turning Movements



$$W_{SIG} = [C_{bt}(X_{v\text{-}v}) / K_1 + (F\ (X_{v\text{-}p})\ L) / K_2] \times C_i$$

W =	397	397	0
		Veh	***Ped***

Warranted

RESET SHEET

City of Prince Albert - Traffic Signal & Pedestrian Signal Head Warrant Analysis

Main Street (name)	**2nd Ave W**		**Direction (EW or NS)**	**NS**	**Road Authority:**	**City of Prince Albert**
Side Street (name)	**28th St W**		**Direction (EW or NS)**	**EW**	**City:**	**City of Prince Albert**
Quadrant / Int #	**1**	**Comments**	**Enter Comments about the analysis here.**		**Analysis Date:**	**2016 Dec 19, Mon**
for Warrant Calculation Results, please hit 'Page Down'	CHECK SHEET				**Count Date:**	**2016 Oct 27, Thu**
					Date Entry Format:	(yyyy-mm-dd)

Lane Configuration		Excl LT	Th & LT	Through	Th+RT+LT	Th & RT	Excl RT	RT Channelization (y/n)	UpStream Signal (m)	# of Thru Lanes	LT Phase Type	RTOR Allowed (y/n)	Actuated Thru Phase
2nd Ave W	NB	1		2			1	n	297	2			
2nd Ave W	SB	1		2			1	n	609	2			
28th St W	WB	2		2			1	n	333	2			
28th St W	EB	1		2			1	n	393	2			
							n						
							n						
							n						

Saturation Flow Rates (if not default) (vphpl)		**Default Saturation Flow Rates (vphpl)**
Left Turn		1,650
Through		1,800
Right Turn		1,500

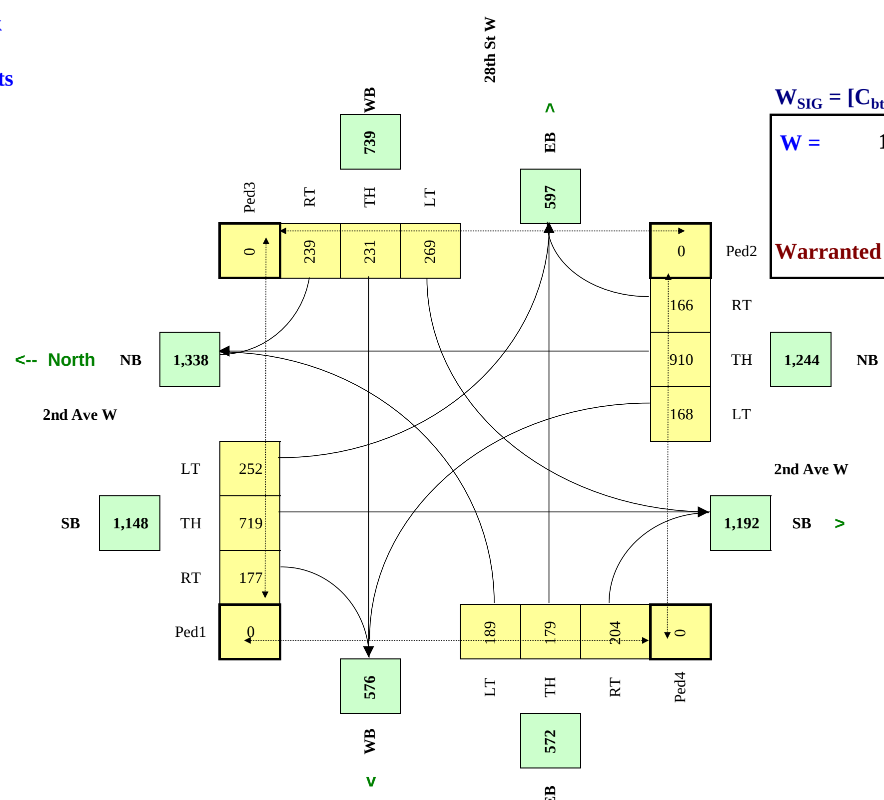
Demographics		
Elem. School/Mobility Challenged	(y/n)	n
Senior's Complex	(y/n)	n
Pathway to School	(y/n)	n
Metro Area Population	(#)	35,000
Central Business District	(y/n)	n

Other input		Speed (Km/h)	Truck %	Bus Rt (y/n)	Median (m)
2nd Ave W	NS	50	5.0%	n	1.5
28th St W	EW		2.0%	n	1.5

Set Peak Hours

Traffic Input	**NB**			**SB**			**WB**			**EB**			**Ped1 NS**	**Ped2 NS**	**Ped3 EW**	**Ped4 EW**
	LT	**Th**	**RT**	**LT**	**Th**	**RT**	**LT**	**Th**	**RT**	**LT**	**Th**	**RT**	**W Side**	**E Side**	**N Side**	**S Side**
8:00 - 9:00																
9:00 - 10:00																
11:00 - 12:00																
12:00-13:00																
16:00-17:00	168	910	166	252	719	177	269	231	239	189	179	204				
17:00-18:00																
Total (PM Peak Hour)	**168**	**910**	**166**	**252**	**719**	**177**	**269**	**231**	**239**	**189**	**179**	**204**	**0**	**0**	**0**	**0**
Average(PM Peak Hour)	**168**	**910**	**166**	**252**	**719**	**177**	**269**	**231**	**239**	**189**	**179**	**204**	**0**	**0**	**0**	**0**
Actual Pedestrian Crossing Distance (m)																

PM Peak Turning Movements



$$W_{SIG} = [C_{bt}(X_{v-v}) / K_1 + (F (X_{v-p}) L) / K_2] \times C_i$$

W =	**1,278**	**1,278**	**0**
		Veh	***Ped***

Warranted

RESET SHEET

City of Prince Albert - Traffic Signal & Pedestrian Signal Head Warrant Analysis

Main Street (name)	**2nd Ave W**	**Direction (EW or NS)**	**NS**	**Road Authority:**	**City of Prince Albert**
Side Street (name)	**32nd St W**	**Direction (EW or NS)**	**EW**	**City:**	**City of Prince Albert**
Quadrant / Int #	**1**	**Comments**	**Enter Comments about the analysis here.**	**Analysis Date:**	**2016 Dec 19, Mon**
for Warrant Calculation Results, please hit 'Page Down'	**CHECK SHEET**			**Count Date:**	**2016 Oct 27, Thu**
				Date Entry Format:	(yyyy-mm-dd)

Lane Configuration		Excl LT	Th & LT	Through	Th+RT+LT	Th & RT	Excl RT	RT Channelization (y/n)	UpStream Signal (m)	# of Thru Lanes	LT Phase Type	RTOR Allowed (y/n)	Actuated Thru Phase
2nd Ave W	NB	1		2			1	n	297	2			
2nd Ave W	SB	1		2			1	n	609	2			
32nd St W	WB		1			1		n	333	2			
32nd St W	EB		1			1		n	393	2			

Saturation Flow Rates (if not default) (vphpl)		**Default Saturation Flow Rates (vphpl)**
Left Turn		1,650
Through		1,800
Right Turn		1,500

Are the 32nd St W WB right turns significantly impeded by through movements? (y/n)	n
Are the 32nd St W EB right turns significantly impeded by through movements? (y/n)	n
	n

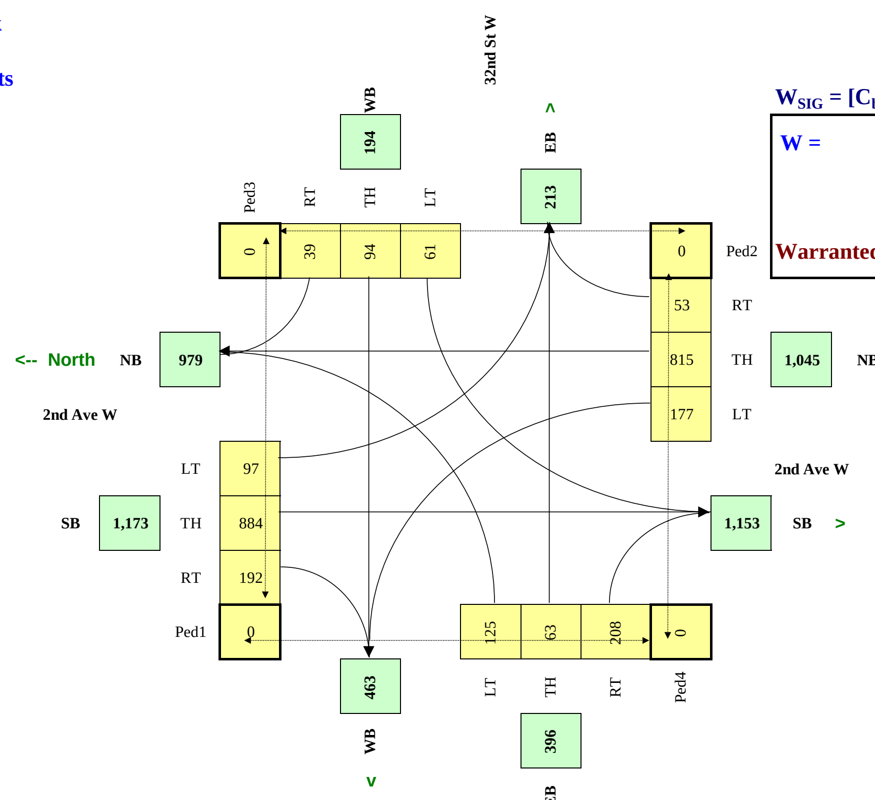
Demographics		
Elem. School/Mobility Challenged	(y/n)	n
Senior's Complex	(y/n)	n
Pathway to School	(y/n)	n
Metro Area Population	(#)	35,000
Central Business District	(y/n)	n

Other input		Speed (Km/h)	Truck %	Bus Rt (y/n)	Median (m)
2nd Ave W	NS	50	5.0%	n	1.5
32nd St W	EW		2.0%	n	

Set Peak Hours

Traffic Input	**NB**			**SB**			**WB**			**EB**			**Ped1 NS**	**Ped2 NS**	**Ped3 EW**	**Ped4 EW**
	LT	**Th**	**RT**	**LT**	**Th**	**RT**	**LT**	**Th**	**RT**	**LT**	**Th**	**RT**	**W Side**	**E Side**	**N Side**	**S Side**
8:00 - 9:00																
9:00 - 10:00																
11:00 - 12:00																
12:00-13:00																
16:00-17:00	177	815	53	97	884	192	61	94	39	125	63	208				
17:00-18:00																
Total (PM Peak Hour)	**177**	**815**	**53**	**97**	**884**	**192**	**61**	**94**	**39**	**125**	**63**	**208**	**0**	**0**	**0**	**0**
Average(PM Peak Hour)	**177**	**815**	**53**	**97**	**884**	**192**	**61**	**94**	**39**	**125**	**63**	**208**	**0**	**0**	**0**	**0**
Actual Pedestrian Crossing Distance (m)																

PM Peak Turning Movements



$$W_{SIG} = [C_{bt}(X_{v\text{-}v}) / K_1 + (F\ (X_{v\text{-}p})\ L) / K_2] \times C_i$$

W =	**538**	**538**	**0**
		Veh	***Ped***

Warranted

RESET SHEET

City of Prince Albert - Traffic Signal & Pedestrian Signal Head Warrant Analysis

Main Street (name)	2nd Ave W	Direction (EW or NS)	NS	Road Authority:	City of Prince Albert
Side Street (name)	Marquis Road	Direction (EW or NS)	EW	City:	City of Prince Albert
Quadrant / Int #	1	Comments	Enter Comments about the analysis here.	Analysis Date:	2016 Dec 19, Mon
	CHECK SHEET			Count Date:	2016 Nov 02, Wed
				Date Entry Format:	(yyyy-mm-dd)

for Warrant Calculation Results, please hit 'Page Down'

Lane Configuration		Excl LT	Th & LT	Through	Th+RT+LT	Th & RT	Excl RT	RT Channelization (y/n)	UpStream Signal (m)	# of Thru Lanes	LT Phase Type	RTOR Allowed (y/n)	Actuated Thru Phase
2nd Ave W	NB	1		2			1	n	297	2			
2nd Ave W	SB	1		2			1	n	609	2			
Marquis Road	WB		1			1		n	333	2			
Marquis Road	EB		1			1		n	393	2			

Are the Marquis Road WB right turns significantly impeded by through movements? (y/n)	n
Are the Marquis Road EB right turns significantly impeded by through movements? (y/n)	n
	n

Saturation Flow Rates (if not default) (vphpl)		Default Saturation Flow Rates (vphpl)
Left Turn		1,650
Through		1,800
Right Turn		1,500

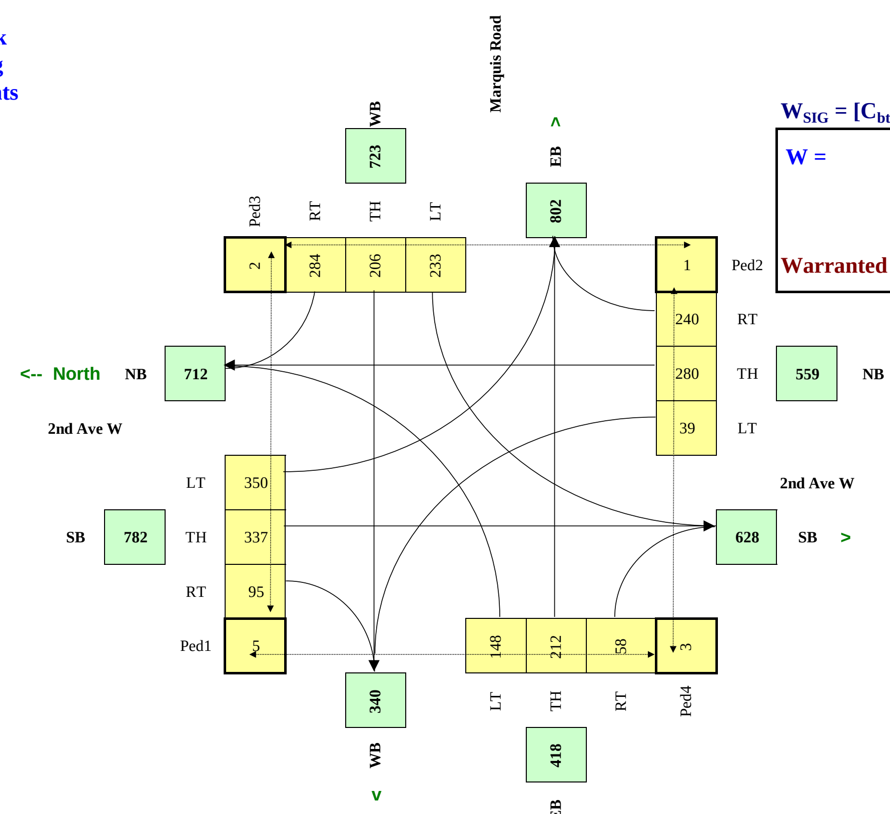
Demographics		
Elem. School/Mobility Challenged	(y/n)	n
Senior's Complex	(y/n)	n
Pathway to School	(y/n)	n
Metro Area Population	(#)	35,000
Central Business District	(y/n)	n

Other input		Speed (Km/h)	Truck %	Bus Rt (y/n)	Median (m)
2nd Ave W	NS	50	5.0%	n	1.5
Marquis Road	EW	50	2.0%	n	1.5

Set Peak Hours

Traffic Input	NB			SB			WB			EB			Ped1 NS	Ped2 NS	Ped3 EW	Ped4 EW
	LT	Th	RT	LT	Th	RT	LT	Th	RT	LT	Th	RT	W Side	E Side	N Side	S Side
8:00 - 9:00																
9:00 - 10:00																
11:00 - 12:00																
12:00-13:00																
16:00-17:00	39	280	240	350	337	95	233	206	284	148	212	58	5	1	2	3
17:00-18:00																
Total (PM Peak Hour)	39	280	240	350	337	95	233	206	284	148	212	58	5	1	2	3
Average(PM Peak Hour)	39	280	240	350	337	95	233	206	284	148	212	58	5	1	2	3
Actual Pedestrian Crossing Distance (m)																

PM Peak Turning Movements



$$W_{SIG} = [C_{bt}(X_{v-v}) / K_1 + (F\ (X_{v-p})\ L) / K_2] \times C_i$$

W =	605	598	7
		Veh	Ped

Warranted

RESET SHEET

Traffic Signal Warrant Spreadsheet - v2.0 © 2014 Transportation Association of Canada

Intersection on Central Avenue

City of Prince Albert - Traffic Signal & Pedestrian Signal Head Warrant Analysis

Main Street (name)	**Central Ave**	**Direction (EW or NS)**	**NS**	**Road Authority:**	**City of Prince Albert**
Side Street (name)	**22nd St**	**Direction (EW or NS)**	**EW**	**City:**	**City of Prince Albert**
Quadrant / Int #	**1**	**Comments**	**Enter Comments about the analysis here.**	**Analysis Date:**	**2016 Dec 20, Tue**
	CHECK SHEET			**Count Date:**	**2016 Oct 25, Tue**
				Date Entry Format:	(yyyy-mm-dd)

for Warrant Calculation Results, please hit 'Page Down'

Lane Configuration		Excl LT	Th & LT	Through	Th+RT+LT	Th & RT	Excl RT	RT Channelization (y/n)	UpStream Signal (m)	# of Thru Lanes	LT Phase Type	RTOR Allowed (y/n)	Actuated Thru Phase
Central Ave	NB				1			n		1			
Central Ave	SB				1			n		1			
22nd St	WB				1			n		1			
22nd St	EB				1			n		1			

Saturation Flow Rates (if not default) (vphpl)		**Default Saturation Flow Rates (vphpl)**
Left Turn		1,650
Through		1,800
Right Turn		1,500

Are the 22nd St WB right turns significantly impeded by through movements? (y/n)	n
Are the 22nd St EB right turns significantly impeded by through movements? (y/n)	n
Are the Central Ave NB right turns significantly impeded by through movements? (y/n)	n
Are the Central Ave SB right turns significantly impeded by through movements? (y/n)	n

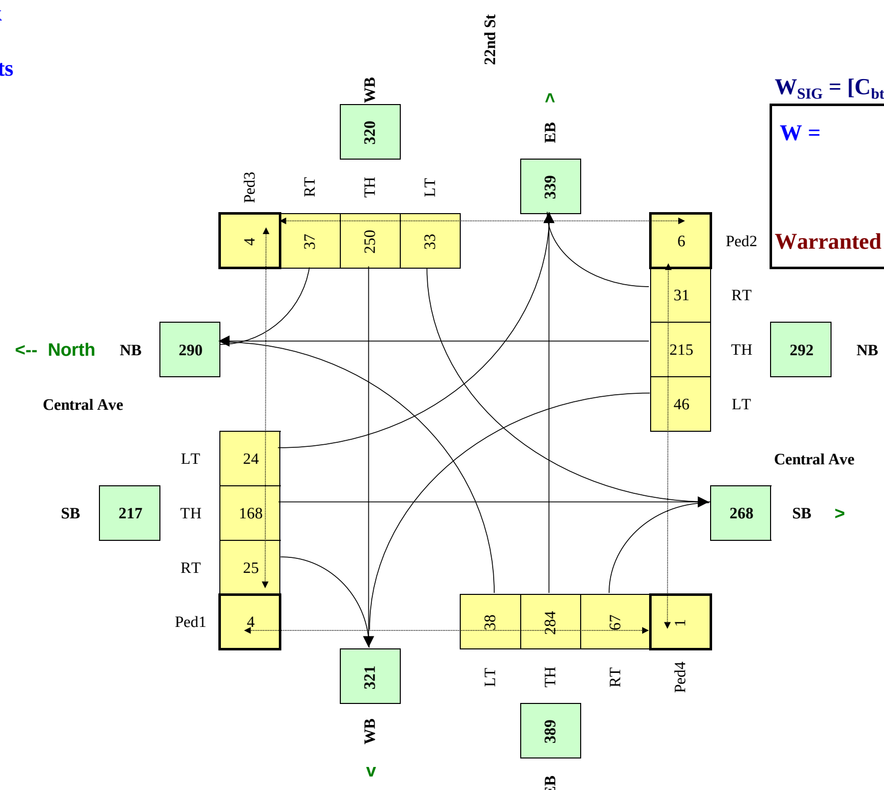
Demographics		
Elem. School/Mobility Challenged	(y/n)	n
Senior's Complex	(y/n)	n
Pathway to School	(y/n)	n
Metro Area Population	(#)	35,000
Central Business District	(y/n)	n

Other input		Speed (Km/h)	Truck %	Bus Rt (y/n)	Median (m)
Central Ave	NS	50	5.0%	n	1.5
22nd St	EW	50	2.0%	n	

Set Peak Hours

Traffic Input	**NB**			**SB**			**WB**			**EB**			**Ped1 NS**	**Ped2 NS**	**Ped3 EW**	**Ped4 EW**
	LT	**Th**	**RT**	**LT**	**Th**	**RT**	**LT**	**Th**	**RT**	**LT**	**Th**	**RT**	**W Side**	**E Side**	**N Side**	**S Side**
8:00 - 9:00																
9:00 - 10:00																
11:00 - 12:00																
12:00-13:00																
16:00-17:00	46	215	31	24	168	25	33	250	37	38	284	67	4	6	4	1
17:00-18:00																
Total (PM Peak Hour)	**46**	**215**	**31**	**24**	**168**	**25**	**33**	**250**	**37**	**38**	**284**	**67**	**4**	**6**	**4**	**1**
Average(PM Peak Hour)	**46**	**215**	**31**	**24**	**168**	**25**	**33**	**250**	**37**	**38**	**284**	**67**	**4**	**6**	**4**	**1**
												Actual Pedestrian Crossing Distance (m)				

PM Peak Turning Movements



$$W_{SIG} = [C_{bt}(X_{v-v}) / K_1 + (F\ (X_{v-p})\ L) / K_2] \times C_i$$

W =	**220**	**217**	**3**
		Veh	***Ped***
Warranted			

RESET SHEET

City of Prince Albert - Traffic Signal & Pedestrian Signal Head Warrant Analysis

Main Street (name)	28th St W		**Direction (EW or NS)**	EW		**Road Authority:**	City of Prince Albert
Side Street (name)	Central Ave		**Direction (EW or NS)**	NS		**City:**	City of Prince Albert
Quadrant / Int #	1	**Comments**	Enter Comments about the analysis here.			**Analysis Date:**	2016 Dec 19, Mon
for Warrant Calculation Results, please hit 'Page Down'	CHECK SHEET					**Count Date:**	2016 Oct 20, Thu
						Date Entry Format:	(yyyy-mm-dd)

Lane Configuration		Excl LT	Th & LT	Through	Th+RT+LT	Th & RT	Excl RT	RT Channelization (y/n)	UpStream Signal (m)	# of Thru Lanes	LT Phase Type	RTOR Allowed (y/n)	Actuated Thru Phase
28th St W	WB		1				1	n	341	1			
28th St W	EB	1		1			1	n	393	1			
Central Ave	NB		1				1	n	887	1			
Central Ave	SB		1				1	n	1,377	1			
							n						
							n						
							n						

	Saturation Flow Rates (if not default) (vphpl)	Default Saturation Flow Rates (vphpl)
Left Turn		1,650
Through		1,800
Right Turn		1,500

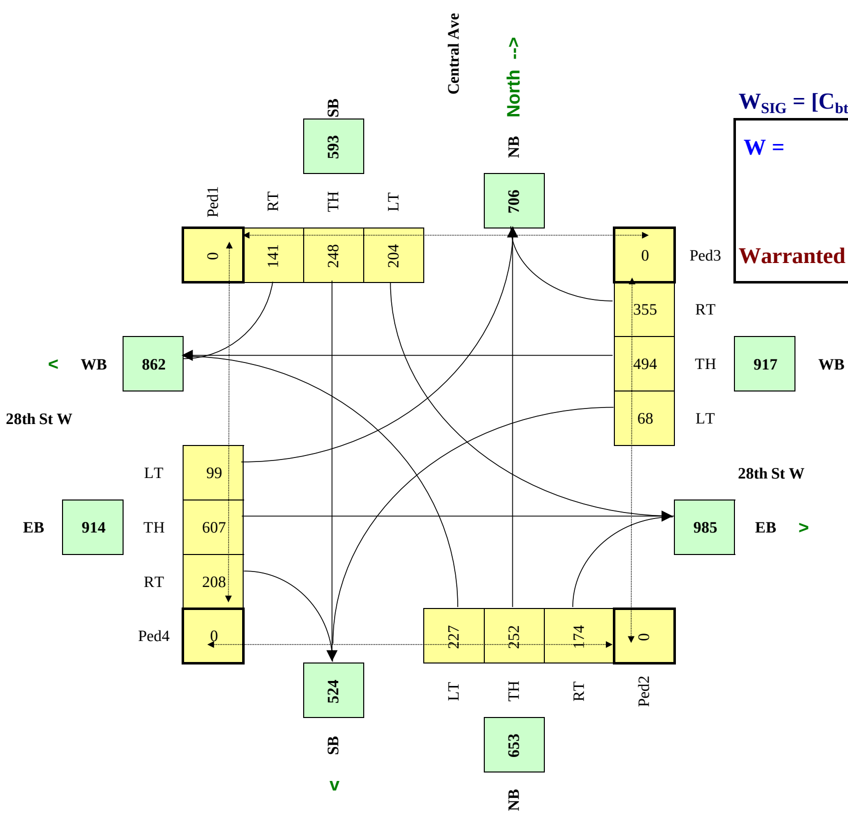
Demographics		
Elem. School/Mobility Challenged	(y/n)	n
Senior's Complex	(y/n)	n
Pathway to School	(y/n)	n
Metro Area Population	(#)	35,000
Central Business District	(y/n)	n

Other input		Speed (Km/h)	Truck %	Bus Rt (y/n)	Median (m)
28th St W	EW	50	5.0%	n	
Central Ave	NS	50	2.0%	n	

Set Peak Hours

Traffic Input	NB			SB			WB			EB			Ped1 NS	Ped2 NS	Ped3 EW	Ped4 EW
	LT	Th	RT	LT	Th	RT	LT	Th	RT	LT	Th	RT	W Side	E Side	N Side	S Side
8:00 - 9:00																
9:00 - 10:00																
11:00 - 12:00																
12:00-13:00																
16:00-17:00	227	252	174	204	248	141	68	494	355	99	607	208				
17:00-18:00																
Total (PM Peak Hour)	**227**	**252**	**174**	**204**	**248**	**141**	**68**	**494**	**355**	**99**	**607**	**208**	**0**	**0**	**0**	**0**
Average(PM Peak Hour)	**227**	**252**	**174**	**204**	**248**	**141**	**68**	**494**	**355**	**99**	**607**	**208**	**0**	**0**	**0**	**0**
Actual Pedestrian Crossing Distance (m)																

PM Peak Turning Movements



$$W_{SIG} = [C_{bt}(X_{v\text{-}v}) / K_1 + (F\,(X_{v\text{-}p})\,L) / K_2] \times C_i$$

W =	**961**	**961**	**0**
		Veh	***Ped***
Warranted			

RESET SHEET

City of Prince Albert - Traffic Signal & Pedestrian Signal Head Warrant Analysis

Main Street (name)	**Maquis Road**	**Direction (EW or NS)**	**EW**	**Road Authority:**	**City of Prince Albert**
Side Street (name)	**Central Ave**	**Direction (EW or NS)**	**NS**	**City:**	**City of Prince Albert**
Quadrant / Int #	**1**	**Comments**	**Enter Comments about the analysis here.**	**Analysis Date:**	**2016 Dec 19, Mon**
	CHECK SHEET			**Count Date:**	**2016 Oct 20, Thu**
for Warrant Calculation Results, please hit 'Page Down'				**Date Entry Format:**	(yyyy-mm-dd)

Lane Configuration		Excl LT	Th & LT	Through	Th+RT+LT	Th & RT	Excl RT	RT Channelization (y/n)	UpStream Signal (m)	# of Thru Lanes	LT Phase Type	RTOR Allowed (y/n)	Actuated Thru Phase
Maquis Road	WB	1		1		1		n	341	2			
Maquis Road	EB	1		1		1		n	393	2			
Central Ave	NB		1				1	n	887	1			
Central Ave	SB			1			1	n	1,377	1			
							n						
							n						
Are the Maquis Road WB right turns significantly impeded by through movements? (y/n)							n						
Are the Maquis Road EB right turns significantly impeded by through movements? (y/n)													

Saturation Flow Rates (if not default) (vphpl)		**Default Saturation Flow Rates (vphpl)**
Left Turn		1,650
Through		1,800
Right Turn		1,500

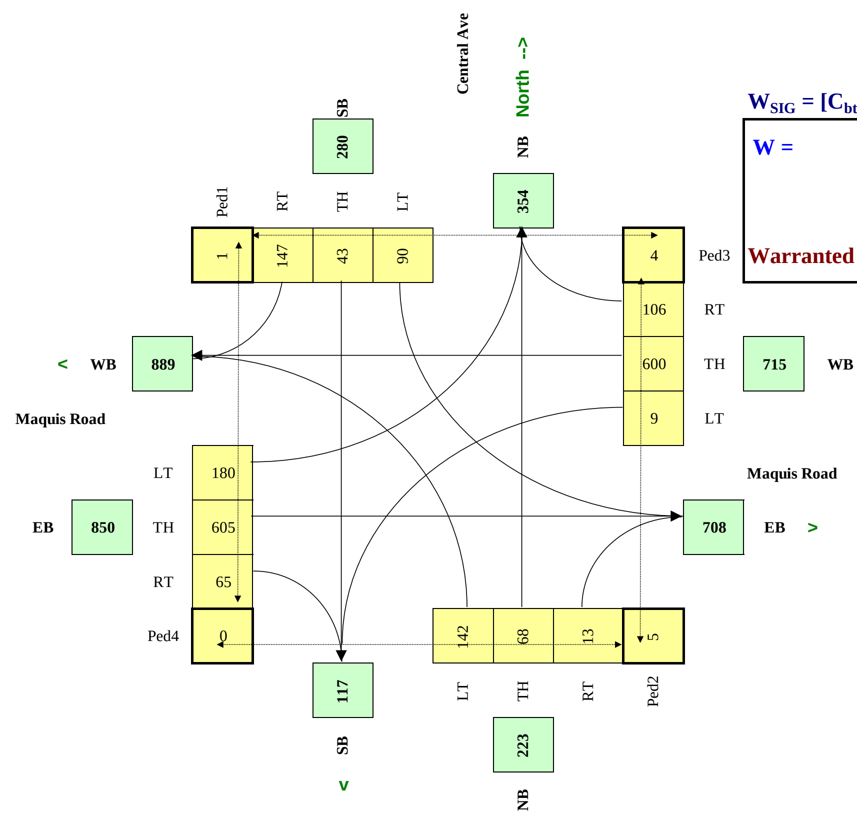
Demographics		
Elem. School/Mobility Challenged	(y/n)	n
Senior's Complex	(y/n)	n
Pathway to School	(y/n)	n
Metro Area Population	(#)	35,000
Central Business District	(y/n)	n

Other input		Speed (Km/h)	Truck %	Bus Rt (y/n)	Median (m)
Maquis Road	EW	50	5.0%	n	
Central Ave	NS	50	2.0%	n	

Set Peak Hours

Traffic Input	**NB** LT	**NB** Th	**NB** RT	**SB** LT	**SB** Th	**SB** RT	**WB** LT	**WB** Th	**WB** RT	**EB** LT	**EB** Th	**EB** RT	**Ped1 NS** W Side	**Ped2 NS** E Side	**Ped3 EW** N Side	**Ped4 EW** S Side
8:00 - 9:00																
9:00 - 10:00																
11:00 - 12:00																
12:00-13:00																
16:00-17:00	142	68	13	90	43	147	9	600	106	180	605	65	1	5	4	0
17:00-18:00																
Total (PM Peak Hour)	**142**	**68**	**13**	**90**	**43**	**147**	**9**	**600**	**106**	**180**	**605**	**65**	**1**	**5**	**4**	**0**
Average(PM Peak Hour)	**142**	**68**	**13**	**90**	**43**	**147**	**9**	**600**	**106**	**180**	**605**	**65**	**1**	**5**	**4**	**0**
Actual Pedestrian Crossing Distance (m)																

PM Peak Turning Movements



$$W_{SIG} = [C_{bt}(X_{v-v}) / K_1 + (F (X_{v-p}) L) / K_2] \times C_i$$

W =	**345**	**335**	**10**
		Veh	***Ped***
Warranted			

RESET SHEET

Traffic Signal Warrant Spreadsheet - v2.0 © 2014 Transportation Association of Canada

City of Prince Albert - Traffic Signal & Pedestrian Signal Head Warrant Analysis

Main Street (name)	**Central Ave**		**Direction (EW or NS)**	**NS**	**Road Authority:**	**City of Prince Albert**
Side Street (name)	**22nd St**		**Direction (EW or NS)**	**EW**	**City:**	**City of Prince Albert**
Quadrant / Int #	**1**	**Comments**	**Enter Comments about the analysis here.**		**Analysis Date:**	**2016 Dec 20, Tue**
for Warrant Calculation Results, please hit 'Page Down'	**CHECK SHEET**				**Count Date:**	**2016 Oct 25, Tue**
					Date Entry Format:	(yyyy-mm-dd)

Lane Configuration		Excl LT	Th & LT	Through	Th+RT+LT	Th & RT	Excl RT	RT Channelization (y/n)	UpStream Signal (m)	# of Thru Lanes	LT Phase Type	RTOR Allowed (y/n)	Actuated Thru Phase
Central Ave	NB				1			n		1			
Central Ave	SB				1			n		1			
22nd St	WB				1			n		1			
22nd St	EB				1			n		1			

Saturation Flow Rates (if not default) (vphpl)		**Default Saturation Flow Rates (vphpl)**
Left Turn		1,650
Through		1,800
Right Turn		1,500

Are the 22nd St WB right turns significantly impeded by through movements? (y/n)	n
Are the 22nd St EB right turns significantly impeded by through movements? (y/n)	n
Are the Central Ave NB right turns significantly impeded by through movements? (y/n)	n
Are the Central Ave SB right turns significantly impeded by through movements? (y/n)	n

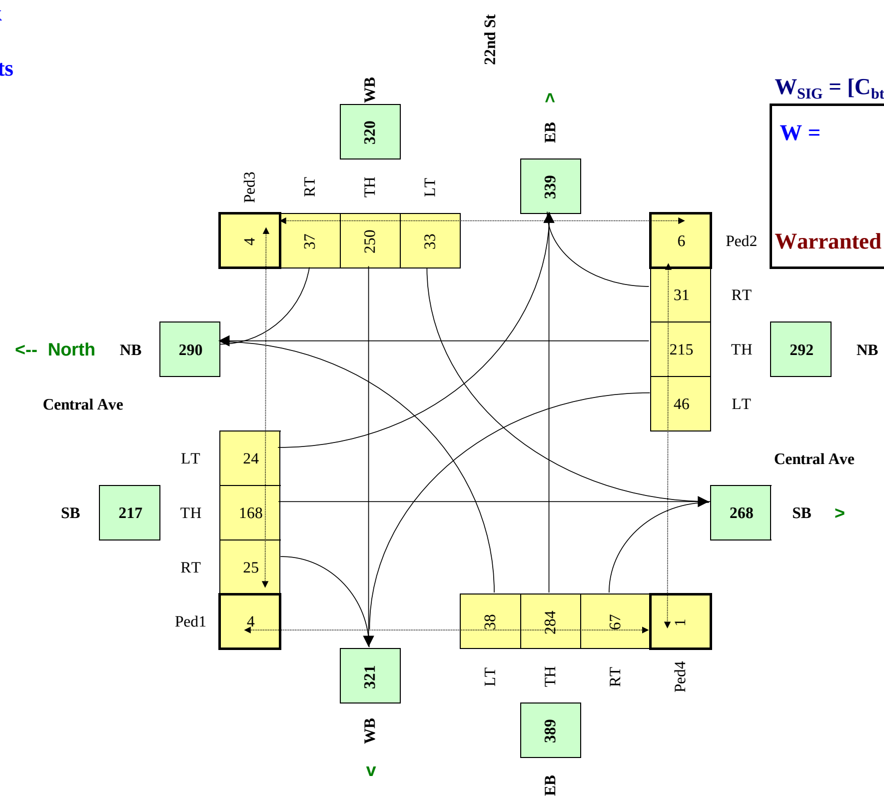
Demographics		
Elem. School/Mobility Challenged	(y/n)	n
Senior's Complex	(y/n)	n
Pathway to School	(y/n)	n
Metro Area Population	(#)	35,000
Central Business District	(y/n)	n

Other input		Speed (Km/h)	Truck %	Bus Rt (y/n)	Median (m)
Central Ave	NS	50	5.0%	n	1.5
22nd St	EW	50	2.0%	n	

Set Peak Hours

Traffic Input	**NB**			**SB**			**WB**			**EB**			**Ped1 NS**	**Ped2 NS**	**Ped3 EW**	**Ped4 EW**
	LT	**Th**	**RT**	**LT**	**Th**	**RT**	**LT**	**Th**	**RT**	**LT**	**Th**	**RT**	**W Side**	**E Side**	**N Side**	**S Side**
8:00 - 9:00																
9:00 - 10:00																
11:00 - 12:00																
12:00-13:00																
16:00-17:00	46	215	31	24	168	25	33	250	37	38	284	67	4	6	4	1
17:00-18:00																
Total (PM Peak Hour)	**46**	**215**	**31**	**24**	**168**	**25**	**33**	**250**	**37**	**38**	**284**	**67**	**4**	**6**	**4**	**1**
Average(PM Peak Hour)	**46**	**215**	**31**	**24**	**168**	**25**	**33**	**250**	**37**	**38**	**284**	**67**	**4**	**6**	**4**	**1**
												Actual Pedestrian Crossing Distance (m)				

PM Peak Turning Movements



$$W_{SIG} = [C_{bt}(X_{v-v}) / K_1 + (F (X_{v-p}) L) / K_2] \times C_i$$

W =	**220**	**217**	**3**
		Veh	***Ped***
Warranted			

RESET SHEET

Intersection on 6th Avenue East

City of Prince Albert - Traffic Signal & Pedestrian Signal Head Warrant Analysis

Main Street (name)	**6th Ave E**	**Direction (EW or NS)**	**NS**	**Road Authority:**	**City of Prince Albert**
Side Street (name)	**15th St E**	**Direction (EW or NS)**	**EW**	**City:**	**City of Prince Albert**
Quadrant / Int #	**1**	**Comments**	**Enter Comments about the analysis here.**	**Analysis Date:**	**2016 Dec 19, Mon**
	CHECK SHEET			**Count Date:**	**2016 Oct 27, Thu**
				Date Entry Format:	(yyyy-mm-dd)

for Warrant Calculation Results, please hit 'Page Down'

Lane Configuration		Excl LT	Th & LT	Through	Th+RT+LT	Th & RT	Excl RT	RT Channelization (y/n)	UpStream Signal (m)	# of Thru Lanes	LT Phase Type	RTOR Allowed (y/n)	Actuated Thru Phase
6th Ave E	NB	1		2			1	y	385	2			
6th Ave E	SB	1		2			1	n	204	2			
15th St E	WB	2		1			1	n	167	1			
15th St E	EB	1		2			1	y	253	2			
							n						
							n						
							n						
							n						

	Saturation Flow Rates (if not default) (vphpl)	**Default Saturation Flow Rates (vphpl)**
Left Turn		1,650
Through		1,800
Right Turn		1,500

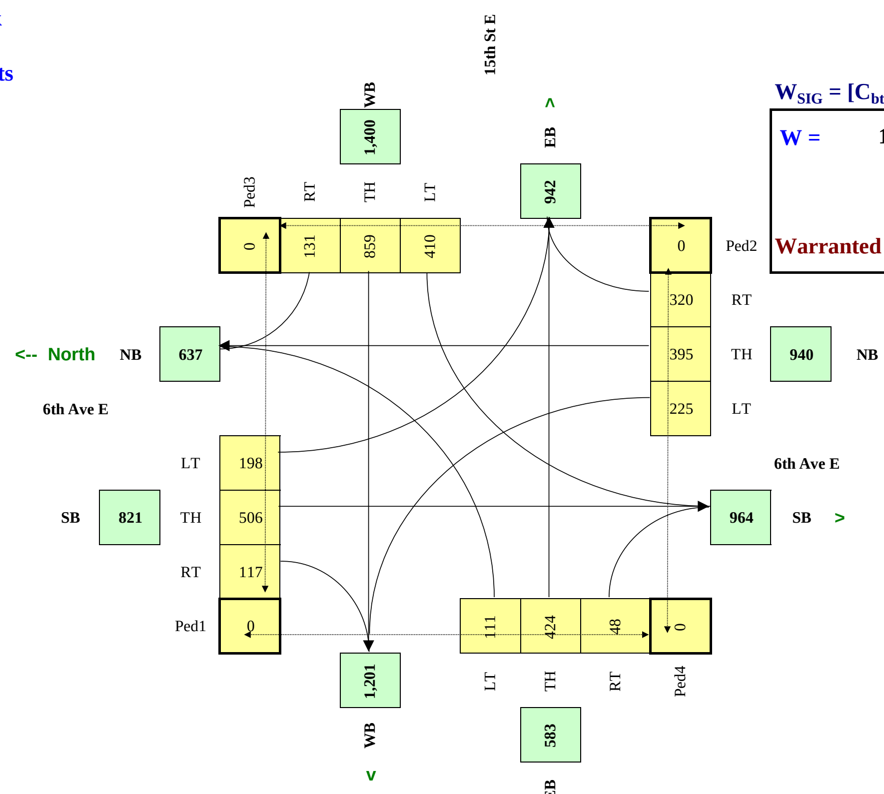
Demographics		
Elem. School/Mobility Challenged	(y/n)	n
Senior's Complex	(y/n)	n
Pathway to School	(y/n)	n
Metro Area Population	(#)	35,000
Central Business District	(y/n)	n

Other input		Speed (Km/h)	Truck %	Bus Rt (y/n)	Median (m)
6th Ave E	NS	50	5.0%	n	1.5
15th St E	EW	50	2.0%	n	1.5

Set Peak Hours

Traffic Input	**NB**			**SB**			**WB**			**EB**			**Ped1 NS**	**Ped2 NS**	**Ped3 EW**	**Ped4 EW**
	LT	**Th**	**RT**	**LT**	**Th**	**RT**	**LT**	**Th**	**RT**	**LT**	**Th**	**RT**	**W Side**	**E Side**	**N Side**	**S Side**
8:00 - 9:00																
9:00 - 10:00																
11:00 - 12:00																
12:00-13:00																
16:00-17:00	225	395	320	198	506	117	410	859	131	111	424	48				
17:00-18:00																
Total (PM Peak Hour)	**225**	**395**	**320**	**198**	**506**	**117**	**410**	**859**	**131**	**111**	**424**	**48**	**0**	**0**	**0**	**0**
Average(PM Peak Hour)	**225**	**395**	**320**	**198**	**506**	**117**	**410**	**859**	**131**	**111**	**424**	**48**	**0**	**0**	**0**	**0**
Actual Pedestrian Crossing Distance (m)																

PM Peak Turning Movements



$$W_{SIG} = [C_{bt}(X_{v-v}) / K_1 + (F (X_{v-p}) L) / K_2] \times C_i$$

W =	**1,490**	**1,490**	**0**
		Veh	***Ped***
Warranted			

RESET SHEET

City of Prince Albert - Traffic Signal & Pedestrian Signal Head Warrant Analysis

Main Street (name)	**6th Ave E**	**Direction (EW or NS)**	**NS**	**Road Authority:**	**City of Prince Albert**
Side Street (name)	**22nd St E**	**Direction (EW or NS)**	**EW**	**City:**	**City of Prince Albert**
Quadrant / Int #	**1**	**Comments**	**Enter Comments about the analysis here.**	**Analysis Date:**	**2016 Dec 19, Mon**
	CHECK SHEET			**Count Date:**	**2016 Oct 27, Thu**
for Warrant Calculation Results, please hit 'Page Down'				**Date Entry Format:**	(yyyy-mm-dd)

Lane Configuration		Excl LT	Th & LT	Through	Th+RT+LT	Th & RT	Excl RT	RT Channelization (y/n)	UpStream Signal (m)	# of Thru Lanes	LT Phase Type	RTOR Allowed (y/n)	Actuated Thru Phase
6th Ave E	NB	1		2			1	n	222	2			
6th Ave E	SB	1		2			1	n	314	2			
22nd St E	WB		1				1	n	5,000	1			
22nd St E	EB		1				1	n	661	1			
							n						
							n						
							n						
							n						

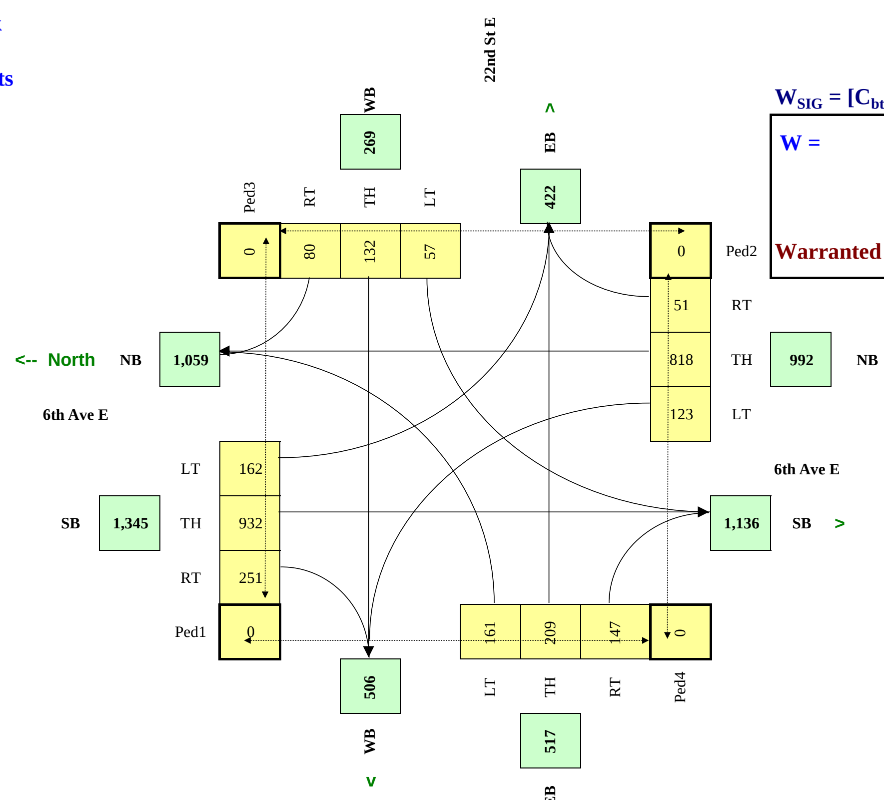
Saturation Flow Rates (if not default) (vphpl)		**Default Saturation Flow Rates (vphpl)**
Left Turn		1,650
Through		1,800
Right Turn		1,500

Demographics		
Elem. School/Mobility Challenged	(y/n)	n
Senior's Complex	(y/n)	n
Pathway to School	(y/n)	n
Metro Area Population	(#)	35,000
Central Business District	(y/n)	n

Other input		Speed (Km/h)	Truck %	Bus Rt (y/n)	Median (m)
6th Ave E	NS	50	5.0%	n	1.5
22nd St E	EW	50	2.0%	n	1.5

Set Peak Hours	NB			SB			WB			EB			Ped1 NS	Ped2 NS	Ped3 EW	Ped4 EW
Traffic Input	**LT**	**Th**	**RT**	**LT**	**Th**	**RT**	**LT**	**Th**	**RT**	**LT**	**Th**	**RT**	**W Side**	**E Side**	**N Side**	**S Side**
8:00 - 9:00																
9:00 - 10:00																
11:00 - 12:00																
12:00-13:00																
16:00-17:00																
17:00-18:00	123	818	51	162	932	251	57	132	80	161	209	147				
Total (PM Peak Hour)	**123**	**818**	**51**	**162**	**932**	**251**	**57**	**132**	**80**	**161**	**209**	**147**	**0**	**0**	**0**	**0**
Average(PM Peak Hour)	**123**	**818**	**51**	**162**	**932**	**251**	**57**	**132**	**80**	**161**	**209**	**147**	**0**	**0**	**0**	**0**
Actual Pedestrian Crossing Distance (m)																

PM Peak Turning Movements



$$W_{SIG} = [C_{bt}(X_{v\text{-}v}) / K_1 + (F\ (X_{v\text{-}p})\ L) / K_2] \times C_i$$

W =	**750**	**750**	**0**
		Veh	***Ped***
Warranted			

RESET SHEET

City of Prince Albert - Traffic Signal & Pedestrian Signal Head Warrant Analysis

Main Street (name)	**6th Ave E**	**Direction (EW or NS)**	**NS**	**Road Authority:**	**City of Prince Albert**
Side Street (name)	**28th St E**	**Direction (EW or NS)**	**EW**	**City:**	**City of Prince Albert**
Quadrant / Int #	**1**	**Comments**	**Enter Comments about the analysis here.**	**Analysis Date:**	**2016 Dec 19, Mon**
for Warrant Calculation Results, please hit 'Page Down'	**CHECK SHEET**			**Count Date:**	**2016 Oct 27, Thu**
				Date Entry Format:	(yyyy-mm-dd)

Lane Configuration		Excl LT	Th & LT	Through	Th+RT+LT	Th & RT	Excl RT	RT Channelization (y/n)	UpStream Signal (m)	# of Thru Lanes	LT Phase Type	RTOR Allowed (y/n)	Actuated Thru Phase
6th Ave E	NB	1		2			1	n	222	2			
6th Ave E	SB	1		2			1	n	314	2			
28th St E	WB	1		1			1	n	5,000	1			
28th St E	EB	1		1			1	n	661	1			
							n						
							n						
							n						
							n						

Saturation Flow Rates (if not default) (vphpl)		**Default Saturation Flow Rates (vphpl)**
Left Turn		1,650
Through		1,800
Right Turn		1,500

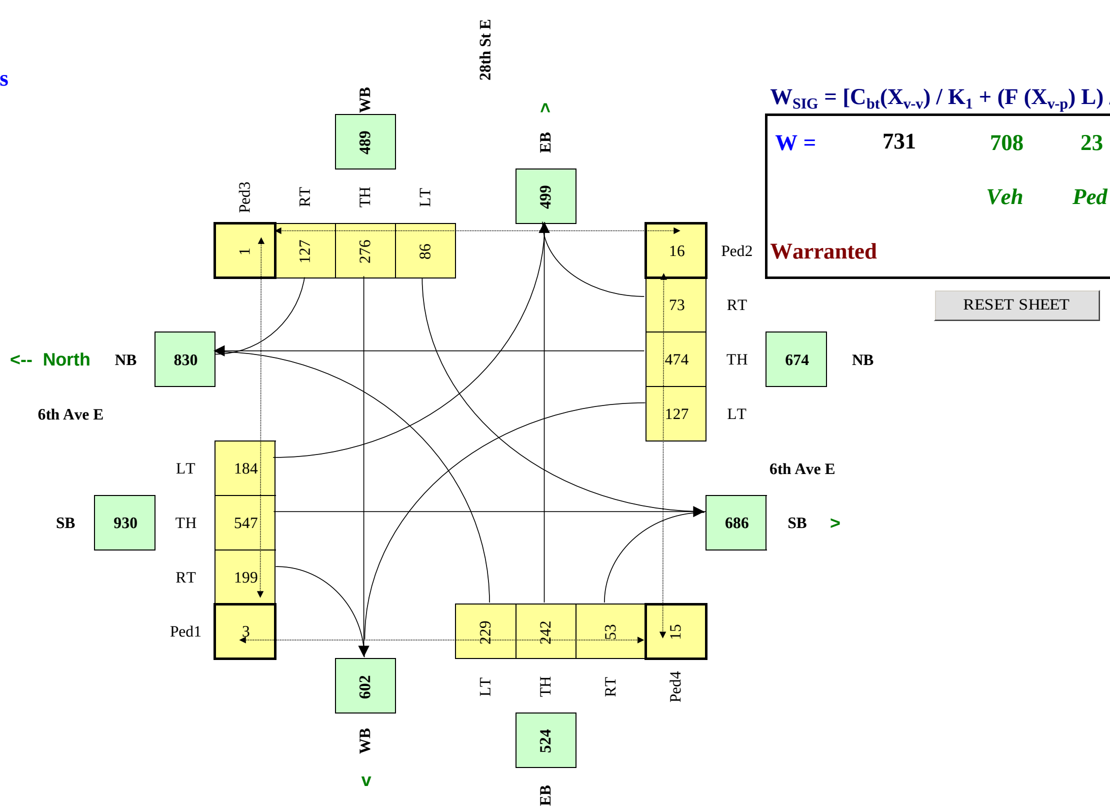
Demographics		
Elem. School/Mobility Challenged	(y/n)	n
Senior's Complex	(y/n)	n
Pathway to School	(y/n)	n
Metro Area Population	(#)	35,000
Central Business District	(y/n)	n

Other input		Speed (Km/h)	Truck %	Bus Rt (y/n)	Median (m)
6th Ave E	NS	50	5.0%	n	1.5
28th St E	EW	50	2.0%	n	1.5

Set Peak Hours

Traffic Input	**NB**			**SB**			**WB**			**EB**			**Ped1 NS**	**Ped2 NS**	**Ped3 EW**	**Ped4 EW**
	LT	**Th**	**RT**	**LT**	**Th**	**RT**	**LT**	**Th**	**RT**	**LT**	**Th**	**RT**	**W Side**	**E Side**	**N Side**	**S Side**
8:00 - 9:00																
9:00 - 10:00																
11:00 - 12:00																
12:00-13:00																
15:00-16:00	127	474	73	184	547	199	86	276	127	229	242	53	3	16	1	15
17:00-18:00																
Total (PM Peak Hour)	**127**	**474**	**73**	**184**	**547**	**199**	**86**	**276**	**127**	**229**	**242**	**53**	**3**	**16**	**1**	**15**
Average(PM Peak Hour)	**127**	**474**	**73**	**184**	**547**	**199**	**86**	**276**	**127**	**229**	**242**	**53**	**3**	**16**	**1**	**15**
Actual Pedestrian Crossing Distance (m)																

PM Peak Turning Movements



$$W_{SIG} = [C_{bt}(X_{v\text{-}v}) / K_1 + (F\ (X_{v\text{-}p})\ L) / K_2] \times C_i$$

W =	**731**	**708**	**23**
		Veh	***Ped***
Warranted			

RESET SHEET

City of Prince Albert - Traffic Signal & Pedestrian Signal Head Warrant Analysis

Main Street (name)	**6th Ave E**		**Direction (EW or NS)**	**NS**	**Road Authority:**	**City of Prince Albert**
Side Street (name)	**4th St E**		**Direction (EW or NS)**	**EW**	**City:**	**City of Prince Albert**
Quadrant / Int #	**1**	**Comments**	**Enter Comments about the analysis here.**		**Analysis Date:**	**2016 Dec 19, Mon**
for Warrant Calculation Results, please hit 'Page Down'	**CHECK SHEET**				**Count Date:**	**2016 Oct 24, Mon**
					Date Entry Format:	(yyyy-mm-dd)

Lane Configuration		Excl LT	Th & LT	Through	Th+RT+LT	Th & RT	Excl RT	RT Channelization (y/n)	UpStream Signal (m)	# of Thru Lanes	LT Phase Type	RTOR Allowed (y/n)	Actuated Thru Phase
6th Ave E	NB	2					1	n	927	0			
6th Ave E	SB							n	5,000	0			
4th St E	WB				1			n	1,709	1			
4th St E	EB				1			n	992	1			

Are the 4th St E WB right turns significantly impeded by through movements? (y/n)	n
Are the 4th St E EB right turns significantly impeded by through movements? (y/n)	n
	n
	n

Saturation Flow Rates (if not default) (vphpl)		**Default Saturation Flow Rates (vphpl)**
Left Turn		1,650
Through		1,800
Right Turn		1,500

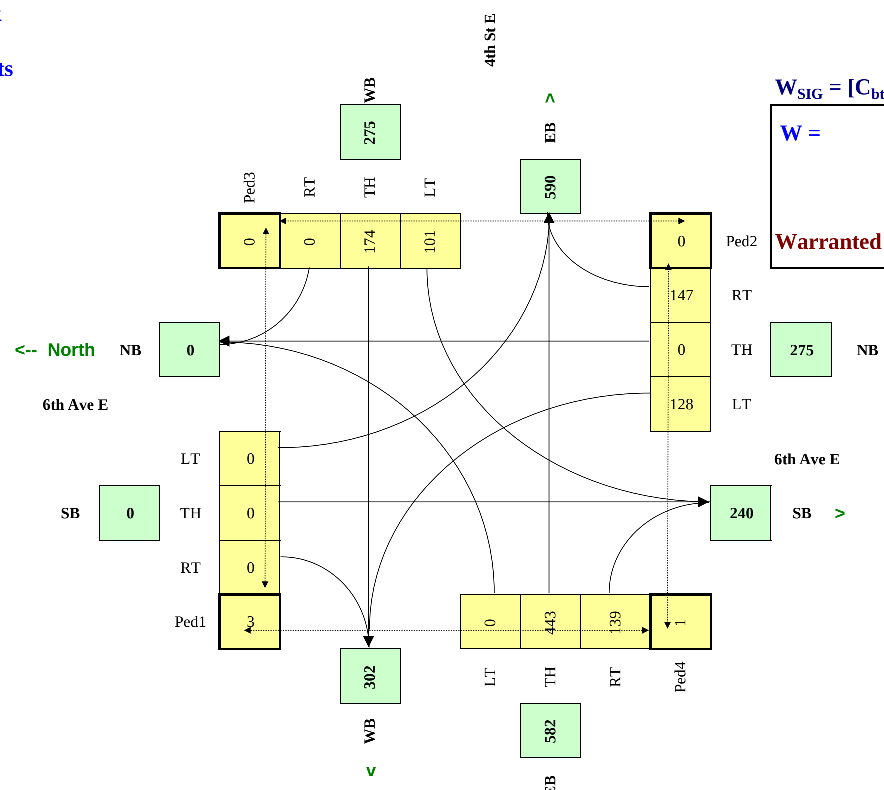
Demographics		
Elem. School/Mobility Challenged	(y/n)	n
Senior's Complex	(y/n)	n
Pathway to School	(y/n)	n
Metro Area Population	(#)	35,000
Central Business District	(y/n)	n

Other input		Speed (Km/h)	Truck %	Bus Rt (y/n)	Median (m)
6th Ave E	NS	50	5.0%	n	1.5
4th St E	EW	50	2.0%	n	

Set Peak Hours

Traffic Input	**NB**			**SB**			**WB**			**EB**			**Ped1 NS**	**Ped2 NS**	**Ped3 EW**	**Ped4 EW**
	LT	**Th**	**RT**	**LT**	**Th**	**RT**	**LT**	**Th**	**RT**	**LT**	**Th**	**RT**	**W Side**	**E Side**	**N Side**	**S Side**
8:00 - 9:00																
9:00 - 10:00																
11:00 - 12:00																
12:00-13:00																
16:00-17:00	128	0	147	0	0	0	101	174	0	0	443	139	3	0	0	1
17:00-18:00																
Total (PM Peak Hour)	**128**	**0**	**147**	**0**	**0**	**0**	**101**	**174**	**0**	**0**	**443**	**139**	**3**	**0**	**0**	**1**
Average(PM Peak Hour)	**128**	**0**	**147**	**0**	**0**	**0**	**101**	**174**	**0**	**0**	**443**	**139**	**3**	**0**	**0**	**1**
Actual Pedestrian Crossing Distance (m)																

PM Peak Turning Movements



$$W_{SIG} = [C_{bt}(X_{v-v}) / K_1 + (F\ (X_{v-p})\ L) / K_2] \times C_i$$

W =	**141**	**140**	**1**
		Veh	***Ped***

Warranted

RESET SHEET

City of Prince Albert - Traffic Signal & Pedestrian Signal Head Warrant Analysis

Main Street (name)	6th Ave E	Direction (EW or NS)	NS	Road Authority:	City of Prince Albert
Side Street (name)	Marquis Road	Direction (EW or NS)	EW	City:	City of Prince Albert
Quadrant / Int #	1	Comments	Enter Comments about the analysis here.	Analysis Date:	2016 Dec 19, Mon
	CHECK SHEET			Count Date:	2016 Oct 27, Thu
				Date Entry Format:	(yyyy-mm-dd)

for Warrant Calculation Results, please hit 'Page Down'

Lane Configuration		Excl LT	Th & LT	Through	Th+RT+LT	Th & RT	Excl RT	RT Channelization (y/n)	UpStream Signal (m)	# of Thru Lanes	LT Phase Type	RTOR Allowed (y/n)	Actuated Thru Phase
6th Ave E	NB	1		1			1	y	5,000	1			
6th Ave E	SB	1		1			1	n	808	1			
Marquis Road	WB	1		1			1	n	5,000	1			
Marquis Road	EB	1		1			1	y	486	1			
							n						
							n						
							n						
							n						

Saturation Flow Rates (if not default) (vphpl)		Default Saturation Flow Rates (vphpl)
Left Turn		1,650
Through		1,800
Right Turn		1,500

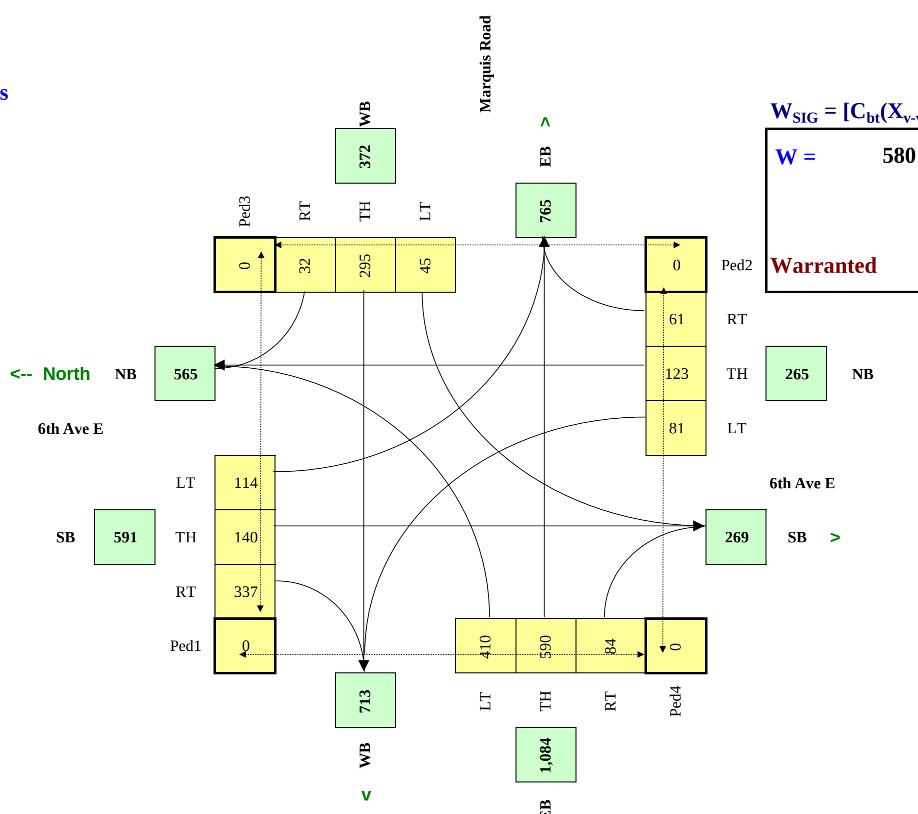
Demographics		
Elem. School/Mobility Challenged	(y/n)	n
Senior's Complex	(y/n)	n
Pathway to School	(y/n)	n
Metro Area Population	(#)	35,000
Central Business District	(y/n)	n

Other input		Speed (Km/h)	Truck %	Bus Rt (y/n)	Median (m)
6th Ave E	NS	50	5.0%	n	1.5
Marquis Road	EW	50	2.0%	n	1.5

Set Peak Hours

Traffic Input	NB			SB			WB			EB			Ped1 NS	Ped2 NS	Ped3 EW	Ped4 EW
	LT	Th	RT	LT	Th	RT	LT	Th	RT	LT	Th	RT	W Side	E Side	N Side	S Side
8:00 - 9:00																
9:00 - 10:00																
11:00 - 12:00																
12:00-13:00																
15:00-16:00																
17:00-18:00	81	123	61	114	140	337	45	295	32	410	590	84				
Total (PM Peak Hour)	81	123	61	114	140	337	45	295	32	410	590	84	0	0	0	0
Average(PM Peak Hour)	81	123	61	114	140	337	45	295	32	410	590	84	0	0	0	0
Actual Pedestrian Crossing Distance (m)																

PM Peak Turning Movements



$$W_{SIG} = [C_{bt}(X_{v\text{-}v}) / K_1 + (F\,(X_{v\text{-}p})\,L) / K_2] \times C_i$$

W =	580	580	0
		Veh	Ped

Warranted

RESET SHEET

Intersection on 15^{th} Avenue East

City of Prince Albert - Traffic Signal & Pedestrian Signal Head Warrant Analysis

Main Street (name)	15th Ave E	Direction (EW or NS)	NS	Road Authority:	City of Prince Albert
Side Street (name)	22nd St E	Direction (EW or NS)	EW	City:	City of Prince Albert
Quadrant / Int #	1	Comments	Enter Comments about the analysis here.	Analysis Date:	2016 Dec 19, Mon
	CHECK SHEET			Count Date:	2016 Oct 25, Tue
for Warrant Calculation Results, please hit 'Page Down'				Date Entry Format:	(yyyy-mm-dd)

Lane Configuration		Excl LT	Th & LT	Through	Th+RT+LT	Th & RT	Excl RT	RT Channelization (y/n)	UpStream Signal (m)	# of Thru Lanes	LT Phase Type	RTOR Allowed (y/n)	Actuated Thru Phase
15th Ave E	NB				1			n	333	1			
15th Ave E	SB				1			n	5,000	1			
22nd St E	WB				1			n	5,000	1			
22nd St E	EB				1			n	5,000	1			

Saturation Flow Rates (if not default) (vphpl)		Default Saturation Flow Rates (vphpl)
Left Turn		1,650
Through		1,800
Right Turn		1,500

Are the 22nd St E WB right turns significantly impeded by through movements? (y/n)	n
Are the 22nd St E EB right turns significantly impeded by through movements? (y/n)	n
Are the 15th Ave E NB right turns significantly impeded by through movements? (y/n)	n
Are the 15th Ave E SB right turns significantly impeded by through movements? (y/n)	

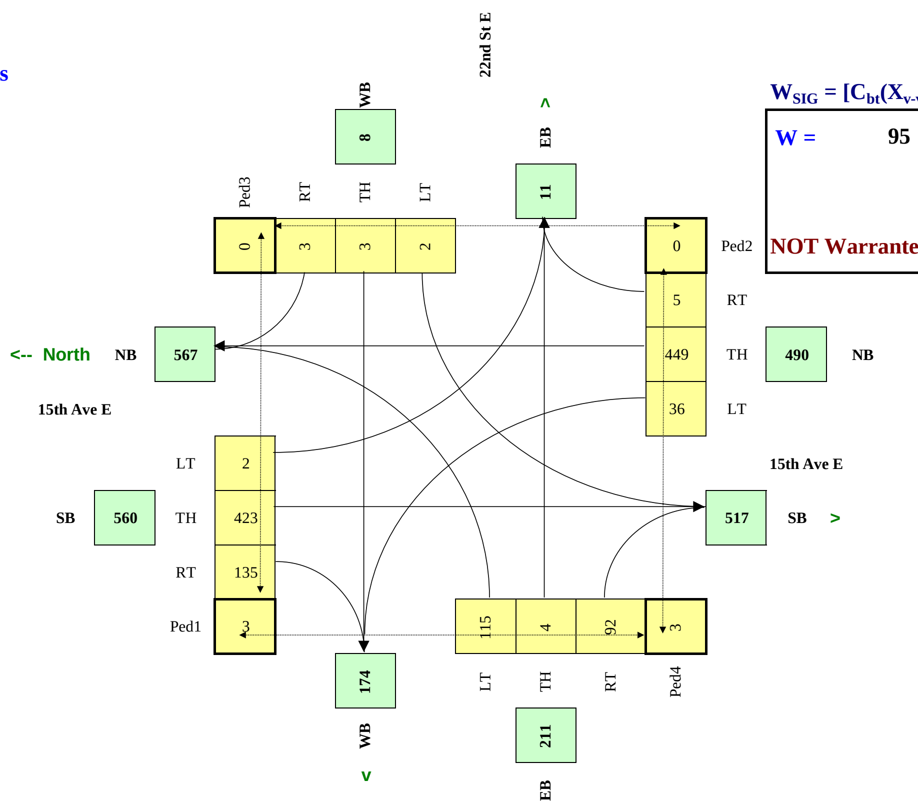
Demographics		
Elem. School/Mobility Challenged	(y/n)	n
Senior's Complex	(y/n)	n
Pathway to School	(y/n)	n
Metro Area Population	(#)	35,000
Central Business District	(y/n)	n

Other input		Speed (Km/h)	Truck %	Bus Rt (y/n)	Median (m)
15th Ave E	NS	50	5.0%	n	
22nd St E	EW	50	2.0%	n	

Set Peak Hours

Traffic Input	NB			SB			WB			EB			Ped1 NS	Ped2 NS	Ped3 EW	Ped4 EW
	LT	Th	RT	LT	Th	RT	LT	Th	RT	LT	Th	RT	W Side	E Side	N Side	S Side
8:00 - 9:00																
9:00 - 10:00																
11:00 - 12:00																
12:00-13:00																
16:00-17:00	36	449	5	2	423	135	2	3	3	115	4	92	3	0	0	3
17:00-18:00																
Total (PM Peak Hour)	**36**	**449**	**5**	**2**	**423**	**135**	**2**	**3**	**3**	**115**	**4**	**92**	**3**	**0**	**0**	**3**
Average(PM Peak Hour)	**36**	**449**	**5**	**2**	**423**	**135**	**2**	**3**	**3**	**115**	**4**	**92**	**3**	**0**	**0**	**3**
Actual Pedestrian Crossing Distance (m)																

PM Peak Turning Movements



$W_{SIG} = [C_{bt}(X_{v\text{-}v}) / K_1 + (F\ (X_{v\text{-}p})\ L) / K_2] \times C_i$

W =	95	92	3
		Veh	Ped

NOT Warranted

RESET SHEET

City of Prince Albert - Traffic Signal & Pedestrian Signal Head Warrant Analysis

Main Street (name)	**15th Ave E**	**Direction (EW or NS)**	**NS**	**Road Authority:**	**City of Prince Albert**
Side Street (name)	**22nd St E**	**Direction (EW or NS)**	**EW**	**City:**	**City of Prince Albert**
Quadrant / Int #	**1**	**Comments**	**Enter Comments about the analysis here.**	**Analysis Date:**	**2017 Feb 09, Thu**
for Warrant Calculation Results, please hit 'Page Down'	**CHECK SHEET**			**Count Date:**	**2021 Traffic Forcasting**
				Date Entry Format:	(yyyy-mm-dd)

Lane Configuration		Excl LT	Th & LT	Through	Th+RT+LT	Th & RT	Excl RT	RT Channelization (y/n)	UpStream Signal (m)	# of Thru Lanes	LT Phase Type	RTOR Allowed (y/n)	Actuated Thru Phase
15th Ave E	NB				1			n	333	1			
15th Ave E	SB				1			n	5,000	1			
22nd St E	WB				1			n	5,000	1			
22nd St E	EB				1			n	5,000	1			

	Saturation Flow Rates (if not default) (vphpl)	**Default Saturation Flow Rates (vphpl)**
Left Turn		1,650
Through		1,800
Right Turn		1,500

Are the 22nd St E WB right turns significantly impeded by through movements? (y/n)	n
Are the 22nd St E EB right turns significantly impeded by through movements? (y/n)	n
Are the 15th Ave E NB right turns significantly impeded by through movements? (y/n)	n
Are the 15th Ave E SB right turns significantly impeded by through movements? (y/n)	

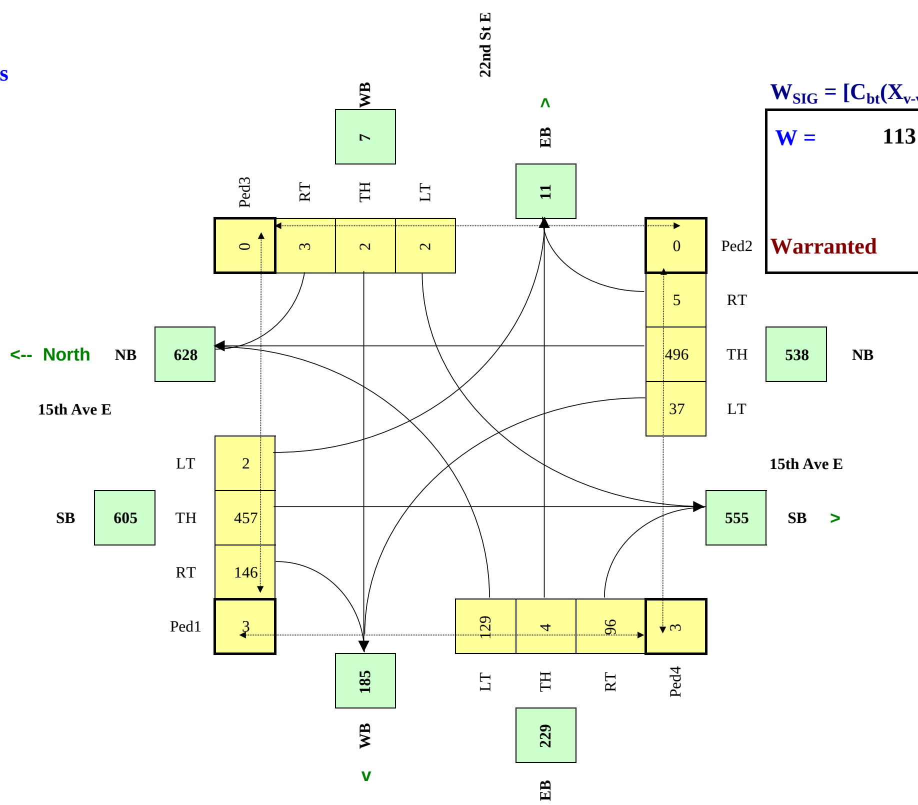
Demographics		
Elem. School/Mobility Challenged	(y/n)	n
Senior's Complex	(y/n)	n
Pathway to School	(y/n)	n
Metro Area Population	(#)	35,000
Central Business District	(y/n)	n

Other input		Speed (Km/h)	Truck %	Bus Rt (y/n)	Median (m)
15th Ave E	NS	50	5.0%	n	
22nd St E	EW	50	2.0%	n	

Set Peak Hours

Traffic Input	**NB**			**SB**			**WB**			**EB**			**Ped1** **NS**	**Ped2** **NS**	**Ped3** **EW**	**Ped4** **EW**
	LT	**Th**	**RT**	**LT**	**Th**	**RT**	**LT**	**Th**	**RT**	**LT**	**Th**	**RT**	**W Side**	**E Side**	**N Side**	**S Side**
8:00 - 9:00																
9:00 - 10:00																
11:00 - 12:00																
12:00-13:00																
16:00-17:00	37	496	5	2	457	146	2	2	3	129	4	96	3	0	0	3
17:00-18:00																
Total (PM Peak Hour)	**37**	**496**	**5**	**2**	**457**	**146**	**2**	**2**	**3**	**129**	**4**	**96**	**3**	**0**	**0**	**3**
Average(PM Peak Hour)	**37**	**496**	**5**	**2**	**457**	**146**	**2**	**2**	**3**	**129**	**4**	**96**	**3**	**0**	**0**	**3**
Actual Pedestrian Crossing Distance (m)																

PM Peak Turning Movements



$$W_{SIG} = [C_{bt}(X_{v\text{-}v}) / K_1 + (F\ (X_{v\text{-}p})\ L) / K_2] \times C_i$$

W =	**113**	**109**	**4**
		Veh	***Ped***

Warranted

RESET SHEET

City of Prince Albert - Traffic Signal & Pedestrian Signal Head Warrant Analysis

Main Street (name)	**28th St E**	**Direction (EW or NS)**	**EW**	**Road Authority:**	**City of Prince Albert**
Side Street (name)	**15th Ave E**	**Direction (EW or NS)**	**NS**	**City:**	**City of Prince Albert**
Quadrant / Int #	**1**	**Comments**	**Enter Comments about the analysis here.**	**Analysis Date:**	**2016 Dec 19, Mon**
for Warrant Calculation Results, please hit 'Page Down'	**CHECK SHEET**			**Count Date:**	**2016 Oct 20, Thu**
				Date Entry Format:	(yyyy-mm-dd)

Lane Configuration		Excl LT	Th & LT	Through	Th+RT+LT	Th & RT	Excl RT	RT Channelization (y/n)	UpStream Signal (m)	# of Thru Lanes	LT Phase Type	RTOR Allowed (y/n)	Actuated Thru Phase
28th St E	WB		1				1	n	333	1			
28th St E	EB		1				1	n	5,000	1			
15th Ave E	NB		1				1	n	5,000	1			
15th Ave E	SB		1				1	n	5,000	1			
							n						
							n						
							n						

Saturation Flow Rates (if not default) (vphpl)		**Default Saturation Flow Rates (vphpl)**
Left Turn		1,650
Through		1,800
Right Turn		1,500

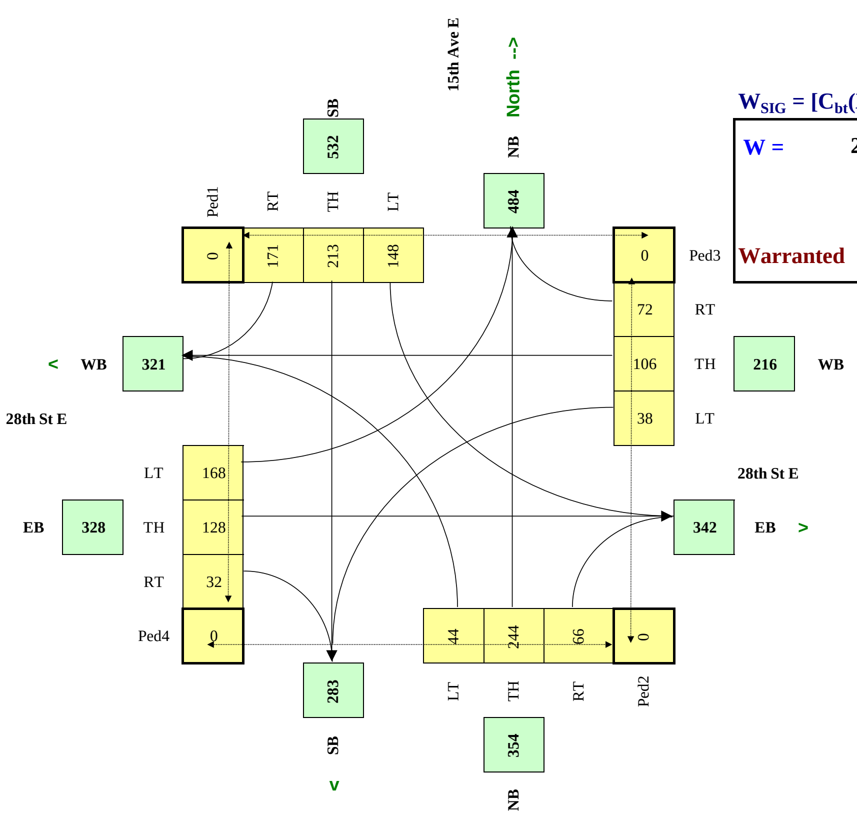
Demographics		
Elem. School/Mobility Challenged	(y/n)	n
Senior's Complex	(y/n)	n
Pathway to School	(y/n)	n
Metro Area Population	(#)	35,000
Central Business District	(y/n)	n

Other input		Speed (Km/h)	Truck %	Bus Rt (y/n)	Median (m)
28th St E	EW	50	5.0%	n	
15th Ave E	NS	50	2.0%	n	

Set Peak Hours

Traffic Input	**NB**			**SB**			**WB**			**EB**			**Ped1 NS**	**Ped2 NS**	**Ped3 EW**	**Ped4 EW**
	LT	**Th**	**RT**	**LT**	**Th**	**RT**	**LT**	**Th**	**RT**	**LT**	**Th**	**RT**	**W Side**	**E Side**	**N Side**	**S Side**
8:00 - 9:00																
9:00 - 10:00																
11:00 - 12:00																
12:00-13:00																
16:00-17:00	44	244	66	148	213	171	38	106	72	168	128	32				
17:00-18:00																
Total (PM Peak Hour)	**44**	**244**	**66**	**148**	**213**	**171**	**38**	**106**	**72**	**168**	**128**	**32**	**0**	**0**	**0**	**0**
Average(PM Peak Hour)	**44**	**244**	**66**	**148**	**213**	**171**	**38**	**106**	**72**	**168**	**128**	**32**	**0**	**0**	**0**	**0**
Actual Pedestrian Crossing Distance (m)																

PM Peak Turning Movements



$W_{SIG} = [C_{bt}(X_{v-v}) / K_1 + (F (X_{v-p}) L) / K_2] \times C_i$

W =	**249**	**249**	**0**
		Veh	***Ped***

Warranted

RESET SHEET

City of Prince Albert - Traffic Signal & Pedestrian Signal Head Warrant Analysis

Main Street (name)	**15th Ave E**	**Direction (EW or NS)**	**NS**	**Road Authority:**	**City of Prince Albert**
Side Street (name)	**4th St E**	**Direction (EW or NS)**	**EW**	**City:**	**City of Prince Albert**
Quadrant / Int #	**1**	**Comments**	**Enter Comments about the analysis here.**	**Analysis Date:**	**2016 Dec 20, Tue**
	CHECK SHEET			**Count Date:**	**2016 Oct 24, Mon**
for Warrant Calculation Results, please hit 'Page Down'				**Date Entry Format:**	(yyyy-mm-dd)

Lane Configuration		Excl LT	Th & LT	Through	Th+RT+LT	Th & RT	Excl RT	RT Channelization (y/n)	UpStream Signal (m)	# of Thru Lanes	LT Phase Type	RTOR Allowed (y/n)	Actuated Thru Phase
15th Ave E	NB				1			n		1			
15th Ave E	SB				1			n		1			
4th St E	WB				1			n		1			
4th St E	EB				1			n		1			

Saturation Flow Rates (if not default) (vphpl)		**Default Saturation Flow Rates (vphpl)**
Left Turn		1,650
Through		1,800
Right Turn		1,500

Are the 4th St E WB right turns significantly impeded by through movements? (y/n)	n
Are the 4th St E EB right turns significantly impeded by through movements? (y/n)	n
Are the 15th Ave E NB right turns significantly impeded by through movements? (y/n)	n
Are the 15th Ave E SB right turns significantly impeded by through movements? (y/n)	n

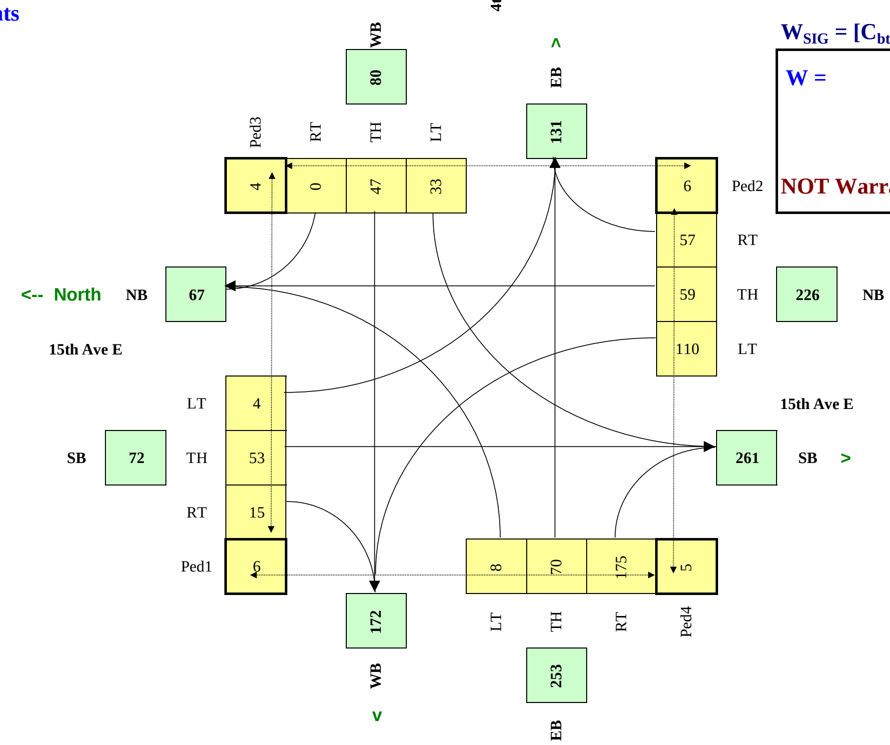
Demographics		
Elem. School/Mobility Challenged	(y/n)	n
Senior's Complex	(y/n)	n
Pathway to School	(y/n)	n
Metro Area Population	(#)	35,000
Central Business District	(y/n)	n

Other input		Speed (Km/h)	Truck %	Bus Rt (y/n)	Median (m)
15th Ave E	NS	50	5.0%	n	1.5
4th St E	EW	50	2.0%	n	

Set Peak Hours

Traffic Input	**NB**			**SB**			**WB**			**EB**			**Ped1 NS**	**Ped2 NS**	**Ped3 EW**	**Ped4 EW**
	LT	**Th**	**RT**	**LT**	**Th**	**RT**	**LT**	**Th**	**RT**	**LT**	**Th**	**RT**	**W Side**	**E Side**	**N Side**	**S Side**
8:00 - 9:00																
9:00 - 10:00																
11:00 - 12:00																
12:00-13:00																
16:00-17:00	110	59	57	4	53	15	33	47	0	8	70	175	6	6	4	5
17:00-18:00																
Total (PM Peak Hour)	**110**	**59**	**57**	**4**	**53**	**15**	**33**	**47**	**0**	**8**	**70**	**175**	**6**	**6**	**4**	**5**
Average(PM Peak Hour)	**110**	**59**	**57**	**4**	**53**	**15**	**33**	**47**	**0**	**8**	**70**	**175**	**6**	**6**	**4**	**5**
Actual Pedestrian Crossing Distance (m)																

PM Peak Turning Movements



$W_{SIG} = [C_{bt}(X_{v-v}) / K_1 + (F (X_{v-p}) L) / K_2] \times C_i$

W =	**42**	**39**	**3**
		Veh	***Ped***

NOT Warranted

RESET SHEET

Traffic Signal Warrant Spreadsheet - v2.0 © 2014 Transportation Association of Canada

Intersection on 15th Street West/East

City of Prince Albert - Traffic Signal & Pedestrian Signal Head Warrant Analysis

Main Street (name)	15th St E		Direction (EW or NS)	EW	Road Authority:	City of Prince Albert
Side Street (name)	10th Ave E		Direction (EW or NS)	NS	City:	City of Prince Albert
Quadrant / Int #	1	Comments	Enter Comments about the analysis here.		Analysis Date:	2016 Dec 20, Tue
for Warrant Calculation Results, please hit 'Page Down'	CHECK SHEET				Count Date:	2016 Oct 27, Thu
					Date Entry Format:	(yyyy-mm-dd)

Lane Configuration		Excl LT	Th & LT	Through	Th+RT+LT	Th & RT	Excl RT	RT Channelization (y/n)	UpStream Signal (m)	# of Thru Lanes	LT Phase Type	RTOR Allowed (y/n)	Actuated Thru Phase
15th St E	WB		1	1			1	y		2			
15th St E	EB	1		2			1	n		2			
10th Ave E	NB			1				n		1			
10th Ave E	SB		1				1	y		1			
							n						
							n						
							n						
							n						

Saturation Flow Rates (if not default) (vphpl)		Default Saturation Flow Rates (vphpl)
Left Turn		1,650
Through		1,800
Right Turn		1,500

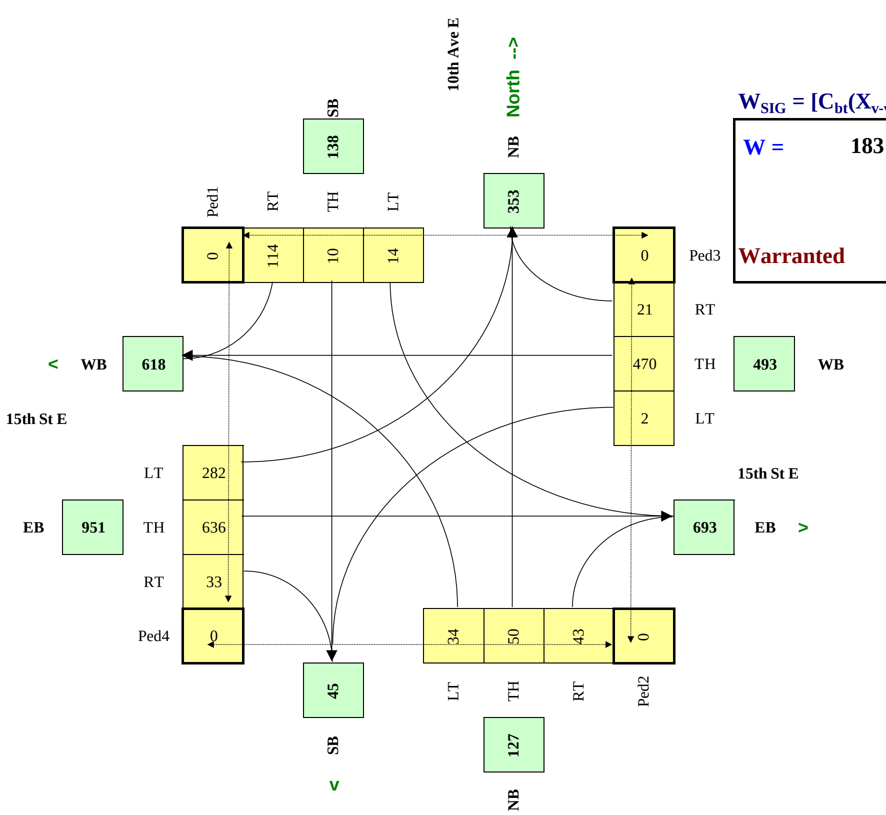
Demographics		
Elem. School/Mobility Challenged	(y/n)	n
Senior's Complex	(y/n)	n
Pathway to School	(y/n)	n
Metro Area Population	(#)	35,000
Central Business District	(y/n)	n

Other input		Speed (Km/h)	Truck %	Bus Rt (y/n)	Median (m)
15th St E	EW	50	5.0%	n	1.5
10th Ave E	NS	50	2.0%	n	

Set Peak Hours

Traffic Input	NB			SB			WB			EB			Ped1 NS	Ped2 NS	Ped3 EW	Ped4 EW
	LT	Th	RT	LT	Th	RT	LT	Th	RT	LT	Th	RT	W Side	E Side	N Side	S Side
8:00 - 9:00																
9:00 - 10:00																
11:00 - 12:00																
12:00-13:00																
16:00-17:00																
17:00-18:00	34	50	43	14	10	114	2	470	21	282	636	33				
Total (PM Peak Hour)	34	50	43	14	10	114	2	470	21	282	636	33	0	0	0	0
Average(PM Peak Hour)	34	50	43	14	10	114	2	470	21	282	636	33	0	0	0	0
Actual Pedestrian Crossing Distance (m)																

PM Peak Turning Movements



$$W_{SIG} = [C_{bt}(X_{v\text{-}v}) / K_1 + (F\ (X_{v\text{-}p})\ L) / K_2] \times C_i$$

W =	183	183	0
		Veh	Ped
Warranted			

RESET SHEET

Traffic Signal Warrant Spreadsheet - v2.0 © 2014 Transportation Association of Canada

City of Prince Albert - Traffic Signal & Pedestrian Signal Head Warrant Analysis

Main Street (name)	15th St E	Direction (EW or NS)	EW	Road Authority:	City of Prince Albert
Side Street (name)	15th Ave E	Direction (EW or NS)	NS	City:	City of Prince Albert
Quadrant / Int #	1	Comments	Enter Comments about the analysis here.	Analysis Date:	2016 Dec 20, Tue
	CHECK SHEET			Count Date:	Projeced 2016
for Warrant Calculation Results, please hit 'Page Down'				Date Entry Format:	(yyyy-mm-dd)

Lane Configuration		Excl LT	Th & LT	Through	Th+RT+LT	Th & RT	Excl RT	RT Channelization (y/n)	UpStream Signal (m)	# of Thru Lanes	LT Phase Type	RTOR Allowed (y/n)	Actuated Thru Phase
15th St E	WB	1		2			1	y		2			
15th St E	EB	1		2			1	y		2			
15th Ave E	NB	1		1			1	y		1			
15th Ave E	SB	1		1			1	y		1			
							n						
							n						
							n						
							n						

	Saturation Flow Rates (if not default) (vphpl)	Default Saturation Flow Rates (vphpl)
Left Turn		1,650
Through		1,800
Right Turn		1,500

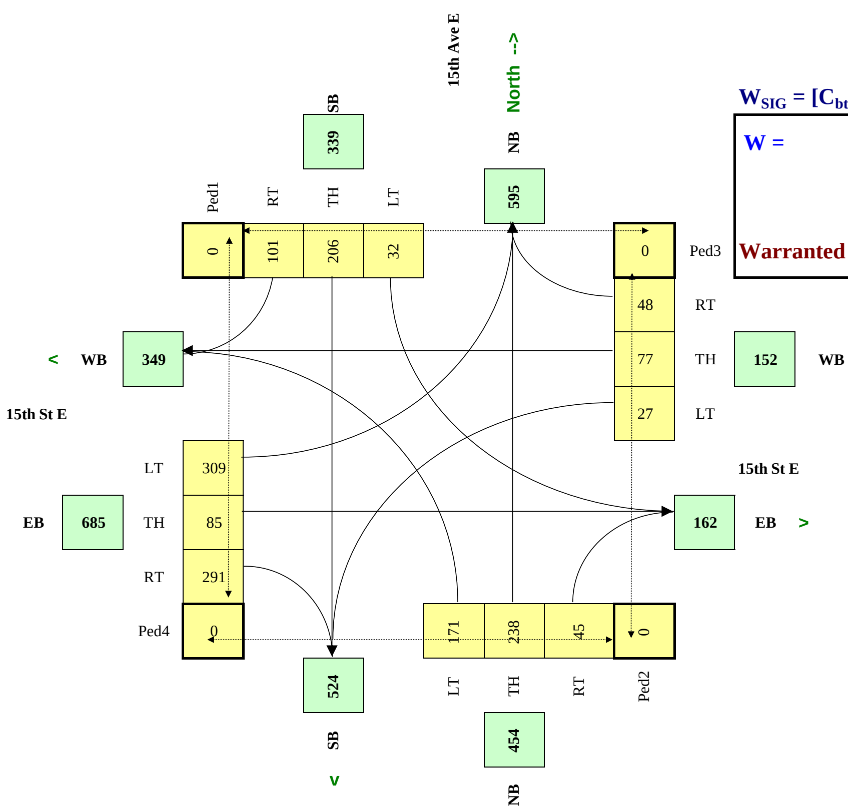
Demographics		
Elem. School/Mobility Challenged	(y/n)	n
Senior's Complex	(y/n)	n
Pathway to School	(y/n)	n
Metro Area Population	(#)	35,000
Central Business District	(y/n)	n

Other input		Speed (Km/h)	Truck %	Bus Rt (y/n)	Median (m)
15th St E	EW	50	5.0%	n	1.5
15th Ave E	NS	50	2.0%	n	

Set Peak Hours

Traffic Input	NB			SB			WB			EB			Ped1 NS	Ped2 NS	Ped3 EW	Ped4 EW
	LT	Th	RT	LT	Th	RT	LT	Th	RT	LT	Th	RT	W Side	E Side	N Side	S Side
8:00 - 9:00																
9:00 - 10:00																
11:00 - 12:00																
12:00-13:00																
16:00-17:00	171	238	45	32	206	101	27	77	48	309	85	291				
17:00-18:00																
Total (PM Peak Hour)	**171**	**238**	**45**	**32**	**206**	**101**	**27**	**77**	**48**	**309**	**85**	**291**	**0**	**0**	**0**	**0**
Average(PM Peak Hour)	**171**	**238**	**45**	**32**	**206**	**101**	**27**	**77**	**48**	**309**	**85**	**291**	**0**	**0**	**0**	**0**
Actual Pedestrian Crossing Distance (m)																

PM Peak Turning Movements



$W_{SIG} = [C_{bt}(X_{v\text{-}v}) / K_1 + (F\ (X_{v\text{-}p})\ L) / K_2] \times C_i$

W =	271	271	0
		Veh	Ped
Warranted			

RESET SHEET

Traffic Signal Warrant Spreadsheet - v2.0 © 2014 Transportation Association of Canada

City of Prince Albert - Traffic Signal & Pedestrian Signal Head Warrant Analysis

Main Street (name)	**15th St E**		**Direction (EW or NS)**	**EW**	**Road Authority:**	**City of Prince Albert**
Side Street (name)	**1st Ave E**		**Direction (EW or NS)**	**NS**	**City:**	**City of Prince Albert**
Quadrant / Int #	**1**	**Comments**	**Enter Comments about the analysis here.**		**Analysis Date:**	**2016 Dec 20, Tue**
for Warrant Calculation Results, please hit 'Page Down'	**CHECK SHEET**				**Count Date:**	**Projected 2016**
					Date Entry Format:	(yyyy-mm-dd)

Lane Configuration		Excl LT	Th & LT	Through	Th+RT+LT	Th & RT	Excl RT	RT Channelization (y/n)	UpStream Signal (m)	# of Thru Lanes	LT Phase Type	RTOR Allowed (y/n)	Actuated Thru Phase
15th St E	WB	1		2			1	n		2			
15th St E	EB	1		2			1	n		2			
1st Ave E	NB		1				1	n		1			
1st Ave E	SB		1				1	n		1			
							n						
							n						
							n						
							n						

Saturation Flow Rates (if not default) (vphpl)		**Default Saturation Flow Rates (vphpl)**
Left Turn		1,650
Through		1,800
Right Turn		1,500

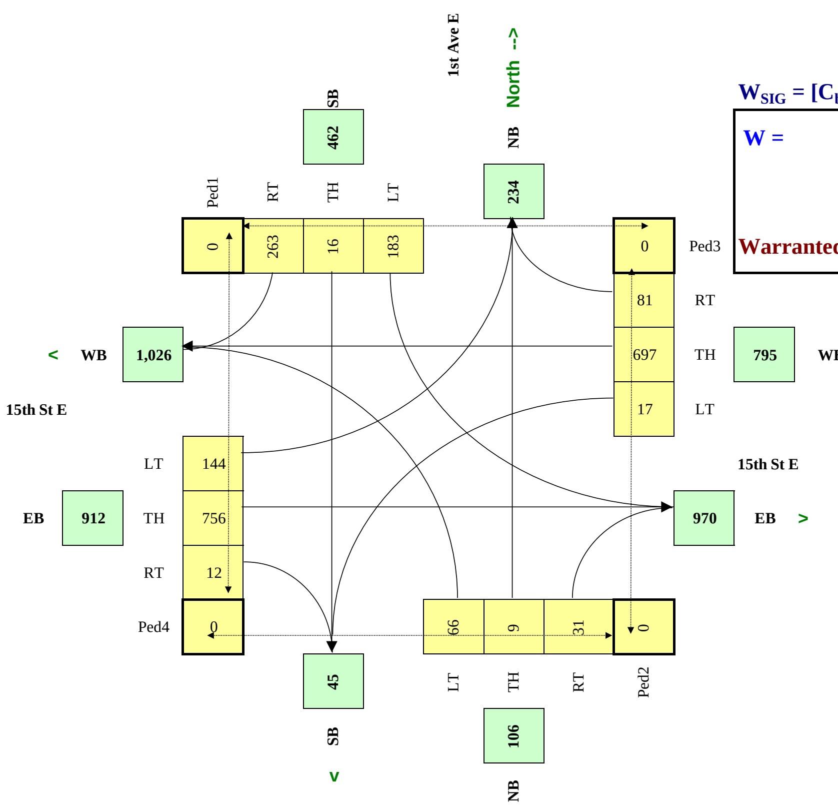
Demographics		
Elem. School/Mobility Challenged	(y/n)	n
Senior's Complex	(y/n)	n
Pathway to School	(y/n)	n
Metro Area Population	(#)	35,000
Central Business District	(y/n)	n

Other input		Speed (Km/h)	Truck %	Bus Rt (y/n)	Median (m)
15th St E	EW	50	5.0%	n	1.5
1st Ave E	NS	50	2.0%	n	

Set Peak Hours

Traffic Input	**NB**			**SB**			**WB**			**EB**			**Ped1 NS**	**Ped2 NS**	**Ped3 EW**	**Ped4 EW**
	LT	**Th**	**RT**	**LT**	**Th**	**RT**	**LT**	**Th**	**RT**	**LT**	**Th**	**RT**	**W Side**	**E Side**	**N Side**	**S Side**
8:00 - 9:00																
9:00 - 10:00																
11:00 - 12:00																
12:00-13:00																
16:00-17:00	66	9	31	183	16	263	17	697	81	144	756	12				
17:00-18:00																
Total (PM Peak Hour)	**66**	**9**	**31**	**183**	**16**	**263**	**17**	**697**	**81**	**144**	**756**	**12**	**0**	**0**	**0**	**0**
Average(PM Peak Hour)	**66**	**9**	**31**	**183**	**16**	**263**	**17**	**697**	**81**	**144**	**756**	**12**	**0**	**0**	**0**	**0**
Actual Pedestrian Crossing Distance (m)																

PM Peak Turning Movements



$W_{SIG} = [C_{bt}(X_{v-v}) / K_1 + (F\ (X_{v-p})\ L) / K_2] \times C_i$

W =	379	379	0
		Veh	*Ped*

Warranted

RESET SHEET

Traffic Signal Warrant Spreadsheet - v2.0 © 2014 Transportation Association of Canada

City of Prince Albert - Traffic Signal & Pedestrian Signal Head Warrant Analysis

Main Street (name)	**15th St E**	**Direction (EW or NS)**	**EW**	**Road Authority:**	**City of Prince Albert**
Side Street (name)	**7Ave E**	**Direction (EW or NS)**	**NS**	**City:**	**City of Prince Albert**
Quadrant / Int #	**1**	**Comments**	**Enter Comments about the analysis here.**	**Analysis Date:**	**2016 Dec 20, Tue**
	CHECK SHEET			**Count Date:**	**2016 Oct 27, Thu**
for Warrant Calculation Results, please hit 'Page Down'				**Date Entry Format:**	(yyyy-mm-dd)

Lane Configuration		Excl LT	Th & LT	Through	Th+RT+LT	Th & RT	Excl RT	RT Channelization (y/n)	UpStream Signal (m)	# of Thru Lanes	LT Phase Type	RTOR Allowed (y/n)	Actuated Thru Phase
15th St E	WB	1		2			1	n		2			
15th St E	EB	1		2			1	n		2			
7Ave E	NB		1				1	y		1			
7Ave E	SB		1				1	y		1			
							n						
							n						
							n						
							n						

	Saturation Flow Rates (if not default) (vphpl)	**Default Saturation Flow Rates (vphpl)**
Left Turn		1,650
Through		1,800
Right Turn		1,500

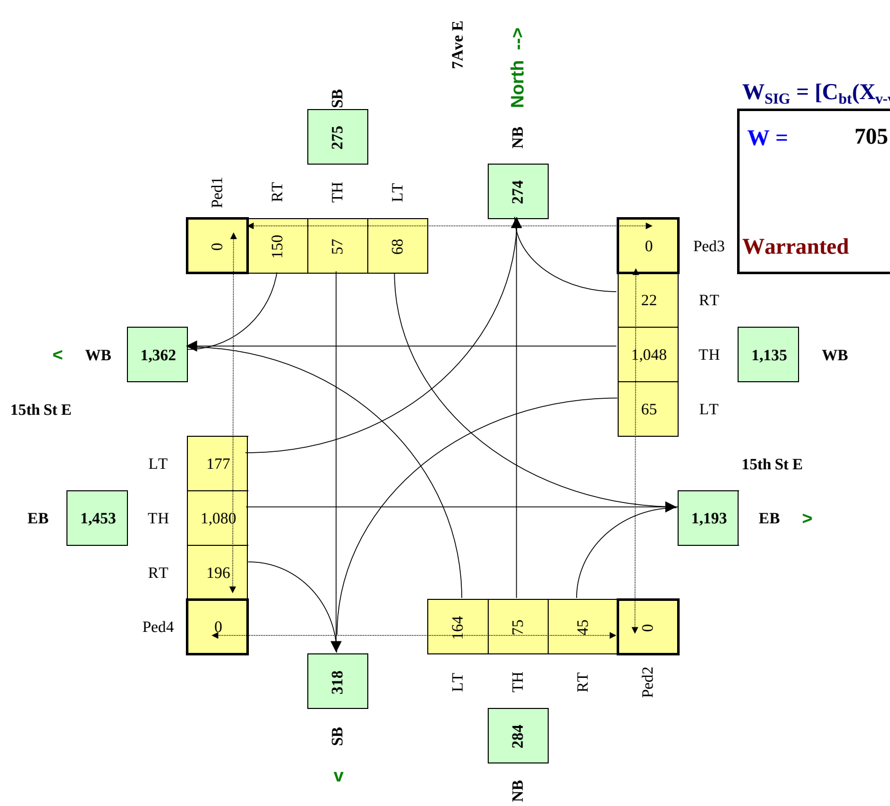
Demographics		
Elem. School/Mobility Challenged	(y/n)	n
Senior's Complex	(y/n)	n
Pathway to School	(y/n)	n
Metro Area Population	(#)	35,000
Central Business District	(y/n)	n

Other input		Speed (Km/h)	Truck %	Bus Rt (y/n)	Median (m)
15th St E	EW	50	5.0%	n	1.5
7Ave E	NS	50	2.0%	n	

Set Peak Hours

Traffic Input	**NB**			**SB**			**WB**			**EB**			**Ped1 NS**	**Ped2 NS**	**Ped3 EW**	**Ped4 EW**
	LT	**Th**	**RT**	**LT**	**Th**	**RT**	**LT**	**Th**	**RT**	**LT**	**Th**	**RT**	**W Side**	**E Side**	**N Side**	**S Side**
8:00 - 9:00																
9:00 - 10:00																
11:00 - 12:00																
12:00-13:00																
16:00-17:00																
17:00-18:00	164	75	45	68	57	150	65	1048	22	177	1080	196				
Total (PM Peak Hour)	**164**	**75**	**45**	**68**	**57**	**150**	**65**	**1,048**	**22**	**177**	**1,080**	**196**	**0**	**0**	**0**	**0**
Average(PM Peak Hour)	**164**	**75**	**45**	**68**	**57**	**150**	**65**	**1,048**	**22**	**177**	**1,080**	**196**	**0**	**0**	**0**	**0**
Actual Pedestrian Crossing Distance (m)																

PM Peak Turning Movements



$$W_{SIG} = [C_{bt}(X_{v\text{-}v}) / K_1 + (F\ (X_{v\text{-}p})\ L) / K_2] \times C_i$$

W =	**705**	**705**	**0**
		Veh	***Ped***

Warranted

RESET SHEET

City of Prince Albert - Traffic Signal & Pedestrian Signal Head Warrant Analysis

Main Street (name)	**15th St E**	**Direction (EW or NS)**	**EW**		**Road Authority:**	**City of Prince Albert**
Side Street (name)	**9th Ave E**	**Direction (EW or NS)**	**NS**		**City:**	**City of Prince Albert**
Quadrant / Int #	**1**	**Comments**	**Enter Comments about the analysis here.**		**Analysis Date:**	**2016 Dec 20, Tue**
	CHECK SHEET				**Count Date:**	**2016 Oct 27, Thu**
for Warrant Calculation Results, please hit 'Page Down'					**Date Entry Format:**	(yyyy-mm-dd)

Lane Configuration		Excl LT	Th & LT	Through	Th+RT+LT	Th & RT	Excl RT	RT Channelization (y/n)	UpStream Signal (m)	# of Thru Lanes	LT Phase Type	RTOR Allowed (y/n)	Actuated Thru Phase
15th St E	WB	1		2			1	n		2			
15th St E	EB	1		2			1	n		2			
9th Ave E	NB		1				1	n		1			
9th Ave E	SB		1					n		1			
							n						
							n						
							n						
							n						

Saturation Flow Rates (if not default) (vphpl)		**Default Saturation Flow Rates (vphpl)**
Left Turn		1,650
Through		1,800
Right Turn		1,500

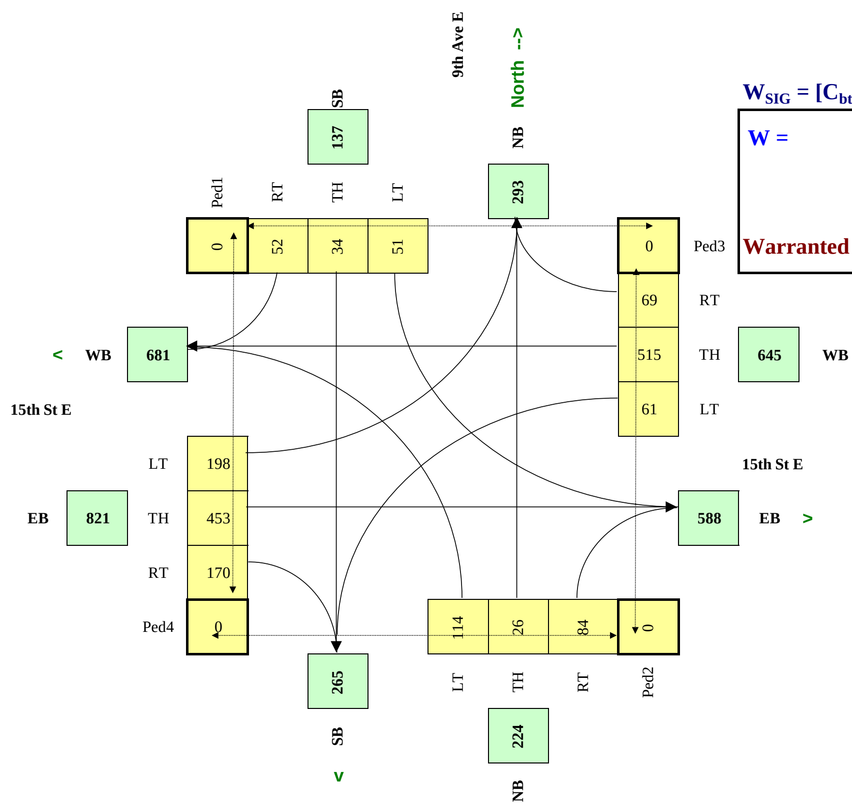
Demographics		
Elem. School/Mobility Challenged	(y/n)	n
Senior's Complex	(y/n)	n
Pathway to School	(y/n)	n
Metro Area Population	(#)	35,000
Central Business District	(y/n)	n

Other input		Speed (Km/h)	Truck %	Bus Rt (y/n)	Median (m)
15th St E	EW	50	5.0%	n	1.5
9th Ave E	NS	50	2.0%	n	

Set Peak Hours

Traffic Input	**NB**			**SB**			**WB**			**EB**			**Ped1 NS**	**Ped2 NS**	**Ped3 EW**	**Ped4 EW**
	LT	**Th**	**RT**	**LT**	**Th**	**RT**	**LT**	**Th**	**RT**	**LT**	**Th**	**RT**	**W Side**	**E Side**	**N Side**	**S Side**
8:00 - 9:00																
9:00 - 10:00																
11:00 - 12:00																
12:00-13:00																
16:00-17:00	114	26	84	51	34	52	61	515	69	198	453	170				
17:00-18:00																
Total (PM Peak Hour)	**114**	**26**	**84**	**51**	**34**	**52**	**61**	**515**	**69**	**198**	**453**	**170**	**0**	**0**	**0**	**0**
Average(PM Peak Hour)	**114**	**26**	**84**	**51**	**34**	**52**	**61**	**515**	**69**	**198**	**453**	**170**	**0**	**0**	**0**	**0**
Actual Pedestrian Crossing Distance (m)																

PM Peak Turning Movements



$$W_{SIG} = [C_{bt}(X_{v\text{-}v}) / K_1 + (F\ (X_{v\text{-}p})\ L) / K_2] \times C_i$$

W =	**263**	**263**	**0**
		Veh	***Ped***

Warranted

RESET SHEET

City of Prince Albert - Traffic Signal & Pedestrian Signal Head Warrant Analysis

Main Street (name)	**15th St W**		**Direction (EW or NS)**	**EW**	**Road Authority:**	**City of Prince Albert**
Side Street (name)	**1st Ave W**		**Direction (EW or NS)**	**NS**	**City:**	**City of Prince Albert**
Quadrant / Int #	**1**	**Comments**	**Enter Comments about the analysis here.**		**Analysis Date:**	**2016 Dec 20, Tue**
for Warrant Calculation Results, please hit 'Page Down'	**CHECK SHEET**				**Count Date:**	**Projected 2016**
					Date Entry Format:	(yyyy-mm-dd)

Lane Configuration		Excl LT	Th & LT	Through	Th+RT+LT	Th & RT	Excl RT	RT Channelization (y/n)	UpStream Signal (m)	# of Thru Lanes	LT Phase Type	RTOR Allowed (y/n)	Actuated Thru Phase
15th St W	WB	1		2			1	n		2			
15th St W	EB	1		2			1	n		2			
1st Ave W	NB		1				1	n		1			
1st Ave W	SB		1				1	n		1			
							n						
							n						
							n						
							n						

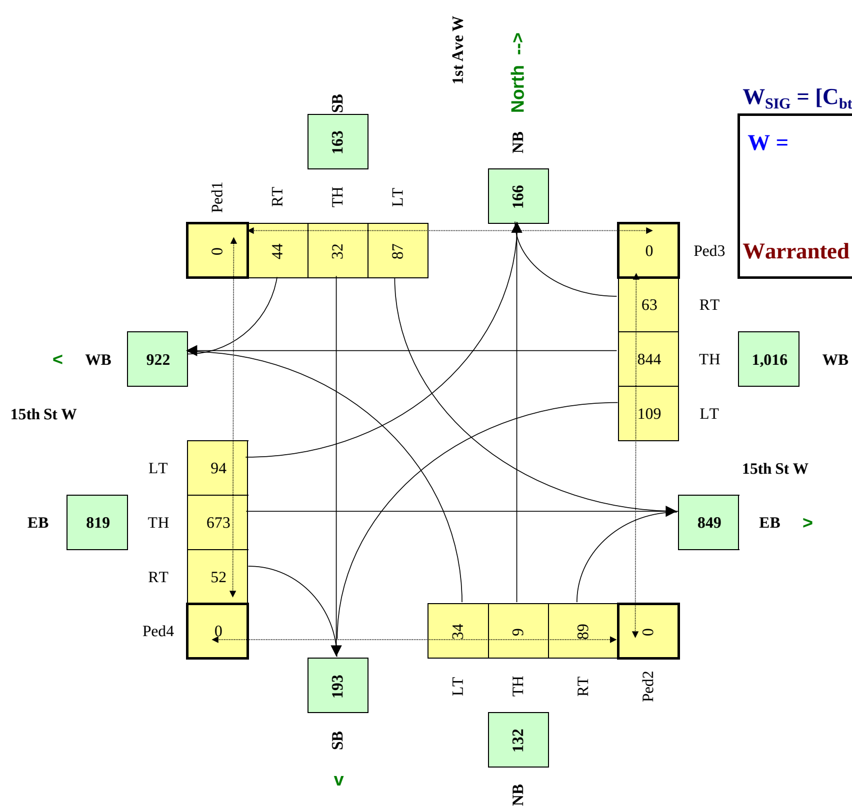
Saturation Flow Rates (if not default) (vphpl)		**Default Saturation Flow Rates (vphpl)**
Left Turn		1,650
Through		1,800
Right Turn		1,500

Demographics		
Elem. School/Mobility Challenged	(y/n)	n
Senior's Complex	(y/n)	n
Pathway to School	(y/n)	n
Metro Area Population	(#)	35,000
Central Business District	(y/n)	n

Other input		Speed (Km/h)	Truck %	Bus Rt (y/n)	Median (m)
15th St W	EW	50	5.0%	n	1.5
1st Ave W	NS	50	2.0%	n	

Set Peak Hours													**Ped1**	**Ped2**	**Ped3**	**Ped4**
Traffic Input	**NB**			**SB**			**WB**			**EB**			**NS**	**NS**	**EW**	**EW**
	LT	**Th**	**RT**	**LT**	**Th**	**RT**	**LT**	**Th**	**RT**	**LT**	**Th**	**RT**	**W Side**	**E Side**	**N Side**	**S Side**
8:00 - 9:00																
9:00 - 10:00																
11:00 - 12:00																
12:00-13:00																
16:00-17:00	34	9	89	87	32	44	109	844	63	94	673	52				
17:00-18:00																
Total (PM Peak Hour)	**34**	**9**	**89**	**87**	**32**	**44**	**109**	**844**	**63**	**94**	**673**	**52**	**0**	**0**	**0**	**0**
Average(PM Peak Hour)	**34**	**9**	**89**	**87**	**32**	**44**	**109**	**844**	**63**	**94**	**673**	**52**	**0**	**0**	**0**	**0**
Actual Pedestrian Crossing Distance (m)																

PM Peak Turning Movements



$W_{SIG} = [C_{bt}(X_{v-v}) / K_1 + (F (X_{v-p}) L) / K_2] \times C_i$

W =	**266**	**266**	**0**
		Veh	***Ped***
Warranted			

RESET SHEET

City of Prince Albert - Traffic Signal & Pedestrian Signal Head Warrant Analysis

Main Street (name)	**15th St W**		**Direction (EW or NS)**	**EW**	**Road Authority:**	**City of Prince Albert**
Side Street (name)	**6th Ave W**		**Direction (EW or NS)**	**NS**	**City:**	**City of Prince Albert**
Quadrant / Int #	**1**	**Comments**	**Enter Comments about the analysis here.**		**Analysis Date:**	**2016 Dec 20, Tue**
for Warrant Calculation Results, please hit 'Page Down'	**CHECK SHEET**				**Count Date:**	**2016 Oct 27, Thu**
					Date Entry Format:	(yyyy-mm-dd)

Lane Configuration		Excl LT	Th & LT	Through	Th+RT+LT	Th & RT	Excl RT	RT Channelization (y/n)	UpStream Signal (m)	# of Thru Lanes	LT Phase Type	RTOR Allowed (y/n)	Actuated Thru Phase
15th St W	WB		1			1		n	667	2			
15th St W	EB		1			1		n	570	2			
6th Ave W	NB			1				n	674	1			
6th Ave W	SB			1				n	5,000	1			

	n
	n
Are the 15th St W WB right turns significantly impeded by through movements? (y/n)	n
Are the 15th St W EB right turns significantly impeded by through movements? (y/n)	n

Saturation Flow Rates (if not default) (vphpl)		**Default Saturation Flow Rates (vphpl)**
Left Turn		1,650
Through		1,800
Right Turn		1,500

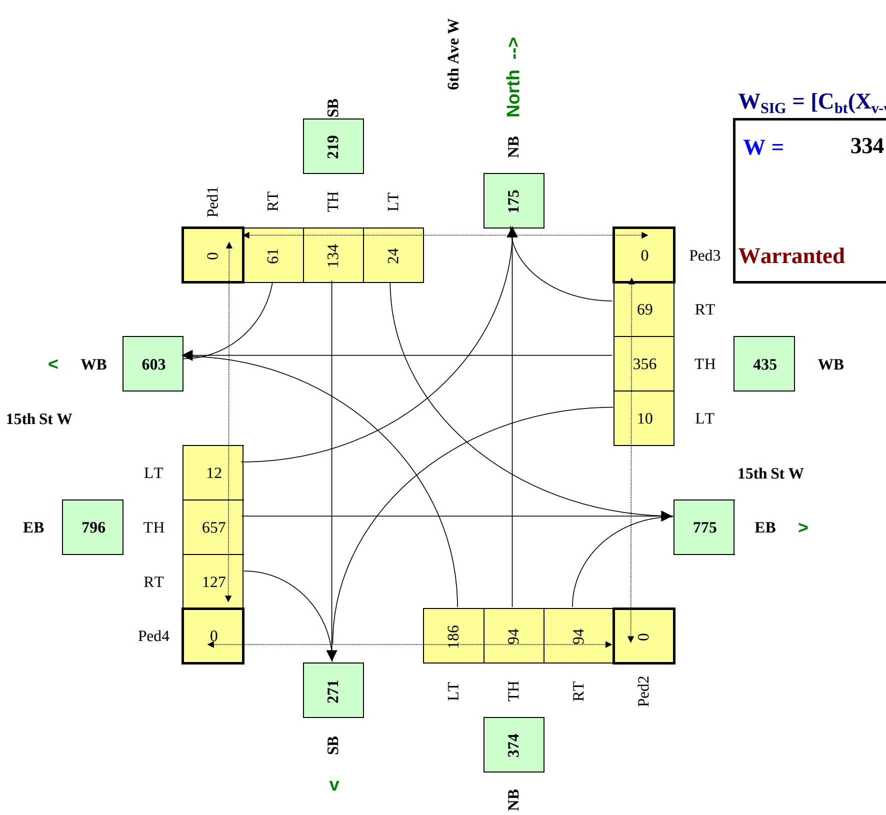
Demographics		
Elem. School/Mobility Challenged	(y/n)	n
Senior's Complex	(y/n)	n
Pathway to School	(y/n)	n
Metro Area Population	(#)	35,000
Central Business District	(y/n)	n

Other input		Speed (Km/h)	Truck %	Bus Rt (y/n)	Median (m)
15th St W	EW	50	5.0%	n	
6th Ave W	NS	50	2.0%	n	

Set Peak Hours

Traffic Input	**NB**			**SB**			**WB**			**EB**			**Ped1 NS**	**Ped2 NS**	**Ped3 EW**	**Ped4 EW**
	LT	**Th**	**RT**	**LT**	**Th**	**RT**	**LT**	**Th**	**RT**	**LT**	**Th**	**RT**	**W Side**	**E Side**	**N Side**	**S Side**
8:00 - 9:00																
9:00 - 10:00																
11:00 - 12:00																
12:00-13:00																
15:00-16:00	186	94	94	24	134	61	10	356	69	12	657	127				
17:00-18:00																
Total (PM Peak Hour)	**186**	**94**	**94**	**24**	**134**	**61**	**10**	**356**	**69**	**12**	**657**	**127**	**0**	**0**	**0**	**0**
Average(PM Peak Hour)	**186**	**94**	**94**	**24**	**134**	**61**	**10**	**356**	**69**	**12**	**657**	**127**	**0**	**0**	**0**	**0**
Actual Pedestrian Crossing Distance (m)																

PM Peak Turning Movements



$$W_{SIG} = [C_{bt}(X_{v\text{-}v}) / K_1 + (F (X_{v\text{-}p}) L) / K_2] \times C_i$$

W =	**334**	**334**	**0**
		Veh	***Ped***
Warranted			

RESET SHEET

City of Prince Albert - Traffic Signal & Pedestrian Signal Head Warrant Analysis

Main Street (name)	**15th St W**	**Direction (EW or NS)**	**EW**	**Road Authority:**	**City of Prince Albert**
Side Street (name)	**9th Ave W**	**Direction (EW or NS)**	**NS**	**City:**	**City of Prince Albert**
Quadrant / Int #	**1**	**Comments**	**Enter Comments about the analysis here.**	**Analysis Date:**	**2016 Dec 20, Tue**
for Warrant Calculation Results, please hit 'Page Down'	CHECK SHEET			**Count Date:**	**2016 Oct 27, Thu**
				Date Entry Format:	(yyyy-mm-dd)

Lane Configuration		Excl LT	Th & LT	Through	Th+RT+LT	Th & RT	Excl RT	RT Channelization (y/n)	UpStream Signal (m)	# of Thru Lanes	LT Phase Type	RTOR Allowed (y/n)	Actuated Thru Phase
15th St W	WB	1		1			1	n		1			
15th St W	EB	1		1			1	n		1			
9th Ave W	NB				1			n		1			
9th Ave W	SB				1			n		1			

Are the 9th Ave W NB right turns significantly impeded by through movements? (y/n)	n
Are the 9th Ave W SB right turns significantly impeded by through movements? (y/n)	n
	n
	n

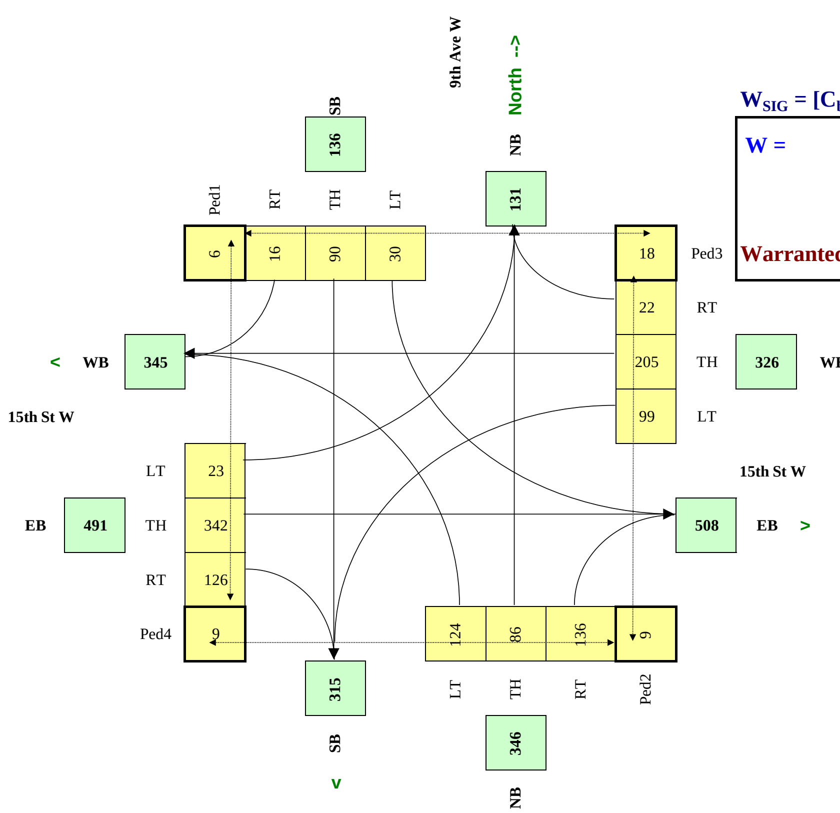
Saturation Flow Rates (if not default) (vphpl)		**Default Saturation Flow Rates (vphpl)**
Left Turn		1,650
Through		1,800
Right Turn		1,500

Demographics		
Elem. School/Mobility Challenged	(y/n)	n
Senior's Complex	(y/n)	n
Pathway to School	(y/n)	n
Metro Area Population	(#)	35,000
Central Business District	(y/n)	n

Other input		Speed (Km/h)	Truck %	Bus Rt (y/n)	Median (m)
15th St W	EW	50	5.0%	n	1.5
9th Ave W	NS	50	2.0%	n	

Set Peak Hours													Ped1	Ped2	Ped3	Ped4
Traffic Input	**NB**			**SB**			**WB**			**EB**			**NS**	**NS**	**EW**	**EW**
	LT	**Th**	**RT**	**LT**	**Th**	**RT**	**LT**	**Th**	**RT**	**LT**	**Th**	**RT**	**W Side**	**E Side**	**N Side**	**S Side**
8:00 - 9:00																
9:00 - 10:00																
11:00 - 12:00																
12:00-13:00																
16:00-17:00	124	86	136	30	90	16	99	205	22	23	342	126	6	9	18	9
17:00-18:00																
Total (PM Peak Hour)	**124**	**86**	**136**	**30**	**90**	**16**	**99**	**205**	**22**	**23**	**342**	**126**	**6**	**9**	**18**	**9**
Average(PM Peak Hour)	**124**	**86**	**136**	**30**	**90**	**16**	**99**	**205**	**22**	**23**	**342**	**126**	**6**	**9**	**18**	**9**
Actual Pedestrian Crossing Distance (m)																

PM Peak Turning Movements



$$W_{SIG} = [C_{bt}(X_{v-v}) / K_1 + (F\,(X_{v-p})\,L) / K_2] \times C_i$$

W =	**212**	**197**	**15**
		Veh	***Ped***
Warranted			

RESET SHEET

City of Prince Albert - Traffic Signal & Pedestrian Signal Head Warrant Analysis

Main Street (name)	15th St W		**Direction (EW or NS)**	EW	**Road Authority:**	City of Prince Albert
Side Street (name)	Central Ave		**Direction (EW or NS)**	NS	**City:**	City of Prince Albert
Quadrant / Int #	1	**Comments**	Enter Comments about the analysis here.		**Analysis Date:**	2016 Dec 20, Tue
	CHECK SHEET				**Count Date:**	2016 Oct 27, Thu
					Date Entry Format:	(yyyy-mm-dd)

for Warrant Calculation Results, please hit 'Page Down'

Lane Configuration		Excl LT	Th & LT	Through	Th+RT+LT	Th & RT	Excl RT	RT Channelization (y/n)	UpStream Signal (m)	# of Thru Lanes	LT Phase Type	RTOR Allowed (y/n)	Actuated Thru Phase
15th St W	WB	1		2			1	n		2			
15th St W	EB	2		2			1	n		2			
Central Ave	NB		1				1	n		1			
Central Ave	SB							n		0			
							n						
							n						
							n						
							n						

Saturation Flow Rates (if not default) (vphpl)		Default Saturation Flow Rates (vphpl)
Left Turn		1,650
Through		1,800
Right Turn		1,500

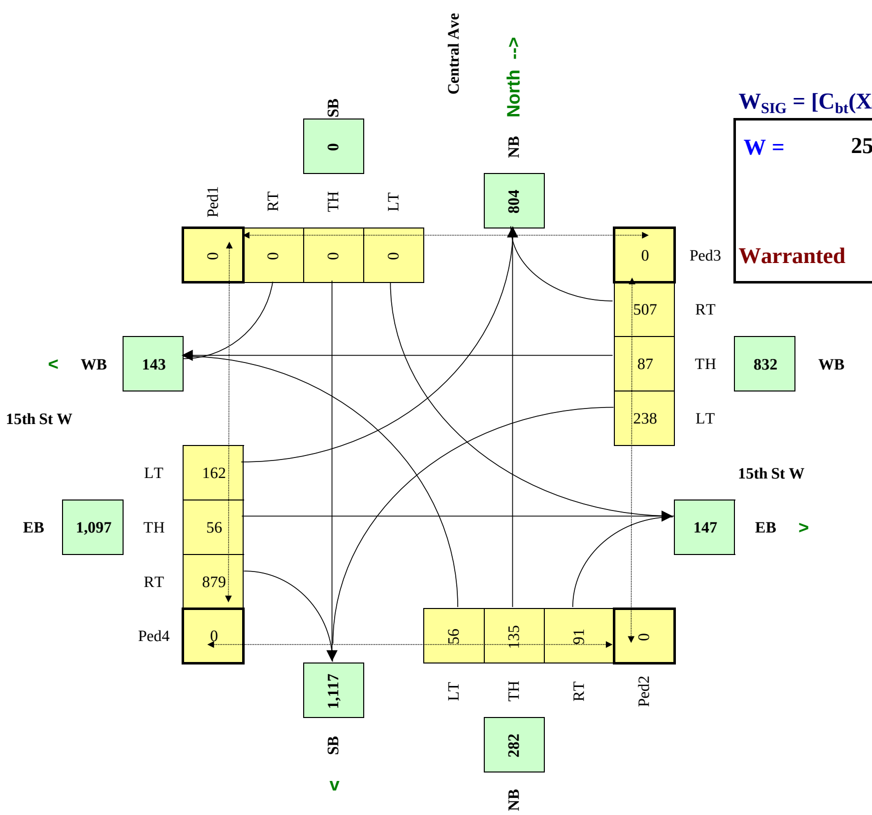
Demographics		
Elem. School/Mobility Challenged	(y/n)	n
Senior's Complex	(y/n)	n
Pathway to School	(y/n)	n
Metro Area Population	(#)	35,000
Central Business District	(y/n)	n

Other input		Speed (Km/h)	Truck %	Bus Rt (y/n)	Median (m)
15th St W	EW	50	5.0%	n	1.5
Central Ave	NS	50	2.0%	n	

Set Peak Hours

Traffic Input	NB			SB			WB			EB			Ped1 NS	Ped2 NS	Ped3 EW	Ped4 EW
	LT	Th	RT	LT	Th	RT	LT	Th	RT	LT	Th	RT	W Side	E Side	N Side	S Side
8:00 - 9:00																
9:00 - 10:00																
11:00 - 12:00																
12:00-13:00																
16:00-17:00	56	135	91	0	0	0	238	87	507	162	56	879				
17:00-18:00																
Total (PM Peak Hour)	56	135	91	0	0	0	238	87	507	162	56	879	0	0	0	0
Average(PM Peak Hour)	56	135	91	0	0	0	238	87	507	162	56	879	0	0	0	0
Actual Pedestrian Crossing Distance (m)																

PM Peak Turning Movements



$$W_{SIG} = [C_{bt}(X_{v-v}) / K_1 + (F (X_{v-p}) L) / K_2] \times C_i$$

W =	253	253	0
		Veh	Ped

Warranted

RESET SHEET

Other Intersections

City of Prince Albert - Traffic Signal & Pedestrian Signal Head Warrant Analysis

Main Street (name)	**10th Ave W**	**Direction (EW or NS)**	**NS**	**Road Authority:**	**City of Prince Albert**
Side Street (name)	**25th St W**	**Direction (EW or NS)**	**EW**	**City:**	**City of Prince Albert**
Quadrant / Int #	**1**	**Comments**	**Enter Comments about the analysis here.**	**Analysis Date:**	**2016 Dec 19, Mon**
	CHECK SHEET			**Count Date:**	**2016 Oct 18, Tue**
				Date Entry Format:	(yyyy-mm-dd)

for Warrant Calculation Results, please hit 'Page Down'

Lane Configuration		Excl LT	Th & LT	Through	Th+RT+LT	Th & RT	Excl RT	RT Channelization (y/n)	UpStream Signal (m)	# of Thru Lanes	LT Phase Type	RTOR Allowed (y/n)	Actuated Thru Phase
10th Ave W	NB		1			1		n	5,000	2			
10th Ave W	SB		1			1		n	900	2			
25th St W	WB				1			n	5,000	1			
25th St W	EB				1			n	5,000	1			

Saturation Flow Rates (if not default) (vphpl)		**Default Saturation Flow Rates (vphpl)**
Left Turn		1,650
Through		1,800
Right Turn		1,500

Are the 25th St W WB right turns significantly impeded by through movements? (y/n)	n
Are the 25th St W EB right turns significantly impeded by through movements? (y/n)	n
Are the 10th Ave W NB right turns significantly impeded by through movements? (y/n)	n
Are the 10th Ave W SB right turns significantly impeded by through movements? (y/n)	

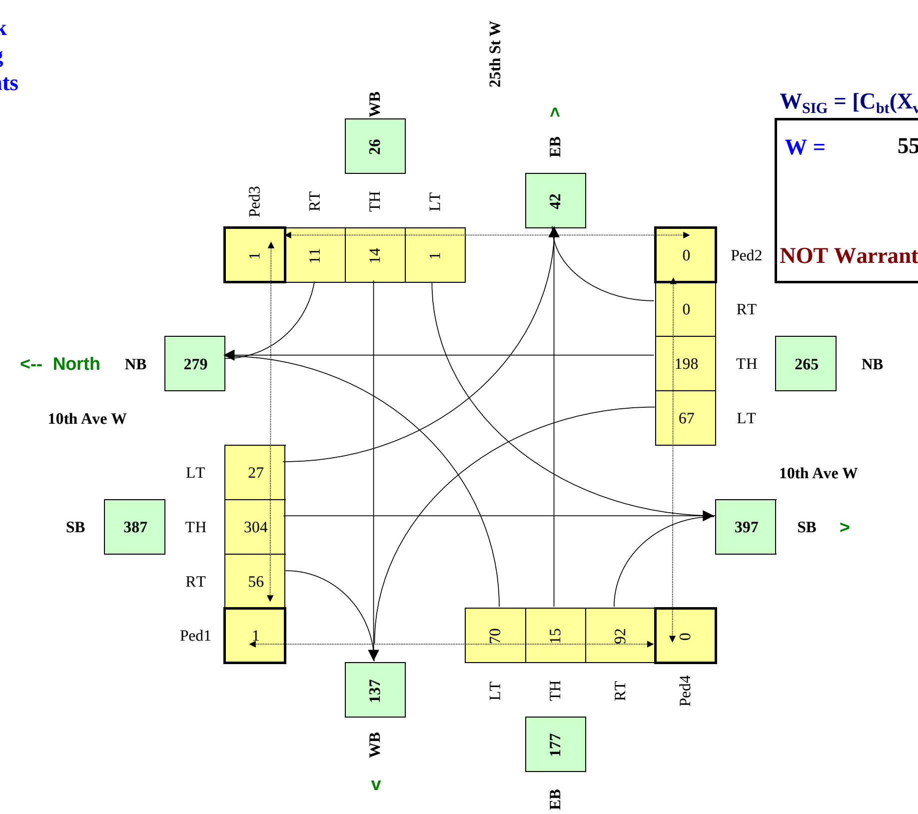
Demographics		
Elem. School/Mobility Challenged	(y/n)	n
Senior's Complex	(y/n)	n
Pathway to School	(y/n)	n
Metro Area Population	(#)	35,000
Central Business District	(y/n)	n

Other input		Speed (Km/h)	Truck %	Bus Rt (y/n)	Median (m)
10th Ave W	NS	50	5.0%	n	
25th St W	EW		2.0%	n	

Set Peak Hours

Traffic Input	NB			SB			WB			EB			Ped1 NS	Ped2 NS	Ped3 EW	Ped4 EW
	LT	Th	RT	LT	Th	RT	LT	Th	RT	LT	Th	RT	W Side	E Side	N Side	S Side
8:00 - 9:00																
9:00 - 10:00																
11:00 - 12:00																
12:00-13:00																
16:00-17:00	67	198	0	27	304	56	1	14	11	70	15	92	4	0	3	1
17:00-18:00																
Total (PM Peak Hour)	**67**	**198**	**0**	**27**	**304**	**56**	**1**	**14**	**11**	**70**	**15**	**92**	**4**	**0**	**3**	**1**
Average(PM Peak Hour)	**67**	**198**	**0**	**27**	**304**	**56**	**1**	**14**	**11**	**70**	**15**	**92**	**1**	**0**	**1**	**0**
Actual Pedestrian Crossing Distance (m)																

PM Peak Turning Movements



$W_{SIG} = [C_{bt}(X_{v\text{-}v}) / K_1 + (F\ (X_{v\text{-}p})\ L) / K_2] \times C_i$

W =	**55**	**55**	**0**
		Veh	***Ped***

NOT Warranted

RESET SHEET

City of Prince Albert - Traffic Signal & Pedestrian Signal Head Warrant Analysis

Main Street (name)	28th St W	**Direction (EW or NS)**	EW	**Road Authority:**	City of Prince Albert
Side Street (name)	4th Ave W	**Direction (EW or NS)**	NS	**City:**	City of Prince Albert
Quadrant / Int #	1	**Comments**	Enter Comments about the analysis here.	**Analysis Date:**	2016 Dec 19, Mon
for Warrant Calculation Results, please hit 'Page Down'	CHECK SHEET			**Count Date:**	2016 Oct 20, Thu
				Date Entry Format:	(yyyy-mm-dd)

Lane Configuration		Excl LT	Th & LT	Through	Th+RT+LT	Th & RT	Excl RT	RT Channelization (y/n)	UpStream Signal (m)	# of Thru Lanes	LT Phase Type	RTOR Allowed (y/n)	Actuated Thru Phase
28th St W	WB		1			1		n	333	2			
28th St W	EB		1			1		n	5,000	2			
4th Ave W	NB		1			1		n	5,000	2			
4th Ave W	SB		1			1		n	5,000	2			

Are the 4th Ave W NB right turns significantly impeded by through movements? (y/n)	n
Are the 4th Ave W SB right turns significantly impeded by through movements? (y/n)	n
Are the 28th St W WB right turns significantly impeded by through movements? (y/n)	n
Are the 28th St W EB right turns significantly impeded by through movements? (y/n)	

	Saturation Flow Rates (if not default) (vphpl)	Default Saturation Flow Rates (vphpl)
Left Turn		1,650
Through		1,800
Right Turn		1,500

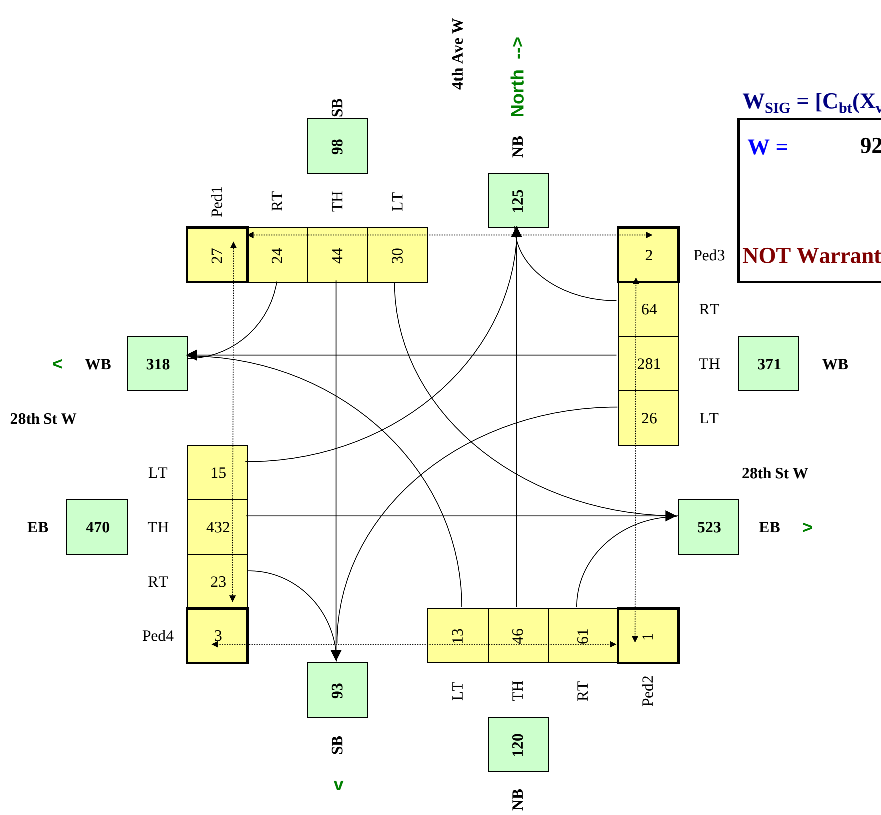
Demographics		
Elem. School/Mobility Challenged	(y/n)	n
Senior's Complex	(y/n)	n
Pathway to School	(y/n)	n
Metro Area Population	(#)	35,000
Central Business District	(y/n)	n

Other input		Speed (Km/h)	Truck %	Bus Rt (y/n)	Median (m)
28th St W	EW	50	5.0%	n	
4th Ave W	NS	50	2.0%	n	

Set Peak Hours

Traffic Input	NB			SB			WB			EB			Ped1 NS	Ped2 NS	Ped3 EW	Ped4 EW
	LT	Th	RT	LT	Th	RT	LT	Th	RT	LT	Th	RT	W Side	E Side	N Side	S Side
8:00 - 9:00																
9:00 - 10:00																
11:00 - 12:00																
12:00-13:00																
16:00-17:00	13	46	61	30	44	24	26	281	64	15	432	23	27	1	2	3
17:00-18:00																
Total (PM Peak Hour)	**13**	**46**	**61**	**30**	**44**	**24**	**26**	**281**	**64**	**15**	**432**	**23**	**27**	**1**	**2**	**3**
Average(PM Peak Hour)	**13**	**46**	**61**	**30**	**44**	**24**	**26**	**281**	**64**	**15**	**432**	**23**	**27**	**1**	**2**	**3**
												Actual Pedestrian Crossing Distance (m)				

PM Peak Turning Movements



$$W_{SIG} = [C_{bt}(X_{v-v}) / K_1 + (F (X_{v-p}) L) / K_2] \times C_i$$

W =	92	68	24
		Veh	*Ped*

NOT Warranted

RESET SHEET

Traffic Signal Warrant Spreadsheet - v2.0 © 2014 Transportation Association of Canada

City of Prince Albert - Traffic Signal & Pedestrian Signal Head Warrant Analysis

Main Street (name)	6th Ave W	Direction (EW or NS)	NS	Road Authority:	City of Prince Albert
Side Street (name)	22nd St W	Direction (EW or NS)	EW	City:	City of Prince Albert
Quadrant / Int #	1	Comments	Enter Comments about the analysis here.	Analysis Date:	2016 Dec 19, Mon
	CHECK SHEET			Count Date:	2016 Oct 27, Thu
for Warrant Calculation Results, please hit 'Page Down'				Date Entry Format:	(yyyy-mm-dd)

Lane Configuration		Excl LT	Th & LT	Through	Th+RT+LT	Th & RT	Excl RT	RT Channelization (y/n)	UpStream Signal (m)	# of Thru Lanes	LT Phase Type	RTOR Allowed (y/n)	Actuated Thru Phase
6th Ave W	NB				1			n	267	1			
6th Ave W	SB				1			n	647	1			
22nd St W	WB				1			n	661	1			
22nd St W	EB				1			n	5,000	1			

Saturation Flow Rates (if not default) (vphpl)		Default Saturation Flow Rates (vphpl)
Left Turn		1,650
Through		1,800
Right Turn		1,500

Are the 22nd St W WB right turns significantly impeded by through movements? (y/n)	n
Are the 22nd St W EB right turns significantly impeded by through movements? (y/n)	n
Are the 6th Ave W NB right turns significantly impeded by through movements? (y/n)	n
Are the 6th Ave W SB right turns significantly impeded by through movements? (y/n)	n

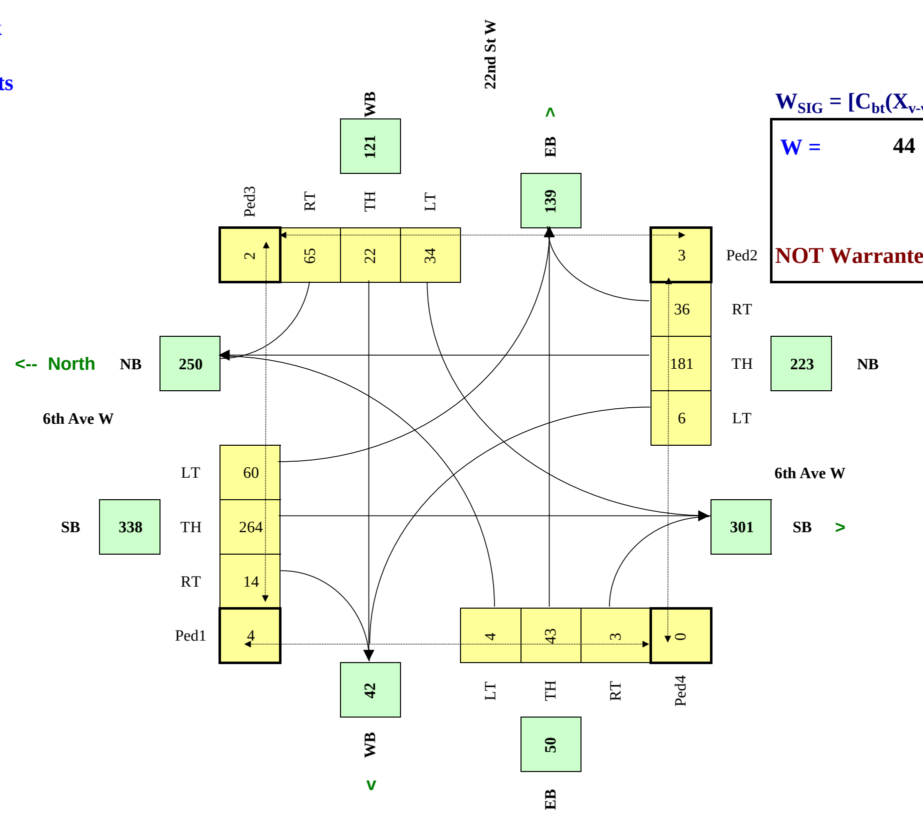
Demographics		
Elem. School/Mobility Challenged	(y/n)	n
Senior's Complex	(y/n)	n
Pathway to School	(y/n)	n
Metro Area Population	(#)	35,000
Central Business District	(y/n)	n

Other input		Speed (Km/h)	Truck %	Bus Rt (y/n)	Median (m)
6th Ave W	NS	50	5.0%	n	1.5
22nd St W	EW	50	2.0%	n	1.5

Set Peak Hours

Traffic Input	NB			SB			WB			EB			Ped1 NS	Ped2 NS	Ped3 EW	Ped4 EW
	LT	Th	RT	LT	Th	RT	LT	Th	RT	LT	Th	RT	W Side	E Side	N Side	S Side
8:00 - 9:00																
9:00 - 10:00																
11:00 - 12:00																
12:00-13:00																
16:00-17:00	6	181	36	60	264	14	34	22	65	4	43	3	4	3	2	0
17:00-18:00																
Total (PM Peak Hour)	**6**	**181**	**36**	**60**	**264**	**14**	**34**	**22**	**65**	**4**	**43**	**3**	**4**	**3**	**2**	**0**
Average(PM Peak Hour)	**6**	**181**	**36**	**60**	**264**	**14**	**34**	**22**	**65**	**4**	**43**	**3**	**4**	**3**	**2**	**0**
Actual Pedestrian Crossing Distance (m)																

PM Peak Turning Movements



$W_{SIG} = [C_{bt}(X_{v\text{-}v}) / K_1 + (F\ (X_{v\text{-}p})\ L) / K_2] \times C_i$

W =	44	43	1
		Veh	Ped

NOT Warranted

RESET SHEET

City of Prince Albert - Traffic Signal & Pedestrian Signal Head Warrant Analysis

Main Street (name)	**6th Ave W**	**Direction (EW or NS)**	**NS**	**Road Authority:**	**City of Prince Albert**
Side Street (name)	**28th St W**	**Direction (EW or NS)**	**EW**	**City:**	**City of Prince Albert**
Quadrant / Int #	**1**	**Comments**	**Enter Comments about the analysis here.**	**Analysis Date:**	**2016 Dec 19, Mon**
for Warrant Calculation Results, please hit 'Page Down'	CHECK SHEET			**Count Date:**	**2016 Oct 19, Wed**
				Date Entry Format:	(yyyy-mm-dd)

Lane Configuration		Excl LT	Th & LT	Through	Th+RT+LT	Th & RT	Excl RT	RT Channelization (y/n)	UpStream Signal (m)	# of Thru Lanes	LT Phase Type	RTOR Allowed (y/n)	Actuated Thru Phase
6th Ave W	NB	1		2			1	n	267	2			
6th Ave W	SB	1		2			1	n	647	2			
28th St W	WB	1		1			1	n	661	1			
28th St W	EB	1		1			1	n	5,000	1			
							n						
							n						
							n						
							n						

Saturation Flow Rates (if not default) (vphpl)		Default Saturation Flow Rates (vphpl)
Left Turn		1,650
Through		1,800
Right Turn		1,500

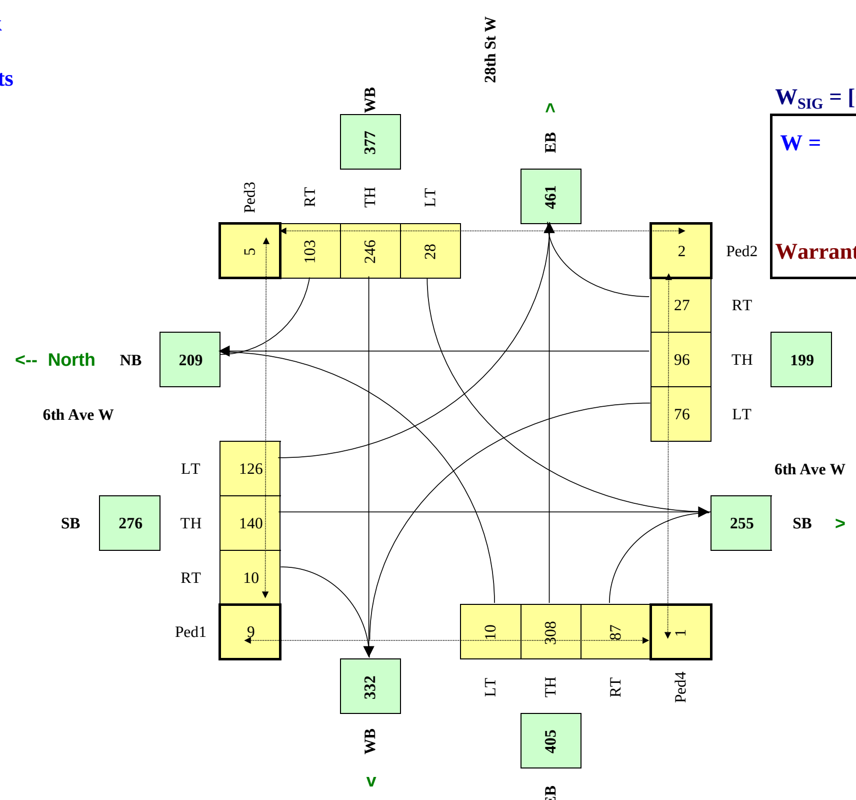
Demographics		
Elem. School/Mobility Challenged	(y/n)	n
Senior's Complex	(y/n)	n
Pathway to School	(y/n)	n
Metro Area Population	(#)	35,000
Central Business District	(y/n)	n

Other input		Speed (Km/h)	Truck %	Bus Rt (y/n)	Median (m)
6th Ave W	NS	50	5.0%	n	1.5
28th St W	EW	50	2.0%	n	1.5

Set Peak Hours

Traffic Input	NB			SB			WB			EB			Ped1 NS	Ped2 NS	Ped3 EW	Ped4 EW
	LT	Th	RT	LT	Th	RT	LT	Th	RT	LT	Th	RT	W Side	E Side	N Side	S Side
8:00 - 9:00																
9:00 - 10:00																
11:00 - 12:00																
12:00-13:00																
16:00-17:00	76	96	27	126	140	10	28	246	103	10	308	87	9	2	5	1
17:00-18:00																
Total (PM Peak Hour)	**76**	**96**	**27**	**126**	**140**	**10**	**28**	**246**	**103**	**10**	**308**	**87**	**9**	**2**	**5**	**1**
Average(PM Peak Hour)	**76**	**96**	**27**	**126**	**140**	**10**	**28**	**246**	**103**	**10**	**308**	**87**	**9**	**2**	**5**	**1**
Actual Pedestrian Crossing Distance (m)																

PM Peak Turning Movements



$$W_{SIG} = [C_{bt}(X_{v\text{-}v}) / K_1 + (F\ (X_{v\text{-}p})\ L) / K_2] \times C_i$$

W =	**153**	**150**	**3**
		Veh	***Ped***

Warranted

RESET SHEET

Appendix C Cost Estimates

Estimate of Probable Costs

Project Name: City of Prince Albert Transportation Study

Allnorth Project #: 15SK0016

March 10, 2017

Item	Item Description	Unit	Estimated Quantity	Consultant Estimated Unit Price	Consultant Estimated Cost
	Short-Term Improvements				
Maquis Dr					
	Widen to 4-lane (Central Ave to 4th Ave E)	m	450	$ 2,000.00	$ 900,000
	Install sidewalk on both side (5th Ave E to 6th Ave E)	m	300	$ 210.00	$ 63,000
	Widen from 2-lane to 4-lane (4th Ave W to 6th Ave W)	m	310	$ 2,000.00	$ 620,000
					$ 1,583,000
2nd Avenue W					
	Install sidewalk on eastside (28th St W to 30th St W)	m	190	$ 210.00	$ 39,900
	Install RRFB (at 13th St W)	each	1	$ 10,000.00	$ 10,000
					$ 49,900
15th Street E					
	Extend Left Turning lane, allow right-in right-out only. Reomve trafific signal (6th Ave E to 7th Ave E Redesgin)	lump	1	$ 10,000.00	$ 10,000
	Install a salvaged traffic Signal at 8th Ave E	each	1	$ 80,000.00	$ 80,000
	Install sidewalk on Eastside (12th Ave E to 15th Ave E)	m	600	$ 210.00	$ 126,000
	Install Raised Median (1st Ave to 5th Ave & 6th Ave to 10th Ave)	m^2	6,275	$ 96.00	$ 602,400
	Curb and Gutter (1st Ave to 5th Ave & 6th Ave to 10th Ave)	m	3,000	$ 125.00	$ 375,000
					$ 1,193,400
6th Ave E					
	Widen and Install Raided median (Marquis Road to Southwood Dr)	m	400	$ 1,200.00	$ 480,000
	Install RRFB (at Carlton High School)	each	1	40,000	$ 40,000
					$ 520,000
17th Ave E					
	Construct 2-lane Road (Byars St E to HWY 302)	m	400	$ 1,700.00	$ 680,000
					$ 680,000
2 Traffic Signals: 6th Ave W & at Central Ave and 22nd St					
	Install Traffic Signal (at 28th Street E)	each	2	$ 180,000.00	$ 360,000
					$ 360,000
City Wide					
	Prepare access control/management guidelines	lump			$ 15,000
					$ 15,000
		Sched. 'A' Construction Sub-Total			**$ 4,401,300**
		Contingency (30%)			**$ 1,320,390**
		Engineering Fees (10%)			**$ 440,130**
		Sched. 'A' Total (excluding GST)			**$ 6,161,820**

Estimate of Probable Costs

Project Name: City of Prince Albert Transportation Study

Allnorth Project #: 15SK0016

March 10, 2017

Item	Item Description	Unit	Estimated Quantity	Consultant Estimated Unit Price	Consultant Estimated Cost
Medium-Term Improvements					
Maquis Dr					
	Construct 2-lane Road (15th Ave E to Bradbury Dr)	m	1,600	$ 1,700.00	$ 2,720,000
	Construct 2-lane Road (6th Ave W to 10th Ave W)	m	680	$ 1,700.00	$ 1,156,000
					$ 3,876,000
10th Avenue W					
	Construct 2-lane Road (28th St W to Marquis Road)	m	800	$ 1,700.00	$ 1,360,000
					$ 1,360,000
		Sched. 'A' Construction Sub-Total			**$ 5,236,000**
		Contingency (30%)			**$ 1,570,800**
		Engineering Fees (10%)			**$ 523,600**
		Sched. 'A' Total (excluding GST)			**$ 7,330,400**

Estimate of Probable Costs

Project Name: City of Prince Albert Transportation Study

Allnorth Project #: 15SK0016

March 10, 2017

Item	Item Description	Unit	Estimated Quantity	Consultant Estimated Unit Price	Consultant Estimated Cost
Long-Term Improvements					
15th Steet E					
	Widen to 6 lanes (10th Ave E to 2nd Ave W)	m	2,000	$ 3,500.00	$ 7,000,000
					$ 7,000,000
15th Ave E					
	Intersection Improvement (at Muzzy Street)	lump			$ 150,000
	Intersection Improvement (at Olive Diefenbaker Dr)	lump			$ 150,000
					$ 300,000
21th Ave E					
	Construct 2-lane Road (Marquis Road to Byars St)	m	1,700	$ 1,700.00	$ 2,890,000
					$ 2,890,000
Marquis Road					
	*Construct 2-lane Road (21st Ave E to Bayers Ave W)	m	2,000	$ 1,700.00	$ 3,400,000
					$ 3,400,000
	*Construct 2-lane Road (10th Ave W to 16th Ave W)	m	800	$ 1,700.00	$ 1,360,000
					$ 1,360,000
28th Street W					
	*Construct 2-lane Road (10th Ave W to 16th Ave W)	m	800	$ 1,700.00	$ 1,360,000
					$ 1,360,000
16th Ave W					
	*Construct 2-lane Road (Marquis Road to 15th St W)	lump	2,100	$ 1,700.00	$ 3,570,000
					$ 3,570,000
		Sched. 'A' Construction Sub-Total			**$ 19,880,000**
		Contingency (30%)			**$ 5,964,000**
		Engineering Fees (10%)			**$ 1,988,000**
		Sched. 'A' Total (excluding GST)			**$ 27,832,000**

Appendix D Synchro Analysis

Synchro analysis files and data files will be submitted electronically and not included in this report.