Transportation and Economic Corridors

Operational Review within the Town of Olds

Highway 27:06 from 70 Avenue to Highway 2A (46 Avenue)

km 36.490 to km 39.715

CON0022782

CIMA+ file number: CA000873.280
September 2024 – Final Report

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CIMA+ file number: CA000873.280
September 2024 – Final Report

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Table of involved resources

In addition to the signatories of this report, the following individuals h also been involved in the study and writing of the report as technical experts within the project team:

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Ellen McLaughlan	Traffic signal coordination
Jatinder Hayer	Traffic signal infrastructure assessment
Chris Philp	Rail interconnection

Review and submission register			
Review No.	Reviewed by	Date	Description of the change or submission
01	P. Steel	June 18, 2024	Draft report review
02	R. Rosvold	June 26, 2024	Draft report review
03	P. Steel	August 28, 2024	Address review comments to finalize report

Executive Summary

The Town of Olds (the Town) has requested a review of the operation of each signalized intersection along Highway 27 within the Town boundaries. CIMA+ has conducted this review to identify modifications that will improve the travel progression of the highway corridor for all road users, as well as to identify upgrades at each signalized intersection, where feasible, that will address specific concerns raised by the Town at those locations, as well as other concerns identified through completion of this review.

Highway 27 is a two-lane, Level 2 provincial highway with a typical posted speed of 100 km/h. It extends in an east-west direction and runs from Sundre to Morrin, with a portion that is discontinuous at Highway 21. For access management purposes through Olds, Highway 27 is classified as future Urban Arterial Divided (UAD) corridor. Under existing conditions, Highway 27 through Olds functions as a Rural Arterial Undivided (RAU) corridor. Entering the Town, the speed limit drops to 60 km/h (from the west) or 80 km/h (from the east) and then down to 50 km/h. Highway 27 through Olds is not an existing or planned high load corridor. In the future, it is not classified as a recommended route.

There are 15 at-grade connections to municipal roads, a highway, and service roads with typical intersection spacing ranging between 60 m and 490 m. Eight of these intersections are included in the operational review. Highway 27 from 70 Avenue through to 57 Avenue is access controlled with no additional access points/driveways. Highway 27 from 57 Avenue through to Highway 2A (46 Avenue) contains many access points, commercial driveways, and residential driveways. Many of these intersections serve a mix of travel demands.

The Highway 27 Functional Planning Study – Town of Olds (April 2009) was completed to identify proposed improvements and access management that focused on minimizing adverse impacts to properties/businesses and reducing construction costs beyond those established from previous review. This current operational review has identified some access management enhancements as part of improving each of the signalized intersections, which seeks to align with the 2009 planning study recommendations. Where possible, opportunities to accelerate access management improvements noted in this report as well as the 2009 planning study should be implemented to reinforce the function of this highway and to reduce conflict points along the study corridor.

The Town has established plans to manage the development and access of lands south of Highway 27 adjacent to the 67A Avenue / Walmart Access intersection. Such development will require that the south leg of this intersection be converted from the current right-in/right-out to all movement access. Improvements specific to this operational review have considered the current configuration, but additional considerations will be required to support all movement access.

A Development Permit application from the Town to Alberta Transportation and Economic Corridors (TEC) was approved in February 2024 granting the Town the ability to upgrade the raised channelization in all corners of the Highway 27 and 57 Avenue intersection, as well as the island in the northeast corner of the Highway 27 and 50 Avenue intersection. The upgrades are specific to providing mobility/pedestrian ramps making them accessible for all sidewalk users.

The Town is in the process of completing a pedestrian network study. At the time of preparing this report, the study is still ongoing. Enhancements specific to pedestrian facilities at the signalized intersections have been identified. Integration into the Town's proposed network will need to be confirmed beyond the considerations presented within this operational review.

A total of 72 collisions were reported along Highway 27 over a five-year period within the Town boundaries. An additional 19 collisions were reported on Highway 2A:14 that specifically referenced the intersection at Highway 27. A detailed review of this data has been completed to determine whether specific revisions to the geometry, operation or other existing conditions may improve the safety performance of individual intersections. Of the total 91 collisions, 13 reported injuries, with the remainder property damage only (PDO). The high proportion of PDO collisions is indicative of an urban corridor with lower speed limits with some form of appropriate access management control. The highest proportion of collisions by type is rear-end (37 collisions, 40.7%), followed by left turn across path (18, 19.8%), and sideswipe same direction (11, 12.1%). All other reported collision types amount to one or fewer collisions per year for the entire corridor.

The calculated collision rate for the study corridor is 89.64 collisions per 100 million vehicle-kilometres (100MVKm). This rate is comparable to the provincial average of 91.03 collisions per 100MVKm. In general, collision rates for urban corridors are expected to be higher than the provincial rate, as this rate is based predominantly of rural corridors with relatively low access density, compared to higher density accesses in urban areas where vehicle conflicts increase.

In the morning peak hour, the intersections along the corridor operate with an overall LOS of “A” or “B”, except for Highway 2A (46 Avenue) that operates with an overall LOS of “C”, corresponding to relatively low delays at the intersections. Individual approaches and movements operate with a LOS of “C” or better, which represents low to moderately low delays. In the midday and PM peak hours, the intersections operate with an overall LOS of “C” or better, with only a few movements indicating LOS “D” (65 Avenue southbound left movement, 50 Avenue southbound left-through movement, Highway 2A (46 Avenue) southbound left-through movement, Highway 2A (46 Avenue) westbound movements). For a level 2 highway in an urban context, a LOS D is the tolerable LOS target.

The intersection of Highway 27 and 50 Avenue is located immediately west of an at-grade rail crossing, which results in the potential for queues of vehicles to back up over the tracks. This crossing falls under the Canadian Pacific Kansas City (CPKC) railway’s jurisdiction. This crossing is located on the Red Deer subdivision at mile 56.72. Due to the proximity of the crossing and signalized 50 Avenue intersection, interconnection between the rail warning system and the traffic signal controller, and the use of traffic signal pre-emption timings at the traffic signal have been reviewed to identify any recommended improvements.

An assessment of the traffic signal infrastructure at each of the signalized intersections along Highway 27 within the Town was completed to determine upgrades required to support the possibility of signal coordination and to identify other deficiencies that may require repair or upgrade of existing infrastructure.

The overall recommendation from the capacity review is to update signal timings for all eight signalized intersections and improve coordination of the signals between 52 Avenue and 50 Avenue. Separate signal timings for morning/off-peak and afternoon periods have been developed. Coordination is also considered to benefit the safety performance of the corridor by improving the progression of vehicles through the Town and reducing the potential of rear-end conflicts.

Signal timing updates were completed for the morning, midday, and afternoon peak hours along Highway 27 for all study intersections. Signal coordination was completed at the intersections of 50 Avenue, 51 Avenue, and 52 Avenue at the request of the Town to improve progression. These three intersections are within an approximate 400 m length of corridor along the north border of the central business district of the Town of Olds. Traffic volumes do not display large directional variations, with slightly higher traffic volumes westbound in all peak periods.

Many recommendations have been identified to enhance the signal progression between intersections and the timing for individual intersections. Correcting signal infrastructure deficiencies has also formed many of the recommendations contained within this report. Beyond these recommendations, additional enhancements to traffic control, intersection treatments, and pedestrian facilities have been identified for consideration. All study recommendations have been presented in a relative order of prioritization with associated costs by intersection for TEC's consideration. The prioritization includes four discrete levels, namely, Short-term (regular maintenance activities), Priority 1 and Priority 2 (both requiring capital funding and programming), and Continued monitoring/Next step (potentially longer-term improvement requiring additional coordination with the Town).

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List of Acronyms

AADT – Average Annual Daily Traffic
ATR – Automatic Traffic Recorder
ASDT – Average Summer Daily Traffic
CIMA+ – CIMA (Canada) Inc.
CP – Canadian Pacific (railway)
HGDG – Highway Geometric Design Guide
LOS – Level-of-Service
MDP – Municipal Development Plan
PDO – Property Damage Only
PHF – Peak Hour Factor
RAU – Rural Arterial Undivided
The Town – Town of Olds
TEC – Alberta Transportation and Economic Corridors
UAD – Urban Arterial Divided
v/c – Volume-to-Capacity (ratio)

1. Introduction

The Town of Olds (the Town) has requested that a review of the operation of each signalized intersection along Highway 27 within the Town limits be completed by Alberta Transportation and Economic Corridors (TEC). In response to this request, CIMA (Canada) Inc. (CIMA+) was retained by TEC to conduct an operational review to:

+ Identify modifications to improve the travel progression along the highway corridor for all road users
+ Identify modifications, where feasible, to address specific concerns raised by the Town, as well as other concerns identified through completion of the review.

The Highway 27 study limits begin at the Town's west corporate limits at 70 Avenue (Highway 27:06 km 36.490) and proceed east to Highway 2A (46 Avenue) (km 39.715). Reference made to intersections throughout this report follows the chainages from west to east.

Figure 1-1 and **Figure 1-2** show the location plan and study area respectively.

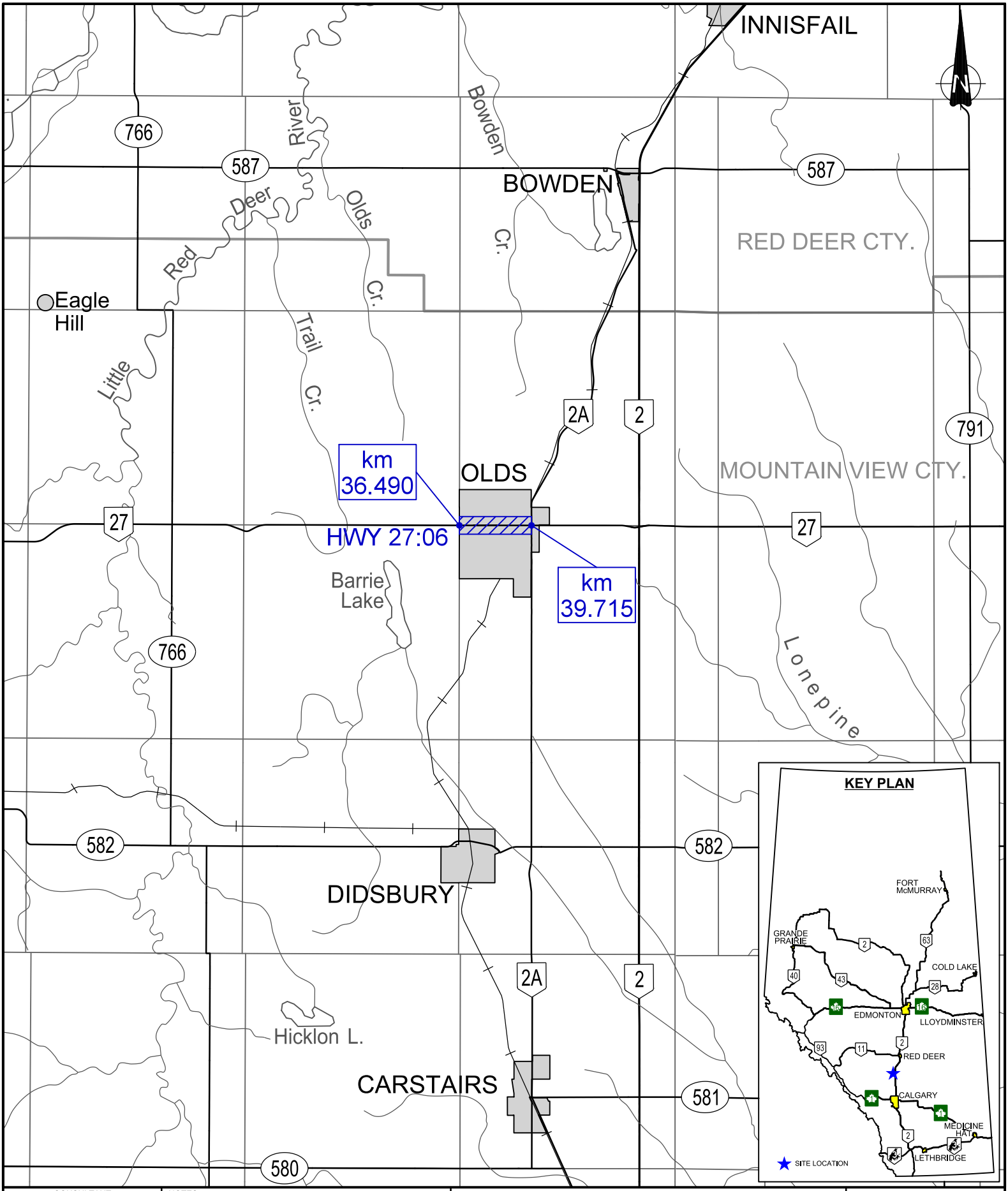
1.1 Overview

The Town of Olds is located approximately 61 km south of the City of Red Deer, 90 km north of Calgary. The Town is at the crossroads of Highway 27 running east-west and Highway 2A running north-south. The Town covers approximately 14.92 square km. As of 2021, Olds was home to 9,209 people, which represented a 0.3% increase since 2016 and an increase of 28.3% since 2001.

Highway 27 is a two-lane, Level 2[1] provincial highway with a typical posted speed of 100 km/h outside urban municipalities. It extends in an east-west direction running from Sundre to Morrin with a portion that is discontinuous at Highway 21. The Town of Olds is the largest population served by Highway 27. For access management purposes[2] through Olds, Highway 27 is classified as future Urban Arterial Divided (UAD) corridor. Under existing conditions, Highway 27 through Olds functions as a Rural Arterial Undivided (RAU)[3] corridor. Entering the Town, the speed limit drops to 60 km/h (from the west) or 80 km/h (from the east) and then down to 50 km/h. Highway 27 through Olds is not an existing or planned high load corridor[4]. In the future, it is not classified as a recommended route[5].

The Highway 27 Functional Planning Study – Town of Olds (April 2009) was completed to identify proposed improvements and access management that focused on minimizing adverse impacts to properties/businesses and reducing construction costs beyond those established from previous review. This current operational review has referenced the findings from this earlier plan to inform the recommendations.

[1] Alberta Transportation and Economic Corridors, Provincial Highway Service Classification Map, 2018
[2] Alberta Transportation and Economic Corridors, Roadside Management Classification Map, 2020
[3] Alberta Transportation and Economic Corridors, Functional Classification – Existing Conditions Map, 2020
[4] Alberta Transportation and Economic Corridors, High Load Corridor on provincial Highways Map, 2015
[5] Alberta Transportation and Economic Corridors, Planning Study High Load Corridor Network for Over-Size Over-Weight Loads in Alberta, 2021



CONSULTANT

CIMA+

PROJECT NO. CA000873.280

NOTES

SCALE
0 1.0 2.5 4.0 km

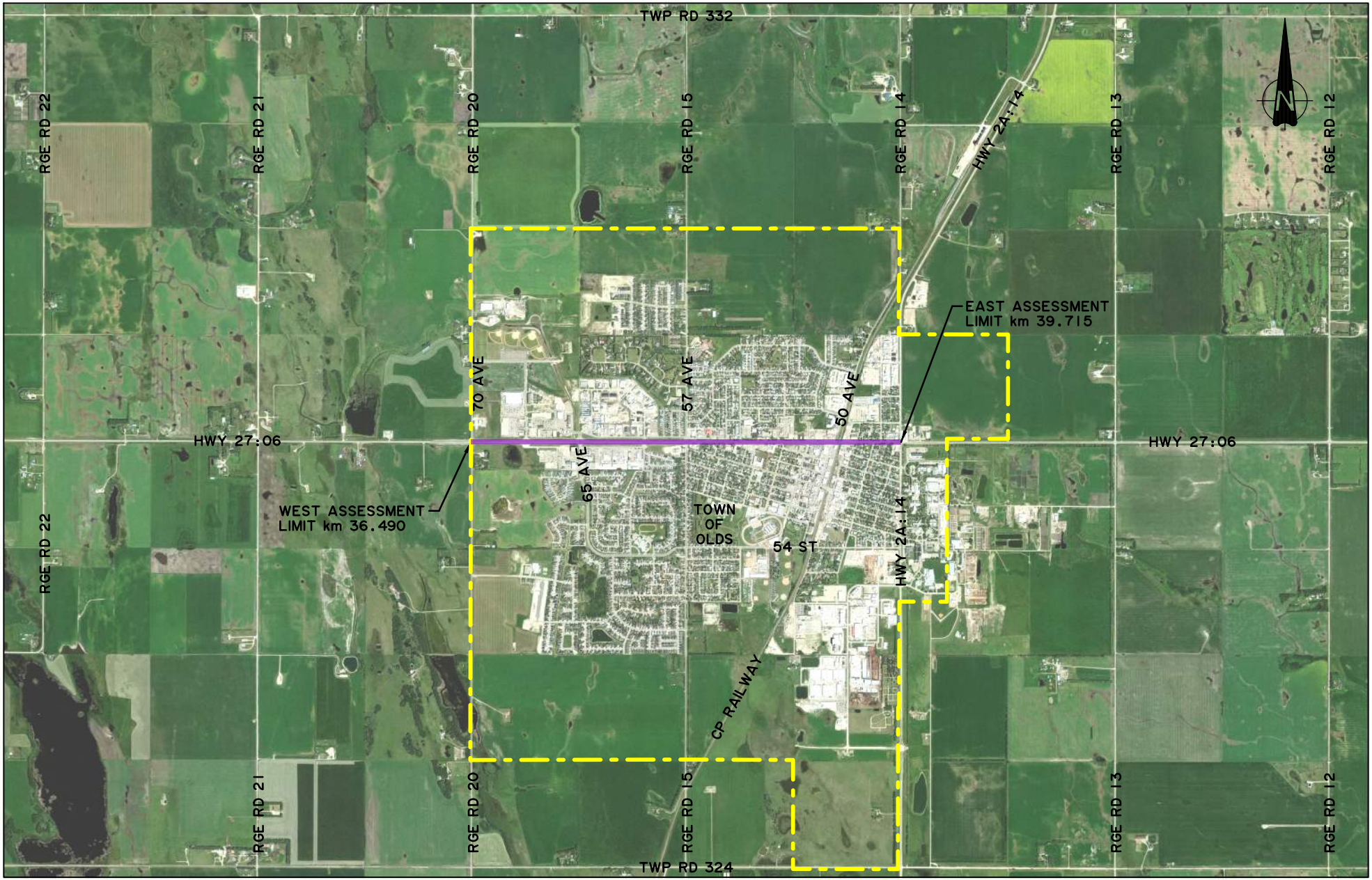
LOCATION PLAN

HIGHWAY 27 TOWN OF OLDS
OPERATIONAL REVIEW

REGION	LOCATION	DATE	DWN	CHK
CENTRAL	HWY 27:06 from km 36.490 to 39.715	01/31/2024	SD	PS

Alberta

FIGURE 1-1



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PROJECT NO. CA000873.280

NOTES

- TOWN OF OLDS BOUNDARY
- STUDY EXTENTS

SCALE 1:2000

STUDY AREA

HIGHWAY 27 TOWN OF OLDS OPERATIONAL REVIEW

Alberta

REGION	LOCATION	DATE	DWN	CHK
CENTRAL	HWY 27:06 from km 36.490 to 39.715	01/31/2024	SD	PS

FIGURE 1-2

1.2 Study Objective

The objective of this operational review is to identify cost-effective solutions, at signalized intersections within the Town of Olds, for all road users, to address those concerns identified by the Town, as well as any additional items identified by the study team. This includes:

- Improving the travel progression of the highway corridor within the Town.
- Determining the need/benefits associated with signal timing and coordination revisions.
- Identifying any associated signal infrastructure upgrades (signal heads, controllers, detectors etc.) that might be required to support signal timing and pedestrian phase changes and implement dynamic timing at all study intersections except for 70 Avenue.
- Identifying any associated signal infrastructure upgrades (signal heads, controllers, detectors etc.) that might be required to support coordination at 50 Avenue, 51 Avenue and 52 Avenue, and develop timing plans.
- Identifying any signal infrastructure deficiencies that should be addressed with any proposed changes.
- Identifying any improvements to pedestrian facilities at the study intersections that could enhance active mode accommodation within the Town.
- Identifying improvements to the corridor and intersections such as turn lanes and channelization, pavement marking enhancements, advanced warning and signage, signalization, access upgrades or restrictions etc.
- Determining the need for updates to the interconnection between the signals at the Canadian Pacific Kansas City Railway (CPKC) crossing and the 50 Avenue intersection.

2. Background Information

There are 15 municipal road intersections along Highway 27 within the Town limits, including the intersection at Highway 2A (46 Avenue). The eight key intersections from these 15 municipal intersections within the study corridor are listed in **Table 2.1**, along with location, traffic control and most recent traffic count data collection date. The seven other municipal intersections that are not included in the study; all are unsignalized. Traffic volume data used in this study consists of turning movement and Automatic Traffic Recorder (ATR) data from TEC. Turning Movement data for the study, along with the corresponding intersection sketches are provided in **Appendix A**.

Table 2.1 : Study Intersections – Location, Control & Data Summary

Intersection	KM Posting	Traffic Control	Date of Count
70 Avenue	km 36.490	Signalized	Thursday, July 20, 2023
67A Avenue / Walmart Access	km 36.863	Signalized	Thursday, July 20, 2023
65 Avenue	km 37.278	Signalized	Thursday, July 20, 2023
57 Avenue	km 38.083	Signalized	Tuesday, August 2, 2022
52 Avenue	km 38.782	Signalized	Thursday, July 20, 2023
51 Avenue	km 39.018	Signalized	Thursday, September 7, 2023
50 Avenue	km 39.188	Signalized	Thursday, July 20, 2023
Highway 2A (46 Avenue)	km 39.715	Signalized	Wednesday, July 3, 2019

CIMA+ received some signal timing data from available records drawing from TEC's Traffic Signal Systems Application at 70 Avenue, 65 Avenue, 52 Avenue and 51 Avenue. Supplementary information was obtained from TEC's signal maintenance contractor via maintenance reports and signal controllers for all locations. There were inconsistencies between the two sets of plans, therefor, the signal controller outputs were used. This signal controller data included in **Appendix B** formed the basis for the existing conditions analysis.

3. Existing Conditions

The existing traffic volume characteristics, operating conditions, safety considerations and other factors influencing the development of recommendations along the Highway 27 corridor through Olds are identified in the following sections.

3.1 Active Modes Network

The existing active modes accommodation includes a sidewalk and pathway network that extends for a portion on one or both sides of Highway 27 between 67A Avenue / Walmart Access and Highway 2A (46 Avenue). Regardless of the presence of a sidewalk or pathway, crosswalks are provided on Highway 27 and the municipal crossroads at each of the study intersections. The exception to this is 70 Street where there are no east/west crosswalk markings.

The Town is in the process of completing a pedestrian network study. Available details provided to CIMA+ at the time of this report are documented in Section 5.

3.2 Intersections

Highway 27 through Olds is a four-lane divided and undivided corridor with 15 at-grade connections to municipal roads including Highway 2A (46 Avenue), with intersection spacing ranging between 60 m and 490 m. Eight of these municipal road intersections are included in this operational review. Highway 27 from 70 Avenue to 57 Avenue has a raised median, and is access controlled with no additional access points/driveways other than the municipal roads. Service roads run parallel to Highway 27 between 67A Avenue / Walmart Access and 57 Avenue on the north side and between 67A Avenue / Walmart Access and 61 Avenue on the south side. Between 57 Avenue and Highway 2A (46 Avenue), Highway 27 is undivided and contains many access points, commercial and residential driveways. **Figure 3-1** (page 10) shows the study corridor intersection lane configurations, including deceleration/turn lane lengths and traffic control. **Figure 3-2** through **Figure 3-4** (pages 11 to 13) show 1:500 scale plans of the study corridor.

The following provides a summary of each intersection. Where applicable, comments provided by the Town are summarised in *blue italics*. The Town also noted that the concerns they've expressed are most prevalent during the lunchtime and PM peak periods. These comments have also been summarized on **Figure 3-5** (page 14).

In addition to specific intersection requests noted below, the Town also requested that TEC consider off-peak (nighttime) flashing yellow operations at the signalized intersections.

Highway 27 and 70 Avenue

The intersection of Highway 27 and 70 Avenue is the westmost intersection in Olds and is a 4-leg signalized intersection. The eastbound direction of travel has a left turn bay, a dedicated through lane, and a through-right turn lane. The westbound direction of travel has right and left turn bays, as well as two dedicated through lanes. There is a raised concrete median along Highway 27. The northbound and southbound legs each have a left turn bay and a through-right-turn lane. The traffic volume at the intersection includes a fair proportion of heavy vehicles, most notable a jump to an average of 17% heavy truck traffic during the midday peak. The posted speed limit on Highway 27 through the intersection is 60 km/h, and the speed limit on 70 Avenue is 50 km/h.

The Town has requested that the left turning arrow for WB left turning traffic be disabled to improve EB/WB traffic flow, the turning volumes is believed to be quite low.

Highway 27 and 67A Avenue / Walmart Access

The intersection of Highway 27 and 67A Avenue / Walmart Access is a 4-leg signalized intersection with certain movements restricted at this time. The eastbound direction of travel has a left turn bay, two dedicated through lanes, and a channelized right turn (yield condition). The westbound direction of travel has two dedicated through lanes and a channelized right turn bay (yield condition). Note: there is also a left turn bay that is closed at this time. There is a raised concrete median along Highway 27. The northbound leg has a channelized right turn bay (yield condition), and (currently closed) through lane and left turn bay. The southbound leg has a left turn bay and channelized right turn bay (yield condition), as well as a dedicated through lane, with a closed receiving lane, that is currently being used as a second left turn lane without applicable signage or pavement markings.

The posted speed limit on Highway 27 through the intersection is 60 km/h, and the speed limit on 67A Avenue / Walmart Access is 50 km/h. Although it is assumed that all movements will be opened as the area is built out, the intersection remains restricted for the purpose of this analysis.

The Town has requested that CIMA+ address their desire for dual southbound left turn lanes at this intersection (while the south leg remains closed), including the required updates to lane markings and signage to accommodate the southbound dual left turns. The Town has also requested that delays associated with pedestrian signals be minimized by using pedestrian actuated signals (and associated signage) instead of pedestrian recall. Note: The Town will address opening the south leg of the intersection at a later date through a Traffic Impact Assessment.

Highway 27 and 65 Avenue

The intersection of Highway 27 and 65 Avenue is a 4-leg signalized intersection. The eastbound direction of travel has a left turn bay, a dedicated through lane, and a through-right turn lane. The westbound direction of travel has a channelized right turn bay (yield condition) and a left turn bay, as well as two dedicated through lanes. There is a raised concrete median along Highway 27. The northbound has a combined left-through lane and a right turn bay. The southbound leg has a left turn lane and a shared through-right turn lane with a channelized right turn (yield condition). The posted speed limit on Highway 27 through the intersection is 60 km/h, and the speed limit on 65 Avenue is 50 km/h.

The Town has requested signing and laning improvements for northbound traffic. It was also noted that the distance between Highway 27 and the south service road is problematic; they would like to see right-in/right-out operations considered for the service road.

Highway 27 and 57 Avenue

Highway 27 and 57 Avenue is a signalized 4-leg intersection that is the primary intersection in Olds, connecting through the Town to Range Road 15. The eastbound and westbound legs have a left turn bay, a dedicated through lane, and a shared through-right lane with a channelized right turn (yield condition). There is a raised concrete median along Highway 27. The northbound and southbound lanes have a shared left-through lane and a channelized right turn bay (yield condition). The posted speed limit on Highway 27 through the intersection is 60 km/h, and the speed limit on 57 Avenue is 50 km/h.

The Town has requested that lane markings and signage changes be confirmed. They have also requested that changes to the left turn movements onto the north service road and 50 Street be considered.

Highway 27 and 52 Avenue

The intersection of Highway 27 and 52 Avenue is a 3-leg signalized intersection. The eastbound leg has a shared left-through turn lane and a dedicated through lane. The westbound leg has two dedicated through lanes and a right turn bay. There is an uncontrolled alley providing access to commercial properties on the south side of Highway 27 that is offset from the north leg of the intersection, between the signal pole and the west crosswalk. The southbound leg has a left turn lane and a right turn bay. The posted speed limit on Highway 27 through the intersection is 50 km/h, and the speed limit on 52 Avenue is 50 km/h.

The Town has requested that the detectors for southbound movements be relocated to avoid right turn activation. Coordination of signal timing of this intersection with 51 Avenue and 50 Avenue has also been requested.

Highway 27 and 51 Avenue

The intersection of Highway 27 and 51 Avenue is a 4-leg signalized intersection. The eastbound leg has a left turn bay, a dedicated through lane and a shared through-left turn lane. The westbound leg has a left turn bay, a dedicated through lane, and a shared through-right turn lane. The northbound and southbound legs have a left turn bay and a shared through-right turn lane. The south leg is skewed left. The posted speed limit on Highway 27 through the intersection is 50 km/h, and the speed limit on 51 Avenue is 50 km/h.

The Town has requested signal timing coordination of this intersection with 52 Avenue and 50 Avenue.

Highway 27 and 50 Avenue

The intersection of Highway 27 and 50 Avenue is a 4-leg skewed left intersection that is signalized. The eastbound leg has a shared left-through lane and through-right lane. The westbound leg has a shared left-through lane and through-right lane with a channelized right (yield condition). Both the northbound and southbound legs have a shared left-through lane and a right turn bay. Centreline to centreline, the intersection is 55 m west of the adjacent rail line. The posted speed limit on Highway 27 through the intersection is 50 km/h, and the speed limit on 50 Avenue is 50 km/h.

The Town has requested signal timing coordination of this intersection with 52 Avenue and 51 Avenue.

Highway 27 and CPKC Railway Line

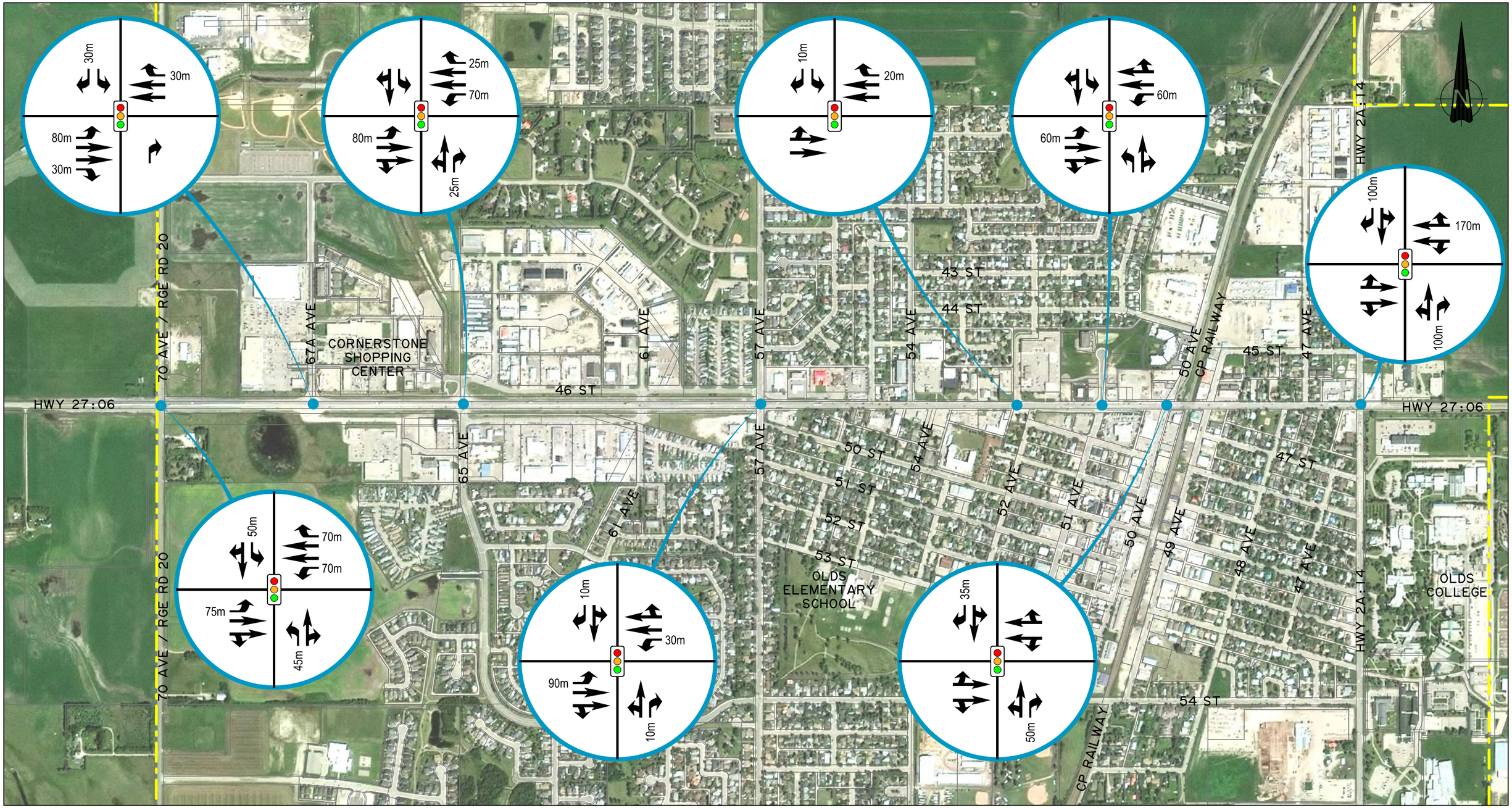
There is an at-grade railway crossing of Highway 27 just east of 50 Avenue. There is one set of tracks crossing the roadway at this location. The crossing is equipped with a cantilevered warning system with bells, flashing lights and a gate for both directions of travel. Discussion regarding this crossing is provided in Section 10.

Highway 27 and Highway 2A (46 Avenue)

The junction of Highway 27 and Highway 2A (46 Avenue) is the eastmost intersection in Olds and is a 4-leg signalized intersection. The eastbound and westbound legs have a shared left-through lane and through-right lane. Both the northbound and southbound legs have a shared left-through lane and a right turn bay. The posted speed limit on Highway 27 through the intersection is 50 km/h, and the speed limit on 46 Avenue is 50 km/h.

The Town would like information on timing of upgrades to pedestrian drop-curbs/ramps. They have noted that right turn channelization for eastbound and westbound traffic may be possible when developments in the northeast and southwest corners facilitate implementations.

The Town also noted a signal infrastructure concern that is causing delays for eastbound and westbound traffic due to driver confusion. There is a green arrow for eastbound and westbound traffic that disappears approximately 10 seconds prior to the light turning yellow. When the arrow disappears, traffic believes they no longer have the right of way which is incorrect.



CONSULTANT

CIMA+

PROJECT NO. CA000873.280

LEGEND

- TOWN OF OLDS BOUNDARY
- LANE CONFIGURATION
- XXXm STORAGE LENGTH

SCALE 1:1000

LANING CONFIGURATION

HIGHWAY 27 TOWN OF OLDS OPERATIONAL REVIEW

REGION	LOCATION	DATE	DWN	CHK
CENTRAL	HWY 27:06 from km 36.490 to 39.715	02/09/2024	SD	PS

Alberta

FIGURE 3-1

CONSULTANT

CIMA+

PROJECT NO. CA000873.280

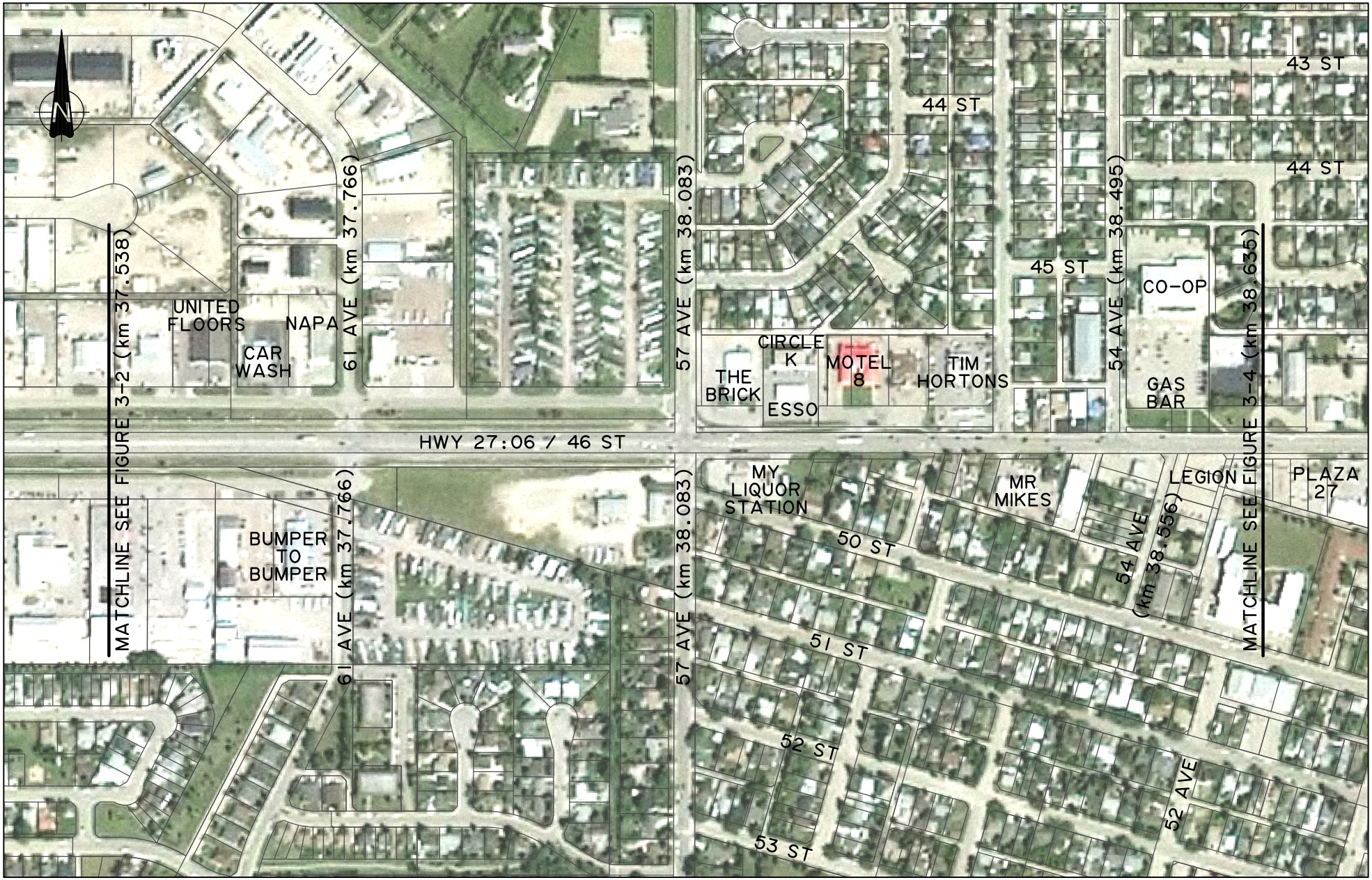
NOTES

1:500 PLAN
HWY 27 KM 36.490 TO KM 37.538
HIGHWAY 27 TOWN OF OLDS OPERATIONAL REVIEW

REGION	LOCATION	DATE	DWN	CHK
CENTRAL	HWY 27:08 from km 36.490 to 39.715	09/16/2024	SD	PS

Alberta

FIGURE 3-2



CONSULTANT

CIMA+

PROJECT NO. CA000873.280

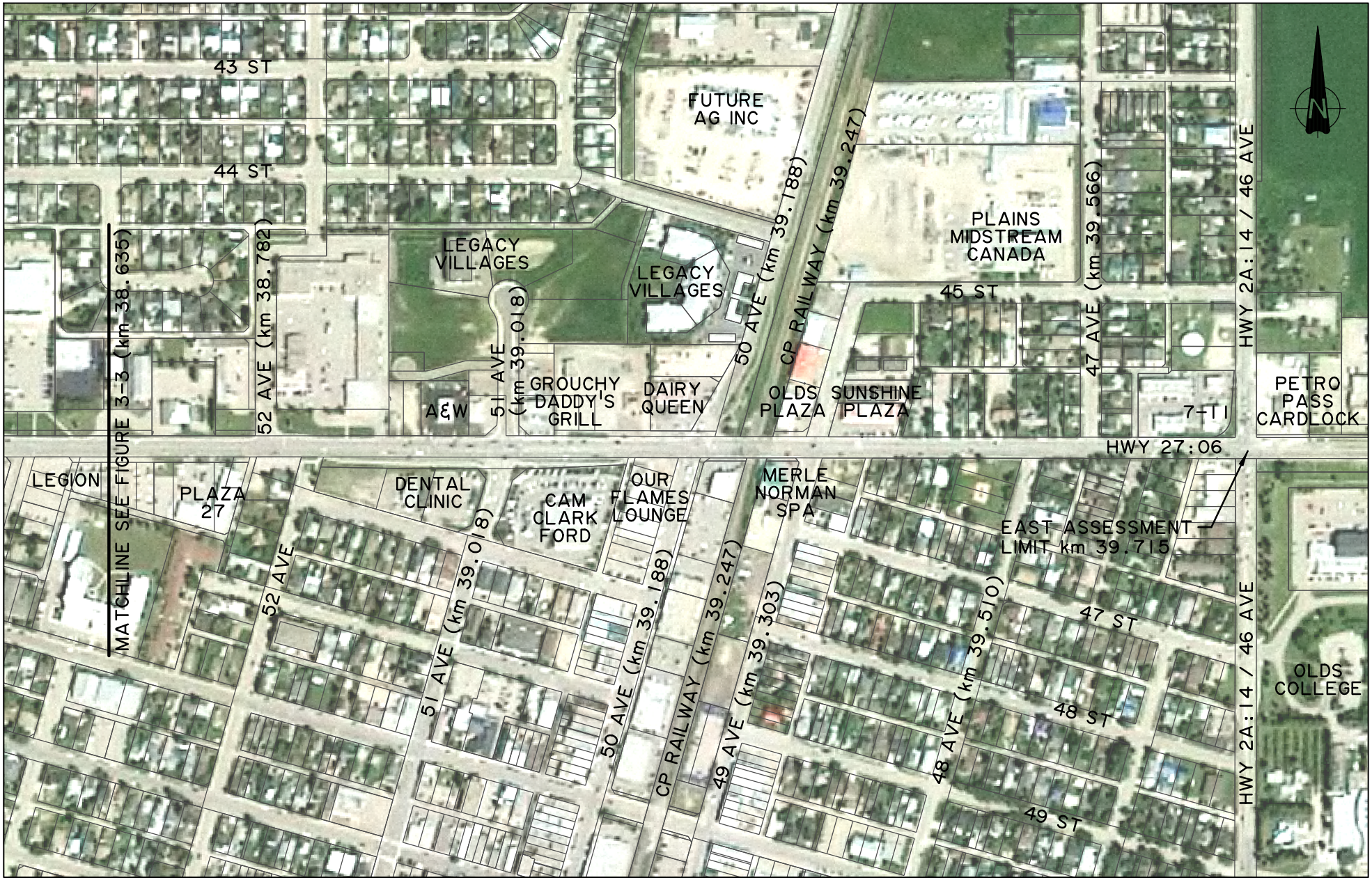
NOTES

1:500 PLAN
HWY 27 KM 37.538 TO KM 38.635
HIGHWAY 27 TOWN OF OLDS OPERATIONAL REVIEW

REGION	LOCATION	DATE	DWN	CHK
CENTRAL	HWY 27:08 from km 36.490 to 39.715	09/16/2024	SD	PS

Alberta

FIGURE 3-3



CONSULTANT

CIMA+

PROJECT NO. CA000873.280

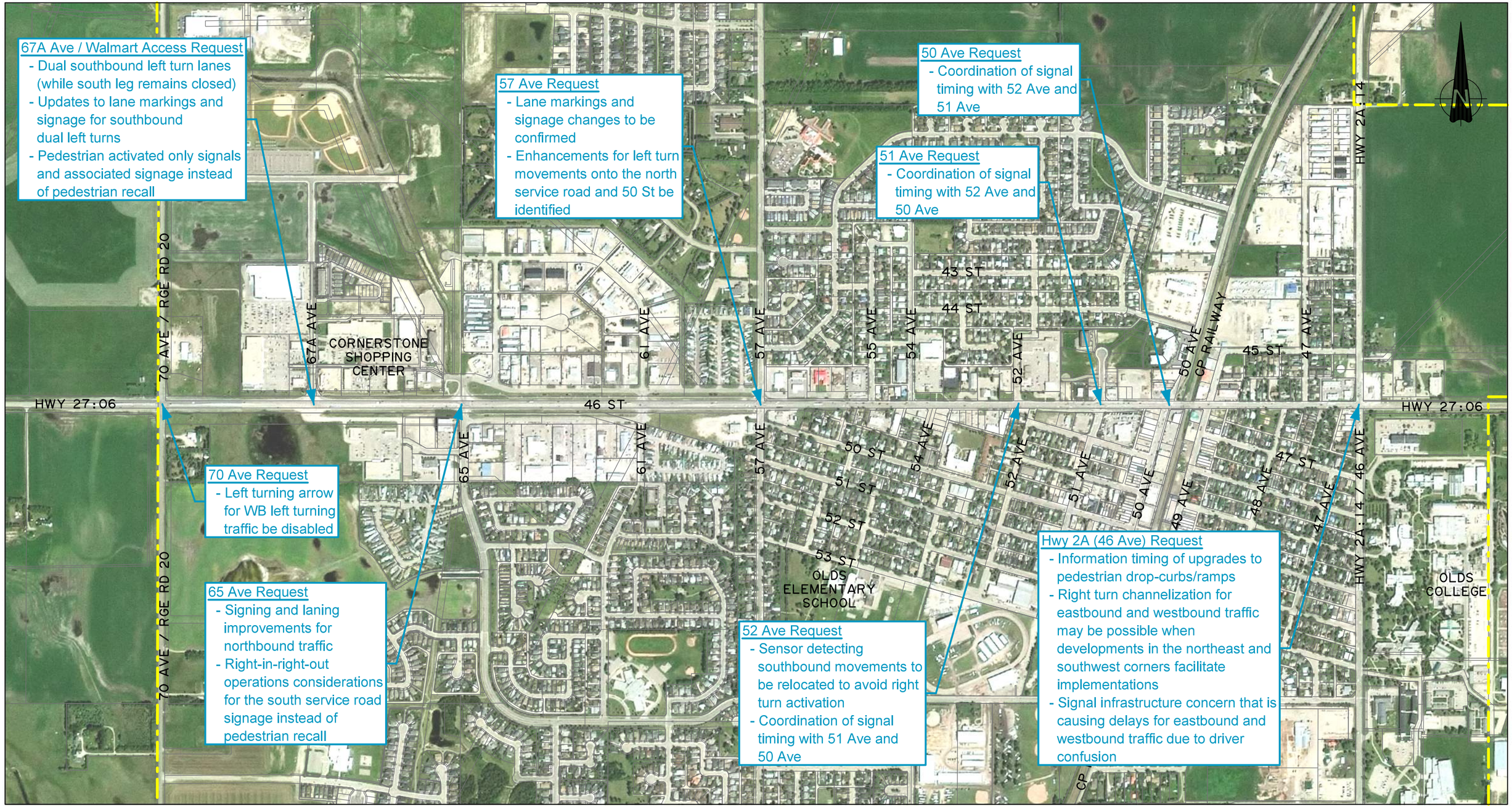
NOTES

1:500 PLAN
HWY 27 KM 38.635 TO KM 39.715
HIGHWAY 27 TOWN OF OLDS OPERATIONAL REVIEW

REGION	LOCATION	DATE	DWN	CHK
CENTRAL	HWY 27:08 from km 36.490 to 39.715	09/16/2024	SD	PS

Alberta

FIGURE 3-4



CONSULTANT

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PROJECT NO. CA000873.280

LEGEND

TOWN OF OLDS BOUNDARY

SCALE 1:1000

TOWN OF OLDS
REQUEST SUMMARY

HIGHWAY 27 TOWN OF OLDS OPERATIONAL REVIEW

REGION	LOCATION	DATE	DWN	CHK
CENTRAL	HWY 27:06 from km 36.490 to 39.715	02/09/2024	SD	PS

Alberta

FIGURE 3-5

3.3 Land Use and Population

The recently updated Municipal Development Plan (MDP) notes that the population in Olds is projected to grow 2.14% to 2.40% per year.[6] **Table 3.1** shows a summary of historical population data, compound growth rates based on historic data, and 25-year (2046) projected values based on an initial year of 2021 (the newest available population data). Recent and historical population growth indicates that future growth may be less than the 2.31% per year growth rate and 18,221-population horizon in 2046, which was reported in the 2020 Municipal Development Plan and grown from 2016 population data. Growth has slowed slightly based on 2021 census values, with a compound growth rate of 0.1% in the last 5 years, vs. 1.9% in the last 25 years. As the Town continues to grow, according to the development plan, the majority of growth will be west in the town, with some growth south and north throughout the 20 to 30-year planning horizon.

Table 3.1 : Olds Historical Population & Projection

Population						Compound Growth Rate					25-Year Projection (2021-2046)		
1996	2001	2006	2011	2016	2021	5-Yr	10-Yr	10-Yr	20-Yr	25-Yr	0.1%	1.9%	2.31%
5,815	6,607	7,248	8,235	9,184	9,209	0.1%	1.1%	1.6%	1.7%	1.9%	9,442	14,742	16,299

3.4 Collisions

A summary of the reported collisions along Highway 27 within the study limits was provided by TEC for the period from 2014 to 2018. This data is included in **Appendix C**. A total of 72 collisions were reported within the five-year period between km 36.182 and km 39.950, encompassing the intersection treatment areas. An additional 19 collisions reported on Highway 2A:14 have been included within the analysis as they specifically reference the intersection at Highway 27. The combined data is illustrated in the observed collision trends diagram included in **Figure 3-6** (page 21). A detailed review of this data has been completed to determine whether specific revisions to the geometry, operation or other existing conditions may improve the safety performance of individual intersections.

Table 3.2 presents a summary of the data for the entire study corridor. As several intersection treatments overlap or the end of one forms the start of the next, the short section between the physical intersection locations has been assigned to an appropriate adjacent intersection. Where this does not occur, collisions have been reviewed for the discrete segment between intersection treatments.

Table 3.3 summarizes the observed trends in the collision data specific to type, severity, location, occurrence, and direction of travel. A trend has been defined as three or more collisions within the intersection or segment, of a similar type or presence of other factors outside ideal conditions (i.e., not considering clear environmental conditions, dry surface conditions, daylight etc.).

[6] Town of Olds Municipal Development Plan, 2020, https://www.olds.ca/town-services/bylaws/municipal-development-plan

Of the total 91 collisions, 13 reported injuries, with the remainder property damage only (PDO). The high proportion of PDO collisions is indicative of an urban corridor with lower speed limits with some form of appropriate access management control. The highest proportion of collisions by type is rear-end (37 collisions, 40.7%), followed by left turn across path (18, 19.8%), sideswipe same direction (11, 12.1%), and animal-strike (6, 6.6%). All other reported collision types amount to one or fewer collisions per year for the entire corridor. **Table 3.2** and **Table 3.3** capture all 91 collisions assessed in this study.

The collision frequency is 18.2 collisions per year within the entire study limits. The location with the highest frequency is the intersection at Highway 2A (46 Avenue)where 29 collisions were reported, accounting for 31.9% of all collisions within the study corridor. Excluding this intersection shows a reduction in frequency to 12.4 collisions per year.

The calculated collision rate for the study corridor is 89.64 collisions per 100 million vehicle-kilometres (100MVKm), including collisions at the Highway 2A (46 Avenue) intersection, but only those specifically reported on Highway 27 (10 of the 29). This rate is comparable to the provincial average of 91.03 collisions per 100MVKm (for undivided highway corridors no. 001 to 499). The collision rate considers traffic volumes for 2018 since the latest collision data analyzed is up to 2018. In general, collision rates for urban corridors are expected to be higher than the provincial rate, as this rate is based predominantly of rural corridors with relatively low access density, compared to higher density accesses in urban areas where vehicle conflicts increase.

Specific commentary that highlights issues along the Highway 27 corridor or at discrete locations includes:

Rear-end collisions

- Total of 6 collisions involving a mix of directions and traffic control (signals and yield) on the approaches at the 67A Avenue / Walmart Access intersection. No specific trends.
- Three collisions in the eastbound and westbound directions, with two resulting in an injury (both occurring during icy road conditions), at the 57 Avenue intersection.
- Three collisions in the westbound direction at the 52 Avenue intersection.
- Total of 13 collisions at the Highway 2A (46 Avenue) intersection; however, the description of one suggests it to be a backing event. There are eight collisions involving eastbound vehicles, with three resulting in an injury. One of two collisions involving northbound vehicles resulted in an injury.

Left turn across path collisions

- Three collisions involved eastbound vehicles turning left in front of a westbound vehicle at the 50 Avenue intersection.
- Three collisions involved westbound vehicles turning left in front of an eastbound vehicle at the Highway 2A (46 Avenue) intersection, with one resulting in an injury. Two other collisions involved a northbound vehicle turning in front of a southbound vehicle.
- Two collisions were reported at three other intersections (70 Avenue, 57 Avenue and 52 Avenue), with five of the six collisions involving a westbound vehicle turning in front an eastbound vehicle.

Sideswipe same direction

- Four collisions occurred at the Highway 2A (46 Avenue) intersection, with two involving eastbound vehicles and two southbound vehicles. Both collisions involving eastbound vehicles occurred during a lane change to move from the inside to the outside lane.
- Two collisions were reported at two other locations (in the area near 55 Avenue to 54 Avenue, and at the 51 Avenue intersection). In both locations, the collisions occurred in opposite directions, i.e., one involving eastbound vehicles, and the other westbound vehicles.

Animal strikes

- All collisions occurred near the 70 Avenue intersection, with five of the six reported west of 70 Avenue outside the corporate limits, in a rural environment. All animal strikes involved westbound vehicles. The intersection has been upgraded to its current configuration post collision period.

Table 3.2 : Collision Data Summary – Study Corridor

Metric		No. of Collisions	Proportion
Location			
70 Avenue – km 36.490		13	14.3%
67A Avenue / Walmart Access – km 36.863		10	12.1%
65 Avenue – km 37.278		1	1.1%
61 Avenue – km 37.764		3	3.3%
57 Avenue – km 38.083		9	9.9%
East of 57 Avenue to West of 52 Avenue – km 38.083 to km 38.782		6	6.6%
52 Avenue – km 38.782		6	6.6%
51 Avenue – km 39.018		2	2.2%
50 Avenue – km 39.188		8	8.8%
East of 50 Avenue to West of Highway 2A (46 Avenue) – km 39.188 to km 39.715		3	3.3%
Highway 2A (46 Avenue) – km 39.715[1]	Collisions reported on Highway 27 only	10	--
	Including collisions reported on Highway 2A (46 Avenue)	29	31.9%

Metric	No. of Collisions	Proportion
Severity		
Fatal	0	0.0%
Injury	13	14.3%
Property Damage Only	78	85.7%
Collision Type[1]		
Struck Object (non-animal)	1	1.1%
Animal Strike	6	6.6%
Off road left	3	3.3%
Right Angle	5	5.5%
Passing Left Turn	0	0.0%
Left Turn Across Path	18	19.8%
Sideswipe (opposite)	2	2.2%
Other	2	2.2%
Rear-end	37	40.7%
Off road right	3	3.3%
Head on	0	0.0%
Passing Right Turn	1	1.1%
Sideswipe (same)	11	12.1%
Backing	2	2.2%

Metric	No. of Collisions	Proportion
Environmental Condition		
Clear	77	84.6%
Raining	1	1.1%
Hail / sleet	1	1.1%
Loose surface material	8	8.8%
Fog / smog / smoke / dust	0	0.0%
High wind	2	2.2%
Blank / unknown	2	2.2%
Surface Condition		
Dry	65	71.4%
Wet	2	2.2%
Slush / snow / ice	22	24.2%
Loose surface material	0	0.0%
Muddy	0	0.0%
Blank / unknown	2	2.2%
Natural Light Condition		
Daylight	75	82.4%
Sun glare	0	0.0%
Darkness	16	17.6%
Unknown	0	0.0%

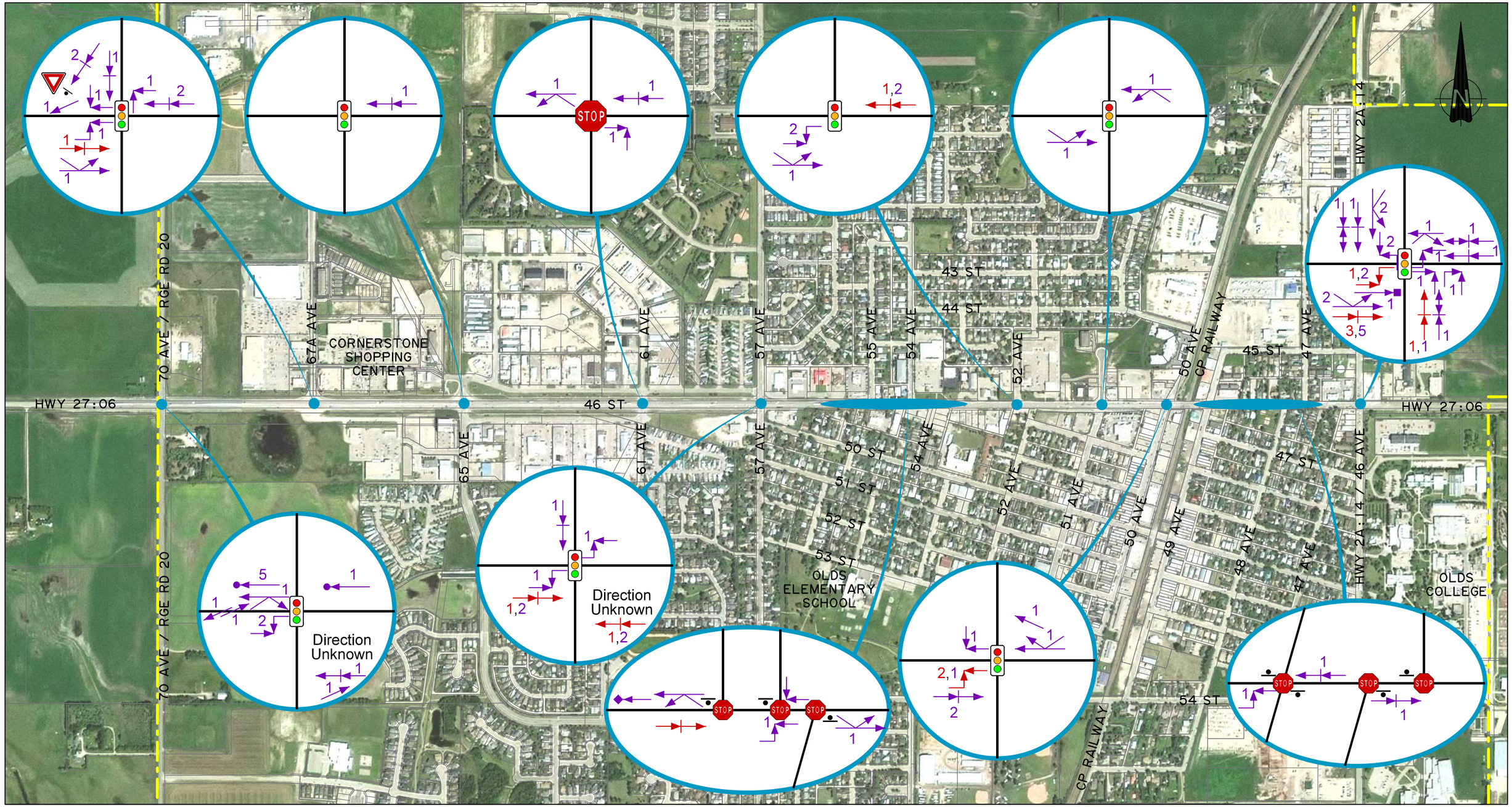
Note: 1 – values differ from those included in Appendix C, which focus solely on Highway 27 to establish a corridor collision rate, and do not include the addition of collisions reported on Highway 2A at the Highway 2A (46 Avenue) intersection.

Table 3.3 : Collision Data Summary – Location Breakdown

Collision Type	No. of Collisions	Severity	Occurrence		Other Factors / Observations [1]
			Month	Time of Day	
70 Avenue, km 36.490 – Total of 13 Collisions					
Animal strike	6	PDO – 6	Oct/Nov – 1 each Mar/Aug – 2 each	Daytime – 1 Nighttime – 5	All WB conflicts; 5 occurring to the west of the intersection prior to recent upgrades & lighting
Run-off-road	3	PDO – 3	Feb/Mar/July – 1 each	Daytime – 1 Nighttime – 2	Two nighttime collisions occurred in the early morning Daytime collision caused by medical conditions
67A Avenue / Walmart Access, km 36.863 – Total of 11 Collisions					
Rear-end	6	Injury – 1 PDO – 5	Jan/Apr/Sept/Oct – 1 each Nov – 2	Daytime – 6	SB – 2, both in right turn channelized lane, yield control, during the PM peak period WB – 2, one reported adverse road conditions EB – 1 (injury), SB – 1 (not in channelized lane)
Right angle / Left turn across path	3	PDO – 3	June/Nov/Dec – 1 each	Daytime – 2 Nighttime – 1	WB – 2 right angle collisions, vehicle proceeded when unsafe (ran red light) One collision cites the intersection location as unknown (km posting suggests 67A Avenue / Walmart Access)
57 Avenue, km 38.083 – Total of 9 Collisions					
Rear-end	7	Injury – 2 PDO – 5	Jan/Feb/Sept/Nov/Dec – 1 each Mar – 2	Daytime – 7	EB – 3 (one injury), SB – 1, unknown – 3 (one injury) Adverse road conditions – 4 Following vehicle proceeded before the lead vehicle moved, after stopping for red light – 3
52 Avenue, km 38.782 – Total of 6 Collisions					
Rear-end	3	Injury – 1 PDO – 2	Feb/Sept/Dec – 1 each	Daytime – 3	WB – 3 Adverse road conditions – 1 Sun glare – 1 (midday occurrence)

Collision Type	No. of Collisions	Severity	Occurrence		Other Factors / Observations [1]
			Month	Time of Day	
50 Avenue, km 39.188 – Total of 8 Collisions					
Right angle / Left turn across path	4	Injury – 2 PDO – 2	Jan/Apr/June/Sept – 1 each	Daytime – 4	EB – 3 turned in front of WB vehicle SB – 1 improper turn colliding with WB vehicle
Highway 2A (46 Avenue), km 39.715 – Total of 29 Collisions					
Rear-end [2]	12	Injury – 3 PDO – 10	Jan/Aug/Oct/Nov – 1 each May – 2 July/Sept – 3 each	Daytime – 11 Nighttime – 1	EB – 8 (3 injuries with 2 citing slippery road conditions) NB – 2 (1 injury), WB – 1, SB – 1 Conflict occurred while slowing as signal changed – 3 Conflict occurred while stopped – 2 Following vehicle proceeded before the lead vehicle moved, after stopping for red light – 2 Adverse road conditions – 4
Left turn across path	6	Injury – 1 PDO – 5	Feb/Mar/Apr/May/Oct/ Dec – 1 each	Daytime – 5 Nighttime – 1	WB – 3 turned in front of EB vehicle (one injury) NB – 2 turned in front of SB vehicle EB – 1 turned in front of WB vehicle Conflict occurred from a vehicle changing lanes and continue through on a yellow signal – 1 Proceeded through intersection from a right turn only lane – 1
Backing [2]	3	PDO – 3	Jan/Mar/May – 1 each	Daytime – 2 Nighttime – 1	WB – 1, NB – 1, SB – 1 All vehicles were stopped at lights when struck
Sideswipe [3]	5	PDO – 5	Feb/June/Dec – 1 each July – 2	Daytime – 4 Nighttime – 1	EB – 2, attributed to lane changes SB – 2 (hit & run – 1) Adverse conditions – struck opposite vehicle while turning

Note: 1 – southbound (SB), northbound (NB), eastbound (EB), westbound (WB).
1 – numbers represent the total collisions associated with the causal factor.
2 – an additional collision was reported as a rear-end, but description suggests backing. Has been included as a backing event.
3 – an additional collision was reported as an off-road right, but description fields suggest sideswipe. Has been included as a sideswipe event.



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LEGEND

- 1,3 — NUMBER OF COLLISIONS BY TYPE (INJURY, PROPERTY)
- INJURY COLLISION
- PROPERTY DAMAGE COLLISION
- ANIMAL COLLISION
- U-TURN COLLISION
- SIGN COLLISION
- REAR-END COLLISION
- RUN-OFF ROAD COLLISION
- SIDE SWIPE COLLISION
- RIGHT ANGLE COLLISION
- LEFT TURN COLLISION
- REVERSING COLLISION
- TOWN OF OLDS BOUNDARY

SCALE 1:1000

OBSERVED COLLISION TRENDS

HIGHWAY 27 TOWN OF OLDS OPERATIONAL REVIEW

REGION	LOCATION	DATE	DWN	CHK
CENTRAL	HWY 27:06 from km 36.490 to 39.715	02/23/2024	SD	PS

Alberta

FIGURE 3-6

3.5 Traffic Volumes

All traffic counts used were conducted in the summer period of 2022 or 2023 (except for the count at 51 Avenue conducted in fall 2023, and the count at Highway 2A (46 Avenue) conducted in summer 2019). Counts used were a combination of data provided by TEC as well as data collected specifically for this study by Crossroads Traffic Consultants Ltd. The common AM, Midday, and PM Peak Hour was determined and a set of volumes for 2023 was created, balanced where applicable (i.e., where there was no missing data or additional approaches between intersections). Existing AM, Midday, and PM Peak Hour traffic volumes are shown in **Figure 3-8.** The AM peak occurred between 8:15 AM and 9:15 AM, the Midday peak from 12:00 PM to 1:00 PM, and the PM peak from 4:15 PM to 5:15 PM.

Historical ATR volumes in and around Olds were analyzed to determine whether any factoring was required due to COVID-19 impacts and seasonal trends. The four ATR's surrounding Olds were reviewed. **Figure 3-7** shows the average annual daily traffic (AADT) and average summer daily traffic (ASDT) volumes for the two most relevant ATR locations. AADT considers traffic volumes across the entire year, while ASDT considers traffic volumes from May 1st through September 30th. Both locations show that impacts of COVID-19 on the traffic volumes were minimal beyond 2021, and that they continue to stabilize heading into 2023 and beyond. Further, it shows that the seasonal summer peak (shown by the ASDT) is consistently higher than the AADT. On average, the ASDT presented as 15.3% higher than the AADT at the nearest Highway 27 ATR in the vicinity of Olds (E of Sundre), and 6.4% higher than the AADT at the overall nearest ATR (S of Olds on Highway 2A).

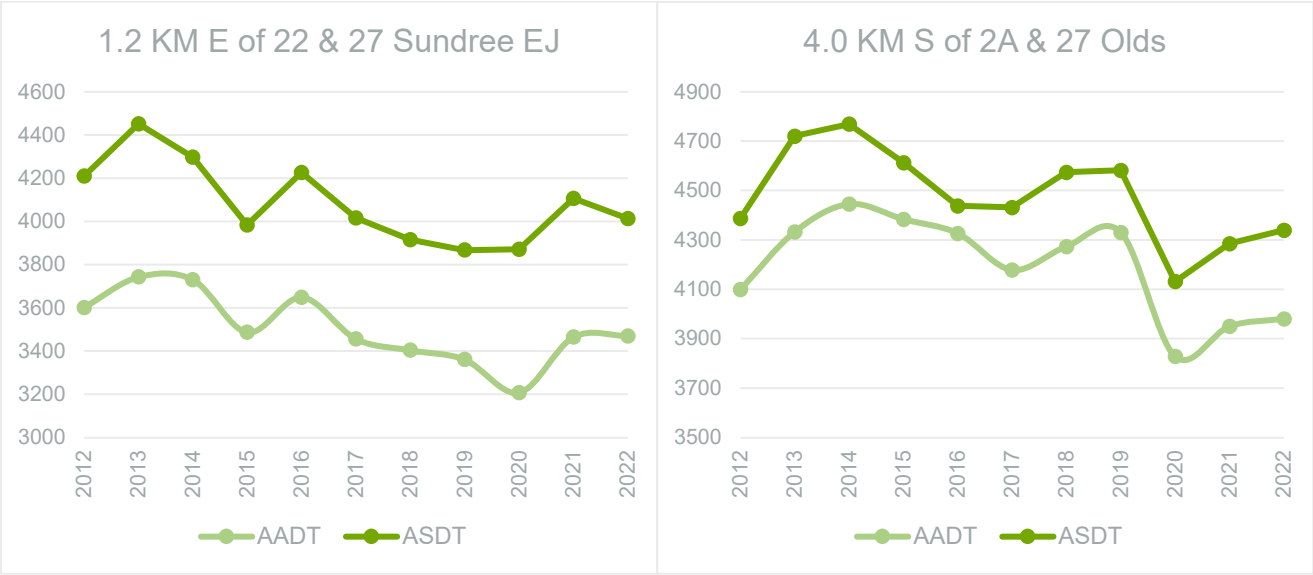
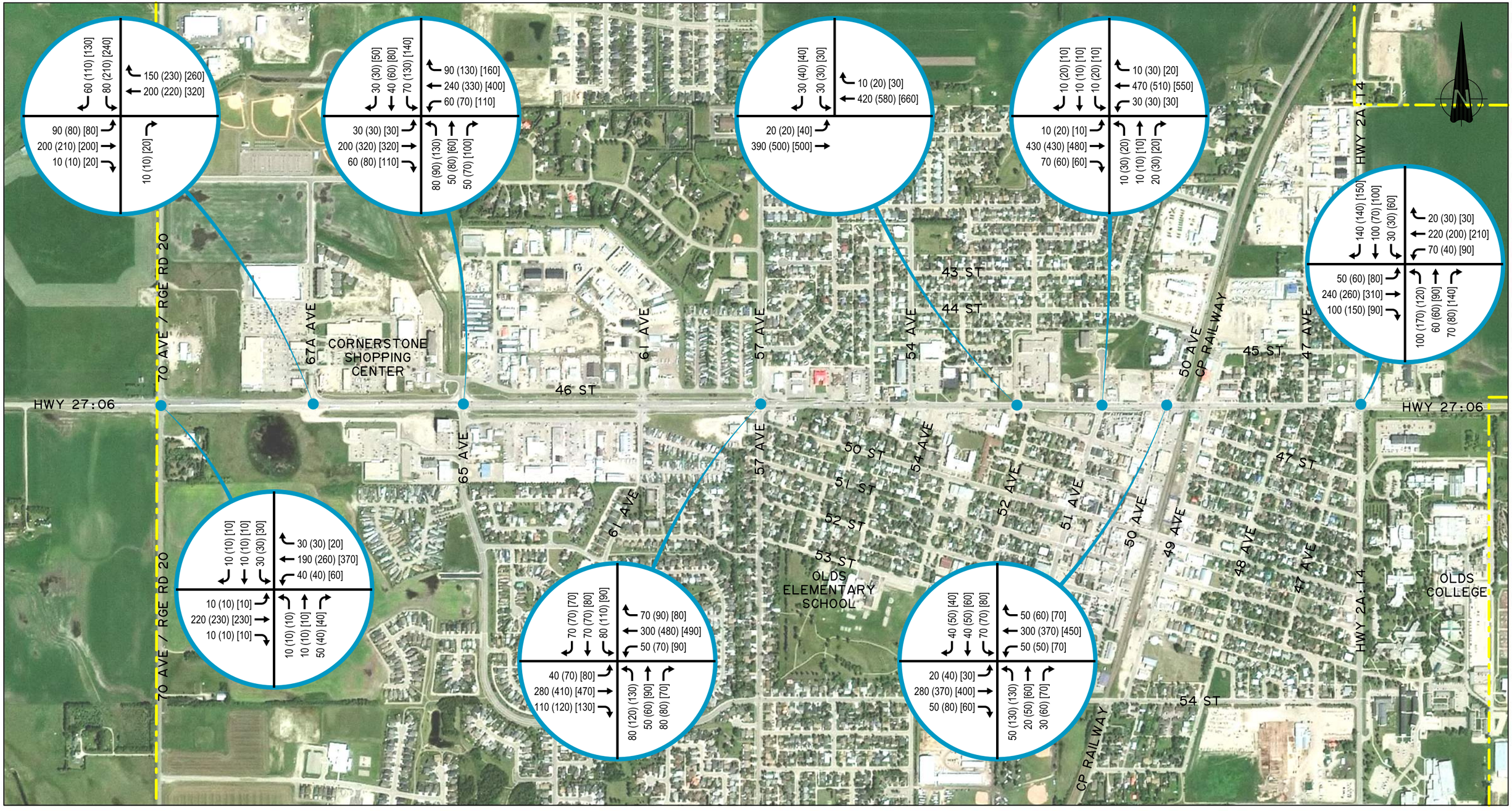


Figure 3-7 : AADT and ASDT Data



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LEGEND

TOWN OF OLDS BOUNDARY

XXX (XXX) [XXX] AM (MID) [PM] PEAK VOLUMES

SCALE 1:1000

EXISTING TRAFFIC VOLUMES

HIGHWAY 27 TOWN OF OLDS OPERATIONAL REVIEW

Alberta

REGION	LOCATION	DATE	DWN	CHK
CENTRAL	HWY 27:06 from km 36.490 to 39.715	02/09/2024	SD	PS

FIGURE 3-8

Figure 3-9 and **Figure 3-10** show the monthly variation in AADT from 2012 to 2022 for the two most relevant ATR locations. Aside from the data trend of 2020 caused by the beginning of the Covid-19 pandemic, both show a clear seasonal spring through fall peak, justifying use of the counts in July and September to represent peak conditions for analysis. Graphs for all four ATR locations comparing the AADT and ASDT, as well as monthly AADT variations can also be found in **Appendix A**.

The average 20-year traffic growth rate (TGR) in the region around Olds is 0.8%. This is generally consistent with more recent population growth in Olds. Historical traffic growth data near Olds is summarized in **Table 3.4.**

Table 3.4 : Historical Traffic Growth Data

Road	ATR	Location Description	AADT				Traffic Growth Rate		
			2003	2013	2018	2022	5-Yr	10-Yr	20-Yr
Hwy 27	50270670	Hwy 27 E of Sundre	3199	3743	3404	3470	0.5%	-0.9%	0.4%
Hwy 2A	60201458	Hwy 2A S of Olds	3348	4333	4274	3981	-1.8%	-1.0%	0.8%
Hwy 2	60022250	Hwy 2 N of Olds	21471	29371	30447	29712	-0.6%	0.1%	1.5%
Hwy 22	60221850	Hwy 22 S of Sundre	2687	2830	2734	2981	2.1%	0.6%	0.5%
Road	**TMC**	**Location Description**	**2003**	**2013**	**2018**	**2022**	**5-Yr**	**10-Yr**	**20-Yr**
Hwy 27	00990133	Hwy 2A (46 Avenue)	8515	10045	9570	9280	-0.8%	-0.9%	0.4%
Hwy 27	00997026	57 Avenue	9465	14305	14365	13080	-2.5%	-1.0%	1.5%
Hwy 27	70000470	67A Avenue / Walmart Access	-	8485	8260	7580	-2.2%	-1.3%	-

Based on the current and historical count data and patterns, it was determined that the 2023 traffic count data is an adequate representation of the current typical peak operating conditions, volumes were factored to account for previous count years and differences in count months.

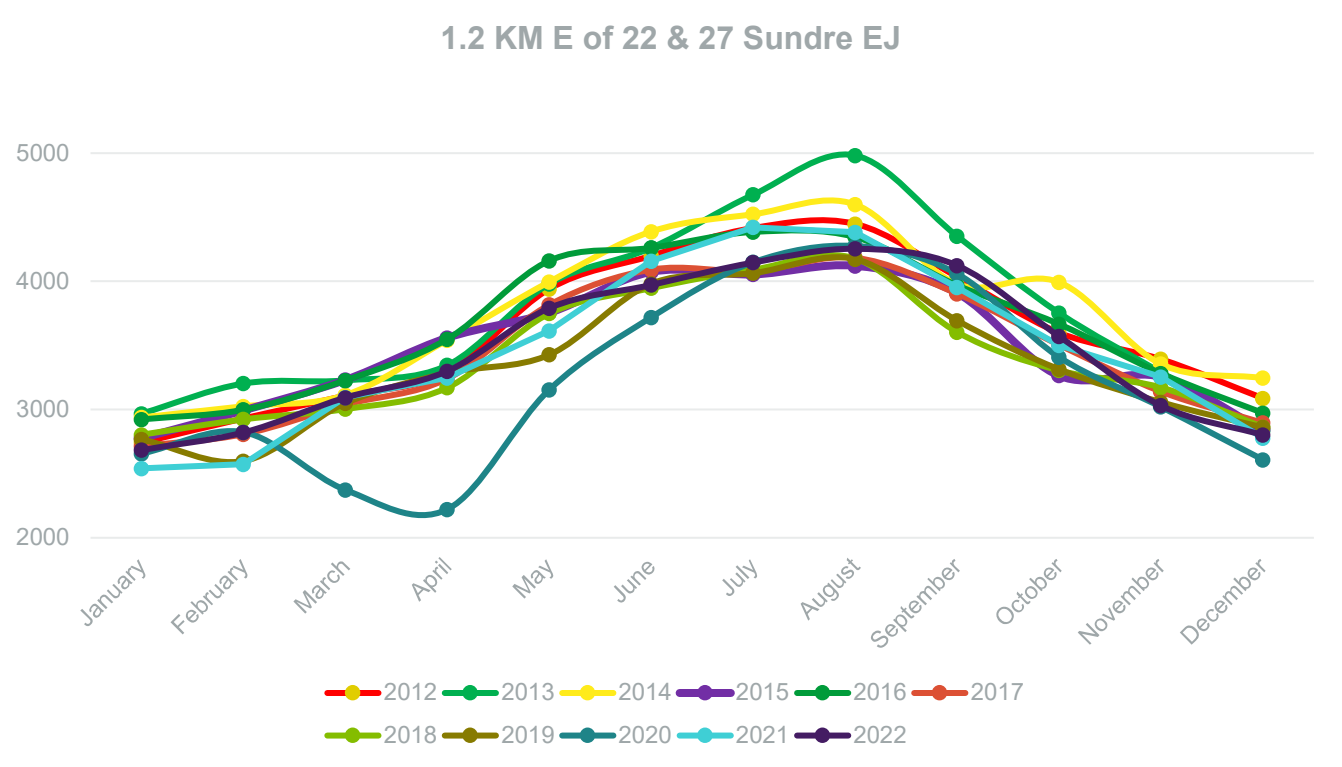


Figure 3-9 : Monthly AADT Variation – Highway 27 W of Olds

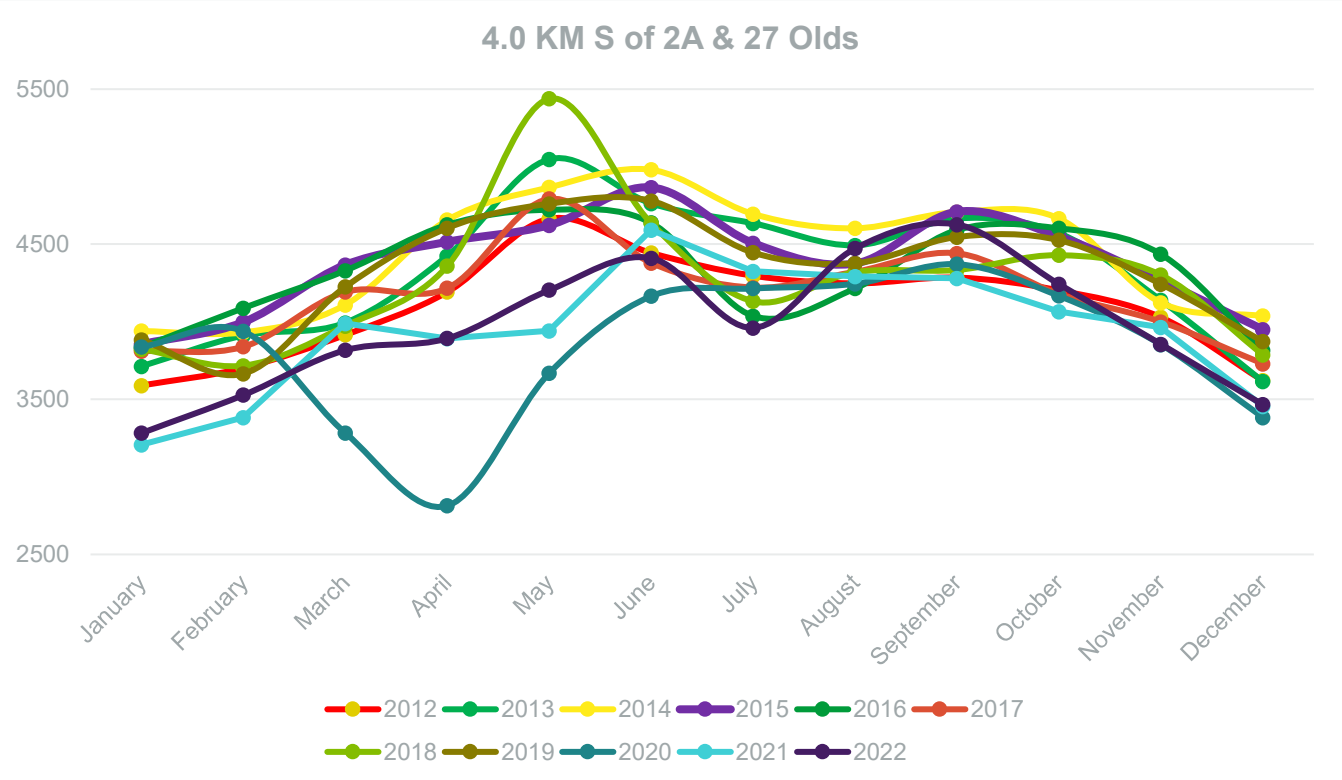


Figure 3-10 : Monthly AADT Variation – Hwy 2A S of Olds

3.6 Capacity

The capacity and operating characteristics of the study intersections were evaluated using Cubic|Trafficware's Synchro 11 analysis software.

Synchro 11 implements the methodology of the 2016 Transportation Research Board's Highway Capacity Manual, Sixth Edition: A Guide for Multimodal Mobility Analysis. Synchro can be used to analyse signalized and unsignalized intersections, and the software provides several measures of effectiveness to assess the operations of an intersection, including Level-of-Service (LOS), average vehicle delay, queue lengths, and volume-to-capacity (v/c) ratios. LOS analysis assesses the effectiveness of traffic operations alphabetically from A to F, based on average delay per vehicle. Grading criteria for signalized intersections differs from unsignalized intersections as drivers expect signalized intersections to carry higher volumes and will therefore tolerate longer control delays. The LOS criteria for a signalized intersection is summarized in **Table 3.5.** LOS targets on Alberta highways vary by service classification[7] and by the location of the highway within the province. The LOS target is tolerable within the design period. For a level 2 highway in an urban context, a LOS D is the tolerable LOS target.

Table 3.5 : Level of Service Criteria

Level of Service	Average Total Delay at Signalized Intersections (seconds)
A	≤10
B	>10 - 20
C	>20 - 35
D	>35 - 55
E	>55 - 80
F	>80

Other measures, such as queue length, and v/c ratio are also assessed to identify traffic capacity issues. The v/c ratio represents the amount of congestion and available capacity at an intersection and for each individual movement and is generally indicative of an intersection's ability to accommodate fluctuations in traffic flow. Volume-to-capacity has a theoretical maximum of 1.00; a value of 0.90 is generally accepted as the maximum desirable for design of intersection modifications. Synchro is also used to estimate queuing lengths for individual movements at at-grade intersections. Estimated 95th Percentile Queue Lengths are reviewed on a movement-by-movement basis. Queuing calculations are used to design appropriate turn bay storage lengths, and to ensure that spillback into adjacent intersections is not a problem.

[7] Alberta Transportation and Economic Corridors, Highway Geometric Design Guide, Chapter A, February 2022, Table A-6-1a, https://open.alberta.ca/dataset/2b5c861b-3de9-41f5-9d80-522f0c34550c/resource/dd4963a8-331e-4fbe-aea7-1845eee31f8a/download/trans-highway-geometric-design-guide-chapter-a-2022-02.pdf

Analysis parameters were programmed in accordance with site conditions or typical industry practices. Peak Hour Factors (PHF) were calculated for each intersection, and the average PHF for each peak was applied to the whole network. Heavy vehicle percentages were determined directly from the traffic counts.

Summaries of the AM Peak Hour analyses for the existing volumes are provided in Error! Reference source not found., and also shown graphically in **Figure 3-11**. In the morning peak hour, the intersections along the corridor operate with an overall LOS of “A” or “B”, except for Highway 2A (46 Avenue) that operates with an overall LOS of “C”, corresponding to relatively low delays at the intersections. Individual approaches and movements operate with a LOS of “C” or better, which represents low to moderately low delays. The entire corridor operates well within the LOS targets outlined by TEC. V/C ratios are less than 0.60 for all movements, with most below 0.40.

Summaries of the Midday Peak Hour analyses for the 2023 volumes are provided in Error! Reference source not found., and also shown graphically in **Figure 3-12**. In the midday peak hour, the intersections along the corridor operate with an overall LOS of “C” or better, corresponding to relatively low to moderately low delays at the intersections. Almost all individual approaches and movements operate with a LOS of “C” or better, which represents low to moderately low delays. The only exceptions are the 65 Avenue southbound left movement and the 50 Avenue southbound left-through movement which operate at a LOS “D” and are not of concern. The entire highway corridor operates well within the LOS targets outlined by TEC. V/C ratios are less than 0.70 for all movements, with most below 0.40.

Summaries of the PM Peak Hour analyses for the 2023 volumes are provided in Error! Reference source not found., and also shown graphically in **Figure 3-13**. In the PM peak hour, the intersections along the corridor operate with an overall LOS of “C” or better, corresponding to relatively low to moderately low delays at the intersections. Most individual approaches and movements operate with a LOS of “C” or better, which represents low to moderately low delays. Exceptions are the southbound left turn movement at 65 Avenue, southbound left-through movement at 50 Avenue and the southbound left-through movement at Highway 2A (46 Avenue) which operate at a LOS “D” and are not a concern. The westbound movements at Highway 2A (46 Avenue) do currently operate at a LOS “D”, however, operations are not significantly impacted. Almost the entire highway corridor operates well within the LOS targets outlined by TEC. V/C ratios are less than 0.75 for all movements, with most below 0.40.

Queuing is only a concern along the corridor where there is a proximity between Highway 27 and the service road intersections or access points. Queuing at 65 Avenue northbound is expected to impact 51 Street in the Midday and PM peak periods. Queuing at 57 Avenue northbound and southbound is expected to impact 50 Street and 46 Street in all peak periods. Queuing at 50 Avenue northbound and southbound is expected to impact access points in all peak periods. Queuing at Highway 2A (46 Avenue) northbound and southbound is expected to impact access points in all peak periods.

Synchro reports for existing conditions can be found in **Appendix D.**

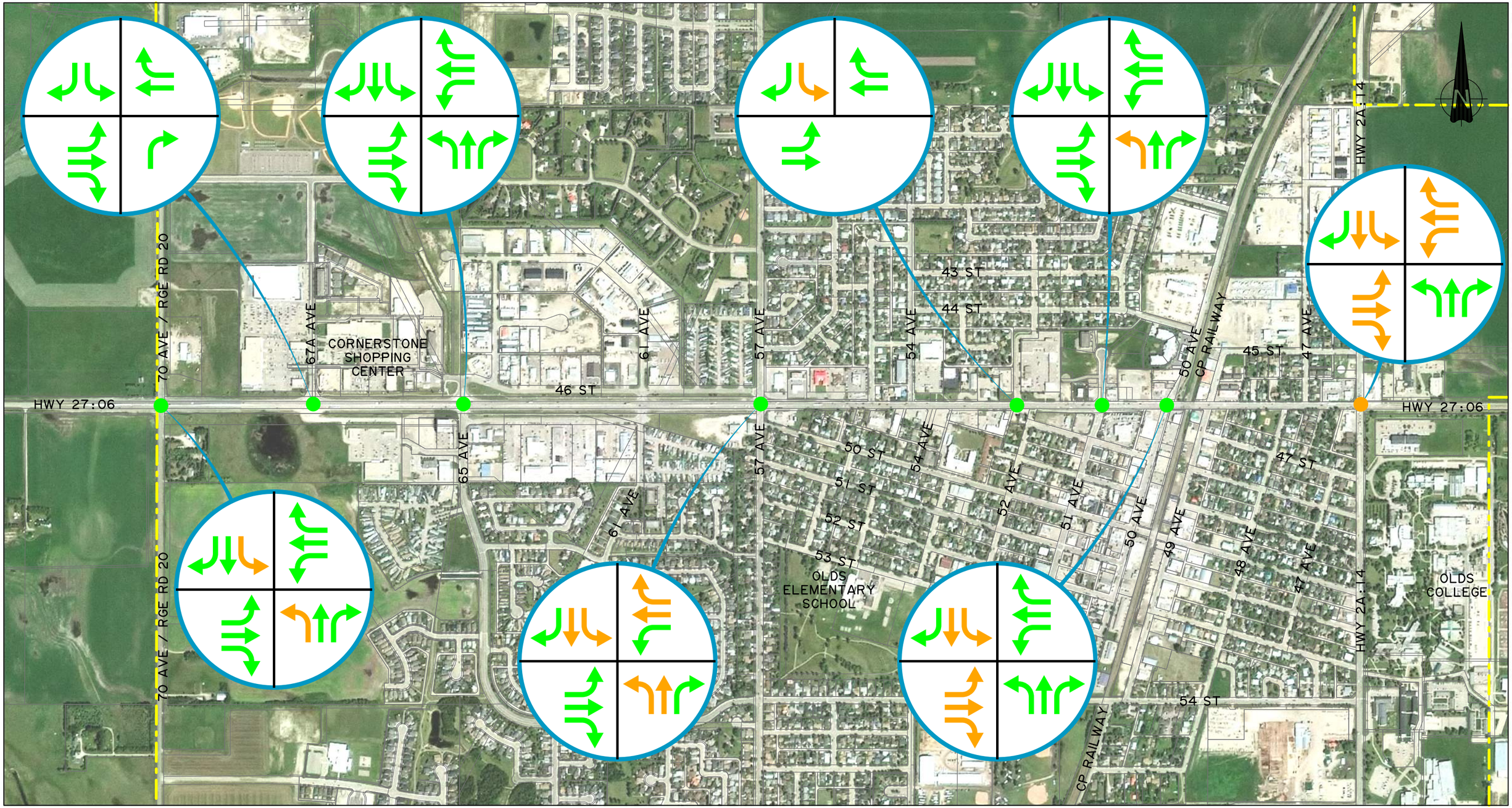
By observation and examining the time space diagrams in Synchro, although it is not anticipated that there will be significant increases in LOS or other factors, there is potential for improving driver experience through coordination between the three signals at 50 Avenue, 51 Avenue and 52 Avenue.

Based on the Traffic Signal Infrastructure Assessment, most of the existing intersections have Econolite M-Cabinets (51 Avenue uses a P-Cabinet). The best and most affordable way to implement/alter coordination would be to use Time of Day Coordination. It is reasonable to assume that the Controllers are able to accommodate the proposed coordination. The systems will need the addition of GPS units, using GPS with serial connection to Controllers at each location. An independent assessment of the signal infrastructure is presented in **Appendix E**.

Table 3.6 : AM Peak Hour Measures of Effectiveness

Intersection	Traffic Control	Measure of Effectiveness	Eastbound			Westbound			Northbound			Southbound			Overall
			LT	TH	RT	LT	TH	RT	LT	TH	RT	LT	TH	RT	
			L/T/TR			L/T/T/R			L/TR			L/TR			
HWY 27 and 70 Ave	Signalized	Volume	10	220	10	40	190	30	10	10	50	30	10	10	620
		v/c Ratio	0.01	0.14		0.07	0.10	0.04	0.04	0.20		0.14	0.06		
		LOS	A	B		A	A	A	C	B		C	B		A
		Delay (s)	5.0	10.7		5.2	7.7	0.1	23.4	10.9		24.9	17.0		9.9
		95th % Queue (m)	1.9	17.3		5.1	14.8	0.0	4.9	10.2		10.6	6.5		
		Storage (m)	75	-		70	-	70	45	-		50	-		
			L/T/T/R			T/T/R			R			L/R			
HWY 27 and 67A Ave / Walmart Access	Signalized	Volume	90	200	10		200	150			10	80		60	800
		v/c Ratio	0.25	0.19	0.02		0.20	0.25			0.01	0.11		0.08	
		LOS	B	B	A		B	A			A	B		A	B
		Delay (s)	19.1	17.2	0.1		17.3	4.3			0.0	10.7		3.3	12.9
		95th % Queue (m)	21.2	18.8	0.0		19.0	11.7			0.0	13.7		5.7	
		Storage (m)	80	-	30		-	30			-	-		30	
			L/T/TR			L/T/T/R			LT/R			L/TR			
HWY 27 and 65 Ave	Signalized	Volume	30	200	60	60	240	90	80	50	50	70	40	30	1000
		v/c Ratio	0.06	0.17		0.12	0.16	0.12	0.32		0.10	0.21	0.15		
		LOS	A	A		A	A	A	B		A	B	A		A
		Delay (s)	8.6	6.7		9.2	8.4	3.1	13.2		4.5	12.1	7.6		8.1
		95th % Queue (m)	5.2	10.8		8.7	11.9	6.0	17.7		5.0	11.0	8.4		
		Storage (m)	80	-		70	-	25	-		25	-	-		
			L/T/TR			L/T/TR			LT/R			LT/R			
HWY 27 and 57 Ave	Signalized	Volume	40	280	110	50	300	70	80	50	80	80	70	70	1280
		v/c Ratio	0.07	0.34		0.09	0.32		0.30		0.15	0.34		0.13	
		LOS	A	B		A	C		C		A	C		A	B
		Delay (s)	8.8	18.4		8.9	20.1		25.3		6.5	25.8		6.5	18.4
		95th % Queue (m)	7.7	35.9		8.9	36.7		34.6		10.6	39.2		9.7	
		Storage (m)	90	-		30	-		-		10	-		10	

Intersection	Traffic Control	Measure of Effectiveness	Eastbound			Westbound			Northbound			Southbound			Overall
			LT	TH	RT	LT	TH	RT	LT	TH	RT	LT	TH	RT	
			LT/T			T/T/R			-			L/R			
HWY 27 and 52 Ave	Signalized	Volume	20	390			420	10				30		30	900
		v/c Ratio	0.18				0.17	0.01				0.12		0.13	
		LOS	A				A	A				C		B	A
		Delay (s)	3.5				3.4	2.2				21.7		10.1	4.3
		95th % Queue (m)	13.6				13.7	1.3				9.3		6.1	
		Storage (m)	-				-	20				-		10	
			L/T/TR			L/T/TR			L/TR			L/TR			
HWY 27 and 51 Ave	Signalized	Volume	10	430	70	30	470	10	70	10	20	10	10	10	1150
		v/c Ratio	0.02	0.24		0.06	0.24		0.27	0.10		0.04	0.06		
		LOS	A	A		A	A		C	B		B	B		A
		Delay (s)	5.0	5.2		5.4	5.4		21.0	11.3		17.6	13.2		6.6
		95th % Queue (m)	2.0	18.3		4.1	18.5		15.9	6.5		4.2	5.5		
		Storage (m)	60	-		60	-		-	-		-	-		
			LT/TR			LT/TR			LT/R			LT/R			
HWY 27 and 50 Ave	Signalized	Volume	20	280	50	50	300	50	50	20	30	70	40	40	1000
		v/c Ratio	0.44			0.27			0.13		0.05	0.36		0.10	
		LOS	C			B			B		A	C		A	B
		Delay (s)	21.5			10.3			14.2		2.0	27.6		0.5	15.7
		95th % Queue (m)	37.0			28.2			15.1		2.6	30.6		0.6	
		Storage (m)	-			-			-		50	-		35	
			LT/TR			LT/TR			LT/R			LT/R			
HWY 27 and HWY 2A (46 Ave)	Signalized	Volume	50	240	100	70	220	20	100	60	70	30	100	140	1200
		v/c Ratio	0.57			0.60			0.39		0.12	0.54		0.37	
		LOS	C			C			B		A	C		A	C
		Delay (s)	23.1			31.2			17.6		1.3	34.3		4.9	22.3
		95th % Queue (m)	35.4			#37.6			28.6		2.6	33.4		8.6	
		Storage (m)	-			-	170		-		100	-		100	



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PROJECT NO. CA000873.280

LEGEND

- TOWN OF OLDS BOUNDARY
- MOVEMENT LOS A-B OR V/C < 0.80
- MOVEMENT LOS C-D OR 0.80 < V/C < 0.89
- INTERSECTION LOS A-B
- INTERSECTION LOS C-D

SCALE 1:1000

MEASURES OF EFFECTIVENESS AM PEAK

HIGHWAY 27 TOWN OF OLDS OPERATIONAL REVIEW

REGION	LOCATION	DATE	DWN	CHK
CENTRAL	HWY 27:06 from km 36.490 to 39.715	06/17/2024	SD	PS

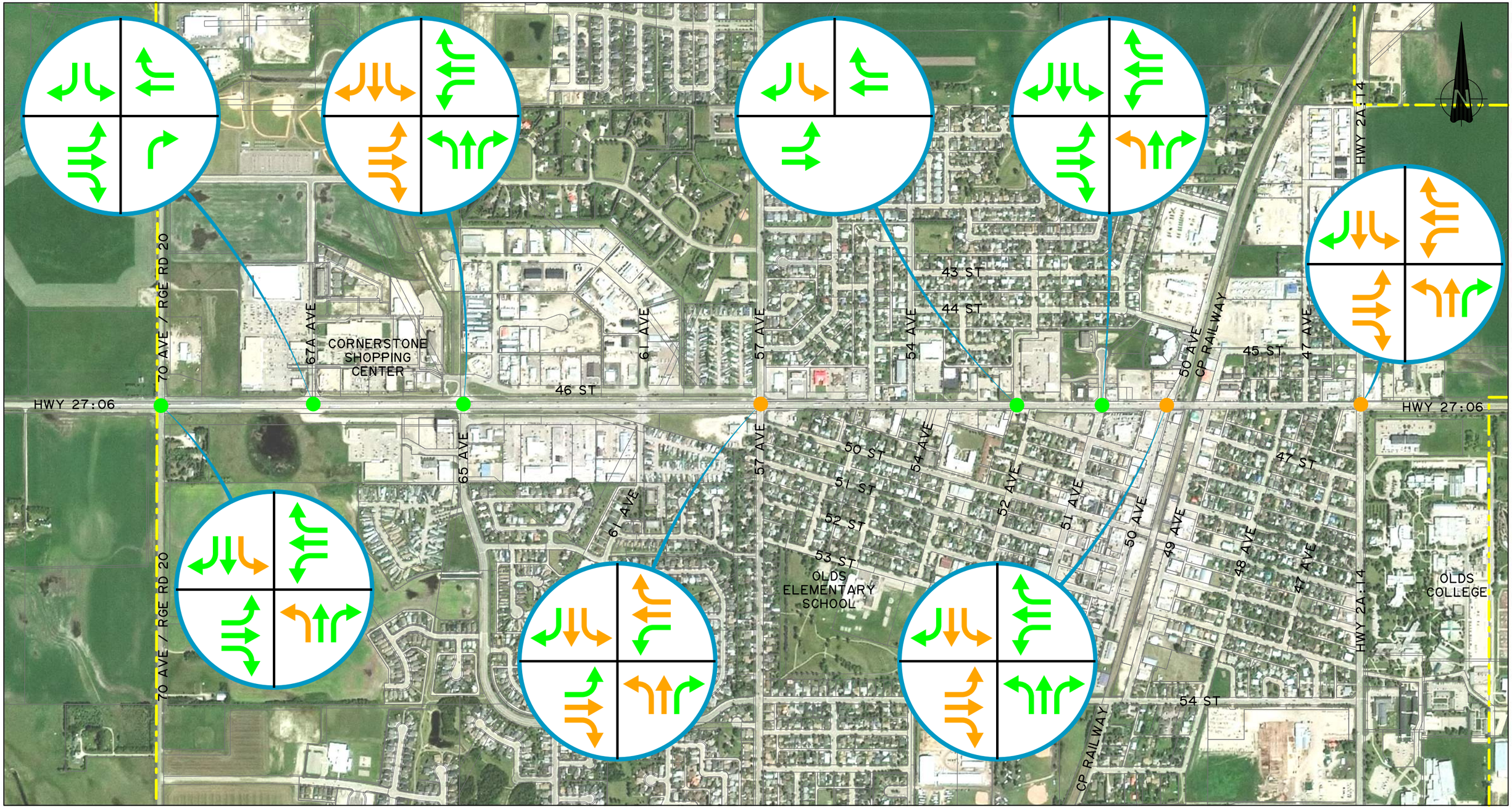
Alberta

FIGURE 3-11

Table 3.7 : Midday Peak Hour Measures of Effectiveness

Intersection	Traffic Control	Measure of Effectiveness	Eastbound			Westbound			Northbound			Southbound			Overall
			LT	TH	RT	LT	TH	RT	LT	TH	RT	LT	TH	RT	
			L/T/TR			L/T/T/R			L/TR			L/TR			
HWY 27 and 70 Ave	Signalized	Volume	10	230	10	40	260	30	10	10	40	30	10	10	690
		v/c Ratio	0.02	0.12		0.05	0.12	0.03	0.06	0.15		0.12	0.07		
		LOS	A	A		A	A	A	C	B		C	B		A
		Delay (s)	5.1	9.9		4.9	6.8	0.0	24.1	11.7		24.2	17.6		9.1
		95th % Queue (m)	2.0	18.0		5.0	19.6	0.0	5.3	9.9		10.8	6.8		
		Storage (m)	75	-		70	-	70	45	-		50	-		
			L/T/T/R			T/T/R			R			L/R			
HWY 27 and 67A Ave / Walmart Access	Signalized	Volume	80	210	10		220	230			10	210		110	1080
		v/c Ratio	0.23	0.21	0.02		0.22	0.36			0.01	0.27		0.15	
		LOS	B	B	A		B	A			A	B		A	B
		Delay (s)	19.0	17.4	0.1		17.5	4.1			0.0	12.2		2.8	11.9
		95th % Queue (m)	19.6	20.2	0.0		21.1	14.3			0.0	32.6		7.7	
		Storage (m)	80	-	30		-	30			-	-		30	
			L/T/TR			L/T/T/R			LT/R			L/TR			
HWY 27 and 65 Ave	Signalized	Volume	30	320	80	70	330	130	90	80	70	130	60	30	1420
		v/c Ratio	0.14	0.51		0.19	0.29	0.21	0.31		0.11	0.55	0.26		
		LOS	C	C		B	B	A	B		A	D	C		B
		Delay (s)	25.2	24.7		14.1	15.7	3.8	15.9		4.2	35.5	21.9		18.9
		95th % Queue (m)	12.3	48.3		16.1	32.4	10.3	35.7		7.5	41.3	23.7		
		Storage (m)	80	-		70	-	25	-		25	-	-		
			L/T/TR			L/T/TR			LT/R			LT/R			
HWY 27 and 57 Ave	Signalized	Volume	70	410	120	70	480	90	120	60	80	110	70	70	1750
		v/c Ratio	0.15	0.47		0.14	0.50		0.50		0.15	0.48		0.14	
		LOS	A	C		A	C		C		A	C		A	C
		Delay (s)	9.4	22.2		9.2	23.5		30.2		8.0	29.5		6.8	21.9
		95th % Queue (m)	11.7	54.1		11.7	60.2		50.6		12.1	49.5		9.9	
		Storage (m)	90	-		30	-		-		10	-		10	

Intersection	Traffic Control	Measure of Effectiveness	Eastbound			Westbound			Northbound			Southbound			Overall
			LT	TH	RT	LT	TH	RT	LT	TH	RT	LT	TH	RT	
			LT/T			T/T/R			-			L/R			
HWY 27 and 52 Ave	Signalized	Volume	20	500			580	20				30		40	1190
		v/c Ratio	0.23				0.24	0.02				0.13		0.17	
		LOS	A				A	A				C		A	A
		Delay (s)	3.7				3.6	1.9				21.9		9.6	4.3
		95th % Queue (m)	18.4				20.2	1.9				9.5		7.2	
		Storage (m)	-				-	20				-		10	
			L/T/TR			L/T/TR			L/TR			L/TR			
HWY 27 and 51 Ave	Signalized	Volume	20	430	60	30	510	30	60	10	30	20	10	20	1230
		v/c Ratio	0.04	0.24		0.06	0.26		0.25	0.12		0.09	0.10		
		LOS	A	A		A	A		C	B		B	B		A
		Delay (s)	5.2	5.1		5.3	5.4		20.6	10.3		18.4	11.4		6.5
		95th % Queue (m)	3.0	17.7		4.0	20.0		14.3	7.4		6.6	6.6		
		Storage (m)	60	-		60	-		-	-		-	-		
			LT/TR			LT/TR			LT/R			LT/R			
HWY 27 and 50 Ave	Signalized	Volume	40	370	80	50	370	60	130	50	60	70	50	50	1380
		v/c Ratio	0.68			0.38			0.41		0.10	0.53		0.15	
		LOS	C			B			B		A	D		A	C
		Delay (s)	28.3			12.9			19.9		5.2	37.9		1.6	20.7
		95th % Queue (m)	58.8			39.8			41.2		7.7	39.9		1.5	
		Storage (m)	-			-			-		50	-		35	
			LT/TR			LT/TR			LT/R			LT/R			
HWY 27 and HWY 2A (46 Ave)	Signalized	Volume	60	260	150	40	200	30	170	60	80	30	70	140	1290
		v/c Ratio	0.66			0.56			0.57		0.14	0.48		0.37	
		LOS	C			C			C		A	C		A	C
		Delay (s)	23.6			29.6			21.4		1.9	33.1		5.2	21.9
		95th % Queue (m)	42.1			30.8			41.5		4.3	27.8		9.4	
		Storage (m)	-			-	170		-		100	-		100	



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PROJECT NO. CA000873.280

LEGEND

- TOWN OF OLDS BOUNDARY
- MOVEMENT LOS A-B OR V/C < 0.80
- MOVEMENT LOS C-D OR 0.80 < V/C < 0.89
- INTERSECTION LOS A-B
- INTERSECTION LOS C-D

SCALE 1:1000

MEASURES OF EFFECTIVENESS MIDDAY PEAK

HIGHWAY 27 TOWN OF OLDS OPERATIONAL REVIEW

REGION	LOCATION	DATE	DWN	CHK
CENTRAL	HWY 27:06 from km 36.490 to 39.715	06/17/2024	SD	PS

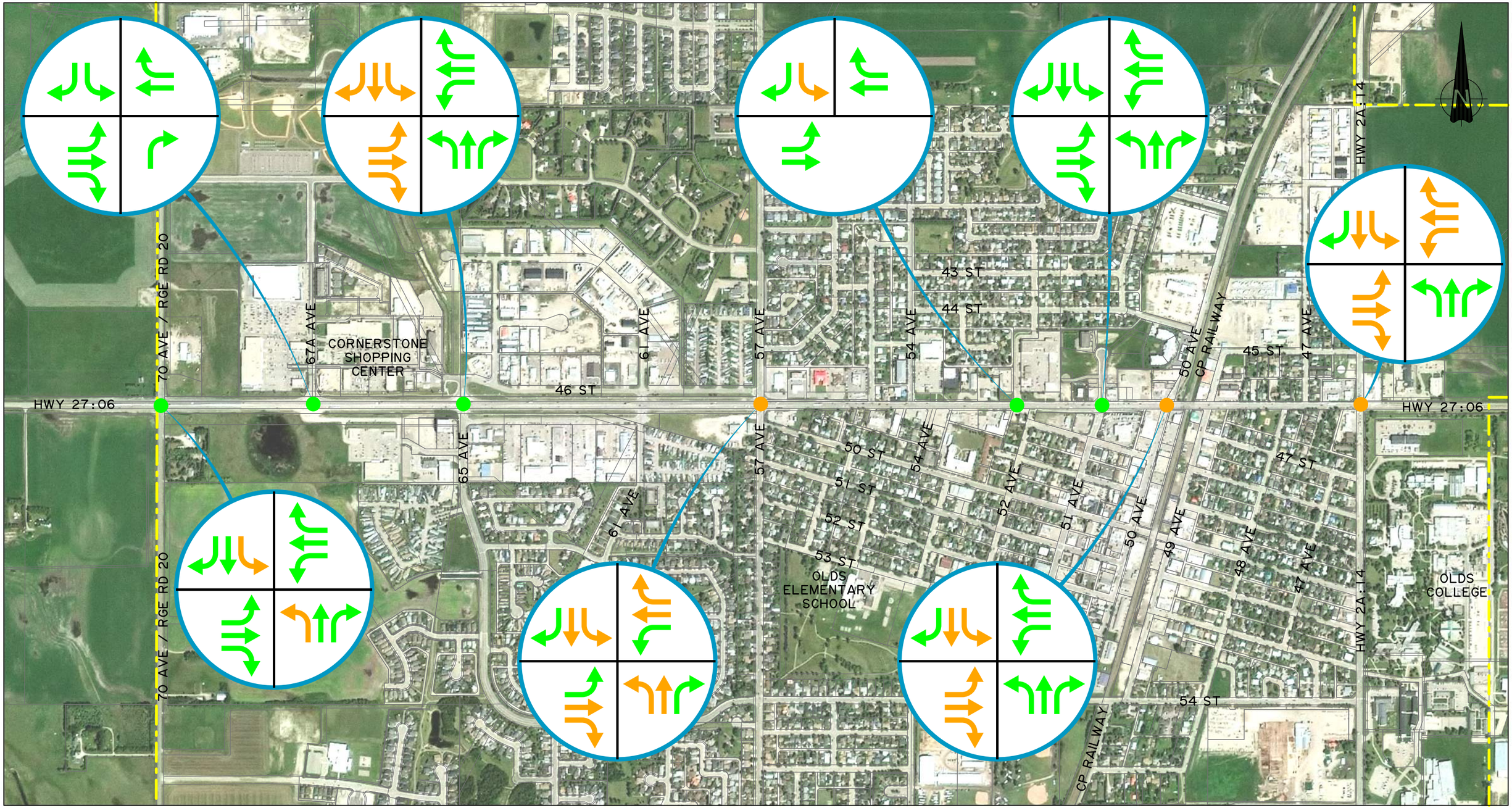
Alberta

FIGURE 3-12

Table 3.8 : PM Peak Hour Measures of Effectiveness

Intersection	Traffic Control	Measure of Effectiveness	Eastbound			Westbound			Northbound			Southbound			Overall
			LT	TH	RT	LT	TH	RT	LT	TH	RT	LT	TH	RT	
			L/T/TR			L/T/T/R			L/TR			L/TR			
HWY 27 and 70 Ave	Signalized	Volume	10	230	10	60	370	20	10	10	40	30	10	10	810
		v/c Ratio	0.01	0.13		0.08	0.17	0.02	0.04	0.15		0.13	0.06		
		LOS	A	A		A	A	A	C	B		C	B		A
		Delay (s)	5.0	9.9		4.9	6.9	0.1	23.3	11.7		24.5	17.4		8.8
		95th % Queue (m)	2.0	18.2		6.9	27.5	0.0	5.2	9.9		10.8	6.8		
		Storage (m)	75	-		70	-	70	45	-		50	-		
			L/T/T/R			T/T/R			R			L/R			
HWY 27 and 67A Ave / Walmart Access	Signalized	Volume	80	200	20		320	260			20	240		130	1270
		v/c Ratio	0.26	0.19	0.04		0.30	0.39			0.03	0.30		0.17	
		LOS	B	B	A		B	A			A	B		A	B
		Delay (s)	19.7	17.2	1.4		18.2	4.2			0.1	12.5		2.6	12.1
		95th % Queue (m)	19.8	18.8	1.4		29.0	15.0			0.0	36.3		8.3	
		Storage (m)	80	-	30		-	30			-	-		30	
			L/T/TR			L/T/T/R			LT/R			L/TR			
HWY 27 and 65 Ave	Signalized	Volume	30	320	110	110	400	160	130	60	100	140	80	50	1690
		v/c Ratio	0.14	0.50		0.26	0.30	0.23	0.36		0.14	0.54	0.33		
		LOS	C	C		B	B	A	B		A	D	C		B
		Delay (s)	26.0	24.1		14.6	15.6	3.7	16.9		4.0	35.7	23.0		18.5
		95th % Queue (m)	11.9	47.7		21.8	35.8	11.2	38.1		9.1	41.8	31.3		
		Storage (m)	80	-		70	-	25	-		25	-	-		
			L/T/TR			L/T/TR			LT/R			LT/R			
HWY 27 and 57 Ave	Signalized	Volume	80	470	130	90	490	80	130	90	70	90	80	70	1870
		v/c Ratio	0.16	0.50		0.18	0.46		0.55		0.13	0.42		0.13	
		LOS	A	C		A	C		C		A	C		A	C
		Delay (s)	9.4	22.8		9.6	23.0		31.2		6.2	27.7		6.2	21.9
		95th % Queue (m)	12.6	59.4		14.0	57.2		58.3		9.3	44.2		9.3	
		Storage (m)	90	-		30	-		-		10	-		10	

Intersection	Traffic Control	Measure of Effectiveness	Eastbound			Westbound			Northbound			Southbound			Overall
			LT	TH	RT	LT	TH	RT	LT	TH	RT	LT	TH	RT	
			LT/T			T/T/R			-			L/R			
HWY 27 and 52 Ave	Signalized	Volume	40	500			660	30				30		40	1300
		v/c Ratio	0.25				0.26	0.03				0.13		0.16	
		LOS	A				A	A				C		A	A
		Delay (s)	3.8				3.7	1.8				21.9		9.6	4.3
		95th % Queue (m)	19.1				22.7	2.2				9.3		7.1	
		Storage (m)	-				-	20				-		10	
			L/T/TR			L/T/TR			L/TR			L/TR			
HWY 27 and 51 Ave	Signalized	Volume	10	480	60	30	550	20	50	10	20	10	10	10	1260
		v/c Ratio	0.02	0.22		0.05	0.23		0.19	0.09		0.05	0.06		
		LOS	A	A		A	A		B	B		B	B		A
		Delay (s)	4.9	4.3		5.1	4.4		19.7	11.5		17.9	13.4		5.4
		95th % Queue (m)	1.9	19.0		4.0	20.5		12.3	6.5		4.2	5.5		
		Storage (m)	60	-		60	-		-	-		-	-		
			LT/TR			LT/TR			LT/R			LT/R			
HWY 27 and 50 Ave	Signalized	Volume	30	400	60	70	450	70	130	60	70	80	60	40	1520
		v/c Ratio	0.66			0.47			0.40		0.11	0.57		0.11	
		LOS	C			B			B		A	D		A	C
		Delay (s)	28.6			14.3			18.7		4.7	37.8		0.6	20.8
		95th % Queue (m)	57.7			49.6			40.2		8.1	43.2		0.0	
		Storage (m)	-			-			-		50	-		35	
			LT/TR			LT/TR			LT/R			LT/R			
HWY 27 and HWY 2A (46 Ave)	Signalized	Volume	80	310	90	90	210	30	120	90	140	60	100	150	1470
		v/c Ratio	0.70			0.70			0.52		0.23	0.74		0.38	
		LOS	C			D			B		A	D		A	C
		Delay (s)	28.2			35.1			19.9		3.8	46.7		5.1	25.9
		95th % Queue (m)	48.3			#42.7			37.9		10.3	#51.1		9.5	
		Storage (m)	-			-		170	-		100	-		100	



CONSULTANT

CIMA+

PROJECT NO. CA000873.280

LEGEND

- TOWN OF OLDS BOUNDARY
- MOVEMENT LOS A-B OR V/C < 0.80
- MOVEMENT LOS C-D OR 0.80 < V/C < 0.89
- INTERSECTION LOS A-B
- INTERSECTION LOS C-D

SCALE 1:1000

MEASURES OF EFFECTIVENESS PM PEAK

HIGHWAY 27 TOWN OF OLDS OPERATIONAL REVIEW

REGION	LOCATION	DATE	DWN	CHK
CENTRAL	HWY 27:06 from km 36.490 to 39.715	06/17/2024	SD	PS

Alberta

FIGURE 3-13

3.7 Access Management

For access management purposes, through Olds, Highway 27 is classified as future Urban Arterial Divided roadway. Under existing conditions, Highway 27 is a Rural Arterial Undivided roadway[8], although the western portion has a raised median. Entering the Town, the speed limit gradually drops to 50 km/h.

Generally, it is expected that at-grade intersections will comprise the majority of access types along a multi-lane corridor. Integral to the application of access management for multi-lane highways in urban settings, a minimum intersection spacing of 400 m is desirable for arterial roads. For divided arterial segments, right-in/right-out access may be allowed, provided there is no median opening and a minimum of 100 m from an all-directional intersection[9] is provided.

Current intersection spacing ranges between 60 m and 490 m within the study area. Between 70 Avenue and 57 Avenue where service roads or rear access roads have been constructed, spacing is between 320 m and 490 m. From 57 Avenue to Highway 2A (46 Avenue), the spacing ranges from 60 m to 305 m. The oldest portions of Olds were built to run parallel/perpendicular to the railway (running north/northeast-south/southwest), and the newer portions to run primarily north-south, east-west. This has produced the closely spaced intersections and staggered access points from 57 Avenue to Highway 2A (46 Avenue), which contains many access points for commercial and residential driveways. Many of these intersections serve a mix of travel demands.

The Highway 27 Functional Planning Study – Town of Olds (April 2009) was completed to identify proposed improvements and access management that focused on minimizing adverse impacts to properties/businesses and reducing construction costs beyond those established from previous review. This current operational review has identified some access management enhancements as part of improving each of the signalized intersections, which seeks to align with the 2009 planning study recommendations. Some differences exist, which have been discussed in later report sections.

Where possible, opportunities to accelerate access management improvements noted in this report as well as the 2009 planning study should be implemented to reinforce the function of this highway and to reduce conflict points along the study corridor. Appropriate plans from the 2009 study are included in **Appendix F** for reference.

[8] Alberta Transportation and Economic Corridors, Roadside Management Classification Map, 2020, https://open.alberta.ca/dataset/3848b5e9-1ab3-4a03-914c-c5886707460f/resource/7ae74a6f-ccfb-48a0-8ffb-ca8ac9a3c23a/download/trans-rmc-map-red-deer-district.pdf
[9] Alberta Transportation and Economic Corridors, Urban Highway Geometric Design Guide, November 2003, Table U.A.1, http://www.transportation.alberta.ca/content/doctype233/production/uhgdg.pdf

4. Observations

Field observations were undertaken by CIMA+ in September 2023 at each of the study intersections along Highway 27 to supplement the previous analyses, with additional observations completed in the wintertime at 70 Avenue. A summary of the observations that inform the development of improvements is captured below. Additional observations were made at other locations outside the key intersections, which have also been captured for consideration, where appropriate.

4.1 Key Intersections

Highway 27 & 70 Avenue

- Other than pedestrian signals for each leg of the intersection, there are no pedestrian facilities. The east-west walk phase over the north and south legs operates without activation. There was no evidence of any pedestrian use of the signals (i.e., desire lines).
- Vehicle off-tracking was observed in all corners except in the southwest corner.
- The lane markings on 70 Avenue were almost completely worn and did not assist drivers to locate the stop line area or turn lanes.
- The overhead lane designation signs on the west, south, and north legs indicate that each of the outside lanes supports through movements. The operation of these lanes supports both through and right turn movements.
- There are two westbound lanes proceeding through the intersection with the outside lane dropped a short distance beyond the intersection, to the west. This results in unbalanced lane utilization, with many drivers favouring to use the inside lane and not having to merge at the lane drop.

Photo: southbound view of the north leg approach

Highway 27 & 67A Avenue / Walmart Access

- The south leg of 67A Avenue (the Walmart Access) is currently closed off to turning movements through the placement of moveable concrete barriers between the right turn channelized islands. The only movements permitted from the south leg are the eastbound and northbound right turns.
- The traffic control devices on the north leg, including an overhead lane designation sign and painted left turn arrow, suggest only a single southbound left turn lane is provided. A

Photo: dual left operation

painted through arrow was observed indicating a second approach lane; however, the concrete barriers over the south leg preclude this movement from occurring. Dual left turn queues and movements were observed to form and occur often despite the messaging from the traffic control devices. The above photo shows vehicles signaling to turn left, which both vehicles then turned concurrently following commencement of the green signal. As there are two receiving lanes on Highway 27, concurrent movements are easily accommodated.

+ The pedestrian walk phase was activated every cycle regardless of a call being made by a pedestrian. Based on observations, there are no obvious pedestrian desire lines existing at this intersection or pedestrians using any of the intersection legs. The Town's pathway network supports access within the northeast quadrant, which is anticipated to address current pedestrian requirements.
+ The signals controlling the south leg are active despite no movements requiring this control. The overhead lane designation signs indicate a single left turn lane and single through lane configuration once this leg is open to all movements. Similarly, a westbound left turn lane with appropriate traffic control devices is provided, while no left turn movements are currently permitted.
+ On more than one occasion, a vehicle turning left from the north leg onto Highway 27 was then observed to use the northbound channelized right turn lane incorrectly, turning against the correct direction of travel, to access the commercial developments on the south side of the highway (see adjacent photo). This can be a cause of conflict. These observations were noted during off-peak periods when traffic volumes on the south leg were very low.

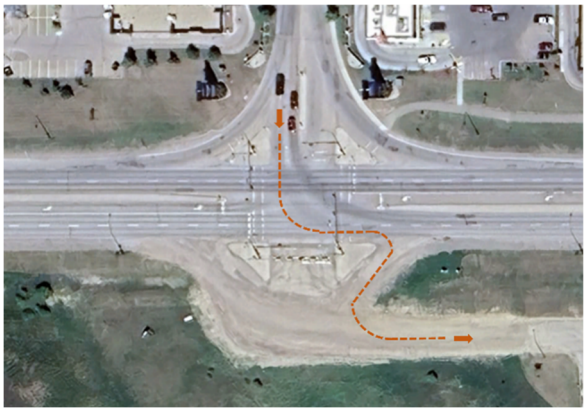


Photo: observed north-south access

+ The channelized right turn lanes along westbound Highway 27 have an approach and return taper respectively, with both controlled by Yield signs. There are no similar treatments along eastbound Highway 27 or traffic control for the right turn movements.

Highway 27 & 65 Avenue

+ Pedestrian Crosswalk signs are provided for the channelized right turns with signs placed within the island only. The roadside sign placement was missing.
+ The north leg only has one receiving lane, located adjacent to the median island. Creating a dedicated northbound left turn lane with shared through-right lane would require northbound through vehicles to switch lanes within the intersection since the receiving lane is offset. The operational analysis confirms that the current shared through-left movements are working within acceptable parameters.
+ The Yield sign in the northwest corner is not always within the view of approaching drivers. This sign could be moved closer to the actual yielding location or replaced by a Merge sign since there is a short section of parallel lane departing the right turn area.

- The apron for the south leg is wide enough to allow three vehicles to stop adjacent to each other. The overhead lane designation indicates shared through-left turns only and there are no pavement markings to confirm whether two or three approach lanes are desired.
- The distance between Highway 27 and the south service road allows only three passenger vehicles to queue before spilling back and blocking access to the service road. This spillback was observed to occur regularly, even during typical off-peak periods.

Photo: vehicle positioning and queueing on the south leg

- The pushbutton in the southwest corner is not easily accessible for individuals with mobility challenges.
- A drop curb in the southeast quadrant does not align with other pedestrian facilities provided at this intersection.

Highway 27 & 57 Avenue

- The right turn channelized lanes on Highway 27 are relatively short, providing storage for one or two passenger vehicles at the crosswalk and/or yield locations. This can lead to spillback concerns when the crosswalks are in use, particularly in the southwest and northeast quadrants where vehicles spillback onto the highway. Right turning vehicles try to squeeze by those continued through that are stopped by the red signal, with evidence of off-tracking in the southwest and northeast quadrants.
- Queue lengths on 57 Avenue often spillback through the adjacent municipal street intersections on the north and south legs blocking access.
- To accommodate the southbound to westbound right turn, the north leg has a wide approach that allows for simultaneous movements to occur. The width of the southbound lane is much narrower to the north of the north service road. The transition in width through the service road intersection on this leg creates a situation where the stop location on the service road is set back from the near face of curb along 57 Avenue by approximately 15 m and 23 m to the south and north respectively. The sight lines from this location are restricted to the north by mobile homes in the northwest quadrant. One near miss was observed to occur between an eastbound left turning vehicle exiting the service road and an approaching southbound vehicle. As southbound vehicles cannot see a vehicle

Photo: service road intersection and set back from the north leg

waiting to enter 57 Avenue from the service road, queues can spillback through this intersection.

- The left turn signals for eastbound and westbound Highway 27 are located over the adjacent through lane and not directly over the left turn lanes themselves due to the short cantilever spans. The vertical signal head arrangement suggests dedicated left turn phases on these legs; however, the current signal timing does not provide dedicated phases. As there are no other signal heads over the approach lanes, this arrangement may cause confusion.
- Pushbuttons to activate the crosswalks are located within the raised channelized islands. Placement of the pushbuttons on the signal poles does not appear to be at the most convenient locations, sometimes requiring pedestrians to reach behind the waiting area since pole placement is near the edge of the raised island.
- Pedestrian drop curbs are provided to facilitate the crossing of all sidewalk users for some of the crosswalk movements but not all. As such, this can present obstacles to pedestrians with mobility challenges, particularly those in a wheelchair.
- Moveable concrete barriers were observed in the northeast and southeast quadrants restricting access points closest to the intersection. It appears desirable for these to be closed permanently. Other problematic accesses remain open that are in close proximity to the intersection, including the only access to a commercial development in the southwest quadrant.

Highway 27 & 52 Avenue

- Appears to be a T-intersection with 52 Avenue forming the north leg. A south leg does exist forming an alley that serves an adjacent strip mall as well as three yards and a restaurant that fronts onto Highway 27. The alley access does not align with 52 Avenue, but rather aligns with the pedestrian ramp on the north side requiring that the crosswalk over the west leg be skewed (see photo).

Photo: alley alignment and crosswalk

- There are no turn lanes, painted arrows, or signs that support access to the alley (south leg).
- A short right turn bay is provided in the westbound direction for vehicles turning north onto 52 Avenue. Queues can form when pedestrians cross the north leg, but these queues are typically contained within the turn bay.
- The traffic signals support movements from the north, east and west legs; however, there are none to support access from the south leg, suggesting the south leg operates as a driveway.
- The traffic signal head placed over the westbound lanes is tilted downwards, which can reduce the visibility for drivers approaching compared to signal heads that are aligned appropriately.

- A defined pathway is provided along the south side of Highway 27 that ends at the offset (south) leg of 52 Avenue, east of the subject T-intersection. This offset (south) leg was closed to traffic 10-15 years ago but provides access to the alley through a restaurant parking lot. There is no pathway or sidewalk through the 52 Avenue intersection or west of the intersection. As such, pedestrians using the pathway that desire to cross Highway 27, do so by walking through the parking lot, or between any parked vehicles and Highway 27.

Photo: discontinuous south sidewalk

- There is no crosswalk on the east leg of Highway 27.
- The height of the pedestrian signal and Maximum Speed sign in the northwest corner appear to be positioned lower than typical height requirements, with the sign located in advance and lower than the signal head to avoid blocking the signal displays.
- The pedestrian signal and pushbutton on the south side of Highway 27 are mounted on a pole located between the alley entrance and drop curb. The pole location helps to provide a separation of the crosswalk area and define a refuge area on the south side since there are no defined pedestrian facilities (i.e., there is no distinction between the driving surface and pedestrian areas).
- The parking area on either side of the alley inhibits the ability to accommodate pedestrian traffic by providing formal facilities (i.e., pathway, sidewalk, boulevard space).

Highway 27 & 51 Avenue

- The only pavement markings observed on the north leg included left turn arrows and a stop line. Lane lines for the southbound approach were missing, as was the centreline. Lane lines and a centreline assist drivers to position their vehicles on the approach such that conflicts are minimized. These lines appear to have been missing for several years, based on a review of available historical aerial images.
- The parking area associated with the commercial development on the northwest corner abuts the sidewalk along Highway 27 and 51 Avenue. There are no barriers that prohibit vehicles from mounting the curb either to enter or exit the parking area. Rolled curb instead of barrier curb is provided along 51 Avenue.
- Dedicated left turn lanes are provided on all legs as defined by the left turn arrows, and appropriate lane designation signs mounted on the cantilever signal arms. The only other indication as to the appropriate use of each approach lane are through/right lane designation signs provided for the cross streets.
- The overhead signal head arrangements suggest dedicated left turn phases on all legs; however, the current signal timing does not provide dedicated phases.
- Train crossings east of 50 Avenue can cause queues to spillback through the 51 Avenue intersection and impede the operation of turning movements.

- The south leg connects with Highway 27 on a slight skew (left hand forward). This skew requires that the southwest corner radii provide a wider paved area to support eastbound to southbound right turns. This wider area appears to present an issue in terms of aligning the sidewalk and drop curbs on the south side of Highway 27, since the crosswalk markings suggest pedestrians need to adjust their travel within the south leg.

Photo: misaligned crosswalk markings

- The location of a driveway access within 40 m to the west of 51 Avenue can impact the westbound traffic flow through the 51 Avenue intersection. This driveway can be accessed by eastbound vehicles within the dedicated left turn lane.
- The skew associated with the south leg places the stopping location for a left turning vehicle in advance of vehicles going through or turning right. When both approach lanes are in use, left turn vehicles can block the sight lines for drivers in the northbound outside lane. This restriction is not a concern if the vehicle is proceeding through, but can be a concern for any drivers attempting to turn right on red.

Highway 27 & 50 Avenue

- A dedicated right turn lane is provided on the south leg, with all other lanes (on each leg) having shared movements. The north leg has a single (southbound) approach lane. The westbound and northbound left turn movements have a protected-permissive phase.
- When the railway crossing is in use, spillback extends along Highway 27 through the intersection at 51 Avenue to the west, and the intersection at 49 Avenue to the east. The green signal is held on 50 Avenue during the crossing.
- Several vehicles were observed completing a U-turn on Highway 27 when the railway crossing was in use, presumably to find an alternative route to their desired destination and from previous delay experience. In addition, a few eastbound vehicles in the outside (curb) lane, were observed to cut through the paved area (see photo), which is anticipated to be used for parking at various times of the day, in the southwest quadrant instead of waiting for the crossing to clear. At the time of observations, a patio area was established adjacent to the curb drop on 50 Avenue, requiring vehicles to travel over the sidewalk where barrier curb is located.

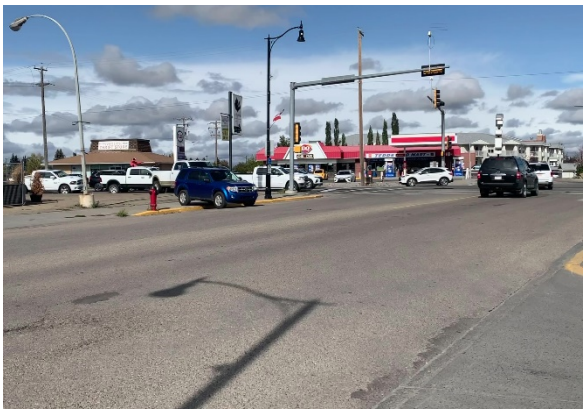


Photo: shortcutting through the southwest property

- Frequent lane changes were observed related to westbound vehicles queued behind those making a left turn onto 50 Avenue southbound.

- Hatched areas are provided in the shared through-left turn lanes on Highway 27 that accommodates the swept path of large vehicles turning left from an adjacent intersection leg, due to the skew of the cross street.
- There are several driveways located in close proximity to the intersection, particularly on the west leg of Highway 27. Moveable concrete barriers were observed at two driveways adjacent to the westbound lanes, west of 50 Avenue. Other driveway closure appears to be desirable from an access management perspective.
- The sidewalk along the south side of Highway 27, west of 50 Avenue appears to end prior to an alley driveway and then picks up again at 50 Avenue. The break in formal sidewalk coincides with a commercial development and associated driveway accesses that allow vehicles to cut through the property, as noted previously.
- View of the westbound to northbound channelized right turn and pedestrians on the sidewalk is limited by trees located in the northeast corner adjacent to the railway right-of-way within a park. The Yield sign controlling the right turn movement is placed within the channelized island to increase the sight lines as much as possible. There is no roadside sign. The Yield sign is mounted on the signal pole, and a non-standard arrow has been placed above the sign, presumably to indicate to drivers that the Yield sign is applicable to the right turn and not the adjacent through movement.

Photo: non-standard signing

- There are no drop curbs within the channelized island to accommodate pedestrians. The island is small enough that someone with a mobility challenge can go around the island on the south side without too much difficulty.

Highway 27 & Highway 2A (46 Avenue)

- Dedicated right turn lanes are provided on the north and south legs, with all other lanes having shared movements. The Highway 27 legs run on split phase signal timings.
- At times, some vehicles were observed to wait in the intersection for a gap in the opposite direction of travel but were unable to find the desired gap prior to the red signal being activated. These vehicles either proceeded through the red phase or backed up to avoid impeding the cross-street traffic. This was more apparent with traffic on the north and south legs due to the split phase operation on Highway 27.
- The longest queues were observed on the south leg for vehicles proceeding north. These queues were associated with vehicles leaving the nearby college campus that extended beyond the campus entrance at 47 Street. A protected-permissive left turn phase assigns the right-of-way to left turning vehicles for a portion of the cycle. No left turn phase was observed for southbound movements at the intersection, which caused vehicles to turn on red frequently.

- All left turn movements occur within a shared through-left turn lane. A hatched area is provided in each of the shared through-left turn lanes that accommodates the swept path of large vehicles turning right or left from an adjacent intersection leg. Many drivers did not appear to understand the intent of these hatched areas, stopping within the areas when the signal turned red. On several occasions when a queue formed behind a left turning vehicle, the queue would not clear within the yellow interval leaving drivers to proceed on red or to remain within the hatched area. This occurred in each leg.

Photo: hatched area encroachment

- Queues on the north and east legs were seen to spillback through adjacent driveway entrances, including the gas station and convenience store driveway in the northwest corner. This driveway provides the only left turn exit from this and other commercial developments.
- Several large trucks were observed to use the inside northbound lane to complete a right turn movement onto eastbound Highway 27. Such vehicles have limited space to off-track to the outside due to the placement of light and signal street furniture in the southeast corner.

Photo: north leg – southbound queue spillback and driveway access

- There are multiple driveways for the developments in the northeast corner that do not appear to support all desired access to/from the developments. Off-tracking outside the defined driveways as well as widespread use of the curb area to access the developments is apparent.
- The pedestrian facilities include sidewalks along the east side of the south leg and west side of the north leg of Highway 2A (46 Avenue), as well as along the north side of Highway 27. Drop curbs are provided in the northeast and northwest corners, but not within the other corners. Painted crosswalk markings are provided over all legs; however, the crosswalks do not align with the sidewalk approaches.

4.2 Other Locations

Highway 27 & 61 Avenue

- Unsignalized intersection with service road access in three of the four quadrants (no south service road to the east of 61 Avenue).
- Platoons and gaps in the traffic flow are created by the adjacent signalized intersections at 65 Avenue and 57 Avenue.

+ Left turn movements are relatively low compared to other movements, the exception being the westbound to southbound left turn. It may be possible to restrict left turn and through movements from the cross streets if these become problematic in the future. At this time, there appear to be few concerns with such movements.

Highway 27 & Commercial Driveway west of Highway 2A (46 Avenue)

This driveway is located less than 100 m from the intersection at 2A (46 Avenue), and directly opposite the cul-de-sac bulb for 47 Avenue on the south side of Highway 27.

+ Has a right-in/right-out operation on west-bound Highway 27 only, based on the alignment of the raised island and Turn Right sign located in the island facing vehicles exiting the commercial area.
+ No left turn movements are permitted; however, left turns from Highway 27 into the commercial area were observed. There are no traffic control devices that prohibit the left turn from Highway 27 into the commercial area.

Photo: eastbound left turning vehicle using the right-in/right-out access

5. Proposed Upgrades by Others

There are several upgrades that have been proposed by the Town as part of enhancing mobility options for residents, as well as continuing with land development. The known proposed upgrades at the time of report preparation are described below.

5.1 67A Avenue / Walmart Access Proposed Development

The Town has established plans to manage the development and access of lands south of Highway 27 adjacent to the 67A Avenue / Walmart Access intersection. Such development will require that the south leg of this intersection be converted from the current right-in/right-out to all movement access. The south leg currently makes a 90 degree turn that connects with a parallel service road. The proposed road revisions indicate that the service road connection will be closed, with the south leg extended tangentially towards future development areas served by an internal road network. The proposed plans are shown below. The internal road connecting to the south leg appears to establish a spacing of approximately 80 m from the shoulder of Highway 27.

The timing of the land development that will trigger the implementation of these improvements is expected to be in 2025. Interim improvements to address the previous observations are the focus for this study; however, a review of the plans was completed to identify any enhancements that should be considered in support of the proposed development and road network requirements.

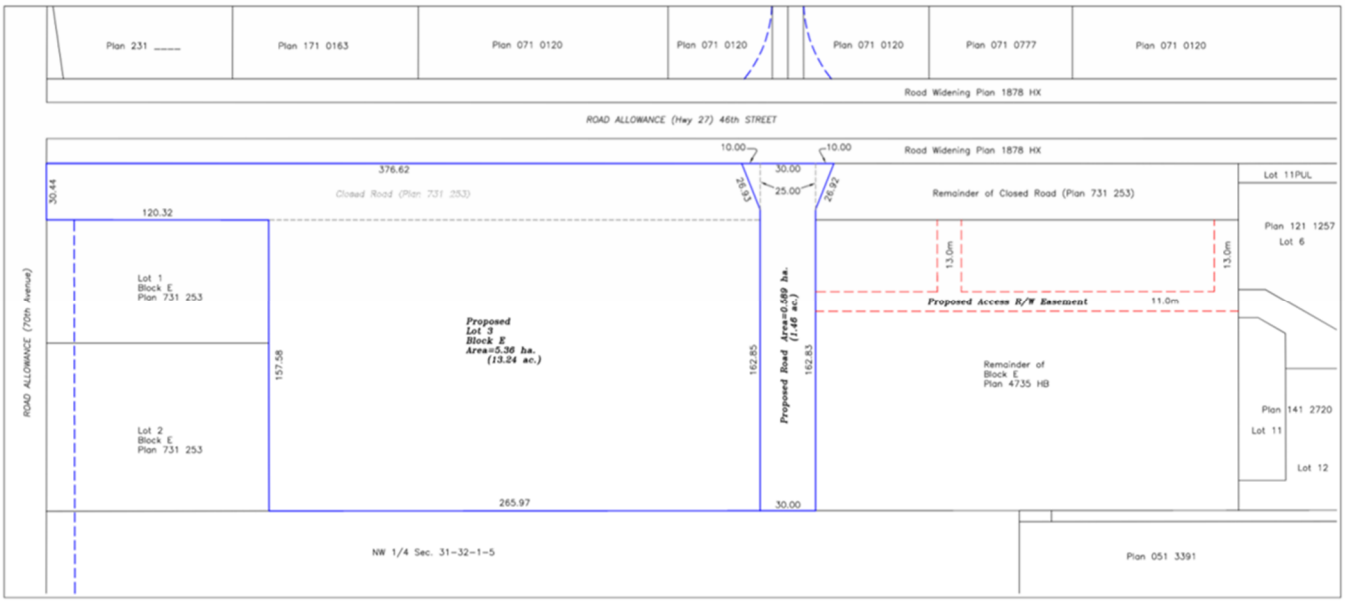


Figure 5-1 : Land Development Parcels and New Road Plan Proposal

5.2 Drop Curb/Pedestrian Ramp Upgrades

A Development Permit application from the Town to TEC was approved in February 2024 granting the Town the ability to upgrade the raised channelized islands in all corners of the Highway 27 and 57 Avenue intersection, as well as the island in the northeast corner of the Highway 27 and 50 Avenue intersection. The upgrades are specific to providing mobility/pedestrian ramps making them accessible for all sidewalk users. Conditions of the permit require that these upgrades be completed within two years.

The upgrades are anticipated to address the observations noted previously, regarding current challenges facing pedestrians, in particular those with mobility difficulties.

5.3 Pedestrian Network Study

The Town is in the process of completing a pedestrian network study. At the time of preparing this report, the study is still ongoing. The Town shared the primary recommendations from this study that relate to Highway 27:

+ South Sidewalk
  - The study will comment on the lack of sidewalks along the south side of Hwy 27. During the study's research, they noticed informal paths being used (also evident by the well-worn grass) to access businesses on the south side. This presents both a safety hazard and a business accessibility issue.
+ Highway 27 and 57 Avenue Intersection Recommended Upgrades
  - Removing the channelized right turn lanes, which are challenging and inconvenient for pedestrians to cross due to the higher speed of the turning vehicles and the yield controlled (unsignalized) nature of the turn. The triangular refuge island ("pork chop") provides limited space for pedestrians.

  - Doubling the size of the curb ramps to make it easier for people on wheelchairs and those pushing strollers to access the sidewalks.
  - Adding leading pedestrian intervals, which would give pedestrians a 3–7 second head start when entering an intersection with a corresponding green signal in the same direction of travel.
- Highway 27 and 50 Avenue Intersection
  - Adding a curb ramp to the triangular refuge island on the northeast corner.
  - Doubling the size of the curb ramps to make it easier for people on wheelchairs and those pushing strollers to access the sidewalks.
  - Adding leading pedestrian intervals in the traffic signal programming, which would give pedestrians a 3–7 second head start when entering an intersection with a corresponding green signal in the same direction of travel.
- Crossing Devices
  - There will be comments that some of the pedestrian 'Walk' signals (both at intersections and flashing devices) vary in length, and some appear not to be long enough to accommodate many seniors, people with disabilities, and parents with young children. Some type of timing study/comparison will be recommended.

Additional considerations presented within this operational review may need to be integrated into the Town's proposed network.

5.4 Age Friendly Action Plan

This study conducted by the Town in 2021 developed an action plan that would allow Olds to be recognized as an age-friendly community, specifically by adapting 'structures and services to be accessible and inclusive of older people with varying needs and capacities'. Several strategies were identified within this plan specific to the Highway 27 corridor or localized areas, as follows:

- Increase and improve crosswalks – the island at 50 Avenue needs to be accessible.
  - This appears to refer to the westbound to northbound island noted in Section 5.2, although not specifically confirmed within the action plan itself.
- Increase and improve crosswalks – need a flashing light at the legion crosswalk to the corner.
  - The legion is located on the south side of Highway 27 midway between 52 Avenue and 54 Avenue. A pedestrian signal is located at the intersection with 52 Avenue across Highway 27, and a Special Crosswalk is located at the 54 Avenue intersection. The intent of this strategy is unknown, given the existing crosswalks and level of pedestrian accommodation.
- Increase usability of sidewalks and trails – provide wider sidewalks on Highway 27.

Other than the island at 50 Avenue, the other strategies noted from this action plan have not been reviewed any further as part of this Operational Review.

6. Review Summary

A summary of the observations and analyses presented previously is provided below to inform the study recommendations for each intersection.

Highway 27 & 70 Avenue

The intersection with 70 Avenue operates with an overall LOS of “A”, corresponding to overall low delay, in the AM, Midday and PM peak hours. Individual approaches and movements operate with a LOS of “C” or better, well within the LOS targets.

Two collision types were listed in the location breakdown in Table 3.3, including animal strike and run-off-road conflicts. All collisions occurred prior to the existing treatment and traffic control being implemented. As such, the presence of these collisions should be confirmed prior to implementing any measures that could specifically target mitigation. The animal-vehicle collisions are predominantly located to the west of the intersection. Conversely, there are no trends associated with the run-off-road collisions.

The on-site observations noted issues with traffic control devices, off-tracking, and lane utilization, as well as an absence of pedestrian facilities to support the pedestrian signals provided over each leg.

Highway 27 & 67A Avenue / Walmart Access

The intersection with 67A Avenue / Walmart Access operates with an overall LOS of “B”, corresponding to overall low delay, in the AM, Midday and PM peak hours. Individual approaches and movements operate with a LOS of “B” or better, well within the LOS targets.

Two collision types were listed in the location breakdown in Table 3.3, including rear-end and right angle/left turn cross path conflicts. Considerations specific to these safety performance issues are as follows:

+ The rear-end collisions are spread throughout the intersection with two occurring in the southbound to westbound channelized right turn lane, and two on the westbound approach. Neither constitutes a trend to which targeted measures could seek to address. However, the channelized approach having gentle curvature with a return taper can suggest to drivers that a merge operation is more appropriate that yielding. In addition, the Yield sign is located at the end of the right turn lane curvature outside the line of sight for drivers approaching the turn, and within the area where drivers are deciding on their action as they seek to confirm available gaps in the traffic flow of Highway 27.
+ The injury rear-end collision involving eastbound vehicles occurred before the signals and advanced warning flasher installations at 70 Avenue were installed. These recent installations may negate future injury collisions occurring at 67A Avenue / Walmart Access as they provide a suitable gateway transition; however, TEC should continue to monitor 70 Avenue and 67A Avenue /Walmart Access to confirm this.
+ Two right angle collisions involved vehicles that ran the red light. At the time of these collisions, the 67A Avenue / Walmart Access intersection was the last signal and possible stop condition departing the Town, which may have presented a dilemma for some drivers to speed up instead of slow down at the onset of the yellow signal.

Enhancements to the current traffic control devices including pedestrian signals can be made to better conform to available movements and current expectations. Additional revisions will be required at the time the south leg is opened to support all turning movements.

Given the occurrence of vehicles turning onto the south leg against the intended direction of travel for the northbound right turn, closure of the movement could be considered as a means to minimize conflicts.

Highway 27 & 65 Avenue

The intersection with 65 Avenue operates with an overall LOS of “B” or better, corresponding to overall low delay, in the AM, Midday and PM. With the exception of the southbound left movement operating at a LOS of “D” in the midday and afternoon peak hours, all individual approaches and movements operate with a LOS of “C” or better, well within the LOS targets. Queuing at 65 Avenue northbound is expected to impact 51 Street in the Midday and PM peak periods.

There were no safety performance issues observed at this location that inform specific improvements that should be considered at this intersection.

Observations noted a lack of guidance regarding intended lane use, specifically for the south leg. In addition, the short spacing between Highway 27 and the south service road can lead to vehicle queues spilling back and blocking the service road access. Opportunities to enhance the existing traffic control devices can assist drivers and minimize future conflicts. Revisions to the pedestrian facilities have been identified to improve the existing conditions for all users.

Highway 27 & 57 Avenue

The intersection with 57 Avenue operates with an overall LOS of “C” or better, corresponding to overall low to moderately low delays, in the AM, Midday and PM peak hours. Individual approaches and movements operate with a LOS of “C” or better, well within the LOS targets. Queuing at 57 Avenue northbound and southbound is expected to impact 50 Street and 46 Street in all peak periods.

The predominant collision type listed in the location breakdown included rear-end conflicts. Observations specific to these collisions are as follows:

+ Three collisions involved eastbound vehicles with two of these reported to occur when the following vehicle proceeded after stopping before the preceding vehicle had moved. The other collision was the result of slippery road conditions. There are no obvious external vehicle engineering measures to mitigate collisions when vehicles have stopped, and one proceeds before it should.
+ There are three rear-end collisions where the direction of travel is unknown, making it difficult to identify any specific mitigation measures for a given leg. Similar causal factors were cited in two of these, namely slippery road conditions and proceeding prematurely after stopping. The other collision noted being rear-ended while stopped.
+ The trend observed within the rear-end collisions relates to four of the seven occurring in the lunchtime period from 12:00pm to 1:30pm. Enhancements to the intersection may assist to reduce the potential of rear-end collisions occurring at this intersection since there are few reported conflicts to which targeted countermeasures may prove effective.

In addition to the rear-end collisions, two left turn across path conflicts indicate potential issues for some drivers to judge the gap of approaching vehicles, possibly due to negative offset between opposing movements.

The intersection geometry and adjacent access spacing can present concerns related to queues blocking access to the right turn lanes as well as upstream municipal roads and driveways.

Enhancements to the current traffic control devices and pedestrian facilities can be made to reduce potential conflicts and meet driver expectations.

Highway 27 & 52 Avenue

The intersection with 52 Avenue operates with an overall LOS of “A”, corresponding to overall low delay, in the AM, Midday and PM peak hours. Individual approaches and movements operate with a LOS of “C” or better, well within the LOS targets.

The predominant collision type listed in the location breakdown included rear-end conflicts. All three rear-end collisions involved westbound vehicles. Neither constitutes a trend to which targeted measures could seek to address. There are no trends in causal factors, with one reporting sun glare, another icy road conditions, and no pertinent description details in the third.

Two other collisions reported at this intersection involved a westbound vehicle turning left in the path on an oncoming eastbound vehicle. No specific causal factors were listed other than turning in front of the other vehicle. Enhancements to the intersection may be possible to minimize the occurrence of westbound vehicle conflicts.

The current intersection configuration with an offset minor approach to developments on the south side of Highway 27 is less than ideal. A lack of traffic control on the south leg means that movements can occur irrespective of the signal timing phasing, i.e., even though green time is assigned to Highway 27, movements from the south leg can occur unexpectedly, since it acts as a driveway.

The offset minor legs impact the west leg crosswalk. In addition, the pathway on the south side is discontinuous requiring users to walk through a business parking lot to access the west leg crosswalk. Enhancements to traffic control devices and pedestrian facilities can be made to reduce potential conflicts and meet driver expectations.

Highway 27 & 51 Avenue

The intersection with 51 Avenue operates with an overall LOS of “A” or better, corresponding to overall low delays in the AM, Midday and PM peak hours. Individual approaches and movements operate with a LOS of “C” or better, well within the LOS targets.

From a review of available collisions, there are no safety performance issues that require mitigation. The only collisions observed in the review period involved vehicles changing lanes and sideswiping another vehicle occupying the desire lane.

Potential improvements for this intersection include traffic control device enhancements and modifications to the traffic signal operations.

Highway 27 & 50 Avenue

The intersection with 50 Avenue operates with an overall LOS of “C” or better, corresponding to overall low to moderately low delays in the AM, Midday and PM peak hours. With the exception of the southbound through-left movement operating at a LOS of “D” in the midday and afternoon peak hours, individual approaches and movements operate with a LOS of “C” or better, well within the LOS targets. Queuing at 50 Avenue northbound and southbound is expected to impact access points in all peak periods.

From a collision perspective, three conflicts were reported involving an eastbound vehicle that turned left in front of an oncoming westbound vehicle. Two of these conflicts resulted in injuries. No specific causal factors were listed other than turning in front of the other vehicle. The left turn movements on Highway 27 have a negative offset causing sight line issues for left turning vehicles, which is anticipated to be factors in these three collisions.

One of the two rear-end collisions involving eastbound drivers cited a lane change and abrupt braking. Frequent occurrences of lane changes to move around a vehicle waiting to turn left were observed in both directions of travel on Highway 27.

Enhancements to the signal timing may assist to reduce the occurrence of conflicts at this intersection. The prevalence of eastbound collisions compared to those in the westbound direction may be indicative of the westbound left turn having a protected-permissive phase, while the eastbound is strictly permissive.

Frequent queuing associated with the rail crossing operations immediately to the east spills back through 50 Avenue and beyond invoking some drivers to find alternative routes to reduce their delay. Some concerns were noted during field observations regarding driver behaviour.

Highway 27 & Highway 2A (46 Avenue)

The intersection with Highway 2A (46 Avenue) operates with an overall LOS of “C”, corresponding to moderately low delays. With the exception of the southbound through-left movement and the westbound movements operating at a LOS of “D” in the PM peak hour, individual approaches and movements operate with a LOS of “C” or better, within the TEC LOS targets. Queuing at Highway 2A (46 Avenue) northbound and southbound is expected to impact access points in all peak periods.

From a review of available collisions, several trends were observed as follows:

+ Backing collisions tend to be uncommon compared to other types. Three collisions were reported at this intersection, one on the south, north and east legs. These collisions occurred after a vehicle had stopped and then reversed into the one behind. As observed onsite, vehicles often stop within the hatched areas of all legs, which can impede the left turn movements from the cross street leg. This can be caused by split phase signal timings and shorter clearance intervals. Adjustments to the current traffic signal timings can reduce the potential for such conflicts.
+ Six left turn across path collisions, with three involving a westbound vehicle turning in front of an opposing eastbound vehicle. Although not explicitly noted in all collisions, the descriptions suggest two likely causal factors, a late lane change and the perception that the vehicle in the outside lane was not continuing through the intersection. Similarly, adjustments to the current traffic signal timings can reduce the potential for such conflicts.

- Several sideswipe collisions were reported to occur, mostly related to late lane changes. Overhead lane designation signs are provided for each lane indicating either a shared or dedicated turn movement.
- The highest proportion of collisions by type is rear-end, with the majority involving eastbound vehicles. The westbound approach includes an overhead Prepare To Stop sign, which appears to assist drivers and reduce conflicts with only one collision reported compared to eight in the other direction. A variety of causal factors were noted in the descriptions including pre- and post-signal timing changes, icy road conditions, abrupt braking, and unable to anticipate the preceding vehicle.

Many of the onsite observations noted issues related to queuing or the intersection operation. There appeared to be quite a bit of driver uncertainty regarding the operation of the left turn movements as seen with vehicles encroaching into the intersection or waiting within the hatched areas during the red signal, and the presence of backing collisions. Queue lengths were noted to spillback through adjacent intersections indicating possible capacity issues during peak periods.

General Observations

There are several sections of discontinuous sidewalk/pathway on the south side of Highway 27 between study intersections. At times, this requires pedestrians to use portions of private parking lots of driveways. If the desire is to retain these discontinuous sections, additional guidance to pedestrians may be required to support desired access to the pathway network. This may be an initiative that the Town has already considered but may require further collaboration between both road authorities to eliminate gaps and improve mobility.

There are numerous driveway accesses onto Highway 27 between 57 Avenue and 47 Avenue. Each driveway access represents potential conflicts at residential and commercial areas. Stricter access control is desirable to reduce conflicts, maintain access management and driver expectations, and improve operations. An aggressive measure is to consider implementing right-in/right-out operations, particularly for accesses experiencing higher volumes (commercial operations) and within intersection treatments. Left turn movements can be displaced to the turn bays at downstream accesses. Where possible, providing shared back access and establishing connections between adjoining parcels should be considered. This will likely require that a holistic review be completed to establish possible options beyond the considerations noted in this report.

The constrained right-of-way supporting the four-lane undivided cross-section between 57 Avenue and Highway 2A (46 Avenue) favours the ability to create intersection treatments that are relatively similar from one location to the next. The use of shared lanes does introduce conflicts at some intersections, largely associated with late lane changes; however, the safety performance generally indicates few severe conflicts. Many intersections have few reported collisions and trends, the exception being those that represent gateways intersections into the Town at the urban fringe.

Many of the rear-end collisions, the highest proportion by type, reference a vehicle striking one in front, a result of the driver not recognizing the need to slow in time or judging the braking of a preceding vehicle. In addition to the considerations noted above, one other enhancement is presented that may assist drivers with progression through closely spaced intersections. Signal coordination can enhance progression through the downtown higher volume area. This can reduce the amount of stop and go traffic, and therefore reduce the potential for conflicts.

7. Traffic Signals Infrastructure Assessment

An assessment of the traffic signal infrastructure at each of the signalized intersections along Highway 27 within the Town was completed to determine upgrades required to support the possibility of signal coordination and to identify other deficiencies that may require repair or upgrade of existing infrastructure. The assessment was based on a site visit completed on October 18, 2023, as well as review of the annual maintenance report completed in the Fall of 2023.

A summary of the key findings and recommendations is presented below for reference, with specific details of the site visit findings and review of the annual maintenance report included in **Appendix E**. The investigation of the existing signal infrastructure indicates that:

+ The geometry of the 52 Avenue intersection is uncomfortable for drivers, and the installation is not as per TEC specifications. A concurrent rebuild of the intersection and traffic signal infrastructure is highly recommended. In the interim, replacement of signal heads and pedestrian audible signals is required.
+ There are some significant issues at Highway 2A (46 Avenue) which include a lack of right-of-way, turning radius concerns, and poor power quality. A concurrent rebuild of the intersection and traffic signal infrastructure is highly recommended. In the interim, power quality issues can be addressed with the addition of a battery back-up uninterruptible power system (UPS).
+ Other intersections have issues with GPS clocks, signage, detection and/or pavement markings, which should be addressed by priority.

A breakdown of the costs associated with the repair, upgrade and replacement of signal infrastructure is included in **Appendix E**. The cost estimates were prepared through discussion with TEC's traffic signal contractor, HighLine Electrical Constructors Ltd. These cost estimates consider the scope required along the Highway 27 corridor from 70 Avenue to Highway 2A (46 Avenue), and are summarized as follows:

+ 67A Avenue / Walmart Access to Highway 2A (46 Avenue) combined improvements – $79,100 (rounded).
  - Replacement, relocation or supply of signs, GPS clocks, wiring, cameras, pole stopper pins, end caps, signal heads, push buttons etc.
  - Sealing of holes, grouting, etc.
+ 52 Avenue and Highway 2A (46 Avenue) entire signal infrastructure rebuilds – $620,000.
+ Total cost for signal infrastructure within study corridor (without Rebuild) – $129,100.
+ Total cost for signal infrastructure within study corridor (with Rebuild Included) – $699,100.

8. Signal Timing Review and Coordination

Signal timing updates were completed for the morning, midday, and afternoon peak hours along Highway 27 for all study intersections. New signal timing plans are provided in **Appendix G**. Signal coordination was completed at the intersections of:

- 52 Avenue
- 51 Avenue
- 50 Avenue

These three intersections are within an approximate 400 m length of corridor along the north border of the central business district of the Town of Olds. Traffic volumes do not display large directional variations, with slightly higher traffic volumes westbound in all peak periods.

After reviewing existing signal timing parameters and refining new cycle lengths, split times, and offsets in an iterative process, the following findings have been established:

- Low traffic volumes and a short corridor mean results show only small variations in impacts. Signals, by their very nature, will always cause delay for motorists. This exercise focused on minimizing the delays for as many motorists as possible with the understanding that a baseline level of delay can never be eliminated.
- Based on observed travel times, existing conditions are near free flow, leaving small room for improvement. The corridor travel time for existing traffic signal timing is only 40 to 80 seconds slower than complete free flow.
- Coordination offers small but consistent improvements to travel time compared to the baseline Synchro model.
- Total stops for all movements along the study corridor drop by 600 to 800 stops per hour depending on the peak period.

Signal timing parameters used are as follows:

- Red time was updated to 1.0 second for through movements and 1.5 seconds for left turn movements.
- Amber clearance times were updated to 3.5 seconds for through movements and 3 seconds for left turn movements.
- Walk times were maintained at 7 seconds, Flashing Don’t Walk times were calculated based on the length of exposed crossing distance and a walk speed of 1.1 m/s.
- A coordinated cycle length of 70 seconds in the PM peak hour and 65 seconds throughout the rest of the day were used at the three coordinated intersections. This provides a balance between travel time, queuing, and delay for major and minor roads while keeping cycle lengths short enough for waiting pedestrians.
- Local Zero Override (LZO) allows the signal controller to remain in a coordinated sequence while allowing for shorter side street split times that would normally violate pedestrian minimum timing. LZO was used to maintain coordination at study intersections with low pedestrian calls while meeting Flashing Don’t Walk minimums when a pedestrian call is placed.

Changes made to each intersection are summarized in **Table 8.1**. Modifications are colour coded based on implementation – green for signal timing updates, yellow for further consideration, and red for items that could not be implemented based on current infrastructure.

Table 8.1 : Signal Timing Changes

Intersection	Town Request	Signal Timing Modifications
70 Avenue	Disable the westbound left phase.	A detector malfunction results in a max recall placed for westbound left traffic. Fixing the detector will address timing issues.
	Replace pedestrian recall with pedestrian actuation.	Pedestrian recall cannot be removed for east / west phases because there are no pedestrian call buttons. The Town may consider removing / bagging pedestrian walk lights until there is pedestrian demand for such a crossing.
67A Avenue / Walmart Access	Incorporate dual southbound left turn lanes until the south leg is opened to through traffic.	Signal timing updated accordingly. Northbound signal heads should be bagged until the south leg opens to through traffic. Update assumes that detector malfunctions have been addressed.
	Replace pedestrian recall with pedestrian actuation.	Signal timing updated accordingly.
65 Avenue	No changes.	No changes beyond routine signal timing update.
57 Avenue	Replace pedestrian recall with pedestrian actuation.	Pedestrian recall cannot be removed for east / west phases because there are no pedestrian call buttons.
	Incorporate Leading Pedestrian Intervals (LPI).	A 5 second LPI was included for pedestrians crossing north/south. Update assumes that detector malfunctions have been addressed.
52 Avenue	Coordinate with 51 Avenue and 50 Avenue.	Coordinated east / west using Max Recall. Major leg does not have detectors.
	Detector on the north leg detecting both left and right turning vehicles.	Detector information is limited. Check detector locking settings (set to non-locking) or redefine camera detection area to prevent right turns from triggering a phase call.
51 Avenue	Coordinate with 52 Avenue and 50 Avenue.	Coordinated east / west.
	Reconsider left turn phases.	Current timing plan does not include any left turn phases, but physical infrastructure could support this change. Inclusion reduces overall LOS but improves left turn operations.
50 Avenue	Coordinate with 52 Avenue and 51 Avenue.	Coordinated east / west.
	Incorporate Leading Pedestrian Intervals (LPI).	LPI cannot be incorporated at intersections with protected-permissive left turn phases due to the conflicting protected movements.
Highway 2A (46 Avenue)	Current signal timing creates confusion for motorists.	Three signal timing options were explored: • Split phase signal timing with existing geometry, • Permissive left turns with existing geometry, and • Lead / lag protected-prohibited left turns with dedicated left turn lanes. Permissive left turns offer the best operational improvements; however, split phase timing offers the greatest safety benefit. Current timing plans reflect permissive left turns on the major road.

8.1 57 Avenue

The 2009 functional planning study recommends dedicated left turn lanes (no offset), combined with a shared through/right lane for the north and south approaches. Currently both approaches are signed with a shared left/through lane with channelized right turns with some right turn storage provided between Highway 27 and the adjacent streets. Although not specifically noted by the study team, anecdotally, drivers avoid waiting behind left turning vehicles by going around them and proceeding through the intersection. Based on the signed laning at the intersection, opposing drivers would not be anticipating this movement. There appears to be enough pavement width to consider implementing this configuration, providing dedicated through lanes.

A summary of the comparison of the analysis results for existing conditions to dedicated northbound and southbound left turn lanes are shown in **Table 8.2**. Synchro analysis shows that providing dedicated northbound and southbound left turn lanes with permitted phasing improves overall intersection delays and queue lengths.

Based on these results it is recommended that dedicated left turns for the north and south approaches be implemented. The signal timing plan provided assumes this laning configuration.

As redevelopment occurs the Town should continue to work towards the recommendations in the 2009 plan for 57 Avenue, including realignment of 46 Street to increase intersection spacing.

Table 8.2 : 57 Avenue AM and PM Peak Intersection Operation Comparison

Scenario	Measure of Effectiveness	Eastbound			Westbound			Northbound			Southbound			Overall
		LT	TH	RT	LT	TH	RT	LT	TH	RT	LT	TH	RT	
AM Peak														
		L/T/TR			L/T/TR			LT/R			LT/R			
Existing Signal Timing	Volume	40	280	110	50	300	70	80	50	80	80	70	70	1,280
	LOS	A	B	B	A	C	C	C	C	A	C	C	A	B
	Delay (s)	17.5			18.8			18.1			19.6			18.4
		L/T/TR			L/T/TR			L/T/R			L/T/R			
Dedicated Left Turn Lanes (57 Ave)	LOS	A	B	B	A	A	A	B	B	A	B	B	A	B
	Delay (s)	9.8			9.2			13.0			13.5			10.8
PM Peak														
		L/T/TR			L/T/TR			LT/R			LT/R			
Existing Signal Timing	Volume	80	470	130	90	490	80	130	90	70	90	80	70	1,870
	LOS	A	C	C	A	C	C	C	C	A	C	C	A	C
	Delay (s)	21.2			21.2			25.2			21.5			21.9
		L/T/TR			L/T/TR			L/T/R			L/T/R			
Dedicated Left Turn Lanes (57 Ave)	LOS	A	B	B	A	B	B	C	B	A	C	B	A	B
	Delay (s)	13.0			11.9			18.0			15.9			13.7

8.2 Coordination

Intersection operations were assessed using the traffic signal analysis software Synchro 11, which employs methodology from the Highway Capacity Manual (HCM2000) published by the Transportation Research Board (TRB) National Research Council.

The signal coordination for the entire corridor was evaluated using SimTraffic, a microsimulation tool within Synchro. SimTraffic provides a visual representation of how intersections and traffic interact along an arterial roadway. It can also calculate various measures of effectiveness for signal timing progression along a corridor.

The performance of the overall corridor considers:

1. Travel time of the coordinated system compared to the existing conditions in Synchro; and
2. Reducing the total number of stops made by vehicles.

Results throughout this report are taken from the average of five 1-hr simulation runs for each scenario. Through an iterative process, a cycle length of 70 seconds was selected for the PM peak hour and a cycle length of 65 seconds was selected for all other times. **Figure 8-1** through **Figure 8-2** illustrate the expected flow patterns for the 90th percentile of vehicles throughout the day.

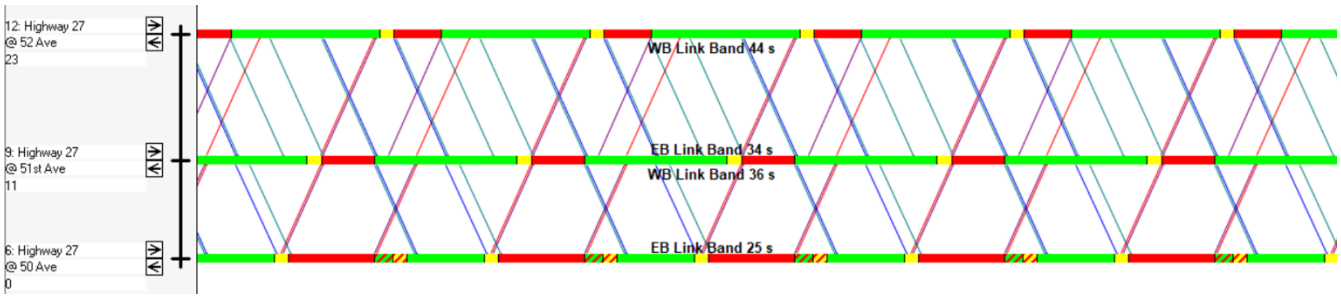


Figure 8-1 : AM and Midday Peak Flow Diagram

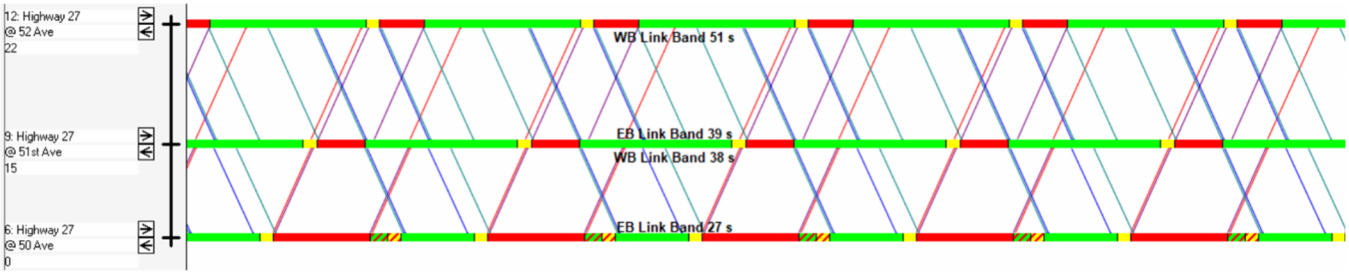


Figure 8-2 : PM Peak Flow Diagram

8.2.1 Travel Time

Corridor travel times for the coordinated scenarios were compared to the baseline travel times in the original Synchro model. Travel time data is summarized in **Table 8.3**. **Appendix G** contains the Synchro outputs for the coordination and SimTraffic outputs for the before and after analysis.

Coordination offers small but consistent improvements to travel time compared to the baseline Synchro model in all periods. To contextualize these results, it would take at least 4.5 minutes to travel this corridor in complete free flow conditions.

Table 8.3 : Travel Time

Period	Travel Time Source	Travel Time (min)		% Difference	
		EB	WB	EB	WB
AM Peak	Existing Synchro	5.2	5.5	-	-
	Coordinated Synchro	4.6	4.7	13%	18%
Midday Peak	Existing Synchro	5.7	5.7	-	-
	Coordinated Synchro	5.2	5.0	10%	15%
PM Peak	Existing Synchro	5.7	5.8	-	-
	Coordinated Synchro	5.3	5.0	8%	16%

8.2.2 Stops

The number of stops made by vehicles along the corridor can be a measure of signal timing and coordination effectiveness. The number of stops before and after coordination are summarized for all vehicles in the AM, midday, and PM Peak Hours in **Figure 8-3** through **Figures 8-5**, respectively. These results may underestimate the actual reduction in stops because the analysis relies on the SimTraffic model for existing conditions.

The number of stops at the first and last intersection in a coordinated corridor are generally not affected by coordination since the stoppage would occur regardless.

Stops on the major road decrease as a result of coordination along Highway 27. Stops on the minor road are generally stable, indicating no major compromises to intersection operation as a result of the updated signal timing parameters and coordination. Total stops for all movements drop by between 600 and 800 along the entire corridor.

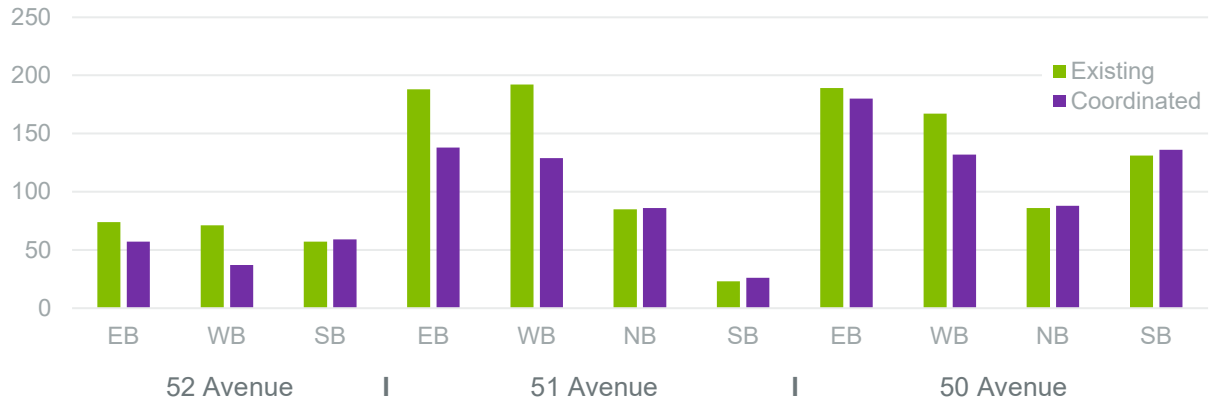


Figure 8-3 : AM Stops

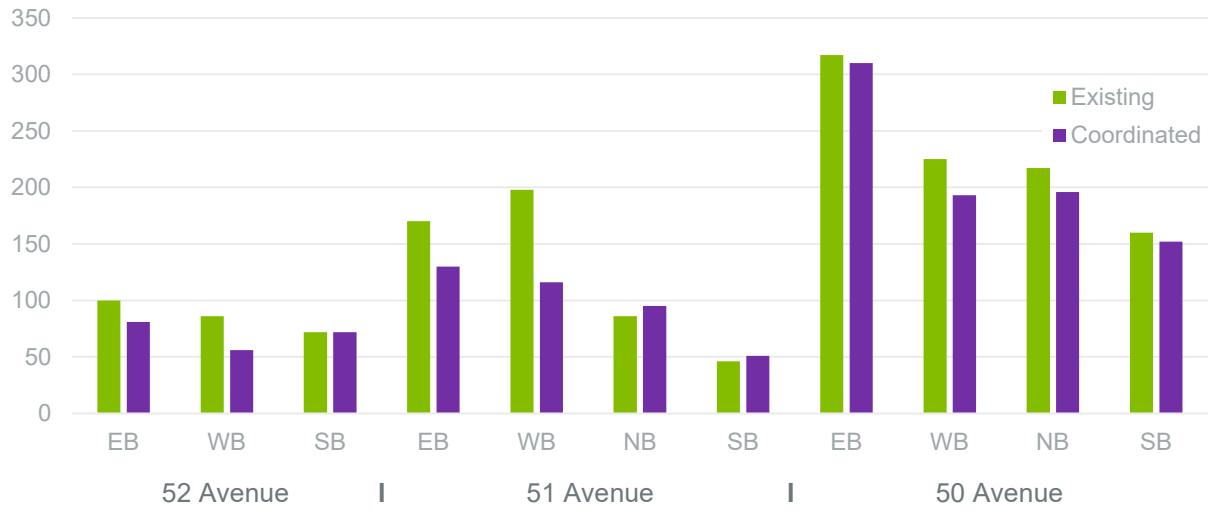


Figure 8-4 : Midday Stops

Figure 8-5 : PM Stops

In addition to the corridor wide measures of effectiveness taken from SimTraffic, vehicle delay at each intersection within the coordinated corridor was compared to the original operational analysis completed in **Section 3.6**. The revised LOS for the coordinated corridor is presented in **Section 8.4**.

Similar to the corridor wide MOE, there are small improvements to delay on Highway 27 before and after coordination. Delay on the minor roads increase slightly as a result of the changes to detector operations and split times. All intersections continue to operate within acceptable limits.

8.3 Highway 2A (46 Avenue)

A number of signal timing plans were explored at Highway 2A (46 Avenue) to address Town concerns. All options considered at this time lie within existing road widths. Options explored on Highway 27 include:

+ Dedicated left turn lanes on Highway 27,
+ Lead-lag, protected-prohibited left turn phases,
+ Split phase signal timing
+ Permissive left turn phases, and
+ Dedicated left turn lanes on Highway 2A (46 Avenue).

Operational impacts were initially explored in the PM peak period, summarized in **Table 8.4**, then the preferred signal timing plan was applied to all three analysis periods.

Converting the shared left-through lanes on Highway 27 to dedicated left turn lanes improved left turn operations but created lane continuity concerns. Highway 27 maintains two through lanes in each direction within the study area, drivers may mistakenly assume that the inner lane at Highway 2A (46 Avenue) will continue to allow through movements and be forced to make last minute lane changes. This option is not recommended.

Lead-lag left turn phases provide dedicated time to turning vehicles on Highway 27 without modifications to lane geometry. However, the increase in left turn safety results in additional delays. This option is not recommended.

Split phase signal timing provides dedicated time to turning vehicles on Highway 27 without modifications to lane geometry and closely resembles existing signal timing plans. This option is recommended if permissive signal timing fails to meet Town signal operations objectives.

Permissive left turn phases do not provide any dedicated time to turning vehicles on Highway 27. Due to the relatively low volume of left turns from Highway 27, green time can be reallocated to other movements, and the overall intersection LOS is improved. This option is recommended for implementation. If permissive left turns are implemented, we suggest replacing the existing signal heads with three ball displays. This will help set expectations for the public. Turning vehicles may expect a protected left turn phase if the existing four ball displays are kept in place.

Converting the shared left-through lanes on Highway 2A (46 Avenue) to dedicated left turn lanes while using permissive left turn phases on Highway 27 offers no significant improvement to intersection operations when compared to the previous scenario. There is a high volume of both north and southbound right turning vehicles in the AM and PM peak period that could be blocked by waiting through vehicles if they were made to share a lane. This option is not recommended at this time.

If further improvements are desired, the Town may consider land acquisition for a fifth lane to create dedicated left turn lanes on Highway 27 or Highway 2A (46 Avenue). A dedicated left turn lane is not required based on LOS results but creates additional opportunities for signal timing options such as protected-permissive left turn phases.

Table 8.4 : Highway 2A (46 Avenue) PM Peak Intersection Operation Comparison

Scenario	Measure of Effectiveness	Eastbound			Westbound			Northbound			Southbound			Overall
		LT	TH	RT	LT	TH	RT	LT	TH	RT	LT	TH	RT	
		LT/TR			LT/TR			LT/R			LT/R			
Existing Signal Timing	Volume	80	310	90	90	210	30	120	90	140	60	100	150	
	LOS	C	C	C	D	D	D	B	B	A	D	D	A	C
	Delay (s)	28.2			35.1			13.4			26.6			25.9
		L/TR			L/TR			LT/R			LT/R			
Dedicated Left Turn Lanes (Hwy 27)	LOS	B	D	D	B	C	C	C	C	A	D	D	A	C
	Delay (s)	34.2			21.9			14.6			21.7			24.1
		LT/TR			LT/TR			LT/R			LT/R			
Lead-Lag, Protected-Prohibited Left Turn Phases	LOS	D	D	D	C	C	C	C	C	A	D	D	A	C
	Delay (s)	47.2			32.7			14.8			21.1			30.7
		LT/TR			LT/TR			LT/R			LT/R			
Split Phase	LOS	C	C	C	C	C	C	C	C	A	D	D	A	C
	Delay (s)	29.4			30.3			15.5			28.1			26.0
		LT/TR			LT/TR			LT/R			LT/R			
Permissive Left Turn Phases	LOS	B	B	B	B	B	B	B	B	A	C	C	A	B
	Delay (s)	15.4			14.9			7.4			14.5			13.2
		LT/TR			LT/TR			L/TR			LT/R			
Dedicated Left Turn Lanes (Hwy 2A / 46 Avenue)	LOS	B	B	B	B	B	B	A	A	A	C	C	A	B
	Delay (s)	15.4			15.0			7.1			14.5			13.1

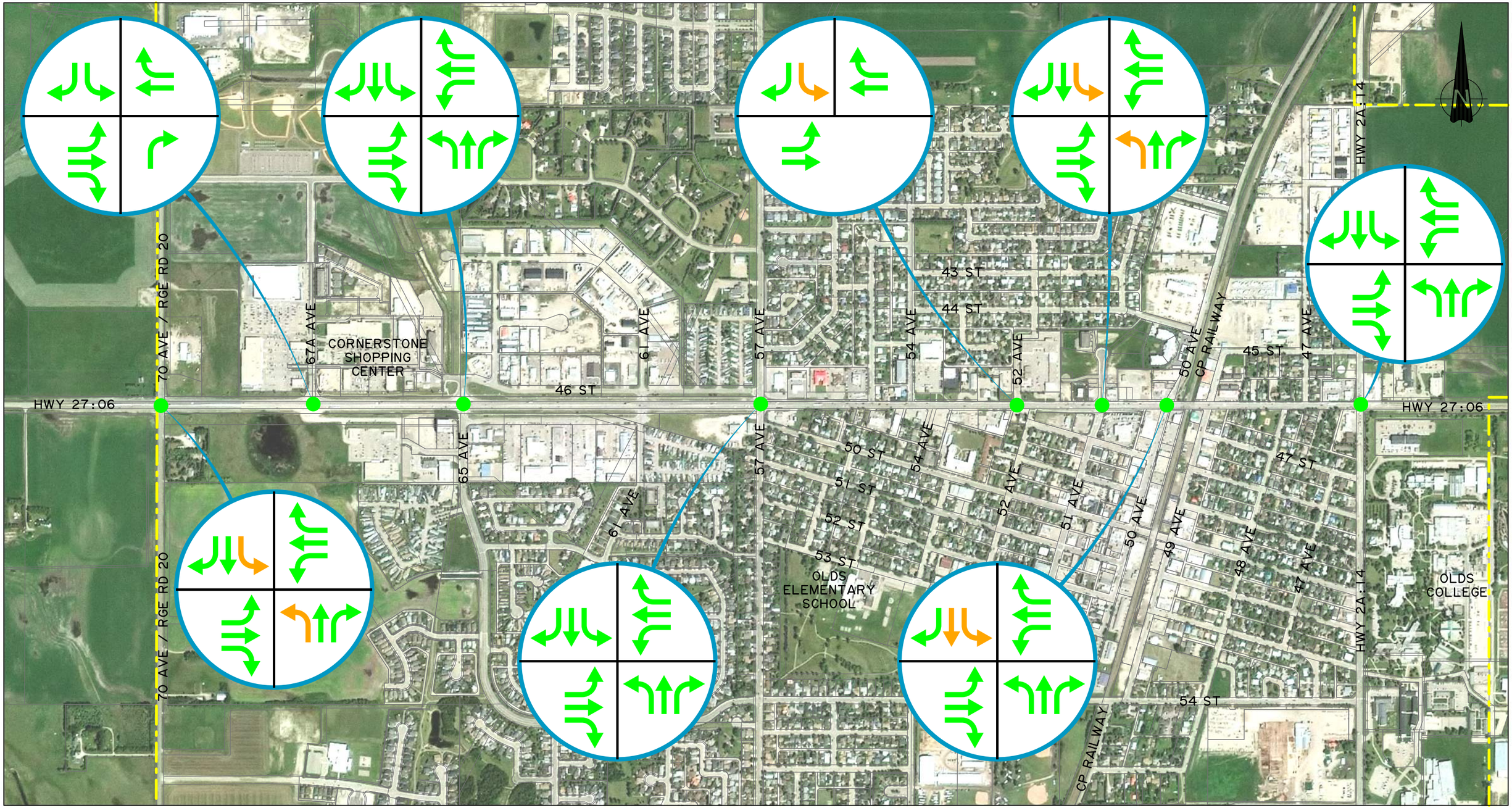
8.4 Capacity

The AM, midday, and PM Peak Hour LOS and delay are resulting from the coordination, signal timing revisions and laning configuration recommendations are summarized in **Table 8.5** through **Table 8.7**, and graphically shown in **Figure 8-6** through **Figure 8-8**. At all intersections throughout all peak hours, there are minor to significant improvements in overall intersection delay, and some improvements in overall intersection LOS.

Table 8.5 : Revised AM Peak Intersection Operations

Intersection	Measure of Effectiveness	Eastbound			Westbound			Northbound			Southbound			Overall
		LT	TH	RT	LT	TH	RT	LT	TH	RT	LT	TH	RT	
		L/T/TR			L/T/T/R			L/TR			L/TR			
HWY 27 and 70 Ave	Volume	10	220	10	40	190	30	10	10	50	30	10	10	620
	v/c Ratio	0.01	0.12		0.06	0.09	0.03	0.04	0.18		0.12	0.06		
	LOS	A	A		A	A	A	C	A		C	B		A
	Delay (s)	3.9	7.8		3.8	5.4	1.7	20.3	9.7		21.4	15.3		7.7
	95th % Queue (m)	1.6	14.4		4.1	12.4	2.3	4.5	9.5		9.7	5.8		
	Storage (m)	75	-		70	-	70	45	-		50	-		
		L/T/T/R			T/T/R			R			L/L/R			
HWY 27 and 67A Ave / Walmart Access	Volume	90	200	10		200	150			10	80		60	800
	v/c Ratio	0.18	0.14	0.01		0.14	0.19			0.01	0.06		0.10	
	LOS	B	A	A		A	A			A	A		A	A
	Delay (s)	10.3	8.9	2.6		8.9	3.0			0.0	6.7		2.6	7.1
	95th % Queue (m)	11.6	9.8	1.3		9.9	7.5			0.0	3.7		3.7	
	Storage (m)	80	-	30		-	30			-	-		20	
		L/T/TR			L/T/T/R			LT/R			L/TR			
HWY 27 and 65 Ave	Volume	30	200	60	60	240	90	80	50	50	70	40	30	1000
	v/c Ratio	0.06	0.16		0.12	0.15	0.12	0.30		0.10	0.20	0.14		
	LOS	A	A		A	A	A	B		A	B	A		A
	Delay (s)	7.0	5.5		7.6	6.9	2.5	11.4		3.9	10.5	6.6		6.8
	95th % Queue (m)	4.3	8.8		7.1	9.7	4.9	15.2		4.3	9.4	7.3		
	Storage (m)	80	-		70	-	25	-		25	-	-		
		L/T/TR			L/T/TR			L/T/R			L/T/R			
HWY 27 and 57 Ave	Volume	40	280	110	50	300	70	80	50	80	80	70	70	1280
	v/c Ratio	0.06	0.24		0.08	0.21		0.22	0.10	0.16	0.22	0.13	0.14	
	LOS	A	B		A	A		B	B	A	B	B	A	B
	Delay (s)	5.4	10.3		5.4	9.7		18.6	16.9	5.0	18.7	17.1	4.1	10.8
	95th % Queue (m)	4.8	23.9		5.6	24.2		18.0	11.9	7.8	18.0	15.4	6.3	
	Storage (m)	90	-		30	-		20	-	10	20	-	-	

Intersection	Measure of Effectiveness	Eastbound			Westbound			Northbound			Southbound			Overall
		LT	TH	RT	LT	TH	RT	LT	TH	RT	LT	TH	RT	
		LT/T			T/T/R			-			L/R			
HWY 27 and 52 Ave	Volume	20	390			420	10				30		30	900
	v/c Ratio	0.17				0.16	0.01				0.12		0.12	
	LOS	A				A	A				C		B	A
	Delay (s)	2.6				1.9	1.3				24.9		11.0	3.3
	95th % Queue (m)	11.8				8.2	0.3				10.5		6.7	
	Storage (m)	-				-	20				-		10	
		L/T/TR			L/T/TR			L/TR			L/TR			
HWY 27 and 51 Ave	Volume	10	430	70	30	470	10	70	10	20	10	10	10	1150
	v/c Ratio	0.02	0.21		0.05	0.21		0.33	0.11		0.05	0.08		
	LOS	A	A		A	A		C	B		C	B		A
	Delay (s)	3.3	3.0		3.0	2.8		28.1	14.1		22.9	16.7		5.2
	95th % Queue (m)	1.7	14.8		3.1	13.1		19.0	7.7		5.0	6.4		
	Storage (m)	60	-		60	-		-	-		-	-		
		LT/TR			LT/TR			LT/R			LT/R			
HWY 27 and 50 Ave	Volume	20	280	50	50	300	50	50	20	30	70	40	40	1000
	v/c Ratio	0.30			0.25			0.15		0.06	0.53		0.11	
	LOS	B			A			B		A	C		A	B
	Delay (s)	13.0			8.1			14.8		0.2	34.2		0.6	12.6
	95th % Queue (m)	31.4			22.6			14.2		0.0	29.6		0.0	
	Storage (m)	-			-			-		50	-		35	
		LT/TR			LT/TR			LT/R			LT/R			
HWY 27 and HWY 2A (46 Ave)	Volume	50	240	100	70	220	20	100	60	70	30	100	140	1200
	v/c Ratio	0.42			0.36			0.28		0.11	0.36		0.31	
	LOS	B			B			A		A	B		A	B
	Delay (s)	11.8			13.3			8.9		2.8	18.9		5.7	11.3
	95th % Queue (m)	23.7			21.6			19.0		5.1	24.4		11.0	
	Storage (m)	-			-		170	-		100	-		100	



CONSULTANT

CIMA+

PROJECT NO. CA000873.280

LEGEND

- TOWN OF OLDS BOUNDARY
- MOVEMENT LOS A-B OR V/C < 0.80
- MOVEMENT LOS C-D OR 0.80 < V/C < 0.89
- INTERSECTION LOS A-B
- INTERSECTION LOS C-D

SCALE 1:1000

REVISED MEASURES OF EFFECTIVENESS AM PEAK

HIGHWAY 27 TOWN OF OLDS OPERATIONAL REVIEW

REGION	LOCATION	DATE	DWN	CHK
CENTRAL	HWY 27:06 from km 36.490 to 39.715	07/04/2024	SD	PS

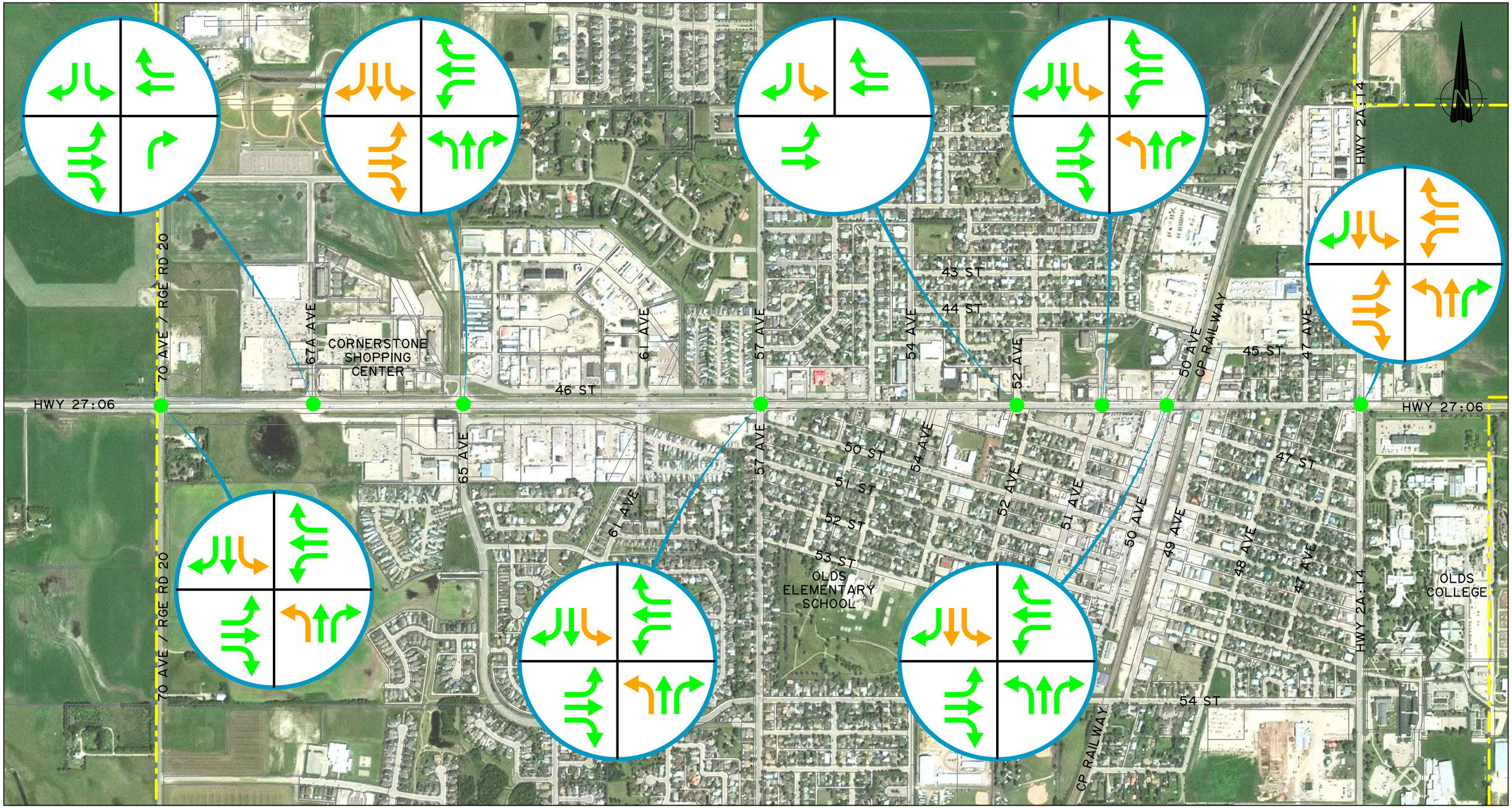
Alberta

FIGURE 8-6

Table 8.6 : Revised Midday Peak Intersection Operations

Intersection	Measure of Effectiveness	Eastbound			Westbound			Northbound			Southbound			Overall
		LT	TH	RT	LT	TH	RT	LT	TH	RT	LT	TH	RT	
		L/T/TR			L/T/T/R			L/TR			L/TR			
HWY 27 and 70 Ave	Volume	10	230	10	40	260	30	10	10	40	30	10	10	690
	v/c Ratio	0.02	0.12		0.05	0.12	0.03	0.06	0.14		0.11	0.07		
	LOS	A	A		A	A	A	C	B		C	B		A
	Delay (s)	4.0	6.9		3.9	5.5	1.1	20.4	10.2		20.5	15.2		7.1
	95th % Queue (m)	1.7	15.1		4.1	16.5	1.6	4.9	9.1		9.8	6.2		
	Storage (m)	75	-		70	-	70	45	-		50	-		
		L/T/T/R			T/T/R			R			L/L/R			
HWY 27 and 67A Ave / Walmart Access	Volume	80	210	10		220	230			10	210		110	1080
	v/c Ratio	0.26	0.23	0.02		0.24	0.38			0.01	0.16		0.17	
	LOS	B	A	A		B	A			A	A		A	A
	Delay (s)	11.8	10.0	3.3		10.0	3.7			0.0	6.5		2.4	7.2
	95th % Queue (m)	10.8	10.5	1.4		11.0	9.4			0.0	7.7		4.9	
	Storage (m)	80	-	30		-	30			-	-		20	
		L/T/TR			L/T/T/R			LT/R			L/TR			
HWY 27 and 65 Ave	Volume	30	320	80	70	330	130	90	80	70	130	60	30	1420
	v/c Ratio	0.13	0.50		0.20	0.27	0.21	0.27		0.11	0.54	0.25		
	LOS	C	C		B	B	A	B		A	C	C		B
	Delay (s)	23.7	23.2		13.9	14.1	3.5	14.3		3.9	33.5	20.7		17.6
	95th % Queue (m)	11.7	45.9		15.7	30.0	9.7	33.5		7.2	39.7	22.9		
	Storage (m)	80	-		70	-	25	-		25	-	-		
		L/T/TR			L/T/TR			L/T/R			L/T/R			
HWY 27 and 57 Ave	Volume	70	410	120	70	480	90	120	60	80	110	70	70	1750
	v/c Ratio	0.13	0.34		0.12	0.36		0.33	0.12	0.16	0.31	0.13	0.15	
	LOS	A	B		A	B		C	B	A	C	B	A	B
	Delay (s)	6.2	12.3		6.2	13.2		21.0	17.9	5.2	20.7	18.0	4.3	13.0
	95th % Queue (m)	8.7	40.7		8.6	46.2		28.3	15.3	8.4	26.2	17.1	6.6	
	Storage (m)	90	-		30	-		20	-	10	20	-	-	

Intersection	Measure of Effectiveness	Eastbound			Westbound			Northbound			Southbound			Overall
		LT	TH	RT	LT	TH	RT	LT	TH	RT	LT	TH	RT	
		LT/T			T/T/R			-			L/R			
HWY 27 and 52 Ave	Volume	20	500			580	20				30		40	1190
	v/c Ratio	0.22				0.23	0.02				0.12		0.15	
	LOS	A				A	A				C		A	A
	Delay (s)	3.0				2.5	1.2				22.5		9.4	3.4
	95th % Queue (m)	16.0				7.3	0.0				9.9		7.4	
	Storage (m)	-				-	20				-		10	
		L/T/TR			L/T/TR			L/TR			L/TR			
HWY 27 and 51 Ave	Volume	20	430	60	30	510	30	60	10	30	20	10	20	1230
	v/c Ratio	0.03	0.20		0.05	0.21		0.28	0.14		0.10	0.11		
	LOS	A	A		A	A		C	B		C	B		A
	Delay (s)	5.8	4.6		2.9	2.4		24.8	11.8		21.9	13.1		5.3
	95th % Queue (m)	4.1	23.6		m2.9	14.8		16.0	8.1		7.4	7.2		
	Storage (m)	60	-		60	-		-	-		-	-		
		LT/TR			LT/TR			LT/R			LT/R			
HWY 27 and 50 Ave	Volume	40	370	80	50	370	60	130	50	60	70	50	50	1380
	v/c Ratio	0.62			0.39			0.40		0.10	0.65		0.14	
	LOS	B			A			B		A	D		A	B
	Delay (s)	14.5			9.7			16.9		2.0	48.9		0.7	15.1
	95th % Queue (m)	16.8			22.1			33.4		3.5	#47.5		0.0	
	Storage (m)	-			-			-		50	-		35	
		LT/TR			LT/TR			LT/R			LT/R			
HWY 27 and HWY 2A (46 Ave)	Volume	60	260	150	40	200	30	170	60	80	30	70	140	1290
	v/c Ratio	0.60			0.40			0.57		0.14	0.39		0.34	
	LOS	C			C			C		A	C		A	B
	Delay (s)	20.5			22.8			22.5		1.6	29.2		4.5	19.1
	95th % Queue (m)	45.8			31.2			46.8		3.6	28.5		8.8	
	Storage (m)	-			-		170	-		100	-		100	



CONSULTANT

CIMA+

PROJECT NO. CA000873.280

LEGEND

- TOWN OF OLDS BOUNDARY
- MOVEMENT LOS A-B OR V/C < 0.80
- MOVEMENT LOS C-D OR 0.80 < V/C < 0.89
- INTERSECTION LOS A-B
- INTERSECTION LOS C-D

SCALE 1:1000

REVISED MEASURES OF EFFECTIVENESS MIDDAY PEAK

HIGHWAY 27 TOWN OF OLDS OPERATIONAL REVIEW

REGION	LOCATION	DATE	DWN	CHK
CENTRAL	HWY 27:06 from km 36.490 to 39.715	07/04/2024	SD	PS

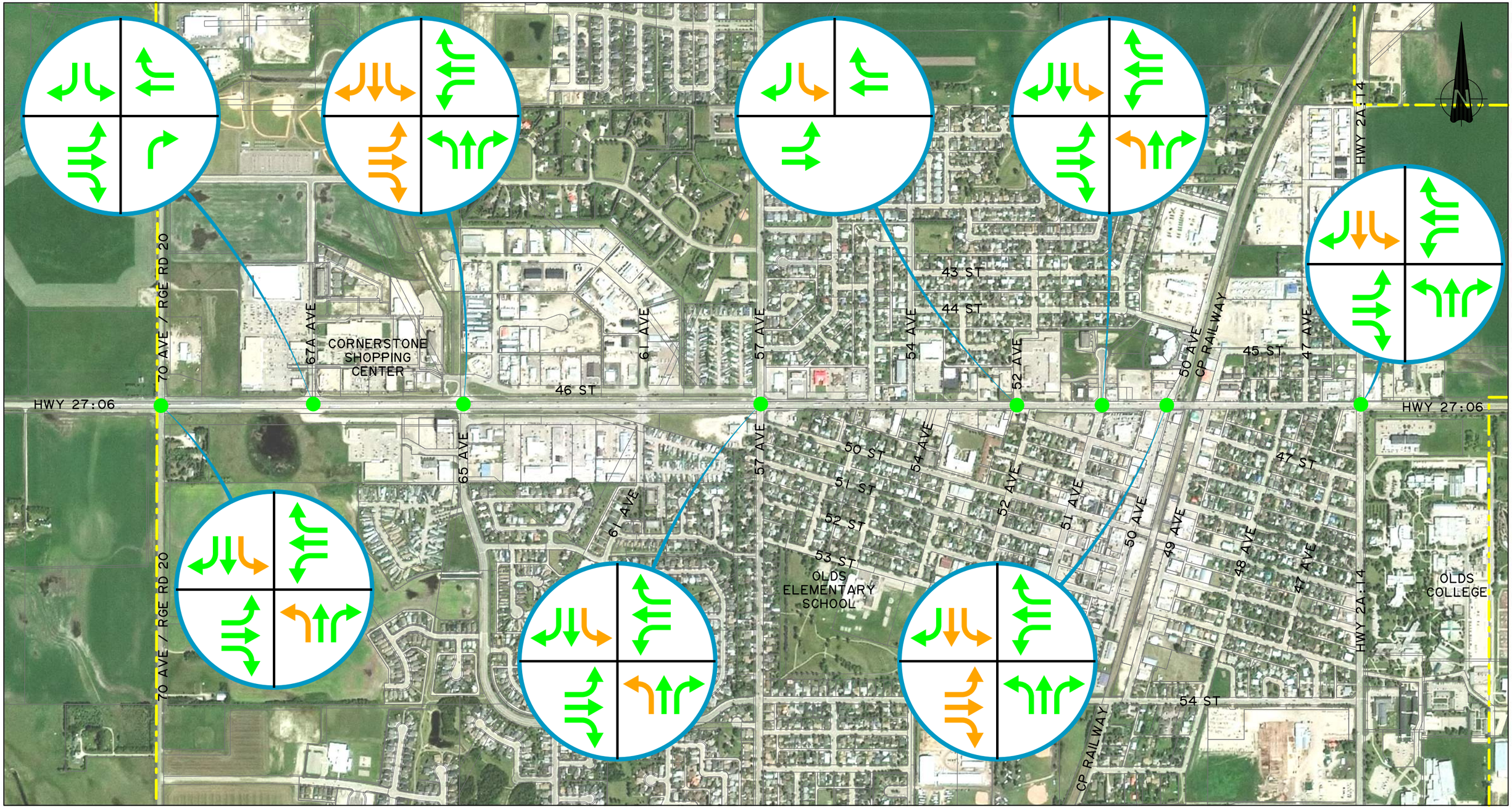
Alberta

FIGURE 8-7

Table 8.7 : Revised PM Peak Intersection Operations

Intersection	Measure of Effectiveness	Eastbound			Westbound			Northbound			Southbound			Overall
		LT	TH	RT	LT	TH	RT	LT	TH	RT	LT	TH	RT	
		L/T/TR			L/T/T/R			L/TR			L/TR			
HWY 27 and 70 Ave	Volume	10	230	10	60	370	20	10	10	40	30	10	10	810
	v/c Ratio	0.01	0.12		0.08	0.16	0.02	0.04	0.14		0.12	0.06		
	LOS	A	A		A	A	A	C	B		C	B		A
	Delay (s)	3.9	7.9		3.8	5.4	0.1	20.3	10.4		21.4	15.2		7.2
	95th % Queue (m)	1.6	15.2		5.6	23.0	0.3	4.8	9.1		9.8	6.2		
	Storage (m)	75	-		70	-	70	45	-		50	-		
		L/T/T/R			T/T/R			R			L/L/R			
HWY 27 and 67A Ave / Walmart Access	Volume	80	200	20		320	260			20	240		130	1270
	v/c Ratio	0.29	0.21	0.04		0.34	0.42			0.03	0.17		0.18	
	LOS	B	A	A		B	A			A	A		A	A
	Delay (s)	12.5	9.8	4.8		10.6	3.9			0.1	6.4		2.3	7.3
	95th % Queue (m)	11.0	9.8	2.7		15.0	9.9			0.0	8.8		5.4	
	Storage (m)	80	-	30		-	30			-	-		20	
		L/T/TR			L/T/T/R			LT/R			L/TR			
HWY 27 and 65 Ave	Volume	30	320	110	110	400	160	130	60	100	140	80	50	1690
	v/c Ratio	0.13	0.49		0.28	0.29	0.23	0.31		0.14	0.53	0.32		
	LOS	C	C		B	B	A	B		A	C	C		B
	Delay (s)	24.5	22.7		14.5	14.0	3.4	15.0		3.8	33.6	21.7		17.1
	95th % Queue (m)	11.6	45.4		21.3	33.3	10.6	35.7		8.7	40.1	29.7		
	Storage (m)	80	-		70	-	25	-		25	-	-		
		L/T/TR			L/T/TR			L/T/R			L/T/R			
HWY 27 and 57 Ave	Volume	80	470	130	90	490	80	130	90	70	90	80	70	1870
	v/c Ratio	0.14	0.43		0.17	0.36		0.44	0.21	0.16	0.32	0.19	0.16	
	LOS	A	B		A	B		C	B	A	C	B	A	B
	Delay (s)	6.0	13.9		6.1	12.8		24.5	19.6	4.0	22.0	19.3	4.0	13.7
	95th % Queue (m)	9.5	46.0		10.5	44.5		29.4	20.2	6.0	21.3	18.2	6.0	
	Storage (m)	90	-		30	-		20	-	10	20	-	-	

Intersection	Measure of Effectiveness	Eastbound			Westbound			Northbound			Southbound			Overall
		LT	TH	RT	LT	TH	RT	LT	TH	RT	LT	TH	RT	
		LT/T			T/T/R			-			L/R			
HWY 27 and 52 Ave	Volume	40	500			660	30				30		40	1300
	v/c Ratio	0.23				0.24	0.03				0.14		0.17	
	LOS	A				A	A				C		B	A
	Delay (s)	2.6				2.1	1.4				27.9		11.1	3.2
	95th % Queue (m)	16.0				19.2	2.5				11.3		8.2	
	Storage (m)	-				-	20				-		10	
		L/T/TR			L/T/TR			L/TR			L/TR			
HWY 27 and 51 Ave	Volume	10	480	60	30	550	20	50	10	20	10	10	10	1260
	v/c Ratio	0.02	0.20		0.05	0.21		0.26	0.12		0.07	0.08		
	LOS	A	A		A	A		C	B		C	B		A
	Delay (s)	2.8	2.3		2.2	1.8		29.9	16.1		26.6	19.0		4.0
	95th % Queue (m)	1.5	14.4		m2.0	12.8		16.1	8.3		5.5	7.1		
	Storage (m)	60	-		60	-		-	-		-	-		
		LT/TR			LT/TR			LT/R			LT/R			
HWY 27 and 50 Ave	Volume	30	400	60	70	450	70	130	60	70	80	60	40	1520
	v/c Ratio	0.57			0.44			0.41		0.12	0.65		0.11	
	LOS	C			B			B		A	D		A	B
	Delay (s)	21.5			12.3			17.3		3.0	42.5		0.6	18.0
	95th % Queue (m)	48.3			37.5			33.9		5.6	#48.5		0.0	
	Storage (m)	-			-			-		50	-		35	
		LT/TR			LT/TR			LT/R			LT/R			
HWY 27 and HWY 2A (46 Ave)	Volume	80	310	90	90	210	30	120	90	140	60	100	150	1470
	v/c Ratio	0.54			0.44			0.35		0.19	0.49		0.33	
	LOS	B			B			B		A	C		A	B
	Delay (s)	15.4			14.9			10.6		2.6	22.9		5.5	13.2
	95th % Queue (m)	38.1			27.4			30.8		8.4	35.3		12.3	
	Storage (m)	-			-		170	-		100	-		100	



CONSULTANT

CIMA+

PROJECT NO. CA000873.280

LEGEND

- TOWN OF OLDS BOUNDARY
- MOVEMENT LOS A-B OR V/C < 0.80
- MOVEMENT LOS C-D OR 0.80 < V/C < 0.89
- INTERSECTION LOS A-B
- INTERSECTION LOS C-D

SCALE 1:1000

REVISED MEASURES OF EFFECTIVENESS PM PEAK

HIGHWAY 27 TOWN OF OLDS OPERATIONAL REVIEW

REGION	LOCATION	DATE	DWN	CHK
CENTRAL	HWY 27:06 from km 36.490 to 39.715	07/04/2024	SD	PS

Alberta

FIGURE 8-8

9. Off-Peak Flashing Yellow Operations

As a means to improve progression along Highway 27 within the Town limits, the Town suggested that TEC consider off-peak (nighttime) flashing yellow operations at each of the signalized intersections. The Manual of Uniform Traffic Control Devices of Canada (MUTCDC) notes that vehicular and pedestrian traffic facing a Flashing Amber Ball Indication may proceed with caution, after yielding to vehicles and pedestrians lawfully within the intersection or road.

TEC's Recommended Practice for Beacons (under Traffic Signals guidelines) provides direction on the use of Flashing Amber Ball Indication specifically for warning and control beacons, but not for traffic signals. There are no other Recommended Practices for flashing amber balls. TEC does not permit Flashing Amber Ball Indication operations.

Other jurisdictions throughout North America still use flashing yellow operations at signalized intersections as part of typical traffic-calming toolbox measures; however, there are concerns with their use. Unlike a red signal, a flashing yellow does not necessarily confirm to a driver what direct action to take. Although a flashing yellow is to be treated as proceeding with caution after yielding, to slow down, and be especially alert to changing conditions, drivers facing such an indication can often interpret the signal as providing priority over other approach legs to an intersection when no pedestrians are observed at the intersection.

Use of flashing yellow operations has not been considered at any of the study signalized intersections.

10. Railway Pre-emption Considerations at 50 Avenue

The intersection of Highway 27 and 50 Avenue is located immediately west of an at-grade rail crossing, which results in the potential for queues of vehicles to back up over the tracks. This crossing falls under the Canadian Pacific Kansas City (CPKC) railway's jurisdiction. This crossing is located on the Red Deer subdivision at mile 56.72. Due to the proximity of the crossing and signalized 50 Avenue intersection, interconnection between the rail warning system and the traffic signal controller, and the use of traffic signal pre-emption timings at the traffic signal have been reviewed to identify any recommended improvements.

Correspondence from CPKC was received as part of identifying the appropriate improvements and signal timing adjustments. The existing timings suggest that the existing operations of the rail pre-emption at the 50 Avenue intersection does not meet today's standards. More specifically, additional pre-emption time may be needed to account for the controller response time, full minimum green and pedestrian clearance intervals, design vehicle characteristics (i.e., sizes) and acceleration profiles, and (industry standard) buffer times.

Review of the existing timing and identification of improvements followed the guidelines and standards contained in the following references:

+ Grade Crossings Regulations, Transport Canada
+ Grade Crossings Standards, Transport Canada
+ Worksheet for Determining Time Requirements for Traffic Signal Pre-emption at Highway-Rail Grade Crossings, Texas Department of Transportation, March 2009

Details of the input parameters and analyses completed to determine the adequacy of the existing timings and findings are included in **Appendix H**. The analyses and findings indicated that an advanced pre-emption time of 25 seconds in addition to the existing 20 seconds of minimum warning time be considered at this crossing. To avoid a pre-empt trap, a gates down signal should be issued by the rail warning system to the traffic signal controller, and that the track clearance phase does not terminate until this second signal is received. A traffic signal health indication from the traffic signal controller to the rail warning system should also be considered.

These findings were presented to CPKC in March 2024. At the time of presenting the findings, CPKC was in the process of designing upgrades to the Red Deer subdivision. The details of these upgrades were not shared with CIMA+, but the following responses were:

+ Currently, existing crossing warning system is interconnected to the traffic signals.
+ The current interconnection is simultaneous, so it does not provide any advance pre-emption timing.
+ The existing crossing equipment is not capable of providing advanced pre-emption time requiring that equipment upgrades be implemented.
+ If this project will move forward, CPKC would have to provide a cost estimate for approval and would require a PO or signed agreement prior to starting any work.

In order for CPKC to consider pre-emption adjustments within their designed upgrades, CPKC requested that the timing be confirmed, as well as an agreement be entered into with TEC to define associated costs and to assign those costs to the appropriate party. As the timing to implement the pre-emption had not been established, these could not be accommodated within CPKC's current design upgrades and will need to be completed independent of these. CPKC did not respond to CIMA's request to provide a rough indication as to the nature and magnitude of the required improvements and associated costs. Details of the correspondence between CIMA+ and CPKC are also included in **Appendix H**.

11. Highway 27 Recommendations

The overall recommendation from the capacity review is to update signal timings for all eight signalized intersections and improve coordination of the signals between 50 Avenue and 52 Avenue. Separate signal timings for morning/off-peak and afternoon periods have been developed. Coordination is also considered to benefit the safety performance of the corridor by improving the progression of vehicles through the Town and reducing the potential of rear-end conflicts.

Location specific intersection recommendations include:

70 Avenue

- Continue to monitor the safety performance at this intersection, specifically the influence of the installation of traffic signals, and the development of any associated trends.
- Work with the Town to implement any desired pedestrian facilities and the associated timing. Install pedestrian call buttons and revise the pedestrian signal timing to require activation of the east-west walk phases, given the lack of desire lines and anticipated pedestrian use.
  - Alternatively, remove the walk phase and cover up the pedestrian signal heads.
- Revise the traffic control signs and pavement markings to indicate appropriate shared lane use.
- Enhanced pavement markings could be considered to reduce the frequency of wear. Repaint worn pavement markings as part of regular maintenance activities.
- Consider minor widening to address the off-tracking observed in three of the four corners. There does not appear to be any urgency associated with this, which could be completed as part of a future rehabilitation of either corridor.
- Revise the signal timing.
- Conduct the following signal infrastructure updates:
  - Reorganize the wiring within the traffic control cabinet.
  - Consider raising the cabinet foundation (found to be lower than current specification).
  - Repair or replace the vehicle detector for westbound traffic.
  - Consider providing longer camera mounting extensions to improve detector accuracy.
  - Follow up with the construction contractor to confirm whether the northwest pole base meets current specifications and determine an appropriate course of action if not.
  - Improve the junction boxes to be flush with grade, where required.
  - Replace the eastbound Prepare To Stop sign and repair the exposed wiring.
  - Install a lock on the power distribution centre (PDC) and traffic control cabinet.

67A Avenue / Walmart Access

- Continue to monitor the recurrence of rear-end collisions, specifically in the southbound to westbound right turn lane. Should a trend in collisions be observed, consider the benefit to converting the right turn to a smart right that enhances the yield operation and placement of the Yield sign, or the benefit to creating a merge operation and need to extend the return taper accordingly.
- Continue to monitor the recurrence of right angle collisions, and the possibility that the installation of signals at the downstream 70 Avenue intersection may have assisted to reduce conflicts at 67A Avenue / Walmart Access.
- Until the development accessing the south leg requires that the intersection support all turning movements, consider closing the northbound to eastbound right turn lane to mitigate the potential for any conflicts associated with the incorrect use of this lane.
- Reconfigure the southbound approach of the north leg to support a dual left operation. Sign and mark this movement appropriately to supplement the current traffic control devices facing southbound vehicles.
- As part of supporting the future development and opening of the south leg to all turning movements, ensure that the existing south service road is closed and the internal road connection is established at a desirable spacing from Highway 27, as appears to be proposed with the current development plan. Appropriate approach and departure tapers, as well as channelization should be reviewed to enhance turning movements and traffic control requirements. Update the traffic control (i.e., lane designation signs, pavement markings etc.) on this approach accordingly.
- Revise the signal timing, incorporating a southbound dual left turn movement and eliminating the pedestrian walk phase recall.
- Conduct the following signal infrastructure updates:
  - Replace existing controller.
  - Repair or replace the Terra Interface Panel (video detection).
  - Replace the broken southbound overhead 3-section signal head.
  - Provide a coating for or replace the pedestrian head enclosures.
  - Install a lock on the PDC and traffic control cabinet.

65 Avenue

- Install roadside Pedestrian Crosswalk signs within the channelized right turn areas (northeast and northwest quadrants) to enhance the crosswalks.
- Enhance the traffic control to confirm the appropriate movements from each approach lane on the south leg. The south approach operates as a through-left turn lane, and separate right turn lane. These enhancements include lane lines, painted arrows, and the addition of a Right Turn Only (RB-41R) sign.
- Consider narrowing the effective driving width of the south approach. This could be achieved with the following options:
  - A painted buffer between the approach lanes or adjacent to the outside curb
  - Installing delineators adjacent to the outside curb

  - Installing a low profile (mountable) concrete apron adjacent to the outside curb
+ Consider extending the median island on the south leg through the adjacent service road intersection to create a right-in/right-out only operation. There were no operational or safety concerns observed from within the data, however, the intent is to eliminate future concerns as development growth continues and traffic volumes increase creating additional conflicts due to the close proximity to Highway 27. A right-in/right-out operation aligns with the 2009 planning study recommendations.
+ Revise the pedestrian pushbutton location in the southwest corner to improve accessibility, particularly for individuals with mobility challenges.
+ Remove the redundant drop curb in the southeast quadrant within the boulevard space.
+ Relocate the Yield sign in the northwest corner to improve the visibility for approaching drivers. Consider enhancing with supplementary Yield pavement markings.
+ Revise the signal timing.
+ Conduct the following signal infrastructure updates:
  - Replace existing controller.
  - Replace the broken southbound overhead 3-section signal head.
  - Replace the bimodal inserts for the pedestrian countdown timers in the southwest and northwest corners.
  - Replace the pedestrian pushbutton in the northwest corner.
  - Install a lock on the PDC and traffic control cabinet.
  - Undertake a structural review and measure clearances associated with the westbound lane cantilever pole.

57 Avenue

+ Consider provision of an eastbound right turn bay that minimizes spillback onto Highway 27 and off-tracking.
+ Maintain the existing lane configuration in the westbound direction due to adjacent constraints restricting the ability to construct a right turn bay. Continue to monitor queue spillback effects in the westbound direction.
+ Provide dedicated northbound left and southbound left turn lanes (non-offset), combining the through and right turn movements together in the second lane, install lane designation signs.
+ Due to the proximity of the commercial access in the southwest quadrant, consider the feasibility of closing this access and providing access from the west via 61 Avenue. Enhancements to the service road intersection at 61 Avenue may be required to ensure adequate sight lines are established for a new connection to this intersection. Alternatively, consider relocating the access on 57 Avenue as per the 2009 planning study.
+ Explore the possibility of introducing a left turn restriction from 57 Avenue to 50 Street during peak periods to avoid intersection spillback and blockages. A similar consideration should be given at the north service road intersection to restrict northbound to westbound left turn movements during peak periods. The Town noted challenges associated with enforcing such restrictions; however, such restrictions may discourage some drivers from completing left turns during peak periods and reducing current conflicts. A median along 57 Avenue, past

the 46 Street and 50 Street connections, preventing left turn lanes could be considered if the changes to laning and restricting left turns are not effective in alleviating operational issues.

+ Consider narrowing the effective driving width of the north approach as an interim measure until the ultimate closure of the north service road can be completed, as per the 2009 planning study. This narrowing could be achieved with the following options:
  - A painted buffer between the approach lanes or adjacent to the outside curb
  - Installing delineators adjacent to the outside curb
  - Installing a low profile (mountable) concrete apron adjacent to the outside curb
+ In conjunction with narrowing of the north approach, relocate the crosswalk over the north service road to align better with the west sidewalk, and move the stop line and STOP sign closer to the southbound travel lane eliminating sight lane restrictions.
+ Introduce permanent access closures in the northeast and southeast quadrants by re-establishing barrier curbs and boulevard spaces.
+ Consider installing a second overhead signal head on both approaches along Highway 27 over the through lanes to reduce any confusion caused by the recent introduction of the vertical heads.
+ Revise the placement of the pedestrian pushbuttons within the islands to better align with accessibility and crosswalk movement expectations. Install pushbutton signs to guide users.
+ The Town has proposed upgrades the pedestrian ramps in all quadrants. Continue to work with the Town to ensure all desired improvements are implemented and do not present any compounding issues.
+ Revise the signal timing and introduce 5 s Leading Pedestrian Intervals (LPI) to provide vulnerable road users with a head start while crossing Highway 27.
+ Conduct the following signal infrastructure updates:
  - Replace existing controller.
  - Replace all failed detectors with video detection.
  - Replace standard signal heads and backboards.
  - Adjust the cantilevered westbound overhead signal and tighten mounting hardware.
  - Add directions signs below the pedestrian pushbuttons.

52 Avenue

+ Consider restricting movements on the south leg to allow access into the development area, but not departing it. This will eliminate any northbound left or through movements that could conflict with movements when Highway 27 traffic has right-of-way. This also justifies the lack of traffic control for this approach. Egress from the south side developments can occur at downstream driveways that are well established, obvious, and meet driver expectations.
+ To support the potential of inbound movements to the south side developments opposite 52 Avenue, consider the provision of painted arrows and lane designation signs that advise all approaching drivers of the potential for westbound left turns and eastbound right turns to occur at this intersection.
+ Consider installing a low profile barrier system that seeks to heighten the awareness of the south leg, and its offset position to 52 Avenue (north leg). This system could include a low

tension cable observed over the previously closed 52 Avenue south leg to the east of the developments. Drivers typically expect opposing legs to be aligned, and may anticipate access to the south leg to be directly under the overhead signal head that controls the north leg. The offset driveway location may be confusing since it is placed between the overhead signal pole and adjacent crosswalk. The placement of delineators at the actual driveway location may enhance the access and avoid any conflicts with the barrier curb underneath the overhead signal head.

+ A long-term plan to close the south side driveway should be discussed with the Town, such that when an opportunity arises to direct development and alley traffic to an adjacent approach, this can be implemented with minimal delay. This may require the Town to purchase the development property and convert the parking area to a public frontage road right-of-way, to subdivide the parcel, and establish parking elsewhere based on desired land use options. Closing this alley entrance/access is consistent with the 2009 plan.
+ Adjust the signal head alignment of the overhead signals facing westbound vehicles.
+ Install reflective sheeting to the signal head backplate, specifically to the head facing westbound vehicles.
+ Establish a defined sidewalk adjacent to the eastbound curb along Highway 27 that supports desired pedestrian access between the south leg of 52 Avenue and the west leg crosswalk. The defined sidewalk should establish a buffer from the parking area such that parked vehicles do not overhang into the sidewalk reducing the effective pedestrian space. This sidewalk should extend over the south driveway/alley signifying pedestrian priority over vehicle traffic.
+ Formalize the pedestrian refuge area adjacent to the pedestrian pushbutton in the southwest quadrant. This should be done in conjunction with the sidewalk development. Install pedestrian signage that directs users to cross at the west leg since the south side pedestrian facilities are discontinuous at this location.
+ Consider raising the height of the pedestrian signal and Maximum Speed sign in the northwest corner to meet typical placement requirements, maintaining consistency with other locations along the study corridor.
+ Relocate the Signals Ahead sign facing westbound vehicle closer to the intersection. Its currently location is approximately 130m to the east of the intersection and is inconspicuous due to adjacent development distractions.
+ Revise the signal timing and coordinate signals with 51 Avenue and 50 Avenue.
+ Conduct the following signal infrastructure updates:
  - Replace the existing controller.
  - Install a GPS timeclock for coordination.
  - Replace signal heads, door, and backboards.
  - Replace the pedestrian signal in the northeast corner.
  - Rebuild the traffic signal system – ultimate upgrade.
  - Review detection settings and zones on the north leg to address activation issues.

51 Avenue

- Install lane lines on the north leg that supplement the left turn arrows and overhead lane designation signs. These markings include a single yellow centreline and dashed lane lines, similar to the south leg.
- Encourage the Town and property owners in the north quadrants, to establish a mean of traffic control that limits the ability of a vehicle to travel over the rolled curb within the intersection area, and that requires vehicles to access the developments at the established driveways from 51 Avenue. This could include the use of additional parking stops/curbs, raised planters, or other means to define the sidewalk space from the parking/driveway areas.
- Consider reducing the effective driving width of the south approach and impact of the skew in the southwest corner by installing a low profile (mountable) concrete apron adjacent to the outside curb. This should be done in conjunction with improvements to the crosswalk over the south leg.
- Realign the sidewalk along the south side of Highway 27 to eliminate the curved approaches improving the accessibly for mobility challenged users. This allows the crosswalk markings to be revised removing the awkward alignment in the southwest corner and shifting the south leg crosswalk away from the outside eastbound lane. The drop curbs in the southeast and southwest corners should be extended to accommodate the sidewalk and crosswalk adjustments.
- Consider implementing a northbound left turn stop line setback that reduces the sight line restrictions for vehicles turning right when the left turn lane is occupied. This also reduces crosswalk encroachment from vehicles stopping for the red signal on the south leg.
- Revise the signal timing and coordinate signals with 52 Avenue and 50 Avenue.
- Replace the 4 phase signal heads with 3 phase signal heads since there are no protected left turns at this intersection – OPTIONAL *(this may be contingent on future development plans that may require revisiting the timing plan closer to construction, and a desire to introduce dedicated left turn phasing)*
- Conduct the following signal infrastructure updates:
  - Install a GPS timeclock for coordination.
  - Replace the pedestrian countdown timer in the southwest corner.

50 Avenue

- The sidewalk in the southwest corner is discontinuous due to the adjacent commercial property. Consideration should be given to establishing a defined sidewalk adjacent to the eastbound curb along Highway 27 that supports desired pedestrian access through this commercial property. The defined sidewalk should establish a buffer from the driveway/ parking area on the north side of the existing building such that vehicles do not impact pedestrian use. This sidewalk should extend over the south alley signifying pedestrian priority over vehicle traffic.
- Encourage the Town and property owner in the southwest quadrant, to establish a means of traffic control that limits the ability of a vehicle to travel through and over the barrier curb within the intersection area, and that requires vehicles to access the developments at the defined driveway locations on Highway 27 and 50 Avenue. This could include the use of

parking stops/curbs, raised planters, or other means to define the sidewalk space from the parking/driveway areas.

+ Implement stricter access management control to reduce driveways onto Highway 27, such as the drop curb in the southwest corner immediately west of 50 Avenue. Determine the ability to reduce driveways along the west leg of Highway 27 by establishing front and/or backside connections between the north side parcels.
+ Install overhead lane designation signs to provide notification of the shared use lanes, increasing awareness of competing turning movements.
+ Consider installing a Yield Ahead sign on the overhead power pole facing westbound vehicles on the approach to the channelized right turn lane. This should be accompanied by a Next Right tab (RB-75-TR) or equivalent.
+ Consider installing a Yield sign on the roadside of the channelized westbound to northbound right turn lane to supplement and validate the signs in the channelized island.
+ Consider placing the Yield sign mounted on the signal pole within the channelized island on a separate pole at the physical end of the island to reduce confusion of its current intent. Replace the non-standard arrow with a convention arrow (appropriate option from IB-5 to IB-9), based on final placement of the separate pole.
+ Continue to undertake tree and vegetation clearing to enhance the visibility of the signs associated with the westbound right turn movement.
+ The Town has proposed upgrades the pedestrian ramps in the northeast quadrant. Continue to work with the Town to ensure all desired improvements are implemented and do not present any compounding issues.
+ Revise the signal timing and coordinate signals with 52 Avenue and 51 Avenue.
+ Conduct the following signal infrastructure updates:
  - Replace existing controller.
  - Install a GPS timeclock for coordination.
  - Replace the pedestrian countdown timer in the southeast corner.
  - Replace the signs below the pushbuttons.
+ Implement the following railway pre-emption considerations through continued discussion with CPKC:
  - An advanced pre-emption time of 25 seconds in addition to the existing 20 seconds of minimum warning time.
  - To avoid a pre-empt trap, a gates down signal should be issued by the rail warning system to the traffic signal controller.
  - A traffic signal health indication from the traffic signal controller to the rail warning system should also be considered.

Highway 2A (46 Avenue)

+ The addition of dedicated left and right turn lanes will help to improve the safety and operation of the intersection for those legs to which these lanes are implemented. The existing right-of-way and surrounding development prohibits the ability to add dedicated lanes at this time. As opportunities arise to acquire lands that support dedicated lanes, the movements of greatest

concern at this time benefiting from dedicated lanes include the eastbound and northbound left turns, and eastbound and southbound right turns. In the meantime, continue to monitor traffic growth and collision patterns to determine whether improvements to the signal timing are able to manage growth and reduce collision frequency and severity.

+ Continue to monitor vehicles stopping in the hatched areas and swept path conflicts. Should these conflicts continue modifications to the signal timings may be required to lengthen clearance intervals, which would likely increase vehicle delays. The addition of non-typical signage to increase awareness for the purpose of the hatched areas on each leg may be required, e.g., do not stop in hatched area. Alternatively, the hatched areas could be removed if a lack of adherence continues, with short areas of mountable curb provided in each quadrant that would allow larger vehicles to off-track and not encroach into the opposing lane. This would impact adjacent sidewalks requiring their modification.
+ As part of future development permit applications associated with redevelopment of the southwest quadrant, establish access control that restricts driveway access to the adjacent alley on Highway 27 and as far south within the property as possible on Highway 2A (46 Avenue).
+ There are five accesses into the Petro-Canada commercial area in the northeast quadrant, with significant off-tracking observed on Highway 27 and a lack of definition for those on Highway 2A (46 Avenue). Work with the owner to consolidate and establish better control and circulation of accesses. This may require the use of barriers, raised planters, or other means to define the driveway areas, that could also support creation of pedestrian space on the east side of the north leg, if desirable.
+ Continue to monitor queue spillback through upstream intersections. Consider implementing measures such as installing signage or pavement markings that discourage vehicles from blocking accesses when queues form.
+ Consider installing ground mounted lane designation signs to supplement the overhead signs, in advance that drivers can select their desired lane adequately.
+ Improve current pedestrian facilities by installing accessible curb ramps and refuge areas in all quadrants. These improvements should align with pedestrian desire lines and crosswalk markings to direct pedestrians appropriately on approach and through the intersection.
+ Revise the signal timing using permissive left turns for east and west approaches.
+ Conduct the following signal infrastructure updates:
  - Replace existing controller.
  - Add an Uninterruptible Power Supply (UPS) battery backup system with separate enclosure and metered.
  - Apply cold galvanizing spray paint to prevent corrosion of the poles in the northeast, northwest, and southeast corners.
  - Replace all pushbuttons with solid state type.
  - Replace the beacons for the overhead Prepare To Stop sign.
  - Install a handhole cover on the overhead Prepare To Stop sign pole.
  - Rebuild the traffic signal system – ultimate upgrade.

General / Other Locations

- Continue to work with the Town to implement appropriate measures that provides additional guidance to pedestrians supporting desired access to the pathway network, and/or to eliminate gaps and improve mobility along the Highway 27 corridor.
- Continue to work with the Town to implement stricter access controls, closing redundant driveways and establishing right-in/right-out operations to minimize future conflicts. Identify appropriate options that encourage and allow left turn movements to be directed to downstream accesses that accommodate these desired movements. Where possible, providing shared back access and establishing connections between adjoining parcels should be considered.
- Enhance the right-in/right-out only operation of the commercial driveway west of 46 Avenue. Measures to do so include installing a No Left Turn sign facing eastbound drivers, and extending the channelized island (or use of delineators) to better define the right-in and right-out travel paths.

12. Implementation Plan and Cost Estimate

For each of the recommendations (or groups of recommendations) presented in **Section 11**, a relative order of prioritization and associated costs by intersection is listed in Table 12.1 for TEC's consideration. The prioritization includes four discrete levels, namely:

- Short-term – can largely be implemented as part of regular maintenance activities.
- Priority 1 – first stage of improvements that will require capital funding and programming.
- Priority 2 – second stage of improvements that will also require capital funding and programming, but either requires Priority 1 improvements to be in place first, or there is less urgency to implement right away.
- Continued monitoring/Next step – is a longer-term improvement that will need additional coordination with internal resources and/or the Town to determine feasibility (is complementary with future upgrade plans through the Town), or requires additional attention by TEC to determine a sustained need to implement improvements.

The associated cost estimates are based on TEC's recent unit price averages reports as well as practical experience from the completion of several similar planning studies within Central Region. Those improvements requiring capital expenditures assume a 30% contingency to account for many unknown conditions. The party responsible for implementation of these recommendations and costs has not been identified as several may require shared responsibility.

Costs listed as 'N/A' in **Table 12.1** assume that these will be completed by internal TEC resources, borne under existing contractual budgets, or are unknown for the purposes of this study.

Table 12.1 : Implementation Plan

Improvement	Priority	Estimated Cost
70 Avenue Intersection		
Revise the pedestrian signal timing to require activation of the east-west walk phases OR remove the walk phase	Short-term	N/A
Revise the traffic control devices to indicate appropriate shared lane use	Short-term	$3,500
Enhance & repaint pavement markings	Short-term	$6,500
Revise signal timing	Priority 1	N/A
Undertake required signal maintenance [1]	Priority 1	$21,100
Grade widen to correct off-tracking in the northwest, northeast and southeast corners	Priority 2	***$45,000***
Monitor the safety performance, specifically the influence of the recently installed traffic signals Investigate measures if trends develop	Continued Monitoring	N/A
Work with the Town to implement any desired pedestrian facilities	Next Step	N/A
67A Avenue / Walmart Access Intersection		
Close the northbound to eastbound right turn lane to mitigate potential conflicts with incorrect lane use	Short-term	$18,000
Reconfigure the southbound approach of the north leg to support a dual left operation – signing and marking	Short-term	$2,000
Revise the signal timing to incorporate a southbound dual left turn movement and eliminate the pedestrian walk phase recall.	Short-term	N/A
Revise signal timing	Priority 1	N/A
Undertake required signal maintenance	Priority 1	$11,470
Close the south service road as part of redeveloping the surrounding lands and establish desired internal road connections and spacing from Highway 27	Priority 2	***$20,000***
• Provide appropriate tapers and channelization	Priority 2	***$200,000***
• Update the traffic control (i.e., lane designation signs, pavement markings etc.) on this approach accordingly	Priority 2	***$6,500***
Monitor rear-end collisions, specifically in the southbound to westbound right turn lane	Continued Monitoring	N/A
• Consider converting the right turn into a smart right to enhance the yield operation or create a merge operation	Next Step	***$30,000***
Monitor right angle collisions, specifically any benefit from the downstream signals at 70 Avenue	Continued Monitoring	N/A

Improvement	Priority	Estimated Cost
65 Avenue Intersection		
Install roadside Pedestrian Crosswalk signs within the channelized lanes	Short-term	$650
Install appropriate lane designation signs and arrows, and lane lines on the south leg approach	Short-term	$2,000
Revise the pushbutton location in the southwest corner to improve accessibility	Short-term	$8,500
Relocate the Yield sign in the northwest corner	Short-term	$400
Narrow the effective driving width of the south approach *(assumes installing a low profile/mountable concrete apron)* [2]	Priority 1	***$19,000***
Revise signal timing	Priority 1	N/A
Undertake required signal maintenance	Priority 1	$12,090
Extend the median island on the south leg through the adjacent service road intersection to create a right-in/right-out only operation	Priority 2	***$11,500***
Remove the redundant drop curb in the southeast quadrant	Priority 2	***$3,000***
57 Avenue Intersection		
Introduce left turn restrictions from 57 Avenue to 50 Street and the north service road during peak periods	Short-term	$2,000
Revise the pushbutton locations in the channelized islands Alternatively: *install pushbuttons for east/west progression if pedestrian recall removal is desirable*	Short-term	$2,500
Narrow the effective driving width of the north approach *(assumes installing a low profile/mountable concrete apron)* [2]	Priority 1	***$37,500***
Relocate the crosswalk over the north service road, and move the stop line and STOP sign closer to the southbound travel lane	Priority 1	***$2.000***
Install a second overhead signal head on both approaches along Highway 27 over the through lanes	Priority 1	$4,200
Provide dedicated northbound left and southbound left turn lanes, install lane designation signs.	Priority 1	$5,000
Revise signal timing	Priority 1	N/A
Undertake required signal maintenance	Priority 1	$44,620
Consider provision of an eastbound right turn bay	Priority 2	***$110,000***
Review the feasibility of closing the commercial access in the southwest quadrant and provide access from the west via 61 Avenue [3]	Priority 2	***$20,000***
Introduce permanent access closures in the northeast and southeast quadrants – re-establish barrier curbs and boulevard spaces	Priority 2	***$30,000***

Improvement	Priority	Estimated Cost
Monitor queue spillback effects in the westbound direction	Continued Monitoring	N/A
Continue to work with the Town to ensure all proposed pedestrian ramp upgrades are implemented and do not present any compounding issues	Next Steps	N/A
52 Avenue Intersection		
Restrict movements on the south leg that allow access into the development area only	Short-term	$2,000
Install painted arrows and lane designation signs advising of the potential for westbound left turns and eastbound right turns	Short-term	$3,500
Raise the height of the pedestrian signal and Maximum Speed sign in the northwest corner	Short-term	N/A
Relocate the Signals Ahead sign facing westbound vehicle closer to the intersection	Short-term	$400
Install a low profile barrier system and delineators that define the south driveway/alley location	Priority 1	***$13,000***
Revise signal timing	Priority 1	N/A
Undertake required signal maintenance	Priority 1	$16,720
Full rebuild of the traffic control system	Priority 2	***$270,000***
Establish a defined sidewalk adjacent to the eastbound curb supporting pedestrian access between the south leg and the west leg crosswalk	Priority 2	***$25,000***
Formalize the pedestrian refuge area adjacent to the pedestrian pushbutton in the southwest quadrant	Priority 2	***$5,000***
Establish a long-term plan to close the south side driveway through discussion with the Town	Next Step	N/A
51 Avenue Intersection		
Install lane lines on the north leg	Short-term	**$500**
Implement a northbound left turn stop line setback	Short-term	**$1,000**
Reduce the effective driving width of the south approach & skew impact by installing a low profile/mountable concrete apron	Priority 1	***$10,000***
Realign the sidewalk along the south side of Highway 27, revise the south leg crosswalk markings, & extend the drop curbs	Priority 1	***$17,000***
Revise signal timing	Priority 1	N/A
Replace the 4 phase signal heads with 3 phase signal heads – no protected left turn requirements	Priority 1	OPTIONAL
Undertake required signal maintenance	Priority 1	$1,900
Work with the Town & property owners to limit the ability of a vehicle to travel over the rolled curb within the intersection area	Next Step	N/A

Improvement	Priority	Estimated Cost
50 Avenue Intersection		
Install overhead lane designation signs to provide notification of the shared use lanes	Short-term	$3,500
Consider installing a Yield Ahead sign facing westbound vehicles accompanied by a Next Right tab (RB-75-TR) or equivalent	Short-term	$650
Install a Yield sign on the roadside of the westbound right turn lane	Short-term	$350
Consider placing the pole mounted Yield sign on a separate pole at the physical end of the island, & replace the non-standard arrow	Short-term	$400
Continue to clear tree and vegetation to enhance visibility of the signs associated with the westbound right turn	Short-term	N/A
Revise signal timing	Priority 1	N/A
Undertake required signal maintenance	Priority 1	$9,020
Establish a defined sidewalk adjacent to the eastbound curb in the southwest corner	Priority 2	***$22,000***
Implement stricter access management control to reduce driveways onto Highway 27 – establish front and/or backside connections between the north side parcels	Next Step	N/A
Work with the Town & property owner to limit the ability of a vehicle to travel over the barrier curb within the intersection area	Next Step	N/A
Continue to work with the Town to ensure the proposed pedestrian ramp upgrades are implemented and do not present any compounding issues	Next Step	N/A
Implement an advanced railway pre-emption time of 25 seconds, a gates down signal, and a traffic signal health indicator	Next Step	To be determined by CPKC
Highway 2A (46 Avenue) Intersection		
Implement measures such as signage or pavement markings that discourage vehicles from blocking upstream accesses	Short-term	$5,000
Install ground mounted lane designation signs to supplement the overhead signs	Short-term	$1,500
Install accessible curb ramps and refuge areas in all quadrants	Priority 1	***$24,000***
Revise signal timing	Priority 1	N/A
Undertake required signal maintenance	Priority 1	$33,260
Full rebuild of the traffic control system	Priority 2	***$350,000***
Monitor traffic growth and collision patterns to confirm the need/benefit to implementing dedicated turn lane phasing	Continued Monitoring	N/A

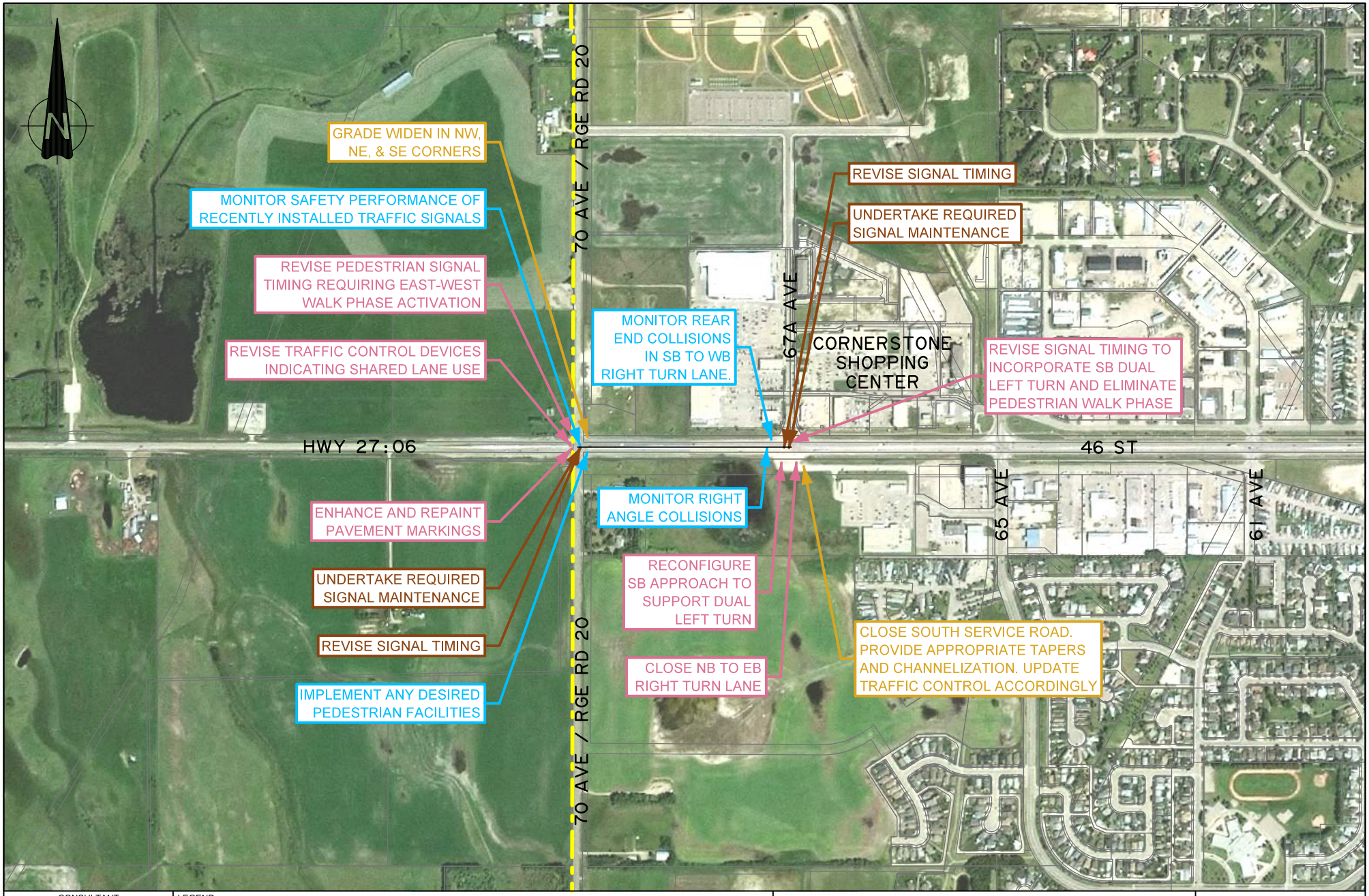
Improvement	Priority	Estimated Cost
Monitor vehicles stopping in the hatched areas and swept path conflicts	Continued Monitoring	N/A
• Provide short areas of mountable curb & modify sidewalk areas as needed	Next Step	***$60,000***
Establish access control associated with redevelopment of the southwest quadrant	Next Step	N/A
Work with the owner of the northeast quadrant to consolidate and establish better control and circulation of accesses	Next Step	N/A
General / Other Recommendations		
Install a No Left Turn sign along the eastbound approach to the commercial driveway west of Highway 2A (46 Avenue)	Short-term	$350
Enhance the right-in/right-out channelized island operation at the commercial driveway west of Highway 2A (46 Avenue) – install flexible delineators	Short-term	$1,000
Work with the Town to implement appropriate measures – pedestrian guidance & eliminate gaps	Next Step	N/A
Work with the Town to implement stricter access controls, closing redundant driveways and establishing right-in/right-out operations	Next Step	N/A

Note: 1 – estimate from similar corridor operational reviews

2 – as there are a few possible options available for consideration, the most cost conservative option has been included

3 – assumes access closure on 57 Avenue with revised access provided from 61 Avenue (actual scope to be determined by others).

SUMMARY OF CORRIDOR IMPROVEMENTS	
Total Estimated Costs	**$1,554,800**
Contingency – 30% (on ***$1,335,500 – capital costs only***)	**$400,650**
Engineering – 10%	**$133,550**
Grand Total Estimated Cost	**$2,089,000**



CONSULTANT

CIMA+

PROJECT NO. CA000873.280

LEGEND

TOWN OF OLDS BOUNDARY

PRIORITY 1

PRIORITY 2

NEXT STEP

SHORT TERM PRIORITY

SCALE 1:1000

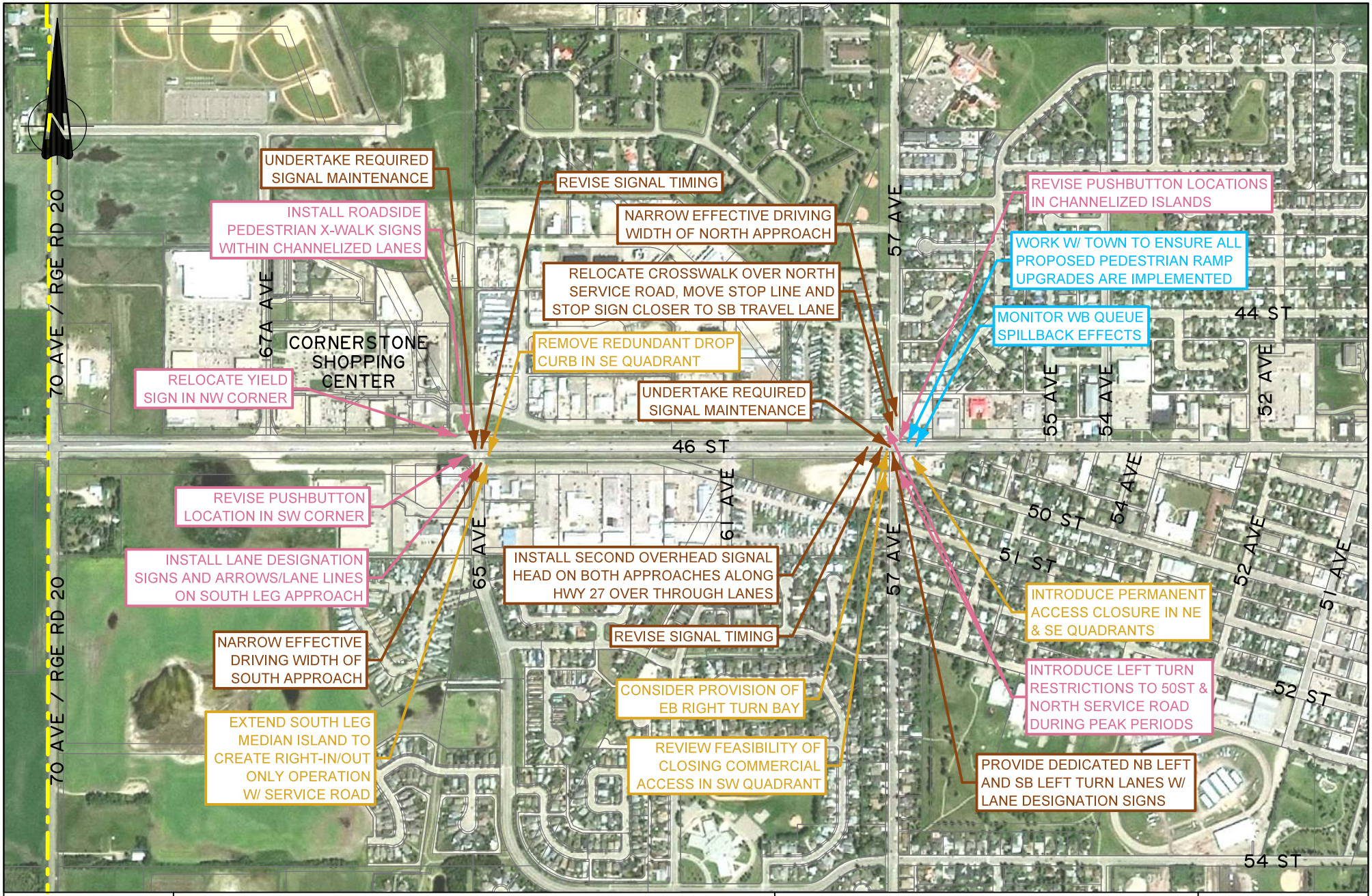
IMPLEMENTATION PLAN

70 AVE & 67A AVE/WALMART ACCESS INTERSECTIONS
HIGHWAY 27 TOWN OF OLDS
OPERATIONAL REVIEW

REGION	LOCATION	DATE	DWN	CHK
CENTRAL	HWY 27:06 from km 36.490 to 39.715	06/17/2024	SD	PS

Alberta

FIGURE 12-1



CONSULTANT

CIMA+

PROJECT NO. CA000873.280

LEGEND

- TOWN OF OLDS BOUNDARY
- PRIORITY 1
- PRIORITY 2
- NEXT STEP
- SHORT TERM PRIORITY

SCALE 1:1000

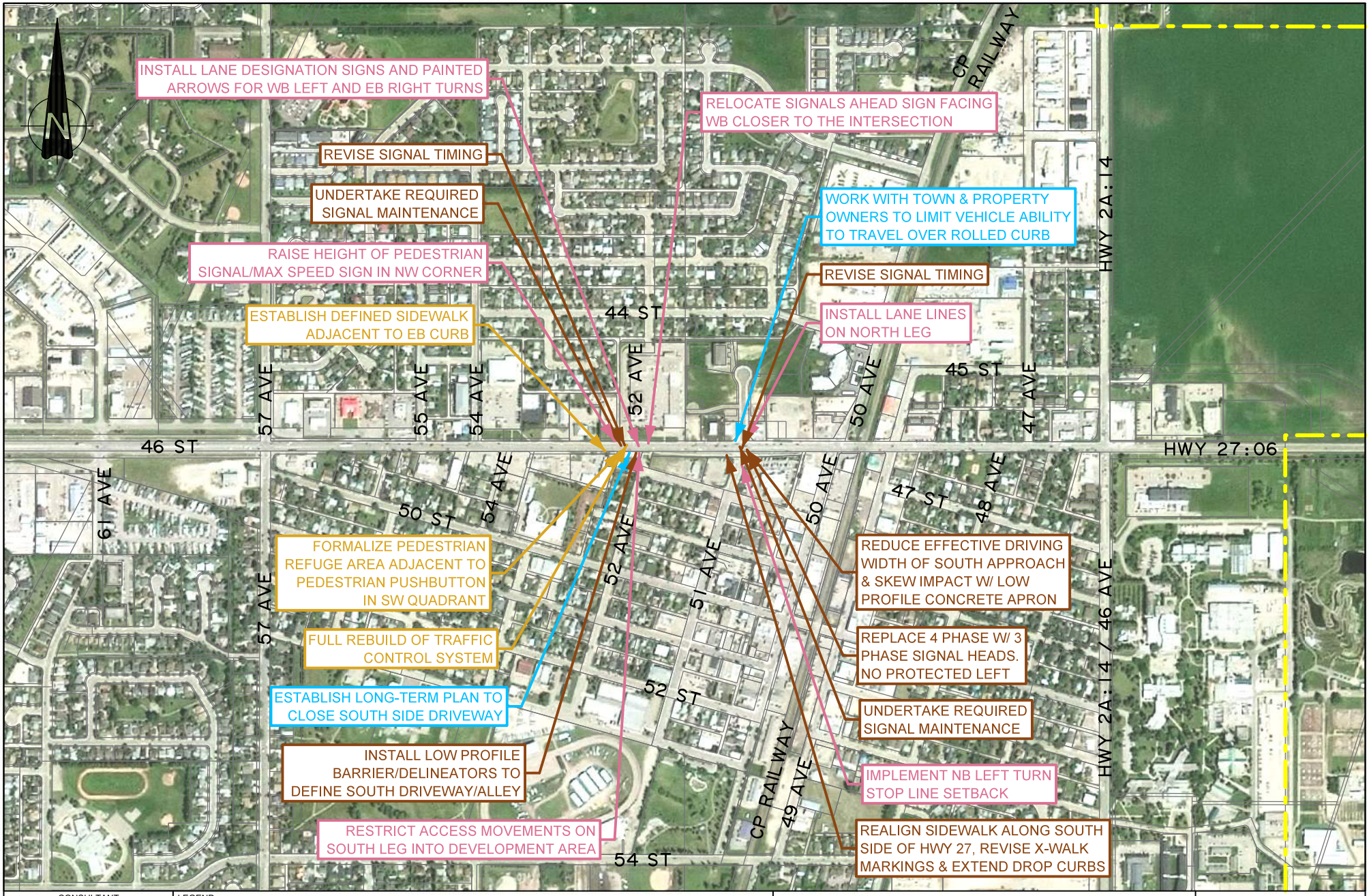
IMPLEMENTATION PLAN

65 AVE & 57 AVE INTERSECTIONS
HIGHWAY 27 TOWN OF OLDS
OPERATIONAL REVIEW

REGION	LOCATION	DATE	DWN	CHK
CENTRAL	HWY 27:06 from km 36.490 to 39.715	06/17/2024	SD	PS

Alberta

FIGURE 12-2



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PROJECT NO. CA000873.280

LEGEND

TOWN OF OLDS BOUNDARY

PRIORITY 1

PRIORITY 2

NEXT STEP

SHORT TERM PRIORITY

SCALE 1:1000

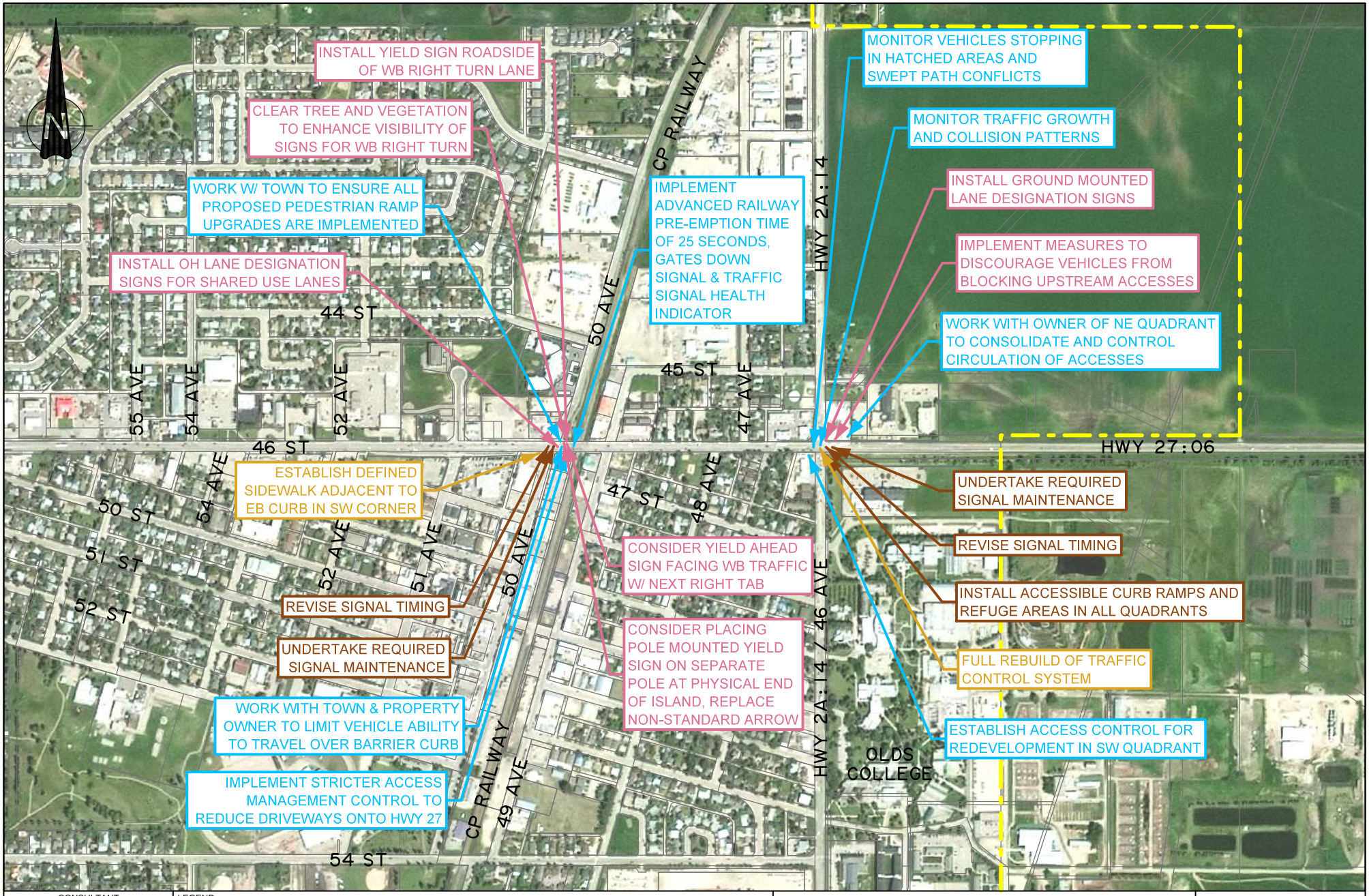
IMPLEMENTATION PLAN

52 AVE & 51 AVE INTERSECTIONS
HIGHWAY 27 TOWN OF OLDS
OPERATIONAL REVIEW

REGION	LOCATION	DATE	DWN	CHK
CENTRAL	HWY 27:06 from km 36.490 to 39.715	06/17/2024	SD	PS

Alberta

FIGURE 12-3



CONSULTANT

CIMA+

PROJECT NO. CA000873.280

LEGEND

TOWN OF OLDS BOUNDARY

PRIORITY 1

PRIORITY 2

NEXT STEP

SHORT TERM PRIORITY

SCALE 1:1000

IMPLEMENTATION PLAN

50 AVE & HWY 2A (46 AVE) INTERSECTIONS
HIGHWAY 27 TOWN OF OLDS
OPERATIONAL REVIEW

REGION	LOCATION	DATE	DWN	CHK
CENTRAL	HWY 27:06 from km 36.490 to 39.715	06/17/2024	SD	PS

Alberta

FIGURE 12-4

13. Conclusions

The overall recommendation from the capacity review is to update signal timings for all eight signalized intersections and implement coordination of the signals between 50 Avenue and 52 Avenue. Separate signal timings for morning, afternoon, and midday peak periods have been developed. Improvements required to support coordination as well as bringing all signal infrastructure up to current standards have been identified. Coordination is also considered to benefit the safety performance of the corridor by improving the progression of vehicles through the Town and reducing rear-end conflicts.

Some improvements to signal operations that were requested by the Town could not be implemented within the scope of this report. This included removal of pedestrian walk phases at 70 Avenue and 57 Avenue due to the lack of pedestrian recall buttons and the implementation of a LPI at 50 Avenue due to conflicting protected movements.

Pedestrian accessibility at a number of intersections would benefit from adding sidewalk/trail connections to crosswalks, installations of signs, re-positioning of push button locations and provisions for pedestrian drop curbs and refuge areas to enhance facilities and reduce potential conflicts.

The nearby CPKC rail crossing is interconnected with the 50 Avenue signal; however, advanced pre-emption time is not currently provided or possible with the existing rail infrastructure. In order to meet current requirements, pre-emption will be required, with necessary updates to the interconnection between the rail and traffic signals to be coordinated through future discussions with CPKC.

A review of available collision data reported along Highway 27 between 2014 and 2018 indicates there to be some areas of concern. The corridor collision rate is comparable to the provincial average indicating fewer safety performance concerns than other urban corridors. Trends in collisions have largely been focused at the eight signalized intersections along the study corridor. Opportunities to improve the safety performance of the corridor by implementing low-cost measures have been identified, some of which are applicable to multiple locations within the Town.

A

Appendix A
Traffic Data and Intersection Sketches

Reference Number:
70000203

Intersection of:
27 & RGE RD 20, 70 AVE OLDS

North On: 70 AVE

Vehicle Type	Volume	%
A: Passenger Vehicle	698	94.3%
B: Recreational Vehicle	5	0.7%
C: Bus	2	0.3%
D: Single Unit Truck	30	4.1%
E: Tractor Trailer Unit	5	0.7%
AADT	**740**	
ASDT	860	

2023 AADT / ASDT Estimates

Leg AADT Volumes

740
5,630 6,740
1,090

Total Entering Volume:
7,100

From North

	360		
	Right	Thru	Left
	40	**50**	**270**
A	33	48	261
B	0	0	2
C	0	0	1
D	7	1	5
E	0	1	1

To North

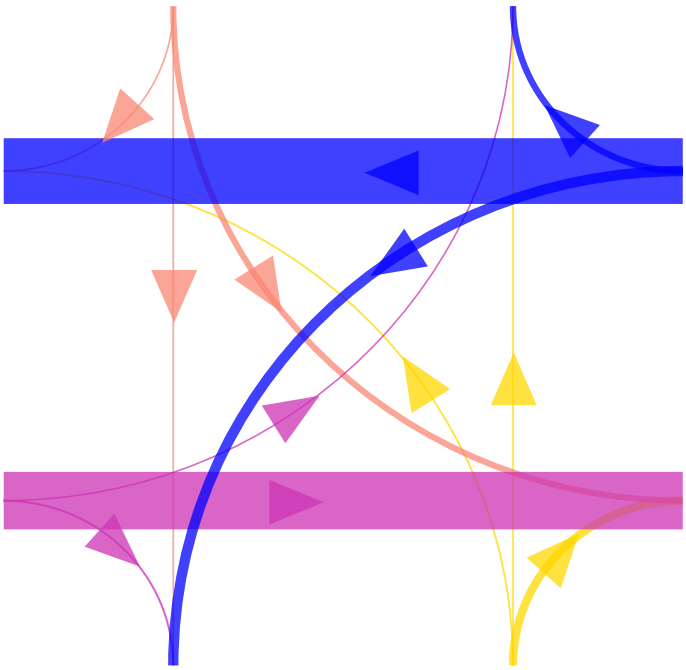
	380
A	356
B	3
C	1
D	17
E	3

To West

	2,990
A	2,734
B	82
C	5
D	82
E	87

From East

	3,600		
	Left	Thru	Right
	450	**2,870**	**280**
A	438	2,633	267
B	1	75	2
C	0	5	1
D	10	70	9
E	1	87	1



West On: 27

	Volume	%
A	5,164	91.7%
B	127	2.3%
C	8	0.1%
D	154	2.7%
E	177	3.1%
AADT	**5,630**	
ASDT	6,560	

East On: 27

Vehicle Type		
A	6,262	92.9%
B	121	1.8%
C	10	0.1%
D	168	2.5%
E	179	2.7%
AADT	**6,740**	
ASDT	7,830	

From West

	2,640		
	Left	Thru	Right
	40	**2,510**	**90**
A	32	2,317	81
B	1	39	5
C	0	3	0
D	7	63	2
E	0	88	2

To East

	3,140
A	2,924
B	43
C	4
D	79
E	90

To South

	590
A	567
B	6
C	0
D	13
E	4

From South

	500		
	Left	Thru	Right
	80	**60**	**360**
A	68	57	346
B	7	0	2
C	0	0	0
D	5	1	11
E	0	2	1

South On: 70 AVE

Vehicle Type	Volume	%
A: Passenger Vehicle	1,038	95.2%
B: Recreational Vehicle	15	1.4%
C: Bus	0	0.0%
D: Single Unit Truck	30	2.8%
E: Tractor Trailer Unit	7	0.6%
AADT	**1,090**	
ASDT	1,270	

ABBREVIATIONS:

AADT: Annual Average Daily Traffic. Average daily traffic expressed as vehicles per day for the period from January 1 to December 31 (inclusive), 365 days.

ASDT: Average Summer Daily Traffic. Average daily traffic expressed as vehicles per day for the period from May 1 to September 30 (inclusive), 153 days.

NOTE:
Coloured line thickness corresponds to turning movement volume.

Reference Number:
70000203

Intersection of:
27 & RGE RD 20, 70 AVE OLDS

North On: 70 AVE

Vehicle Type	Volume	%
A: Passenger Vehicle	41	85.4%
B: Recreational Vehicle	0	0.0%
C: Bus	0	0.0%
D: Single Unit Truck	7	14.6%
E: Tractor Trailer Unit	0	0.0%
AM	**48**	

2023 AM 100th Highest Hour Estimates

Leg AM Volumes

48 / 640 / 756 / 152

Total Entering Volume: **798**

From North

	Right	Thru	Left
	7	**0**	**27**
A	0	0	27
B	0	0	0
C	0	0	0
D	7	0	0
E	0	0	0

34

To North

	14
A	14
B	0
C	0
D	0
E	0

To West

	296
A	254
B	0
C	0
D	21
E	21

From East

	Left	Thru	Right
	48	**275**	**7**
A	48	240	7
B	0	0	0
C	0	0	0
D	0	14	0
E	0	21	0

330

West On: 27

	Volume	%
A	570	89.1%
B	7	1.1%
C	7	1.1%
D	28	4.4%
E	28	4.4%
AM	**640**	

East On: 27

Vehicle Type		
A	693	91.7%
B	7	0.9%
C	7	0.9%
D	21	2.8%
E	28	3.7%
AM	**756**	

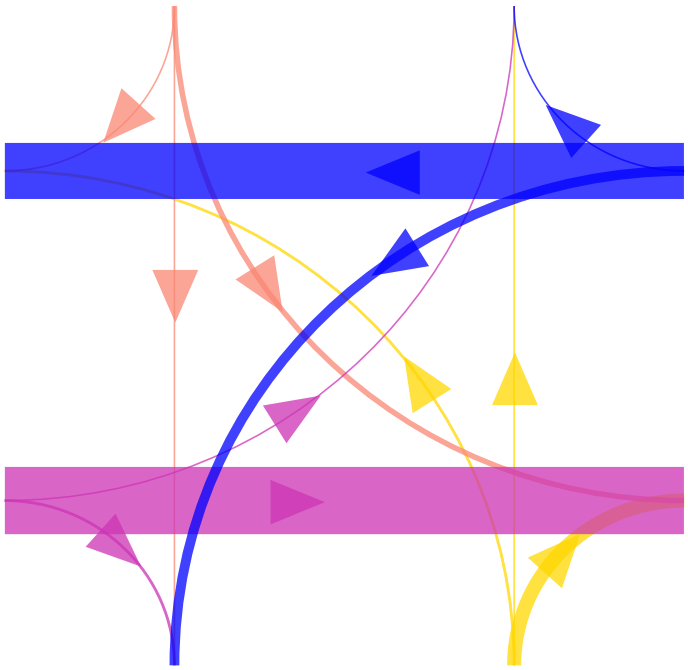
From West

	Left	Thru	Right
	0	**330**	**14**
A	0	302	14
B	0	7	0
C	0	7	0
D	0	7	0
E	0	7	0

344

To East

	426
A	398
B	7
C	7
D	7
E	7



To South

	62
A	62
B	0
C	0
D	0
E	0

From South

	Left	Thru	Right
	14	**7**	**69**
A	14	7	69
B	0	0	0
C	0	0	0
D	0	0	0
E	0	0	0

90

South On: 70 AVE

Vehicle Type	Volume	%
A: Passenger Vehicle	152	100.0%
B: Recreational Vehicle	0	0.0%
C: Bus	0	0.0%
D: Single Unit Truck	0	0.0%
E: Tractor Trailer Unit	0	0.0%
AM	**152**	

NOTE:
Coloured line thickness corresponds to turning movement volume.

Reference Number:
70000203

Intersection of:
27 & RGE RD 20, 70 AVE OLDS

North On: 70 AVE

Vehicle Type	Volume	%
A: Passenger Vehicle	86	95.6%
B: Recreational Vehicle	0	0.0%
C: Bus	0	0.0%
D: Single Unit Truck	4	4.4%
E: Tractor Trailer Unit	0	0.0%
PM	**90**	

2023 PM 100th Highest Hour Estimates

Leg PM Volumes

90 / 639 / 748 / 119

Total Entering Volume: **798**

From North

	Right	Thru	Left
	41		
	4	**4**	**33**
A	4	4	33
B	0	0	0
C	0	0	0
D	0	0	0
E	0	0	0

To North

	49
A	45
B	0
C	0
D	4
E	0

To West

	329
A	288
B	22
C	0
D	15
E	4

From East

Left	Thru	Right	
413			
55	**321**	**37**	
55	280	37	A
0	22	0	B
0	0	0	C
0	15	0	D
0	4	0	E

West On: 27

Vehicle Type	Volume	%
A	561	87.8%
B	26	4.1%
C	0	0.0%
D	30	4.7%
E	22	3.4%
PM	**639**	

East On: 27

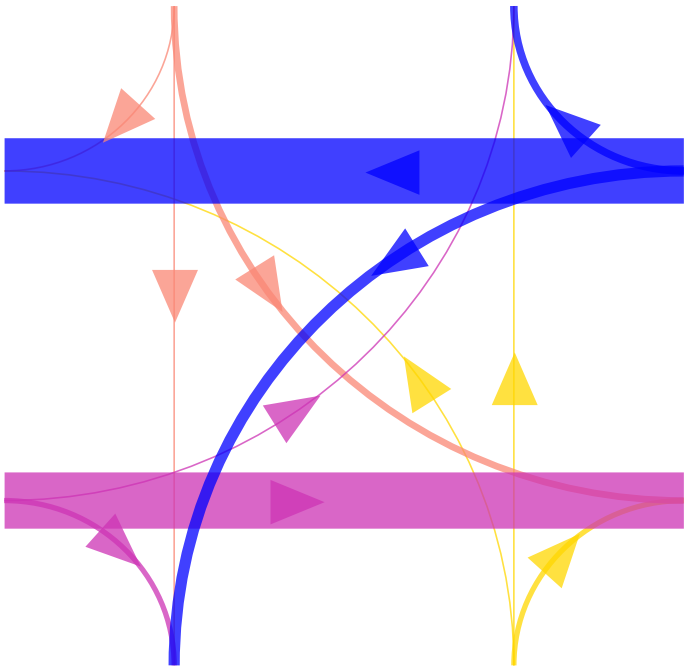
Vehicle Type		
A	674	90.1%
B	26	3.5%
C	0	0.0%
D	26	3.5%
E	22	2.9%
PM	**748**	

From West

	Left	Thru	Right
	310		
	8	**276**	**26**
A	4	243	26
B	0	4	0
C	0	0	0
D	4	11	0
E	0	18	0

To East

	335
	302
A	4
B	0
C	11
D	18
E	



To South

	85
A	85
B	0
C	0
D	0
E	0

From South

	Left	Thru	Right
	34		
	4	**4**	**26**
A	4	4	26
B	0	0	0
C	0	0	0
D	0	0	0
E	0	0	0

South On: 70 AVE

Vehicle Type	Volume	%
A: Passenger Vehicle	119	100.0%
B: Recreational Vehicle	0	0.0%
C: Bus	0	0.0%
D: Single Unit Truck	0	0.0%
E: Tractor Trailer Unit	0	0.0%
PM	**119**	

NOTE:
Coloured line thickness corresponds to turning movement volume.

CROSSROADS TRAFFIC CONSULTANTS LTD.

DIRECTIONAL TRAFFIC COUNT SUMMARY

HIGHWAY: 27 **REFERENCE NO.:** 70000203 **INTERSECTION OF:** 27 & RGE RD 20, 70 AVE OLDS
LATITUDE (degrees): 51.79501057 **LONGITUDE (degrees):** -114.1434362 **LEGAL DESCRIPTION:** 36-32-2-500000000
DAY & DATE OF COUNT: THURSDAY, JULY 20, 2023 **COUNT DURATION:** 24 HOURS (MIDNIGHT TO MIDNIGHT)

| | APPROACHING INTERSECTION | | |

Reference Number:
70000470

Intersection of:
27 & 67A AVE WALMART ACC, OLDS

North On: 67A AVE

Vehicle Type	Volume	%
A: Passenger Vehicle	6,056	98.5%
B: Recreational Vehicle	25	0.4%
C: Bus	3	0.0%
D: Single Unit Truck	44	0.7%
E: Tractor Trailer Unit	22	0.4%
AADT	**6,150**	
ASDT	7,170	

2023 AADT / ASDT Estimates

Leg AADT Volumes

6,150
6,740 9,120
110

Total Entering Volume: **11,060**

From North

	Total	Right	Thru	Left
	3,210	**1,080**	**0**	**2,130**
A	1,056	1,056	0	2,107
B	9	9	0	3
C	0	0	0	1
D	12	12	0	11
E	3	3	0	8

To North

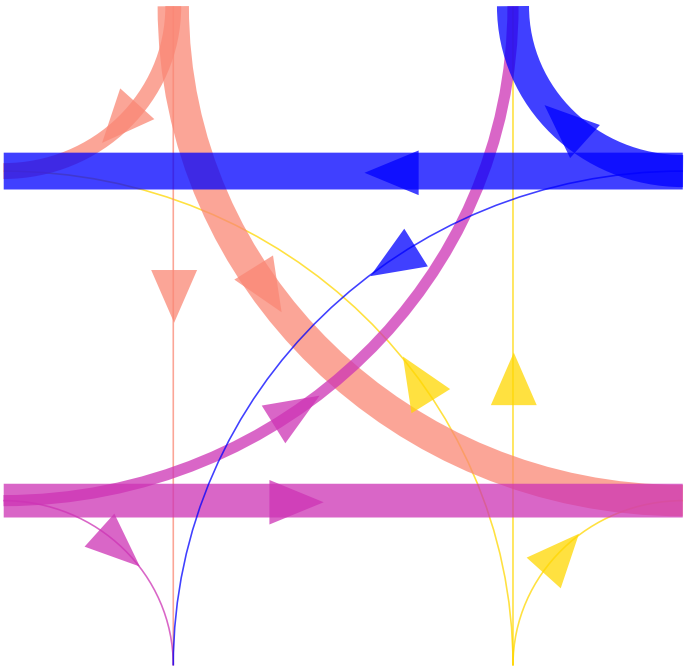
2,940	
A	2,893
B	13
C	2
D	21
E	11

To West

3,585	
A	3,350
B	66
C	6
D	76
E	87

From East

Left	Thru	Right	
4,685			
0	**2,505**	**2,180**	
0	2,294	2,151	A
0	57	7	B
0	6	1	C
0	64	10	D
0	84	11	E



West On: 27

	Volume	%
A	6,301	93.5%
B	109	1.6%
C	10	0.1%
D	141	2.1%
E	179	2.7%
AADT	**6,740**	
ASDT	7,860	

East On: 27

Vehicle Type		
A	8,672	95.1%
B	104	1.1%
C	11	0.1%
D	139	1.5%
E	194	2.1%
AADT	**9,120**	
ASDT	10,640	

From West

	Total	Left	Thru	Right
	3,155	**760**	**2,295**	**100**
A	742	742	2,112	97
B	6	6	36	1
C	1	1	3	0
D	11	11	53	1
E	0	0	91	1

To East

4,435	
4,227	A
40	B
4	C
65	D
99	E

To South

100	
A	97
B	1
C	0
D	1
E	1

From South

	Total	Left	Thru	Right
	10	**0**	**0**	**10**
A	0	0	0	8
B	0	0	0	1
C	0	0	0	0
D	0	0	0	1
E	0	0	0	0

South On: 51 ST

Vehicle Type	Volume	%
A: Passenger Vehicle	105	95.5%
B: Recreational Vehicle	2	1.8%
C: Bus	0	0.0%
D: Single Unit Truck	2	1.8%
E: Tractor Trailer Unit	1	0.9%
AADT	**110**	
ASDT	120	

ABBREVIATIONS:

AADT: Annual Average Daily Traffic. Average daily traffic expressed as vehicles per day for the period from January 1 to December 31 (inclusive), 365 days.

ASDT: Average Summer Daily Traffic. Average daily traffic expressed as vehicles per day for the period from May 1 to September 30 (inclusive), 153 days.

NOTE:
Coloured line thickness corresponds to turning movement volume.

Reference Number:
70000470

Intersection of:
27 & 67A AVE WALMART ACC, OLDS

North On: 67A AVE

Vehicle Type	Volume	%
A: Passenger Vehicle	684	93.8%
B: Recreational Vehicle	0	0.0%
C: Bus	9	1.2%
D: Single Unit Truck	18	2.5%
E: Tractor Trailer Unit	18	2.5%
AM	**729**	

2023 AM 100th Highest Hour Estimates

Leg AM Volumes

729 / 969 / 1,155 / 9

Total Entering Volume: **1,431**

From North

	Total	Right	Thru	Left
	240	**89**	**0**	**151**
A	71		0	151
B	0		0	0
C	0		0	0
D	9		0	0
E	9		0	0

To North

	489
A	462
B	0
C	9
D	9
E	9

To West

	427
A	364
B	18
C	0
D	27
E	18

From East

	Total	Left	Thru	Right
	649	**0**	**338**	**311**
A		0	293	293
B		0	18	0
C		0	0	9
D		0	18	0
E		0	9	9

West On: 27

	Volume	%
A	888	91.6%
B	18	1.9%
C	0	0.0%
D	45	4.6%
E	18	1.9%
AM	**969**	

East On: 27

Vehicle Type	Volume	%
A	1,083	93.8%
B	18	1.6%
C	9	0.8%
D	27	2.3%
E	18	1.6%
AM	**1,155**	

From West

	Total	Left	Thru	Right
	542	**178**	**355**	**9**
A	169		346	9
B	0		0	0
C	0		0	0
D	9		9	0
E	0		0	0

To East

	506
A	497
B	0
C	0
D	9
E	0

To South

	9
A	9
B	0
C	0
D	0
E	0

From South

	Total	Left	Thru	Right
	0	**0**	**0**	**0**
A		0	0	0
B		0	0	0
C		0	0	0
D		0	0	0
E		0	0	0

South On: 51 ST

Vehicle Type	Volume	%
A: Passenger Vehicle	9	100.0%
B: Recreational Vehicle	0	0.0%
C: Bus	0	0.0%
D: Single Unit Truck	0	0.0%
E: Tractor Trailer Unit	0	0.0%
AM	**9**	

NOTE:
Coloured line thickness corresponds to turning movement volume.

Reference Number:
70000470

Intersection of:
27 & 67A AVE WALMART ACC, OLDS

North On: 67A AVE

Vehicle Type	Volume	%
A: Passenger Vehicle	812	99.0%
B: Recreational Vehicle	4	0.5%
C: Bus	0	0.0%
D: Single Unit Truck	4	0.5%
E: Tractor Trailer Unit	0	0.0%
PM	**820**	

2023 PM 100th Highest Hour Estimates

Leg PM Volumes

820 / 849 / 1,164 / 21

Total Entering Volume: **1,427**

From North

	Total	Right	Thru	Left
	442	**170**	**0**	**272**
A	170	170	0	268
B	0	0	0	4
C	0	0	0	0
D	0	0	0	0
E	0	0	0	0

To North

	378
A	374
B	0
C	0
D	4
E	0

To West

	454
A	425
B	21
C	0
D	4
E	4

From East

	Total	Left	Thru	Right
	590	**0**	**284**	**306**
A	306	0	255	306
B	0	0	21	0
C	0	0	0	0
D	0	0	4	0
E	0	0	4	0

West On: 27

	Volume	%
A	786	92.6%
B	21	2.5%
C	4	0.5%
D	17	2.0%
E	21	2.5%
PM	**849**	

East On: 27

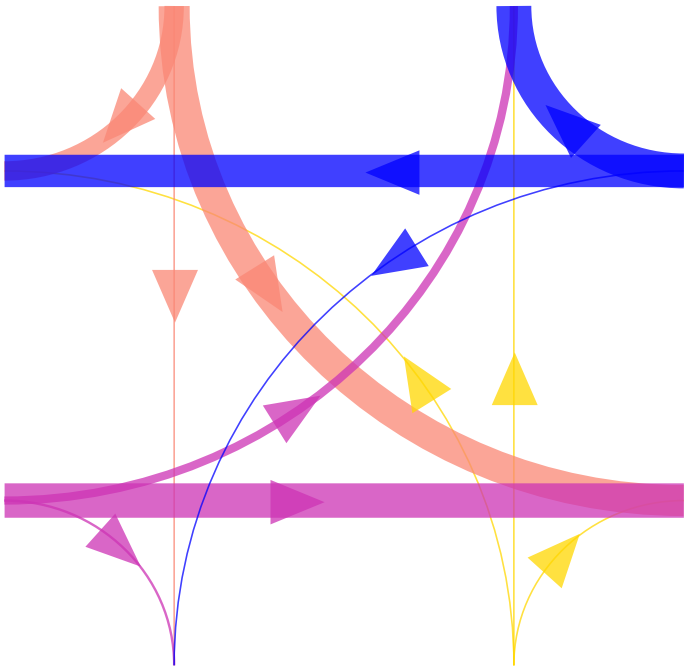
Vehicle Type	Volume	%
A	1,101	94.6%
B	25	2.1%
C	4	0.3%
D	13	1.1%
E	21	1.8%
PM	**1,164**	

From West

	Total	Left	Thru	Right
	395	**72**	**302**	**21**
A	68	68	272	21
B	0	0	0	0
C	0	0	4	0
D	4	4	9	0
E	0	0	17	0

To East

	574
A	540
B	4
C	4
D	9
E	17



To South

	21
A	21
B	0
C	0
D	0
E	0

From South

	Total	Left	Thru	Right
	0	**0**	**0**	**0**
A	0	0	0	0
B	0	0	0	0
C	0	0	0	0
D	0	0	0	0
E	0	0	0	0

South On: 51 ST

Vehicle Type	Volume	%
A: Passenger Vehicle	21	100.0%
B: Recreational Vehicle	0	0.0%
C: Bus	0	0.0%
D: Single Unit Truck	0	0.0%
E: Tractor Trailer Unit	0	0.0%
PM	**21**	

NOTE:
Coloured line thickness corresponds to turning movement volume.

CROSSROADS TRAFFIC CONSULTANTS LTD.

DIRECTIONAL TRAFFIC COUNT SUMMARY

HIGHWAY: 27 **REFERENCE NO.:** 70000470 **INTERSECTION OF:** 27 & 67A AVE WALMART ACC, OLDS
LATITUDE (degrees): 51.79501236 **LONGITUDE (degrees):** -114.1375178 **LEGAL DESCRIPTION:** 31-32-1-512100000
DAY & DATE OF COUNT: THURSDAY, JULY 20, 2023 **COUNT DURATION:** 24 HOURS (MIDNIGHT TO MIDNIGHT)

APPROACHING INTERSECTION — FROM THE EAST ON 27

INTERVAL	LEFT					THROUGH					RIGHT					TOTALS
	A	B	C	D	E	A	B	C	D	E	A	B	C	D	E	
MIDNIGHT - 0:15						2					1				1	9
0:15 - 0:30						2					1					5
0:30 - 0:45						8					1					11
0:45 - 1:00											1					2
1:00 - 1:15						1			1		1					4
1:15 - 1:30						1					2					4
1:30 - 1:45						2										3
1:45 - 2:00						1					2					5
2:00 - 2:15						1										2
2:15 - 2:30																1
2:30 - 2:45																1
2:45 - 3:00											1					1
3:00 - 3:15						2										5
3:15 - 3:30									1		1					4
3:30 - 3:45						3					1					5
3:45 - 4:00						1					1					3
4:00 - 4:15						1			1							3
4:15 - 4:30						4					1					9
4:30 - 4:45						3			1							9
4:45 - 5:00						3					4					15
5:00 - 5:15						14					1					19
5:15 - 5:30						13			1		4					25
5:30 - 5:45						9			1	1	3					26
5:45 - 6:00						12			1		6					36
6:00 - 6:15						12			1	1	9				1	36
6:15 - 6:30						20			2		8			1		58
6:30 - 6:45						27		2	2		18			1		92
6:45 - 7:00						32		1			21					98
7:00 - 7:15						30	2	2	1		6	1				64
7:15 - 7:30						26		2	2		10			1		76
7:30 - 7:45						27		2	1		21					110
7:45 - 8:00						21		3			28					118
8:00 - 8:15						37	1		4		22			1	2	134
8:15 - 8:30						35		3	4		24					132
8:30 - 8:45						31			2		28	1				129
8:45 - 9:00						33	2	2	1		33		1		1	134
9:00 - 9:15						48		6			29					141
9:15 - 9:30						32	2	1	1		30					135
9:30 - 9:45						31		1	1		34				1	133
9:45 - 10:00						40		2			48			2		156
10:00 - 10:15						44	1		1		48				1	165
10:15 - 10:30						37		3	1		47					160
10:30 - 10:45						40	2	2	3		34				1	154
10:45 - 11:00						51			2		48					177
11:00 - 11:15						37	2		5		55					170
11:15 - 11:30						45	2		2		56	1		1		172
11:30 - 11:45						51		1	3		44					188
11:45 - 12:00 PM						50	1	1	2		54			1		184
12:00 - 12:15						52	3	1			64			1	1	207
12:15 - 12:30						44	3	2	4		63				1	195
12:30 - 12:45						49	1	1	3		61			1	1	186
12:45 - 1:00						56	3		3		41					202
1:00 - 1:15						33	3	1	2		59					158
1:15 - 1:30						38		1	4		40					173
1:30 - 1:45						57		3	1		52					196
1:45 - 2:00						50	1	1	2	5	68	2		1		221
2:00 - 2:15						65	1		1		54			1		175
2:15 - 2:30						44	4		1	3	56	1				174
2:30 - 2:45						44	2		3		61					180
2:45 - 3:00						52	2			1	50					187
3:00 - 3:15						68	1		1		63	1		1		211
3:15 - 3:30						60	5		1	1	72					232
3:30 - 3:45						64	1		2		43					189
3:45 - 4:00						65	1	1	2	2	55					206
4:00 - 4:15						51	2			1	46					151
4:15 - 4:30						52		1		3	73					190
4:30 - 4:45						74	2		2	6	72					209
4:45 - 5:00						77	2		1	1	58					209
5:00 - 5:15						91	1			2	54					222
5:15 - 5:30						54				1	49					155
5:30 - 5:45						62	1		3	1	45					187
5:45 - 6:00						45				2	44					149
6:00 - 6:15						40	2		1	1	51			1		152
6:15 - 6:30						46					47	1				152
6:30 - 6:45						36	1	1			41					133
6:45 - 7:00						39	2		1	1	33					119
7:00 - 7:15						36	3			1	26					109
7:15 - 7:30						40	2			1	29					115
7:30 - 7:45						41				1	29					100
7:45 - 8:00						29	2				27					101
8:00 - 8:15						17					31					92
8:15 - 8:30						33	2		1		28					95
8:30 - 8:45						32					24					84
8:45 - 9:00						22	2		1	1	23					72
9:00 - 9:15						19		1	1	1	23					70
9:15 - 9:30						21				1	9					55
9:30 - 9:45						23					15					51
9:45 - 10:00						19					11					39
10:00 - 10:15						13			2		16					41
10:15 - 10:30						15					5			1		33
10:30 - 10:45						11					7					29
10:45 - 11:00						5	1				9					38
11:00 - 11:15						7			1		2					31
11:15 - 11:30						6					3					10
11:30 - 11:45						3					5					9
11:45 - MIDNIGHT						2					6					15
VEH CLASS	A	B	C	D	E	A	B	C	D	E	A	B	C	D	E	
TOTALS						2821	70	7	78	102	2631	8	1	12	14	9610
	EL					ET					ER					

APPROACHING INTERSECTION — FROM THE WEST ON 27

INTERVAL	LEFT					THROUGH					RIGHT					TOTALS
	A	B	C	D	E	A	B	C	D	E	A	B	C	D	E	
MIDNIGHT - 0:15						3										9
0:15 - 0:30																5
0:30 - 0:45						2										11
0:45 - 1:00																2
1:00 - 1:15						1										4
1:15 - 1:30						1										4
1:30 - 1:45						1										3
1:45 - 2:00						2										5
2:00 - 2:15						1					1					2
2:15 - 2:30						1										1
2:30 - 2:45						1										1
2:45 - 3:00																1
3:00 - 3:15						1					1					5
3:15 - 3:30						1										4
3:30 - 3:45						1										5
3:45 - 4:00						1			1							3
4:00 - 4:15						1										3
4:15 - 4:30						2					1					9
4:30 - 4:45						2										9
4:45 - 5:00						7										15
5:00 - 5:15						2					1					19
5:15 - 5:30						4										25
5:30 - 5:45						8										26
5:45 - 6:00						12										36
6:00 - 6:15						5			1	1						36
6:15 - 6:30						17				1						58
6:30 - 6:45						31				2						92
6:45 - 7:00						34				2						98
7:00 - 7:15						15	1				1					64
7:15 - 7:30						20				1						76
7:30 - 7:45						47				2	1					110
7:45 - 8:00						42			1	4	4					118
8:00 - 8:15						42	1	1		2	1					134
8:15 - 8:30						45			2	4	1					132
8:30 - 8:45						33	1		2	3	2					129
8:45 - 9:00						39			1		1					134
9:00 - 9:15						39			2	1	1					141
9:15 - 9:30						46			1		8					135
9:30 - 9:45						43	3		1	1	2					133
9:45 - 10:00						36			1	4	5					156
10:00 - 10:15						49	1		1	2	2	1				165
10:15 - 10:30						51		1	3	4	3					160
10:30 - 10:45						45			1	1	2					154
10:45 - 11:00						56	1			4						177
11:00 - 11:15						41	1		1	3	2					170
11:15 - 11:30						43										172
11:30 - 11:45						56			3	1	1					188
11:45 - 12:00 PM						45	1		3	3	1					184
12:00 - 12:15						53	1		2	1	2					207
12:15 - 12:30						53	1		1	4	1					195
12:30 - 12:45						37	1		2	3	5					186
12:45 - 1:00						67			1	6	2					202
1:00 - 1:15						36	1		2	1	4					158
1:15 - 1:30						60	1		1	4	3					173
1:30 - 1:45						51			3	3	2					196
1:45 - 2:00						70				2	2					221
2:00 - 2:15						33	2		3	2	1					175
2:15 - 2:30						41	4		3	2	4					174
2:30 - 2:45						44		1		2	5					180
2:45 - 3:00						55	2		1	2	6					187
3:00 - 3:15						52	2		1	2	3					211
3:15 - 3:30						64		1	2	4	5					232
3:30 - 3:45						60	1		1	3	5					189
3:45 - 4:00						62	4		3	2	2					206
4:00 - 4:15						30	2									151
4:15 - 4:30						34	2			2						190
4:30 - 4:45						36	1		2	3						209
4:45 - 5:00						50	1		1	2						209
5:00 - 5:15						53			3	3	1					222
5:15 - 5:30						33				1	2					155
5:30 - 5:45						47			3	2	5					187
5:45 - 6:00						33	2		2	2	2				1	149
6:00 - 6:15						42				1						152
6:15 - 6:30						45										152
6:30 - 6:45						34	1									133
6:45 - 7:00						33	2									119
7:00 - 7:15						31					2				1	109
7:15 - 7:30						28	1									115
7:30 - 7:45						21			2	1						100
7:45 - 8:00						34					1					101
8:00 - 8:15						30					3					92
8:15 - 8:30						24					1					95
8:30 - 8:45						24										84
8:45 - 9:00						16					3					72
9:00 - 9:15						17				2						70
9:15 - 9:30						18										55
9:30 - 9:45						10	1									51
9:45 - 10:00						5										39
10:00 - 10:15						10										41
10:15 - 10:30						9										33
10:30 - 10:45						7			1							29
10:45 - 11:00						9				1						22
11:00 - 11:15						6										17
11:15 - 11:30						4										13
11:30 - 11:45						3	1									5
11:45 - MIDNIGHT						7										15
VEH CLASS	A	B	C	D	E	A	B	C	D	E	A	B	C	D	E	
TOTALS						2592	44	4	65	111	109	1	1	1	1	3941
	WL					WT					WR					

APPROACHING INTERSECTION — FROM THE NORTH ON 67A AVE

INTERVAL	LEFT					THROUGH					RIGHT					TOTALS
	A	B	C	D	E	A	B	C	D	E	A	B	C	D	E	
MIDNIGHT - 0:15	5															5
0:15 - 0:30	4										1					5
0:30 - 0:45	1															1
0:45 - 1:00					1											1
1:00 - 1:15	1															1
1:15 - 1:30	3															3
1:30 - 1:45	1				1											2
1:45 - 2:00											1					1
2:00 - 2:15	1															1
2:15 - 2:30																
2:30 - 2:45																
2:45 - 3:00																
3:00 - 3:15	1															1
3:15 - 3:30	2										1					3
3:30 - 3:45																
3:45 - 4:00	2															2
4:00 - 4:15											1					1
4:15 - 4:30											1					1
4:30 - 4:45											2					2
4:45 - 5:00	1															1
5:00 - 5:15	1										1					2
5:15 - 5:30	2										4					6
5:30 - 5:45	3										4					7
5:45 - 6:00	4										3					7
6:00 - 6:15	4				1						2					7
6:15 - 6:30	4										4					8
6:30 - 6:45	6										7					13
6:45 - 7:00	11										3					14
7:00 - 7:15	6										7					13
7:15 - 7:30	6				1						8	1				16
7:30 - 7:45	7										7					14
7:45 - 8:00	10										11			1		22
8:00 - 8:15	13										8				1	22
8:15 - 8:30	14										9					23
8:30 - 8:45	16				1						11					28
8:45 - 9:00	17										8			1	1	27
9:00 - 9:15	19				2	1					7					29
9:15 - 9:30	20				1						17					38
9:30 - 9:45	28										12					40
9:45 - 10:00	28										13					41
10:00 - 10:15	31				2						13			1	1	50
10:15 - 10:30	24	1			1						17			1	1	43
10:30 - 10:45	35										19				1	56
10:45 - 11:00	42										28					68
11:00 - 11:15	48										21				1	70
11:15 - 11:30	44										24					68
11:30 - 11:45	46	1			2						24			1		74
11:45 - 12:00 PM	56								1		26			1		84
12:00 - 12:15	60										29			1		91
12:15 - 12:30	50										23	1				74
12:30 - 12:45	61								1		23			1		86
12:45 - 1:00	52								1		36					89
1:00 - 1:15	62										26	1				90
1:15 - 1:30	56										23					80
1:30 - 1:45	54										20					75
1:45 - 2:00	59										31					91
2:00 - 2:15	46				2	1					27	1				77
2:15 - 2:30	61				1						33					95
2:30 - 2:45	49										36	1		1		87
2:45 - 3:00	61										25			1		87
3:00 - 3:15	53										30			1		85
3:15 - 3:30	63	1									40					104
3:30 - 3:45	60				1						35					97
3:45 - 4:00	63										31					95
4:00 - 4:15	78										29			1		108
4:15 - 4:30	54										35					89
4:30 - 4:45	64										24	1		1		91
4:45 - 5:00	56										26					82
5:00 - 5:15	61	1									37			1		101
5:15 - 5:30	57				1						39					97
5:30 - 5:45	55										33			1		89
5:45 - 6:00	43										26	1				71
6:00 - 6:15	44										34	1				79
6:15 - 6:30	47										24					71
6:30 - 6:45	43										22					65
6:45 - 7:00	50										19					69
7:00 - 7:15	46				1						17	1				65
7:15 - 7:30	42										15	1				58
7:30 - 7:45	47										10	1		1		32
7:45 - 8:00	44										11					43
8:00 - 8:15	38										19					50
8:15 - 8:30	39										9				2	50
8:30 - 8:45	38										6					44
8:45 - 9:00	28										11					39
9:00 - 9:15	30										8					38
9:15 - 9:30	25										9					34
9:30 - 9:45	25										7					32
9:45 - 10:00	22										6					28
10:00 - 10:15	23										4					27
10:15 - 10:30	16										4					20
10:30 - 10:45	5										4					9
10:45 - 11:00	6				1						2					9
11:00 - 11:15	7										3					10
11:15 - 11:30	8										1					9
11:30 - 11:45	4										1					5
11:45 - MIDNIGHT	3															3
VEH CLASS	A	B	C	D	E	A	B	C	D	E	A	B	C	D	E	
TOTALS	2578	4	1	14	10	2					1286	11		15	4	9610
	NL					NT					NR					

APPROACHING INTERSECTION — FROM THE SOUTH ON 51 ST

INTERVAL	LEFT					THROUGH					RIGHT					TOTALS
	A	B	C	D	E	A	B	C	D	E	A	B	C	D	E	
MIDNIGHT - 0:15																5
0:15 - 0:30																5
0:30 - 0:45																1
0:45 - 1:00																1
1:00 - 1:15																1
1:15 - 1:30																3
1:30 - 1:45																2
1:45 - 2:00																1
2:00 - 2:15																1
2:15 - 2:30																
2:30 - 2:45																
2:45 - 3:00																
3:00 - 3:15																1
3:15 - 3:30																3
3:30 - 3:45																
3:45 - 4:00																2
4:00 - 4:15																1
4:15 - 4:30																1
4:30 - 4:45																2
4:45 - 5:00																1
5:00 - 5:15																2
5:15 - 5:30																6
5:30 - 5:45																7
5:45 - 6:00																7
6:00 - 6:15																7
6:15 - 6:30																8
6:30 - 6:45																13
6:45 - 7:00																14
7:00 - 7:15																13
7:15 - 7:30																16
7:30 - 7:45																14
7:45 - 8:00																22
8:00 - 8:15																22
8:15 - 8:30																23
8:30 - 8:45																28
8:45 - 9:00																27
9:00 - 9:15																29
9:15 - 9:30																38
9:30 - 9:45																40
9:45 - 10:00																41
10:00 - 10:15													1		1	50
10:15 - 10:30															1	43
10:30 - 10:45																56
10:45 - 11:00																68
11:00 - 11:15																70
11:15 - 11:30																68
11:30 - 11:45																74
11:45 - 12:00 PM																84
12:00 - 12:15																91
12:15 - 12:30																74
12:30 - 12:45																86
12:45 - 1:00																89
1:00 - 1:15												1				90
1:15 - 1:30												1				80
1:30 - 1:45												1				75
1:45 - 2:00												1				91
2:00 - 2:15																77
2:15 - 2:30																95
2:30 - 2:45																87
2:45 - 3:00																87
3:00 - 3:15																85
3:15 - 3:30																104
3:30 - 3:45												1				97
3:45 - 4:00											1					95
4:00 - 4:15																108
4:15 - 4:30																89
4:30 - 4:45												1				91
4:45 - 5:00																82
5:00 - 5:15												1				101
5:15 - 5:30																97
5:30 - 5:45																89
5:45 - 6:00												1				71
6:00 - 6:15																79
6:15 - 6:30																71
6:30 - 6:45																65
6:45 - 7:00																69
7:00 - 7:15																65
7:15 - 7:30																58
7:30 - 7:45																32
7:45 - 8:00																43
8:00 - 8:15																50
8:15 - 8:30										

CROSSROADS TRAFFIC CONSULTANTS LTD.

DIRECTIONAL PEDESTRIAN COUNT SUMMARY

LOCATION: 27 & 67A AVE WALMART ACC, OLDS

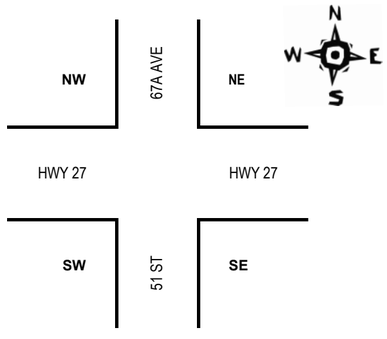
DATE: THURSDAY, JULY 20, 2023

REFERENCE No: 70000470

REMARKS: MIOVISION CAMERAS CANNOT CLASSIFY PEDESTRIANS OR MONITOR JAYWALKING

COUNT DURATION: 24 HOURS (MIDNIGHT TO MIDNIGHT)

PEDESTRIAN CROSSING FROM	TO	INTERVAL																						SUB-TOTAL
		MIDNIGHT TO 1:00AM	1:00 AM TO 2:00 AM	2:00 AM TO 3:00 AM	3:00 AM TO 4:00 AM	4:00 AM TO 5:00 AM	5:00 AM TO 6:00AM	6:00 AM TO 7:00 AM	7:00 AM TO 8:00 AM	8:00 AM TO 9:00 AM	9:00 AM TO 10:00 AM	10:00 AM TO 11:00 AM	11:00 AM TO NOON	NOON TO 1:00PM	1:00PM TO 2:00 PM	2:00 PM TO 3:00 PM	3:00 PM TO 4:00 PM	4:00 PM TO 5:00 PM	5:00 PM TO 6:00 PM	6:00 PM TO 7:00 PM	7:00 PM TO 8:00 PM	8:00 PM TO 9:00 PM	9:00 PM TO 10:00 PM	10:00 PM TO 11:00 PM	11:00 PM TO MIDNIGHT	
NE CORNER	SE CORNER										1	3								1						5
	NW CORNER															1		2		2						5
NW CORNER	SW CORNER											2														2
	NE CORNER																		1							1
SE CORNER	NE CORNER							1	2	1			1				2									7
	SW CORNER																1									1
SW CORNER	NW CORNER								1								1									2
	SE CORNER												1													1
																								TOTAL PEDESTRIANS		24



Reference Number:
70000204

Intersection of:
27 & 65 AVE OLDS

North On: 65 AVE

Vehicle Type	Volume	%
A: Passenger Vehicle	4,180	96.5%
B: Recreational Vehicle	39	0.9%
C: Bus	5	0.1%
D: Single Unit Truck	74	1.7%
E: Tractor Trailer Unit	32	0.7%
AADT	**4,330**	
ASDT	5,050	

2023 AADT / ASDT Estimates

Leg AADT Volumes

4,330
9,120 10,960
4,810

Total Entering Volume:
14,570

From North

	2,110		
	Right	Thru	Left
	300	**620**	**1,190**
A	272	607	1,156
B	9	4	5
C	2	0	1
D	9	8	17
E	8	1	11

To North

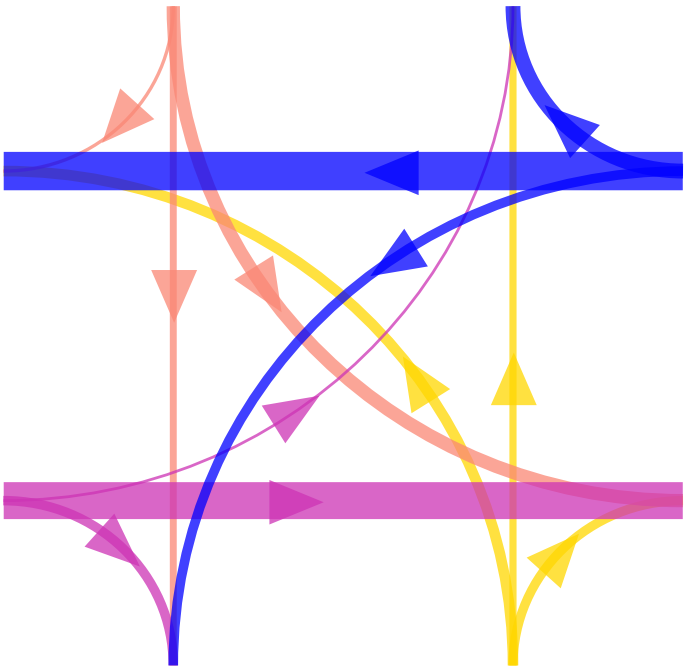
	2,220
A	2,145
B	21
C	2
D	40
E	12

To West

	4,710
A	4,450
B	70
C	8
D	70
E	92

From East

	5,630		
	Left	Thru	Right
	860	**3,440**	**1,330**
A	840	3,259	1,293
B	2	49	12
C	0	6	0
D	14	48	18
E	4	78	7



West On: 27

	Volume	%
A	8,641	95.0%
B	106	1.2%
C	12	0.1%
D	147	1.6%
E	194	2.1%
AADT	**9,120**	
ASDT	10,630	

East On: 27

Vehicle Type		
A	10,499	95.8%
B	95	0.9%
C	11	0.1%
D	158	1.4%
E	197	1.8%
AADT	**10,960**	
ASDT	12,770	

From West

	4,410		
	Left	Thru	Right
	250	**3,310**	**850**
A	227	3,135	829
B	7	27	2
C	1	3	0
D	11	52	14
E	4	93	5

To East

	5,330
A	5,107
B	32
C	5
D	78
E	108

To South

	2,350
A	2,276
B	8
C	0
D	36
E	10

From South

	2,420		
	Left	Thru	Right
	950	**640**	**830**
A	919	625	816
B	12	2	0
C	0	1	1
D	13	11	9
E	6	1	4

South On: 65 AVE

Vehicle Type	Volume	%
A: Passenger Vehicle	4,636	97.6%
B: Recreational Vehicle	22	0.5%
C: Bus	2	0.0%
D: Single Unit Truck	69	1.5%
E: Tractor Trailer Unit	21	0.4%
AADT	**4,810**	
ASDT	5,640	

ABBREVIATIONS:

AADT: Annual Average Daily Traffic. Average daily traffic expressed as vehicles per day for the period from January 1 to December 31 (inclusive), 365 days.

ASDT: Average Summer Daily Traffic. Average daily traffic expressed as vehicles per day for the period from May 1 to September 30 (inclusive), 153 days.

NOTE:
Coloured line thickness corresponds to turning movement volume.

Reference Number:
70000204

Intersection of:
27 & 65 AVE OLDS

North On: 65 AVE

Vehicle Type	Volume	%
A: Passenger Vehicle	506	93.9%
B: Recreational Vehicle	0	0.0%
C: Bus	0	0.0%
D: Single Unit Truck	16	3.0%
E: Tractor Trailer Unit	17	3.2%
AM	**539**	

2023 AM 100th Highest Hour Estimates

Leg AM Volumes

539 / 1,122 / 1,409 / 692

Total Entering Volume: **1,881**

From North

	235		
	Right	Thru	Left
	50	**76**	**109**
A	42	76	84
B	0	0	0
C	0	0	0
D	8	0	8
E	0	0	17

To North

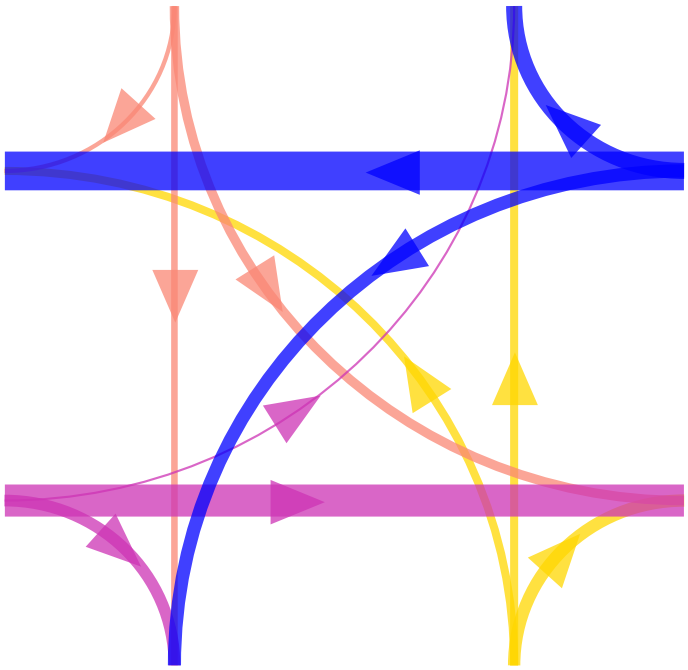
	304
A	304
B	0
C	0
D	0
E	0

To West

	591
A	541
B	17
C	0
D	16
E	17

From East

	786		
	Left	Thru	Right
	152	**448**	**186**
A	152	406	186
B	0	17	0
C	0	0	0
D	0	8	0
E	0	17	0



West On: 27

	Volume	%
A	1,064	94.8%
B	17	1.5%
C	0	0.0%
D	24	2.1%
E	17	1.5%
AM	**1,122**	

East On: 27

Vehicle Type		
A	1,326	94.1%
B	17	1.2%
C	0	0.0%
D	24	1.7%
E	42	3.0%
AM	**1,409**	

From West

	531		
	Left	Thru	Right
	25	**371**	**135**
A	25	363	135
B	0	0	0
C	0	0	0
D	0	8	0
E	0	0	0

To East

	623
A	582
B	0
C	0
D	16
E	25

To South

	363
A	363
B	0
C	0
D	0
E	0

From South

	329		
	Left	Thru	Right
	93	**93**	**143**
A	93	93	135
B	0	0	0
C	0	0	0
D	0	0	0
E	0	0	8

South On: 65 AVE

Vehicle Type	Volume	%
A: Passenger Vehicle	684	98.8%
B: Recreational Vehicle	0	0.0%
C: Bus	0	0.0%
D: Single Unit Truck	0	0.0%
E: Tractor Trailer Unit	8	1.2%
AM	**692**	

NOTE:
Coloured line thickness corresponds to turning movement volume.

Reference Number:
70000204

Intersection of:
27 & 65 AVE OLDS

North On: 65 AVE

Vehicle Type	Volume	%
A: Passenger Vehicle	619	97.9%
B: Recreational Vehicle	4	0.6%
C: Bus	0	0.0%
D: Single Unit Truck	9	1.4%
E: Tractor Trailer Unit	0	0.0%
PM	**632**	

2023 PM 100th Highest Hour Estimates

Leg PM Volumes

632 / 1,118 / 1,343 / 671

Total Entering Volume: **1,882**

From North

	Right	Thru	Left
	308		
	53	**123**	**132**
A	53	123	132
B	0	0	0
C	0	0	0
D	0	0	0
E	0	0	0

To North

	324
A	311
B	4
C	0
D	9
E	0

To West

	496
A	471
B	8
C	4
D	9
E	4

From East

Left	Thru	Right	
623			
119	**320**	**184**	
119	299	180	A
0	4	4	B
0	4	0	C
0	9	0	D
0	4	0	E

West On: 27

	Volume	%
A	1,041	93.1%
B	30	2.7%
C	4	0.4%
D	22	2.0%
E	21	1.9%
PM	**1,118**	

East On: 27

Vehicle Type		
A	1,283	95.5%
B	26	1.9%
C	4	0.3%
D	13	1.0%
E	17	1.3%
PM	**1,343**	

From West

	Left	Thru	Right
	622		
	35	**487**	**100**
A	26	452	92
B	0	18	4
C	0	0	0
D	9	4	0
E	0	13	4

To East

	720
A	685
B	18
C	0
D	4
E	13

To South

	342
A	334
B	4
C	0
D	0
E	4

From South

	Left	Thru	Right
	329		
	123	**105**	**101**
A	119	105	101
B	4	0	0
C	0	0	0
D	0	0	0
E	0	0	0

South On: 65 AVE

Vehicle Type	Volume	%
A: Passenger Vehicle	659	98.2%
B: Recreational Vehicle	8	1.2%
C: Bus	0	0.0%
D: Single Unit Truck	0	0.0%
E: Tractor Trailer Unit	4	0.6%
PM	**671**	

NOTE:
Coloured line thickness corresponds to turning movement volume.

CROSSROADS TRAFFIC CONSULTANTS LTD.

DIRECTIONAL TRAFFIC COUNT SUMMARY

HIGHWAY: 27 **REFERENCE NO.:** 70000204 **INTERSECTION OF:** 27 & 65 AVE OLDS
LATITUDE (degrees): 51.79500604 **LONGITUDE (degrees):** -114.1315179 **LEGAL DESCRIPTION:** 31-32-1-508150000
DAY & DATE OF COUNT: THURSDAY, JULY 20, 2023 **COUNT DURATION:** 24 HOURS (MIDNIGHT TO MIDNIGHT)

| | APPROACHING INTERSECTION | | |

CROSSROADS TRAFFIC CONSULTANTS LTD.

DIRECTIONAL PEDESTRIAN COUNT SUMMARY

LOCATION: 27 & 65 AVE OLDS

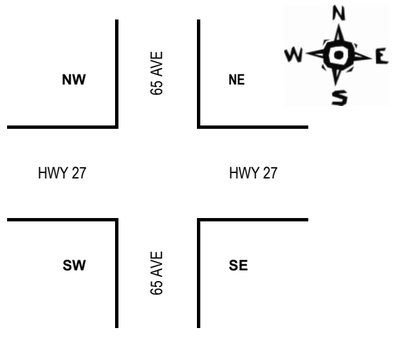
DATE: THURSDAY, JULY 20, 2023

REFERENCE No: 70000204

REMARKS: MIOVISION CAMERAS CANNOT CLASSIFY PEDESTRIANS OR MONITOR JAYWALKING

COUNT DURATION: 24 HOURS (MIDNIGHT TO MIDNIGHT)

PEDESTRIAN CROSSING FROM	TO	INTERVAL																						SUB-TOTAL
		MIDNIGHT TO 1:00AM	1:00 AM TO 2:00 AM	2:00 AM TO 3:00 AM	3:00 AM TO 4:00 AM	4:00 AM TO 5:00 AM	5:00 AM TO 6:00AM	6:00 AM TO 7:00 AM	7:00 AM TO 8:00 AM	8:00 AM TO 9:00 AM	9:00 AM TO 10:00 AM	10:00 AM TO 11:00 AM	11:00 AM TO NOON	NOON TO 1:00PM	1:00PM TO 2:00 PM	2:00 PM TO 3:00 PM	3:00 PM TO 4:00 PM	4:00 PM TO 5:00 PM	5:00 PM TO 6:00 PM	6:00 PM TO 7:00 PM	7:00 PM TO 8:00 PM	8:00 PM TO 9:00 PM	9:00 PM TO 10:00 PM	10:00 PM TO 11:00 PM	11:00 PM TO MIDNIGHT	
NE CORNER	SE CORNER								1			1				1	1				1				1	**6**
	NW CORNER				1			2	1	1	1		1			3	1	4				5		1		**21**
NW CORNER	SW CORNER						2	1	3		5	1	1	1	6	6	2	5	8	6		4	4	2		**57**
	NE CORNER							2		1	1		1			2	7						3		1	**18**
SE CORNER	NE CORNER															2	1	1								**4**
	SW CORNER																	1							1	**2**
SW CORNER	NW CORNER							1	1	1	7			4	1	7	1	7	2	16	2		1	3		**54**
	SE CORNER							1					1		1						5	2				**10**
																								TOTAL PEDESTRIANS		**172**



Reference Number:
997026

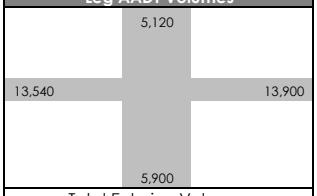
Intersection of:
27 & RGE RD 15 57 AVE, OLDS

North On: 57 AVE

Vehicle Type	Volume	%
A: Passenger Vehicle	4,983	97.3%
B: Recreational Vehicle	26	0.5%
C: Bus	0	0.0%
D: Single Unit Truck	79	1.5%
E: Tractor Trailer Unit	32	0.6%
AADT	**5,120**	
ASDT	5,550	

2023 AADT / ASDT Estimates

Leg AADT Volumes



Total Entering Volume: **19,230**

From North			
2,690			
	Right	Thru	Left
	680	**900**	**1,110**
A	649	889	1,078
B	3	3	11
C	0	0	0
D	15	8	17
E	13	0	4

To North	
2,430	
A	2,367
B	9
C	0
D	39
E	15

To West	
6,960	
A	6,641
B	69
C	1
D	108
E	141

From East			
7,140			
Left	Thru	Right	
960	**5,180**	**1,000**	
949	4,905	975	A
2	63	4	B
0	1	0	C
6	83	18	D
3	128	3	E

West On: 27

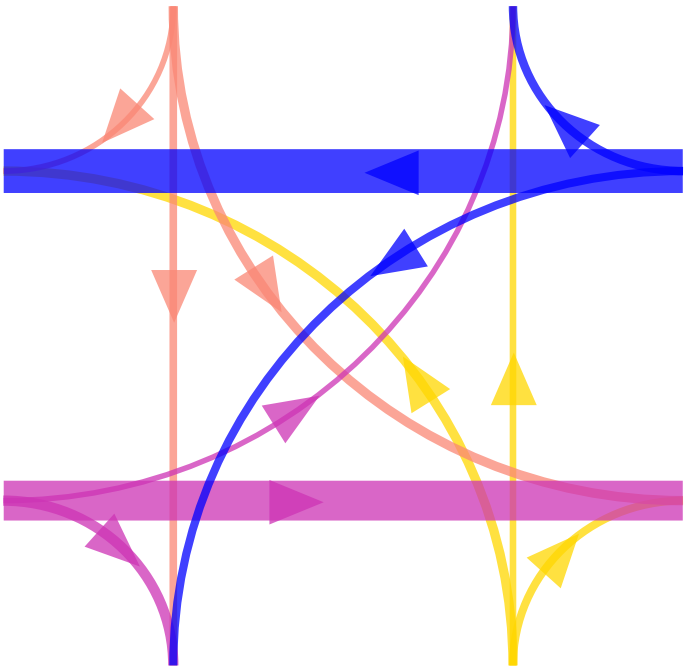
	Volume	%
A	12,900	95.3%
B	145	1.1%
C	2	0.0%
D	210	1.6%
E	283	2.1%
AADT	**13,540**	
ASDT	14,810	

East On: 27

Vehicle Type		
A	13,276	95.5%
B	151	1.1%
C	1	0.0%
D	204	1.5%
E	268	1.9%
AADT	**13,900**	
ASDT	15,200	

From West			
6,580			
Left	Thru	Right	
650	**4,710**	**1,220**	
620	4,437	1,202	A
3	68	5	B
0	0	1	C
15	76	11	D
12	129	1	E

To East	
6,760	
6,447	A
82	B
0	C
97	D
134	E



To South	
3,080	
A	3,040
B	10
C	1
D	25
E	4

From South			
2,820			
Left	Thru	Right	
1,100	**780**	**940**	
1,087	772	932	A
3	2	3	B
0	0	0	C
10	6	4	D
0	0	1	E

South On: 57 AVE

Vehicle Type	Volume	%
A: Passenger Vehicle	5,831	98.8%
B: Recreational Vehicle	18	0.3%
C: Bus	1	0.0%
D: Single Unit Truck	45	0.8%
E: Tractor Trailer Unit	5	0.1%
AADT	**5,900**	
ASDT	6,410	

ABBREVIATIONS:

AADT: Annual Average Daily Traffic. Average daily traffic expressed as vehicles per day for the period from January 1 to December 31 (inclusive), 365 days.

ASDT: Average Summer Daily Traffic. Average daily traffic expressed as vehicles per day for the period from May 1 to September 30 (inclusive), 153 days.

NOTE:
Coloured line thickness corresponds to turning movement volume.

Reference Number:
997026

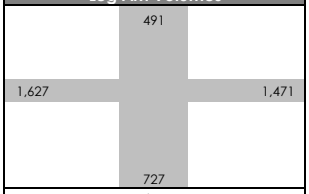
Intersection of:
27 & RGE RD 15 57 AVE, OLDS

North On: 57 AVE

Vehicle Type	Volume	%
A: Passenger Vehicle	482	98.2%
B: Recreational Vehicle	0	0.0%
C: Bus	2	0.4%
D: Single Unit Truck	4	0.8%
E: Tractor Trailer Unit	3	0.6%
AM	**491**	

2023 AM 100th Highest Hour Estimates

Leg AM Volumes



Total Entering Volume:
2,158

From North

	Right	Thru	Left
	230		
	73	**81**	**76**
A	72	77	72
B	0	0	0
C	0	1	1
D	1	0	3
E	0	3	0

To North

	261
A	261
B	0
C	0
D	0
E	0

To West

	844
A	790
B	6
C	1
D	21
E	26

From East

Left	Thru	Right	
735			
69	**561**	**105**	
69	510	105	A
0	5	0	B
0	1	0	C
0	19	0	D
0	26	0	E

West On: 27

	Volume	%
A	1,529	94.0%
B	8	0.5%
C	1	0.1%
D	41	2.5%
E	48	3.0%
AM	**1,627**	

East On: 27

Vehicle Type		
A	1,374	93.4%
B	6	0.4%
C	2	0.1%
D	41	2.8%
E	48	3.3%
AM	**1,471**	

From West

	Left	Thru	Right
	783		
	61	**555**	**167**
A	61	513	165
B	0	1	1
C	0	0	0
D	0	19	1
E	0	22	0

To East

	736
	690
A	1
B	1
C	22
D	22
E	

To South

	317
A	311
B	1
C	1
D	1
E	3

From South

	Left	Thru	Right
	410		
	210	**95**	**105**
A	208	95	105
B	1	0	0
C	0	0	0
D	1	0	0
E	0	0	0

South On: 57 AVE

Vehicle Type	Volume	%
A: Passenger Vehicle	719	98.9%
B: Recreational Vehicle	2	0.3%
C: Bus	1	0.1%
D: Single Unit Truck	2	0.3%
E: Tractor Trailer Unit	3	0.4%
AM	**727**	

NOTE:
Coloured line thickness corresponds to turning movement volume.

Reference Number:
997026

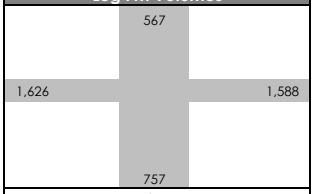
Intersection of:
27 & RGE RD 15 57 AVE, OLDS

North On: 57 AVE

Vehicle Type	Volume	%
A: Passenger Vehicle	561	98.9%
B: Recreational Vehicle	1	0.2%
C: Bus	0	0.0%
D: Single Unit Truck	5	0.9%
E: Tractor Trailer Unit	0	0.0%
PM	**567**	

2023 PM 100th Highest Hour Estimates

Leg PM Volumes



Total Entering Volume:
2,269

From North

	Right	Thru	Left
	302		
	83	**105**	**114**
A	82	105	112
B	0	0	1
C	0	0	0
D	1	0	1
E	0	0	0

To North

	265
A	262
B	0
C	0
D	3
E	0

To West

	821
A	795
B	2
C	1
D	6
E	17

From East

Left	Thru	Right	
793			
104	**573**	**116**	
103	549	115	A
0	2	0	B
0	0	0	C
1	5	1	D
0	17	0	E

West On: 27

	Volume	%
A	1,557	95.8%
B	4	0.2%
C	2	0.1%
D	20	1.2%
E	43	2.6%
PM	**1,626**	

East On: 27

Vehicle Type		
A	1,520	95.7%
B	5	0.3%
C	0	0.0%
D	21	1.3%
E	42	2.6%
PM	**1,588**	

From West

	Left	Thru	Right
	805		
	47	**579**	**179**
A	46	540	176
B	0	1	1
C	0	0	1
D	1	13	0
E	0	25	1

To East

	795
A	753
B	3
C	0
D	14
E	25

To South

	388
A	384
B	1
C	1
D	1
E	1

From South

	Left	Thru	Right
	369		
	165	**102**	**102**
A	164	101	101
B	0	0	1
C	1	0	0
D	0	1	0
E	0	0	0

South On: 57 AVE

Vehicle Type	Volume	%
A: Passenger Vehicle	750	99.1%
B: Recreational Vehicle	2	0.3%
C: Bus	2	0.3%
D: Single Unit Truck	2	0.3%
E: Tractor Trailer Unit	1	0.1%
PM	**757**	

NOTE:
Coloured line thickness corresponds to turning movement volume.

CROSSROADS TRAFFIC CONSULTANTS LTD.

DIRECTIONAL TRAFFIC COUNT SUMMARY

HIGHWAY: 27 **REFERENCE NO.:** 00997026 **INTERSECTION OF:** 27 & RGE RD 15 57 AVE, OLDS
LATITUDE (degrees): 51.795019 **LONGITUDE (degrees):** -114.1198656 **LEGAL DESCRIPTION:** 31-32-1-500000000
DAY & DATE OF COUNT: TUESDAY, AUGUST 02, 2022 **COUNT DURATION:** 24 HOURS (MIDNIGHT TO MIDNIGHT)

APPROACHING INTERSECTION

INTERVAL	FROM THE EAST ON 27 LEFT					FROM THE EAST ON 27 THROUGH					FROM THE EAST ON 27 RIGHT					FROM THE WEST ON 27 LEFT					FROM THE WEST ON 27 THROUGH					FROM THE WEST ON 27 RIGHT					TOTALS
MIDNIGHT - 0:15	1					3															2					2					8
0:15 - 0:30	1					3					3								1		3										11
0:30 - 0:45	1																				1					2					4
0:45 - 1:00						1				1	1										2					1					6
1:00 - 1:15	1					4			1		1										2										9
1:15 - 1:30						1															1										2
1:30 - 1:45						2															1										3
1:45 - 2:00																			1		1					1					3
2:00 - 2:15						1														1											2
2:15 - 2:30						2					1										2										5
2:30 - 2:45	1					1					1										3										6
2:45 - 3:00						4				1	2										3					1					11
3:00 - 3:15																			1		1										2
3:15 - 3:30						2					1										2										5
3:30 - 3:45						1					1										1										3
3:45 - 4:00						3				1									1												5
4:00 - 4:15	1					1				1									1		3			1	2						10
4:15 - 4:30	1					5															5										11
4:30 - 4:45						10													2		2			2	1	3					20
4:45 - 5:00						8					2										6				1						15
5:00 - 5:15						10													1		8					1					19
5:15 - 5:30						16					2								1		18										37
5:30 - 5:45	3					9	1			1									1		21			1							37
5:45 - 6:00	2					14					4								1		22			1		2					46
6:00 - 6:15	1					17			1	3	5										16				3	3					49
6:15 - 6:30	3					22				1	2								2		21				1	5					57
6:30 - 6:45	4					27			2		14								5		30					7					89
6:45 - 7:00	2					31	1		1	2	11								4		31					6			1		90
7:00 - 7:15	12					30	1			1	10								3		25			3		4		1			90
7:15 - 7:30	3					36			2	1	9								6		29	1			1	8					96
7:30 - 7:45	6					49			1	2	13				1				6		47	1		1	4	16					149
7:45 - 8:00	11					63	1		2	1	18								9		60					5	16				186
8:00 - 8:15	9					59			3	4	15				1				8		46			2	8	20			1		177
8:15 - 8:30	6			1		62			1	2	15				2				8		56	1			1	22					178
8:30 - 8:45	7					54	1		1	2	12								9		61	1			1	18			1		169
8:45 - 9:00	13					70			3	4	15				1				6		53			5	3	21					194
9:00 - 9:15	10					69	1		1	1	16								7		65	2		1	3	31					209
9:15 - 9:30	12			1		68			2	1	21				1				11		68	2			1	13					201
9:30 - 9:45	11					100			3	3	15								7		75	2		1	3	26			1		247
9:45 - 10:00	14				1	91			4	2	22				1				13		109	2		4	2	35	1				303
10:00 - 10:15	12					86			2	4	15								4		87			1	1	25					237
10:15 - 10:30	7					85	3		3	3	15								11		77	1			2	39					246
10:30 - 10:45	12					86			2	2	19								16		99	2		4	3	31	1				277
10:45 - 11:00	17	1				125	4		4	9	15								9		91	2		3	5	37					324
11:00 - 11:15	16					101	3		1	3	19				1				11		96	1		4	4	35			1		297
11:15 - 11:30	14					114	5		2	2	17								9		101	4			2	26					296
11:30 - 11:45	24					128	4		7	6	16				1	1			9		119	1		1	3	33					354
11:45 - 12:00 PM	23			2		120	3			5	20				1				9		104	2		3	1	35					328
12:00 - 12:15	24					116			1	4	22								24		91	5		2	3	36	1		1		331
12:15 - 12:30	23					127	1		2	6	27								12		131	4		3	7	32	1				379
12:30 - 12:45	11					114	6		2	3	26								22		102	2		2		26			1		318
12:45 - 1:00	15					155	2		2	5	20								11		109	3		3	1	38	1				365
1:00 - 1:15	19					102	3		2	8	14				1				17		116	2		1	2	45					332
1:15 - 1:30	18					124			4	2	19				1				19		106	1			1	31		2	1		331
1:30 - 1:45	28					112			1	1	14								14		100	1		3	4	22		1			309
1:45 - 2:00	21					119	4		3	3	32				1				15		113	1		2	4	25					345
2:00 - 2:15	17					131	1			4	18	1			1				18		115	1			4	30	1				342
2:15 - 2:30	15					127	1		3	1	14				2				11		101	2		1	5	28					314
2:30 - 2:45	21					119			1	3	25					1			17	1	117	1		7	4	39					356
2:45 - 3:00	28					124	2		1	3	14				1				14		112	2		2	2	31					336
3:00 - 3:15	20					123	1		1	2	15								10		84	4		4	2	26					292
3:15 - 3:30	16	1				108	1		2	1	21								14		103	1		2	2	31					303
3:30 - 3:45	19					133			2	5	13				2				15		116	2		2	2	29		1			342
3:45 - 4:00	18			1		114			2	4	12								13		110	1		2	4	42					323
4:00 - 4:15	17					111	3		1	3	20								13		87	1			2	30		1			290
4:15 - 4:30	15			1		127	1	1	2		19				1				20	1	116	1		2	5	32					345
4:30 - 4:45	18					138	2		1		21								19		123	3		3	1	24		1			354
4:45 - 5:00	33					135	1		2	1	22								20		111	1		2	4	31					363
5:00 - 5:15	21					102			1		19	1							18		118	1		2		44					328
5:15 - 5:30	22					108	3			1	27								18		96	2		1		27					305
5:30 - 5:45	14					101			1	2	17	1							18		115	1			3	28					301
5:45 - 6:00	24					86	3		1		12	1							20		75			1	3	15			1		241
6:00 - 6:15	15					85	1		1	1	19								16		74				5	15					232
6:15 - 6:30	9				1	75			1		19								13		63	1				25					207
6:30 - 6:45	16					73	1			2	14								7		77					17					207
6:45 - 7:00	9					68				1	16								9		53					17					173
7:00 - 7:15	14					56					10								11		48				1	8					148
7:15 - 7:30	14				1	61				1	6	1							10		49	1		1	1	4					150
7:30 - 7:45	9					51	2			1	6								6		51	1			2	9					138
7:45 - 8:00	6					57				1	9								9		46	1			1	13					143
8:00 - 8:15	13					54	2		1	1	12								14	1	40			1		10					149
8:15 - 8:30	12					38	1		1		13								6		28				1	5					105
8:30 - 8:45	5					42					5								10		38	2		1		10					113
8:45 - 9:00	8					37			1		5								7		30				2	11					101
9:00 - 9:15	9					37	1			1	5								6		29				2	3					92
9:15 - 9:30	13					35			3	1	5								8		22					9					93
9:30 - 9:45	10					22			1		6								7		28				1	4					79
9:45 - 10:00	8					24				2	3								4		26					6					73
10:00 - 10:15	5					16					6								10		22	1				5					65
10:15 - 10:30	3					18	1				1								3		18										44
10:30 - 10:45	6					16					2								6	1	19				1	3					54
10:45 - 11:00	4					15					6								2		10					3					40
11:00 - 11:15	4					12					3								3		11					1					34
11:15 - 11:30	1					9					1								1		5					1					18
11:30 - 11:45	5					7					2										5					1					20
11:45 - MIDNIGHT	4					8					3								2		1					2					19
VEH CLASS	**A**	**B**	**C**	**D**	**E**	**A**	**B**	**C**	**D**	**E**	**A**	**B**	**C**	**D**	**E**	**A**	**B**	**C**	**D**	**E**	**A**	**B**	**C**	**D**	**E**	**A**	**B**	**C**	**D**	**E**	
TOTALS	940	2		6	3	5564	72	1	94	145	1011	5		19	3	750	4		17	14	5036	77		88	146	1447	6	1	13	1	15465
	EL					**ET**					**ER**					**WL**					**WT**					**WR**					

APPROACHING INTERSECTION

INTERVAL	FROM THE NORTH ON 57 AVE LEFT					FROM THE NORTH ON 57 AVE THROUGH					FROM THE NORTH ON 57 AVE RIGHT					FROM THE SOUTH ON 57 AVE LEFT					FROM THE SOUTH ON 57 AVE THROUGH					FROM THE SOUTH ON 57 AVE RIGHT					TOTALS	GRAND TOTALS
MIDNIGHT - 0:15	3					1					2																			6	14
0:15 - 0:30	3					1										4									2					10	21
0:30 - 0:45						2										2									1					5	9
0:45 - 1:00	1				1	1					3														1					7	13
1:00 - 1:15	1															1									1					3	12
1:15 - 1:30	2										1																			4	6
1:30 - 1:45																1									1					2	5
1:45 - 2:00															1															1	4
2:00 - 2:15	1																													1	3
2:15 - 2:30																									1					1	6
2:30 - 2:45											1														1					2	8
2:45 - 3:00											1																			1	12
3:00 - 3:15																									1					1	3
3:15 - 3:30	1															1														2	7
3:30 - 3:45	1																								2					3	6
3:45 - 4:00	2																													3	8
4:00 - 4:15																									1					5	15
4:15 - 4:30	1					1					1														1					5	16
4:30 - 4:45	2					1									1										1					5	25
4:45 - 5:00						3					4					2					3				5					18	33
5:00 - 5:15	1															2					1				2					6	25
5:15 - 5:30	3					2					2														2					9	46
5:30 - 5:45	4					8					2					2					1				7					24	61
5:45 - 6:00	5					1					2					1					5				5					19	65
6:00 - 6:15	6					3					4					1					1				11					26	75
6:15 - 6:30	5					2					3					5									5					20	77
6:30 - 6:45	7					6					5					5					6				10					39	128
6:45 - 7:00	5					7					4					13			1		13				14					57	147
7:00 - 7:15	11			1		9					6					4					4				10					45	135
7:15 - 7:30	13			1		8					8					5	1				7				8					51	147
7:30 - 7:45	19					14					4					7					14				17					75	224
7:45 - 8:00	17					12				1	8					15					13				13					79	265
8:00 - 8:15	12					14				1	9					10					12				10					68	245
8:15 - 8:30	21				1	13					10					20					10				18					93	271
8:30 - 8:45	16				1	11				1	14				2	17			1		10				15	1		1		90	259
8:45 - 9:00	16					18					21					20				1	12				18					103	297
9:00 - 9:15	15				1	14					9					13			1		8				16					79	287
9:15 - 9:30	17				1	14					10					14					12				12					79	280
9:30 - 9:45	11					17					17					22			1		7				14					91	338
9:45 - 10:00	18				2	14					25					15					15				16					105	408
10:00 - 10:15	16				1	10					23					6					8				8					84	321
10:15 - 10:30	16					9					8					17			1		8				16					85	331
10:30 - 10:45	15					13					14					31					14				16				1	104	381
10:45 - 11:00	19					10					14					34	1				14				13					107	431
11:00 - 11:15	18					15				1	11				1	21				1	10				15					113	410
11:15 - 11:30	12					12					17				1	25					17				18					107	403
11:30 - 11:45	13					9				1	10					22					10				13					91	445
11:45 - 12:00 PM	18					10					14	1				45					14	1			17					122	450
12:00 - 12:15	16					17			1	2	41				1	16					16				17					143	474
12:15 - 12:30	15					9					24					27					13				27					110	489
12:30 - 12:45	20					14	1			2	33					7					7				16			1		128	446
12:45 - 1:00	25			1		21				1	34				1	21				1	21				19					151	516
1:00 - 1:15	17					14					30					20					17				17					126	458
1:15 - 1:30	23	1		1		16				1	28					14					12				12					122	453
1:30 - 1:45	20					15			2		35	1				20					16	1		1	16					129	438
1:45 - 2:00	19			2		18				1	30					11					14				14					114	459
2:00 - 2:15	22					11			1		35					12					13				13					119	461
2:15 - 2:30	15					16				1	30				1	15				1	23				17				1	122	436
2:30 - 2:45	21				1	19	1			1	31					6					17				17					120	476
2:45 - 3:00	18				1	14			1		24					20					13				13					126	462
3:00 - 3:15	16					21			1		25					25					18				18					130	422
3:15 - 3:30	27					18			1		24	1			1	19					16				16					131	434
3:30 - 3:45	12			1		16					24					12					18				12					102	444
3:45 - 4:00	13			1		16					35					22					22				16					131	454
4:00 - 4:15	21					13			1		36					17					13				17					119	409
4:15 - 4:30	16					16					27				1	18					17				17					124	469
4:30 - 4:45	23					15			1		38				1	24					15				15					140	494
4:45 - 5:00	19			1		18					32					17					16				16					127	490
5:00 - 5:15	22					16				1	33					20	1				26				20	1				128	456
5:15 - 5:30	15					13					24					12				1	18				13			1		97	402
5:30 - 5:45	11					17					26					18					12				18					113	414
5:45 - 6:00	18				1	10					15					11					18				11					91	332
6:00 - 6:15	14	1				7					15					15				1	11				14					78	310
6:15 - 6:30	10					14					15					16					11				16					78	285
6:30 - 6:45	9					7					12					9	1				9				17					67	274
6:45 - 7:00	8					7					5					11					7				11					46	219
7:00 - 7:15	16					5					8					6					12				6					56	204
7:15 - 7:30	8					5					13					10					10				10					59	209
7:30 - 7:45	12					8				1	5					5					6				5					47	185
7:45 - 8:00	15					12					11					6					6				9					67	210
8:00 - 8:15	9					8					12					11					11				7					55	204
8:15 - 8:30	14	1				10					8					9					9				10					62	167
8:30 - 8:45	5					4					7					13					16				10					45	158
8:45 - 9:00	10					8					3					16					16				9					55	156
9:00 - 9:15	6					5					7					8					7				7					39	131
9:15 - 9:30	7					7					10					11					8				11					49	142
9:30 - 9:45	8					6					6					8					4				8					38	117
9:45 - 10:00	5					3					3					1					1				1					17	90
10:00 - 10:15	7					3					6					3					6				3					23	88
10:15 - 10:30	6					2					3					4					3				4					20	64
10:30 - 10:45	5					2					4					2					4				2					18	72
10:45 - 11:00	1					1					6					2					6				2					16	56
11:00 - 11:15	6					2					2					2					2				2					14	48
11:15 - 11:30	2					2					1					2					1				2					16	34
11:30 - 11:45	3					2					2					4					4				4					15	35
11:45 - MIDNIGHT	2					1					2										2									8	27
VEH CLASS	**A**	**B**	**C**	**D**	**E**	**A**	**B**	**C**	**D**	**E**	**A**	**B**	**C**	**D**	**E**	**A**	**B**	**C**	**D**	**E**	**A**	**B**	**C**	**D**	**E**	**A**	**B**	**C**	**D**	**E**		
TOTALS	1109	12		18	5	949	3		8		782	3		17	15	1297	3		12		824	2		7		911	3		5	1	5986	21451
	NL					**NT**					**NR**					**SL**					**ST**					**SR**						

LOCATION DIAGRAM ENCLOSED (Y / N): YES
WEATHER CONDITIONS: SUNNY
RECORDER(S): MIOVISION CAMERAS - ISAAC CASSLEY
ROAD SURFACE CONDTIONS: DRY

VEHICLE CLASSES
A: PASSENGER VEHICLES **B: RECREATION VEHICLES** **C: BUSES**
D: SINGLE UNIT TRUCKS **E: TRACTOR TRAILER COMBINATIONS**

LOCATION DIAGRAM ENCLOSED (Y / N): YES
WEATHER CONDITIONS: SUNNY
RECORDER(S): MIOVISION CAMERAS - ISAAC CASSLEY
ROAD SURFACE CONDTIONS: DRY

VEHICLE CLASSES
A: PASSENGER VEHICLES **B: RECREATION VEHICLES** **C: BUSES**
D: SINGLE UNIT TRUCKS **E: TRACTOR TRAILER COMBINATIONS**

Reference Number:
70000127

Intersection of:
27 & 52 AVE WJ OLDS

North On: 52 AVE

Vehicle Type	Volume	%
A: Passenger Vehicle	1,233	97.9%
B: Recreational Vehicle	8	0.6%
C: Bus	0	0.0%
D: Single Unit Truck	15	1.2%
E: Tractor Trailer Unit	4	0.3%
AADT	**1,260**	
ASDT	1,400	

2023 AADT / ASDT Estimates

Leg AADT Volumes

1,260
12,580 12,900
80

Total Entering Volume:
13,410

From North

		710	
	Right	Thru	Left
	250	**0**	**460**
A	245	0	448
B	1	0	2
C	0	0	0
D	3	0	7
E	1	0	3

To North

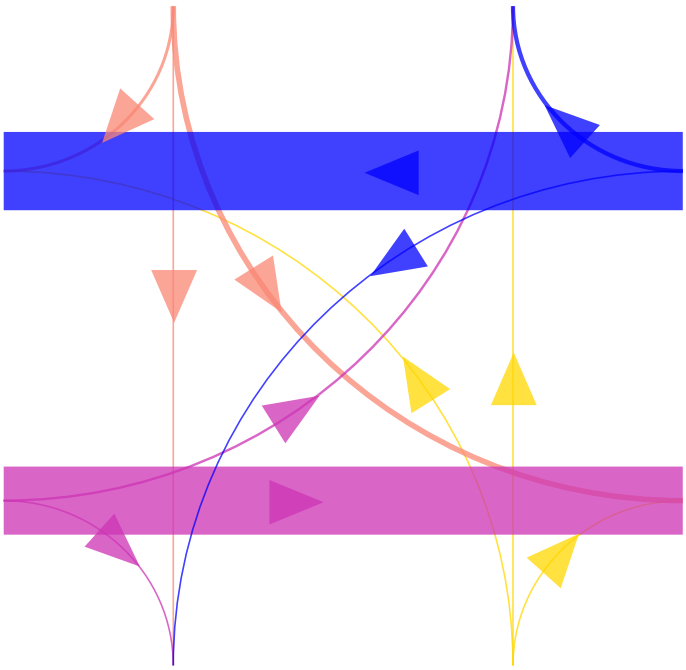
	550
A	540
B	5
C	0
D	5
E	0

To West

	6,725
A	6,419
B	71
C	8
D	108
E	119

From East

	6,815	
Left	Thru	Right
10	**6,455**	**350**
10	6,154	342
0	70	4
0	8	0
0	105	4
0	118	0



West On: 27

	Volume	%
A	12,001	95.4%
B	120	1.0%
C	11	0.1%
D	204	1.6%
E	244	1.9%
AADT	**12,580**	
ASDT	14,000	

East On: 27

Vehicle Type		
A	12,308	95.4%
B	124	1.0%
C	11	0.1%
D	211	1.6%
E	246	1.9%
AADT	**12,900**	
ASDT	15,040	

From West

	5,855	
Left	Thru	Right
200	**5,615**	**40**
198	5,344	40
1	48	0
0	3	0
1	95	0
0	125	0

To East

	6,085
A	5,802
B	50
C	3
D	102
E	128

To South

	50
A	50
B	0
C	0
D	0
E	0

From South

		30	
	Left	Thru	Right
	20	**0**	**10**
A	20	0	10
B	0	0	0
C	0	0	0
D	0	0	0
E	0	0	0

South On: BACK ALLEY

Vehicle Type	Volume	%
A: Passenger Vehicle	80	100.0%
B: Recreational Vehicle	0	0.0%
C: Bus	0	0.0%
D: Single Unit Truck	0	0.0%
E: Tractor Trailer Unit	0	0.0%
AADT	**80**	
ASDT	100	

ABBREVIATIONS:

AADT: Annual Average Daily Traffic. Average daily traffic expressed as vehicles per day for the period from January 1 to December 31 (inclusive), 365 days.

ASDT: Average Summer Daily Traffic. Average daily traffic expressed as vehicles per day for the period from May 1 to September 30 (inclusive), 153 days.

NOTE:
Coloured line thickness corresponds to turning movement volume.

Reference Number:
70000127

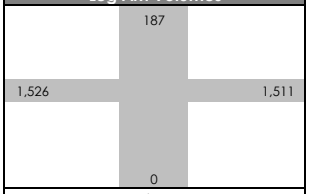
Intersection of:
27 & 52 AVE WJ OLDS

North On: 52 AVE

Vehicle Type	Volume	%
A: Passenger Vehicle	187	100.0%
B: Recreational Vehicle	0	0.0%
C: Bus	0	0.0%
D: Single Unit Truck	0	0.0%
E: Tractor Trailer Unit	0	0.0%
AM	**187**	

2023 AM 100th Highest Hour Estimates

Leg AM Volumes



Total Entering Volume: **1,612**

From North

	Right	Thru	Left
	109		
	62	**0**	**47**
A	62	0	47
B	0	0	0
C	0	0	0
D	0	0	0
E	0	0	0

To North

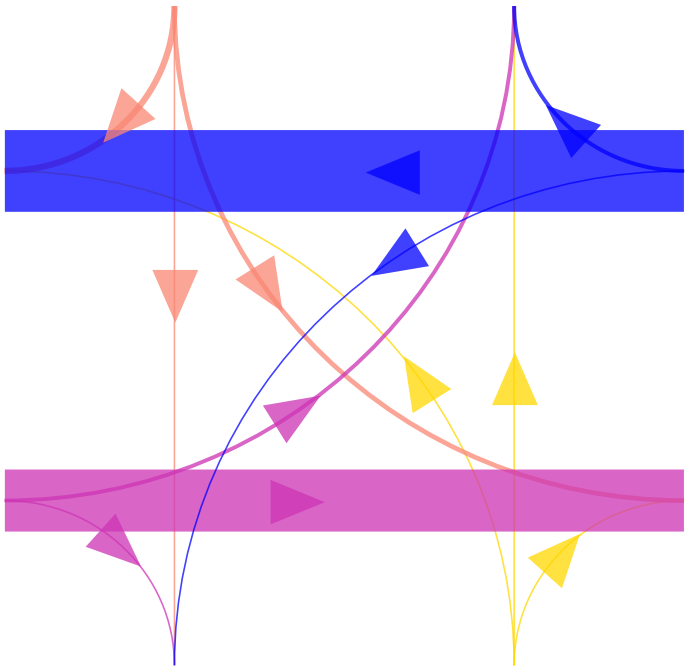
	78
A	78
B	0
C	0
D	0
E	0

To West

	872
A	802
B	8
C	0
D	39
E	23

From East

Left	Thru	Right	
849			
0	**810**	**39**	
0	740	39	A
0	8	0	B
0	0	0	C
0	39	0	D
0	23	0	E



West On: 27

	Volume	%
A	1,433	93.9%
B	8	0.5%
C	0	0.0%
D	62	4.1%
E	23	1.5%
AM	**1,526**	

East On: 27

Vehicle Type		
A	1,418	93.8%
B	8	0.5%
C	0	0.0%
D	62	4.1%
E	23	1.5%
AM	**1,511**	

From West

	Left	Thru	Right
	654		
	39	**615**	**0**
A	39	592	0
B	0	0	0
C	0	0	0
D	0	23	0
E	0	0	0

To East

	662
	639
A	0
B	0
C	23
D	0
E	

To South

	0
A	0
B	0
C	0
D	0
E	0

From South

	Left	Thru	Right
	0		
	0	**0**	**0**
A	0	0	0
B	0	0	0
C	0	0	0
D	0	0	0
E	0	0	0

South On: BACK ALLEY

Vehicle Type	Volume	%
A: Passenger Vehicle	0	-
B: Recreational Vehicle	0	-
C: Bus	0	-
D: Single Unit Truck	0	-
E: Tractor Trailer Unit	0	-
AM	**0**	

NOTE:
Coloured line thickness corresponds to turning movement volume.

Reference Number:
70000127

Intersection of:
27 & 52 AVE WJ OLDS

North On: 52 AVE

Vehicle Type	Volume	%
A: Passenger Vehicle	136	87.7%
B: Recreational Vehicle	5	3.2%
C: Bus	0	0.0%
D: Single Unit Truck	14	9.0%
E: Tractor Trailer Unit	0	0.0%
PM	**155**	

2023 PM 100th Highest Hour Estimates

Leg PM Volumes

155
1,553 1,502
14

Total Entering Volume:
1,612

From North

	Total: 73		
	Right	Thru	Left
	55	**0**	**18**
A	50	0	9
B	5	0	0
C	0	0	0
D	0	0	9
E	0	0	0

To North

	Total: 82
A	77
B	0
C	0
D	5
E	0

To West

	Total: 920
A	870
B	23
C	0
D	9
E	18

From East

	Total: 901		
	Left	Thru	Right
	0	**860**	**41**
A	0	815	36
B	0	18	0
C	0	0	0
D	0	9	5
E	0	18	0

West On: 27

Vehicle Type	Volume	%
A	1,480	95.3%
B	28	1.8%
C	0	0.0%
D	18	1.2%
E	27	1.7%
PM	**1,553**	

East On: 27

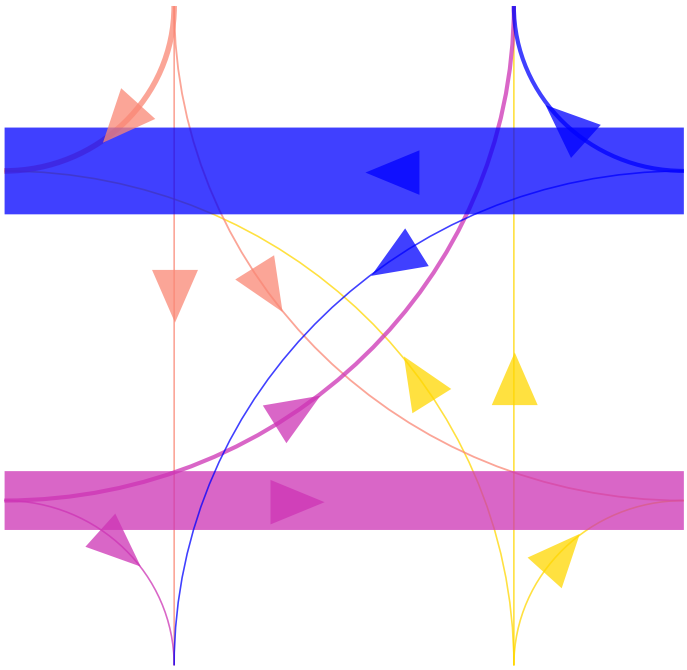
Vehicle Type	Volume	%
A	1,420	94.5%
B	23	1.5%
C	0	0.0%
D	32	2.1%
E	27	1.8%
PM	**1,502**	

From West

	Total: 633		
	Left	Thru	Right
	41	**583**	**9**
A	41	560	9
B	0	5	0
C	0	0	0
D	0	9	0
E	0	9	0

To East

	Total: 601
A	569
B	5
C	0
D	18
E	9



To South

	Total: 9
A	9
B	0
C	0
D	0
E	0

From South

	Total: 5		
	Left	Thru	Right
	5	**0**	**0**
A	5	0	0
B	0	0	0
C	0	0	0
D	0	0	0
E	0	0	0

South On: BACK ALLEY

Vehicle Type	Volume	%
A: Passenger Vehicle	14	100.0%
B: Recreational Vehicle	0	0.0%
C: Bus	0	0.0%
D: Single Unit Truck	0	0.0%
E: Tractor Trailer Unit	0	0.0%
PM	**14**	

NOTE:
Coloured line thickness corresponds to turning movement volume.

CROSSROADS TRAFFIC CONSULTANTS LTD.

DIRECTIONAL TRAFFIC COUNT SUMMARY

HIGHWAY: 27 **REFERENCE NO.:** 70000127 **INTERSECTION OF:** 27 & 52 AVE WJ OLDS
LATITUDE (degrees): 51.79502385 **LONGITUDE (degrees):** -114.1097253 **LEGAL DESCRIPTION:** 32-32-1-509300000
DAY & DATE OF COUNT: THURSDAY, JULY 20, 2023 **COUNT DURATION:** 24 HOURS (MIDNIGHT TO MIDNIGHT)

| | APPROACHING INTERSECTION | | |

CROSSROADS TRAFFIC CONSULTANTS LTD.

DIRECTIONAL PEDESTRIAN COUNT SUMMARY

LOCATION: 27 & 52 AVE WJ OLDS

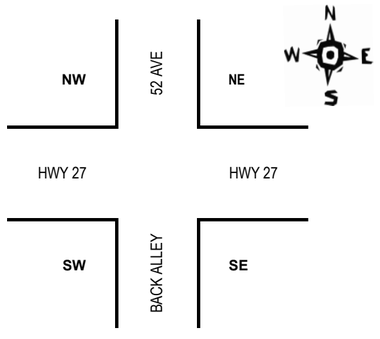
DATE: THURSDAY, JULY 20, 2023

REFERENCE No: 70000127

REMARKS: MIOVISION CAMERAS CANNOT CLASSIFY PEDESTRIANS OR MONITOR JAYWALKING

COUNT DURATION: 24 HOURS (MIDNIGHT TO MIDNIGHT)

PEDESTRIAN CROSSING FROM	TO	INTERVAL																						SUB-TOTAL
		MIDNIGHT TO 1:00AM	1:00 AM TO 2:00 AM	2:00 AM TO 3:00 AM	3:00 AM TO 4:00 AM	4:00 AM TO 5:00 AM	5:00 AM TO 6:00AM	6:00 AM TO 7:00 AM	7:00 AM TO 8:00 AM	8:00 AM TO 9:00 AM	9:00 AM TO 10:00 AM	10:00 AM TO 11:00 AM	11:00 AM TO NOON	NOON TO 1:00PM	1:00PM TO 2:00 PM	2:00 PM TO 3:00 PM	3:00 PM TO 4:00 PM	4:00 PM TO 5:00 PM	5:00 PM TO 6:00 PM	6:00 PM TO 7:00 PM	7:00 PM TO 8:00 PM	8:00 PM TO 9:00 PM	9:00 PM TO 10:00 PM	10:00 PM TO 11:00 PM	11:00 PM TO MIDNIGHT	
NE CORNER	SE CORNER																								
	NW CORNER	1							2	1	1	1	1			2	2	7		1	3		1	2		**25**
NW CORNER	SW CORNER	1								1	2	2	3	2	3	4	3	2	2	4	6	2	1			**38**
	NE CORNER								2	1			2	5	3	3		1		5	4		1	3		**30**
SE CORNER	NE CORNER																									
	SW CORNER								1	1	1		3	1	1	3	3		3	3			1		2	**23**
SW CORNER	NW CORNER		1						3	1	1	2	4	3	4	5	2	4	1	4	4	1	1		3	**44**
	SE CORNER									1	2	1	1	1	1		1	1	1							**10**
																								TOTAL PEDESTRIANS		**170**



Reference Number:
70001024

Intersection of:
27 & 51 AVENUE, OLDS

North On: 51 AVE

Vehicle Type	Volume	%
A: Passenger Vehicle	457	96.6%
B: Recreational Vehicle	4	0.8%
C: Bus	2	0.4%
D: Single Unit Truck	7	1.5%
E: Tractor Trailer Unit	3	0.6%
AADT	**480**	
ASDT	520	

2023 AADT / ASDT Estimates

Leg AADT Volumes

480
11,570 10,940
1,700

Total Entering Volume:
12,344

From North

	242		
	Right	Thru	Left
	121	**30**	**91**
A	118	28	88
B	1	0	1
C	1	0	0
D	1	2	1
E	0	0	1

To North

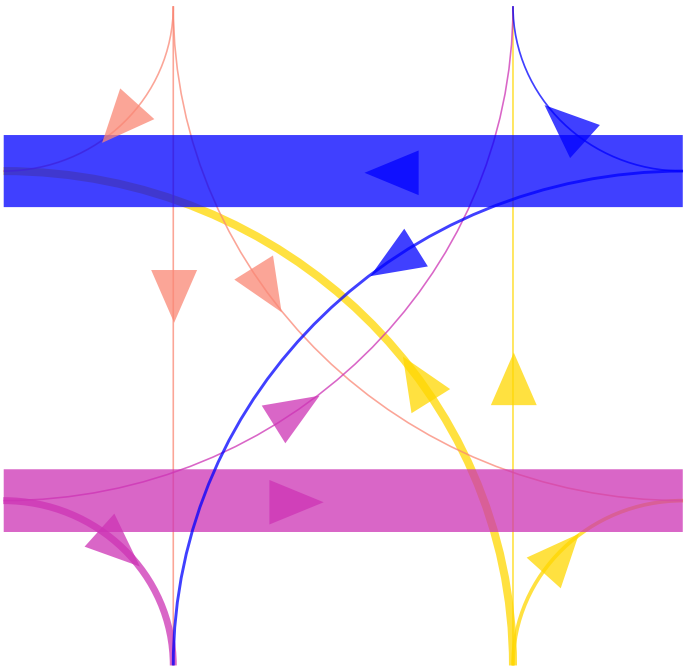
	240
A	223
B	2
C	1
D	3
E	2

To West

	6,190
A	5,920
B	43
C	18
D	112
E	109

From East

	5,821	
Left	Thru	Right
220	**5,470**	**131**
216	5,201	124
0	41	2
0	13	1
3	106	2
1	109	2



West On: 27

	Volume	%
A	11,039	95.4%
B	78	0.7%
C	31	0.3%
D	209	1.8%
E	215	1.9%
AADT	**11,570**	
ASDT	12,580	

East On: 27

Vehicle Type		
A	10,419	95.1%
B	77	0.7%
C	28	0.3%
D	210	1.9%
E	219	2.0%
AADT	**10,940**	
ASDT	11,890	

From West

	5,370		
	Left	Thru	Right
	80	**4,761**	**529**
A	79	4,519	521
B	0	33	2
C	0	13	0
D	1	90	6
E	0	106	0

To East

	5,130
A	4,878
B	34
C	14
D	99
E	107

To South

	780
A	765
B	2
C	0
D	11
E	1

From South

	911		
	Left	Thru	Right
	611	**20**	**280**
A	601	20	271
B	1	0	0
C	4	0	1
D	5	0	8
E	0	0	0

South On: 51 AVE

Vehicle Type	Volume	%
A: Passenger Vehicle	1,657	98.0%
B: Recreational Vehicle	3	0.2%
C: Bus	5	0.3%
D: Single Unit Truck	24	1.4%
E: Tractor Trailer Unit	1	0.1%
AADT	**1,700**	
ASDT	1,850	

ABBREVIATIONS:

AADT: Annual Average Daily Traffic. Average daily traffic expressed as vehicles per day for the period from January 1 to December 31 (inclusive), 365 days.

ASDT: Average Summer Daily Traffic. Average daily traffic expressed as vehicles per day for the period from May 1 to September 30 (inclusive), 153 days.

NOTE:
Coloured line thickness corresponds to turning movement volume.

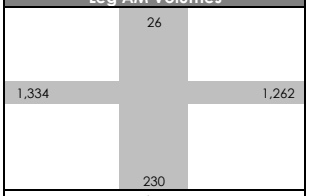
Reference Number:
70001024

Intersection of:
27 & 51 AVENUE, OLDS

North On: 51 AVE	Vehicle Type	Volume	%
	A: Passenger Vehicle	26	100.0%
	B: Recreational Vehicle	0	0.0%
	C: Bus	0	0.0%
	D: Single Unit Truck	0	0.0%
	E: Tractor Trailer Unit	0	0.0%
	AM	**26**	

2023 AM 100th Highest Hour Estimates

Leg AM Volumes



Total Entering Volume:
1,426

From North			
	16		
	Right	Thru	Left
	11	**0**	**5**
A	11	0	5
B	0	0	0
C	0	0	0
D	0	0	0
E	0	0	0

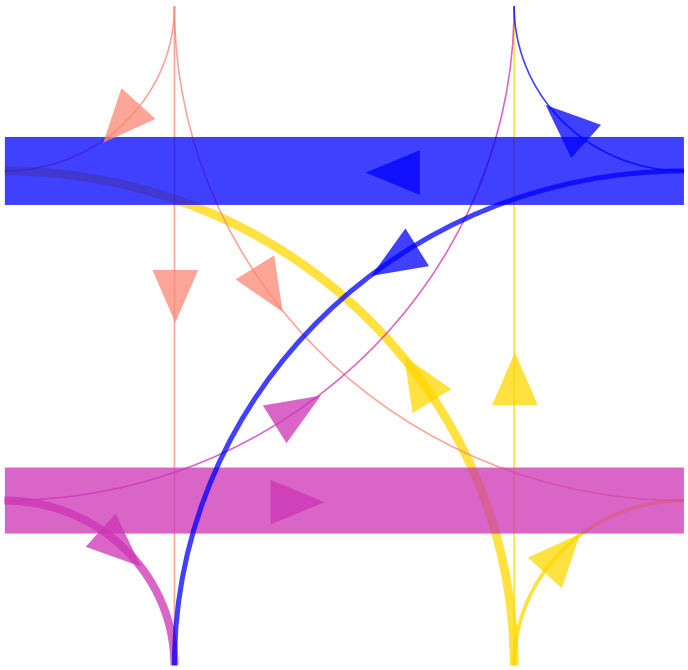
To North	
	10
A	10
B	0
C	0
D	0
E	0

To West	
	684
A	640
B	0
C	11
D	33
E	0

From East			
	645		
	Left	Thru	Right
	44	**596**	**5**
	44	552	5
	0	0	0
	0	11	0
	0	33	0
	0	0	0

West On: 27		Volume	%
	A	1,263	94.7%
	B	0	0.0%
	C	22	1.6%
	D	33	2.5%
	E	16	1.2%
	AM	**1,334**	

	Vehicle Type			East On: 27
	A	1,191	94.4%	
	B	0	0.0%	
	C	22	1.7%	
	D	33	2.6%	
	E	16	1.3%	
	AM	**1,262**		



From West			
	650		
	Left	Thru	Right
	0	**579**	**71**
A	0	552	71
B	0	0	0
C	0	11	0
D	0	0	0
E	0	16	0

To East	
	617
	590
A	0
B	11
C	0
D	16
E	

To South	
	115
A	115
B	0
C	0
D	0
E	0

From South			
	115		
	Left	Thru	Right
	77	**5**	**33**
A	77	5	33
B	0	0	0
C	0	0	0
D	0	0	0
E	0	0	0

South On: 51 AVE	Vehicle Type	Volume	%
	A: Passenger Vehicle	230	100.0%
	B: Recreational Vehicle	0	0.0%
	C: Bus	0	0.0%
	D: Single Unit Truck	0	0.0%
	E: Tractor Trailer Unit	0	0.0%
	AM	**230**	

NOTE:
Coloured line thickness corresponds to turning movement volume.

Reference Number:
70001024

Intersection of:
27 & 51 AVENUE, OLDS

North On: 51 AVE

Vehicle Type	Volume	%
A: Passenger Vehicle	64	100.0%
B: Recreational Vehicle	0	0.0%
C: Bus	0	0.0%
D: Single Unit Truck	0	0.0%
E: Tractor Trailer Unit	0	0.0%
PM	**64**	

2023 PM 100th Highest Hour Estimates

Leg PM Volumes

64 / 1,346 / 1,201 / 247

Total Entering Volume: **1,429**

From North

	Right	Thru	Left
	24		
	16	**4**	**4**
A	16	4	4
B	0	0	0
C	0	0	0
D	0	0	0
E	0	0	0

To North

	40
A	40
B	0
C	0
D	0
E	0

To West

	765
A	737
B	0
C	4
D	16
E	8

From East

Left	Thru	Right	
679			
12	**659**	**8**	
12	631	8	A
0	0	0	B
0	4	0	C
0	16	0	D
0	8	0	E

West On: 27

	Volume	%
A	1,298	96.4%
B	4	0.3%
C	4	0.3%
D	28	2.1%
E	12	0.9%
PM	**1,346**	

East On: 27

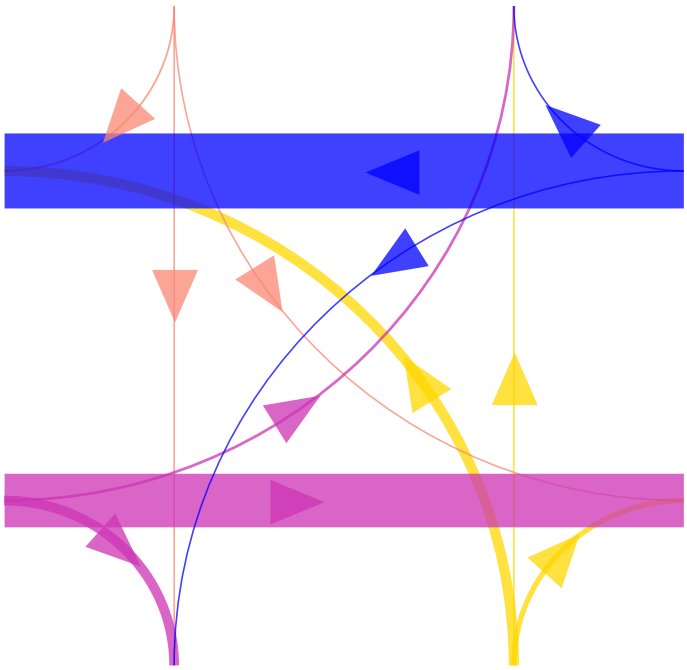
Vehicle Type		
A	1,149	95.7%
B	4	0.3%
C	4	0.3%
D	32	2.7%
E	12	1.0%
PM	**1,201**	

From West

Left	Thru	Right	
581			
24	**471**	**86**	
24	451	86	A
0	4	0	B
0	0	0	C
0	12	0	D
0	4	0	E

To East

522	
498	A
4	B
0	C
16	D
4	E



To South

102	
102	A
0	B
0	C
0	D
0	E

From South

Left	Thru	Right	
145			
90	**8**	**47**	
90	8	43	A
0	0	0	B
0	0	0	C
0	0	4	D
0	0	0	E

South On: 51 AVE

Vehicle Type	Volume	%
A: Passenger Vehicle	243	98.4%
B: Recreational Vehicle	0	0.0%
C: Bus	0	0.0%
D: Single Unit Truck	4	1.6%
E: Tractor Trailer Unit	0	0.0%
PM	**247**	

NOTE:
Coloured line thickness corresponds to turning movement volume.

CROSSROADS TRAFFIC CONSULTANTS LTD.

DIRECTIONAL TRAFFIC COUNT SUMMARY

HIGHWAY: 27 **REFERENCE NO.:** 70001024 **INTERSECTION OF:** 27 & 51 AVENUE, OLDS
LATITUDE (degrees): 51.795143 **LONGITUDE (degrees):** -114.106472 **LEGAL DESCRIPTION:**
DAY & DATE OF COUNT: THURSDAY, SEPTEMBER 07, 2023 **COUNT DURATION:** 24 HOURS (MIDNIGHT TO MIDNIGHT)

INTERVAL	APPROACHING INTERSECTION: FROM THE EAST ON 27 — LEFT					THROUGH					RIGHT					TOTALS
MIDNIGHT - 0:15						7										13
0:15 - 0:30						4										9
0:30 - 0:45						3										5
0:45 - 1:00						2										4
1:00 - 1:15						2										5
1:15 - 1:30						1										3
1:30 - 1:45						1										2
1:45 - 2:00						1										2
2:00 - 2:15						1										1
2:15 - 2:30						2										3
2:30 - 2:45				1		4					1					9
2:45 - 3:00						1										2
3:00 - 3:15						1										2
3:15 - 3:30	1					1										4
3:30 - 3:45						1										1
3:45 - 4:00						4										9
4:00 - 4:15						2				1						7
4:15 - 4:30						6										9
4:30 - 4:45						4										16
4:45 - 5:00						5										13
5:00 - 5:15						9				1						26
5:15 - 5:30						5				1						25
5:30 - 5:45	1					18	2									44
5:45 - 6:00	1					15				1						44
6:00 - 6:15						26				1	1					66
6:15 - 6:30						30				1						70
6:30 - 6:45						34				2	1					89
6:45 - 7:00						51				1	2					113
7:00 - 7:15						38		1								95
7:15 - 7:30	2					61	1		7	5						151
7:30 - 7:45						56			2	1						143
7:45 - 8:00	4					95			4	2						198
8:00 - 8:15	5					81			5	4						183
8:15 - 8:30	1			1		78	1	1	4	2						206
8:30 - 8:45	8					101		2	6		1					237
8:45 - 9:00	9					114		2	2	3						238
9:00 - 9:15	2					86			6	8	2					201
9:15 - 9:30	3					93	1		7	5	2					221
9:30 - 9:45	3					97			5	1	1					203
9:45 - 10:00	2					91			4	4	2					214
10:00 - 10:15	5					111			2	7						230
10:15 - 10:30	6					81			6	4	3					213
10:30 - 10:45	5					102			2	5						240
10:45 - 11:00	6					118			3	4	3					232
11:00 - 11:15	8					104	2		3	6	4					248
11:15 - 11:30	6					121	4		6	2	3					265
11:30 - 11:45	2			1		151	2	1	2	3	5					300
11:45 - 12:00 PM	13					121	3	1		3	9					290
12:00 - 12:15	9					145	3		2	1	11					306
12:15 - 12:30	7					125	2		1	4	4					275
12:30 - 12:45	6					132	3		1	4	2					282
12:45 - 1:00	6					135	1		3	2	4					309
1:00 - 1:15	2					123			3	2	2					251
1:15 - 1:30	4					100			5	3	1					245
1:30 - 1:45	4					111	1		4	2	2					246
1:45 - 2:00	7					112		1		1						235
2:00 - 2:15	1					131	1		3	2	4					289
2:15 - 2:30	6					121	2		1	7	5	1				286
2:30 - 2:45	7					151	3	1	5	4	2					295
2:45 - 3:00	7					154	2	2	3	2	4					305
3:00 - 3:15	7					130		1	4	3	1		1		1	297
3:15 - 3:30	6					114			1	1	2					278
3:30 - 3:45	3					161		1	4	2	2					321
3:45 - 4:00	5					157	1		1	2	3					320
4:00 - 4:15	5					134	1	1	2	1		1				273
4:15 - 4:30	8			1		116	2		1	2	1					275
4:30 - 4:45	5					141			3	1	4					290
4:45 - 5:00	3					143	2			2	2					309
5:00 - 5:15	6					151	1			2	4					284
5:15 - 5:30	1					143			2		4					262
5:30 - 5:45	5					146				2	3	1				263
5:45 - 6:00	7					107	3				6					229
6:00 - 6:15	6					96			1		6	1				217
6:15 - 6:30	5					77			1		7					164
6:30 - 6:45	3					88	1				9					181
6:45 - 7:00	3					99			1		5					192
7:00 - 7:15						84	1	1	1		2					156
7:15 - 7:30						90					5					184
7:30 - 7:45	3					77	1		1		3					150
7:45 - 8:00	3					74			1	1						169
8:00 - 8:15	1					66					1					132
8:15 - 8:30	3					62	1				2					131
8:30 - 8:45	2					55					2					108
8:45 - 9:00	2					53			1		1					107
9:00 - 9:15	3					54				2						96
9:15 - 9:30	4					43	1									83
9:30 - 9:45	1					44			1							75
9:45 - 10:00	1					21	1									55
10:00 - 10:15	1					27	1				1					55
10:15 - 10:30	2			1		17										35
10:30 - 10:45	1					25										39
10:45 - 11:00	1					24				2						41
11:00 - 11:15						10					1					22
11:15 - 11:30						10			1		1					26
11:30 - 11:45						15										21
11:45 - MIDNIGHT	1					12					1					23
VEH CLASS	A	B	C	D	E	A	B	C	D	E	A	B	C	D	E	A	B	C	D	E	A	B	C	D	E	A	B	C	D	E
TOTALS	266			4	1	6547	51	16	134	137	152	3	1	2	2	106			1		5692	41	16	113	133	662	3		8	
	EL					ET					ER					WL					WT					WR				

INTERVAL	APPROACHING INTERSECTION: FROM THE NORTH ON 51 AVE — LEFT					THROUGH					RIGHT					FROM THE SOUTH ON 51 AVE — LEFT					THROUGH					RIGHT					TOTALS	GRAND TOTALS
MIDNIGHT - 0:15																															
0:15 - 0:30																										1					
0:30 - 0:45																1															
0:45 - 1:00																										1					
1:00 - 1:15																															
1:15 - 1:30																1															
1:30 - 1:45																										1					
1:45 - 2:00																															
2:00 - 2:15																															
2:15 - 2:30																										1					
2:30 - 2:45																												1			
2:45 - 3:00																															
3:00 - 3:15																															
3:15 - 3:30																										1					
3:30 - 3:45																															
3:45 - 4:00																1															
4:00 - 4:15																1															
4:15 - 4:30																										2					
4:30 - 4:45																										1					
4:45 - 5:00																3															
5:00 - 5:15																2										3					
5:15 - 5:30																2															
5:30 - 5:45																2										1					
5:45 - 6:00																3															
6:00 - 6:15																2										4					
6:15 - 6:30																5										3					
6:30 - 6:45																6										5					
6:45 - 7:00																10				1						3					
7:00 - 7:15																9				1						3					
7:15 - 7:30																3										4					
7:30 - 7:45																10										3		1			
7:45 - 8:00																7										7					
8:00 - 8:15																13										6					
8:15 - 8:30																19										3					
8:30 - 8:45																14										6					
8:45 - 9:00																18										2					
9:00 - 9:15																10										5					
9:15 - 9:30																7										5					
9:30 - 9:45																20										6					
9:45 - 10:00																15				1						4					
10:00 - 10:15																16										5					
10:15 - 10:30																17										12					
10:30 - 10:45																7										6					
10:45 - 11:00																23										9					
11:00 - 11:15																32										9					
11:15 - 11:30																16										10					
11:30 - 11:45																14										6					
11:45 - MIDNIGHT																15										12					
VEH CLASS	A	B	C	D	E	A	B	C	D	E	A	B	C	D	E	A	B	C	D	E	A	B	C	D	E	A	B	C	D	E	
TOTALS	115	1		1		33					146	1	1	1		761	1	3	6		31					347	1	10			1464	15555
	NL					NT					NR					SL					ST					SR						

LOCATION DIAGRAM ENCLOSED (Y / N): YES
WEATHER CONDITIONS: SUNNY
RECORDER(S): MIOVISION CAMERAS - TROY PEACOCK
ROAD SURFACE CONDITIONS: DRY

VEHICLE CLASSES
A: PASSENGER VEHICLES
B: RECREATION VEHICLES
C: BUSES
D: SINGLE UNIT TRUCKS
E: TRACTOR TRAILER COMBINATIONS

LOCATION DIAGRAM ENCLOSED (Y / N): YES
WEATHER CONDITIONS: SUNNY
RECORDER(S): MIOVISION CAMERAS - TROY PEACOCK
ROAD SURFACE CONDITIONS: DRY

VEHICLE CLASSES
A: PASSENGER VEHICLES
B: RECREATION VEHICLES
C: BUSES
D: SINGLE UNIT TRUCKS
E: TRACTOR TRAILER COMBINATIONS

CROSSROADS TRAFFIC CONSULTANTS LTD.

DIRECTIONAL PEDESTRIAN COUNT SUMMARY

LOCATION: ERROR

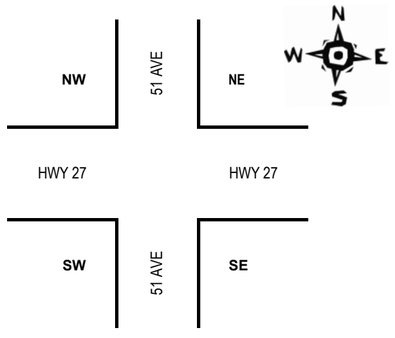
DATE: THURSDAY, SEPTEMBER 07, 2023

REFERENCE No: 700001024

REMARKS: MIOVISION CAMERAS CANNOT CLASSIFY PEDESTRIANS OR MONITOR JAYWALKING

COUNT DURATION: 24 HOURS (MIDNIGHT TO MIDNIGHT)

PEDESTRIAN CROSSING FROM	TO	INTERVAL																						SUB-TOTAL
		MIDNIGHT TO 1:00AM	1:00 AM TO 2:00 AM	2:00 AM TO 3:00 AM	3:00 AM TO 4:00 AM	4:00 AM TO 5:00 AM	5:00 AM TO 6:00AM	6:00 AM TO 7:00 AM	7:00 AM TO 8:00 AM	8:00 AM TO 9:00 AM	9:00 AM TO 10:00 AM	10:00 AM TO 11:00 AM	11:00 AM TO NOON	NOON TO 1:00PM	1:00PM TO 2:00 PM	2:00 PM TO 3:00 PM	3:00 PM TO 4:00 PM	4:00 PM TO 5:00 PM	5:00 PM TO 6:00 PM	6:00 PM TO 7:00 PM	7:00 PM TO 8:00 PM	8:00 PM TO 9:00 PM	9:00 PM TO 10:00 PM	10:00 PM TO 11:00 PM	11:00 PM TO MIDNIGHT	
NE CORNER	SE CORNER								3	1	3	2				1		2	4	2	1					**19**
	NW CORNER			1					1	1	4		4	3	3	6	21	8	5	8		3	6	2		**76**
NW CORNER	SW CORNER										5	1	2	2	2		1	2		2	1					**18**
	NE CORNER				1			10	5	7	12	6	4		6	8	5	5	1	6	7		4			**87**
SE CORNER	NE CORNER										3						3	3	3	1		2	1			**16**
	SW CORNER							2					2		5	3	2	8		2						**24**
SW CORNER	NW CORNER								4	2	2	2	3	1	4	1	4		2	3	1					**29**
	SE CORNER											1		2	2			3			1			1		**10**
																								TOTAL PEDESTRIANS		**279**



Reference Number:
997027

Intersection of:
27 & 50 AVE OLDS

North On: 50 AVE

Vehicle Type	Volume	%
A: Passenger Vehicle	2,720	97.8%
B: Recreational Vehicle	5	0.2%
C: Bus	1	0.0%
D: Single Unit Truck	40	1.4%
E: Tractor Trailer Unit	14	0.5%
AADT	**2,780**	
ASDT	3,300	

2023 AADT / ASDT Estimates

Leg AADT Volumes

2,780
12,080 10,720
3,670

Total Entering Volume:
14,610

From North

	1,430		
	Right	Thru	Left
	490	**430**	**510**
A	475	427	499
B	3	0	0
C	0	0	1
D	8	3	6
E	4	0	4

To North

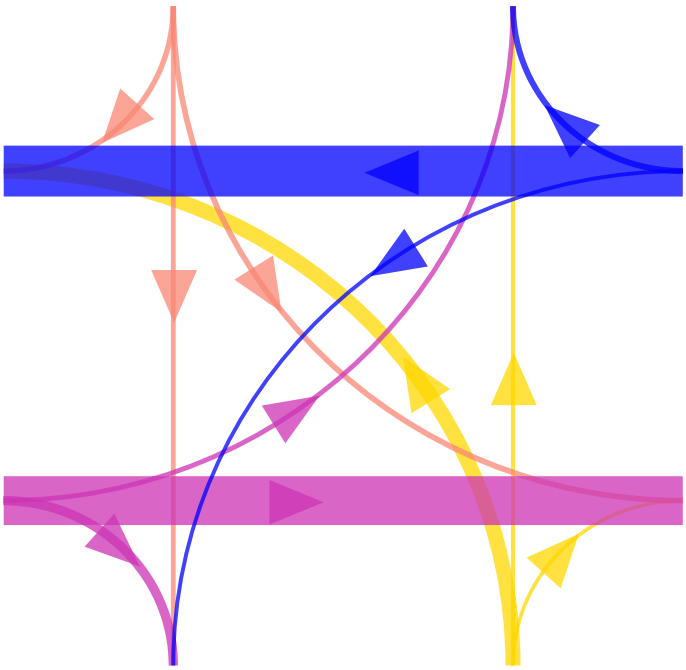
	1,350
A	1,319
B	2
C	0
D	23
E	6

To West

	6,410
A	6,109
B	72
C	3
D	110
E	116

From East

	5,460		
	Left	Thru	Right
	350	**4,570**	**540**
A	345	4,286	521
B	0	69	2
C	0	3	0
D	4	100	12
E	1	112	5



West On: 27

	Volume	%
A	11,494	95.1%
B	117	1.0%
C	5	0.0%
D	220	1.8%
E	244	2.0%
AADT	**12,080**	
ASDT	14,080	

East On: 27

Vehicle Type		
A	10,095	94.4%
B	116	1.1%
C	6	0.1%
D	224	2.1%
E	249	2.3%
AADT	**10,720**	
ASDT	12,490	

From West

	5,670		
	Left	Thru	Right
	440	**4,390**	**840**
A	433	4,120	832
B	0	44	1
C	0	2	0
D	6	98	6
E	1	126	1

To East

	5,260
A	4,943
B	45
C	3
D	108
E	131

To South

	1,620
A	1,604
B	1
C	0
D	13
E	2

From South

	2,050		
	Left	Thru	Right
	1,350	**370**	**330**
A	1,348	365	324
B	0	0	1
C	0	0	0
D	2	5	4
E	0	0	1

South On: 50 AVE

Vehicle Type	Volume	%
A: Passenger Vehicle	3,641	99.2%
B: Recreational Vehicle	2	0.1%
C: Bus	0	0.0%
D: Single Unit Truck	24	0.7%
E: Tractor Trailer Unit	3	0.1%
AADT	**3,670**	
ASDT	4,270	

ABBREVIATIONS:

AADT: Annual Average Daily Traffic. Average daily traffic expressed as vehicles per day for the period from January 1 to December 31 (inclusive), 365 days.

ASDT: Average Summer Daily Traffic. Average daily traffic expressed as vehicles per day for the period from May 1 to September 30 (inclusive), 153 days.

NOTE:
Coloured line thickness corresponds to turning movement volume.

Reference Number:
997027

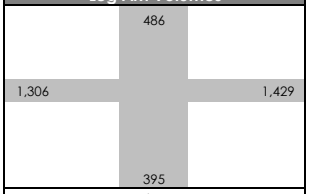
Intersection of:
27 & 50 AVE OLDS

North On: 50 AVE

Vehicle Type	Volume	%
A: Passenger Vehicle	470	96.7%
B: Recreational Vehicle	8	1.6%
C: Bus	0	0.0%
D: Single Unit Truck	8	1.6%
E: Tractor Trailer Unit	0	0.0%
AM	**486**	

2023 AM 100th Highest Hour Estimates

Leg AM Volumes



Total Entering Volume: **1,808**

From North			
319			
	Right	Thru	Left
	107	**53**	**159**
A	99	53	159
B	8	0	0
C	0	0	0
D	0	0	0
E	0	0	0

To North	
167	
A	159
B	0
C	0
D	8
E	0

To West	
813	
A	752
B	8
C	0
D	30
E	23

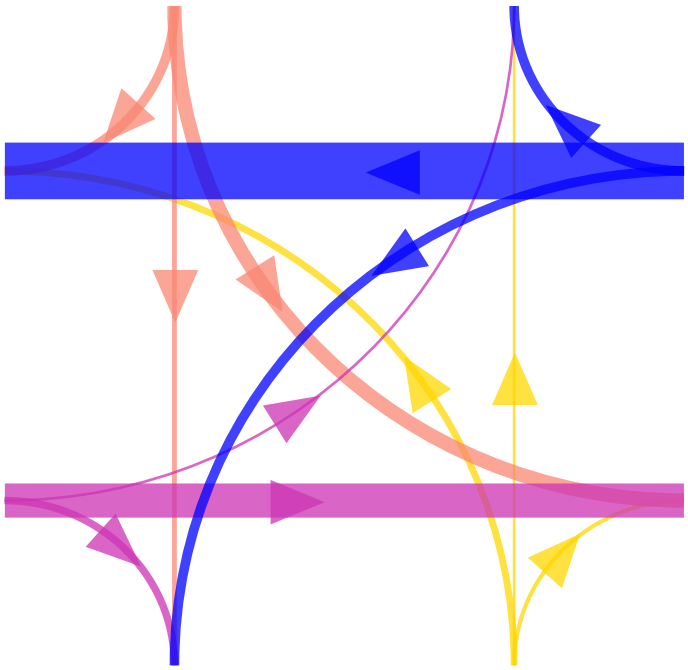
From East		
844		
Left	Thru	Right
107	**630**	**107**
99	577	99
0	0	0
0	0	0
8	30	8
0	23	0

West On: 27

	Volume	%
A	1,222	93.6%
B	8	0.6%
C	0	0.0%
D	53	4.1%
E	23	1.8%
AM	**1,306**	

East On: 27

Vehicle Type		
A	1,337	93.6%
B	0	0.0%
C	0	0.0%
D	69	4.8%
E	23	1.6%
AM	**1,429**	



From West		
493		
Left	Thru	Right
30	**380**	**83**
30	357	83
0	0	0
0	0	0
0	23	0
0	0	0

To East	
585	
562	A
0	B
0	C
23	D
0	E

To South	
243	
A	235
B	0
C	0
D	8
E	0

From South			
152			
	Left	Thru	Right
	76	**30**	**46**
A	76	30	46
B	0	0	0
C	0	0	0
D	0	0	0
E	0	0	0

South On: 50 AVE

Vehicle Type	Volume	%
A: Passenger Vehicle	387	98.0%
B: Recreational Vehicle	0	0.0%
C: Bus	0	0.0%
D: Single Unit Truck	8	2.0%
E: Tractor Trailer Unit	0	0.0%
AM	**395**	

NOTE:
Coloured line thickness corresponds to turning movement volume.

Reference Number:
997027

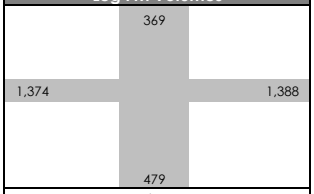
Intersection of:
27 & 50 AVE OLDS

North On: 50 AVE

Vehicle Type	Volume	%
A: Passenger Vehicle	369	100.0%
B: Recreational Vehicle	0	0.0%
C: Bus	0	0.0%
D: Single Unit Truck	0	0.0%
E: Tractor Trailer Unit	0	0.0%
PM	**369**	

2023 PM 100th Highest Hour Estimates

Leg PM Volumes



Total Entering Volume:
1,805

From North

	Right	Thru	Left
	151		
	35	**49**	**67**
A	35	49	67
B	0	0	0
C	0	0	0
D	0	0	0
E	0	0	0

To North

	218
A	218
B	0
C	0
D	0
E	0

To West

	785
A	736
B	22
C	0
D	9
E	18

From East

Left	Thru	Right	
777			
71	**617**	**89**	
71	568	89	A
0	22	0	B
0	0	0	C
0	9	0	D
0	18	0	E

West On: 27

	Volume	%
A	1,308	95.2%
B	26	1.9%
C	0	0.0%
D	18	1.3%
E	22	1.6%
PM	**1,374**	

East On: 27

Vehicle Type		
A	1,322	95.2%
B	26	1.9%
C	0	0.0%
D	18	1.3%
E	22	1.6%
PM	**1,388**	

From West

Left	Thru	Right	
589			
49	**469**	**71**	
49	452	71	A
0	4	0	B
0	0	0	C
0	9	0	D
0	4	0	E

To East

611	
594	A
4	B
0	C
9	D
4	E

To South

191	
191	A
0	B
0	C
0	D
0	E

From South

Left	Thru	Right	
288			
133	**80**	**75**	
133	80	75	A
0	0	0	B
0	0	0	C
0	0	0	D
0	0	0	E

South On: 50 AVE

Vehicle Type	Volume	%
A: Passenger Vehicle	479	100.0%
B: Recreational Vehicle	0	0.0%
C: Bus	0	0.0%
D: Single Unit Truck	0	0.0%
E: Tractor Trailer Unit	0	0.0%
PM	**479**	

NOTE:
Coloured line thickness corresponds to turning movement volume.

CROSSROADS TRAFFIC CONSULTANTS LTD.

DIRECTIONAL TRAFFIC COUNT SUMMARY

HIGHWAY: 27 **REFERENCE NO.:** 00997027 **INTERSECTION OF:** 27 & 50 AVE OLDS
LATITUDE (degrees): 51.79502269 **LONGITUDE (degrees):** -114.103855 **LEGAL DESCRIPTION:** 32-32-1-505150000
DAY & DATE OF COUNT: THURSDAY, JULY 20, 2023 **COUNT DURATION:** 24 HOURS (MIDNIGHT TO MIDNIGHT)

INTERVAL	APPROACHING INTERSECTION: FROM THE EAST ON 27 — LEFT					THROUGH					RIGHT					FROM THE WEST ON 27 — LEFT					THROUGH					RIGHT					TOTALS
	A	B	C	D	E	A	B	C	D	E	A	B	C	D	E	A	B	C	D	E	A	B	C	D	E	A	B	C	D	E	
MIDNIGHT - 0:15						3	1			3	2					1					7				2						17
0:15 - 0:30						8			1												2										11
0:30 - 0:45						7				1	2										3			1		1					15
0:45 - 1:00	1					5										1					1	1		1							10
1:00 - 1:15						1			1							1					2										5
1:15 - 1:30						2			1							1					2										6
1:30 - 1:45						1										1					3										6
1:45 - 2:00																															
2:00 - 2:15						1				1																					2
2:15 - 2:30						1															1			1							3
2:30 - 2:45																					1										1
2:45 - 3:00						3			1												1										5
3:00 - 3:15						3				1											2										6
3:15 - 3:30																1					3			1	1						6
3:30 - 3:45						1			1					1							2										5
3:45 - 4:00	1																				2			1							4
4:00 - 4:15						3					1										1										5
4:15 - 4:30						1				1											2				1						6
4:30 - 4:45						3			2	1											6				2						12
4:45 - 5:00						4															14				1						19
5:00 - 5:15						7					1										19				1						28
5:15 - 5:30						8										1					13										22
5:30 - 5:45						11			1	1	1				1						29										45
5:45 - 6:00						21			2	1											27			1	1						57
6:00 - 6:15						16				2	1										30			2	1						54
6:15 - 6:30	1					23			1	2	2				1						29										61
6:30 - 6:45						40			2	1	5					1					50			1	3						106
6:45 - 7:00	4					44	2		2	1	3				1						54			1	2						120
7:00 - 7:15	3					45	2		6	4	5					2					41	1		2							113
7:15 - 7:30	1					42			1		4					1					55			2	3						113
7:30 - 7:45	5					48	1		4	1	4				1	3					58			1	2						136
7:45 - 8:00	7					72			1	3	13				1	8					55	1			3					1	170
8:00 - 8:15	5				1	50			3	2	5					6					51	1		1	1						131
8:15 - 8:30	14					62			3	4	8				1	3					65	2		2	2						176
8:30 - 8:45	7					71	1		1	1	9	1				1					51	1		4	4						161
8:45 - 9:00	13				1	76			4	3	13				1	4					47			3	2						176
9:00 - 9:15	5				1	60			3	3	9					2				1	56			2	2					1	159
9:15 - 9:30	7					64			1	2	8				1	3					47	1		3	3						151
9:30 - 9:45	8					55			6	2	7					2					61	2		2	1						165
9:45 - 10:00	11					88	1		1	1	16					4					68	1		5	5						214
10:00 - 10:15	14				1	78			2	3	7					4					65	1			2						187
10:15 - 10:30	13					73			1	1	14				1	7					84	1		3	3						215
10:30 - 10:45	13				2	71			3	4	14					6					92	1		5	1						223
10:45 - 11:00	12					83	2		1	3	10					7				1	85	1		1	7						228
11:00 - 11:15	8					77	2		3	4	9				1	10					72	1		1	4						207
11:15 - 11:30	13					90	1		1	2	15				1	4					67	1		1	2						217
11:30 - 11:45	8					98			2	2	18				1	5					75	1		2	1						226
11:45 - 12:00 PM	15					92	1	1		3	9				2	9					89			1	6						241
12:00 - 12:15	10				1	96	2		2	1	14				1	12					82			2							238
12:15 - 12:30	19				1	116	4		3	6	23				1	4				1	107	1		6	5						321
12:30 - 12:45	10					76	2		3	4	12				1	11					92	1	1	2	3						238
12:45 - 1:00	13				1	83	1			3	12					9					93	2		2	6						247
1:00 - 1:15	15					96	1		1	4	12					11				1	83	3		4	4						254
1:15 - 1:30	11					93	1			4	9				1	10					80			3	2						230
1:30 - 1:45	14					120			3	3	16					10					102	1			6						294
1:45 - 2:00	13					100	3		1	2	12	1				8					98			3	1						259
2:00 - 2:15	16				1	85	1		2	1	12					6					72			1	4						217
2:15 - 2:30	16					85	5		1	1	14				1	5					91	2		4	2						248
2:30 - 2:45	10					88	1		1	1	17					8					69	2			2						219
2:45 - 3:00	14					89	1		1	4	15					8					94	1	1	1	3						249
3:00 - 3:15	19					108	2		2		25				1	7					84	3		2	2						267
3:15 - 3:30	18					97	3		3	1	7				1	8					98	3		2	5						269
3:30 - 3:45	11					87	2		5	1	16				2	10					89			2							244
3:45 - 4:00	11					92	1			1	11					9					99	1		1	3						245
4:00 - 4:15	8					85	4		1	3	22				1	5					123	4		1	3						274
4:15 - 4:30	14					100	3	1		3	18					8					97			1	4						265
4:30 - 4:45	16					128	5		2	4	20					11					102	1		2	1						308
4:45 - 5:00	22					109	1			2	19					6					104	1		5	3						281
5:00 - 5:15	17					100			3	2	13					5					87			3	2						244
5:15 - 5:30	10					113	2		3	3	24					9					96			1	3						278
5:30 - 5:45	11					86	1		1		17					2					95	1		6	4						237
5:45 - 6:00	9					85	2		3	2	16					6					76	1		1	1						218
6:00 - 6:15	12					89			1	1	19					5					75			2	1						212
6:15 - 6:30	12					90	2	1	2	1	14					7					72	1		1	1						223
6:30 - 6:45	8					75	1		1		13					8					59				1						178
6:45 - 7:00	10					58	1		2	1	10					4					48										146
7:00 - 7:15	3					59	4			1	12					8					63	1			1						160
7:15 - 7:30	4					52	1		1	1	6					12					55	1		1							141
7:30 - 7:45	6					47			6	1	12					8					42			1							123
7:45 - 8:00	4					44	2				8					1					48	1	1		1						117
8:00 - 8:15	5					42			1		7					10					34										111
8:15 - 8:30	4					50	1	1			10					4					51										133
8:30 - 8:45	3					49	1		1		7					2					40										106
8:45 - 9:00	2					47	3		1	2	7					5					40										117
9:00 - 9:15	4					34			3		13					2					29										93
9:15 - 9:30						35				1	9					2					35										87
9:30 - 9:45						41			1	1	5					2					24			1							78
9:45 - 10:00	2					26			1		7					3					32										74
10:00 - 10:15	4					32					4										31										72
10:15 - 10:30	2					21				2	5				1	1					23										59
10:30 - 10:45	5					25				1	5										17			1							54
10:45 - 11:00	1					23	1				1										14				2						42
11:00 - 11:15	2					18					1										10										31
11:15 - 11:30	2					8					2					3					13				1						29
11:30 - 11:45	1					5				1	2					1					7				1						18
11:45 - MIDNIGHT	1					12					1					2					5				1						23
VEH CLASS	A	B	C	D	E	A	B	C	D	E	A	B	C	D	E	A	B	C	D	E	A	B	C	D	E	A	B	C	D	E	
TOTALS	613			7	3	4911	79	4	115	129	771	2		18	7	377			5	1	4670	50	3	111	143	790	1		6	1	12817
	EL					ET					ER					WL					WT					WR					

INTERVAL	APPROACHING INTERSECTION: FROM THE NORTH ON 50 AVE — LEFT					THROUGH					RIGHT					FROM THE SOUTH ON 50 AVE — LEFT					THROUGH					RIGHT					TOTALS	GRAND TOTALS
	A	B	C	D	E	A	B	C	D	E	A	B	C	D	E	A	B	C	D	E	A	B	C	D	E	A	B	C	D	E		
MIDNIGHT - 0:15	2					1										1										1					5	22
0:15 - 0:30	1										1															1					3	14
0:30 - 0:45																3															3	18
0:45 - 1:00	1					1																									2	12
1:00 - 1:15																																5
1:15 - 1:30						1																									1	7
1:30 - 1:45									1																	1					2	8
1:45 - 2:00																										2					2	2
2:00 - 2:15																																2
2:15 - 2:30																																3
2:30 - 2:45																																1
2:45 - 3:00																					1										1	6
3:00 - 3:15																																6
3:15 - 3:30																					1										1	7
3:30 - 3:45								1																							1	6
3:45 - 4:00	1																														1	5
4:00 - 4:15																															1	6
4:15 - 4:30						1																									2	8
4:30 - 4:45	1																									1					3	15
4:45 - 5:00						2																									5	24
5:00 - 5:15											1																				3	31
5:15 - 5:30						2																									7	29
5:30 - 5:45						1					1																				6	51
5:45 - 6:00						5					1																				20	77
6:00 - 6:15						1															2										16	70
6:15 - 6:30						1					1																				15	76
6:30 - 6:45						1					2																				18	124
6:45 - 7:00						6					4										1										37	157
7:00 - 7:15											5																				23	136
7:15 - 7:30						2					2																				33	146
7:30 - 7:45						6				1	3										2										35	171
7:45 - 8:00						6					3										3										41	211
8:00 - 8:15						10					3										2										33	164
8:15 - 8:30						10					3										8										45	221
8:30 - 8:45						9					3										5										44	205
8:45 - 9:00						10					4										6										62	238
9:00 - 9:15						14					6										5										44	203
9:15 - 9:30						21					7										7										47	198
9:30 - 9:45						17				1	7										9										53	218
9:45 - 10:00						22					9										16										66	280
10:00 - 10:15						18					10										10										60	247
10:15 - 10:30						22			1		4			1							8										67	282
10:30 - 10:45						32					10										11										95	354
10:45 - 11:00						32					15										10										93	310
11:00 - 11:15						35					12										15										88	336
11:15 - 11:30						18					9										16										83	302
11:30 - 11:45						41					7										19										103	352
11:45 - MIDNIGHT						27					10										23										98	365
MIDNIGHT - 0:15						29					8										11										96	365
0:15 - 0:30						37					11										10										96	340
0:30 - 0:45						47					17										11										111	356
0:45 - 1:00						38					10										14										93	367
1:00 - 1:15						40					19										14										118	383
1:15 - 1:30						30					18										17										99	407
1:30 - 1:45						28					10										14										93	374
1:45 - 2:00						28					7										18										101	345
2:00 - 2:15						29					8										15										82	360
2:15 - 2:30						30					6										14	1								1	89	326
2:30 - 2:45						16					7										8										59	277
2:45 - 3:00						28					14										13										71	283
3:00 - 3:15						16					8										7										47	270
3:15 - 3:30						13					14										6										54	232
3:30 - 3:45						22					7										4										57	203
3:45 - 4:00						7					9										5										39	199
4:00 - 4:15						9					10										7										51	192
4:15 - 4:30						11					8										8										42	165
4:30 - 4:45						10					3										8										40	157
4:45 - 5:00						15					8										5										35	146
5:00 - 5:15						12					2										5										30	163
5:15 - 5:30						13					3										5										37	143
5:30 - 5:45						14					2										7										34	151
5:45 - 6:00						6					3										6										35	128
6:00 - 6:15						7					7										7										27	114
6:15 - 6:30						7					2										2										21	99
6:30 - 6:45						8					6										3										27	101
6:45 - 7:00						6					2										2										11	83
7:00 - 7:15						2					1										1										9	68
7:15 - 7:30						2					2										1										10	64
7:30 - 7:45						2										2					2										7	49
7:45 - 8:00						1					1										1										4	35
8:00 - 8:15						3										1					3										4	33
8:15 - 8:30						2					1										2										6	24
8:30 - 8:45						1										1					1										2	25
VEH CLASS	A	B	C	D	E	A	B	C	D	E	A	B	C	D	E	A	B	C	D	E	A	B	C	D	E	A	B	C	D	E		
TOTALS	786		1	10	6	547			4		418	2		7	4	1371			2		492			8		625	2		8	2	4293	17110
	NL					NT					NR					SL					ST					SR						

LOCATION DIAGRAM ENCLOSED (Y / N): YES
WEATHER CONDITIONS: MAINLY SUNNY
RECORDER(S): MIOVISION CAMERAS - ISAAC CASSLEY
ROAD SURFACE CONDTIONS: EARLY MORNING DAMP FROM OVERNIGHT RAIN, CLEAR LATER

VEHICLE CLASSES
A: PASSENGER VEHICLES B: RECREATION VEHICLES C: BUSES
D: SINGLE UNIT TRUCKS E: TRACTOR TRAILER COMBINATIONS

LOCATION DIAGRAM ENCLOSED (Y / N): YES
WEATHER CONDITIONS: MAINLY SUNNY
RECORDER(S): MIOVISION CAMERAS - ISAAC CASSLEY
ROAD SURFACE CONDTIONS: EARLY MORNING DAMP FROM OVERNIGHT RAIN, CLEAR LATER

VEHICLE CLASSES
A: PASSENGER VEHICLES B: RECREATION VEHICLES C: BUSES
D: SINGLE UNIT TRUCKS E: TRACTOR TRAILER COMBINATIONS

CROSSROADS TRAFFIC CONSULTANTS LTD.

DIRECTIONAL PEDESTRIAN COUNT SUMMARY

LOCATION: 27 & 50 AVE OLDS

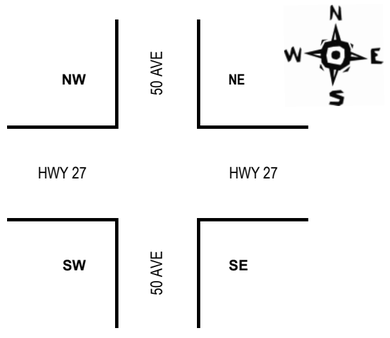
DATE: THURSDAY, JULY 20, 2023

REFERENCE No: 00997027

REMARKS: MIOVISION CAMERAS CANNOT CLASSIFY PEDESTRIANS OR MONITOR JAYWALKING

COUNT DURATION: 24 HOURS (MIDNIGHT TO MIDNIGHT)

PEDESTRIAN CROSSING FROM	TO	INTERVAL																							SUB-TOTAL
		MIDNIGHT TO 1:00AM	1:00 AM TO 2:00 AM	2:00 AM TO 3:00 AM	3:00 AM TO 4:00 AM	4:00 AM TO 5:00 AM	5:00 AM TO 6:00AM	6:00 AM TO 7:00 AM	7:00 AM TO 8:00 AM	8:00 AM TO 9:00 AM	9:00 AM TO 10:00 AM	10:00 AM TO 11:00 AM	11:00 AM TO NOON	NOON TO 1:00PM	1:00PM TO 2:00 PM	2:00 PM TO 3:00 PM	3:00 PM TO 4:00 PM	4:00 PM TO 5:00 PM	5:00 PM TO 6:00 PM	6:00 PM TO 7:00 PM	7:00 PM TO 8:00 PM	8:00 PM TO 9:00 PM	9:00 PM TO 10:00 PM	10:00 PM TO 11:00 PM	11:00 PM TO MIDNIGHT	
NE CORNER	SE CORNER									1		2	2	1	3	3	6	2			1	2	1		1	**25**
	NW CORNER							1	2	1	1		1	1	1	6	3	4	1	3	1			4		**30**
NW CORNER	SW CORNER							1	1	3	1	3	3	4	3	6	3	4	3	3	3		1	1		**43**
	NE CORNER				2			1	1				1	1	1	8	3	2	1	1	2		3	1		**28**
SE CORNER	NE CORNER									1	2	1	2	2	6	5	1	4	2	3	1	4		3	1	**38**
	SW CORNER								1		1		2	1		1		2							3	**11**
SW CORNER	NW CORNER							1		2	1	4	1	4	2	5	1	4	1	2	1	1	2	2		**34**
	SE CORNER	1							1			1	1	1				2	2			1		1		**11**
																								TOTAL PEDESTRIANS		**220**



Reference Number:
990133

Intersection of:
2A & 27 AT OLDS

North On: 2A

Vehicle Type	Volume	%
A: Passenger Vehicle	4,430	92.7%
B: Recreational Vehicle	35	0.7%
C: Bus	6	0.1%
D: Single Unit Truck	172	3.6%
E: Tractor Trailer Unit	137	2.9%
AADT	**4,760**	
ASDT	5,180	

2023 AADT / ASDT Estimates

Leg AADT Volumes

4,760
11,360 8,600
6,040

Total Entering Volume:
15,410

From North

	2,390		
	Right	Thru	Left
	1,160	**910**	**320**
A	1,091	831	286
B	9	3	2
C	1	2	0
D	37	34	18
E	22	40	14

To North

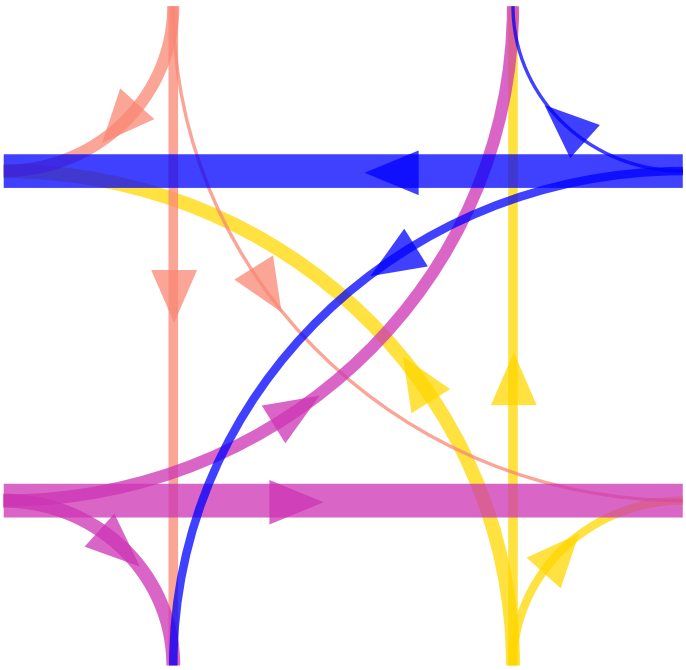
	2,380
A	2,222
B	21
C	3
D	83
E	61

To West

	5,680
A	5,263
B	37
C	5
D	156
E	219

From East

	4,310		
	Left	Thru	Right
	800	**3,190**	**320**
A	736	2,911	278
B	5	23	2
C	2	3	0
D	29	86	22
E	28	167	18



West On: 27

	Volume	%
A	10,507	92.5%
B	97	0.9%
C	13	0.1%
D	316	2.8%
E	427	3.8%
AADT	**11,360**	
ASDT	12,320	

East On: 27

Vehicle Type		
A	7,841	91.0%
B	77	0.9%
C	11	0.1%
D	278	3.2%
E	413	4.8%
AADT	**8,600**	
ASDT	9,350	

From West

	5,680		
	Left	Thru	Right
	1,160	**3,200**	**1,320**
A	1,094	2,906	1,244
B	15	41	4
C	3	4	1
D	26	96	38
E	22	153	33

To East

	4,300
A	3,916
B	47
C	6
D	141
E	200

To South

	3,020
A	2,811
B	12
C	5
D	101
E	101

From South

	3,030		
	Left	Thru	Right
	1,330	**910**	**790**
A	1,261	850	724
B	5	4	4
C	1	0	2
D	33	35	27
E	30	21	33

South On: 2A

Vehicle Type	Volume	%
A: Passenger Vehicle	5,646	93.2%
B: Recreational Vehicle	25	0.4%
C: Bus	8	0.1%
D: Single Unit Truck	196	3.2%
E: Tractor Trailer Unit	185	3.1%
AADT	**6,040**	
ASDT	6,580	

ABBREVIATIONS:

AADT: Annual Average Daily Traffic. Average daily traffic expressed as vehicles per day for the period from January 1 to December 31 (inclusive), 365 days.

ASDT: Average Summer Daily Traffic. Average daily traffic expressed as vehicles per day for the period from May 1 to September 30 (inclusive), 153 days.

NOTE:
Coloured line thickness corresponds to turning movement volume.

Reference Number:
990133

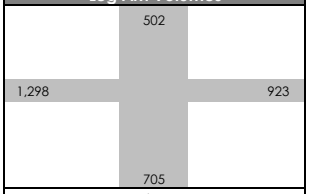
Intersection of:
2A & 27 AT OLDS

North On: 2A

Vehicle Type	Volume	%
A: Passenger Vehicle	467	93.0%
B: Recreational Vehicle	4	0.8%
C: Bus	0	0.0%
D: Single Unit Truck	18	3.6%
E: Tractor Trailer Unit	13	2.6%
AM	**502**	

2023 AM 100th Highest Hour Estimates

Leg AM Volumes



Total Entering Volume:
1,714

From North

	Right	Thru	Left
	295		
	180	**84**	**31**
A	170	75	27
B	1	0	0
C	0	0	0
D	6	3	1
E	3	6	3

To North

	207
A	195
B	3
C	0
D	8
E	1

To West

	703
A	633
B	4
C	0
D	31
E	35

From East

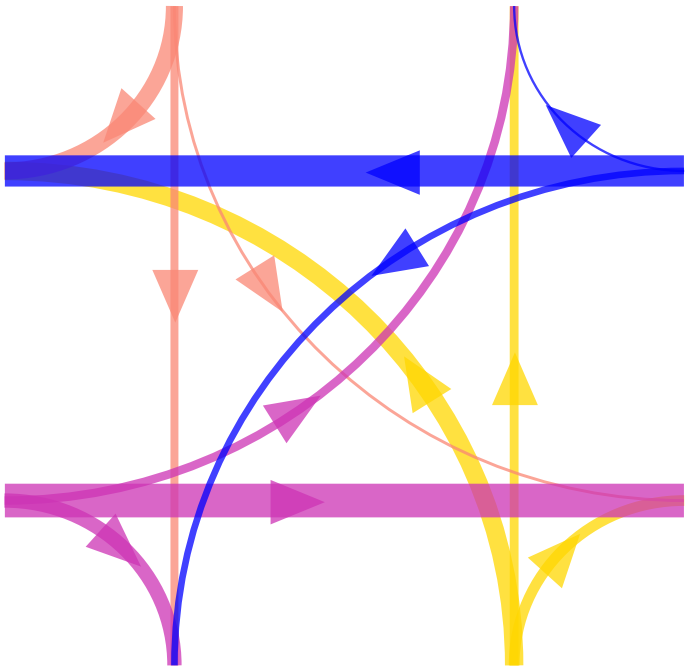
Left	Thru	Right	
424			
70	**329**	**25**	
64	289	22	A
0	3	1	B
0	0	0	C
3	12	1	D
3	25	1	E

West On: 27

	Volume	%
A	1,153	88.8%
B	11	0.8%
C	0	0.0%
D	61	4.7%
E	73	5.6%
AM	**1,298**	

East On: 27

Vehicle Type		
A	807	87.4%
B	11	1.2%
C	0	0.0%
D	39	4.2%
E	66	7.2%
AM	**923**	



From West

Left	Thru	Right	
595			
89	**355**	**151**	
85	306	129	A
1	6	0	B
0	0	0	C
3	15	12	D
0	28	10	E

To East

499	
432	A
7	B
0	C
23	D
37	E

To South

305	
268	A
0	B
0	C
18	D
19	E

From South

Left	Thru	Right	
400			
194	**93**	**113**	
174	88	99	A
0	1	1	B
0	0	0	C
13	4	7	D
7	0	6	E

South On: 2A

Vehicle Type	Volume	%
A: Passenger Vehicle	629	89.2%
B: Recreational Vehicle	2	0.3%
C: Bus	0	0.0%
D: Single Unit Truck	42	6.0%
E: Tractor Trailer Unit	32	4.5%
AM	**705**	

NOTE:
Coloured line thickness corresponds to turning movement volume.

Reference Number:
990133

Intersection of:
2A & 27 AT OLDS

North On: 2A

Vehicle Type	Volume	%
A: Passenger Vehicle	558	92.5%
B: Recreational Vehicle	4	0.7%
C: Bus	1	0.2%
D: Single Unit Truck	18	3.0%
E: Tractor Trailer Unit	22	3.6%
PM	**603**	

2023 PM 100th Highest Hour Estimates

Leg PM Volumes

603 / 1,302 / 1,112 / 801

Total Entering Volume: **1,909**

From North

	350		
	Right	Thru	Left
	185	**100**	**65**
A	170	92	60
B	3	0	1
C	0	1	0
D	8	4	1
E	4	3	3

To North

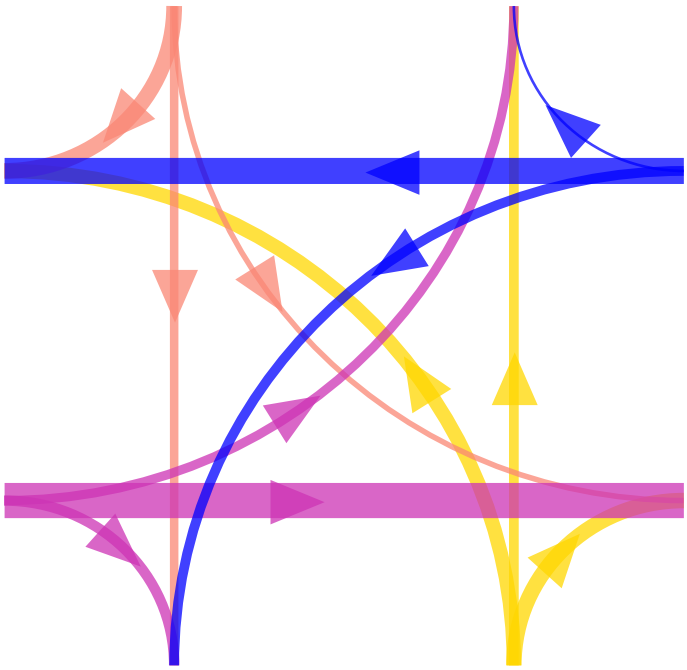
	253
A	236
B	0
C	0
D	5
E	12

To West

	659
A	617
B	6
C	0
D	23
E	13

From East

	452		
	Left	Thru	Right
	115	**306**	**31**
A	109	280	26
B	3	3	0
C	0	0	0
D	3	14	1
E	0	9	4



West On: 27

	Volume	%
A	1,224	94.0%
B	10	0.8%
C	0	0.0%
D	35	2.7%
E	33	2.5%
PM	**1,302**	

East On: 27

Vehicle Type	Volume	%
A	1,035	93.1%
B	10	0.9%
C	0	0.0%
D	28	2.5%
E	39	3.5%
PM	**1,112**	

From West

	643		
	Left	Thru	Right
	108	**413**	**122**
A	104	386	117
B	0	3	1
C	0	0	0
D	0	9	3
E	4	15	1

To East

	660
A	620
B	4
C	0
D	10
E	26

To South

	337
A	318
B	4
C	1
D	10
E	4

From South

	464		
	Left	Thru	Right
	168	**114**	**182**
A	167	106	174
B	0	0	0
C	0	0	0
D	1	4	0
E	0	4	8

South On: 2A

Vehicle Type	Volume	%
A: Passenger Vehicle	765	95.5%
B: Recreational Vehicle	4	0.5%
C: Bus	1	0.1%
D: Single Unit Truck	15	1.9%
E: Tractor Trailer Unit	16	2.0%
PM	**801**	

NOTE:
Coloured line thickness corresponds to turning movement volume.

McElhanney

DIRECTIONAL TRAFFIC COUNT SUMMARY

HIGHWAY: 2A **REFERENCE NO.:** 00990133 **INTERSECTION OF:** 2A & 27 AT OLDS
LATITUDE (degrees): 51.79502206 **LONGITUDE (degrees):** -114.0961968 **LEGAL DESCRIPTION:**
DAY & DATE OF COUNT: WEDNESDAY, JULY 03, 2019 **COUNT DURATION:** 24 HOURS (MIDNIGHT TO MINDNIGHT)

APPROACHING INTERSECTION — FROM THE EAST ON 27

INTERVAL	LEFT					THROUGH					RIGHT					TOTALS
	A	B	C	D	E	A	B	C	D	E	A	B	C	D	E	
MIDNIGHT - 0:15						11										12
0:15 - 0:30	2					3										10
0:30 - 0:45						3										4
0:45 - 1:00						3										6
1:00 - 1:15	1					4	1									10
1:15 - 1:30																4
1:30 - 1:45						2					1					3
1:45 - 2:00	1					1										5
2:00 - 2:15						1			1		1					6
2:15 - 2:30	1					2					1					9
2:30 - 2:45																3
2:45 - 3:00											1					2
3:00 - 3:15					1											1
3:15 - 3:30											1					4
3:30 - 3:45					1	2										7
3:45 - 4:00						1										6
4:00 - 4:15	1					2										4
4:15 - 4:30	1					1				1	1					8
4:30 - 4:45						1				1	1					15
4:45 - 5:00						4				3						24
5:00 - 5:15	3					2				1	1					25
5:15 - 5:30						5				3						27
5:30 - 5:45	6				1	11					2					49
5:45 - 6:00	2					8										52
6:00 - 6:15	3					4	1				4					50
6:15 - 6:30	6					9				1	2	3			1	85
6:30 - 6:45	11					22				1	1					100
6:45 - 7:00	11					23				1	3	4				98
7:00 - 7:15	10					16				1		4				89
7:15 - 7:30	5					25				2	1	2			1	108
7:30 - 7:45	24					29				5		2				146
7:45 - 8:00	20					46		1	2	2		2				147
8:00 - 8:15	16			1		28	1		3	3		5			1	133
8:15 - 8:30	19			1		34			2	5		5			1	165
8:30 - 8:45	12				1	38			1	5		1				135
8:45 - 9:00	17					51			1	3		1			3	148
9:00 - 9:15	8			1		41			1	3		2			1	134
9:15 - 9:30	13					43	1		1	1		3				146
9:30 - 9:45	10					38				3		5			1	106
9:45 - 10:00	14			1		48				4		4			1	153
10:00 - 10:15	8			1		39	1		2	3		2				143
10:15 - 10:30	11		1		2	33	1		1	5		3			1	166
10:30 - 10:45	5			2	1	30				1		2				133
10:45 - 11:00	8			1		42	1		1	2		6				154
11:00 - 11:15	8				1	45	1		2	4		1				144
11:15 - 11:30	12			1	1	54	1			3		5	1			184
11:30 - 11:45	9					41			6	4		5			1	179
11:45 - 12:00 PM	13			1		50				5		3				162
12:00 - 12:15	6			2		54				1		8			1	222
12:15 - 12:30	10				1	31			1	3		9			2	173
12:30 - 12:45	9				1	54	1		3	6		2				200
12:45 - 1:00	10			2	2	46			4	4		6			1	181
1:00 - 1:15	11	1		1	1	46			3	4		7				197
1:15 - 1:30	13					41				2		3				172
1:30 - 1:45	18					34	2		3	2		3				191
1:45 - 2:00	11			1		50				2		8			1	199
2:00 - 2:15	6			4	1	44			3	6		2			1	160
2:15 - 2:30	8				2	42				2		4				163
2:30 - 2:45	9				2	37				1		5				150
2:45 - 3:00	7	1	1			32			1	2		4				149
3:00 - 3:15	12				1	33			1	1		4				164
3:15 - 3:30	12				1	46			5	2		2				166
3:30 - 3:45	20			1	1	67		1		15		2	1			222
3:45 - 4:00	10			2	2	49			1	4		2			1	168
4:00 - 4:15	15			1		61	1		1	2		3				203
4:15 - 4:30	18	2				47			2	1		4			2	204
4:30 - 4:45	25			1		62	1		5	2		5				214
4:45 - 5:00	22					37			2	1		7	1	1		185
5:00 - 5:15	19				1	42			1			9				183
5:15 - 5:30	9					45	1		1	3		7				178
5:30 - 5:45	6					44			1			5		1		172
5:45 - 6:00	8			1		34	1			1		2				137
6:00 - 6:15	8					40			1	1		1			1	136
6:15 - 6:30	14					35			1	1		3				145
6:30 - 6:45	6				1	35						2			1	127
6:45 - 7:00	12					48				1		3	1		1	126
7:00 - 7:15	11	1				48	3			1		5				133
7:15 - 7:30	2				2	24			1	1		3				94
7:30 - 7:45	11					26						7				90
7:45 - 8:00	6					19				1		4				81
8:00 - 8:15	10					28	1		1	1		4				89
8:15 - 8:30	13					35			1	1		2			1	103
8:30 - 8:45	7					37	1					2				90
8:45 - 9:00	3				1	34						2				76
9:00 - 9:15	9					19						1				77
9:15 - 9:30	5					23				2		2				60
9:30 - 9:45	7				1	27						5				63
9:45 - 10:00	8					14				1		3				58
10:00 - 10:15	4					22						7			1	48
10:15 - 10:30	5					9				3		2				33
10:30 - 10:45	3					7			1			1				24
10:45 - 11:00	6					11					1	5				39
11:00 - 11:15	2					8				1		2				27
11:15 - 11:30	3					6				4		3				23
11:30 - 11:45						5				1		1				13
11:45 - MIDNIGHT	1			1		4						1				12
VEH CLASS	A	B	C	D	E	A	B	C	D	E	A	B	C	D	E	
TOTALS	741	5	2	28	27	2537	21	2	74	145	252	2		21	16	
	EL					**ET**					**ER**					

APPROACHING INTERSECTION — FROM THE WEST ON 27

LEFT					THROUGH					RIGHT					TOTALS
A	B	C	D	E	A	B	C	D	E	A	B	C	D	E	
					1										1
2					2					1					10
					1										4
					2				1	1					6
					2				1	1					10
1					3										4
										1					3
1					1				1	1					5
					1				1	1					6
					3				1						9
					2				1						3
1															2
					4					1					5
					4										7
					2										2
					8				1	1					4
					15				2	2					24
1					4										7
					2										8
					4										7
					8				1	1					28
					15				2	2					49
2					9				1	10					52
2					10					6					50
2					12					12					85
7					27				2	11				2	100
					35				1	14					98
5					11		1		1	10					89
8				2	22				1	14					108
7				2	29				2	27					146
1					20				3	28					147
9				1	16				1	17				1	133
6					17				2	25					165
5				1	26				1	37					135
4				1	15				1	23					148
7				2	15				1	18	1		2	2	134
4				1	12				1	18			2		146
8				1	13				4	32				2	154
3				1	12				2	25	1		1	1	153
4				1	3				1	25			1	2	143
4				1	17				1	30					166
2				1	16				1	29			2	1	133
3					20					23	1		2	1	154
3				1	11				1	26			1		144
2					12				1	23			2		184
6				1	12				1	40			2		179
6					15				1	38			2		149
6					20				1	31			1	2	164
6				1	12				1	30					166
3					10				2	41			1		222
9				1	20				1	32	1				168
10				1	12				1	30	2		2		203
10				1	16				1	30			1	2	204
10				1	14				1	36			3	1	214
10				1	28		1			34					185
14					32					37			1		183
6					22				1	27			1	1	178
12				1	15					29				1	172
8				1	18					23					137
9					12					27	1				136
7					18					32	1				145
6				1	8				1	23					127
5				1	6				1	16					126
7					10			1		16					133
1					6					14				1	94
4					4			1		14					90
2					8					13			1		81
2					12					13				1	89
2					6					9					103
2					5	1				15					90
3					21					6					76
3					3					8	1				77
5					16					14					60
2					5					3					63
5				1	6					11					58
4					3					4					48
3					4					4					33
4				1	3					2					24
5					4					2					39
1					3					2					27
1					3					2					23
1					4					1					13
1					1					3					12
A	**B**	**C**	**D**	**E**	**A**	**B**	**C**	**D**	**E**	**A**	**B**	**C**	**D**	**E**	
381	2		25	21	977	3	2	39	46	1597	13	1	55	32	
NL					**NT**					**NR**					

APPROACHING INTERSECTION — FROM THE NORTH ON 2A

LEFT					THROUGH					RIGHT					TOTALS
A	B	C	D	E	A	B	C	D	E	A	B	C	D	E	
										2			1		12
					1					1			1		10
1										1					4
					1					2					6
					2					2					10
1															2
					1					1					4
2										1					5
					1					1					6
										1					2
					1					1					4
					1					1					7
					1					1					8
					2					1					15
					2					1					24
1										2					25
					2					5					27
					15				1	8					49
2					9					10					52
					10					6					50
					12					12					85
					27					27					100
					35				1	14					98
					11		1		1	10					89
					22				1	14					108
					29				2	27					146
					20				3	28					147
					16				1	17					133
					17				2	25					165
					26				1	37					135
					15				1	23					148
					15				1	18	1		2	2	134
					12				1	18			2		146
					13				4	32				2	154
					12				2	25	1		1	1	153
					3				1	25			1	2	143
					17				1	30					166
					16				1	29			2	1	133
					11	1			1	26			1		154
					8				1	30			1		144
					12				1	23			2		184
					15				1	38			2		149
					20				1	31			1	2	164
					12				1	30					166
					10				2	41			1		222
					20				1	32	1				168
					12				1	30	2		2		203
					16				1	30			1	2	204
					14				1	36			3	1	214
					28	1				34					185
					32					37			1		183
					22				1	27			1	1	178
					15					29				1	172
					18					23					137
					12					27	1				136
					18					32	1				145
					8				1	23					127
					6				1	16					126
					10			1		16					133
					6					14				1	94
					4			1		14					90
					8					13			1		81
					12					13				1	89
					6					9					103
					5	1				15					90
					6					8	1				76
					3					3					77
					5					14					60
					3					5					63
					5				1	6					58
					4					3					48
					4					3					33
					3					4					24
					4					5					39
					3					1					27
					4					1					23
					1					1					13
					1					1					12
A	**B**	**C**	**D**	**E**	**A**	**B**	**C**	**D**	**E**	**A**	**B**	**C**	**D**	**E**	
1383	7	1	35	32	732	4		30	19	1021	6	2	36	46	
SL					**ST**					**SR**					

GRAND TOTALS
23
16
7
9
17
5
9
6
11
10
7
4
9
12
25
29
13
6
31
83
83
126
174
181
147
189
258
249
232
265
257
230
241
214
260
245
218
254
232
263
254
273
314
300
374
311
324
340
329
277
331
305
283
275
253
259
278
261
364
301
341
367
390
330
329
292
291
243
231
269
210
201
196
159
145
128
165
154
145
119
116
101
81
87
66
62
45
61
33
24
17
16223

LOCATION DIAGRAM ENCLOSED (Y / N): YES
WEATHER CONDITIONS: A MIX OF SUN AND CLOUD
RECORDER(S): MIOVISION CAMERAS - TROY PEACOCK
ROAD SURFACE CONDTIONS: CLEAR AND DRY

VEHICLE CLASSES
A: PASSENGER VEHICLES
B: RECREATION VEHICLES
C: BUSES
D: SINGLE UNIT TRUCKS
E: TRACTOR TRAILER COMBINATIONS

LOCATION DIAGRAM ENCLOSED (Y / N): YES
WEATHER CONDITIONS: A MIX OF SUN AND CLOUD
RECORDER(S): MIOVISION CAMERAS - TROY PEACOCK
ROAD SURFACE CONDTIONS: CLEAR AND DRY

VEHICLE CLASSES
A: PASSENGER VEHICLES
B: RECREATION VEHICLES
C: BUSES
D: SINGLE UNIT TRUCKS
E: TRACTOR TRAILER COMBINATIONS

ALBERTA HIGHWAYS 1 TO 986
TRAFFIC VOLUME HISTORY 2013- 2022

Alberta Transportation

Produced: 2023-Jul-10 By MORR Transportation Consulting Ltd.

Hwy	CS	TCS	Muni	Location Description	2013 AADT	2014 AADT	2015 AADT	2016 AADT	2017 AADT	2018 AADT	2019 AADT	2020 AADT	2021 AADT	2022 AADT
27	06	02	MntV	W OF 3 ST IN SUNDRE 4-33-5-504101480	9340	9340	9270	8970	9320	9370	9390	9020	9620	8920
27	06	02	MntV	E OF 3 ST IN SUNDRE 4-33-5-504101480	9440	9440	9370	9060	9420	9400	9490	9130	9740	8640
27	06	02	MntV	W OF 2 ST, SUNDRE 4-33-5-514000160			8650	8380	9140	9140	10210	9810	10470	8640
27	06	02	MntV	E OF 2 ST, SUNDRE 4-33-5-514000160			8690	8420	9180	9180	10160	9780	10450	9200
27	06	02	MntV	W OF 1 ST, SUNDRE 4-33-5-513800075			8620	8330	9080	9080	9690	9320	9960	9200
27	06	02	MntV	E OF 1 ST, SUNDRE 4-33-5-513800075			8560	8280	9020	9020	9690	9320	9960	9860
27	06	02	MntV	W OF CENTRE ST IN SUNDRE 4-33-5-500001350	9510	9510	9030	8740	9840	9840	9250	8910	9530	9860
27	06	02	MntV	E OF CENTRE ST IN SUNDRE 4-33-5-500001350	8910	8910	8470	8200	9440	9440	8900	8550	9130	9280
27	06	02	MntV	W OF 760 IN SUNDRE	9180	9180	9000	8710	9350	9350	9190	8840	9440	11380
27	06	02	MntV	E OF 22 & 584 W OF SUNDRE	6800	7530	7350	7060	7340	7320	7260	6960	7420	8200
27	06	04	MntV	E OF 760 IN SUNDRE	7620	7620	7470	7230	7570	7570	7450	7160	7650	7800
27	06	04	MntV	W OF RGE RD 51 E OF SUNDRE							4970	4790	5110	5120
27	06	04	MntV	E OF RGE RD 51 E OF SUNDRE							4870	4690	5010	5020
27	06	04	MntV	W OF RGE RD 44 WESTWARD HO ACC E OF SUNDRE				4820	4900	4900	4820	4640	4840	4840
27	06	04	MntV	E OF RGE RD 44 WESTWARD HO ACC E OF SUNDRE				4680	4760	4760	4680	4520	4780	4780
27	06	04	MntV	W OF 22 N OF WESTWARD HO EJ	4680	4630	4580	4430	4520	4520	4440	4270	4610	4640
27	06	08	MntV	1.2 KM E OF 22 & 27 SUNDRE EJ	3740	3730	3650	3490	3460	3400	3360	3210	3470	3470
27	06	08	MntV	W OF HARMATTAN RD 36-32-4-501000750	3750	3700	3670	3500	3450	3410	3360	3230	3450	3460
27	06	08	MntV	E OF HARMATTAN RD 36-32-4-501000750	3740	3760	3730	3560	3510	3470	3360	3230	3460	3460
27	06	08	MntV	W OF 766 W OF OLDS	3960	3930	3910	3730	3690	3650	3500	3360	3580	3580
27	06	08	MntV	E OF 22 N OF WESTWARD HO EJ	3730	3660	3630	3470	3500	3460	3410	3280	3500	3740
27	06	12	MntV	E OF 766 W OF OLDS	4240	4230	4210	4020	3980	3940	3850	3710	3930	3940
27	06	12	MntV	W OF 70 AVE IN OLDS 36-32-2-500000000	5370	5370	5350	5150	5110	5520	5460	4900	5000	4920
27	06	16	MntV	E OF 70 AVE IN OLDS 36-32-2-500000000	7080	7080	7060	6800	6740	7400	7320	6560	6690	6600
27	06	16	MntV	W OF 67A AVE WALMART ACC, OLDS 31-32-1-512100000	7080	7080	7060	6800	6740	7400	7320	6560	6690	6600
27	06	16	MntV	E OF 67A AVE (WALMART ACC), OLDS 31-32-1-512100000	9440	9440	9400	9050	8970	9570	9470	8490	8670	8560
27	06	16	MntV	W OF 65 AVE IN OLDS 31-32-1-508050000	9440	9440	9400	9050	8970	9570	9470	8490	8670	8560
27	06	16	MntV	E OF 65 AVE IN OLDS 31-32-1-508050000	11590	11590	11530	11060	10960	12150	12030	10790	11010	10880
27	06	16	MntV	W OF 61 AVE IN OLDS 31-32-1-503300000	11590	11590	11530	11060	10960	12150	12030	10790	11010	10880
27	06	16	MntV	E OF 61 AVE IN OLDS 31-32-1-503300000	14850	14850	14770	14140	14010	14620	14480	12990	13260	13200
27	06	16	MntV	W OF 57 AVE IN OLDS 31-32-1-500000000	14850	14850	14770	14140	14010	14620	14480	12990	13260	13200

ALBERTA HIGHWAYS 1 TO 986
TRAFFIC VOLUME HISTORY 2013- 2022

Alberta Transportation

Produced: 2023-Jul-10 By MORR Transportation Consulting Ltd.

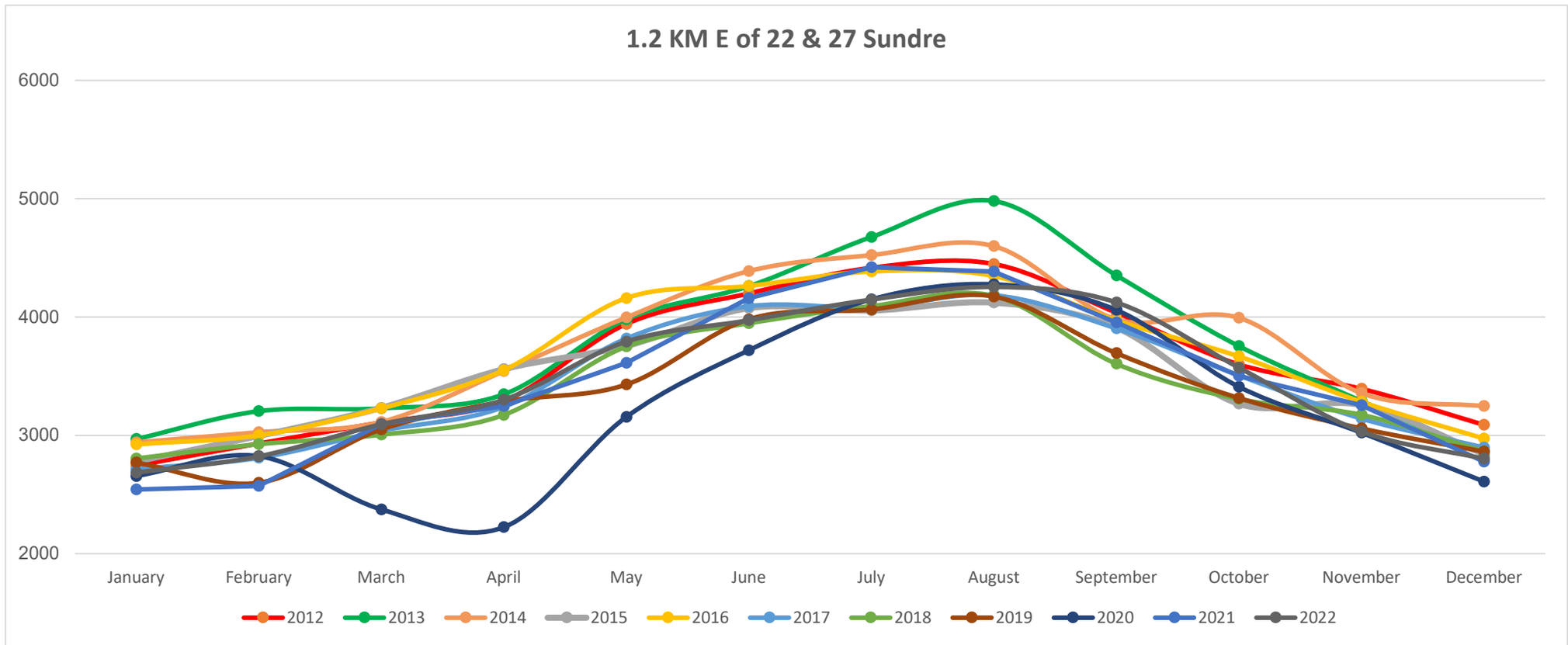
Hwy	CS	TCS	Muni	Location Description	2013 AADT	2014 AADT	2015 AADT	2016 AADT	2017 AADT	2018 AADT	2019 AADT	2020 AADT	2021 AADT	2022 AADT
27	06	16	MntV	E OF 57 AVE IN OLDS 31-32-1-500000000	13760	13760	13710	13660	13520	14110	13970	12520	12790	12960
27	06	16	MntV	W OF 52 AVE IN OLDS WJ 32-32-1-509300000	12950	12950	12890	12710	12580	14380	14250	12770	13040	12880
27	06	16	MntV	E OF 52 AVE IN OLDS WJ 32-32-1-509300000	12470	12470	12410	12250	12130	14080	13950	12500	12770	12620
27	06	16	MntV	W OF 50 AVE IN OLDS 32-32-1-505150000	11970	11970	11920	11770	11670	13160	13040	11680	11920	11820
27	06	16	MntV	E OF 50 AVE IN OLDS 32-32-1-505150000	12100	12100	12060	11900	11780	12980	12840	11510	11740	11600
27	06	16	MntV	W OF 49 AVE IN OLDS 32-32-1-504100000	12100	12100	12060	11900	11780	12980	12840	11510	11740	11600
27	06	16	MntV	E OF 49 AVE IN OLDS 32-32-1-504100000	11480	11480	11420	11260	11140	12180	12040	10800	11000	10860
27	06	16	MntV	W OF 48 AVE IN OLDS 32-33-1-502000000	11480	11480	11420	11260	11140	12180	12040	10800	11000	10860
27	06	16	MntV	E OF 48 AVE IN OLDS 32-33-1-502000000	11380	11380	11320	11160	11040	12060	11920	10690	10890	10760
27	06	16	MntV	W OF 2A AT OLDS	11970	11880	11820	11680	11560	11800	11680	10460	10680	10560
27	06	20	MntV	W OF RGE RD 11 E OF OLDS							6800	6120	6660	6580
27	06	20	MntV	E OF RGE RD 11 E OF OLDS							7060	6340	6890	6800
27	06	20	MntV	W OF 2 E OF OLDS	7990	7470	7590	6990	6950	6940	7060	6340	6890	6800
27	06	20	MntV	E OF 2A AT OLDS	8120	7540	7560	7480	7240	7340	8840	7920	8100	8000
27	08	04	MntV	W OF 791 W OF TORRINGTON	1600	1610	1590	1510	1530	1620	1630	1390	1420	1380
27	08	04	MntV	E OF 2 E OF OLDS	3520	3530	3530	3160	3160	3160	3170	2960	2730	2660
27	08	08	MntV	E OF 791 W OF TORRINGTON	1280	1290	1270	1210	1230	1350	1360	1160	1190	1160
27	08	08	Knee	W OF 805 E OF TORRINGTON	1240	1250	1240	1190	1210	1210	1230	1050	1080	1040
27	08	12	Knee	E OF 805 E OF TORRINGTON	860	870	860	880	900	900	920	800	780	760
27	08	12	Knee	5.0 KM W OF 21 & 27 TROCHU NJ	840	850	830	800	810	810	820	690	720	760
27	08	12	Knee	W OF 21 S OF TROCHU NJ	860	850	840	800	810	830	820	700	720	700
27	10	04	Knee	W OF 836 S OF GHOST PINE CREEK	1910	1900	1880	1910	1990	1950	1920	1580	1720	1680
27	10	04	Knee	E OF 21 & 582 S OF THREE HILLS	2090	2090	2090	2100	2180	2080	2060	1700	1800	1760
27	10	08	Knee	E OF 836 S OF GHOST PINE CREEK	1900	1890	1870	1860	1940	1900	1870	1530	1660	1580
27	10	08	Knee	W OF 837 NW OF NACMINE	1910	1900	1880	1890	1970	1930	1890	1550	1690	1620
27	10	12	Knee	E OF 837 NW OF NACMINE	1770	1760	1740	1750	1830	1720	1680	1380	1500	1440
27	10	12	Strl	W OF 839 SW OF MORRIN	1740	1690	1650	1710	1790	1760	1710	1310	1460	1400
27	10	16	Strl	E OF 839 SW OF MORRIN	1800	1750	1710	1770	1850	1860	1810	1410	1580	1520
27	10	16	Strl	5.6 KM W 9 & 27 & 56 MORRIN	1780	1740	1700	1780	1850	1810	1740	1290	1540	1680
27	10	16	Strl	W OF RGE RD 203 9-31-20-400000000	1800	1750	1710	1780	1860	1840	1780	1380	1540	1480
27	10	16	Strl	E OF RGE RD 203 9-31-20-400000000	2090	2040	2000	2070	2150	2070	2000	1550	1730	1640

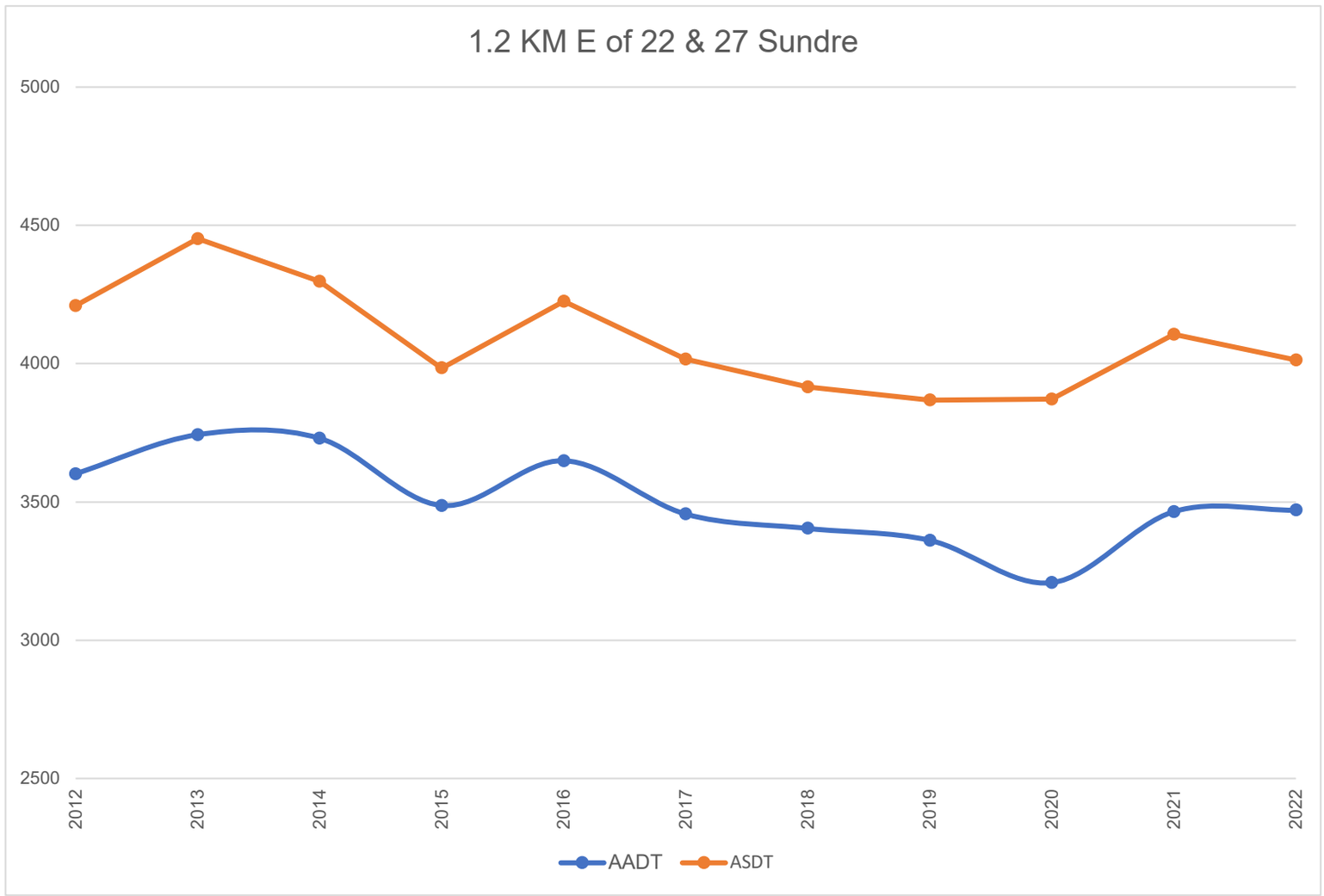
ALBERTA HIGHWAYS 1 TO 986
TRAFFIC VOLUME, VEHICLE CLASSIFICATION, TRAVEL and ESAL STATISTICS REPORT
2022

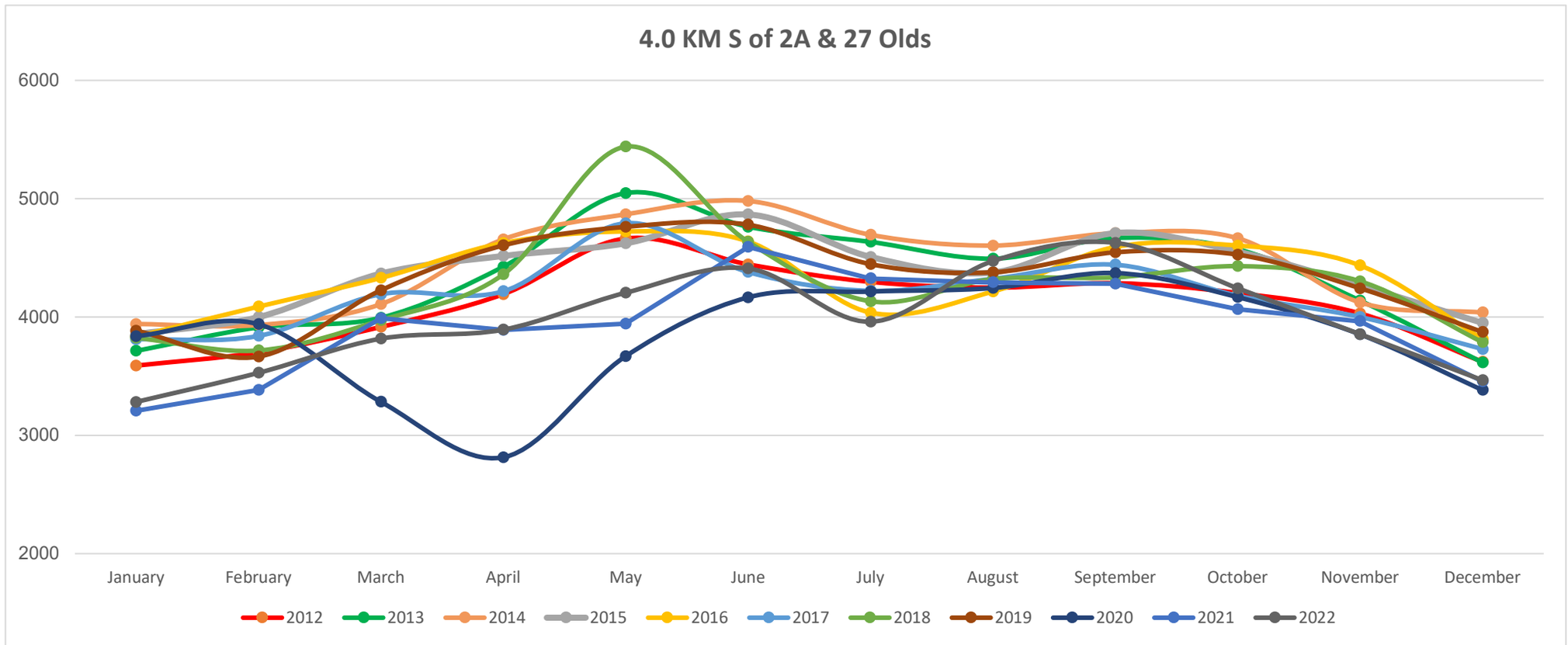
Alberta Transportation

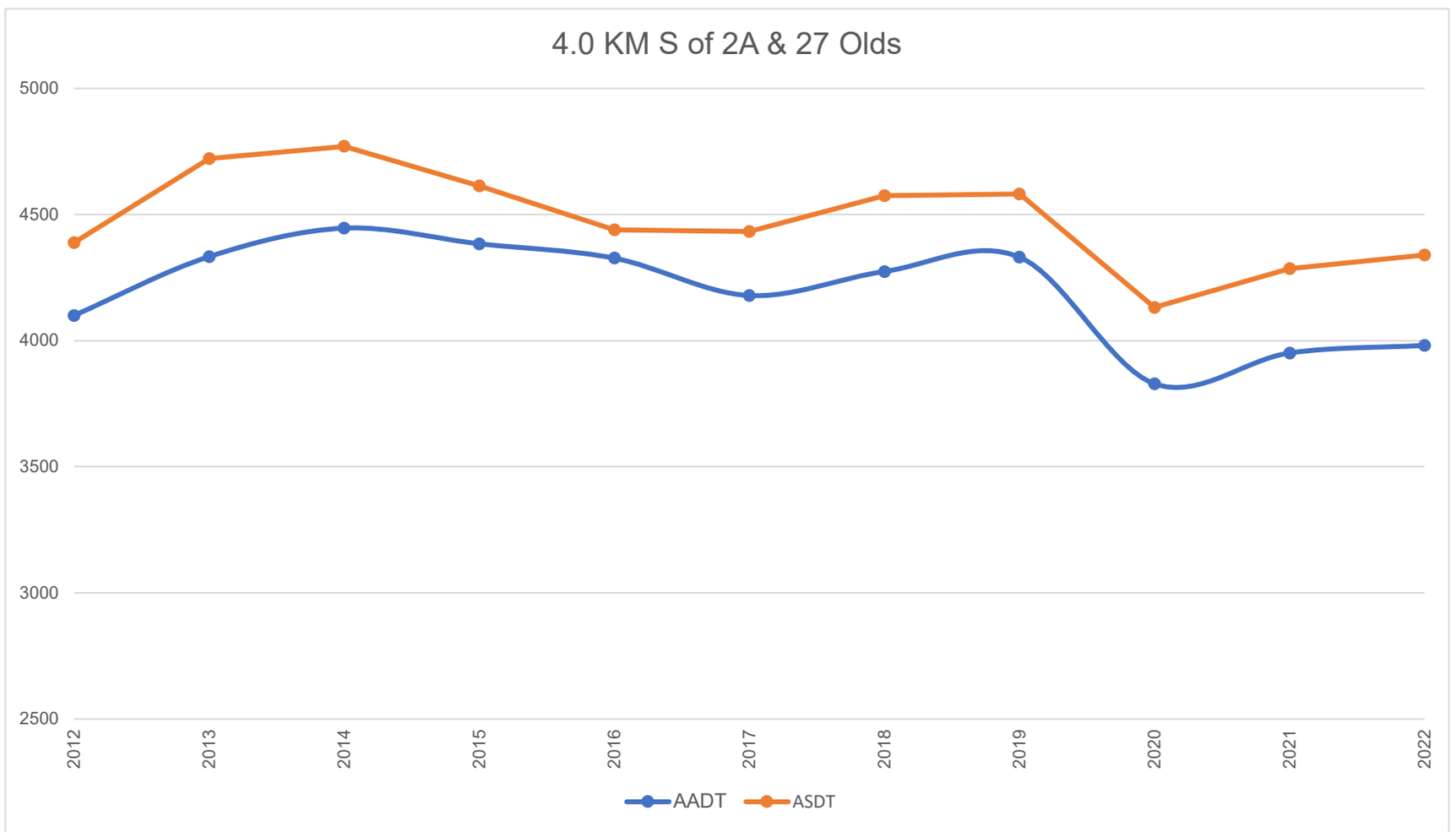
Produced: 2023-May-24 By MORR Transportation Consulting Ltd.

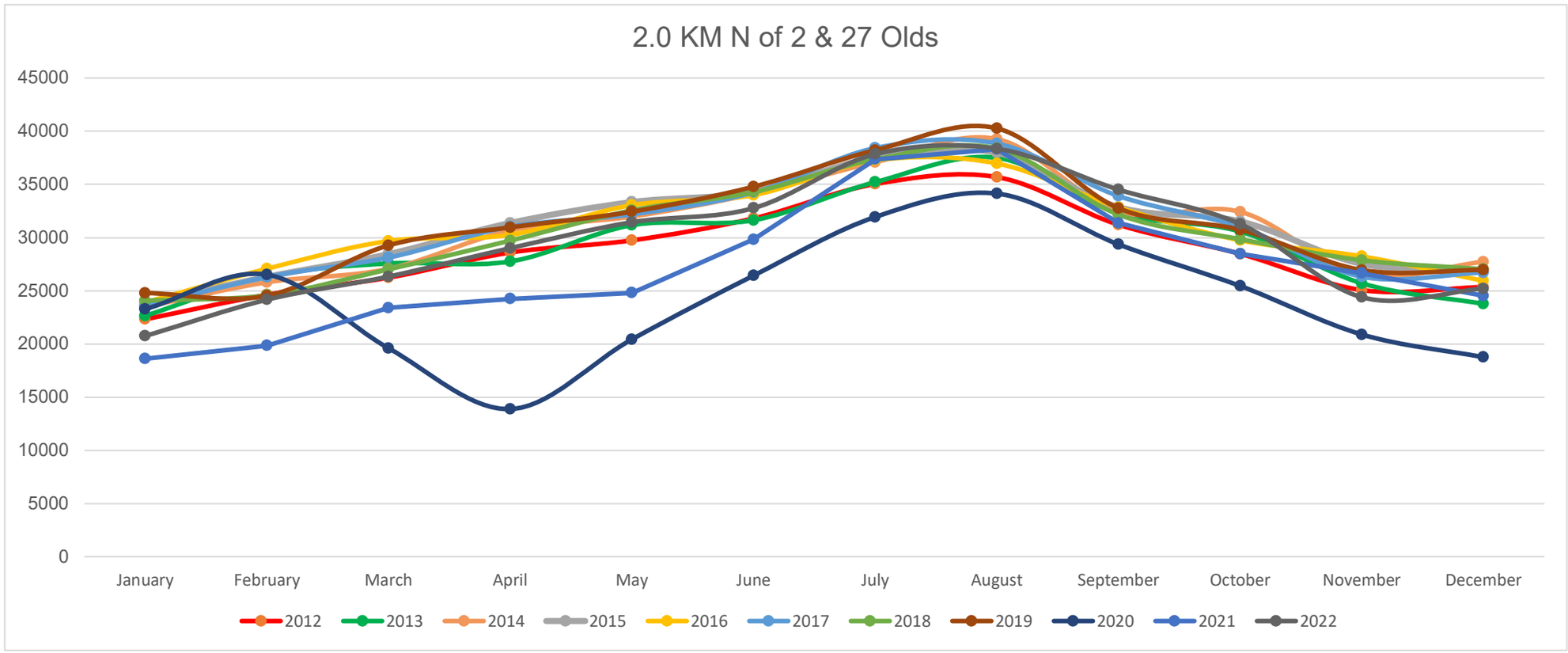
						From	To	Length	Volume		Classifications						Travel MVKM		ESAL / Day / Dir		
Hwy	CS	TCS	Muni	From	To	Km	Km	in Km	WAADT	WASDT	%PV	%RV	%BU	%SU	%TT	%CM	Annual	Summer	SU	TT	Total
25				**N OF 3 AT LETHBRIDGE**	**S OF 526 & 847 SW OF ENCHANT**			**72.156**	**1770**	**2030**	**80.5**	**0.7**	**1.0**	**4.6**	**13.2**	**18.8**	**46.6**	**22.3**	**28.5**	**193.3**	**221.9**
26	10	4	Camr	CAMROSE E.C.L.	W OF 834 E OF CAMROSE	0.000	9.263	9.263	2350	2600	80.1	1.4	0.3	5.4	12.8	18.5	7.9	3.7	55.9	311.8	367.7
26	10	8	Camr	E OF 834 E OF CAMROSE	W OF 854 E OF CAMROSE	9.263	22.134	12.871	1690	1900	72.5	1.1	0.3	8.1	18.0	26.4	7.9	3.7	60.3	315.3	375.6
26	10	12	Camr	E OF 854 E OF CAMROSE	W OF 855 S OF HOLDEN	22.134	35.165	13.031	1340	1540	75.1	2.6	0.2	7.0	15.1	22.3	6.4	3.1	41.3	209.7	251.0
26	10			CAMROSE E.C.L.	W OF 855 S OF HOLDEN			35.165	1730	1950	75.5	1.7	0.3	7.0	15.6	22.8	22.2	10.5	52.1	275.2	327.3
26	12	4	Beav	E OF 855 S OF HOLDEN	W OF 36 SW OF VIKING	0.000	27.345	27.345	1050	1040	78.5	4.0	0.0	3.1	14.4	17.5	10.5	4.4	14.3	156.7	171.0
26	12			E OF 855 S OF HOLDEN	W OF 36 SW OF VIKING			27.345	1050	1040	78.5	4.0	0.0	3.1	14.4	17.5	10.5	4.4	14.3	156.7	171.0
26	14	4	Beav	E OF 36 S OF VIKING	W OF 14 NW OF KINSELLA	0.000	14.082	14.082	490	480	69.0	2.9	0.0	3.4	24.7	28.1	2.5	1.0	7.3	125.4	132.7
26	14			E OF 36 S OF VIKING	W OF 14 NW OF KINSELLA			14.082	490	480	69.0	2.9	0.0	3.4	24.7	28.1	2.5	1.0	7.3	125.4	132.7
26				**CAMROSE E.C.L.**	**W OF 14 NW OF KINSELLA**			**76.592**	**1260**	**1350**	**75.4**	**2.7**	**0.1**	**4.9**	**16.8**	**21.9**	**35.2**	**15.9**	**30.4**	**205.4**	**235.7**
27	6	2	MntV	E OF 22 AT SUNDRE	W OF 760 E OF SUNDRE	0.000	2.310	2.310	9140	8600	91.0	1.5	0.3	2.1	5.2	7.5	7.7	3.0	84.5	492.6	577.1
27	6	4	MntV	E OF 760 E OF SUNDRE	W OF 22 N OF WESTWARD HO EJ	2.310	12.491	10.181	5370	5680	85.5	4.5	0.2	3.0	6.8	10.0	20.0	8.8	71.0	378.5	449.5
27	6	8	MntV	E OF 22 N OF WESTWARD HO EJ	W OF 766 W OF OLDS	12.491	23.324	10.833	3560	3920	85.4	2.0	0.5	3.1	9.0	12.6	14.1	6.5	48.6	332.1	380.7
27	6	12	MntV	E OF 766 W OF OLDS	OLDS W.C.L.	23.324	36.490	13.166	5150	5710	87.6	1.9	0.5	3.2	6.8	10.5	24.7	11.5	72.6	363.0	435.6
27	6	16	MntV	OLDS W.C.L.	W OF 2A AT OLDS	36.490	39.715	3.225	11080	11760	93.9	1.2	0.1	2.1	2.6	4.9	13.0	5.8	102.5	298.6	401.1
27	6	20	MntV	E OF 2A AT OLDS	W OF 2 E OF OLDS	39.715	44.610	4.895	7040	7880	88.1	1.4	0.1	3.4	7.1	10.6	12.6	5.9	105.4	518.1	623.5
27	6			E OF 22 AT SUNDRE	W OF 2 E OF OLDS			44.610	5660	6090	87.3	2.4	0.3	3.0	7.0	10.3	92.1	41.5	72.8	378.1	450.9
27	8	4	MntV	E OF 2 E OF OLDS	W OF 791 W OF TORRINGTON	0.000	15.020	15.020	2020	2320	88.5	0.9	0.4	2.5	7.7	10.6	11.1	5.3	22.2	161.2	183.4
27	8	8	MntV	E OF 791 W OF TORRINGTON	W OF 805 AT TORRINGTON	15.020	29.675	14.655	1100	1270	83.3	0.7	0.7	3.8	11.4	16.0	5.9	2.8	18.4	130.0	148.4
27	8	12	Knee	E OF 805 AT TORRINGTON	W OF 21 S OF TROCHU NJ	29.675	54.119	24.444	730	840	79.7	2.2	0.1	5.5	12.4	18.1	6.5	3.1	17.7	93.8	111.5
27	8			E OF 2 E OF OLDS	W OF 21 S OF TROCHU NJ			54.119	1190	1370	83.1	1.4	0.3	4.2	10.8	15.4	23.5	11.2	19.1	122.3	141.4
27	10	4	Knee	E OF 21 & 582 S OF THREE HILLS SJ	W OF 836 S OF GHOST PINE CREEK	0.000	11.430	11.430	1720	2100	79.4	4.4	0.0	2.1	14.0	16.2	7.2	3.7	15.9	249.6	265.5
27	10	8	Knee	E OF 836 S OF GHOST PINE CREEK	W OF 837 NW OF NACMINE	11.430	17.978	6.548	1600	1960	73.1	3.5	0.2	3.6	19.7	23.5	3.8	2.0	25.4	326.7	352.1
27	10	12	Knee	E OF 837 NW OF NACMINE	W OF 839 SW OF MORRIN	17.978	28.812	10.834	1420	1720	72.3	3.7	0.2	4.0	19.8	24.1	5.6	2.9	25.0	291.4	316.4
27	10	16	Strl	E OF 839 SW OF MORRIN	W OF 9 & 56 SE OF MORRIN	28.812	36.989	8.177	1600	1760	77.7	2.7	0.2	3.9	15.4	19.6	4.8	2.2	27.5	255.4	282.9
27	10			E OF 21 & 582 S OF THREE HILLS SJ	W OF 9 & 56 SE OF MORRIN			36.989	1580	1890	75.8	3.7	0.1	3.3	17.0	20.6	21.4	10.8	22.8	276.8	299.6
27				**E OF 22 AT SUNDRE**	**W OF 9 & 56 SE OF MORRIN**			**135.718**	**2770**	**3060**	**82.5**	**2.4**	**0.2**	**3.6**	**11.2**	**15.1**	**137.0**	**63.5**	**37.8**	**248.5**	**286.2**
28	2	8	Stur	T.U.C. BOUNDARY S OF HIGHWAY 216	S OF TWP RD 542 S OF LANCASTER PARK	0.000	1.739	1.739	20690	23180	93.6	0.2	0.3	3.1	2.7	6.2	13.1	6.2	282.5	579.0	861.5
28	2	12	Stur	N OF TWP RD 542 S OF LANCASTER PARK	S OF 37 W OF NAMAO	1.739	8.448	6.709	12650	14070	88.6	0.6	0.2	2.8	7.8	10.8	31.0	14.4	156.0	1022.7	1178.7
28	2	16	Stur	N OF 37 W OF NAMAO	S OF 642 N OF EXCELSIOR	8.448	18.227	9.779	7510	8360	89.2	0.6	0.3	2.9	7.1	10.2	26.8	12.5	95.9	552.7	648.6
28	2	20	Stur	N OF 642 N OF EXCELSIOR	S OF 803 W OF BON ACCORD	18.227	20.834	2.607	6380	6150	88.4	0.6	0.6	2.8	7.5	10.9	6.1	2.5	78.7	496.0	574.7
28	2	24	Stur	N OF 803 W OF BON ACCORD	W OF 28A N OF GIBBONS	20.834	33.787	12.953	5770	5260	86.6	0.4	0.7	3.0	9.3	13.0	27.3	10.4	76.3	556.2	632.5
28	2			T.U.C. BOUNDARY S OF HIGHWAY 216	W OF 28A N OF GIBBONS			33.787	8450	8900	88.2	0.5	0.5	2.9	7.9	11.2	104.3	46.0	108.6	644.3	752.9
28	4	4	Stur	N OF 28A N OF GIBBONS	W OF 651 E OF REDWATER	0.000	13.340	13.340	7430	7490	81.7	1.3	0.3	3.0	13.8	17.0	36.2	15.3	98.2	1062.8	1161.0
28	4	8	Stur	E OF 651 W OF REDWATER	W OF 38 W OF REDWATER	13.340	20.040	6.700	7760	9090	82.5	1.2	0.6	2.5	13.2	16.3	19.0	9.3	85.5	1061.7	1147.2
28	4	12	Thor	N OF 38 W OF REDWATER	W OF 827 S OF EGREMONT	20.040	29.995	9.955	5780	6780	79.9	0.8	0.5	2.2	16.5	19.3	21.0	10.3	56.0	988.5	1044.5
28	4	16	Thor	E OF 827 S OF EGREMONT	W OF 63 & 829 S OF RADWAY	29.995	36.494	6.499	5450	5600	77.0	1.2	0.5	2.7	18.5	21.7	12.9	5.6	64.8	1045.1	1109.9
28	4			N OF 28A N OF GIBBONS	W OF 63 & 829 S OF RADWAY			36.494	6690	7250	80.5	1.1	0.4	2.6	15.3	18.3	89.1	40.5	78.4	1039.2	1117.6
28	6	4	Thor	E OF 63 & 829 SW OF RADWAY	W OF 831 N OF WASKATENAU	0.000	16.630	16.630	3170	3580	85.6	1.6	0.3	2.6	9.9	12.8	19.2	9.1	36.3	325.3	361.6
28	6	8	SmkL	E OF 831 N OF WASKATENAU	NORTH OF WARSPITE	16.630	28.106	11.476	3300	4040	79.9	3.0	0.6	3.9	12.7	17.1	13.8	7.1	56.7	434.4	491.1
28	6			E OF 63 & 829 SW OF RADWAY	NORTH OF WARSPITE			28.106	3220	3770	83.3	2.2	0.4	3.1	11.0	14.6	33.0	16.2	44.6	369.8	414.5
28	8	4	SmkL	NORTH OF WARSPITE	W OF 855 N OF SMOKY LAKE	0.000	11.310	11.310	3200	3880	79.1	4.0	0.3	3.6	13.0	16.9	13.2	6.7	50.7	431.2	481.9
28	8	8	SmkL	E OF 855 N OF SMOKY LAKE	W OF 857 SE OF BELLIS	11.310	34.700	23.390	2880	3200	79.2	2.1	0.6	3.5	14.6	18.7	24.6	11.5	44.4	435.8	480.2
28	8	12	SmkL	E OF 857 SE OF BELLIS	W OF 36 W OF VILNA WJ	34.700	41.237	6.537	3350	4050	79.4	5.1	0.2	2.7	12.6	15.5	8.0	4.1	39.8	437.5	477.3

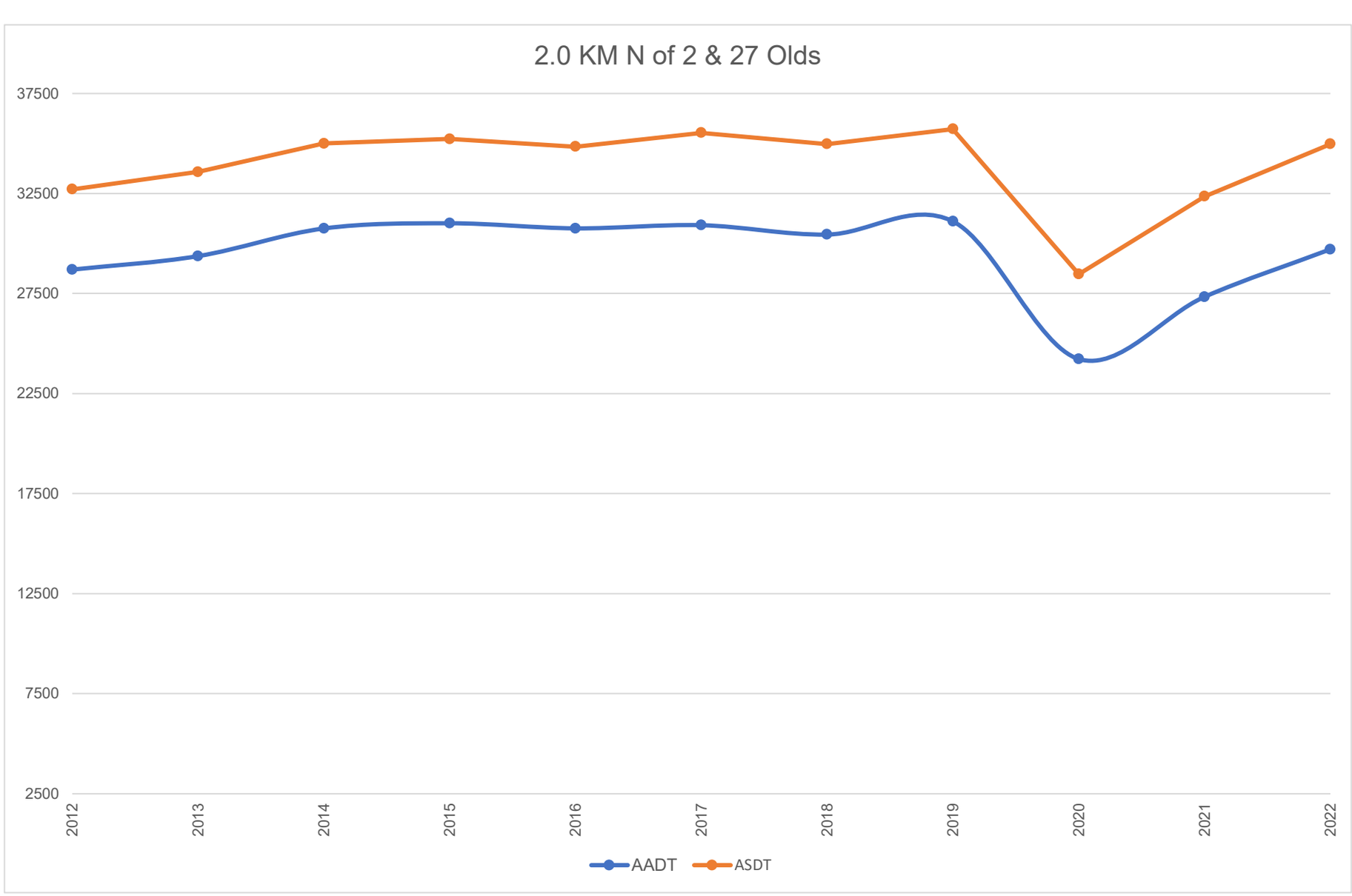

1.2 KM E of 22 & 27 Sundre
6000
5000
4000
3000
2000
January
February
March
April
May
June
July
August
September
October
November
December
2012
2013
2014
2015
2016
2017
2018
2019
2020
2021
2022

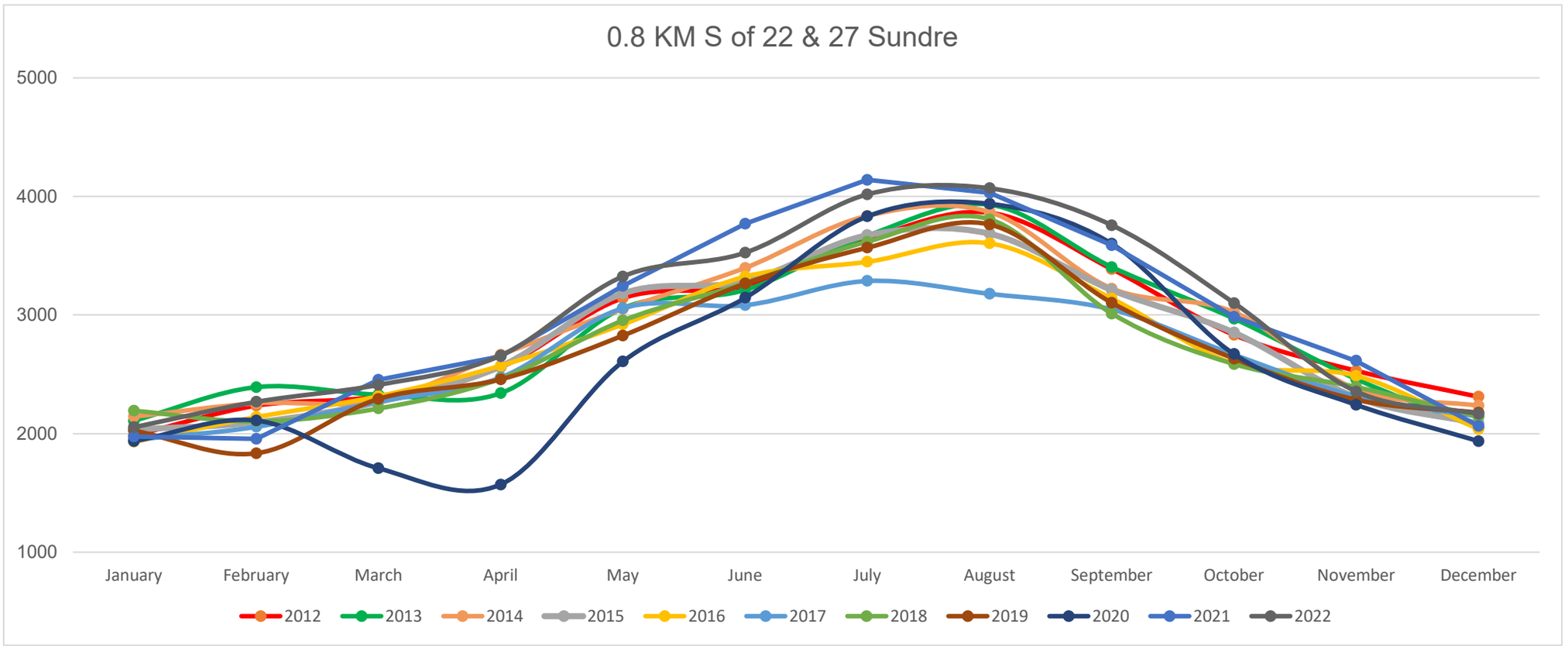

1.2 KM E of 22 & 27 Sundre
5000
4500
4000
3500
3000
2500
2012
2013
2014
2015
2016
2017
2018
2019
2020
2021
2022
AADT
ASDT

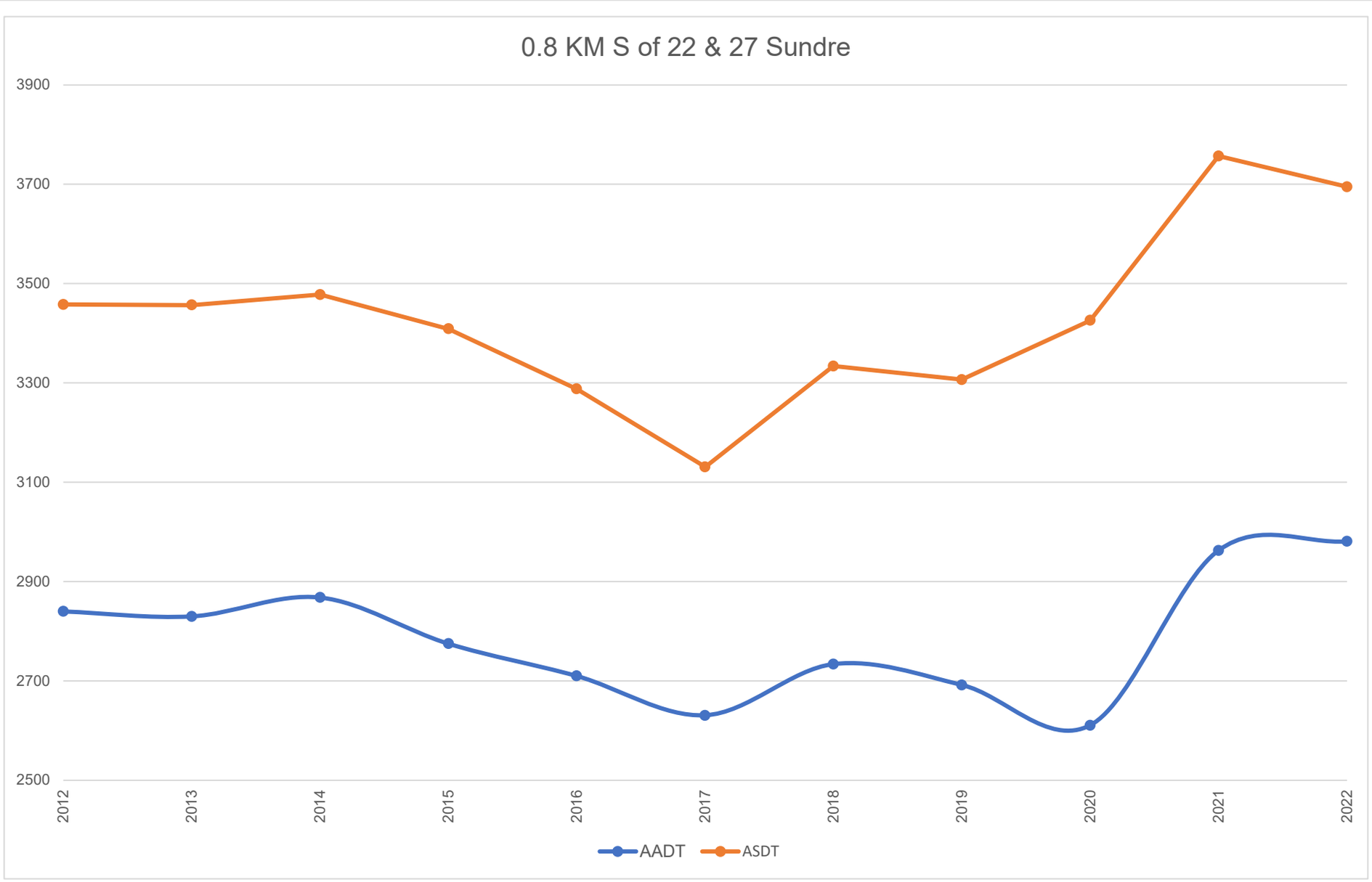

4.0 KM S of 2A & 27 Olds
6000
5000
4000
3000
2000
January
February
March
April
May
June
July
August
September
October
November
December
2012
2013
2014
2015
2016
2017
2018
2019
2020
2021
2022


4.0 KM S of 2A & 27 Olds
5000
4500
4000
3500
3000
2500
2012
2013
2014
2015
2016
2017
2018
2019
2020
2021
2022
AADT
ASDT


2.0 KM N of 2 & 27 Olds
45000
40000
35000
30000
25000
20000
15000
10000
5000
0
January
February
March
April
May
June
July
August
September
October
November
December
2012
2013
2014
2015
2016
2017
2018
2019
2020
2021
2022


2.0 KM N of 2 & 27 Olds
37500
32500
27500
22500
17500
12500
7500
2500
2012
2013
2014
2015
2016
2017
2018
2019
2020
2021
2022
AADT
ASDT


0.8 KM S of 22 & 27 Sundre
5000
4000
3000
2000
1000
January
February
March
April
May
June
July
August
September
October
November
December
2012
2013
2014
2015
2016
2017
2018
2019
2020
2021
2022


0.8 KM S of 22 & 27 Sundre
3900
3700
3500
3300
3100
2900
2700
2500
2012
2013
2014
2015
2016
2017
2018
2019
2020
2021
2022
AADT
ASDT

McElhanney
Consulting Services Ltd.

DETAILED LOCATION DIAGRAM

HIGHWAY: 27 **INTERSECTION OF:** 27 & 67A AVE, WALMART ACC. OLD 31-32-1-512100000

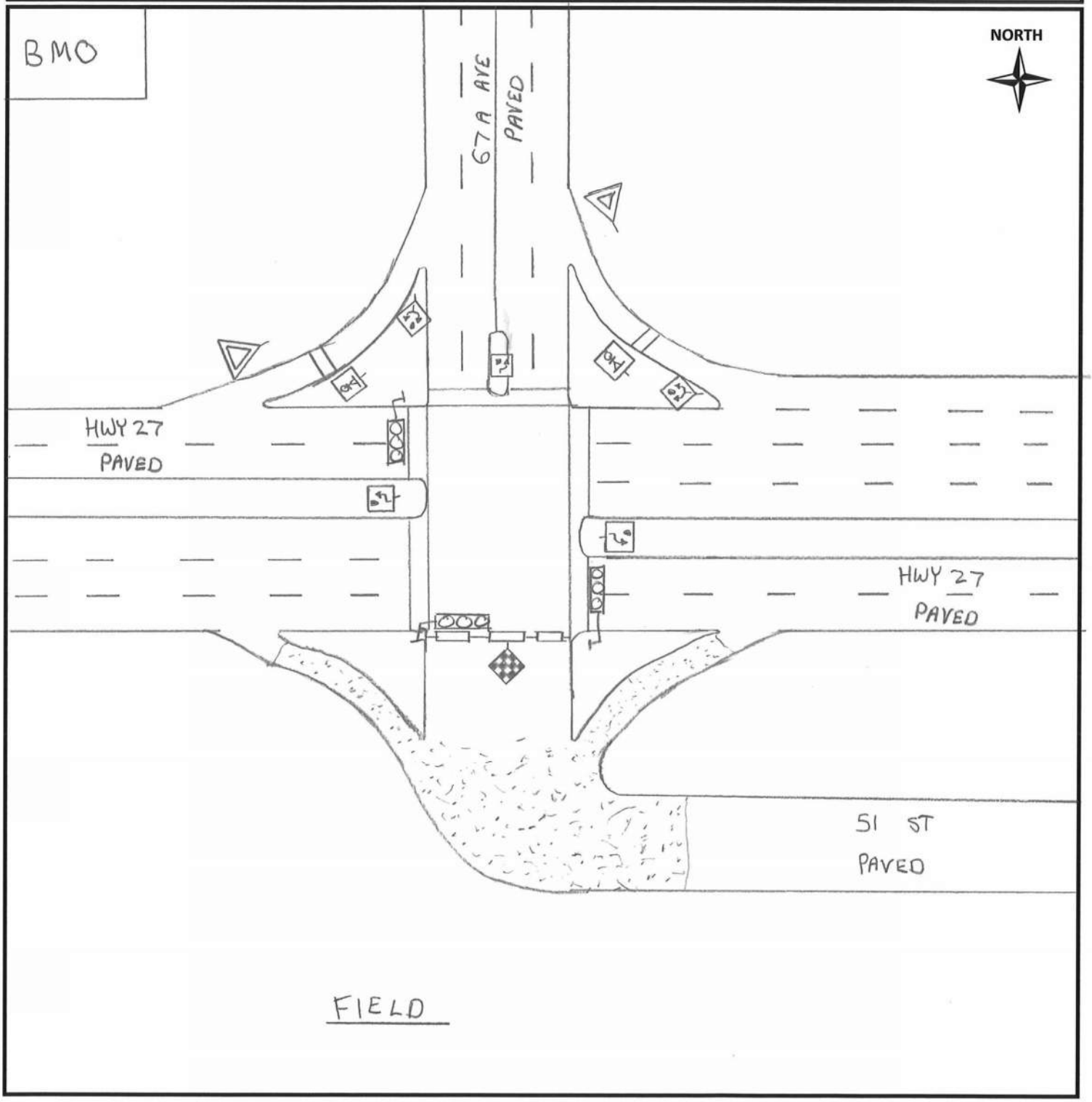
REFERENCE No.: 70000470 **LATITUDE (Degrees):** 51.79501236 **LONGITUDE (Degrees):** -114.1375178

DAY: THURSDAY **DATE:** 23 AUGUST 2018 **DURATION:** MIDNIGHT TO MIDNIGHT

RECORDED BY: MIOVISION CAMERAS

REMARKS:

PEDESTRIANS (Y / N): YES



McElhanney
Consulting Services Ltd.

DETAILED LOCATION DIAGRAM

HIGHWAY: 27 **INTERSECTION OF:** 27 & 65 AVE, OLDS 31-32-1-508150000

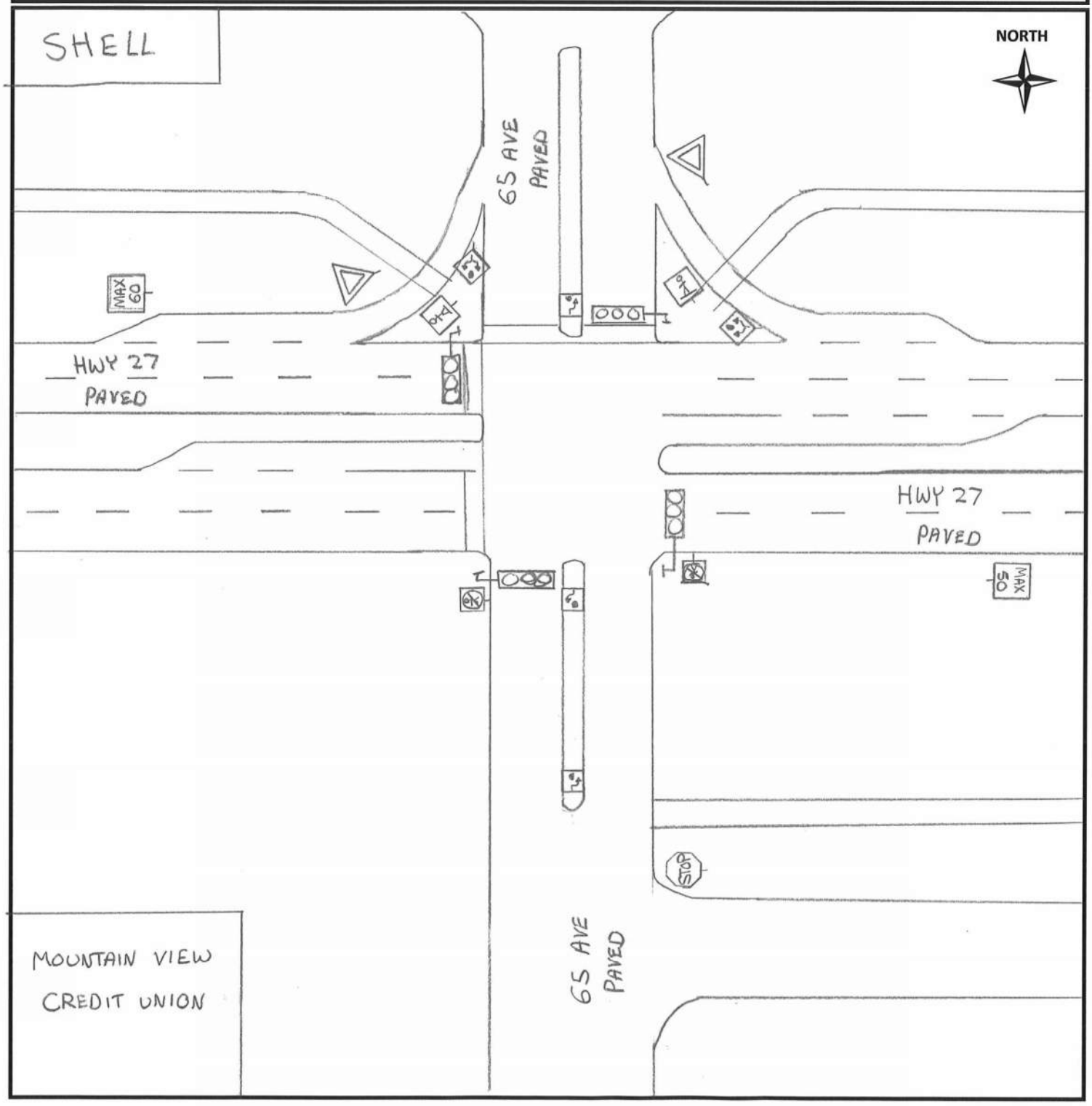
REFERENCE No.: 70000204 **LATITUDE (Degrees):** 51.79500604 **LONGITUDE (Degrees):** -114.1315179

DAY: THURSDAY **DATE:** 23 AUGUST 2018 **DURATION:** MIDNIGHT TO MIDNIGHT

RECORDED BY: MIOVISION CAMERAS

REMARKS:

PEDESTRIANS (Y / N): YES



McElhanney
Consulting Services Ltd.

DETAILED LOCATION DIAGRAM

HIGHWAY: 27 **INTERSECTION OF:** 27 & 61 AVE, OLDS 31-32-1-503350000

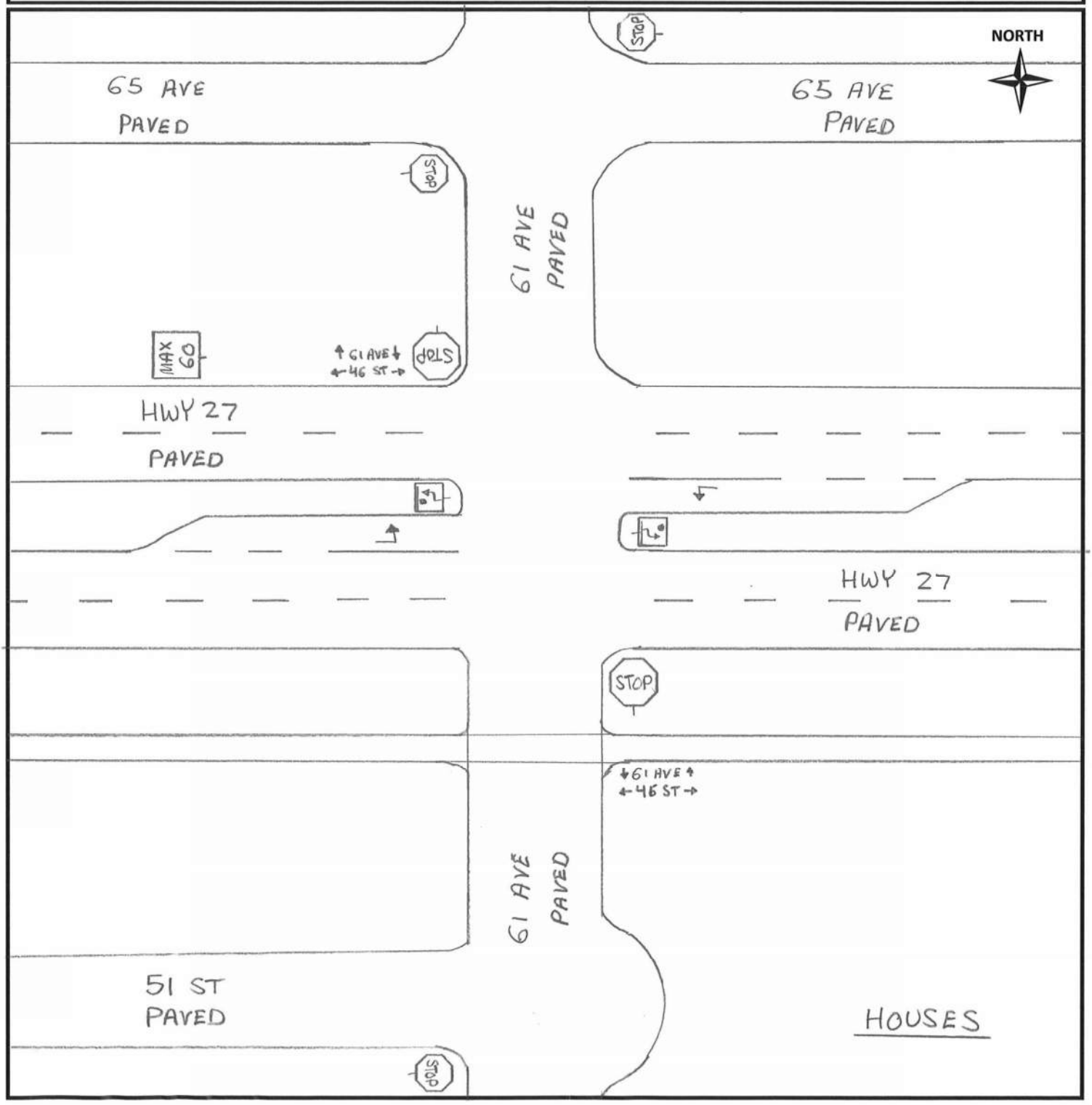
REFERENCE No.: 70000205 **LATITUDE (Degrees):** 51.79501146 **LONGITUDE (Degrees):** -114.1244891

DAY: THURSDAY **DATE:** 23 AUGUST 2018 **DURATION:** MIDNIGHT TO MIDNIGHT

RECORDED BY: MIOVISION CAMERAS

REMARKS:

PEDESTRIANS (Y / N): YES



CROSSROADS TRAFFIC CONSULTANTS LTD.

DETAILED LOCATION DIAGRAM

HIGHWAY: 27 **INTERSECTION OF:** 27 & RGE RD 15 57 AVE, OLDS 31-32-1-500000000

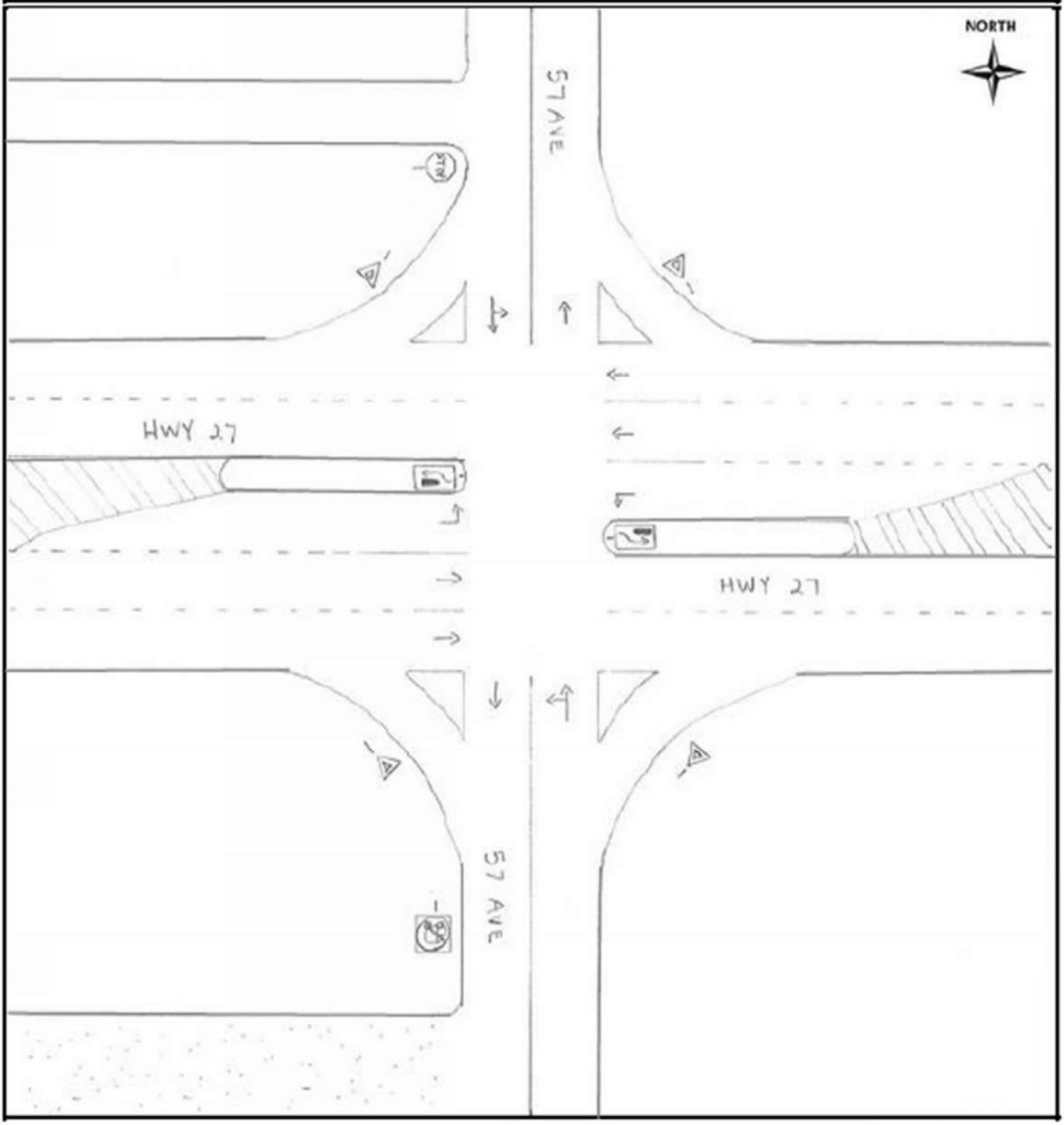
REFERENCE No.: 00997026 **LATITUDE (Degrees):** 51.79501887 **LONGITUDE (Degrees):** -114.11986560

DAY: TUESDAY **DATE:** AUGUST 02, 2002 **DURATION:** MIDNIGHT **TO** MIDNIGHT

RECORDED BY: MIOVISION CAMERAS - ISAAC CASSLEY

REMARKS:

PEDESTRIANS (Y / N): YES



McElhanney
Consulting Services Ltd.

DETAILED LOCATION DIAGRAM

HIGHWAY: 27 **INTERSECTION OF:** 27 & 52 AVE WJ, OLDS 32-32-1-509300000

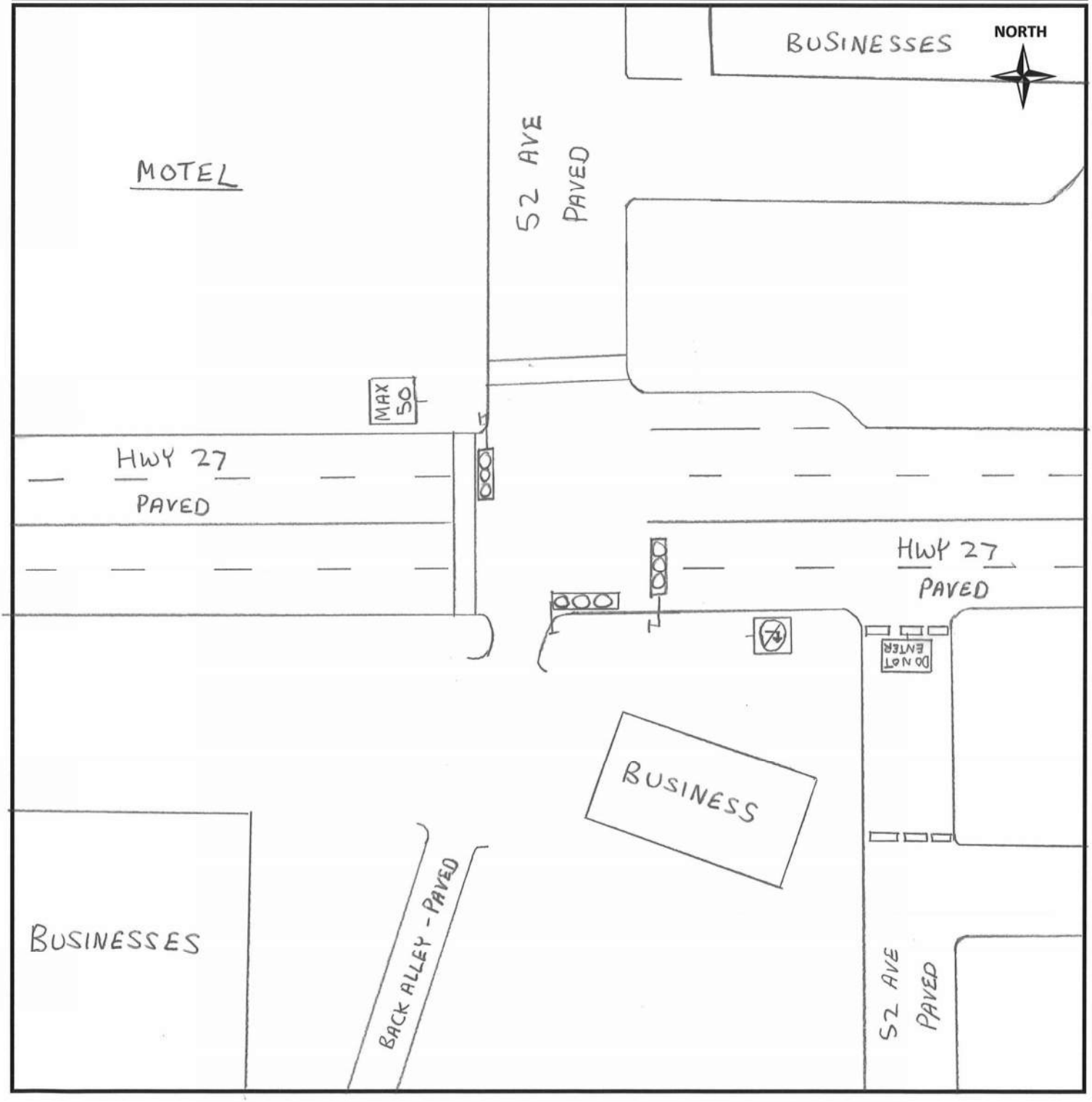
REFERENCE No.: 70000127 **LATITUDE (Degrees):** 51.79502385 **LONGITUDE (Degrees):** -114.1097253

DAY: THURSDAY **DATE:** 23 AUGUST 2018 **DURATION:** MIDNIGHT TO MIDNIGHT

RECORDED BY: MIOVISION CAMERAS

REMARKS:

PEDESTRIANS (Y / N): YES



McElhanney
Consulting Services Ltd.

DETAILED LOCATION DIAGRAM

HIGHWAY: 27 **INTERSECTION OF:** 27 & 50 AVE, OLDS 32-32-1-505150000

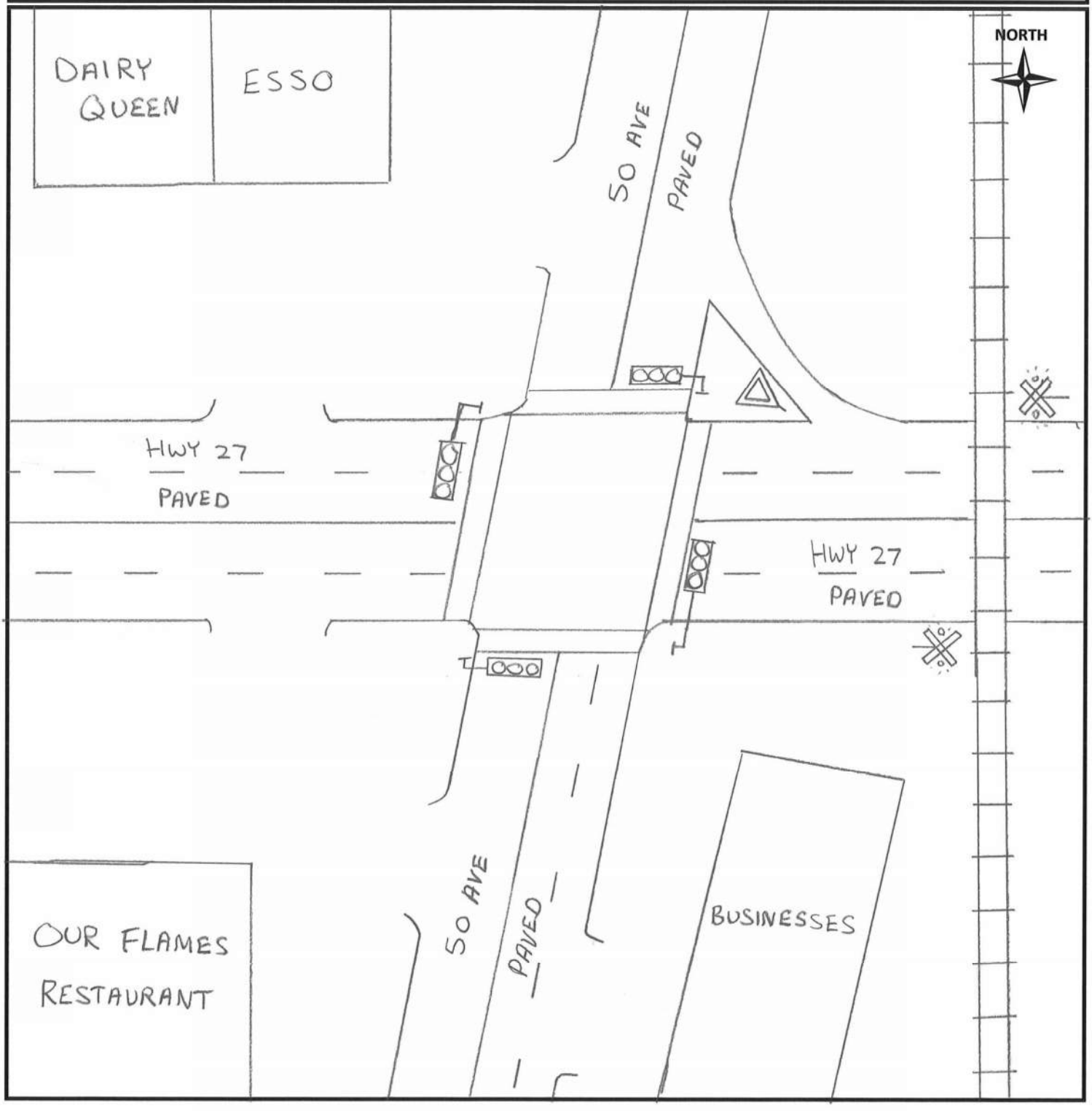
REFERENCE No.: 00997027 **LATITUDE (Degrees):** 51.79502269 **LONGITUDE (Degrees):** -114.103855

DAY: THURSDAY **DATE:** 23 AUGUST 2018 **DURATION:** MIDNIGHT TO MIDNIGHT

RECORDED BY: MIOVISION CAMERAS

REMARKS:

PEDESTRIANS (Y / N): YES



McElhanney

DETAILED LOCATION DIAGRAM

HIGHWAY: 2A **INTERSECTION OF:** 2A & 27 AT OLDS

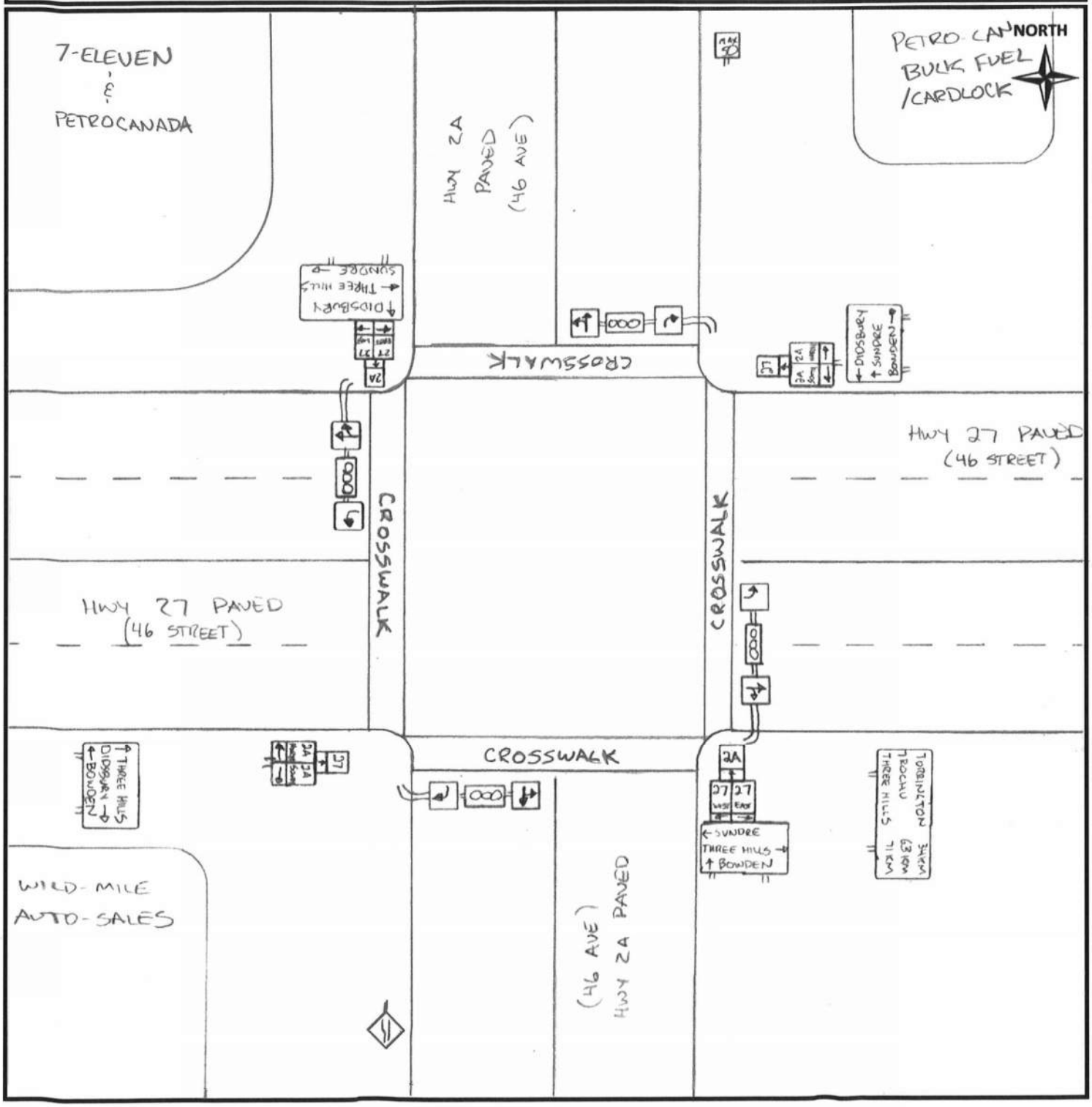
REFERENCE No.: 00990133 **LATITUDE (Degrees):** 51.79502206 **LONGITUDE (Degrees):** -114.0961968

DAY: WEDNESDAY **DATE:** JULY 03 , 2019 **DURATION:** MIDNIGHT **TO** MIDNIGHT

RECORDED BY: MIOVISION CAMERAS - TROY PEACOCK

REMARKS:

PEDESTRIANS (Y / N): NO



B

Appendix B
Existing Signal Data

CIMA+

Alberta Transportation

Traffic Signal Systems Application

Signal Phase Sequence Diagram

Chris Lo
29-Aug-2023 09:56

Number of results found: 1

Report Parameters

Signal Number:	S384
Date Requested:	
Time of Day:	
Day of Week:	All
Include:	Active only

Summary of Timing Plans

Signal System: S384
HIGHWAY 27:06 AND 67A AVE IN OLDS (27:6 L1 36.863)

Phasing Plans

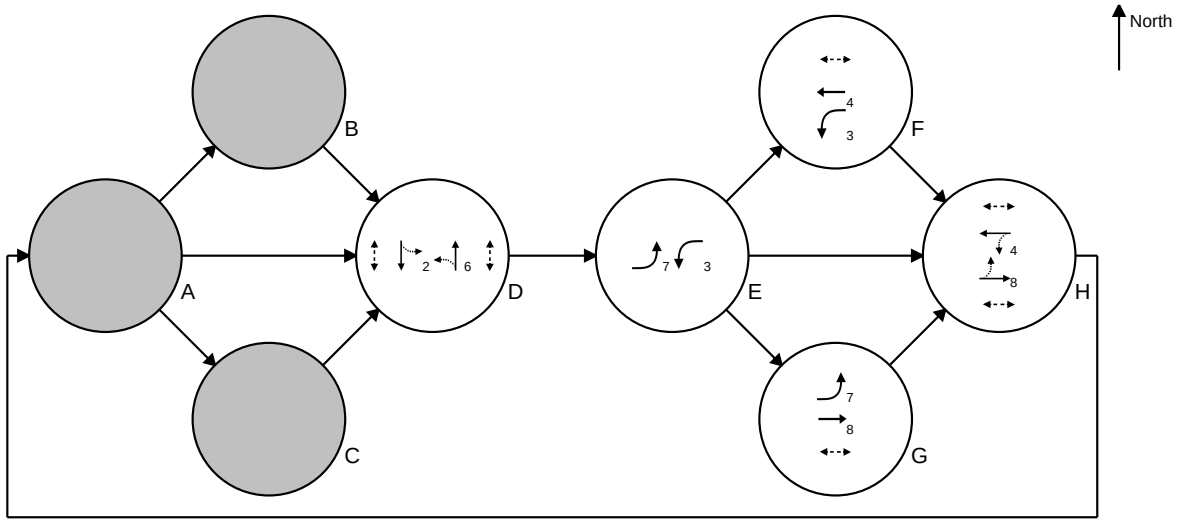
Plan Name	M	T	W	T	F	S	S	Effective Date	Expiry Date
All Day	X	X	X	X	X	X	X	22-May-2013	

Plan: All Day

Days of Week: Mon, Tue, Wed, Thu, Fri, Sat, Sun

Coordinated?: N

Timings: 22-May-2013 - current 00:00:00 - 23:59:59



Signal Phase Diagram for Signal System S384 at HIGHWAY 27:06 AND 67A AVE IN OLDS (27:6 L1 36.863)

Legend: Protected left turn; Permissive left turn; Through movement; Pedestrian

Comments: Northbound approach is currently closed and signal heads are dark, phase 6 not currently in use.

	Phase 1	Phase 2	Phase 3	Phase 4	Phase 5	Phase 6	Phase 7	Phase 8
Road Name		67A Ave	Highway 27	Highway 27		67A Ave	Highway 27	Highway 27
Movement		SBT	WBL	WBT		NBT	EBL	EBT
Road Name								
Movement								
Minimum Green		10	7	15		10	7	15
Maximum Green 1		25	15	30		25	15	30
Maximum Green 2		35	20	40		35	20	40
Amber		4.0	4.0	4.5		4.0	4.0	4.5
All Red		2.0	2.0	2.5		2.0	2.0	2.5
Vehicle Passage		3.0	3.0	3.0		3.0	3.0	3.0
Detector Delay								
Walk		7		7		7		7
Pedestrian Clearance		15		15		15		15
Pedestrian Recall								
Advance Warning								8
Detector Lock								
Vehicle Recall				MIN				MIN
Left Turn Type		PERM		PERM		PERM		PERM
Overlap Permitted?			Y				Y	

Alberta Transportation

Traffic Signal Systems Application

Signal Phase Sequence Diagram

Chris Lo
29-Aug-2023 09:57

Number of results found: 1

Report Parameters

Signal Number:	S044
Date Requested:	
Time of Day:	
Day of Week:	All
Include:	Active only

Summary of Timing Plans

Signal System: S044
HIGHWAY 27:06 AND 57 AVENUE IN OLDS (27:6 L1 38.080)

Phasing Plans

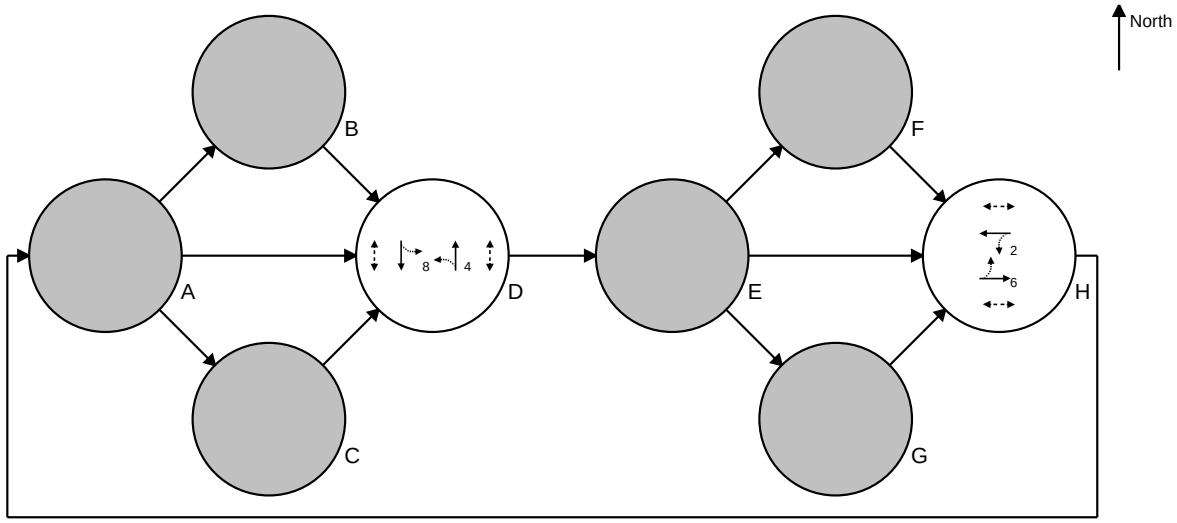
Plan Name	M	T	W	T	F	S	S	Effective Date	Expiry Date
All Day	X	X	X	X	X	X	X	18-Jul-1989	

Plan: All Day

Days of Week: Mon, Tue, Wed, Thu, Fri, Sat, Sun

Coordinated?: N

Timings: 18-Jul-1989 - current 00:00:00 - 23:59:59

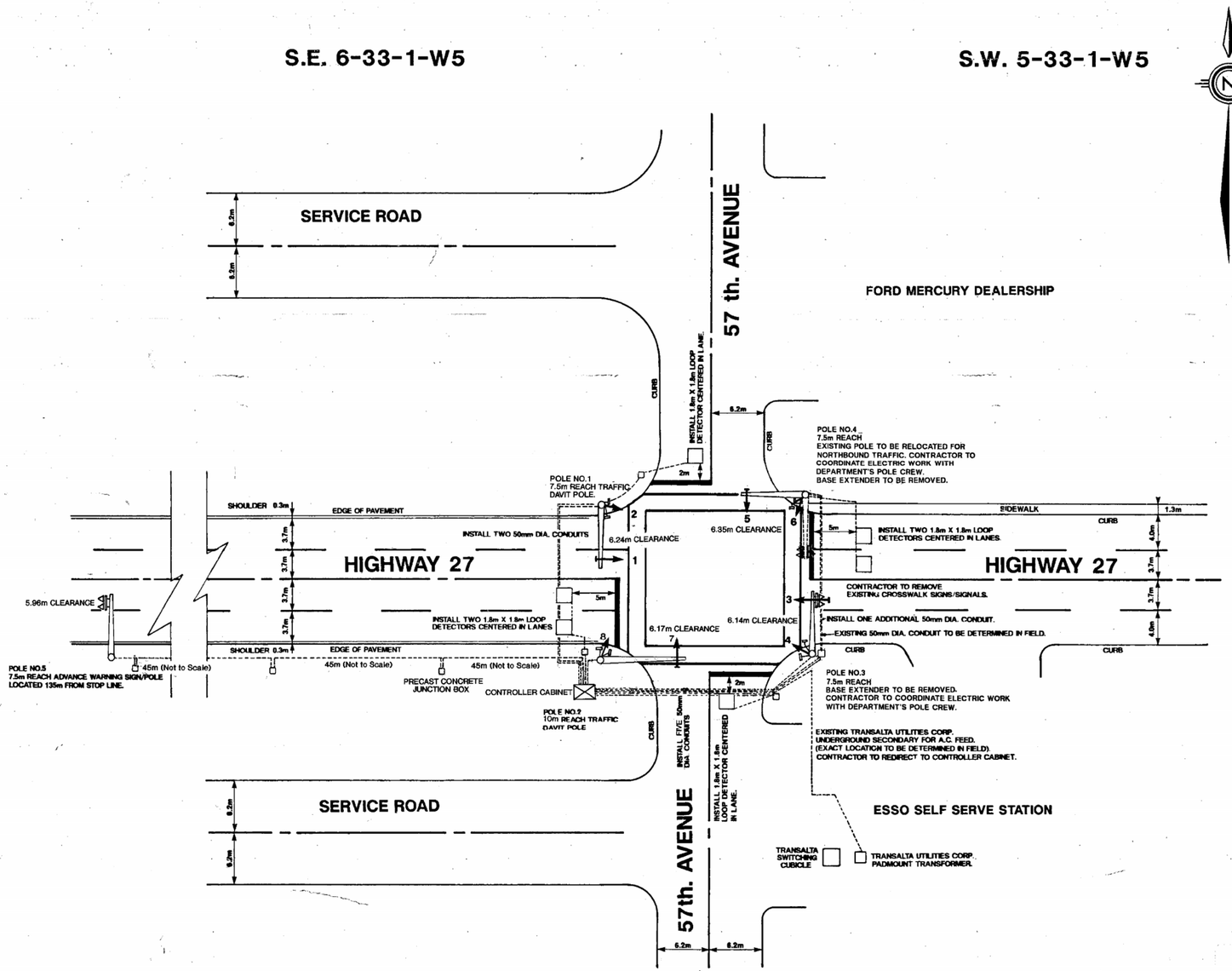


Signal Phase Diagram for Signal System S044 at HIGHWAY 27:06 AND 57 AVENUE IN OLDS (27:6 L1 38.080)

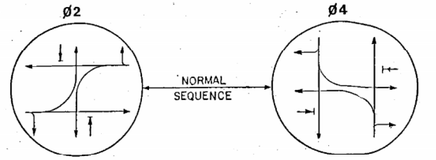
Legend: Protected left turn; Permissive left turn; Through movement; Pedestrian

Comments:

	Phase 1	Phase 2	Phase 3	Phase 4	Phase 5	Phase 6	Phase 7	Phase 8
Road Name								
Movement		WBT		NBT		EBT		SBT
Road Name								
Movement								
Minimum Green		18		15		18		15
Maximum Green 1		33		30		33		30
Maximum Green 2								
Amber		4.0		3.5		4.0		3.5
All Red		1.0		1.0		1.0		1.0
Vehicle Passage		5.0		5.0		5.0		5.0
Detector Delay								
Walk		10		10		10		10
Pedestrian Clearance		10		12		10		12
Pedestrian Recall								
Advance Warning								
Detector Lock				Y				Y
Vehicle Recall		MIN				MIN		
Left Turn Type		PERM		PERM		PERM		PERM
Overlap Permitted?								



SIGNAL SEQUENCE – TWO PHASE OPERATION



CONTROLLER TRAFFIC SIGNAL CYCLE												
PHASE	SIGNALS	COLOUR SEQUENCE (BY FACE Nº)										
	TRAFFIC HEADS	Nos 1,2,3,4								Nos. 5,6,7,8		
	PEDESTRIAN HEADS	EAST-WEST MOVEMENTS								NORTH-SOUTH MOVEMENTS		
	INTERVAL	1	(c) 2	3 (a)	4	5 (b)	6 (c)	7	8 (a)	9	10 (b)	
	SIGNAL INTERVAL											
ø2	VEHICLE	G	G	G	Y	R	R	R	R	R	R	
	PEDESTRIAN	WK	FDW	DW	DW	DW	DW	DW	DW	DW	DW	
ø4	VEHICLE	R	R	R	R	R	G	G	G	Y	R	
	PEDESTRIAN	DW	DW	DW	DW	DW	WK	FDW	DW	DW	DW	

(a) Controller rests at end of interval 3 or interval 8 in absence of opposite phase traffic demand

(b) Either or both second clearance (all red) intervals may be omitted if desired

(c) Intervals omitted in absence of pedestrian demand

COLOUR CODING FOR CABLES		
SIGNAL HEAD	SIGNAL SECTION	CONDUCTOR
ø2	RED AMBER GREEN	RED YELLOW BLUE
ø4	RED AMBER GREEN	RED BROWN BLUE
NEUTRAL		WHITE
GROUND		GREEN

LEGEND

R . . . . . Red
Y . . . . . Yellow
G . . . . . Green
DW . . . . . Don't Walk
WK . . . . . Walk
FDW . . . . Flashing Don't Walk

NOTES

1. Before any excavation work is performed, the Contractor shall inform the Project Engineer of the methods and timing of work, and shall not start until approval is given.

2. The exact position of the signal heads shall be determined by the Engineer in the field. Where traffic signal heads are to be placed in the horizontal position across the roadway, the Contractor shall adjust the lenses to their vertical position for the desired signal aiming axis. The mounting brackets required are to be supplied by the Contractor. The design shall be of sufficient strength to carry the signal loadings and approved by the Engineer.

3. All horizontal signals on the davits are to be mounted at 90 degree to the horizontal plane of the signal structure.

4. The Contractor shall completely cover the signal heads from the time they are installed until the system is turned on for full operation.

5. The Contractor shall check with the local TransAlta Utilities Corporation office at Olds (PH: 556-3200) for the exact location of the A.C. feed. The Contractor is to install underground secondary between the controller cabinet and the power source. Sufficient conduits and cables to connect to the transformer shall be provided.

6. The Contractor shall supply all vertical clearance measurements to the Engineer for signal heads, signs, etc., over roadways. Where measurements are less than 5.8 metres, the Contractor shall advise the Engineer and receive instructions from him to adjust these signal heads and signs for greater clearance. The cost for the revisions (adjustments) shall be part of the contract.

7. All signals shall be mounted in accordance with the diagrams shown in the appendix of the specifications.

8. The pedestrian pushbutton signs shall be mounted directly above the pushbuttons for each signal poles so that the arrow and pedestrian symbol point in the direction of the crossing.

9. All detector loops are to be installed in a saw-cut pavement slot and sealed with the "3M" brand sealant.

10. All polyethyene conduits supplied by the Contractor for the underground runs shall be 50mm in diameter, unless otherwise noted in the drawing. These conduits shall be C.S.A. approved at 520 kPa.

11. All signal davit structures and the signal control base are to be supplied and installed by Alberta Transportation and Utilities. The Contractor shall coordinate with Alberta Transportation and Utilities' pole crew on the dismounting of the existing pedestrian crosswalk signal/signs.

AS CONSTRUCTED
REVISION 15 NOV.1990

EQUIPMENT SCHEDULE			
POLES	TYPE	SIGNAL HEADS	
		PRIME SIGNALS	SECONDARY SIGNALS
1	7.5m DAVIT	30cm R-A-G	20cm R-A-G
2	10m DAVIT	30cm R-A-G	20cm R-A-G
3	7.5m DAVIT	30cm R-A-G	20cm R-A-G
4	7.5m DAVIT	30cm R-A-G	20cm R-A-G
5	7.5m DAVIT	ADVANCE WARNING	20cm BEACONS
CABINET: TACEL I FE		CONTROLLERS: LFE 314	
MONITOR: M6L		DETECTORS: LOOPS	
SPECIAL AUXILIARY EQUIPMENT: C/W ADVANCE WARNING PACKAGE.			

REVISIONS				
NO.	DATE	DESCRIPTION	BY	APPR.
1	24/10/89	AS-BUILT	J.L.	

DATE OF OPERATION:

TIMING : SEE TIMING SHEET BOOK

APPROVED BY:

A.Cherewuk
Director - Traffic Engineering
Date: May 25/89

Alberta
TRANSPORTATION AND UTILITIES
Traffic Engineering Branch

SIGNALIZATION OF HIGHWAY 27 & 57th. AVENUE TOWN OF OLDS

IN-4675-2-C

Drawn by : J.LANDRY	Checked by : R.C./D.D	Reg.: 2	Dist.: 4
Scale : 1:300	Drawing No.:	Plan No. SNL 163	

Alberta Transportation

Traffic Signal Systems Application

Signal Phase Sequence Diagram

Chris Lo
29-Aug-2023 09:58

Number of results found: 1

Report Parameters

Signal Number:	S042
Date Requested:	
Time of Day:	
Day of Week:	All
Include:	Active only

Summary of Timing Plans

Signal System: S042
HIGHWAY 27:06 AND 50 AVENUE IN OLDS (27:6 C1 39.188)

Phasing Plans

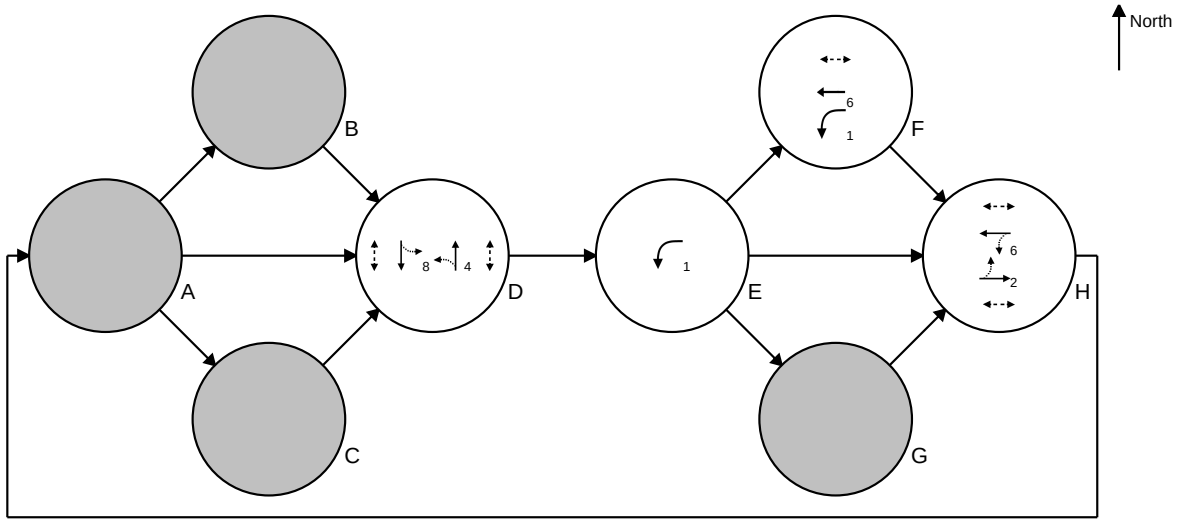
Plan Name	M	T	W	T	F	S	S	Effective Date	Expiry Date
All Day	X	X	X	X	X	X	X	10-Feb-2004	

Plan: All Day

Days of Week: Mon, Tue, Wed, Thu, Fri, Sat, Sun

Coordinated?: N

Timings: 10-Feb-2004 - current 00:00:00 - 23:59:59

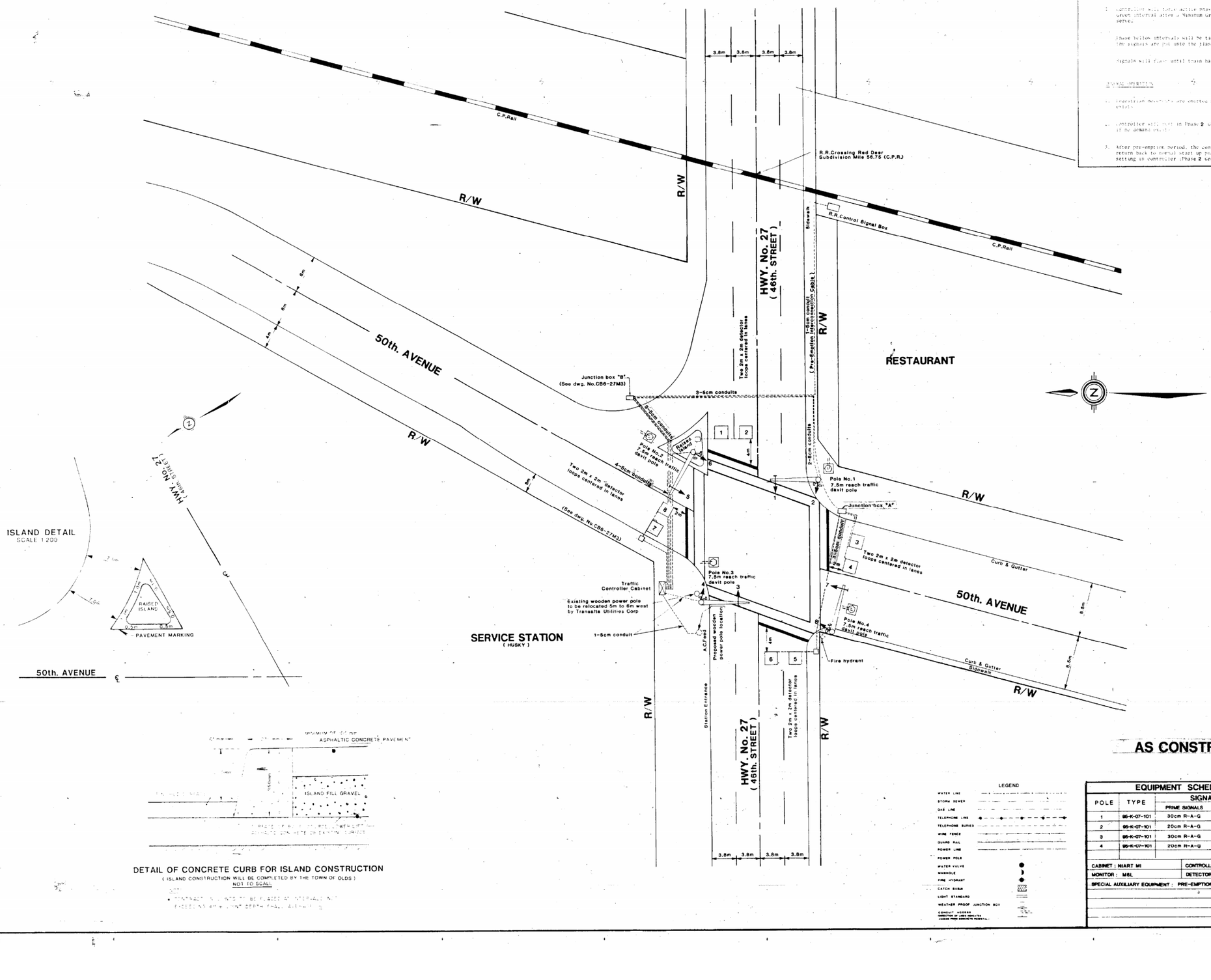


Signal Phase Diagram for Signal System S042 at HIGHWAY 27:06 AND 50 AVENUE IN OLDS (27:6 C1 39.188)

Legend: Protected left turn; Permissive left turn; Through movement; Pedestrian

Comments: Check amber times for phase 6 and 8 as they are inconsistent between movements occuring at the same time. Westbound protected left turn movement occurs only as an overlap with the westbound through movement. The signal spends zero seconds in Bubble E.

	Phase 1	Phase 2	Phase 3	Phase 4	Phase 5	Phase 6	Phase 7	Phase 8
Road Name								
Movement	WBL	EBT		NBT		WBT		SBT
Road Name								
Movement								
Minimum Green	6	15		12		15		12
Maximum Green 1	12	40		30		40		30
Maximum Green 2								
Amber	3.0	3.5		3.5		3.5		3.5
All Red	1.0	1.0		1.0		1.5		1.5
Vehicle Passage	3.0	4.0		3.0		4.0		3.0
Detector Delay								
Walk		7		7		7		7
Pedestrian Clearance		15		15		15		15
Pedestrian Recall								
Advance Warning								
Detector Lock								
Vehicle Recall		MIN				MIN		
Left Turn Type		PERM		PERM		PERM		PERM
Overlap Permitted?	Y							



NOTE: SEQUENCE OF OPERATION

1. Controller will force active phase to terminate when interval after a Minimum Green has been served.

   Phase Yellow intervals will be timed fully before the signals are put into the Flash condition

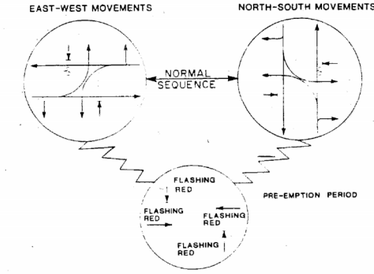
   Signals will flash until train has passed.

2. Pedestrian movements are omitted unless demand exists.

3. Controller will rest in Phase 2 Green interval if no demand exists.

4. After pre-emption period, the controller will return back to normal start up phase as per setting in controller (Phase 2 Green

SIGNAL SEQUENCE - TWO PHASE OPERATION



CONTROLLER TRAFFIC SIGNAL CYCLE

PHASE	SIGNALS	COLOUR SEQUENCE (BY FACE Nº)											PRE-EMPTION	
	FRONT HEADS: Nos 1,2,3,4. REAR HEADS: Nos 5,6,7,8.	EAST-WEST MOVEMENT				NORTH-SOUTH MOVEMENT							FORCE OFF TO	HOLD
	SIGNAL INTERVAL	(1)	2	3 (2)	4	5 (3)	6	7 *	8 (2)	9	10 (1)			
Ø2	VEHICLE	G	G	G	Y	R	R	R	R	R	R		G	Y	FLASHING RED
	PEDESTRIAN	**	FDA	DW	DW	DW	DW	DW	DW	DW	DW		FDW	DW	OFF
Ø4	VEHICLE	R	R	R	R	R	G	G	G	Y	R		G	Y	FLASHING RED
	PEDESTRIAN	DW	DW	DW	DW	DW	**	FDW	DW	DW	DW		FDW	DW	OFF

(1) Controller rests at end of interval 3 or interval 8 in absence of opposing cross traffic demand
(2) Either or both second clearance (all red) intervals may be omitted if desired
(3) Intervals omitted in absence of pedestrian demand

NOTES

1. The contractor will not be allowed to cut the existing pavement without application from the Engineer. Permission to cut the pavement will not be considered unless [illegible] has made a minimum of three attempts at the railroad crossing and has been unsuccessful in installing the conduits.

2. Where the contract involves cutting of paved areas, the contractor will be responsible for patching of the pavement.

3. The contractor will be required to contact the town superintendent of works before any underground work is done on their right-of-ways.

4. Before any excavation work is performed, the contractor shall inform the Engineer the methods and timing of work, and shall not start until approval is given.

5. Traffic control methods must also be considered satisfactory to the Project Engineer and District Transportation Engineer.

6. Each signal head shall be wired separately to the base of the pole and all common connections shall be made at the base of the pole accessible from the hand hole.

7. The exact location of the signal heads shall be determined by the Engineer in the field. Where traffic signal heads are to be placed in the horizontal position across the roadway, the Contractor shall adjust the lenses to their vertical position for the desired signal alignment.

8. The contractor shall completely cover the signal heads from the time they are installed until the system is turned on for full operation.

9. The contractor shall check with Transalta Utilities Corp. the location of all underground services between the controller cabinet and the power source. Sufficient conduits and riserwas to continue up the pole to within 30 cm. of the secondary racks should be provided. Service connections and related work on the power poles will be completed by Transalta Utilities Corp. at the request of the contractor.

10. The contractor will be required to supply all vertical clearance measurements to the Engineer for signals heads, signs, etc. over roadways. Where measurements are less than 5.8 metres, the contractor shall advise the Engineer and to receive instruction from him to adjust these signals heads and signs for greater clearance. The cost for the revisions (adjustments) shall be part of the contract.

11. The traffic signal system shall be set for a two phase operation which has two conflicting vehicular movements both of which have variable traffic and require pedestrian movements on both phases.

12. Detector loops shall be installed in 13 mm rigid plastic pipes. The pipes shall be installed in sawcut slots in the roadway. The slots shall be patched with asphalt or other approved patching material.

13. Detector loops #3 and 7 are to be wired independently from #4 and 8 to the controller cabinet with separate amplifiers for Phase A. Dector loops #3 and 7 are to be set on delay function.

14. Junction Box "A" and "B" will be supplied by Alberta Transportation. The contractor shall install these in accordance with Dwg. No. CB6-2.7M3 which is included in the Appendix of the specifications.

15. All polyethelene conduits supplied for the underground runs shall be 5 cm in diameter, unless otherwise noted, and C.S.A. approved at 520 kPa.

16. All signals shall be mounted in accordance with the diagrams shown in the Appendix of the specifications.

17. The island construction in the N.E. quadrant will be completed by the town. The contractor will be required to coordinate the installation with the town's crew as to the island construction by contacting Mr. Ron Hilton, Town Manager, Olds (Ph: 556-6981)

18. The contractor will be required to arrange and coordinate for the signal preemption connections with C.P.R. representative, Mr. C. Phillips from Edmonton, Alberta (Ph: 428-5611).

DETAIL OF CONCRETE CURB FOR ISLAND CONSTRUCTION
(ISLAND CONSTRUCTION WILL BE COMPLETED BY THE TOWN OF OLDS)
NOT TO SCALE

LEGEND

WATER LINE
STORM SEWER
GAS LINE
TELEPHONE LINE
TELEPHONE BURIED
WIRE FENCE
GUARD RAIL
POWER LINE
POWER POLE
WATER VALVE
MANHOLE
FIRE HYDRANT
CATCH BASIN
LIGHT STANDARD
WEATHER PROOF JUNCTION BOX
CONDUIT ACCESS (CONDUIT ACCESS TO BE COMPLETED HOLES FROM CONCRETE PEDESTAL)

AS CONSTRUCTED

EQUIPMENT SCHEDULE

POLE	TYPE	SIGNAL HEADS: PRIME SIGNALS	SIGNAL HEADS: SECONDARY SIGNALS
1	95-K-07-101	30cm R-A-G	30cm R-A-G
2	95-K-07-101	20cm R-A-G	20cm R-A-G
3	95-K-07-101	30cm R-A-G	30cm R-A-G
4	95-K-07-101	20cm R-A-G	20cm R-A-G

CABINET : NIART MI — CONTROLLERS : HMP-40
MONITOR : M6L — DETECTORS : 235T
SPECIAL AUXILIARY EQUIPMENT : PRE-EMPTION TO FLASH MODE

REVISIONS

NO.	DATE	DESCRIPTION	BY	APPR.
	Sept. 2/86	AS-BUILT	J.L.	R.C.

DATE OF OPERATION :
TIMING : SEE TIMING SHEET BOOK

APPROVED BY :

A. Cherewnuk
Assistant Director - Engineering
Date: May 5/86

Alberta TRANSPORTATION
Transportation Safety Branch

SIGNALIZATION
INTERSECTION
OF Ø2Ø4
HWY. No. 27 & 50th. AVE.
AT
OLDS
IN-4673-1-C

Drawn by : J.Landry | Checked by : R.Chow / R.J.P.
Scale : 1:250 | Drawing No. SNL136

Alberta Transportation

Traffic Signal Systems Application
Signal Phase Sequence Diagram

Chris Lo
29-Aug-2023 09:59

Number of results found: 2

Report Parameters

Signal Number:	S103
Date Requested:	
Time of Day:	
Day of Week:	All
Include:	Active only

Summary of Timing Plans

Signal System: S103
HIGHWAY 2A:14 AND 27:06 (2A:14 C1 14.579)

Phasing Plans

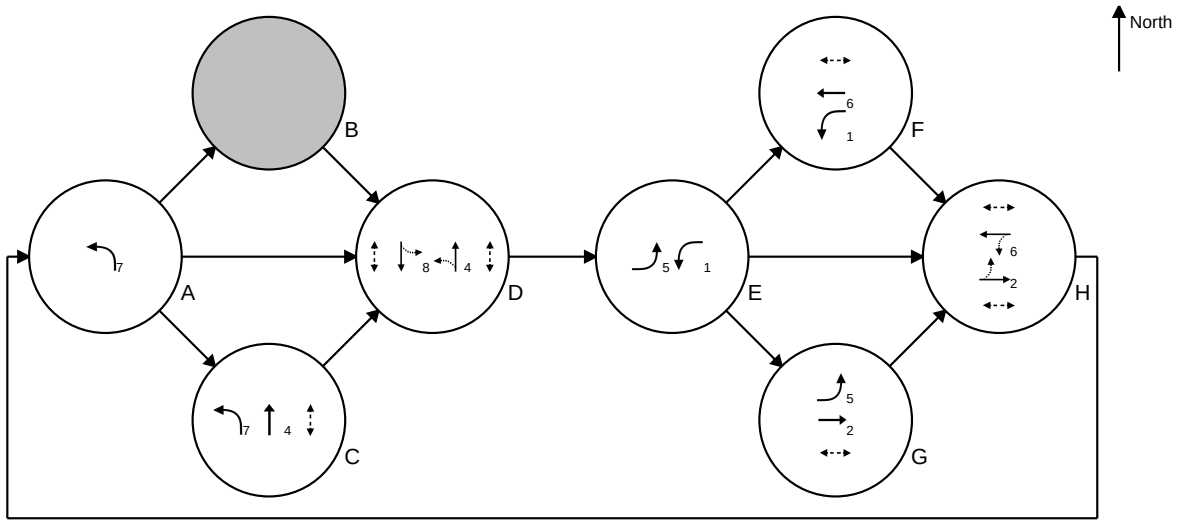
Plan Name	M	T	W	T	F	S	S	Effective Date	Expiry Date
Daytime	X	X	X	X	X	X	X	26-Jul-2013	
Nighttime	X	X	X	X	X	X	X	26-Jul-2013	

Plan: Daytime

Days of Week: Mon, Tue, Wed, Thu, Fri, Sat, Sun

Coordinated?: N

Timings: 26-Jul-2013 - current 06:00:00 - 23:00:00



Signal Phase Diagram for Signal System S103 at HIGHWAY 2A:14 AND 27:06 (2A:14 C1 14.579)

Legend: Protected left turn; Permissive left turn; Through movement; Pedestrian

Comments:

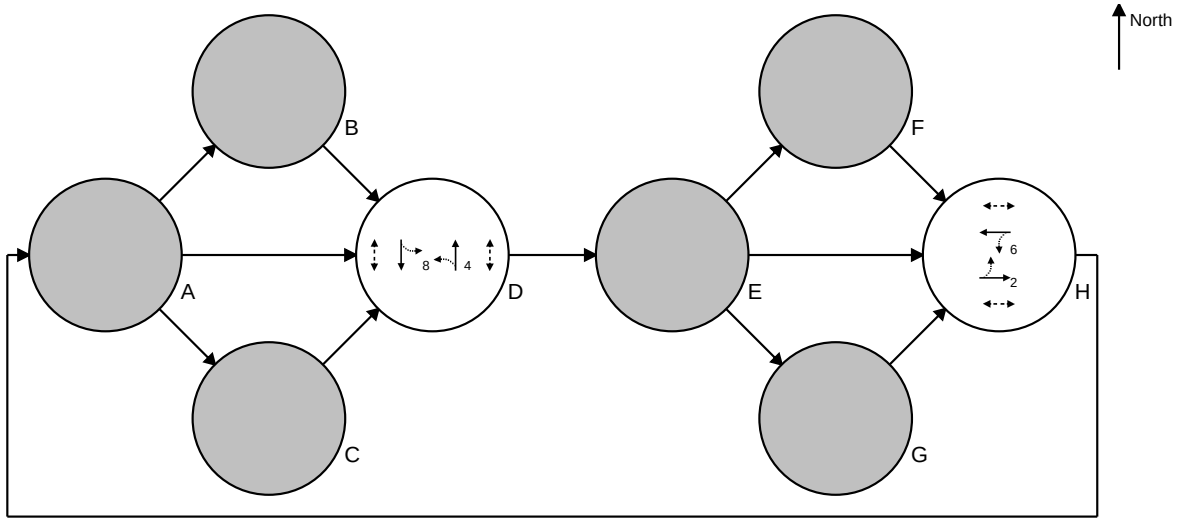
	Phase 1	Phase 2	Phase 3	Phase 4	Phase 5	Phase 6	Phase 7	Phase 8
Road Name	Highway 27	Highway 27		Highway 2A	Highway 27	Highway 27	Highway 2A	Highway 2A
Movement	WBL	EBT		NBT	EBL	WBT	NBL	SBT
Road Name								
Movement								
Minimum Green	7	15		10	7	15	7	10
Maximum Green 1	15	30		25	15	30	15	25
Maximum Green 2	20	40		35	20	40	20	35
Amber	3.0	3.5		3.5	3.0	3.5	3.0	3.5
All Red	1.5	2.0		2.0	1.5	2.0	1.5	2.0
Vehicle Passage	3.0	4.0		4.0	3.0	4.0	3.0	4.0
Detector Delay	2.0			7.0	2.0		2.0	7.2
Walk		7		7		7		7
Pedestrian Clearance		13		17		13		17
Pedestrian Recall		N		N		N		N
Advance Warning								
Detector Lock				Y		Y		Y
Vehicle Recall		MIN				MIN		
Left Turn Type		PERM		PERM		PERM		PERM
Overlap Permitted?	Y				Y		Y	

Plan: Nighttime

Days of Week: Mon, Tue, Wed, Thu, Fri, Sat, Sun

Coordinated?: N

Timings: 26-Jul-2013 - current 00:00:00 - 06:00:00; 23:00:00 - 23:59:59



Signal Phase Diagram for Signal System S103 at HIGHWAY 2A:14 AND 27:06 (2A:14 C1 14.579)

Legend: Protected left turn; Permissive left turn; Through movement; Pedestrian

Comments:

	Phase 1	Phase 2	Phase 3	Phase 4	Phase 5	Phase 6	Phase 7	Phase 8
Road Name		Highway 27		Highway 2A		Highway 27		Highway 2A
Movement		EBT		NBT		WBT		SBT
Road Name								
Movement								
Minimum Green		15		10		15		10
Maximum Green 1		30		25		30		25
Maximum Green 2		40		35		40		35
Amber		3.5		3.5		3.5		3.5
All Red		2.0		2.0		2.0		2.0
Vehicle Passage		4.0		4.0		4.0		4.0
Detector Delay				7.0				7.2
Walk		7		7		7		7
Pedestrian Clearance		13		17		13		17
Pedestrian Recall		N		N		N		N
Advance Warning								
Detector Lock				Y		Y		Y
Vehicle Recall		MIN				MIN		
Left Turn Type		PERM		PERM		PERM		PERM
Overlap Permitted?								

Alberta Transportation

Traffic Signal Systems Application
Signal System Report
Date: 24-Jan-2024

Jodeen Swan
24-Jan-2024 08:59

Number of results found: 1

Report Parameters

Date:	24-Jan-2024
Signal Number:	S103
Serving Municipality:	-- Any --
Road Name:	
Control Section:	
Include Diagram:	Yes
Include:	Active only

Signal System

Signal Number:	S103	Signal Location:	HIGHWAY 2A:14 AND 27:06
Date Active:	19-Dec-2003	Serving Municipality:	OLDS
Signal System Type:	FULL SIGNAL	Timing Type:	FULLY ACTUATED
Date Inactive:		Wire Service Provider:	
Power Site Id:		Servicing Authority:	Unspecified
Last Inspection Type:		Last Inspection Date:	

Signal System S103 - HIGHWAY 2A:14 AND 27:06

No preemptions

Main Equipment

Equipment Type: M CABINET (1 DOOR) | Equipment Manufacturer: ECONOLITE
Equipment Model: TS1-36 circuit | Location Description:
Installation Date: 01-Aug-1998
Wire Diagram Number: | Metered?: No

Equipment Condition

Condition Date: 26-Jul-2013 | Condition: Fair

Equipment Type: MMU CONFLICT MONITOR | Equipment Manufacturer: ECONOLITE
Equipment Model: 16 | Location Description:
Installation Date: 19-Dec-2003

Equipment Condition

Condition Date: 26-Jul-2013 | Condition: Fair

Equipment Type: TS2 (TYPE 1) CONTROLLER | Equipment Manufacturer: ECONOLITE
Equipment Model: ASC/3-2100 | Location Description:
Installation Date: 26-Jul-2013 | Master Controller in Coordination?: No

Equipment Condition

Condition Date: 26-Jul-2013 | Condition: Good

Equipment Type: VIDEO DETECTOR | Equipment Manufacturer: ECONOLITE
Equipment Model: Auto.SoloTerra | Location Description: Detector 3 Encore
Installation Date: 26-Jul-2013

Equipment Condition

Condition Date: 26-Jul-2013 | Condition: Good

Equipment Type: VIDEO DETECTOR | Equipment Manufacturer: ECONOLITE
Equipment Model: Auto.SoloTerra | Location Description: Detector 4 Encore
Installation Date: 26-Jul-2013

Equipment Condition

Condition Date: 26-Jul-2013 | Condition: Good

Equipment Type: VIDEO DETECTOR | Equipment Manufacturer: ECONOLITE
Equipment Model: Auto.SoloTerra | Location Description: Detector 1 Encore
Installation Date: 26-Jul-2013

Equipment Condition

Condition Date: 26-Jul-2013 | Condition: Good

Equipment Type: VIDEO DETECTOR | Equipment Manufacturer: ECONOLITE
Equipment Model: Auto.SoloTerra | Location Description: Detector 2 Encore
Installation Date: 26-Jul-2013

Equipment Condition

Condition Date: 26-Jul-2013 | Condition: Good

Signal System S103 - HIGHWAY 2A:14 AND 27:06

Supports and Displays

North Bound

Appurtenance #: SPT17204696	Use: SIGNAL DISPLAY	Type: SUPPORT CANTILEVER	Push button: Y
LRS: 2A:14 C1 14.594	Position: OVERHEAD RIGHT	Condition: GOOD	

Display Equipment Type	Display Type	Layout	Placement	Location	Audible?
TRAFFIC SIGNAL DISPLAY	Red, Amber, Green	VERTICAL		SECONDARY	N
TRAFFIC SIGNAL DISPLAY	Red, Amber, Green, Amber/Green Left Arrow	HORIZONTAL	1ST DISPLAY FROM RIGHT	PRIMARY	N
PEDESTRIAN SIGNAL DISPLAY	Pedestrian Countdown Timer	NOT APPLICABLE		CROSSWALK	N
PEDESTRIAN SIGNAL DISPLAY	Pedestrian Countdown Timer	NOT APPLICABLE		CROSSWALK	N

South Bound

Appurtenance #: SPT17204683	Use: SIGNAL DISPLAY	Type: SUPPORT CANTILEVER	Push button: Y
LRS: 2A:14 C1 14.567	Position: OVERHEAD LEFT	Condition: GOOD	

Display Equipment Type	Display Type	Layout	Placement	Location	Audible?
PEDESTRIAN SIGNAL DISPLAY	Pedestrian Countdown Timer	NOT APPLICABLE		CROSSWALK	N
PEDESTRIAN SIGNAL DISPLAY	Pedestrian Countdown Timer	NOT APPLICABLE		CROSSWALK	N
TRAFFIC SIGNAL DISPLAY	Red, Amber, Green	VERTICAL		SECONDARY	N
TRAFFIC SIGNAL DISPLAY	Red, Amber, Green	HORIZONTAL	1ST DISPLAY FROM RIGHT	PRIMARY	N

East Bound

Appurtenance #: SPT17204702	Use: SIGNAL DISPLAY	Type: SUPPORT STUB POLE	Push button: N
LRS: 27:06 C1 39.722	Position: OUTSIDE RIGHT	Condition: GOOD	

Display Equipment Type	Display Type	Layout	Placement	Location	Audible?
TRAFFIC SIGNAL DISPLAY	Red, Amber, Green	VERTICAL		SECONDARY	N
TRAFFIC SIGNAL DISPLAY	Red, Amber, Green	HORIZONTAL	1ST DISPLAY FROM RIGHT	PRIMARY	N
TRAFFIC SIGNAL DISPLAY	Red, Amber, Green, Amber/Green Left Arrow	VERTICAL	2ND DISPLAY FROM RIGHT	PRIMARY	N

West Bound

Appurtenance #: SPT17204690	Use: SIGNAL DISPLAY	Type: SUPPORT CANTILEVER	Push button: N
LRS: 27:06 C1 39.731	Position: OVERHEAD RIGHT	Condition: GOOD	

Display Equipment Type	Display Type	Layout	Placement	Location	Audible?
TRAFFIC SIGNAL DISPLAY	Red, Amber, Green	VERTICAL		SECONDARY	N
PEDESTRIAN SIGNAL DISPLAY	Pedestrian Countdown Timer	NOT APPLICABLE		CROSSWALK	N
PEDESTRIAN SIGNAL DISPLAY	Pedestrian Countdown Timer	NOT APPLICABLE		CROSSWALK	N
TRAFFIC SIGNAL DISPLAY	Red, Amber, Green, Amber/Green Left Arrow	VERTICAL	2ND DISPLAY FROM RIGHT	PRIMARY	N
TRAFFIC SIGNAL DISPLAY	Red, Amber, Green	HORIZONTAL	1ST DISPLAY FROM RIGHT	PRIMARY	N

Appurtenance #: SPT17204711	Use: SIGNAL DISPLAY	Type: SUPPORT CANTILEVER	Push button: Y
LRS: 27:06 C1 39.701	Position: OVERHEAD LEFT	Condition: GOOD	

Display Equipment Type	Display Type	Layout	Placement	Location	Audible?
PEDESTRIAN SIGNAL DISPLAY	Pedestrian Countdown Timer	NOT APPLICABLE		CROSSWALK	N
PEDESTRIAN SIGNAL DISPLAY	Pedestrian Countdown Timer	NOT APPLICABLE		CROSSWALK	N

No Other Equipment Data

Signal System S103 - HIGHWAY 2A:14 AND 27:06

Summary of Timing Plans

Plan Name	M	T	W	T	F	S	S	Effective Date	Expiry Date
Daytime	X	X	X	X	X	X	X	26-Jul-2013	
Nighttime	X	X	X	X	X	X	X	26-Jul-2013	

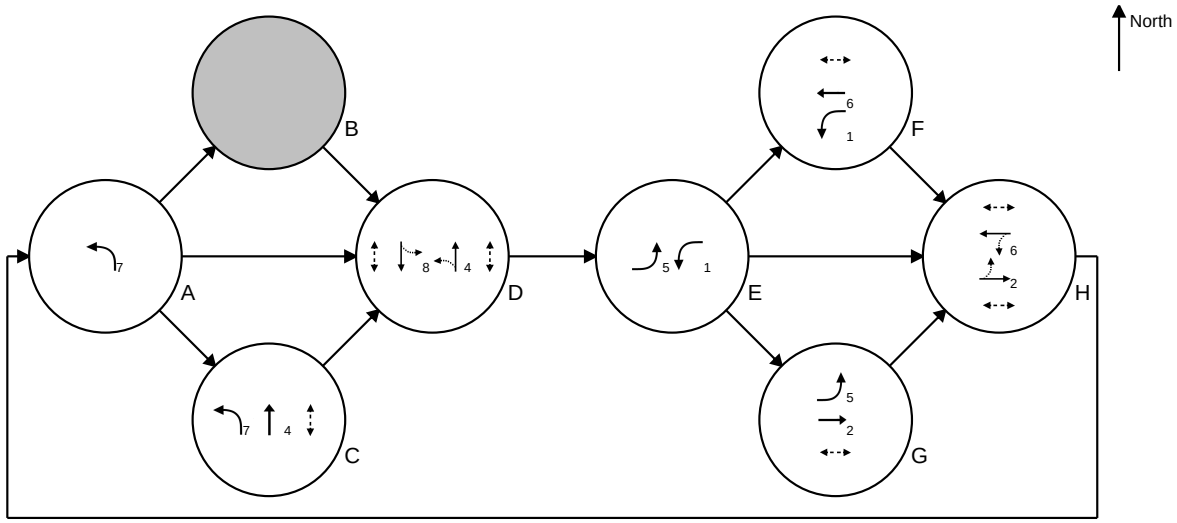
Signal System S103 - HIGHWAY 2A:14 AND 27:06

Plan: Daytime

Days of Week: Mon, Tue, Wed, Thu, Fri, Sat, Sun

Coordinated?: N

Timings: 26-Jul-2013 - current 06:00:00 - 23:00:00



Signal Phase Diagram for Signal System S103 at HIGHWAY 2A:14 AND 27:06 (2A:14 C1 14.593)

Legend: Protected left turn; Permissive left turn; Through movement; Pedestrian

Comments:

	Phase 1	Phase 2	Phase 3	Phase 4	Phase 5	Phase 6	Phase 7	Phase 8
Road Name	Highway 27	Highway 27		Highway 2A	Highway 27	Highway 27	Highway 2A	Highway 2A
Movement	WBL	EBT		NBT	EBL	WBT	NBL	SBT
Road Name								
Movement								
Minimum Green	7	15		10	7	15	7	10
Maximum Green 1	15	30		25	15	30	15	25
Maximum Green 2	20	40		35	20	40	20	35
Amber	3.0	3.5		3.5	3.0	3.5	3.0	3.5
All Red	1.5	2.0		2.0	1.5	2.0	1.5	2.0
Vehicle Passage	3.0	4.0		4.0	3.0	4.0	3.0	4.0
Detector Delay	2.0			7.0	2.0		2.0	7.2
Walk		7		7		7		7
Pedestrian Clearance		13		17		13		17
Pedestrian Recall		N		N		N		N
Advance Warning								
Detector Lock				Y		Y		Y
Vehicle Recall		MIN				MIN		
Left Turn Type		PERM		PERM		PERM		PERM
Overlap Permitted?	Y				Y		Y	

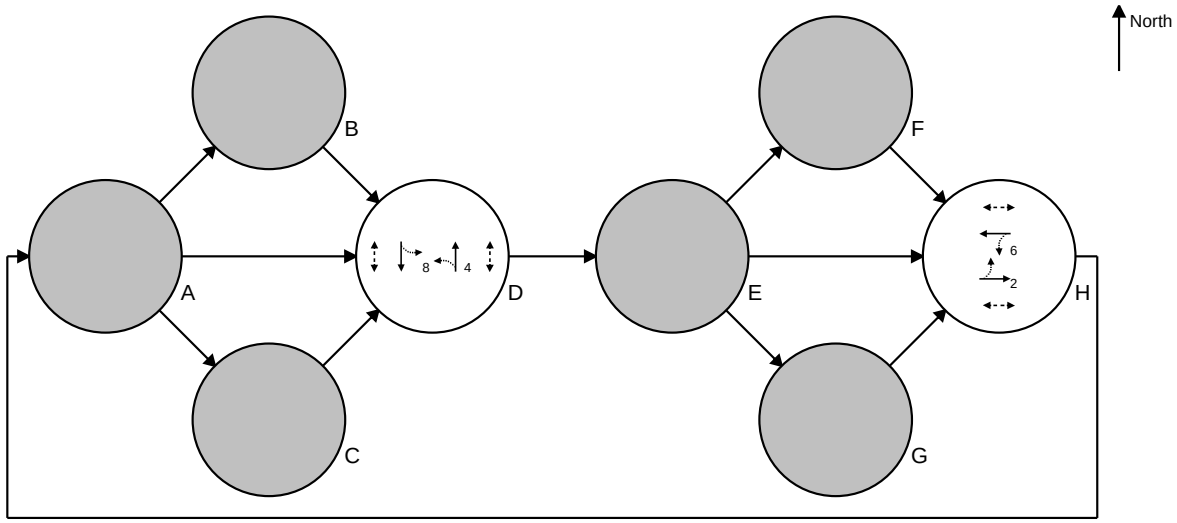
Signal System S103 - HIGHWAY 2A:14 AND 27:06

Plan: Nighttime

Days of Week: Mon, Tue, Wed, Thu, Fri, Sat, Sun

Coordinated?: N

Timings: 26-Jul-2013 - current 00:00:00 - 06:00:00; 23:00:00 - 23:59:59

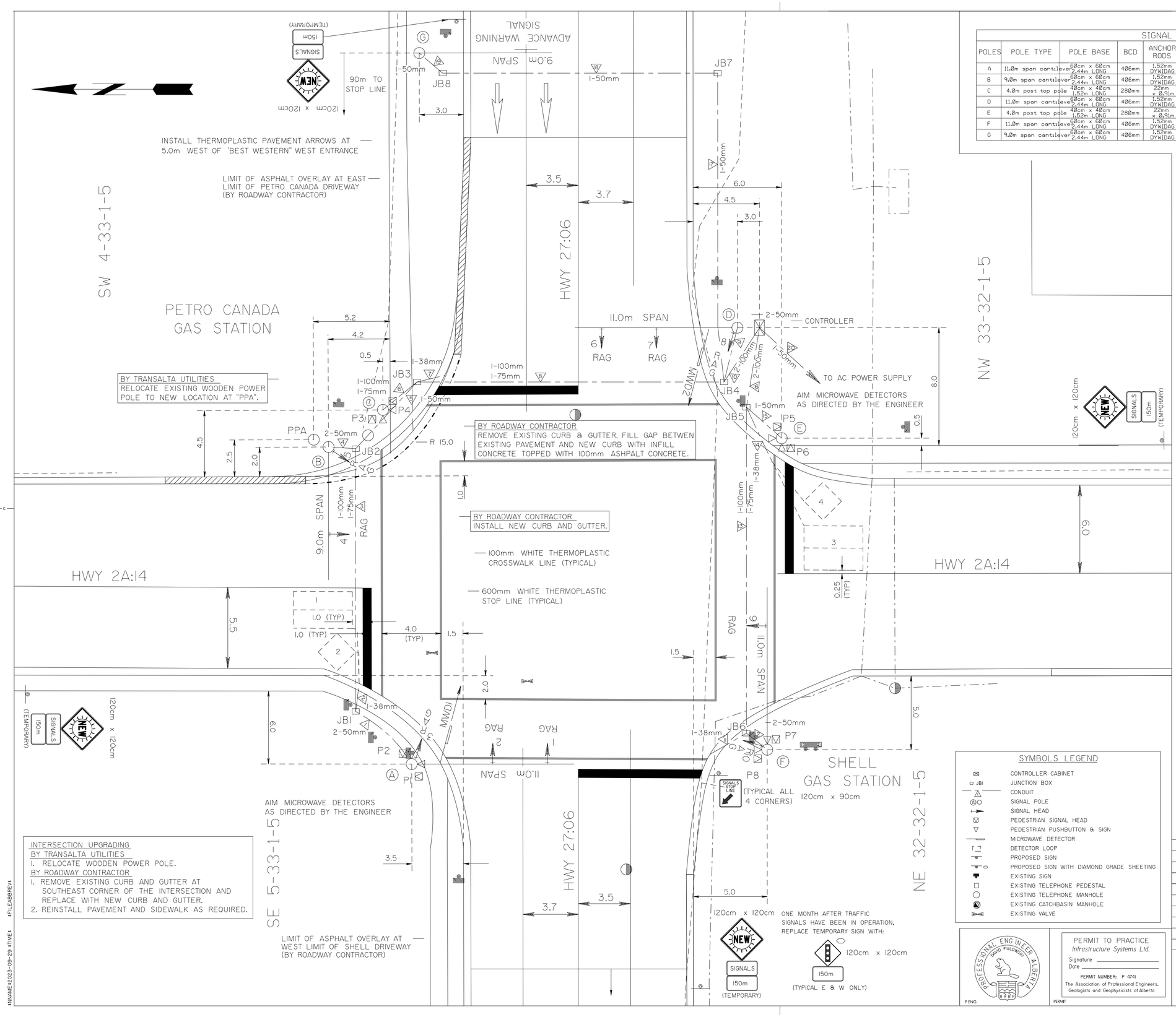


Signal Phase Diagram for Signal System S103 at HIGHWAY 2A:14 AND 27:06 (2A:14 C1 14.593)

Legend: Protected left turn; Through movement; Permissive left turn; Pedestrian

Comments:

	Phase 1	Phase 2	Phase 3	Phase 4	Phase 5	Phase 6	Phase 7	Phase 8
Road Name		Highway 27		Highway 2A		Highway 27		Highway 2A
Movement		EBT		NBT		WBT		SBT
Road Name								
Movement								
Minimum Green		15		10		15		10
Maximum Green 1		30		25		30		25
Maximum Green 2		40		35		40		35
Amber		3.5		3.5		3.5		3.5
All Red		2.0		2.0		2.0		2.0
Vehicle Passage		4.0		4.0		4.0		4.0
Detector Delay				7.0				7.2
Walk		7		7		7		7
Pedestrian Clearance		13		17		13		17
Pedestrian Recall		N		N		N		N
Advance Warning								
Detector Lock				Y		Y		Y
Vehicle Recall		MIN				MIN		
Left Turn Type		PERM		PERM		PERM		PERM
Overlap Permitted?								



INTERSECTION UPGRADING

BY TRANSALTA UTILITIES

1. RELOCATE WOODEN POWER POLE.

BY ROADWAY CONTRACTOR

1. REMOVE EXISTING CURB AND GUTTER AT SOUTHEAST CORNER OF THE INTERSECTION AND REPLACE WITH NEW CURB AND GUTTER.
2. REINSTALL PAVEMENT AND SIDEWALK AS REQUIRED.

SIGNAL POLE EQUIPMENT SCHEDULE

POLES	POLE TYPE	POLE BASE	BCD	ANCHOR RODS	SIGNAL HEADS			STREETLIGHT LUMINAIRE (L)/ SIGN LIGHT(S)	SIGNS	SPECIAL EQUIPMENT
					PRIMARY	SECONDARY	PEDESTRIAN SIGNALS			
A	11.0m span cantilever	60cm x 60cm 2.44m LONG	406mm	1.52mm DYWIDAG	1,2: RAG (300mm)	3: RAG (300 mm)	P1, P2: WK/DW (300mm)		Pushbutton Sign	Microwave Detector (MWD1)
B	9.0m span cantilever	60cm x 60cm 2.44m LONG	406mm	1.52mm DYWIDAG	4: RAG (300 mm)	4: RAG (300 mm)				
C	4.0m post top pole	40cm x 40cm 1.52m LONG	280mm	22mm x Ø.91m			P3, P4: WK/DW (300mm)		Pushbutton Sign	
D	11.0m span cantilever	60cm x 60cm 2.44m LONG	406mm	1.52mm DYWIDAG	6,7: RAG (300mm)	8: RAG (300 mm)				Microwave Detector (MWD2)
E	4.0m post top pole	40cm x 40cm 1.52m LONG	280mm	22mm x Ø.91m			P5, P6: WK/DW (300mm)		Pushbutton Sign	
F	11.0m span cantilever	60cm x 60cm 2.44m LONG	406mm	1.52mm DYWIDAG	9: RAG (300mm)	10: RAG (300 mm)	P7, P8: WK/DW (300mm)		Pushbutton Sign	
G	9.0m span cantilever	60cm x 60cm 2.44m LONG	406mm	1.52mm DYWIDAG				Sign Light	Advance Warning Sign	

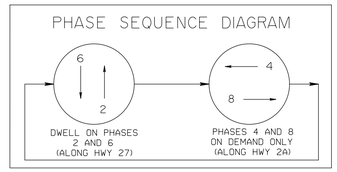
CONDUIT SCHEDULE

PURPOSE	CONDUIT RUN NUMBER																			
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20
POLE A	X		X		X			X		X										
POLE B				X	X			X		X										
POLE C					X			X		X										
POLE D								X	X											
POLE E													X	X						
POLE F											X	X		X						
POLE G										X					X	X	X			
LOOP 1	X	X	X		X			X		X										
LOOP 2	X	X	X		X			X		X										
LOOP 3													X		X					
LOOP 4													X		X					
FUTURE LOOPS						X				X										
A/C FEED																				X
MWD1	X		X		X			X		X										
MWD2								X		X										
CONDUIT SIZE (mm)	50 50	38	100 75	50 50	100 75	50	38	100 75	50 50	100 100	38	50 50	100 75	38	50	100 100	50	50	50	50

DETECTOR SCHEDULE

Detector No	Dimensions	Type	Phase Assignment	Special Function
1	4.0m x 2.5m	quad loop (3 windings/loop)	Phase 8	Locking
2	1.8m x 1.8m	loop (3 windings/loop)	Phase 8	4 sec Delay
3	4.0m x 3.0m	quad loop (3 windings/loop)	Phase 4	Locking
4	1.8m x 1.8m	loop (3 windings/loop)	Phase 4	4 sec Delay
MWD1		Microwave Sensor TC-26B	Phase 6	
MWD2		Microwave Sensor TC-26B	Phase 2	

PHASE SEQUENCE DIAGRAM



CONTROLLER TRAFFIC SIGNAL CYCLE

PHASE	SIGNALS	COLOUR SEQUENCE (BY FACE NO.)								
	TRAFFIC HEADS	NO'S. 1,2,3,6,7,8					NO'S 4,5,9,10			
	PEDESTRIAN SIGNAL HEADS	NO'S. P2, P3, P6, P7					NO'S P1, P4, P5, P8			
	SIGNALS INTERVAL	1	2	3	4	5	6	7	8	9	10
PHASE 2,6	VEHICLE	G	G	G	Y	R	R	R	R	R	R
	PEDESTRIAN	WK	FDW	DW	DW	DW	DW	DW	DW	DW	DW
PHASE 4,8	VEHICLE	R	R	R	R	R	G	G	G	Y	R
	PEDESTRIAN	DW	DW	DW	DW	DW	WK	FDW	DW	DW	DW

REMARKS:

1. CONTROLLER RESTS AT END OF INTERVAL 3 IN ABSENCE OF OPPOSITE PHASE TRAFFIC DEMAND.
2. EITHER OR BOTH SECOND CLEARANCE (ALL RED) INTERVALS MAY BE OMITTED IF DESIRED.

LEGEND:

R - RED
Y - YELLOW
G - GREEN
DW - DON'T WALK
WK - WALK
FDW - FLASHING DON'T WALK

SYMBOLS LEGEND

- CONTROLLER CABINET
- JBI JUNCTION BOX
- CONDUIT
- SIGNAL POLE
- SIGNAL HEAD
- PEDESTRIAN SIGNAL HEAD
- PEDESTRIAN PUSHBUTTON & SIGN
- MICROWAVE DETECTOR
- DETECTOR LOOP
- PROPOSED SIGN
- PROPOSED SIGN WITH DIAMOND GRADE SHEETING
- EXISTING SIGN
- EXISTING TELEPHONE PEDESTAL
- EXISTING TELEPHONE MANHOLE
- EXISTING CATCHBASIN MANHOLE
- EXISTING VALVE

REVISIONS

NO.	DATE	DESCRIPTION	BY	APPR.

DATE OF OPERATION:

TIMING : SEE TIMING SHEET BOOK

APPROVED BY:

Director Date:

PROFESSIONAL ENGINEER ALBERTA DAVID FULGRAM P.ENG

PERMIT TO PRACTICE
Infrastructure Systems Ltd.
Signature
Date
PERMIT NUMBER: P 4741
The Association of Professional Engineers, Geologists and Geophysicists of Alberta
PERMIT

Infrastructure Systems Ltd.
ENGINEERS & PLANNERS

Alberta TRANSPORTATION AND UTILITIES

ISL JOB NO. 0104

TRAFFIC SIGNALS FOR INTERSECTION JCT HWY 2A & HWY 27 TOWN OF OLDS

Drawn by : S. Shankowsky	Checked by : P. Chan	Reg. : Southern Dist. :Calgary
Scale: 1:125	Drawing No. :	Plan No. : SNL 230

$NAME$ 2023-09-29 $TIME$ $FILEABBREV$

Data pulled from controllers

Intersection	Controller
Hy 27 & 70	Cobalt
Hy 27 & 67A	ASC3
Hy 27 & 65	ASC2
Hy 27 & 57	ASC2
Hy 27 & 52	ASC2
Hy 27 & 51	Cobalt
Hy 27 & 50	ASC2
Hy 27 & 46	ASC3

CMA	OLDS
Traffic Signal	Hy 27 & 70 Ave

Cobalt

Movement	WBLT	EB		SB	EBLT	WB		NB
Phase	**1**	**2**	3	**4**	**5**	**6**	7	**8**
Minimum Green	7	20		12	7	20		12
Walk		7				7		7
Pedestrian Clearance		21		22		21		25
Vehicle extension		4	3	3		4		3
Max 1	15	35		25	15	35		25
Max 2	20	45		30	20	5		30
Dynamic Max								
Dynamic Step								
Yellow Change	5	4.5		4	5	4.5		4
Red Clearance	1	2.5		3	1	2.5		**0**
Red Max								
Red Revert	2	2	2	2	2	2	2	2
Vehicle Recall		X				X		
Pedestrian Recall		X				X		

Time of Day	**Action Plan**	**change**
7:30	1	max 2
9:30	2	max 1
15:00	3	max 1
18:00	4	max 1

** I never noticed before, but there is a zero for RED CLR for phase 8. This should be changed to 3 ASAP.

CMA	OLDS
Traffic Signal	Hy 27 & 67A Ave

ASC3/1000

Movement		EB	SBLT	NB		WB		SB
Phase	1	**2**	**3**	**4**	5	**6**	7	**8**
Minimum Green		10	7	15		10		15
Walk		7				7		7
Pedestrian Clearance		15		15		15		15
Vehicle extension		3	3	3		3		3
Max 1		25	15	35		10		35
Max 2		30	20	40		10		40
Dynamic Max								
Dynamic Step								
Yellow Change		4	4	4.5		4		4.5
Red Clearance		2	2	2		2		2
Red Max								
Red Revert		2		2		2		2
Vehicle Recall	X	X	X	X	X	X	X	X
Pedestrian Recall		X		X		X		X

Time of Day **Action Plan** **change**

** there is some funky load swith to phase assigment programming that isn't right here
I think there was an advance warning pole that got moved to the West when 70th was built…but the advance warning programming was never removed.
The signals are working, but it is overly complicated and could confuse a novice.

CMA	OLDS
Traffic Signal	Hy 27 & 65th Ave

ASC/2s-1000

Movement	WBLT	EB	NBLT	SB		WB		NB
Phase	**1**	**2**	**3**	**4**	**5**	**6**	**7**	**8**
Minimum Green	7	15	7	12	0	15	0	12
Walk		7		7		7		7
Pedestrian Clearance		24		18		20		18
Vehicle extension	3	5	3	3.5		5		3.5
Max 1	12	32	12	24	0	32	0	28
Max 2	16	37	16	28	0	37	0	32
Dynamic Max								
Dynamic Step								
Yellow Change	3	4.5	3	4	0	4.5	0	4
Red Clearance	1	2	1	2	0	2		2
Red Max								
Red Revert								
Vehicle Recall		X				X		
Pedestrian Recall								

time of day	**change**
7am - 9am	omit 1 & 3
9am - 7am	enable 1 & 3

CMA	OLDS
Traffic Signal	Hy 27 & 57th Ave

ASC/2s-1000

Movement	EBLT	WB		NB	WBLT	EB		SB
Phase	**1**	**2**	**3**	**4**	**5**	**6**	**7**	**8**
Minimum Green	5	18		15	5	18		15
Walk		10		10		10		10
Pedestrian Clearance		10		12		10		12
Vehicle extension	5	5		5	5	5		5
Max 1	15	33		30	15	33		30
Max 2	20	40		40	20	40		40
Dynamic Max								
Dynamic Step								
Yellow Change	3	4		3.5	3	4		3.5
Red Clearance	1	1		1	1	1		1
Red Max								
Red Revert								
Vehicle Recall	X	X	X	X	X	X	X	X
Pedestrian Recall	X		X		X		X	

Time of Day

no change

CMA	OLDS
Traffic Signal	Hy 27 & 52 Ave

ASC/2s-1000

Movement	EBLT	EB		SB		WB		
Phase	**1**	**2**	**3**	**4**	**5**	**6**	**7**	**8**
Minimum Green		35		8		35		
Walk		7		7		7		
Pedestrian Clearance		10		10		10		
Vehicle extension		6		3.5		6		
Max 1		0		25		0		
Max 2		30		15		30		
Dynamic Max								
Dynamic Step								
Yellow Change		4		4		4		
Red Clearance		2		2		2		
Red Max								
Red Revert								
Vehicle Recall		X				X		
Pedestrian Recall								

Time of Day
no change

CMA	OLDS
Traffic Signal	Hy 27 & 51 Ave

Cobalt

Movement		EB		SB		WB		NB
Phase	**1**	**2**	**3**	**4**	**5**	**6**	**7**	**8**
Minimum Green		30		10	0	30		10
Walk		7				7		7
Pedestrian Clearance		16		21		16		21
Vehicle extension		4		3		4		3
Max 1		50		30		50		30
Max 2		50		40		50		40
Dynamic Max								
Dynamic Step								
Yellow Change		3.5		3.5		3.5		3.5
Red Clearance		2.4		2.6		2.4		2.6
Red Max								
Red Revert	2	2	2	2	2	2	2	2
Vehicle Recall		X				X		
Pedestrian Recall								

Time of Day	**Change**

** There is some data in the time of day programming that looks like coordination patterns are running as directed by Action Plans 1, 2, 3 on Day 1 of the schedule. Since there is no day programmed in the schedule, every day is forced to run automatic, and so the day 1 programming has no effect.

CMA	OLDS
Traffic Signal	Hy 27 & 50 Ave

ASC/2s-1000

Movement	WBLT	EB	NBLT	SB		WB		NB
Phase	**1**	**2**	**3**	**4**	**5**	**6**	**7**	**8**
Minimum Green	6	15	7	12	0	15	0	12
Walk		7		7		7		7
Pedestrian Clearance		15		15		15		15
Vehicle extension	3	4	3.5	3		4	0	3
Max 1	12	40	12	30		40	0	30
Max 2	20	30	15	25		30		25
Dynamic Max								
Dynamic Step								
Yellow Change	3	3.5	3	3.5		3.5	3	3.5
Red Clearance	1	1	1.5	1		1.5	1	1.5
Red Max								
Red Revert								
Vehicle Recall		X				X		
Pedestrian Recall								

Time of Day	**Change**
6:30	
9:00	omit 3
11:30	
13:30	
15:00	
18:30	omit 3
21:30	omit 3

CMA	OLDS
Traffic Signal	Hy 27 & 46 Ave

ASC3/2100

Movement	WBLT	EB		NB	EBLT	WB	NBLT	SB
Phase	**1**	**2**	3	**4**	**5**	**6**	**7**	**8**
Minimum Green	10	10		10	10	10	7	10
Walk		7				7		7
Pedestrian Clearance		13		17		13		17
Vehicle extension	3	5	0	4	5	5	3	4
Max 1	10	15	0	22	15	10	6	12
Max 2	20	40	0	35	20	40	20	35
Dynamic Max								
Dynamic Step								
Yellow Change	3	4	4	4	3	4	3	4
Red Clearance	2	2	1	2	2	2	1	2
Red Max								
Red Revert	2	2		2	2	2	2	2
Vehicle Recall								
Pedestrian Recall								

Time of Day	**Action Plan**	**change**
NA		

Advance Warning timings (Eastbound)

lag green	7
yellow	3.5
red	2

2023 Fall Traffic Signal Maintenance & Inspections for CMA 514.

Winterizing cabinet procedure is typical and includes the following:

Dust & vacuum cabinet internals
Record activity in logbook
Clean air filter
Close vent cover
Check & set fan & heater thermostat positions for fall / winter operation
Lube door hinges & lock
Perform walk-around – test push buttons, look for burnt-out lights, identify unusual conditions
Check operation of flasher
Check operation of service outlet
Check operation of cabinet trouble light
Check & set current date and time in controller
Check that line voltage is within specified ranges – 117 to 125 VAC
Check & reason for last flash condition
Check vehicle detection function

Sundre:	
Hy 27 & Centre -Northeast corner push button heading South is not working. Replace button -Southeast corner push buttons both need to be hit hard to activate. Replace 2 x buttons -multiple Audible Pedestrian Signals are broken or not working.	51.797063, -114.639322

Carstairs:	
Hy 2A & Hy 581 Fan no longer working in cabinet. Loops not working, intersection in recall. No countdown timer in NE corner, replace old style fixture with new fixture and countdown insert.	51.562019, -114.095353

Olds:	
Hy 27 & 70 Ave -Traffic Cabinet & Power Cabinet are both low. AT spec for pre-cast bases is 600mm above grade. Raise cabinet or install protective bollards to prevent damage from vehicles sliding off the road.	51.794996, -114.143517
Hy 27 & 67A Ave -push buttons not working: Southeast corner heading West Southwest corner heading East Northwest corner heading East Northeast corner heading West All pedestrian crossings switched to AUTOMATIC until buttons are replaced. -Southeast corner countdown timer facing North is not displaying the ONES digits. Insert is faulty. Replace 16" bimodal ped insert with countdown. -cameras not functional. Could not communicate with the system. Could be a bad Terra Interface Panel. Camera system not serviceable – replace system with new 4-approach vehicle detection system.	51.795002, -114.137512
Hy 27 & 65 Ave - OLDS -Audible Pedestrian Signals on North side for East/West movement are not working. Replace 2 x APS. -Northwest corner countdown timer facing South is not working. Replace 16" insert. -Audible Pedestrian Signals on West side for North/South movement are not working. Replace 2 x APS. -Eastbound side-mount green has burnt out LEDs. Replace LED insert. -NB side mount Amber insert and NB 3 section amber insert both have burnt out LED's.	51.795015, -114.131595
Hy 27 & 57 Ave -new cabinet at this location. -vehicle detection loops 4, 8, 6 are broken, causing signals to cycle regardless of traffic. Repair loops or install new 4-approach vehicle detection system. -all push buttons tied together – this is inefficient operation. -ASC/2s-1000 controller is obsolete and could fail at any time. Replace controller to provide reliable operation. -cabinet door is dented on the Left side flange near handle. -No push button signage at any pole. Install at least 4 push button signs. -visor missing for Southeast corner side-mount. Install visor. -Southeast corner countdown timer facing North is not working. Replace 16" insert. -Audible Pedestrian Signals on East side for North/South operation are not working. Replace 2 x APS. -Southwest corner countdown timer facing North is not working. Replace 16" insert. -Audible Pedestrian Signal in Southwest corer facing North is not working. Replace 1 x APS.	51.795022, -114.119901

Hy 27 & 52 Ave -ASC2-1000 controller is obsolete and could fail at any time. Replace controller to provide reliable operation. -Westbound 3-section is aimed down. -Northwest corner push button has not sign. Install push button signage. -Northwest corner countdown timer facing South is not working. Replace 16" insert. -Southwest corner pedestal pole is leaning to the East. Add shims under baseplate to plumb pole. -Push button tied together in cabinet. Add 1 button to Northwest corner pole to separate movements and provide safer operation.	51.795028, -114.109698
Hy 27 & 51 Ave SW corner north facing ped countdown is not working. New 16" insert required. All pushbuttons are facing up, not in the direction of travel.	51.795029, -114.106399
Hy 27 & 50 Ave – OLDS Southeast corner countdown facing North is not working. -7 of 8 push buttons are pointing UP.	51.795009, -114.103878
Hy 27 & 46 Ave EB black tunnel visor cracked. Poles in SE, NE, NW corners damaged, starting to rust.	51.794966, -114.096089

Rocky Mountain House:	
Hy 11 & 42 Ave -Northbound Advance Warning Sign severely damaged -Northwest pole Vertical 3 section is smashed open on top support arm -Southwest pole Vertical has a broken Tunnel Visor -Cabinet bulb is burned out and needs to be replaced	52.363062, -114.906764
Hy 11 & 47 Ave -South bound cantilever 4 section back board has been hit. -North bound structure push button signs are damaged and south bound push button not working -East bound structure push button sign is damaged, push button base is badly worn, North bound push button not working	52.370288, -114.910028
Hy 11 & 50 Ave -North bound structure is leaning heavily into the road, -North bound structure pedestrian fixture is smashed off the pole	52.374467, -114.912388
Hy 11 & 52 Ave -North bound structure south facing Ped has burnt out LED -Soth bound 4 Section is crooked and back board is peeling -South bound structure east bound push button has no audio indication -East bound structure is missing proper push button signage and large hole from removed button should be plugged to reduce moisture entering the pole Eastbound structure missing small diwidag nut on the base	52.377847, -114.914201

52 Ave & 48 Street -North bound structure west facing ped fixture has burnt out LED -Northbound structure south facing Ped fixture does not count down and has burnt out LED -Northbound structure eastbound push button no audio -Westbound structure south bound ped has burnt out LED -Westbound structure south bound push button has no audio -Southbound structure east bound push button has no audio -Eastbound structure north bound ped is not counting down	52.377621, -114.916197
52 Ave & Main Street -Cabinet fan not working	52.377614, -114.919255
Hy 11 & 53 Ave – Rocky Mtn. House -West bound structure push button sign is damaged with hazardous sharp edges. -Northbound structure push button sign is damaged with hazardous sharp edges -South bound structure street sign is loose, and friction held with a lag bolt	52.380450, -114.914652

C

Appendix C
Collision Review

COLLISIONS REPORTED ALONG HIGHWAY 27:06 - 2014 to 2018

70 AVENUE - km 36.182 to km 36.626

Localized No.	Case Year	Case No.	Object No.	Police Service	In / Near	Place Name	On Highway (# & suffix - 999X)	At Intersection with Highway (999X)	On Street	At Intersection with Street	Not at Intersection Distance	Not at Intersection Direction	Not at Intersection km / metre	Not at Intersection Reference Point Description	Special Reference Location Description	Occurrence Date (ccyy/mm/dd)	Occurrence Hour (24 hour clock - hh:mm)	Collision Severity	Primary Event	Vehicle 1 Direction of Travel	Vehicle 2 Direction of Travel	Vehicle 1 Manoeuvre	Vehicle 2 Manoeuvre	Collision Type	Highway Number (999X)	Major Control Section	Safety Section	Kilometre Post	Enviromental Condition	Surface Condition	Total Injuries	Total Fatalities	Natural Light Condition	Artificial Light Condition	Collision Description
1	2017	799532	1	3265	2	OLDS		27							EXACT LOC UNK	2017-03-19	6.00	3	1	7		47		94	27	6	36.213	1	1	0	0	3	2	Driver 1 was WB on Hwy 27 when a deer came from the ditch and was struck. No injuries. Damage sticker issued.
2	2015	516285	1	3265	2	OLDS		27			0				HWY 27	2015-03-01	6.00	3	2	7		47		51	27	6	36.218	1	1	0	0	3	1	MVC ROLLOVER GREEN TOYOTA CAMRY ON ITS ROOF SOUTH SIDE OF THE HIGHWAY, NO INJURIES, COM SAW THE VEH. OCC SPOKE TO THE DRIVERS FATHER WHO ARRIVED AT THE DETACHMENT VEH NOT LEAKING, NOT BLOCKING TRAFFIC, NO INJUR
3	2018	1018273	1	3265	2	OLDS		27							WB ON HWY 27	2018-08-17	22.15	3	1	7		47		94	27	6	36.222	1	1	0	0	3	1	WB on Highway 27. Deer from south ditch impacted vehicle on left side front fender, windshield and mirror.
4	2015	581934	1	3265	2	OLDS		27		RANGE ROAD 20	0				HWY 27 & RR 20	2015-08-22	0.01	3	1	7		47		94	27	6	36.233	1	1	0	0	3	2	OBJECT1_LN(C), OBJECT1_FN(W) ATTENDED THE FRONT COUNTER TO REPORT A COLLISION VS A FOX. DAMAGE OVER $2000. ACCIDENT OCCURED CLOSE TO OLDS, AB. STMT TO FORWARDED TO OLDS RCMP. /// 2015-09-09 STATEMENT RECEIVE
5	2017	836387	1	3265	2	OLDS		27							NEAR RR20	2017-06-28	16.27	3	8	9	9	47	47	28	27	6	36.269	1	1	0	0	1	1	MVC. No injuries, fluids leaking, no fire. Mrb attended, found a White VW Jetta had rear ended a White Ford Explorer at Hwy 27 and RR 20. Driver 2 charged under ROR. No indication of susbstances being a fact
6	2014	2816495	1	3272	2	OLDS		27			100	W	M	OLDS	UKN	2014-07-09	16.10	3	2	3		47		41	27	6	36.317	1	1	0	0	1	1	VEHICLE WAS TRAVELING E/B ON HWY 27 WHEN HE WENT INTO THE DITCH N/S AND DROVE INTO THE DITCH MEDICAL REASON DID NOT APPEAR TO BE INJURED FROM COLLISION
7	2014	2816600	1	3265	2	OLDS		27		RGE RD 20	0				UKN	2014-01-08	6.00	3	6	3	7	47	47	34	27	6	36.386	4	3	0	0	3	1	VEHICLE 1 EB VEHICLE 2 WB VEHICLE 1 LOST CONTROL SWERVED INTO VEHICLE 2 SNOW COVERED ROADWAY
8	2016	632380	1	3265	2	OLDS		27		20 RANGE ROAD						2016-01-11	18.45	3	5	7	3	34	47	1	27	6	36.396	1	1	0	0	1	1	Object1_LN(N) westbound and turned infront of Object2_LN(R).
9	2018	945396	1	3265	2	OLDS		27		20 RA					*	2018-03-03	14.54	3	1	7		47		94	27	6	36.408	4	3	0	0	1	1	Driver 1 WB on Hwy 27 when a dog ran out and was struck. No injuries.
10	2017	911149	1	3265	2	OLDS		27		70 AVENUE					*	2017-11-27	18.00	3	1	7		47		94	27	6	36.425	1	1	0	0	3	2	Driver 1 WB on Hwy 27 when a dog ran out and was struck. Damage sticker issued. Statement obtained.
11	2016	669027	1	3265	2	OLDS		27		RANGE ROAD 20					HWY 27 & RR 20	2016-02-28	3.55	3	9	9		47		58	27	6	36.428	1	1	0	0	3	2	Hwy 27 Range Road 30 Truck has rolled into the ditch. smoke coming from the truck. unknown if anyone is inside. Fire and EMS enroute. People in the vehicle keep pressing on the gas and lights keep turning on a
12	2016	714111	1	3265	2	OLDS		27	20						HWY 27 AT RR 20	2016-09-07	11.40	3	5	3	7	47	34	1	27	6	36.452	1	1	0	0	1	1	Mbr received complaint of collision RR 20 and HWY 27. Object2_LN(F) heading westbound turned left unsafely in front of Object1_LN(D) causing accident. Audio statements/photos obtained. VT issued to Object2_L
13	2017	873189	1	3265	1	OLDS		27							NEAR RR20	2017-10-09	20.47	3	1	7		47		94	27	6	36.627	1	1	0	0	3	2	Driver struck deer. No human injuries.

Severity		Primary Event				Environmental Condition		Surface Condition		Natural Light Condition	
1 - Fatal	0	1 - Struck Object (non-animal)	0	7 - Other	0	1 - Clear	11	1 - Dry	11	1 - Daylight	5
2 - Injury	0	1 - Animal	6	8 - Rear End	1	2 - Raining	0	2 - Wet	0	2 - Sun glare	0
3 - PDO	13	2 - Off Road Left	2	9 - Off Road Right	1	3 - Hail/Sleet	0	3 - Slush/Snow/Ice	2	3 - Darkness	8
		3 - Right Angle	0	10 - Head On	0	4 - Snow	2	4 - Loose Surface Material	0	99 - Unknown	0
		4 - Passing Left Turn	0	11 - Passing Right Turn	0	5 - Fog/Smog/Smoke/Dust	0	5 - Muddy	0		
		5 - Left Turn Across Path	2	12 - Sideswipe Same Direction	0	6 - High Wind	0	97 - Blank	0		
		6 - Sideswipe	1	13 - Backing	0	97 - Blank	0	98 - Other	0		
						98 - Other	0	99 - Unknown	0		
						99 - Unknown	0				

67A AVENUE - km 36.674 to km 37.048

Localized No.	Case Year	Case No.	Object No.	Police Service	In / Near	Place Name	On Highway (# & suffix - 999X)	At Intersection with Highway (999X)	On Street	At Intersection with Street	Not at Intersection Distance	Not at Intersection Direction	Not at Intersection km / metre	Not at Intersection Reference Point Description	Special Reference Location Description	Occurrence Date (ccyy/mm/dd)	Occurrence Hour (24 hour clock - hh:mm)	Collision Severity	Primary Event	Vehicle 1 Direction of Travel	Vehicle 2 Direction of Travel	Vehicle 1 Manoeuvre	Vehicle 2 Manoeuvre	Collision Type	Highway Number (999X)	Major Control Section	Safety Section	Kilometre Post	Enviromental Condition	Surface Condition	Total Injuries	Total Fatalities	Natural Light Condition	Artificial Light Condition	Collision Description
1	2015	492161	1	3265	1	OLDS		27			0				NB ON HWY 27	2015-01-08	8.00	3	2	9		47		61	27	6	36.857	6	3	0	0	1	1	OBJECT1_LN(B) WAS NB ON HWY 2 WHEN HE LOST CONTROL AND HIT THE MEDIAN DAMAGING THE DRIVER SIDE OF HIS VEHICLE. NO INJURIES. DAMAGE STICKER ISSUED. STATEMENT OBTAINED. ECOLLISION COMPLETE. CH
2	2015	577740	1	3272	1	OLDS		27		67A STREET	0					2015-09-01	17.00	3	8	5	5	47	47	28	27	6	36.859	1	1	0	0	1	1	OBJECT1_LN(M) ATTENDED DIDSBURY DETACHMENT TO REPORT A COLLISION. COM WAS PULLING ONTO HIGHWAY 27 FROM THE WAL-MART PARKING AREA. COM SHOULDER CHECKED PULLING UP TO A YIELD SIGN BUT FAILED TO NOTICE THAT OBJECT
3	2014	471981	1	3272	1	OLDS		27		6900 AVENUE	0				TRAFFIC LIGHTS HEADING EB	2014-11-18	9.15	2	8	3	3	47	47	28	27	6	36.861	1	3	1	0	1	1	OBJECT1_(KB) ATTENDED FRONT COUNTER TO REPORT BEING INVOLVED IN A 2 VEH MVC, NO INJ, DAMAGE OVER $2000. OBJECT1_LN(B) STATED HE WAS DRIVING E INTO OLDS ON H27 AT 6900 ACROSS FM BMO WHEN SUDDENLY THE LIGHTS TUR
4	2016	743645	1	3272	1	OLDS		27							LIGHTS BY WALMART	2016-11-18	15.36	3	8	5	5	97	97	28	27	6	36.863	1	1	0	0	1	1	Object1_LN(E) and Object2_LN(F) attended front counter and reported a collision at the intersection of Hwy27 and 67A Ave. Object1_LN(E) ran into the back of Object2_LN(F). No injuries. Statements obtained and f
5	2014	Z711261	1	3272	1	OLDS		27		67 AVE	0					2014-01-29	17.30	3	8	7	7	47	47	28	27	6	36.864			0	0	1	1	V2 W/B MERGING ONTO HWY 27 STOPPED AT YIELD SIGN BEFORE MERGING & WAS REAR ENDED BY V1.
6	2014	419834	1	3272	1	OLDS		27		67A AVENUE	0					2014-06-13	15.20	3	3	7	5	47	97	8	27	6	36.865	1	1	0	0	1	1	OBJECT1_LN(M) DRIVING WEST BOUND ON HIGHWAY 27 (46 STREET) OLDS. OBJECT2_LN(A) IN INTERSECTION FACING SOUTH WAITING TO TURN EAST BOUND FROM 67A AVENUE ONTO HIGHWAY 27. OBJECT1_LN(M) PROCEEDED THROUGH INTERSEC
7	2017	912764	1	3272	1	OLDS		27		67 AVENUE					*	2017-12-31	14.30	3	3	1	7	97	47	8	27	6	36.868	1	1	0	0	1	1	Driver 2 ran red light and struck driver 1
8	2018	1047384	1	3272	1	OLDS		27		69 ST					* UNKNOWN INTERSECTION	2018-11-23	22.50	3	5	7	3	47	34	1	27	6	36.872	4	3	0	0	3	2	Driver 1 WB on Hwy 27, Driver 2 EB turning left and collided with Driver 1. No injuries.
9	2016	726167	1	3272	1	OLDS		27		67A					EXIT LANE	2016-10-07	13.45	3	8	7	7	24	45	28	27	6	36.918	4	3	0	0	1	1	Object2_LN(R) was driving WB on HWY 27 approaching the traffic lights at 67A. When he applied the brakes to slow down and stop he started sliding so he veered to the right and struck a sign post and the back en
10	2014	423355	1	3272	1	OLDS		27			0				TRAVELLING EAST ON HWY 27 BY CORNERSTONE MALL	2014-06-24	14.45	3	12	3	3	28	47	36	27	6	36.928	1	1	0	0	1	1	OBJECT1_LN(A) FAILED TO MAKE PROPER LANE CHANGE AND STRUCK REAR OF SEMI TRAILER DRIVEN BY OBJECT2_LN(R). DRIVER ASSESSMENT REQUESTED FOR ELDERLY OBJECT1_LN(A).
11	2015	533836	1	3272	2	OLDS		27		46 STREET	0				CROSSWALK BY MCDONALDS	2015-04-10	19.00	3	8	7	7	47	47	28	27	6	38.495	1	1	0	0	1	1	OBJECT2_LN(P) ATTENDED FRONT COUNTER TO REPORT MINOR MVC IN WHICH HIS CAR WAS REAR-ENDED BY VEHICLE DRIVEN BY OBJECT1_LN(W). DAMAGE STICKER 8306603 ISSUED. ///OBJECT1_LN(W) ATTENDED OLDS DETACHMENT AND PROVIDED

Severity		Primary Event				Environmental Condition		Surface Condition		Natural Light Condition	
1 - Fatal	0	1 - Struck Object (non-animal)	0	7 - Other	0	1 - Clear	7	1 - Dry	6	1 - Daylight	10
2 - Injury	1	1 - Animal	0	8 - Rear End	6	2 - Raining	0	2 - Wet	0	2 - Sun glare	0
3 - PDO	10	2 - Off Road Left	1	9 - Off Road Right	0	3 - Hail/Sleet	0	3 - Slush/Snow/Ice	4	3 - Darkness	1
		3 - Right Angle	2	10 - Head On	0	4 - Snow	2	4 - Loose Surface Material	0	99 - Unknown	0
		4 - Passing Left Turn	0	11 - Passing Right Turn	0	5 - Fog/Smog/Smoke/Dust	0	5 - Muddy	0		
		5 - Left Turn Across Path	1	12 - Sideswipe Same Direction	1	6 - High Wind	1	97 - Blank	1		
		6 - Sideswipe	0	13 - Backing	0	97 - Blank	1	98 - Other	0		
						98 - Other	0	99 - Unknown	0		
						99 - Unknown	0				

Localized No.	Case Year	Case No.	Object No.	Police Service	In / Near	Place Name	On Highway (# & suffix - 999X)	At Intersection with Highway (999X)	On Street	At Intersection with Street	Not at Intersection Distance	Not at Intersection Direction	Not at Intersection km / metre	Not at Intersection Reference Point Description	Special Reference Location Description	Occurrence Date (ccyy/mm/dd)	Occurrence Hour (24 hour clock - hh:mm)	Collision Severity	Primary Event	Vehicle 1 Direction of Travel	Vehicle 2 Direction of Travel	Vehicle 1 Manoeuvre	Vehicle 2 Manoeuvre	Collision Type	Highway Number (999X)	Major Control Section	Safety Section	Kilometre Post	Environmental Condition	Surface Condition	Total Injuries	Total Fatalities	Natural Light Condition	Artificial Light Condition	Collision Description
65 AVENUE - km 37.117 to km 37.420																																		
1	2018	935197	1	3272	1	OLDS	27			65 AVENUE					*	2018-02-09	21.30	3	8	3	3	47	49	28	27	6		37.276	1	3	0	0	3	2	Driver 1 was rear ended by driver 2
61 AVENUE - km 37.632 to km 37.897																																		
1	2017	892454	1	3272	1	OLDS	27			61 AVENUE					*	2017-11-20	15.15	3	3	3	1	47	97	8	27	6		37.761	1	1	0	0	1	1	Driver 2 pulled out in front of driver 1 and they collided. No injuries. OBJECT1_LN(S) WAS ENTERING HWY 27 FROM IMPERIAL WAY IN THE WB LEFT LANE AND DIDN'T SEE OBJECT2_LN(W) COMING SB AND COLLIDED WITH HER. STATEMENTS OBTAINED, DAMAGE STICKERS
2	2015	502044	1	3272	1	OLDS	27			IMPERIAL WA	0				HWY 27 & IMPERIAL WAY	2015-01-28	15.15	3	12	7	7	47	36	36	27	6		37.762	1	1	0	0	1	1	ISSUED. ECOLLISION COMPLETED. CH
3	2018	952695	1	3272	1	OLDS	27								HWY 27	2018-03-20	10.30	3	8	7	7	49	47	28	27	6		37.763	1	1	0	0	1	1	Driver 2 rear ended driver 1

Severity		Primary Event				Environmental Condition		Surface Condition		Natural Light Condition	
1 - Fatal	0	1 - Struck Object (non-animal)	0	7 - Other	0	1 - Clear	1	1 - Dry	0	1 - Daylight	0
2 - Injury	0	1 - Animal	0	8 - Rear End	1	2 - Raining	0	2 - Wet	0	2 - Sun glare	0
3 - PDO	1	2 - Off Road Left	0	9 - Off Road Right	0	3 - Hail/Sleet	0	3 - Slush/Snow/Ice	1	3 - Darkness	1
		3 - Right Angle	0	10 - Head On	0	4 - Snow	0	4 - Loose Surface Material	0	99 - Unknown	0
		4 - Passing Left Turn	0	11 - Passing Right Turn	0	5 - Fog/Smog/Smoke/Dust	0	5 - Muddy	0		
		5 - Left Turn Across Path	0	12 - Sideswipe Same Direction	0	6 - High Wind	0	97 - Blank	0		
		6 - Sideswipe	0	13 - Backing	0	97 - Blank	0	98 - Other	0		
						98 - Other	0	99 - Unknown	0		
						99 - Unknown	0				

Severity		Primary Event				Environmental Condition		Surface Condition		Natural Light Condition	
1 - Fatal	0	1 - Struck Object (non-animal)	0	7 - Other	0	1 - Clear	3	1 - Dry	3	1 - Daylight	3
2 - Injury	0	1 - Animal	0	8 - Rear End	1	2 - Raining	0	2 - Wet	0	2 - Sun glare	0
3 - PDO	3	2 - Off Road Left	0	9 - Off Road Right	0	3 - Hail/Sleet	0	3 - Slush/Snow/Ice	0	3 - Darkness	0
		3 - Right Angle	1	10 - Head On	0	4 - Snow	0	4 - Loose Surface Material	0	99 - Unknown	0
		4 - Passing Left Turn	0	11 - Passing Right Turn	0	5 - Fog/Smog/Smoke/Dust	0	5 - Muddy	0		
		5 - Left Turn Across Path	0	12 - Sideswipe Same Direction	1	6 - High Wind	0	97 - Blank	0		
		6 - Sideswipe	0	13 - Backing	0	97 - Blank	0	98 - Other	0		
						98 - Other	0	99 - Unknown	0		
						99 - Unknown	0				

57 AVENUE - km 37.940 to km 38.162

Localized No.	Case Year	Case No.	Object No.	Police Service	In / Near	Place Name	On Highway (# & suffix - 999X)	At Intersection with Highway (999X)	On Street	At Intersection with Street	Not at Intersection Distance	Not at Intersection Direction	Not at Intersection km / metre	Not at Intersection Reference Point Description	Special Reference Location Description	Occurrence Date (ccyy/mm/dd)	Occurrence Hour (24 hour clock - hh:mm)	Collision Severity	Primary Event	Vehicle 1 Direction of Travel	Vehicle 2 Direction of Travel	Vehicle 1 Manoeuvre	Vehicle 2 Manoeuvre	Collision Type	Highway Number (999X)	Major Control Section	Safety Section	Kilometre Post	Enviromental Condition	Surface Condition	Total Injuries	Total Fatalities	Natural Light Condition	Artificial Light Condition	Collision Description
1	2015	492186	1	3272	1	OLDS		27			0				INTERSECTION OF HWY 27 & 57	2015-01-07	12.05	3	8	9	9	45	47	28	27	6		38.071	6	3	0	0	1	1	OBJECT1_LN(D) ATTENDED FRONT COUNTER TO REPORT THAT WHILE STOPPED BEHIND VEHICLES AT THE INTERSECTION OF 57TH AND 46, SHE WAS REAR-ENDED BY STEVE OBJECT2_LN(H). NO INJURIES. DAMAGE STICKER ISSUED. STATEMENTS
2	2017	892152	1	3272	1	OLDS		27		57 AVENUE					*	2017-11-17	17.30	3	5	3	7	47	34	1	27	6		38.080	1	1	0	0	3	2	Driver 2 turned left at intersection and did not see Driver1 and hit the side of his car. No injuries. Statements obtained and TSS completed and forwarded to RO's. //ch
3	2014	454985	1	3272	1	OLDS		27		46 STREET	0					2014-09-19	18.00	3	8	3	3	45	47	28	27	6		38.082	1	1	0	0	1	1	D1 STOPPED AT RED LIGHT. D2 DISTRACTED AND STARTED TO MOVE FORWARD WHILE D1 WAS STOPPED.
4	2017	797220	1	3265	1	OLDS		27		57					IN FRONT OF REMAX	2017-03-15	8.40	2	8	9	9	47	47	28	27	6		38.082	1	3	2	0	1	1	driver 2 attended the Olds detachment to report a collision. She was driving North on Hwy 27 when the car ahead of her braked suddenly. She slammed on her braked and due to icey road conditions, slid into the b
5	2018	1055664	1	3272	1	OLDS		27		57 AVENUE					*	2018-12-13	14.35	3	5	7	3	47	34	1	27	6		38.083	1	1	0	0	1	1	Driver 1 proceeded WB on Hwy 27 through a red light, causing a collision with Driver 2 who was turning left on a turn light. No injuries.
6	2018	942546	1	3272	1	OLDS		27		57 AVENUE						2018-02-26	15.50	3	8	5	5	47	36	28	27	6		38.086	1	1	0	0	1	1	DRIVER 2 SOUTHBOUND ON 57 AVENUE STOPPED AT RED LIGHT AT HWY 27 BEFORE TURNING WEST. WHILE WAITING FOR TRAFFIC TO CLEAR BEFORE TURNING WEST DRIVER 2 WAS REAR-ENDED BY DRIVER 1.
7	2016	661638	1	3272	1	OLDS		27		57 AVENUE						2016-03-29	13.30	3	8	9	9	47	47	28	27	6		38.087	1	1	0	0	1	1	Object2_LN(W) and Object1_LN(W) attended the Olds detachment front counter to report a collision. Object1_LN(W) was stopped at the intersection of 57 ave and hwy 27 in Olds and proceeded forward and rear ended
8	2015	619316	1	3272	1	OLDS		27			0				HWY 27 & 57 AVE	2015-12-12	12.35	3	8	3	3	34	47	28	27	6		38.088	1	3	0	0	1	1	OBJECT1_LN(C) WAS DRIVING EAST ON HWY 27 WHEN THE CAR N FRONT OF HIM SLOWED TO A STOP TO TURN LEFT. OBJECT1_LN(C) APPLIED BRAKE BUT ROAD WAS SLIPPERY AND HE SLID INTO THE REAR OF OBJECT2_LN(F). NO INDURIES. BOT
9	2018	1044886	1	3272	1	OLDS		27		57 AVE					*	2018-11-23	12.10	2	8	3	3	47	45	28	27	6		38.089	4	3	1	0	1	1	Driver 1 began to go after light turned green, driver 2 who was in front did not and was rear-ended by Driver 1

Severity		Primary Event				Environmental Condition		Surface Condition		Natural Light Condition	
1 - Fatal	0	1 - Struck Object (non-animal)	0	7 - Other	0	1 - Clear	7	1 - Dry	5	1 - Daylight	8
2 - Injury	2	1 - Animal	0	8 - Rear End	7	2 - Raining	0	2 - Wet	0	2 - Sun glare	0
3 - PDO	7	2 - Off Road Left	0	9 - Off Road Right	0	3 - Hail/Sleet	0	3 - Slush/Snow/Ice	4	3 - Darkness	1
		3 - Right Angle	0	10 - Head On	0	4 - Snow	1	4 - Loose Surface Material	0	99 - Unknown	0
		4 - Passing Left Turn	0	11 - Passing Right Turn	0	5 - Fog/Smog/Smoke/Dust	0	5 - Muddy	0		
		5 - Left Turn Across Path	2	12 - Sideswipe Same Direction	0	6 - High Wind	1	97 - Blank	0		
		6 - Sideswipe	0	13 - Backing	0	97 - Blank	0	98 - Other	0		
						98 - Other	0	99 - Unknown	0		
						99 - Unknown	0				

Between 57 AVENUE & 52 AVENUE

Localized No.	Case Year	Case No.	Object No.	Police Service	In / Near	Place Name	On Highway (# & suffix - 999X)	At Intersection with Highway (999X)	On Street	At Intersection with Street	Not at Intersection Distance	Not at Intersection Direction	Not at Intersection km / metre	Not at Intersection Reference Point Description	Special Reference Location Description	Occurrence Date (ccyy/mm/dd)	Occurrence Hour (24 hour clock - hh:mm)	Collision Severity	Primary Event	Vehicle 1 Direction of Travel	Vehicle 2 Direction of Travel	Vehicle 1 Manoeuvre	Vehicle 2 Manoeuvre	Collision Type	Highway Number (999X)	Major Control Section	Safety Section	Kilometre Post	Enviromental Condition	Surface Condition	Total Injuries	Total Fatalities	Natural Light Condition	Artificial Light Condition	Collision Description
1	2015	517430	1	3272	1	OLDS		27		56 AVENUE	0				HWY 27 AND 56TH AVE	2015-02-28	11.00	3	1	7		47		92	27	6		38.325	1	1	0	0	1	1	OBJECT1_LN(M) WAS DRIVING WB ON HWY 27 WHEN LOST CONTROL AND HIT A SIGN. NO INJURIES. DAMAGE STICKER ISSUED. STATEMENT OBTAINED. ECOLLISION COMPLETED. CH
2	2015	528229	1	3272	1	OLDS		27			0				IN FRONT OF TIM HORTONS	2015-04-01	14.40	2	8	3	3	47	45	28	27	6		38.374	1	1	1	0	1	1	OBJECT1_LN(W) WAS DRIVING EB ON HWY 27 AND LOOKED AWAY FOR A BRIEF MOMENT AND WHEN HE LOOKED FORWARD THE CAR IN FRONT OF HIM HAD STOPPED AND OBJECT1_LN(W) REAR ENDED IT. NO INJURIES. ECOLLISION REPORT COMPLETED
3	2014	2816457	1	3272	1	OLDS		27			0				5508 46 ST	2014-03-20	6.42	3	12	7	7	36	47	36	27	6		38.379	1	1	0	0	3	2	OBJ 1 WAS WAITING TO TURN RIGHT INTO TIM HORTONS WHEN A TRUCK STUCK SIDE-SWIPED BY A BLACK TRUCK WHICH NOT NOT STOP.
4	2014	2658849	1	3272	1	OLDS		27		55 AVE	0				UNK ACROSS FROM CO-OP GAS	2014-03-06	0.01	3	3	5	7	84	47	8	27	6		38.387	4	3	0	0	1	1	VEH1 ATTEMPT TO TURN EB ON 46 ST. CROSSED PATH OF VEH2 CAUSING COLLISION.
5	2014	473603	1	3272	1	OLDS		27		54 AVENUE	0				BAR, OLDS LEGION PARKING LOT	2014-11-20	17.00	3	5	3	7	47	84	1	27	6		38.496	1	3	0	0	1	1	D1 CHANGING LANES AND COLLIDED WITH VEHICLE DRIVEN BY D2
6	2014	2816439	1	3272	1	OLDS		27			0				ENTRANCE	2014-08-05	13.20	2	12	3	3	28	47	36	27	6		38.640	1	1	1	0	1	1	V2 CHANGED LANES WHITE EB CUT OFF V1 ALSO EB HWY 27, V2 DROVE OVER CURB STRUCK V3 & V4

Severity		Primary Event				Environmental Condition		Surface Condition		Natural Light Condition	
1 - Fatal	0	1 - Struck Object (non-animal)	1	7 - Other	0	1 - Clear	5	1 - Dry	4	1 - Daylight	5
2 - Injury	2	1 - Animal	0	8 - Rear End	1	2 - Raining	0	2 - Wet	0	2 - Sun glare	0
3 - PDO	4	2 - Off Road Left	0	9 - Off Road Right	0	3 - Hail/Sleet	0	3 - Slush/Snow/Ice	2	3 - Darkness	1
		3 - Right Angle	1	10 - Head On	0	4 - Snow	1	4 - Loose Surface Material	0	99 - Unknown	0
		4 - Passing Left Turn	0	11 - Passing Right Turn	0	5 - Fog/Smog/Smoke/Dust	0	5 - Muddy	0		
		5 - Left Turn Across Path	1	12 - Sideswipe Same Direction	2	6 - High Wind	0	97 - Blank	0		
		6 - Sideswipe	0	13 - Backing	0	97 - Blank	0	98 - Other	0		

52 AVENUE - km 38.675 to km 38.854

Localized No.	Case Year	Case No.	Object No.	Police Service	In / Near	Place Name	On Highway (# & suffix - 999X)	At Intersection with Highway (999X)	On Street	At Intersection with Street	Not at Intersection Distance	Not at Intersection Direction	Not at Intersection km / metre	Not at Intersection Reference Point Description	Special Reference Location Description	Occurrence Date (ccyy/mm/dd)	Occurrence Hour (24 hour clock - hh:mm)	Collision Severity	Primary Event	Vehicle 1 Direction of Travel	Vehicle 2 Direction of Travel	Vehicle 1 Manoeuvre	Vehicle 2 Manoeuvre	Collision Type	Highway Number (999X)	Major Control Section	Safety Section	Kilometre Post	Environmental Condition	Surface Condition	Total Injuries	Total Fatalities	Natural Light Condition	Artificial Light Condition	Collision Description
1	2015	534887	1	3265	1	OLDS		27		52 AVENUE	0				46 STREET AND 52 AVE	2015-04-18	14.20	3	5	7	3	34	47	1	27	6		38.784	1	1	0	0	1	1	VEHICLE 1 WAS DRIVING WEST BOUND AND TURNED LEFT IN FRONT OF EAST BOUND VEHICLE 2.
2	2018	949390	1	3272	1	OLDS		27		52 AVENUE					NEAR SMITTYS	2018-03-12	17.30	3	5	7	3	47	34	1	27	6		38.785	1	1	0	0	1	1	Driver 2 turned left in front of driver 1 and collided.
3	2017	790464	1	3272	1	OLDS		27		52 AVE.						2017-02-28	12.20	3	8	7	7	47	47	28	27	6		38.827	1	1	0	0	1	1	Driver 1 proceeding through green light, sun in her eyes, Driver 2 who was in front wasn't proceeding. Driver 1 rear-ended Driver 2.
4	2014	2816575	1	3272	1	OLDS		27		52 AV	0					2014-02-06	12.00	3	12	3	3	47	28	36	27	6		38.831	1	1	0	0	1	1	V1 EB ON 46 ST IN RIGHT LANE V2 EB ON 46 ST IN LEFT LANE CHANGED LANES & STRUCK V1
5	2015	621514	1	3272	1	OLDS		27		52 AVENUE	0				SUBWAY / OLDS COOP GAS BAR	2015-12-18	13.30	2	8	7	7	47	47	28	27	6		38.833	1	3	1	0	1	1	MULTIPLE VEHICLE MVC - 3 VEHICLES IN TOTAL. ONE VEHICLE MAY NOT BE DRIVEABLE. BLOCKING TRAFFIC. LEAKING FLUIDS. SOME DEBRIS. NO ONE TRAPPED. NO SMOKE OR FLAMES. NO ALCOHOL. ICY ROADS. WHITE CHEVY 2500 BLACK RVR
6	2016	718250	1	3272	1	OLDS		27		52						2016-09-16	17.05	3	8	7	7	49	49	28	27	6		38.841	1	1	0	0	1	1	Object1_LN(H) report a 2 vehcile mvc at the intersection of hwy 27 and 52 Ave. Olds, No damage to Object1_LN(H) vehicle only to Object2_(DL) vehicle. Rec'd docs for Object1_LN(H). Waiting for Object2_LN(L) to

Severity		Primary Event				Environmental Condition		Surface Condition		Natural Light Condition	
1 - Fatal	0	1 - Struck Object (non-animal)	0	7 - Other	0	1 - Clear	6	1 - Dry	5	1 - Daylight	6
2 - Injury	1	1 - Animal	0	8 - Rear End	3	2 - Raining	0	2 - Wet	0	2 - Sun glare	0
3 - PDO	5	2 - Off Road Left	0	9 - Off Road Right	0	3 - Hail/Sleet	0	3 - Slush/Snow/Ice	1	3 - Darkness	0
		3 - Right Angle	0	10 - Head On	0	4 - Snow	0	4 - Loose Surface Material	0	99 - Unknown	0
		4 - Passing Left Turn	0	11 - Passing Right Turn	0	5 - Fog/Smog/Smoke/Dust	0	5 - Muddy	0		
		5 - Left Turn Across Path	2	12 - Sideswipe Same Direction	1	6 - High Wind	0	97 - Blank	0		
		6 - Sideswipe	0	13 - Backing	0	97 - Blank	0	98 - Other	0		
						98 - Other	0	99 - Unknown	0		
						99 - Unknown	0				

51 AVENUE - km 38.854 to km 39.132

Localized No.	Case Year	Case No.	Object No.	Police Service	In / Near	Place Name	On Highway (# & suffix - 999X)	At Intersection with Highway (999X)	On Street	At Intersection with Street	Not at Intersection Distance	Not at Intersection Direction	Not at Intersection km / metre	Not at Intersection Reference Point Description	Special Reference Location Description	Occurrence Date (ccyy/mm/dd)	Occurrence Hour (24 hour clock - hh:mm)	Collision Severity	Primary Event	Vehicle 1 Direction of Travel	Vehicle 2 Direction of Travel	Vehicle 1 Manoeuvre	Vehicle 2 Manoeuvre	Collision Type	Highway Number (999X)	Major Control Section	Safety Section	Kilometre Post	Environmental Condition	Surface Condition	Total Injuries	Total Fatalities	Natural Light Condition	Artificial Light Condition	Collision Description
1	2014	Z722657	1	3272	1	OLDS		27		51 AV	0				UNK	2014-02-28	15.20	3	12	3	3	28	47	36	27	6		38.850			0	0	1	1	VEHICLES WERE EB ON 46 ST V2 IN FAR RIGHT LANE V1 MOVED TO THE RIGHT AND STRUCK V2.
2	2014	2816399	1	3272	1	OLDS		27		51 AVENUE	0				NA	2014-02-04	12.00	3	12	7	7	28	47	36	27	6		39.009	1	3	0	0	1	1	VEH 1 WAS WB ON HWY 27 WHEN SHE CHANGED LANES AND COLLIDED WITH VEH 2 WHO WAS ALSO WB IN THE NORTH LANE

Severity		Primary Event				Environmental Condition		Surface Condition		Natural Light Condition	
1 - Fatal	0	1 - Struck Object (non-animal)	0	7 - Other	0	1 - Clear	1	1 - Dry	0	1 - Daylight	2
2 - Injury	0	1 - Animal	0	8 - Rear End	0	2 - Raining	0	2 - Wet	0	2 - Sun glare	0
3 - PDO	2	2 - Off Road Left	0	9 - Off Road Right	0	3 - Hail/Sleet	0	3 - Slush/Snow/Ice	1	3 - Darkness	0
		3 - Right Angle	0	10 - Head On	0	4 - Snow	0	4 - Loose Surface Material	0	99 - Unknown	0
		4 - Passing Left Turn	0	11 - Passing Right Turn	0	5 - Fog/Smog/Smoke/Dust	0	5 - Muddy	0		
		5 - Left Turn Across Path	0	12 - Sideswipe Same Direction	2	6 - High Wind	0	97 - Blank	1		
		6 - Sideswipe	0	13 - Backing	0	97 - Blank	1	98 - Other	0		
						98 - Other	0	99 - Unknown	0		
						99 - Unknown	0				

50 AVENUE - km 39.132 to km 39.248

Localized No.	Case Year	Case No.	Object No.	Police Service	In / Near	Place Name	On Highway (# & suffix - 999X)	At Intersection with Highway (999X)	On Street	At Intersection with Street	Not at Intersection Distance	Not at Intersection Direction	Not at Intersection km / metre	Not at Intersection Reference Point Description	Special Reference Location Description	Occurrence Date (ccyy/mm/dd)	Occurrence Hour (24 hour clock - hh:mm)	Collision Severity	Primary Event	Vehicle 1 Direction of Travel	Vehicle 2 Direction of Travel	Vehicle 1 Manoeuvre	Vehicle 2 Manoeuvre	Collision Type	Highway Number (999X)	Major Control Section	Safety Section	Kilometre Post	Environmental Condition	Surface Condition	Total Injuries	Total Fatalities	Natural Light Condition	Artificial Light Condition	Collision Description
1	2015	579548	1	3272	1	OLDS	27		50		0				INTERSECTION	2015-09-04	16.00	2	5	3	7	34	47	1	27	6		39.187	1	1	1	0	1	1	OBJECT2_LN(S) WAS DRIVING WB ON HWY 27. VEHICLE WITH FEMALE DRIVER WAS DRIVING EAST ON HWY 27 TURNED LEFT AT 50TH STREET IN FRONT OF OBJECT2_LN(S) AND OBJECT2_LN(S) SLAMMED ON HER BRAKES AND HIT HER. OBJECT2_L
2	2016	730825	1	3272	1	OLDS	27		50 AVENUE						HWY 27 & 50 AVENUE	2016-10-19	10.15	3	12	7	7	28	49	36	27	6		39.188	1	1	0	0	1	1	Object1_LN(N) was WB on Hwy 27 and 50 Street waiting to turn south. Object1_LN(N) was behind a truck when he moved forward into another lane and collided with Object2_LN(S). No injuries. Damage sticker issue
3	2014	2816431	1	3272	1	OLDS	27		50 ST		0				UKN	2014-02-19	17.00	3	8	3	3	45	47	28	27	6		39.188	1	1	0	0	1	1	D1 WAS EB ON HWY 27 STOPPED AT A RED LIGHT WHEN SHE WAS REAR ENDED BY D2 REVIEWED MINOR DAMAGE NO CHARGES
4	2016	669021	1	3265	1	OLDS	27		50 AVE						INTERSECTION	2016-04-20	17.17	2	5	3	7	34	47	1	27	6		39.189	1	1	1	0	1	1	911. Injury MVC. Motorcycle vs car. EMS attempted to transfer complainant reporting mvc but transfer failed. EMS and fire enroute. No further details at this time. @ems dispatch advising motorcycle rider is co
5	2014	2816421	1	3272	1	OLDS	27		50 AVE		0				46 ST	2014-03-12	13.00	3	8	3	3	45	28	28	27	6		39.190	1	3	0	0	1	1	OBJ1 WAS EB ON 46 ST AND STOPPED AT THE RED LIGHT SUDDENLY. OBJ2 WAS CHANGING LANES, TRIED TO BRAKE AND SLID ON THE ICE & GRAVEL, REAR ENDING OBJ1.
6	2014	421316	1	3272	1	OLDS	27		50 AVE		0					2014-06-06	15.47	3	3	5	7	86	47	8	27	6		39.192	1	1	0	0	1	1	OBJECT1_LN(B) PERFORMED IMPROPER RIGHT TURN FROM 50 AVENUE AND WEST HWY 27
7	2018	912694	1	3272	1	OLDS	27		50 AVENUE						*	2018-01-02	8.45	3	5	7	3	47	34	1	27	6		39.193	1	1	0	0	1	1	Driver 2 turned left in front od driver 1 and collided.
8	2016	755022	1	3265	1	OLDS	27								ENTRANCE TO OFF LEASH DOG PARK	2016-12-09	12.45	3	9	7		47		68	27	6		39.194	1	3	0	0	1	1	Driver attended the Olds detachment to report a collision. Driving West on 27, slowed down to turn into the dog park and slid into the fence post. No injuries. Damage sticker provided. Ecollision completed and

Severity		Primary Event				Environmental Condition		Surface Condition		Natural Light Condition	
1 - Fatal	0	1 - Struck Object (non-animal)	0	7 - Other	0	1 - Clear	8	1 - Dry	6	1 - Daylight	8
2 - Injury	2	1 - Animal	0	8 - Rear End	2	2 - Raining	0	2 - Wet	0	2 - Sun glare	0
3 - PDO	6	2 - Off Road Left	0	9 - Off Road Right	1	3 - Hail/Sleet	0	3 - Slush/Snow/Ice	2	3 - Darkness	0
		3 - Right Angle	1	10 - Head On	0	4 - Snow	0	4 - Loose Surface Material	0	99 - Unknown	0
		4 - Passing Left Turn	0	11 - Passing Right Turn	0	5 - Fog/Smog/Smoke/Dust	0	5 - Muddy	0		
		5 - Left Turn Across Path	3	12 - Sideswipe Same Direction	1	6 - High Wind	0	97 - Blank	0		
		6 - Sideswipe	0	13 - Backing	0	97 - Blank	0	98 - Other	0		
						98 - Other	0	99 - Unknown	0		
						99 - Unknown	0				

Between 50 AVENUE & 46 AVENUE

Localized No.	Case Year	Case No.	Object No.	Police Service	In / Near	Place Name	On Highway (# & suffix - 999X)	At Intersection with Highway (999X)	On Street	At Intersection with Street	Not at Intersection Distance	Not at Intersection Direction	Not at Intersection km / metre	Not at Intersection Reference Point Description	Special Reference Location Description	Occurrence Date (ccyy/mm/dd)	Occurrence Hour (24 hour clock - hh:mm)	Collision Severity	Primary Event	Vehicle 1 Direction of Travel	Vehicle 2 Direction of Travel	Vehicle 1 Manoeuvre	Vehicle 2 Manoeuvre	Collision Type	Highway Number (999X)	Major Control Section	Safety Section	Kilometre Post	Environmental Condition	Surface Condition	Total Injuries	Total Fatalities	Natural Light Condition	Artificial Light Condition	Collision Description
1	2014	431071	1	3272	1	OLDS	27		49 AVENUE		0					2014-07-21	17.15	3	5	7	3	47	34	1	27	6		39.301	1	1	0	0	1	1	D1 TRAVELLING OUTSIDE LANE WEST ON HWY 27. D2 COLLIDED WITH D1 TURNING NORTH FROM 49 AVENUE TO HEAD WEST ON HWY 27.
2	2014	478183	1	3272	1	OLDS	27				0				ON HIGHWAY 27 WB AT CORNER OF 46 STREET & 49 AVENUE	2014-12-02	15.20	3	8	7	7	47	45	28	27	6		39.303	1	3	0	0	1	1	D1 WAS PLAYING WITH HIS RADIO AND HE LOOKED UP TO FIND HE WAS APPROACHING THE BACK OF D2, HE HIT HIS BRAKES WHERE HIS ABS KICKED IN AND IT CAUSED D1 TO HIT D2'S REAR BUMPER. DAMAGE OVER $2000.00 ON D2'S VEHICL
3	2015	582150	1	3272	1	OLDS	27		47 AVE		0				TURNING LEFT OFF HWY 27	2015-09-05	20.47	3	8	3	3	45	47	28	27	6		39.567	1	1	0	0	1	1	OBJECT1_LN(R) WAS DRIVING EAST ON HWY 27 AND SLOWED TO TURN LEFT ONTO 47TH AVE. VEHICLE DRIVING BEHIND, REAR ENDED HER. NO INJURIES. DAMAGE STICKER #8235379 ISSUED TO OBJECT2_LN(M). OBJECT2_LN(M)'S CAR WAS NOT

Severity		Primary Event				Environmental Condition		Surface Condition		Natural Light Condition	
1 - Fatal	0	1 - Struck Object (non-animal)	0	7 - Other	0	1 - Clear	3	1 - Dry	2	1 - Daylight	3
2 - Injury	0	1 - Animal	0	8 - Rear End	2	2 - Raining	0	2 - Wet	0	2 - Sun glare	0
3 - PDO	3	2 - Off Road Left	0	9 - Off Road Right	0	3 - Hail/Sleet	0	3 - Slush/Snow/Ice	1	3 - Darkness	0
		3 - Right Angle	0	10 - Head On	0	4 - Snow	0	4 - Loose Surface Material	0	99 - Unknown	0
		4 - Passing Left Turn	0	11 - Passing Right Turn	0	5 - Fog/Smog/Smoke/Dust	0	5 - Muddy	0		
		5 - Left Turn Across Path	1	12 - Sideswipe Same Direction	0	6 - High Wind	0	97 - Blank	0		
		6 - Sideswipe	0	13 - Backing	0	97 - Blank	0	98 - Other	0		
						98 - Other	0	99 - Unknown	0		
						99 - Unknown	0				

Localized No.	Case Year	Case No.	Object No.	Police Service	In / Near	Place Name	On Highway (# & suffix - 999X)	At Intersection with Highway (999X)	On Street	At Intersection with Street	Not at Intersection Distance	Not at Intersection Direction	Not at Intersection km / metre	Not at Intersection Reference Point Description	Special Reference Location Description	Occurrence Date (ccyy/mm/dd)	Occurrence Hour (24 hour clock - hh:mm)	Collision Severity	Primary Event	Vehicle 1 Direction of Travel	Vehicle 2 Direction of Travel	Vehicle 1 Manoeuvre	Vehicle 2 Manoeuvre	Collision Type	Highway Number (999X)	Major Control Section	Safety Section	Kilometre Post	Environmental Condition	Surface Condition	Total Injuries	Total Fatalities	Natural Light Condition	Artificial Light Condition	Collision Description
HIGHWAY 2A - km 39.605 to km 39.950																																		
1	2014	446779	1	3272	1	OLDS	27	002A			0				UNK	2014-09-09	12.50	3	8	3	3	47	45	28	27	6	39.714	2	2	0	0	1	1	FRONT COUNTER REAR END REPORT. OBJECT1_LN(S) AND OBJECT2_LN(H) WERE EB ON HWY 27. OBJECT1_LN(S) WAS TURNING LEFT WHEN THE ARROW CHANGED TO YELLOW AND SHE STOPPED. OBJECT2_LN(H) WAS UNABLE TO STOP IN TIME AND
2	2014	458157	1	3272	1	OLDS	27	002A			0					2014-10-14	15.40	3	8	7	7	45	30	28	27	6	39.717	1	1	0	0	1	1	OBJECT3_LN(B) WAS STOPPED AT THE LIGHTS ON HWY 27 & 2A WAITING TO TURN LEFT. A SEMI WAS TURNING AND OBJECT3_LN(B) THOUGHT THE SEMI WOULD HIT HIS VEHICLE SO BACKED UP. ATKINSON-VANBRUNSHOT WAS BEHIND OBJECT3_L
3	2015	511165	1	3272	1	OLDS	27			46 AVENUE	0				HWY 27 & 46 AVE.	2015-01-25	21.05	3	8	3	3	47	45	28	27	6	39.717	1	1	0	0	3	2	OBJECT2_LN(M) WAS STOPPED ON HWY 27 AND 46 AVE, WHEN HE WAS REAR ENDED BY OBJECT1_LN(B). NO INJURIES. DAMAGE STICKER ISSUED TO OBJECT2_LN(M). STATEMENTS OBTAINED. ECOLLISION COMPLETED. CH
4	2014	457735	1	3272	1	OLDS	27	002A			0				2A & 27 INTERSECTION	2014-10-11	15.00	3	5	7	3	34	47	1	27	6	39.719	1	1	0	0	1	1	2 MVC COLLISION - NO INJURIES OBJECT1_(KD) WAS IN AN ACCIDENT ON HWY 27 & HWY 2A - NO INJURIES, BOTH VEHICLES ARE DRIVEABLE AND HAVE LEFT THE SCENE. DRIVERS WERE CALLING FROM THE PHONE AT THE DETACHMENT. 2006 H
5	2018	1003374	1	3272	1	OLDS	27	002A							*	2018-08-07	13.00	3	8	1	1	47	47	28	27	6	39.719	1	1	0	0	1	1	Driver 1 NB on 46 Ave., inched into the intersection and was rear-ended by Driver 2. No injuries.
6	2015	569069	1	3272	1	OLDS	27	002A			0				HWY 27 & 2A	2015-07-25	16.47	3	12	5	5	47	47	36	27	6	39.720	1	1	0	0	1	1	2 VEH MVC. NO INJURIES. EMS ON SCENE. VEHICLES DRIVEABLE. MEMBERS ATTENDED. NO INJURIES. EMS ATTENDED AS PRECAUTION FOR 2MTH OLD.
7	2015	620798	1	3272	1	OLDS	27	002A			0				INTERSECTION	2015-12-15	13.15	3	6	3	7	45	34	34	27	6	39.723	1	3	0	0	1	1	OBJECT1_LN(M) WAS DRIVING EB ON HWY 27 AND STOPPED AT THE LIGHT AT HWY 2A. OBJECT2_LN(H) WAS TURNING AND SLID INTO THE DRIVERS SIDE OF OBJECT1_LN(M). BOTH PARTIES ATTENDED OLDS DETACHMENT AND PROVIDED STATEMENT
8	2014	401984	1	3272	1	OLDS	27	002A			0				UNK	2014-04-16	16.45	3	5	7	3	47	34	1	27	6	39.724	1	1	0	0	1	1	OBJECT2_LN(E) WAS WB ON HWY 27 WHEN OBJECT1_LN(M), TRAVELLING EB TURNED NORTH IN FRONT OF OBJECT2_LN(E) AND WAS STRUCK. NO INJURIES. DAMAGE STICKERS ISSUED. ECOLLISION AND STATEMENTS OBTAINED.
9	2014	315969	1	3265	1	OLDS	27				100	E	M	2A	100 METRES EAST OF HIGHWAY 2A	2014-02-18	18.50	3	12	3	3	20	47	36	27	6	39.825	1	1	0	0	3	2	OBJECT1_LN(C) EASTBOUND ON HIGHWAY 27 IN THE TOWN OF OLDS. OBJECT1_LN(C) IN THE NORTH LANE OF TWO EASTBOUND LANES. THE NORTH LANE EVENTUALLY MERGED INTO THE SOUTH LANE TO FORM ONE EASTBOUND LANE. OBJECT1_LN(C)
10	2017	844494	1	3272	1	OLDS	27								NEAR 46 STREET	2017-07-14	8.56	3	12	3	3	28	47	36	27	6	39.950	1	1	0	0	1	1	Driver 1 was changing lanes from the left lane to the right lane and did not see driver 2 beside her and they collided.
11	2014	448705	1	3272	1	OLDS	002A	27			0				INTERSECTION OF HWY 27 AND HWY 2A	2014-09-09	17.45	2	8	3	3	47	47	28	002A	14	14.566	3	2	1	0	1	1	HEADING EAST ON HWY 27. D2 ACCELERATED TOO QUICKLY AND COULDN'T STOP IN TIME TO AVOID IMPACT.
12	2018	1054865	1	3272	1	OLDS	002A	27								2018-12-11	12.45	2	5	7	3	34	47	1	002A	14	14.572	1	1	1	0	1	1	DRIVER WB ON HWY 27 ATTEMPTING LEFT TURN ONTO HWY 2A. BROWN TRUCK BEHIND OPPOSITE VEHICLE ATTEMPTING RIGHT TURN ONTO HWY 2A WENT INTO RIGHT LANE, PROCEEDED EB THROUGH YELLOW LIGHT STRIKING REPORTING DRIVER.BUT
13	2015	514718	1	3272	1	OLDS	002A	27			0				INTERSECTION 2A & 27	2015-02-24	19.10	3	5	5	1	47	34	1	002A	14	14.576	1	1	0	0	3	2	OBJECT1_LN(R) WAS SB ON 2A GOING THROUGH THE GREEN LIGHT WHEN OBJECT2_LN(J) ATTEMPTED TO TURN LEFT. OBJECT1_LN(R) TRIED TO STOP BUT COLLIDED WITH OBJECT2_LN(J). NO INJURIES. DAMAGE STICKERS ISSUED. STATEMEN
14	2015	548830	1	3265	1	OLDS	002A	27			0					2015-05-28	14.00	3	8	3	3	97	95	28	002A	14	14.576	1	1	0	0	1	1	OBJECT 1 FOLLOWING BEHIND OBJECT 2. DRIVER 1 EXPECTED THAT THE TRUCK WOULD GO THROUGH THE YELLOW TRAFFIC LIGHT, BUT ENDED UP STOPPING SUDDENLY, CAUSING OBJECT 1 TO REAR-END OBJECT 2. DRIVER 1 SAYS THAT DRIVER 2
15	2014	413139	1	3272	1	OLDS	002A	27			0					2014-05-03	22.15	3	8	3	3	34	47	28	002A	14	14.577	4	3	0	0	1	1	OBJECT2_LN(N) WAS EB ON 46 ST. AND WAS TURNING NORTH ONTO HWY 2A WHEN HE WAS REAR-ENDED BY OBJECT1_LN(W). BAD SNOW STORM THAT DAY. OBJECT2_LN(N) HAD NO BRAKE LIGHTS. NO INJURIES. DAMAGE STICKER ISSUED. ECO
16	2014	439399	1	3272	1	OLDS	002A	27			0					2014-08-15	10.29	3	7	3	1	49	48	99	002A	14	14.577	1	1	0	0	1	1	911- MVC. INTERSECTION OF HWY 27 & 2A. WITNESS1_LN(C) IS JUST A WITNESS. NO INJURIES. VEHICLES DRIVEABLE. NOT BLOCKING TRAFFIC, NO FLUIDS, NO HAZARDOUS GOODS. NO DRUGS/ALCOHOL AS FAR AS WITNESS1_LN(C) CAN TEL
17	2017	821614	1	3265	1	OLDS	002A	27							STOP	2017-05-23	8.20	3	13	7	7	45	30	28	002A	14	14.577	1	1	0	0	1	1	Driver 1 attended the olds detachment to report a collision. He was stopped at the 4way when the truck in front of him reversed into his front bumper. No injuries. Damage sticker issued.
18	2016	715165	1	3272	1	OLDS	002A	27							4OM EAST OF INTERSECTION	2016-09-06	15.30	3	8	3	3	47	45	28	002A	14	14.578	1	1	0	0	1	1	Object1_LN(R) attended the Olds detachment to report a collision. While travelling EB on Hwy 27, he was rear ended when approaching the intersection at Hwy 2A when traffic came to an abrupt stop.Damage sticker
19	2018	943178	1	3265	2	OLDS	002A	27							*	2018-02-24	10.45	3	7	3	3	47	32	38	002A	14	14.578	1	1	0	0	1	1	Driver 1 was EB on Hwy 27 when Driver 2, who was trying to get back on Hwy 2, made a U-turn in front of her and they collided. No injuries.

Localized No.	Case Year	Case No.	Object No.	Police Service	In / Near	Place Name	On Highway (# & suffix - 999X)	At Intersection with Highway (999X)	On Street	At Intersection with Street	Not at Intersection Distance	Not at Intersection Direction	Not at Intersection km / metre	Not at Intersection Reference Point Description	Special Reference Location Description	Occurrence Date (ccyy/mm/dd)	Occurrence Hour (24 hour clock - hh:mm)	Collision Severity	Primary Event	Vehicle 1 Direction of Travel	Vehicle 2 Direction of Travel	Vehicle 1 Manoeuvre	Vehicle 2 Manoeuvre	Collision Type	Highway Number (999X)	Major Control Section	Safety Section	Kilometre Post	Enviromental Condition	Surface Condition	Total Injuries	Total Fatalities	Natural Light Condition	Artificial Light Condition	Collision Description
20	2016	691587	1	3272	1	OLDS	002A	27								2016-07-02	14.00	3	8	5	5	47	45	28	002A	14		14.579	1	1	0	0	1	1	Object1_LN(G) attended Blackfalds Det to report that he had been involved in a collision while traveling south through Olds at the intersection of hwy 27 & 2A. Object1_LN(G) was pulling his RV and the vehicle
21	2016	695947	1	3272	1	OLDS	002A	27							HWY 27 & 46 AVE.	2016-07-14	8.25	2	8	3	3	47	47	28	002A	14		14.579	1	1	3	0	1	1	MVC - minor injuries. 911 EMS en route. 46 Ave. & Hwy 27. Black Toyota Matrix rear-ended by a Lincoln Town Car. Possibly drivable. Blocking traffic. No fluid, smoke or flames. Daughter seems to have sore neck.
22	2017	769164	1	3272	1	OLDS	002A	27							STOPPED AT INTERSECTION	2017-01-11	6.30	3	13	1	1	45	30	28	002A	14		14.579	1	3	0	0	3	2	Driver #1 attended the Olds detachment and reported a collision. While stopped at the lights, the truck in front of him (Driver #2)started backing up. Driver #1 honked his horn but the truck backed in to his fr
23	2017	797719	1	3272	1	OLDS	002A	27							*	2017-03-15	15.45	3	11	1	1	36	10	36	002A	14		14.579	1	1	0	0	1	1	Driver 1 Semi was turning right taking a wide turn when Driver 2 was gong straight in the right lane and collided with Semi.
24	2017	844486	1	3265	1	OLDS	002A	27								2017-07-17	13.45	2	8	1	1	34	47	28	002A	14		14.579	1	1	1	0	1	1	Object 1 travelling north on Hwy 2A, waiting at intersection to make a left hand turn onto Hwy 27. Object 2, also travelling north on Hwy 2A, came from behind and rear ended Object 1.
25	2014	2816415	1	3272	1	OLDS	002A	27			0					2014-03-12		3	5	7	3	34	47	1	002A	14		14.579	1	1	0	0	1	1	V1 WB TURNING SBON HWY 2A V2 EB HWY 27 V1 TURNED IN FRONT V2 CAUSING COLLISION.
26	2014	382595	1	3272	1	OLDS	002A	27			0					2014-03-31	16.30	3	8	5	5	45	30	28	002A	14		14.580	1	1	0	0	1	1	OBJECT1_LN(P) WAS TRAVELLING SOUTH ON HWY 2A STOPPED BEHIND A TRACTOR TRAILER ON HWY 27. WHILE PARKED, THE TRACTOR TRAILER BACKED UP AND COLLIDED WITH OBJECT1_LN(P) DAMAGING THE GRILL OF HIS TRUCK. NO INJURIE
27	2014	1395731	1	3272	1	OLDS	002A	27			0				UNK	2014-05-27	16.50	3	5	5	1	47	34	1	002A	14		14.580	1	1	0	0	1	1	V2 NB HWY 2A, TURNED WEST ON HWY 27. V1 SB HWY 2A, IN RT TURN ONLY LANE, PROCEEDED STRAIGHT STRAIGHT THROUGH AND STRUCK V2.
28	2015	556740	1	3272	2	OLDS	002A	27			0				INTERSECTION OF 2A AND 27 HWYS	2015-06-10	14.58	3	9	5	5	47	49	48	002A	14		14.582	1	1	0	0	1	1	REPORT OF HIT AND RUN, DRK COLOR, POSS GRN OLDER CHEV OR GMC TRUCK, NO MARKER OBTAINED, LIGHT DAMAGE ON PASS SIDE BOX, MALE DRIVER, 2 MALE PASSENGERS, CALLER'S SEMI WAS HIT BY TRUCK AND IT TOOK OFF, CALLER'S VE
29	2017	882470	1	3272	1	OLDS	002A	27							*	2017-11-01	8.36	2	8	3	3	47	49	28	002A	14		14.591	4	3	1	0	1	1	Driver 1 EB approaching red light at Hwy 27, rear-ended Driver 2. Roads very slippery. Driver 2 minor injuries. Statements obtained. Damage stickers issued.

Severity		Primary Event			
1 - Fatal	0	1 - Struck Object (non-animal)	0	7 - Other	2
2 - Injury	5	1 - Animal	0	8 - Rear End	13
3 - PDO	24	2 - Off Road Left	0	9 - Off Road Right	1
		3 - Right Angle	0	10 - Head On	0
		4 - Passing Left Turn	0	11 - Passing Right Turn	1
		5 - Left Turn Across Path	6	12 - Sideswipe Same Direction	3
		6 - Sideswipe	1	13 - Backing	2

Environmental Condition		Surface Condition		Natural Light Condition	
1 - Clear	25	1 - Dry	23	1 - Daylight	25
2 - Raining	1	2 - Wet	2	2 - Sun glare	0
3 - Hail/Sleet	1	3 - Slush/Snow/Ice	4	3 - Darkness	4
4 - Snow	2	4 - Loose Surface Material	0	99 - Unknown	0
5 - Fog/Smog/Smoke/Dust	0	5 - Muddy	0		
6 - High Wind	0	97 - Blank	0		
97 - Blank	0	98 - Other	0		
98 - Other	0	99 - Unknown	0		
99 - Unknown	0				

ROADWAY ASSESSMENT - BREAKDOWN

Control Section									Total Collisions	Collision Rate (100 MVKm/yr)	Provincial Average Rate (100 MVKm/yr) (Undivided 001-499)	Fatal Collisions - ALL			Injury Collisions - ALL			PDO Collisions - ALL		
No.	CS	TCS	Segment	Segment Description	WAADT 2018	From	To	Length				Total Number	Calc. Rate	Prov. Rate	Total Number	Calc. Rate	Prov. Rate	Total Number	Calc. Rate	Prov. Rate
27	06	6	E of 70 Ave to W of Hwy 2A	Town of Olds	11,680	36.182	39.950	3.768	72	89.64	91.03	0	0.00	0.98	13	16.19	12.86	59	73.46	77.19

Control Section									Total Collisions	Primary Event													
No.	CS	TCS	Segment	Segment Description	WAADT 2018	From	To	Length		Animal	Struck Object	Off Road Left	Right Angle	Passing Left Turn	Left Turn Across Path	Sideswipe - Opposite	Other	Rear End	Off Road Right	Head On	Passing Right Turn	Sideswipe - Same	Backing
27	06	6	E of 70 Ave to W of Hwy 2A	Town of Olds	11,680	36.182	39.950	3.768	72	6	1	3	5	0	14	2	0	28	2	0	0	11	0
										8.3%	*1.4%*	*4.2%*	*6.9%*	*0.0%*	*19.4%*	*2.8%*	*0.0%*	*38.9%*	*2.8%*	*0.0%*	*0.0%*	*15.3%*	*0.0%*

Note: only includes those collisions referenced to Hwy 27 and not intersecting routes (i.e. Hwy 2A:14)

Date: 2021/12/15

Time: 12:54

Alberta Transportation
Annual Provincial Highway Rates

Report year 2018

Highway 001 - 499

			Fatal Collisions				Injury Collisions			PDO Collisions		Total	
	Length	100 MVKM	NBR	Rate	#FAT	#INJ	NBR	Rate	#Inj	NBR	Rate	NBR	Rate
GRAVEL	256.651	0.3466	0	0	0	0	8	23.08	12	37	106.75	45	129.83
UNDIVIDED	10891.583	86.9973	85	0.98	105	94	1119	12.86	1575	6715	77.19	7919	91.03
DIVIDED	2508.212	123.9874	38	0.31	45	34	1248	10.07	1800	5026	40.54	6312	50.91
Grand Total	13656.446	211.3313	123	0.58	150	128	2375	11.24	3387	11778	55.73	14276	67.55

Highway 500 - 999

			Fatal Collisions				Injury Collisions			PDO Collisions		Total	
	Length	100 MVKM	NBR	Rate	#FAT	#INJ	NBR	Rate	#Inj	NBR	Rate	NBR	Rate
GRAVEL	2843.821	1.364	0	0	0	0	22	16.13	34	149	109.24	171	125.37
UNDIVIDED	11841.183	38.4087	32	0.83	41	25	546	14.22	750	3842	100.03	4420	115.08
DIVIDED	29.741	0.8547	0	0	0	0	32	37.44	42	97	113.49	129	150.93
Grand Total	14714.745	40.6274	32	0.79	41	25	600	14.77	826	4088	100.62	4720	116.18

ALBERTA COLLISION DATA DICTIONARY -TSS284 & TSS284A

IMPORTANT NOTE:
The file contains one line of information for each collision unless the **lighting** information has been requested then there is one line of information for each **object** involved in the collision. Each object is identified by the unique case year/collision case number/object number combination. In order to count the number of **collisions** from this file count only the first occurrence of the unique case year/case number combination (columns 1 - 12).

COLLISION INFORMATION

1-4	case year
5-12	case number
13-15	object number (only available when lighting selected)
16-19	police service
20	in/near
21-28	place name
29-32	on highway (# & suffix - 999X)
33-36	at intersection with highway (999X)
37-66	on street
67-96	at intersection with street
97-102	not at intersection distance (6.2)
103-104	not at intersection direction
105	not at intersection km/metre
106-130	not at intersection reference point description
131-190	special reference location description
191-200	occurrence date (ccyy/mm/dd)
201-205	occurrence hour (24 hour clock – hh:mm)
206	collision severity
207-208	primary event
209-210	vehicle 1 direction of travel
211-212	vehicle 2 direction of travel
213-214	vehicle 1 manouever
215-216	vehicle 2 manouever
217-218	collision type
219-222	highway number (999X)
223-225	major control section
226-228	[blank]
229-236	kilometre post (8.4)
237-238	environmental condition (investigated forms only – will not be present for collision case numbers beginning with 'Z')
239-240	surface condition (investigated form only –will not be present for collision case numbers beginning with 'Z')

241-244 total injuries
245-248 total fatalities
249-250 natural light condition (if lighting selected)
251-252 artificial light condition (if lighting selected)
253-473 collision description

ALBERTA COLLISION REPORT FORM - TSS284/TSS284A
CODE DEFINITIONS

(Please note that throughout the code 97 identifies missing information)

OCCURRENCE MONTH

01 = January
02 = February
03 = March
04 = April
05 = May
06 = June
07 = July
08 = August
09 = September
10 = October
11 = November
12 = December

OCCURRENCE TIME

24 hr clock

COLLISION SEVERITY

01 = Fatal
02 = Injury
03 = Property Damage

PRIMARY EVENT

01 = Struck Object
02 = Off Road Left
03 = Right Angle
04 = Passing - Left Turn
05 = Left Turn - Across Path
06 = Sideswipe
07 = Other
08 = Rear End
09 = Off Road Right
10 = Head On

11 = Passing Right Turn
12 = Sideswipe - Same Direction
13 = Backing

VEHICLE DIRECTION OF TRAVEL

01 = Northbound
02 = Northeastbound
03 = Eastbound
04 = Southeastbound
05 = Southbound
06 = Southwestbound
07 = Westbound
08 = Northwestbound
09 = Unknown

VEHICLE MANEUVER

01= Post-Collision Maneuver
05 = Parked
10 = Passing Maneuver
15 = Being Passed
20 = Merging
22 = Diverging
24 = Avoiding A Vehicle
26 = Avoiding Other Objects
28 = Other Lane - Changing Maneuver
30 = Backing
32 = Making A U-Turn
34 = Making A Left Turn
36 = Making A right Turn
45 = Stopped/Stopping in Traffic
47 = Moving Ahead
48 = Unusual Maneuver
49 = Unknown
51 = Post-Collision Maneuver
55 = Parked
60 = Passing Maneuver
65 = Being Passed
70 = Merging
72 = Diverging
74 = Avoiding A Vehicle
76 = Avoiding Other Objects
78 = Other Lane - Changing Maneuver
80 = Backing
82 = Making A U-Turn

84 = Making A Left Turn
86 = Making A Right Turn
95 = Stopping/Stopped In Traffic
97 = Moving Ahead
98 = Unusual Maneuver
99 = Unknown

COLLISION TYPE

Angle
01 = left turn across path
02 = passing on left turn
08 = all others

Head-on
11 = cross through median
12 = wrong way on one-way
18 = all others

Rear-end
21 = parked vehicle
28 = all others

Sideswipe
31 = cross through median
32 = wrong way on one-way
33 = parked vehicle
34 = opposite direction sideswipe
36 = same direction sideswipe
38 = all others

Run-off-road-only
41 = left/median side
42 = 'T' intersection
48 = all others

Run-off-road and overturn
51 = left/median side
52 = 'T' Intersection
58 = all others

Run-off-road and strike fixed object
61 = left/median side
62 = 'T' intersection
68 = all others

Run-off-road and strike fixed object and overturn
71 = left/median side
72 = 'T' intersection
78 = all others

Miscellaneous
90 = pedestrian

91 = over turn on roadway
92 = strike fixed object while traveling on roadway
93 = strike non-fixed object on roadway (include trains)
94 = strike animal
97 = multi-vehicle collision off roadway
98 = others
99 = unknown

ENVIRONMENTAL CONDITION

01 = Clear
02 = Raining
03 = Hail/Sleet
04 = Snow
05 = Fog/Smog/Smoke/Dust
06 = High Wind
97 = Blank
98 = Other
99 = Unknown

SURFACE CONDITION

01 = Dry
02 = Wet
03 = Slush/Snow/Ice
04 = Loose Surface Material
05 = Muddy
97 = Blank
98 = Other
99 = Unknown

NATURAL LIGHT CONDITION (if selected)

01 = Daylight
02 = Sun glare
03 = Darkness
99 = Unknown

ARTIFICIAL LIGHT CONDITION (if selected)

01 = No artificial light
02 = Artificial light
99 = Unknown

D

Appendix D
Synchro 11 Analysis

Lanes, Volumes, Timings
23: 70 Avenue & Highway 27

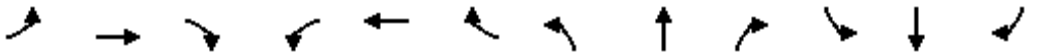
01-05-2024

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	10	220	10	40	190	30	10	10	50	30	10	10
Future Volume (vph)	10	220	10	40	190	30	10	10	50	30	10	10
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (m)	75.0		0.0	70.0		70.0	45.0		0.0	50.0		0.0
Storage Lanes	1		0	1		1	1		0	1		0
Taper Length (m)	40.0			45.0			30.0			45.0		
Satd. Flow (prot)	1805	3333	0	1626	3282	1324	1805	1532	0	1719	1758	0
Flt Permitted	0.615			0.549			0.743			0.713		
Satd. Flow (perm)	1168	3333	0	940	3282	1324	1412	1532	0	1290	1758	0
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)		4				95		57			11	
Link Speed (k/h)		60			60			50			50	
Link Distance (m)		228.6			411.6			170.2			183.8	
Travel Time (s)		13.7			24.7			12.3			13.2	
Peak Hour Factor	0.87	0.87	0.87	0.87	0.87	0.87	0.87	0.87	0.87	0.87	0.87	0.87
Heavy Vehicles (%)	0%	8%	0%	11%	10%	22%	0%	0%	10%	5%	0%	0%
Shared Lane Traffic (%)												
Lane Group Flow (vph)	11	264	0	46	218	34	11	68	0	34	22	0
Enter Blocked Intersection	No	No	No	No	No	No	No	No	No	No	No	No
Lane Alignment	Left	Left	Right	Left	Left	Right	Left	Left	Right	Left	Left	Right
Median Width(m)		5.6			5.6			3.6			3.6	
Link Offset(m)		0.0			0.0			0.0			0.0	
Crosswalk Width(m)		4.8			4.8			4.8			4.8	
Two way Left Turn Lane												
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Turning Speed (k/h)	25		15	25		15	25		15	25		15
Turn Type	pm+pt	NA		pm+pt	NA	Perm	Perm	NA		Perm	NA	
Protected Phases	5	2		1	6			8			4	
Permitted Phases	2			6		6	8			4		
Total Split (s)	26.0	52.0		26.0	52.0	52.0	37.0	37.0		37.0	37.0	
Total Lost Time (s)	6.0	7.0		6.0	7.0	7.0	7.0	7.0		7.0	7.0	
Act Effct Green (s)	39.7	36.5		42.0	41.4	41.4	12.2	12.2		12.2	12.2	
Actuated g/C Ratio	0.62	0.57		0.66	0.65	0.65	0.19	0.19		0.19	0.19	
v/c Ratio	0.01	0.14		0.07	0.10	0.04	0.04	0.20		0.14	0.06	
Control Delay	5.0	10.7		5.2	7.7	0.1	23.4	10.9		24.9	17.0	
Queue Delay	0.0	0.0		0.0	0.0	0.0	0.0	0.0		0.0	0.0	
Total Delay	5.0	10.7		5.2	7.7	0.1	23.4	10.9		24.9	17.0	
LOS	A	B		A	A	A	C	B		C	B	
Approach Delay		10.5			6.4			12.7			21.8	
Approach LOS		B			A			B			C	
Queue Length 50th (m)	0.5	10.8		2.0	5.4	0.0	1.2	1.2		3.8	1.2	
Queue Length 95th (m)	1.9	17.3		5.1	14.8	0.0	4.9	10.2		10.6	6.5	
Internal Link Dist (m)		204.6			387.6			146.2			159.8	
Turn Bay Length (m)	75.0			70.0		70.0	45.0			50.0		
Base Capacity (vph)	994	2391		855	2353	976	675	762		616	846	
Starvation Cap Reductn	0	0		0	0	0	0	0		0	0	
Spillback Cap Reductn	0	0		0	0	0	0	0		0	0	
Storage Cap Reductn	0	0		0	0	0	0	0		0	0	

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Reduced v/c Ratio	0.01	0.11		0.05	0.09	0.03	0.02	0.09		0.06	0.03	

Intersection Summary			
Area Type:	Other		
Cycle Length: 115			
Actuated Cycle Length: 63.6			
Control Type: Semi Act-Uncoord			
Maximum v/c Ratio: 0.20			
Intersection Signal Delay: 9.9		Intersection LOS: A	
Intersection Capacity Utilization 49.2%		ICU Level of Service A	
Analysis Period (min) 15			

Splits and Phases: 23: 70 Avenue & Highway 27

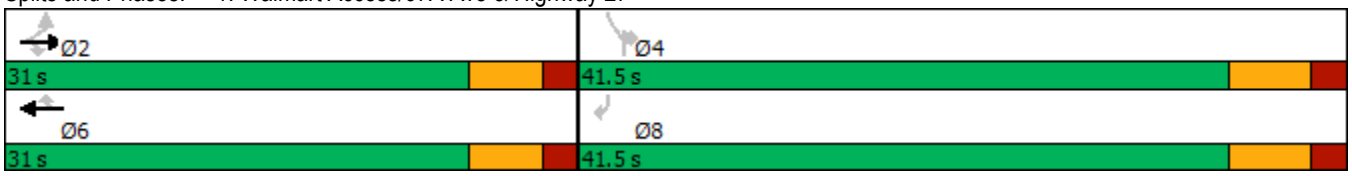


Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	90	200	10	0	200	150	0	0	10	80	0	60
Future Volume (vph)	90	200	10	0	200	150	0	0	10	80	0	60
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (m)	80.0		30.0	80.0		30.0	0.0		30.0	0.0		30.0
Storage Lanes	1		1	0		1	0		0	1		1
Taper Length (m)	60.0			80.0			7.5			7.5		
Satd. Flow (prot)	1787	3312	1615	0	3223	1568	0	0	1644	1703	0	1538
Flt Permitted	0.616									0.950		
Satd. Flow (perm)	1159	3312	1615	0	3223	1568	0	0	1621	1699	0	1538
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)			53			163			486			65
Link Speed (k/h)		60			60			50			50	
Link Distance (m)		411.6			406.1			117.8			163.6	
Travel Time (s)		24.7			24.4			8.5			11.8	
Confl. Peds. (#/hr)									2	2		
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Heavy Vehicles (%)	1%	9%	0%	0%	12%	3%	0%	0%	0%	6%	0%	5%
Shared Lane Traffic (%)												
Lane Group Flow (vph)	98	217	11	0	217	163	0	0	11	87	0	65
Enter Blocked Intersection	No	No	No	No	No	No	No	No	No	No	No	No
Lane Alignment	Left	Left	Right	Left	Left	Right	Left	Left	Right	Left	Left	Right
Median Width(m)		6.1			6.1			3.6			3.6	
Link Offset(m)		0.0			0.0			0.0			0.0	
Crosswalk Width(m)		4.8			4.8			4.8			4.8	
Two way Left Turn Lane												
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Turning Speed (k/h)	25		15	25		15	25		15	25		15
Turn Type	Perm	NA	Perm		NA	Perm			Perm	Perm		Perm
Protected Phases		2			6							
Permitted Phases	2		2			6			4	4		8
Total Split (s)	31.0	31.0	31.0		31.0	31.0			41.5	41.5		41.5
Total Lost Time (s)	6.0	6.0	6.0		6.0	6.0			6.5	6.5		6.5
Act Effct Green (s)	25.0	25.0	25.0		25.0	25.0			35.0	35.0		35.0
Actuated g/C Ratio	0.34	0.34	0.34		0.34	0.34			0.48	0.48		0.48
v/c Ratio	0.25	0.19	0.02		0.20	0.25			0.01	0.11		0.08
Control Delay	19.1	17.2	0.1		17.3	4.3			0.0	10.7		3.3
Queue Delay	0.0	0.0	0.0		0.0	0.0			0.0	0.0		0.0
Total Delay	19.1	17.2	0.1		17.3	4.3			0.0	10.7		3.3
LOS	B	B	A		B	A			A	B		A
Approach Delay		17.2			11.7						7.6	
Approach LOS		B			B						A	
Queue Length 50th (m)	9.9	11.3	0.0		11.3	0.0			0.0	6.4		0.0
Queue Length 95th (m)	21.2	18.8	0.0		19.0	11.7			0.0	13.7		5.7
Internal Link Dist (m)		387.6			382.1			93.8			139.6	
Turn Bay Length (m)	80.0		30.0			30.0			30.0			30.0
Base Capacity (vph)	399	1142	591		1111	647			1033	820		776
Starvation Cap Reductn	0	0	0		0	0			0	0		0
Spillback Cap Reductn	0	0	0		0	0			0	0		0

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Storage Cap Reductn	0	0	0		0	0			0	0		0
Reduced v/c Ratio	0.25	0.19	0.02		0.20	0.25			0.01	0.11		0.08

Intersection Summary			
Area Type:	Other		
Cycle Length: 72.5			
Actuated Cycle Length: 72.5			
Control Type: Semi Act-Uncoord			
Maximum v/c Ratio: 0.25			
Intersection Signal Delay: 12.9		Intersection LOS: B	
Intersection Capacity Utilization 41.1%		ICU Level of Service A	
Analysis Period (min) 15			

Splits and Phases: 1: Walmart Access/67A Ave & Highway 27

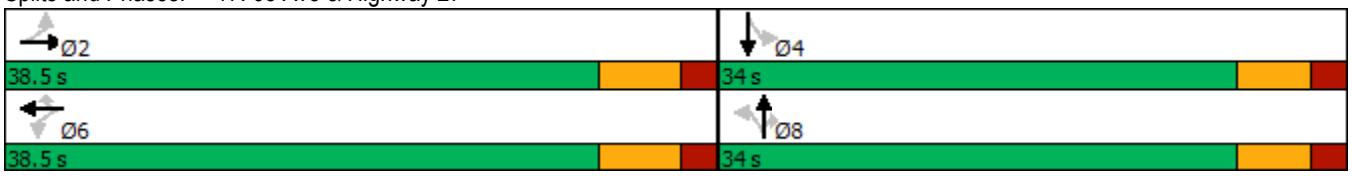


Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	30	200	60	60	240	90	80	50	50	70	40	30
Future Volume (vph)	30	200	60	60	240	90	80	50	50	70	40	30
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (m)	80.0		0.0	70.0		25.0	0.0		25.0	0.0		0.0
Storage Lanes	1		0	1		1	0		1	1		0
Taper Length (m)	30.0			50.0			7.5			7.5		
Satd. Flow (prot)	1671	3221	0	1736	3312	1553	0	1787	1583	1641	1555	0
Flt Permitted	0.591			0.579				0.767		0.667		
Satd. Flow (perm)	1036	3221	0	1058	3312	1514	0	1404	1583	1152	1555	0
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)		65				98			54		33	
Link Speed (k/h)		60			60			50			50	
Link Distance (m)		406.1			805.5			80.7			74.7	
Travel Time (s)		24.4			48.3			5.8			5.4	
Confl. Peds. (#/hr)	4					4	13					13
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Heavy Vehicles (%)	8%	10%	2%	4%	9%	4%	2%	5%	2%	10%	4%	25%
Shared Lane Traffic (%)												
Lane Group Flow (vph)	33	282	0	65	261	98	0	141	54	76	76	0
Enter Blocked Intersection	No	No	No	No	No	No	No	No	No	No	No	No
Lane Alignment	Left	Left	Right	Left	Left	Right	Left	Left	Right	Left	Left	Right
Median Width(m)		6.1			6.1			5.6			5.6	
Link Offset(m)		0.0			0.0			0.0			0.0	
Crosswalk Width(m)		4.8			4.8			4.8			4.8	
Two way Left Turn Lane												
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Turning Speed (k/h)	25		15	25		15	25		15	25		15
Turn Type	Perm	NA		Perm	NA	Perm	Perm	NA	Perm	Perm	NA	
Protected Phases		2			6			8			4	
Permitted Phases	2			6		6	8		8	4		
Total Split (s)	38.5	38.5		38.5	38.5	38.5	34.0	34.0	34.0	34.0	34.0	
Total Lost Time (s)	6.5	6.5		6.5	6.5	6.5		6.0	6.0	6.0	6.0	
Act Effct Green (s)	19.6	19.6		19.6	19.6	19.6		12.1	12.1	12.1	12.1	
Actuated g/C Ratio	0.50	0.50		0.50	0.50	0.50		0.31	0.31	0.31	0.31	
v/c Ratio	0.06	0.17		0.12	0.16	0.12		0.32	0.10	0.21	0.15	
Control Delay	8.6	6.7		9.2	8.4	3.1		13.2	4.5	12.1	7.6	
Queue Delay	0.0	0.0		0.0	0.0	0.0		0.0	0.0	0.0	0.0	
Total Delay	8.6	6.7		9.2	8.4	3.1		13.2	4.5	12.1	7.6	
LOS	A	A		A	A	A		B	A	B	A	
Approach Delay		6.9			7.3			10.8			9.9	
Approach LOS		A			A			B			A	
Queue Length 50th (m)	1.4	5.0		2.9	6.1	0.0		7.5	0.0	3.9	2.1	
Queue Length 95th (m)	5.2	10.8		8.7	11.9	6.0		17.7	5.0	11.0	8.4	
Internal Link Dist (m)		382.1			781.5			56.7			50.7	
Turn Bay Length (m)	80.0			70.0		25.0			25.0			
Base Capacity (vph)	850	2654		868	2718	1260		1008	1151	827	1125	
Starvation Cap Reductn	0	0		0	0	0		0	0	0	0	
Spillback Cap Reductn	0	0		0	0	0		0	0	0	0	

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Storage Cap Reductn	0	0		0	0	0		0	0	0	0	
Reduced v/c Ratio	0.04	0.11		0.07	0.10	0.08		0.14	0.05	0.09	0.07	

Intersection Summary			
Area Type:	Other		
Cycle Length: 72.5			
Actuated Cycle Length: 39			
Control Type: Semi Act-Uncoord			
Maximum v/c Ratio: 0.32			
Intersection Signal Delay: 8.1		Intersection LOS: A	
Intersection Capacity Utilization 56.2%		ICU Level of Service B	
Analysis Period (min) 15			

Splits and Phases: 17: 65 Ave & Highway 27

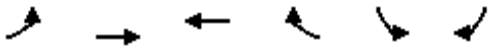


Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	40	280	110	50	300	70	80	50	80	80	70	70
Future Volume (vph)	40	280	110	50	300	70	80	50	80	80	70	70
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (m)	90.0		0.0	30.0		0.0	0.0		10.0	0.0		10.0
Storage Lanes	1		0	1		0	0		1	0		1
Taper Length (m)	40.0			30.0			7.5			7.5		
Satd. Flow (prot)	1703	3262	0	1752	3316	0	0	1796	1568	0	1793	1538
Flt Permitted	0.479			0.461				0.748			0.783	
Satd. Flow (perm)	859	3262	0	850	3316	0	0	1385	1568	0	1441	1538
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)		71			34				81			72
Link Speed (k/h)		50			50			50			50	
Link Distance (m)		805.5			697.8			130.8			121.6	
Travel Time (s)		58.0			50.2			9.4			8.8	
Peak Hour Factor	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94
Heavy Vehicles (%)	6%	8%	1%	3%	6%	5%	3%	2%	3%	6%	0%	5%
Shared Lane Traffic (%)												
Lane Group Flow (vph)	43	415	0	53	393	0	0	138	85	0	159	74
Enter Blocked Intersection	No	No	No	No	No	No	No	No	No	No	No	No
Lane Alignment	Left	Left	Right	Left	Left	Right	Left	Left	Right	Left	Left	Right
Median Width(m)		6.1			6.1			0.0			0.0	
Link Offset(m)		0.0			0.0			0.0			0.0	
Crosswalk Width(m)		4.8			4.8			4.8			4.8	
Two way Left Turn Lane												
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Turning Speed (k/h)	25		15	25		15	25		15	25		15
Turn Type	pm+pt	NA		pm+pt	NA		Perm	NA	Perm	Perm	NA	Perm
Protected Phases	5	2		1	6			8			4	
Permitted Phases	2			6			8		8	4		4
Total Split (s)	19.0	38.0		19.0	38.0		34.5	34.5	34.5	34.5	34.5	34.5
Total Lost Time (s)	4.0	5.0		4.0	5.0			4.5	4.5		4.5	4.5
Act Effct Green (s)	49.0	33.0		49.0	33.0			30.0	30.0		30.0	30.0
Actuated g/C Ratio	0.54	0.36		0.54	0.36			0.33	0.33		0.33	0.33
v/c Ratio	0.07	0.34		0.09	0.32			0.30	0.15		0.34	0.13
Control Delay	8.8	18.4		8.9	20.1			25.3	6.5		25.8	6.5
Queue Delay	0.0	0.0		0.0	0.0			0.0	0.0		0.0	0.0
Total Delay	8.8	18.4		8.9	20.1			25.3	6.5		25.8	6.5
LOS	A	B		A	C			C	A		C	A
Approach Delay		17.5			18.8			18.1			19.6	
Approach LOS		B			B			B			B	
Queue Length 50th (m)	3.2	23.6		4.0	24.7			18.9	0.5		22.1	0.3
Queue Length 95th (m)	7.7	35.9		8.9	36.7			34.6	10.6		39.2	9.7
Internal Link Dist (m)		781.5			673.8			106.8			97.6	
Turn Bay Length (m)	90.0			30.0					10.0			10.0
Base Capacity (vph)	598	1221		603	1217			454	568		472	552
Starvation Cap Reductn	0	0		0	0			0	0		0	0
Spillback Cap Reductn	0	0		0	0			0	0		0	0
Storage Cap Reductn	0	0		0	0			0	0		0	0

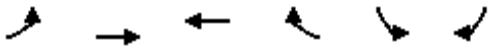
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Reduced v/c Ratio	0.07	0.34		0.09	0.32			0.30	0.15		0.34	0.13

Intersection Summary			
Area Type:	Other		
Cycle Length: 91.5			
Actuated Cycle Length: 91.5			
Control Type: Semi Act-Uncoord			
Maximum v/c Ratio: 0.34			
Intersection Signal Delay: 18.4		Intersection LOS: B	
Intersection Capacity Utilization 51.7%		ICU Level of Service A	
Analysis Period (min) 15			

Splits and Phases: 14: 57 Ave & Highway 27



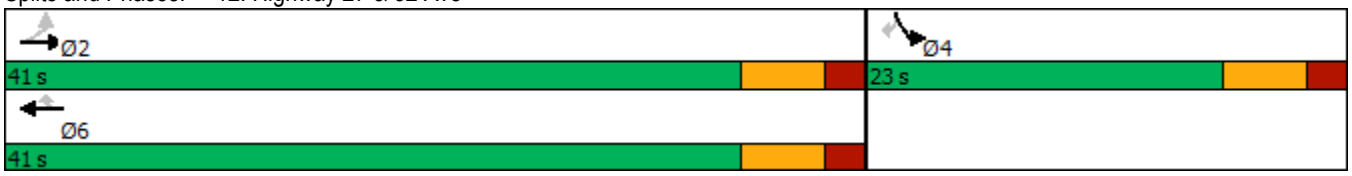
Lane Group	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Traffic Volume (vph)	20	390	420	10	30	30
Future Volume (vph)	20	390	420	10	30	30
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Storage Length (m)	0.0			20.0	0.0	10.0
Storage Lanes	0			1	1	1
Taper Length (m)	7.5				7.5	
Satd. Flow (prot)	0	3336	3374	1615	1805	1553
Flt Permitted		0.927			0.950	
Satd. Flow (perm)	0	3098	3374	1574	1805	1526
Right Turn on Red				Yes		Yes
Satd. Flow (RTOR)				11		32
Link Speed (k/h)		50	50		50	
Link Distance (m)		697.8	226.5		137.7	
Travel Time (s)		50.2	16.3		9.9	
Confl. Peds. (#/hr)	3			3		5
Peak Hour Factor	0.94	0.94	0.94	0.94	0.94	0.94
Heavy Vehicles (%)	8%	8%	7%	0%	0%	4%
Shared Lane Traffic (%)						
Lane Group Flow (vph)	0	436	447	11	32	32
Enter Blocked Intersection	No	No	No	No	No	No
Lane Alignment	Left	Left	Left	Right	Left	Right
Median Width(m)		0.0	0.0		3.6	
Link Offset(m)		0.0	0.0		0.0	
Crosswalk Width(m)		4.8	4.8		4.8	
Two way Left Turn Lane						
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00
Turning Speed (k/h)	25			15	25	15
Turn Type	Perm	NA	NA	Perm	Prot	Perm
Protected Phases		2	6		4	
Permitted Phases	2			6		4
Total Split (s)	41.0	41.0	41.0	41.0	23.0	23.0
Total Lost Time (s)		6.0	6.0	6.0	6.0	6.0
Act Effct Green (s)		43.3	43.3	43.3	8.1	8.1
Actuated g/C Ratio		0.78	0.78	0.78	0.15	0.15
v/c Ratio		0.18	0.17	0.01	0.12	0.13
Control Delay		3.5	3.4	2.2	21.7	10.1
Queue Delay		0.0	0.0	0.0	0.0	0.0
Total Delay		3.5	3.4	2.2	21.7	10.1
LOS		A	A	A	C	B
Approach Delay		3.5	3.4		15.9	
Approach LOS		A	A		B	
Queue Length 50th (m)		8.3	8.4	0.0	3.0	0.0
Queue Length 95th (m)		13.6	13.7	1.3	9.3	6.1
Internal Link Dist (m)		673.8	202.5		113.7	
Turn Bay Length (m)				20.0		10.0
Base Capacity (vph)		2419	2635	1231	552	489
Starvation Cap Reductn		0	0	0	0	0
Spillback Cap Reductn		0	0	0	0	0

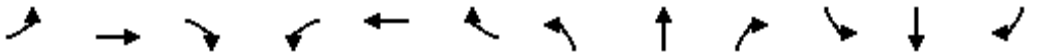


Lane Group	EBL	EBT	WBT	WBR	SBL	SBR
Storage Cap Reductn		0	0	0	0	0
Reduced v/c Ratio		0.18	0.17	0.01	0.06	0.07

Intersection Summary			
Area Type:	Other		
Cycle Length: 64			
Actuated Cycle Length: 55.5			
Control Type: Actuated-Uncoordinated			
Maximum v/c Ratio: 0.18			
Intersection Signal Delay: 4.3		Intersection LOS: A	
Intersection Capacity Utilization 68.3%		ICU Level of Service C	
Analysis Period (min) 15			

Splits and Phases: 12: Highway 27 & 52 Ave



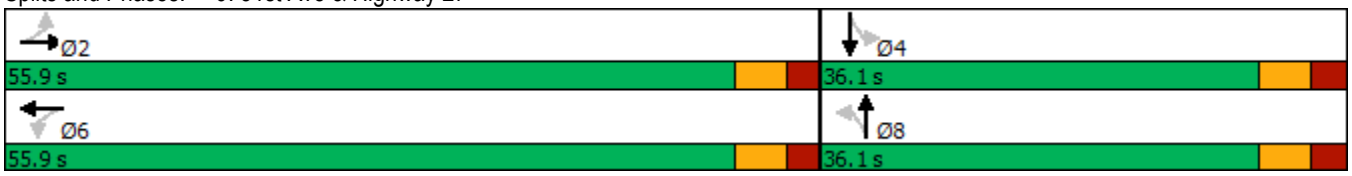


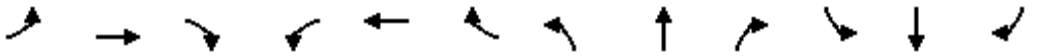
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	10	430	70	30	470	10	70	10	20	10	10	10
Future Volume (vph)	10	430	70	30	470	10	70	10	20	10	10	10
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (m)	60.0		0.0	60.0		0.0	30.0		0.0	0.0		0.0
Storage Lanes	1		0	1		0	0		0	1		0
Taper Length (m)	80.0			80.0			40.0			7.5		
Satd. Flow (prot)	1805	3307	0	1719	3303	0	1805	1689	0	1805	1739	0
Flt Permitted	0.461			0.452			0.743			0.736		
Satd. Flow (perm)	856	3307	0	818	3303	0	1400	1689	0	1389	1739	0
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)		31			4			22			11	
Link Speed (k/h)		50			50			50			50	
Link Distance (m)		226.5			173.9			143.4			146.6	
Travel Time (s)		16.3			12.5			10.3			10.6	
Confl. Peds. (#/hr)	24					24	9		7	7		9
Peak Hour Factor	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93
Heavy Vehicles (%)	0%	8%	0%	5%	9%	0%	0%	0%	0%	0%	0%	0%
Shared Lane Traffic (%)												
Lane Group Flow (vph)	11	537	0	32	516	0	75	33	0	11	22	0
Enter Blocked Intersection	No	No	No	No	No	No	No	No	No	No	No	No
Lane Alignment	Left	Left	Right	Left	Left	Right	Left	Left	Right	Left	Left	Right
Median Width(m)		3.6			3.6			3.6			3.6	
Link Offset(m)		0.0			0.0			0.0			0.0	
Crosswalk Width(m)		4.8			4.8			4.8			4.8	
Two way Left Turn Lane												
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Turning Speed (k/h)	25		15	25		15	25		15	25		15
Turn Type	Perm	NA		Perm	NA		Perm	NA		Perm	NA	
Protected Phases		2			6			8			4	
Permitted Phases	2			6			8			4		
Total Split (s)	55.9	55.9		55.9	55.9		36.1	36.1		36.1	36.1	
Total Lost Time (s)	5.9	5.9		5.9	5.9		6.1	6.1		6.1	6.1	
Act Effct Green (s)	34.3	34.3		34.3	34.3		10.1	10.1		10.1	10.1	
Actuated g/C Ratio	0.66	0.66		0.66	0.66		0.19	0.19		0.19	0.19	
v/c Ratio	0.02	0.24		0.06	0.24		0.27	0.10		0.04	0.06	
Control Delay	5.0	5.2		5.4	5.4		21.0	11.3		17.6	13.2	
Queue Delay	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Total Delay	5.0	5.2		5.4	5.4		21.0	11.3		17.6	13.2	
LOS	A	A		A	A		C	B		B	B	
Approach Delay		5.2			5.4			18.0			14.7	
Approach LOS		A			A			B			B	
Queue Length 50th (m)	0.4	11.2		1.2	11.3		6.4	0.9		0.9	0.9	
Queue Length 95th (m)	2.0	18.3		4.1	18.5		15.9	6.5		4.2	5.5	
Internal Link Dist (m)		202.5			149.9			119.4			122.6	
Turn Bay Length (m)	60.0			60.0			30.0					
Base Capacity (vph)	824	3186		787	3181		809	985		802	1009	
Starvation Cap Reductn	0	0		0	0		0	0		0	0	
Spillback Cap Reductn	0	0		0	0		0	0		0	0	

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Storage Cap Reductn	0	0		0	0		0	0		0	0	
Reduced v/c Ratio	0.01	0.17		0.04	0.16		0.09	0.03		0.01	0.02	

Intersection Summary			
Area Type:	Other		
Cycle Length: 92			
Actuated Cycle Length: 51.9			
Control Type: Actuated-Uncoordinated			
Maximum v/c Ratio: 0.27			
Intersection Signal Delay: 6.6		Intersection LOS: A	
Intersection Capacity Utilization 48.2%		ICU Level of Service A	
Analysis Period (min) 15			

Splits and Phases: 9: 51st Ave & Highway 27



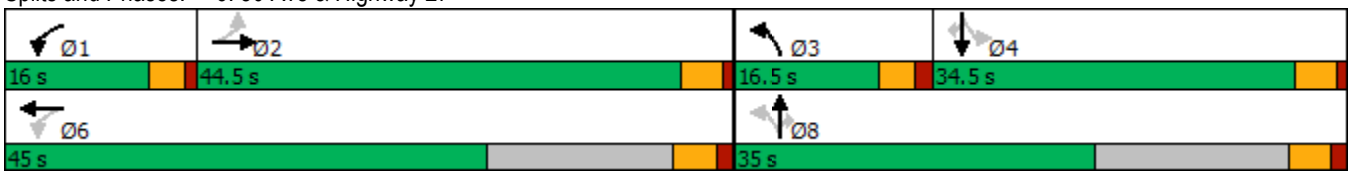


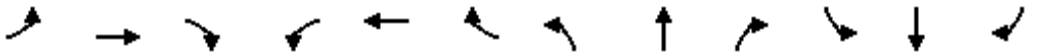
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	20	280	50	50	300	50	50	20	30	70	40	40
Future Volume (vph)	20	280	50	50	300	50	50	20	30	70	40	40
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (m)	0.0		0.0	0.0		0.0	0.0		50.0	0.0		35.0
Storage Lanes	0		0	0		0	0		1	0		1
Taper Length (m)	7.5			7.5			7.5			7.5		
Satd. Flow (prot)	0	3228	0	0	3264	0	0	1835	1583	0	1829	1524
Flt Permitted		0.916			0.889			0.726			0.761	
Satd. Flow (perm)	0	2965	0	0	2919	0	0	1372	1545	0	1427	1489
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)		19			20				59			103
Link Speed (k/h)		50			50			50			50	
Link Distance (m)		173.9			528.1			104.3			106.1	
Travel Time (s)		12.5			38.0			7.5			7.6	
Confl. Peds. (#/hr)	2		1	1		2	7		8	8		7
Peak Hour Factor	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91
Heavy Vehicles (%)	9%	10%	2%	5%	8%	7%	0%	0%	2%	1%	0%	6%
Shared Lane Traffic (%)												
Lane Group Flow (vph)	0	385	0	0	440	0	0	77	33	0	121	44
Enter Blocked Intersection	No	No	No	No	No	No	No	No	No	No	No	No
Lane Alignment	Left	Left	Right	Left	Left	Right	Left	Left	Right	Left	Left	Right
Median Width(m)		0.0			0.0			0.0			0.0	
Link Offset(m)		0.0			0.0			0.0			0.0	
Crosswalk Width(m)		4.8			4.8			4.8			4.8	
Two way Left Turn Lane												
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Turning Speed (k/h)	25		15	25		15	25		15	25		15
Turn Type	Perm	NA		pm+pt	NA		pm+pt	NA	Perm	Perm	NA	Perm
Protected Phases		2		1	6		3	8			4	
Permitted Phases	2			6			8		8	4		4
Total Split (s)	44.5	44.5		16.0	45.0		16.5	35.0	35.0	34.5	34.5	34.5
Total Lost Time (s)		4.5			5.0			5.0	5.0		4.5	4.5
Act Effct Green (s)		17.3			31.9			22.6	22.6		13.9	13.9
Actuated g/C Ratio		0.29			0.54			0.38	0.38		0.24	0.24
v/c Ratio		0.44			0.27			0.13	0.05		0.36	0.10
Control Delay		21.5			10.3			14.2	2.0		27.6	0.5
Queue Delay		0.0			0.0			0.0	0.0		0.0	0.0
Total Delay		21.5			10.3			14.2	2.0		27.6	0.5
LOS		C			B			B	A		C	A
Approach Delay		21.5			10.3			10.6			20.4	
Approach LOS		C			B			B			C	
Queue Length 50th (m)		20.4			15.6			5.9	0.0		13.2	0.0
Queue Length 95th (m)		37.0			28.2			15.1	2.6		30.6	0.6
Internal Link Dist (m)		149.9			504.1			80.3			82.1	
Turn Bay Length (m)									50.0			35.0
Base Capacity (vph)		2043			2630			1142	1189		798	878
Starvation Cap Reductn		0			0			0	0		0	0
Spillback Cap Reductn		0			0			0	0		0	0

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Storage Cap Reductn		0			0			0	0		0	0
Reduced v/c Ratio		0.19			0.17			0.07	0.03		0.15	0.05

Intersection Summary			
Area Type:	Other		
Cycle Length: 111.5			
Actuated Cycle Length: 59			
Control Type: Actuated-Uncoordinated			
Maximum v/c Ratio: 0.44			
Intersection Signal Delay: 15.7		Intersection LOS: B	
Intersection Capacity Utilization 51.1%		ICU Level of Service A	
Analysis Period (min) 15			

Splits and Phases: 6: 50 Ave & Highway 27





Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	50	240	100	70	220	20	100	60	70	30	100	140
Future Volume (vph)	50	240	100	70	220	20	100	60	70	30	100	140
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (m)	0.0		0.0	0.0		170.0	0.0		100.0	0.0		100.0
Storage Lanes	0		0	0		1	0		1	0		1
Taper Length (m)	7.5			7.5			7.5			7.5		
Satd. Flow (prot)	0	3049	0	0	3170	0	0	1651	1442	0	1714	1468
Flt Permitted		0.955			0.955			0.580			0.871	
Satd. Flow (perm)	0	2929	0	0	3061	0	0	987	1442	0	1510	1468
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)		64			9				128			193
Link Speed (k/h)		50			50			50			50	
Link Distance (m)		528.1			342.3			155.6			175.4	
Travel Time (s)		38.0			24.6			11.2			12.6	
Peak Hour Factor	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94
Heavy Vehicles (%)	8%	14%	14%	5%	11%	40%	9%	16%	12%	15%	8%	10%
Shared Lane Traffic (%)												
Lane Group Flow (vph)	0	414	0	0	329	0	0	170	74	0	138	149
Enter Blocked Intersection	No	No	No	No	No	No	No	No	No	No	No	No
Lane Alignment	Left	Left	Right	Left	Left	Right	Left	Left	Right	Left	Left	Right
Median Width(m)		0.0			0.0			0.0			0.0	
Link Offset(m)		0.0			0.0			0.0			0.0	
Crosswalk Width(m)		4.8			4.8			4.8			4.8	
Two way Left Turn Lane												
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Turning Speed (k/h)	25		15	25		15	25		15	25		15
Turn Type	pm+pt	NA		pm+pt	NA		pm+pt	NA	Perm	Perm	NA	Perm
Protected Phases	5	2		1	6		7	4			8	
Permitted Phases	2			6			4		4	8		8
Total Split (s)	20.0	21.0		15.0	16.0		14.0	28.0	28.0	18.0	18.0	18.0
Total Lost Time (s)		6.0			6.0			6.0	6.0		6.0	6.0
Act Effct Green (s)		14.9			11.5			24.6	24.6		11.2	11.2
Actuated g/C Ratio		0.22			0.17			0.37	0.37		0.17	0.17
v/c Ratio		0.57			0.60			0.39	0.12		0.54	0.37
Control Delay		23.1			31.2			17.6	1.3		34.3	4.9
Queue Delay		0.0			0.0			0.0	0.0		0.0	0.0
Total Delay		23.1			31.2			17.6	1.3		34.3	4.9
LOS		C			C			B	A		C	A
Approach Delay		23.1			31.2			12.7			19.0	
Approach LOS		C			C			B			B	
Queue Length 50th (m)		21.7			21.4			15.2	0.0		16.9	0.0
Queue Length 95th (m)		35.4			#37.6			28.6	2.6		33.4	8.6
Internal Link Dist (m)		504.1			318.3			131.6			151.4	
Turn Bay Length (m)									100.0			100.0
Base Capacity (vph)		736			551			466	642		272	423
Starvation Cap Reductn		0			0			0	0		0	0
Spillback Cap Reductn		0			0			0	0		0	0
Storage Cap Reductn		0			0			0	0		0	0

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Reduced v/c Ratio		0.56			0.60			0.36	0.12		0.51	0.35

Intersection Summary			
Area Type:	Other		
Cycle Length: 68			
Actuated Cycle Length: 66.5			
Control Type: Actuated-Uncoordinated			
Maximum v/c Ratio: 0.60			
Intersection Signal Delay: 22.3		Intersection LOS: C	
Intersection Capacity Utilization 50.4%		ICU Level of Service A	
Analysis Period (min) 15			
# 95th percentile volume exceeds capacity, queue may be longer.			
Queue shown is maximum after two cycles.			

Splits and Phases: 3: 46 Ave (Highway 2A) & Highway 27

Lanes, Volumes, Timings
23: 70 Avenue & Highway 27

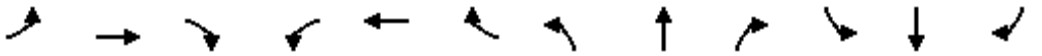
01-05-2024

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	10	230	10	40	260	30	10	10	40	30	10	10
Future Volume (vph)	10	230	10	40	260	30	10	10	40	30	10	10
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (m)	75.0		0.0	70.0		70.0	45.0		0.0	50.0		0.0
Storage Lanes	1		0	1		1	1		0	1		0
Taper Length (m)	40.0			45.0			30.0			45.0		
Satd. Flow (prot)	1357	3258	0	1770	3282	1615	1128	1608	0	1805	1406	0
Flt Permitted	0.576			0.552			0.743			0.721		
Satd. Flow (perm)	823	3258	0	1028	3282	1615	882	1608	0	1370	1406	0
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)		5				115		44			11	
Link Speed (k/h)		60			60			50			50	
Link Distance (m)		228.6			411.6			170.2			183.8	
Travel Time (s)		13.7			24.7			12.3			13.2	
Peak Hour Factor	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91
Heavy Vehicles (%)	33%	9%	36%	2%	10%	0%	60%	0%	5%	0%	0%	50%
Shared Lane Traffic (%)												
Lane Group Flow (vph)	11	264	0	44	286	33	11	55	0	33	22	0
Enter Blocked Intersection	No	No	No	No	No	No	No	No	No	No	No	No
Lane Alignment	Left	Left	Right	Left	Left	Right	Left	Left	Right	Left	Left	Right
Median Width(m)		5.6			5.6			3.6			3.6	
Link Offset(m)		0.0			0.0			0.0			0.0	
Crosswalk Width(m)		4.8			4.8			4.8			4.8	
Two way Left Turn Lane												
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Turning Speed (k/h)	25		15	25		15	25		15	25		15
Turn Type	pm+pt	NA		pm+pt	NA	Perm	Perm	NA		Perm	NA	
Protected Phases	5	2		1	6			8			4	
Permitted Phases	2			6		6	8			4		
Total Split (s)	21.0	42.0		21.0	42.0	42.0	32.0	32.0		32.0	32.0	
Total Lost Time (s)	6.0	7.0		6.0	7.0	7.0	7.0	7.0		7.0	7.0	
Act Effct Green (s)	40.6	39.2		42.8	43.8	43.8	12.2	12.2		12.2	12.2	
Actuated g/C Ratio	0.67	0.65		0.71	0.73	0.73	0.20	0.20		0.20	0.20	
v/c Ratio	0.02	0.12		0.05	0.12	0.03	0.06	0.15		0.12	0.07	
Control Delay	5.1	9.9		4.9	6.8	0.0	24.1	11.7		24.2	17.6	
Queue Delay	0.0	0.0		0.0	0.0	0.0	0.0	0.0		0.0	0.0	
Total Delay	5.1	9.9		4.9	6.8	0.0	24.1	11.7		24.2	17.6	
LOS	A	A		A	A	A	C	B		C	B	
Approach Delay		9.7			6.0			13.8			21.6	
Approach LOS		A			A			B			C	
Queue Length 50th (m)	0.5	10.8		1.9	7.3	0.0	1.2	1.2		3.7	1.2	
Queue Length 95th (m)	2.0	18.0		5.0	19.6	0.0	5.3	9.9		10.8	6.8	
Internal Link Dist (m)		204.6			387.6			146.2			159.8	
Turn Bay Length (m)	75.0			70.0		70.0	45.0			50.0		
Base Capacity (vph)	735	2326		937	2459	1238	374	707		581	602	
Starvation Cap Reductn	0	0		0	0	0	0	0		0	0	
Spillback Cap Reductn	0	0		0	0	0	0	0		0	0	
Storage Cap Reductn	0	0		0	0	0	0	0		0	0	

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Reduced v/c Ratio	0.01	0.11		0.05	0.12	0.03	0.03	0.08		0.06	0.04	

Intersection Summary			
Area Type:	Other		
Cycle Length: 95			
Actuated Cycle Length: 60.2			
Control Type: Actuated-Uncoordinated			
Maximum v/c Ratio: 0.15			
Intersection Signal Delay: 9.1		Intersection LOS: A	
Intersection Capacity Utilization 49.2%		ICU Level of Service A	
Analysis Period (min) 15			

Splits and Phases: 23: 70 Avenue & Highway 27

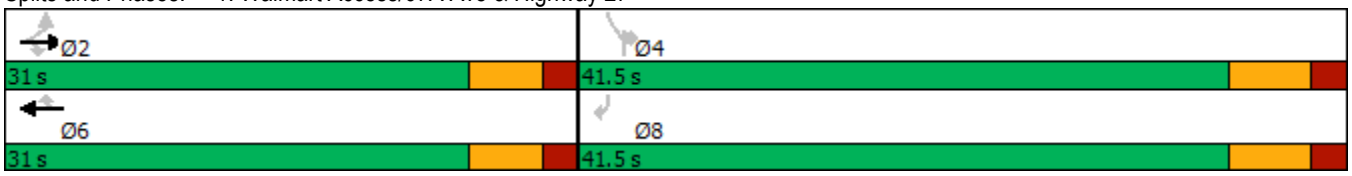


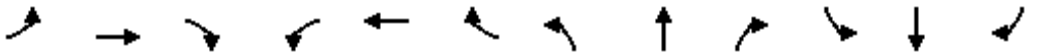
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	80	210	10	0	220	230	0	0	10	210	0	110
Future Volume (vph)	80	210	10	0	220	230	0	0	10	210	0	110
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (m)	80.0		30.0	80.0		30.0	0.0		30.0	0.0		30.0
Storage Lanes	1		1	0		1	0		0	1		1
Taper Length (m)	60.0			80.0			7.5			7.5		
Satd. Flow (prot)	1752	3282	1615	0	3252	1583	0	0	1644	1787	0	1568
Flt Permitted	0.600									0.950		
Satd. Flow (perm)	1107	3282	1615	0	3252	1583	0	0	1644	1787	0	1568
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)			53			256			457			122
Link Speed (k/h)		60			60			50			50	
Link Distance (m)		411.6			406.1			117.8			163.6	
Travel Time (s)		24.7			24.4			8.5			11.8	
Peak Hour Factor	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90
Heavy Vehicles (%)	3%	10%	0%	0%	11%	2%	0%	0%	0%	1%	0%	3%
Shared Lane Traffic (%)												
Lane Group Flow (vph)	89	233	11	0	244	256	0	0	11	233	0	122
Enter Blocked Intersection	No	No	No	No	No	No	No	No	No	No	No	No
Lane Alignment	Left	Left	Right	Left	Left	Right	Left	Left	Right	Left	Left	Right
Median Width(m)		6.1			6.1			3.6			3.6	
Link Offset(m)		0.0			0.0			0.0			0.0	
Crosswalk Width(m)		4.8			4.8			4.8			4.8	
Two way Left Turn Lane												
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Turning Speed (k/h)	25		15	25		15	25		15	25		15
Turn Type	Perm	NA	Perm		NA	Perm			Perm	Perm		Perm
Protected Phases		2			6							
Permitted Phases	2		2			6			4	4		8
Total Split (s)	31.0	31.0	31.0		31.0	31.0			41.5	41.5		41.5
Total Lost Time (s)	6.0	6.0	6.0		6.0	6.0			6.5	6.5		6.5
Act Effct Green (s)	25.0	25.0	25.0		25.0	25.0			35.0	35.0		35.0
Actuated g/C Ratio	0.34	0.34	0.34		0.34	0.34			0.48	0.48		0.48
v/c Ratio	0.23	0.21	0.02		0.22	0.36			0.01	0.27		0.15
Control Delay	19.0	17.4	0.1		17.5	4.1			0.0	12.2		2.8
Queue Delay	0.0	0.0	0.0		0.0	0.0			0.0	0.0		0.0
Total Delay	19.0	17.4	0.1		17.5	4.1			0.0	12.2		2.8
LOS	B	B	A		B	A			A	B		A
Approach Delay		17.2			10.6						9.0	
Approach LOS		B			B						A	
Queue Length 50th (m)	8.9	12.1	0.0		12.7	0.0			0.0	18.8		0.0
Queue Length 95th (m)	19.6	20.2	0.0		21.1	14.3			0.0	32.6		7.7
Internal Link Dist (m)		387.6			382.1			93.8			139.6	
Turn Bay Length (m)	80.0		30.0			30.0			30.0			30.0
Base Capacity (vph)	381	1131	591		1121	713			1030	862		820
Starvation Cap Reductn	0	0	0		0	0			0	0		0
Spillback Cap Reductn	0	0	0		0	0			0	0		0
Storage Cap Reductn	0	0	0		0	0			0	0		0

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Reduced v/c Ratio	0.23	0.21	0.02		0.22	0.36			0.01	0.27		0.15

Intersection Summary			
Area Type:	Other		
Cycle Length: 72.5			
Actuated Cycle Length: 72.5			
Control Type: Semi Act-Uncoord			
Maximum v/c Ratio: 0.36			
Intersection Signal Delay: 11.9		Intersection LOS: B	
Intersection Capacity Utilization 46.2%		ICU Level of Service A	
Analysis Period (min) 15			

Splits and Phases: 1: Walmart Access/67A Ave & Highway 27



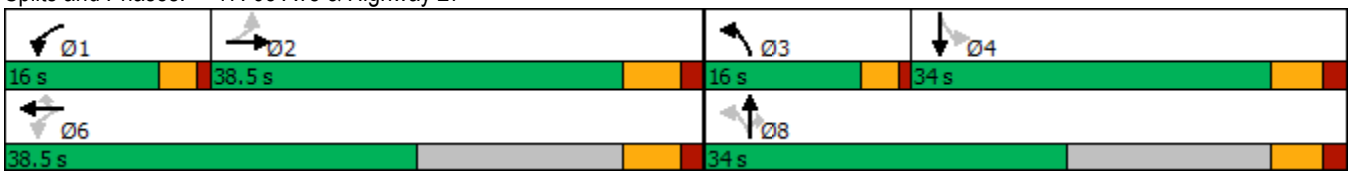


Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	30	320	80	70	330	130	90	80	70	130	60	30
Future Volume (vph)	30	320	80	70	330	130	90	80	70	130	60	30
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (m)	80.0		0.0	70.0		25.0	0.0		25.0	0.0		0.0
Storage Lanes	1		0	1		1	0		1	1		0
Taper Length (m)	30.0			50.0			7.5			7.5		
Satd. Flow (prot)	1687	3322	0	1805	3374	1553	0	1825	1599	1770	1666	0
Flt Permitted	0.529			0.367				0.721		0.636		
Satd. Flow (perm)	939	3322	0	697	3374	1553	0	1347	1599	1185	1666	0
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)		31				148			80		24	
Link Speed (k/h)		60			60			50			50	
Link Distance (m)		406.1			805.5			80.7			74.7	
Travel Time (s)		24.4			48.3			5.8			5.4	
Confl. Peds. (#/hr)							5					5
Peak Hour Factor	0.88	0.88	0.88	0.88	0.88	0.88	0.88	0.88	0.88	0.88	0.88	0.88
Heavy Vehicles (%)	7%	6%	3%	0%	7%	4%	0%	3%	1%	2%	3%	17%
Shared Lane Traffic (%)												
Lane Group Flow (vph)	34	455	0	80	375	148	0	193	80	148	102	0
Enter Blocked Intersection	No	No	No	No	No	No	No	No	No	No	No	No
Lane Alignment	Left	Left	Right	Left	Left	Right	Left	Left	Right	Left	Left	Right
Median Width(m)		6.1			6.1			5.6			5.6	
Link Offset(m)		0.0			0.0			0.0			0.0	
Crosswalk Width(m)		4.8			4.8			4.8			4.8	
Two way Left Turn Lane												
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Turning Speed (k/h)	25		15	25		15	25		15	25		15
Turn Type	Perm	NA		pm+pt	NA	Perm	pm+pt	NA	Perm	Perm	NA	
Protected Phases		2		1	6		3	8			4	
Permitted Phases	2			6		6	8		8	4		
Total Split (s)	38.5	38.5		16.0	38.5	38.5	16.0	34.0	34.0	34.0	34.0	
Total Lost Time (s)	6.5	6.5		4.0	6.5	6.5		6.0	6.0	6.0	6.0	
Act Effct Green (s)	18.4	18.4		30.2	27.6	27.6		30.2	30.2	16.0	16.0	
Actuated g/C Ratio	0.26	0.26		0.43	0.39	0.39		0.43	0.43	0.23	0.23	
v/c Ratio	0.14	0.51		0.19	0.29	0.21		0.31	0.11	0.55	0.26	
Control Delay	25.2	24.7		14.1	15.7	3.8		15.9	4.2	35.5	21.9	
Queue Delay	0.0	0.0		0.0	0.0	0.0		0.0	0.0	0.0	0.0	
Total Delay	25.2	24.7		14.1	15.7	3.8		15.9	4.2	35.5	21.9	
LOS	C	C		B	B	A		B	A	D	C	
Approach Delay		24.8			12.6			12.5			29.9	
Approach LOS		C			B			B			C	
Queue Length 50th (m)	3.7	26.7		6.1	17.5	0.0		16.8	0.0	18.6	9.0	
Queue Length 95th (m)	12.3	48.3		16.1	32.4	10.3		35.7	7.5	41.3	23.7	
Internal Link Dist (m)		382.1			781.5			56.7			50.7	
Turn Bay Length (m)	80.0			70.0		25.0			25.0			
Base Capacity (vph)	441	1579		492	2380	1139		941	1062	487	699	
Starvation Cap Reductn	0	0		0	0	0		0	0	0	0	
Spillback Cap Reductn	0	0		0	0	0		0	0	0	0	

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Storage Cap Reductn	0	0		0	0	0		0	0	0	0	
Reduced v/c Ratio	0.08	0.29		0.16	0.16	0.13		0.21	0.08	0.30	0.15	

Intersection Summary			
Area Type:	Other		
Cycle Length: 104.5			
Actuated Cycle Length: 70.8			
Control Type: Actuated-Uncoordinated			
Maximum v/c Ratio: 0.55			
Intersection Signal Delay: 18.9		Intersection LOS: B	
Intersection Capacity Utilization 56.7%		ICU Level of Service B	
Analysis Period (min) 15			

Splits and Phases: 17: 65 Ave & Highway 27

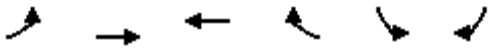


Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	70	410	120	70	480	90	120	60	80	110	70	70
Future Volume (vph)	70	410	120	70	480	90	120	60	80	110	70	70
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (m)	90.0		0.0	30.0		0.0	0.0		10.0	0.0		10.0
Storage Lanes	1		0	1		0	0		1	0		1
Taper Length (m)	40.0			30.0			7.5			7.5		
Satd. Flow (prot)	1687	3256	0	1805	3354	0	0	1803	1599	0	1782	1468
Flt Permitted	0.321			0.349				0.634			0.665	
Satd. Flow (perm)	570	3256	0	663	3354	0	0	1181	1599	0	1221	1468
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)		46			26				72			72
Link Speed (k/h)		50			50			50			50	
Link Distance (m)		805.5			697.8			130.8			121.6	
Travel Time (s)		58.0			50.2			9.4			8.8	
Peak Hour Factor	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93
Heavy Vehicles (%)	7%	8%	4%	0%	6%	0%	2%	2%	1%	5%	1%	10%
Shared Lane Traffic (%)												
Lane Group Flow (vph)	75	570	0	75	613	0	0	194	86	0	193	75
Enter Blocked Intersection	No	No	No	No	No	No	No	No	No	No	No	No
Lane Alignment	Left	Left	Right	Left	Left	Right	Left	Left	Right	Left	Left	Right
Median Width(m)		6.1			6.1			0.0			0.0	
Link Offset(m)		0.0			0.0			0.0			0.0	
Crosswalk Width(m)		4.8			4.8			4.8			4.8	
Two way Left Turn Lane												
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Turning Speed (k/h)	25		15	25		15	25		15	25		15
Turn Type	pm+pt	NA		pm+pt	NA		Perm	NA	Perm	Perm	NA	Perm
Protected Phases	5	2		1	6			4			8	
Permitted Phases	2			6			4		4	8		8
Total Split (s)	19.0	38.0		19.0	38.0		34.5	34.5	34.5	34.5	34.5	34.5
Total Lost Time (s)	4.0	5.0		4.0	5.0			4.5	4.5		4.5	4.5
Act Effct Green (s)	49.0	33.0		49.0	33.0			30.0	30.0		30.0	30.0
Actuated g/C Ratio	0.54	0.36		0.54	0.36			0.33	0.33		0.33	0.33
v/c Ratio	0.15	0.47		0.14	0.50			0.50	0.15		0.48	0.14
Control Delay	9.4	22.2		9.2	23.5			30.2	8.0		29.5	6.8
Queue Delay	0.0	0.0		0.0	0.0			0.0	0.0		0.0	0.0
Total Delay	9.4	22.2		9.2	23.5			30.2	8.0		29.5	6.8
LOS	A	C		A	C			C	A		C	A
Approach Delay		20.7			21.9			23.4			23.2	
Approach LOS		C			C			C			C	
Queue Length 50th (m)	5.7	38.6		5.7	43.9			28.6	1.7		28.3	0.4
Queue Length 95th (m)	11.7	54.1		11.7	60.2			50.6	12.1		49.5	9.9
Internal Link Dist (m)		781.5			673.8			106.8			97.6	
Turn Bay Length (m)	90.0			30.0					10.0			10.0
Base Capacity (vph)	488	1203		542	1226			387	572		400	529
Starvation Cap Reductn	0	0		0	0			0	0		0	0
Spillback Cap Reductn	0	0		0	0			0	0		0	0
Storage Cap Reductn	0	0		0	0			0	0		0	0

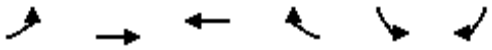
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Reduced v/c Ratio	0.15	0.47		0.14	0.50			0.50	0.15		0.48	0.14

Intersection Summary			
Area Type:	Other		
Cycle Length: 91.5			
Actuated Cycle Length: 91.5			
Control Type: Semi Act-Uncoord			
Maximum v/c Ratio: 0.50			
Intersection Signal Delay: 21.9		Intersection LOS: C	
Intersection Capacity Utilization 52.8%		ICU Level of Service A	
Analysis Period (min) 15			

Splits and Phases: 14: 57 Ave & Highway 27



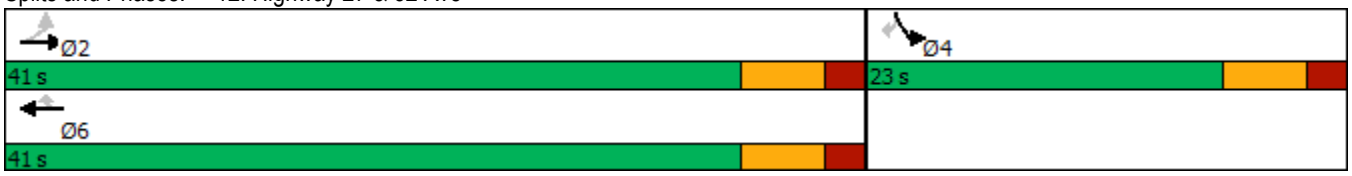
Lane Group	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Traffic Volume (vph)	20	500	580	20	30	40
Future Volume (vph)	20	500	580	20	30	40
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Storage Length (m)	0.0			20.0	0.0	10.0
Storage Lanes	0			1	1	1
Taper Length (m)	7.5				7.5	
Satd. Flow (prot)	0	3406	3438	1468	1687	1538
Flt Permitted		0.923			0.950	
Satd. Flow (perm)	0	3150	3438	1425	1687	1511
Right Turn on Red				Yes		Yes
Satd. Flow (RTOR)				22		44
Link Speed (k/h)		50	50		50	
Link Distance (m)		697.8	226.5		137.7	
Travel Time (s)		50.2	16.3		9.9	
Confl. Peds. (#/hr)	5			5		5
Peak Hour Factor	0.91	0.91	0.91	0.91	0.91	0.91
Heavy Vehicles (%)	0%	6%	5%	10%	7%	5%
Shared Lane Traffic (%)						
Lane Group Flow (vph)	0	571	637	22	33	44
Enter Blocked Intersection	No	No	No	No	No	No
Lane Alignment	Left	Left	Left	Right	Left	Right
Median Width(m)		0.0	0.0		3.6	
Link Offset(m)		0.0	0.0		0.0	
Crosswalk Width(m)		4.8	4.8		4.8	
Two way Left Turn Lane						
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00
Turning Speed (k/h)	25			15	25	15
Turn Type	Perm	NA	NA	Perm	Prot	Perm
Protected Phases		2	6		4	
Permitted Phases	2			6		4
Total Split (s)	41.0	41.0	41.0	41.0	23.0	23.0
Total Lost Time (s)		6.0	6.0	6.0	6.0	6.0
Act Effct Green (s)		43.3	43.3	43.3	8.1	8.1
Actuated g/C Ratio		0.78	0.78	0.78	0.15	0.15
v/c Ratio		0.23	0.24	0.02	0.13	0.17
Control Delay		3.7	3.6	1.9	21.9	9.6
Queue Delay		0.0	0.0	0.0	0.0	0.0
Total Delay		3.7	3.6	1.9	21.9	9.6
LOS		A	A	A	C	A
Approach Delay		3.7	3.6		14.9	
Approach LOS		A	A		B	
Queue Length 50th (m)		11.4	12.8	0.0	3.1	0.0
Queue Length 95th (m)		18.4	20.2	1.9	9.5	7.2
Internal Link Dist (m)		673.8	202.5		113.7	
Turn Bay Length (m)				20.0		10.0
Base Capacity (vph)		2457	2682	1116	516	493
Starvation Cap Reductn		0	0	0	0	0
Spillback Cap Reductn		0	0	0	0	0

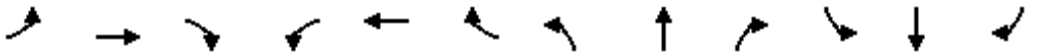


Lane Group	EBL	EBT	WBT	WBR	SBL	SBR
Storage Cap Reductn		0	0	0	0	0
Reduced v/c Ratio		0.23	0.24	0.02	0.06	0.09

Intersection Summary			
Area Type:	Other		
Cycle Length: 64			
Actuated Cycle Length: 55.5			
Control Type: Semi Act-Uncoord			
Maximum v/c Ratio: 0.24			
Intersection Signal Delay: 4.3		Intersection LOS: A	
Intersection Capacity Utilization 68.3%		ICU Level of Service C	
Analysis Period (min) 15			

Splits and Phases: 12: Highway 27 & 52 Ave



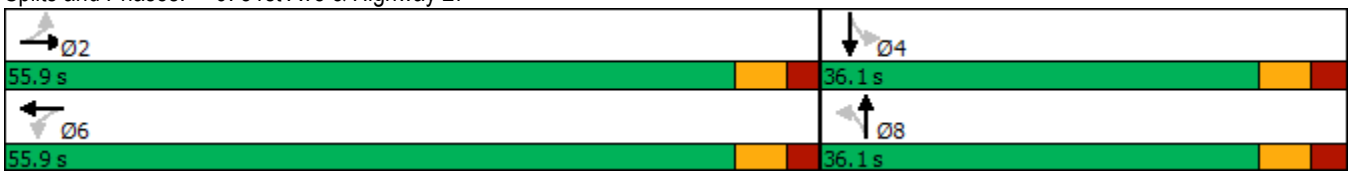


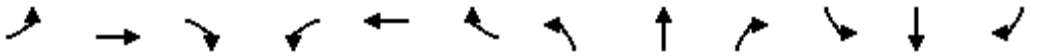
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	20	430	60	30	510	30	60	10	30	20	10	20
Future Volume (vph)	20	430	60	30	510	30	60	10	30	20	10	20
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (m)	60.0		0.0	60.0		0.0	30.0		0.0	0.0		0.0
Storage Lanes	1		0	1		0	0		0	1		0
Taper Length (m)	80.0			80.0			40.0			7.5		
Satd. Flow (prot)	1805	3319	0	1805	3392	0	1770	1687	0	1703	1692	0
Flt Permitted	0.434			0.456			0.736			0.729		
Satd. Flow (perm)	823	3319	0	865	3392	0	1366	1687	0	1307	1692	0
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)		26			10			32			22	
Link Speed (k/h)		50			50			50			50	
Link Distance (m)		226.5			173.9			143.4			146.6	
Travel Time (s)		16.3			12.5			10.3			10.6	
Confl. Peds. (#/hr)	3		2	2		3	3					3
Peak Hour Factor	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93
Heavy Vehicles (%)	0%	7%	2%	0%	5%	13%	2%	0%	0%	6%	0%	0%
Shared Lane Traffic (%)												
Lane Group Flow (vph)	22	527	0	32	580	0	65	43	0	22	33	0
Enter Blocked Intersection	No	No	No	No	No	No	No	No	No	No	No	No
Lane Alignment	Left	Left	Right	Left	Left	Right	Left	Left	Right	Left	Left	Right
Median Width(m)		3.6			3.6			3.6			3.6	
Link Offset(m)		0.0			0.0			0.0			0.0	
Crosswalk Width(m)		4.8			4.8			4.8			4.8	
Two way Left Turn Lane												
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Turning Speed (k/h)	25		15	25		15	25		15	25		15
Turn Type	Perm	NA		Perm	NA		Perm	NA		Perm	NA	
Protected Phases		2			6			8			4	
Permitted Phases	2			6			8			4		
Total Split (s)	55.9	55.9		55.9	55.9		36.1	36.1		36.1	36.1	
Total Lost Time (s)	5.9	5.9		5.9	5.9		6.1	6.1		6.1	6.1	
Act Effct Green (s)	34.3	34.3		34.3	34.3		10.0	10.0		10.0	10.0	
Actuated g/C Ratio	0.66	0.66		0.66	0.66		0.19	0.19		0.19	0.19	
v/c Ratio	0.04	0.24		0.06	0.26		0.25	0.12		0.09	0.10	
Control Delay	5.2	5.1		5.3	5.4		20.6	10.3		18.4	11.4	
Queue Delay	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Total Delay	5.2	5.1		5.3	5.4		20.6	10.3		18.4	11.4	
LOS	A	A		A	A		C	B		B	B	
Approach Delay		5.1			5.4			16.5			14.2	
Approach LOS		A			A			B			B	
Queue Length 50th (m)	0.8	11.0		1.2	12.8		5.5	0.9		1.8	0.9	
Queue Length 95th (m)	3.0	17.7		4.0	20.0		14.3	7.4		6.6	6.6	
Internal Link Dist (m)		202.5			149.9			119.4			122.6	
Turn Bay Length (m)	60.0			60.0			30.0					
Base Capacity (vph)	794	3204		834	3274		791	990		757	989	
Starvation Cap Reductn	0	0		0	0		0	0		0	0	
Spillback Cap Reductn	0	0		0	0		0	0		0	0	

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Storage Cap Reductn	0	0		0	0		0	0		0	0	
Reduced v/c Ratio	0.03	0.16		0.04	0.18		0.08	0.04		0.03	0.03	

Intersection Summary			
Area Type:	Other		
Cycle Length: 92			
Actuated Cycle Length: 51.8			
Control Type: Actuated-Uncoordinated			
Maximum v/c Ratio: 0.26			
Intersection Signal Delay: 6.5		Intersection LOS: A	
Intersection Capacity Utilization 45.0%		ICU Level of Service A	
Analysis Period (min) 15			

Splits and Phases: 9: 51st Ave & Highway 27



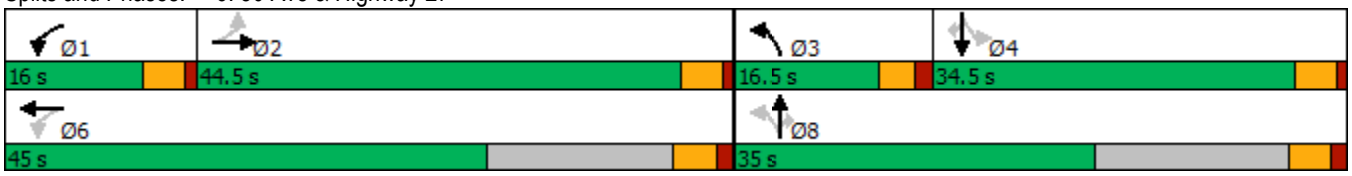


Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	40	370	80	50	370	60	130	50	60	70	50	50
Future Volume (vph)	40	370	80	50	370	60	130	50	60	70	50	50
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (m)	0.0		0.0	0.0		0.0	0.0		50.0	0.0		35.0
Storage Lanes	0		0	0		0	0		1	0		1
Taper Length (m)	7.5			7.5			7.5			7.5		
Satd. Flow (prot)	0	3270	0	0	3270	0	0	1823	1615	0	1836	1553
Flt Permitted		0.869			0.839			0.520			0.709	
Satd. Flow (perm)	0	2852	0	0	2757	0	0	976	1588	0	1337	1516
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)		23			20				67			108
Link Speed (k/h)		50			50			50			50	
Link Distance (m)		173.9			528.1			104.3			106.1	
Travel Time (s)		12.5			38.0			7.5			7.6	
Confl. Peds. (#/hr)	2		2	2		2	8		3	3		8
Peak Hour Factor	0.89	0.89	0.89	0.89	0.89	0.89	0.89	0.89	0.89	0.89	0.89	0.89
Heavy Vehicles (%)	3%	8%	3%	6%	8%	5%	0%	2%	0%	1%	0%	4%
Shared Lane Traffic (%)												
Lane Group Flow (vph)	0	551	0	0	539	0	0	202	67	0	135	56
Enter Blocked Intersection	No	No	No	No	No	No	No	No	No	No	No	No
Lane Alignment	Left	Left	Right	Left	Left	Right	Left	Left	Right	Left	Left	Right
Median Width(m)		0.0			0.0			0.0			0.0	
Link Offset(m)		0.0			0.0			0.0			0.0	
Crosswalk Width(m)		4.8			4.8			4.8			4.8	
Two way Left Turn Lane												
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Turning Speed (k/h)	25		15	25		15	25		15	25		15
Turn Type	Perm	NA		pm+pt	NA		pm+pt	NA	Perm	Perm	NA	Perm
Protected Phases		2		1	6		3	8			4	
Permitted Phases	2			6			8		8	4		4
Total Split (s)	44.5	44.5		16.0	45.0		16.5	35.0	35.0	34.5	34.5	34.5
Total Lost Time (s)		4.5			5.0			5.0	5.0		4.5	4.5
Act Effct Green (s)		21.1			36.4			29.2	29.2		14.4	14.4
Actuated g/C Ratio		0.28			0.48			0.39	0.39		0.19	0.19
v/c Ratio		0.68			0.38			0.41	0.10		0.53	0.15
Control Delay		28.3			12.9			19.9	5.2		37.9	1.6
Queue Delay		0.0			0.0			0.0	0.0		0.0	0.0
Total Delay		28.3			12.9			19.9	5.2		37.9	1.6
LOS		C			B			B	A		D	A
Approach Delay		28.3			12.9			16.2			27.3	
Approach LOS		C			B			B			C	
Queue Length 50th (m)		36.6			23.5			20.5	0.0		18.8	0.0
Queue Length 95th (m)		58.8			39.8			41.2	7.7		39.9	1.5
Internal Link Dist (m)		149.9			504.1			80.3			82.1	
Turn Bay Length (m)									50.0			35.0
Base Capacity (vph)		1542			2136			733	1006		538	675
Starvation Cap Reductn		0			0			0	0		0	0
Spillback Cap Reductn		0			0			0	0		0	0

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Storage Cap Reductn		0			0			0	0		0	0
Reduced v/c Ratio		0.36			0.25			0.28	0.07		0.25	0.08

Intersection Summary			
Area Type:	Other		
Cycle Length: 111.5			
Actuated Cycle Length: 75.8			
Control Type: Actuated-Uncoordinated			
Maximum v/c Ratio: 0.68			
Intersection Signal Delay: 20.7		Intersection LOS: C	
Intersection Capacity Utilization 56.9%		ICU Level of Service B	
Analysis Period (min) 15			

Splits and Phases: 6: 50 Ave & Highway 27

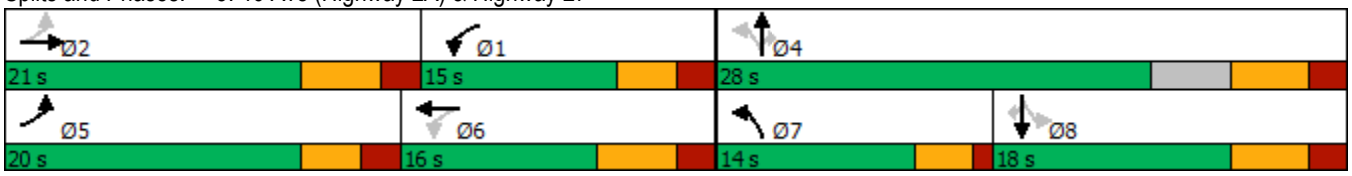


Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	60	260	150	40	200	30	170	60	80	30	70	140
Future Volume (vph)	60	260	150	40	200	30	170	60	80	30	70	140
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (m)	0.0		0.0	0.0		170.0	0.0		100.0	0.0		100.0
Storage Lanes	0		0	0		1	0		1	0		1
Taper Length (m)	7.5			7.5			7.5			7.5		
Satd. Flow (prot)	0	3131	0	0	3122	0	0	1732	1468	0	1683	1538
Flt Permitted		0.955			0.955			0.524			0.808	
Satd. Flow (perm)	0	3008	0	0	3003	0	0	942	1468	0	1381	1538
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)		105			17				128			193
Link Speed (k/h)		50			50			50			50	
Link Distance (m)		528.1			342.3			155.6			175.4	
Travel Time (s)		38.0			24.6			11.2			12.6	
Peak Hour Factor	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91
Heavy Vehicles (%)	8%	10%	8%	19%	11%	17%	6%	5%	10%	7%	13%	5%
Shared Lane Traffic (%)												
Lane Group Flow (vph)	0	517	0	0	297	0	0	253	88	0	110	154
Enter Blocked Intersection	No	No	No	No	No	No	No	No	No	No	No	No
Lane Alignment	Left	Left	Right	Left	Left	Right	Left	Left	Right	Left	Left	Right
Median Width(m)		0.0			0.0			0.0			0.0	
Link Offset(m)		0.0			0.0			0.0			0.0	
Crosswalk Width(m)		4.8			4.8			4.8			4.8	
Two way Left Turn Lane												
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Turning Speed (k/h)	25		15	25		15	25		15	25		15
Turn Type	pm+pt	NA		pm+pt	NA		pm+pt	NA	Perm	Perm	NA	Perm
Protected Phases	5	2		1	6		7	4			8	
Permitted Phases	2			6			4		4	8		8
Total Split (s)	20.0	21.0		15.0	16.0		14.0	28.0	28.0	18.0	18.0	18.0
Total Lost Time (s)		6.0			6.0			6.0	6.0		6.0	6.0
Act Effct Green (s)		15.0			11.1			24.9	24.9		11.1	11.1
Actuated g/C Ratio		0.22			0.17			0.37	0.37		0.17	0.17
v/c Ratio		0.66			0.56			0.57	0.14		0.48	0.37
Control Delay		23.6			29.6			21.4	1.9		33.1	5.2
Queue Delay		0.0			0.0			0.0	0.0		0.0	0.0
Total Delay		23.6			29.6			21.4	1.9		33.1	5.2
LOS		C			C			C	A		C	A
Approach Delay		23.6			29.6			16.4			16.9	
Approach LOS		C			C			B			B	
Queue Length 50th (m)		25.9			18.5			23.7	0.0		13.3	0.0
Queue Length 95th (m)		42.1			30.8			41.5	4.3		27.8	9.4
Internal Link Dist (m)		504.1			318.3			131.6			151.4	
Turn Bay Length (m)									100.0			100.0
Base Capacity (vph)		782			530			461	649		247	434
Starvation Cap Reductn		0			0			0	0		0	0
Spillback Cap Reductn		0			0			0	0		0	0
Storage Cap Reductn		0			0			0	0		0	0

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Reduced v/c Ratio		0.66			0.56			0.55	0.14		0.45	0.35

Intersection Summary			
Area Type:	Other		
Cycle Length: 68			
Actuated Cycle Length: 66.9			
Control Type: Actuated-Uncoordinated			
Maximum v/c Ratio: 0.66			
Intersection Signal Delay: 21.9		Intersection LOS: C	
Intersection Capacity Utilization 56.3%		ICU Level of Service B	
Analysis Period (min) 15			

Splits and Phases: 3: 46 Ave (Highway 2A) & Highway 27



Lanes, Volumes, Timings
23: 70 Avenue & Highway 27

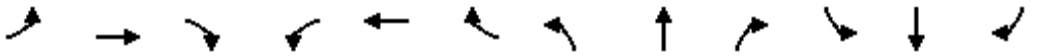
01-05-2024

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	10	230	10	60	370	20	10	10	40	30	10	10
Future Volume (vph)	10	230	10	60	370	20	10	10	40	30	10	10
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (m)	75.0		0.0	70.0		70.0	45.0		0.0	50.0		0.0
Storage Lanes	1		0	1		1	1		0	1		0
Taper Length (m)	40.0			45.0			30.0			45.0		
Satd. Flow (prot)	1805	3274	0	1805	3374	1615	1805	1633	0	1687	1758	0
Flt Permitted	0.511			0.551			0.743			0.721		
Satd. Flow (perm)	971	3274	0	1047	3374	1615	1412	1633	0	1280	1758	0
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)		5				115		44			11	
Link Speed (k/h)		60			60			50			50	
Link Distance (m)		228.6			411.6			170.2			183.8	
Travel Time (s)		13.7			24.7			12.3			13.2	
Peak Hour Factor	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90
Heavy Vehicles (%)	0%	10%	0%	0%	7%	0%	0%	0%	3%	7%	0%	0%
Shared Lane Traffic (%)												
Lane Group Flow (vph)	11	267	0	67	411	22	11	55	0	33	22	0
Enter Blocked Intersection	No	No	No	No	No	No	No	No	No	No	No	No
Lane Alignment	Left	Left	Right	Left	Left	Right	Left	Left	Right	Left	Left	Right
Median Width(m)		5.6			5.6			3.6			3.6	
Link Offset(m)		0.0			0.0			0.0			0.0	
Crosswalk Width(m)		4.8			4.8			4.8			4.8	
Two way Left Turn Lane												
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Turning Speed (k/h)	25		15	25		15	25		15	25		15
Turn Type	pm+pt	NA		pm+pt	NA	Perm	Perm	NA		Perm	NA	
Protected Phases	5	2		1	6			8			4	
Permitted Phases	2			6		6	8			4		
Total Split (s)	21.0	42.0		21.0	42.0	42.0	32.0	32.0		32.0	32.0	
Total Lost Time (s)	6.0	7.0		6.0	7.0	7.0	7.0	7.0		7.0	7.0	
Act Effct Green (s)	40.6	39.2		42.8	43.8	43.8	12.2	12.2		12.2	12.2	
Actuated g/C Ratio	0.67	0.65		0.71	0.73	0.73	0.20	0.20		0.20	0.20	
v/c Ratio	0.01	0.13		0.08	0.17	0.02	0.04	0.15		0.13	0.06	
Control Delay	5.0	9.9		4.9	6.9	0.1	23.3	11.7		24.5	17.4	
Queue Delay	0.0	0.0		0.0	0.0	0.0	0.0	0.0		0.0	0.0	
Total Delay	5.0	9.9		4.9	6.9	0.1	23.3	11.7		24.5	17.4	
LOS	A	A		A	A	A	C	B		C	B	
Approach Delay		9.7			6.3			13.6			21.6	
Approach LOS		A			A			B			C	
Queue Length 50th (m)	0.5	11.0		2.9	11.0	0.0	1.2	1.2		3.7	1.2	
Queue Length 95th (m)	2.0	18.2		6.9	27.5	0.0	5.2	9.9		10.8	6.8	
Internal Link Dist (m)		204.6			387.6			146.2			159.8	
Turn Bay Length (m)	75.0			70.0		70.0	45.0			50.0		
Base Capacity (vph)	919	2337		955	2528	1238	598	717		542	751	
Starvation Cap Reductn	0	0		0	0	0	0	0		0	0	
Spillback Cap Reductn	0	0		0	0	0	0	0		0	0	
Storage Cap Reductn	0	0		0	0	0	0	0		0	0	

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Reduced v/c Ratio	0.01	0.11		0.07	0.16	0.02	0.02	0.08		0.06	0.03	

Intersection Summary			
Area Type:	Other		
Cycle Length: 95			
Actuated Cycle Length: 60.2			
Control Type: Actuated-Uncoordinated			
Maximum v/c Ratio: 0.17			
Intersection Signal Delay: 8.8		Intersection LOS: A	
Intersection Capacity Utilization 49.2%		ICU Level of Service A	
Analysis Period (min) 15			

Splits and Phases: 23: 70 Avenue & Highway 27

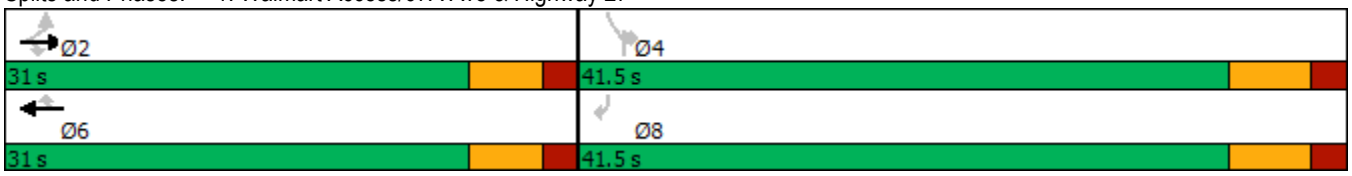


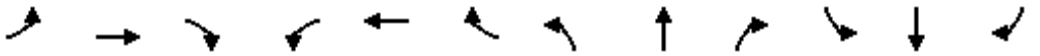
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	80	200	20	0	320	260	0	0	20	240	0	130
Future Volume (vph)	80	200	20	0	320	260	0	0	20	240	0	130
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (m)	80.0		30.0	80.0		30.0	0.0		30.0	0.0		30.0
Storage Lanes	1		1	0		1	0		0	1		1
Taper Length (m)	60.0			80.0			7.5			7.5		
Satd. Flow (prot)	1719	3312	1615	0	3374	1615	0	0	1096	1805	0	1583
Flt Permitted	0.543									0.950		
Satd. Flow (perm)	980	3312	1615	0	3374	1575	0	0	1096	1805	0	1583
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)			53			283			486			141
Link Speed (k/h)		60			60			50			50	
Link Distance (m)		411.6			406.1			117.8			163.6	
Travel Time (s)		24.7			24.4			8.5			11.8	
Confl. Peds. (#/hr)	3					3						
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Heavy Vehicles (%)	5%	9%	0%	0%	7%	0%	0%	0%	50%	0%	0%	2%
Shared Lane Traffic (%)												
Lane Group Flow (vph)	87	217	22	0	348	283	0	0	22	261	0	141
Enter Blocked Intersection	No	No	No	No	No	No	No	No	No	No	No	No
Lane Alignment	Left	Left	Right	Left	Left	Right	Left	Left	Right	Left	Left	Right
Median Width(m)		6.1			6.1			3.6			3.6	
Link Offset(m)		0.0			0.0			0.0			0.0	
Crosswalk Width(m)		4.8			4.8			4.8			4.8	
Two way Left Turn Lane												
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Turning Speed (k/h)	25		15	25		15	25		15	25		15
Turn Type	Perm	NA	Perm		NA	Perm			Perm	Perm		Perm
Protected Phases		2			6							
Permitted Phases	2		2			6			4	4		8
Total Split (s)	31.0	31.0	31.0		31.0	31.0			41.5	41.5		41.5
Total Lost Time (s)	6.0	6.0	6.0		6.0	6.0			6.5	6.5		6.5
Act Effct Green (s)	25.0	25.0	25.0		25.0	25.0			35.0	35.0		35.0
Actuated g/C Ratio	0.34	0.34	0.34		0.34	0.34			0.48	0.48		0.48
v/c Ratio	0.26	0.19	0.04		0.30	0.39			0.03	0.30		0.17
Control Delay	19.7	17.2	1.4		18.2	4.2			0.1	12.5		2.6
Queue Delay	0.0	0.0	0.0		0.0	0.0			0.0	0.0		0.0
Total Delay	19.7	17.2	1.4		18.2	4.2			0.1	12.5		2.6
LOS	B	B	A		B	A			A	B		A
Approach Delay		16.8			11.9			0.1			9.1	
Approach LOS		B			B			A			A	
Queue Length 50th (m)	8.8	11.3	0.0		18.8	0.0			0.0	21.4		0.0
Queue Length 95th (m)	19.8	18.8	1.4		29.0	15.0			0.0	36.3		8.3
Internal Link Dist (m)		387.6			382.1			93.8			139.6	
Turn Bay Length (m)	80.0		30.0			30.0			30.0			30.0
Base Capacity (vph)	337	1142	591		1163	728			780	871		837
Starvation Cap Reductn	0	0	0		0	0			0	0		0
Spillback Cap Reductn	0	0	0		0	0			0	0		0

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Storage Cap Reductn	0	0	0		0	0			0	0		0
Reduced v/c Ratio	0.26	0.19	0.04		0.30	0.39			0.03	0.30		0.17

Intersection Summary			
Area Type:	Other		
Cycle Length: 72.5			
Actuated Cycle Length: 72.5			
Control Type: Semi Act-Uncoord			
Maximum v/c Ratio: 0.39			
Intersection Signal Delay: 12.1		Intersection LOS: B	
Intersection Capacity Utilization 53.3%		ICU Level of Service A	
Analysis Period (min) 15			

Splits and Phases: 1: Walmart Access/67A Ave & Highway 27



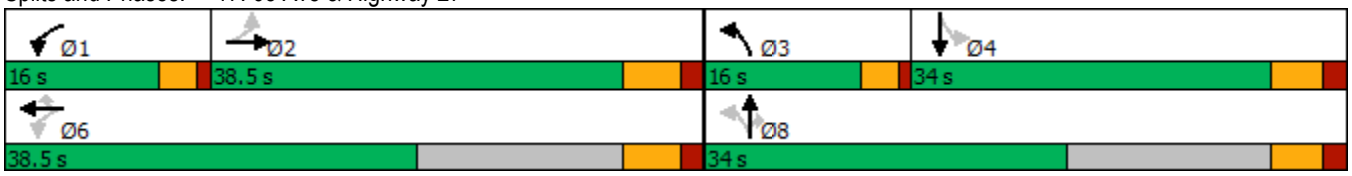


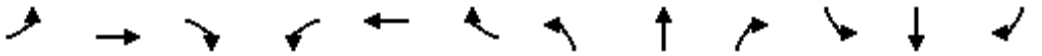
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	30	320	110	110	400	160	130	60	100	140	80	50
Future Volume (vph)	30	320	110	110	400	160	130	60	100	140	80	50
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (m)	80.0		0.0	70.0		25.0	0.0		25.0	0.0		0.0
Storage Lanes	1		0	1		1	0		1	1		0
Taper Length (m)	30.0			50.0			7.5			7.5		
Satd. Flow (prot)	1641	3305	0	1752	3471	1583	0	1826	1583	1787	1716	0
Flt Permitted	0.510			0.373				0.578		0.634		
Satd. Flow (perm)	877	3305	0	688	3471	1540	0	1076	1562	1192	1716	0
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)		47				165			103		30	
Link Speed (k/h)		60			60			50			50	
Link Distance (m)		406.1			805.5			80.7			74.7	
Travel Time (s)		24.4			48.3			5.8			5.4	
Confl. Peds. (#/hr)	4		1	1		4	22		1	1		22
Peak Hour Factor	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97
Heavy Vehicles (%)	10%	5%	3%	3%	4%	2%	0%	2%	2%	1%	0%	7%
Shared Lane Traffic (%)												
Lane Group Flow (vph)	31	443	0	113	412	165	0	196	103	144	134	0
Enter Blocked Intersection	No	No	No	No	No	No	No	No	No	No	No	No
Lane Alignment	Left	Left	Right	Left	Left	Right	Left	Left	Right	Left	Left	Right
Median Width(m)		6.1			6.1			5.6			5.6	
Link Offset(m)		0.0			0.0			0.0			0.0	
Crosswalk Width(m)		4.8			4.8			4.8			4.8	
Two way Left Turn Lane												
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Turning Speed (k/h)	25		15	25		15	25		15	25		15
Turn Type	Perm	NA		pm+pt	NA	Perm	pm+pt	NA	Perm	Perm	NA	
Protected Phases		2		1	6		3	8			4	
Permitted Phases	2			6		6	8		8	4		
Total Split (s)	38.5	38.5		16.0	38.5	38.5	16.0	34.0	34.0	34.0	34.0	
Total Lost Time (s)	6.5	6.5		4.0	6.5	6.5		6.0	6.0	6.0	6.0	
Act Effct Green (s)	18.1	18.1		30.6	28.0	28.0		30.1	30.1	15.8	15.8	
Actuated g/C Ratio	0.25	0.25		0.43	0.39	0.39		0.42	0.42	0.22	0.22	
v/c Ratio	0.14	0.50		0.26	0.30	0.23		0.36	0.14	0.54	0.33	
Control Delay	26.0	24.1		14.6	15.6	3.7		16.9	4.0	35.7	23.0	
Queue Delay	0.0	0.0		0.0	0.0	0.0		0.0	0.0	0.0	0.0	
Total Delay	26.0	24.1		14.6	15.6	3.7		16.9	4.0	35.7	23.0	
LOS	C	C		B	B	A		B	A	D	C	
Approach Delay		24.3			12.6			12.5			29.6	
Approach LOS		C			B			B			C	
Queue Length 50th (m)	3.4	25.1		8.8	19.3	0.0		17.3	0.0	18.2	12.3	
Queue Length 95th (m)	11.9	47.7		21.8	35.8	11.2		38.1	9.1	41.8	31.3	
Internal Link Dist (m)		382.1			781.5			56.7			50.7	
Turn Bay Length (m)	80.0			70.0		25.0			25.0			
Base Capacity (vph)	411	1574		483	2440	1131		803	1043	488	721	
Starvation Cap Reductn	0	0		0	0	0		0	0	0	0	
Spillback Cap Reductn	0	0		0	0	0		0	0	0	0	

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Storage Cap Reductn	0	0		0	0	0		0	0	0	0	
Reduced v/c Ratio	0.08	0.28		0.23	0.17	0.15		0.24	0.10	0.30	0.19	

Intersection Summary			
Area Type:	Other		
Cycle Length: 104.5			
Actuated Cycle Length: 71.1			
Control Type: Actuated-Uncoordinated			
Maximum v/c Ratio: 0.54			
Intersection Signal Delay: 18.5		Intersection LOS: B	
Intersection Capacity Utilization 73.4%		ICU Level of Service D	
Analysis Period (min) 15			

Splits and Phases: 17: 65 Ave & Highway 27



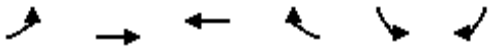


Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	80	470	130	90	490	80	130	90	70	90	80	70
Future Volume (vph)	80	470	130	90	490	80	130	90	70	90	80	70
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (m)	90.0		0.0	30.0		0.0	0.0		10.0	0.0		10.0
Storage Lanes	1		0	1		0	0		1	0		1
Taper Length (m)	40.0			30.0			7.5			7.5		
Satd. Flow (prot)	1736	3356	0	1787	3465	0	0	1816	1599	0	1804	1583
Flt Permitted	0.338			0.317				0.676			0.690	
Satd. Flow (perm)	617	3356	0	596	3465	0	0	1264	1599	0	1278	1583
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)		43			22				72			72
Link Speed (k/h)		50			50			50			50	
Link Distance (m)		805.5			697.8			130.8			121.6	
Travel Time (s)		58.0			50.2			9.4			8.8	
Peak Hour Factor	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97
Heavy Vehicles (%)	4%	5%	1%	1%	2%	2%	2%	1%	1%	4%	1%	2%
Shared Lane Traffic (%)												
Lane Group Flow (vph)	82	619	0	93	587	0	0	227	72	0	175	72
Enter Blocked Intersection	No	No	No	No	No	No	No	No	No	No	No	No
Lane Alignment	Left	Left	Right	Left	Left	Right	Left	Left	Right	Left	Left	Right
Median Width(m)		6.1			6.1			0.0			0.0	
Link Offset(m)		0.0			0.0			0.0			0.0	
Crosswalk Width(m)		4.8			4.8			4.8			4.8	
Two way Left Turn Lane												
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Turning Speed (k/h)	25		15	25		15	25		15	25		15
Turn Type	pm+pt	NA		pm+pt	NA		Perm	NA	Perm	Perm	NA	Perm
Protected Phases	5	2		1	6			4			8	
Permitted Phases	2			6			4		4	8		8
Total Split (s)	19.0	38.0		19.0	38.0		34.5	34.5	34.5	34.5	34.5	34.5
Total Lost Time (s)	4.0	5.0		4.0	5.0			4.5	4.5		4.5	4.5
Act Effct Green (s)	49.0	33.0		49.0	33.0			30.0	30.0		30.0	30.0
Actuated g/C Ratio	0.54	0.36		0.54	0.36			0.33	0.33		0.33	0.33
v/c Ratio	0.16	0.50		0.18	0.46			0.55	0.13		0.42	0.13
Control Delay	9.4	22.8		9.6	23.0			31.2	6.2		27.7	6.2
Queue Delay	0.0	0.0		0.0	0.0			0.0	0.0		0.0	0.0
Total Delay	9.4	22.8		9.6	23.0			31.2	6.2		27.7	6.2
LOS	A	C		A	C			C	A		C	A
Approach Delay		21.2			21.2			25.2			21.5	
Approach LOS		C			C			C			C	
Queue Length 50th (m)	6.2	43.0		7.1	41.5			34.1	0.0		25.0	0.0
Queue Length 95th (m)	12.6	59.4		14.0	57.2			58.3	9.3		44.2	9.3
Internal Link Dist (m)		781.5			673.8			106.8			97.6	
Turn Bay Length (m)	90.0			30.0					10.0			10.0
Base Capacity (vph)	513	1237		514	1263			414	572		419	567
Starvation Cap Reductn	0	0		0	0			0	0		0	0
Spillback Cap Reductn	0	0		0	0			0	0		0	0
Storage Cap Reductn	0	0		0	0			0	0		0	0

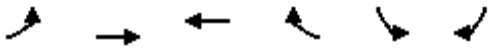
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Reduced v/c Ratio	0.16	0.50		0.18	0.46			0.55	0.13		0.42	0.13

Intersection Summary			
Area Type:	Other		
Cycle Length: 91.5			
Actuated Cycle Length: 91.5			
Control Type: Semi Act-Uncoord			
Maximum v/c Ratio: 0.55			
Intersection Signal Delay: 21.9		Intersection LOS: C	
Intersection Capacity Utilization 52.0%		ICU Level of Service A	
Analysis Period (min) 15			

Splits and Phases: 14: 57 Ave & Highway 27



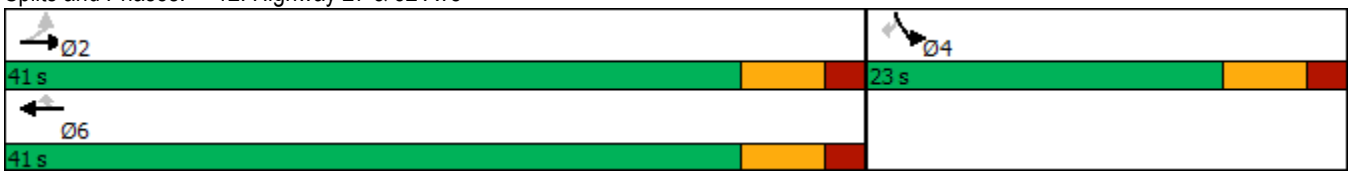
Lane Group	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Traffic Volume (vph)	40	500	660	30	30	40
Future Volume (vph)	40	500	660	30	30	40
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Storage Length (m)	0.0			20.0	0.0	10.0
Storage Lanes	0			1	1	1
Taper Length (m)	7.5				7.5	
Satd. Flow (prot)	0	3436	3471	1553	1656	1583
Flt Permitted		0.872			0.950	
Satd. Flow (perm)	0	3007	3471	1499	1656	1549
Right Turn on Red				Yes		Yes
Satd. Flow (RTOR)				32		43
Link Speed (k/h)		50	50		50	
Link Distance (m)		697.8	226.5		137.7	
Travel Time (s)		50.2	16.3		9.9	
Confl. Peds. (#/hr)	8			8		9
Peak Hour Factor	0.93	0.93	0.93	0.93	0.93	0.93
Heavy Vehicles (%)	0%	5%	4%	4%	9%	2%
Shared Lane Traffic (%)						
Lane Group Flow (vph)	0	581	710	32	32	43
Enter Blocked Intersection	No	No	No	No	No	No
Lane Alignment	Left	Left	Left	Right	Left	Right
Median Width(m)		0.0	0.0		3.6	
Link Offset(m)		0.0	0.0		0.0	
Crosswalk Width(m)		4.8	4.8		4.8	
Two way Left Turn Lane						
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00
Turning Speed (k/h)	25			15	25	15
Turn Type	Perm	NA	NA	Perm	Prot	Perm
Protected Phases		2	6		4	
Permitted Phases	2			6		4
Total Split (s)	41.0	41.0	41.0	41.0	23.0	23.0
Total Lost Time (s)		6.0	6.0	6.0	6.0	6.0
Act Effct Green (s)		43.3	43.3	43.3	8.1	8.1
Actuated g/C Ratio		0.78	0.78	0.78	0.15	0.15
v/c Ratio		0.25	0.26	0.03	0.13	0.16
Control Delay		3.8	3.7	1.8	21.9	9.6
Queue Delay		0.0	0.0	0.0	0.0	0.0
Total Delay		3.8	3.7	1.8	21.9	9.6
LOS		A	A	A	C	A
Approach Delay		3.8	3.7		14.9	
Approach LOS		A	A		B	
Queue Length 50th (m)		11.7	14.6	0.0	3.0	0.0
Queue Length 95th (m)		19.1	22.7	2.2	9.3	7.1
Internal Link Dist (m)		673.8	202.5		113.7	
Turn Bay Length (m)				20.0		10.0
Base Capacity (vph)		2346	2708	1176	506	504
Starvation Cap Reductn		0	0	0	0	0
Spillback Cap Reductn		0	0	0	0	0

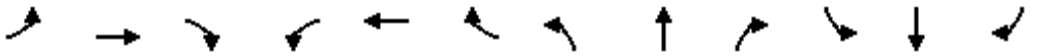


Lane Group	EBL	EBT	WBT	WBR	SBL	SBR
Storage Cap Reductn		0	0	0	0	0
Reduced v/c Ratio		0.25	0.26	0.03	0.06	0.09

Intersection Summary			
Area Type:	Other		
Cycle Length: 64			
Actuated Cycle Length: 55.5			
Control Type: Semi Act-Uncoord			
Maximum v/c Ratio: 0.26			
Intersection Signal Delay: 4.3		Intersection LOS: A	
Intersection Capacity Utilization 68.3%		ICU Level of Service C	
Analysis Period (min) 15			

Splits and Phases: 12: Highway 27 & 52 Ave



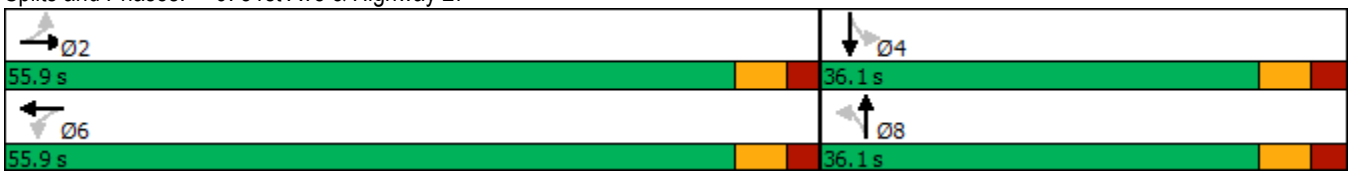


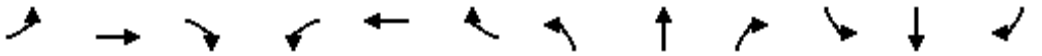
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	10	480	60	30	550	20	50	10	20	10	10	10
Future Volume (vph)	10	480	60	30	550	20	50	10	20	10	10	10
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (m)	60.0		0.0	60.0		0.0	30.0		0.0	0.0		0.0
Storage Lanes	1		0	1		0	0		0	1		0
Taper Length (m)	80.0			80.0			40.0			7.5		
Satd. Flow (prot)	1805	3411	0	1736	3484	0	1805	1687	0	1504	1744	0
Flt Permitted	0.425			0.439			0.743			0.736		
Satd. Flow (perm)	795	3411	0	794	3484	0	1406	1687	0	1152	1744	0
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)		23			6			21			11	
Link Speed (k/h)		50			50			50			50	
Link Distance (m)		226.5			173.9			143.4			146.6	
Travel Time (s)		16.3			12.5			10.3			10.6	
Confl. Peds. (#/hr)	19		11	11		19	4		12	12		4
Peak Hour Factor	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Heavy Vehicles (%)	0%	4%	0%	4%	3%	0%	0%	0%	0%	20%	0%	0%
Shared Lane Traffic (%)												
Lane Group Flow (vph)	11	568	0	32	600	0	53	32	0	11	22	0
Enter Blocked Intersection	No	No	No	No	No	No	No	No	No	No	No	No
Lane Alignment	Left	Left	Right	Left	Left	Right	Left	Left	Right	Left	Left	Right
Median Width(m)		3.6			3.6			3.6			3.6	
Link Offset(m)		0.0			0.0			0.0			0.0	
Crosswalk Width(m)		4.8			4.8			4.8			4.8	
Two way Left Turn Lane												
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Turning Speed (k/h)	25		15	25		15	25		15	25		15
Turn Type	Perm	NA		Perm	NA		Perm	NA		Perm	NA	
Protected Phases		2			6			8			4	
Permitted Phases	2			6			8			4		
Total Split (s)	55.9	55.9		55.9	55.9		36.1	36.1		36.1	36.1	
Total Lost Time (s)	5.9	5.9		5.9	5.9		6.1	6.1		6.1	6.1	
Act Effct Green (s)	38.5	38.5		38.5	38.5		10.0	10.0		10.0	10.0	
Actuated g/C Ratio	0.75	0.75		0.75	0.75		0.19	0.19		0.19	0.19	
v/c Ratio	0.02	0.22		0.05	0.23		0.19	0.09		0.05	0.06	
Control Delay	4.9	4.3		5.1	4.4		19.7	11.5		17.9	13.4	
Queue Delay	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Total Delay	4.9	4.3		5.1	4.4		19.7	11.5		17.9	13.4	
LOS	A	A		A	A		B	B		B	B	
Approach Delay		4.3			4.5			16.7			14.9	
Approach LOS		A			A			B			B	
Queue Length 50th (m)	0.4	12.1		1.2	13.4		4.4	0.9		0.9	0.9	
Queue Length 95th (m)	1.9	19.0		4.0	20.5		12.3	6.5		4.2	5.5	
Internal Link Dist (m)		202.5			149.9			119.4			122.6	
Turn Bay Length (m)	60.0			60.0			30.0					
Base Capacity (vph)	770	3308		769	3379		818	990		670	1019	
Starvation Cap Reductn	0	0		0	0		0	0		0	0	
Spillback Cap Reductn	0	0		0	0		0	0		0	0	

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Storage Cap Reductn	0	0		0	0		0	0		0	0	
Reduced v/c Ratio	0.01	0.17		0.04	0.18		0.06	0.03		0.02	0.02	

Intersection Summary			
Area Type:	Other		
Cycle Length: 92			
Actuated Cycle Length: 51.6			
Control Type: Actuated-Uncoordinated			
Maximum v/c Ratio: 0.23			
Intersection Signal Delay: 5.4		Intersection LOS: A	
Intersection Capacity Utilization 49.0%		ICU Level of Service A	
Analysis Period (min) 15			

Splits and Phases: 9: 51st Ave & Highway 27



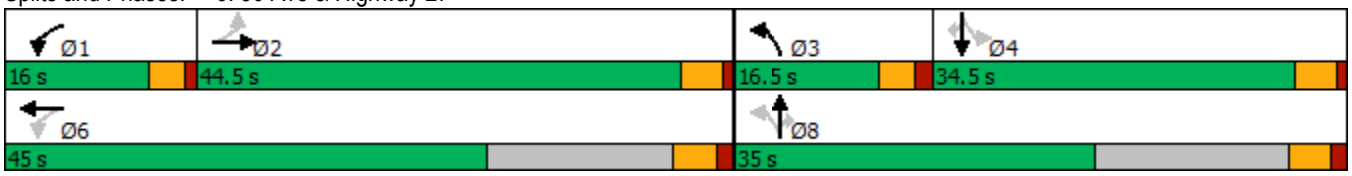


Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	30	400	60	70	450	70	130	60	70	80	60	40
Future Volume (vph)	30	400	60	70	450	70	130	60	70	80	60	40
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (m)	0.0		0.0	0.0		0.0	0.0		50.0	0.0		35.0
Storage Lanes	0		0	0		0	0		1	0		1
Taper Length (m)	7.5			7.5			7.5			7.5		
Satd. Flow (prot)	0	3370	0	0	3378	0	0	1837	1583	0	1836	1524
Flt Permitted		0.887			0.780			0.528			0.713	
Satd. Flow (perm)	0	2996	0	0	2649	0	0	995	1545	0	1340	1478
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)		15			19				75			103
Link Speed (k/h)		50			50			50			50	
Link Distance (m)		173.9			528.1			104.3			106.1	
Travel Time (s)		12.5			38.0			7.5			7.6	
Confl. Peds. (#/hr)	8		6	6		8	12		8	8		12
Peak Hour Factor	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93
Heavy Vehicles (%)	0%	5%	2%	0%	5%	0%	0%	0%	2%	1%	0%	6%
Shared Lane Traffic (%)												
Lane Group Flow (vph)	0	527	0	0	634	0	0	205	75	0	151	43
Enter Blocked Intersection	No	No	No	No	No	No	No	No	No	No	No	No
Lane Alignment	Left	Left	Right	Left	Left	Right	Left	Left	Right	Left	Left	Right
Median Width(m)		0.0			0.0			0.0			0.0	
Link Offset(m)		0.0			0.0			0.0			0.0	
Crosswalk Width(m)		4.8			4.8			4.8			4.8	
Two way Left Turn Lane												
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Turning Speed (k/h)	25		15	25		15	25		15	25		15
Turn Type	Perm	NA		pm+pt	NA		pm+pt	NA	Perm	Perm	NA	Perm
Protected Phases		2		1	6		3	8			4	
Permitted Phases	2			6			8		8	4		4
Total Split (s)	44.5	44.5		16.0	45.0		16.5	35.0	35.0	34.5	34.5	34.5
Total Lost Time (s)		4.5			5.0			5.0	5.0		4.5	4.5
Act Effct Green (s)		19.8			35.2			29.7	29.7		14.9	14.9
Actuated g/C Ratio		0.26			0.47			0.40	0.40		0.20	0.20
v/c Ratio		0.66			0.47			0.40	0.11		0.57	0.11
Control Delay		28.6			14.3			18.7	4.7		37.8	0.6
Queue Delay		0.0			0.0			0.0	0.0		0.0	0.0
Total Delay		28.6			14.3			18.7	4.7		37.8	0.6
LOS		C			B			B	A		D	A
Approach Delay		28.6			14.3			15.0			29.5	
Approach LOS		C			B			B			C	
Queue Length 50th (m)		35.2			29.1			19.7	0.0		20.4	0.0
Queue Length 95th (m)		57.7			49.6			40.2	8.1		43.2	0.0
Internal Link Dist (m)		149.9			504.1			80.3			82.1	
Turn Bay Length (m)									50.0			35.0
Base Capacity (vph)		1629			2104			751	990		544	661
Starvation Cap Reductn		0			0			0	0		0	0
Spillback Cap Reductn		0			0			0	0		0	0

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Storage Cap Reductn		0			0			0	0		0	0
Reduced v/c Ratio		0.32			0.30			0.27	0.08		0.28	0.07

Intersection Summary			
Area Type:	Other		
Cycle Length: 111.5			
Actuated Cycle Length: 75			
Control Type: Actuated-Uncoordinated			
Maximum v/c Ratio: 0.66			
Intersection Signal Delay: 20.8		Intersection LOS: C	
Intersection Capacity Utilization 61.3%		ICU Level of Service B	
Analysis Period (min) 15			

Splits and Phases: 6: 50 Ave & Highway 27



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	80	310	90	90	210	30	120	90	140	60	100	150
Future Volume (vph)	80	310	90	90	210	30	120	90	140	60	100	150
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (m)	0.0		0.0	0.0		170.0	0.0		100.0	0.0		100.0
Storage Lanes	0		0	0		1	0		1	0		1
Taper Length (m)	7.5			7.5			7.5			7.5		
Satd. Flow (prot)	0	3301	0	0	3281	0	0	1776	1538	0	1781	1524
Flt Permitted		0.955			0.955			0.502			0.778	
Satd. Flow (perm)	0	3178	0	0	3174	0	0	917	1538	0	1411	1524
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)		38			13				156			209
Link Speed (k/h)		50			50			50			50	
Link Distance (m)		528.1			342.3			155.6			175.4	
Travel Time (s)		38.0			24.6			11.2			12.6	
Peak Hour Factor	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90
Heavy Vehicles (%)	5%	6%	4%	5%	7%	14%	1%	8%	5%	6%	4%	6%
Shared Lane Traffic (%)												
Lane Group Flow (vph)	0	533	0	0	366	0	0	233	156	0	178	167
Enter Blocked Intersection	No	No	No	No	No	No	No	No	No	No	No	No
Lane Alignment	Left	Left	Right	Left	Left	Right	Left	Left	Right	Left	Left	Right
Median Width(m)		0.0			0.0			0.0			0.0	
Link Offset(m)		0.0			0.0			0.0			0.0	
Crosswalk Width(m)		4.8			4.8			4.8			4.8	
Two way Left Turn Lane												
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Turning Speed (k/h)	25		15	25		15	25		15	25		15
Turn Type	pm+pt	NA		pm+pt	NA		pm+pt	NA	Perm	Perm	NA	Perm
Protected Phases	5	2		1	6		7	4			8	
Permitted Phases	2			6			4		4	8		8
Total Split (s)	20.0	21.0		15.0	16.0		14.0	28.0	28.0	18.0	18.0	18.0
Total Lost Time (s)		6.0			6.0			6.0	6.0		6.0	6.0
Act Effct Green (s)		15.0			10.6			25.5	25.5		11.6	11.6
Actuated g/C Ratio		0.22			0.16			0.38	0.38		0.17	0.17
v/c Ratio		0.70			0.70			0.52	0.23		0.74	0.38
Control Delay		28.2			35.1			19.9	3.8		46.7	5.1
Queue Delay		0.0			0.0			0.0	0.0		0.0	0.0
Total Delay		28.2			35.1			19.9	3.8		46.7	5.1
LOS		C			D			B	A		D	A
Approach Delay		28.2			35.1			13.4			26.6	
Approach LOS		C			D			B			C	
Queue Length 50th (m)		32.1			24.1			21.5	0.0		22.6	0.0
Queue Length 95th (m)		48.3			#42.7			37.9	10.3		#51.1	9.5
Internal Link Dist (m)		504.1			318.3			131.6			151.4	
Turn Bay Length (m)									100.0			100.0
Base Capacity (vph)		761			523			455	688		251	443
Starvation Cap Reductn		0			0			0	0		0	0
Spillback Cap Reductn		0			0			0	0		0	0
Storage Cap Reductn		0			0			0	0		0	0

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Reduced v/c Ratio		0.70			0.70			0.51	0.23		0.71	0.38

Intersection Summary			
Area Type:	Other		
Cycle Length: 68			
Actuated Cycle Length: 67.5			
Control Type: Actuated-Uncoordinated			
Maximum v/c Ratio: 0.74			
Intersection Signal Delay: 25.9		Intersection LOS: C	
Intersection Capacity Utilization 56.2%		ICU Level of Service B	
Analysis Period (min) 15			

\# 95th percentile volume exceeds capacity, queue may be longer.
Queue shown is maximum after two cycles.

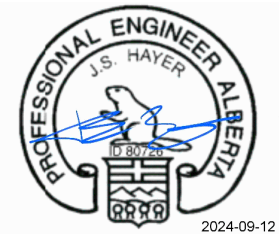
Splits and Phases: 3: 46 Ave (Highway 2A) & Highway 27

E

Appendix E
Traffic Signal Infrastructure Assessment

Traffic Signals Infrastructure Assessment
Highway 27 from 70 Ave to Highway 2A
Olds, AB

PERMIT TO PRACTICE
POWERLOOP CONSULTING INC.
RM SIGNATURE: Gurpreet Kaur
RM APEGA ID #: 170438
DATE: Sep. 12, 2024
PERMIT NUMBER: P15280
The Association of Professional Engineers and Geoscientists of Alberta (APEGA)



Date: September 12, 2024

Author: Jatinder Hayer

Background:

As part of the study undertaken by CIMA, requested by Alberta Transportation and Economic Corridors - the Traffic Signal infrastructure assessment was completed by Powerloop Consulting as Traffic Systems Electrical Engineering sub-consultant to CIMA+ to determine upgrades required for the future co-ordination of signals, and, to identify other deficiencies that require repair or upgrade of existing appurtenances.

This assessment is based on a site visit and a review of the Contractor's Fall maintenance report. The site visit was completed on October 18th 2023. The annual maintenance report was commissioned by the area maintenance contractor and completed in the Fall of 2023.

The assessment is based on visual observation of above ground appurtenances only. Condition of foundations, wiring and other underground installation was not undertaken.

Following intersections on Highway 27:06 (from west to east) were reviewed:

1. 70 Avenue, km 36.490
2. 67A Avenue (Walmart access), km 36.863
3. 65 Avenue, km 37.278
4. 57 Avenue, km 38.083
5. 52 Avenue, km 38.782
6. 51 Avenue, km 39.018
7. 50 Avenue, km 39.188
8. 46 Avenue (Hwy 2A), km 39.715

SUMMARY:

1. Hwy 27 and 70 Ave Intersection

This intersection is a relatively newer installation. Some deficiencies were found which should have been identified through inspections during construction and/or at substantial completion. It is recommended that deficiencies get rectified under warranty, if still valid. This inspection was completed as a value add and no cost estimate for upgrades at this intersection is provided.

2. Hwy 27 and 67A Ave Intersection

Currently operating as a T-intersection, the traffic signal at this location had been installed with provisions for future south leg addition. Item needing immediate attention here is the video detection system, which is non-functional as terra interface panel (TIP) inside the traffic cabinet has failed, causing the signal to constantly operate in a recall

cycle mode. Other deficiencies related to signal heads were noticed and could be addressed at the time of preventive maintenance.

3. Hwy 27 and 65 Ave Intersection

Minor deficiencies related to signal heads, countdown timers and push buttons were noticed and could be addressed at the time of preventive maintenance.

4. Hwy 27 and 57 Ave Intersection

In pavement detection loops at this intersection appear to have failed causing the operation to constantly operate in recall cycle. Other deficiencies related to signal heads were noticed and could be addressed at the time of preventive maintenance.

The traffic cabinet at this intersection was replaced recently although most hardware inside is original from several years ago, including the traffic controller. Structures and other hardware at this intersection is not built to TEC specifications. A rebuild of the intersection in 5 to 10 years should be planned.

5. Hwy 27 and 52 Ave Intersection

The geometry of the intersection is awkward, and the installation is not as per TEC specifications. A rebuild of the intersection should be planned. Short term improvements are recommended to replace a few signal heads and pedestrian audible signals.

6. Hwy 27 and 51 Ave Intersection

Minor deficiencies related to countdown timers were noticed at this location and could be addressed at the time of preventive maintenance.

7. Hwy 27 and 50 Ave Intersection

Minor deficiencies related to countdown timers and push buttons were noticed at this location and could be addressed at the time of preventive maintenance.

This intersection has a rail pre-emption and TEC had requested verification of the pre-emption operation. Two train crossings were observed during the field visit and traffic signals were observed to operate as intended. The rail pre-emption timing program was manually deciphered from the controller by the maintenance contractor's signal technician and is provided in APPENDIX B.

8. Hwy 27 and Hwy 2A Intersection

Major issues at this intersection include lack of real estate and poor power quality. Several power outages and brownouts have required service calls in the past few years and traffic signal pole shafts appear to be repeatedly hit by large turning vehicles. A rebuild of the intersection is recommended but will likely require property acquisition and relocating overhead power line to underground. In the short term, power quality issues can be addressed with addition of a battery back-up uninterruptible power system (UPS).

FIELD REVIEW AND RECOMMENDATIONS:

A detailed description of findings during the site reviews at each intersection is provided in this section. Discussions related to traffic control system components and other field appurtenances are provided separately.

Intersection of Highway 27 and 70 Ave

Traffic Control Cabinet and System Components:

Existing Equipment		Comments / Recommendations	Priority
Controller	Cobalt-1000	NA	NA
TC Cabinet	M-Cabinet	Wiring inside cabinet could be organized and cleaned up.	Low
		Cabinet Foundation lower than TEC specification, should be raised.	Low
Vehicle Detection	Video – AS Vision	Detection for WB traffic not working. Repair or replacement required.	Med
		Camera mounting extensions are short – longer extension may improve detector accuracy.	Low
Pre-emption	None	NA	NA
MMU	MMU2-16LEip	NA	NA
UPS – Battery Backup	None	NA	NA
Network	None	NA	NA
GPS Time Clock	None	GPS Timeclock required if coordination is desired	High
Coordination	None	NA	NA
Monitoring	None	NA	NA
PDC	AC Dandy Metered	Cabinet Foundation lower than TEC specification, should be raised.	Low

Other Issues and recommendations:

1. NW pole base shows concrete spalling, rebar is not visible. It is unclear if the base is built to TEC specification. Recommend follow up with construction contractor to ensure base is built to spec. *Priority: Medium*
2. Some of the junction boxes are not flush with grade. Recommend remediation of the deficiency under warranty or through maintenance. *Priority: Low*
3. Stop lines and crosswalk markings are not visible. Recommend repainting markings using durable paint. *Priority: Medium*
4. EB Advance Warning Flasher sign assembly appears to be non-standard installation and also has exposed wiring for one flashing beacon. Recommend replacement/repair. *Priority: Low.*
5. Neither TC nor PDC had lock on during field visit. Recommend putting standard TEC locks on cabinets to minimize risk of theft and vandalism. *Priority: Medium.*

Intersection of Highway 27 and 67A Ave

Traffic Control Cabinet and System Components:

Existing Equipment		Comments / Recommendations	Priority
Controller	ASC3-1000	Consider replacing with Cobalt 1000	Low
TC Cabinet	M-Cabinet	NA	NA
Vehicle Detection	Video – AS Solo Terra	Terra Interface Panel (TIP) appears to be non-functional, video detection not working. Repair or replacement of TIP is required.	High
Pre-emption	None	NA	NA
MMU	MMU2-16LEip	NA	NA
UPS – Battery Backup	None	NA	NA
Network	Encom	Radio installed but no connection to TC, no network	NA
GPS Time Clock	None	GPS Timeclock required if coordination is desired	High
Coordination	None	NA	NA
Monitoring	None	NA	NA
PDC	AC Dandy Metered	NA	NA

Other Issues and recommendations:

1. SB overhead 3-section vehicle signal head has a broken backboard. Recommend replacing the backboard. *Priority: Medium*
2. Paint on pedestrian head enclosures is flaking exposing the metal underneath. Provide coating or replace. *Priority: Low*
3. Neither TC nor PDC had lock on during field visit. Recommend putting standard TEC locks on cabinets to minimize the risk of theft and vandalism. *Priority: Medium.*

2. Intersection of Highway 27 and 65 Ave

Traffic Control Cabinet and System Components:

Existing Equipment		Comments / Recommendations	Priority
Controller	ASC/2S-1000	Consider replacing with COBALT	Low
TC Cabinet	M-Cabinet	NA	NA
Vehicle Detection	Video – AS Encore		
	EB det w/ Microwave		
Pre-emption	None	NA	NA
MMU	MMU-16R	NA	NA
UPS – Battery Backup	None	NA	NA
Network	Encom	Radio installed but no connection to TC, no network	NA
GPS Time Clock	None	GPS Timeclock required if coordination is desired	High
Coordination	None	NA	NA
Monitoring	None	NA	NA
PDC	AC Dandy Metered Pedestal	NA	NA

Other Issues and recommendations:

1. SB overhead 3-section vehicle signal head has a broken backboard. Recommend replacing the backboard. *Priority: Medium*
2. Countdown timers not working on: SW corner facing North and NW corner facing South. Replace bimodal inserts. *Priority: Medium*
3. Push button in NW corner has a faint beep, indicating imminent failure. Replace button. *Priority: Medium*
4. Neither TC nor PDC had lock on during field visit. Recommend putting standard TEC locks on cabinets to minimize the risk of theft and vandalism. *Priority: Medium.*
5. WB cantilever pole appears to be leaning down slightly. Undertake structural review and measure clearances. *Priority: Low*

3. Intersection of Highway 27 and 57 Ave

Traffic Control Cabinet and System Components:

Existing Equipment		Comments / Recommendations	Priority
Controller	ASC/2S-1000	Consider replacing with COBALT	Low
TC Cabinet	M-Cabinet	Newer Cabinet	NA
Vehicle Detection	Loops – thru lanes	All detectors appear to have failed and need to be replaced. Recommend replacement with video detection	High
	Accusense (magnetic) – LT lanes	NA	NA
Pre-emption	None	NA	NA
MMU	MMU-16LEip	NA	NA
UPS – Battery Backup	None	NA	NA
Network	None	NA	NA
GPS Time Clock	None	GPS Timeclock required if coordination is desired	High
Coordination	None	NA	NA
Monitoring	None	NA	NA
PDC	NA	NA	NA

Other Issues and recommendations:

This is an older installation that is not built to TEC specification. Traffic poles, bases and some of the signal heads are non-standard. Recommend rebuild of the intersection in the medium to long term. Observed issues and recommendations for upgrades until a complete rebuild is undertaken are provided below.

1. Secondary signal heads are 8” and some have damaged visors. Recommend replacing with standard signal heads and backboards. *Priority: Medium*
2. WB cantilever overhead signal is angled down. Adjust as required and tighten mounting hardware. *Priority: Medium*
3. Push button signs missing. Recommend adding signs below push buttons. *Priority: low*

4. Intersection of Highway 27 and 52 Ave

Traffic Control Cabinet and System Components:

Existing Equipment		Comments / Recommendations	Priority
Controller	ASC/2S-1000	Consider replacing with COBALT	Low
TC Cabinet	M-Cabinet	NA	NA
Vehicle Detection	AS Encore	Only SB Detector	NA
Pre-emption	None	NA	NA
MMU	MMU2-16E	NA	NA
UPS – Battery Backup	None	NA	NA
Network	None	NA	NA
GPS Time Clock	None	GPS Timeclock required if coordination is desired	High
Coordination	None	NA	NA
Monitoring	None	NA	NA
PDC	NA	NA	NA

Other Issues and recommendations:

This is an older non-standard installation that will require a rebuild to bring it to current standard. Major issues include:

1. Although the signal is intended to operate as a T-intersection, southbound vehicle drivers may still drive through as there is no “DO NOT ENTER” or Lane Use signage that would indicate the through movement is prohibited.
2. An alley exists between the SB vehicle display structure and pedestrian crossing across east leg, making the intersection layout awkward. The proximity of electrical utility pole with a speed sign on it to the pedestrian signal post in the NW corner appears to limit visibility of the pedestrian signal display for WB direction (across north leg).
3. No metered power cabinet at this location.
4. All pole base tops are below finished grade.

While the above issues will require a re-design of the intersection and should be a long term objective, other issues listed below require near term attention:

1. Some of the existing signal heads are non-standard 8” display and there is damage to one visor. Recommend replacing signal heads, door and backboards. *Priority: Medium*
2. Audible Pedestrian Signal in the NE corner is not working and needs replacement. *Priority: Medium*

5. Intersection of Highway 27 and 51 Ave

Traffic Control Cabinet and System Components:

Existing Equipment		Comments / Recommendations	Priority
Controller	Cobalt-1000	NA	NA
TC Cabinet	P-Cabinet	NA	NA
Vehicle Detection	ITERIS Smart Cycle	NA	NA
Pre-emption	NA	NA	NA
MMU	MMU-16E	NA	NA
UPS – Battery Backup	None	NA	NA
Network	None	NA	NA
GPS Time Clock	None	GPS Timeclock required if coordination is desired	High
Coordination	None	NA	NA
Monitoring	None	NA	NA
PDC	AC Dandy – Metered Cabinet	NA	NA
HWY 27 & 51 Ave			

Other Issues and recommendations:

Some issues identified:

1. Pedestrian countdown timer in the SW corner for SB pedestrians is not working. Recommend replacement. *Priority: Medium*

6. Intersection of Highway 27 and 50 Ave

Traffic Control Cabinet and System Components:

Existing Equipment		Comments / Recommendations	Priority
Controller	ASC/2S-1000	Consider replacing with COBALT	Low
TC Cabinet	M-Cabinet	NA	NA
Vehicle Detection	AS Encore	NA	NA
Pre-emption	Rail	Functioning / NA	NA
MMU	MMU-1600	NA	NA
UPS – Battery Backup	None	NA	NA
Network	None	NA	NA
GPS Time Clock	None	GPS Timeclock required if coordination is desired	High
Coordination	None	NA	NA
Monitoring	None	NA	NA
PDC	NA	NA	NA

Other Issues and recommendations:

Some issues identified:

1. Pedestrian countdown timer in the SE corner for SB pedestrians is not working. Recommend replacement. *Priority: Medium*
2. Push button signs not pointing in the direction of crossings. Recommend replacement. *Priority: Low*

8. Intersection of Highway 27 and Highway 2A

Traffic Control Cabinet and System Components:

Existing Equipment		Comments / Recommendations	Priority
Controller	ASC/3-2100	Consider replacing with Cobalt1000	Low
TC Cabinet	M-Cabinet	NA	NA
Vehicle Detection	Video – AS Encore	NA	Med
Pre-emption	None	NA	NA
MMU	MMU-1600	NA	NA
UPS – Battery Backup	None	Recommend addition of UPS c/w enclosure and metered service. See below.	Med
Network	None	NA	NA
GPS Time Clock	None	GPS Timeclock required if coordination is desired	High
Coordination	None	NA	NA
Monitoring	None	NA	NA
PDC	NA	NA	NA

Other Issues and recommendations:

This intersection is characterized by tight turns, utility conflicts, pole shafts scratched by turning traffic, and generally an aged installation. It may be a candidate for a complete rebuild in the medium term but will require utility relocation for overhead power distribution and may also require property acquisition. Recommendations for improving operations at this location until a complete rebuild are provided below.

1. The TC logbook has several entries indicating frequent brownouts and power outages. The intersection doesn't appear to have a PDC either. Feedback from electrical maintenance contractor confirmed that most of the repair calls to this intersection have to do with power quality issues. Recommend addition of a UPS – Battery Backup system, it could be in a separate enclosure from TC and metered. *Priority: Medium*
2. Pole shafts in NE, NW and SE corners have visible surface damage due to scraping by vehicles while turning. Recommend application of cold galvanizing spray paint to prevent corrosion. *Priority: Medium*
3. There is a mix of push button types at the intersection. Recommend replacing all push buttons with solid state type. *Priority: Low*
4. Advance warning flasher sign has two different types of flashing beacons, with different brightness. Recommend beacon replacement. *Priority: Low.*
5. Missing handhole cover on Advance Warning pole. Install handhole cover. *Priority: Medium*

APPENDIX – A
SITE PHOTOS

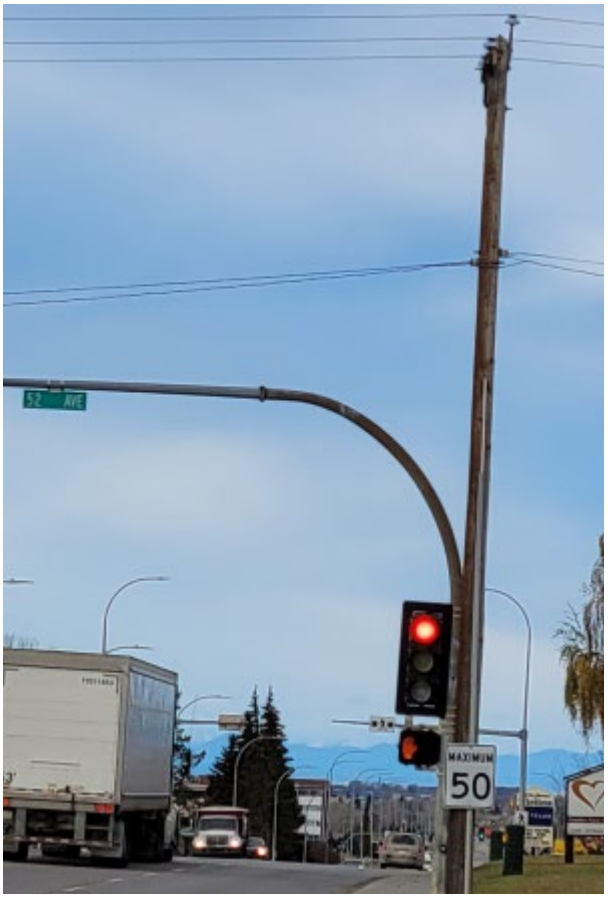
Highway 27 and 70 Ave

Highway 27 and 67A Ave

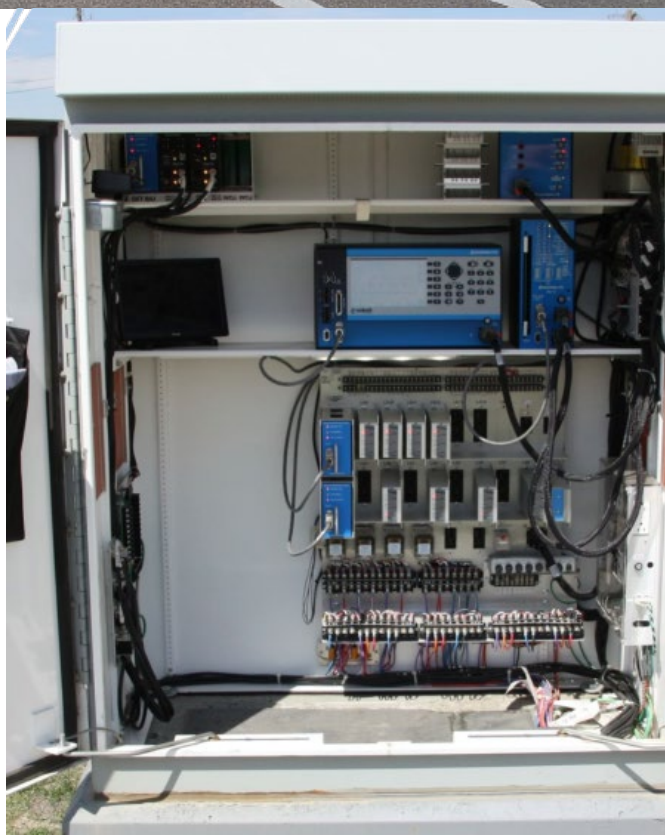
Highway 27 and 65 Ave

Highway 27 and 57 Ave

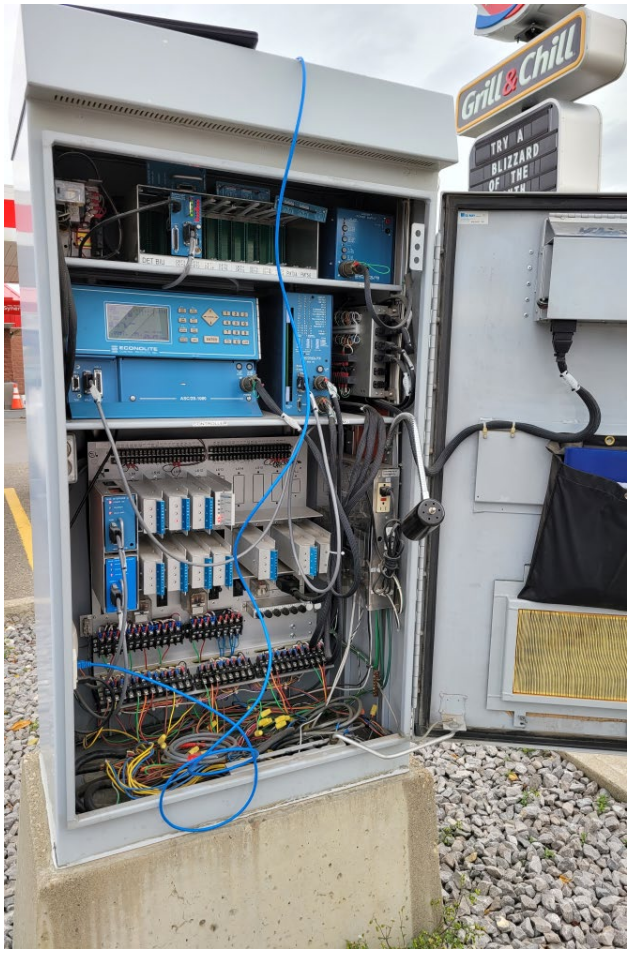
Highway 27 and 52 Ave



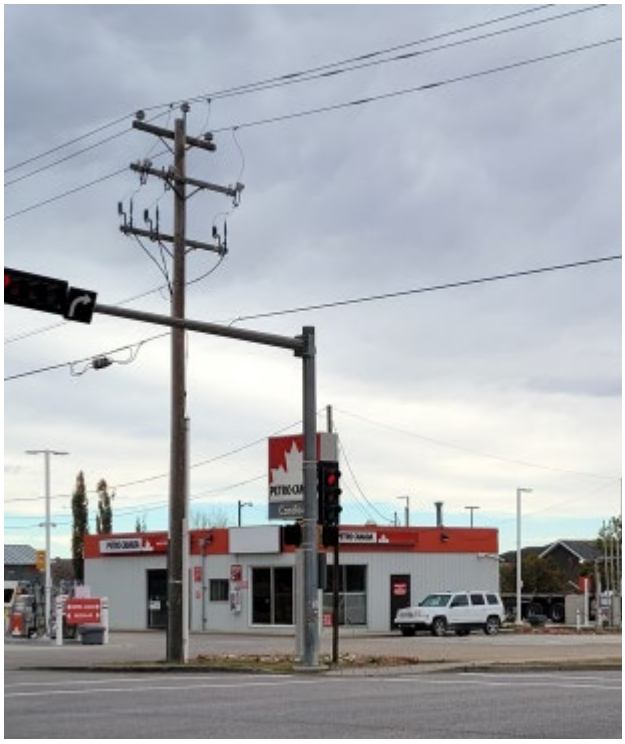
Highway 27 and 51 Ave



Highway 27 and 50 Ave



Highway 27 and Highway 2A



APPENDIX – B

RAIL-PREEMPTION TIMINGS AT HWY 27 / 50 AVE

Track Clear Phases: 1+6
Min. Green: 6 Sec
Min. Ped Clear: 6 Sec
Track Clear: 10 Sec
Yellow: 3.0 Sec
Red: 2.0 Sec

Hold Phases: 4+8

Exit Phases: 2+6

Location	Improvement	Unit	Qty	Unit Cost	Ext. Cost	Priority
67A Avenue	Supply and install GPS clock*	ea	1	$1,020.00	$1,020.00	High
	Replace T.I.P. for Video Detection	ea	1	$2,500.00	$2,500.00	High
	Replace Existing Controller with New Cobalt	ea	1	$6,500.00	$6,500.00	Low
	Add locks to TC and PDC	ea	2	$100.00	$200.00	Med
	Replace Signal-head Backboard	ea	1	$600.00	$600.00	Low
	Apply paint coating to ped head enclsures	LS	1	$650.00	$650.00	Low
	SITE SUBTOTAL	$11,470.00				
65 Avenue	Supply and install GPS clock*	ea	1	$1,020.00	$1,020.00	High
	Replace Existing Controller with New Cobalt	ea	1	$6,500.00	$6,500.00	Low
	Add locks to TC and PDC	ea	2	$100.00	$200.00	Med
	Replace Signal-head Backboard	ea	1	$150.00	$150.00	Low
	Add bimodal insert to countdown ped heads	ea	2	$800.00	$1,600.00	Med
	Replace push buttons	ea	4	$280.00	$1,120.00	Med
	Assess leaning pole, provide shimming	ea	1	$1,500.00	$1,500.00	Low
	SITE SUBTOTAL	$12,090.00				
57 Avenue	Supply and install GPS clock*	ea	1	$1,020.00	$1,020.00	High
	Replace Existing Controller with New Cobalt	ea	1	$6,500.00	$6,500.00	Low
	Add lock to TC	ea	1	$100.00	$100.00	Med
	Add Video Detection System	LS	1	$28,000.00	$28,000.00	High
	Replace Signal-heads with 300mm display	ea	4	$2,100.00	$8,400.00	Med
	Add push button signs	ea	4	$150.00	$600.00	Low
	SITE SUBTOTAL	$44,620.00				
52 Avenue	Supply and install GPS clock*	ea	1	$1,020.00	$1,020.00	High
	Replace Existing Controller with New Cobalt	ea	1	$6,500.00	$6,500.00	Low
	Add lock to TC	ea	1	$100.00	$100.00	Med
	Replace Signal-heads with 300mm display	ea	4	$2,100.00	$8,400.00	Med
	Replace audible ped signal	ea	2	$350.00	$700.00	Med
	SITE SUBTOTAL	$16,720.00				

Location	Improvement	Unit	Qty	Unit Cost	Ext. Cost	Priority
51 Avenue	Supply and install GPS clock*	ea	1	$1,020.00	$1,020.00	High
	Replace countdown ped signal	ea	1	$680.00	$680.00	Med
	Add locks to TC and PDC	ea	2	$100.00	$200.00	Med
	SITE SUBTOTAL	$1,900.00				
50 Avenue	Supply and install GPS clock*	ea	1	$1,020.00	$1,020.00	High
	Replace Existing Controller with New Cobalt	ea	1	$6,500.00	$6,500.00	Low
	Add lock to TC	ea	1	$100.00	$100.00	Med
	Replace countdown ped signal	ea	1	$680.00	$680.00	Med
	Replace push button signs	ea	4	$180.00	$720.00	Low
	SITE SUBTOTAL	$9,020.00				
HWY 2A	Supply and install GPS clock*	ea	1	$1,020.00	$1,020.00	High
	Replace Existing Controller with New Cobalt	ea	1	$6,500.00	$6,500.00	Low
	Add lock to TC	ea	1	$100.00	$100.00	Med
	Add PDC c/w UPS	ea	1	$24,000.00	$24,000.00	High
	Apply gavanization coating to scratched structures	LS	1	$550.00	$550.00	Med
	Replace push buttons	ea	4	$150.00	$600.00	Low
	AWF sign repair (replace head, add handhole)	LS	1	$490.00	$490.00	Med
	SITE SUBTOTAL	$33,260.00				

Subtotal Cost by Priority Level	$61,640.00	High
	$23,620.00	Med
	$43,820.00	Low
Grand Total**	$129,080.00	

* GPS Clock required for coordination plans

** This estimate is without rebuild option

Complete Rebuild Cost - Hwy 27/ 52Ave	$270,000.00	
Complete Rebuild Cost - Hwy 27/ Hwy 2A	$350,000.00	
Grand Total w Rebuild	$699,100.00	

F

Appendix F
Access Management Plans (2009)

CONSULTANT

PROJECT NO. 1031

FUNCTIONAL PLAN
SUBJECT TO REVISION
DATE: APRIL 2009

CastleGlenn Consultants Inc.
Engineers, Project Managers & Planners

ES - 1
HIGHWAY 27
FUNCTIONAL PLANNING STUDY
TOWN OF OLDS

PROPOSED HIGHWAY 27 IMPROVEMENTS
70TH AVENUE TO 65TH AVENUE

REGION	PLAN No.	PROJECT	CONTRACT No.	SHEET
CENTRAL		HWY 27:06		1 OF 4

Alberta TRANSPORTATION

10m 0 20m
HORIZONTAL

70 AVENUE

FUNCTIONAL PLAN ONLY

BELSHER EQUIPMENT

EXISTING PLAZA DEVELOPMENT

EXISTING 67 AVENUE

IMPERIAL ROAD

UFA CARDLOCK BULK FUELS

MOUNTAIN VIEW TAXIDERMY

TRADESIDE SALES

SKIDOO SNOWMOBILE RECREATIONAL PRODUCTS

TIMBERLINE SOURCE FOR SPORTS

R40
R10 NEW CURB RADII ALLOW FOR IMPROVED W9-23 RIGHT TURN MOVEMENT

36+500 HIGHWAY 27 36+600 36+700 36+800 EXISTING SIGNALS 36+900 37+000 37+100 37+200 EXISTING SIGNALS 37+300 37+400

EXISTING HIGHWAY 27 CONFIGURATION

FUTURE CONFIGURATION OF 70TH AVENUE INTERSECTION TO BE DETERMINED UPON FURTHER DEVELOPMENT IN THE VICINITY OF 70TH AVENUE

ABANDONED BUILDING

FUTURE 67 AVENUE

REAL CANADIAN LIQUOR

GAS BAR

EXTRA FOODS

DESIRED CONNECTING LINK BETWEEN 67TH AVE. AND 65TH AVE.

LOT 1
AREA REQUIRED
1706m²
0.42 Acres

LOT 2
AREA REQUIRED
1080m²
0.27 Acres

LOT 4
AREA REQUIRED
975m² 0.24 Acres

PROPOSED NEW SERVICE ROAD ALIGNMENT

NEW FUTURE FIRE HALL

CLOSED

RIGHT-IN/RIGHT-OUT

McKWINNIE AUTO SALES

WESTSIDE CARWASH

KLOSBRAND DEALER

65 AVENUE

BEECH CRE

FUNCTIONAL PLAN ONLY

CONSULTANT	ES - 2	
PROJECT NO. 1031	HIGHWAY 27 FUNCTIONAL PLANNING STUDY TOWN OF OLDS	
FUNCTIONAL PLAN SUBJECT TO REVISION DATE: APRIL 2009	PROPOSED HIGHWAY 27 IMPROVEMENTS 61ST AVENUE TO 55TH AVENUE	Alberta Transportation
CastleGlenn Consultants Inc. Engineers, Project Managers & Planners	REGION: CENTRAL · PLAN No. · PROJECT: HWY 27:06 · CONTRACT No. · SHEET: 2 OF 4	10m 0 20m HORIZONTAL

IMPERIAL CLOSE
IMPERIAL WAY
57 AVENUE
SHANNON DRIVE
55 AVENUE
SERVICE ROAD
HIGHWAY 27
HIGHWAY 27
37+500
37+600
37+700
37+800
37+900
38+000
38+100
38+200
38+300
38+400
SASQUATCH RECREATIONAL PRODUCTS
TIMBERLINE SOURCE FOR SPORTS
TELUS
ADVANCED TELECOME
IMPERIAL EQUIPMENT RENTALS
HERBAL MAGIC
TIRECRAFT
VACANT LOT
LOT FOR SALE
NAPA AUTOPARTS
SHELL COMMERCIAL ACCESS
ALPINE MOBILE PARK
AREA REQUIRED 1370m² 0.83 Acres
CLOSURE OF ACCESS CONDITIONAL UPON IMPROVEMENTS BEING COMPLETED AT NORTH LEG OF 57TH AVENUE.
ULTIMATE REALIGNMENT OF SERVICE ROAD UPON REDEVELOPMENT OF TRAILER PARKS
CLOSED
PLACE SIGN ON 57TH AVENUE: HEAVY VEHICLE ACCESS ON TO 57TH ST PERMITTED FOR AUTO DELIVERY AND PARKING FOR CAM CLARK FORD ONLY
GARAGES BACK ON TO EXISTING DRIVEWAY TO REMAIN THE SAME
AREA REQUIRED 455m²
AREA REQUIRED 220m²
PROPOSED SERVICE ROAD
AREA REQUIRED 820m² 0.2 Acres
AREA REQUIRED 685m² 0.17 ACRES
CAM CLARK FORD
SPORTSMAN INN MOTEL
SAMSONS RESTAURANT AND BAR
MOHOTS/TIM HORTONS
PROVINCIAL OWNERSHIP - USAGE AT THE DISCRETION OF A.T.
RT-IN/RT-OUT ACCESS TO BE MONITORED AND CLOSED WHEN WARRANTED
CLOSED
EXISTING RAISED MEDIAN
EXISTING SIGNALS
EXISTING PED CROSSING
NO LEFT TURN
NO LEFT TURN TRACTOR-TRAILERS EXEMPT
RAISED MEDIAN
PROPOSED TURNAROUND AREA
ACCESS TO BE MONITORED AND CLOSED WHEN WARRANTED
AREA REQUIRED 45m²
AREA REQUIRED 49m²
CENTER LEFT TURN LANE
RAISED ACCESS
S-CLU
LITTLE HOUSE OF WIRELESS TELUS
DR REALTORS
OLDS ELECTRIC AND LIGHTING
HAYLOFT PROJECTS
GAUDRON EMERGENCY INC
SERVICE ROAD
PROPOSED SERVICE ROAD REALIGNMENT
CLOSED
CLOSED
ADDITIONAL ACCESS (IF REQUIRED)
HILDERBRAND DEALER
HOME HARDWARE
OLDS LIQUOR AND BEER
OLDS JEEP DODGE
RPM AUTOMOTIVE
SASY TRUCKING AND LOADING
THE HOME WATER COMPANY
DROPLETS WATER COMPANY
REMAX
POSSIBLE FUTURE ACCESS
PLACE SIGN IN VICINITY OF 50TH ST: HEAVY VEHICLE ACCESS ON TO 50TH ST PERMITTED FOR FUEL STORAGE PURPOSES ONLY
50 STREET
56 AVENUE
51 STREET
52 STREET
55 AVENUE
61 AVENUE
ECH CRESCENT
ASPEN CLOSE
ALDER CLOSE

CONSULTANT

PROJECT NO. 1031

FUNCTIONAL PLAN
SUBJECT TO REVISION
DATE: APRIL 2009

CastleGlenn Consultants Inc.
Engineers, Project Managers & Planners

ES - 3
HIGHWAY 27
FUNCTIONAL PLANNING STUDY
TOWN OF OLDS
PROPOSED HIGHWAY 27 IMPROVEMENTS
54TH AVENUE TO 49TH AVENUE

REGION	PLAN No.	PROJECT	CONTRACT No.	SHEET
CENTRAL		HWY 27:06		3 OF 4

Alberta Transportation

10m 0 20m HORIZONTAL

FUNCTIONAL PLAN ONLY

44 STREET
52 AVENUE
54 AVENUE
50 AVENUE
49 AVENUE
48 STREET
49 STREET
50 STREET
51 AVENUE
HIGHWAY 27
CO-OP
WILD ROSE MEDICAL CENTER
SHOPPERS DRUGMART
OLDS FAMILY DENTAL CLINIC
FCC CANADA
MOUNTAINVIEW FUNERAL HOME
SIESTA MOTEL
MOUNTAIN VIEW PLAZA
TOWN OF OLDS HIGH SCHOOL
APPROXIMATE AREA REQUIRED FROM SCHOOL GROUNDS 1.9 ACRES
POTENTIAL ALTERNATIVE ALIGNMENT FOR NORTH LEG OF 51ST AVENUE
PROPOSED SERVICE ROAD
PROVINCIAL OWNERSHIP - USAGE AT THE DISCRETION OF A.T.
REMOVE SECTION OF RETAINING WALL AND REGRADE ENTRANCE
RECONFIGURE SIGNALS TO PEDESTRIAN ACTUATED SIGNALS ONLY
POTENTIAL RIGHT-IN AND RIGHT-OUT
AREA REQUIRED 185m²
A&W
KFC (CLOSED)
YANKEE PLACE
MOHAWK GAS
BEAN BROKERS
MOUNTAIN AIR COMPUTER
DAIRY QUEEN
ESSO GAS STATION
ROYAL LEPAGE - WILDROSE ESTATES
RICHARD MARZ, MLA
GADGETS COMPUTERS AND ELECTRONICS
KELPS LIQUOR
NEW TOWNHOUSE DEVELOPMENT
POTENTIAL NEW ACCESS
ACCESS TO BE MONITORED AND CLOSED WHEN WARRANTED AREA REQUIRED 60m²
CORNER SHELL GAS STATION
NEW SIGNALS WHEN WARRANTED
EXISTING SIGNALS
CENTER LEFT TURN LANE
SHARED ACCESS
AREA REQUIRED 40m²
AREA REQUIRED 120m²
IF REQUIRED THE WB LEFT-TURN LANE CAN POTENTIALLY BE EXTENDED APPROXIMATELY 40M EAST TO ALLOW FOR THE WB-LEFT TURN MOVEMENT ON TO 54TH AVENUE. A SECTION OF THE RAISED MEDIAN WOULD BE DEPRESSED TO ALLOW FOR THE MOVEMENT
RELOCATED ACCESS
STRIP SECTION REQUIRED FOR TRUCK TURNAROUND
PLAZA 27
LEGION PARKING
FAS GAS
GAUDREAU EMERGENCY INC
LANE EXTENSION AS REQUIRED
AREA REQUIRED 300m²
OPTIONAL RAISED MEDIAN ENFORCES RIGHT-IN/RIGHT-OUT ACCESS CONFIGURATIONS ALONG HIGHWAY 27 AND PROVIDES FOR PROTECTED LEFT TURN LANES ALONG HIGHWAY 27
APPROXIMATE AREA REQUIRED 1.1 ACRES
SECTION OF MEDIAN MAY POTENTIALLY BE DEPRESSED AT ENTRANCE TO ALLOW GAS REFUELING TANKER TRUCKS TO ENTER THE ESSO FACILITY FOR REFUELING PURPOSES ONLY (TO BE VERIFIED PRIOR TO DETAILED DESIGN)
AREA REQUIRED 110m²
CPR

CONSULTANT

PROJECT NO. 1031

FUNCTIONAL PLAN
SUBJECT TO REVISION
DATE: APRIL 2009

CastleGlenn Consultants Inc.
Engineers, Project Managers & Planners

ES - 4

HIGHWAY 27
FUNCTIONAL PLANNING STUDY
TOWN OF OLDS

PROPOSED HIGHWAY 27 IMPROVEMENTS
48TH AVENUE TO EAST OF HIGHWAY 2A

REGION	PLAN No.	PROJECT	CONTRACT No.	SHEET
CENTRAL		HWY 27:06		4 OF 4

Alberta Transportation

10m 0 20m HORIZONTAL

FUNCTIONAL PLAN ONLY

45 STREET

47 AVENUE

POTENTIAL NEW SERVICE ROAD
EXACT ALIGNMENT TO BE DETERMINED

HIGHWAY 27 URBAN TO RURAL CROSS-SECTION TRANSITION
(IF REQUIRED)

FOR CONTINUATION OF PROPOSED HIGHWAY 27 TWINNING
HIGHWAY 27 (OLDS) FUNCTIONAL PLANNING STUDY
(CASTLEGLENN CONSULTANTS INC, OCTOBER 2006)

BEGIN TRANSITION
152m R=1750
66m ON TANGENT
152m R=1750

PROPOSED HIGHWAY 27 ROW

POTENTIAL NEW ACCESS

ACCESS TO BE MONITORED AND CLOSED WHEN WARRANTED

AREA REQUIRED 300m²

RECONSTRUCT CURB TO ACCOMMODATE WB-23 TURNING MOVEMENTS

R55

R18

CAR PUMP STATION

TRUCK PUMP STATION

AREA REQUIRED 60m²

PETRO PASS

BOSTON PIZZA

BEST WESTERN

NEW ACCESS

TOWN OF OLDS ADMINISTRATION AND COUNCIL INFORMATION

HIGHWAY 27

39+400 39+500 39+600 39+700 39+800 39+900 40+000 40+060.14

EXISTING PED CROSSING
NO SIGNAL ACTUATION

CLOSED

CLOSED R=9M

EXISTING SIGNALS

EXISTING PED CROSSING

AREA REQUIRED 35m²

SECTION OF DEPRESSED MEDIAN TO ALLOW FOR S-E LEFT TURN OUT FOR HEAVY VEHICLES

AREA REQUIRED 160m²

48 AVENUE

47 AVENUE

47 STREET

48 STREET

HIGHWAY 2A

GRASS COVERED LANDSCAPING

MOTOR CAR BUMPER TO BUMPER ALIGNMENT PROFESSIONALS

PLOTTED 5010

G

Appendix G
Traffic Signal Timing and Coordination Report

1: Walmart Access/67A Ave & Highway 27 Performance by movement

Movement	EBL	EBT	EBR	WBT	WBR	NBR	SBL	SBR	All
Total Stops	84	114	0	118	7	0	40	0	363

3: 46 Ave (Highway 2A) & Highway 27 Performance by movement

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Total Stops	35	175	74	68	207	18	82	38	44	24	83	119

3: 46 Ave (Highway 2A) & Highway 27 Performance by movement

Movement	All
Total Stops	967

6: 50 Ave & Highway 27 Performance by movement

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Total Stops	14	146	29	37	127	3	47	14	25	58	38	35

6: 50 Ave & Highway 27 Performance by movement

Movement	All
Total Stops	573

9: 51st Ave & Highway 27 Performance by movement

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Total Stops	8	153	27	21	168	3	60	8	17	8	8	7

9: 51st Ave & Highway 27 Performance by movement

Movement	All
Total Stops	488

12: Highway 27 & 52 Ave Performance by movement

Movement	EBL	EBT	WBT	WBR	SBL	SBR	All
Total Stops	8	66	68	3	30	27	202

14: 57 Ave & Highway 27 Performance by movement

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Total Stops	27	173	5	32	179	5	59	28	80	57	51	77

14: 57 Ave & Highway 27 Performance by movement

Movement	All
Total Stops	773

17: 65 Ave & Highway 27 Performance by movement

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Total Stops	21	91	35	49	112	1	52	33	32	61	26	0

17: 65 Ave & Highway 27 Performance by movement

Movement	All
Total Stops	513

23: 70 Avenue & Highway 27 Performance by movement

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Total Stops	7	81	4	26	69	13	11	7	49	29	7	8

23: 70 Avenue & Highway 27 Performance by movement

Movement	All
Total Stops	311

Total Network Performance

Total Stops	4287

Arterial Level of Service: EB Highway 27

Cross Street	Node	Delay (s/veh)	Travel time (s)	Dist (km)	Arterial Speed	Run 1 Speed	Run 1 Delay
70 Avenue	23	7.2	20.6	0.2	40	39	7.6
Walmart Access	1	15.6	39.1	0.4	38	38	15.0
65 Ave	17	10.7	34.5	0.4	42	41	12.0
57 Ave	14	20.1	67.0	0.8	43	43	20.1
52 Ave	12	6.0	53.6	0.7	47	46	6.8
51st Ave	9	7.8	22.3	0.2	37	36	8.3
50 Ave	6	11.1	22.3	0.2	28	31	8.8
46 Ave (Highway 2A)	3	19.8	54.7	0.5	35	35	19.5
Total		98.3	314.1	3.5	40	40	98.1

Arterial Level of Service: EB Highway 27

Cross Street	Run 2 Speed	Run 2 Delay	Run 3 Speed	Run 3 Delay	Run 4 Speed	Run 4 Delay	Run 5 Speed
70 Avenue	40	7.2	38	7.9	40	7.5	43
Walmart Access	39	14.1	38	15.0	35	19.6	39
65 Ave	44	9.8	41	11.4	44	9.8	42
57 Ave	41	21.4	46	18.5	43	21.8	45
52 Ave	46	5.7	48	5.0	46	6.2	48
51st Ave	39	6.6	36	8.0	35	8.5	37
50 Ave	29	10.3	26	12.8	25	13.4	29
46 Ave (Highway 2A)	35	19.2	34	20.1	35	19.9	35
Total	40	94.3	40	98.7	39	106.8	41

Arterial Level of Service: WB Highway 27

Cross Street	Node	Delay (s/veh)	Travel time (s)	Dist (km)	Arterial Speed	Run 1 Speed	Run 1 Delay
46 Ave (Highway 2A)	3	28.4	52.7	0.3	24	23	30.2
50 Ave	6	11.4	45.7	0.5	42	39	13.6
51st Ave	9	7.9	18.8	0.2	33	34	7.9
52 Ave	12	3.4	18.1	0.2	45	46	3.1
57 Ave	14	19.3	66.8	0.7	38	37	19.7
65 Ave	17	10.3	53.4	0.8	54	54	10.5
67A Ave	1	17.9	42.1	0.4	35	36	16.6
70 Avenue	23	8.2	31.8	0.4	47	47	8.0
Total		106.7	329.3	3.6	39	39	109.6

Arterial Level of Service: WB Highway 27

Cross Street	Run 2 Speed	Run 2 Delay	Run 3 Speed	Run 3 Delay	Run 4 Speed	Run 4 Delay	Run 5 Speed
46 Ave (Highway 2A)	25	26.6	23	28.9	23	28.9	24
50 Ave	47	8.5	43	9.9	39	14.4	43
51st Ave	37	6.4	34	7.7	31	9.1	33
52 Ave	45	3.4	46	2.9	43	4.2	45
57 Ave	37	19.1	39	19.1	37	19.7	38
65 Ave	56	9.5	56	9.8	53	11.1	53
67A Ave	34	19.5	35	17.6	34	18.4	35
70 Avenue	47	7.9	48	7.6	46	8.9	45
Total	40	100.9	40	103.5	38	114.8	39

1: Walmart Access/67A Ave & Highway 27 Performance by movement

Movement	EBL	EBT	EBR	WBT	WBR	NBR	SBL	SBR	All
Total Stops	60	62	0	66	8	0	69	0	265

3: 46 Ave (Highway 2A) & Highway 27 Performance by movement

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Total Stops	32	126	50	50	117	9	74	33	41	22	71	99

3: 46 Ave (Highway 2A) & Highway 27 Performance by movement

Movement	All
Total Stops	724

6: 50 Ave & Highway 27 Performance by movement

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Total Stops	16	134	30	29	101	2	43	19	26	62	38	36

6: 50 Ave & Highway 27 Performance by movement

Movement	All
Total Stops	536

9: 51st Ave & Highway 27 Performance by movement

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Total Stops	7	111	20	19	105	5	59	7	20	10	7	9

9: 51st Ave & Highway 27 Performance by movement

Movement	All
Total Stops	379

12: Highway 27 & 52 Ave Performance by movement

Movement	EBL	EBT	WBT	WBR	SBL	SBR	All
Total Stops	8	49	35	2	29	30	153

14: 57 Ave & Highway 27 Performance by movement

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Total Stops	24	151	2	41	138	1	60	33	85	56	47	77

14: 57 Ave & Highway 27 Performance by movement

Movement	All
Total Stops	715

17: 65 Ave & Highway 27 Performance by movement

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Total Stops	22	81	30	46	95	1	55	32	32	50	23	0

17: 65 Ave & Highway 27 Performance by movement

Movement	All
Total Stops	467

23: 70 Avenue & Highway 27 Performance by movement

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Total Stops	7	62	3	24	56	10	8	6	49	32	9	8

23: 70 Avenue & Highway 27 Performance by movement

Movement	All
Total Stops	274

Total Network Performance

Total Stops	3621

Arterial Level of Service: EB Highway 27

Cross Street	Node	Delay (s/veh)	Travel time (s)	Dist (km)	Arterial Speed	Run 1 Speed	Run 1 Delay
70 Avenue	23	4.7	18.1	0.2	46	44	5.8
Walmart Access	1	5.4	28.9	0.4	51	51	5.3
65 Ave	17	7.8	31.6	0.4	46	47	7.5
57 Ave	14	12.5	59.5	0.8	49	49	11.7
52 Ave	12	4.7	51.5	0.7	49	49	5.2
51st Ave	9	5.5	20.0	0.2	41	40	5.8
50 Ave	6	11.0	22.3	0.2	28	27	11.8
46 Ave (Highway 2A)	3	11.7	46.7	0.5	41	42	10.5
Total		63.3	278.6	3.5	45	45	63.5

Arterial Level of Service: EB Highway 27

Cross Street	Run 2 Speed	Run 2 Delay	Run 3 Speed	Run 3 Delay	Run 4 Speed	Run 4 Delay	Run 5 Speed
70 Avenue	47	4.1	49	3.8	43	6.0	48
Walmart Access	47	7.2	52	4.7	53	5.0	52
65 Ave	44	8.9	47	7.4	46	7.6	47
57 Ave	48	11.6	48	13.5	50	12.0	49
52 Ave	49	5.3	49	4.6	48	4.1	49
51st Ave	42	5.0	40	6.1	41	5.5	41
50 Ave	29	9.9	28	11.3	28	10.9	28
46 Ave (Highway 2A)	41	11.5	40	12.9	41	11.0	40
Total	45	63.5	45	64.2	45	62.2	45

Arterial Level of Service: WB Highway 27

Cross Street	Node	Delay (s/veh)	Travel time (s)	Dist (km)	Arterial Speed	Run 1 Speed	Run 1 Delay
46 Ave (Highway 2A)	3	11.6	36.0	0.3	35	34	11.5
50 Ave	6	8.0	42.9	0.5	44	44	8.2
51st Ave	9	3.9	14.7	0.2	43	42	4.0
52 Ave	12	1.7	16.3	0.2	50	51	1.4
57 Ave	14	10.0	57.3	0.7	44	45	9.0
65 Ave	17	8.4	50.8	0.8	57	57	7.6
67A Ave	1	7.3	31.5	0.4	46	45	8.2
70 Avenue	23	5.4	29.5	0.4	50	50	5.6
Total		56.2	279.1	3.6	46	46	55.5

Arterial Level of Service: WB Highway 27

Cross Street	Run 2 Speed	Run 2 Delay	Run 3 Speed	Run 3 Delay	Run 4 Speed	Run 4 Delay	Run 5 Speed
46 Ave (Highway 2A)	35	11.6	35	11.5	35	11.2	34
50 Ave	45	7.3	45	8.5	42	9.4	47
51st Ave	44	3.6	41	4.6	43	3.6	44
52 Ave	50	1.7	50	1.7	49	1.8	50
57 Ave	43	11.3	44	9.9	44	10.0	44
65 Ave	58	8.3	59	8.5	57	8.2	55
67A Ave	46	7.9	47	6.5	45	7.7	49
70 Avenue	51	4.8	49	5.8	51	5.3	51
Total	46	56.5	47	57.0	46	57.2	47

1: Walmart Access/67A Ave & Highway 27 Performance by movement

Movement	EBL	EBT	EBR	WBT	WBR	NBR	SBL	SBR	All
Total Stops	76	134	0	142	10	0	128	0	490

3: 46 Ave (Highway 2A) & Highway 27 Performance by movement

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Total Stops	51	213	131	38	195	28	149	37	53	30	70	136

3: 46 Ave (Highway 2A) & Highway 27 Performance by movement

Movement	All
Total Stops	1131

6: 50 Ave & Highway 27 Performance by movement

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Total Stops	34	227	56	40	179	6	127	46	44	65	45	50

6: 50 Ave & Highway 27 Performance by movement

Movement	All
Total Stops	919

9: 51st Ave & Highway 27 Performance by movement

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Total Stops	17	134	19	23	160	15	53	8	25	19	9	18

9: 51st Ave & Highway 27 Performance by movement

Movement	All
Total Stops	500

12: Highway 27 & 52 Ave Performance by movement

Movement	EBL	EBT	WBT	WBR	SBL	SBR	All
Total Stops	13	87	83	3	31	41	258

14: 57 Ave & Highway 27 Performance by movement

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Total Stops	51	297	21	52	341	28	93	51	88	84	58	92

14: 57 Ave & Highway 27 Performance by movement

Movement	All
Total Stops	1256

17: 65 Ave & Highway 27 Performance by movement

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Total Stops	24	223	65	67	188	3	69	45	54	124	51	1

17: 65 Ave & Highway 27 Performance by movement

Movement	All
Total Stops	914

23: 70 Avenue & Highway 27 Performance by movement

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Total Stops	7	71	4	28	100	14	8	7	34	29	7	9

23: 70 Avenue & Highway 27 Performance by movement

Movement	All
Total Stops	318

Total Network Performance

Total Stops	5937

Arterial Level of Service: EB Highway 27

Cross Street	Node	Delay (s/veh)	Travel time (s)	Dist (km)	Arterial Speed	Run 1 Speed	Run 1 Delay
70 Avenue	23	5.9	19.3	0.2	43	41	6.9
Walmart Access	1	16.7	41.0	0.4	36	36	16.6
65 Ave	17	18.8	42.4	0.4	34	37	15.3
57 Ave	14	25.1	78.5	0.8	37	36	27.6
52 Ave	12	6.7	53.4	0.7	47	47	7.4
51st Ave	9	6.0	21.6	0.2	38	37	6.6
50 Ave	6	17.3	29.5	0.2	21	22	16.2
46 Ave (Highway 2A)	3	22.3	56.5	0.5	34	35	20.6
Total		118.7	342.3	3.5	37	37	117.2

Arterial Level of Service: EB Highway 27

Cross Street	Run 2 Speed	Run 2 Delay	Run 3 Speed	Run 3 Delay	Run 4 Speed	Run 4 Delay	Run 5 Speed
70 Avenue	44	5.6	42	6.5	45	5.2	44
Walmart Access	38	15.4	37	15.8	35	18.1	35
65 Ave	35	18.7	33	21.0	35	18.3	33
57 Ave	37	26.0	37	24.5	38	23.8	37
52 Ave	48	6.1	47	6.5	47	6.9	47
51st Ave	40	5.0	37	6.5	38	5.7	37
50 Ave	21	17.6	22	16.6	22	16.0	20
46 Ave (Highway 2A)	34	21.9	35	20.3	33	23.5	32
Total	37	116.3	37	117.7	37	117.4	36

Arterial Level of Service: WB Highway 27

Cross Street	Node	Delay (s/veh)	Travel time (s)	Dist (km)	Arterial Speed	Run 1 Speed	Run 1 Delay
46 Ave (Highway 2A)	3	29.1	53.4	0.3	23	23	28.9
50 Ave	6	11.5	47.4	0.5	40	42	9.8
51st Ave	9	6.7	19.3	0.2	32	31	7.4
52 Ave	12	3.5	19.6	0.2	42	43	3.2
57 Ave	14	25.2	74.9	0.7	34	34	24.7
65 Ave	17	14.1	56.7	0.8	51	52	13.2
67A Ave	1	15.8	39.4	0.4	37	36	17.6
70 Avenue	23	8.8	33.6	0.4	44	43	10.3
Total		114.7	344.1	3.6	38	38	115.1

Arterial Level of Service: WB Highway 27

Cross Street	Run 2 Speed	Run 2 Delay	Run 3 Speed	Run 3 Delay	Run 4 Speed	Run 4 Delay	Run 5 Speed
46 Ave (Highway 2A)	24	28.1	23	29.0	23	29.6	23
50 Ave	40	11.4	39	12.9	41	11.4	39
51st Ave	32	6.7	34	5.8	33	6.3	32
52 Ave	42	3.2	42	3.1	41	3.8	40
57 Ave	34	23.8	34	25.2	33	25.6	33
65 Ave	51	14.6	52	13.5	50	15.0	51
67A Ave	41	12.6	36	17.2	35	17.3	39
70 Avenue	45	8.0	44	8.8	45	8.6	44
Total	38	108.5	38	115.5	37	117.7	37

1: Walmart Access/67A Ave & Highway 27 Performance by movement

Movement	EBL	EBT	EBR	WBT	WBR	NBR	SBL	SBR	All
Total Stops	66	104	0	99	9	0	147	0	425

3: 46 Ave (Highway 2A) & Highway 27 Performance by movement

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Total Stops	39	152	90	40	120	15	116	35	42	25	54	122

3: 46 Ave (Highway 2A) & Highway 27 Performance by movement

Movement	All
Total Stops	850

6: 50 Ave & Highway 27 Performance by movement

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Total Stops	26	226	58	36	152	5	110	43	43	61	46	45

6: 50 Ave & Highway 27 Performance by movement

Movement	All
Total Stops	851

9: 51st Ave & Highway 27 Performance by movement

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Total Stops	14	101	15	18	91	7	60	8	27	22	9	20

9: 51st Ave & Highway 27 Performance by movement

Movement	All
Total Stops	392

12: Highway 27 & 52 Ave Performance by movement

Movement	EBL	EBT	WBT	WBR	SBL	SBR	All
Total Stops	12	69	52	4	30	42	209

14: 57 Ave & Highway 27 Performance by movement

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Total Stops	53	219	9	52	267	11	89	42	91	85	53	76

14: 57 Ave & Highway 27 Performance by movement

Movement	All
Total Stops	1047

17: 65 Ave & Highway 27 Performance by movement

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Total Stops	28	213	64	63	184	2	67	51	43	117	53	1

17: 65 Ave & Highway 27 Performance by movement

Movement	All
Total Stops	886

23: 70 Avenue & Highway 27 Performance by movement

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Total Stops	7	68	5	29	81	11	9	7	36	27	8	7

23: 70 Avenue & Highway 27 Performance by movement

Movement	All
Total Stops	295

Total Network Performance

Total Stops	5115

Arterial Level of Service: EB Highway 27

Cross Street	Node	Delay (s/veh)	Travel time (s)	Dist (km)	Arterial Speed	Run 1 Speed	Run 1 Delay
70 Avenue	23	5.0	18.3	0.2	45	43	6.2
Walmart Access	1	8.6	33.0	0.4	45	45	8.7
65 Ave	17	18.2	41.5	0.4	35	33	21.7
57 Ave	14	16.3	70.4	0.8	41	42	15.9
52 Ave	12	5.6	51.8	0.7	49	48	6.4
51st Ave	9	4.5	20.0	0.2	41	42	4.0
50 Ave	6	18.1	30.2	0.2	21	20	19.4
46 Ave (Highway 2A)	3	12.7	47.3	0.5	40	42	10.3
Total		89.0	312.5	3.5	40	40	92.4

Arterial Level of Service: EB Highway 27

Cross Street	Run 2 Speed	Run 2 Delay	Run 3 Speed	Run 3 Delay	Run 4 Speed	Run 4 Delay	Run 5 Speed
70 Avenue	44	5.6	48	4.0	45	5.2	48
Walmart Access	43	9.5	45	8.7	46	7.8	45
65 Ave	36	17.2	36	17.7	35	17.8	37
57 Ave	42	14.7	42	15.7	41	16.2	39
52 Ave	49	4.7	49	5.3	47	5.9	49
51st Ave	42	4.0	41	4.4	39	5.1	40
50 Ave	20	18.4	20	19.3	20	18.8	23
46 Ave (Highway 2A)	39	14.4	39	14.0	40	13.6	42
Total	40	88.5	40	89.0	40	90.3	41

Arterial Level of Service: WB Highway 27

Cross Street	Node	Delay (s/veh)	Travel time (s)	Dist (km)	Arterial Speed	Run 1 Speed	Run 1 Delay
46 Ave (Highway 2A)	3	13.1	37.4	0.3	33	34	12.3
50 Ave	6	10.0	45.6	0.5	42	41	10.0
51st Ave	9	2.9	15.6	0.2	40	41	2.7
52 Ave	12	2.0	18.0	0.2	45	45	2.0
57 Ave	14	15.5	64.9	0.7	39	40	13.2
65 Ave	17	12.8	55.5	0.8	52	51	13.2
67A Ave	1	9.0	32.7	0.4	45	44	9.5
70 Avenue	23	5.4	29.8	0.4	50	49	5.7
Total		70.6	299.5	3.6	43	43	68.7

Arterial Level of Service: WB Highway 27

Cross Street	Run 2 Speed	Run 2 Delay	Run 3 Speed	Run 3 Delay	Run 4 Speed	Run 4 Delay	Run 5 Speed
46 Ave (Highway 2A)	32	14.3	33	12.8	32	14.1	34
50 Ave	42	10.3	44	8.5	41	9.6	40
51st Ave	41	2.7	40	2.9	40	2.9	40
52 Ave	46	1.9	46	2.0	46	1.6	44
57 Ave	40	14.2	39	14.9	38	15.9	37
65 Ave	52	12.8	52	13.1	53	12.6	53
67A Ave	45	8.9	45	8.4	45	8.5	44
70 Avenue	50	4.9	48	6.0	50	5.3	51
Total	43	69.9	44	68.5	43	70.5	43

1: Walmart Access/67A Ave & Highway 27 Performance by movement

Movement	EBL	EBT	EBR	WBT	WBR	NBR	SBL	SBR	All
Total Stops	73	121	0	213	13	0	137	0	557

3: 46 Ave (Highway 2A) & Highway 27 Performance by movement

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Total Stops	69	261	82	96	215	22	94	64	88	55	88	133

3: 46 Ave (Highway 2A) & Highway 27 Performance by movement

Movement	All
Total Stops	1267

6: 50 Ave & Highway 27 Performance by movement

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Total Stops	28	226	34	60	216	9	113	40	47	66	52	34

6: 50 Ave & Highway 27 Performance by movement

Movement	All
Total Stops	925

9: 51st Ave & Highway 27 Performance by movement

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Total Stops	9	140	22	20	185	10	40	7	15	5	6	7

9: 51st Ave & Highway 27 Performance by movement

Movement	All
Total Stops	466

12: Highway 27 & 52 Ave Performance by movement

Movement	EBL	EBT	WBT	WBR	SBL	SBR	All
Total Stops	24	106	114	5	27	37	313

14: 57 Ave & Highway 27 Performance by movement

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Total Stops	52	316	24	73	301	15	112	67	74	71	62	77

14: 57 Ave & Highway 27 Performance by movement

Movement	All
Total Stops	1244

17: 65 Ave & Highway 27 Performance by movement

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Total Stops	27	209	73	92	215	2	96	34	58	123	62	1

17: 65 Ave & Highway 27 Performance by movement

Movement	All
Total Stops	992

23: 70 Avenue & Highway 27 Performance by movement

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Total Stops	6	81	4	44	135	13	7	6	33	31	9	9

23: 70 Avenue & Highway 27 Performance by movement

Movement	All
Total Stops	378

Total Network Performance

Total Stops	6290

Arterial Level of Service: EB Highway 27

Cross Street	Node	Delay (s/veh)	Travel time (s)	Dist (km)	Arterial Speed	Run 1 Speed	Run 1 Delay
70 Avenue	23	6.7	20.0	0.2	41	45	5.1
Walmart Access	1	17.2	41.2	0.4	36	37	16.2
65 Ave	17	20.2	42.6	0.4	34	35	19.3
57 Ave	14	23.4	72.3	0.8	40	39	25.5
52 Ave	12	8.0	55.1	0.7	46	47	7.0
51st Ave	9	6.9	22.6	0.2	36	38	6.0
50 Ave	6	17.1	29.6	0.2	21	22	15.9
46 Ave (Highway 2A)	3	23.7	58.5	0.5	33	31	26.1
Total		123.4	341.9	3.5	37	37	121.0

Arterial Level of Service: EB Highway 27

Cross Street	Run 2 Speed	Run 2 Delay	Run 3 Speed	Run 3 Delay	Run 4 Speed	Run 4 Delay	Run 5 Speed
70 Avenue	39	8.2	42	6.3	42	6.5	40
Walmart Access	35	17.5	37	15.9	34	19.9	36
65 Ave	35	20.3	34	19.8	36	19.4	32
57 Ave	42	20.5	42	22.1	40	22.8	38
52 Ave	45	7.9	45	8.3	45	8.2	45
51st Ave	38	5.8	36	6.9	33	8.8	36
50 Ave	22	16.5	21	16.9	20	18.4	21
46 Ave (Highway 2A)	34	21.0	33	22.0	32	24.9	32
Total	37	117.7	37	118.3	36	128.9	36

Arterial Level of Service: WB Highway 27

Cross Street	Node	Delay (s/veh)	Travel time (s)	Dist (km)	Arterial Speed	Run 1 Speed	Run 1 Delay
46 Ave (Highway 2A)	3	31.5	55.8	0.3	22	22	32.9
50 Ave	6	14.0	45.3	0.5	42	43	12.9
51st Ave	9	7.9	20.3	0.2	31	32	7.2
52 Ave	12	4.3	19.3	0.2	42	43	4.0
57 Ave	14	20.9	67.8	0.7	37	37	21.7
65 Ave	17	19.5	65.3	0.8	44	45	18.1
67A Ave	1	19.4	42.9	0.4	34	35	18.1
70 Avenue	23	9.4	33.5	0.4	44	45	8.0
Total		126.9	350.4	3.6	37	37	122.8

Arterial Level of Service: WB Highway 27

Cross Street	Run 2 Speed	Run 2 Delay	Run 3 Speed	Run 3 Delay	Run 4 Speed	Run 4 Delay	Run 5 Speed
46 Ave (Highway 2A)	23	29.2	23	29.7	22	31.8	21
50 Ave	43	13.7	40	15.6	42	14.1	42
51st Ave	33	6.3	30	8.5	28	9.7	31
52 Ave	43	4.0	42	4.4	46	3.1	39
57 Ave	36	22.3	37	21.1	38	18.5	37
65 Ave	43	22.0	43	21.5	46	17.6	45
67A Ave	31	24.3	36	17.4	34	19.5	37
70 Avenue	42	11.2	45	8.7	45	9.0	43
Total	36	133.1	37	126.9	38	123.3	37

1: Walmart Access/67A Ave & Highway 27 Performance by movement

Movement	EBL	EBT	EBR	WBT	WBR	NBR	SBL	SBR	All
Total Stops	73	79	0	156	15	0	171	0	494

3: 46 Ave (Highway 2A) & Highway 27 Performance by movement

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Total Stops	68	198	59	79	138	18	95	50	92	52	77	119

3: 46 Ave (Highway 2A) & Highway 27 Performance by movement

Movement	All
Total Stops	1045

6: 50 Ave & Highway 27 Performance by movement

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Total Stops	30	276	44	55	207	9	101	46	51	75	54	40

6: 50 Ave & Highway 27 Performance by movement

Movement	All
Total Stops	988

9: 51st Ave & Highway 27 Performance by movement

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Total Stops	7	134	16	17	107	6	43	6	19	9	9	9

9: 51st Ave & Highway 27 Performance by movement

Movement	All
Total Stops	382

12: Highway 27 & 52 Ave Performance by movement

Movement	EBL	EBT	WBT	WBR	SBL	SBR	All
Total Stops	23	88	56	4	26	38	235

14: 57 Ave & Highway 27 Performance by movement

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Total Stops	55	269	14	72	254	8	102	64	76	67	61	78

14: 57 Ave & Highway 27 Performance by movement

Movement	All
Total Stops	1120

17: 65 Ave & Highway 27 Performance by movement

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Total Stops	25	201	70	86	188	3	94	32	58	113	52	0

17: 65 Ave & Highway 27 Performance by movement

Movement	All
Total Stops	922

23: 70 Avenue & Highway 27 Performance by movement

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Total Stops	6	64	3	35	98	9	10	7	37	25	8	10

23: 70 Avenue & Highway 27 Performance by movement

Movement	All
Total Stops	312

Total Network Performance

Total Stops	5673

Arterial Level of Service: EB Highway 27

Cross Street	Node	Delay (s/veh)	Travel time (s)	Dist (km)	Arterial Speed	Run 1 Speed	Run 1 Delay
70 Avenue	23	4.9	18.2	0.2	46	44	5.6
Walmart Access	1	7.1	30.9	0.4	48	49	6.8
65 Ave	17	19.2	42.1	0.4	35	34	19.8
57 Ave	14	16.8	65.8	0.8	44	43	19.2
52 Ave	12	6.6	53.7	0.7	47	47	7.5
51st Ave	9	6.4	22.0	0.2	37	38	5.3
50 Ave	6	22.8	35.3	0.2	18	19	20.7
46 Ave (Highway 2A)	3	14.5	49.8	0.5	38	40	13.0
Total		98.2	317.7	3.5	39	40	98.0

Arterial Level of Service: EB Highway 27

Cross Street	Run 2 Speed	Run 2 Delay	Run 3 Speed	Run 3 Delay	Run 4 Speed	Run 4 Delay	Run 5 Speed
70 Avenue	47	4.5	47	4.4	44	5.4	47
Walmart Access	47	7.9	48	6.6	48	7.1	48
65 Ave	34	20.4	36	17.5	34	20.2	36
57 Ave	45	16.2	44	17.5	44	15.7	44
52 Ave	46	6.4	46	7.0	47	6.2	47
51st Ave	37	6.4	35	7.5	35	7.7	39
50 Ave	17	23.7	17	24.1	18	22.0	17
46 Ave (Highway 2A)	38	14.9	39	14.1	38	14.5	37
Total	39	100.5	39	98.7	39	98.9	40

Arterial Level of Service: WB Highway 27

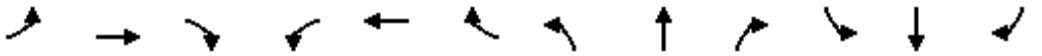
Cross Street	Node	Delay (s/veh)	Travel time (s)	Dist (km)	Arterial Speed	Run 1 Speed	Run 1 Delay
46 Ave (Highway 2A)	3	15.9	40.3	0.3	31	32	14.9
50 Ave	6	12.8	43.8	0.5	43	41	14.8
51st Ave	9	4.0	16.4	0.2	38	40	3.5
52 Ave	12	2.4	17.5	0.2	47	47	2.2
57 Ave	14	13.4	60.5	0.7	42	41	14.3
65 Ave	17	15.0	60.4	0.8	48	47	15.0
67A Ave	1	9.9	33.0	0.4	44	46	9.3
70 Avenue	23	6.0	30.4	0.4	49	48	6.9
Total		79.3	302.3	3.6	43	43	80.8

Arterial Level of Service: WB Highway 27

Cross Street	Run 2 Speed	Run 2 Delay	Run 3 Speed	Run 3 Delay	Run 4 Speed	Run 4 Delay	Run 5 Speed
46 Ave (Highway 2A)	29	18.1	31	15.2	30	16.3	32
50 Ave	45	12.0	42	13.3	43	12.1	45
51st Ave	38	4.0	38	4.1	36	4.9	40
52 Ave	47	2.3	46	2.6	45	2.8	48
57 Ave	42	13.1	40	14.6	42	13.5	43
65 Ave	48	14.6	48	16.5	47	15.9	50
67A Ave	45	9.4	44	10.2	44	9.8	43
70 Avenue	49	6.0	51	4.8	49	5.6	48
Total	43	79.5	43	81.3	42	81.0	44

Lanes, Volumes, Timings
3: 46 Ave (Highway 2A) & Highway 27

07-04-2024



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	80	310	90	90	210	30	120	90	140	60	100	150
Future Volume (vph)	80	310	90	90	210	30	120	90	140	60	100	150
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (m)	0.0		0.0	0.0		170.0	0.0		100.0	0.0		100.0
Storage Lanes	0		0	0		1	0		1	0		1
Taper Length (m)	7.5			7.5			7.5			7.5		
Satd. Flow (prot)	0	3301	0	0	3281	0	0	1776	1538	0	1781	1524
Flt Permitted		0.955			0.955			0.502			0.778	
Satd. Flow (perm)	0	3178	0	0	3174	0	0	917	1538	0	1411	1524
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)		38			13				156			209
Link Speed (k/h)		50			50			50			50	
Link Distance (m)		528.1			342.3			233.4			175.4	
Travel Time (s)		38.0			24.6			16.8			12.6	
Peak Hour Factor	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90
Heavy Vehicles (%)	5%	6%	4%	5%	7%	14%	1%	8%	5%	6%	4%	6%
Shared Lane Traffic (%)												
Lane Group Flow (vph)	0	533	0	0	366	0	0	233	156	0	178	167
Enter Blocked Intersection	No	No	No	No	No	No	No	No	No	No	No	No
Lane Alignment	Left	Left	Right	Left	Left	Right	Left	Left	Right	Left	Left	Right
Median Width(m)		0.0			0.0			0.0			0.0	
Link Offset(m)		0.0			0.0			0.0			0.0	
Crosswalk Width(m)		4.8			4.8			4.8			4.8	
Two way Left Turn Lane												
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Turning Speed (k/h)	25		15	25		15	25		15	25		15
Turn Type	pm+pt	NA		pm+pt	NA		pm+pt	NA	Perm	Perm	NA	Perm
Protected Phases	5	2		1	6		7	4			8	
Permitted Phases	2			6			4		4	8		8
Total Split (s)	20.0	21.0		15.0	16.0		14.0	28.0	28.0	18.0	18.0	18.0
Total Lost Time (s)		6.0			6.0			6.0	6.0		6.0	6.0
Act Effct Green (s)		15.0			10.6			25.5	25.5		11.6	11.6
Actuated g/C Ratio		0.22			0.16			0.38	0.38		0.17	0.17
v/c Ratio		0.70			0.70			0.52	0.23		0.74	0.38
Control Delay		28.2			35.1			19.9	3.8		46.7	5.1
Queue Delay		0.0			0.0			0.0	0.0		0.0	0.0
Total Delay		28.2			35.1			19.9	3.8		46.7	5.1
LOS		C			D			B	A		D	A
Approach Delay		28.2			35.1			13.4			26.6	
Approach LOS		C			D			B			C	
Queue Length 50th (m)		32.1			24.1			21.5	0.0		22.6	0.0
Queue Length 95th (m)		48.3			#42.7			37.9	10.3		#51.1	9.5
Internal Link Dist (m)		504.1			318.3			209.4			151.4	
Turn Bay Length (m)									100.0			100.0
Base Capacity (vph)		761			523			455	688		251	443
Starvation Cap Reductn		0			0			0	0		0	0
Spillback Cap Reductn		0			0			0	0		0	0
Storage Cap Reductn		0			0			0	0		0	0

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Reduced v/c Ratio		0.70			0.70			0.51	0.23		0.71	0.38

Intersection Summary			
Area Type:	Other		
Cycle Length: 68			
Actuated Cycle Length: 67.5			
Control Type: Actuated-Uncoordinated			
Maximum v/c Ratio: 0.74			
Intersection Signal Delay: 25.9		Intersection LOS: C	
Intersection Capacity Utilization 56.2%		ICU Level of Service B	
Analysis Period (min) 15			
# 95th percentile volume exceeds capacity, queue may be longer.			
Queue shown is maximum after two cycles.			

Splits and Phases: 3: 46 Ave (Highway 2A) & Highway 27

Lanes, Volumes, Timings
3: 46 Ave (Highway 2A) & Highway 27

07-04-2024

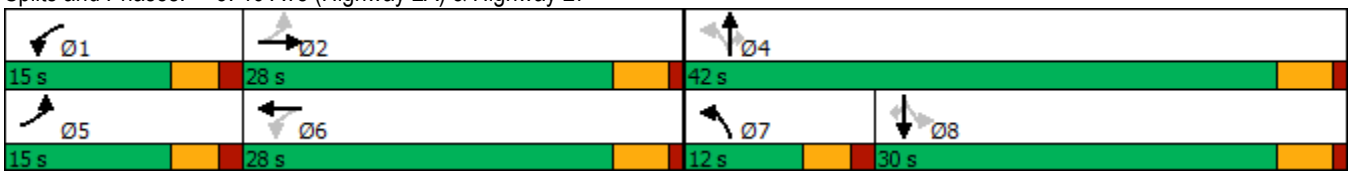
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	80	310	90	90	210	30	120	90	140	60	100	150
Future Volume (vph)	80	310	90	90	210	30	120	90	140	60	100	150
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (m)	0.0		0.0	0.0		170.0	0.0		100.0	0.0		100.0
Storage Lanes	1		0	1		0	0		1	0		1
Taper Length (m)	7.5			7.5			7.5			7.5		
Satd. Flow (prot)	1719	1739	0	1719	1728	0	0	1776	1538	0	1781	1524
Flt Permitted	0.478			0.228				0.538			0.791	
Satd. Flow (perm)	865	1739	0	413	1728	0	0	983	1538	0	1435	1524
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)		17			8				156			167
Link Speed (k/h)		50			50			50			50	
Link Distance (m)		528.1			342.3			233.4			175.4	
Travel Time (s)		38.0			24.6			16.8			12.6	
Peak Hour Factor	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90
Heavy Vehicles (%)	5%	6%	4%	5%	7%	14%	1%	8%	5%	6%	4%	6%
Shared Lane Traffic (%)												
Lane Group Flow (vph)	89	444	0	100	266	0	0	233	156	0	178	167
Enter Blocked Intersection	No	No	No	No	No	No	No	No	No	No	No	No
Lane Alignment	Left	Left	Right	Left	Left	Right	Left	Left	Right	Left	Left	Right
Median Width(m)		3.6			3.6			0.0			0.0	
Link Offset(m)		0.0			0.0			0.0			0.0	
Crosswalk Width(m)		4.8			4.8			4.8			4.8	
Two way Left Turn Lane												
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Turning Speed (k/h)	25		15	25		15	25		15	25		15
Turn Type	pm+pt	NA		pm+pt	NA		pm+pt	NA	Perm	Perm	NA	Perm
Protected Phases	5	2		1	6		7	4			8	
Permitted Phases	2			6			4		4	8		8
Total Split (s)	15.0	28.0		15.0	28.0		12.0	42.0	42.0	30.0	30.0	30.0
Total Lost Time (s)	4.5	4.5		4.5	4.5			4.5	4.5		4.5	4.5
Act Effct Green (s)	33.1	22.5		33.1	22.5			27.4	27.4		15.3	15.3
Actuated g/C Ratio	0.45	0.30		0.45	0.30			0.37	0.37		0.21	0.21
v/c Ratio	0.18	0.82		0.27	0.50			0.52	0.23		0.60	0.37
Control Delay	11.7	38.7		12.8	25.3			21.8	3.8		35.6	6.9
Queue Delay	0.0	0.0		0.0	0.0			0.0	0.0		0.0	0.0
Total Delay	11.7	38.7		12.8	25.3			21.8	3.8		35.6	6.9
LOS	B	D		B	C			C	A		D	A
Approach Delay		34.2			21.9			14.6			21.7	
Approach LOS		C			C			B			C	
Queue Length 50th (m)	6.3	57.1		7.1	30.4			24.7	0.0		24.2	0.0
Queue Length 95th (m)	16.1	#120.8		17.7	59.6			41.5	10.6		43.4	14.1
Internal Link Dist (m)		504.1			318.3			209.4			151.4	
Turn Bay Length (m)									100.0			100.0
Base Capacity (vph)	508	566		370	556			581	859		497	636
Starvation Cap Reductn	0	0		0	0			0	0		0	0
Spillback Cap Reductn	0	0		0	0			0	0		0	0
Storage Cap Reductn	0	0		0	0			0	0		0	0

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Reduced v/c Ratio	0.18	0.78		0.27	0.48			0.40	0.18		0.36	0.26

Intersection Summary			
Area Type:	Other		
Cycle Length: 85			
Actuated Cycle Length: 74.1			
Control Type: Actuated-Uncoordinated			
Maximum v/c Ratio: 0.82			
Intersection Signal Delay: 24.1		Intersection LOS: C	
Intersection Capacity Utilization 59.4%		ICU Level of Service B	
Analysis Period (min) 15			

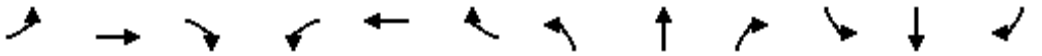
\# 95th percentile volume exceeds capacity, queue may be longer.
Queue shown is maximum after two cycles.

Splits and Phases: 3: 46 Ave (Highway 2A) & Highway 27



Lanes, Volumes, Timings
3: 46 Ave (Highway 2A) & Highway 27

07-04-2024

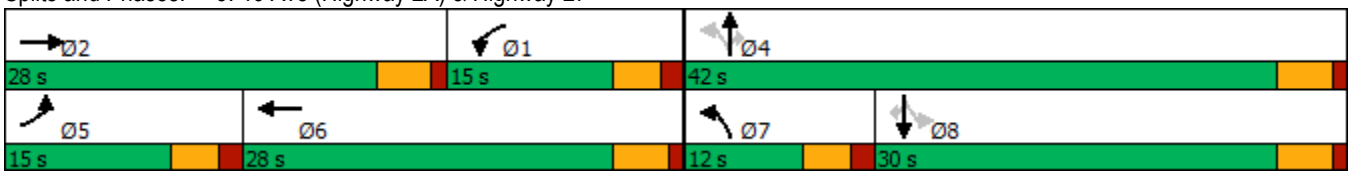


Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	80	310	90	90	210	30	120	90	140	60	100	150
Future Volume (vph)	80	310	90	90	210	30	120	90	140	60	100	150
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (m)	0.0		0.0	0.0		170.0	0.0		100.0	0.0		100.0
Storage Lanes	0		0	0		1	0		1	0		1
Taper Length (m)	7.5			7.5			7.5			7.5		
Satd. Flow (prot)	0	3301	0	0	3281	0	0	1776	1538	0	1781	1524
Flt Permitted		0.697			0.732			0.531			0.790	
Satd. Flow (perm)	0	2319	0	0	2433	0	0	970	1538	0	1433	1524
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)		32			12				156			193
Link Speed (k/h)		50			50			50			50	
Link Distance (m)		528.1			342.3			233.4			175.4	
Travel Time (s)		38.0			24.6			16.8			12.6	
Peak Hour Factor	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90
Heavy Vehicles (%)	5%	6%	4%	5%	7%	14%	1%	8%	5%	6%	4%	6%
Shared Lane Traffic (%)												
Lane Group Flow (vph)	0	533	0	0	366	0	0	233	156	0	178	167
Enter Blocked Intersection	No	No	No	No	No	No	No	No	No	No	No	No
Lane Alignment	Left	Left	Right	Left	Left	Right	Left	Left	Right	Left	Left	Right
Median Width(m)		0.0			0.0			0.0			0.0	
Link Offset(m)		0.0			0.0			0.0			0.0	
Crosswalk Width(m)		4.8			4.8			4.8			4.8	
Two way Left Turn Lane												
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Turning Speed (k/h)	25		15	25		15	25		15	25		15
Turn Type	Prot	NA		Prot	NA		pm+pt	NA	Perm	Perm	NA	Perm
Protected Phases	5	2		1	6		7	4			8	
Permitted Phases							4		4	8		8
Total Split (s)	15.0	28.0		15.0	28.0		12.0	42.0	42.0	30.0	30.0	30.0
Total Lost Time (s)		4.5			4.5			4.5	4.5		4.5	4.5
Act Effct Green (s)		23.6			23.6			27.4	27.4		15.4	15.4
Actuated g/C Ratio		0.31			0.31			0.36	0.36		0.21	0.21
v/c Ratio		0.93			0.63			0.54	0.24		0.61	0.36
Control Delay		47.2			32.7			22.3	3.8		36.1	5.1
Queue Delay		0.0			0.0			0.0	0.0		0.0	0.0
Total Delay		47.2			32.7			22.3	3.8		36.1	5.1
LOS		D			C			C	A		D	A
Approach Delay		47.2			32.7			14.8			21.1	
Approach LOS		D			C			B			C	
Queue Length 50th (m)		31.4			20.8			24.7	0.0		24.2	0.0
Queue Length 95th (m)		#71.7			36.8			41.5	10.6		43.4	10.6
Internal Link Dist (m)		504.1			318.3			209.4			151.4	
Turn Bay Length (m)									100.0			100.0
Base Capacity (vph)		575			578			567	848		488	646
Starvation Cap Reductn		0			0			0	0		0	0
Spillback Cap Reductn		0			0			0	0		0	0
Storage Cap Reductn		0			0			0	0		0	0

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Reduced v/c Ratio		0.93			0.63			0.41	0.18		0.36	0.26

Intersection Summary			
Area Type:	Other		
Cycle Length: 85			
Actuated Cycle Length: 75.1			
Control Type: Actuated-Uncoordinated			
Maximum v/c Ratio: 0.93			
Intersection Signal Delay: 30.7		Intersection LOS: C	
Intersection Capacity Utilization 52.4%		ICU Level of Service A	
Analysis Period (min) 15			
# 95th percentile volume exceeds capacity, queue may be longer.			
Queue shown is maximum after two cycles.			

Splits and Phases: 3: 46 Ave (Highway 2A) & Highway 27



Lanes, Volumes, Timings
3: 46 Ave (Highway 2A) & Highway 27

07-04-2024

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	80	310	90	90	210	30	120	90	140	60	100	150
Future Volume (vph)	80	310	90	90	210	30	120	90	140	60	100	150
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (m)	0.0		0.0	0.0		170.0	0.0		100.0	0.0		100.0
Storage Lanes	0		0	0		1	0		1	0		1
Taper Length (m)	7.5			7.5			7.5			7.5		
Satd. Flow (prot)	0	3301	0	0	3281	0	0	1776	1538	0	1781	1524
Flt Permitted		0.992			0.987			0.512			0.783	
Satd. Flow (perm)	0	3301	0	0	3281	0	0	935	1538	0	1420	1524
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)		30			11				156			167
Link Speed (k/h)		50			50			50			50	
Link Distance (m)		528.1			342.3			233.4			175.4	
Travel Time (s)		38.0			24.6			16.8			12.6	
Peak Hour Factor	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90
Heavy Vehicles (%)	5%	6%	4%	5%	7%	14%	1%	8%	5%	6%	4%	6%
Shared Lane Traffic (%)												
Lane Group Flow (vph)	0	533	0	0	366	0	0	233	156	0	178	167
Enter Blocked Intersection	No	No	No	No	No	No	No	No	No	No	No	No
Lane Alignment	Left	Left	Right	Left	Left	Right	Left	Left	Right	Left	Left	Right
Median Width(m)		0.0			0.0			0.0			0.0	
Link Offset(m)		0.0			0.0			0.0			0.0	
Crosswalk Width(m)		4.8			4.8			4.8			4.8	
Two way Left Turn Lane												
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Turning Speed (k/h)	25		15	25		15	25		15	25		15
Turn Type	Split	NA		Split	NA		pm+pt	NA	Perm	Perm	NA	Perm
Protected Phases	2	2		6	6		7	4			8	
Permitted Phases							4		4	8		8
Total Split (s)	26.0	26.0		26.0	26.0		15.0	35.0	35.0	20.0	20.0	20.0
Total Lost Time (s)		4.5			4.5			4.5	4.5		4.5	4.5
Act Effct Green (s)		18.5			15.6			28.7	28.7		14.0	14.0
Actuated g/C Ratio		0.24			0.20			0.38	0.38		0.18	0.18
v/c Ratio		0.65			0.54			0.50	0.23		0.69	0.40
Control Delay		29.4			30.3			22.9	4.5		46.4	8.7
Queue Delay		0.0			0.0			0.0	0.0		0.0	0.0
Total Delay		29.4			30.3			22.9	4.5		46.4	8.7
LOS		C			C			C	A		D	A
Approach Delay		29.4			30.3			15.5			28.1	
Approach LOS		C			C			B			C	
Queue Length 50th (m)		37.4			26.9			25.6	0.0		26.2	0.0
Queue Length 95th (m)		58.5			41.2			49.6	12.3		#59.1	16.7
Internal Link Dist (m)		504.1			318.3			209.4			151.4	
Turn Bay Length (m)									100.0			100.0
Base Capacity (vph)		963			944			495	715		292	446
Starvation Cap Reductn		0			0			0	0		0	0
Spillback Cap Reductn		0			0			0	0		0	0
Storage Cap Reductn		0			0			0	0		0	0

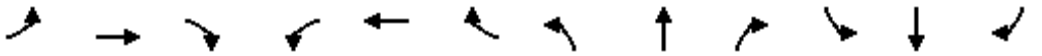
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Reduced v/c Ratio		0.55			0.39			0.47	0.22		0.61	0.37

Intersection Summary			
Area Type:	Other		
Cycle Length: 87			
Actuated Cycle Length: 76.5			
Control Type: Actuated-Uncoordinated			
Maximum v/c Ratio: 0.69			
Intersection Signal Delay: 26.0		Intersection LOS: C	
Intersection Capacity Utilization 52.4%		ICU Level of Service A	
Analysis Period (min) 15			
# 95th percentile volume exceeds capacity, queue may be longer.			
Queue shown is maximum after two cycles.			

Splits and Phases: 3: 46 Ave (Highway 2A) & Highway 27

Lanes, Volumes, Timings
3: 46 Ave (Highway 2A) & Highway 27

07-04-2024

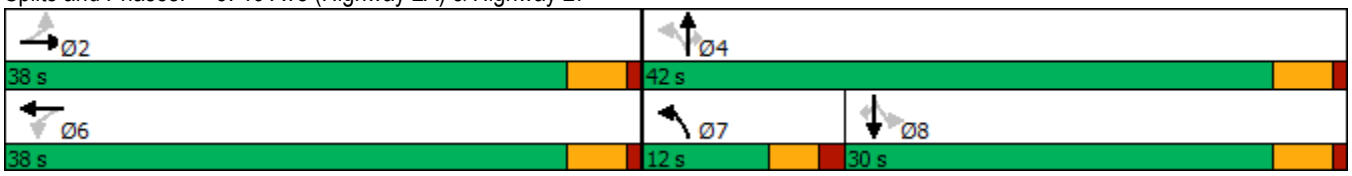


Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	80	310	90	90	210	30	120	90	140	60	100	150
Future Volume (vph)	80	310	90	90	210	30	120	90	140	60	100	150
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (m)	0.0		0.0	0.0		170.0	0.0		100.0	0.0		100.0
Storage Lanes	0		0	0		1	0		1	0		1
Taper Length (m)	7.5			7.5			7.5			7.5		
Satd. Flow (prot)	0	3301	0	0	3281	0	0	1776	1538	0	1781	1524
Flt Permitted		0.825			0.716			0.676			0.798	
Satd. Flow (perm)	0	2745	0	0	2380	0	0	1235	1538	0	1447	1524
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)		43			16				156			167
Link Speed (k/h)		50			50			50			50	
Link Distance (m)		528.1			342.3			233.4			175.4	
Travel Time (s)		38.0			24.6			16.8			12.6	
Peak Hour Factor	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90
Heavy Vehicles (%)	5%	6%	4%	5%	7%	14%	1%	8%	5%	6%	4%	6%
Shared Lane Traffic (%)												
Lane Group Flow (vph)	0	533	0	0	366	0	0	233	156	0	178	167
Enter Blocked Intersection	No	No	No	No	No	No	No	No	No	No	No	No
Lane Alignment	Left	Left	Right	Left	Left	Right	Left	Left	Right	Left	Left	Right
Median Width(m)		0.0			0.0			0.0			0.0	
Link Offset(m)		0.0			0.0			0.0			0.0	
Crosswalk Width(m)		4.8			4.8			4.8			4.8	
Two way Left Turn Lane												
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Turning Speed (k/h)	25		15	25		15	25		15	25		15
Turn Type	Perm	NA		Perm	NA		pm+pt	NA	Perm	Perm	NA	Perm
Protected Phases		2			6		7	4			8	
Permitted Phases	2			6			4		4	8		8
Total Split (s)	38.0	38.0		38.0	38.0		12.0	42.0	42.0	30.0	30.0	30.0
Total Lost Time (s)		4.5			4.5			4.5	4.5		4.5	4.5
Act Effct Green (s)		18.5			18.5			25.5	25.5		13.3	13.3
Actuated g/C Ratio		0.35			0.35			0.48	0.48		0.25	0.25
v/c Ratio		0.54			0.44			0.35	0.19		0.49	0.33
Control Delay		15.4			14.9			10.6	2.6		22.9	5.5
Queue Delay		0.0			0.0			0.0	0.0		0.0	0.0
Total Delay		15.4			14.9			10.6	2.6		22.9	5.5
LOS		B			B			B	A		C	A
Approach Delay		15.4			14.9			7.4			14.5	
Approach LOS		B			B			A			B	
Queue Length 50th (m)		19.0			13.1			11.9	0.0		14.4	0.0
Queue Length 95th (m)		38.1			27.4			30.8	8.4		35.3	12.3
Internal Link Dist (m)		504.1			318.3			209.4			151.4	
Turn Bay Length (m)									100.0			100.0
Base Capacity (vph)		1779			1535			966	1150		708	830
Starvation Cap Reductn		0			0			0	0		0	0
Spillback Cap Reductn		0			0			0	0		0	0
Storage Cap Reductn		0			0			0	0		0	0

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Reduced v/c Ratio		0.30			0.24			0.24	0.14		0.25	0.20

Intersection Summary			
Area Type:	Other		
Cycle Length: 80			
Actuated Cycle Length: 53.2			
Control Type: Actuated-Uncoordinated			
Maximum v/c Ratio: 0.54			
Intersection Signal Delay: 13.2		Intersection LOS: B	
Intersection Capacity Utilization 55.6%		ICU Level of Service B	
Analysis Period (min) 15			

Splits and Phases: 3: 46 Ave (Highway 2A) & Highway 27



Lanes, Volumes, Timings
3: 46 Ave (Highway 2A) & Highway 27

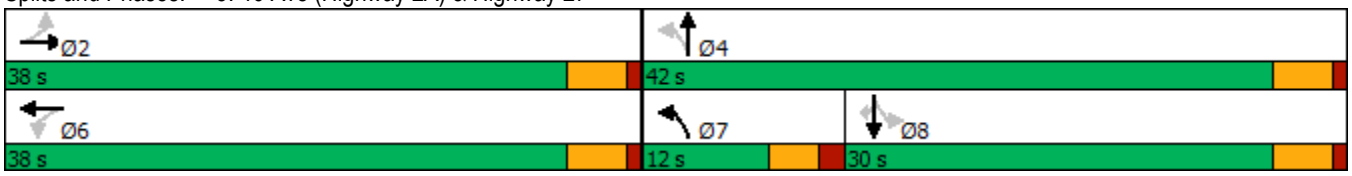
07-04-2024

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	80	310	90	90	210	30	120	90	140	60	100	150
Future Volume (vph)	80	310	90	90	210	30	120	90	140	60	100	150
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (m)	0.0		0.0	0.0		170.0	0.0		100.0	0.0		100.0
Storage Lanes	0		0	0		1	1		0	0		1
Taper Length (m)	7.5			7.5			7.5			7.5		
Satd. Flow (prot)	0	3301	0	0	3281	0	1787	1627	0	0	1781	1524
Flt Permitted		0.825			0.716		0.484				0.790	
Satd. Flow (perm)	0	2745	0	0	2380	0	910	1627	0	0	1433	1524
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)		43			16			132				167
Link Speed (k/h)		50			50			50			50	
Link Distance (m)		528.1			342.3			233.4			175.4	
Travel Time (s)		38.0			24.6			16.8			12.6	
Peak Hour Factor	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90
Heavy Vehicles (%)	5%	6%	4%	5%	7%	14%	1%	8%	5%	6%	4%	6%
Shared Lane Traffic (%)												
Lane Group Flow (vph)	0	533	0	0	366	0	133	256	0	0	178	167
Enter Blocked Intersection	No	No	No	No	No	No	No	No	No	No	No	No
Lane Alignment	Left	Left	Right	Left	Left	Right	Left	Left	Right	Left	Left	Right
Median Width(m)		0.0			0.0			3.6			3.6	
Link Offset(m)		0.0			0.0			0.0			0.0	
Crosswalk Width(m)		4.8			4.8			4.8			4.8	
Two way Left Turn Lane												
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Turning Speed (k/h)	25		15	25		15	25		15	25		15
Turn Type	Perm	NA		Perm	NA		pm+pt	NA		Perm	NA	Perm
Protected Phases		2			6		7	4			8	
Permitted Phases	2			6			4			8		8
Total Split (s)	38.0	38.0		38.0	38.0		12.0	42.0		30.0	30.0	30.0
Total Lost Time (s)		4.5			4.5		4.5	4.5			4.5	4.5
Act Effct Green (s)		18.5			18.5		25.5	25.5			13.4	13.4
Actuated g/C Ratio		0.35			0.35		0.48	0.48			0.25	0.25
v/c Ratio		0.54			0.44		0.24	0.30			0.49	0.33
Control Delay		15.4			15.0		9.8	5.7			23.0	5.5
Queue Delay		0.0			0.0		0.0	0.0			0.0	0.0
Total Delay		15.4			15.0		9.8	5.7			23.0	5.5
LOS		B			B		A	A			C	A
Approach Delay		15.4			15.0			7.1			14.5	
Approach LOS		B			B			A			B	
Queue Length 50th (m)		19.1			13.1		6.4	6.0			14.4	0.0
Queue Length 95th (m)		38.2			27.5		18.4	21.1			35.4	12.2
Internal Link Dist (m)		504.1			318.3			209.4			151.4	
Turn Bay Length (m)												100.0
Base Capacity (vph)		1780			1536		562	1208			701	831
Starvation Cap Reductn		0			0		0	0			0	0
Spillback Cap Reductn		0			0		0	0			0	0
Storage Cap Reductn		0			0		0	0			0	0

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Reduced v/c Ratio		0.30			0.24		0.24	0.21			0.25	0.20

Intersection Summary			
Area Type:	Other		
Cycle Length: 80			
Actuated Cycle Length: 53.2			
Control Type: Actuated-Uncoordinated			
Maximum v/c Ratio: 0.54			
Intersection Signal Delay: 13.1		Intersection LOS: B	
Intersection Capacity Utilization 63.2%		ICU Level of Service B	
Analysis Period (min) 15			

Splits and Phases: 3: 46 Ave (Highway 2A) & Highway 27



Lanes, Volumes, Timings
23: 70 Avenue & Highway 27

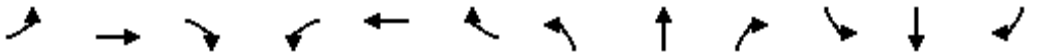
07-04-2024

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	10	220	10	40	190	30	10	10	50	30	10	10
Future Volume (vph)	10	220	10	40	190	30	10	10	50	30	10	10
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (m)	75.0		0.0	70.0		70.0	45.0		0.0	50.0		0.0
Storage Lanes	1		0	1		1	1		0	1		0
Taper Length (m)	40.0			45.0			30.0			45.0		
Satd. Flow (prot)	1805	3333	0	1626	3282	1324	1805	1532	0	1719	1758	0
Flt Permitted	0.615			0.552			0.743			0.713		
Satd. Flow (perm)	1168	3333	0	945	3282	1324	1412	1532	0	1290	1758	0
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)		5				57		57			11	
Link Speed (k/h)		60			60			50			50	
Link Distance (m)		228.6			411.6			170.2			183.8	
Travel Time (s)		13.7			24.7			12.3			13.2	
Peak Hour Factor	0.87	0.87	0.87	0.87	0.87	0.87	0.87	0.87	0.87	0.87	0.87	0.87
Heavy Vehicles (%)	0%	8%	0%	11%	10%	22%	0%	0%	10%	5%	0%	0%
Shared Lane Traffic (%)												
Lane Group Flow (vph)	11	264	0	46	218	34	11	68	0	34	22	0
Enter Blocked Intersection	No	No	No	No	No	No	No	No	No	No	No	No
Lane Alignment	Left	Left	Right	Left	Left	Right	Left	Left	Right	Left	Left	Right
Median Width(m)		5.6			5.6			3.6			3.6	
Link Offset(m)		0.0			0.0			0.0			0.0	
Crosswalk Width(m)		4.8			4.8			4.8			4.8	
Two way Left Turn Lane												
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Turning Speed (k/h)	25		15	25		15	25		15	25		15
Turn Type	pm+pt	NA		pm+pt	NA	Perm	Perm	NA		Perm	NA	
Protected Phases	5	2		1	6			8			4	
Permitted Phases	2			6		6	8			4		
Total Split (s)	26.0	52.0		26.0	52.0	52.0	37.0	37.0		37.0	37.0	
Total Lost Time (s)	4.5	5.0		4.5	5.0	5.0	4.5	4.5		4.5	4.5	
Act Effct Green (s)	39.7	37.7		41.4	41.9	41.9	12.2	12.2		12.2	12.2	
Actuated g/C Ratio	0.71	0.68		0.74	0.75	0.75	0.22	0.22		0.22	0.22	
v/c Ratio	0.01	0.12		0.06	0.09	0.03	0.04	0.18		0.12	0.06	
Control Delay	3.9	7.8		3.8	5.4	1.7	20.3	9.7		21.4	15.3	
Queue Delay	0.0	0.0		0.0	0.0	0.0	0.0	0.0		0.0	0.0	
Total Delay	3.9	7.8		3.8	5.4	1.7	20.3	9.7		21.4	15.3	
LOS	A	A		A	A	A	C	A		C	B	
Approach Delay		7.7			4.7			11.2			19.0	
Approach LOS		A			A			B			B	
Queue Length 50th (m)	0.4	8.8		1.6	4.2	0.0	1.1	1.1		3.4	1.1	
Queue Length 95th (m)	1.6	14.4		4.1	12.4	2.3	4.5	9.5		9.7	5.8	
Internal Link Dist (m)		204.6			387.6			146.2			159.8	
Turn Bay Length (m)	75.0			70.0		70.0	45.0			50.0		
Base Capacity (vph)	1131	2847		980	2802	1139	834	927		761	1042	
Starvation Cap Reductn	0	0		0	0	0	0	0		0	0	
Spillback Cap Reductn	0	0		0	0	0	0	0		0	0	
Storage Cap Reductn	0	0		0	0	0	0	0		0	0	

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Reduced v/c Ratio	0.01	0.09		0.05	0.08	0.03	0.01	0.07		0.04	0.02	

Intersection Summary			
Area Type:	Other		
Cycle Length: 115			
Actuated Cycle Length: 55.8			
Control Type: Actuated-Uncoordinated			
Maximum v/c Ratio: 0.18			
Intersection Signal Delay: 7.7		Intersection LOS: A	
Intersection Capacity Utilization 44.2%		ICU Level of Service A	
Analysis Period (min) 15			

Splits and Phases: 23: 70 Avenue & Highway 27

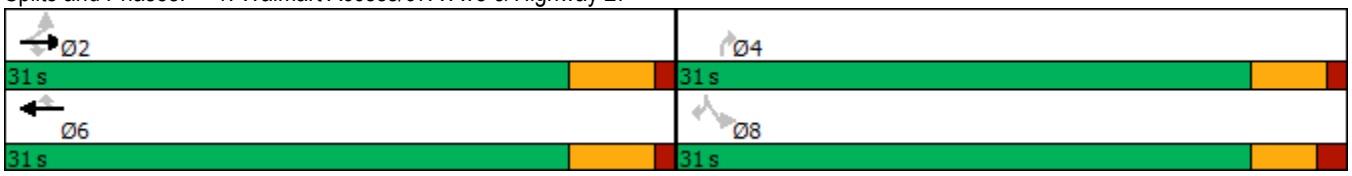


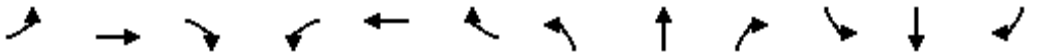
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	90	200	10	0	200	150	0	0	10	80	0	60
Future Volume (vph)	90	200	10	0	200	150	0	0	10	80	0	60
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (m)	80.0		30.0	80.0		30.0	0.0		30.0	0.0		20.0
Storage Lanes	1		1	0		1	0		0	2		1
Taper Length (m)	60.0			80.0			7.5			7.5		
Satd. Flow (prot)	1787	3312	1615	0	3223	1568	0	0	1644	3303	0	1538
Flt Permitted	0.616									0.950		
Satd. Flow (perm)	1159	3312	1615	0	3223	1568	0	0	1621	3294	0	1538
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)			26			163			562			65
Link Speed (k/h)		60			60			50			50	
Link Distance (m)		411.6			406.1			117.8			163.6	
Travel Time (s)		24.7			24.4			8.5			11.8	
Confl. Peds. (#/hr)									2	2		
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Heavy Vehicles (%)	1%	9%	0%	0%	12%	3%	0%	0%	0%	6%	0%	5%
Shared Lane Traffic (%)												
Lane Group Flow (vph)	98	217	11	0	217	163	0	0	11	87	0	65
Enter Blocked Intersection	No	No	No	No	No	No	No	No	No	No	No	No
Lane Alignment	Left	Left	Right	Left	Left	Right	Left	Left	Right	Left	Left	Right
Median Width(m)		6.1			6.1			7.2			7.2	
Link Offset(m)		0.0			0.0			0.0			0.0	
Crosswalk Width(m)		4.8			4.8			4.8			4.8	
Two way Left Turn Lane												
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Turning Speed (k/h)	25		15	25		15	25		15	25		15
Turn Type	Perm	NA	Perm		NA	Perm			Perm	Perm		Perm
Protected Phases		2			6							
Permitted Phases	2		2			6			4	8		8
Total Split (s)	31.0	31.0	31.0		31.0	31.0			31.0	31.0		31.0
Total Lost Time (s)	5.0	5.0	5.0		5.0	5.0			4.5	4.5		4.5
Act Effct Green (s)	17.7	17.7	17.7		17.7	17.7			15.4	15.4		15.4
Actuated g/C Ratio	0.48	0.48	0.48		0.48	0.48			0.42	0.42		0.42
v/c Ratio	0.18	0.14	0.01		0.14	0.19			0.01	0.06		0.10
Control Delay	10.3	8.9	2.6		8.9	3.0			0.0	6.7		2.6
Queue Delay	0.0	0.0	0.0		0.0	0.0			0.0	0.0		0.0
Total Delay	10.3	8.9	2.6		8.9	3.0			0.0	6.7		2.6
LOS	B	A	A		A	A			A	A		A
Approach Delay		9.1			6.4						4.9	
Approach LOS		A			A						A	
Queue Length 50th (m)	4.4	5.0	0.0		5.0	0.0			0.0	1.4		0.0
Queue Length 95th (m)	11.6	9.8	1.3		9.9	7.5			0.0	3.7		3.7
Internal Link Dist (m)		387.6			382.1			93.8			139.6	
Turn Bay Length (m)	80.0		30.0			30.0			30.0			20.0
Base Capacity (vph)	839	2398	1176		2333	1180			1343	2431		1152
Starvation Cap Reductn	0	0	0		0	0			0	0		0
Spillback Cap Reductn	0	0	0		0	0			0	0		0

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Storage Cap Reductn	0	0	0		0	0			0	0		0
Reduced v/c Ratio	0.12	0.09	0.01		0.09	0.14			0.01	0.04		0.06

Intersection Summary			
Area Type:	Other		
Cycle Length: 62			
Actuated Cycle Length: 36.9			
Control Type: Actuated-Uncoordinated			
Maximum v/c Ratio: 0.19			
Intersection Signal Delay: 7.1		Intersection LOS: A	
Intersection Capacity Utilization 37.3%		ICU Level of Service A	
Analysis Period (min) 15			

Splits and Phases: 1: Walmart Access/67A Ave & Highway 27



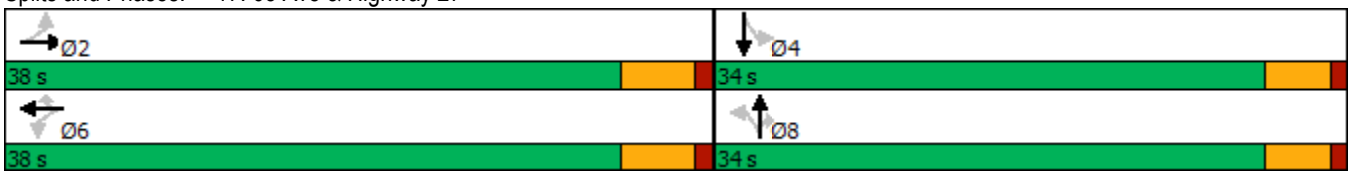


Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	30	200	60	60	240	90	80	50	50	70	40	30
Future Volume (vph)	30	200	60	60	240	90	80	50	50	70	40	30
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (m)	80.0		0.0	70.0		25.0	0.0		25.0	0.0		0.0
Storage Lanes	1		0	1		1	0		1	1		0
Taper Length (m)	30.0			50.0			7.5			7.5		
Satd. Flow (prot)	1671	3221	0	1736	3312	1553	0	1787	1583	1641	1555	0
Flt Permitted	0.591			0.579				0.767		0.667		
Satd. Flow (perm)	1036	3221	0	1058	3312	1514	0	1404	1583	1152	1555	0
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)		65				98			54		33	
Link Speed (k/h)		60			60			50			50	
Link Distance (m)		406.1			805.5			131.0			74.7	
Travel Time (s)		24.4			48.3			9.4			5.4	
Confl. Peds. (#/hr)	4					4	13					13
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Heavy Vehicles (%)	8%	10%	2%	4%	9%	4%	2%	5%	2%	10%	4%	25%
Shared Lane Traffic (%)												
Lane Group Flow (vph)	33	282	0	65	261	98	0	141	54	76	76	0
Enter Blocked Intersection	No	No	No	No	No	No	No	No	No	No	No	No
Lane Alignment	Left	Left	Right	Left	Left	Right	Left	Left	Right	Left	Left	Right
Median Width(m)		6.1			6.1			5.6			5.6	
Link Offset(m)		0.0			0.0			0.0			0.0	
Crosswalk Width(m)		4.8			4.8			4.8			4.8	
Two way Left Turn Lane												
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Turning Speed (k/h)	25		15	25		15	25		15	25		15
Turn Type	Perm	NA		Perm	NA	Perm	Perm	NA	Perm	Perm	NA	
Protected Phases		2			6			8			4	
Permitted Phases	2			6		6	8		8	4		
Total Split (s)	38.0	38.0		38.0	38.0	38.0	34.0	34.0	34.0	34.0	34.0	
Total Lost Time (s)	5.0	5.0		5.0	5.0	5.0		4.5	4.5	4.5	4.5	
Act Effct Green (s)	19.1	19.1		19.1	19.1	19.1		12.0	12.0	12.0	12.0	
Actuated g/C Ratio	0.53	0.53		0.53	0.53	0.53		0.33	0.33	0.33	0.33	
v/c Ratio	0.06	0.16		0.12	0.15	0.12		0.30	0.10	0.20	0.14	
Control Delay	7.0	5.5		7.6	6.9	2.5		11.4	3.9	10.5	6.6	
Queue Delay	0.0	0.0		0.0	0.0	0.0		0.0	0.0	0.0	0.0	
Total Delay	7.0	5.5		7.6	6.9	2.5		11.4	3.9	10.5	6.6	
LOS	A	A		A	A	A		B	A	B	A	
Approach Delay		5.7			6.0			9.3			8.5	
Approach LOS		A			A			A			A	
Queue Length 50th (m)	1.2	4.2		2.4	5.1	0.0		6.5	0.0	3.4	1.8	
Queue Length 95th (m)	4.3	8.8		7.1	9.7	4.9		15.2	4.3	9.4	7.3	
Internal Link Dist (m)		382.1			781.5			107.0			50.7	
Turn Bay Length (m)	80.0			70.0		25.0			25.0			
Base Capacity (vph)	944	2942		964	3020	1389		1144	1300	939	1273	
Starvation Cap Reductn	0	0		0	0	0		0	0	0	0	
Spillback Cap Reductn	0	0		0	0	0		0	0	0	0	

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Storage Cap Reductn	0	0		0	0	0		0	0	0	0	
Reduced v/c Ratio	0.03	0.10		0.07	0.09	0.07		0.12	0.04	0.08	0.06	

Intersection Summary			
Area Type:	Other		
Cycle Length: 72			
Actuated Cycle Length: 36.2			
Control Type: Actuated-Uncoordinated			
Maximum v/c Ratio: 0.30			
Intersection Signal Delay: 6.8		Intersection LOS: A	
Intersection Capacity Utilization 52.5%		ICU Level of Service A	
Analysis Period (min) 15			

Splits and Phases: 17: 65 Ave & Highway 27



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	40	280	110	50	300	70	80	50	80	80	70	70
Future Volume (vph)	40	280	110	50	300	70	80	50	80	80	70	70
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (m)	90.0		0.0	30.0		0.0	20.0		10.0	20.0		10.0
Storage Lanes	1		0	1		0	1		1	1		0
Taper Length (m)	40.0			30.0			7.5			7.5		
Satd. Flow (prot)	1703	3262	0	1752	3316	0	1752	1863	1568	1703	1900	1538
Flt Permitted	0.520			0.479			0.709			0.722		
Satd. Flow (perm)	932	3262	0	884	3316	0	1308	1863	1568	1294	1900	1538
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)		72			35				96			96
Link Speed (k/h)		50			50			50			50	
Link Distance (m)		805.5			697.8			130.8			121.6	
Travel Time (s)		58.0			50.2			9.4			8.8	
Peak Hour Factor	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94
Heavy Vehicles (%)	6%	8%	1%	3%	6%	5%	3%	2%	3%	6%	0%	5%
Shared Lane Traffic (%)												
Lane Group Flow (vph)	43	415	0	53	393	0	85	53	85	85	74	74
Enter Blocked Intersection	No	No	No	No	No	No	No	No	No	No	No	No
Lane Alignment	Left	Left	Right	Left	Left	Right	Left	Left	Right	Left	Left	Right
Median Width(m)		6.1			6.1			3.6			3.6	
Link Offset(m)		0.0			0.0			0.0			0.0	
Crosswalk Width(m)		4.8			4.8			4.8			4.8	
Two way Left Turn Lane												
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Turning Speed (k/h)	25		15	25		15	25		15	25		15
Turn Type	pm+pt	NA		pm+pt	NA		Perm	NA	Perm	Perm	NA	Perm
Protected Phases	5	2		1	6			8			4	
Permitted Phases	2			6			8		8	4		4
Total Split (s)	19.0	38.0		19.0	38.0		29.0	29.0	29.0	29.0	29.0	29.0
Total Lost Time (s)	4.0	5.0		4.0	5.0		4.5	4.5	4.5	4.5	4.5	4.5
Act Effct Green (s)	30.9	26.6		31.8	28.8		15.3	15.3	15.3	15.3	15.3	15.3
Actuated g/C Ratio	0.59	0.51		0.61	0.55		0.29	0.29	0.29	0.29	0.29	0.29
v/c Ratio	0.06	0.24		0.08	0.21		0.22	0.10	0.16	0.22	0.13	0.14
Control Delay	5.4	10.3		5.4	9.7		18.6	16.9	5.0	18.7	17.1	4.1
Queue Delay	0.0	0.0		0.0	0.0		0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	5.4	10.3		5.4	9.7		18.6	16.9	5.0	18.7	17.1	4.1
LOS	A	B		A	A		B	B	A	B	B	A
Approach Delay		9.8			9.2			13.0			13.5	
Approach LOS		A			A			B			B	
Queue Length 50th (m)	1.7	13.7		2.1	8.6		7.4	4.5	0.0	7.5	6.3	0.0
Queue Length 95th (m)	4.8	23.9		5.6	24.2		18.0	11.9	7.8	18.0	15.4	6.3
Internal Link Dist (m)		781.5			673.8			106.8			97.6	
Turn Bay Length (m)	90.0			30.0			20.0		10.0	20.0		10.0
Base Capacity (vph)	818	2258		816	2286		627	894	802	621	911	788
Starvation Cap Reductn	0	0		0	0		0	0	0	0	0	0
Spillback Cap Reductn	0	0		0	0		0	0	0	0	0	0
Storage Cap Reductn	0	0		0	0		0	0	0	0	0	0

Lane Group	Ø11	Ø12
Lane Configurations		
Traffic Volume (vph)		
Future Volume (vph)		
Ideal Flow (vphpl)		
Storage Length (m)		
Storage Lanes		
Taper Length (m)		
Satd. Flow (prot)		
Flt Permitted		
Satd. Flow (perm)		
Right Turn on Red		
Satd. Flow (RTOR)		
Link Speed (k/h)		
Link Distance (m)		
Travel Time (s)		
Peak Hour Factor		
Heavy Vehicles (%)		
Shared Lane Traffic (%)		
Lane Group Flow (vph)		
Enter Blocked Intersection		
Lane Alignment		
Median Width(m)		
Link Offset(m)		
Crosswalk Width(m)		
Two way Left Turn Lane		
Headway Factor		
Turning Speed (k/h)		
Turn Type		
Protected Phases	11	12
Permitted Phases		
Total Split (s)	5.0	5.0
Total Lost Time (s)		
Act Effct Green (s)		
Actuated g/C Ratio		
v/c Ratio		
Control Delay		
Queue Delay		
Total Delay		
LOS		
Approach Delay		
Approach LOS		
Queue Length 50th (m)		
Queue Length 95th (m)		
Internal Link Dist (m)		
Turn Bay Length (m)		
Base Capacity (vph)		
Starvation Cap Reductn		
Spillback Cap Reductn		
Storage Cap Reductn		

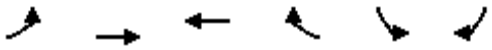
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Reduced v/c Ratio	0.05	0.18		0.06	0.17		0.14	0.06	0.11	0.14	0.08	0.09

Intersection Summary			
Area Type:	Other		
Cycle Length: 91			
Actuated Cycle Length: 52.2			
Control Type: Semi Act-Uncoord			
Maximum v/c Ratio: 0.24			
Intersection Signal Delay: 10.8		Intersection LOS: B	
Intersection Capacity Utilization 51.7%		ICU Level of Service A	
Analysis Period (min) 15			

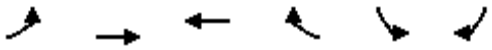
Splits and Phases: 14: 57 Ave & Highway 27

Lane Group	Ø11	Ø12
Reduced v/c Ratio		

Intersection Summary



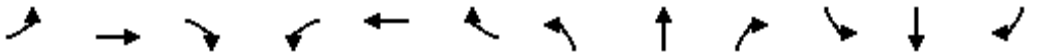
Lane Group	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Traffic Volume (vph)	20	390	420	10	30	30
Future Volume (vph)	20	390	420	10	30	30
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Storage Length (m)	0.0			20.0	0.0	10.0
Storage Lanes	0			1	1	1
Taper Length (m)	7.5				7.5	
Satd. Flow (prot)	0	3336	3374	1615	1805	1553
Flt Permitted		0.929			0.950	
Satd. Flow (perm)	0	3105	3374	1576	1805	1528
Right Turn on Red				Yes		Yes
Satd. Flow (RTOR)				11		32
Link Speed (k/h)		50	50		50	
Link Distance (m)		697.8	226.5		137.7	
Travel Time (s)		50.2	16.3		9.9	
Confl. Peds. (#/hr)	3			3		5
Peak Hour Factor	0.94	0.94	0.94	0.94	0.94	0.94
Heavy Vehicles (%)	8%	8%	7%	0%	0%	4%
Shared Lane Traffic (%)						
Lane Group Flow (vph)	0	436	447	11	32	32
Enter Blocked Intersection	No	No	No	No	No	No
Lane Alignment	Left	Left	Left	Right	Left	Right
Median Width(m)		0.0	0.0		3.6	
Link Offset(m)		0.0	0.0		0.0	
Crosswalk Width(m)		4.8	4.8		4.8	
Two way Left Turn Lane						
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00
Turning Speed (k/h)	25			15	25	15
Turn Type	Perm	NA	NA	Perm	Prot	Perm
Protected Phases		2	6		4	
Permitted Phases	2			6		4
Total Split (s)	38.0	38.0	38.0	38.0	27.0	27.0
Total Lost Time (s)		4.5	4.5	4.5	4.5	4.5
Act Effct Green (s)		53.6	53.6	53.6	10.0	10.0
Actuated g/C Ratio		0.82	0.82	0.82	0.15	0.15
v/c Ratio		0.17	0.16	0.01	0.12	0.12
Control Delay		2.6	1.9	1.3	24.9	11.0
Queue Delay		0.0	0.0	0.0	0.0	0.0
Total Delay		2.6	1.9	1.3	24.9	11.0
LOS		A	A	A	C	B
Approach Delay		2.6	1.9		17.9	
Approach LOS		A	A		B	
Queue Length 50th (m)		7.7	8.4	0.3	3.6	0.0
Queue Length 95th (m)		11.8	8.2	0.3	10.5	6.7
Internal Link Dist (m)		673.8	202.5		113.7	
Turn Bay Length (m)				20.0		10.0
Base Capacity (vph)		2560	2782	1301	624	549
Starvation Cap Reductn		0	0	0	0	0
Spillback Cap Reductn		0	0	0	0	0



Lane Group	EBL	EBT	WBT	WBR	SBL	SBR
Storage Cap Reductn		0	0	0	0	0
Reduced v/c Ratio		0.17	0.16	0.01	0.05	0.06

Intersection Summary			
Area Type:	Other		
Cycle Length: 65			
Actuated Cycle Length: 65			
Offset: 17 (26%), Referenced to phase 2:EBTL and 6:WBT, Start of Green			
Control Type: Actuated-Coordinated			
Maximum v/c Ratio: 0.17			
Intersection Signal Delay: 3.3		Intersection LOS: A	
Intersection Capacity Utilization 43.0%		ICU Level of Service A	
Analysis Period (min) 15			

Splits and Phases: 12: Highway 27 & 52 Ave

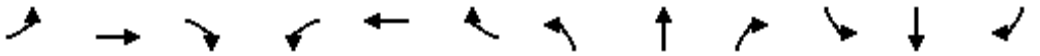


Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	10	430	70	30	470	10	70	10	20	10	10	10
Future Volume (vph)	10	430	70	30	470	10	70	10	20	10	10	10
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (m)	60.0		0.0	60.0		0.0	30.0		0.0	0.0		0.0
Storage Lanes	1		0	1		0	0		0	1		0
Taper Length (m)	80.0			80.0			40.0			7.5		
Satd. Flow (prot)	1805	3307	0	1719	3304	0	1805	1691	0	1805	1742	0
Flt Permitted	0.461			0.452			0.743			0.736		
Satd. Flow (perm)	862	3307	0	818	3304	0	1403	1691	0	1392	1742	0
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)		44			5			22			11	
Link Speed (k/h)		50			50			50			50	
Link Distance (m)		226.5			173.9			143.4			146.6	
Travel Time (s)		16.3			12.5			10.3			10.6	
Confl. Peds. (#/hr)	24					24	9		7	7		9
Peak Hour Factor	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93
Heavy Vehicles (%)	0%	8%	0%	5%	9%	0%	0%	0%	0%	0%	0%	0%
Shared Lane Traffic (%)												
Lane Group Flow (vph)	11	537	0	32	516	0	75	33	0	11	22	0
Enter Blocked Intersection	No	No	No	No	No	No	No	No	No	No	No	No
Lane Alignment	Left	Left	Right	Left	Left	Right	Left	Left	Right	Left	Left	Right
Median Width(m)		3.6			3.6			3.6			3.6	
Link Offset(m)		0.0			0.0			0.0			0.0	
Crosswalk Width(m)		4.8			4.8			4.8			4.8	
Two way Left Turn Lane												
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Turning Speed (k/h)	25		15	25		15	25		15	25		15
Turn Type	Perm	NA		Perm	NA		Perm	NA		Perm	NA	
Protected Phases		2			6			8			4	
Permitted Phases	2			6			8			4		
Total Split (s)	40.0	40.0		40.0	40.0		25.0	25.0		25.0	25.0	
Total Lost Time (s)	4.5	4.5		4.5	4.5		4.5	4.5		4.5	4.5	
Act Effct Green (s)	49.2	49.2		49.2	49.2		10.6	10.6		10.6	10.6	
Actuated g/C Ratio	0.76	0.76		0.76	0.76		0.16	0.16		0.16	0.16	
v/c Ratio	0.02	0.21		0.05	0.21		0.33	0.11		0.05	0.08	
Control Delay	3.3	3.0		3.0	2.8		28.1	14.1		22.9	16.7	
Queue Delay	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Total Delay	3.3	3.0		3.0	2.8		28.1	14.1		22.9	16.7	
LOS	A	A		A	A		C	B		C	B	
Approach Delay		3.0			2.8			23.8			18.8	
Approach LOS		A			A			C			B	
Queue Length 50th (m)	0.3	8.2		0.8	8.6		8.7	1.2		1.2	1.2	
Queue Length 95th (m)	1.7	14.8		3.1	13.1		19.0	7.7		5.0	6.4	
Internal Link Dist (m)		202.5			149.9			119.4			122.6	
Turn Bay Length (m)	60.0			60.0			30.0					
Base Capacity (vph)	653	2515		619	2503		442	548		439	556	
Starvation Cap Reductn	0	0		0	0		0	0		0	0	
Spillback Cap Reductn	0	0		0	0		0	0		0	0	

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Storage Cap Reductn	0	0		0	0		0	0		0	0	
Reduced v/c Ratio	0.02	0.21		0.05	0.21		0.17	0.06		0.03	0.04	

Intersection Summary			
Area Type:	Other		
Cycle Length: 65			
Actuated Cycle Length: 65			
Offset: 11 (17%), Referenced to phase 2:EBTL and 6:WBTL, Start of Green			
Control Type: Actuated-Coordinated			
Maximum v/c Ratio: 0.33			
Intersection Signal Delay: 5.2		Intersection LOS: A	
Intersection Capacity Utilization 45.6%		ICU Level of Service A	
Analysis Period (min) 15			

Splits and Phases: 9: 51st Ave & Highway 27

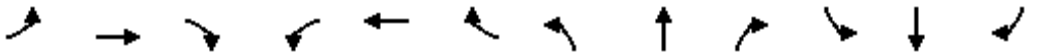


Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	20	280	50	50	300	50	50	20	30	70	40	40
Future Volume (vph)	20	280	50	50	300	50	50	20	30	70	40	40
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (m)	0.0		0.0	0.0		0.0	0.0		50.0	0.0		35.0
Storage Lanes	0		0	0		0	0		1	0		1
Taper Length (m)	7.5			7.5			7.5			7.5		
Satd. Flow (prot)	0	3229	0	0	3265	0	0	1835	1583	0	1829	1524
Flt Permitted		0.920			0.879			0.754			0.761	
Satd. Flow (perm)	0	2979	0	0	2887	0	0	1429	1555	0	1432	1498
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)		34			38				101			176
Link Speed (k/h)		50			50			50			50	
Link Distance (m)		173.9			528.1			144.8			227.8	
Travel Time (s)		12.5			38.0			10.4			16.4	
Confl. Peds. (#/hr)	2		1	1		2	7		8	8		7
Peak Hour Factor	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91
Heavy Vehicles (%)	9%	10%	2%	5%	8%	7%	0%	0%	2%	1%	0%	6%
Shared Lane Traffic (%)												
Lane Group Flow (vph)	0	385	0	0	440	0	0	77	33	0	121	44
Enter Blocked Intersection	No	No	No	No	No	No	No	No	No	No	No	No
Lane Alignment	Left	Left	Right	Left	Left	Right	Left	Left	Right	Left	Left	Right
Median Width(m)		0.0			0.0			0.0			0.0	
Link Offset(m)		0.0			0.0			0.0			0.0	
Crosswalk Width(m)		4.8			4.8			4.8			4.8	
Two way Left Turn Lane												
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Turning Speed (k/h)	25		15	25		15	25		15	25		15
Turn Type	Perm	NA		pm+pt	NA		pm+pt	NA	Perm	Perm	NA	Perm
Protected Phases		2		1	6		3	8			4	
Permitted Phases	2			6			8		8	4		4
Total Split (s)	30.0	30.0		10.0	40.0		10.0	25.0	25.0	15.0	15.0	15.0
Total Lost Time (s)		4.5			4.5			4.5	4.5		4.5	4.5
Act Effct Green (s)		27.6			38.4			20.5	20.5		10.4	10.4
Actuated g/C Ratio		0.42			0.59			0.32	0.32		0.16	0.16
v/c Ratio		0.30			0.25			0.15	0.06		0.53	0.11
Control Delay		13.0			8.1			14.8	0.2		34.2	0.6
Queue Delay		0.0			0.0			0.0	0.0		0.0	0.0
Total Delay		13.0			8.1			14.8	0.2		34.2	0.6
LOS		B			A			B	A		C	A
Approach Delay		13.0			8.1			10.4			25.2	
Approach LOS		B			A			B			C	
Queue Length 50th (m)		19.4			13.9			6.4	0.0		14.2	0.0
Queue Length 95th (m)		31.4			22.6			14.2	0.0		29.6	0.0
Internal Link Dist (m)		149.9			504.1			120.8			203.8	
Turn Bay Length (m)									50.0			35.0
Base Capacity (vph)		1413			1849			544	606		234	391
Starvation Cap Reductn		0			0			0	0		0	0
Spillback Cap Reductn		0			0			0	0		0	0

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Storage Cap Reductn		0			0			0	0		0	0
Reduced v/c Ratio		0.27			0.24			0.14	0.05		0.52	0.11

Intersection Summary			
Area Type:	Other		
Cycle Length: 65			
Actuated Cycle Length: 65			
Offset: 0 (0%), Referenced to phase 2:EBTL and 6:WBTL, Start of Green, Master Intersection			
Control Type: Actuated-Coordinated			
Maximum v/c Ratio: 0.53			
Intersection Signal Delay: 12.6		Intersection LOS: B	
Intersection Capacity Utilization 62.6%		ICU Level of Service B	
Analysis Period (min) 15			

Splits and Phases: 6: 50 Ave & Highway 27

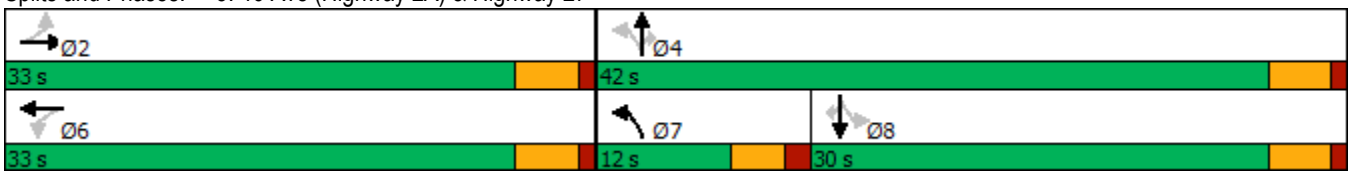


Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	50	240	100	70	220	20	100	60	70	30	100	140
Future Volume (vph)	50	240	100	70	220	20	100	60	70	30	100	140
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (m)	0.0		0.0	0.0		170.0	0.0		100.0	0.0		100.0
Storage Lanes	0		0	0		1	0		1	0		1
Taper Length (m)	7.5			7.5			7.5			7.5		
Satd. Flow (prot)	0	3049	0	0	3170	0	0	1651	1442	0	1714	1468
Flt Permitted		0.874			0.798			0.715			0.898	
Satd. Flow (perm)	0	2681	0	0	2558	0	0	1217	1442	0	1556	1468
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)		73			11				74			149
Link Speed (k/h)		50			50			50			50	
Link Distance (m)		528.1			342.3			233.4			175.4	
Travel Time (s)		38.0			24.6			16.8			12.6	
Peak Hour Factor	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94
Heavy Vehicles (%)	8%	14%	14%	5%	11%	40%	9%	16%	12%	15%	8%	10%
Shared Lane Traffic (%)												
Lane Group Flow (vph)	0	414	0	0	329	0	0	170	74	0	138	149
Enter Blocked Intersection	No	No	No	No	No	No	No	No	No	No	No	No
Lane Alignment	Left	Left	Right	Left	Left	Right	Left	Left	Right	Left	Left	Right
Median Width(m)		0.0			0.0			0.0			0.0	
Link Offset(m)		0.0			0.0			0.0			0.0	
Crosswalk Width(m)		4.8			4.8			4.8			4.8	
Two way Left Turn Lane												
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Turning Speed (k/h)	25		15	25		15	25		15	25		15
Turn Type	Perm	NA		Perm	NA		pm+pt	NA	Perm	Perm	NA	Perm
Protected Phases		2			6		7	4			8	
Permitted Phases	2			6			4		4	8		8
Total Split (s)	33.0	33.0		33.0	33.0		12.0	42.0	42.0	30.0	30.0	30.0
Total Lost Time (s)		4.5			4.5			4.5	4.5		4.5	4.5
Act Effct Green (s)		16.2			16.2			20.5	20.5		11.4	11.4
Actuated g/C Ratio		0.35			0.35			0.45	0.45		0.25	0.25
v/c Ratio		0.42			0.36			0.28	0.11		0.36	0.31
Control Delay		11.8			13.3			8.9	2.8		18.9	5.7
Queue Delay		0.0			0.0			0.0	0.0		0.0	0.0
Total Delay		11.8			13.3			8.9	2.8		18.9	5.7
LOS		B			B			A	A		B	A
Approach Delay		11.8			13.3			7.0			12.1	
Approach LOS		B			B			A			B	
Queue Length 50th (m)		11.4			10.6			7.6	0.0		10.1	0.0
Queue Length 95th (m)		23.7			21.6			19.0	5.1		24.4	11.0
Internal Link Dist (m)		504.1			318.3			209.4			151.4	
Turn Bay Length (m)									100.0			100.0
Base Capacity (vph)		1734			1633			1067	1192		887	900
Starvation Cap Reductn		0			0			0	0		0	0
Spillback Cap Reductn		0			0			0	0		0	0
Storage Cap Reductn		0			0			0	0		0	0

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Reduced v/c Ratio		0.24			0.20			0.16	0.06		0.16	0.17

Intersection Summary			
Area Type:	Other		
Cycle Length: 75			
Actuated Cycle Length: 45.9			
Control Type: Actuated-Uncoordinated			
Maximum v/c Ratio: 0.42			
Intersection Signal Delay: 11.3		Intersection LOS: B	
Intersection Capacity Utilization 51.6%		ICU Level of Service A	
Analysis Period (min) 15			

Splits and Phases: 3: 46 Ave (Highway 2A) & Highway 27



Lanes, Volumes, Timings
23: 70 Avenue & Highway 27

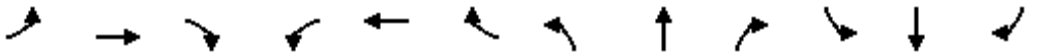
07-04-2024

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	10	230	10	40	260	30	10	10	40	30	10	10
Future Volume (vph)	10	230	10	40	260	30	10	10	40	30	10	10
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (m)	75.0		0.0	70.0		70.0	45.0		0.0	50.0		0.0
Storage Lanes	1		0	1		1	1		0	1		0
Taper Length (m)	40.0			45.0			30.0			45.0		
Satd. Flow (prot)	1357	3258	0	1770	3282	1615	1128	1608	0	1805	1406	0
Flt Permitted	0.576			0.569			0.743			0.721		
Satd. Flow (perm)	823	3258	0	1060	3282	1615	882	1608	0	1370	1406	0
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)		5				69		44			11	
Link Speed (k/h)		60			60			50			50	
Link Distance (m)		228.6			411.6			170.2			183.8	
Travel Time (s)		13.7			24.7			12.3			13.2	
Peak Hour Factor	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91
Heavy Vehicles (%)	33%	9%	36%	2%	10%	0%	60%	0%	5%	0%	0%	50%
Shared Lane Traffic (%)												
Lane Group Flow (vph)	11	264	0	44	286	33	11	55	0	33	22	0
Enter Blocked Intersection	No	No	No	No	No	No	No	No	No	No	No	No
Lane Alignment	Left	Left	Right	Left	Left	Right	Left	Left	Right	Left	Left	Right
Median Width(m)		5.6			5.6			3.6			3.6	
Link Offset(m)		0.0			0.0			0.0			0.0	
Crosswalk Width(m)		4.8			4.8			4.8			4.8	
Two way Left Turn Lane												
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Turning Speed (k/h)	25		15	25		15	25		15	25		15
Turn Type	pm+pt	NA		pm+pt	NA	Perm	Perm	NA		Perm	NA	
Protected Phases	5	2		1	6			8			4	
Permitted Phases	2			6		6	8			4		
Total Split (s)	21.0	42.0		21.0	42.0	42.0	32.0	32.0		32.0	32.0	
Total Lost Time (s)	4.5	5.0		4.5	5.0	5.0	4.5	4.5		4.5	4.5	
Act Effct Green (s)	38.8	38.1		39.6	40.1	40.1	12.1	12.1		12.1	12.1	
Actuated g/C Ratio	0.72	0.70		0.73	0.74	0.74	0.22	0.22		0.22	0.22	
v/c Ratio	0.02	0.12		0.05	0.12	0.03	0.06	0.14		0.11	0.07	
Control Delay	4.0	6.9		3.9	5.5	1.1	20.4	10.2		20.5	15.2	
Queue Delay	0.0	0.0		0.0	0.0	0.0	0.0	0.0		0.0	0.0	
Total Delay	4.0	6.9		3.9	5.5	1.1	20.4	10.2		20.5	15.2	
LOS	A	A		A	A	A	C	B		C	B	
Approach Delay		6.7			4.9			11.9			18.3	
Approach LOS		A			A			B			B	
Queue Length 50th (m)	0.4	5.1		1.5	5.6	0.0	0.9	0.9		2.7	0.9	
Queue Length 95th (m)	1.7	15.1		4.1	16.5	1.6	4.9	9.1		9.8	6.2	
Internal Link Dist (m)		204.6			387.6			146.2			159.8	
Turn Bay Length (m)	75.0			70.0		70.0	45.0			50.0		
Base Capacity (vph)	778	2549		1009	2593	1290	452	846		702	726	
Starvation Cap Reductn	0	0		0	0	0	0	0		0	0	
Spillback Cap Reductn	0	0		0	0	0	0	0		0	0	
Storage Cap Reductn	0	0		0	0	0	0	0		0	0	

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Reduced v/c Ratio	0.01	0.10		0.04	0.11	0.03	0.02	0.07		0.05	0.03	

Intersection Summary			
Area Type:	Other		
Cycle Length: 95			
Actuated Cycle Length: 54.2			
Control Type: Actuated-Uncoordinated			
Maximum v/c Ratio: 0.14			
Intersection Signal Delay: 7.1		Intersection LOS: A	
Intersection Capacity Utilization 44.2%		ICU Level of Service A	
Analysis Period (min) 15			

Splits and Phases: 23: 70 Avenue & Highway 27

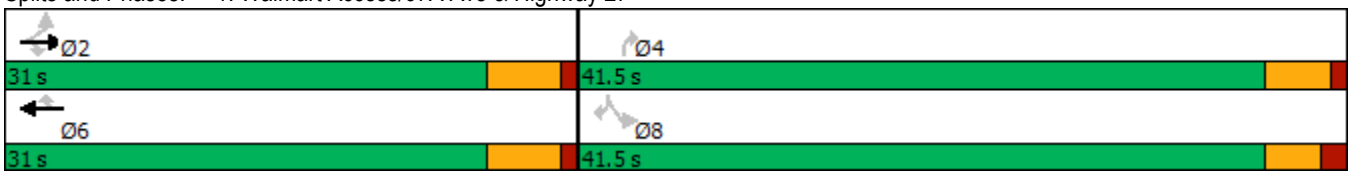


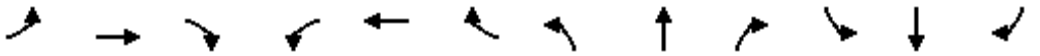
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	80	210	10	0	220	230	0	0	10	210	0	110
Future Volume (vph)	80	210	10	0	220	230	0	0	10	210	0	110
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (m)	80.0		30.0	80.0		30.0	0.0		30.0	0.0		20.0
Storage Lanes	1		1	0		1	0		0	2		1
Taper Length (m)	60.0			80.0			7.5			7.5		
Satd. Flow (prot)	1752	3282	1615	0	3252	1583	0	0	1644	3467	0	1568
Flt Permitted	0.600									0.950		
Satd. Flow (perm)	1107	3282	1615	0	3252	1583	0	0	1644	3467	0	1568
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)			23			256			473			122
Link Speed (k/h)		60			60			50			50	
Link Distance (m)		411.6			406.1			117.8			163.6	
Travel Time (s)		24.7			24.4			8.5			11.8	
Peak Hour Factor	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90
Heavy Vehicles (%)	3%	10%	0%	0%	11%	2%	0%	0%	0%	1%	0%	3%
Shared Lane Traffic (%)												
Lane Group Flow (vph)	89	233	11	0	244	256	0	0	11	233	0	122
Enter Blocked Intersection	No	No	No	No	No	No	No	No	No	No	No	No
Lane Alignment	Left	Left	Right	Left	Left	Right	Left	Left	Right	Left	Left	Right
Median Width(m)		6.1			6.1			7.2			7.2	
Link Offset(m)		0.0			0.0			0.0			0.0	
Crosswalk Width(m)		4.8			4.8			4.8			4.8	
Two way Left Turn Lane												
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Turning Speed (k/h)	25		15	25		15	25		15	25		15
Turn Type	Perm	NA	Perm		NA	Perm			Perm	Perm		Perm
Protected Phases		2			6							
Permitted Phases	2		2			6			4	8		8
Total Split (s)	31.0	31.0	31.0		31.0	31.0			41.5	41.5		41.5
Total Lost Time (s)	5.0	5.0	5.0		5.0	5.0			4.5	4.5		4.5
Act Effct Green (s)	11.3	11.3	11.3		11.3	11.3			15.1	15.1		15.1
Actuated g/C Ratio	0.31	0.31	0.31		0.31	0.31			0.42	0.42		0.42
v/c Ratio	0.26	0.23	0.02		0.24	0.38			0.01	0.16		0.17
Control Delay	11.8	10.0	3.3		10.0	3.7			0.0	6.5		2.4
Queue Delay	0.0	0.0	0.0		0.0	0.0			0.0	0.0		0.0
Total Delay	11.8	10.0	3.3		10.0	3.7			0.0	6.5		2.4
LOS	B	A	A		B	A			A	A		A
Approach Delay		10.2			6.8						5.1	
Approach LOS		B			A						A	
Queue Length 50th (m)	4.0	5.4	0.0		5.6	0.0			0.0	3.9		0.0
Queue Length 95th (m)	10.8	10.5	1.4		11.0	9.4			0.0	7.7		4.9
Internal Link Dist (m)		387.6			382.1			93.8			139.6	
Turn Bay Length (m)	80.0		30.0			30.0			30.0			20.0
Base Capacity (vph)	805	2387	1180		2364	1221			1621	3398		1539
Starvation Cap Reductn	0	0	0		0	0			0	0		0
Spillback Cap Reductn	0	0	0		0	0			0	0		0
Storage Cap Reductn	0	0	0		0	0			0	0		0

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Reduced v/c Ratio	0.11	0.10	0.01		0.10	0.21			0.01	0.07		0.08

Intersection Summary			
Area Type:	Other		
Cycle Length: 72.5			
Actuated Cycle Length: 35.9			
Control Type: Actuated-Uncoordinated			
Maximum v/c Ratio: 0.38			
Intersection Signal Delay: 7.2		Intersection LOS: A	
Intersection Capacity Utilization 38.1%		ICU Level of Service A	
Analysis Period (min) 15			

Splits and Phases: 1: Walmart Access/67A Ave & Highway 27



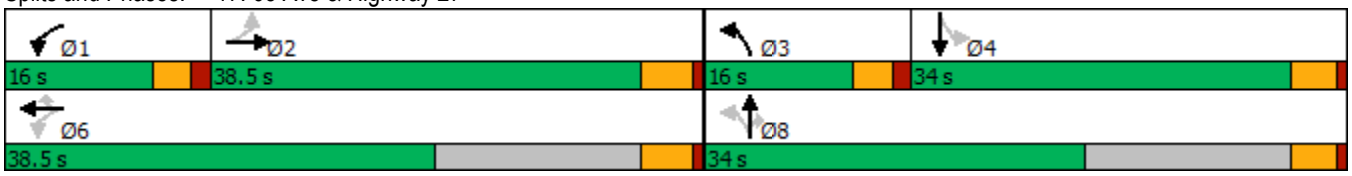


Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	30	320	80	70	330	130	90	80	70	130	60	30
Future Volume (vph)	30	320	80	70	330	130	90	80	70	130	60	30
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (m)	80.0		0.0	70.0		25.0	0.0		25.0	0.0		0.0
Storage Lanes	1		0	1		1	0		1	1		0
Taper Length (m)	30.0			50.0			7.5			7.5		
Satd. Flow (prot)	1687	3322	0	1805	3374	1553	0	1825	1599	1770	1666	0
Flt Permitted	0.529			0.334				0.789		0.636		
Satd. Flow (perm)	939	3322	0	635	3374	1553	0	1474	1599	1185	1666	0
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)		31				148			80		24	
Link Speed (k/h)		60			60			50			50	
Link Distance (m)		406.1			805.5			131.0			74.7	
Travel Time (s)		24.4			48.3			9.4			5.4	
Confl. Peds. (#/hr)							5					5
Peak Hour Factor	0.88	0.88	0.88	0.88	0.88	0.88	0.88	0.88	0.88	0.88	0.88	0.88
Heavy Vehicles (%)	7%	6%	3%	0%	7%	4%	0%	3%	1%	2%	3%	17%
Shared Lane Traffic (%)												
Lane Group Flow (vph)	34	455	0	80	375	148	0	193	80	148	102	0
Enter Blocked Intersection	No	No	No	No	No	No	No	No	No	No	No	No
Lane Alignment	Left	Left	Right	Left	Left	Right	Left	Left	Right	Left	Left	Right
Median Width(m)		6.1			6.1			5.6			5.6	
Link Offset(m)		0.0			0.0			0.0			0.0	
Crosswalk Width(m)		4.8			4.8			4.8			4.8	
Two way Left Turn Lane												
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Turning Speed (k/h)	25		15	25		15	25		15	25		15
Turn Type	Perm	NA		pm+pt	NA	Perm	pm+pt	NA	Perm	Perm	NA	
Protected Phases		2		1	6		3	8			4	
Permitted Phases	2			6		6	8		8	4		
Total Split (s)	38.5	38.5		16.0	38.5	38.5	16.0	34.0	34.0	34.0	34.0	
Total Lost Time (s)	5.0	5.0		4.5	5.0	5.0		4.5	4.5	4.5	4.5	
Act Effct Green (s)	18.2	18.2		28.2	27.6	27.6		30.2	30.2	15.7	15.7	
Actuated g/C Ratio	0.27	0.27		0.42	0.41	0.41		0.45	0.45	0.23	0.23	
v/c Ratio	0.13	0.50		0.20	0.27	0.21		0.27	0.11	0.54	0.25	
Control Delay	23.7	23.2		13.9	14.1	3.5		14.3	3.9	33.5	20.7	
Queue Delay	0.0	0.0		0.0	0.0	0.0		0.0	0.0	0.0	0.0	
Total Delay	23.7	23.2		13.9	14.1	3.5		14.3	3.9	33.5	20.7	
LOS	C	C		B	B	A		B	A	C	C	
Approach Delay		23.2			11.5			11.3			28.3	
Approach LOS		C			B			B			C	
Queue Length 50th (m)	3.5	25.1		5.9	15.9	0.0		15.4	0.0	17.6	8.5	
Queue Length 95th (m)	11.7	45.9		15.7	30.0	9.7		33.5	7.2	39.7	22.9	
Internal Link Dist (m)		382.1			781.5			107.0			50.7	
Turn Bay Length (m)	80.0			70.0		25.0			25.0			
Base Capacity (vph)	483	1726		471	2547	1209		1093	1143	537	769	
Starvation Cap Reductn	0	0		0	0	0		0	0	0	0	
Spillback Cap Reductn	0	0		0	0	0		0	0	0	0	

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Storage Cap Reductn	0	0		0	0	0		0	0	0	0	
Reduced v/c Ratio	0.07	0.26		0.17	0.15	0.12		0.18	0.07	0.28	0.13	

Intersection Summary			
Area Type:	Other		
Cycle Length: 104.5			
Actuated Cycle Length: 67.7			
Control Type: Actuated-Uncoordinated			
Maximum v/c Ratio: 0.54			
Intersection Signal Delay: 17.6		Intersection LOS: B	
Intersection Capacity Utilization 52.9%		ICU Level of Service A	
Analysis Period (min) 15			

Splits and Phases: 17: 65 Ave & Highway 27



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	70	410	120	70	480	90	120	60	80	110	70	70
Future Volume (vph)	70	410	120	70	480	90	120	60	80	110	70	70
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (m)	90.0		0.0	30.0		0.0	20.0		10.0	20.0		10.0
Storage Lanes	1		0	1		0	1		1	1		0
Taper Length (m)	40.0			30.0			7.5			7.5		
Satd. Flow (prot)	1687	3256	0	1805	3354	0	1770	1863	1599	1719	1881	1468
Flt Permitted	0.389			0.422			0.708			0.715		
Satd. Flow (perm)	691	3256	0	802	3354	0	1319	1863	1599	1294	1881	1468
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)		46			26				95			95
Link Speed (k/h)		50			50			50			50	
Link Distance (m)		805.5			697.8			130.8			121.6	
Travel Time (s)		58.0			50.2			9.4			8.8	
Peak Hour Factor	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93
Heavy Vehicles (%)	7%	8%	4%	0%	6%	0%	2%	2%	1%	5%	1%	10%
Shared Lane Traffic (%)												
Lane Group Flow (vph)	75	570	0	75	613	0	129	65	86	118	75	75
Enter Blocked Intersection	No	No	No	No	No	No	No	No	No	No	No	No
Lane Alignment	Left	Left	Right	Left	Left	Right	Left	Left	Right	Left	Left	Right
Median Width(m)		6.1			6.1			3.6			3.6	
Link Offset(m)		0.0			0.0			0.0			0.0	
Crosswalk Width(m)		4.8			4.8			4.8			4.8	
Two way Left Turn Lane												
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Turning Speed (k/h)	25		15	25		15	25		15	25		15
Turn Type	pm+pt	NA		pm+pt	NA		Perm	NA	Perm	Perm	NA	Perm
Protected Phases	5	2		1	6			4			8	
Permitted Phases	2			6			4		4	8		8
Total Split (s)	19.0	38.0		19.0	38.0		29.5	29.5	29.5	29.5	29.5	29.5
Total Lost Time (s)	4.0	5.0		4.0	5.0		4.5	4.5	4.5	4.5	4.5	4.5
Act Effct Green (s)	32.9	28.1		32.4	27.9		16.3	16.3	16.3	16.3	16.3	16.3
Actuated g/C Ratio	0.60	0.51		0.59	0.51		0.30	0.30	0.30	0.30	0.30	0.30
v/c Ratio	0.13	0.34		0.12	0.36		0.33	0.12	0.16	0.31	0.13	0.15
Control Delay	6.2	12.3		6.2	13.2		21.0	17.9	5.2	20.7	18.0	4.3
Queue Delay	0.0	0.0		0.0	0.0		0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	6.2	12.3		6.2	13.2		21.0	17.9	5.2	20.7	18.0	4.3
LOS	A	B		A	B		C	B	A	C	B	A
Approach Delay		11.6			12.5			15.4			15.4	
Approach LOS		B			B			B			B	
Queue Length 50th (m)	3.1	22.6		3.1	25.9		11.8	5.6	0.0	10.7	6.4	0.0
Queue Length 95th (m)	8.7	40.7		8.6	46.2		28.3	15.3	8.4	26.2	17.1	6.6
Internal Link Dist (m)		781.5			673.8			106.8			97.6	
Turn Bay Length (m)	90.0			30.0			20.0		10.0	20.0		10.0
Base Capacity (vph)	722	2181		795	2239		625	883	808	613	892	746
Starvation Cap Reductn	0	0		0	0		0	0	0	0	0	0
Spillback Cap Reductn	0	0		0	0		0	0	0	0	0	0
Storage Cap Reductn	0	0		0	0		0	0	0	0	0	0

Lane Group	Ø11	Ø12
Lane Configurations		
Traffic Volume (vph)		
Future Volume (vph)		
Ideal Flow (vphpl)		
Storage Length (m)		
Storage Lanes		
Taper Length (m)		
Satd. Flow (prot)		
Flt Permitted		
Satd. Flow (perm)		
Right Turn on Red		
Satd. Flow (RTOR)		
Link Speed (k/h)		
Link Distance (m)		
Travel Time (s)		
Peak Hour Factor		
Heavy Vehicles (%)		
Shared Lane Traffic (%)		
Lane Group Flow (vph)		
Enter Blocked Intersection		
Lane Alignment		
Median Width(m)		
Link Offset(m)		
Crosswalk Width(m)		
Two way Left Turn Lane		
Headway Factor		
Turning Speed (k/h)		
Turn Type		
Protected Phases	11	12
Permitted Phases		
Total Split (s)	5.0	5.0
Total Lost Time (s)		
Act Effct Green (s)		
Actuated g/C Ratio		
v/c Ratio		
Control Delay		
Queue Delay		
Total Delay		
LOS		
Approach Delay		
Approach LOS		
Queue Length 50th (m)		
Queue Length 95th (m)		
Internal Link Dist (m)		
Turn Bay Length (m)		
Base Capacity (vph)		
Starvation Cap Reductn		
Spillback Cap Reductn		
Storage Cap Reductn		

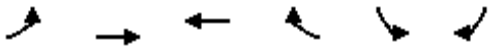
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Reduced v/c Ratio	0.10	0.26		0.09	0.27		0.21	0.07	0.11	0.19	0.08	0.10

Intersection Summary			
Area Type:	Other		
Cycle Length: 91.5			
Actuated Cycle Length: 54.7			
Control Type: Semi Act-Uncoord			
Maximum v/c Ratio: 0.36			
Intersection Signal Delay: 13.0		Intersection LOS: B	
Intersection Capacity Utilization 52.8%		ICU Level of Service A	
Analysis Period (min) 15			

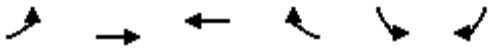
Splits and Phases: 14: 57 Ave & Highway 27

Lane Group	Ø11	Ø12
Reduced v/c Ratio		

Intersection Summary



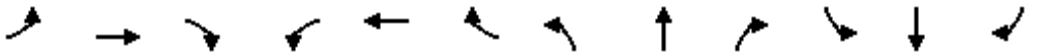
Lane Group	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Traffic Volume (vph)	20	500	580	20	30	40
Future Volume (vph)	20	500	580	20	30	40
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Storage Length (m)	0.0			20.0	0.0	10.0
Storage Lanes	0			1	1	1
Taper Length (m)	7.5				7.5	
Satd. Flow (prot)	0	3406	3438	1468	1687	1538
Flt Permitted		0.926			0.950	
Satd. Flow (perm)	0	3160	3438	1429	1687	1513
Right Turn on Red				Yes		Yes
Satd. Flow (RTOR)				22		44
Link Speed (k/h)		50	50		50	
Link Distance (m)		697.8	226.5		137.7	
Travel Time (s)		50.2	16.3		9.9	
Confl. Peds. (#/hr)	5			5		5
Peak Hour Factor	0.91	0.91	0.91	0.91	0.91	0.91
Heavy Vehicles (%)	0%	6%	5%	10%	7%	5%
Shared Lane Traffic (%)						
Lane Group Flow (vph)	0	571	637	22	33	44
Enter Blocked Intersection	No	No	No	No	No	No
Lane Alignment	Left	Left	Left	Right	Left	Right
Median Width(m)		0.0	0.0		3.6	
Link Offset(m)		0.0	0.0		0.0	
Crosswalk Width(m)		4.8	4.8		4.8	
Two way Left Turn Lane						
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00
Turning Speed (k/h)	25			15	25	15
Turn Type	Perm	NA	NA	Perm	Prot	Perm
Protected Phases		2	6		4	
Permitted Phases	2			6		4
Total Split (s)	35.0	35.0	35.0	35.0	25.0	25.0
Total Lost Time (s)		4.5	4.5	4.5	4.5	4.5
Act Effct Green (s)		48.6	48.6	48.6	10.0	10.0
Actuated g/C Ratio		0.81	0.81	0.81	0.17	0.17
v/c Ratio		0.22	0.23	0.02	0.12	0.15
Control Delay		3.0	2.5	1.2	22.5	9.4
Queue Delay		0.0	0.0	0.0	0.0	0.0
Total Delay		3.0	2.5	1.2	22.5	9.4
LOS		A	A	A	C	A
Approach Delay		3.0	2.5		15.0	
Approach LOS		A	A		B	
Queue Length 50th (m)		10.5	13.8	0.1	3.3	0.0
Queue Length 95th (m)		16.0	7.3	0.0	9.9	7.4
Internal Link Dist (m)		673.8	202.5		113.7	
Turn Bay Length (m)				20.0		10.0
Base Capacity (vph)		2559	2785	1161	576	545
Starvation Cap Reductn		0	0	0	0	0
Spillback Cap Reductn		0	0	0	0	0



Lane Group	EBL	EBT	WBT	WBR	SBL	SBR
Storage Cap Reductn		0	0	0	0	0
Reduced v/c Ratio		0.22	0.23	0.02	0.06	0.08

Intersection Summary			
Area Type:	Other		
Cycle Length: 60			
Actuated Cycle Length: 60			
Offset: 22 (37%), Referenced to phase 2:EBTL and 6:WBT, Start of Green			
Control Type: Actuated-Coordinated			
Maximum v/c Ratio: 0.23			
Intersection Signal Delay: 3.4		Intersection LOS: A	
Intersection Capacity Utilization 45.8%		ICU Level of Service A	
Analysis Period (min) 15			

Splits and Phases: 12: Highway 27 & 52 Ave

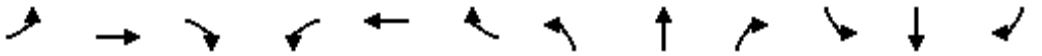


Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	20	430	60	30	510	30	60	10	30	20	10	20
Future Volume (vph)	20	430	60	30	510	30	60	10	30	20	10	20
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (m)	60.0		0.0	60.0		0.0	30.0		0.0	0.0		0.0
Storage Lanes	1		0	1		0	0		0	1		0
Taper Length (m)	80.0			80.0			40.0			7.5		
Satd. Flow (prot)	1805	3320	0	1805	3392	0	1770	1687	0	1703	1694	0
Flt Permitted	0.434			0.456			0.736			0.729		
Satd. Flow (perm)	823	3320	0	865	3392	0	1368	1687	0	1307	1694	0
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)		45			17			32			22	
Link Speed (k/h)		50			50			50			50	
Link Distance (m)		226.5			173.9			143.4			146.6	
Travel Time (s)		16.3			12.5			10.3			10.6	
Confl. Peds. (#/hr)	3		2	2		3	3					3
Peak Hour Factor	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93
Heavy Vehicles (%)	0%	7%	2%	0%	5%	13%	2%	0%	0%	6%	0%	0%
Shared Lane Traffic (%)												
Lane Group Flow (vph)	22	527	0	32	580	0	65	43	0	22	33	0
Enter Blocked Intersection	No	No	No	No	No	No	No	No	No	No	No	No
Lane Alignment	Left	Left	Right	Left	Left	Right	Left	Left	Right	Left	Left	Right
Median Width(m)		3.6			3.6			3.6			3.6	
Link Offset(m)		0.0			0.0			0.0			0.0	
Crosswalk Width(m)		4.8			4.8			4.8			4.8	
Two way Left Turn Lane												
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Turning Speed (k/h)	25		15	25		15	25		15	25		15
Turn Type	Perm	NA		Perm	NA		Perm	NA		Perm	NA	
Protected Phases		2			6			8			4	
Permitted Phases	2			6			8			4		
Total Split (s)	40.0	40.0		40.0	40.0		20.0	20.0		20.0	20.0	
Total Lost Time (s)	4.5	4.5		4.5	4.5		4.5	4.5		4.5	4.5	
Act Effct Green (s)	48.3	48.3		48.3	48.3		10.3	10.3		10.3	10.3	
Actuated g/C Ratio	0.80	0.80		0.80	0.80		0.17	0.17		0.17	0.17	
v/c Ratio	0.03	0.20		0.05	0.21		0.28	0.14		0.10	0.11	
Control Delay	5.8	4.6		2.9	2.4		24.8	11.8		21.9	13.1	
Queue Delay	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Total Delay	5.8	4.6		2.9	2.4		24.8	11.8		21.9	13.1	
LOS	A	A		A	A		C	B		C	B	
Approach Delay		4.6			2.4			19.7			16.6	
Approach LOS		A			A			B			B	
Queue Length 50th (m)	0.8	10.7		1.0	8.9		6.7	1.1		2.2	1.1	
Queue Length 95th (m)	4.1	23.6		m2.9	14.8		16.0	8.1		7.4	7.2	
Internal Link Dist (m)		202.5			149.9			119.4			122.6	
Turn Bay Length (m)	60.0			60.0			30.0					
Base Capacity (vph)	662	2680		696	2733		353	459		337	453	
Starvation Cap Reductn	0	0		0	0		0	0		0	0	
Spillback Cap Reductn	0	0		0	0		0	0		0	0	

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Storage Cap Reductn	0	0		0	0		0	0		0	0	
Reduced v/c Ratio	0.03	0.20		0.05	0.21		0.18	0.09		0.07	0.07	

Intersection Summary			
Area Type:	Other		
Cycle Length: 60			
Actuated Cycle Length: 60			
Offset: 8 (13%), Referenced to phase 2:EBTL and 6:WBTL, Start of Green			
Control Type: Actuated-Coordinated			
Maximum v/c Ratio: 0.28			
Intersection Signal Delay: 5.3		Intersection LOS: A	
Intersection Capacity Utilization 42.4%		ICU Level of Service A	
Analysis Period (min) 15			
m Volume for 95th percentile queue is metered by upstream signal.			

Splits and Phases: 9: 51st Ave & Highway 27



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	40	370	80	50	370	60	130	50	60	70	50	50
Future Volume (vph)	40	370	80	50	370	60	130	50	60	70	50	50
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (m)	0.0		0.0	0.0		0.0	0.0		50.0	0.0		35.0
Storage Lanes	0		0	0		0	0		1	0		1
Taper Length (m)	7.5			7.5			7.5			7.5		
Satd. Flow (prot)	0	3271	0	0	3271	0	0	1823	1615	0	1836	1553
Flt Permitted		0.874			0.862			0.517			0.709	
Satd. Flow (perm)	0	2870	0	0	2834	0	0	973	1592	0	1338	1524
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)		47			45				109			191
Link Speed (k/h)		50			50			50			50	
Link Distance (m)		173.9			528.1			144.8			227.8	
Travel Time (s)		12.5			38.0			10.4			16.4	
Confl. Peds. (#/hr)	2		2	2		2	8		3	3		8
Peak Hour Factor	0.89	0.89	0.89	0.89	0.89	0.89	0.89	0.89	0.89	0.89	0.89	0.89
Heavy Vehicles (%)	3%	8%	3%	6%	8%	5%	0%	2%	0%	1%	0%	4%
Shared Lane Traffic (%)												
Lane Group Flow (vph)	0	551	0	0	539	0	0	202	67	0	135	56
Enter Blocked Intersection	No	No	No	No	No	No	No	No	No	No	No	No
Lane Alignment	Left	Left	Right	Left	Left	Right	Left	Left	Right	Left	Left	Right
Median Width(m)		0.0			0.0			0.0			0.0	
Link Offset(m)		0.0			0.0			0.0			0.0	
Crosswalk Width(m)		4.8			4.8			4.8			4.8	
Two way Left Turn Lane												
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Turning Speed (k/h)	25		15	25		15	25		15	25		15
Turn Type	Perm	NA		pm+pt	NA		pm+pt	NA	Perm	Perm	NA	Perm
Protected Phases		2		1	6		3	8			4	
Permitted Phases	2			6			8		8	4		4
Total Split (s)	30.0	30.0		10.0	40.0		10.0	20.0	20.0	10.0	10.0	10.0
Total Lost Time (s)		4.5			4.5			4.5	4.5		4.5	4.5
Act Effct Green (s)		18.0			28.1			22.9	22.9		9.4	9.4
Actuated g/C Ratio		0.30			0.47			0.38	0.38		0.16	0.16
v/c Ratio		0.62			0.39			0.40	0.10		0.65	0.14
Control Delay		14.5			9.7			16.9	2.0		48.9	0.7
Queue Delay		0.0			0.0			0.0	0.0		0.0	0.0
Total Delay		14.5			9.7			16.9	2.0		48.9	0.7
LOS		B			A			B	A		D	A
Approach Delay		14.5			9.7			13.2			34.8	
Approach LOS		B			A			B			C	
Queue Length 50th (m)		16.4			18.0			15.5	0.0		14.9	0.0
Queue Length 95th (m)		16.8			22.1			33.4	3.5		#47.5	0.0
Internal Link Dist (m)		149.9			504.1			120.8			203.8	
Turn Bay Length (m)									50.0			35.0
Base Capacity (vph)		1246			1736			499	674		208	399
Starvation Cap Reductn		0			0			0	0		0	0
Spillback Cap Reductn		0			0			0	0		0	0

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Storage Cap Reductn		0			0			0	0		0	0
Reduced v/c Ratio		0.44			0.31			0.40	0.10		0.65	0.14

Intersection Summary			
Area Type:	Other		
Cycle Length: 60			
Actuated Cycle Length: 60			
Offset: 0 (0%), Referenced to phase 2:EBTL and 6:WBTL, Start of Green, Master Intersection			
Control Type: Actuated-Coordinated			
Maximum v/c Ratio: 0.65			
Intersection Signal Delay: 15.1		Intersection LOS: B	
Intersection Capacity Utilization 72.9%		ICU Level of Service C	
Analysis Period (min) 15			
# 95th percentile volume exceeds capacity, queue may be longer.			
Queue shown is maximum after two cycles.			

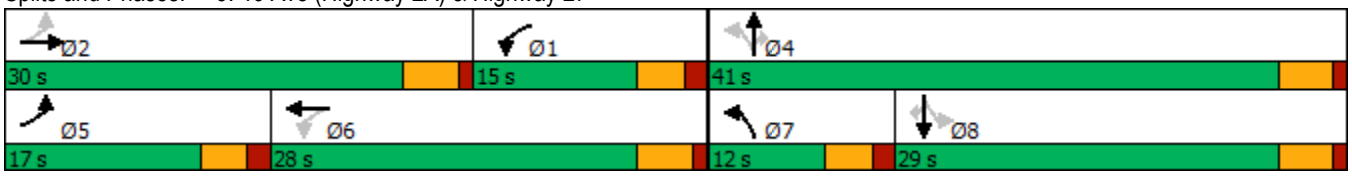
Splits and Phases: 6: 50 Ave & Highway 27

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	60	260	150	40	200	30	170	60	80	30	70	140
Future Volume (vph)	60	260	150	40	200	30	170	60	80	30	70	140
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (m)	0.0		0.0	0.0		170.0	0.0		100.0	0.0		100.0
Storage Lanes	0		0	0		1	0		1	0		1
Taper Length (m)	7.5			7.5			7.5			7.5		
Satd. Flow (prot)	0	3131	0	0	3122	0	0	1732	1468	0	1683	1538
Flt Permitted		0.739			0.886			0.535			0.845	
Satd. Flow (perm)	0	2328	0	0	2786	0	0	961	1468	0	1444	1538
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)		92			15				133			190
Link Speed (k/h)		50			50			50			50	
Link Distance (m)		528.1			342.3			233.4			175.4	
Travel Time (s)		38.0			24.6			16.8			12.6	
Peak Hour Factor	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91
Heavy Vehicles (%)	8%	10%	8%	19%	11%	17%	6%	5%	10%	7%	13%	5%
Shared Lane Traffic (%)												
Lane Group Flow (vph)	0	517	0	0	297	0	0	253	88	0	110	154
Enter Blocked Intersection	No	No	No	No	No	No	No	No	No	No	No	No
Lane Alignment	Left	Left	Right	Left	Left	Right	Left	Left	Right	Left	Left	Right
Median Width(m)		0.0			0.0			0.0			0.0	
Link Offset(m)		0.0			0.0			0.0			0.0	
Crosswalk Width(m)		4.8			4.8			4.8			4.8	
Two way Left Turn Lane												
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Turning Speed (k/h)	25		15	25		15	25		15	25		15
Turn Type	pm+pt	NA		pm+pt	NA		pm+pt	NA	Perm	Perm	NA	Perm
Protected Phases	5	2		1	6		7	4			8	
Permitted Phases	2			6			4		4	8		8
Total Split (s)	17.0	30.0		15.0	28.0		12.0	41.0	41.0	29.0	29.0	29.0
Total Lost Time (s)		4.5			4.5			4.5	4.5		4.5	4.5
Act Effct Green (s)		19.3			17.0			25.7	25.7		13.5	13.5
Actuated g/C Ratio		0.28			0.25			0.37	0.37		0.20	0.20
v/c Ratio		0.60			0.40			0.57	0.14		0.39	0.34
Control Delay		20.5			22.8			22.5	1.6		29.2	4.5
Queue Delay		0.0			0.0			0.0	0.0		0.0	0.0
Total Delay		20.5			22.8			22.5	1.6		29.2	4.5
LOS		C			C			C	A		C	A
Approach Delay		20.5			22.8			17.1			14.8	
Approach LOS		C			C			B			B	
Queue Length 50th (m)		23.5			15.7			24.2	0.0		12.9	0.0
Queue Length 95th (m)		45.8			31.2			46.8	3.6		28.5	8.8
Internal Link Dist (m)		504.1			318.3			209.4			151.4	
Turn Bay Length (m)									100.0			100.0
Base Capacity (vph)		1082			1029			603	852		522	677
Starvation Cap Reductn		0			0			0	0		0	0
Spillback Cap Reductn		0			0			0	0		0	0
Storage Cap Reductn		0			0			0	0		0	0

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Reduced v/c Ratio		0.48			0.29			0.42	0.10		0.21	0.23

Intersection Summary			
Area Type:	Other		
Cycle Length: 86			
Actuated Cycle Length: 68.8			
Control Type: Actuated-Uncoordinated			
Maximum v/c Ratio: 0.60			
Intersection Signal Delay: 19.1		Intersection LOS: B	
Intersection Capacity Utilization 52.6%		ICU Level of Service A	
Analysis Period (min) 15			

Splits and Phases: 3: 46 Ave (Highway 2A) & Highway 27



Lanes, Volumes, Timings
23: 70 Avenue & Highway 27

07-04-2024

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	10	230	10	60	370	20	10	10	40	30	10	10
Future Volume (vph)	10	230	10	60	370	20	10	10	40	30	10	10
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (m)	75.0		0.0	70.0		70.0	45.0		0.0	50.0		0.0
Storage Lanes	1		0	1		1	1		0	1		0
Taper Length (m)	40.0			45.0			30.0			45.0		
Satd. Flow (prot)	1805	3274	0	1805	3374	1615	1805	1633	0	1687	1758	0
Flt Permitted	0.511			0.550			0.743			0.721		
Satd. Flow (perm)	971	3274	0	1045	3374	1615	1412	1633	0	1280	1758	0
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)		5				69		44			11	
Link Speed (k/h)		60			60			50			50	
Link Distance (m)		228.6			411.6			170.2			183.8	
Travel Time (s)		13.7			24.7			12.3			13.2	
Peak Hour Factor	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90
Heavy Vehicles (%)	0%	10%	0%	0%	7%	0%	0%	0%	3%	7%	0%	0%
Shared Lane Traffic (%)												
Lane Group Flow (vph)	11	267	0	67	411	22	11	55	0	33	22	0
Enter Blocked Intersection	No	No	No	No	No	No	No	No	No	No	No	No
Lane Alignment	Left	Left	Right	Left	Left	Right	Left	Left	Right	Left	Left	Right
Median Width(m)		5.6			5.6			3.6			3.6	
Link Offset(m)		0.0			0.0			0.0			0.0	
Crosswalk Width(m)		4.8			4.8			4.8			4.8	
Two way Left Turn Lane												
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Turning Speed (k/h)	25		15	25		15	25		15	25		15
Turn Type	pm+pt	NA		pm+pt	NA	Perm	Perm	NA		Perm	NA	
Protected Phases	5	2		1	6			8			4	
Permitted Phases	2			6		6	8			4		
Total Split (s)	21.0	42.0		21.0	42.0	42.0	32.0	32.0		32.0	32.0	
Total Lost Time (s)	4.5	5.0		4.5	5.0	5.0	4.5	4.5		4.5	4.5	
Act Effct Green (s)	39.7	37.7		41.4	41.9	41.9	12.2	12.2		12.2	12.2	
Actuated g/C Ratio	0.71	0.68		0.74	0.75	0.75	0.22	0.22		0.22	0.22	
v/c Ratio	0.01	0.12		0.08	0.16	0.02	0.04	0.14		0.12	0.06	
Control Delay	3.9	7.9		3.8	5.4	0.1	20.3	10.4		21.4	15.2	
Queue Delay	0.0	0.0		0.0	0.0	0.0	0.0	0.0		0.0	0.0	
Total Delay	3.9	7.9		3.8	5.4	0.1	20.3	10.4		21.4	15.2	
LOS	A	A		A	A	A	C	B		C	B	
Approach Delay		7.7			4.9			12.1			18.9	
Approach LOS		A			A			B			B	
Queue Length 50th (m)	0.4	9.0		2.3	8.4	0.0	1.1	1.1		3.3	1.1	
Queue Length 95th (m)	1.6	15.2		5.6	23.0	0.3	4.8	9.1		9.8	6.2	
Internal Link Dist (m)		204.6			387.6			146.2			159.8	
Turn Bay Length (m)	75.0			70.0		70.0	45.0			50.0		
Base Capacity (vph)	984	2502		1017	2632	1275	705	838		639	883	
Starvation Cap Reductn	0	0		0	0	0	0	0		0	0	
Spillback Cap Reductn	0	0		0	0	0	0	0		0	0	
Storage Cap Reductn	0	0		0	0	0	0	0		0	0	

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Reduced v/c Ratio	0.01	0.11		0.07	0.16	0.02	0.02	0.07		0.05	0.02	

Intersection Summary			
Area Type:	Other		
Cycle Length: 95			
Actuated Cycle Length: 55.8			
Control Type: Actuated-Uncoordinated			
Maximum v/c Ratio: 0.16			
Intersection Signal Delay: 7.2		Intersection LOS: A	
Intersection Capacity Utilization 44.2%		ICU Level of Service A	
Analysis Period (min) 15			

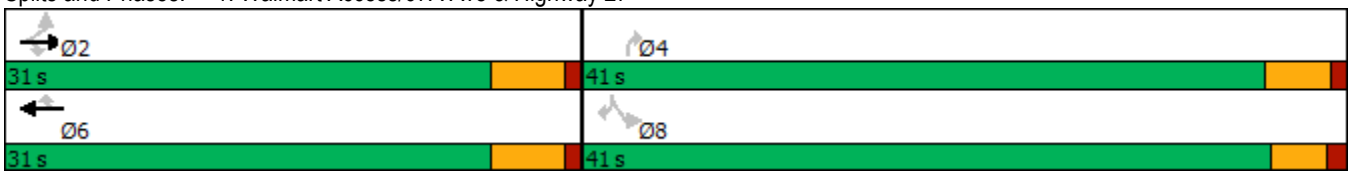
Splits and Phases: 23: 70 Avenue & Highway 27

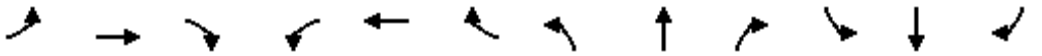
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	80	200	20	0	320	260	0	0	20	240	0	130
Future Volume (vph)	80	200	20	0	320	260	0	0	20	240	0	130
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (m)	80.0		30.0	80.0		30.0	0.0		30.0	0.0		20.0
Storage Lanes	1		1	0		1	0		0	2		1
Taper Length (m)	60.0			80.0			7.5			7.5		
Satd. Flow (prot)	1719	3312	1615	0	3374	1615	0	0	1096	3502	0	1583
Flt Permitted	0.543									0.950		
Satd. Flow (perm)	980	3312	1615	0	3374	1575	0	0	1096	3502	0	1583
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)			23			283			504			141
Link Speed (k/h)		60			60			50			50	
Link Distance (m)		411.6			406.1			117.8			163.6	
Travel Time (s)		24.7			24.4			8.5			11.8	
Confl. Peds. (#/hr)	3					3						
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Heavy Vehicles (%)	5%	9%	0%	0%	7%	0%	0%	0%	50%	0%	0%	2%
Shared Lane Traffic (%)												
Lane Group Flow (vph)	87	217	22	0	348	283	0	0	22	261	0	141
Enter Blocked Intersection	No	No	No	No	No	No	No	No	No	No	No	No
Lane Alignment	Left	Left	Right	Left	Left	Right	Left	Left	Right	Left	Left	Right
Median Width(m)		6.1			6.1			7.2			7.2	
Link Offset(m)		0.0			0.0			0.0			0.0	
Crosswalk Width(m)		4.8			4.8			4.8			4.8	
Two way Left Turn Lane												
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Turning Speed (k/h)	25		15	25		15	25		15	25		15
Turn Type	Perm	NA	Perm		NA	Perm			Perm	Perm		Perm
Protected Phases		2			6							
Permitted Phases	2		2			6			4	8		8
Total Split (s)	31.0	31.0	31.0		31.0	31.0			41.0	41.0		41.0
Total Lost Time (s)	5.0	5.0	5.0		5.0	5.0			4.5	4.2		4.2
Act Effct Green (s)	10.8	10.8	10.8		10.8	10.8			15.0	15.3		15.3
Actuated g/C Ratio	0.31	0.31	0.31		0.31	0.31			0.42	0.43		0.43
v/c Ratio	0.29	0.21	0.04		0.34	0.42			0.03	0.17		0.18
Control Delay	12.5	9.8	4.8		10.6	3.9			0.1	6.4		2.3
Queue Delay	0.0	0.0	0.0		0.0	0.0			0.0	0.0		0.0
Total Delay	12.5	9.8	4.8		10.6	3.9			0.1	6.4		2.3
LOS	B	A	A		B	A			A	A		A
Approach Delay		10.2			7.6			0.1			5.0	
Approach LOS		B			A			A			A	
Queue Length 50th (m)	3.9	5.0	0.0		8.4	0.0			0.0	4.2		0.0
Queue Length 95th (m)	11.0	9.8	2.7		15.0	9.9			0.0	8.8		5.4
Internal Link Dist (m)		387.6			382.1			93.8			139.6	
Turn Bay Length (m)	80.0		30.0			30.0			30.0			20.0
Base Capacity (vph)	722	2441	1196		2486	1235			1095	3500		1582
Starvation Cap Reductn	0	0	0		0	0			0	0		0
Spillback Cap Reductn	0	0	0		0	0			0	0		0

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Storage Cap Reductn	0	0	0		0	0			0	0		0
Reduced v/c Ratio	0.12	0.09	0.02		0.14	0.23			0.02	0.07		0.09

Intersection Summary			
Area Type:	Other		
Cycle Length: 72			
Actuated Cycle Length: 35.3			
Control Type: Actuated-Uncoordinated			
Maximum v/c Ratio: 0.42			
Intersection Signal Delay: 7.3		Intersection LOS: A	
Intersection Capacity Utilization 38.9%		ICU Level of Service A	
Analysis Period (min) 15			

Splits and Phases: 1: Walmart Access/67A Ave & Highway 27



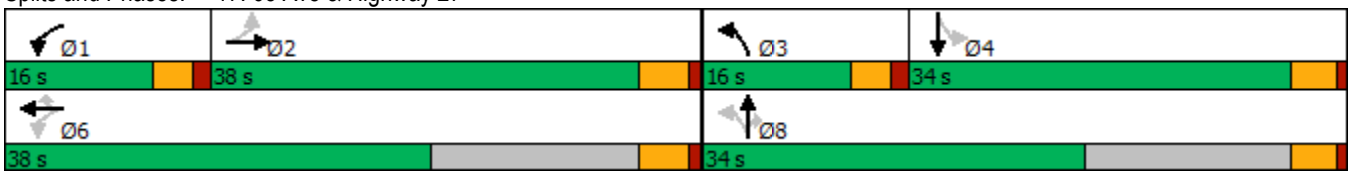


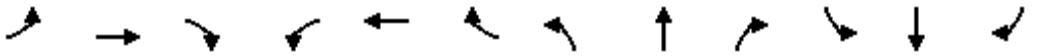
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	30	320	110	110	400	160	130	60	100	140	80	50
Future Volume (vph)	30	320	110	110	400	160	130	60	100	140	80	50
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (m)	80.0		0.0	70.0		25.0	0.0		25.0	0.0		0.0
Storage Lanes	1		0	1		1	0		1	1		0
Taper Length (m)	30.0			50.0			7.5			7.5		
Satd. Flow (prot)	1641	3305	0	1752	3471	1583	0	1826	1583	1787	1716	0
Flt Permitted	0.510			0.339				0.648		0.634		
Satd. Flow (perm)	877	3305	0	625	3471	1540	0	1207	1562	1192	1716	0
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)		48				165			103		31	
Link Speed (k/h)		60			60			50			50	
Link Distance (m)		406.1			805.5			131.0			74.7	
Travel Time (s)		24.4			48.3			9.4			5.4	
Confl. Peds. (#/hr)	4		1	1		4	22		1	1		22
Peak Hour Factor	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97
Heavy Vehicles (%)	10%	5%	3%	3%	4%	2%	0%	2%	2%	1%	0%	7%
Shared Lane Traffic (%)												
Lane Group Flow (vph)	31	443	0	113	412	165	0	196	103	144	134	0
Enter Blocked Intersection	No	No	No	No	No	No	No	No	No	No	No	No
Lane Alignment	Left	Left	Right	Left	Left	Right	Left	Left	Right	Left	Left	Right
Median Width(m)		6.1			6.1			5.6			5.6	
Link Offset(m)		0.0			0.0			0.0			0.0	
Crosswalk Width(m)		4.8			4.8			4.8			4.8	
Two way Left Turn Lane												
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Turning Speed (k/h)	25		15	25		15	25		15	25		15
Turn Type	Perm	NA		pm+pt	NA	Perm	pm+pt	NA	Perm	Perm	NA	
Protected Phases		2		1	6		3	8			4	
Permitted Phases	2			6		6	8		8	4		
Total Split (s)	38.0	38.0		16.0	38.0	38.0	16.0	34.0	34.0	34.0	34.0	
Total Lost Time (s)	5.0	5.0		4.5	5.0	5.0		4.5	4.5	4.5	4.5	
Act Effct Green (s)	17.9	17.9		28.6	28.0	28.0		30.1	30.1	15.6	15.6	
Actuated g/C Ratio	0.26	0.26		0.42	0.41	0.41		0.44	0.44	0.23	0.23	
v/c Ratio	0.13	0.49		0.28	0.29	0.23		0.31	0.14	0.53	0.32	
Control Delay	24.5	22.7		14.5	14.0	3.4		15.0	3.8	33.6	21.7	
Queue Delay	0.0	0.0		0.0	0.0	0.0		0.0	0.0	0.0	0.0	
Total Delay	24.5	22.7		14.5	14.0	3.4		15.0	3.8	33.6	21.7	
LOS	C	C		B	B	A		B	A	C	C	
Approach Delay		22.8			11.6			11.1			27.8	
Approach LOS		C			B			B			C	
Queue Length 50th (m)	3.2	23.5		8.5	17.6	0.0		15.9	0.0	17.1	11.5	
Queue Length 95th (m)	11.6	45.4		21.3	33.3	10.6		35.7	8.7	40.1	29.7	
Internal Link Dist (m)		382.1			781.5			107.0			50.7	
Turn Bay Length (m)	80.0			70.0		25.0			25.0			
Base Capacity (vph)	443	1694		461	2590	1191		950	1120	538	792	
Starvation Cap Reductn	0	0		0	0	0		0	0	0	0	
Spillback Cap Reductn	0	0		0	0	0		0	0	0	0	

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Storage Cap Reductn	0	0		0	0	0		0	0	0	0	
Reduced v/c Ratio	0.07	0.26		0.25	0.16	0.14		0.21	0.09	0.27	0.17	

Intersection Summary			
Area Type:	Other		
Cycle Length: 104			
Actuated Cycle Length: 68			
Control Type: Actuated-Uncoordinated			
Maximum v/c Ratio: 0.53			
Intersection Signal Delay: 17.1		Intersection LOS: B	
Intersection Capacity Utilization 68.4%		ICU Level of Service C	
Analysis Period (min) 15			

Splits and Phases: 17: 65 Ave & Highway 27





Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	80	470	130	90	490	80	130	90	70	90	80	70
Future Volume (vph)	80	470	130	90	490	80	130	90	70	90	80	70
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (m)	90.0		0.0	30.0		0.0	20.0		10.0	20.0		10.0
Storage Lanes	1		0	1		0	1		1	1		0
Taper Length (m)	40.0			30.0			7.5			7.5		
Satd. Flow (prot)	1736	3356	0	1787	3465	0	1770	1881	1599	1736	1881	1583
Flt Permitted	0.430			0.353			0.704			0.697		
Satd. Flow (perm)	786	3356	0	664	3465	0	1311	1881	1599	1273	1881	1583
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)		43			22				96			96
Link Speed (k/h)		50			50			50			50	
Link Distance (m)		805.5			697.8			130.8			121.6	
Travel Time (s)		58.0			50.2			9.4			8.8	
Peak Hour Factor	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97
Heavy Vehicles (%)	4%	5%	1%	1%	2%	2%	2%	1%	1%	4%	1%	2%
Shared Lane Traffic (%)												
Lane Group Flow (vph)	82	619	0	93	587	0	134	93	72	93	82	72
Enter Blocked Intersection	No	No	No	No	No	No	No	No	No	No	No	No
Lane Alignment	Left	Left	Right	Left	Left	Right	Left	Left	Right	Left	Left	Right
Median Width(m)		6.1			6.1			3.6			3.6	
Link Offset(m)		0.0			0.0			0.0			0.0	
Crosswalk Width(m)		4.8			4.8			4.8			4.8	
Two way Left Turn Lane												
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Turning Speed (k/h)	25		15	25		15	25		15	25		15
Turn Type	pm+pt	NA		pm+pt	NA		Perm	NA	Perm	Perm	NA	Perm
Protected Phases	5	2		1	6			4			8	
Permitted Phases	2			6			4		4	8		8
Total Split (s)	19.0	38.0		19.0	38.0		29.0	29.0	29.0	29.0	29.0	29.0
Total Lost Time (s)	4.0	5.0		4.0	5.0		4.5	4.5	4.5	4.5	4.5	4.5
Act Effct Green (s)	33.0	24.7		33.8	27.3		13.4	13.4	13.4	13.4	13.4	13.4
Actuated g/C Ratio	0.57	0.43		0.58	0.47		0.23	0.23	0.23	0.23	0.23	0.23
v/c Ratio	0.14	0.43		0.17	0.36		0.44	0.21	0.16	0.32	0.19	0.16
Control Delay	6.0	13.9		6.1	12.8		24.5	19.6	4.0	22.0	19.3	4.0
Queue Delay	0.0	0.0		0.0	0.0		0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	6.0	13.9		6.1	12.8		24.5	19.6	4.0	22.0	19.3	4.0
LOS	A	B		A	B		C	B	A	C	B	A
Approach Delay		13.0			11.9			18.0			15.9	
Approach LOS		B			B			B			B	
Queue Length 50th (m)	2.9	23.8		3.4	22.9		12.4	8.1	0.0	8.3	7.1	0.0
Queue Length 95th (m)	9.5	46.0		10.5	44.5		29.4	20.2	6.0	21.3	18.2	6.0
Internal Link Dist (m)		781.5			673.8			106.8			97.6	
Turn Bay Length (m)	90.0			30.0			20.0		10.0	20.0		10.0
Base Capacity (vph)	736	1948		705	2004		559	803	737	543	803	731
Starvation Cap Reductn	0	0		0	0		0	0	0	0	0	0
Spillback Cap Reductn	0	0		0	0		0	0	0	0	0	0
Storage Cap Reductn	0	0		0	0		0	0	0	0	0	0

Lane Group	Ø11	Ø12
Lane Configurations		
Traffic Volume (vph)		
Future Volume (vph)		
Ideal Flow (vphpl)		
Storage Length (m)		
Storage Lanes		
Taper Length (m)		
Satd. Flow (prot)		
Flt Permitted		
Satd. Flow (perm)		
Right Turn on Red		
Satd. Flow (RTOR)		
Link Speed (k/h)		
Link Distance (m)		
Travel Time (s)		
Peak Hour Factor		
Heavy Vehicles (%)		
Shared Lane Traffic (%)		
Lane Group Flow (vph)		
Enter Blocked Intersection		
Lane Alignment		
Median Width(m)		
Link Offset(m)		
Crosswalk Width(m)		
Two way Left Turn Lane		
Headway Factor		
Turning Speed (k/h)		
Turn Type		
Protected Phases	11	12
Permitted Phases		
Total Split (s)	5.0	5.0
Total Lost Time (s)		
Act Effct Green (s)		
Actuated g/C Ratio		
v/c Ratio		
Control Delay		
Queue Delay		
Total Delay		
LOS		
Approach Delay		
Approach LOS		
Queue Length 50th (m)		
Queue Length 95th (m)		
Internal Link Dist (m)		
Turn Bay Length (m)		
Base Capacity (vph)		
Starvation Cap Reductn		
Spillback Cap Reductn		
Storage Cap Reductn		

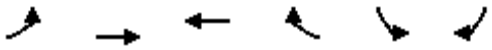
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Reduced v/c Ratio	0.11	0.32		0.13	0.29		0.24	0.12	0.10	0.17	0.10	0.10

Intersection Summary			
Area Type:	Other		
Cycle Length: 91			
Actuated Cycle Length: 58.1			
Control Type: Semi Act-Uncoord			
Maximum v/c Ratio: 0.44			
Intersection Signal Delay: 13.7		Intersection LOS: B	
Intersection Capacity Utilization 47.2%		ICU Level of Service A	
Analysis Period (min) 15			

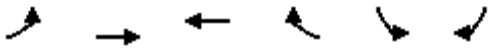
Splits and Phases: 14: 57 Ave & Highway 27

Lane Group	Ø11	Ø12
Reduced v/c Ratio		

Intersection Summary



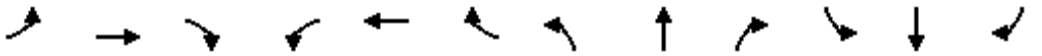
Lane Group	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Traffic Volume (vph)	40	500	660	30	30	40
Future Volume (vph)	40	500	660	30	30	40
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Storage Length (m)	0.0			20.0	0.0	10.0
Storage Lanes	0			1	1	1
Taper Length (m)	7.5				7.5	
Satd. Flow (prot)	0	3436	3471	1553	1656	1583
Flt Permitted		0.873			0.950	
Satd. Flow (perm)	0	3011	3471	1502	1656	1551
Right Turn on Red				Yes		Yes
Satd. Flow (RTOR)				32		43
Link Speed (k/h)		50	50		50	
Link Distance (m)		697.8	226.5		137.7	
Travel Time (s)		50.2	16.3		9.9	
Confl. Peds. (#/hr)	8			8		9
Peak Hour Factor	0.93	0.93	0.93	0.93	0.93	0.93
Heavy Vehicles (%)	0%	5%	4%	4%	9%	2%
Shared Lane Traffic (%)						
Lane Group Flow (vph)	0	581	710	32	32	43
Enter Blocked Intersection	No	No	No	No	No	No
Lane Alignment	Left	Left	Left	Right	Left	Right
Median Width(m)		0.0	0.0		3.6	
Link Offset(m)		0.0	0.0		0.0	
Crosswalk Width(m)		4.8	4.8		4.8	
Two way Left Turn Lane						
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00
Turning Speed (k/h)	25			15	25	15
Turn Type	Perm	NA	NA	Perm	Prot	Perm
Protected Phases		2	6		4	
Permitted Phases	2			6		4
Total Split (s)	41.0	41.0	41.0	41.0	29.0	29.0
Total Lost Time (s)		4.5	4.5	4.5	4.5	4.5
Act Effct Green (s)		58.6	58.6	58.6	10.0	10.0
Actuated g/C Ratio		0.84	0.84	0.84	0.14	0.14
v/c Ratio		0.23	0.24	0.03	0.14	0.17
Control Delay		2.6	2.1	1.4	27.9	11.1
Queue Delay		0.0	0.0	0.0	0.0	0.0
Total Delay		2.6	2.1	1.4	27.9	11.1
LOS		A	A	A	C	B
Approach Delay		2.6	2.1		18.3	
Approach LOS		A	A		B	
Queue Length 50th (m)		11.0	12.5	0.0	3.9	0.0
Queue Length 95th (m)		16.0	19.2	2.5	11.3	8.2
Internal Link Dist (m)		673.8	202.5		113.7	
Turn Bay Length (m)				20.0		10.0
Base Capacity (vph)		2520	2905	1263	579	570
Starvation Cap Reductn		0	0	0	0	0
Spillback Cap Reductn		0	0	0	0	0



Lane Group	EBL	EBT	WBT	WBR	SBL	SBR
Storage Cap Reductn		0	0	0	0	0
Reduced v/c Ratio		0.23	0.24	0.03	0.06	0.08

Intersection Summary			
Area Type:	Other		
Cycle Length: 70			
Actuated Cycle Length: 70			
Offset: 22 (31%), Referenced to phase 2:EBTL and 6:WBT, Start of Green			
Control Type: Actuated-Coordinated			
Maximum v/c Ratio: 0.24			
Intersection Signal Delay: 3.2		Intersection LOS: A	
Intersection Capacity Utilization 55.5%		ICU Level of Service B	
Analysis Period (min) 15			

Splits and Phases: 12: Highway 27 & 52 Ave

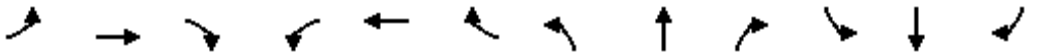


Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	10	480	60	30	550	20	50	10	20	10	10	10
Future Volume (vph)	10	480	60	30	550	20	50	10	20	10	10	10
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (m)	60.0		0.0	60.0		0.0	30.0		0.0	0.0		0.0
Storage Lanes	1		0	1		0	0		0	1		0
Taper Length (m)	80.0			80.0			40.0			7.5		
Satd. Flow (prot)	1805	3413	0	1736	3485	0	1805	1690	0	1504	1744	0
Flt Permitted	0.425			0.439			0.743			0.736		
Satd. Flow (perm)	798	3413	0	796	3485	0	1408	1690	0	1155	1744	0
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)		33			9			21			11	
Link Speed (k/h)		50			50			50			50	
Link Distance (m)		226.5			173.9			143.4			146.6	
Travel Time (s)		16.3			12.5			10.3			10.6	
Confl. Peds. (#/hr)	19		11	11		19	4		12	12		4
Peak Hour Factor	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Heavy Vehicles (%)	0%	4%	0%	4%	3%	0%	0%	0%	0%	20%	0%	0%
Shared Lane Traffic (%)												
Lane Group Flow (vph)	11	568	0	32	600	0	53	32	0	11	22	0
Enter Blocked Intersection	No	No	No	No	No	No	No	No	No	No	No	No
Lane Alignment	Left	Left	Right	Left	Left	Right	Left	Left	Right	Left	Left	Right
Median Width(m)		3.6			3.6			3.6			3.6	
Link Offset(m)		0.0			0.0			0.0			0.0	
Crosswalk Width(m)		4.8			4.8			4.8			4.8	
Two way Left Turn Lane												
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Turning Speed (k/h)	25		15	25		15	25		15	25		15
Turn Type	Perm	NA		Perm	NA		Perm	NA		Perm	NA	
Protected Phases		2			6			8			4	
Permitted Phases	2			6			8			4		
Total Split (s)	45.0	45.0		45.0	45.0		25.0	25.0		25.0	25.0	
Total Lost Time (s)	4.5	4.5		4.5	4.5		4.5	4.5		4.5	4.5	
Act Effct Green (s)	58.4	58.4		58.4	58.4		10.2	10.2		10.2	10.2	
Actuated g/C Ratio	0.83	0.83		0.83	0.83		0.15	0.15		0.15	0.15	
v/c Ratio	0.02	0.20		0.05	0.21		0.26	0.12		0.07	0.08	
Control Delay	2.8	2.3		2.2	1.8		29.9	16.1		26.6	19.0	
Queue Delay	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Total Delay	2.8	2.3		2.2	1.8		29.9	16.1		26.6	19.0	
LOS	A	A		A	A		C	B		C	B	
Approach Delay		2.3			1.8			24.7			21.6	
Approach LOS		A			A			C			C	
Queue Length 50th (m)	0.3	9.0		0.8	8.7		6.6	1.3		1.3	1.3	
Queue Length 95th (m)	1.5	14.4		m2.0	12.8		16.1	8.3		5.5	7.1	
Internal Link Dist (m)		202.5			149.9			119.4			122.6	
Turn Bay Length (m)	60.0			60.0			30.0					
Base Capacity (vph)	665	2851		663	2907		412	509		338	518	
Starvation Cap Reductn	0	0		0	0		0	0		0	0	
Spillback Cap Reductn	0	0		0	0		0	0		0	0	

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Storage Cap Reductn	0	0		0	0		0	0		0	0	
Reduced v/c Ratio	0.02	0.20		0.05	0.21		0.13	0.06		0.03	0.04	

Intersection Summary			
Area Type:	Other		
Cycle Length: 70			
Actuated Cycle Length: 70			
Offset: 15 (21%), Referenced to phase 2:EBTL and 6:WBTL, Start of Green			
Control Type: Actuated-Coordinated			
Maximum v/c Ratio: 0.26			
Intersection Signal Delay: 4.0		Intersection LOS: A	
Intersection Capacity Utilization 46.4%		ICU Level of Service A	
Analysis Period (min) 15			
m Volume for 95th percentile queue is metered by upstream signal.			

Splits and Phases: 9: 51st Ave & Highway 27

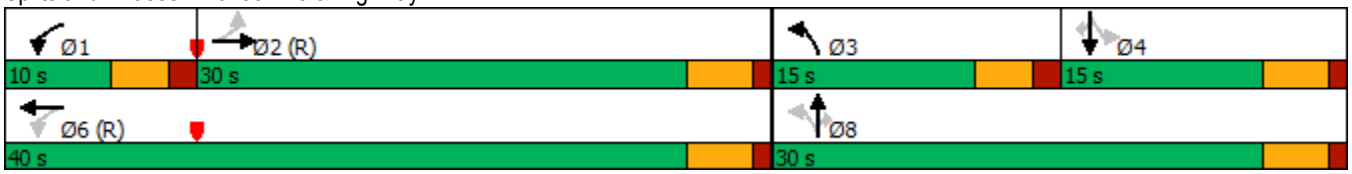


Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	30	400	60	70	450	70	130	60	70	80	60	40
Future Volume (vph)	30	400	60	70	450	70	130	60	70	80	60	40
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (m)	0.0		0.0	0.0		0.0	0.0		50.0	0.0		35.0
Storage Lanes	0		0	0		0	0		1	0		1
Taper Length (m)	7.5			7.5			7.5			7.5		
Satd. Flow (prot)	0	3372	0	0	3381	0	0	1837	1583	0	1836	1524
Flt Permitted		0.890			0.808			0.530			0.713	
Satd. Flow (perm)	0	3009	0	0	2747	0	0	1002	1555	0	1343	1491
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)		25			30				94			164
Link Speed (k/h)		50			50			50			50	
Link Distance (m)		173.9			528.1			144.8			227.8	
Travel Time (s)		12.5			38.0			10.4			16.4	
Confl. Peds. (#/hr)	8		6	6		8	12		8	8		12
Peak Hour Factor	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93
Heavy Vehicles (%)	0%	5%	2%	0%	5%	0%	0%	0%	2%	1%	0%	6%
Shared Lane Traffic (%)												
Lane Group Flow (vph)	0	527	0	0	634	0	0	205	75	0	151	43
Enter Blocked Intersection	No	No	No	No	No	No	No	No	No	No	No	No
Lane Alignment	Left	Left	Right	Left	Left	Right	Left	Left	Right	Left	Left	Right
Median Width(m)		0.0			0.0			0.0			0.0	
Link Offset(m)		0.0			0.0			0.0			0.0	
Crosswalk Width(m)		4.8			4.8			4.8			4.8	
Two way Left Turn Lane												
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Turning Speed (k/h)	25		15	25		15	25		15	25		15
Turn Type	Perm	NA		pm+pt	NA		pm+pt	NA	Perm	Perm	NA	Perm
Protected Phases		2		1	6		3	8			4	
Permitted Phases	2			6			8		8	4		4
Total Split (s)	30.0	30.0		10.0	40.0		15.0	30.0	30.0	15.0	15.0	15.0
Total Lost Time (s)		4.5			4.5			4.5	4.5		4.5	4.5
Act Effct Green (s)		21.3			34.3			26.7	26.7		12.2	12.2
Actuated g/C Ratio		0.30			0.49			0.38	0.38		0.17	0.17
v/c Ratio		0.57			0.44			0.41	0.12		0.65	0.11
Control Delay		21.5			12.3			17.3	3.0		42.5	0.6
Queue Delay		0.0			0.0			0.0	0.0		0.0	0.0
Total Delay		21.5			12.3			17.3	3.0		42.5	0.6
LOS		C			B			B	A		D	A
Approach Delay		21.5			12.3			13.5			33.2	
Approach LOS		C			B			B			C	
Queue Length 50th (m)		34.0			27.0			18.3	0.0		18.9	0.0
Queue Length 95th (m)		48.3			37.5			33.9	5.6		#48.5	0.0
Internal Link Dist (m)		149.9			504.1			120.8			203.8	
Turn Bay Length (m)									50.0			35.0
Base Capacity (vph)		1112			1511			522	666		236	398
Starvation Cap Reductn		0			0			0	0		0	0
Spillback Cap Reductn		0			0			0	0		0	0

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Storage Cap Reductn		0			0			0	0		0	0
Reduced v/c Ratio		0.47			0.42			0.39	0.11		0.64	0.11

Intersection Summary			
Area Type:	Other		
Cycle Length: 70			
Actuated Cycle Length: 70			
Offset: 0 (0%), Referenced to phase 2:EBTL and 6:WBTL, Start of Green, Master Intersection			
Control Type: Actuated-Coordinated			
Maximum v/c Ratio: 0.65			
Intersection Signal Delay: 18.0		Intersection LOS: B	
Intersection Capacity Utilization 66.2%		ICU Level of Service C	
Analysis Period (min) 15			
# 95th percentile volume exceeds capacity, queue may be longer.			
Queue shown is maximum after two cycles.			

Splits and Phases: 6: 50 Ave & Highway 27

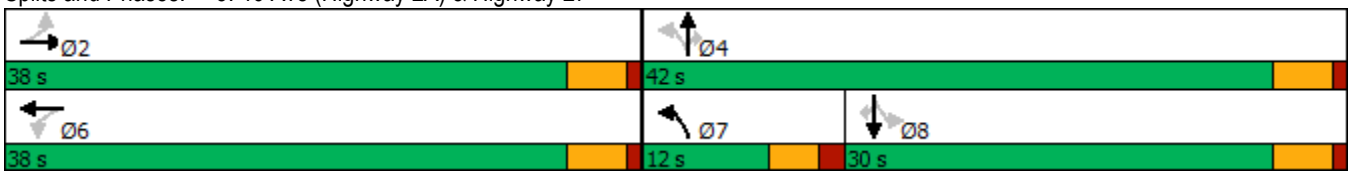


Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	80	310	90	90	210	30	120	90	140	60	100	150
Future Volume (vph)	80	310	90	90	210	30	120	90	140	60	100	150
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (m)	0.0		0.0	0.0		170.0	0.0		100.0	0.0		100.0
Storage Lanes	0		0	0		1	0		1	0		1
Taper Length (m)	7.5			7.5			7.5			7.5		
Satd. Flow (prot)	0	3301	0	0	3281	0	0	1776	1538	0	1781	1524
Flt Permitted		0.825			0.716			0.676			0.798	
Satd. Flow (perm)	0	2745	0	0	2380	0	0	1235	1538	0	1447	1524
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)		43			16				156			167
Link Speed (k/h)		50			50			50			50	
Link Distance (m)		528.1			342.3			233.4			175.4	
Travel Time (s)		38.0			24.6			16.8			12.6	
Peak Hour Factor	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90
Heavy Vehicles (%)	5%	6%	4%	5%	7%	14%	1%	8%	5%	6%	4%	6%
Shared Lane Traffic (%)												
Lane Group Flow (vph)	0	533	0	0	366	0	0	233	156	0	178	167
Enter Blocked Intersection	No	No	No	No	No	No	No	No	No	No	No	No
Lane Alignment	Left	Left	Right	Left	Left	Right	Left	Left	Right	Left	Left	Right
Median Width(m)		0.0			0.0			0.0			0.0	
Link Offset(m)		0.0			0.0			0.0			0.0	
Crosswalk Width(m)		4.8			4.8			4.8			4.8	
Two way Left Turn Lane												
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Turning Speed (k/h)	25		15	25		15	25		15	25		15
Turn Type	Perm	NA		Perm	NA		pm+pt	NA	Perm	Perm	NA	Perm
Protected Phases		2			6		7	4			8	
Permitted Phases	2			6			4		4	8		8
Total Split (s)	38.0	38.0		38.0	38.0		12.0	42.0	42.0	30.0	30.0	30.0
Total Lost Time (s)		4.5			4.5			4.5	4.5		4.5	4.5
Act Effct Green (s)		18.5			18.5			25.5	25.5		13.3	13.3
Actuated g/C Ratio		0.35			0.35			0.48	0.48		0.25	0.25
v/c Ratio		0.54			0.44			0.35	0.19		0.49	0.33
Control Delay		15.4			14.9			10.6	2.6		22.9	5.5
Queue Delay		0.0			0.0			0.0	0.0		0.0	0.0
Total Delay		15.4			14.9			10.6	2.6		22.9	5.5
LOS		B			B			B	A		C	A
Approach Delay		15.4			14.9			7.4			14.5	
Approach LOS		B			B			A			B	
Queue Length 50th (m)		19.0			13.1			11.9	0.0		14.4	0.0
Queue Length 95th (m)		38.1			27.4			30.8	8.4		35.3	12.3
Internal Link Dist (m)		504.1			318.3			209.4			151.4	
Turn Bay Length (m)									100.0			100.0
Base Capacity (vph)		1779			1535			966	1150		708	830
Starvation Cap Reductn		0			0			0	0		0	0
Spillback Cap Reductn		0			0			0	0		0	0
Storage Cap Reductn		0			0			0	0		0	0

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Reduced v/c Ratio		0.30			0.24			0.24	0.14		0.25	0.20

Intersection Summary			
Area Type:	Other		
Cycle Length: 80			
Actuated Cycle Length: 53.2			
Control Type: Actuated-Uncoordinated			
Maximum v/c Ratio: 0.54			
Intersection Signal Delay: 13.2		Intersection LOS: B	
Intersection Capacity Utilization 55.6%		ICU Level of Service B	
Analysis Period (min) 15			

Splits and Phases: 3: 46 Ave (Highway 2A) & Highway 27



SIGNAL TIMING SHEET

Date Issued	June 26, 2024	Intersection	Highway 27 & 70 Ave
Controller Type	Econolite Cobalt 1000	Location	Olds, AB
Cabinet Type	M-Cabinet	Sheet No. & Revision	Rev. 0
Sequence		Previous STS Issue	NA

Phase Number	1	2	3	4	5	6	7	8
Phase Setting	WBL	EBT	NBL	SBT	EBL	WBT	SBL	NBT
Description	pt+pm				pt+pm			
Overlap								
Minimum Green	7	20	-	12	7	20	-	12
Veh Extension	-	4	-	3	-	4	-	3
Yellow	3	4	-	3.5	3	4	-	3.5
Red	1.5	1	-	1	1.5	1	-	1
Max 1	21.5	47	-	32.5	21.5	47	-	32.5
Max 2	16.5	37	-	27.5	16.5	37	-	27.5
Max 3	-	-	-	-	-	-	-	-
Pedestrian Walk	-	7	-	7	-	7	-	7
Pedestrian FDW	-	21	-	22	-	21	-	25
Recall	-	Ped	-	-	-	Ped	-	-
Memory				Non-Locking				
Coordination on Phase	-	-	-	-	-	-	-	-
First Green Display	-	X	-	-	-	X	-	-
AWF Time (s)	-	-	-	-	-	-	-	-

Delay Detection Timing

Programming Comments

1. Fully Actuated, Uncoordinated
2. Local Zero Override to time greens < ped walk + FDW
3

Pre-Emption Type

Delay Time

Pre-Emption Time

Volume Loging

Simultaneous Gap Out

Operational Comments

1. Timing plans prepared for PM Peak (15:30 to 18:00) and Offpeak

2

3

Time Base Settings

Time of Day	Day of Week	Action Plan	Cycle Length	Offset Value	Coord Split Times 1 2 3 4 5 6 7 8	Timing Plan	Max (1/2/3)	Add Clock Settings
Offpeak	All	1	115			1	1	
PM	All	1	95			1	2	

SIGNAL TIMING SHEET

Date Issued	June 26, 2024	Intersection	Highway 27 & 67 Ave
Controller Type	Econolite ASC/3-1000	Location	Olds, AB
Cabinet Type	M-Cabinet	Sheet No. & Revision	Rev. 0
Sequence		Previous STS Issue	NA

Phase Number	1	2	3	4	5	6	7	8
Phase Setting	WBL	EBT	NBL	SBT	EBL	WBT	SBL	NBT
Description								
Overlap								
Minimum Green	-	10	-	15	-	10	-	15
Veh Extension	-	3	-	3	-	3	-	3
Yellow	-	4	-	3	-	4	-	3
Red	-	1	-	1	-	1	-	1
Max 1	-	26	-	27	-	26	-	27
Max 2	-	26	-	37	-	26	-	37
Max 3	-	-	-	-	-	-	-	-
Pedestrian Walk	-	7	-	7	-	7	-	7
Pedestrian FDW	-	15	-	15	-	15	-	15
Recall	-	Min	-	-	-	Min	-	-
Memory				Non-Locking				
Coordination on Phase	-	-	-	-	-	-	-	-
First Green Display	-	X	-	-	-	X	-	-
AWF Time (s)	-	-	-	-	-	-	-	-

Delay Detection Timing

Pre-Emption Type
Delay Time
Pre-Emption Time
Volume Loging
Simultaneous Gap Out

Programming Comments
1. Fully Actuated, Uncoordinated
2
3

Operational Comments
1. Timing plans prepared for PM Peak (15:30 to 18:00) and Offpeak

2. Omit Phase 8 until development occurs

3

Time Base Settings

Time of Day	Day of Week	Action Plan	Cycle Length	Offset Value	Coord Split Times 1 2 3 4 5 6 7 8	Timing Plan	Max (1/2/3)	Add Clock Settings
Offpeak	All	1	62			1	1	
PM	All	1	72			1	2	

SIGNAL TIMING SHEET

Date Issued	June 26, 2024	Intersection	Highway 27 & 65 Ave
Controller Type	Econolite ASC/2S-1000	Location	Olds, AB
Cabinet Type	M-Cabinet	Sheet No. & Revision	Rev. 0
Sequence		Previous STS Issue	NA

Phase Number	1	2	3	4	5	6	7	8
Phase Setting	WBL	EBT	NBL	SBT	EBL	WBT	SBL	NBT
Description	pt+pm		pt+pm					
Overlap								
Minimum Green	7	15	7	12	-	15	-	12
Veh Extension	3	5	3	3.5	-	5	-	3.5
Yellow	3	4	3	3.5	-	4	-	3.5
Red	1.5	1	1.5	1	-	1	-	1
Max 1	-	33	-	29.5	-	33	-	29.5
Max 2	11.5	33	11.5	29.5	-	33	-	29.5
Max 3	-	-	-	-	-	-	-	-
Pedestrian Walk	-	7	-	7	-	7	-	7
Pedestrian FDW	-	24	-	18	-	20	-	18
Recall	-	Min	-	-	-	Min	-	-
Memory				Non-Locking				
Coordination on Phase	-	-	-	-	-	-	-	-
First Green Display	-	X	-	-	-	X	-	-
AWF Time (s)	-	-	-	-	-	-	-	-

Delay Detection Timing

Programming Comments
1. Fully Actuated, Uncoordinated
2
3

Pre-Emption Type
Delay Time
Pre-Emption Time
Volume Loging
Simultaneous Gap Out

Operational Comments
1. Timing plans prepared for PM Peak (15:30 to 18:00) and Offpeak

2. Omit Phase 1 and 3 in off peak

3

Time Base Settings

Time of Day	Day of Week	Action Plan	Cycle Length	Offset Value	Coord Split Times 1 2 3 4 5 6 7 8	Timing Plan	Max (1/2/3)	Add Clock Settings
Offpeak	All	1	72			1	1	
PM	All	1	104			1	2	

SIGNAL TIMING SHEET

Date Issued	June 26, 2024	Intersection	Highway 27 & 57 Ave
Controller Type	Econolite ASC/2S-1000	Location	Olds, AB
Cabinet Type	M-Cabinet	Sheet No. & Revision	Rev. 0
Sequence		Previous STS Issue	NA

Phase Number	1	2	3	4	5	6	7	8
Phase Setting	WBL	EBT	NBL	SBT	EBL	WBT	SBL	NBT
Description	pt + pm				pt + pm			
Overlap								
Minimum Green	5	18	-	15	5	18	-	15
Veh Extension	5	5	-	5	5	5	-	5
Yellow	3	4	-	3.5	3	4	-	3.5
Red	1	1	-	1	1	1	-	1
Max 1	15	33	-	29.5	15	33	-	29.5
Max 2	-	-	-	-	-	-	-	-
Max 3	-	-	-	-	-	-	-	-
Pedestrian Walk	-	7	-	7	-	7	-	7
Pedestrian FDW	-	14	-	14	-	14	-	14
Recall	-	Ped	-	-	-	Ped	-	-
Memory				Non-Locking				
Coordination on Phase	-	-	-	-	-	-	-	-
First Green Display	-	X	-	-	-	X	-	-
AWF Time (s)	-	-	-	-	-	-	-	-

Delay Detection Timing

Programming Comments

1. Semi Actuated, Uncoordinated (detector replacement recommended)
2. 5 sec LPI during Phase 4 and 8

Pre-Emption Type

Delay Time

Pre-Emption Time

Volume Loging

Simultaneous Gap Out

Operational Comments

1

2

3

Time Base Settings

Time of Day	Day of Week	Action Plan	Cycle Length	Offset Value	Coord Split Times 1 2 3 4 5 6 7 8	Timing Plan	Max (1/2/3)	Add Clock Settings
All	All	1	91			1	1	

SIGNAL TIMING SHEET

Date Issued	June 26, 2024	Intersection	Highway 27 & 52 Ave
Controller Type	Econolite ASC/2S-1000	Location	Olds, AB
Cabinet Type	M-Cabinet	Sheet No. & Revision	Rev. 0
Sequence		Previous STS Issue	NA

Phase Number	1	2	3	4	5	6	7	8
Phase Setting	WBL	EBT	NBL	SBT	EBL	WBT	SBL	NBT
Description								
Overlap								
Minimum Green	-	15	-	10	-	15	-	-
Veh Extension	-	4	-	3.5	-	4	-	-
Yellow	-	3.5	-	3.5	-	3.5	-	-
Red	-	1	-	1	-	1	-	-
Max 1	-	33.5	-	22.5	-	33.5	-	-
Max 2	-	36.5	-	24.5	-	36.5	-	-
Max 3	-	-	-	-	-	-	-	-
Pedestrian Walk	-	-	-	7	-	7	-	-
Pedestrian FDW	-	-	-	15	-	15	-	-
Recall	-	Max	-	-	-	Max	-	-
Memory				Non-Locking				
Coordination on Phase	-	X	-	-	-	X	-	-
First Green Display	-	X	-	-	-	X	-	-
AWF Time (s)	-	-	-	-	-	-	-	-

Delay Detection Timing

Programming Comments

1. Fully Actuated, coordinated with 51 Ave and 50 Ave
2. Offset Reference Begin of Green
3

Pre-Emption Type

Delay Time

Pre-Emption Time

Volume Loging

Simultaneous Gap Out

Operational Comments

1. Timing plans prepared for PM Peak (15:30 to 18:00) and Offpeak

2

3

Time Base Settings

Time of Day	Day of Week	Action Plan	Cycle Length	Offset Value	Coord Split Times 1	2	3	4	5	6	7	8	Timing Plan	Max (1/2/3)	Add Clock Settings
Offpeak	All	1	65	17		38		27		38			1	1	
PM	All	1	70	22		41		29		41			1	2	

SIGNAL TIMING SHEET

Date Issued	June 26, 2024	Intersection	Highway 27 & 51 Ave
Controller Type	Econolite Cobalt 1000	Location	Olds, AB
Cabinet Type	P-Cabinet	Sheet No. & Revision	Rev. 0
Sequence		Previous STS Issue	NA

Phase Number	1	2	3	4	5	6	7	8
Phase Setting	WBL	EBT	NBL	SBT	EBL	WBT	SBL	NBT
Description								
Overlap								
Minimum Green	-	15	-	10	-	15	-	10
Veh Extension	-	4	-	3	-	4	-	3
Yellow	-	3.5	-	3.5	-	3.5	-	3.5
Red	-	1	-	1	-	1	-	1
Max 1	-	35.5	-	20.5	-	35.5	-	20.5
Max 2	-	40.5	-	20.5	-	40.5	-	20.5
Max 3	-	-	-	-	-	-	-	-
Pedestrian Walk	-	7	-	7	-	7	-	7
Pedestrian FDW	-	16	-	21	-	16	-	21
Recall	-	Min	-	-	-	Min	-	-
Memory				Non-Locking				
Coordination on Phase	-	X	-	-	-	X	-	-
First Green Display	-	X	-	-	-	X	-	-
AWF Time (s)	-	-	-	-	-	-	-	-

Delay Detection Timing

Programming Comments

1. Fully Actuated, coordinated with 52 Ave and 50 Ave
2. Offset Reference Begin of Green
3. Local Zero Override to time greens < ped walk + FDW

Pre-Emption Type

Delay Time

Pre-Emption Time

Volume Loging 2

Simultaneous Gap Out 3

Operational Comments

1. Timing plans prepared for PM Peak (15:30 to 18:00) and Offpeak

Time Base Settings

Time of Day	Day of Week	Action Plan	Cycle Length	Offset Value	Coord Split Times 1	2	3	4	5	6	7	8	Timing Plan	Max (1/2/3)	Add Clock Settings
Offpeak	All	1	65	11		40		25		40		25	1	1	
PM	All	1	70	15		45		25		45		25	1	2	

SIGNAL TIMING SHEET

Date Issued	June 26, 2024	Intersection	Highway 27 & 50 Ave
Controller Type	Econolite ASC/2S-1000	Location	Olds, AB
Cabinet Type	M-Cabinet	Sheet No. & Revision	Rev. 0
Sequence		Previous STS Issue	NA

Phase Number	1	2	3	4	5	6	7	8
Phase Setting	WBL	EBT	NBL	SBT	EBL	WBT	SBL	NBT
Description	pt + pm		pt + pm					
Overlap								
Minimum Green	5	22	5	10	-	22	-	10
Veh Extension	3	4	3.5	3	-	4	-	3.5
Yellow	3	3.5	3	3.5	-	3.5	-	3.5
Red	1.5	1	1.5	1	-	1	-	1
Max 1	5.5	25.5	5.5	10.5	-	35.5	-	20.5
Max 2	5.5	25.5	10.5	10.5	-	35.5	-	25.5
Max 3	-	-	-	-	-	-	-	-
Pedestrian Walk	-	7	-	7	-	7	-	7
Pedestrian FDW	-	15	-	20	-	15	-	20
Recall	-	Min	-	-	-	Min	-	-
Memory				Non-Locking				
Coordination on Phase	-	X	-	-	-	X	-	-
First Green Display	-	X	-	-	-	X	-	-
AWF Time (s)	-	-	-	-	-	-	-	-

Delay Detection Timing

Programming Comments
1. Fully Actuated, coordinated with 51 Ave and 52 Ave
2. Offset Reference Begin of Green
3

Pre-Emption Type	Rail
Delay Time	
Pre-Emption Time	
Volume Loging	
Simultaneous Gap Out	

Operational Comments
1. Timing plans prepared for PM Peak (15:30 to 18:00) and Offpeak

2. Master Clock

3

Time Base Settings

Time of Day	Day of Week	Action Plan	Cycle Length	Offset Value	Coord Split Times 1	2	3	4	5	6	7	8	Timing Plan	Max (1/2/3)	Add Clock Settings
Offpeak	All	1	65	0	10	30	10	15		40		25	1	1	
PM	All	1	70	0	10	30	15	15		40		30	1	2	

SIGNAL TIMING SHEET

Date Issued	June 26, 2024	Intersection	Highway 27 & Hwy 2A /46 Ave
Controller Type	Econolite ASC/3-1000	Location	Olds, AB
Cabinet Type	M-Cabinet	Sheet No. & Revision	Rev. 0
Sequence		Previous STS Issue	NA

Phase Number	1	2	3	4	5	6	7	8
Phase Setting	WBL	EBT	NBL	SBT	EBL	WBT	SBL	NBT
Description			pt + pm					
Overlap								
Minimum Green	-	15	7	10	-	15	-	10
Veh Extension	-	5	3	4	-	5	-	4
Yellow	-	3.5	3	3.5	-	3.5	-	3.5
Red	-	1	1.5	1	-	1	-	1
Max 1	-	28.5	7.5	25.5	-	28.5	-	37.5
Max 2	-	33.5	7.5	25.5	-	33.5	-	37.5
Max 3	-	-	-	-	-	-	-	-
Pedestrian Walk	-	7	-	7	-	7	-	7
Pedestrian FDW	-	13	-	17	-	13	-	17
Recall	-	Min	-	-	-	Min	-	-
Memory				Non-Locking				
Coordination on Phase	-	-	-	-	-	-	-	-
First Green Display	-	X	-	-	-	X	-	-
AWF Time (s)	-	-	-	-	-	-	-	-

Delay Detection Timing

Programming Comments

1. Fully Actuated, uncoordinated
2
3

Pre-Emption Type
Delay Time
Pre-Emption Time
Volume Loging
Simultaneous Gap Out

Operational Comments

1. Timing plans prepared for PM Peak (15:30 to 18:00) and Offpeak
2
3

Time Base Settings

Time of Day	Day of Week	Action Plan	Cycle Length	Offset Value	Coord Split Times 1 2 3 4 5 6 7 8	Timing Plan	Max (1/2/3)	Add Clock Settings
Offpeak	All	1	75			1	1	
PM	All	1	80			1	2	

H

Appendix H
Rail Pre-Emption / Interconnection

MEMO

TO : **Chris Lo, P.Eng.**

COPY TO : **Paul Steel, P.Eng.**

FROM : **Chris Philp, P.Eng.**

DATE : **March 4, 2024**

SUBJECT : **Railway Pre-emption Considerations at Highway 27 and 50 Ave Town of Olds AB**

1. Introduction

As part of a corridor review along Highway 27 within the Town of Olds, Alberta Transportation and Economic Corridors (TEC) is reviewing whether any upgrades to the signalized intersection at Highway 27 and 50 Avenue are required. This location is immediately west of an at-grade rail crossing, which results in the potential for queues of vehicles to back up over the tracks. As a result, interconnection between the rail warning system and the traffic signal controller, and the use of traffic signal pre-emption timings at the traffic signal are being reviewed to identify any recommended improvements.

2. Orientation of the Crossing and the Signals

The intersection of Highway 27 and 50 Avenue with the existing at-grade rail crossing is shown in Figure 1. Note the image is oriented such that North is to the top of the figure (which also aligns with Figure 2 as shown in the traffic signal pre-emption workbook discussed below). Given the at-grade rail crossing is located east of the intersection, the following safety concerns are noted:

1) Queues from westbound traffic can extend from the intersection to a point beyond the rail crossing
2) Backups from eastbound traffic stopped at the rail warning system have the potential to queue into the intersection.

Both these safety concerns are addressed with rail pre-emption timings at the traffic signal.

The following location pins are also shown on Figure 1:

- The location pin entitled ‘Stop Line’ denotes the location of the stop bar at the signalized intersection of Highway 27 and 50 Ave. Note that two stop bars are painted in the left

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lane. Selecting the stop bar closest to the edge of the crossing street provides a more conservative result because the resulting longer queue requires more time to disburse back to the tracks during the track clearance phase.

- The location pin entitled '2.4 m from rail' denotes a point 2.4 meters away from the closest rail in the direction of the traffic signal. The distance between these two points is the clearance distance for the rail crossing as specified in the traffic signal pre-emption workbook.
- A third location pin entitled '2 m from stop line' denotes the approximate position of the stop line for westbound traffic at the rail warning system. This location is needed to determine the clearance distance across the tracks as described in Section 4.

Note the slight skew of the intersection of the railway with Highway 27 requires the distances to be taken on the centreline of the road as specified in the traffic signal pre-emption workbook.

Figure 1 – Highway 27 at 50 Avenue

3. Existing Rail Pre-Emption Operations

The traffic signal controller at Highway 27 and 50 Avenue is currently interconnected to the rail warning system on the west leg. The phasing associated with the existing pre-emption is as follows:

Phase Type	Cardinal Directions	NEMA Phase Designations
Track Clearance	Westbound Through-Left	1 & 6
Hold	Northbound-Southbound	4 & 8
Exit	Eastbound-Westbound	2 & 6

The following are the pre-emption timings operational in the controller today:

Interval	Duration (sec)
Min. Green	6.0
Min. Ped Clear	6.0
Yellow	3.0
All-Red	2.0
Track Clear	10.0

It is assumed that the Yellow and All-Red intervals are the same for all pre-emption phases. It is further assumed that, because no walk interval is referenced, the walk (if active) will immediately terminate when a pre-emption request is received by the traffic signal controller.

Based on these existing pre-emption timings, the existing right-of-way transfer time is:

Interval	**Time**
Minimum Green / Ped Clear	6.0 s
Yellow Interval	3.0 s
All Red Interval	2.0 s
Right-of-Way Transfer Time	11.0 s

The track clearance phase is programmed as 10 sec, so the maximum pre-emption time is 21.0 seconds (11.0 seconds + 10.0 seconds). According to Garry Rosin[1] of the Canadian Pacific Kansas City Railway (CPKC), the minimum warning time for the rail warning system is 20 seconds.

The existing timings suggest that the existing operations of the rail pre-emption at the intersection of Highway 27 and 50 Avenue does not meet today's standards. More specifically, additional pre-emption time may be needed to account for the controller response time, full minimum green and pedestrian clearance intervals, design vehicle characteristics (i.e., sizes) and acceleration profiles, and (industry standard) buffer times. As a result, pre-emption operations and timings based on today's standards are determined in the following Sections.

[1] *Email from Garry Rosin of December 5, 2023*

4. Selected Guidelines and Standards

The operation of railways in Canada is governed by the Railway Safety Act[2] (RSA). As a part of the RSA, Transport Canada prepared new Grade Crossings Regulations[3] (GCR). The GCR incorporates the Grade Crossings Standards[4] (GCS) that are mandatory engineering standards, and they reference other standards and resources. The following is a list of these other relevant standards and guidelines applicable to the Province of Alberta, along with their application to the traffic signal pre-emption.

Publication	Application to Traffic Signal Pre-emption
Geometric Design Guide for Canadian Roads, September, 1999	Figure 10-2 provides acceleration profiles for various design vehicles
TxDOT - Worksheet for Determining Time Requirements for Traffic Signal Pre-emption at Highway-Rail Grade Crossings, March 2009	A worksheet and guide book used to determine right-of-way transfer time, queue clearance time, maximum pre-emption time and advanced pre-emption times
Highway Geometric Design Guide, Alberta Infrastructure, August 1999	Provides dimensions and characteristics for design vehicles

It is acknowledged that a 2019 version of the TxDOT Worksheet for Determining Time Requirements for Traffic Signal Pre-emption at Highway-Rail Grade Crossings is available, which includes consideration of signalized left turns towards the tracks and embeds several automated parameters (i.e., the design vehicle types, design vehicle lengths, and acceleration profiles). These parameters are manually entered in the 2009 version, allowing more control of the input data. For this analysis, the 2009 version of the worksheet was used. A comparison between the 2009 and 2019 worksheet versions was conducted, and it confirmed consistent results.

The design vehicle length of 25 m was adopted since both a WB-21 (Semi Trailer Combination) and a WB-23 (Double Trailer Combination) are the longest vehicles that frequently use this Highway, and both these vehicles are 25 meters in length.

[2] *Railway Safety Act (R.S.C., 1985, c. 32 (4th Supp.)), Act current to 2023-11-27 and last amended on 2022-09-02*
[3] *Grade Crossings Regulations (SOR/2014-275), Regulations are current to 2023-11-27 and last amended on 2021-11-26*
[4] *Transport Canada, Grade Crossings Standards, January 1, 2019*

5. Pre-emption Timings

5.1 Signal Phasing

Once the controller receives a pre-emption call, there are three (3) phases that can be serviced:

1) Track clearance phase – The phase that clears out the traffic going over the at-grade crossing towards the traffic signal, including a vehicle which may be stopped on the tracks at a red light.
2) Dwell phase – After servicing the track clearance phase, the traffic signal controller serves any phases that do not move over the tracks. If only one phase is served, the traffic signal is said to be in dwell. (If multiple phases are served, the traffic signal is said to be in a limited cycle.)
3) Exit phase – After the pre-empt call is dropped from the rail warning system, the signal transitions into an exit phase. This phase typically has the heaviest traffic movement towards the tracks.

5.1.1 Track Clearance Phase

For the intersection of Highway 27 and 50 Avenue, the track clearance phase may be considered as the indications provided by the traffic signals:

a) To service westbound traffic – to disperse any queues between the traffic signal stop line and the upstream rail crossing
b) To block eastbound traffic – to prevent vehicles from queueing back from the rail warning system to (and possibly through) the intersection

The recommended track clearance phase is a westbound advance phase (i.e., westbound left turn and through), with all other phases red. To avoid a pre-empt trap, it is further recommended that the track clearance phase not terminate until an input is received from the rail warning system that the gates are down.

A pre-empt trap occurs when right-of-way transfer time is so short that the track clearance phase ends before the rail warning system is activated. As a result, vehicles can continue to cross and possibly stop on the tracks. In this scenario, since the track clearance phase has already been serviced, there is no further opportunity to clear the queue. Using a gate-down input from the rail warning system to terminate the track clearance phase will prevent the occurrence of the pre-empt trap and it is therefore recommended.

Upon termination of the track clearance phase, the signals will cycle to the dwell phase.

5.1.2 Dwell Phase

After track clearance, the traffic signal controller can serve any phases that do not move over the tracks. If only one phase is served, the traffic signal is said to be in dwell.

The dwell phase for the Highway 27 and 50 Avenue intersection is north-south green as this phase does not require traffic to move across the rail crossing. This dwell phase will only be initiated once an input is received from the crossing warning system that the rail warning system gates are down and the track clearance phase has properly terminated (i.e., serviced westbound yellow and all red intervals).

5.1.3 Exit Phase

After the pre-emption call is dropped from the rail crossing system, the signal will transition into an exit phase. This phase is typically the phase with the heaviest traffic movement towards the tracks. In the case of Highway 27 and 50 Avenue intersection, the exit phase will be the eastbound phase on Highway 27. (Note the westbound phase can move concurrently with the eastbound phase during the exit phase.)

5.2 Right-of-Way Transfer Time

The right-of-way transfer time is the time needed for the traffic signal controller to recognize and respond to a pre-emption call. Best practices require it to be calculated as a worst-case scenario. In the case of Highway 27 and 50 Avenue, if the walk indication drops out when a pre-empt request is received and the pedestrian clearance operates through the yellow and all-red clearance intervals, then the right-of-way transfer time is determined by the sum of the worst-case conflicting vehicle times as follows:

Interval	Time[5]
Controller Response Time	1.0 s
Minimum Green	12.0 s
Yellow Interval	3.5 s
All Red Interval	1.5 s
Total	18.0 s

Note, it is assumed there is no pre-empt delay programmed in the traffic signal controller unit.

5.3 Queue Clearance Time

The queue clearance time is the time required for the queue to disperse from the traffic signal stop line back to the upstream side of the crossing. It also assumes a worst-case scenario in that a design vehicle (i.e., a semi or double-trailer combination vehicle) is stopped at the rail warning

[5] *Clearance times per file: 20231030_Olds_Hy 27_Timings_For clarification .xlsx*

system stop line and that the back of the design vehicle must clear the crossing by 2.4 meters from the rail closest to the traffic signal. The queue clearance time is derived from the distances shown in Figure 2.

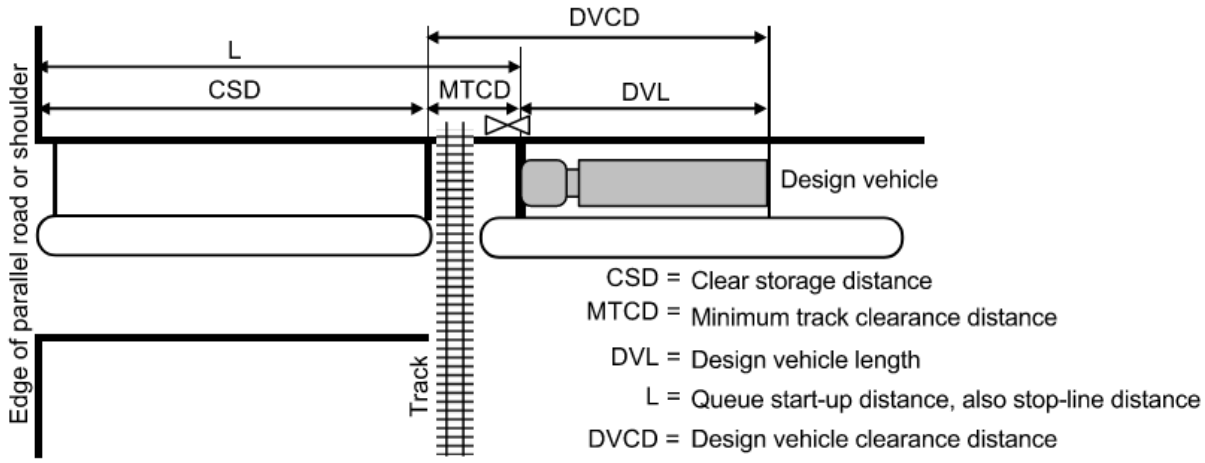


Figure 2 - Queue Clearance Distances

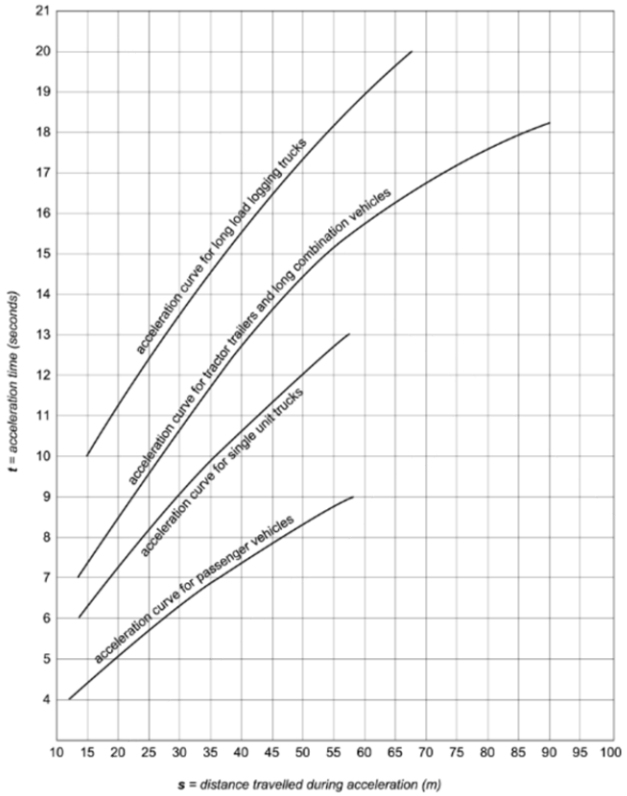
The queue clearance distances (i.e., the distances between the location pins shown in Figure 1) were measured or calculated as follows:

Element	Meters	Feet
CSD	38.0	125
MTCD	11.9	39
DVL	25.0	82
L (CSD + MTCD)	49.9	164
DVCD (MTCD + DVL)	36.9	121

The queue clearance time is composed of:

a) the time required for the design vehicle to start moving (calculated as 2+(L / 20) = 10.2 s), where L is in feet, plus,
b) the time for the design vehicle to accelerate through the DVCD (derived from the acceleration profile for a tractor trailer and long combination vehicles as determined from Figure 10-2 of the Geometric Design Guide for Canadian Roads shown below) for a distance travelled of 36.9 meters. The result is approximately 12.0 seconds of acceleration time.

Figure 10-2 Assumed Acceleration Curves for Grade Crossings with Smooth Approaches and Continuous Road Surfaces - General Design Vehicles (Geometric Design Guide)



Source: *Geometric Design Guide for Canadian Roads*, Transportation Association of Canada, September 1999.

Figure 3 - Acceleration Curves for Grade Crossings

Note that the resulting acceleration time should be further adjusted to account for a grade. However, at this location, the grade is negligible[6] and no further adjustment is required.

Therefore, the total queue clearance time is 10.2 s + 12 s = 22.2 seconds.

[6] *File: 02706_vc.xlsx*

5.4 Buffer Time

A buffer time is usually assigned to prevent the back end of the design vehicle from being exactly 2.4 meters from the arrival of a passing train, or to account for other real-world inconsistencies. A four (4) second buffer is used as a standard and was adopted for this analysis.

5.5 Maximum Pre-emption Time

Therefore, the maximum pre-emption time is:

Parameter	Time (s)
Right of way transfer time	18.0
Queue clearance time	22.2
Buffer time	4.0
Total	44.2

5.6 Current Warning Time

According to correspondence with CPKC[7], there is 20.0 seconds of minimum warning time at the existing crossing with simultaneous pre-emption (i.e., pre-emption notification is sent to the signal controller simultaneously with the activation of the rail warning system).

5.7 Recommended Interconnect Indications

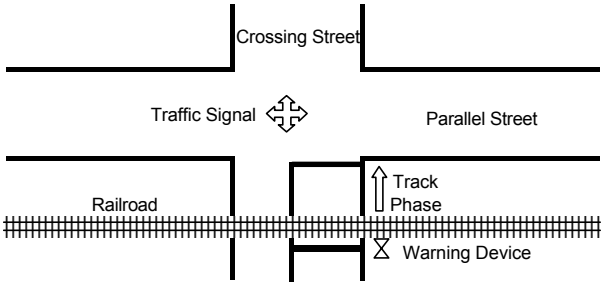
It is recommended that a copy of this report be forwarded to CPKC with a request for an advanced pre-emption time of 25 seconds (i.e., rounded up from 24.2 s (44.2s – 20.0s)) in addition to the existing 20 s of minimum warning time. To avoid a pre-empt trap, it is further recommended that a gates down signal be issued by the rail warning system to the traffic signal controller, and that the track clearance phase not terminate until this second signal is received. A traffic signal health indication from the traffic signal controller to the rail warning system should also be considered.

[7] *Email from Garry Rosin to Paul Steel dated December 5, 2023*

GUIDE FOR DETERMINING TIME REQUIREMENTS FOR TRAFFIC SIGNAL PREEMPTION AT HIGHWAY RAIL GRADE CROSSINGS

City: Town of Olds
County:
District:
Date: 01/04/24
Completed by: C. Philp
District Approval:

Show North Arrow



Parallel Street Name: 50 Ave
Crossing Street Name: Highway 27 (46th St)

Railroad: Canadian Pacific
Crossing DOT#: Mile 56.72
Railroad Contact: Garry Rosin (Garry_Rosin@cpkc
Phone: (403) 835-9223

SECTION 1: RIGHT-OF-WAY TRANSFER TIME CALCULATION

Preempt verification and response time

			Remarks
1.	Preempt delay time (seconds)	0.0	Assume no delay programmed
2.	Controller response time to preempt (seconds)	1.0	Controller type:
3.	Preempt verification and response time (seconds): add lines 1 and 2	1.0	

Worst-case conflicting vehicle time

			Remarks
4.	Worst-case conflicting vehicle phase number	8	
5.	Minimum green time during right-of-way transfer (seconds)	12.00	Min Grn
6.	Other green time during right-of-way transfer (seconds)		
7.	Yellow change time (seconds)	3.50	
8.	Red clearance time (seconds)	1.50	
9.	Worst-case conflicting vehicle time (seconds): add lines 5 through 8	17.0	

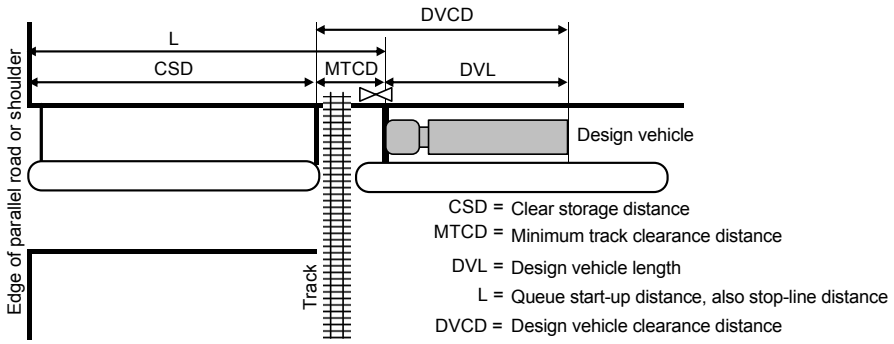
Worst-case conflicting pedestrian time

			Remarks
10.	Worst-case conflicting pedestrian phase number	8	
11.	Minimum walk time during right-of-way transfer (seconds)	0.0	Assume Walk Drops Out
12.	Pedestrian clearance time during right-of-way transfer (seconds)	10.0	NB Ped Clr - A - AR
13.	Vehicle yellow change time, if not included on line 12 (seconds)	3.5	
14.	Vehicle red clearance time, if not included on line 12 (seconds)	1.5	
15.	Worst-case conflicting pedestrian time (seconds): add lines 11 through 14	15.0	

Worst-case conflicting vehicle or pedestrian time

16.	Worst-case conflicting vehicle or pedestrian time (seconds): maximum of lines 9 and 15	17.0
17.	**Right-of-way transfer time (seconds): add lines 3 and 16**	18.0

SECTION 2: QUEUE CLEARANCE TIME CALCULATION



			Remarks
18.	Clear storage distance (CSD, feet) ..... **18.**	125	2.4 m from rail to stop line
19.	Minimum track clearance distance (MTCD, feet) ..... **19.**	39	CSD and MTCD taken from centre of roadw
20.	Design vehicle length (DVL, feet) ..... **20.**	82	Design vehicle type: WB-21 / WB-23
21.	Queue start-up distance, L (feet): add lines 18 and 19 ..... **21.**	164	
22.	Time required for design vehicle to start moving (seconds): calculate as 2+(L÷20) ..... **22.**	10.2	**Remarks**
23.	Design vehicle clearance distance, DVCD (feet): add lines 19 and 20 ..... **23.**	121	
24.	Time for design vehicle to accelerate through the DVCD (seconds) ..... **24.**	12.0	Read from Figure 2 in Instructions.
25.	**Queue clearance time (seconds): add lines 22 and 24 ..... 25.**	22.2	

SECTION 3: MAXIMUM PREEMPTION TIME CALCULATION

			Remarks
26.	Right-of-way transfer time (seconds): line 17 ..... **26.**	18.0	
27.	Queue clearance time (seconds): line 25 ..... **27.**	22.2	
28.	Desired minimum separation time (seconds) ..... **28.**	4.0	
29.	**Maximum preemption time (seconds): add lines 26 through 28 ..... 29.**	44.2	

SECTION 4: SUFFICIENT WARNING TIME CHECK

				Remarks
30.	Required minimum time, MT (seconds): per regulations ..... **30.**	20.0		
31.	Clearance time, CT (seconds): get from railroad ..... **31.**	0.0		
32.	Minimum warning time, MWT (seconds): add lines ..... **32.**		20.0	Excludes buffer time (BT)
33.	Advance preemption time, APT, if provided (seconds): get from railroad ..... **33.**		0.0	
34.	Warning time provided by the railroad (seconds): add lines 32 and 33 ..... **34.**		20.0	
35.	**Additional warning time required from railroad (seconds): subtract line 34 from line 29, round up to nearest full second, enter 0 if less than 0 ..... 35.**		25	

If the additional warning time required (line 35) is greater than zero, additional warning time has to be requested from the railroad. Alternatively, the maximum preemption time (line 29) may be decreased after performing an engineering study to investigate the possibility of reducing the values on lines 1, 5, 6, 7, 8, 11, 12, 13 and 14.

Remarks: Line 24 determined using Figure 10-2 from the Grade Crossing Handbook - single unit trucks.

No adjustments needed for grades (i.e., 0.5% on both approaches).

SECTION 5: TRACK CLEARANCE GREEN TIME CALCULATION (OPTIONAL)

Preempt Trap Check

36. Advance preemption time (APT) provided (seconds):	**36.**		Line 33 only valid if line 35 is zero.
37. Multiplier for maximum APT due to train handling	**37.**		See Instructions for details.
38. Maximum APT (seconds): multiply line 36 and 37	**38.**	0.0	**Remarks**
39. Minimum duration for the track clearance green interval (seconds)	**39.**	15.0	For zero advance preemption time
40. Gates down after start of preemption (seconds): add lines 38 and 39	**40.**	15.0	
41. Preempt verification and response time (seconds): line 3	**41.**	1.0	**Remarks**
42. Best-case conflicting vehicle or pedestrian time (seconds): usually 0.....	**42.**		
43. Minimum right-of-way transfer time (seconds): add lines 41 and 42	**43.**	1.0	
44. Minimum track clearance green time (seconds): subtract line 43 from line 40	**44.**	14.0	

Clearing of Clear Storage Distance

45. Time required for design vehicle to start moving (seconds), line 22	**45.**	10.2	
46. Design vehicle clearance distance (DVCD, feet), line 23	**46.**	121	**Remarks**
47. Portion of CSD to clear during track clearance phase (feet) ...	**47.**		CSD* in Figure 3 in Instructions.
48. Design vehicle relocation distance (DVRD, feet): add lines 46 and 47	**48.**	121	
49. Time required for design vehicle to accelerate through DVRD (seconds)	**49.**		Read from Figure 2 in Instructions.
50. Time to clear portion of clear storage distance (seconds): add lines 45 and 49	**50.**	10.2	
51. Track clearance green interval (seconds): maximum of lines 44 and 50, round up to nearest full second	**51.**	14	

SECTION 6: VEHICLE-GATE INTERACTION CHECK (OPTIONAL)

52. Right-of-way transfer time (seconds): line 17	**52.**	18.0	
53. Time required for design vehicle to start moving (seconds), line 22	**53.**	10.2	
54. Time required for design vehicle to accelerate through DVL (on line 20, seconds)	**54.**		Read from Table 3 in Instructions.
55. Time required for design vehicle to clear descending gate (seconds): add lines 52 though 54	**55.**	28.2	
			Remarks
56. Duration of flashing lights before gate descent start (seconds): get from railroad	**56.**		
			Remarks
57. Full gate descent time (seconds): get from railroad	**57.**		
58. Proportion of non-interaction gate descent time	**58.**		Read from Figure 5 in Instructions.
59. Non-interaction gate descent time (seconds): multiply lines 57 and 58	**59.**	0.0	
60. Time available for design vehicle to clear descending gate (seconds): add lines 56 and 59	**60.**	0.0	
61. Advance preemption time (APT) required to avoid design vehicle-gate interaction (seconds): subtract line 60 from line 55, round up to nearest full second, enter 0 if less than 0	**61.**	29	

Paul Steel

From: Paul Steel
Sent: March 13, 2024 4:52 PM
To: Garry Rosin
Cc: Andrew Krivanek; Will Nash; Ryan Alexander; Chris Philp; Graham Curtis
Subject: RE: Red Deer Subdivision, Mile 56.72 - Hwy 27 corridor study for Alberta Transportation CP additional comments

Hi Garry –

There is uncertainty regarding the timing of any improvements associated with our review of Highway 27 including any upgrades required to support APT.
Part of the uncertainty is around the possible costs associated with equipment upgrades and the availability of funding.

Are you any to elaborate on what those upgrades might include (at a high level) and provide an order of magnitude of possible costs, knowing that actual upgrades and associated costs need to be confirmed when there is more certainty of the timing, and/or an agreement is initiated?
Any additional information with respect to possible upgrades and cost will help inform this discuss with the province further.

Thanks,

PAUL STEEL, M.Eng., P.Eng., RSP1
Senior Project Manager / Transportation – Highway Engineering
T 403-775-0100 **M** 403-998-1113 **F** 403-775-0102

From: Garry Rosin <Garry.Rosin@cpkcr.com>
Sent: Friday, March 8, 2024 11:32 AM
To: Paul Steel <Paul.Steel@cima.ca>
Cc: Andrew Krivanek <Andrew.Krivanek@cpkcr.com>; Will Nash <Will.Nash@cpkcr.com>; Ryan Alexander <Ryan.Alexander@cpkcr.com>; Chris Philp <Chris.Philp@cima.ca>; Garry Rosin <Garry.Rosin@cpkcr.com>; Graham Curtis <Graham.Curtis@cpkcr.com>
Subject: RE: Red Deer Subdivision, Mile 56.72 - Hwy 27 corridor study for Alberta Transportation CP additional comments

Paul:

Thank you for the information.
Currently, existing crossing warning system is interconnected to the traffic signals.
However, the current interconnection is simultaneous, so it does not provide any advance preemption timing.
Based on the attached document, it appears that you will require APT.
Is this improvement something that will be implemented in 2024?
Existing crossing equipment is not capable of providing APT, so equipment upgrades will be necessary.
If this project will move forward, CPKC would have to provide a cost estimate for approval and would require a PO or signed agreement prior to
starting any work.

Please advise.

Thanks,

Garry Rosin
Senior Manager Signal Design
O 403-319-7798
C 403-835-9223
7550 Ogden Dale Road SE
Calgary AB T2C 4X9

From: Paul Steel <Paul.Steel@cima.ca>
Sent: Monday, March 4, 2024 2:13 PM
To: Garry Rosin <Garry_Rosin@cpr.ca>
Cc: Andrew Krivanek <Andrew_Krivanek@cpr.ca>; Will Nash <Will_Nash@cpr.ca>; Ryan Alexander <Ryan_Alexander@cpr.ca>; Chris Philp <Chris.Philp@cima.ca>
Subject: RE: Red Deer Subdivision, Mile 56.72 - Hwy 27 corridor study for Alberta Transportation CP additional comments

Hi Garry –

Please find attached a memo we have prepared for Alberta Transportation and Economic Corridors, which they have asked we provide to you for reference.
We would be happy to present our findings from the memo to you and answer any questions that you might have.
If you feel an online meeting would be beneficial, please let me know when your team might have availability to meet.

Thanks,

PAUL STEEL, M.Eng., P.Eng., RSP1
Senior Project Manager / Transportation – Highway Engineering
T 403-775-0100 **M** 403-998-1113 **F** 403-775-0102

From: Garry Rosin <Garry.Rosin@cpkcr.com>
Sent: Thursday, February 15, 2024 9:54 AM
To: Paul Steel <Paul.Steel@cima.ca>
Cc: Andrew Krivanek <Andrew.Krivanek@cpkcr.com>; Will Nash <Will.Nash@cpkcr.com>; Ryan Alexander <Ryan.Alexander@cpkcr.com>; Chris Philp <Chris.Philp@cima.ca>; Garry Rosin <Garry.Rosin@cpkcr.com>
Subject: RE: Red Deer Subdivision, Mile 56.72 - Hwy 27 corridor study for Alberta Transportation CP additional comments

Paul:

Thank you for the update.
Depending on when you provide the information, we may miss the opportunity to incorporate into our new design.

Thanks,

Paul Steel

From: Garry Rosin <Garry.Rosin@cpkcr.com>
Sent: January 17, 2024 9:29 AM
To: Paul Steel
Cc: Andrew Krivanek; Will Nash; Garry Rosin; Ryan Alexander
Subject: RE: Red Deer Subdivision, Mile 56.72 - Hwy 27 corridor study for Alberta Transportation CP additional comments

EXTERNAL EMAIL

Paul:

Do you have a timeframe for potential implementation of the interconnection to traffic signals?
CPKC is currently planning track changes in the area in Q3 of 2024.
Design will be completed by end of Q1 and there are potential benefits from a cost perspective to incorporate the interconnection changes within that design.
However, we would need to have a signed agreement or PO and the required APT before we could advance any design.

Please advise.

Thanks,

Garry Rosin
Senior Manager Signal Design
O 403-319-7798
C 403-835-9223
7550 Ogden Dale Road SE
Calgary AB T2C 4X9

From: Paul Steel <Paul.Steel@cima.ca>
Sent: Tuesday, January 16, 2024 2:59 PM
To: Garry Rosin <Garry_Rosin@cpr.ca>
Cc: Andrew Krivanek <Andrew_Krivanek@cpr.ca>; Will Nash <Will_Nash@cpr.ca>
Subject: RE: Red Deer Subdivision, Mile 56.72 - Hwy 27 corridor study for Alberta Transportation CP comments

Garry –

Thanks for the clarification.
I'll get back to you if any further questions/clarifications arise from the team.

Regards,

PAUL STEEL, M.Eng., P.Eng., RSP1
Senior Project Manager / Transportation – Highway Engineering
T 403-775-0100 **M** 403-998-1113 **F** 403-775-0102

From: Garry Rosin <Garry.Rosin@cpkcr.com>
Sent: Friday, January 12, 2024 2:58 PM
To: Paul Steel <Paul.Steel@cima.ca>
Cc: Andrew Krivanek <Andrew.Krivanek@cpkcr.com>; Will Nash <Will.Nash@cpkcr.com>; Garry Rosin <Garry.Rosin@cpkcr.com>
Subject: RE: Red Deer Subdivision, Mile 56.72 - Hwy 27 corridor study for Alberta Transportation CP comments

Paul:

You do not include buffer time when calculating APT and it is not included in the MWT.

As per AREMA manual part 3.3.10

8. Advance Preemption Time (APT):

The period of time specified by the Public Agency in accordance with MUTCD part 8C.09 that provides notification of an approaching train prior to activation of the grade crossing warning devices. Buffer Time (BT) and Equipment Response Time (ERT-A,C and D) shall be considered to be zero when calculating APT. See Manual Part 3.1.10, Recommended Functional/Operating Guidelines for Interconnection Between Highway Traffic Signals or Other Traffic Control Devices and Grade Crossing Warning Systems, to provide additional guidance in determining Advance Preemption Time.

Garry Rosin
Senior Manager Signal Design
O 403-319-7798
C 403-835-9223
7550 Ogden Dale Road SE
Calgary AB T2C 4X9

From: Paul Steel <Paul.Steel@cima.ca>
Sent: Friday, January 12, 2024 10:52 AM
To: Garry Rosin <Garry_Rosin@cpr.ca>
Cc: Andrew Krivanek <Andrew_Krivanek@cpr.ca>; Will Nash <Will_Nash@cpr.ca>
Subject: RE: Red Deer Subdivision, Mile 56.72 - Hwy 27 corridor study for Alberta Transportation CP comments

Hi Garry –

We have one other question requiring your input at this time.
We assume that the buffer time included within the MWT is 5 seconds. Is this assumption correct?

Thanks,

PAUL STEEL, M.Eng., P.Eng., RSP1
Senior Project Manager / Transportation – Highway Engineering
T 403-775-0100 **M** 403-998-1113 **F** 403-775-0102

From: Paul Steel
Sent: Tuesday, December 5, 2023 3:09 PM
To: Garry Rosin <Garry.Rosin@cpkcr.com>
Cc: Andrew Krivanek <Andrew.Krivanek@cpkcr.com>; Will Nash <Will.Nash@cpkcr.com>
Subject: RE: Red Deer Subdivision, Mile 56.72 - Hwy 27 corridor study for Alberta Transportation CP comments

Thank you Garry, this is very useful information.
We'll get back to you with any further questions, and suspect we'll reach out in the new year to discuss our findings.

Regards,

PAUL STEEL, M.Eng., P.Eng., RSP1
Senior Project Manager / Transportation – Highway Engineering
T 403-775-0100 **M** 403-998-1113 **F** 403-775-0102

From: Garry Rosin <Garry.Rosin@cpkcr.com>
Sent: Tuesday, December 5, 2023 2:20 PM
To: Paul Steel <Paul.Steel@cima.ca>
Cc: Garry Rosin <Garry.Rosin@cpkcr.com>; Andrew Krivanek <Andrew.Krivanek@cpkcr.com>; Will Nash <Will.Nash@cpkcr.com>
Subject: RE: Red Deer Subdivision, Mile 56.72 - Hwy 27 corridor study for Alberta Transportation CP comments

Paul:

Following comments:

MWT – 20 seconds
CT – 1 second
APT – Currently, CP is connected to the traffic signals using a Simultaneous Interconnection.
CP will not calculate or recommend the APT. We will review and comment.
You will need to do a complete review based on design vehicle, grade, clear out time, etc. (Texas DOT form is a good resource).
You should also consider using a Gate Down Indication to reset Traffic Signal.
We are not aware of what is currently used for the clearout (Timed?)
Another feature that would be desirable would be a Traffic Signal Health indication from the traffic controller to the CP signal housing.

Please reach out if you have any further questions.

Take care,

Garry Rosin
Senior Manager Signal Design
O 403-319-7798
C 403-835-9223
7550 Ogden Dale Road SE
Calgary AB T2C 4X9

From: Paul Steel <Paul.Steel@cima.ca>
Sent: Monday, December 4, 2023 2:31 PM
To: Garry Rosin <Garry_Rosin@cpr.ca>
Subject: Red Deer Subdivision, Mile 56.72 - Hwy 27 corridor study for Alberta Transportation

Hi Garry -

CIMA+ is working with Alberta Transportation and Economic Corridors to complete a review of the Highway 27 corridor through the Town of Olds.
A part of our required scope of work is to identify improvements to the intersections along the corridor.
As the signals at the 50 Avenue intersection are interconnected with the rail crossing at Mile 56.72 of the Red Deer Subdivision, our intent is to confirm that the current interconnection/pre-emption meets Transport Canada requirements, and that any potential upgrades to the intersection and signal infrastructure meet current requirements.
To help inform our review, I'm wondering if you could comment on CP's requirements for this crossing regarding:

- Minimum time
- Clearance time
- Advance pre-emption time

If you'd like to discuss any aspects of our study, I'd be happy to do so.
And if this request should be directed to someone else within CP, please advise.
Thanks,

PAUL STEEL, M.Eng., P.Eng., RSP1
Senior Project Manager / Transportation – Highway Engineering

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