Appendix 1

# 2019

# Chief Mistawasis Bridge Traffic Assessment

City of Saskatoon
Transportation

10/9/2019

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# 1. Introduction

The Chief Mistawasis Bridge and the Traffic Bridge opened in October 2018. This report outlines the traffic impacts due to the bridge openings. Assessments are as follows:

- Bridge Traffic Comparisons
- Road Segment Review
- Intersection Analysis

The study locations are illustrated in Figure 1.

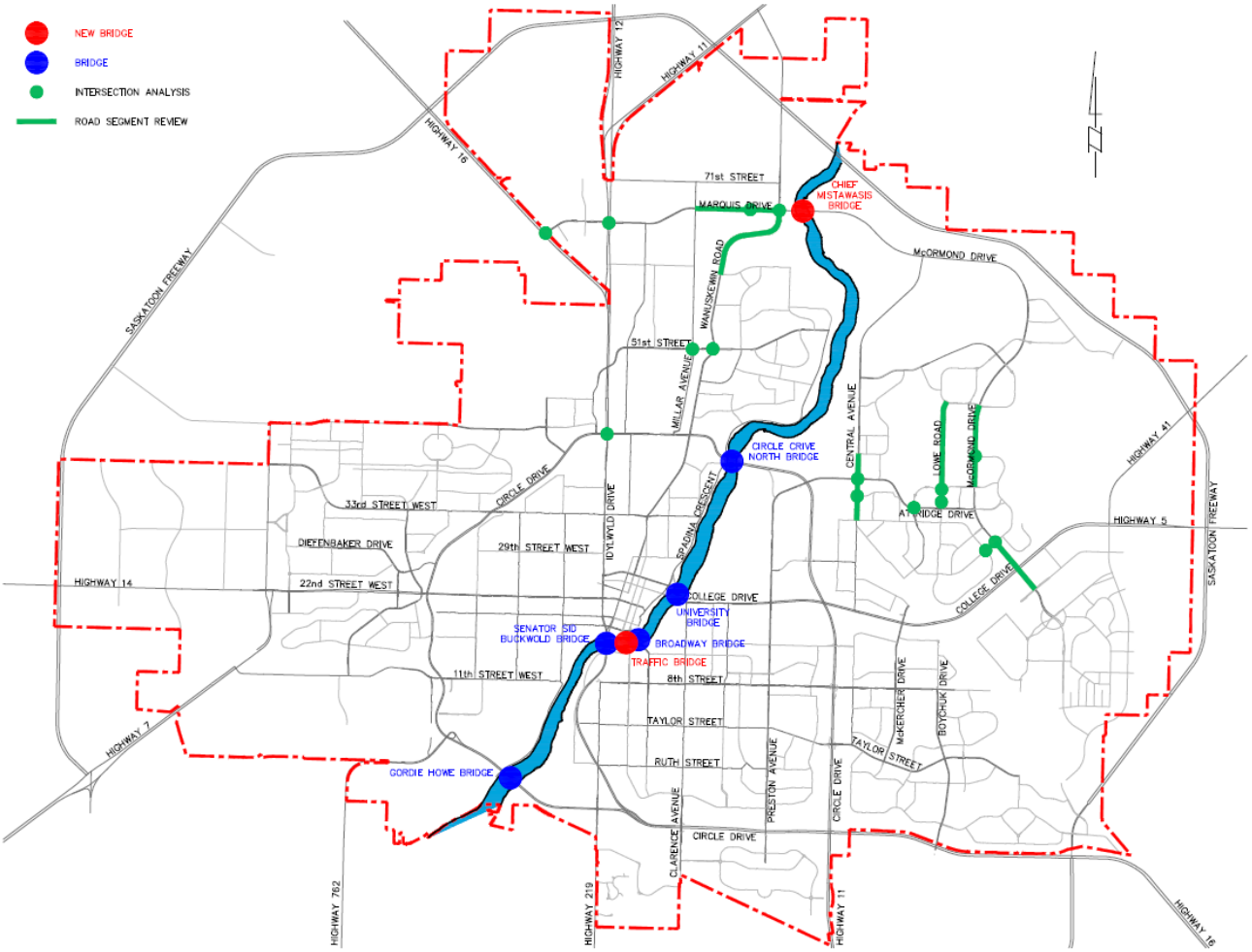



**Figure 1: Study Locations**

## 2. Bridge Traffic Comparison

The Average Daily Traffic observed on Saskatoon's bridges is illustrated in Figure 2. The data was collected in early 2019.

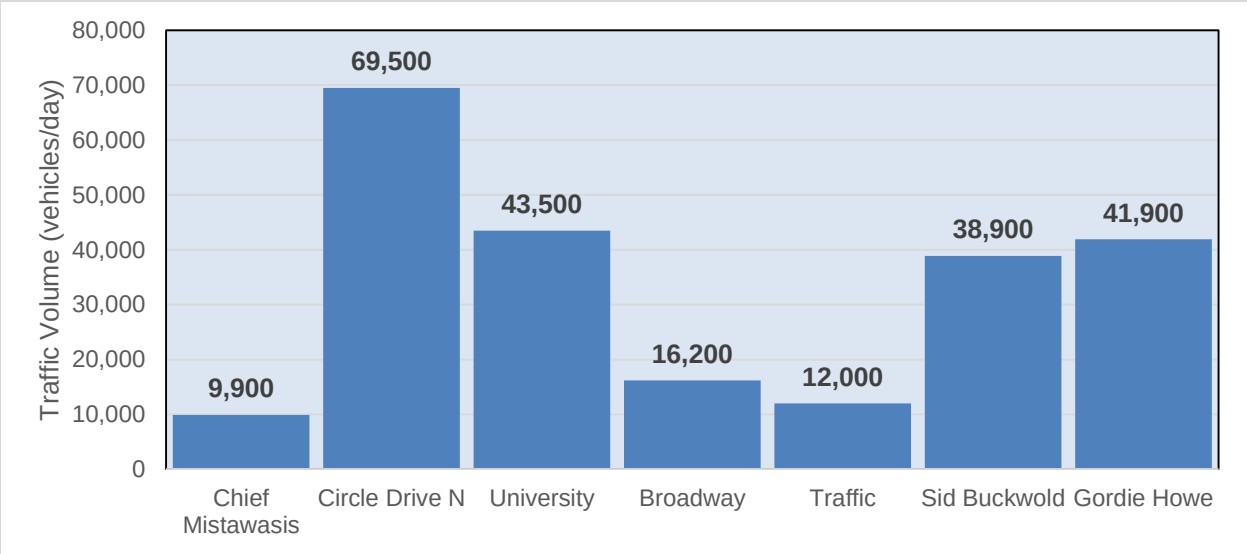



**Figure 2: Average Daily Traffic – Bridges**

A review of the information presented in the figure above yields the following observations:

- The Chief Mistawasis Bridge has been operating with approximately 10,000 vehicles per day (vpd) since opening, resulting in a reduction of approximately 10,000 vpd on the Circle Drive North Bridge.
- The re-opened Traffic Bridge has been operating at approximately 12,000 vpd. There may be some impact to this volume due to construction on the nearby Sid Buckwold Bridge.
- Traffic volumes on the remaining bridges are relatively unchanged since the opening of the two new bridges.

## 3. Road Segment Review

The street network is comprised of various street types, each of which performs a particular function in facilitating the way people and goods move through and within the city. The City of Saskatoon street classifications characteristics for the street types included in the study are summarized in Table 1.

### Table 1: City of Saskatoon Street Classifications Characteristics

| Characteristic | Collectors | | Arterials | | Expressways/ Freeways |
|---|---|---|---|---|---|
| | Residential | Commercial | Minor | Major | |
| **Traffic Service Function** | Traffic movement and land access of equal importance | | Traffic movement major consideration | Traffic movement primary consideration | Traffic movement primary consideration |
| **Typical Traffic Volume (veh/day)** | <5,000 | 8,000 to 10,000 | 5,000 to 25,000 | | >10,000 / >20,000 |
| **Traffic Flow Characteristics** | Interrupted flow | | Uninterrupted flow except at signals and crosswalks | | Free-flow (grade separated) Uninterrupted flow except at signals |
| **Typical Posted Speed Limits (kph)** | 50 | | 50 to 70 | | 80 to 90 |
| **Typical Vehicle Type** | Passenger and service vehicles | All types | All types | All types, large portion of trucks | All types, large portion of trucks |

The before and after Average Daily Traffic volumes for a number of various street segments are presented in Table 2.

## Table 2: Road Segment Traffic Changes

| Segment | Road Classification | Previous Observations | | 2019 | Change |
|---|---|---|---|---|---|
| | | Year | AADT | ADT | |
| Chief Mistawasis Bridge | Major Arterial | - | - | 9,900 | - |
| Circle Drive (North) Bridge | Expressway | 2018 | 79,300 | 69,500 | -9,800 |
| University Bridge | Major Arterial | 2017 | 43,100 | 43,500 | +400 |
| Broadway Bridge | Major Arterial | 2018 | 17,900 | 16,200 | -1,700 |
| Traffic Bridge | Commercial Collector | 2018 | 6,100 | 12,000 | +5,900 |
| Sid Buckwold Bridge | Freeway | 2017 | 45,400 | 38,900 | -6,500 |
| Gordie Howe Bridge | Freeway | 2018 | 43,500 | 41,900 | -1,600 |
| Marquis Drive (Millar Avenue – Arthur Rose Avenue) | Major Arterial | 2017 | 5,300 | 7,800 | +2,500 |
| Central Avenue (Attridge Drive – Konihowski Road) | Major Arterial | 2015 | 9,300 | 13,500 | +4,200 |
| Central Avenue (Attridge Drive – 115th Street) | Major Arterial | 2018 | 11,000 | 13,200 | +2,200 |
| Lowe Road (Nelson Road – Evergreen Boulevard) | Commercial Collector | 2016 | 6,500 | 5,500 | -1,000 |
| McOrmond Drive (Stensrud Road – Baltzan Boulevard) | Major Arterial | 2016 | 7,600 | 13,200 | +5,600 |
| Wanuskewin Road (south of Marquis Drive) | Major Arterial | 2016 | 10,800 | 9,800 | -1,000 |
| McOrmond Drive (Kerr Road – College Drive) | Major Arterial | 2016 | 39,200 | 25,100 | -14,100 |
| McOrmond Drive (South of College Drive) | Major Arterial | New in 2019 | - | 9,000 | - |

Note: AADT = Annual Average Daily Traffic, ADT = Average Daily Traffic,

A review of the information presented in the table above yields the following observations:

- In general, the streets directly connected to the new Chief Mistawasis Bridge saw increased daily traffic.
- Previous alternate routes connecting to the Circle Drive North Bridge saw some decreases.

# 4. Intersection Analysis – Signalized Intersections

The North American traffic engineering standard for measuring the performance of a signalized intersection is to measure the *average delay* in seconds a driver will experience in completing a maneuver. The software used to analyze the intersection calculates an average delay to each movement based on the traffic volumes, permitted movements and signal timing. This average delay corresponds to established Levels of Service (LOS). The LOS can range from A to F (the shorter the average delay the better the LOS, the longer the average delay the worse the LOS). Generally, the City prefers to avoid LOS E and F. However, a LOS E or F does not indicate the need for or trigger improvements. Other considerations include: the traffic volume performing the problematic movement with LOS E or F, intersection geometrics and signal operation, intersection spacing, road classification, availability of alternate routes, pedestrian movements, access management, type of adjacent land use, future development in the area and cost. A summary of the Level of Service characteristics for signalized intersections is provided in Table 3.

### Table 3: Level of Service Characteristics (signalized)

| Average Control Delay (sec./veh.) | Level of Service | General Description |
|---|---|---|
| <= 10 | A | Free Flow |
| >10 to 20 | B | Stable Flow (slight delays) |
| >20 to 35 | C | Stable Flow (acceptable delays) |
| >35 to 55 | D | Approaching unstable flow (tolerable delay, occasional wait through more than one signal cycle before proceeding) |
| >55 to 80 | E | Unstable flow |
| >80 | F | Forced flow |

Detailed intersection analysis, including weekday AM and PM peak hours, was completed for the following signalized intersections:

- Marquis Drive and Wanuskewin Drive
- Marquis Drive and Arthur Rose Avenue
- Marquis Drive and Idylwyld Drive
- Marquis Drive and Highway 16
- 51st Street and Warman Road
- 51st Street and Millar Avenue
- Circle Drive and Idylwyld Drive
- Attridge Drive and Central Avenue
- Attridge Drive and Berini Drive
- McOrmond Drive and Kerr Road

A summary of the analysis for each intersection is provided in Table 4. Detailed analysis results for each intersection movement is provided in Appendix 1.

### Table 4: Intersection Analysis – Signalized Intersections

| Intersection | Weekday AM Peak Hour | | | Weekday PM Peak Hour | | |
|---|---|---|---|---|---|---|
| | Max v/c ratio | Average Delay (s) | LOS | Max v/c ratio | Average Delay (s) | LOS |
| Marquis Drive and Wanuskewin Drive | 0.53 | 24.6 | C | 0.8 | 35.7 | D |
| Marquis Drive and Arthur Rose Avenue | 0.63 | 15.7 | B | 0.91 | 23.1 | C |
| Marquis Drive and Idylwyld Drive | 1.28 | 59.9 | E | 2.29 | 163.4 | F |
| Marquis Drive and Highway 16 | 0.62 | 37.4 | D | 0.58 | 32.3 | C |
| 51st Street and Warman Road | 0.82 | 38.3 | D | 1.11 | 44 | D |
| 51st Street and Millar Avenue | 0.84 | 38.7 | D | 1.83 | 177.5 | F |
| Circle Drive and Idylwyld Drive | 0.72 | 20.7 | C | 1.05 | 55 | E |
| Attridge Drive and Central Avenue | 0.88 | 33 | C | 0.99 | 68.2 | E |
| Attridge Drive and Berini Drive | 0.83 | 24 | C | 0.85 | 21.4 | C |
| McOrmond Drive and Kerr Road | 0.75 | 18.7 | B | 0.74 | 21.4 | C |

v/c – volume to capacity; LOS – Level of Service

A review of the information provided in the table above and Appendix 1 yield the following observations:

- Marquis Drive and Idylwyld Drive – multiple intersection movements, notably eastbound and westbound movements, provide a poor LOS with significant delays in both AM and PM peak hours.
- 51st Street and Millar Avenue – multiple intersection movements, notably southbound and northbound movements, provide a poor LOS with significant delay mostly in the weekday PM peak hour.
- Circle Drive and Idylwyld Drive – multiple intersection movements, in all directions, provide a poor LOS with significant delay mostly in the weekday PM peak hour.
- Attridge Drive and Central Avenue – multiple intersection movements, in all directions, provide a poor LOS with significant delay mostly in the weekday PM peak hour.

The following is recommended:

- In the short-term, continue to monitor and adjust signal timings at impacted intersections.
- As part of the North Saskatoon Transportation Study include an intersection improvement plan for the intersection of Marquis Drive and Idylwyld Drive.
- Begin stakeholder consultation for the previously identified required improvement at the intersection of 51st Street and Millar Avenue.
- Revisit the previously completed functional planning study for the Circle Drive and Idylwyld Drive interchange once Phase 1 of the Saskatoon Freeway Functional Planning project is complete. More details are provided in Appendix 4.
- Complete an intersection improvement study for the intersections of Attridge Drive and Central Avenue in advance of the Bus Rapid Transit (BRT) project.

# 5. Intersection Analysis – Unsignalized Intersections

Details of the Level of Service for unsignalized intersections is provided in Table 5.

### Table 5: Level of Service Standards (unsignalized)

| Average Control Delay (sec./veh.) | Level of Service | General Description |
|---|---|---|
| <= 10 | A | Free Flow |
| >10 to 15 | B | Stable Flow (slight delays) |
| >15 to 25 | C | Stable Flow (acceptable delays) |
| >25 to 35 | D | Approaching unstable flow (tolerable delay, occasional wait through more than one signal cycle before proceeding) |
| >35 to 50 | E | Unstable flow |
| >50 | F | Forced flow |

Detailed intersection analysis was completed for the following unsignalized intersections:

- McOrmond Drive and Stensrud Road (north)
- Central Avenue and Reid Road/Rossmo Road
- Lowe Road and Nelson Road
- Lowe Road and Ludlow Street
- Kerr Road and Kenderdine Road

A summary of the analysis for each of the unsignalized intersections is provided in Table 6. In addition, assessments were conducted to determine the need for traffic signals in adherence to the Traffic Signal and Pedestrian Signal Head Warrant Handbook. A warrant system assigns points for a variety of conditions including:

- Number of traffic lanes;
- Posted speed limit of the street;
- Distance to the nearest protected traffic signal; and
- Number of pedestrians and vehicles at the location.

Pedestrians and traffic data was collected during the peak hours of 7:00 a.m. to 9:00 a.m., 11:30 a.m. to 1:30 p.m., and 4:00 p.m. to 6:00 p.m. Full details of the intersection analysis for the unsignalized locations are provided in Appendix 2. Traffic Signal Warrants are provided in Appendix 3.

## Table 6: Intersection Analysis – Unsignalized Intersections

| Intersection | Weekday AM Peak Hour | | | Weekday PM Peak Hour | | | Traffic Signal Warrant |
|---|---|---|---|---|---|---|---|
| | Max v/c ratio | Average Delay (s) | LOS | Max v/c ratio | Average Delay (s) | LOS | |
| McOrmond Drive and Stensrud Road (north) | 0.42 | 3.3 | A | 0.52 | 2.8 | A | 56 (Traffic Signal NOT warranted) |
| Central Avenue and Reid Road / Rossmo Road | 0.52 | 5.5 | A | 1.17 | 16.5 | C | 74 (Traffic Signal NOT warranted) |
| Lowe Road and Nelson Road | 0.61 | 18.9 | C | 0.63 | 20.4 | C | 112 (Traffic Signal warranted) |
| Lowe Road and Ludlow Street | 0.6 | 4.8 | B | 0.62 | 8.7 | B | 86 (Traffic Signal NOT warranted) |
| Kerr Road and Kenderdine Road | 0.44 | 9.8 | A | 1.02 | 37.1 | E | 66 (Traffic Signal NOT warranted) |

A review of the information provided in Table 5, Table 6, Appendix 2 and Appendix 3 yield the following observations:

- Traffic signals are not warranted at the intersection of McOrmond Drive and Stensrud Road (north), the intersection of Central Avenue and Reid Road/ Rossmo Road, the intersection of Lowe Road and Ludlow Street.
- Traffic signals are warranted at the intersection of Lowe Road and Nelson Road.
- At the intersection of Kerr Road and Kenderdine Road there is a poor LOS for the southwest bound movement in the weekday PM peak hour.

The following is recommended:

- Place the intersection of Lowe Road and Nelson Road on the prioritization list for intersections to be signalized.
- Adjust lane designations (i.e. signs and pavement markings) at the intersection of Kerr Road and Kenderdine Road.

# 6. Summary

## 6.1 Bridge Traffic Comparison

The Chief Mistawasis Bridge has been operating with approximately 10,000 vpd, resulting in a reduction of approximately 10,000 vpd on the Circle Drive North Bridge. The Traffic Bridge has been operating at approximately 12,000 vpd. There may be some impact to the volume due to construction of the nearby Sid Buckwold Bridge.

Traffic volumes on the remaining bridges are relatively unchanged since the opening of the two new bridges.

## 6.2 Road Segment Review

In general, the streets directly connected to the new Chief Mistawasis Bridge saw increased daily traffic, and previous alternate routes connecting to the Circle Drive North Bridge saw some decreases.

## 6.3 Intersection Recommendations

The following is recommended:

1. In the short-term, continue to monitor and adjust signal timings at impacted intersections.
2. As part of the North Saskatoon Transportation Study include an intersection improvement plan for the intersection of Marquis Drive and Idylwyld Drive.
3. Begin stakeholder consultation for the previously identified required improvement at the intersection of 51st Street and Millar Avenue.
4. Revisit the previously completed functional planning study for the Circle Drive and Idylwyld Drive interchange once Phase 1 of the Saskatoon Freeway Functional Planning project is complete.
5. Complete an intersection improvement study for the intersections of Attridge Drive and Central Avenue in advance of the BRT project.
6. Place the intersection of Lowe Road and Nelson Road on the prioritization list for intersections to be signalized.
7. Adjust lane designations (i.e. signs and pavement markings) at the intersection of Kerr Road and Kenderdine Road.

# Appendix 1: Intersection Analysis – Signalized Intersections

## Marquis Drive and Wanuskewin Drive

| Movement | | Weekday AM Peak Hour | | | | Weekday PM Peak Hour | | | |
|---|---|---|---|---|---|---|---|---|---|
| | | v/c ratio | Delay (s) | LOS | Queue (m) | v/c ratio | Delay (s) | LOS | Queue (m) |
| SB | LT | 0.49 | 35.2 | D | 45.8 | 0.74 | 57.5 | E | 77.7 |
| | Thru | 0.53 | 28.5 | C | 56.8 | 0.29 | 25.6 | C | 45.0 |
| | RT | 0.27 | 4.0 | A | 9.1 | 0.05 | 0.2 | A | 0 |
| NB | LT | 0.32 | 33.0 | C | 28.4 | 0.31 | 51.9 | D | 23.6 |
| | Thru | 0.32 | 30.8 | C | 24.8 | 0.80 | 43.7 | D | 99.0 |
| | RT | 0.08 | 0.4 | A | 0 | 0.34 | 6.8 | A | 16.5 |
| EB | LT | 0.06 | 34.9 | C | 6.7 | 0.27 | 39.0 | D | 26.1 |
| | Thru | 0.11 | 26.2 | C | 13.2 | 0.70 | 39.2 | D | 94.6 |
| | RT | 0.03 | 0.1 | A | 0 | 0.05 | 0.1 | A | 0 |
| WB | LT | 0.24 | 34.9 | C | 17.9 | 0.20 | 49.1 | D | 13.3 |
| | Thru | 0.51 | 24.9 | C | 71.0 | 0.26 | 41.3 | D | 23.7 |
| | RT | 0.22 | 2.7 | A | 6.3 | 0.38 | 5.8 | A | 10.6 |
| **Intersection Summary** | | **Max 0.53** | **Average 24.6** | **C** | **-** | **Max 0.80** | **Average 35.7** | **D** | **-** |

## Marquis Drive and Arthur Rose Avenue

| Movement | | Weekday AM Peak Hour | | | | Weekday PM Peak Hour | | | |
|---|---|---|---|---|---|---|---|---|---|
| | | v/c ratio | Delay (s) | LOS | Queue (m) | v/c ratio | Delay (s) | LOS | Queue (m) |
| SB | LT/Thru/RT | 0.05 | 5.1 | A | 5.1 | 0.10 | 6.4 | A | 7.9 |
| NB | LT/Thru/RT | 0.29 | 10.9 | B | 22.9 | 0.24 | 8.6 | A | 16.2 |
| EB | LT | 0.54 | 29.6 | C | 21.1 | 0.09 | 12.9 | B | 7.0 |
| | Thru/RT | 0.23 | 7.2 | A | 10.7 | 0.91 | 28.7 | C | 88.2 |
| WB | LT | 0.14 | 13.6 | B | 8.5 | 0.34 | 21.7 | C | 11.1 |
| | Thru/RT | 0.69 | 19.0 | B | 46.8 | 0.20 | 13.0 | B | 15.5 |
| **Intersection Summary** | | **Ma9 0.63** | **Average 15.7** | **B** | **-** | **Max 0.91** | **Average 23.1** | **C** | **-** |

## Marquis Drive and Idylwyld Drive

| Movement | | Weekday AM Peak Hour | | | | Weekday PM Peak Hour | | | |
|---|---|---|---|---|---|---|---|---|---|
| | | v/c ratio | Delay (s) | LOS | Queue (m) | v/c ratio | Delay (s) | LOS | Queue (m) |
| SB | LT | 0.88 | 100.9 | F | 144.6 | 0.86 | 9104.1 | F | 125.0 |
| | Thru | 0.85 | 40.8 | D | 322.7 | 0.59 | 31.6 | C | 188.6 |
| | RT | 0.08 | 0.9 | A | 2.4 | 0.11 | 3.0 | A | 9.1 |
| NB | LT | 0.47 | 87.2 | F | 32.1 | 0.68 | 90.3 | F | 52.2 |
| | Thru | 0.43 | 36.2 | D | 113.8 | 1.09 | 93.7 | F | 436.7 |
| | RT | 0.34 | 4.2 | A | 19.8 | 0.16 | 5.2 | A | 14.1 |
| EB | LT | 0.30 | 52.7 | D | 35.3 | 1.00 | 113.8 | F | 130.4 |
| | Thru | 1.28 | 204.1 | F | 232.9 | 2.29 | 617.5 | F | 477.8 |
| | RT | 1.28 | 204.1 | F | 232.9 | 2.29 | 617.5 | F | 477.8 |
| WB | LT | 0.56 | 62.5 | E | 46.4 | 0.82 | 87.3 | F | 76.1 |
| | Thru | 0.58 | 67.0 | E | 72.5 | 1.31 | 198.0 | F | 191.4 |
| | RT | 0.58 | 67.0 | E | 72.5 | 1.31 | 198.0 | F | 191.4 |
| **Intersection Summary** | | **Max 1.28** | **Average 59.9** | **E** | **-** | **Max 2.29** | **Average 163.4** | **F** | **-** |

## Marquis Drive and Highway 16

| Movement | | Weekday AM Peak Hour | | | | Weekday PM Peak Hour | | | |
|---|---|---|---|---|---|---|---|---|---|
| | | v/c ratio | Delay (s) | LOS | Queue (m) | v/c ratio | Delay (s) | LOS | Queue (m) |
| SB | LT | 0.62 | 51.6 | D | 57.1 | 0.47 | 48.7 | D | 37.2 |
| | Thru | 0.53 | 36.0 | C | 73.0 | 0.33 | 28.4 | C | 58.9 |
| | RT | 0.53 | 36.0 | C | 73.0 | 0.33 | 28.4 | C | 58.9 |
| NB | LT | 0.36 | 42.5 | D | 37.1 | 0.17 | 41.2 | D | 17.1 |
| | Thru | 0.28 | 32.8 | C | 39.5 | 0.51 | 33.7 | C | 69.1 |
| EB | LT/Thru/RT | 0.56 | 46.4 | D | 51.0 | 0.58 | 40.3 | D | 48.1 |
| WB | LT | 0.17 | 43.1 | D | 17.8 | 0.30 | 43.0 | D | 28.3 |
| | Thru | 0.44 | 48.8 | D | 40.1 | 0.46 | 46.4 | D | 41.0 |
| | RT | 0.26 | 1.7 | A | 0 | 0.54 | 11.5 | B | 21.0 |
| **Intersection Summary** | | **Max 0.62** | **Average 37.4** | **D** | **-** | **Max 0.58** | **Average 32.3** | **C** | **-** |

## 51st Street and Warman Road

| Movement | | Weekday AM Peak Hour | | | | Weekday PM Peak Hour | | | |
|---|---|---|---|---|---|---|---|---|---|
| | | v/c ratio | Delay (s) | LOS | Queue (m) | v/c ratio | Delay (s) | LOS | Queue (m) |
| SB | LT | 0.36 | 60.2 | E | 29.1 | 0.68 | 49.0 | D | 51.3 |
| | Thru | 0.82 | 54.8 | D | 114.6 | 0.75 | 57.1 | E | 118.0 |
| | RT | 0.65 | 21.2 | C | 63.9 | 0.41 | 7.8 | A | 22.1 |
| NB | LT | 0.75 | 53.0 | D | 87.7 | 0.71 | 64.4 | E | 78.4 |
| | Thru | 0.39 | 29.0 | C | 67.9 | 0.81 | 52.1 | D | 153.5 |
| | RT | 0.19 | 1.9 | A | 5.9 | 0.68 | 23.5 | C | 91.5 |
| EB | LT | 0.46 | 32.2 | C | 41.9 | 0.71 | 17.0 | B | 42.4 |
| | Thru | 0.36 | 30.8 | C | 34.8 | 0.60 | 26.8 | C | 105.0 |
| | RT | 0.36 | 30.8 | C | 34.8 | 1.11 | 69.0 | E | 201.1 |
| WB | LT | 0.64 | 34.1 | C | 73.7 | 0.62 | 36.1 | D | 48.7 |
| | Thru | 0.51 | 38.3 | D | 79.5 | 0.33 | 40.9 | D | 66.3 |
| | RT | 0.51 | 38.3 | D | 79.5 | 0.24 | 2.3 | A | 5.0 |
| **Intersection Summary** | | **Max 0.82** | **Average 38.3** | **D** | **-** | **Max 1.11** | **Average 44.0** | **D** | **-** |

## 51st Street and Millar Avenue

| Movement | | Weekday AM Peak Hour | | | | Weekday PM Peak Hour | | | |
|---|---|---|---|---|---|---|---|---|---|
| | | v/c ratio | Delay (s) | LOS | Queue (m) | v/c ratio | Delay (s) | LOS | Queue (m) |
| SB | LT | 0.78 | 52.7 | D | 86.2 | 1.83 | 412.9 | F | 279.5 |
| | Thru | | | | | | | | |
| | RT | | | | | | | | |
| NB | LT | 0.84 | 60.4 | E | 95.2 | 2.05 | 326.3 | F | 184.8 |
| | Thru | | | | | | | | |
| | RT | | | | | | | | |
| EB | LT | 0.84 | 64.4 | E | 78.2 | 0.62 | 36.3 | D | 44.4 |
| | Thru | 0.35 | 32.6 | C | 50.4 | 0.93 | 57.5 | E | 193.5 |
| | RT | 0.35 | 32.6 | C | 50.4 | 0.93 | 57.5 | E | 193.5 |
| WB | LT | 0.53 | 15.0 | B | 36.8 | 0.62 | 46.8 | D | 48.4 |
| | Thru | 0.81 | 27.1 | C | 135.5 | 0.54 | 54.3 | D | 114.3 |
| | RT | 0.81 | 27.1 | C | 135.5 | 0.54 | 54.3 | D | 114.3 |
| **Intersection Summary** | | **Max 0.84** | **Average 38.7** | **D** | **-** | **Max 1.83** | **Average 177.5** | **F** | **-** |

## Circle Drive and Idylwyld Drive

| Movement | | Weekday AM Peak Hour | | | | Weekday PM Peak Hour | | | |
|---|---|---|---|---|---|---|---|---|---|
| | | v/c ratio | Delay (s) | LOS | Queue (m) | v/c ratio | Delay (s) | LOS | Queue (m) |
| SB | LT | 0.65 | 65.1 | E | 64.4 | 0.63 | 60.7 | E | 73.8 |
| | RT | 0.24 | 1.7 | A | 0 | 0.53 | 20.8 | C | 36.5 |
| NB | LT | 0.72 | 86.1 | F | 52.2 | 0.72 | 76.4 | E | 75.6 |
| | RT | 0.62 | 34.4 | C | 36.7 | 0.67 | 41.8 | D | 56.4 |
| EB | LT | 0.60 | 59.9 | E | 78.5 | 0.53 | 62.7 | E | 74.6 |
| | Thru | 0.58 | 4.5 | A | 52.6 | 0.68 | 18.0 | B | 42.5 |
| | RT | 0.71 | 10.5 | B | 45.6 | 0.68 | 18.0 | B | 42.5 |
| WB | LT | 0.63 | 66.2 | E | 52.3 | 0.70 | 49.9 | E | 48.8 |
| | Thru | 0.61 | 27.1 | C | 60.0 | 1.05 | 71.1 | F | 177.0 |
| | RT | 0.61 | 27.1 | C | 60.0 | 1.05 | 71.1 | F | 177.0 |
| **Intersection Summary** | | **Max 0.72** | **Average 20.7** | **C** | **-** | **Max 1.05** | **Average 55.0** | **E** | **-** |

## Attridge Drive and Central Avenue

| Movement | | Weekday AM Peak Hour | | | | Weekday PM Peak Hour | | | |
|---|---|---|---|---|---|---|---|---|---|
| | | v/c ratio | Delay (s) | LOS | Queue (m) | v/c ratio | Delay (s) | LOS | Queue (m) |
| SB | LT | 0.10 | 62.2 | E | 12.4 | 0.42 | 88.5 | F | 68.3 |
| | Thru | 0.43 | 67.6 | E | 32.2 | 0.53 | 87.2 | F | 77.8 |
| | RT | 0.71 | 2.8 | A | 0 | 0.85 | 25.0 | C | 73.7 |
| NB | LT | 0.83 | 80.0 | E | 121.2 | 0.75 | 100.9 | F | 143.4 |
| | Thru | 0.80 | 66.7 | E | 97.1 | 0.74 | 87.4 | E | 124.4 |
| | RT | 0.80 | 66.7 | E | 97.1 | 0.74 | 87.4 | D | 124.4 |
| EB | LT | 0.68 | 74.9 | E | 37.0 | 0.81 | 80.2 | F | 193.1 |
| | Thru | 0.36 | 23.9 | C | 84.4 | 0.99 | 72.9 | E | 578.4 |
| | RT | 0.19 | 3.6 | A | 13.1 | 0.92 | 54.2 | D | 457.8 |
| WB | LT | 0.20 | 54.3 | D | 7.7 | 0.32 | 82.1 | F | 58.5 |
| | Thru | 0.88 | 33.0 | C | 290.4 | 0.79 | 65.4 | E | 325.3 |
| | RT | 0.05 | 0.1 | A | 0 | 0.08 | 5.0 | A | 5.8 |
| **Intersection Summary** | | **Max 0.88** | **Average 33.0** | **C** | **-** | **Max 0.99** | **Average 68.2** | **E** | **-** |

## Attridge Drive and Berini Drive

| Movement | | Weekday AM Peak Hour | | | | Weekday PM Peak Hour | | | |
|---|---|---|---|---|---|---|---|---|---|
| | | v/c ratio | Delay (s) | LOS | Queue (m) | v/c ratio | Delay (s) | LOS | Queue (m) |
| SB | LT | 0.43 | 45.6 | D | 20.8 | 0.28 | 52.3 | D | 16.6 |
| | Thru | 0.59 | 18.7 | B | 23.1 | 0.46 | 22.1 | C | 17.4 |
| | RT | 0.59 | 18.7 | B | 23.1 | 0.46 | 22.1 | C | 17.4 |
| NB | LT | 0.83 | 51.1 | D | 53.3 | 0.51 | 42.0 | D | 41.0 |
| | Thru | 0.25 | 24.3 | C | 25.7 | 0.05 | 33.0 | C | 7.9 |
| | RT | 0.16 | 4.4 | A | 25.7 | 0.28 | 7.8 | A | 14.2 |
| EB | LT | 0.56 | 21.6 | C | 29.7 | 0.36 | 9.6 | A | 16.8 |
| | Thru | 0.50 | 19.7 | B | 72.7 | 0.85 | 27.8 | C | 207.8 |
| | RT | 0.50 | 19.7 | B | 72.7 | 0.85 | 27.8 | C | 207.8 |
| WB | LT | 0.22 | 10.4 | B | 12.5 | 0.48 | 34.4 | C | 18.9 |
| | Thru | 0.83 | 26.8 | C | 150.6 | 0.51 | 9.1 | A | 75.2 |
| | RT | 0.20 | 3.3 | A | 6.1 | 0.51 | 0.2 | A | 0.2 |
| **Intersection Summary** | | **Max 0.83** | **Average 24.0** | **C** | **-** | **Max 0.85** | **Average 21.4** | **C** | **-** |

## McOrmond Drive and Kerr Road/Stensrud Road

| Movement | | Weekday AM Peak Hour | | | | Weekday PM Peak Hour | | | |
|---|---|---|---|---|---|---|---|---|---|
| | | v/c ratio | Delay (s) | LOS | Queue (m) | v/c ratio | Delay (s) | LOS | Queue (m) |
| SB (McOrmond Dr) | LT | 0.12 | 12.2 | B | 10.2 | 0.46 | 16.8 | B | 25.4 |
| | Thru | 0.59 | 26.5 | C | 76.1 | 0.61 | 34.1 | C | 104.4 |
| | RT | 0.08 | 0.2 | A | 0 | 0.25 | 7.4 | A | 16.9 |
| NB (McOrmond Dr) | LT | 0.36 | 14.6 | B | 20.8 | 0.74 | 22.2 | C | 106.1 |
| | Thru | 0.38 | 21.6 | C | 51.1 | 0.58 | 19.7 | B | 119.4 |
| | RT | 0.18 | 4.6 | A | 10.7 | 0.48 | 5.1 | A | 33.8 |
| EB (Kerr Rd) | LT | 0.19 | 19.4 | B | 21.9 | 0.27 | 34.1 | C | 28.6 |
| | Thru | 0.05 | 17.5 | B | 9.8 | 0.16 | 31.6 | C | 23.4 |
| | RT | 0.53 | 4.3 | A | 18.4 | 0.47 | 6.7 | A | 19.1 |
| WB (Stensrud Rd) | LT | 0.75 | 34.2 | C | 94.2 | 0.72 | 48.8 | D | 72.4 |
| | Thru | 0.06 | 17.6 | B | 10.9 | 0.14 | 31.4 | C | 21.5 |
| | RT | 0.27 | 4.0 | A | 12.5 | 0.23 | 5.9 | A | 10.4 |
| **Intersection Summary** | | **Max 0.75** | **Average 18.7** | **B** | **-** | **Max 0.74** | **Average 21.4** | **C** | **-** |

# Appendix 2: Intersection Analysis – Unsignalized Intersections

## McOrmond Drive and Stensrud Road (north intersection)

| Movement | | Weekday AM Peak Hour | | | | Weekday PM Peak Hour | | | |
|---|---|---|---|---|---|---|---|---|---|
| | | v/c ratio | Delay (s) | LOS | Queue (m) | v/c ratio | Delay (s) | LOS | Queue (m) |
| SB | LT | 0.02 | 8.3 | A | 0.6 | 0.09 | 9.8 | A | 2.2 |
| | Thru | 0.17 | 0 | A | 0 | 0.24 | 0 | A | 0 |
| NB | Thru | 0.12 | 0 | A | 0 | 0.24 | 0 | A | 0 |
| | RT | 0.02 | 0 | A | 0 | 0.08 | 0 | A | 0 |
| WB | LT | 0.42 | 23.8 | C | 15.3 | 0.52 | 59.9 | F | 18.7 |
| | RT | 0.09 | 10.0 | A | 2.3 | 0.11 | 11.7 | B | 2.8 |
| **Intersection Summary** | | **Max 0.42** | **Average 3.3** | **A** | **-** | **Max 0.52** | **Average 2.8** | **A** | **-** |

## Central Avenue and Reid Road/Rossmo Road

| Movement | | Weekday AM Peak Hour | | | | Weekday PM Peak Hour | | | |
|---|---|---|---|---|---|---|---|---|---|
| | | v/c ratio | Delay (s) | LOS | Queue (m) | v/c ratio | Delay (s) | LOS | Queue (m) |
| SB | LT/Thru | 0.03 | 1.1 | A | 0.7 | 0.18 | 4.2 | A | 4.9 |
| | RT | 0.03 | 0 | A | 0 | 0.07 | 0 | A | 0 |
| NB | LT/Thru/RT | 0.01 | 0.2 | A | 0.2 | 0.05 | 1.2 | A | 1.1 |
| EB | LT/Thru/RT | 0.52 | 44.8 | E | 20.1 | 1.17 | 251.6 | F | 50.4 |
| WB | LT/Thru/RT | 0.28 | 16.3 | C | 8.6 | 0.36 | 33.0 | D | 50.4 |
| **Intersection Summary** | | **Max 0.52** | **Average 5.5** | **A** | **-** | **Max 1.17** | **Average 16.5** | **C** | **-** |

## Lowe Road and Nelson Road

| Movement | | Weekday AM Peak Hour | | | | Weekday PM Peak Hour | | | |
|---|---|---|---|---|---|---|---|---|---|
| | | v/c ratio | Delay (s) | LOS | Queue (m) | v/c ratio | Delay (s) | LOS | Queue (m) |
| SB | LT/Thru/RT | NA | 24.7 | C | NA | NA | 15.7 | C | NA |
| NB | LT/Thru/RT | NA | 14.2 | B | NA | NA | 26.1 | D | NA |
| EB | LT/Thru/RT | NA | 14.7 | B | NA | NA | 12.7 | B | NA |
| WB | LT/Thru/RT | NA | 16.9 | C | NA | NA | 19.3 | C | NA |
| **Intersection Summary** | | **0.61** | **18.9** | **C** | **NA** | **0.63** | **20.4** | **C** | **NA** |

## Lowe Road and Ludlow Street

| Movement | | Weekday AM Peak Hour | | | | Weekday PM Peak Hour | | | |
|---|---|---|---|---|---|---|---|---|---|
| | | v/c ratio | Delay (s) | LOS | Queue (m) | v/c ratio | Delay (s) | LOS | Queue (m) |
| SB | All movements | 0.02 | 0.6 | A | 0 | 0.04 | 1.3 | A | 1 |
| NB | LT / Thru | 0.16 | 5.0 | A | 4 | 0.01 | 0.3 | A | 0 |
| | RT | 0.07 | 0 | A | 0 | 0.09 | 0 | A | 0 |
| EB | All movements | 0.11 | 13.4 | B | 3 | 0.07 | 12.9 | B | 2 |
| WB | All movements | 0.34 | 36.8 | E | 10 | 0.71 | 45.6 | E | 37 |
| **Intersection Summary** | | **0.60** | **4.8** | **B** | **NA** | **0.62** | **8.7** | **B** | **NA** |

## Kerr Road and Kenderdine Road

| Movement | | Weekday AM Peak Hour | | | | Weekday PM Peak Hour | | | |
|---|---|---|---|---|---|---|---|---|---|
| | | v/c ratio | Delay (s) | LOS | Queue (m) | v/c ratio | Delay (s) | LOS | Queue (m) |
| SEB (Kenderdine Rd) | LT/Thru/RT | 0.10 | 9.0 | A | - | 0.34 | 13.5 | B | - |
| NWB (Kenderdine Rd) | LT/Thru/RT | 0.44 | 10.8 | B | - | 0.42 | 13.8 | B | - |
| NEB (Kerr Rd) | LT | 0.18 | 8.8 | A | - | 0.21 | 10.7 | B | - |
| | Thru/RT | 0.18 | 8.7 | A | - | 0.20 | 10.4 | B | - |
| SWB (Kerr Rd) | LT/Thru | 0.17 | 9.2 | A | - | 1.02 | 68.3 | F | - |
| | RT | 0.02 | 7.1 | A | - | 0.10 | 8.1 | A | - |
| **Intersection Summary** | | **Max 0.44** | **Average 9.8** | **A** | **-** | **Max 1.02** | **Average 37.1** | **E** | **-** |

# Appendix 3: Traffic Signal Warrants

## McOrmond Drive and Stensrud Road (north intersection)

| | | | | | |
|---|---|---|---|---|---|
| Main Street (name) | McOrmond Dr | Direction (EW or NS) | NS | Road Authority: | City of Saskatoon |
| Side Street (name) | Stensrud (north) | Direction (EW or NS) | EW | City: | Saskatoon |
| Quadrant / Int # | | Comments | | Analysis Date: | 2019 Sep 11, Wed |
| for Warrant Calculation Results, please hit 'Page Down' | CHECK SHEET | | | Count Date: | 2019 Apr 18, Thu |
| | | | | Date Entry Format: | (yyyy-mm-dd) |

| Lane Configuration | | Exd LT | Th & LT | Through | Th+RT+LT | Th & RT | Exd RT | UpStream Signal (m) | # of Thru Lanes |
|---|---|---|---|---|---|---|---|---|---|
| McOrmond Dr | NB | | | 2 | | 1 | | | 3 |
| McOrmond Dr | SB | 1 | | 2 | | | | | 2 |
| Stensrud (north) | WB | 1 | | | | | 1 | | |
| Stensrud (north) | EB | | | | | | | | |
| | | | | | | | n | | |
| | | | | | | | n | | |

| Demographics | | |
|---|---|---|
| Elem. School/Mobility Challenged | (y/n) | n |
| Senior's Complex | (y/n) | n |
| Pathway to School | (y/n) | n |
| Metro Area Population | (#) | 250,000 |
| Central Business District | (y/n) | n |

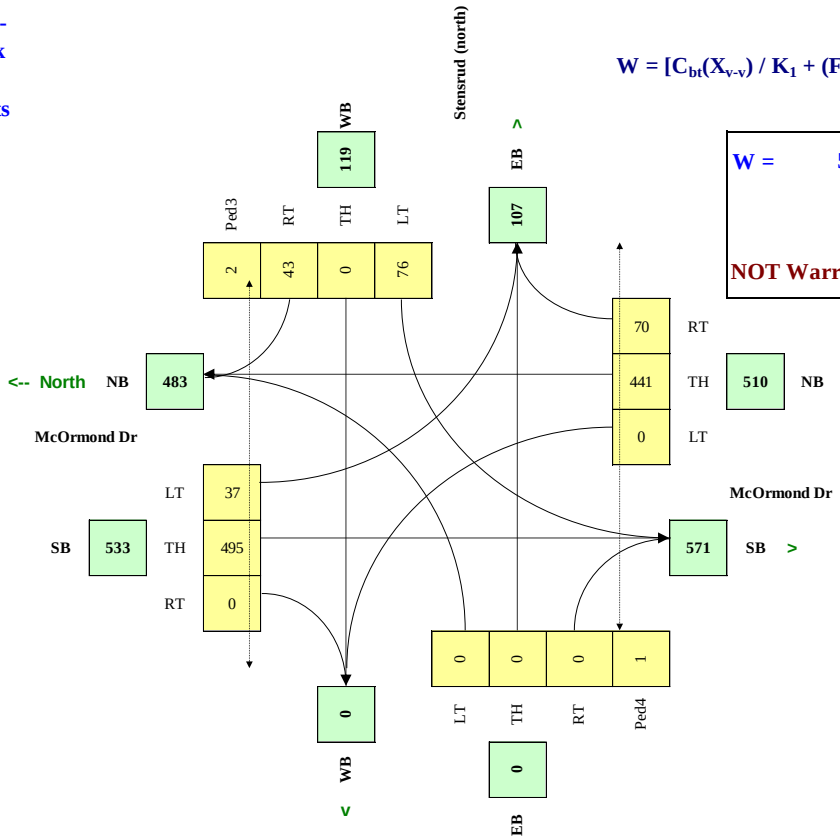
| Other input | | Speed (Km/h) | Truck % | Bus Rt (y/n) | Median (m) |
|---|---|---|---|---|---|
| McOrmond Dr | NS | 50 | 2.0% | y | 5.0 |
| Stensrud (north) | EW | 50 | 2.0% | y | |

Set Peak Hours

| Traffic Input | NB | | | SB | | | WB | | | EB | | | Ped1 NS | Ped2 NS | Ped3 EW | Ped4 EW |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | LT | Th | RT | LT | Th | RT | LT | Th | RT | LT | Th | RT | W Side | E Side | N Side | S Side |
| 7:00 - 8:00 | | 361 | 16 | 16 | 475 | | 97 | | 73 | | | | | | 4 | 1 |
| 8:00 - 9:00 | | 346 | 52 | 33 | 519 | | 118 | | 38 | | | | | | 3 | 1 |
| 11:30 - 12:30 | | 313 | 64 | 22 | 359 | | 50 | | 27 | | | | | | 1 | |
| 12:30 - 13:30 | | 311 | 52 | 20 | 345 | | 62 | | 22 | | | | | | 4 | |
| 4:00 - 5:00 | | 601 | 125 | 64 | 645 | | 67 | | 61 | | | | | | | |
| 5:00 - 6:00 | | 711 | 109 | 69 | 628 | | 61 | | 35 | | | | | | | 2 |
| Total (6-hour peak) | 0 | 2,643 | 418 | 224 | 2,971 | 0 | 455 | 0 | 256 | 0 | 0 | 0 | 0 | 0 | 12 | 4 |
| Average (6-hour peak) | 0 | 441 | 70 | 37 | 495 | 0 | 76 | 0 | 43 | 0 | 0 | 0 | 0 | 0 | 2 | 1 |

**Average 6-hour Peak Turning Movements**

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




| W = | 56 | 55 | 1 |
|---|---|---|---|
| | | *Veh* | *Ped* |

**NOT Warranted**

RESET SHEET

# Central Avenue and Reid Road/Rossmo Road

| | | | | | |
|---|---|---|---|---|---|
| Main Street (name) | Central Ave | Direction (EW or NS) | NS | Road Authority: | City of Saskatoon |
| Side Street (name) | Reid Rd/Rossmo Rd | Direction (EW or NS) | EW | City: | Saskatoon |
| Quadrant / Int # | | Comments | | Analysis Date: | 2019 Sep 11, Wed |
| for Warrant Calculation Results, please hit 'Page Down' | CHECK SHEET | | | Count Date: | 2019 Apr 30, Tue |
| | | | | Date Entry Format: | (yyyy-mm-dd) |

| Lane Configuration | | Excl LT | Th & LT | Through | Th+RT+LT | Th & RT | Excl RT | UpStream Signal (m) | # of Thru Lanes |
|---|---|---|---|---|---|---|---|---|---|
| Central Ave | NB | | 1 | | | 1 | | | 2 |
| Central Ave | SB | | 1 | | | | 1 | | 1 |
| Reid Rd/Rossmo Rd | WB | | | | 1 | | | | |
| Reid Rd/Rossmo Rd | EB | | | | 1 | | | | |
| Are the Reid Rd/Rossmo Rd WB right turns significantly impeded by through movements? (y/n) | | | | | | | n | | |
| Are the Reid Rd/Rossmo Rd EB right turns significantly impeded by through movements? (y/n) | | | | | | | n | | |

| Demographics | | |
|---|---|---|
| Elem. School/Mobility Challenged | (y/n) | n |
| Senior's Complex | (y/n) | n |
| Pathway to School | (y/n) | n |
| Metro Area Population | (#) | 250,000 |
| Central Business District | (y/n) | n |

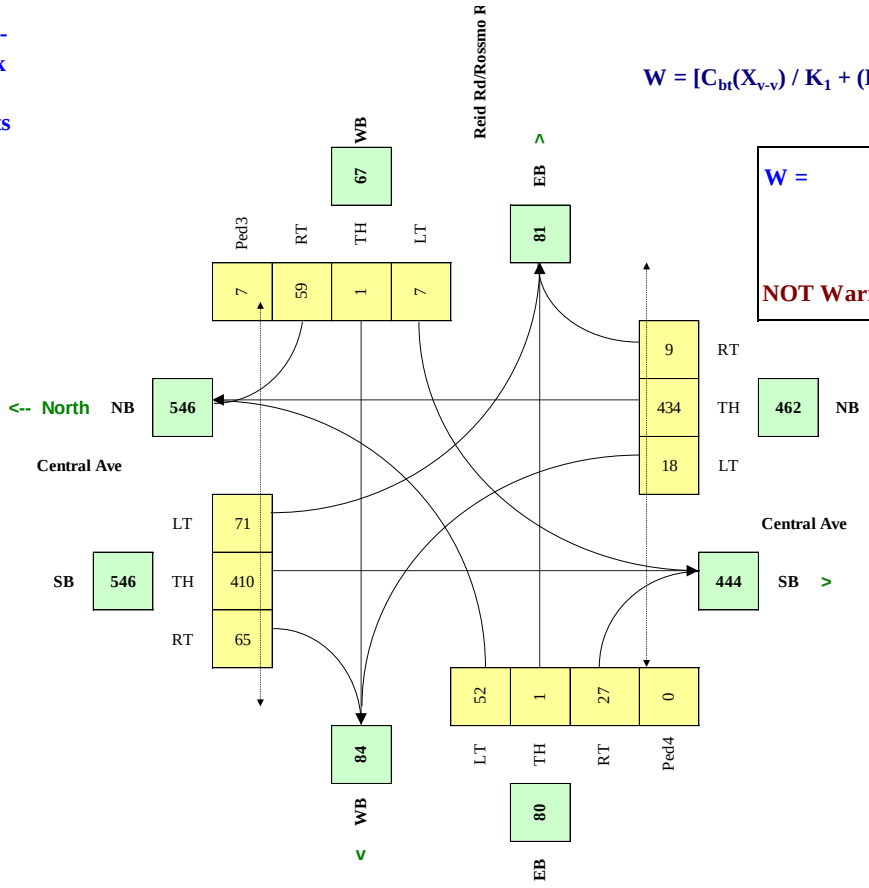
| Other input | | Speed (Km/h) | Truck % | Bus Rt (y/n) | Median (m) |
|---|---|---|---|---|---|
| Central Ave | NS | 50 | 2.0% | y | |
| Reid Rd/Rossmo Rd | EW | 50 | 2.0% | y | |

Set Peak Hours

| Traffic Input | NB | | | SB | | | WB | | | EB | | | Ped1 | Ped2 | Ped3 | Ped4 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | LT | Th | RT | LT | Th | RT | LT | Th | RT | LT | Th | RT | NS | NS | EW | EW |
| | | | | | | | | | | | | | W Side | E Side | N Side | S Side |
| 7:00 - 8:00 | 6 | 465 | 3 | 8 | 178 | 15 | 4 | 0 | 90 | 74 | 0 | 26 | 8 | 3 | 6 | 2 |
| 8:00 - 9:00 | 13 | 528 | 5 | 28 | 266 | 48 | 6 | 0 | 96 | 56 | 2 | 28 | 3 | 3 | 12 | |
| 11:30 - 12:30 | 15 | 402 | 9 | 44 | 366 | 59 | 9 | 1 | 27 | 48 | 1 | 17 | 1 | 4 | 6 | |
| 12:30 - 13:30 | 17 | 360 | 10 | 45 | 372 | 40 | 7 | 2 | 50 | 46 | 1 | 16 | 4 | 0 | 3 | |
| 4:00 - 5:00 | 29 | 387 | 12 | 136 | 628 | 121 | 7 | 0 | 36 | 43 | 1 | 32 | 1 | 5 | 7 | |
| 5:00 - 6:00 | 28 | 464 | 16 | 165 | 647 | 107 | 10 | 2 | 57 | 46 | 0 | 44 | 2 | 2 | 6 | |
| **Total (6-hour peak)** | **108** | **2,606** | **55** | **426** | **2,457** | **390** | **43** | **5** | **356** | **313** | **5** | **163** | **19** | **17** | **40** | **2** |
| **Average (6-hour peak)** | **18** | **434** | **9** | **71** | **410** | **65** | **7** | **1** | **59** | **52** | **1** | **27** | **3** | **3** | **7** | **0** |

**Average 6-hour Peak Turning Movements**

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




| W = | 73 | 65 | 8 |
|---|---|---|---|
| | | *Veh* | *Ped* |

**NOT Warranted**

RESET SHEET

# Lowe Road and Nelson Road

| | | | | | |
|---|---|---|---|---|---|
| Main Street (name) | Nelson | Direction (EW or NS) | EW | Road Authority: | City of Saskatoon |
| Side Street (name) | Lowe | Direction (EW or NS) | NS | City: | Saskatoon |
| Quadrant / Int # | | Comments | | Analysis Date: | 2019 Aug 27, Tue |
| for Warrant Calculation Results, please hit 'Page Down' | CHECK SHEET | | | Count Date: | 2019 Apr 16, Tue |
| | | | | Date Entry Format: | (yyyy-mm-dd) |

| Lane Configuration | | Excl LT | Th & LT | Through | Th+RT+LT | Th & RT | Excl RT | UpStream Signal (m) | # of Thru Lanes |
|---|---|---|---|---|---|---|---|---|---|
| Nelson | WB | | | | 1 | | | | 1 |
| Nelson | EB | | | | 1 | | | | 1 |
| Lowe | NB | | | | 1 | | | | |
| Lowe | SB | | | | 1 | | | | |

| | |
|---|---|
| Are the Lowe NB right turns significantly impeded by through movements? (y/n) | n |
| Are the Lowe SB right turns significantly impeded by through movements? (y/n) | n |

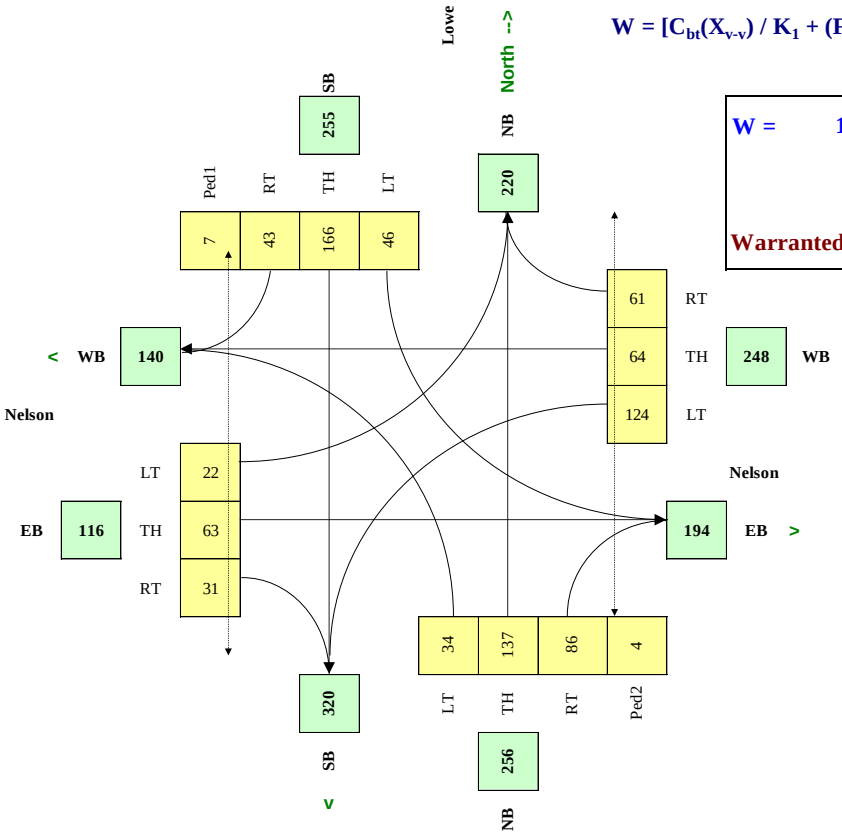
| Demographics | | |
|---|---|---|
| Elem. School/Mobility Challenged | (y/n) | n |
| Senior's Complex | (y/n) | n |
| Pathway to School | (y/n) | n |
| Metro Area Population | (#) | 250,000 |
| Central Business District | (y/n) | n |

| Other input | | Speed (Km/h) | Truck % | Bus Rt (y/n) | Median (m) |
|---|---|---|---|---|---|
| Nelson | EW | 50 | 20.0% | y | |
| Lowe | NS | 50 | 10.0% | y | |

Set Peak Hours

| Traffic Input | NB | | | SB | | | WB | | | EB | | | Ped1 | Ped2 | Ped3 | Ped4 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | LT | Th | RT | LT | Th | RT | LT | Th | RT | LT | Th | RT | NS | NS | EW | EW |
| | | | | | | | | | | | | | W Side | E Side | N Side | S Side |
| 7:00 - 8:00 | 13 | 48 | 21 | 45 | 215 | 27 | 76 | 37 | 18 | 4 | 19 | 7 | 3 | 3 | 4 | 3 |
| 8:00 - 9:00 | 68 | 80 | 61 | 41 | 226 | 142 | 100 | 134 | 27 | 38 | 107 | 72 | 6 | 1 | 8 | 43 |
| 11:30 - 12:30 | 21 | 130 | 94 | 44 | 125 | 9 | 119 | 32 | 56 | 28 | 71 | 39 | 10 | 4 | 22 | 10 |
| 12:30 - 13:30 | 38 | 105 | 93 | 34 | 151 | 32 | 173 | 74 | 58 | 14 | 46 | 25 | 11 | 6 | 21 | 22 |
| 4:00 - 5:00 | 22 | 223 | 125 | 60 | 132 | 15 | 125 | 44 | 90 | 37 | 66 | 15 | 4 | 6 | 23 | 14 |
| 5:00 - 6:00 | 41 | 235 | 120 | 49 | 148 | 32 | 149 | 60 | 115 | 13 | 68 | 25 | 9 | 4 | 27 | 17 |
| **Total (6-hour peak)** | **203** | **821** | **514** | **273** | **997** | **257** | **742** | **381** | **364** | **134** | **377** | **183** | **43** | **24** | **105** | **109** |
| **Average (6-hour peak)** | **34** | **137** | **86** | **46** | **166** | **43** | **124** | **64** | **61** | **22** | **63** | **31** | **7** | **4** | **18** | **18** |

**Average 6-hour Peak Turning Movements**




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

| W = | 112 | 108 | 4 |
|---|---|---|---|
| | | *Veh* | *Ped* |

**Warranted**

RESET SHEET

# Lowe Road and Ludlow Street

| | | | |
|---|---|---|---|
| Main Street (name) | Lowe Rd | Direction (EW or NS) | NS |
| Side Street (name) | Ludlow St | Direction (EW or NS) | EW |
| Quadrant / Int # | | Comments | |
| for Warrant Calculation Results, please hit 'Page Down' | CHECK SHEET | | |

| | | | |
|---|---|---|---|
| Road Authority: | City of Saskatoon | | |
| City: | Saskatoon | | |
| Analysis Date: | 2019 Sep 11, Wed | | |
| Count Date: | 2019 Apr 17, Wed | | |
| Date Entry Format: | (yyyy-mm-dd) | | |

| Lane Configuration | | Excl LT | Th & LT | Through | Th+RT+LT | Th & RT | Excl RT | UpStream Signal (m) | # of Thru Lanes |
|---|---|---|---|---|---|---|---|---|---|
| Lowe Rd | NB | | 1 | | | | 1 | | 1 |
| Lowe Rd | SB | | | | 1 | | | | 1 |
| Ludlow St | WB | | | | 1 | | | | |
| Ludlow St | EB | | | | 1 | | | | |
| Are the Ludlow St WB right turns significantly impeded by through movements? (y/n) | | | | | | | n | | |
| Are the Ludlow St EB right turns significantly impeded by through movements? (y/n) | | | | | | | y | | |

| Demographics | | |
|---|---|---|
| Elem. School/Mobility Challenged | (y/n) | n |
| Senior's Complex | (y/n) | n |
| Pathway to School | (y/n) | y |
| Metro Area Population | (#) | 250,000 |
| Central Business District | (y/n) | n |

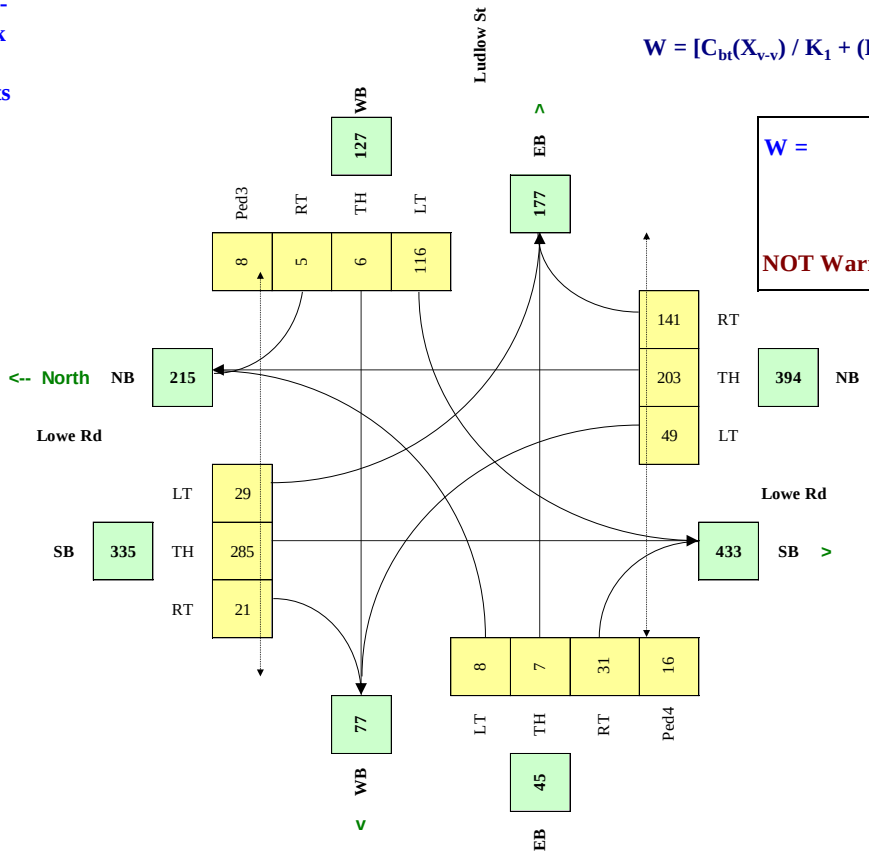
| Other input | | Speed (Km/h) | Truck % | Bus Rt (y/n) | Median (m) |
|---|---|---|---|---|---|
| Lowe Rd | NS | 50 | 2.0% | y | 0.0 |
| Ludlow St | EW | 50 | 2.0% | n | |

Set Peak Hours

| Traffic Input | NB | | | SB | | | WB | | | EB | | | Ped1 | Ped2 | Ped3 | Ped4 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | LT | Th | RT | LT | Th | RT | LT | Th | RT | LT | Th | RT | NS | NS | EW | EW |
| | | | | | | | | | | | | | W Side | E Side | N Side | S Side |
| 7:00 - 8:00 | 11 | 74 | 84 | 16 | 301 | 2 | 48 | 1 | 0 | 0 | 0 | 4 | 4 | 2 | 1 | 2 |
| 8:00 - 9:00 | 165 | 185 | 107 | 19 | 325 | 56 | 47 | 4 | 3 | 2 | 5 | 43 | 4 | 2 | 1 | 6 |
| 11:30 - 12:30 | 17 | 171 | 156 | 32 | 252 | 4 | 143 | 10 | 8 | 16 | 6 | 61 | 15 | 3 | 11 | 15 |
| 12:30 - 13:30 | 70 | 173 | 195 | 42 | 289 | 47 | 148 | 18 | 7 | 13 | 18 | 37 | 26 | 10 | 25 | 67 |
| 4:00 - 5:00 | 11 | 285 | 170 | 28 | 263 | 2 | 180 | 1 | 4 | 8 | 5 | 22 | 21 | 6 | 6 | 3 |
| 5:00 - 6:00 | 21 | 331 | 135 | 39 | 280 | 15 | 132 | 4 | 5 | 6 | 5 | 20 | 1 | 8 | 1 | 2 |
| **Total (6-hour peak)** | **295** | **1,219** | **847** | **176** | **1,710** | **126** | **698** | **38** | **27** | **45** | **39** | **187** | **71** | **31** | **45** | **95** |
| **Average (6-hour peak)** | **49** | **203** | **141** | **29** | **285** | **21** | **116** | **6** | **5** | **8** | **7** | **31** | **12** | **5** | **8** | **16** |

**Average 6-hour Peak Turning Movements**

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




| W = | 86 | 67 | 19 |
|---|---|---|---|
| | | *Veh* | *Ped* |

**NOT Warranted**

RESET SHEET

# Kerr Road and Kenderdine Road

| | | | | | |
|---|---|---|---|---|---|
| Main Street (name) | Kerr | Direction (EW or NS) | EW | Road Authority: | City of Saskatoon |
| Side Street (name) | Kenderdine | Direction (EW or NS) | NS | City: | Saskatoon |
| Quadrant / Int # | | Comments | | Analysis Date: | 2019 Sep 11, Wed |
| for Warrant Calculation Results, please hit 'Page Down' | CHECK SHEET | | | Count Date: | 2019 Jul 09, Tue |
| | | | | Date Entry Format: | (yyyy-mm-dd) |

| Lane Configuration | | Excl LT | Th & LT | Through | Th+RT+LT | Th & RT | Excl RT | UpStream Signal (m) | # of Thru Lanes |
|---|---|---|---|---|---|---|---|---|---|
| Kerr | WB | | 1 | | | | 1 | | 1 |
| Kerr | EB | | 1 | | | 1 | | | 2 |
| Kenderdine | NB | | | | 1 | | | | |
| Kenderdine | SB | | | | 1 | | | | |
| Are the Kenderdine NB right turns significantly impeded by through movements? (y/n) | | | | | | | y | | |
| Are the Kenderdine SB right turns significantly impeded by through movements? (y/n) | | | | | | | n | | |

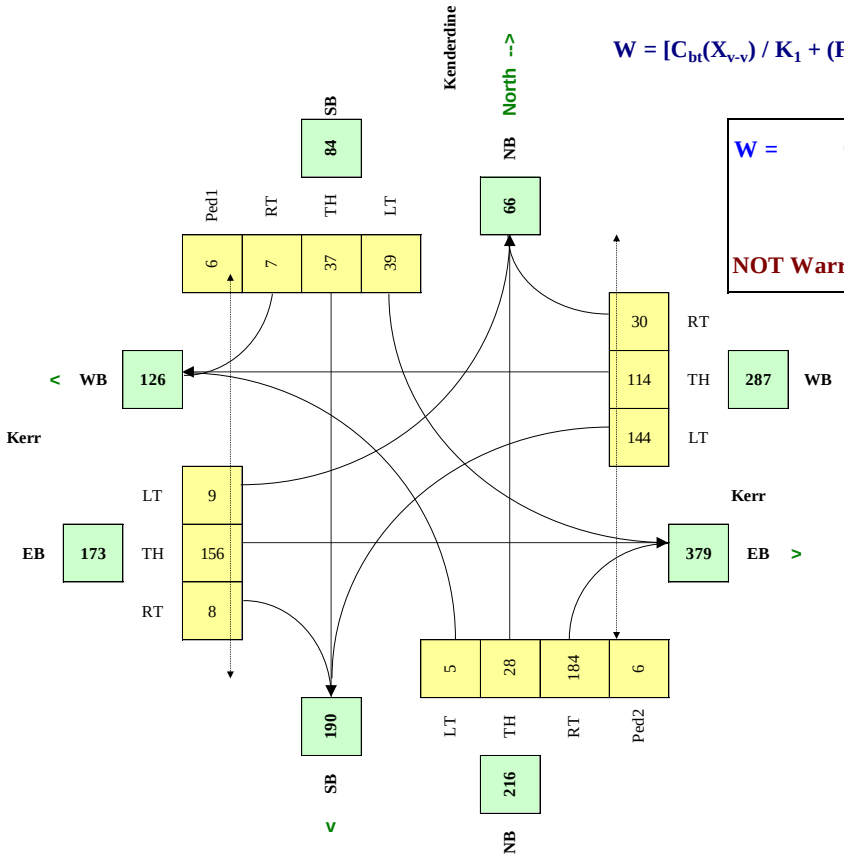
| Demographics | | |
|---|---|---|
| Elem. School/Mobility Challenged | (y/n) | n |
| Senior's Complex | (y/n) | n |
| Pathway to School | (y/n) | n |
| Metro Area Population | (#) | 250,000 |
| Central Business District | (y/n) | n |

| Other input | | Speed (Km/h) | Truck % | Bus Rt (y/n) | Median (m) |
|---|---|---|---|---|---|
| Kerr | EW | 50 | 2.0% | y | 0.0 |
| Kenderdine | NS | 50 | 2.0% | n | |

Set Peak Hours

| Traffic Input | NB | | | SB | | | WB | | | EB | | | Ped1 | Ped2 | Ped3 | Ped4 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | LT | Th | RT | LT | Th | RT | LT | Th | RT | LT | Th | RT | NS | NS | EW | EW |
| | | | | | | | | | | | | | W Side | E Side | N Side | S Side |
| 7:00 - 8:00 | 5 | 25 | 297 | 40 | 10 | 2 | 38 | 39 | 10 | 4 | 183 | 6 | 9 | 2 | 6 | 3 |
| 8:00 - 9:00 | 5 | 32 | 220 | 28 | 18 | 3 | 69 | 57 | 18 | 9 | 183 | 3 | 8 | 4 | 5 | |
| 11:30 - 12:30 | 3 | 23 | 114 | 32 | 30 | 10 | 122 | 102 | 30 | 9 | 110 | 8 | 5 | 3 | 7 | |
| 12:30 - 13:30 | 6 | 8 | 158 | 32 | 26 | 11 | 111 | 98 | 15 | 9 | 165 | 8 | 5 | 5 | 12 | 2 |
| 4:00 - 5:00 | 7 | 32 | 149 | 37 | 67 | 14 | 242 | 196 | 49 | 14 | 150 | 12 | 2 | 6 | 8 | |
| 5:00 - 6:00 | 3 | 46 | 165 | 65 | 73 | 3 | 283 | 190 | 55 | 9 | 146 | 12 | 9 | 14 | 6 | |
| **Total (6-hour peak)** | **29** | **166** | **1,103** | **234** | **224** | **43** | **865** | **682** | **177** | **54** | **937** | **49** | **38** | **34** | **44** | **5** |
| **Average (6-hour peak)** | **5** | **28** | **184** | **39** | **37** | **7** | **144** | **114** | **30** | **9** | **156** | **8** | **6** | **6** | **7** | **1** |

**Average 6-hour Peak Turning Movements**




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

| W = | 66 | 60 | 6 |
|---|---|---|---|
| | | *Veh* | *Ped* |

**NOT Warranted**

RESET SHEET

## Appendix 4: Circle Drive and Idylwyld Drive Interchange

Background:

In August 2010, the City of Saskatoon retained Hatch Mott MacDonald to review the design of the Idylwyld Drive/Circle Drive interchange in an effort to identify opportunities to improve its operation and function, as well as the operation and function of the Circle Drive North corridor between Millar Avenue and Avenue C.

The Administration brought a report to the Planning and Operations Committee on March 6, 2012 recommending:

> 1. "That the Idylwyld Drive – Circle Drive Functional Design Study – Final Report be approved in principle; and
>
> 2. That the Administration report further with respect to the funding and/or timing of the implementation of the recommendations from the Idylwyld Drive – Circle Drive Functional Design Study – Final Report."

The Administration proposed the following course of action:

1) That the Administration continue to work with the Province on the development of the Saskatoon Freeway as the preferred commercial vehicle route (to address capacity issues related to truck movements at this interchange).

- The functional planning study is currently underway.

2) That the Administration investigate the potential to improve the Warman Road and 51st Street corridors as a means to relieve the operational problems at the interchange and along the corridor.

- The intersection of Warman Road and 51st Street was improved in 2016.
- The functional planning study for intersection improvements at 51st Street and Millar Avenue will begin stakeholder engagement in 2020.

3) That the Administration create a capital budget submission to undertake short term ramp improvements at the interchange.

- This work was delayed to wait for the opening of the Chief Mistawasis Bridge.

4) That the Administration undertake further investigations into the design of a "Single Point Urban Interchange" at this location.

- This work was delayed to wait for the opening of the Chief Mistawasis Bridge. Table A4-1 illustrates the LOS with existing traffic volumes.

**Table A4-1: Circle Drive and Idylwyld Drive – Single Point Urban Interchange**

| Movement | | Weekday AM Peak Hour | | | | Weekday PM Peak Hour | | | |
|---|---|---|---|---|---|---|---|---|---|
| | | v/c ratio | Delay (s) | LOS | Queue (m) | v/c ratio | Delay (s) | LOS | Queue (m) |
| SB | LT | 0.74 | 48.5 | D | 40.8 | 0.86 | 59.3 | E | 53.5 |
| | Thru | - | - | - | - | - | - | - | - |
| | RT | 0.06 | 0 | A | 0 | 0.13 | 0.2 | A | 0 |
| NB | LT | 0.50 | 43.6 | D | 36.2 | 0.77 | 60.5 | E | 61.1 |
| | Thru | - | - | - | - | - | - | - | - |
| | RT | 0.10 | 0 | A | 0 | 0.13 | 0.2 | A | 0 |
| EB | LT | 0.73 | 49.1 | D | 55.3 | 0.73 | 48.9 | D | 54.8 |
| | Thru | 0.81 | 21.9 | C | 159.0 | 0.78 | 21.9 | C | 115.3 |
| | RT | 0.16 | 2.8 | A | 9.5 | 0.22 | 2.7 | A | 10.6 |
| WB | LT | 0.52 | 45.0 | D | 33.3 | 0.65 | 47.9 | D | 47.1 |
| | Thru | 0.51 | 18.9 | B | 63.6 | 0.81 | 25.4 | C | 123.2 |
| | RT | 0.47 | 3.8 | A | 16.4 | 0.56 | 4.2 | A | 17.8 |
| **Intersection Summary** | | **Max 0.78** | **Average 21.5** | **C** | **-** | **Max 0.81** | **Average 24.0** | **C** | **-** |

5) That the Administration continue to monitor and assess the effects on traffic patterns arising from the completion of Circle Drive South and alternate routing.

- Circle Drive South and the Gordie Howe Bridge opened in 2011 and a follow-up study was completed in 2012.
- The Chief Mistawasis Bridge opened October 2, 2018.

The Administration does not recommend proceeding to the development of a capital project for the short-term ramp improvements at this time. During Phase 1 of the Saskatoon Freeway Functional Planning Study a significant change to the regional highway network is proposed – relocating Highway 11 from Idylwyld Drive to Wanuskewin Road near the northern city limits. This has the potential to move some commercial truck traffic from the Circle Drive and Idylwyld Drive interchange further east to the Warman Road interchange as well as shift some commuter traffic in a similar manner. The Administration is working with the Ministry and the Ministry's consultant on the functional plan for the Saskatoon Freeway, as planning progresses to a recommendation the Administration will revisit the Single Point Urban Interchange at this location.