

## **APPENDIX 12**

### **SIGHTLINE ASSESSMENT STUDY**





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## **Sightline Assessment Study**

King Street (RR81) & Lincoln Avenue, Lincoln, ON.

Final

February 16, 2024

Prepared for:



# **Sightline Assessment Study**

King Street (RR81) & Lincoln  
Avenue, Lincoln, ON.

Final

February 16, 2024



Prepared for:



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RVA 237326

February 16, 2024

Niagara Region  
Public Works  
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**Attention: Melissa Tomascik, C.E.T.**  
**Project Manager, Public Works, Niagara Region**

Dear Ms. Tomascik,

Re: Sightline Assessment Study  
King Street (RR81) & Lincoln Avenue, Lincoln, Ontario.

We are pleased to submit herein the final sightline assessment study completed for King Street (RR81) & Lincoln Avenue, in Lincoln, Ontario. Please find enclosed the final report completed by R.V. Anderson Associates Limited.

If you have any questions, please do not hesitate to contact us.

Yours very truly,

**R.V. ANDERSON ASSOCIATES LIMITED**

Michael Kong, C.E.T.  
Transportation Planner

Altaf Hussain, P.Eng.  
Manager, Transportation Planning

Encls.

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## **Sightline Assessment Study**

King Street (RR81) & Lincoln Avenue, Lincoln, ON.

**Final**

Niagara Region

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**RVA 237326**

**February 16, 2024**



**SIGHTLINE ASSESSMENT STUDY**  
**KING STREET (RR81) & LINCOLN AVENUE**  
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## EXECUTIVE SUMMARY

R.V. Anderson Associates Limited (RVA) was retained by Niagara Region (the Region) to prepare a Sightline Assessment Study that reviews the existing driver sightlines for all four (4) vehicular approaches. The subject intersection is King Street (RR81) & Lincoln Avenue, situated in the Town of Lincoln, Ontario, as seen in **Figure ES 1.1 – Study Intersection**.



**Figure ES 1.1 – Study Intersection**

As noted in **Figure ES 1.1 – Study Intersection**, the intersection exhibits a skewed alignment, where an approximate deflection of 63 degrees and an offset of 2.5 metres exists. In addition, physical sightline obstructions are noted in all four (4) corners of the intersection, including: (1) a residential property that is located in the northeast corner, (2) restaurant signage in the northwest corner, (3) vegetation in the southeast corner, and (4) parked vehicles in the southwest corner.

The study was completed in accordance with the *Transportation Association of Canada (TAC)* guidelines, which outline minimum driver sight distances for major approach and minor approach turning movements. For this intersection, the existing gradients and design speeds result in minimum driver sight distances of 180 metres; however, as a conservative approach, the analysis considers the presence of auxiliary left-turn lanes along King Street (RR81) as per the draft detailed design drawings that have been completed as part of the ongoing King Street (RR81) Road

Reconstruction project, and therefore adopts an enhanced sight distance requirement of 190 metres for left turn movements from the minor approaches.

The results of the study conclude that sufficient driver sight distances exist for left turn movements along King Street (i.e., left turn from King Street to Lincoln Avenue). However, drivers situated at the stop bar along the minor approaches are not provided sufficient sight distances. The field investigation found that the only scenario where drivers are afforded sufficient sight distances along Lincoln Avenue is when they situate their driver eye approximately 2.4 metres back from the edge of the major roadway travelled path.

In other words, drivers must traverse the pedestrian travelled path to achieve a suitable position for completing a turning movement from Lincoln Avenue onto King Street (RR81). As a result, it is recommended that remediation measures be implemented for the minor street turning movements, as to mitigate sightline concerns and enable the walkability of the surrounding land uses.

It is recommended that at a minimum, the Region implement all-way stop control (AWS) at the intersection to mitigate right-of-way confusion and allow for safe turning movements from the minor streets. In support of this, it is also recommended that the stop bars on the minor approaches be relocated closer to the intersection, where these still maintain at least one (1) metre of separation from the pedestrian travelled path. This will serve to increase visibility and presence of stopped vehicles at the minor approaches, thereby reducing right-of-way uncertainty. Furthermore, with the posted speed transitioning from 50km/hr to 60km/hr at the intersection, it is recommended that this speed transition be relocated 100 to 150 metres west of the intersection, to facilitate more appropriate operating speeds for approaching vehicles along King Street (RR81).

However, due to the multilane cross section, the Region may want to consider implementing a traffic signal in the future, in addition to sightline improvements for the right-turn movements and elimination of the offsetting issues for the minor approaches.

## 1.0 INTRODUCTION

R.V. Anderson Associates Limited was retained by the Niagara Region (the Region) to complete a Sightline and Safety Assessment at the intersection of King Street (RR81) and Lincoln Avenue in the Town of Lincoln, Ontario. This assignment is being undertaken in response to the skewed intersection alignment and presence of sightline obstructions within close proximity of the intersection.

The purpose of this assessment is to review the driver sightlines for turning movements from all approaches, evaluate collision history at the intersection, assess intersection control, and identify corresponding mitigation measures for any identified deficiencies. Subsequent sections summarize the findings of this assessment.

### 1.1 Study Location

The intersection of King Street (RR81) and Lincoln Avenue is a four-legged intersection with stop control along Lincoln Avenue and free-flow traffic movement along King Street (RR81). Located along the western extremity of the Beamsville community, King Street has a posted speed limit of 60km/hr. west of the intersection and 50km/hr. east of the intersection. King Street (RR81) exhibits a sporadic horizontal alignment throughout its entirety, resulting in a skewed intersection alignment at its intersection with Lincoln Avenue at an angle of approximately 63 degrees, with an offset of approximately 2.5m, which can be seen in the aerial image shown in **Figure 1.1**.



Figure 1.1 – King Street (RR81) & Lincoln Avenue Aerial Image

Further to the skewed intersection alignment, there are physical obstructions on all four (4) corners surrounding the intersections that hinder sightlines for turning vehicles. The potential obstructions include a residential property that is located in the northeast corner, restaurant signage in the northwest corner, vegetation in the southeast corner, and parked vehicles in the southwest corner.

It should be noted that Lincoln Avenue exhibits a vertical gradient approaching the intersection. This results in an approximately 4.45% downgrade on the south approach and 3.55% upgrade on the north approach.

The intersection serves as the eastern limit of the ongoing King Street between Greenlane and Lincoln Avenue Road Reconstruction and Watermain Replacement project.

## 1.2 Methodology

While completing the safety assessment at the intersection, the basic intersection configuration and the sightline assessment were reviewed.

The basic intersection configuration assessment is reviewed based on the guidelines provided under Section 9.2.4 of Chapter 9 – Intersections of the *2017 Transportation Association of Canada's (TAC) Geometric Design Guide for Canadian Roads*.

The sightline assessment has been completed in accordance with the standards outlined in Section 9.8 of Chapter 9 – Intersections of the *2017 Transportation Association of Canada's (TAC) Geometric Design Guide for Canadian Roads*. More specifically, the study considers the methodology found under to assess the required intersection sight distances for various traffic maneuvers.

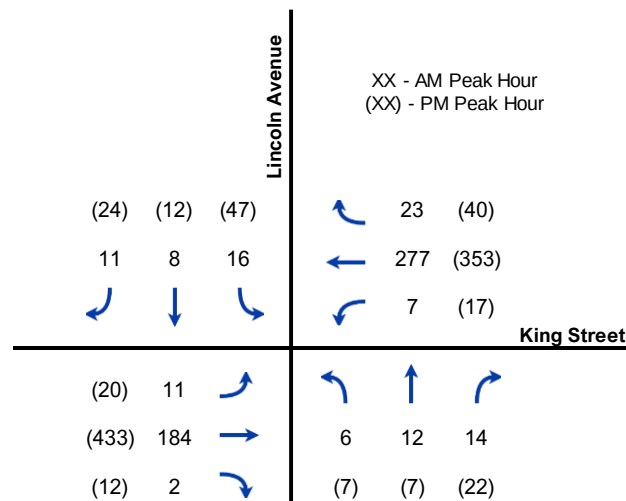
## 1.3 On-Going Corridor Improvements

The detailed design of King Street (RR81) between Greenlane and Lincoln Avenue is currently ongoing, with the design upgrades near the subject intersection including drainage improvements, enhanced illumination, and widening of the asphalt width to accommodate paved shoulder with painted buffers. The draft detailed design drawings indicate that sufficient right-of-way width exists to include auxiliary left-turn lanes along King Street.

## 2.0 EXISTING (2023) CONDITIONS

### 2.1 Intersection Traffic Volumes

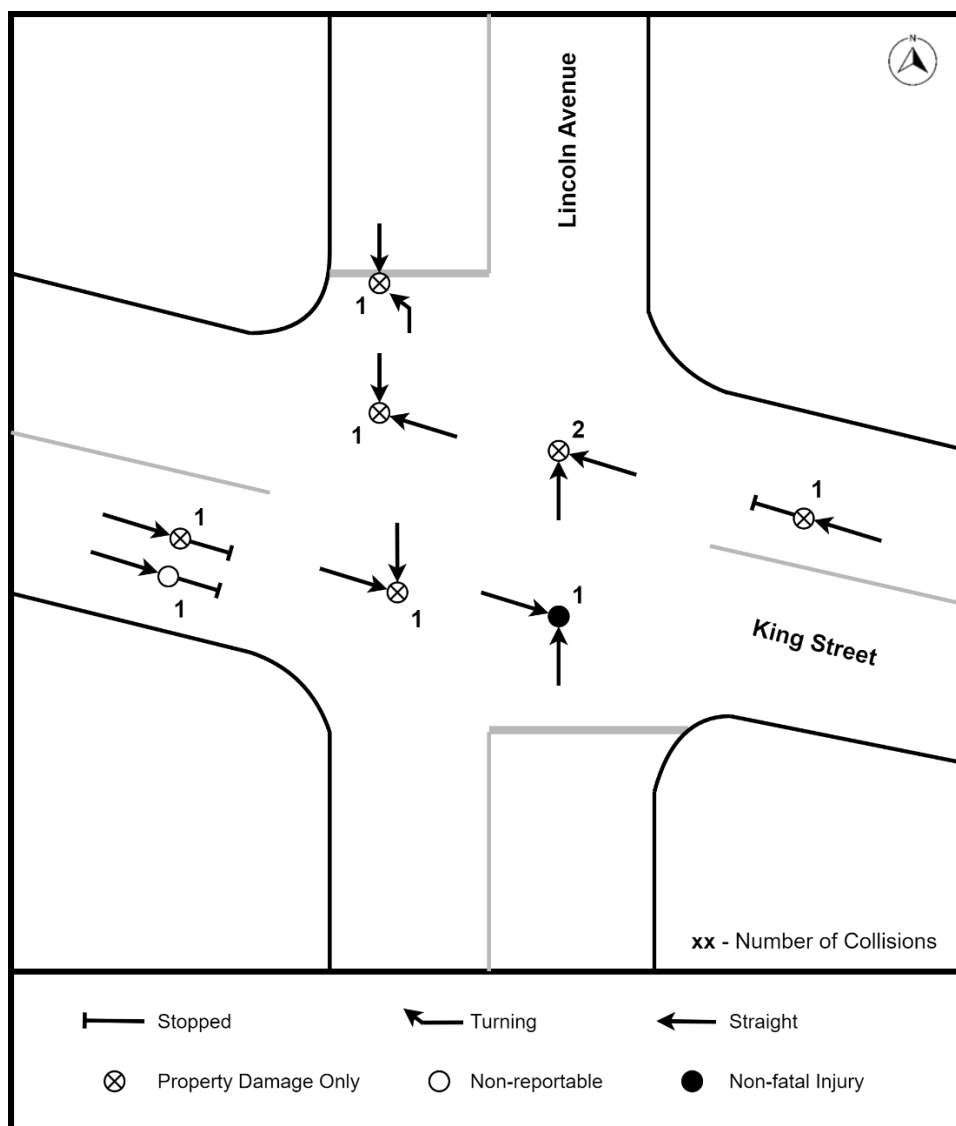
An intersection turning movement count (TMC) provided by the Region was completed on July 14<sup>th</sup>, 2023, for the subject intersection. The AM peak hour and PM peak hour traffic volumes are summarized in **Figure 2.1** and show that the majority vehicular traffic volumes are travelling east-west along King Street. Traffic volumes from the minor approaches are modest in nature, with most movements travelling eastbound on King Street. The 15-minute intervals and full eight-hour count are available in **Appendix 1**.



## 2.2 Collision History

As part of this assessment, collision data from January 1<sup>st</sup>, 2014, to December 1<sup>st</sup>, 2023, was provided for review. As typical practice, the most recent five (5) years of collision data was reviewed, comprising a study period from December 1<sup>st</sup>, 2018, to December 1<sup>st</sup>, 2023.

In this period, a total of nine (9) collisions were reported, with five (5) being classified as angle collisions, three (3) being classified as rear-end collisions, and one (1) being identified as a turning movement collision. The collision type, severity, and approximate spatial characteristics of the recorded collisions are illustrated in **Figure 2.2**.



**Figure 2.2 – King Street (RR81) & Lincoln Avenue Collision Diagram**

As seen in **Figure 2.2**, seven (7) of the collisions resulted in property damage only (PDO), with one (1) being classified as non-reportable and one (1) being classified as a non-fatal

injury. The angle collisions are relatively dispersed among the approaches, with no discernible trends regarding any specific movement. The number of angle collisions overall, however, implies that an issue exists at the intersection and requires mitigation. All three (3) of the rear-end collisions were caused by a driver following too close along King Street.

## 3.0 SAFETY ASSESSMENT

### 3.1 Intersection Configuration Assessment

The current intersection is an oblique four-legged intersection with at an intersecting angle of approximately 63 degrees, with an intersection off-set of 2.5m between north and south approaches of Lincoln Avenue.

*As per TAC, “offsets equal to or less than 1.5 m do not normally pose any difficulties and offsets greater than 40 m usually operate acceptably as successive T-intersections. However, intersection offsets between 1.5 m and 40 m often create more conflict points, difficult maneuvers, and unsafe conditions for vehicles and pedestrians in the intersection area. These should be avoided whenever possible”.*

Based on the TAC guidelines, the offset should be removed in conjunction with any intersection improvements that are planned in the future.

### 3.2 Sightline Assessment

#### 3.2.1 TAC Sight Distance Criteria

The TAC guidelines present minimum sight distances for various turning maneuvers including a left and right turn movement from the minor road (Lincoln Avenue), and a left turn from the major road (King Street). These minimum sight distances are a function of design speed and time gap. In this case where the subject intersection serves as a transition point between posted speeds, the higher posted speed is utilized. Therefore, the analysis adopts a posted speed of 60km/hr for the sightline assessment, which corresponds to design speed of 80km/hr.

The TAC guidelines outline a calculated sight distance and design sight distance. The calculated sight distance, as the name implies, is the minimum sight distance calculated using the intersection sight distance formula. The design sight distance rounds the calculated sight distance up to the nearest five-metre interval. Given the subject intersection is included in the King Street Road Reconstruction and Watermain Replacement, it is

recommended that the design sight distance be maintained as part of these works. The intersection sight distances for the applicable turning maneuvers are shown in **Table 3.1**.

Due to the approximate 3.55% upgrade on the north approach, the time gap ( $t_g$ ) requires calibration to reflect the loss in acceleration. This results in a time gap of 8.0 seconds for Case B1 and 6.9 seconds for Case B2. Case F is along King Street and therefore utilizes the standard time gap of 5.5 seconds.

**Table 3.1 – Existing (2023) Intersection Sight Distance Requirements**

| Scenario                                                  | TAC Reference                   | Design Speed (km/h) | Stopping Sight Distance (m) | Sight Distance for Passenger Cars (m) |        |
|-----------------------------------------------------------|---------------------------------|---------------------|-----------------------------|---------------------------------------|--------|
|                                                           |                                 |                     |                             | Calculated                            | Design |
| Case B1 – Left turn from the minor road (Lincoln Avenue)  | $ISD = 0.278 * V_{Major} * t_g$ | 80                  | 130                         | 177.9                                 | 180    |
| Case B2 – Right turn from the minor road (Lincoln Avenue) |                                 | 80                  |                             | 153.5                                 | 155    |
| Case F – Left turn from the major road (King Street)      | Table 9.9.12                    | 80                  |                             | 122.3                                 | 125    |

*ISD = Intersection Sight Distance;  $V_{Major}$  = Design Speed;  $t_g$  = Time Gap*

With the preliminary detailed design drawings including auxiliary left-turn lanes along King Street, the time gap needs to be further increased for Case B1 movements under future conditions. The resulting time gap ( $t_g$ ) for Case B1 under future conditions is 8.5 seconds, and the corresponding intersection sight distance requirements are shown in **Table 3.2**

**Table 3.2 – Future Intersection Sight Distance Requirements**

| Scenario                                                 | TAC Reference                   | Design Speed (km/h) | Stopping Sight Distance (m) | Sight Distance for Passenger Cars (m) |        |
|----------------------------------------------------------|---------------------------------|---------------------|-----------------------------|---------------------------------------|--------|
|                                                          |                                 |                     |                             | Calculated                            | Design |
| Case B1 – Left turn from the minor road (Lincoln Avenue) | $ISD = 0.278 * V_{Major} * t_g$ | 80                  | 130                         | 189.0                                 | 190    |

As shown in **Table 3.2**, the addition of auxiliary left-turn lanes along King Street results in an increase of 10 (ten) metres to the minimum sight distance for left-turning vehicles.

In order to be conservative, the sightline assessment for the left turning movements was completed assuming the presence of auxiliary left turn lanes along King Street.

The TAC guidelines indicate that the driver eye should be set back 4.4 metres back from the edge of the major roadway travelled path; however, TAC indicates that based on field observations, almost no drivers in North America conform with this standard, with the

majority of drivers placing their driver eye 2.4 metres or less from the major roadway travelled path.

### 3.3 Measured Sight Distances

Approximate sight distances were measured in the field for all of the cases outlined in the foregoing section. Three (3) decision point locations were reviewed: the first set back 2.4 metres from the existing stop bar, the second set back 4.4 metres from the major roadway travelled path, and the third set back 2.4 metres from the major roadway travelled path. For Case F (left turning from King Street), the field investigation concluded that there are no obstructions for vehicles turning left from the major roadway and the sightline requirements would be sufficiently met. As a result, the following sections only review cases from the minor approaches: Case B1 and Case B2. Photos taken in the field are provided in **Appendix 2**.

### 3.3.1 North Approach (Lincoln Avenue)

The sightlines for the three (3) decision points at the north approach are illustrated in Figure 3.1, Figure 3.2, and Figure 3.3.

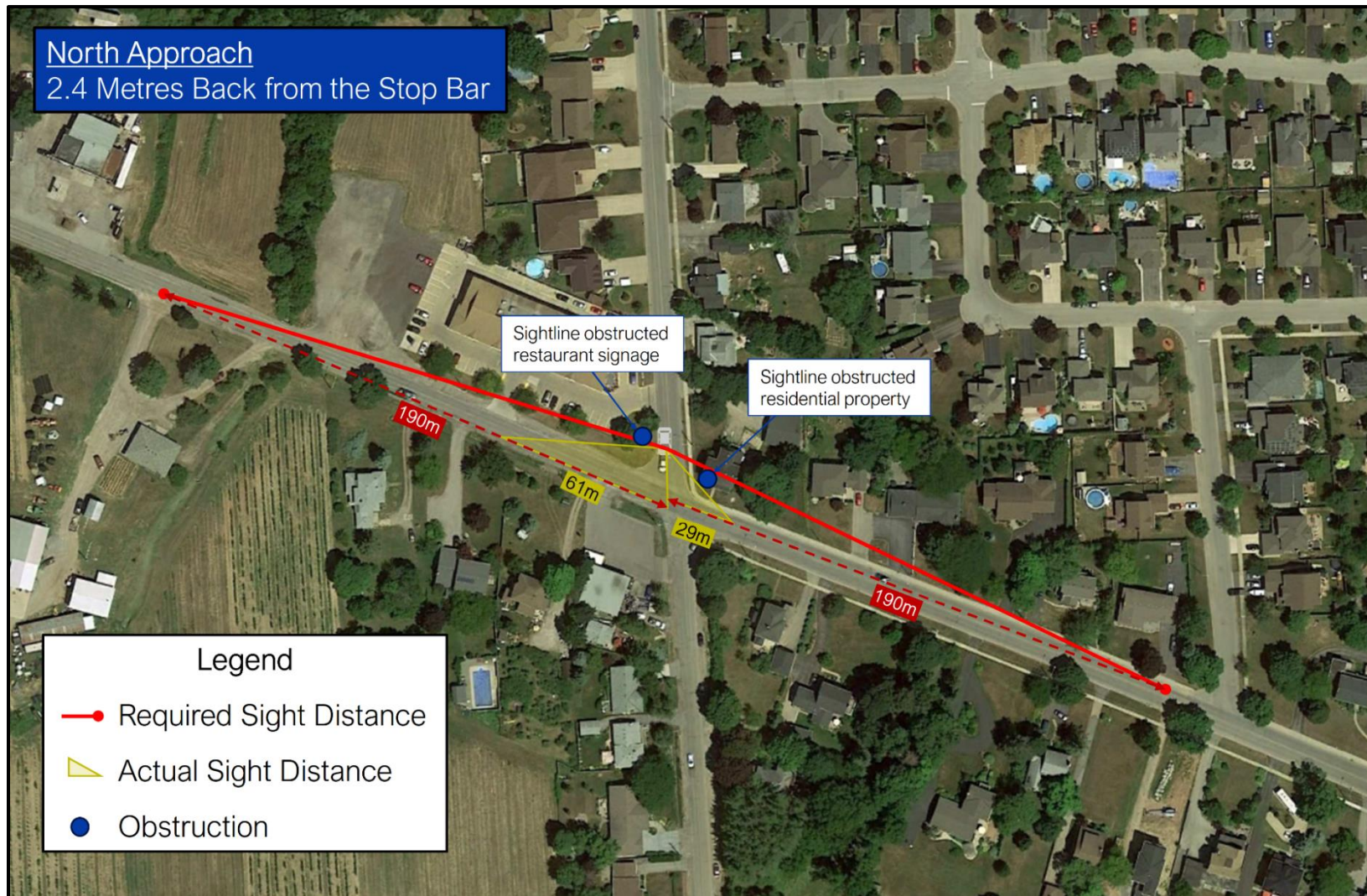


Figure 3.1 – North Approach – 2.4 Metres Back from the Stop Bar

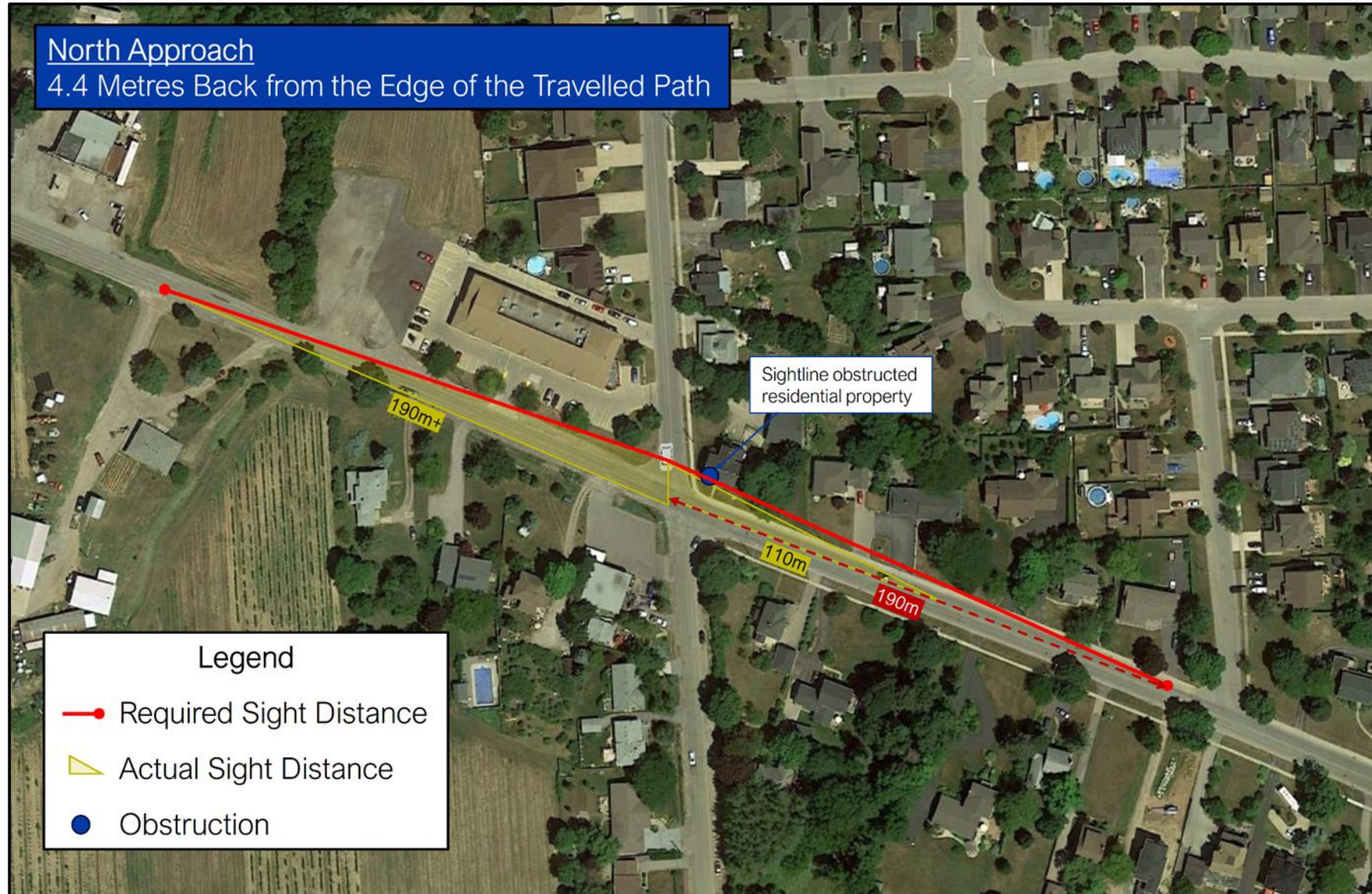


Figure 3.2 – North Approach – 4.4 Metres Back from the Edge of the Travelled Path

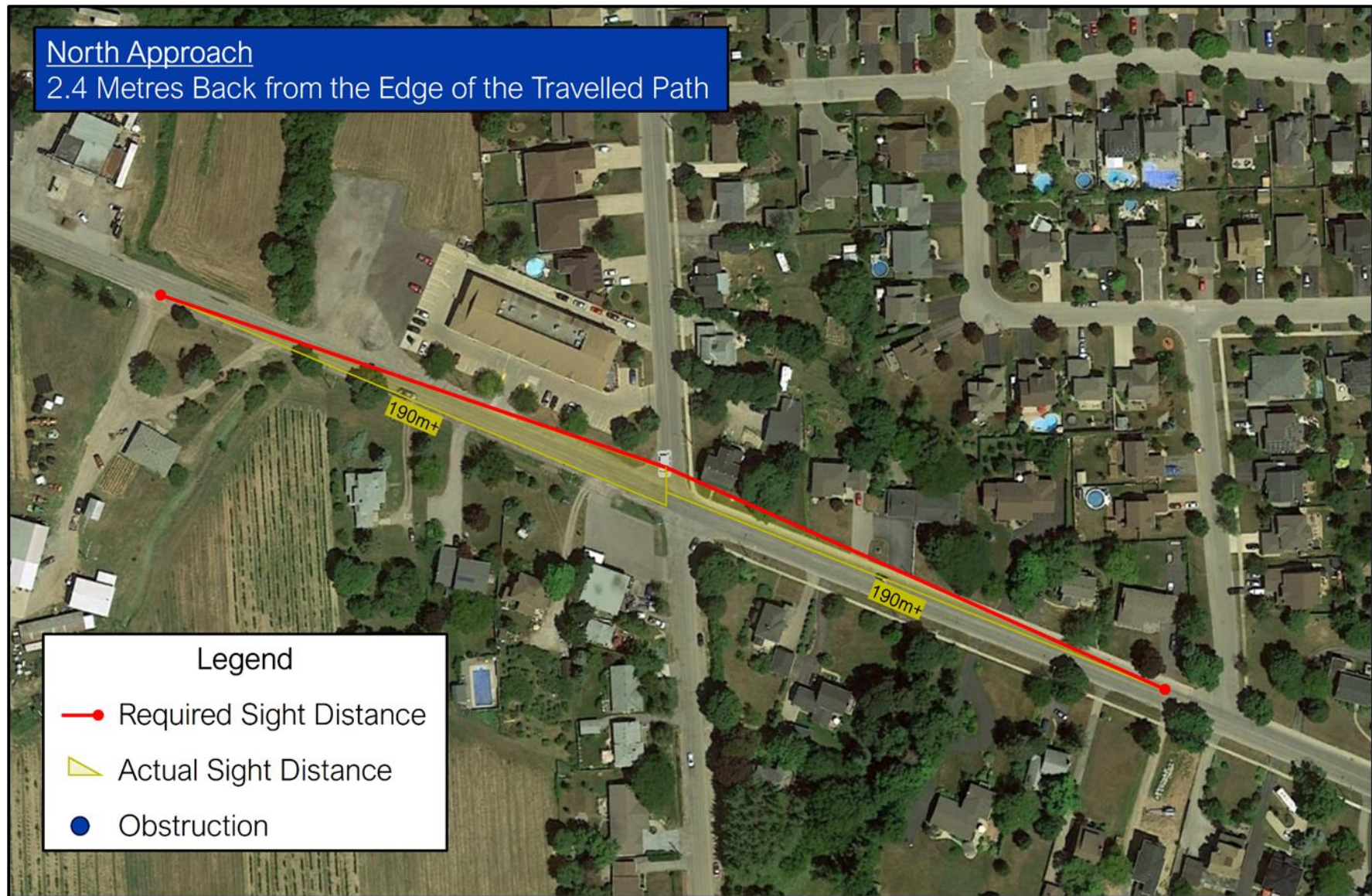


Figure 3.3 – North Approach – 2.4 Metres Back from the Edge of the Travelled Path

As shown in **Figure 3.1**, the placement of the existing stop bar results in insufficient sightlines for both Case B1 and Case B2, with these deficiencies being attributed to the restaurant signage in the northwest corner and a residential property in the northeast corner. It should be noted that the existing stop bar placement is a substantial distance from the edge of the major roadway travelled path, as shown in **Figure 3.4**.



**Figure 3.4 – North Approach – Stop Bar Placement**

As vehicles move beyond the existing stop bar to the point where they are 4.4 metres back from the major roadway travelled path (**Figure 3.2**), the restaurant signage on the northwest corner no longer serves as an obstruction for drivers looking west. However, the residential property still serves to obstruct sightlines for vehicles looking east, with the available sightline being measured at 110 metres.

Lastly, as vehicles approach to 2.4 metres from the edge of the major roadway travelled path (**Figure 3.3**), the driver sightlines are no longer obstructed by the residential property, and no additional obstructions are introduced for either case. This results in sufficient sightlines for both cases at the north approach.

### **3.3.2 South Approach (Lincoln Avenue)**

The sightlines for the three (3) decision points at the north approach are illustrated in **Figure 3.5**, **Figure 3.6**, and **Figure 3.7**.

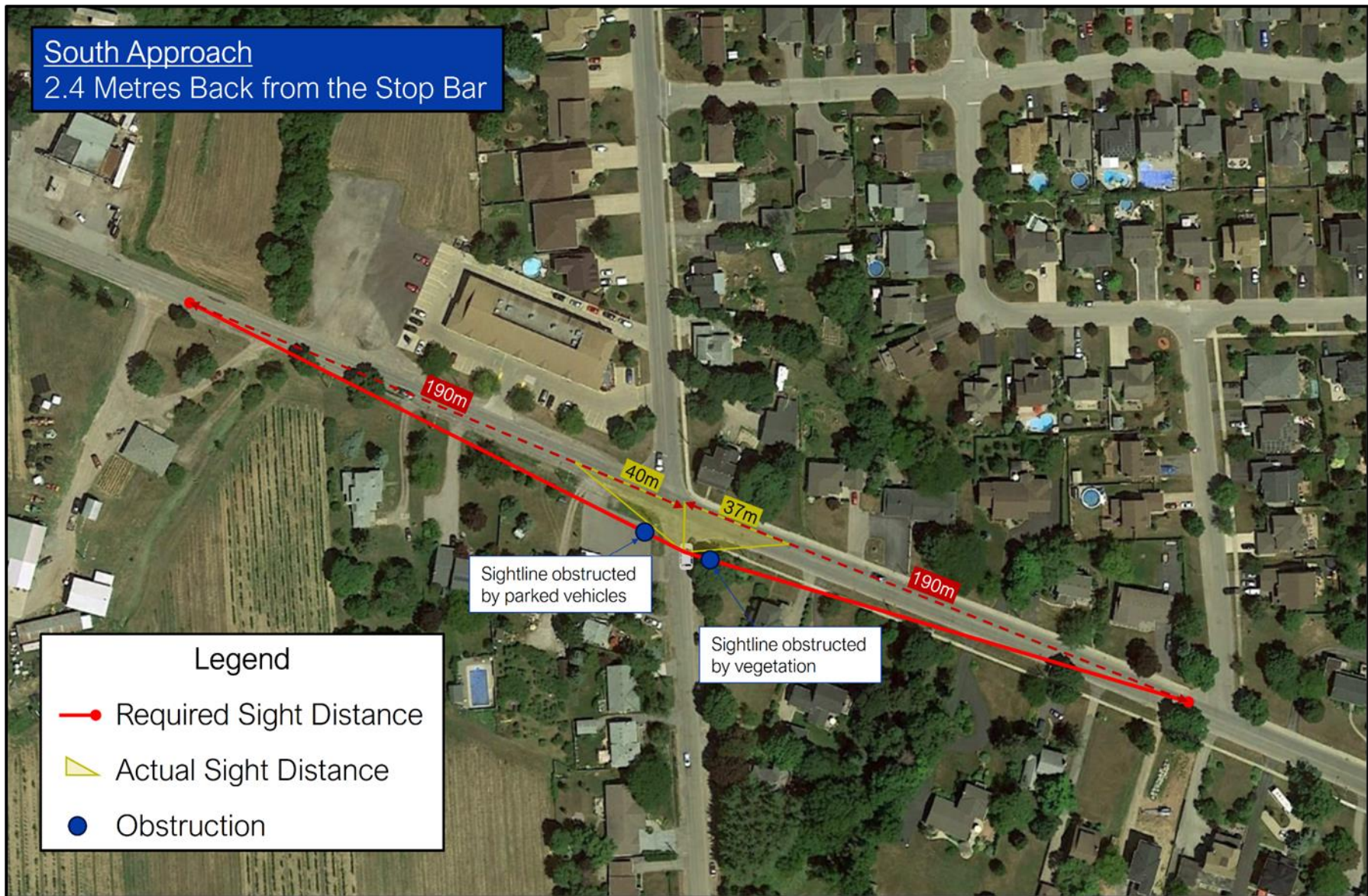


Figure 3.5 – South Approach – 2.4 Metres Back from the Stop Bar

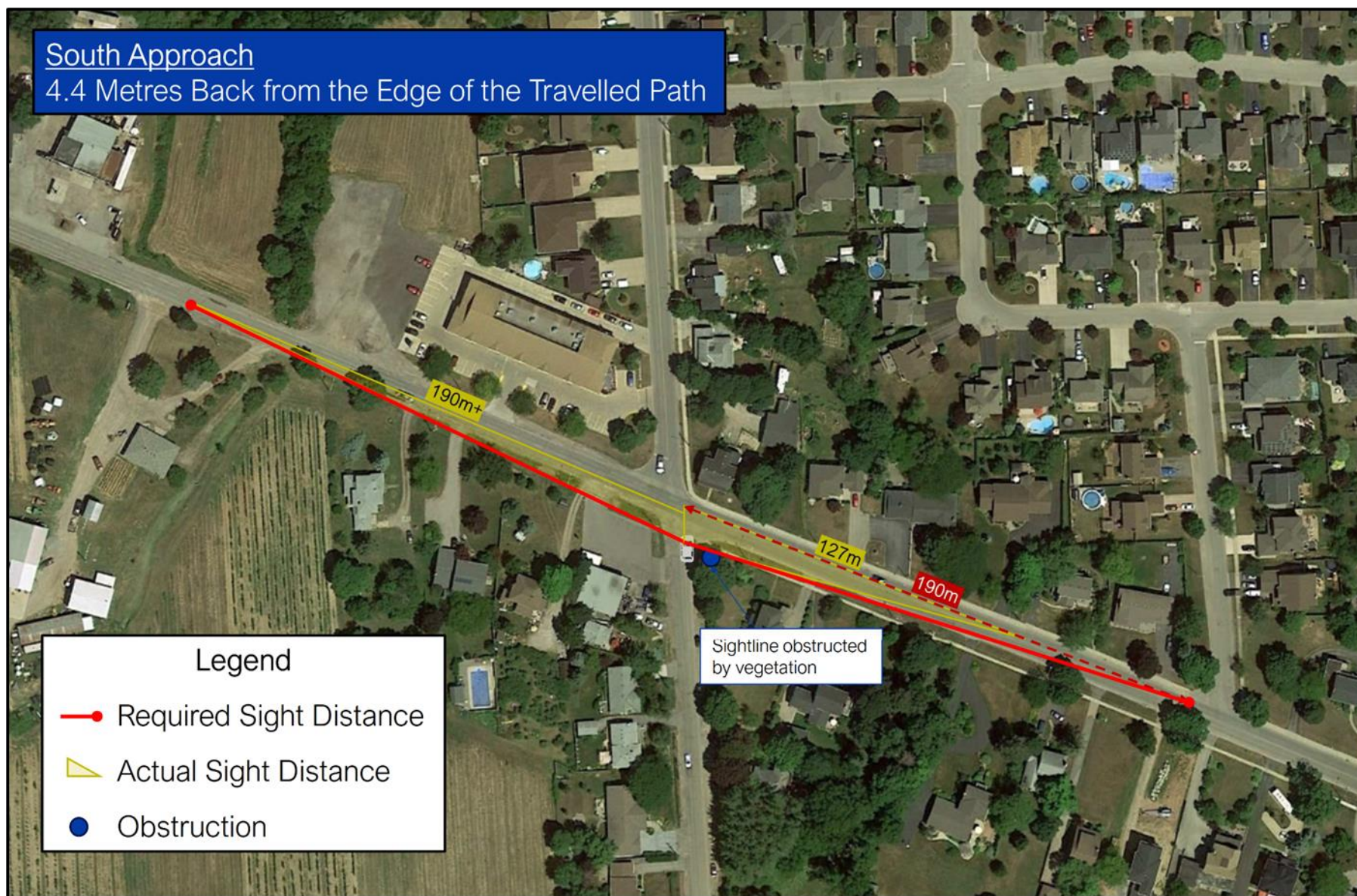


Figure 3.6 – South Approach – 4.4 Metres Back from the Edge of the Travelled Path

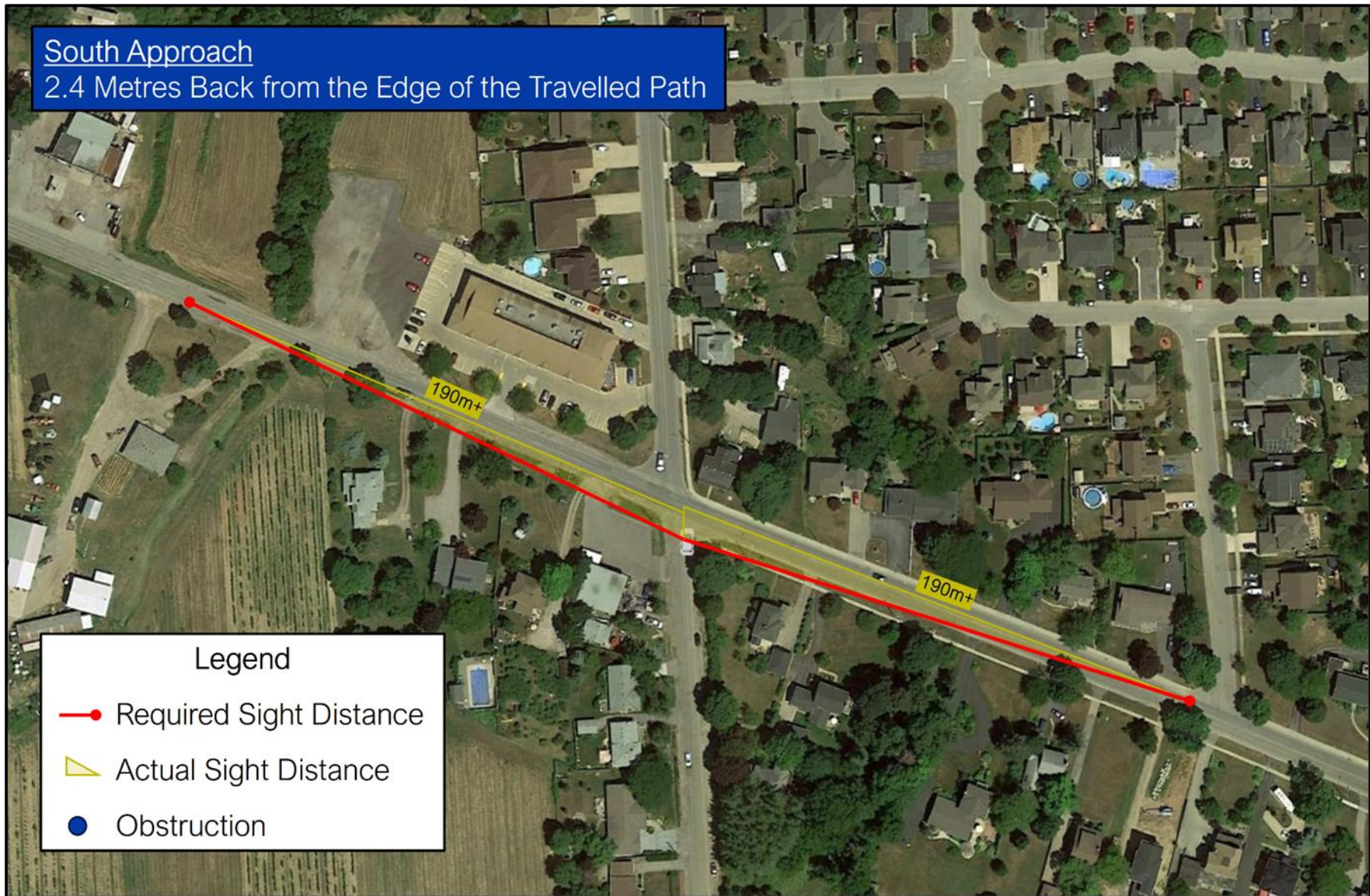


Figure 3.7 – South Approach – 2.4 Metres Back from the Edge of the Travelled Path

Similar to the north approach, the stop bar is a considerable distance from the edge of the major roadway travelled path, as seen in **Figure 3.8**, and therefore results in insufficient sightlines looking both directions for drivers at the south approach. This is illustrated in **Figure 3.5**, where the sightlines are obstructed by parked vehicles on the southwest corner of the intersection and by vegetation on the southeast corner of the intersection. It is noted that these sightlines can be improved if there were no parked vehicles in the private lot, or if the vegetation was managed; however, as a conservative analysis, the assessment considers both obstructions because vegetation grow significantly in the spring and summer seasons.



**Figure 3.8 – South Approach – Stop Bar Placement**

As drivers approach to 4.4 metres back from the edge of the major roadway travelled path (**Figure 3.6**), the parked vehicles on the southwest corner no longer serve as sightline obstructions, but the vegetation will still block line of sight if it is not regularly trimmed. It not until the driver approaches to 2.4 metres back from the edge of the major roadway travelled path (**Figure 3.7**) that they are afforded sufficient sightlines for both directions.

### 3.3.3 Measured Sight Distances Conclusion

The field investigation concludes that insufficient sightlines exist for drivers making their decision from the stop bar and 4.4 metres back from the edge of the major roadway travelled path, but they are afforded sufficient sightlines if they are situated 2.4 metres back from the edge of the major roadway travelled path.

However, considering drivers will have to traverse the pedestrian crosswalks to reach an optimal decision point, it is concluded that remediation measures are required at the intersection to improve safety for the minor street movements and to avoid any potential conflicts with pedestrians.

## 4.0 COUNTERMEASURES

Given the financial implications associated with fully removing the obstructions (includes property purchase), the analysis seeks to identify solutions that are cost-effective to implement. A preliminary analysis considered the feasibility of relocating the stop bar closer to the intersection to alleviate sightline constraints. However, it was found that the stop bar relocation in isolation does not result in adequate sightlines for the minor approaches due to the presence of pedestrians due to presence of commercial land uses in the proximity of the intersection, and additional alternatives would need to be considered as a result.

An alternative that can be considered is converting the intersection to all-way stop control, as it would serve to reduce right-of-way confusion and eliminate line of sight constraints. An all-way stop warrant analysis was completed in accordance with the *Ontario Traffic Manual – Book 5* guidelines, with the findings showing that an all-way stop is not warranted when based solely on traffic volumes, collisions, and minor street delays (see **Appendix 3**). Nonetheless, in support of the skewed intersection alignment and pedestrian safety, it is recommended that an all-way stop be considered at this intersection.

An operations analysis has been completed for the subject intersection using Synchro 11, macroscopic traffic analysis software, to evaluate the operational performance of the intersection under two-way stop control (TWSC) and all-way stop control (AWS). The analysis considers existing (2023) traffic conditions and a forecasted horizon year of 2028 using a 2% annualized growth rate (see **Appendix 4**). It should be noted that left-turn lanes are warranted under existing (TWSC) conditions, but are not necessary if the intersection is to be converted to an all-way stop. The results are shown in **Table 4.1**, with the full reports shown in **Appendix 5**.

Table 4.1 – Intersection Operations Analysis Results

| Scenario<br>(Traffic Control)                   | Movement       | Peak Hour  |          |             |                                  |            |          |             |                                  |
|-------------------------------------------------|----------------|------------|----------|-------------|----------------------------------|------------|----------|-------------|----------------------------------|
|                                                 |                | Weekday AM |          |             |                                  | Weekday PM |          |             |                                  |
|                                                 |                | V/C        | LOS      | Delay (s)   | 95% <sup>tile</sup><br>Queue (m) | V/C        | LOS      | Delay (s)   | 95% <sup>tile</sup><br>Queue (m) |
| Existing (2023)<br>Traffic Conditions<br>(TWSC) | EBLTR          | 0.01       | A        | 0.5         | 0                                | 0.02       | A        | 0.6         | 1                                |
|                                                 | WBLTR          | 0.01       | A        | 0.2         | 0                                | 0.02       | A        | 0.5         | 0                                |
|                                                 | NBLTR          | 0.07       | B        | 12.2        | 2                                | 0.11       | C        | 16.6        | 3                                |
|                                                 | SBLTR          | 0.08       | B        | 13.1        | 2                                | 0.34       | D        | 25.7        | 12                               |
|                                                 | <b>Overall</b> | -          | <b>A</b> | <b>1.8</b>  | -                                | -          | <b>A</b> | <b>3.2</b>  | -                                |
| Future (2028)<br>Traffic Conditions<br>(TWSC)   | EBLTR          | 0.01       | A        | 0.5         | 0                                | 0.02       | A        | 0.6         | 1                                |
|                                                 | WBLTR          | 0.01       | A        | 0.3         | 0                                | 0.02       | A        | 0.6         | 1                                |
|                                                 | NBLTR          | 0.08       | B        | 12.8        | 2                                | 0.14       | C        | 18.9        | 4                                |
|                                                 | SBLTR          | 0.10       | B        | 14.1        | 3                                | 0.45       | D        | 33.7        | 17                               |
|                                                 | <b>Overall</b> | -          | <b>A</b> | <b>1.9</b>  | -                                | -          | <b>A</b> | <b>4.0</b>  | -                                |
| Existing (2023)<br>Traffic Conditions<br>(AWS)  | EBLTR          | 0.27       | A        | 9.1         | 1                                | 0.68       | C        | 18.2        | 6                                |
|                                                 | WBLTR          | 0.40       | B        | 10.2        | 2                                | 0.61       | C        | 15.5        | 4                                |
|                                                 | NBLTR          | 0.05       | A        | 8.3         | 0                                | 0.07       | A        | 9.6         | 0                                |
|                                                 | SBLTR          | 0.05       | A        | 8.4         | 0                                | 0.16       | B        | 10.4        | 1                                |
|                                                 | <b>Overall</b> | -          | <b>A</b> | <b>9.6</b>  | -                                | -          | <b>C</b> | <b>16.1</b> | -                                |
| Future (2028)<br>Traffic Conditions<br>(AWS)    | EBLTR          | 0.30       | A        | 9.5         | 0                                | 0.78       | C        | 23.9        | 8                                |
|                                                 | WBLTR          | 0.45       | A        | 10.9        | 1                                | 0.69       | C        | 19.0        | 6                                |
|                                                 | NBLTR          | 0.05       | B        | 8.5         | 2                                | 0.08       | A        | 10.0        | 0                                |
|                                                 | SBLTR          | 0.06       | A        | 8.6         | 0                                | 0.18       | A        | 11.0        | 1                                |
|                                                 | <b>Overall</b> | -          | <b>B</b> | <b>10.1</b> | -                                | -          | <b>C</b> | <b>17.5</b> | -                                |

The results shown in **Table 4.1** indicate that the intersection will operate with acceptable performance measures under TWSC and AWS control through to the five-year horizon of 2028.

In conjunction with the all-way stop implementation, it is recommended that the stop bars on the minor approaches be relocated to be closer to the intersection. *OTM Book 11* recommends one (1) metre of separation between the pedestrian crosswalk and the stop bar, or 1.25 to 3.0 metres separation from the edge of the major road travelled path when there are no pedestrians. Although there is no crosswalk at this location, it is recommended that the stop bar be set back at least one (1) metre from the pedestrian travelled path to support pedestrian access to the surrounding land uses.

Relocating the stop bar will allow stopped vehicles along Lincoln Avenue to be plainly visible for all approaches and will also discourage drivers on the minor approaches from taking

refuge in the pedestrian travelled path. It is also recommended that the posted speed transition point along King Street be relocated further west by approximately 100 to 150 metres to foster more suitable speeds approaching the stop sign.

In addition to an all-way stop, the feasibility of a traffic signal was also reviewed, with the findings of the *Ontario Traffic Manual – Book 12* warrant analysis concluding that a traffic signal is not warranted at this location through any of the justifications (see **Appendix 6**). Regardless, a traffic signal will only mitigate sightline constraints for the Case B1 scenario (left turn from minor street), as Case B2 (right turn from minor street) will still require sufficient sightlines unless a right-turn-on-red prohibition is introduced. Furthermore, the skewed alignment of the intersection creates a “hooking” scenario for left-turn movements from the minor approaches and will therefore require substantial property requirements to mitigate. It is recommended that this intersection operation be monitored in the future to determine if a traffic signal is required at a future horizon.

## 5.0 SUMMARY OF CONCLUSIONS & RECOMMENDATIONS

The conclusions and recommendations of the sightline and safety assessment study are summarized as follows:

- The intersection offset of 2.5 metres between north and south approaches of Lincoln Avenue does not meet the TAC guidelines and should be rectified as part of future intersection improvements.
- Sightline constraints exist for the minor street approaches due to physical obstructions on every corner of the intersection.
- For vehicles turning from the stop bars or 4.4 metres back from the edge of the major roadway travelled path, there are insufficient sightlines available for both minor street approaches.
- For vehicles turning from 2.4 metres back from the edge of the major roadway travelled path, there are sufficient sightlines for both approaches; however, this requires drivers to traverse the pedestrian crosswalk to reach a decision point which would create potential pedestrian conflicts.
- The all-way stop control warrant is not met from a volume or collision warrant perspective, but it is nonetheless recommended that it is implemented at this intersection to mitigate right-of-way confusion and sightline constraints.
- All-way stop control is forecast to operate with acceptable operations under existing (2023) traffic conditions, as well as a future (2028) scenario that was formulated using a 2% annualized growth rate.
- It is recommended that the all-way stop control is supplemented by relocating the stop bar to be one (1) metre from the pedestrian travelled path on both minor approaches, and speed transition zone along King Street be moved 100 to 150 metres west of the intersection to facilitate appropriate operating speeds approaching the stop sign.

In conclusion, it is recommended that at a minimum, the Region implement all-way stop control (AWS) at the intersection to mitigate right-of-way confusion and allow for safe turning movements from the minor streets. In support of this, it is also recommended that the stop bars on the minor approaches be relocated closer to the intersection, where these still maintain at least one (1) metre of separation from the pedestrian travelled path. This will serve to increase visibility and presence of stopped vehicles at the minor approaches, thereby reducing right-of-way uncertainty. Furthermore, with the posted speed transitioning from 50km/hr to 60km/hr at the intersection, it is recommended that this speed transition be relocated 100 to 150 metres west of the intersection, to facilitate more appropriate operating speeds for approaching vehicles along King Street (RR81).

However, due to the multilane cross section, the Region may want to consider implementing a traffic signal in the future, in addition to sightline improvements for the right-turn movements and elimination of the offsetting issues for the minor approaches.

## **APPENDIX 1**

### Turning Movement Count Data



# Turning Movement Count - Details Report (15 min)

**Location.....** King Street @ Lincoln Avenue

**Municipality.....** LINCOLN

**Count Date.....** Friday, July 14, 2023

## Lincoln Avenue

## King Street

### North Approach

### South Approach

### East Approach

### West Approach

| Time Period  | LT | TH | RT | U-Turn | TOT | LT | TH | RT | U-Turn | TOT | LT | TH  | RT | U-Turn | TOT | LT | TH  | RT | U-Turn | TOT |
|--------------|----|----|----|--------|-----|----|----|----|--------|-----|----|-----|----|--------|-----|----|-----|----|--------|-----|
| 07:00 07:15  | 4  | 1  | 6  | 0      | 11  | 1  | 2  | 1  | 0      | 4   | 1  | 29  | 3  | 0      | 33  | 1  | 14  | 1  | 0      | 16  |
| 07:15 07:30  | 2  | 0  | 1  | 0      | 3   | 2  | 2  | 1  | 0      | 5   | 1  | 44  | 2  | 0      | 47  | 1  | 16  | 1  | 0      | 18  |
| 07:30 07:45  | 4  | 3  | 4  | 0      | 11  | 1  | 1  | 2  | 0      | 4   | 0  | 40  | 4  | 0      | 44  | 1  | 30  | 1  | 0      | 32  |
| 07:45 08:00  | 4  | 1  | 2  | 0      | 7   | 3  | 3  | 1  | 0      | 7   | 1  | 48  | 11 | 0      | 60  | 3  | 29  | 2  | 0      | 34  |
| Hourly Total | 14 | 5  | 13 | 0      | 32  | 7  | 8  | 5  | 0      | 20  | 3  | 161 | 20 | 0      | 184 | 6  | 89  | 5  | 0      | 100 |
| 08:00 08:15  | 5  | 1  | 3  | 0      | 9   | 1  | 7  | 4  | 0      | 12  | 4  | 57  | 2  | 0      | 63  | 1  | 38  | 1  | 0      | 40  |
| 08:15 08:30  | 4  | 2  | 2  | 0      | 8   | 2  | 3  | 1  | 0      | 6   | 0  | 73  | 7  | 0      | 80  | 5  | 44  | 0  | 0      | 49  |
| 08:30 08:45  | 3  | 3  | 3  | 0      | 9   | 2  | 1  | 6  | 0      | 9   | 1  | 71  | 6  | 0      | 78  | 3  | 48  | 0  | 0      | 51  |
| 08:45 09:00  | 4  | 2  | 3  | 0      | 9   | 1  | 1  | 3  | 0      | 5   | 2  | 76  | 8  | 0      | 86  | 2  | 54  | 1  | 0      | 57  |
| Hourly Total | 16 | 8  | 11 | 0      | 35  | 6  | 12 | 14 | 0      | 32  | 7  | 277 | 23 | 0      | 307 | 11 | 184 | 2  | 0      | 197 |
| 11:00 11:15  | 2  | 1  | 2  | 0      | 5   | 1  | 4  | 2  | 0      | 7   | 1  | 69  | 5  | 0      | 75  | 4  | 87  | 0  | 0      | 91  |
| 11:15 11:30  | 14 | 3  | 1  | 0      | 18  | 0  | 1  | 4  | 0      | 5   | 2  | 70  | 12 | 0      | 84  | 4  | 84  | 2  | 0      | 90  |
| 11:30 11:45  | 5  | 2  | 3  | 0      | 10  | 1  | 2  | 4  | 0      | 7   | 6  | 67  | 8  | 0      | 81  | 3  | 96  | 2  | 0      | 101 |
| 11:45 12:00  | 7  | 2  | 2  | 0      | 11  | 2  | 0  | 6  | 0      | 8   | 3  | 75  | 10 | 0      | 88  | 5  | 87  | 2  | 0      | 94  |
| Hourly Total | 28 | 8  | 8  | 0      | 44  | 4  | 7  | 16 | 0      | 27  | 12 | 281 | 35 | 0      | 328 | 16 | 354 | 6  | 0      | 376 |
| 12:00 12:15  | 4  | 2  | 1  | 0      | 7   | 3  | 2  | 6  | 0      | 11  | 1  | 71  | 11 | 0      | 83  | 4  | 89  | 4  | 0      | 97  |
| 12:15 12:30  | 10 | 4  | 2  | 0      | 16  | 1  | 1  | 2  | 0      | 4   | 5  | 82  | 7  | 0      | 94  | 4  | 78  | 2  | 0      | 84  |
| 12:30 12:45  | 10 | 1  | 4  | 0      | 15  | 2  | 4  | 1  | 0      | 7   | 2  | 80  | 11 | 0      | 93  | 4  | 75  | 0  | 0      | 79  |
| 12:45 13:00  | 13 | 3  | 1  | 0      | 17  | 4  | 2  | 2  | 0      | 8   | 0  | 83  | 7  | 0      | 90  | 4  | 86  | 4  | 0      | 94  |
| Hourly Total | 37 | 10 | 8  | 0      | 55  | 10 | 9  | 11 | 0      | 30  | 8  | 316 | 36 | 0      | 360 | 16 | 328 | 10 | 0      | 354 |
| 13:00 13:15  | 6  | 5  | 6  | 0      | 17  | 2  | 2  | 2  | 0      | 6   | 0  | 78  | 4  | 0      | 82  | 6  | 91  | 3  | 0      | 100 |
| 13:15 13:30  | 4  | 4  | 7  | 0      | 15  | 2  | 1  | 4  | 0      | 7   | 3  | 71  | 6  | 0      | 80  | 2  | 93  | 3  | 0      | 98  |
| 13:30 13:45  | 7  | 2  | 5  | 0      | 14  | 3  | 2  | 6  | 0      | 11  | 3  | 81  | 6  | 0      | 90  | 5  | 88  | 3  | 0      | 96  |
| 13:45 14:00  | 7  | 4  | 5  | 0      | 16  | 2  | 1  | 6  | 0      | 9   | 4  | 91  | 4  | 0      | 99  | 6  | 79  | 3  | 0      | 88  |
| Hourly Total | 24 | 15 | 23 | 0      | 62  | 9  | 6  | 18 | 0      | 33  | 10 | 321 | 20 | 0      | 351 | 19 | 351 | 12 | 0      | 382 |
| 15:00 15:15  | 9  | 1  | 2  | 0      | 12  | 1  | 0  | 6  | 0      | 7   | 2  | 82  | 6  | 0      | 90  | 8  | 105 | 2  | 0      | 115 |
| 15:15 15:30  | 11 | 3  | 3  | 0      | 17  | 3  | 0  | 5  | 0      | 8   | 3  | 74  | 9  | 0      | 86  | 3  | 97  | 0  | 0      | 100 |
| 15:30 15:45  | 8  | 2  | 5  | 0      | 15  | 1  | 2  | 6  | 0      | 9   | 3  | 82  | 5  | 0      | 90  | 8  | 120 | 2  | 0      | 130 |
| 15:45 16:00  | 13 | 3  | 5  | 0      | 21  | 1  | 4  | 6  | 0      | 11  | 1  | 95  | 9  | 0      | 105 | 7  | 110 | 2  | 0      | 119 |
| Hourly Total | 41 | 9  | 15 | 0      | 65  | 6  | 6  | 23 | 0      | 35  | 9  | 333 | 29 | 0      | 371 | 26 | 432 | 6  | 0      | 464 |
| 16:00 16:15  | 10 | 3  | 7  | 0      | 20  | 2  | 1  | 6  | 0      | 9   | 4  | 98  | 6  | 0      | 108 | 6  | 111 | 4  | 0      | 121 |

## Lincoln Avenue

## King Street

| North Approach |     |    |     |        |     | South Approach |    |     |        |     | East Approach |      |     |        |      | West Approach |      |    |        |      |
|----------------|-----|----|-----|--------|-----|----------------|----|-----|--------|-----|---------------|------|-----|--------|------|---------------|------|----|--------|------|
| Time Period    | LT  | TH | RT  | U-Turn | TOT | LT             | TH | RT  | U-Turn | TOT | LT            | TH   | RT  | U-Turn | TOT  | LT            | TH   | RT | U-Turn | TOT  |
| 16:15 16:30    | 16  | 1  | 8   | 0      | 25  | 4              | 1  | 3   | 0      | 8   | 4             | 74   | 13  | 0      | 91   | 2             | 99   | 2  | 0      | 103  |
| 16:30 16:45    | 8   | 5  | 4   | 0      | 17  | 0              | 1  | 7   | 0      | 8   | 8             | 86   | 12  | 0      | 106  | 5             | 113  | 4  | 0      | 122  |
| 16:45 17:00    | 11  | 6  | 1   | 0      | 18  | 1              | 5  | 2   | 0      | 8   | 5             | 82   | 9   | 0      | 96   | 8             | 105  | 3  | 0      | 116  |
| Hourly Total   | 45  | 15 | 20  | 0      | 80  | 7              | 8  | 18  | 0      | 33  | 21            | 340  | 40  | 0      | 401  | 21            | 428  | 13 | 0      | 462  |
| 17:00 17:15    | 14  | 4  | 4   | 0      | 22  | 2              | 3  | 2   | 0      | 7   | 6             | 80   | 11  | 0      | 97   | 7             | 114  | 0  | 0      | 121  |
| 17:15 17:30    | 10  | 5  | 4   | 0      | 19  | 0              | 2  | 7   | 0      | 9   | 3             | 57   | 3   | 0      | 63   | 7             | 106  | 3  | 0      | 116  |
| 17:30 17:45    | 12  | 2  | 4   | 0      | 18  | 0              | 3  | 2   | 0      | 5   | 2             | 88   | 5   | 0      | 95   | 7             | 102  | 4  | 0      | 113  |
| 17:45 18:00    | 6   | 1  | 5   | 0      | 12  | 2              | 2  | 4   | 0      | 8   | 4             | 62   | 11  | 0      | 77   | 3             | 92   | 1  | 0      | 96   |
| Hourly Total   | 42  | 12 | 17  | 0      | 71  | 4              | 10 | 15  | 0      | 29  | 15            | 287  | 30  | 0      | 332  | 24            | 414  | 8  | 0      | 446  |
| Grand Total    | 247 | 82 | 115 | 0      | 444 | 53             | 66 | 120 | 0      | 239 | 85            | 2316 | 233 | 0      | 2634 | 139           | 2580 | 62 | 0      | 2781 |
| Truck %        | 0%  | 1% | 3%  | 0%     | 1%  | 0%             | 0% | 0%  | 0%     | 0%  | 2%            | 2%   | 1%  | 0%     | 2%   | 1%            | 1%   | 5% | 0%     | 1%   |

## **APPENDIX 2**

### Field Investigation Photos



## South Approach – 2.4 Metres Back from Stop Bar

Looking West



Looking East

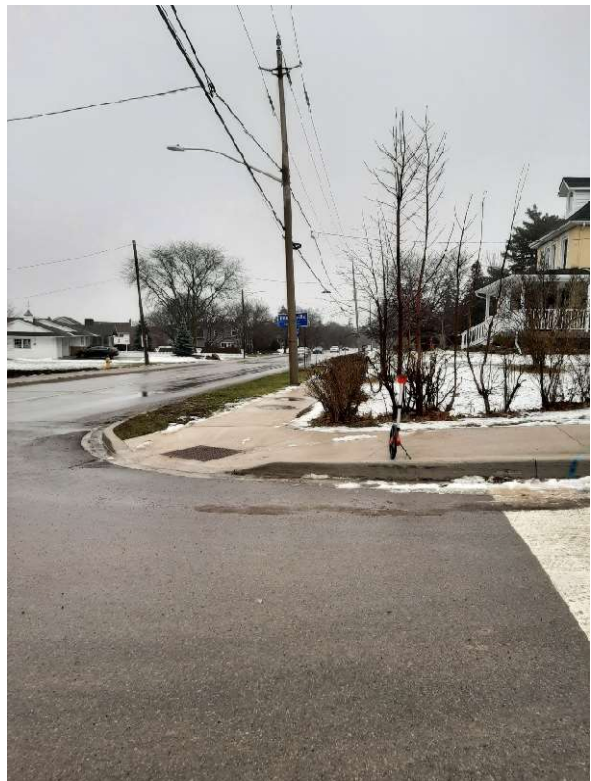


## South Approach – 4.4 Metres Back from the Edge of the Travelled Path

Looking West

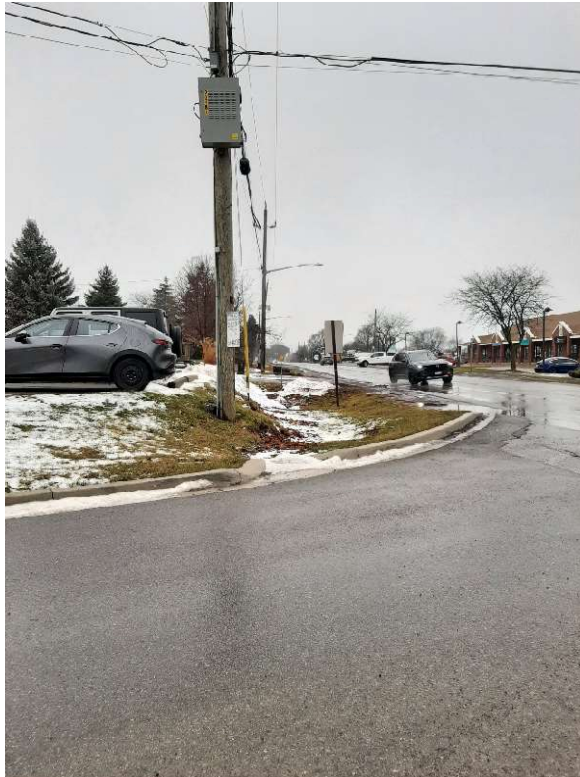


Looking East



## South Approach – 2.4 Metres Back from the Edge of the Travelled Path

Looking West



Looking East



## North Approach – 2.4 Metres Back the Stop Bar

Looking East



Looking West



## North Approach – 4.4 Metres Back the Edge of the Travelled Path

Looking East



Looking West



## North Approach – 2.4 Metres Back the Edge of the Travelled Path

Looking East



Looking West



## **APPENDIX 3**

### **All-Way Stop Warrant**



### King Street/Lincoln Avenue - Existing (8-Hour Signal Warrant)

| Signal Warrant |                             | Description |                                                                                                      | Hour Ending |         |     |     |     |         |     |     |              |                                       | Sectional<br>Total % Fulfilled/8 | Entire % | Warrant   |
|----------------|-----------------------------|-------------|------------------------------------------------------------------------------------------------------|-------------|---------|-----|-----|-----|---------|-----|-----|--------------|---------------------------------------|----------------------------------|----------|-----------|
|                |                             |             |                                                                                                      | 1           | AM Peak | 3   | 4   | 5   | PM Peak | 7   | 8   |              |                                       |                                  |          |           |
| Intersection   | 1. Minimum Vehicular Volume | 1A          | Vehicle Volume, All Approaches for Each of the Heaviest 8 Hours of on Average Day, and               | 336         | 571     | 775 | 799 | 828 | 935     | 976 | 878 | Total Across | Min Requirement for Two-Lane Roadways | 91%                              | 50%      | 65%<br>No |
|                |                             |             | 100% Fulfilled                                                                                       |             |         | X   | X   | X   | X       | X   | 600 | 720          |                                       |                                  |          |           |
|                |                             |             | 80% Fulfilled                                                                                        |             |         |     |     |     |         |     | 0   | 580          |                                       |                                  |          |           |
|                |                             |             | Actual % if below 80% value                                                                          | 47%         | 79%     |     |     |     |         |     | 126 |              |                                       |                                  |          |           |
|                |                             |             | Total % Fulfilled                                                                                    |             |         |     |     |     |         |     |     |              | 726                                   |                                  |          |           |
|                |                             | 1B          | Vehicle Volume, Along Minor Streets for Each of the Same 8 Hours                                     | 52          | 67      | 71  | 85  | 95  | 100     | 113 | 100 | Total Across | Min Requirement for Two-Lane Roadways | 50%                              |          |           |
|                |                             |             | 100% Fulfilled                                                                                       |             |         |     |     |     |         |     | 0   | 170          |                                       |                                  |          |           |
|                |                             |             | 80% Fulfilled                                                                                        |             |         |     |     |     |         |     | 0   | 135          |                                       |                                  |          |           |
|                |                             |             | Actual % if below 80% value                                                                          | 31%         | 39%     | 42% | 50% | 56% | 59%     | 66% | 59% | 402          |                                       |                                  |          |           |
|                |                             |             | Total % Fulfilled                                                                                    |             |         |     |     |     |         |     |     |              | 402                                   |                                  |          |           |
|                | 2. Delay to Cross Traffic   | 2A          | Vehicle Volume, Along Major Street for Each of the Heaviest 8 Hours of an Average Day, and           | 284         | 504     | 704 | 714 | 733 | 835     | 863 | 778 | Total Across | Min Requirement for Two-Lane Roadways | 88%                              |          |           |
|                |                             |             | 100% Fulfilled                                                                                       |             |         |     |     | X   | X       | X   | X   | 400          | 720                                   |                                  |          |           |
|                |                             |             | 80% Fulfilled                                                                                        |             |         | 98% | 99% |     |         |     |     | 197          | 580                                   |                                  |          |           |
|                |                             |             | Actual % if below 80% value                                                                          | 39%         | 70%     |     |     |     |         |     |     | 109          |                                       |                                  |          |           |
|                |                             |             | Total % Fulfilled                                                                                    |             |         |     |     |     |         |     |     |              | 706                                   |                                  |          |           |
|                |                             | 2B          | Combined Vehicle and Pedestrian Volume <u>Crossing</u> the Major Street for Each of the Same 8 Hours | 29          | 34      | 40  | 57  | 48  | 56      | 67  | 58  | Total Across | Min Requirement for Two-Lane Roadways | 65%                              |          |           |
|                |                             |             | 100% Fulfilled                                                                                       |             |         |     |     |     |         |     |     | 0            | 75                                    |                                  |          |           |
|                |                             |             | 80% Fulfilled                                                                                        |             |         |     |     |     |         | 89% |     | 89           | 60                                    |                                  |          |           |
|                |                             |             | Actual % if below 80% value                                                                          | 39%         | 45%     | 53% | 76% | 64% | 75%     |     | 77% | 429          |                                       |                                  |          |           |
|                |                             |             | Total % Fulfilled                                                                                    |             |         |     |     |     |         |     |     |              | 518                                   |                                  |          |           |

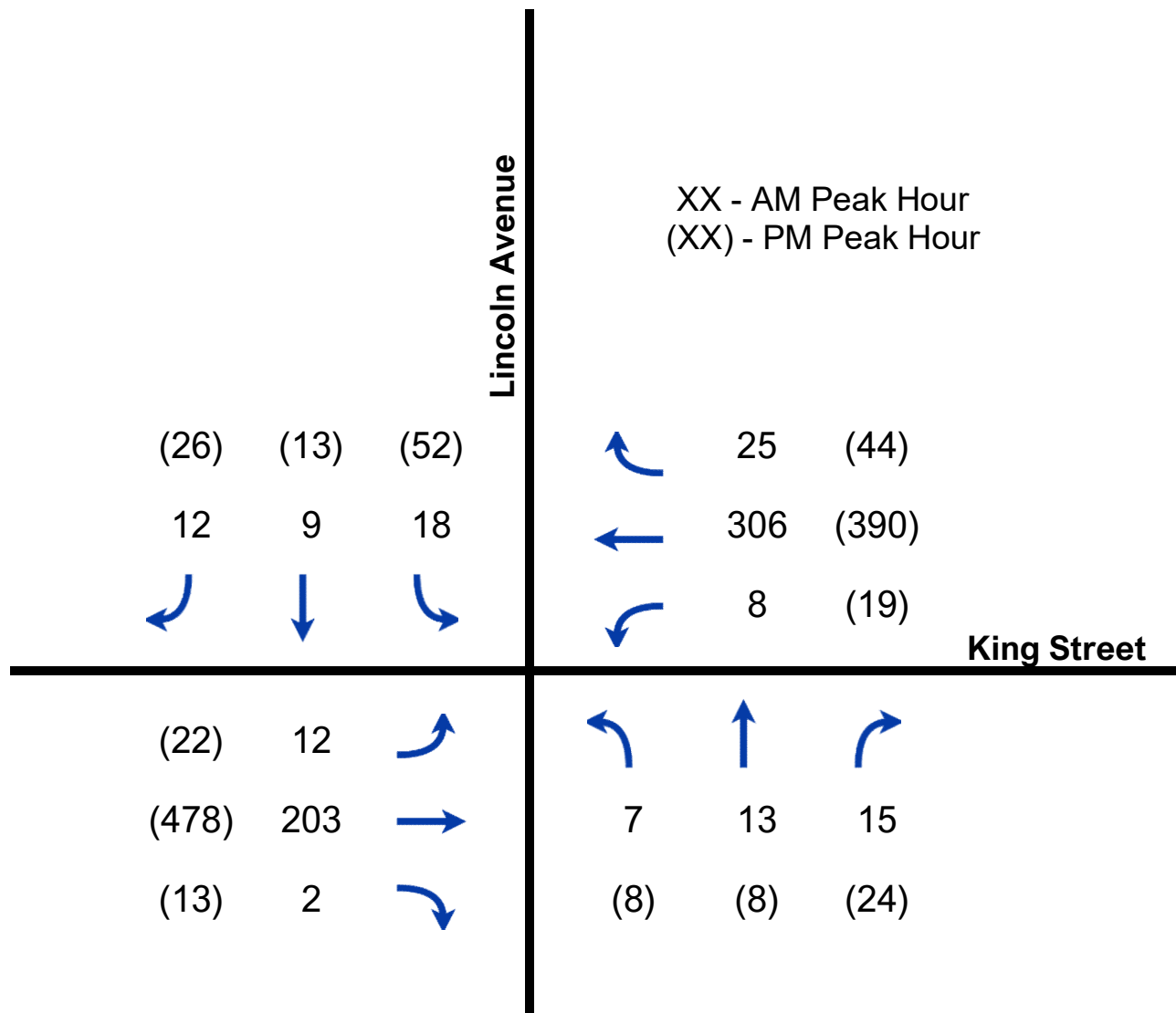
## **APPENDIX 4**

### **Future (2028) Volume Forecasts**





## Future (2028) Intersection Traffic Volumes



## **APPENDIX 5**

### Highway Capacity Manual (HCM) Output Reports



# King Street & Lincoln Avenue Sightline Assessment

## Existing (2023) Traffic Conditions - TWSC

AM Peak Hour

|                                   |                                                                                   |                                                                                   |                                                                                   |                                                                                   |                                                                                   |                                                                                   |                                                                                     |                                                                                     |                                                                                     |                                                                                     |                                                                                     |                                                                                     |
|-----------------------------------|-----------------------------------------------------------------------------------|-----------------------------------------------------------------------------------|-----------------------------------------------------------------------------------|-----------------------------------------------------------------------------------|-----------------------------------------------------------------------------------|-----------------------------------------------------------------------------------|-------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------|
|                                   |  |  |  |  |  |  |  |  |  |  |  |  |
| Movement                          | EBL                                                                               | EBT                                                                               | EBR                                                                               | WBL                                                                               | WBT                                                                               | WBR                                                                               | NBL                                                                                 | NBT                                                                                 | NBR                                                                                 | SBL                                                                                 | SBT                                                                                 | SBR                                                                                 |
| Lane Configurations               |                                                                                   |  |                                                                                   |                                                                                   |  |                                                                                   |                                                                                     |  |                                                                                     |                                                                                     |  |                                                                                     |
| Traffic Volume (veh/h)            | 11                                                                                | 184                                                                               | 2                                                                                 | 7                                                                                 | 277                                                                               | 23                                                                                | 6                                                                                   | 12                                                                                  | 14                                                                                  | 16                                                                                  | 8                                                                                   | 11                                                                                  |
| Future Volume (Veh/h)             | 11                                                                                | 184                                                                               | 2                                                                                 | 7                                                                                 | 277                                                                               | 23                                                                                | 6                                                                                   | 12                                                                                  | 14                                                                                  | 16                                                                                  | 8                                                                                   | 11                                                                                  |
| Sign Control                      |                                                                                   | Free                                                                              |                                                                                   |                                                                                   | Free                                                                              |                                                                                   |                                                                                     | Stop                                                                                |                                                                                     |                                                                                     | Stop                                                                                |                                                                                     |
| Grade                             |                                                                                   | 0%                                                                                |                                                                                   |                                                                                   | 0%                                                                                |                                                                                   |                                                                                     | 0%                                                                                  |                                                                                     |                                                                                     | 0%                                                                                  |                                                                                     |
| 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                                                                                |
| Hourly flow rate (vph)            | 12                                                                                | 200                                                                               | 2                                                                                 | 8                                                                                 | 301                                                                               | 25                                                                                | 7                                                                                   | 13                                                                                  | 15                                                                                  | 17                                                                                  | 9                                                                                   | 12                                                                                  |
| Pedestrians                       |                                                                                   |                                                                                   |                                                                                   |                                                                                   |                                                                                   |                                                                                   |                                                                                     |                                                                                     |                                                                                     |                                                                                     |                                                                                     |                                                                                     |
| Lane Width (m)                    |                                                                                   |                                                                                   |                                                                                   |                                                                                   |                                                                                   |                                                                                   |                                                                                     |                                                                                     |                                                                                     |                                                                                     |                                                                                     |                                                                                     |
| Walking Speed (m/s)               |                                                                                   |                                                                                   |                                                                                   |                                                                                   |                                                                                   |                                                                                   |                                                                                     |                                                                                     |                                                                                     |                                                                                     |                                                                                     |                                                                                     |
| Percent Blockage                  |                                                                                   |                                                                                   |                                                                                   |                                                                                   |                                                                                   |                                                                                   |                                                                                     |                                                                                     |                                                                                     |                                                                                     |                                                                                     |                                                                                     |
| Right turn flare (veh)            |                                                                                   |                                                                                   |                                                                                   |                                                                                   |                                                                                   |                                                                                   |                                                                                     |                                                                                     |                                                                                     |                                                                                     |                                                                                     |                                                                                     |
| Median type                       | None                                                                              |                                                                                   |                                                                                   |                                                                                   | None                                                                              |                                                                                   |                                                                                     |                                                                                     |                                                                                     |                                                                                     |                                                                                     |                                                                                     |
| Median storage (veh)              |                                                                                   |                                                                                   |                                                                                   |                                                                                   |                                                                                   |                                                                                   |                                                                                     |                                                                                     |                                                                                     |                                                                                     |                                                                                     |                                                                                     |
| Upstream signal (m)               |                                                                                   |                                                                                   |                                                                                   |                                                                                   |                                                                                   |                                                                                   |                                                                                     |                                                                                     |                                                                                     |                                                                                     |                                                                                     |                                                                                     |
| pX, platoon unblocked             |                                                                                   |                                                                                   |                                                                                   |                                                                                   |                                                                                   |                                                                                   |                                                                                     |                                                                                     |                                                                                     |                                                                                     |                                                                                     |                                                                                     |
| vC, conflicting volume            | 326                                                                               |                                                                                   |                                                                                   | 202                                                                               |                                                                                   |                                                                                   | 571                                                                                 | 567                                                                                 | 201                                                                                 | 576                                                                                 | 556                                                                                 | 314                                                                                 |
| vC1, stage 1 conf vol             |                                                                                   |                                                                                   |                                                                                   |                                                                                   |                                                                                   |                                                                                   |                                                                                     |                                                                                     |                                                                                     |                                                                                     |                                                                                     |                                                                                     |
| vC2, stage 2 conf vol             |                                                                                   |                                                                                   |                                                                                   |                                                                                   |                                                                                   |                                                                                   |                                                                                     |                                                                                     |                                                                                     |                                                                                     |                                                                                     |                                                                                     |
| vCu, unblocked vol                | 326                                                                               |                                                                                   |                                                                                   | 202                                                                               |                                                                                   |                                                                                   | 571                                                                                 | 567                                                                                 | 201                                                                                 | 576                                                                                 | 556                                                                                 | 314                                                                                 |
| tC, single (s)                    | 4.1                                                                               |                                                                                   |                                                                                   | 4.1                                                                               |                                                                                   |                                                                                   | 7.1                                                                                 | 6.5                                                                                 | 6.2                                                                                 | 7.1                                                                                 | 6.5                                                                                 | 6.2                                                                                 |
| tC, 2 stage (s)                   |                                                                                   |                                                                                   |                                                                                   |                                                                                   |                                                                                   |                                                                                   |                                                                                     |                                                                                     |                                                                                     |                                                                                     |                                                                                     |                                                                                     |
| tF (s)                            | 2.2                                                                               |                                                                                   |                                                                                   | 2.2                                                                               |                                                                                   |                                                                                   | 3.5                                                                                 | 4.0                                                                                 | 3.3                                                                                 | 3.5                                                                                 | 4.0                                                                                 | 3.3                                                                                 |
| p0 queue free %                   | 99                                                                                |                                                                                   |                                                                                   | 99                                                                                |                                                                                   |                                                                                   | 98                                                                                  | 97                                                                                  | 98                                                                                  | 96                                                                                  | 98                                                                                  | 98                                                                                  |
| cM capacity (veh/h)               | 1234                                                                              |                                                                                   |                                                                                   | 1370                                                                              |                                                                                   |                                                                                   | 413                                                                                 | 426                                                                                 | 840                                                                                 | 406                                                                                 | 433                                                                                 | 727                                                                                 |
| Direction, Lane #                 | EB 1                                                                              | WB 1                                                                              | NB 1                                                                              | SB 1                                                                              |                                                                                   |                                                                                   |                                                                                     |                                                                                     |                                                                                     |                                                                                     |                                                                                     |                                                                                     |
| Volume Total                      | 214                                                                               | 334                                                                               | 35                                                                                | 38                                                                                |                                                                                   |                                                                                   |                                                                                     |                                                                                     |                                                                                     |                                                                                     |                                                                                     |                                                                                     |
| Volume Left                       | 12                                                                                | 8                                                                                 | 7                                                                                 | 17                                                                                |                                                                                   |                                                                                   |                                                                                     |                                                                                     |                                                                                     |                                                                                     |                                                                                     |                                                                                     |
| Volume Right                      | 2                                                                                 | 25                                                                                | 15                                                                                | 12                                                                                |                                                                                   |                                                                                   |                                                                                     |                                                                                     |                                                                                     |                                                                                     |                                                                                     |                                                                                     |
| cSH                               | 1234                                                                              | 1370                                                                              | 536                                                                               | 480                                                                               |                                                                                   |                                                                                   |                                                                                     |                                                                                     |                                                                                     |                                                                                     |                                                                                     |                                                                                     |
| Volume to Capacity                | 0.01                                                                              | 0.01                                                                              | 0.07                                                                              | 0.08                                                                              |                                                                                   |                                                                                   |                                                                                     |                                                                                     |                                                                                     |                                                                                     |                                                                                     |                                                                                     |
| Queue Length 95th (m)             | 0.2                                                                               | 0.1                                                                               | 1.7                                                                               | 2.1                                                                               |                                                                                   |                                                                                   |                                                                                     |                                                                                     |                                                                                     |                                                                                     |                                                                                     |                                                                                     |
| Control Delay (s)                 | 0.5                                                                               | 0.2                                                                               | 12.2                                                                              | 13.1                                                                              |                                                                                   |                                                                                   |                                                                                     |                                                                                     |                                                                                     |                                                                                     |                                                                                     |                                                                                     |
| Lane LOS                          | A                                                                                 | A                                                                                 | B                                                                                 | B                                                                                 |                                                                                   |                                                                                   |                                                                                     |                                                                                     |                                                                                     |                                                                                     |                                                                                     |                                                                                     |
| Approach Delay (s)                | 0.5                                                                               | 0.2                                                                               | 12.2                                                                              | 13.1                                                                              |                                                                                   |                                                                                   |                                                                                     |                                                                                     |                                                                                     |                                                                                     |                                                                                     |                                                                                     |
| Approach LOS                      |                                                                                   |                                                                                   | B                                                                                 | B                                                                                 |                                                                                   |                                                                                   |                                                                                     |                                                                                     |                                                                                     |                                                                                     |                                                                                     |                                                                                     |
| Intersection Summary              |                                                                                   |                                                                                   |                                                                                   |                                                                                   |                                                                                   |                                                                                   |                                                                                     |                                                                                     |                                                                                     |                                                                                     |                                                                                     |                                                                                     |
| Average Delay                     |                                                                                   |                                                                                   | 1.8                                                                               |                                                                                   |                                                                                   |                                                                                   |                                                                                     |                                                                                     |                                                                                     |                                                                                     |                                                                                     |                                                                                     |
| Intersection Capacity Utilization |                                                                                   |                                                                                   | 29.0%                                                                             |                                                                                   | ICU Level of Service                                                              |                                                                                   |                                                                                     |                                                                                     | A                                                                                   |                                                                                     |                                                                                     |                                                                                     |
| Analysis Period (min)             |                                                                                   |                                                                                   | 15                                                                                |                                                                                   |                                                                                   |                                                                                   |                                                                                     |                                                                                     |                                                                                     |                                                                                     |                                                                                     |                                                                                     |

# King Street & Lincoln Avenue Sightline Assessment

## Existing (2023) Traffic Conditions - TWSC

PM Peak Hour

|                                   |                                                                                   |                                                                                   |                                                                                   |                                                                                   |                                                                                   |                                                                                   |                                                                                     |                                                                                     |                                                                                     |                                                                                     |                                                                                     |                                                                                     |
|-----------------------------------|-----------------------------------------------------------------------------------|-----------------------------------------------------------------------------------|-----------------------------------------------------------------------------------|-----------------------------------------------------------------------------------|-----------------------------------------------------------------------------------|-----------------------------------------------------------------------------------|-------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------|
|                                   |  |  |  |  |  |  |  |  |  |  |  |  |
| Movement                          | EBL                                                                               | EBT                                                                               | EBR                                                                               | WBL                                                                               | WBT                                                                               | WBR                                                                               | NBL                                                                                 | NBT                                                                                 | NBR                                                                                 | SBL                                                                                 | SBT                                                                                 | SBR                                                                                 |
| Lane Configurations               |                                                                                   |  |                                                                                   |                                                                                   |  |                                                                                   |                                                                                     |  |                                                                                     |                                                                                     |  |                                                                                     |
| Traffic Volume (veh/h)            | 20                                                                                | 433                                                                               | 12                                                                                | 17                                                                                | 353                                                                               | 40                                                                                | 7                                                                                   | 7                                                                                   | 22                                                                                  | 47                                                                                  | 12                                                                                  | 24                                                                                  |
| Future Volume (Veh/h)             | 20                                                                                | 433                                                                               | 12                                                                                | 17                                                                                | 353                                                                               | 40                                                                                | 7                                                                                   | 7                                                                                   | 22                                                                                  | 47                                                                                  | 12                                                                                  | 24                                                                                  |
| Sign Control                      |                                                                                   | Free                                                                              |                                                                                   |                                                                                   | Free                                                                              |                                                                                   |                                                                                     | Stop                                                                                |                                                                                     |                                                                                     | Stop                                                                                |                                                                                     |
| Grade                             |                                                                                   | 0%                                                                                |                                                                                   |                                                                                   | 0%                                                                                |                                                                                   |                                                                                     | 0%                                                                                  |                                                                                     |                                                                                     | 0%                                                                                  |                                                                                     |
| 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                                                                                |
| Hourly flow rate (vph)            | 22                                                                                | 471                                                                               | 13                                                                                | 18                                                                                | 384                                                                               | 43                                                                                | 8                                                                                   | 8                                                                                   | 24                                                                                  | 51                                                                                  | 13                                                                                  | 26                                                                                  |
| Pedestrians                       |                                                                                   |                                                                                   |                                                                                   |                                                                                   |                                                                                   |                                                                                   |                                                                                     |                                                                                     |                                                                                     |                                                                                     |                                                                                     |                                                                                     |
| Lane Width (m)                    |                                                                                   |                                                                                   |                                                                                   |                                                                                   |                                                                                   |                                                                                   |                                                                                     |                                                                                     |                                                                                     |                                                                                     |                                                                                     |                                                                                     |
| Walking Speed (m/s)               |                                                                                   |                                                                                   |                                                                                   |                                                                                   |                                                                                   |                                                                                   |                                                                                     |                                                                                     |                                                                                     |                                                                                     |                                                                                     |                                                                                     |
| Percent Blockage                  |                                                                                   |                                                                                   |                                                                                   |                                                                                   |                                                                                   |                                                                                   |                                                                                     |                                                                                     |                                                                                     |                                                                                     |                                                                                     |                                                                                     |
| Right turn flare (veh)            |                                                                                   |                                                                                   |                                                                                   |                                                                                   |                                                                                   |                                                                                   |                                                                                     |                                                                                     |                                                                                     |                                                                                     |                                                                                     |                                                                                     |
| Median type                       | None                                                                              |                                                                                   |                                                                                   |                                                                                   | None                                                                              |                                                                                   |                                                                                     |                                                                                     |                                                                                     |                                                                                     |                                                                                     |                                                                                     |
| Median storage veh                |                                                                                   |                                                                                   |                                                                                   |                                                                                   |                                                                                   |                                                                                   |                                                                                     |                                                                                     |                                                                                     |                                                                                     |                                                                                     |                                                                                     |
| Upstream signal (m)               |                                                                                   |                                                                                   |                                                                                   |                                                                                   |                                                                                   |                                                                                   |                                                                                     |                                                                                     |                                                                                     |                                                                                     |                                                                                     |                                                                                     |
| pX, platoon unblocked             |                                                                                   |                                                                                   |                                                                                   |                                                                                   |                                                                                   |                                                                                   |                                                                                     |                                                                                     |                                                                                     |                                                                                     |                                                                                     |                                                                                     |
| vC, conflicting volume            | 427                                                                               |                                                                                   |                                                                                   | 484                                                                               |                                                                                   |                                                                                   | 996                                                                                 | 984                                                                                 | 478                                                                                 | 991                                                                                 | 970                                                                                 | 406                                                                                 |
| vC1, stage 1 conf vol             |                                                                                   |                                                                                   |                                                                                   |                                                                                   |                                                                                   |                                                                                   |                                                                                     |                                                                                     |                                                                                     |                                                                                     |                                                                                     |                                                                                     |
| vC2, stage 2 conf vol             |                                                                                   |                                                                                   |                                                                                   |                                                                                   |                                                                                   |                                                                                   |                                                                                     |                                                                                     |                                                                                     |                                                                                     |                                                                                     |                                                                                     |
| vCu, unblocked vol                | 427                                                                               |                                                                                   |                                                                                   | 484                                                                               |                                                                                   |                                                                                   | 996                                                                                 | 984                                                                                 | 478                                                                                 | 991                                                                                 | 970                                                                                 | 406                                                                                 |
| tC, single (s)                    | 4.1                                                                               |                                                                                   |                                                                                   | 4.1                                                                               |                                                                                   |                                                                                   | 7.1                                                                                 | 6.5                                                                                 | 6.2                                                                                 | 7.1                                                                                 | 6.5                                                                                 | 6.2                                                                                 |
| tC, 2 stage (s)                   |                                                                                   |                                                                                   |                                                                                   |                                                                                   |                                                                                   |                                                                                   |                                                                                     |                                                                                     |                                                                                     |                                                                                     |                                                                                     |                                                                                     |
| tF (s)                            | 2.2                                                                               |                                                                                   |                                                                                   | 2.2                                                                               |                                                                                   |                                                                                   | 3.5                                                                                 | 4.0                                                                                 | 3.3                                                                                 | 3.5                                                                                 | 4.0                                                                                 | 3.3                                                                                 |
| p0 queue free %                   | 98                                                                                |                                                                                   |                                                                                   | 98                                                                                |                                                                                   |                                                                                   | 96                                                                                  | 97                                                                                  | 96                                                                                  | 75                                                                                  | 95                                                                                  | 96                                                                                  |
| cM capacity (veh/h)               | 1132                                                                              |                                                                                   |                                                                                   | 1079                                                                              |                                                                                   |                                                                                   | 200                                                                                 | 239                                                                                 | 588                                                                                 | 205                                                                                 | 244                                                                                 | 645                                                                                 |
| Direction, Lane #                 | EB 1                                                                              | WB 1                                                                              | NB 1                                                                              | SB 1                                                                              |                                                                                   |                                                                                   |                                                                                     |                                                                                     |                                                                                     |                                                                                     |                                                                                     |                                                                                     |
| Volume Total                      | 506                                                                               | 445                                                                               | 40                                                                                | 90                                                                                |                                                                                   |                                                                                   |                                                                                     |                                                                                     |                                                                                     |                                                                                     |                                                                                     |                                                                                     |
| Volume Left                       | 22                                                                                | 18                                                                                | 8                                                                                 | 51                                                                                |                                                                                   |                                                                                   |                                                                                     |                                                                                     |                                                                                     |                                                                                     |                                                                                     |                                                                                     |
| Volume Right                      | 13                                                                                | 43                                                                                | 24                                                                                | 26                                                                                |                                                                                   |                                                                                   |                                                                                     |                                                                                     |                                                                                     |                                                                                     |                                                                                     |                                                                                     |
| cSH                               | 1132                                                                              | 1079                                                                              | 350                                                                               | 263                                                                               |                                                                                   |                                                                                   |                                                                                     |                                                                                     |                                                                                     |                                                                                     |                                                                                     |                                                                                     |
| Volume to Capacity                | 0.02                                                                              | 0.02                                                                              | 0.11                                                                              | 0.34                                                                              |                                                                                   |                                                                                   |                                                                                     |                                                                                     |                                                                                     |                                                                                     |                                                                                     |                                                                                     |
| Queue Length 95th (m)             | 0.5                                                                               | 0.4                                                                               | 3.1                                                                               | 11.7                                                                              |                                                                                   |                                                                                   |                                                                                     |                                                                                     |                                                                                     |                                                                                     |                                                                                     |                                                                                     |
| Control Delay (s)                 | 0.6                                                                               | 0.5                                                                               | 16.6                                                                              | 25.7                                                                              |                                                                                   |                                                                                   |                                                                                     |                                                                                     |                                                                                     |                                                                                     |                                                                                     |                                                                                     |
| Lane LOS                          | A                                                                                 | A                                                                                 | C                                                                                 | D                                                                                 |                                                                                   |                                                                                   |                                                                                     |                                                                                     |                                                                                     |                                                                                     |                                                                                     |                                                                                     |
| Approach Delay (s)                | 0.6                                                                               | 0.5                                                                               | 16.6                                                                              | 25.7                                                                              |                                                                                   |                                                                                   |                                                                                     |                                                                                     |                                                                                     |                                                                                     |                                                                                     |                                                                                     |
| Approach LOS                      |                                                                                   |                                                                                   | C                                                                                 | D                                                                                 |                                                                                   |                                                                                   |                                                                                     |                                                                                     |                                                                                     |                                                                                     |                                                                                     |                                                                                     |
| Intersection Summary              |                                                                                   |                                                                                   |                                                                                   |                                                                                   |                                                                                   |                                                                                   |                                                                                     |                                                                                     |                                                                                     |                                                                                     |                                                                                     |                                                                                     |
| Average Delay                     |                                                                                   |                                                                                   | 3.2                                                                               |                                                                                   |                                                                                   |                                                                                   |                                                                                     |                                                                                     |                                                                                     |                                                                                     |                                                                                     |                                                                                     |
| Intersection Capacity Utilization |                                                                                   |                                                                                   | 48.9%                                                                             | ICU Level of Service                                                              |                                                                                   |                                                                                   |                                                                                     |                                                                                     | A                                                                                   |                                                                                     |                                                                                     |                                                                                     |
| Analysis Period (min)             |                                                                                   |                                                                                   | 15                                                                                |                                                                                   |                                                                                   |                                                                                   |                                                                                     |                                                                                     |                                                                                     |                                                                                     |                                                                                     |                                                                                     |

King Street & Lincoln Avenue Sightline Assessment  
Existing (2023) Traffic Conditions - AWS

AM Peak Hour

| Intersection              |     |
|---------------------------|-----|
| Intersection Delay, s/veh | 9.6 |
| Intersection LOS          | A   |

| Movement            | EBL  | EBT                                                                               | EBR  | WBL  | WBT                                                                               | WBR  | NBL  | NBT                                                                                 | NBR  | SBL  | SBT                                                                                 | SBR  |
|---------------------|------|-----------------------------------------------------------------------------------|------|------|-----------------------------------------------------------------------------------|------|------|-------------------------------------------------------------------------------------|------|------|-------------------------------------------------------------------------------------|------|
| Lane Configurations |      |  |      |      |  |      |      |  |      |      |  |      |
| Traffic Vol, veh/h  | 11   | 184                                                                               | 2    | 7    | 277                                                                               | 23   | 6    | 12                                                                                  | 14   | 16   | 8                                                                                   | 11   |
| Future Vol, veh/h   | 11   | 184                                                                               | 2    | 7    | 277                                                                               | 23   | 6    | 12                                                                                  | 14   | 16   | 8                                                                                   | 11   |
| 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, %   | 2    | 2                                                                                 | 2    | 2    | 2                                                                                 | 2    | 2    | 2                                                                                   | 2    | 2    | 2                                                                                   | 2    |
| Mvmt Flow           | 12   | 200                                                                               | 2    | 8    | 301                                                                               | 25   | 7    | 13                                                                                  | 15   | 17   | 9                                                                                   | 12   |
| Number of Lanes     | 0    | 1                                                                                 | 0    | 0    | 1                                                                                 | 0    | 0    | 1                                                                                   | 0    | 0    | 1                                                                                   | 0    |

| Approach                   | EB  | WB   | NB  | SB  |
|----------------------------|-----|------|-----|-----|
| Opposing Approach          | WB  | EB   | SB  | NB  |
| Opposing Lanes             | 1   | 1    | 1   | 1   |
| Conflicting Approach Left  | SB  | NB   | EB  | WB  |
| Conflicting Lanes Left     | 1   | 1    | 1   | 1   |
| Conflicting Approach Right | NB  | SB   | WB  | EB  |
| Conflicting Lanes Right    | 1   | 1    | 1   | 1   |
| HCM Control Delay          | 9.1 | 10.2 | 8.3 | 8.4 |
| HCM LOS                    | A   | B    | A   | A   |

| Lane                   | NBLn1 | EBLn1 | WBLn1 | SBLn1 |
|------------------------|-------|-------|-------|-------|
| Vol Left, %            | 19%   | 6%    | 2%    | 46%   |
| Vol Thru, %            | 38%   | 93%   | 90%   | 23%   |
| Vol Right, %           | 44%   | 1%    | 7%    | 31%   |
| Sign Control           | Stop  | Stop  | Stop  | Stop  |
| Traffic Vol by Lane    | 32    | 197   | 307   | 35    |
| LT Vol                 | 6     | 11    | 7     | 16    |
| Through Vol            | 12    | 184   | 277   | 8     |
| RT Vol                 | 14    | 2     | 23    | 11    |
| Lane Flow Rate         | 35    | 214   | 334   | 38    |
| Geometry Grp           | 1     | 1     | 1     | 1     |
| Degree of Util (X)     | 0.048 | 0.266 | 0.399 | 0.054 |
| Departure Headway (Hd) | 4.964 | 4.466 | 4.305 | 5.086 |
| Convergence, Y/N       | Yes   | Yes   | Yes   | Yes   |
| Cap                    | 720   | 805   | 838   | 703   |
| Service Time           | 3.003 | 2.488 | 2.326 | 3.125 |
| HCM Lane V/C Ratio     | 0.049 | 0.266 | 0.399 | 0.054 |
| HCM Control Delay      | 8.3   | 9.1   | 10.2  | 8.4   |
| HCM Lane LOS           | A     | A     | B     | A     |
| HCM 95th-tile Q        | 0.2   | 1.1   | 1.9   | 0.2   |

King Street & Lincoln Avenue Sightline Assessment  
Existing (2023) Traffic Conditions - AWS

PM Peak Hour

| Intersection              |      |
|---------------------------|------|
| Intersection Delay, s/veh | 16.1 |
| Intersection LOS          | C    |

| Movement            | EBL  | EBT                                                                               | EBR  | WBL  | WBT                                                                               | WBR  | NBL  | NBT                                                                                 | NBR  | SBL  | SBT                                                                                 | SBR  |
|---------------------|------|-----------------------------------------------------------------------------------|------|------|-----------------------------------------------------------------------------------|------|------|-------------------------------------------------------------------------------------|------|------|-------------------------------------------------------------------------------------|------|
| Lane Configurations |      |  |      |      |  |      |      |  |      |      |  |      |
| Traffic Vol, veh/h  | 20   | 433                                                                               | 12   | 17   | 353                                                                               | 40   | 7    | 7                                                                                   | 22   | 47   | 12                                                                                  | 24   |
| Future Vol, veh/h   | 20   | 433                                                                               | 12   | 17   | 353                                                                               | 40   | 7    | 7                                                                                   | 22   | 47   | 12                                                                                  | 24   |
| 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, %   | 2    | 2                                                                                 | 2    | 2    | 2                                                                                 | 2    | 2    | 2                                                                                   | 2    | 2    | 2                                                                                   | 2    |
| Mvmt Flow           | 22   | 471                                                                               | 13   | 18   | 384                                                                               | 43   | 8    | 8                                                                                   | 24   | 51   | 13                                                                                  | 26   |
| Number of Lanes     | 0    | 1                                                                                 | 0    | 0    | 1                                                                                 | 0    | 0    | 1                                                                                   | 0    | 0    | 1                                                                                   | 0    |

| Approach                   | EB   | WB   | NB  | SB   |
|----------------------------|------|------|-----|------|
| Opposing Approach          | WB   | EB   | SB  | NB   |
| Opposing Lanes             | 1    | 1    | 1   | 1    |
| Conflicting Approach Left  | SB   | NB   | EB  | WB   |
| Conflicting Lanes Left     | 1    | 1    | 1   | 1    |
| Conflicting Approach Right | NB   | SB   | WB  | EB   |
| Conflicting Lanes Right    | 1    | 1    | 1   | 1    |
| HCM Control Delay          | 18.2 | 15.5 | 9.6 | 10.4 |
| HCM LOS                    | C    | C    | A   | B    |

| Lane                   | NBLn1 | EBLn1 | WBLn1 | SBLn1 |
|------------------------|-------|-------|-------|-------|
| Vol Left, %            | 19%   | 4%    | 4%    | 57%   |
| Vol Thru, %            | 19%   | 93%   | 86%   | 14%   |
| Vol Right, %           | 61%   | 3%    | 10%   | 29%   |
| Sign Control           | Stop  | Stop  | Stop  | Stop  |
| Traffic Vol by Lane    | 36    | 465   | 410   | 83    |
| LT Vol                 | 7     | 20    | 17    | 47    |
| Through Vol            | 7     | 433   | 353   | 12    |
| RT Vol                 | 22    | 12    | 40    | 24    |
| Lane Flow Rate         | 39    | 505   | 446   | 90    |
| Geometry Grp           | 1     | 1     | 1     | 1     |
| Degree of Util (X)     | 0.066 | 0.691 | 0.612 | 0.156 |
| Departure Headway (Hd) | 6.091 | 4.919 | 4.947 | 6.208 |
| Convergence, Y/N       | Yes   | Yes   | Yes   | Yes   |
| Cap                    | 587   | 738   | 731   | 577   |
| Service Time           | 4.143 | 2.93  | 2.961 | 4.254 |
| HCM Lane V/C Ratio     | 0.066 | 0.684 | 0.61  | 0.156 |
| HCM Control Delay      | 9.6   | 18.2  | 15.5  | 10.4  |
| HCM Lane LOS           | A     | C     | C     | B     |
| HCM 95th-tile Q        | 0.2   | 5.6   | 4.2   | 0.5   |

King Street & Lincoln Avenue Sightline Assessment  
Future (2028) Traffic Conditions - TWSC

AM Peak Hour

|                                   |                                                                                   |                                                                                   |                                                                                   |                                                                                   |                                                                                   |                                                                                   |                                                                                    |                                                                                     |                                                                                     |                                                                                     |                                                                                     |                                                                                     |
|-----------------------------------|-----------------------------------------------------------------------------------|-----------------------------------------------------------------------------------|-----------------------------------------------------------------------------------|-----------------------------------------------------------------------------------|-----------------------------------------------------------------------------------|-----------------------------------------------------------------------------------|------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------|
|                                   |  |  |  |  |  |  |  |  |  |  |  |  |
| Movement                          | EBL                                                                               | EBT                                                                               | EBR                                                                               | WBL                                                                               | WBT                                                                               | WBR                                                                               | NBL                                                                                | NBT                                                                                 | NBR                                                                                 | SBL                                                                                 | SBT                                                                                 | SBR                                                                                 |
| Lane Configurations               |                                                                                   |  |                                                                                   |                                                                                   |  |                                                                                   |                                                                                    |  |                                                                                     |                                                                                     |  |                                                                                     |
| Traffic Volume (veh/h)            | 12                                                                                | 203                                                                               | 2                                                                                 | 8                                                                                 | 306                                                                               | 25                                                                                | 7                                                                                  | 13                                                                                  | 15                                                                                  | 18                                                                                  | 9                                                                                   | 12                                                                                  |
| Future Volume (Veh/h)             | 12                                                                                | 203                                                                               | 2                                                                                 | 8                                                                                 | 306                                                                               | 25                                                                                | 7                                                                                  | 13                                                                                  | 15                                                                                  | 18                                                                                  | 9                                                                                   | 12                                                                                  |
| Sign Control                      |                                                                                   | Free                                                                              |                                                                                   |                                                                                   | Free                                                                              |                                                                                   |                                                                                    | Stop                                                                                |                                                                                     |                                                                                     | Stop                                                                                |                                                                                     |
| Grade                             |                                                                                   | 0%                                                                                |                                                                                   |                                                                                   | 0%                                                                                |                                                                                   |                                                                                    | 0%                                                                                  |                                                                                     |                                                                                     | 0%                                                                                  |                                                                                     |
| 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                                                                                |
| Hourly flow rate (vph)            | 13                                                                                | 221                                                                               | 2                                                                                 | 9                                                                                 | 333                                                                               | 27                                                                                | 8                                                                                  | 14                                                                                  | 16                                                                                  | 20                                                                                  | 10                                                                                  | 13                                                                                  |
| Pedestrians                       |                                                                                   |                                                                                   |                                                                                   |                                                                                   |                                                                                   |                                                                                   |                                                                                    |                                                                                     |                                                                                     |                                                                                     |                                                                                     |                                                                                     |
| Lane Width (m)                    |                                                                                   |                                                                                   |                                                                                   |                                                                                   |                                                                                   |                                                                                   |                                                                                    |                                                                                     |                                                                                     |                                                                                     |                                                                                     |                                                                                     |
| Walking Speed (m/s)               |                                                                                   |                                                                                   |                                                                                   |                                                                                   |                                                                                   |                                                                                   |                                                                                    |                                                                                     |                                                                                     |                                                                                     |                                                                                     |                                                                                     |
| Percent Blockage                  |                                                                                   |                                                                                   |                                                                                   |                                                                                   |                                                                                   |                                                                                   |                                                                                    |                                                                                     |                                                                                     |                                                                                     |                                                                                     |                                                                                     |
| Right turn flare (veh)            |                                                                                   |                                                                                   |                                                                                   |                                                                                   |                                                                                   |                                                                                   |                                                                                    |                                                                                     |                                                                                     |                                                                                     |                                                                                     |                                                                                     |
| Median type                       | None                                                                              |                                                                                   |                                                                                   |                                                                                   | None                                                                              |                                                                                   |                                                                                    |                                                                                     |                                                                                     |                                                                                     |                                                                                     |                                                                                     |
| Median storage (veh)              |                                                                                   |                                                                                   |                                                                                   |                                                                                   |                                                                                   |                                                                                   |                                                                                    |                                                                                     |                                                                                     |                                                                                     |                                                                                     |                                                                                     |
| Upstream signal (m)               |                                                                                   |                                                                                   |                                                                                   |                                                                                   |                                                                                   |                                                                                   |                                                                                    |                                                                                     |                                                                                     |                                                                                     |                                                                                     |                                                                                     |
| pX, platoon unblocked             |                                                                                   |                                                                                   |                                                                                   |                                                                                   |                                                                                   |                                                                                   |                                                                                    |                                                                                     |                                                                                     |                                                                                     |                                                                                     |                                                                                     |
| vC, conflicting volume            | 360                                                                               |                                                                                   |                                                                                   | 223                                                                               |                                                                                   |                                                                                   | 630                                                                                | 626                                                                                 | 222                                                                                 | 636                                                                                 | 614                                                                                 | 346                                                                                 |
| vC1, stage 1 conf vol             |                                                                                   |                                                                                   |                                                                                   |                                                                                   |                                                                                   |                                                                                   |                                                                                    |                                                                                     |                                                                                     |                                                                                     |                                                                                     |                                                                                     |
| vC2, stage 2 conf vol             |                                                                                   |                                                                                   |                                                                                   |                                                                                   |                                                                                   |                                                                                   |                                                                                    |                                                                                     |                                                                                     |                                                                                     |                                                                                     |                                                                                     |
| vCu, unblocked vol                | 360                                                                               |                                                                                   |                                                                                   | 223                                                                               |                                                                                   |                                                                                   | 630                                                                                | 626                                                                                 | 222                                                                                 | 636                                                                                 | 614                                                                                 | 346                                                                                 |
| tC, single (s)                    | 4.1                                                                               |                                                                                   |                                                                                   | 4.1                                                                               |                                                                                   |                                                                                   | 7.1                                                                                | 6.5                                                                                 | 6.2                                                                                 | 7.1                                                                                 | 6.5                                                                                 | 6.2                                                                                 |
| tC, 2 stage (s)                   |                                                                                   |                                                                                   |                                                                                   |                                                                                   |                                                                                   |                                                                                   |                                                                                    |                                                                                     |                                                                                     |                                                                                     |                                                                                     |                                                                                     |
| tF (s)                            | 2.2                                                                               |                                                                                   |                                                                                   | 2.2                                                                               |                                                                                   |                                                                                   | 3.5                                                                                | 4.0                                                                                 | 3.3                                                                                 | 3.5                                                                                 | 4.0                                                                                 | 3.3                                                                                 |
| p0 queue free %                   | 99                                                                                |                                                                                   |                                                                                   | 99                                                                                |                                                                                   |                                                                                   | 98                                                                                 | 96                                                                                  | 98                                                                                  | 95                                                                                  | 98                                                                                  | 98                                                                                  |
| cM capacity (veh/h)               | 1199                                                                              |                                                                                   |                                                                                   | 1346                                                                              |                                                                                   |                                                                                   | 374                                                                                | 394                                                                                 | 818                                                                                 | 368                                                                                 | 400                                                                                 | 697                                                                                 |
| Direction, Lane #                 | EB 1                                                                              | WB 1                                                                              | NB 1                                                                              | SB 1                                                                              |                                                                                   |                                                                                   |                                                                                    |                                                                                     |                                                                                     |                                                                                     |                                                                                     |                                                                                     |
| Volume Total                      | 236                                                                               | 369                                                                               | 38                                                                                | 43                                                                                |                                                                                   |                                                                                   |                                                                                    |                                                                                     |                                                                                     |                                                                                     |                                                                                     |                                                                                     |
| Volume Left                       | 13                                                                                | 9                                                                                 | 8                                                                                 | 20                                                                                |                                                                                   |                                                                                   |                                                                                    |                                                                                     |                                                                                     |                                                                                     |                                                                                     |                                                                                     |
| Volume Right                      | 2                                                                                 | 27                                                                                | 16                                                                                | 13                                                                                |                                                                                   |                                                                                   |                                                                                    |                                                                                     |                                                                                     |                                                                                     |                                                                                     |                                                                                     |
| cSH                               | 1199                                                                              | 1346                                                                              | 497                                                                               | 439                                                                               |                                                                                   |                                                                                   |                                                                                    |                                                                                     |                                                                                     |                                                                                     |                                                                                     |                                                                                     |
| Volume to Capacity                | 0.01                                                                              | 0.01                                                                              | 0.08                                                                              | 0.10                                                                              |                                                                                   |                                                                                   |                                                                                    |                                                                                     |                                                                                     |                                                                                     |                                                                                     |                                                                                     |
| Queue Length 95th (m)             | 0.3                                                                               | 0.2                                                                               | 2.0                                                                               | 2.6                                                                               |                                                                                   |                                                                                   |                                                                                    |                                                                                     |                                                                                     |                                                                                     |                                                                                     |                                                                                     |
| Control Delay (s)                 | 0.5                                                                               | 0.3                                                                               | 12.8                                                                              | 14.1                                                                              |                                                                                   |                                                                                   |                                                                                    |                                                                                     |                                                                                     |                                                                                     |                                                                                     |                                                                                     |
| Lane LOS                          | A                                                                                 | A                                                                                 | B                                                                                 | B                                                                                 |                                                                                   |                                                                                   |                                                                                    |                                                                                     |                                                                                     |                                                                                     |                                                                                     |                                                                                     |
| Approach Delay (s)                | 0.5                                                                               | 0.3                                                                               | 12.8                                                                              | 14.1                                                                              |                                                                                   |                                                                                   |                                                                                    |                                                                                     |                                                                                     |                                                                                     |                                                                                     |                                                                                     |
| Approach LOS                      |                                                                                   |                                                                                   | B                                                                                 | B                                                                                 |                                                                                   |                                                                                   |                                                                                    |                                                                                     |                                                                                     |                                                                                     |                                                                                     |                                                                                     |
| Intersection Summary              |                                                                                   |                                                                                   |                                                                                   |                                                                                   |                                                                                   |                                                                                   |                                                                                    |                                                                                     |                                                                                     |                                                                                     |                                                                                     |                                                                                     |
| Average Delay                     |                                                                                   |                                                                                   | 1.9                                                                               |                                                                                   |                                                                                   |                                                                                   |                                                                                    |                                                                                     |                                                                                     |                                                                                     |                                                                                     |                                                                                     |
| Intersection Capacity Utilization |                                                                                   |                                                                                   | 31.3%                                                                             | ICU Level of Service                                                              |                                                                                   |                                                                                   |                                                                                    |                                                                                     | A                                                                                   |                                                                                     |                                                                                     |                                                                                     |
| Analysis Period (min)             |                                                                                   |                                                                                   | 15                                                                                |                                                                                   |                                                                                   |                                                                                   |                                                                                    |                                                                                     |                                                                                     |                                                                                     |                                                                                     |                                                                                     |

King Street & Lincoln Avenue Sightline Assessment  
Future (2028) Traffic Conditions - TWSC

PM Peak Hour

|                                   |                                                                                   |                                                                                   |                                                                                   |                                                                                   |                                                                                   |                                                                                   |                                                                                     |                                                                                     |                                                                                     |                                                                                     |                                                                                     |                                                                                     |
|-----------------------------------|-----------------------------------------------------------------------------------|-----------------------------------------------------------------------------------|-----------------------------------------------------------------------------------|-----------------------------------------------------------------------------------|-----------------------------------------------------------------------------------|-----------------------------------------------------------------------------------|-------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------|
|                                   |  |  |  |  |  |  |  |  |  |  |  |  |
| Movement                          | EBL                                                                               | EBT                                                                               | EBR                                                                               | WBL                                                                               | WBT                                                                               | WBR                                                                               | NBL                                                                                 | NBT                                                                                 | NBR                                                                                 | SBL                                                                                 | SBT                                                                                 | SBR                                                                                 |
| Lane Configurations               |                                                                                   |  |                                                                                   |                                                                                   |  |                                                                                   |                                                                                     |  |                                                                                     |                                                                                     |  |                                                                                     |
| Traffic Volume (veh/h)            | 22                                                                                | 478                                                                               | 13                                                                                | 19                                                                                | 390                                                                               | 44                                                                                | 8                                                                                   | 8                                                                                   | 24                                                                                  | 52                                                                                  | 13                                                                                  | 26                                                                                  |
| Future Volume (Veh/h)             | 22                                                                                | 478                                                                               | 13                                                                                | 19                                                                                | 390                                                                               | 44                                                                                | 8                                                                                   | 8                                                                                   | 24                                                                                  | 52                                                                                  | 13                                                                                  | 26                                                                                  |
| Sign Control                      |                                                                                   | Free                                                                              |                                                                                   |                                                                                   | Free                                                                              |                                                                                   |                                                                                     | Stop                                                                                |                                                                                     |                                                                                     | Stop                                                                                |                                                                                     |
| Grade                             |                                                                                   | 0%                                                                                |                                                                                   |                                                                                   | 0%                                                                                |                                                                                   |                                                                                     | 0%                                                                                  |                                                                                     |                                                                                     | 0%                                                                                  |                                                                                     |
| 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                                                                                |
| Hourly flow rate (vph)            | 24                                                                                | 520                                                                               | 14                                                                                | 21                                                                                | 424                                                                               | 48                                                                                | 9                                                                                   | 9                                                                                   | 26                                                                                  | 57                                                                                  | 14                                                                                  | 28                                                                                  |
| Pedestrians                       |                                                                                   |                                                                                   |                                                                                   |                                                                                   |                                                                                   |                                                                                   |                                                                                     |                                                                                     |                                                                                     |                                                                                     |                                                                                     |                                                                                     |
| Lane Width (m)                    |                                                                                   |                                                                                   |                                                                                   |                                                                                   |                                                                                   |                                                                                   |                                                                                     |                                                                                     |                                                                                     |                                                                                     |                                                                                     |                                                                                     |
| Walking Speed (m/s)               |                                                                                   |                                                                                   |                                                                                   |                                                                                   |                                                                                   |                                                                                   |                                                                                     |                                                                                     |                                                                                     |                                                                                     |                                                                                     |                                                                                     |
| Percent Blockage                  |                                                                                   |                                                                                   |                                                                                   |                                                                                   |                                                                                   |                                                                                   |                                                                                     |                                                                                     |                                                                                     |                                                                                     |                                                                                     |                                                                                     |
| Right turn flare (veh)            |                                                                                   |                                                                                   |                                                                                   |                                                                                   |                                                                                   |                                                                                   |                                                                                     |                                                                                     |                                                                                     |                                                                                     |                                                                                     |                                                                                     |
| Median type                       | None                                                                              |                                                                                   |                                                                                   | None                                                                              |                                                                                   |                                                                                   |                                                                                     |                                                                                     |                                                                                     |                                                                                     |                                                                                     |                                                                                     |
| Median storage veh                |                                                                                   |                                                                                   |                                                                                   |                                                                                   |                                                                                   |                                                                                   |                                                                                     |                                                                                     |                                                                                     |                                                                                     |                                                                                     |                                                                                     |
| Upstream signal (m)               |                                                                                   |                                                                                   |                                                                                   |                                                                                   |                                                                                   |                                                                                   |                                                                                     |                                                                                     |                                                                                     |                                                                                     |                                                                                     |                                                                                     |
| pX, platoon unblocked             |                                                                                   |                                                                                   |                                                                                   |                                                                                   |                                                                                   |                                                                                   |                                                                                     |                                                                                     |                                                                                     |                                                                                     |                                                                                     |                                                                                     |
| vC, conflicting volume            | 472                                                                               |                                                                                   |                                                                                   | 534                                                                               |                                                                                   |                                                                                   | 1100                                                                                | 1089                                                                                | 527                                                                                 | 1096                                                                                | 1072                                                                                | 448                                                                                 |
| vC1, stage 1 conf vol             |                                                                                   |                                                                                   |                                                                                   |                                                                                   |                                                                                   |                                                                                   |                                                                                     |                                                                                     |                                                                                     |                                                                                     |                                                                                     |                                                                                     |
| vC2, stage 2 conf vol             |                                                                                   |                                                                                   |                                                                                   |                                                                                   |                                                                                   |                                                                                   |                                                                                     |                                                                                     |                                                                                     |                                                                                     |                                                                                     |                                                                                     |
| vCu, unblocked vol                | 472                                                                               |                                                                                   |                                                                                   | 534                                                                               |                                                                                   |                                                                                   | 1100                                                                                | 1089                                                                                | 527                                                                                 | 1096                                                                                | 1072                                                                                | 448                                                                                 |
| tC, single (s)                    | 4.1                                                                               |                                                                                   |                                                                                   | 4.1                                                                               |                                                                                   |                                                                                   | 7.1                                                                                 | 6.5                                                                                 | 6.2                                                                                 | 7.1                                                                                 | 6.5                                                                                 | 6.2                                                                                 |
| tC, 2 stage (s)                   |                                                                                   |                                                                                   |                                                                                   |                                                                                   |                                                                                   |                                                                                   |                                                                                     |                                                                                     |                                                                                     |                                                                                     |                                                                                     |                                                                                     |
| tF (s)                            | 2.2                                                                               |                                                                                   |                                                                                   | 2.2                                                                               |                                                                                   |                                                                                   | 3.5                                                                                 | 4.0                                                                                 | 3.3                                                                                 | 3.5                                                                                 | 4.0                                                                                 | 3.3                                                                                 |
| p0 queue free %                   | 98                                                                                |                                                                                   |                                                                                   | 98                                                                                |                                                                                   |                                                                                   | 95                                                                                  | 96                                                                                  | 95                                                                                  | 67                                                                                  | 93                                                                                  | 95                                                                                  |
| cM capacity (veh/h)               | 1090                                                                              |                                                                                   |                                                                                   | 1034                                                                              |                                                                                   |                                                                                   | 166                                                                                 | 206                                                                                 | 551                                                                                 | 170                                                                                 | 211                                                                                 | 611                                                                                 |
| Direction, Lane #                 | EB 1                                                                              | WB 1                                                                              | NB 1                                                                              | SB 1                                                                              |                                                                                   |                                                                                   |                                                                                     |                                                                                     |                                                                                     |                                                                                     |                                                                                     |                                                                                     |
| Volume Total                      | 558                                                                               | 493                                                                               | 44                                                                                | 99                                                                                |                                                                                   |                                                                                   |                                                                                     |                                                                                     |                                                                                     |                                                                                     |                                                                                     |                                                                                     |
| Volume Left                       | 24                                                                                | 21                                                                                | 9                                                                                 | 57                                                                                |                                                                                   |                                                                                   |                                                                                     |                                                                                     |                                                                                     |                                                                                     |                                                                                     |                                                                                     |
| Volume Right                      | 14                                                                                | 48                                                                                | 26                                                                                | 28                                                                                |                                                                                   |                                                                                   |                                                                                     |                                                                                     |                                                                                     |                                                                                     |                                                                                     |                                                                                     |
| cSH                               | 1090                                                                              | 1034                                                                              | 304                                                                               | 222                                                                               |                                                                                   |                                                                                   |                                                                                     |                                                                                     |                                                                                     |                                                                                     |                                                                                     |                                                                                     |
| Volume to Capacity                | 0.02                                                                              | 0.02                                                                              | 0.14                                                                              | 0.45                                                                              |                                                                                   |                                                                                   |                                                                                     |                                                                                     |                                                                                     |                                                                                     |                                                                                     |                                                                                     |
| Queue Length 95th (m)             | 0.5                                                                               | 0.5                                                                               | 4.0                                                                               | 17.0                                                                              |                                                                                   |                                                                                   |                                                                                     |                                                                                     |                                                                                     |                                                                                     |                                                                                     |                                                                                     |
| Control Delay (s)                 | 0.6                                                                               | 0.6                                                                               | 18.9                                                                              | 33.7                                                                              |                                                                                   |                                                                                   |                                                                                     |                                                                                     |                                                                                     |                                                                                     |                                                                                     |                                                                                     |
| Lane LOS                          | A                                                                                 | A                                                                                 | C                                                                                 | D                                                                                 |                                                                                   |                                                                                   |                                                                                     |                                                                                     |                                                                                     |                                                                                     |                                                                                     |                                                                                     |
| Approach Delay (s)                | 0.6                                                                               | 0.6                                                                               | 18.9                                                                              | 33.7                                                                              |                                                                                   |                                                                                   |                                                                                     |                                                                                     |                                                                                     |                                                                                     |                                                                                     |                                                                                     |
| Approach LOS                      |                                                                                   |                                                                                   | C                                                                                 | D                                                                                 |                                                                                   |                                                                                   |                                                                                     |                                                                                     |                                                                                     |                                                                                     |                                                                                     |                                                                                     |
| Intersection Summary              |                                                                                   |                                                                                   |                                                                                   |                                                                                   |                                                                                   |                                                                                   |                                                                                     |                                                                                     |                                                                                     |                                                                                     |                                                                                     |                                                                                     |
| Average Delay                     |                                                                                   |                                                                                   | 4.0                                                                               |                                                                                   |                                                                                   |                                                                                   |                                                                                     |                                                                                     |                                                                                     |                                                                                     |                                                                                     |                                                                                     |
| Intersection Capacity Utilization |                                                                                   |                                                                                   | 52.6%                                                                             |                                                                                   | ICU Level of Service                                                              |                                                                                   |                                                                                     |                                                                                     | A                                                                                   |                                                                                     |                                                                                     |                                                                                     |
| Analysis Period (min)             |                                                                                   |                                                                                   | 15                                                                                |                                                                                   |                                                                                   |                                                                                   |                                                                                     |                                                                                     |                                                                                     |                                                                                     |                                                                                     |                                                                                     |

King Street & Lincoln Avenue Sightline Assessment  
Future (2028) Traffic Conditions - AWS

AM Peak Hour

| Intersection              |      |
|---------------------------|------|
| Intersection Delay, s/veh | 10.1 |
| Intersection LOS          | B    |

| Movement            | EBL  | EBT                                                                               | EBR  | WBL  | WBT                                                                               | WBR  | NBL  | NBT                                                                                 | NBR  | SBL  | SBT                                                                                 | SBR  |
|---------------------|------|-----------------------------------------------------------------------------------|------|------|-----------------------------------------------------------------------------------|------|------|-------------------------------------------------------------------------------------|------|------|-------------------------------------------------------------------------------------|------|
| Lane Configurations |      |  |      |      |  |      |      |  |      |      |  |      |
| Traffic Vol, veh/h  | 12   | 203                                                                               | 2    | 8    | 306                                                                               | 25   | 7    | 13                                                                                  | 15   | 18   | 9                                                                                   | 12   |
| Future Vol, veh/h   | 12   | 203                                                                               | 2    | 8    | 306                                                                               | 25   | 7    | 13                                                                                  | 15   | 18   | 9                                                                                   | 12   |
| 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, %   | 2    | 2                                                                                 | 2    | 2    | 2                                                                                 | 2    | 2    | 2                                                                                   | 2    | 2    | 2                                                                                   | 2    |
| Mvmt Flow           | 13   | 221                                                                               | 2    | 9    | 333                                                                               | 27   | 8    | 14                                                                                  | 16   | 20   | 10                                                                                  | 13   |
| Number of Lanes     | 0    | 1                                                                                 | 0    | 0    | 1                                                                                 | 0    | 0    | 1                                                                                   | 0    | 0    | 1                                                                                   | 0    |

| Approach                   | EB  | WB   | NB  | SB  |
|----------------------------|-----|------|-----|-----|
| Opposing Approach          | WB  | EB   | SB  | NB  |
| Opposing Lanes             | 1   | 1    | 1   | 1   |
| Conflicting Approach Left  | SB  | NB   | EB  | WB  |
| Conflicting Lanes Left     | 1   | 1    | 1   | 1   |
| Conflicting Approach Right | NB  | SB   | WB  | EB  |
| Conflicting Lanes Right    | 1   | 1    | 1   | 1   |
| HCM Control Delay          | 9.5 | 10.9 | 8.5 | 8.6 |
| HCM LOS                    | A   | B    | A   | A   |

| Lane                   | NBLn1 | EBLn1 | WBLn1 | SBLn1 |
|------------------------|-------|-------|-------|-------|
| Vol Left, %            | 20%   | 6%    | 2%    | 46%   |
| Vol Thru, %            | 37%   | 94%   | 90%   | 23%   |
| Vol Right, %           | 43%   | 1%    | 7%    | 31%   |
| Sign Control           | Stop  | Stop  | Stop  | Stop  |
| Traffic Vol by Lane    | 35    | 217   | 339   | 39    |
| LT Vol                 | 7     | 12    | 8     | 18    |
| Through Vol            | 13    | 203   | 306   | 9     |
| RT Vol                 | 15    | 2     | 25    | 12    |
| Lane Flow Rate         | 38    | 236   | 368   | 42    |
| Geometry Grp           | 1     | 1     | 1     | 1     |
| Degree of Util (X)     | 0.054 | 0.297 | 0.446 | 0.062 |
| Departure Headway (Hd) | 5.11  | 4.531 | 4.356 | 5.226 |
| Convergence, Y/N       | Yes   | Yes   | Yes   | Yes   |
| Cap                    | 698   | 793   | 825   | 683   |
| Service Time           | 3.159 | 2.56  | 2.383 | 3.275 |
| HCM Lane V/C Ratio     | 0.054 | 0.298 | 0.446 | 0.061 |
| HCM Control Delay      | 8.5   | 9.5   | 10.9  | 8.6   |
| HCM Lane LOS           | A     | A     | B     | A     |
| HCM 95th-tile Q        | 0.2   | 1.2   | 2.3   | 0.2   |

King Street & Lincoln Avenue Sightline Assessment  
Future (2028) Traffic Conditions - AWS

PM Peak Hour

| Intersection              |      |
|---------------------------|------|
| Intersection Delay, s/veh | 20.3 |
| Intersection LOS          | C    |

| Movement            | EBL  | EBT                                                                               | EBR  | WBL  | WBT                                                                               | WBR  | NBL  | NBT                                                                                 | NBR  | SBL  | SBT                                                                                 | SBR  |
|---------------------|------|-----------------------------------------------------------------------------------|------|------|-----------------------------------------------------------------------------------|------|------|-------------------------------------------------------------------------------------|------|------|-------------------------------------------------------------------------------------|------|
| Lane Configurations |      |  |      |      |  |      |      |  |      |      |  |      |
| Traffic Vol, veh/h  | 22   | 478                                                                               | 13   | 19   | 390                                                                               | 44   | 8    | 8                                                                                   | 24   | 52   | 13                                                                                  | 26   |
| Future Vol, veh/h   | 22   | 478                                                                               | 13   | 19   | 390                                                                               | 44   | 8    | 8                                                                                   | 24   | 52   | 13                                                                                  | 26   |
| 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, %   | 2    | 2                                                                                 | 2    | 2    | 2                                                                                 | 2    | 2    | 2                                                                                   | 2    | 2    | 2                                                                                   | 2    |
| Mvmt Flow           | 24   | 520                                                                               | 14   | 21   | 424                                                                               | 48   | 9    | 9                                                                                   | 26   | 57   | 14                                                                                  | 28   |
| Number of Lanes     | 0    | 1                                                                                 | 0    | 0    | 1                                                                                 | 0    | 0    | 1                                                                                   | 0    | 0    | 1                                                                                   | 0    |

| Approach                   | EB   | WB | NB | SB |
|----------------------------|------|----|----|----|
| Opposing Approach          | WB   | EB | SB | NB |
| Opposing Lanes             | 1    | 1  | 1  | 1  |
| Conflicting Approach Left  | SB   | NB | EB | WB |
| Conflicting Lanes Left     | 1    | 1  | 1  | 1  |
| Conflicting Approach Right | NB   | SB | WB | EB |
| Conflicting Lanes Right    | 1    | 1  | 1  | 1  |
| HCM Control Delay          | 23.9 | 19 | 10 | 11 |
| HCM LOS                    | C    | C  | A  | B  |

| Lane                   | NBLn1 | EBLn1 | WBLn1 | SBLn1 |
|------------------------|-------|-------|-------|-------|
| Vol Left, %            | 20%   | 4%    | 4%    | 57%   |
| Vol Thru, %            | 20%   | 93%   | 86%   | 14%   |
| Vol Right, %           | 60%   | 3%    | 10%   | 29%   |
| Sign Control           | Stop  | Stop  | Stop  | Stop  |
| Traffic Vol by Lane    | 40    | 513   | 453   | 91    |
| LT Vol                 | 8     | 22    | 19    | 52    |
| Through Vol            | 8     | 478   | 390   | 13    |
| RT Vol                 | 24    | 13    | 44    | 26    |
| Lane Flow Rate         | 43    | 558   | 492   | 99    |
| Geometry Grp           | 1     | 1     | 1     | 1     |
| Degree of Util (X)     | 0.078 | 0.783 | 0.696 | 0.179 |
| Departure Headway (Hd) | 6.419 | 5.053 | 5.09  | 6.497 |
| Convergence, Y/N       | Yes   | Yes   | Yes   | Yes   |
| Cap                    | 556   | 714   | 709   | 551   |
| Service Time           | 4.487 | 3.089 | 3.128 | 4.555 |
| HCM Lane V/C Ratio     | 0.077 | 0.782 | 0.694 | 0.18  |
| HCM Control Delay      | 10    | 23.9  | 19    | 11    |
| HCM Lane LOS           | A     | C     | C     | B     |
| HCM 95th-tile Q        | 0.3   | 7.7   | 5.7   | 0.6   |

## **APPENDIX 6**

### **OTM Traffic Signal Warrant**



### King Street/Lincoln Avenue - Existing (8-Hour Signal Warrant)

| Signal Warrant |                             | Description |                                                                                                      | Hour Ending |         |     |     |     |         |     |     |              |                                       | Sectional<br>Total % Fulfilled/8 | Entire % | Warrant   |
|----------------|-----------------------------|-------------|------------------------------------------------------------------------------------------------------|-------------|---------|-----|-----|-----|---------|-----|-----|--------------|---------------------------------------|----------------------------------|----------|-----------|
|                |                             |             |                                                                                                      | 1           | AM Peak | 3   | 4   | 5   | PM Peak | 7   | 8   |              |                                       |                                  |          |           |
| Intersection   | 1. Minimum Vehicular Volume | 1A          | Vehicle Volume, All Approaches for Each of the Heaviest 8 Hours of on Average Day, and               | 336         | 571     | 775 | 799 | 828 | 935     | 976 | 878 | Total Across | Min Requirement for Two-Lane Roadways | 91%                              | 50%      | 65%<br>No |
|                |                             |             | 100% Fulfilled                                                                                       |             |         | X   | X   | X   | X       | X   | 600 | 720          |                                       |                                  |          |           |
|                |                             |             | 80% Fulfilled                                                                                        |             |         |     |     |     |         |     | 0   | 580          |                                       |                                  |          |           |
|                |                             |             | Actual % if below 80% value                                                                          | 47%         | 79%     |     |     |     |         |     | 126 |              |                                       |                                  |          |           |
|                |                             |             | Total % Fulfilled                                                                                    |             |         |     |     |     |         |     |     |              | 726                                   |                                  |          |           |
|                |                             | 1B          | Vehicle Volume, Along Minor Streets for Each of the Same 8 Hours                                     | 52          | 67      | 71  | 85  | 95  | 100     | 113 | 100 | Total Across | Min Requirement for Two-Lane Roadways | 50%                              |          |           |
|                |                             |             | 100% Fulfilled                                                                                       |             |         |     |     |     |         |     | 0   | 170          |                                       |                                  |          |           |
|                |                             |             | 80% Fulfilled                                                                                        |             |         |     |     |     |         |     | 0   | 135          |                                       |                                  |          |           |
|                |                             |             | Actual % if below 80% value                                                                          | 31%         | 39%     | 42% | 50% | 56% | 59%     | 66% | 59% | 402          |                                       |                                  |          |           |
|                |                             |             | Total % Fulfilled                                                                                    |             |         |     |     |     |         |     |     |              | 402                                   |                                  |          |           |
|                | 2. Delay to Cross Traffic   | 2A          | Vehicle Volume, Along Major Street for Each of the Heaviest 8 Hours of an Average Day, and           | 284         | 504     | 704 | 714 | 733 | 835     | 863 | 778 | Total Across | Min Requirement for Two-Lane Roadways | 88%                              |          |           |
|                |                             |             | 100% Fulfilled                                                                                       |             |         |     |     | X   | X       | X   | X   | 400          | 720                                   |                                  |          |           |
|                |                             |             | 80% Fulfilled                                                                                        |             |         | 98% | 99% |     |         |     |     | 197          | 580                                   |                                  |          |           |
|                |                             |             | Actual % if below 80% value                                                                          | 39%         | 70%     |     |     |     |         |     |     | 109          |                                       |                                  |          |           |
|                |                             |             | Total % Fulfilled                                                                                    |             |         |     |     |     |         |     |     |              | 706                                   |                                  |          |           |
|                |                             | 2B          | Combined Vehicle and Pedestrian Volume <u>Crossing</u> the Major Street for Each of the Same 8 Hours | 29          | 34      | 40  | 57  | 48  | 56      | 67  | 58  | Total Across | Min Requirement for Two-Lane Roadways | 65%                              |          |           |
|                |                             |             | 100% Fulfilled                                                                                       |             |         |     |     |     |         |     |     | 0            | 75                                    |                                  |          |           |
|                |                             |             | 80% Fulfilled                                                                                        |             |         |     |     |     |         | 89% |     | 89           | 60                                    |                                  |          |           |
|                |                             |             | Actual % if below 80% value                                                                          | 39%         | 45%     | 53% | 76% | 64% | 75%     |     | 77% | 429          |                                       |                                  |          |           |
|                |                             |             | Total % Fulfilled                                                                                    |             |         |     |     |     |         |     |     |              | 518                                   |                                  |          |           |