# TRANSPORTATION IMPACT ASSESSMENT (TIA)

## THUNDER ROAD & BOUNDARY ROAD
## PROPOSED INDUSTRIAL DEVELOPMENT
## CITY OF OTTAWA

**PREPARED FOR:**
**THUNDER ROAD DEVELOPMENTS (2019) INC.**


**PREPARED BY:**

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# Certification Form for TIA Study PM

## TIA Plan Reports

On 14 June 2017, the Council of the City of Ottawa adopted new Transportation Impact Assessment (TIA) Guidelines. In adopting the guidelines, Council established a requirement for those preparing and delivering transportation impact assessments and reports to sign a letter of certification.

Individuals submitting TIA reports will be responsible for all aspects of development-related transportation assessment and reporting, and undertaking such work, in accordance and compliance with the City of Ottawa's Official Plan, the Transportation Master Plan and the Transportation Impact Assessment (2017) Guidelines.

By submitting the attached TIA report (and any associated documents) and signing this document, the individual acknowledges that s/he meets the four criteria listed below.

**CERTIFICATION**

- ☑ I have reviewed and have a sound understanding of the objectives, needs and requirements of the City of Ottawa's Official Plan, Transportation Master Plan and the Transportation Impact Assessment (2017) Guidelines;
- ☑ I have a sound knowledge of industry standard practice with respect to the preparation of transportation impact assessment reports, including multi modal level of service review;
- ☑ I have substantial experience (more than 5 years) in undertaking and delivering transportation impact studies (analysis, reporting and geometric design) with strong background knowledge in transportation planning, engineering or traffic operations; and
- ☑ I am either a licensed[1] or registered[2] professional in good standing, whose field of expertise
  - ☑ is either transportation engineering
  - ☑ or transportation planning .

[1,2] License of registration body that oversees the profession is required to have a code of conduct and ethics guidelines that will ensure appropriate conduct and representation for transportation planning and/or transportation engineering works.

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## Executive Summary

Background

C.F. Crozier & Associates Inc. (Crozier) was retained by Thunder Road Developments (2019) Inc. to prepare a Transportation Impact Assessment in support of the Official Plan Amendment (OPA), Zoning By-Law Amendment (ZBA) and Site Plan Approval (SPA) applications for the proposed industrial development located at Thunder Road and Boundary Road in the City of Ottawa.

This TIA assesses the site specific requirements and impacts of the proposed industrial development on the boundary road network and recommends required mitigation measures, as warranted.

The proposed development has an anticipated buildout by 2025 and includes three industrial buildings outlined below:

- Industrial Building 1: consists of 600,611 sq. ft of Gross Floor Area (GFA), 426 auto parking spaces, 98 trailer parking spaces and two full-moves accesses to Thunder Road;
- Industrial Building 2: consists of 41,449 sq. ft of GFA, 57 auto parking spaces and a full-moves access to Thunder Road, and
- Industrial Building 3: consists of 31,988 sq. ft of GFA, 52 auto parking spaces and a full-moves access to Boundary Road opposite the South Amazon access.

The proposed industrial development is projected to generate a total of 156 and 165 two-way auto trips during the weekday a.m. and p.m. peak hours, respectively.

Existing Traffic Operations

Under 2020 existing traffic conditions, the study intersections are projected to operate at the Level of Services (LOS) below.

- The stop-controlled Highway 417 Westbound Ramp Terminal at Boundary Road is operating below capacity at a LOS "C" or better during the a.m. and p.m. peak hours.

- The signalized intersections of Boundary Road with Highway 417 Eastbound Ramp Terminal and Thunder Road/Amazon Way are operating at a LOS "B" or better during the a.m. and p.m. peak hours.

- The stop-controlled South Amazon Access at Boundary Road is operating below capacity at a LOS "D" or better during the a.m. and p.m. peak hours.

- The stop-controlled Mitch Owens Road connection to Boundary Road is operating below capacity at a LOS "E" for the eastbound left turn movement during the a.m. and p.m. peak hours. All other movements at the intersection are at a LOS "A".

Future Background Traffic Operations

Under the 2025, 2030 and 2035 future background conditions:

- The stop-controlled Highway 417 Westbound Ramp Terminal at Boundary Road is forecast to operate at a LOS "E" or better during the a.m. peak hour and a LOS" B" or better during the p.m. peak hour.

- The signalized intersections of Boundary Road with Highway 417 Eastbound Ramp Terminal and Thunder Road/Amazon Way are both forecast to operate at a LOS "D" or better during the a.m. and p.m. peak hours.

- The stop-controlled South Amazon Access at Boundary Road is projected to operate at a LOS "E" and "F" during the a.m. and p.m. peak hours, respectively.

- The stop-controlled Mitch Owens Road connection to Boundary Road is expected to operate at a LOS "F" during the a.m. and p.m. peak hours. However, similar to Novatech's recommendation, adding a northbound left turn lane (2025 horizon) and implementing traffic signals (2035 horizon) is expected to result in a forecasted LOS "B" or better during the a.m. and p.m. peak hours.

Future Total Traffic Operations

For the 2025, 2030 and 2035 total traffic conditions (includes site generated trips), the study intersections are projected to operate as follows:

- The stop-controlled Highway 417 Westbound Ramp Terminal at Boundary Road is forecast to operate at a LOS "F" or better during the a.m. peak hour and a LOS "C" or better during the p.m. peak hour.

- The signalized intersections of Boundary Road with Highway 417 Eastbound Ramp Terminal and Thunder Road/Amazon Way are both forecast to operate at a LOS "D" or better during the a.m. and p.m. peak hours, similar to the future background conditions.

- The stop-controlled Mitch Owens Road connection to Boundary Road is expected to operate at a LOS "F" during the a.m. and p.m. peak hours under the ultimate 2035 horizon. Similar to the future background conditions, adding the northbound left turn lane (2025 horizon) and implementing traffic signals (2035 horizon) is expected to result in a forecasted LOS "B" or better during the a.m. and p.m. peak hours.

- The stop-controlled South Amazon Access at Boundary Road is projected to operate at a LOS "F" during the a.m. and p.m. peak hours under the ultimate 2035 horizon. This is a future background issue and is attributable to an increase in through volumes on Boundary Road.

- The proposed three stop-controlled site access connections to Thunder Road are projected to operate below capacity at a LOS "B" or better during the a.m. and p.m. peak hours, under all study horizons.

A signal warrant assessment based on the ultimate 2035 traffic volumes indicates that traffic signals are not warranted at the intersections of Boundary Road and South Amazon Access / Site Access and Thunder Road with the proposed three Site Accesses. Additionally, no left or right turn auxiliary lanes are warranted on Thunder Road or Boundary Road at the site access connections.

The proposed site accesses are projected to operate efficiently and safely without any issues related to sight-lines, corner clearance, access conflicts, truck movements and transit operational conflicts.

The vehicle parking supply of for each of the three buildings exceeds the City's Zoning By-Law minimum parking requirements.

Recommendations and Conclusion

Given the analysis herein, the recommendations presented in the Table E-1 should be considered to support the proposed development.

**Table E-1: Summary of Recommendations for Development Full build-Out**

| Category | Improvement | Responsibility | Timeline |
|---|---|---|---|
| **Parking** | Provide bicycle parking spaces for each building per City of Ottawa Zoning By-Law 2008-250 requirements | Developer | Full build-out (2025) |
| **Roadway Improvements** | **Boundary Road and Site Access / South Amazon Access:** Repurpose existing runout lane at south approach to provide auxiliary northbound left-turn with 15 metres of storage | Developer | Full build-out (2025) |
| **Network Monitoring** | **Boundary Road south of Highway 417 Westbound Ramp Terminal:** Monitor future traffic growth and demand on Boundary Road to identify any future potential network concept changes to accommodate the forecasted volumes from a capacity perspective (e.g., road widening to add additional through lanes). | City of Ottawa | Ongoing (prior to 2031 planning year) |
| **TDM Measures** | Provide cycling provisions such as secure bicycle parking, lockers, and showers | Developer | Full build-out (2025) |
| | Provide preferred carpool parking spaces to promote carpooling | Developer | Full build-out (2025) |
| | Co-ordinate with City to list development on the City's ride-matching portal and/or implement an internal ride-matching service to help employees find carpool partners | -- | Full build-out (2025) |
| | Implement an Emergency Ride Home program to guarantee employees a ride home in the case of an emergency | -- | Full build-out (2025) |
| | Provide information on available TDM opportunities through promotion and education | -- | Full build-out (2025) |
| | Establish a TDM program to monitor implementation and effectiveness of TDM measures | -- | Full build-out (2025) |

Further, in addition to the City's network monitoring, given the potential long term impact of the Covid-19 pandemic on home-work trips, the forecasted future volumes may be overstated, it is important to monitor intersection volumes in future to confirm if any roadway improvements and or traffic signal modifications are needed for optimal performance of relevant surrounding intersections.

Based on this study findings, it is our conclusion that the traffic generated by the proposed industrial development at Thunder Road and Boundary Road can be accommodated by the boundary road network. The Official Plan Amendment (OPA), Zoning By-Law Amendment (ZBA) and Site Plan Approval (SPA) applications can be supported from a traffic operations perspective as the boundary road system is forecast to adequately accommodate the increase in traffic volumes attributable to the proposed development.

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# 1.0 Introduction

## 1.1 Background

Crozier & Associates Inc. (Crozier) was retained by Thunder Road Developments (2019) Inc. to prepare a Transportation Impact Assessment in support of the Official Plan Amendment (OPA), Zoning By-Law Amendment (ZBA) and Site Plan Approval (SPA) applications for the proposed industrial development located at Thunder Road and Boundary Road in the City of Ottawa.

Based on the City of Ottawa's "Transportation Impact Assessment Guidelines (2017)" requirements a Transportation Impact Assessment (TIA) Screening and Scoping Report, a Forecasting Report and a Strategy Report were all submitted and confirmed by the City of Ottawa as part of the first four steps of the TIA submission process.

As required by the City's TIA Guidelines, this TIA report fulfils the final step of the TIA submission by compiling the TIA Screening and Scoping, Forecasting and Strategy Reports into a single document to support the proposed development application.

The subject property is within the Ministry of Transportation of Ontario (MTO) Permit Controlled Area and therefore subject to MTO review and approval, including conformance to the MTO's "Traffic Impact Study Guideline" (September 2014). Thus, the scope of work presented in this TIA report conforms to both the City and MTO's guidelines.

## 1.2 Subject Property

The subject property covers an area of approximately 43.15 acres and is located in a rural area east of the urban core of Ottawa. The subject property is located south of Highway 417 and near the Amazon Facility east of Boundary Road that was constructed in 2019. Highway 417 functions as the transportation link between Ottawa and Quebec.

The subject property is designated as "General Rural Area" per the City's Official Plan which permits farms, rural housing, wood lots and forests, small industries, golf courses and existing clusters of residential subdivisions and severances and commercial development. It is noted that the east side of Boundary Road is identified as "Employment Area" per the City's Official Plan.

The subject property is currently zoned as "Rural Countryside Zone" (RU) per the City's Zoning By-Law 2008-250. The purpose of the RU zone is to "accommodate agricultural, forestry, country residential lots created by severance and other land uses characteristic of Ottawa's countryside, in areas designated as General Rural Area, Rural Natural Features and Greenbelt Rural in the Official Plan…"

The subject property is bound by Thunder Road to the north, treed areas to the south and west, and Boundary Road to the east. With the exception of two residences at Boundary Road and a residential dwelling on Thunder Road, the subject property is primarily vacant. **Figure 1** contains the Site Location Plan.

### 1.3 Development Proposal

Per the Conceptual Site Plan prepared by Ware Malcomb dated November 2, 2020 (see **Appendix A**), the development proposes the following:

- An industrial building (Industrial Building 1) with 600,611 sq. ft of Gross Floor Area (GFA), 426 auto parking spaces, 98 trailer parking spaces and two full-moves accesses to Thunder Road;
- An industrial building (Industrial Building 2) with 41,449 sq. ft of GFA, 57 auto parking spaces and a full-moves access to Thunder Road, and
- An industrial building (Industrial Building 3) with 31,988 sq. ft of GFA, 52 auto parking spaces and a full-moves access to Boundary Road opposite the South Amazon access.

The development is expected to be built-out and occupied within a five-year horizon (i.e., 2025).

## 2.0 Screening

The City's TIA Guidelines contain a screening form that must be reviewed and completed to determine if a TIA is required for the proposed development. There are three triggers as part of the screening analysis: trip generation trigger, location trigger and safety trigger.

The **trip generation trigger** is satisfied as the proposed industrial development exceeds the 5,000 sq. m threshold.

The **location trigger** is not satisfied as the subject property is not located in a Design Priority Area (DPA), Transit-Oriented Development (TOD) zone, nor fronting a roadway that is part of the City's Transit Priority, Rapid Transit or Spine Bicycle Networks.

The **safety trigger** is satisfied as the posted speed limit on Boundary Road is 80 km/h and three of the proposed site accesses are within 300 metres of the signalized intersection of Thunder Road and Boundary Road. Additionally, City staff have identified concerns per the pre-application notes dated December 23, 2019 regarding the location of the proposed site accesses to Thunder Road particularly near the horizontal curve.

Therefore, a TIA is required to support the proposed development leading into the next step of scoping the work. The completed screening form is included as **Appendix B.**

## 3.0 Scoping

### 3.1 Existing Conditions

#### *3.1.1. Roadways*

The boundary road network is described in **Table 3-1.**

**Table 3-1: Boundary Road Network – Roadways**

| Feature | Roadway | | | | |
|---|---|---|---|---|---|
| | **Highway 417** | **Thunder Road** | **Boundary Road** | **Mitch Owens Road** | **Amazon Way** |
| Direction | Two-way (East-West) | Two-way (East-West) | Two-way (North-South) | Two-way (East-West) | Two-way (East-West) |
| Jurisdiction | MTO | Ottawa | Ottawa | Ottawa | Private |
| Classification | Highway | Collector | Arterial (Regional Road 41) | Arterial (Regional Road 8) | Private Road |
| Speed Limit | 110 km/h posted [1] 40 km/h advised for ramps | 60 km/h posted | 80 km/h posted | 80 km/h posted | 15 km/h posted |
| Span | Highway 17 to Quebec | Ramsayville Road to Boundary Road | Russel Road to Craig Street | Regional Road 49 to Boundary Road | Boundary Road to within the site |
| Alignment in Study Area | Straight and Flat | 45m radius curve west of Boundary Road, straight westerly Flat | Straight and Flat | Straight and Flat | Straight and Flat |
| Existing Developments in Study Area | None | Residential dwellings on south side, gas-station at southwest corner of intersection with Boundary Road | Distribution centre and other commercial uses, gas-station at southwest corner of intersection with Thunder Road | None | Distribution centre (Amazon) |
| Number of travel lanes | Four | Two | Two | Two | Two |
| Divided? | Yes | No | No | No | No |
| Intersection Control | Signal control at East Terminal and stop control at West Terminal | Signal control at Boundary Road | Signal control at Thunder Road and Amazon Way | Stop control at Boundary Road | Signal control at Boundary Road |

*Note 1: The posted speed limit of 110 km/h is a part of an MTO Pilot Project for 110 km/h speed limits within Ontario.*

**Figure 2** illustrates the existing boundary road network lane configurations and intersection control.

### *3.1.2. Intersections*

**Table 3-2** outlines the existing traffic control, configurations, and pedestrian crossing provisions at the intersections on the boundary road network.

**Table 3-2: Boundary Road Network – Intersections**

| Intersection | Control | Approaches | Major Street | Lane Configurations | Pedestrian Crossing |
|---|---|---|---|---|---|
| Boundary Road and Highway 417 Westbound Terminal | Stop (Minor Street) | 3 | Boundary Road | NBTR<br>SBLT<br>WBLR | None |
| Boundary Road and Highway 417 Eastbound Terminal | Signal | 3 | Boundary Road | NBL<br>NBT<br>SBTR<br>EBL<br>EBR – channelized | South and West Approaches |
| Boundary Road and Thunder Road / Amazon Way | Signal | 4 | Boundary Road | SBL<br>SBTR<br>NBL<br>NBT<br>NBR<br>WBTL<br>WBR<br>EBTLR | All Approaches |
| Boundary Road and South Amazon Access | Stop (Minor Street) | 3 | Boundary Road | NBTR<br>SBL<br>SBT<br>WBLR | East Approach |
| Boundary Road and Mitch Owens Road | Stop (Minor Road) | 3 | Boundary Road | EBR<br>EBL<br>NBTL<br>SBR<br>SBT | None |

The Amazon Facility Y0W1 has recently been constructed in the study area. A review of the supporting "Transportation Impact Study Addendum #1" prepared by NOVATECH (dated April 2018, herein referred to as the NOVATECH study) indicates that roadway improvements were recommended along Boundary Road at the Amazon site accesses, and the Highway 417 south ramp terminal. The intersection improvements were implemented in 2019 including auxiliary turn lanes at the intersections, as well as traffic signal control at the intersections of Boundary Road and Thunder Road / Amazon Access, and Boundary Road and Highway 417 south ramp terminal.

### *3.1.3. Adjacent Driveways*

There are several existing driveways on the boundary road network within 200 metres of the proposed site accesses as described below:

- Four driveways to residential dwellings on the south side of Thunder Road, west of the proposed site access to Building 2;
- One driveway to a residential dwelling on the south side of Thunder Road, between the proposed site accesses to Buildings 1 and 2. This driveway will be removed as part of the development proposal;
- One driveway to a gas station on the south side of Thunder Road, at the southwest corner of Thunder Road and Boundary Road;
- One driveway to a gas station on the west side of Boundary Road, at the southwest corner of Thunder Road and Boundary Road;
- One driveway to a restaurant on the west side of Boundary Road, north of the proposed site

access to Building 3;
- Two driveways to residential dwellings on the west side of Boundary Road, south of the proposed site access to Building 3 (these dwelling units are within the development boundary and thus would be replaced by the development build-out);
- One driveway to a commercial use on the west side of Boundary Road, south of the proposed site access to Building 3;
- One driveway to a residential dwelling on the east side of Boundary Road at the southeast corner of Thunder Road and Amazon Way;
- Two driveways to a commercial use on the east side of Boundary Road, north of the proposed site access to Building 3;
- One driveway to the Amazon Facility on the east side of Boundary Road, opposite the proposed site access to Building 3;
- Two driveways to commercial properties on the east side of Boundary Road, south of the proposed site access to Building 3; and
- One driveway to a residential dwelling on the east side of Boundary Road, south of the proposed site access to Building 3.

### *3.1.4. Existing Transit Services*

OC Transpo operates one transit route within the study area. **Table 3-3** outlines the existing transit route, direction, days of operation, peak hour headways, and the location of bus stops in the study area.

**Table 3-3: Existing Transit Services**

| Route | Direction | Span | Days of Operation | Peak Hour Headways (min) | Bus Stops in Study Area |
|---|---|---|---|---|---|
| Route 222 (OC Transpo) | West (AM Peak)<br>East (PM Peak) | Rockdale Road to Blair Station | Monday to Friday (6:00AM - 9:00AM and 3:00PM – 6:00PM) | 60 | None (Bus stop 1.25 km north of site on Boundary Road at GreyHawk Golf Club |

As outlined above, one bus route operates within the study area but does not actually service the immediate site frontage nor the nearby distribution centre. As there are no pedestrian facilities on Boundary Road between the site and the existing bus stop at GreyHawk Golf Club, there is a lack of convenient transit accessibility to and from the immediate study area. Additionally, the route only operates westbound (from Rockdale Road to Blair Station) during the weekday a.m. peak period and vice versa during the weekday p.m. peak period.

### *3.1.5. Existing Active Transportation Facilities*

The existing active transportation facilities on the boundary road network are described in **Table 3-4**.

**Table 3-4: Existing Active Transportation Network**

| Roadway | Pedestrian Facilities | Separation from Roadway | Cycling Facilities | Separation from Roadway |
|---|---|---|---|---|
| Highway 417 | None | N/A | None | N/A |
| Thunder Road | None | N/A | None | N/A |
| Boundary Road | None | N/A | Paved Shoulders – Highway 417 Eastbound Terminal to South Amazon Access | None |
| Mitch Owens Road | None | N/A | None | N/A |

As outlined above, the only existing pedestrian or cycling facilities in the study area are paved shoulders on Boundary Road between Highway 417 Eastbound Terminal to the South Amazon Access.

### *3.1.6. Area Traffic Management*

There are no Area Traffic Management measures in the study area nor are there any Area Traffic Management studies in progress.

### *3.1.7. Existing Traffic Volumes*

Commissioned traffic counts were provided by the proponent and collected during the weekday peak periods (6:00 a.m. – 10:00 a.m. and 3:00 p.m. – 7:00 p.m.) on January 7, 2020. The existing traffic volumes are illustrated in **Figure 3** and the traffic count data is included as **Appendix C.**

The recorded volumes on the boundary road network were auto traffic including heavy trucks. No pedestrian volumes were observed during the weekday a.m. and p.m. count periods.

### *3.1.8. Collision History*

Historical collision data was provided by the proponent from January 1, 2014 to December 31, 2018. A collision analysis was conducted to identify any existing collision trends in the area, with the critical threshold per the City's guidelines being more than six collisions within a five-year time frame for any collision type. The collision data is included as **Appendix D**.

**Table 3-5** outlines the collision frequency by type, severity, and weather conditions in the area

**Table 3-5: Collision History**

| Intersection | Collision Type | Severity | Weather Conditions |
|---|---|---|---|
| Boundary Road and Highway 417 Westbound Ramp Terminal | Angle – 2<br>Rear-End – 5<br>Sideswipe – 1<br>Single Manned Vehicle (SMV)/Other – 1<br>**Total - 9** | Fatal – 1<br>Property Damage (PD) Only - 8 | Rain – 1<br>Clear - 8 |
| Boundary Road and Highway 417 Eastbound Ramp Terminal | Rear-End – 3<br>SMV/Other – 1<br>**Total - 4** | Injury – 1<br>PD Only - 3 | Rain – 2<br>Clear – 2 |
| Boundary Road and Thunder Road | Turning Movement – 2<br>**Total - 2** | PD Only - 2 | Snow – 1<br>Clear – 1 |
| Boundary Road and Mitch Owens Road | Angle – 7<br>Rear-End – 3<br>SMV/Other – 8<br>**Total - 18** | Injury – 3<br>PD Only – 15 | Rain – 1<br>Snow – 2<br>Fog – 3<br>Clear - 12 |

As outlined above, the only collision patterns in the area that exceeds the City's threshold of six collisions within five years are angle collisions and SMV / other collisions at the intersection of Boundary Road and Mitch Owens Road, with seven and eight collisions (respectively) in the five-year time period.

Therefore, the TIA will include a safety analysis of the intersection of Boundary Road and Mitch Owens Road to identify existing conditions at the intersection and opportunities to address the pattern of angle collisions and SMV / other collisions, particularly under future conditions with the inclusion of development generated traffic.

## 3.2 Future Planned Conditions

### *3.2.1. Roadway Improvements*

No future roadway capacity improvements nor alternative transportation infrastructure plans have been identified on Thunder Road nor Boundary Road in the study area per the City's Transportation Master Plan (2013). Further, several roadway improvements have recently been implemented on Boundary Road to support the Amazon Facility build-out.

However, the City is currently updating their Transportation Master Plan which may include improvements to Thunder Road or Boundary Road. The City can confirm if any future improvements are planned in the study area.

### *3.2.2. Background Developments*

A review of the City's development applications map indicates a background development located on the properties at 5471-5613 Boundary Road and 5508-5800 Frontier Road. The development application is for Site Plan Control and is for a future waste management facility for the Capital Region Resource Recovery Centre (CRRRC). Thus, this development will be accounted for in the TIA. In the absence of current anticipated development build-out timing, build-out of the development will be accounted for under all future horizon years.

### 3.3 Study Area

The study area for the TIA will consist of the following study intersections:

- Highway 417 and Westbound Terminal
- Highway 417 and Eastbound Terminal
- Thunder Road and Boundary Road / Amazon Way
- Boundary Road and South Amazon Access / future site access
- Boundary Road and Mitch Owens Road

### 3.4 Time Periods

The employment nature of the proposed development will result in additional traffic on the boundary road network during the critical weekday commuter peak hours. Per typical TIS practice for employment developments, the TIA will analyze the weekday a.m. and p.m. peak periods.

### 3.5 Horizon Years

Per the City's guidelines, the year of full build-out and the five-year horizon must be analyzed. However, the MTO requires analysis of the year of full build-out, the five-year horizon and ten-year horizon.

It can reasonably be assumed that the development will be built-out by 2025. Therefore, the TIA will analyze the 2025, 2030 and 2035 horizon years.

### 3.6 Exemptions Review

This section reviews possible exemptions in the scope of work elements of the TIA study per the City's guidelines. **Table 3-6** summarizes the City's possible exemptions and the developments status in meeting the exemption.

**Table 3-6: Possible Exemptions**

| Module | Element | Exemption Condition | Development Status |
|---|---|---|---|
| **Design Review Component** | | | |
| Development Design | Circulation and Access | Only required for Site Plans | Not exempt |
| | **New Street Networks** | **Only required for Plans of Subdivision** | **Exempt** |
| Parking | Parking Supply | Only required for Site Plans | Not exempt |
| | **Spillover Parking** | **Only required for Site Plans where parking supply is 15% below unconstrained demand** | **Exempt** |
| Transportation Demand Management | All elements | Not required for Site Plans expected to have fewer than 60 employees and/or students on location at any given time | Not exempt |
| Neighbourhood Traffic Management | **Adjacent Neighbourhoods** | **Only required when the development relies on local or collector streets for access and total volumes exceed ATM capacity thresholds** | **Exempt** |
| Network Concept | --- | Only required when proposed development generates more than 200 person-trips during the peak hour in excess of the equivalent volume permitted by established zoning | Not exempt |

Therefore, the TIA will contain analysis of circulation and access, parking supply and demand, Transportation Demand management, and Network Concept (changes to Transportation Master Plan concepts for auto and transit use).

# 4.0 Forecasting

## 4.1 Trip Generation Forecasts

Trip generation for the proposed development was forecasted using the latest published data from the Institute of Transportation Engineers (ITE) Trip Generation Manual, 10th Edition. The ITE Trip Generation Manual is a compendium of industry collected trip generation data across North America for a variety of land uses and is used industry wide as a source for trip generation forecasts.

### *4.1.1. Auto Trip Generation*

The trip generation rates for Land Use Category (LUC) 150 "Warehousing" were applied to the proposed industrial buildings to forecast auto trips generated by the buildings. The fitted curve equation was applied to the proposed building GFAs from which a trip generation rate (trips generated per 1,000 sq. ft) was reverse calculated to determine non-auto trip generation rates.

The total trip generation for the proposed industrial buildings was categorized into passenger cars and heavy truck traffic. Per the ITE Trip Generation Handbook (3rd Edition), Table I.1, approximately 20% of site traffic generated by LUC 150 "Warehousing" on a weekday is heavy truck traffic. Site traffic generated by similar land use LUC 130 "Industrial Park" consists of between 1-31% of heavy truck traffic during the weekday peak hours with an average of 13%, and site traffic generated by similar land use LUC 152 "High-Cube Warehouse/Distribution Centre" consists of between 9-29% of heavy truck traffic during the weekday peak hours. Therefore, an estimate of 20% for heavy truck traffic is considered

reasonable.

**Table 4-1** outlines the auto trip generation for the proposed development.

**Table 4-1: Auto Trip Generation**

| Building | GFA | Land use | Trips Generated – A.M. Peak | | | Trips Generated – P.M. Peak | | |
|---|---|---|---|---|---|---|---|---|
| | | | In | Out | Total | In | Out | Total |
| **Total Auto Trip Generation** | | | | | | | | |
| 1 | 600,611 sq. ft | Industrial | **75** *(77%)* | **22** *(23%)* | **97** *(0.17)* | **27** *(27%)* | **73** *(73%)* | **100** *(0.17)* |
| 2 | 41,449 sq. ft | Industrial | **23** *(77%)* | **7** *(23%)* | **30** *(0.72)* | **9** *(27%)* | **24** *(73%)* | **33** *(0.80)* |
| 3 | 31,988 sq. ft | Industrial | **22** *(77%)* | **7** *(23%)* | **29** *(0.91)* | **9** *(27%)* | **23** *(73%)* | **32** *(1.00)* |
| **DEVELOPMENT TOTAL:** | | | **120** | **36** | **156** | **45** | **120** | **165** |
| **Passenger Car Trip Generation (80%)** | | | | | | | | |
| 1 | 600,611 sq. ft | Industrial | **60** | **18** | **78** | **22** | **58** | **80** |
| 2 | 41,449 sq. ft | Industrial | **18** | **6** | **24** | **7** | **19** | **26** |
| 3 | 31,988 sq. ft | Industrial | **18** | **6** | **24** | **7** | **18** | **25** |
| **DEVELOPMENT TOTAL:** | | | **96** | **30** | **126** | **36** | **95** | **131** |
| **Heavy Truck Trip Generation (20%)** | | | | | | | | |
| 1 | 600,611 sq. ft | Industrial | **15** | **4** | **19** | **5** | **15** | **20** |
| 2 | 41,449 sq. ft | Industrial | **5** | **1** | **6** | **2** | **5** | **7** |
| 3 | 31,988 sq. ft | Industrial | **4** | **1** | **5** | **2** | **5** | **7** |
| **DEVELOPMENT TOTAL:** | | | **24** | **6** | **30** | **9** | **25** | **34** |

The full build-out of the proposed development is expected to generate approximately 126 and 131 total two-way passenger car trips during the weekday a.m. and p.m. peak hour, respectively, and approximately 30 and 34 total two-way heavy truck trips during the weekday a.m. and p.m. peak hour, respectively.

Given that the proposed development is solely industrial use, no trip synergy is expected between the buildings and no pass-by trips are expected to be generated by the development. Therefore, no internal trip synergy reductions or pass-by trip reductions were applied.

### *4.1.2. Non-Auto Trip Generation*

The City's TIA Guidelines provide methodology for forecasting non-auto trips using the ITE Trip Generation Rates, as follows:

- Assume a 10% non-auto mode share for trips generated by the proposed development for low-density areas with low transit mode shares; and
- Assume an average vehicle occupancy of 1.15 for the purposes of translating auto trips to person trips.

The methodology outlined above equates to a factor of 1.28 to be applied to the ITE auto trip rates outlined in **Table 1** to forecast person trips.
**Table 4-2** outlines the non-auto trip generation for the proposed development.

**Table 4-2: Non-Auto Trip Generation**

| Building | GFA | Land use | Trips Generated – A.M. Peak | | | Trips Generated – P.M. Peak | | |
|---|---|---|---|---|---|---|---|---|
| | | | In | Out | Total | In | Out | Total |
| **Total Person Trip Generation** | | | | | | | | |
| 1 | 600,611 sq. ft | Industrial | **95** *(77%)* | **29** *(23%)* | **124** *(0.21)* | **35** *(27%)* | **93** *(73%)* | **128** *(0.21)* |
| 2 | 41,449 sq. ft | Industrial | **29** *(77%)* | **9** *(23%)* | **38** *(0.93)* | **11** *(27%)* | **31** *(73%)* | **42** *(1.02)* |
| 3 | 31,988 sq. ft | Industrial | **28** *(77%)* | **9** *(23%)* | **37** *(1.16)* | **11** *(27%)* | **30** *(73%)* | **41** *(1.28)* |
| **DEVELOPMENT TOTAL:** | | | **152** | **47** | **199** | **57** | **154** | **211** |
| **Non-Auto Trip Generation (10%)** | | | | | | | | |
| 1 | 600,611 sq. ft | Industrial | **10** | **3** | **13** | **4** | **9** | **13** |
| 2 | 41,449 sq. ft | Industrial | **3** | **1** | **4** | **1** | **3** | **4** |
| 3 | 31,988 sq. ft | Industrial | **3** | **1** | **4** | **1** | **3** | **4** |
| **DEVELOPMENT TOTAL:** | | | **16** | **5** | **21** | **6** | **15** | **21** |

The full build-out of the proposed development is expected to generate approximately 199 and 211 total person trips during the weekday a.m. and p.m. peak hour, respectively, and approximately 21 and 21 total non-auto trips during the weekday a.m. and p.m. peak hour, respectively.

## 4.2 Mode Shares

### *4.2.1. Existing Mode Shares*

The National Capital Region (NCR) Origin-Destination survey was reviewed to identify existing mode shares in the study area for transit, walking, cycling, auto passengers and auto trips for the Traffic Assessment Zone (TAZ) that contains the proposed development.

The subject property is located in the Rural Southeast TAZ. Thus, the latest census data (2011) was analyzed for the Rural Southeast TAZ. Specifically, the mode shares for trips entering and exiting the Rural Southeast TAZ during the weekday a.m. and p.m. peak periods (6:30 a.m. – 9:00 a.m., and 3:30 p.m. – 6:00 p.m.) were analyzed and are outlined in **Table 4-3.**

**Appendix E** contains the NCR survey data.

**Table 4-3: Existing Mode Share**

| Travel Mode | Weekday A.M. Peak Period | | Weekday P.M. Peak Period | | Average | Assumed Existing for Study Area |
|---|---|---|---|---|---|---|
| | Inbound | Outbound | Inbound | Outbound | | |
| Auto Driver | 69% | 68% | 73% | 64% | 69% | 77% |
| Auto Passenger | 9% | 14% | 18% | 30% | 18% | 20% |
| Transit | 0% | 6% | 5% | 3% | 3% | 3% |
| Cycling | 0% | 0% | 0% | 0% | 0% | 0% |
| Walking | 2% | 0% | 0% | 0% | 0% | 0% |
| Other [1] | 20% | 12% | 4% | 3% | 10% | 0% |
| **Total** | **100%** | **100%** | **100%** | **100%** | **100%** | **100%** |

*Note 1: Per the NCR survey methodology, "other" refers to trips made by school bus, paratransit, taxi, motorcycle/scooter, intercity/chartered bus, ferry, rail transit or air.*

As outlined above, the average auto mode share is approximately 87% and the average non-auto mode share is approximately 13%. It is noted that the mode share for "other" is significantly higher during the weekday a.m. peak hour compared to the weekday p.m. peak hour. This could be attributed to school bus activity during the morning school hours which overlap with the weekday a.m. commuter peak hours, whereas afternoon school hours do not typically overlap with weekday p.m. commuter peak hours.

It is further noted that the Rural Southeast TAZ consists of suburban areas such as Greely and Metcafe which may act as the origin or destination points for walking and other trips such as school bus and taxi. The subject lands are located in a rural area with no nearby suburban areas that would act as origin or destination points for walking trips and other trips made by school bus, ferry, rail, or air.

Therefore, the existing "other" mode share for the immediate study area would realistically be expected to be none or negligible at best. Thus, the mode share for auto driver and auto passenger would be expected to be higher than the average from the census data. The transit mode share assumption of 3% is also considered conservative as the nearest transit facility in the study area is the Route 222 (OC Transpo) bus stop at the GreyHawk Golf Club located 1.25 kilometres north of the subject property and there are no existing pedestrian facilities on Boundary Road in the area. Additionally, the route only operates westbound (from Rockdale Road to Blair Station) during the weekday a.m. peak period and vice versa during the weekday p.m. peak period, further limiting transit service availability for employees of the proposed future development.

Based on these assumptions, the existing non-auto mode share in the study area is only 3% which is less than the City's standard base assumption of 10% for low-density areas. This means that the person and non-auto trip generation forecasts outlined in **Table 4-2** may be overstated.

### *4.2.2. Future Mode Shares Targets*

Future mode share targets have been established for the proposed development considering the context of the development proposal, the assumed horizon year of 2025 for build-out, planned future roadway capacity and alternative transportation infrastructure improvements in the study area, and non-auto trip generation opportunities of the proposed development.

**Table 4-4** outlines the future mode share targets for the proposed development.

**Table 4-4: Future Mode Share Targets**

| Travel Mode | Assumed Existing Mode Share for Study Area | Target Mode Share (2025) | Rationale |
|---|---|---|---|
| Auto Driver | 77% | 70% (-7%) | Potential to increase auto passenger and transit mode shares may result in reductions in single-occupant vehicle (SOV) trips |
| Auto Passenger | 20% | 27% (+7%) | Potential for development to promote carpooling (e.g., provide preferred carpool parking spaces) to reduce SOV trips |
| Transit | 3% | 3% | Nearest transit stop is 1.25 kilometres north of site with no pedestrian facilities on Boundary Road, and weekday peak hour transit services are limited to westbound only in a.m. peak hour and eastbound only in p.m. peak hour |
| Cycling | 0% | 0% | Rural area with no nearby origin/destination points for cycling or walking trips, no planned cycling or walking infrastructure improvements in the study area, warehouse distribution nature of development typically not associated with cycling or walking trips |
| Walking | 0% | 0% | |
| **Total** | **100%** | **100%** | **--** |

As outlined above, a heavy reliance on auto travel is still expected in the future given the warehouse distribution nature of the proposed development, the rural context of the study area with no nearby origin or destination points for walking or cycling trips, and the absence of planned alternative transportation infrastructure improvements in the study area.

However, there are potential opportunities for the proposed development to reduce single-occupant vehicle (SOV) trips by promoting carpooling (e.g., provide preferred carpool parking spaces and incentives for employees to travel together), thus reducing the SOV trips generated by the proposed development. Co-ordination with City staff should also occur to list the proposed future development on the City's ride-matching portal to increase and encourage carpooling opportunities for employees.

## 4.3 Trip Distribution and Assignment

### *4.3.1. Employee Trip Distribution*

The employee trips generated by the proposed development will be distributed to the road network based on origin and destination data from the NCR survey (2011) for the Rural Southeast and Rural East TAZ, given that the subject property is adjacent to the Rural East TAZ. The percentage of trips from origin points outside of the study area entering the study area during the weekday a.m. peak hour were analyzed, and the following trip distribution was derived:

- 35% to and from the south via Boundary Road
- 5% to and from the south/west via Mitch Owens Road
- 20% to and from the north via Boundary Road
- 25% to and from the west via Highway 417
- 15% to and from the east via Highway 417

**Appendix E** contains the NCR survey data and **Appendix F** contains the trip distribution analysis based on percentage of trips from various origin points.

It is noted that this trip distribution is similar to the trip distribution that was applied to the "Transportation Impact Study Addendum #1" prepared by NOVATECH for the Amazon Warehouse and Distribution Facility (Y0W1) that was recently constructed in the study area. The study was prepared in April 2018 and is herein referred to as the NOVATECH study.

Employee trip distribution was derived in the NOVATECH study based on:

- origin and destination data provided by the proponent;
- origin and destination data from the NCR survey (2011) for the Rural Southeast and Rural East TAZ; and
- the population of surrounding communities per Statistics Canada.

The rationale listed above are accepted justification for trip distribution assumptions per the City's TIA Guidelines. Additionally, the 2011 NCR survey data used in the NOVATECH study still reflects the latest NCR survey data that is currently available.

The assumed trip distribution for employees in the NOVATECH study is as follows:

- 30% to and from the south via Boundary Road
- 5% to and from the south/west via Mitch Owens Road
- 20% to and from the north via Boundary Road
- 25% to and from the west via Highway 417
- 20% to and from the east via Highway 417

The study was approved by the City in 2018 and the proposed development will operate similarly to this warehouse and distribution facility. Therefore, given the similar land use and the similar trip distributions, the employee trip distribution in the NOVATECH study will be applied to this TIA for consistency.

### *4.3.2. Heavy Truck Trip Distribution*

The heavy truck trips generated by the proposed development will be distributed to the road network based on expected catchment areas for heavy trucks. The City of Ottawa and surrounding areas, as well as the Gatineau areas of Quebec are considered to be the major truck origin and destination points to the west, and the Montreal and surrounding areas are considered to be the major truck origin and destination point to the east. Therefore, a reasonable truck distribution is as follows:

- 60% to and from the west via Highway 417
- 40% to and from the east via Highway 417

Heavy truck trip distribution was derived in the NOVATECH study based on logical routing assumptions (given Ottawa to the west and Quebec to the east via Highway 417), as follows:

- 65% to and from the west via Highway 417
- 35% to and from the east via Highway 417

Given the similar land use and the similar assumed trip distributions, the heavy truck trip distribution in the NOVATECH study will be applied to this TIA for consistency.

### *4.3.3. Trip Assignment*

Employee and truck trips generated by the proposed development will be assigned to the road network based on the trip distribution outlined in subsequent Sections. Trips are assumed to travel to and from their origin and destination points based on the most convenient route available and the route with the shortest travel time.

For Building 1, employees are expected to enter and exit the site via the easterly access to Thunder Road (located at the horizontal curve) and the proposed access to Boundary Road. Heavy trucks are expected to enter and exit the site via the westerly access to Thunder Road. The westerly access extends within the site as a drive aisle solely connecting to the truck loading area while employee parking connects solely to the drive aisle extending from the easterly access.

For Building 2, all employees and heavy trucks will enter and exit the site via the sole proposed access to Thunder Road.

For Building 3, all employees and heavy trucks are expected to enter the site via the proposed access to Boundary Road. Most employees and heavy trucks are expected to exit the site via the proposed easterly access to Thunder Road to turn left onto Boundary Road at the signalized intersection.

**Figures 8 and 9** outline the employee and heavy truck trip assignment, respectively.

## 4.4 Background Network Travel Demands

### *4.4.1. Background Transportation Network Plans*

No future roadway capacity improvements nor alternative transportation infrastructure plans have been identified on Thunder Road nor Boundary Road in the study area per the City's Transportation Master Plan (2013). Further, several roadway improvements have recently been implemented on Boundary Road to support the Amazon Facility build-out.

As mentioned in the Screening and Scoping Report, the City is currently updating their Transportation Master Plan which may include improvements to Thunder Road or Boundary Road. The City can confirm if any future improvements are planned in the study area. However, for the purposes of this study, no background roadway improvements are assumed to occur.

The NOVATECH study that was prepared for the Amazon Facility recommended that the City consider implementing traffic signal control and an auxiliary northbound left-turn lane at the intersection of Boundary Road and Mitch Owens Road. The study found that under 2017 existing conditions, traffic signals and an auxiliary left-turn lane were warranted at the intersection, and that under future total conditions, the forecasted operations at the intersection were poor and indicated the need for traffic signal control. While this improvement has not been implemented as have the NOVATECH recommended improvements on Boundary Road at Highway 417 Eastbound Ramp Terminal and at Thunder Road / Amazon Way, this TIA will consider this recommendation. Therefore, the TIA will analyze the intersection of Boundary Road and Mitch Owens Road with and without the recommended improvements to compare operations and validate the NOVATECH recommendation.

### *4.4.2. Background Growth*

Historical growth rates were derived from Annual Average Daily Traffic (AADT) and Summer Average Daily Traffic (SADT) trends on Highway 417 at the Boundary Road Interchange. The latest AADT and SADT data available are for 2016; thus, growth rates from 2012 to 2016 were analyzed. **Appendix G** contains the growth rate analysis.

A compounded growth rate of 0.19% compounded annually was determined from the AADT for Highway 417 between 2012 and 2016, and a compounded growth rate of 0.66% compounded annually was determined from the SADT for Highway 417 between 2012 and 2016. These low growth rates indicate low traffic growth in the study area.

The NOVATECH study applied a conservative growth rate of 2% compounded annually to existing traffic volumes to forecast future background traffic volumes. This growth rate is exclusive of background development generated traffic in the study area. Additionally, the "Traffic Impact Study – Addendum 2" prepared by Taggart Group of Companies for the future Capital Region Resource Recovery Centre (CRRRC) in the study area also applied a growth rate of 2% compounded annually.

Therefore, given the calculated growth rates in the study area and the growth rate applied in background studies, the 2% growth rate compounded annually will be applied in this TIA for consistency.

### *4.4.3. Background Development*

A review of the City's development applications map indicates a background development located on the properties at 5471-5613 Boundary Road and 5508-5800 Frontier Road. The development application is for Site Plan Control and is for a future waste management facility for the Capital Region Resource Recovery Centre (CRRRC). Thus, this development will be accounted for in the TIA.

Per Figure 3.1 from the "Traffic Impact Study – Addendum 2" prepared by Taggart Group of Companies for the CRRRC, the development is expected to add site traffic to the study intersections. The weekday peak hour volumes outlined in Figure 3.1 of the CRRC were added to the boundary road network under 2025, 2030 and 2035 future background conditions. **Appendix H** contains excerpts from the CRRRC TIS. **Figure 4** outlines the CRRC background site traffic.

## 4.5 Demand Rationalization

Preliminary capacity analysis was conducted for this forecasting report to determine if there are any locations or movements under future analysis scenarios where the forecasted demand exceeds capacity. Per the City's TIA guidelines, if the forecasted demand for a location or movement is expected to exceed capacity (i.e., volume-to-capacity ratio exceeding 1.00), then future travel demands must be rationalized to account for capacity limitations on the transportation network.

For the purposes of this analysis, the ultimate build-out scenario (2035 future total conditions) was analyzed. The analysis methodology follows the City's TIA guidelines for Synchro 9.2 inputs and modelling parameters and will be detailed in the TIA Strategy Report as part of the next step in the TIA process.

**Figures 5, 6 and 7** outline the 2025, 2030 and 2035 future background traffic volumes, respectively, on the road network (with the growth rate outlined in Section 4.4.2 applied to the existing volumes plus

the CRRC background site traffic outlined in **Figure 4**). **Figures 10, 11 and 12** outline the 2025, 2030 and 2035 future total traffic volumes, respectively (with the site trip assignment outlined in **Figures 8 and 9** added to the future background traffic volumes).

Preliminary modelling of 2035 future total conditions indicates that the only movement expected to operate with a volume-to-capacity ratio exceeding 1.00 is the eastbound left-turn movement at Boundary Road and Mitch Owens Road during the weekday p.m. peak hour, with a ratio of 1.01. These operations are attributed to the reduced available capacity for the eastbound left-turn movement given the stop-controlled approach and the heavy through volumes on Boundary Road, as evidenced by the high forecasted average delay of 85 seconds.

However, these results are consistent with the findings of the NOVATECH study and as discussed earlier, the NOVATECH study recommended that the City implement traffic signal control and an auxiliary northbound left-turn lane at the intersection to improve traffic operations. If traffic signals are implemented, then the intersection is expected to operate with an average delay less than 20 seconds and a maximum volume-to-capacity ratio less than 0.80, thus resulting in no movements on the road network under 2035 future total conditions expected to exceed capacity.

Therefore, the TIA will analyze the intersection of Boundary Road and Mitch Owens Road with and without the recommended improvements to rationalize the future forecasted demand at the intersection.

# 5.0 Analysis

## 5.1 Development Design

### *5.1.1. Design for Sustainable Modes*

As detailed in the Forecasting Report (March 2021), there is a heavy reliance on auto travel in the study area given the rural industrial nature of the area and the lack of existing dedicated pedestrian, cycling, and transit facilities. However, there are opportunities for the proposed development to promote non-auto mode of travel as detailed further in Section 5.5.

### *5.1.2. Circulation and Access*

For Building 1, employees are expected to enter and exit the site via the easterly access to Thunder Road (located at the horizontal curve) and the proposed access to Boundary Road. Heavy trucks are expected to enter and exit the site via the westerly access to Thunder Road. The westerly access extends within the site as a drive aisle solely connecting to the truck loading area while employee parking connects solely to the drive aisle extending from the easterly access.

For Building 2, all employees and heavy trucks will enter and exit the site via the sole proposed access to Thunder Road.

For Building 3, all employees and heavy trucks are expected to enter the site via the proposed access to Boundary Road. Most employees and heavy trucks are expected to exit the site via the proposed easterly access to Thunder Road to turn left onto Boundary Road at the signalized intersection.

Vehicle turning analysis was conducted at the site accesses and within the sites for the most constrained vehicle profiles expected to navigate within the site. The purpose of this analysis is to

determine if there are any expected vehicle maneuverability issues within the site.

Analysis was conducted for the following vehicle profiles:

- a passenger car (per TAC GDGCR standards) navigating the passenger car parking areas;
- a WB-20 tractor semi-trailer (per TAC GDGCR standards) navigating the heavy truck areas; and
- a pumper firetruck navigating around the industrial buildings.

Vehicle turning analysis indicates that there are generally no expected maneuverability constraints within the site. Internal site geometrics and details will be finalized at a later stage in the project.

**Appendix I** contains the vehicle turning diagrams for each vehicle profile.

## 5.2 Parking Analysis

The proposed parking supply for the industrial buildings is outlined in **Table 5-1.**

**Table 5-1: Proposed Passenger Car Parking Supply**

| Building | GFA (sq. m) | Proposed Passenger Car Parking Supply |
|---|---|---|
| 1 | 55,799 | 426 spaces |
| 2 | 3,850 | 52 spaces |
| 3 | 2,972 | 57 spaces |

### *5.2.1. Auto Parking*

The minimum parking requirements for warehouse land uses in Area D "Rural" per the City of Ottawa Zoning By-Law 2008-250 (consolidated) is:

- 0.8 spaces per 100 sq. m for the first 5,000 sq. m of GFA, and
- 0.4 spaces per 100 sq. m for GFA greater than 5,000 sq. m.

**Table 5-2** outlines the minimum auto parking required for each building compared to the proposed supply for each building.

**Table 5-2: City of Ottawa Zoning By-Law Minimum Auto Parking Requirements**

| Building | GFA (sq. m) | Zoning Land Use | Minimum Spaces Required | Proposed Supply | Surplus or Deficiency |
|---|---|---|---|---|---|
| 1 | 55,799 | Warehouse | 244 spaces | 426 spaces | **+182** |
| 2 | 3,850 | Warehouse | 31 spaces | 52 spaces | **+21** |
| 3 | 2,972 | Warehouse | 24 spaces | 57 spaces | **+33** |

As outlined above, the proposed parking supply for each building exceeds the minimum requirements per the City's Zoning By-Law. Therefore, the proposed auto parking supply is sufficient.

### *5.2.2. Bicycle Parking*

The minimum bicycle parking requirements for the proposed warehouse development per the City's Zoning By-Law are calculated as follows:

- 1 space per 2,000 sq. m of GFA

**Table 5-3** outlines the minimum bicycle parking required for each building.

**Table 5-3: City of Ottawa Zoning By-Law Minimum Bicycle Parking Requirements**

| Building | GFA (sq. m) | Zoning Land Use | Minimum Bicycle Parking Spaces Required |
|---|---|---|---|
| 1 | 55,799 | Warehouse | 28 |
| 2 | 3,850 | Warehouse | 2 |
| 3 | 2,972 | Warehouse | 2 |

Bicycle parking spaces should be provided for each building in conformance with the City's Zoning By-law to encourage cycling as a viable mode of transportation to and from the site.

## 5.3 Boundary Streets

### *5.3.1. Multi-modal Level of Service*

A multi-modal level of service (MMLOS) assessment was conducted for non-auto modes of transportation in the study area following the City's MMLOS guidelines. **Table 5-4** outlines the MMLOS for pedestrian, cycling, transit and truck modes.

**Table 5-4: Boundary Street Multi-Modal Levels of Service**

| Intersection | Approach / Direction | Pedestrian LOS | Cycling LOS | Transit LOS | Truck LOS |
|---|---|---|---|---|---|
| Boundary Road between Highway 417 Eastbound Ramp Terminal | Northbound | F | F | E | C |
| | Southbound | F | F | E | C |
| Boundary Road and Thunder Road / Amazon Way | East Approach | C | F | N/A[2] | E |
| | West Approach | B | D | N/A[2] | E |
| | North Approach | E | F | N/A[2] | E |
| | South Approach | E | F | N/A[2] | E |
| Thunder Road west of Boundary Road | Eastbound | F | F | E | C |
| | Westbound | F | F | E | C |
| Boundary Road between Thunder Road and South Amazon Access | Northbound | F | F | E | C |
| | Southbound | F | F | E | C |
| Boundary Road and Thunder Road / South Amazon Access | East Approach | N/A[1] | D | N/A[2] | C |
| | West Approach | N/A[1] | N/A[3] | N/A[2] | N/A[3] |
| | North Approach | N/A[1] | D | N/A[2] | N/A[3] |
| | South Approach | N/A[1] | N/A[3] | N/A[2] | C |
| Boundary Road between South Amazon Access and Mitch Owens Road | Northbound | F | F | E | C |
| | Southbound | F | F | E | C |

*Note 1: Analysis not completed due to intersection constraints with unsignalized intersection while calculations require a signalized intersection per the City of Ottawa's "The Multimodal Level of Service (MMLOS) Guidelines".*

*Note 2: Transit Level of Service at intersections not required for Rural areas per City of Ottawa's "The Multimodal Level of Service (MMLOS) Guidelines".*

*Note 3: Leg of intersection required to complete analysis is not constructed (i.e., no leg for cyclists to turn left onto or from, or no leg for trucks to turn right onto or from).*

The multi-modal level of service analysis results reflects the existing rural industrial nature of the area and the lack of existing dedicated pedestrian, cycling, and transit facilities on the road network. Additionally, no future multi-modal improvements are currently identified in the study area.

### *5.3.2. Road Safety Analysis*

As identified in the Screening and Scoping Report, safety analysis was conducted for the intersection of Boundary Road and Mitch Owens Road to address the existing pattern of angle collisions and SMV / other collisions.

The dominant trend in the reported angle collisions is driver right-of-way conflicts with drivers turning left from the stop-controlled approach of Mitch Owens Road onto Boundary Road and colliding with northbound or southbound through traffic during clear weather and road surface conditions. There was no dominant trend in the reported SMV / other collisions, as they were observed to be relatively evenly distributed by direction, weather and road surface condition, time of day and driver action. These types of collisions are not uncommon on high-speed rural roadways.

A desktop review of the existing intersection indicates that the intersection is illuminated, the pavement markings and signage at the intersection appear to be in good condition, and there appears to be proper warning signs of the intersection at each intersection approach (stop ahead sign on Mitch Owens Road, and intersection ahead signs on Boundary Road). There is also a

checkerboard sign at the east leg of the intersection facing eastbound traffic approaching from Mitch Owens Road. The intersection also features an overhead flashing beacon (flashing amber on Boundary Road and flashing red on Mitch Owens Road) to further emphasize the three-legged intersection and provide caution to approaching drivers. These measures appear to have been in place since 2012 (per desktop historical imagery), suggesting that these reported collisions are more attributed to driver error and inclement weather conditions (e.g., snow and ice) as opposed to insufficient traffic control at the intersection.

However, as discussed in the Forecasting Report, the NOVATECH study recommended the implementation of traffic signals and an auxiliary northbound left-turn lane at the intersection of Boundary Road and Mitch Owens Road (warranted as a "background" improvement without the Amazon Facility build-out). If these improvements were to be implemented by the City (as recommended in this TIA), then the traffic signal control would evenly distribute right-of-way at the intersection and address the angle collision trend observed at the intersection. The traffic signal control implementation would "interrupt flow" on Boundary Road and thus force drivers to stop on the red indication, thus potentially addressing the SMV / other collisions occurring from drivers along Boundary Road. The implementation of the proper traffic control signage and pavement markings at the signalized intersection per OTM standards will further reduce the potential of SMV / other collisions occurring at the intersection.

## 5.4 Access Intersections Analysis and Design

### *5.4.1. Access Location*

5.4.1.1 Adjacent Driveways

As detailed in the Screening & Scoping Report (March 2021), there are several existing driveways on the boundary road network within 200 metres of the proposed site accesses as described below:

- Four driveways to residential dwellings on the south side of Thunder Road, west of the proposed site access to Building 2;
- One driveway to a residential dwelling on the south side of Thunder Road, between the proposed site accesses to Buildings 1 and 2. This driveway will be removed as part of the development proposal;
- One driveway to a gas station on the south side of Thunder Road, at the southwest corner of Thunder Road and Boundary Road;
- One driveway to a gas station on the west side of Boundary Road, at the southwest corner of Thunder Road and Boundary Road;
- One driveway to a restaurant on the west side of Boundary Road, north of the proposed site access to Building 3;
- Two driveways to residential dwellings on the west side of Boundary Road, south of the proposed site access to Building 3 (these dwelling units are within the development boundary and thus would be replaced by the development build-out);
- One driveway to a commercial use on the west side of Boundary Road, south of the proposed site access to Building 3;
- One driveway to a residential dwelling on the east side of Boundary Road at the southeast corner of Thunder Road and Amazon Way;
- Two driveways to a commercial use on the east side of Boundary Road, north of the proposed site access to Building 3;
- One driveway to the Amazon Facility on the east side of Boundary Road, opposite the

proposed site access to Building 3;
- Two driveways to commercial properties on the east side of Boundary Road, south of the proposed site access to Building 3; and
- One driveway to a residential dwelling on the east side of Boundary Road, south of the proposed site access to Building 3.

The existing private driveways not located within the subject property limits are spaced more than 15 metres from the proposed Building 2 and 3 site accesses to Thunder Road and Boundary Road and spaced more than 60 metres from the proposed Building 1 site accesses to Thunder Road (per the City's Private Approach By-law No. 2003-477, Section 25.1.m.ii).

5.4.1.2 Number of Proposed Accesses

Per the City's Private Approach By-law No. 2003-477, Section 25.1.a., the maximum number of private approaches permitted to a property is:

- One two-way access with frontage less than 35 metres;
- Two two-way accesses with frontage between 35 – 150 metres; and
- An additional two-way access for every 90 metres of frontage exceeding 150 metres.

The property frontage to Building 1 along Thunder Road is approximately 300 metres; thus, technically permitting four two-way accesses to Thunder Road. The development proposes two two-way accesses to Thunder Road, thus satisfying the City's By-law.

The property frontage to Building 2 along Thunder Road is approximately 135 metres; thus, technically permitting two two-way accesses to Thunder Road. The development proposes one two-way access to Thunder Road, thus satisfying the City's By-law.

The property frontage to Building 3 along Boundary Road is approximately 85 metres; thus, technically permitting two two-way accesses to Boundary Road. The development proposes one two-way access to Boundary Road, thus satisfying the City's By-law.

5.4.1.3 Sight Distance Analysis

The City identified the location of Site Access C to Thunder Road (adjacent to the horizontal curve) as a potential issue given that the horizontal curve may restrict sight distance availability from the access. Therefore, sight distance analysis was conducted at the proposed site accesses to Thunder Road and Boundary Road.

The available sightlines at the proposed accesses must satisfy minimum sight distance requirements set out in the TAC GDGCR. The design speed of a collector roadway in a rural environment is typically 10-20 km/h greater than the posted speed limit. The posted speed limit on Thunder Road is 60 km/h.

However, the sharp horizontal curve on Thunder Road approaching Boundary Road currently has a curve advisory speed of 30 km/h which would lower design speeds as a result. Thus, a conservative design speed of 50 km/h was applied to Site Access C facing east.

There is another horizontal curve on Thunder Road west of the subject property which, while not as tight as the horizontal curve approaching Boundary Road, would reduce operating speeds along Thunder Road approaching the curve and within the straight segment between the two curves. Therefore, a design speed of 70 km/h was applied to the site accesses west of Site Access C.

A design speed of 100 km/h was assumed for Boundary Road given the 80 km/h posted speed limit. **Table 5-5** outlines the required sight distance at the site accesses.

**Table 5-5: Sight Distance Requirements**

| Parameter | Thunder Road and Site Access A | Thunder Road and Site Access B | Thunder Road and Site Access C | Boundary Road and Site Access / South Amazon Access |
|---|---|---|---|---|
| **Design Vehicle** | WB-20 Tractor Semi-Trailer | WB-20 Tractor Semi-Trailer | WB-20 Tractor Semi-Trailer | WB-20 Tractor Semi-Trailer |
| **Posted Speed Limit of Roadway** | 60 km/h | 60 km/h | 60 km/h | 80 km/h |
| **Assumed Design Speed** | 70 km/h | 70 km/h | 70 km/h facing west)<br>50 km/h (facing east) | 100 km/h |
| **Base Time Gap** | 11.5 s [1] | 11.5 s [1] | 11.5 s [1] | 11.5 s [1] |
| **Additional Time Gap** | None | None | None | None |
| **Vertical Alignment of Roadway** | Relatively flat | Relatively flat | Relatively flat | Relatively flat |
| **Horizontal Alignment of Roadway** | Curves east and west of subject property | Curves east and west of subject property | Curves east and west of subject property | Straight |
| **Sight Distance Required** | 225 m [2] | 225 m [2] | 225 m [2] (facing west)<br>160 m [2] (facing east) | 320 m [2] |
| **Sight Distance Available** | Approx. 230 m (facing west)<br>+350 m (facing east) | +350 m (facing west)<br>To Boundary Road / Thunder Road intersection (facing east) | +350 m (facing west)<br>To Boundary Road / Thunder Road intersection (facing east) | +400 m (facing north and south) |

*Note 1: Time gap for left-turning WB-20 trucks from a stop onto a two-lane highway with no median and with a grade less than 3%. Value from Table 9.9.3 in the GDGCR.*
*Note 2: Sight distance values calculated from Intersection Sight Distance equation 9.9.1 in the GDGCR.*

The proposed site access locations satisfy minimum sight distance requirements. It is noted that Site Access B and C to Thunder Road (near the sharp horizontal curve) are positioned so that the available sightlines extend to the signalized intersection of Boundary Road and Thunder Road / Amazon Way. Thus, drivers exiting from those site accesses will be able to see vehicles arriving from the east (turning from Boundary Road onto Thunder Road) and from the west (given the flat and straight segment providing sufficient sightlines).

### *5.4.2. Access Width*

Per the City's Private Approach By-law No. 2003-477, the maximum width of a private approach cannot exceed 9.0 metres, but a higher width may be permitted for transport loading areas.

The proposed accesses to Thunder Road and Boundary Road range in width from 8.0 – 9.4 metres, thus exceeding 9.0 metres. However, these accesses will be utilized by heavy trucks to access the trucking areas for each building, thus justifying the excess width of 0.4 metres.

Access alignment and geometrics can be confirmed at a later stage in the project.

### *5.4.3. Traffic Control and Turn Lane Warrant Assessment*

5.4.3.1 Signal Warrant Analysis

A signal warrant analysis was conducted for the proposed site accesses to Thunder Road and proposed site access to Boundary Road under the ultimate 2035 horizon year. The TAC signal warrant analysis was applied per the City's TIA Guidelines.

Given the rural nature of the study area and the higher speed limits, a "free flow" type was applied to this warrant.

**Table 5-6** outlines the results of the signal warrant analysis.

**Table 5-6: Signal Warrant Analysis Results**

| Location | Flow Type | Horizon Year | Number of lanes on major road | Traffic Signals Warranted? |
|---|---|---|---|---|
| **Thunder Road and Site Access A** | Free Flow | 2035 | Two | **No** |
| **Thunder Road and Site Access B** | Free Flow | 2035 | Two | **No** |
| **Thunder Road and Site Access C** | Free Flow | 2035 | Two | **No** |
| **Boundary Road and South Amazon Access / Site Access** | Free Flow | 2035 | Two | **No** |

The results of the signal warrant analysis indicate that traffic signals are not warranted at the proposed site accesses to Thunder Road and proposed site access to Boundary Road opposite the South Amazon access. These results are attributed to the low forecasted minor-street volumes at the site accesses not triggering the minimum thresholds for traffic signal justification.

**Appendix J** contains the signal warrant sheets.

5.4.3.2 Left-Turn Lane Warrant Analysis

Auxiliary left-turn lane warrant analysis was conducted for the proposed site accesses to Thunder Road and proposed site access to Boundary Road under 2035 future total conditions. The analysis was conducted using the Ministry of Transportation (MTO)'s "Design Supplement for TAC Geometric Design Guide for Canadian Roads – April 2020."

Consistent with the sight distance analysis, a design speed of 70 km/h and 100 km/h was assumed for Thunder Road and Boundary Road, respectively.

**Table 5-7** outlines the results of the left-turn lane warrant analysis.

**Table 5-7: Left-Turn Lane Warrant Analysis Results**

| Location | Movement | Design Speed | Horizon Year | Number of lanes on major road | Left-Turn Lane Storage Requirement? |
|---|---|---|---|---|---|
| **Thunder Road and Site Access A** | Westbound left-turn movement | 70 km/h | 2035 | Two | None |
| **Thunder Road and Site Access B** | Westbound left-turn movement | 70 km/h | 2035 | Two | None |
| **Thunder Road and Site Access C** | Westbound left-turn movement | 70 km/h | 2035 | Two | None |
| **Boundary Road and South Amazon Access / Site Access** | Northbound left-turn movement | 100 km/h | 2035 | Two | None |

The results of the left-turn lane analysis indicate that auxiliary westbound left-turn lanes are not required on Thunder Road at the site accesses given the low forecasted approaching and opposing volumes along Thunder Road.

An auxiliary northbound left-turn lane is also not warranted on Boundary Road at the site access opposite the South Amazon access given the low forecasted northbound left-turn volumes not triggering the minimum thresholds for the left-turn lane warrant. However, there is an existing runout lane and taper at the south approach from the existing southbound left-turn lane on Boundary Road entering the South Amazon access that could be repurposed to provide a northbound left-turn lane into the site access. Left-turn lanes should be provided on opposing approaches at an intersection even if a left-turn lane is only warranted or existing at one approach, as to maintain geometric alignment along the roadway through the intersection. **Appendix K** contains the left-turn lane warrant analysis worksheets.

Therefore, it is recommended that the existing runout lane at the south approach of Boundary Road and South Amazon Access / Site Access be repurposed to provide an auxiliary northbound left-turn lane with a minimum storage length of 15 metres for passenger cars (as heavy trucks are not expected to arrive from the south).

5.4.3.3 Right-Turn Lane Warrant Analysis

Auxiliary right-turn lane warrant analysis was conducted for the proposed site accesses to Thunder Road and proposed site access to Boundary Road under 2035 future total conditions. Per the Transportation Association of Canada (TAC) Geometric Design Guide for Canadian Roads (GFGCR), June 2017, a right-turn auxiliary lane on an urban or rural road should be implemented at unsignalized intersections when the volume of decelerating or accelerating vehicles compared with the through traffic volume causes undue hazard.

It is a common convention in traffic engineering that an auxiliary right-turn lane should be considered where the right-turn volume exceeds 60 vehicles per hour. Therefore, this threshold was applied to the proposed site accesses to gauge right-turn lane requirements.

**Table5- 8** outlines the results of the right-turn lane warrant analysis.

**Table 5-8: Right-Turn Lane Warrant Analysis Results**

| Location | Movement | Design Speed | Horizon Year | Forecasted Critical Right-Turn Volume [1] | Right-Turn Lane Storage Requirement? |
|---|---|---|---|---|---|
| **Thunder Road and Site Access A** | Eastbound right-turn movement | 70 km/h | 2035 | 0 veh/hr | None |
| **Thunder Road and Site Access B** | Eastbound right-turn movement | 70 km/h | 2035 | 0 veh/hr | None |
| **Thunder Road and Site Access C** | Eastbound right-turn movement | 70 km/h | 2035 | 0 veh/hr | None |
| **Boundary Road and South Amazon Access / Site Access** | Southbound right-turn movement | 100 km/h | 2035 | 16 veh/hr (12 passenger cars, 4 heavy trucks) | None |

*Note 1: Volumes forecasted for 2035 future total conditions.*

The results of the right-turn lane analysis indicate that auxiliary right-turn lanes are not required at the proposed site accesses given the low forecasted right-turning volumes at the site accesses.

5.4.3.4 Access Operations

The traffic operations at the proposed site accesses are detailed in Section 5.7.7 of this report.

## 5.5 Transportation Demand Management (TDM) Analysis

As detailed in the Forecasting Report (March 2021), there is a heavy reliance on auto travel in the study area given the rural industrial nature of the area and the lack of existing dedicated pedestrian, cycling, and transit facilities. The existing auto modal split is assumed to be 97% and the non-auto modal split is assumed to be 3% (per the Forecasting Report).

A heavy reliance on auto travel is still expected in the future given the warehouse distribution nature of the proposed development, the rural context of the study area with no nearby origin or destination points for walking or cycling trips, and the absence of planned alternative transportation infrastructure improvements in the study area. Given the warehousing and distribution focus of the proposed development, employees would be required to physically work at the site during set hours, thus further restricting TDM opportunities such as flexible working hours and telework.

However, there are potential opportunities for the proposed development to reduce single-occupant vehicle (SOV) trips as described in this section.

### *5.5.1. Active Transportation*

The development could encourage cycling to and from the proposed development via the provision of bicycle parking spaces in conformance with the City's Zoning By-Law requirements. Additionally, further cycling provisions such as secure bicycle parking, lockers and showers could be implemented to encourage employees to bike to and from work.

### *5.5.2. Carpooling*

The development could promote carpooling by providing preferred carpool parking spaces and

incentives for employees to travel together. The provision of carpool parking spaces will encourage carpooling as an alternate mode of transportation with benefits such as cost savings, reduced environmental pollution and reduced commuting stress. Encouraging carpooling would contribute to a reduction in SOV trips and a reduction in peak hour auto trip generation and peak auto parking demand on site.

Co-ordination with City staff should occur to list the proposed future development on the City's ride-matching portal to help employees find carpool partners and increase and encourage carpooling opportunities for employees.

An internal ride-matching service to employees could also be implemented to maximize carpooling opportunities for employees, as carpooling with coworkers may be more appealing to employees compared to carpooling with strangers.

#### *5.5.3. Emergency Ride Home*

The employer could set up an Emergency Ride Home program that guarantees non-driving commuters that they will be taken home immediately and in a convenient manner in the case of unplanned circumstances which require employees to get home immediately. This program would provide reimbursements to employees for taxi, carshare or rental car usage to facilitate this Emergency Ride Home incentive, which may encourage employees to carpool.

#### *5.5.4. Promotion and Education*

There are opportunities for the implementation of other "soft" TDM measures. For example, the employer could provide information on available TDM opportunities such as preferred carpool parking, ride-matching opportunities, and programs such as Emergency Ride Home to educate employees of alternate modes of transportation. This promoted awareness of TDM opportunities can encourage the use of alternate modes of transportation, reduce SOV trip to and from the site, and reduce peak parking demand at the site.

#### *5.5.5. TDM Program Management*

A TDM program could be established by the employer to monitor the implementation and effectiveness of proposed TDM measures. This could include an internal or external program co-ordinator to oversee performance monitoring (e.g., in the form of employee feedback surveys or parking utilization surveys to determine if the TDM measures are effective in reducing auto demand), and to co-ordinate with the City on available TDM opportunities.

#### *5.5.6. Summary of Potential TDM Measures*

**Table 5-9** outlines the recommended TDM measures to reduce single-occupant vehicle (SOV) trips.

**Table 5-9: Summary of Potential TDM Measures and Implementation**

| Measure | Implementation |
|---|---|
| Bicycle Storage and Amenities | Full build-out (2025) |
| Preferential parking for Carpooling | Full build-out (2025) |
| Ride-Matching Service (co-ordination with City and/or internal service) | Full build-out (2025) |
| Emergency Ride Home | Full build-out (2025) |
| Promotion and Education | Full build-out (2025) |
| TDM Program Management | Full build-out (2025) |

### 5.6 Review of Network Concept

As detailed in the Forecasting Report and Screening & Scoping Reports, no future roadway capacity improvements nor alternative transportation infrastructure plans have been identified on Thunder Road nor Boundary Road in the study area per the City's Transportation Master Plan (2013) and proposed 2031 network concept. Further, several roadway improvements have recently been implemented on Boundary Road to support the Amazon Facility build-out.

The City is currently updating their Transportation Master Plan which may include improvements to Thunder Road or Boundary Road. The City can confirm if any future improvements are planned in the study area. However, for the purposes of this study, no background roadway improvements are assumed to occur.

However, forecasts of 2025, 2030 and 2035 future background traffic volumes indicate heavy through volumes along Boundary Road that exceed the typical capacity of 900 vehicles per hour per lane during the weekday a.m. and p.m. peak hours.

**Table 5-10** outlines the forecasted 2030 future background traffic volumes on Boundary Road by direction and time period, in line with the horizon year for the network concept. Volumes exceeding 900 veh/hr are highlighted.

**Table 5-10: 2030 Future Background – Boundary Road Through Volumes Forecasts**

| Segment | Weekday A.M. Peak Hour Volume (veh/hr) | | Weekday P.M. Peak Hour Volume (veh/hr) | |
|---|---|---|---|---|
| | Northbound | Southbound | Northbound | Southbound |
| Boundary Road north of Highway 417 Westbound Ramp Terminal | 139 | 197 | 160 | 160 |
| Boundary Road between Highway 417 Westbound Ramp Terminal and Highway 417 Eastbound Ramp Terminal | 1052 | 224 | 361 | 250 |
| Boundary Road between Highway 417 Eastbound Ramp Terminal | 1069 | 534 | 441 | 1037 |
| Boundary Road between Thunder Road and South Amazon Access | 1043 | 268 | 349 | 991 |
| Boundary Road between South Amazon Access and Mitch Owens Road | 1033 | 253 | 283 | 999 |
| Boundary Road south of Mitch Owens Road | 1094 | 168 | 205 | 977 |

These volumes suggest that Boundary Road is expected to operate beyond capacity during the weekday a.m. and p.m. peak hours from the Highway 417 Eastbound Ramp Terminal southerly in both directions, and that the northbound segment between the ramp terminals is expected to operate beyond capacity during the weekday a.m. peak hour.

Based on this network concept review, it is recommended that the City monitor future traffic growth and demand on Boundary Road (south of the Highway 417 Westbound Ramp Terminal) to identify any future potential network concept changes to accommodate the forecasted volumes from a capacity perspective (e.g., road widening to add additional through lanes).

## 5.7 Intersection Analysis and Design

The methodology outlined in the Screening & Scoping Reports, and Forecasting Reports was applied to this analysis to forecast future traffic volumes and analyze traffic operations on the road network to determine required improvements to the road network, if required.

### *5.7.1. Traffic Modelling*

The boundary road network was modelled in Synchro 11.0 using January 2020 weekday a.m. and p.m. peak hour traffic data in the study area (outlined in **Figure 2**), existing signal timing plans obtained from the City in January 2021, existing roadway geometric conditions and per the Synchro modelling guidelines outlined in the City's TIA guidelines.

The assessment of auto intersections is based on the "Highway Capacity Manual (HCM)" methodology. Intersections are assessed using a Level of Service (LOS) metric with ranges of delay assigned a letter from "A" to "F"; "A" representing low delays and "F" representing heavy delays. The LOS definitions for signalized and unsignalized intersections are included in **Appendix L.**

95$^{th}$ percentile queue lengths were derived from Synchro.

A critical volume-to-capacity threshold of 0.85 was applied to all movements on the road network to

flag any movements nearing capacity, except for the off-ramp movements at the ramp terminals for which a threshold of 0.75 was applied per the MTO's TIS guidelines.

### *5.7.2. Existing Auto Operations*

The existing auto intersection operations at the study intersections were analyzed using the existing traffic volumes illustrated in **Figure 3.** Detailed capacity analysis worksheets are included in **Appendix M**.

**Table 5-11** outlines the 2020 existing traffic operations.

**Table 5-11: 2020 Existing Traffic Operations**

| Intersection | Control | Peak Hour | Level of Service | Control Delay | Critical v/c ratio | 95th Percentile Queue Length > Storage Length |
|---|---|---|---|---|---|---|
| Boundary Road and Highway 417 Westbound Ramp Terminal | Stop (Minor) | A.M. | C | 22.2s (WBLR) | 0.39 (WBLR) | None |
| | | P.M. | B | 12.3s (WBLR) | 0.09 (WBLR) | None |
| Boundary Road and Highway 417 Eastbound Ramp Terminal | Signal | A.M. | B | 13.5 s | 0.80 (NBT) | None |
| | | P.M. | B | 14.3 s | 0.88 (EBR) | 66.1 m > 25 m (EBR) |
| Boundary Road and Thunder Road/Amazon Way | Signal | A.M. | B | 18.9 s | 0.83 (NBT) | 243.6m (NBT) |
| | | P.M. | A | 9.7 s | 0.72 (SBTR) | None |
| Boundary Road and South Amazon Access | Stop (Minor) | A.M. | D | 27.7s (WBLR) | 0.05 (WBLR) | None |
| | | P.M. | C | 20.0s (WBLR) | 0.07 (WBLR) | None |
| Boundary Road and Mitch Owens Road | Stop (Minor) | A.M. | E | 45.1s (EBL) | 0.47 (EBL) | None |
| | | P.M. | E | 38.6s (EBL) | 0.55 (EBL) | None |

The road network is currently operating at overall acceptable levels of service with minor control delays.

The NOVATECH study that was prepared for the Amazon Facility recommended that the City consider implementing traffic signal control and an auxiliary northbound left-turn lane at the intersection of Boundary Road and Mitch Owens Road. The study found that under 2017 existing conditions, traffic signals and an auxiliary left-turn lane were warranted at the intersection, and that under future total conditions, the forecasted operations at the intersection were poor and indicated the need for traffic signal control. While this improvement has not been implemented as have the NOVATECH recommended improvements on Boundary Road at Highway 417 Eastbound Ramp Terminal and at Thunder Road / Amazon Way, this improvement has been accounted for under future background and future total conditions in this analysis and is found to significantly improve traffic operations.

No movements on the existing road network are operating over capacity, albeit the eastbound right-turn movement at the Highway 417 Eastbound Ramp Terminal (which currently experiences a peak hour volume of 631 vehicles per hour during the weekday p.m. peak period).

The existing traffic operations on the road network are acceptable.

### *5.7.3. Future Background Volumes Forecasting*

As detailed in the Forecasting Report, growth rate of 2% compounded annually has been applied to all movements on the road network (as consistent with background studies in the area) to forecast 2025, 2030 and 2035 future background traffic volumes. This analysis also accounts for background traffic generated by the future Capital Region Resource Recovery Centre (CRRC) waste management facility south of the Amazon Facility.

**Figure 4** outlines the CRRC background site traffic. **Figures 5, 6 and 7** outline the 2025, 2030 and 2035 future background traffic volumes, respectively, on the road network (with the growth rate outlined in Section 4.4.2 applied to the existing volumes plus the CRRC background site traffic outlined in **Figure 4**).

### *5.7.4. Future Background Auto Operations*

The future background auto intersection operations at the study intersections were analyzed using the 2025, 2030 and 2035 future background traffic volumes illustrated in **Figures 5, 6 and 7,** respectively, and optimized signal timings. Detailed capacity analysis worksheets are included in **Appendix M**.

It is noted that the existing cycle length at the intersection of Boundary Road and Highway 417 Eastbound Ramp Terminal is 80 seconds, which is typically reflective of low-medium volume intersections and not typically reflective of high-volume arterial intersections. Additionally, the existing cycle length at the intersection of Boundary Road and Thunder Road / Amazon Way is 100 seconds. For consistency with the existing cycle length at Boundary Road and Thunder Road / Amazon Way (which is ideal for corridor progression between signalized intersections), the Highway 417 Eastbound Ramp Terminal was modelled with a cycle length of 100 seconds under all future background and total scenarios.

The intersection of Boundary Road and Mitch Owens Road was analyzed under 2035 future background and total conditions under two scenarios: with the recommended NOVATECH improvements, and with the existing side-street stop control.

**Tables 5-12, 5-13 and 5-14** outline the 2025, 2030 and 2035 future background traffic operations, respectively.

**Table 5-12: 2025 Future Background Traffic Operations**

| Intersection | Control | Peak Hour | Level of Service | Control Delay | Critical v/c ratio | 95th Percentile Queue Length > Storage Length |
|---|---|---|---|---|---|---|
| Boundary Road and Highway 417 Westbound Ramp Terminal | Stop (Minor) | A.M. | C | 22.9s (WBLR) | 0.43 (WBLR) | None |
| | | P.M. | B | 12.6 s (WBLR) | 0.09 (WBLR) | None |
| Boundary Road and Highway 417 Eastbound Ramp Terminal | Signal | A.M. | B | 14.1 s | 0.82 (NBT) | None |
| | | P.M. | B | 18.9 s | 0.91 (EBR) | 75.0m > 25 m (EBR) |
| Boundary Road and Thunder Road/Amazon Way | Signal | A.M. | C | 20.1 s | 0.87 (NBT) | 237.8m (NBT) |
| | | P.M. | A | 9.8 s | 0.74 (SBTR) | None |
| Boundary Road and South Amazon Access | Stop (Minor) | A.M. | D | 30.1s (WBLR) | 0.06 (WBLR) | None |
| | | P.M. | C | 22.5s (WBLR) | 0.08 (WBLR) | None |
| Boundary Road and Mitch Owens Road | Stop (Minor) | A.M. | E | 45.6s (EBL) | 0.48 (EBL) | None |
| | | P.M. | E | 38.5s (EBL) | 0.56 (EBL) | None |

**Table 5-13: 2030 Future Background Traffic Operations**

| Intersection | Control | Peak Hour | Level of Service | Control Delay | Critical v/c ratio | 95th Percentile Queue Length > Storage Length |
|---|---|---|---|---|---|---|
| Boundary Road and Highway 417 Westbound Ramp Terminal | Stop (Minor) | A.M. | D | 29.8s (WBLR) | 0.54 (WBLR) | None |
| | | P.M. | B | 13.2 s (WBLR) | 0.11 (WBLR) | None |
| Boundary Road and Highway 417 Eastbound Ramp Terminal | Signal | A.M. | B | 16.3 s | 0.88 (NBT) | 27.3m > 25m (EBR) |
| | | P.M. | C | 24.8 s | 0.95 (EBR) | 143.3 m > 25 m (EBR) |
| Boundary Road and Thunder Road/Amazon Way | Signal | A.M. | C | 28.0 s | 0.93 (NBT) | 279.3m (NBT) |
| | | P.M. | B | 10.4 s | 0.78 (SBTR) | None |
| Boundary Road and South Amazon Access | Stop (Minor) | A.M. | D | 34.7s (WBLR) | 0.08 (WBLR) | None |
| | | P.M. | D | 28.4s (WBLR) | 0.11 (WBLR) | None |
| Boundary Road and Mitch Owens Road | Stop (Minor) | A.M. | F | 70.0s (EBL) | 0.64 (EBL) | 27.2m > 25m (EBL) |
| | | P.M. | F | 60.4s (EBL) | 0.72 (EBL) | 37.0m > 25m (EBL) |

**Table 5-14: 2035 Future Background Traffic Operations**

| Intersection | Control | Peak Hour | Level of Service | Control Delay | Critical v/c ratio | 95th Percentile Queue Length > Storage Length |
|---|---|---|---|---|---|---|
| Boundary Road and Highway 417 Westbound Ramp Terminal | Stop (Minor) | A.M. | E | 43.8s (WBLR) | 0.69 (WBLR) | None |
| | | P.M. | B | 14.1 s (WBLR) | 0.13 (WBLR) | None |
| Boundary Road and Highway 417 Eastbound Ramp Terminal | Signal | A.M. | B | 19.5 s | 0.92 (NBT)<br>0.75 (EBR) | 29.2m > 25m (EBR) |
| | | P.M. | C | 33.5 s | 1.00 (EBR) | 189.1m > 25m (EBR) |
| Boundary Road and Thunder Road/Amazon Way | Signal | A.M. | D | 46.7 s | 1.03 (NBT) | 324.6m (NBT) |
| | | P.M. | B | 12.3 s | 0.82 (SBTR) | 277.2m (SBTR) |
| Boundary Road and South Amazon Access | Stop (Minor) | A.M. | E | 43.2s (WBLR) | 0.10 (WBLR) | None |
| | | P.M. | F | 88.1s (WBLR) | 0.34 (WBLR) | None |
| Boundary Road and Mitch Owens Road | Stop (Minor) | A.M. | F | 130.0s (EBL) | 0.88 (EBL) | 41.8m > 25m (EBL) |
| | | P.M. | F | 116.4s (EBL) | 0.96 (EBL) | 57.7m > 25m (EBL) |
| | Signal | A.M. | B | 13.7s | 0.80 (NBT) | 33.0m > 25m (EBL) |
| | | P.M. | B | 17.6 s | 0.84 (SBT) | 50.8m > 25m (EBL) |

The intersections of Boundary Road and Highway 417 Westbound Ramp Terminal, and Boundary Road and South Amazon Access are expected to operate near or at capacity under 2035 future background conditions. Several movements on the road network are expected to operate near capacity and with 95th percentile queue lengths exceeding available storage lengths. These results are mainly attributed to fifteen years of steady traffic growth in the study area, and heavy forecasted volumes on Boundary Road exceeding typical arterial roadway capacity.

Network concept changes such as identifying improvements to Boundary Road (e.g., road widening) would be expected to significantly improve traffic operations on the road network and increase capacity for individual movements. Additionally, the implementation of the recommended NOVATECH improvements at the intersection of Boundary Road and Mitch Owens Road is expected to improve the LOS from "F" to "B."

### *5.7.5. Site Traffic*

As detailed in the Forecasting Report (March 2021), the full build-out of the proposed development is expected to generate approximately 199 and 211 total person trips during the weekday a.m. and p.m. peak hour, respectively, and approximately 21 and 21 total non-auto trips during the weekday a.m. and p.m. peak hour, respectively.

Employee trips generated by the proposed development were distributed to the road network based on origin-destination data from the National Capital Region (NCR) survey (2011) and the population of surrounding communities per Statistics Canada. Heavy truck trips generated by the proposed development were distributed to the road network based on expected catchment areas and logical

routing assumptions for heavy trucks.

**Figures 8 and 9** outline the employee and heavy truck trip assignment, respectively.

### *5.7.6. Basis of Future Total Assessment*

The site generated traffic volumes illustrated in **Figures 8 and 9** were added to the 2025, 2030 and 2035 future background traffic volumes in . **Figures 5, 6 and 7**, respectively, to determine the 2025, 2030 and 2035 future total traffic volumes. **Figures 10, 11 and 12** outline the 2025, 2030 and 2035 future total traffic volumes, respectively.

### *5.7.7. Future Total Auto Operations*

The future total auto intersection operations at the study intersections were analyzed using the 2025, 2030 and 2035 future total traffic volumes illustrated in **Figures 10, 11 and 12,** respectively, and optimized signal timings. Detailed capacity analysis worksheets are included in **Appendix M**.

Given that a significant portion of site traffic entering and exiting the site accesses is heavy truck traffic, heavy truck percentages were calculated and modelled for all movements on the road network to reflect the increase in heavy truck percentages under future total conditions.

**Tables 5-15, 5-16 and 5-17** outline the 2025, 2030 and 2035 future total traffic operations, respectively.

**Table 5-15: 2025 Future Total Traffic Operations**

| Intersection | Control | Peak Hour | Level of Service | Control Delay | Critical v/c ratio | 95th Percentile Queue Length > Storage Length |
|---|---|---|---|---|---|---|
| Boundary Road and Highway 417 Westbound Ramp Terminal | Stop (Minor) | A.M. | D | 29.0s (WBLR) | 0.55 (WBLR) | None |
| | | P.M. | B | 13.4s (WBLR) | 0.12 (WBLR) | None |
| Boundary Road and Highway 417 Eastbound Ramp Terminal | Signal | A.M. | B | 14.2 s | 0.82 (NBT) | 28.8m > 25 m (EBR) |
| | | P.M. | C | 21.2 s | 0.93 (EBR) | 107.0 m > 25 m (EBR) |
| Boundary Road and Thunder Road/Amazon Way | Signal | A.M. | C | 22.9 s | 0.90 (NBT) | 256.8m(NBT) |
| | | P.M. | B | 19.5 s | 0.88 (SBT) | None |
| Boundary Road and South Amazon Access / Site Access | Stop (Minor) | A.M. | E | 39.4s (WBLR) | 0.08 (WBLR) | None |
| | | P.M. | D | 30.0s (WBLTR) | 0.11 (WBLTR) | None |
| Boundary Road and Mitch Owens Road | Stop (Minor) | A.M. | F | 51.7s (EBL) | 0.53 (EBL) | None |
| | | P.M. | E | 43.1s (EBL) | 0.59 (EBL) | 26.8m > 25m (EBL) |
| Site Access A and Thunder Road | Stop (Minor) | A.M. | A | 8.7s (NBLR) | 0.02 (NBLR) | None |
| | | P.M. | A | 9.2s (NBLR) | 0.07 (NBLR) | None |
| Site Access B and Thunder Road | Stop (Minor) | A.M. | A | 9.6s (NBLR) | 0.01 (NBLR) | None |
| | | P.M. | A | 10.0s (NBLR) | 0.02 (NBLR) | None |
| Site Access C and Thunder Road | Stop (Minor) | A.M. | A | 8.7s (NBLR) | 0.01 (NBLR) | None |
| | | P.M. | A | 9.0s (NBLR) | 0.03 (NBLR) | None |

**Table 5-16: 2030 Future Total Traffic Operations**

| Intersection | Control | Peak Hour | Level of Service | Control Delay | Critical v/c ratio | 95th Percentile Queue Length > Storage Length |
|---|---|---|---|---|---|---|
| Boundary Road and Highway 417 Westbound Ramp Terminal | Stop (Minor) | A.M. | E | 40.9s (WBLR) | 0.68 (WBLR) | None |
| | | P.M. | B | 14.2s (WBLR) | 0.14 (WBLR) | None |
| Boundary Road and Highway 417 Eastbound Ramp Terminal | Signal | A.M. | B | 16.8 s | 0.88 (NBT)<br>0.75 (EBR) | 31.1m > 25 m (EBR) |
| | | P.M. | D | 27.2 s | 0.97 (EBR) | 159.1 m > 25 m (EBR) |
| Boundary Road and Thunder Road/Amazon Way | Signal | A.M. | C | 32.6 s | 0.96 (NBT) | 299.7m(NBT) |
| | | P.M. | C | 23.3 s | 0.92 (SBT) | 286.5m (SBT) |
| Boundary Road and South Amazon Access / Site Access | Stop (Minor) | A.M. | E | 46.3s (WBLR) | 0.10 (WBLR) | None |
| | | P.M. | E | 43.2s (WBLTR) | 0.17 (WBLTR) | None |
| Boundary Road and Mitch Owens Road | Stop (Minor) | A.M. | F | 82.7s (EBL) | 0.71 (EBL) | 31.7m > 25m (EBL) |
| | | P.M. | F | 70.0.s (EBL) | 0.77 (EBL) | 40.9m > 25m (EBL) |
| Site Access A and Thunder Road | Stop (Minor) | A.M. | A | 8.7s (NBLR) | 0.02 (NBLR) | None |
| | | P.M. | A | 9.3s (NBLR) | 0.07 (NBLR) | None |
| Site Access B and Thunder Road | Stop (Minor) | A.M. | A | 9.6s (NBLR) | 0.01 (NBLR) | None |
| | | P.M. | B | 10.1s (NBLR) | 0.02 (NBLR) | None |
| Site Access C and Thunder Road | Stop (Minor) | A.M. | A | 8.7s (NBLR) | 0.01 (NBLR) | None |
| | | P.M. | A | 9.0s (NBLR) | 0.03 (NBLR) | None |

**Table 5-17: 2035 Future Total Traffic Operations**

| Intersection | Control | Peak Hour | Level of Service | Control Delay | Critical v/c ratio | 95th Percentile Queue Length > Storage Length |
|---|---|---|---|---|---|---|
| Boundary Road and Highway 417 Westbound Ramp Terminal | Stop (Minor) | A.M. | F | 68.5s (WBLR) | 0.86 (WBLR) | None |
| | | P.M. | C | 15.2s (WBLR) | 0.17 (WBLR) | None |
| Boundary Road and Highway 417 Eastbound Ramp Terminal | Signal | A.M. | C | 20.4 s | 0.93 (NBT)<br>0.78 (EBR) | 34.6m > 25 m (EBR) |
| | | P.M. | D | 40.0 s | 1.05 (EBR) | 203.5 m > 25 m (EBR) |
| Boundary Road and Thunder Road/Amazon Way | Signal | A.M. | D | 51.4 s | 1.06 (NBT)<br>1.00 (SBL) | 347.4 m (NBT) |
| | | P.M. | C | 31.6 s | 0.96 (SBT) | 332.9m (SBT) |
| Boundary Road and South Amazon Access / Site Access | Stop (Minor) | A.M. | F | 61.3s (WBLR) | 0.15 (WBLR) | None |
| | | P.M. | F | 139.6s (WBLTR) | 0.48 (WBLTR) | None |
| Boundary Road and Mitch Owens Road | Stop (Minor) | A.M. | F | 158.6s (EBL) | 0.97 (EBL) | 47.7m > 25m (EBL) |
| | | P.M. | F | 138.6.s (EBL) | 1.02 (EBL) | 63.1m > 25m (EBL) |
| | Signal | A.M. | B | 14.4s | 0.81 (NBT) | 34.3m > 25m (EBL) |
| | | P.M. | B | 18.5s | 0.86 (SBT) | 51.1m > 25m (EBL) |
| Site Access A and Thunder Road | Stop (Minor) | A.M. | A | 8.8s (NBLR) | 0.02 (NBLR) | None |
| | | P.M. | A | 9.3s (NBLR) | 0.07 (NBLR) | None |
| Site Access B and Thunder Road | Stop (Minor) | A.M. | A | 9.7s (NBLR) | 0.01 (NBLR) | None |
| | | P.M. | B | 10.1s (NBLR) | 0.02 (NBLR) | None |
| Site Access C and Thunder Road | Stop (Minor) | A.M. | A | 8.8s (NBLR) | 0.01 (NBLR) | None |
| | | P.M. | A | 9.1s (NBLR) | 0.03 (NBLR) | None |

The intersections of Boundary Road and Highway 417 Westbound Ramp Terminal, and Boundary Road and South Amazon Access / Site Access are expected to operate beyond capacity under 2035 future total conditions. Several movements on the road network are expected to operate near capacity and with 95th percentile queue lengths exceeding available storage lengths. These results are mainly attributed to fifteen years of steady traffic growth in the study area, and heavy forecasted volumes on Boundary Road exceeding typical arterial roadway capacity and are overall consistent with 2035 future background conditions.

When intersections are operating near or beyond capacity under future background conditions, the addition of even a minor amount of site traffic to the intersection can exponentially increase control delays. Therefore, even with the forecasted 2035 future total operations, the addition of site traffic to the road network is not expected to significantly impact traffic operations.

Network concept changes such as identifying future background improvements to Boundary Road

(e.g., road widening) would be expected to significantly improve traffic operations on the road network and increase capacity for individual movements. Additionally, the implementation of the recommended NOVATECH improvements at the intersection of Boundary Road and Mitch Owens Road is expected to improve the LOS from "F" to "B."

The proposed site accesses to Thunder Road are expected to operate at LOS "B" or better with minor control delays and no critical movements nor 95th percentile queue lengths.

## 6.0 Conclusions and Recommendations

This Transportation Impact Assessment (TIA) has assessed the transportation impacts of the proposed industrial development at the Thunder Road and Boundary Road site in the City of Ottawa. The analysis contained within this report has resulted in the following key findings:

- The proposed industrial development is projected to generate a total of 156 and 165 two-way auto trips during the weekday a.m. and p.m. peak hours, respectively.
- Under 2020 existing traffic conditions, the study intersections are projected to operate at the Level of Services (LOS) below.
    - The stop-controlled Highway 417 Westbound Ramp Terminal at Boundary Road is operating below capacity at a LOS "C" or better during the a.m. and p.m. peak hours.
    - The signalized intersections of Boundary Road with Highway 417 Eastbound Ramp Terminal and Thunder Road/Amazon Way are operating at a LOS "B" or better during the a.m. and p.m. peak hours.
    - The stop-controlled South Amazon Access at Boundary Road is operating below capacity at a LOS "D" or better during the a.m. and p.m. peak hours.
    - The stop-controlled Mitch Owens Road connection to Boundary Road is operating below capacity at a LOS "E" for the eastbound left turn during the a.m. and p.m. peak hours. All other movements at the intersection are at a LOS "A".
- Under the 2025, 2030 and 2035 future background conditions:
    - The stop-controlled Highway 417 Westbound Ramp Terminal at Boundary Road is forecast to operate at a LOS "E" or better during the a.m. peak hour and a LOS" B" or better during the p.m. peak hour.
    - The signalized intersections of Boundary Road with Highway 417 Eastbound Ramp Terminal and Thunder Road/Amazon Way are both forecast to operate at a LOS "D" or better during the a.m. and p.m. peak hours.
    - The stop-controlled South Amazon Access at Boundary Road is projected to operate at a LOS "E" and "F" during the a.m. and p.m. peak hours, respectively.
    - The stop-controlled Mitch Owens Road connection to Boundary Road is expected to operate at a LOS "F" during the a.m. and p.m. peak hours. However, similar to Novatech's recommendation, adding a northbound left turn lane (2025 horizon) and

implementing traffic signals (2035 horizon) is expected to result in a forecasted LOS "B" or better during the a.m. and p.m. peak hours.

- For the 2025, 2030 and 2035 total traffic conditions (includes site generated trips), the study intersections are projected to operate as follows:
    - The stop-controlled Highway 417 Westbound Ramp Terminal at Boundary Road is forecast to operate at a LOS "F" or better during the a.m. peak hour and a LOS "C" or better during the p.m. peak hour.
    - The signalized intersections of Boundary Road with Highway 417 Eastbound Ramp Terminal and Thunder Road/Amazon Way are both forecast to operate at a LOS "D" or better during the a.m. and p.m. peak hours, similar to the future background conditions.
    - The stop-controlled Mitch Owens Road connection to Boundary Road is expected to operate at a LOS "F" during the a.m. and p.m. peak hours under the ultimate 2035 horizon. Similar to the future background conditions, adding the northbound left turn lane (2025 horizon) and implementing traffic signals (2035 horizon) is expected to result in a forecasted LOS "B" or better during the a.m. and p.m. peak hours.
    - The stop-controlled South Amazon Access at Boundary Road is projected to operate at a LOS "F" during the a.m. and p.m. peak hours under the ultimate 2035 horizon. This is a future background issue and is attributable to an increase in through volumes on Boundary Road.
    - The proposed three stop-controlled site access connections to Thunder Road are projected to operate below capacity at a LOS "B" or better during the a.m. and p.m. peak hours, under all study horizons.
- A signal warrant assessment based on the ultimate 2035 traffic volumes indicates that traffic signals are not warranted at the intersections of Boundary Road and South Amazon Access / Site Access and Thunder Road with the proposed three Site Accesses. Additionally, no left or right turn auxiliary lanes are warranted on the major roads at the site access connections.
- The proposed site accesses are projected to operate efficiently and safely without any issues related to sight-lines, corner clearance, access conflicts, truck movements and transit operational conflicts. The vehicle parking supply of for each of the three buildings exceeds the City's Zoning By-Law minimum parking requirements.
- It is recommended that the following be considered to support the proposed development:
    - Consideration should be given to repurposing the existing runout lane at the south approach of the intersection of Boundary Road and Site Access / South Amazon Access to provide an auxiliary 15-metre northbound left-turn storage lane. The NBL lane addition along with a potential traffic signalization in the 2035 horizon is expected to improve the intersection performance in the long-term.
    - To support sustainable transportation, the owner may consider TDM measures such as provision of a good internal connection of pedestrian sidewalks and to municipal sidewalks where available, provision of bicycle parking/amenity, carpooling and

liaise with the City to implement TDM promotion/ education programs. These TDM measures are expected to encourage employees and visitors to be less dependent on single occupant auto trips.

- In addition to the City's existing road network volume monitoring program to assess capacity constrained zones, given the potential long term impact of the Covid-19 pandemic on home-work trips, the forecasted future volumes herein may be overstated, it is important to monitor intersection volumes in future to confirm if any roadway improvements and or traffic signal modifications are needed for optimal performance of the relevant surrounding intersections.

In conclusion, the traffic generated by the proposed industrial development at Thunder Road and Boundary Road can be accommodated by the boundary road network. The Official Plan Amendment (OPA), Zoning By-Law Amendment (ZBA) and Site Plan Approval (SPA) applications can be supported from a traffic operations perspective as the boundary road system is forecast to adequately accommodate the increase in traffic volumes attributable to the proposed development.

Minor changes to the site plan will not materially affect the conclusions contained within this Study. Should you have any questions or require further information, please contact the undersigned.

Respectfully submitted by,

**C.F. CROZIER & ASSOCIATES INC.**

Alexander J.W. Fleming, MBA, P.Eng.
Associate

/dl/pa

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# APPENDIX A

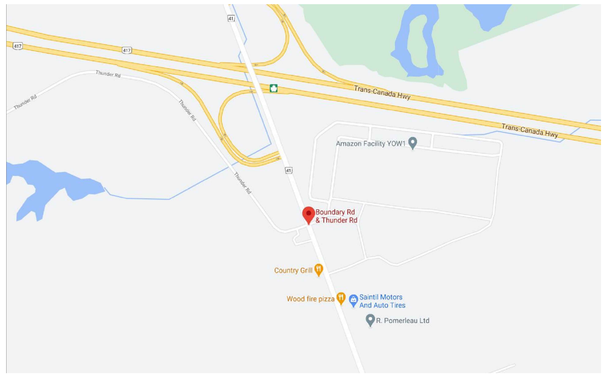
## Conceptual Site Plan

**PROJECT DATA:**

| | | |
|---|---|---|
| **SITE 1 AREA:** | | |
| GROSS: | | 15.34 HA |
| | | 153,400 m² |
| DETENTION: | @ 3% | 4,283 m² |
| NET: | | 3.42 HA |
| | | 149,117 m² |
| BUILDING 1 FOOTPRINT: | | 55,799 m² |
| BUILDING 3 FOOTPRINT: | | 2,972 m² |
| TOTAL: | | 58,771 m² |
| COVERAGE: | | |
| GROSS: | | 38% |
| NET: | | 39% |
| BUILDING 1 PARKING PROVIDED: | | |
| AUTO: | | 426 STALLS |
| *REQ. ACCESSIBLE* | | *9 STALLS* |
| TRAILER: | | 98 STALLS |
| TRUCK DOCKS: | | |
| ▲ DOCK-HIGH DOORS | | 74 |
| O GRADE-LEVEL DOORS | | 4 |
| BUILDING 3 PARKING PROVIDED: | | |
| AUTO: | | 52 STALLS |
| *REQ. ACCESSIBLE* | | *3 STALLS* |
| O GRADE-LEVEL DOORS | | 10 |
| **SITE 2 AREA:** | | |
| GROSS: | | 2.41 HA |
| | | 24,086 m² |
| BUILDING FOOTPRINT: | | 3,850 m² |
| COVERAGE: | | |
| GROSS: | | 16% |
| PARKING PROVIDED: | | |
| AUTO: | | 57 STALLS |
| | | @1.48/100 m² |
| *REQ. ACCESSIBLE* | | *3 STALLS* |
| TRUCK DOCKS: | | |
| ▲ DOCK-HIGH DOORS | | 19 |
| O GRADE-LEVEL DOORS | | 2 |

This conceptual design is based upon a preliminary review of entitlement requirements and on unverified and possibly incomplete site and/or building information, and is intended merely to assist in exploring how the project might be developed.

Boundary Source:
GIS MAP & AERIAL IMAGE




1:1000
0 10m 25m 50m 100m

NORTH

**scheme: 1**

Conceptual Site Plan

**Thunder Road Industrial**
Thunder Road & Boundary Road Ottawa, ON K4B 1P6

WARE MALCOMB

TOR20-0041-00
11.02.2020

SHEET
**1**

# APPENDIX B

## Screening Form

# City of Ottawa 2017 TIA Guidelines Screening Form

## 1. Description of Proposed Development

| | |
|---|---|
| Municipal Address | 6150 Thunder Road, Ottawa, ON K0A 1K0 |
| Description of Location | Bound by Thunder Road, forested areas and Boundary Road |
| Land Use Classification | ZBL - Rural Countryside Zone (RU), OP - General Rural Area |
| Development Size (units) | |
| Development Size ($m^2$) | Industrial Buildings = 62,621 sq. m |
| Number of Accesses and Locations | Three full-moves accesses to Thunder Road, one full-moves access to Boundary Road |
| Phase of Development | TBD |
| Buildout Year | TBD (2025 assumed) |

**If available, please attach a sketch of the development or site plan to this form.**

## 2. Trip Generation Trigger

Considering the Development's Land Use type and Size (as filled out in the previous section), please refer to the Trip Generation Trigger checks below.

| Land Use Type | Minimum Development Size |
|---|---|
| Single-family homes | 40 units |
| Townhomes or apartments | 90 units |
| Office | 3,500 $m^2$ |
| Industrial | 5,000 $m^2$ EXCEEDS 5,000 sq. m |
| Fast-food restaurant or coffee shop | 100 $m^2$ |
| Destination retail | 1,000 $m^2$ |
| Gas station or convenience market | 75 $m^2$ |

** If the development has a land use type other than what is presented in the table above, estimates of person-trip generation may be made based on average trip generation characteristics represented in the current edition of the Institute of Transportation Engineers (ITE) Trip Generation Manual.*

**If the proposed development size is greater than the sizes identified above, the Trip Generation Trigger is satisfied.**

## 3. Location Triggers

| | Yes | No |
|---|---|---|
| Does the development propose a new driveway to a boundary street that is designated as part of the City's Transit Priority, Rapid Transit or Spine Bicycle Networks? | | X |
| Is the development in a Design Priority Area (DPA) or Transit-oriented Development (TOD) zone?* | | X |

**DPA and TOD are identified in the City of Ottawa Official Plan (DPA in Section 2.5.1 and Schedules A and B; TOD in Annex 6). See Chapter 4 for a list of City of Ottawa Planning and Engineering documents that support the completion of TIA).*

**If any of the above questions were answered with 'Yes,' the Location Trigger is satisfied.**

## 4. Safety Triggers

| | Yes | No |
|---|---|---|
| Are posted speed limits on a boundary street are 80 km/hr or greater? | X | |
| Are there any horizontal/vertical curvatures on a boundary street limits sight lines at a proposed driveway? | | X |
| Is the proposed driveway within the area of influence of an adjacent traffic signal or roundabout (i.e. within 300 m of intersection in rural conditions, or within 150 m of intersection in urban/ suburban conditions)? | X | |
| Is the proposed driveway within auxiliary lanes of an intersection? | | X |
| Does the proposed driveway make use of an existing median break that serves an existing site? | | X |
| Is there is a documented history of traffic operations or safety concerns on the boundary streets within 500 m of the development? | | X |
| Does the development include a drive-thru facility? | | X |

**If any of the above questions were answered with 'Yes,' the Safety Trigger is satisfied.**

## 5. Summary

| | Yes | No |
|---|---|---|
| Does the development satisfy the Trip Generation Trigger? | X | |
| Does the development satisfy the Location Trigger? | | X |
| Does the development satisfy the Safety Trigger? | X | |

**If none of the triggers are satisfied, the TIA Study is complete. If one or more of the triggers is satisfied, the TIA Study must continue into the next stage (Screening and Scoping).**

# APPENDIX C

## Traffic Data

ACCURATE TRUSTED TRAFFIC DATA

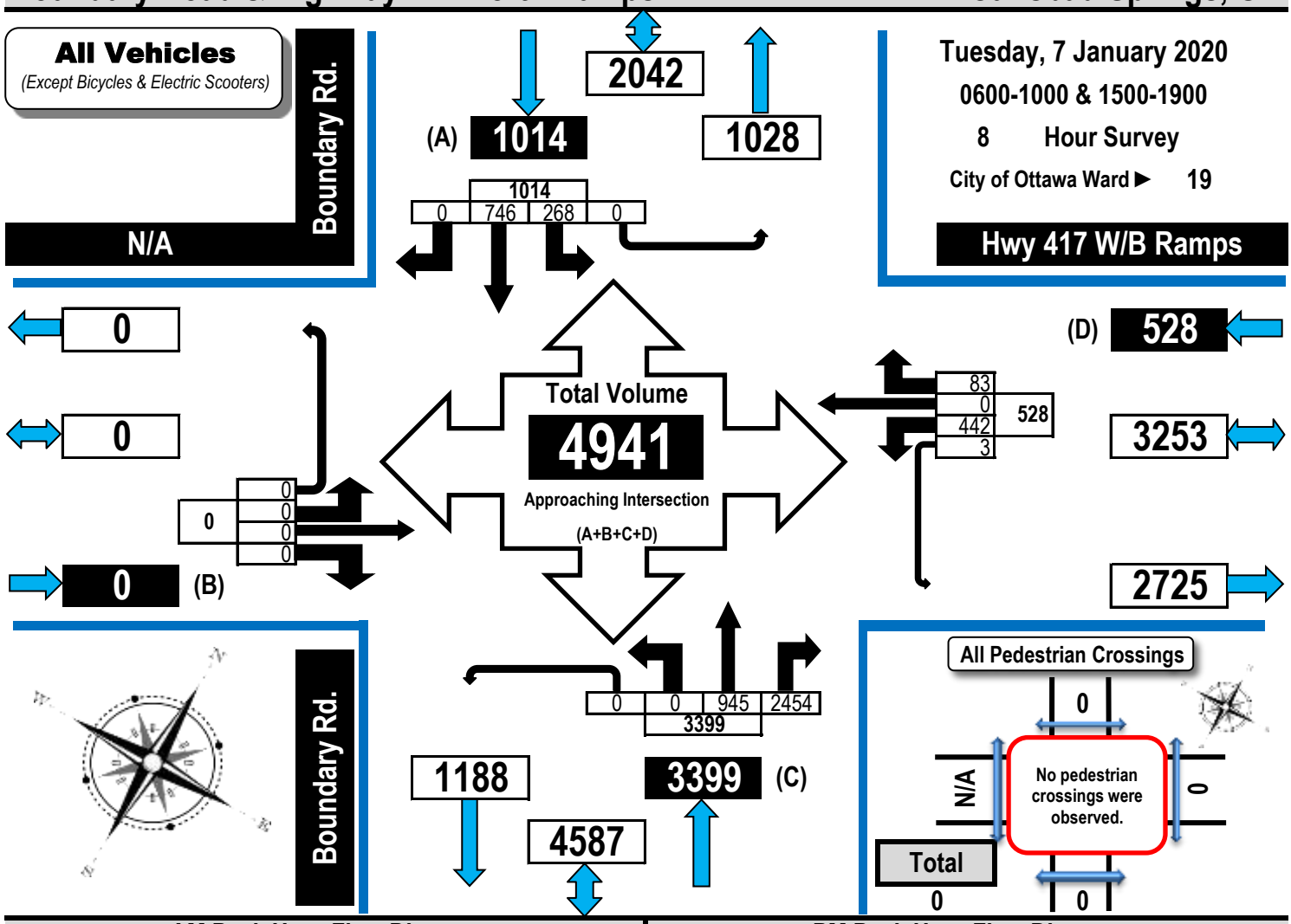
# Turning Movement Count
## Summary, AM and PM Peak Hour Flow Diagrams

Automobiles, Taxis, Light Trucks, Vans, SUV's, Motorcycles, Heavy Trucks, Buses, and School Buses

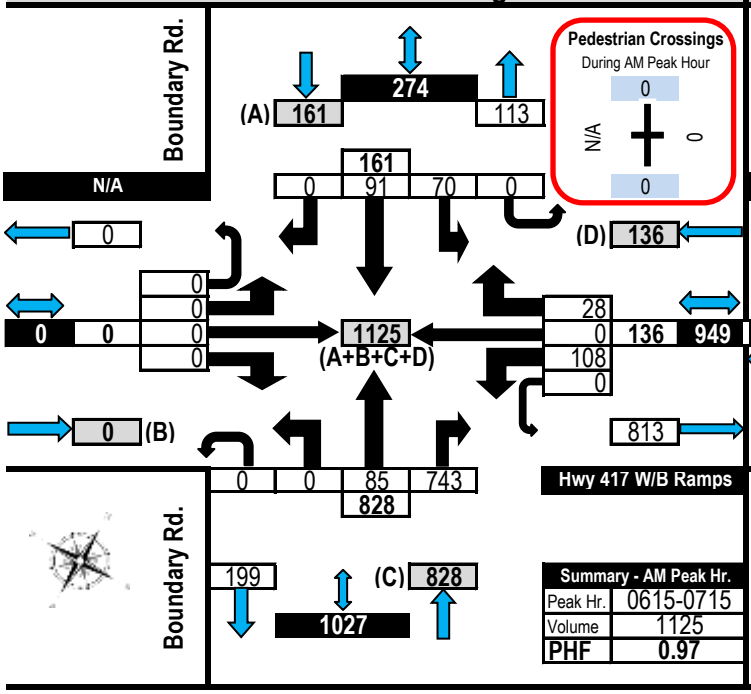
## Boundary Road & Highway 417 North Ramps — Carlsbad Springs, ON

**All Vehicles**
*(Except Bicycles & Electric Scooters)*

Tuesday, 7 January 2020
0600-1000 & 1500-1900
8 Hour Survey
City of Ottawa Ward ► 19

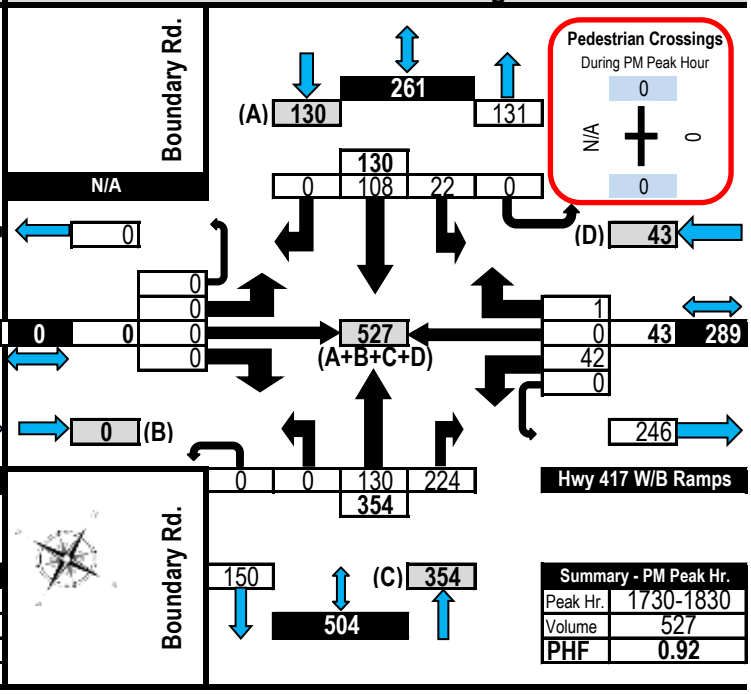



## AM Peak Hour Flow Diagram




| Summary - AM Peak Hr. | |
|---|---|
| Peak Hr. | 0615-0715 |
| Volume | 1125 |
| PHF | 0.97 |

## PM Peak Hour Flow Diagram



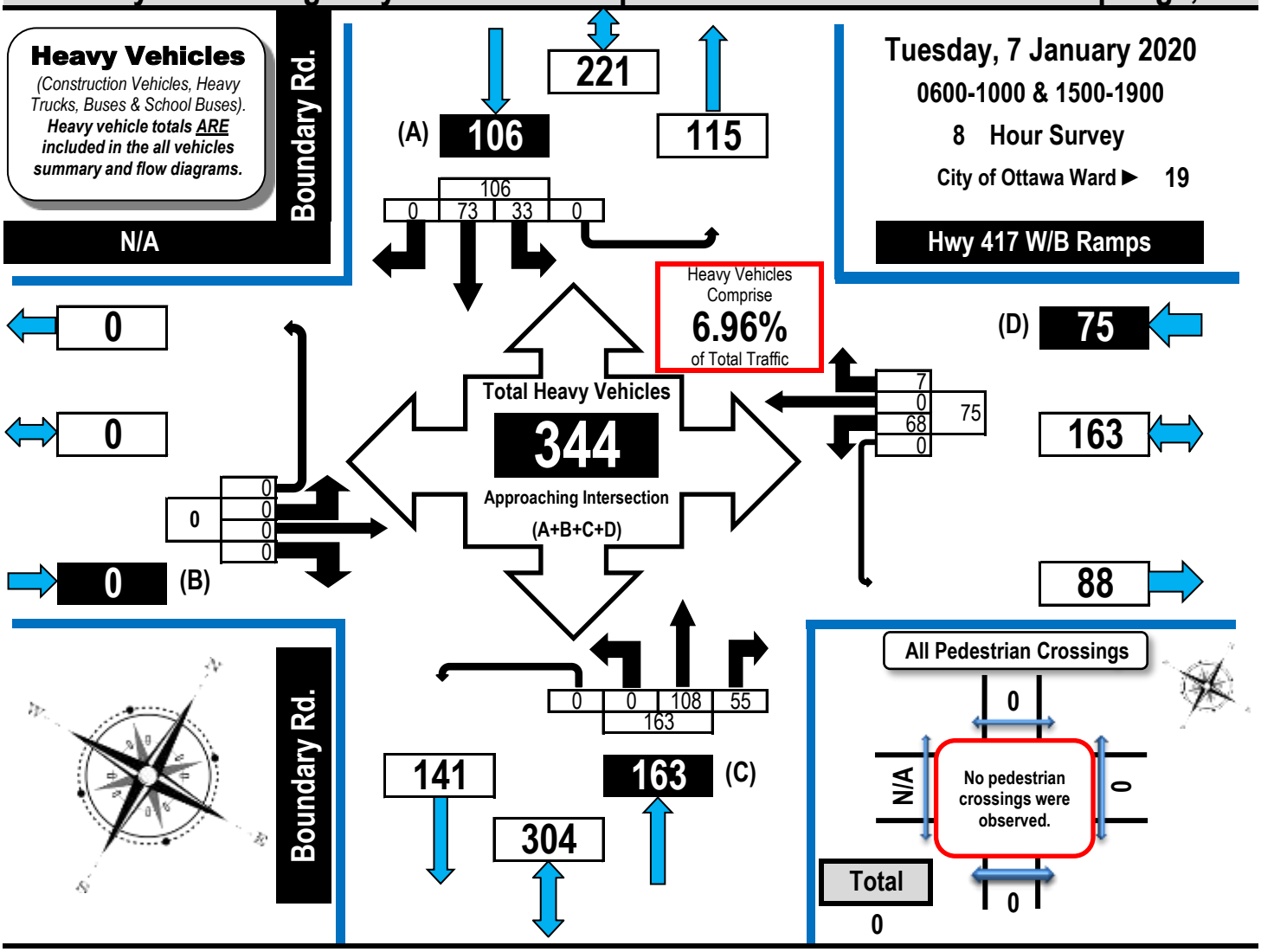

| Summary - PM Peak Hr. | |
|---|---|
| Peak Hr. | 1730-1830 |
| Volume | 527 |
| PHF | 0.92 |

# Turning Movement Count
## Heavy Vehicle Summary
## Flow Diagram

## Boundary Road & Highway 417 North Ramps — Carlsbad Springs, ON

**Heavy Vehicles**
*(Construction Vehicles, Heavy Trucks, Buses & School Buses).*
***Heavy vehicle totals ARE included in the all vehicles summary and flow diagrams.***

Tuesday, 7 January 2020
0600-1000 & 1500-1900
8 Hour Survey
City of Ottawa Ward ► 19




| | N/A Eastbound | | | | | Hwy 417 W/B Ramps Westbound | | | | | Boundary Rd. Northbound | | | | | Boundary Rd. Southbound | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Time Period | LT | ST | RT | UT | S. Tot | LT | ST | RT | UT | S. Tot | LT | ST | RT | UT | S. Tot | LT | ST | RT | UT | S. Tot | G.Tot. |
| 0600-0700 | 0 | 0 | 0 | 0 | 0 | 4 | 0 | 4 | 0 | 8 | 0 | 12 | 8 | 0 | 20 | 6 | 10 | 0 | 0 | 16 | 44 |
| 0700-0800 | 0 | 0 | 0 | 0 | 0 | 10 | 0 | 2 | 0 | 12 | 0 | 9 | 12 | 0 | 21 | 4 | 10 | 0 | 0 | 14 | 47 |
| 0800-0900 | 0 | 0 | 0 | 0 | 0 | 8 | 0 | 0 | 0 | 8 | 0 | 25 | 8 | 0 | 33 | 11 | 19 | 0 | 0 | 30 | 71 |
| 0900-1000 | 0 | 0 | 0 | 0 | 0 | 8 | 0 | 1 | 0 | 9 | 0 | 25 | 10 | 0 | 35 | 5 | 9 | 0 | 0 | 14 | 58 |
| 1500-1600 | 0 | 0 | 0 | 0 | 0 | 12 | 0 | 0 | 0 | 12 | 0 | 11 | 3 | 0 | 14 | 0 | 6 | 0 | 0 | 6 | 32 |
| 1600-1700 | 0 | 0 | 0 | 0 | 0 | 16 | 0 | 0 | 0 | 16 | 0 | 14 | 5 | 0 | 19 | 4 | 6 | 0 | 0 | 10 | 45 |
| 1700-1800 | 0 | 0 | 0 | 0 | 0 | 8 | 0 | 0 | 0 | 8 | 0 | 8 | 6 | 0 | 14 | 1 | 10 | 0 | 0 | 11 | 33 |
| 1800-1900 | 0 | 0 | 0 | 0 | 0 | 2 | 0 | 0 | 0 | 2 | 0 | 4 | 3 | 0 | 7 | 2 | 3 | 0 | 0 | 5 | 14 |
| Totals | 0 | 0 | 0 | 0 | 0 | 68 | 0 | 7 | 0 | 75 | 0 | 108 | 55 | 0 | 163 | 33 | 73 | 0 | 0 | 106 | 344 |

ACCURATE TRUSTED TRAFFIC DATA

# Turning Movement Count
## Summary Report Including AM, OFF Peak, PM, Evening Peak Hours, and PHF

**Automobiles, Taxis, Light Trucks, Vans, SUV's, Motorcycles, Heavy Trucks, Buses, and School Buses**

## Boundary Road & Highway 417 North Ramps — Carlsbad Springs, ON

**Survey Date:** Tuesday, 7 January 2020 **Start Time:** 0600 **AADT Factor:** 1.1

**Weather AM:** Overcast -4° C **Survey Duration:** 8 Hrs. **Survey Hours:** 0600-1000 & 1500-1900

**Weather PM:** Cloudy -1° C **Surveyor(s):** Carmody

| | N/A | | | | | Hwy 417 W/B Ramps | | | | | | Boundary Rd. | | | | | Boundary Rd. | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | Eastbound | | | | | Westbound | | | | | | Northbound | | | | | Southbound | | | | | | |
| Time Period | LT | ST | RT | UT | E/B Tot | LT | ST | RT | UT | W/B Tot | Street Total | LT | ST | RT | UT | N/B Tot | LT | ST | RT | UT | S/B Tot | Street Total | Grand Total |
| 0600-0700 | 0 | 0 | 0 | 0 | **0** | 100 | 0 | 19 | 1 | **120** | **120** | 0 | 87 | 685 | 0 | **772** | 72 | 85 | 0 | 0 | **157** | **929** | **1049** |
| 0700-0800 | 0 | 0 | 0 | 0 | **0** | 79 | 0 | 31 | 0 | **110** | **110** | 0 | 112 | 632 | 0 | **744** | 48 | 81 | 0 | 0 | **129** | **873** | **983** |
| 0800-0900 | 0 | 0 | 0 | 0 | **0** | 57 | 0 | 9 | 0 | **66** | **66** | 0 | 108 | 360 | 0 | **468** | 54 | 84 | 0 | 0 | **138** | **606** | **672** |
| 0900-1000 | 0 | 0 | 0 | 0 | **0** | 32 | 0 | 5 | 1 | **38** | **38** | 0 | 89 | 223 | 0 | **312** | 29 | 52 | 0 | 0 | **81** | **393** | **431** |
| 1500-1600 | 0 | 0 | 0 | 0 | **0** | 44 | 0 | 10 | 1 | **55** | **55** | 0 | 155 | 122 | 0 | **277** | 18 | 95 | 0 | 0 | **113** | **390** | **445** |
| 1600-1700 | 0 | 0 | 0 | 0 | **0** | 57 | 0 | 5 | 0 | **62** | **62** | 0 | 148 | 106 | 0 | **254** | 15 | 131 | 0 | 0 | **146** | **400** | **462** |
| 1700-1800 | 0 | 0 | 0 | 0 | **0** | 44 | 0 | 1 | 0 | **45** | **45** | 0 | 156 | 156 | 0 | **312** | 18 | 138 | 0 | 0 | **156** | **468** | **513** |
| 1800-1900 | 0 | 0 | 0 | 0 | **0** | 29 | 0 | 3 | 0 | **32** | **32** | 0 | 90 | 170 | 0 | **260** | 14 | 80 | 0 | 0 | **94** | **354** | **386** |
| **Totals** | **0** | **0** | **0** | **0** | **0** | **442** | **0** | **83** | **3** | **528** | **528** | **0** | **945** | **2454** | **0** | **3399** | **268** | **746** | **0** | **0** | **1014** | **4413** | **4941** |

**Expansion factors are applied exclusively to standard weekday 8-hour turning movement counts conducted during the hours of 0700h - 1000h, 1130h - 1330h and 1500h - 1800h**

**AM Peak Hour Factor ➡ 0.97** — Highest Hourly Vehicle Volume Between 0500h & 1000h

| AM Peak Hr | LT | ST | RT | UT | TOT | LT | ST | RT | UT | TOT | S.TOT | LT | ST | RT | UT | TOT | LT | ST | RT | UT | TOT | S.TOT | G.TOT |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 0615-0715 | 0 | 0 | 0 | 0 | **0** | 108 | 0 | 28 | 0 | **136** | **136** | 0 | 85 | 743 | 0 | **828** | 70 | 91 | 0 | 0 | **161** | **989** | **1125** |

**OFF Peak Hour Factor ➡ N/A** — Highest Hourly Vehicle Volume Between 1000h & 1500h

| OFF Peak Hr | LT | ST | RT | UT | TOT | LT | ST | RT | UT | TOT | S.TOT | LT | ST | RT | UT | TOT | LT | ST | RT | UT | TOT | S.TOT | G.TOT |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| N/A | 0 | 0 | 0 | 0 | **0** | 0 | 0 | 0 | 0 | **0** | **0** | 0 | 0 | 0 | 0 | **0** | 0 | 0 | 0 | 0 | **0** | **0** | **0** |

**PM Peak Hour Factor ➡ 0.92** — Highest Hourly Vehicle Volume Between 1500h & 1900h

| PM Peak Hr | LT | ST | RT | UT | TOT | LT | ST | RT | UT | TOT | S.TOT | LT | ST | RT | UT | TOT | LT | ST | RT | UT | TOT | S.TOT | G.TOT |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 1730-1830 | 0 | 0 | 0 | 0 | **0** | 42 | 0 | 1 | 0 | **43** | **43** | 0 | 130 | 224 | 0 | **354** | 22 | 108 | 0 | 0 | **130** | **484** | **527** |

**EVNG Peak Hour Factor ➡ N/A** — Highest Hourly Vehicle Volume Between 1900h & 0000h

| EVNG Pk Hr | LT | ST | RT | UT | TOT | LT | ST | RT | UT | TOT | S.TOT | LT | ST | RT | UT | TOT | LT | ST | RT | UT | TOT | S.TOT | G.TOT |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| N/A | 0 | 0 | 0 | 0 | **0** | 0 | 0 | 0 | 0 | **0** | **0** | 0 | 0 | 0 | 0 | **0** | 0 | 0 | 0 | 0 | **0** | **0** | **0** |

**Comments:**

No pedestrian crossings or bicycles were observed. Street lights are not present at this intersection.

**Notes:**

1. Includes all vehicle types except bicycles and electric scooters.
2. When expansion and AADT factors are applied, the results will differ slightly due to rounding.

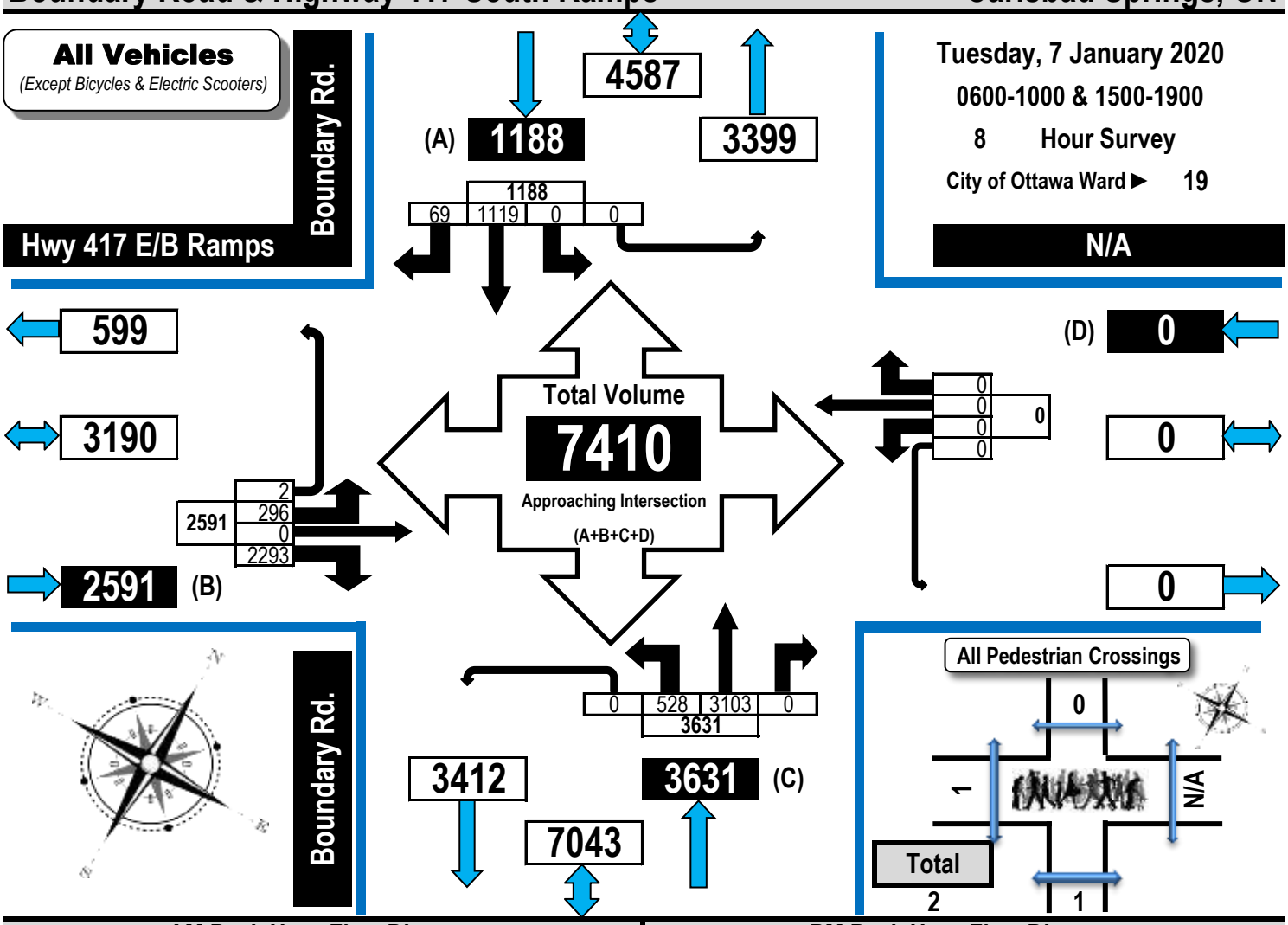
# Turning Movement Count
## Summary, AM and PM Peak Hour Flow Diagrams

Automobiles, Taxis, Light Trucks, Vans, SUV's, Motorcycles, Heavy Trucks, Buses, and School Buses

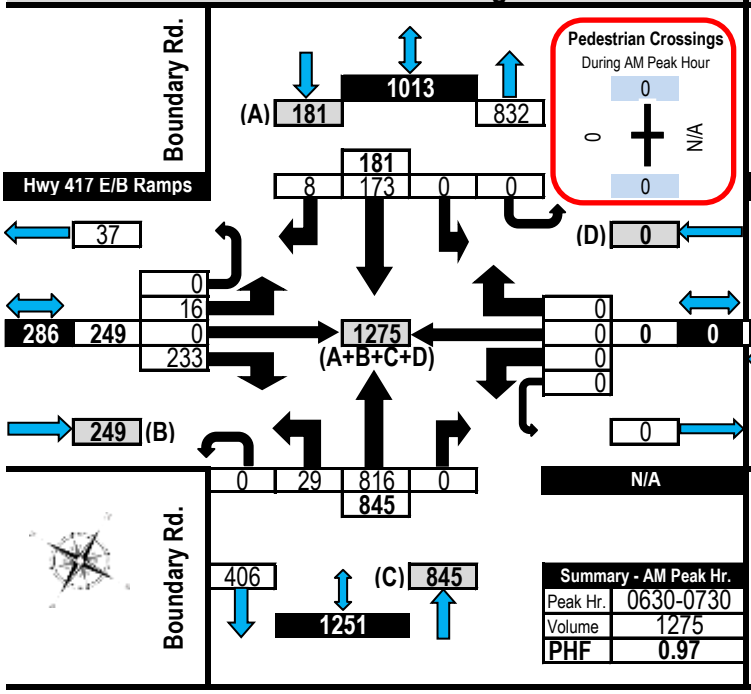
## Boundary Road & Highway 417 South Ramps — Carlsbad Springs, ON

**All Vehicles** *(Except Bicycles & Electric Scooters)*

**Tuesday, 7 January 2020**
**0600-1000 & 1500-1900**
**8 Hour Survey**
**City of Ottawa Ward ▶ 19**

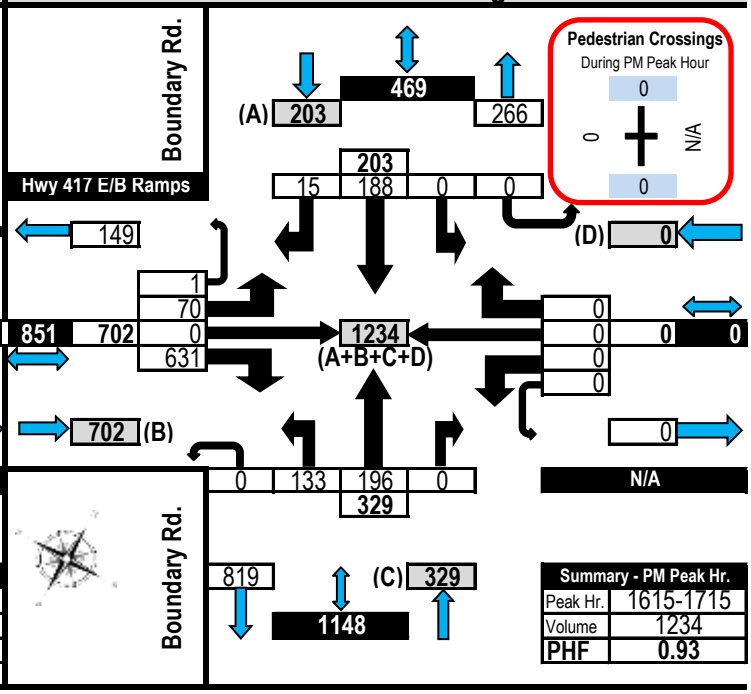



## AM Peak Hour Flow Diagram




| Summary - AM Peak Hr. | |
|---|---|
| Peak Hr. | 0630-0730 |
| Volume | 1275 |
| PHF | 0.97 |

## PM Peak Hour Flow Diagram



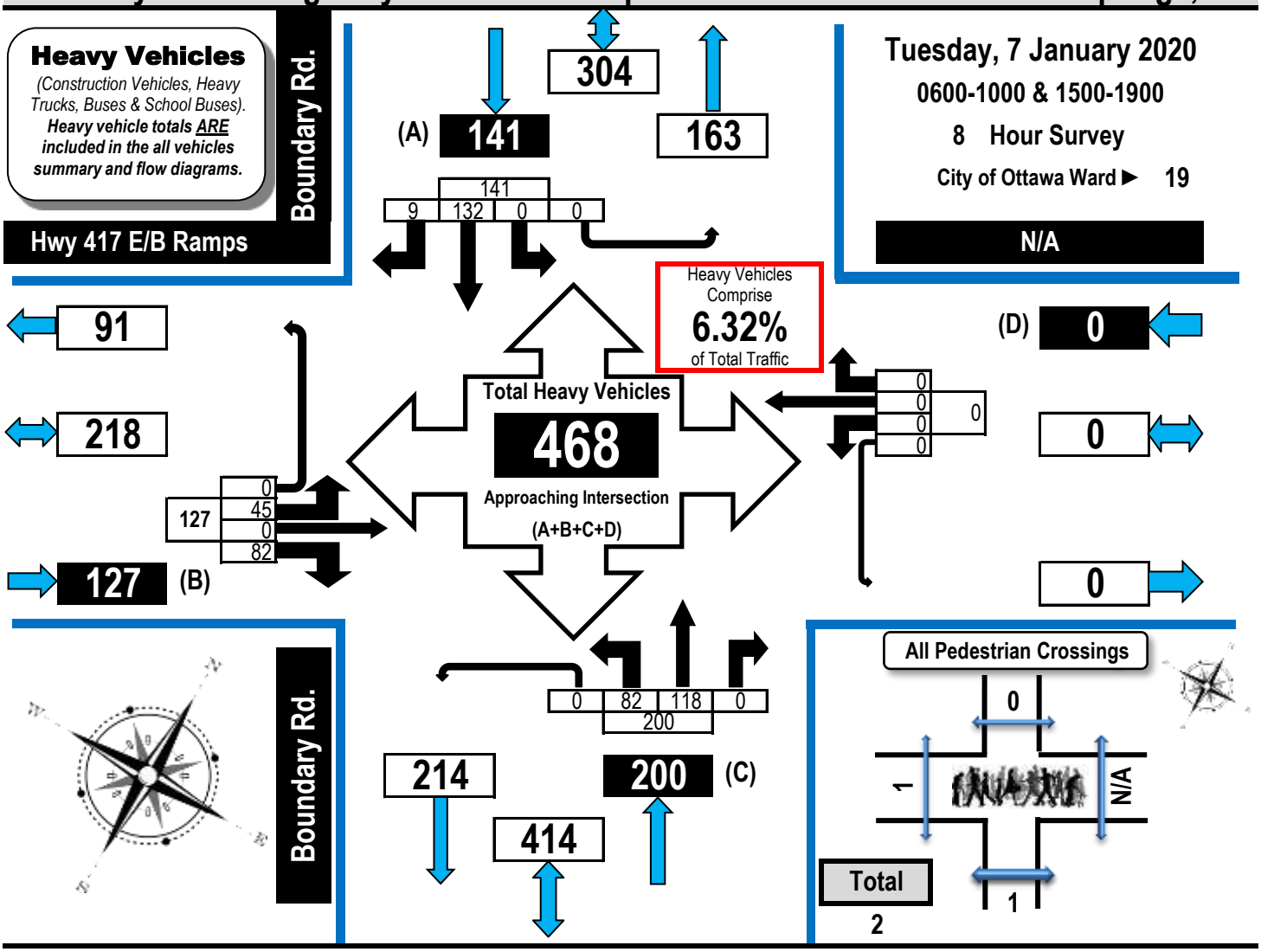

| Summary - PM Peak Hr. | |
|---|---|
| Peak Hr. | 1615-1715 |
| Volume | 1234 |
| PHF | 0.93 |

# Turning Movement Count
## Heavy Vehicle Summary
## Flow Diagram

**Boundary Road & Highway 417 South Ramps** — **Carlsbad Springs, ON**

**Heavy Vehicles**
*(Construction Vehicles, Heavy Trucks, Buses & School Buses).*
***Heavy vehicle totals ARE included in the all vehicles summary and flow diagrams.***

**Tuesday, 7 January 2020**
**0600-1000 & 1500-1900**
**8 Hour Survey**
**City of Ottawa Ward ► 19**




| | Hwy 417 E/B Ramps Eastbound | | | | | N/A Westbound | | | | | Boundary Rd. Northbound | | | | | Boundary Rd. Southbound | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Time Period | LT | ST | RT | UT | S. Tot | LT | ST | RT | UT | S. Tot | LT | ST | RT | UT | S. Tot | LT | ST | RT | UT | S. Tot | G.Tot. |
| 0600-0700 | 5 | 0 | 9 | 0 | 14 | 0 | 0 | 0 | 0 | 0 | 4 | 16 | 0 | 0 | 20 | 0 | 14 | 0 | 0 | 14 | 48 |
| 0700-0800 | 5 | 0 | 14 | 0 | 19 | 0 | 0 | 0 | 0 | 0 | 9 | 16 | 0 | 0 | 25 | 0 | 19 | 1 | 0 | 20 | 64 |
| 0800-0900 | 8 | 0 | 11 | 0 | 19 | 0 | 0 | 0 | 0 | 0 | 13 | 25 | 0 | 0 | 38 | 0 | 27 | 1 | 0 | 28 | 85 |
| 0900-1000 | 9 | 0 | 6 | 0 | 15 | 0 | 0 | 0 | 0 | 0 | 13 | 26 | 0 | 0 | 39 | 0 | 15 | 2 | 0 | 17 | 71 |
| 1500-1600 | 7 | 0 | 12 | 0 | 19 | 0 | 0 | 0 | 0 | 0 | 10 | 6 | 0 | 0 | 16 | 0 | 18 | 1 | 0 | 19 | 54 |
| 1600-1700 | 6 | 0 | 16 | 0 | 22 | 0 | 0 | 0 | 0 | 0 | 13 | 13 | 0 | 0 | 26 | 0 | 20 | 1 | 0 | 21 | 69 |
| 1700-1800 | 4 | 0 | 6 | 0 | 10 | 0 | 0 | 0 | 0 | 0 | 15 | 10 | 0 | 0 | 25 | 0 | 15 | 2 | 0 | 17 | 52 |
| 1800-1900 | 1 | 0 | 8 | 0 | 9 | 0 | 0 | 0 | 0 | 0 | 5 | 6 | 0 | 0 | 11 | 0 | 4 | 1 | 0 | 5 | 25 |
| Totals | 45 | 0 | 82 | 0 | 127 | 0 | 0 | 0 | 0 | 0 | 82 | 118 | 0 | 0 | 200 | 0 | 132 | 9 | 0 | 141 | 468 |

ACCURATE TRUSTED TRAFFIC DATA

# Turning Movement Count
## Summary Report Including AM, OFF Peak, PM, Evening Peak Hours, and PHF

**Automobiles, Taxis, Light Trucks, Vans, SUV's, Motorcycles, Heavy Trucks, Buses, and School Buses**

## Boundary Road & Highway 417 South Ramps — Carlsbad Springs, ON

**Survey Date:** Tuesday, 7 January 2020 **Start Time:** 0600 **AADT Factor:** 1.1

**Weather AM:** Overcast -4° C **Survey Duration:** 8 Hrs. **Survey Hours:** 0600-1000 & 1500-1900

**Weather PM:** Cloudy -1° C **Surveyor(s):** Carmody

| | Hwy 417 E/B Ramps | | | | | N/A | | | | | | Boundary Rd. | | | | | Boundary Rd. | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | Eastbound | | | | | Westbound | | | | | | Northbound | | | | | Southbound | | | | | | |
| Time Period | LT | ST | RT | UT | E/B Tot | LT | ST | RT | UT | W/B Tot | Street Total | LT | ST | RT | UT | N/B Tot | LT | ST | RT | UT | S/B Tot | Street Total | Grand Total |
| 0600-0700 | 16 | 0 | 172 | 0 | 188 | 0 | 0 | 0 | 0 | 0 | 188 | 21 | 756 | 0 | 0 | 777 | 0 | 178 | 7 | 0 | 185 | 962 | 1150 |
| 0700-0800 | 15 | 0 | 171 | 0 | 186 | 0 | 0 | 0 | 0 | 0 | 186 | 39 | 729 | 0 | 0 | 768 | 0 | 151 | 9 | 0 | 160 | 928 | 1114 |
| 0800-0900 | 18 | 0 | 86 | 1 | 105 | 0 | 0 | 0 | 0 | 0 | 105 | 55 | 450 | 0 | 0 | 505 | 0 | 135 | 6 | 0 | 141 | 646 | 751 |
| 0900-1000 | 21 | 0 | 60 | 0 | 81 | 0 | 0 | 0 | 0 | 0 | 81 | 44 | 291 | 0 | 0 | 335 | 0 | 80 | 4 | 0 | 84 | 419 | 500 |
| 1500-1600 | 75 | 0 | 489 | 0 | 564 | 0 | 0 | 0 | 0 | 0 | 564 | 79 | 202 | 0 | 0 | 281 | 0 | 134 | 5 | 0 | 139 | 420 | 984 |
| 1600-1700 | 70 | 0 | 641 | 1 | 712 | 0 | 0 | 0 | 0 | 0 | 712 | 126 | 184 | 0 | 0 | 310 | 0 | 171 | 17 | 0 | 188 | 498 | 1210 |
| 1700-1800 | 51 | 0 | 406 | 0 | 457 | 0 | 0 | 0 | 0 | 0 | 457 | 116 | 261 | 0 | 0 | 377 | 0 | 168 | 14 | 0 | 182 | 559 | 1016 |
| 1800-1900 | 30 | 0 | 268 | 0 | 298 | 0 | 0 | 0 | 0 | 0 | 298 | 48 | 230 | 0 | 0 | 278 | 0 | 102 | 7 | 0 | 109 | 387 | 685 |
| Totals | 296 | 0 | 2293 | 2 | 2591 | 0 | 0 | 0 | 0 | 0 | 2591 | 528 | 3103 | 0 | 0 | 3631 | 0 | 1119 | 69 | 0 | 1188 | 4819 | 7410 |

**Expansion factors are applied exclusively to standard weekday 8-hour turning movement counts conducted during the hours of 0700h - 1000h, 1130h - 1330h and 1500h - 1800h**

| AM Peak Hour Factor ➡ 0.97 | | | | | | | | | | | | | Highest Hourly Vehicle Volume Between 0500h & 1000h | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| AM Peak Hr | LT | ST | RT | UT | TOT | LT | ST | RT | UT | TOT | S.TOT | LT | ST | RT | UT | TOT | LT | ST | RT | UT | TOT | S.TOT | G.TOT |
| 0630-0730 | 16 | 0 | 233 | 0 | 249 | 0 | 0 | 0 | 0 | 0 | 249 | 29 | 816 | 0 | 0 | 845 | 0 | 173 | 8 | 0 | 181 | 1026 | 1275 |
| OFF Peak Hour Factor ➡ N/A | | | | | | | | | | | | | Highest Hourly Vehicle Volume Between 1000h & 1500h | | | | | | | | | | |
| OFF Peak Hr | LT | ST | RT | UT | TOT | LT | ST | RT | UT | TOT | S.TOT | LT | ST | RT | UT | TOT | LT | ST | RT | UT | TOT | S.TOT | G.TOT |
| N/A | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| PM Peak Hour Factor ➡ 0.93 | | | | | | | | | | | | | Highest Hourly Vehicle Volume Between 1500h & 1900h | | | | | | | | | | |
| PM Peak Hr | LT | ST | RT | UT | TOT | LT | ST | RT | UT | TOT | S.TOT | LT | ST | RT | UT | TOT | LT | ST | RT | UT | TOT | S.TOT | G.TOT |
| 1615-1715 | 70 | 0 | 631 | 1 | 702 | 0 | 0 | 0 | 0 | 0 | 702 | 133 | 196 | 0 | 0 | 329 | 0 | 188 | 15 | 0 | 203 | 532 | 1234 |
| EVNG Peak Hour Factor ➡ N/A | | | | | | | | | | | | | Highest Hourly Vehicle Volume Between 1900h & 0000h | | | | | | | | | | |
| EVNG Pk Hr | LT | ST | RT | UT | TOT | LT | ST | RT | UT | TOT | S.TOT | LT | ST | RT | UT | TOT | LT | ST | RT | UT | TOT | S.TOT | G.TOT |
| N/A | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |

**Comments:**

No bicycles were observed.

**Notes:**

1. Includes all vehicle types except bicycles and electric scooters.
2. When expansion and AADT factors are applied, the results will differ slightly due to rounding.

ACCURATE TRUSTED TRAFFIC DATA

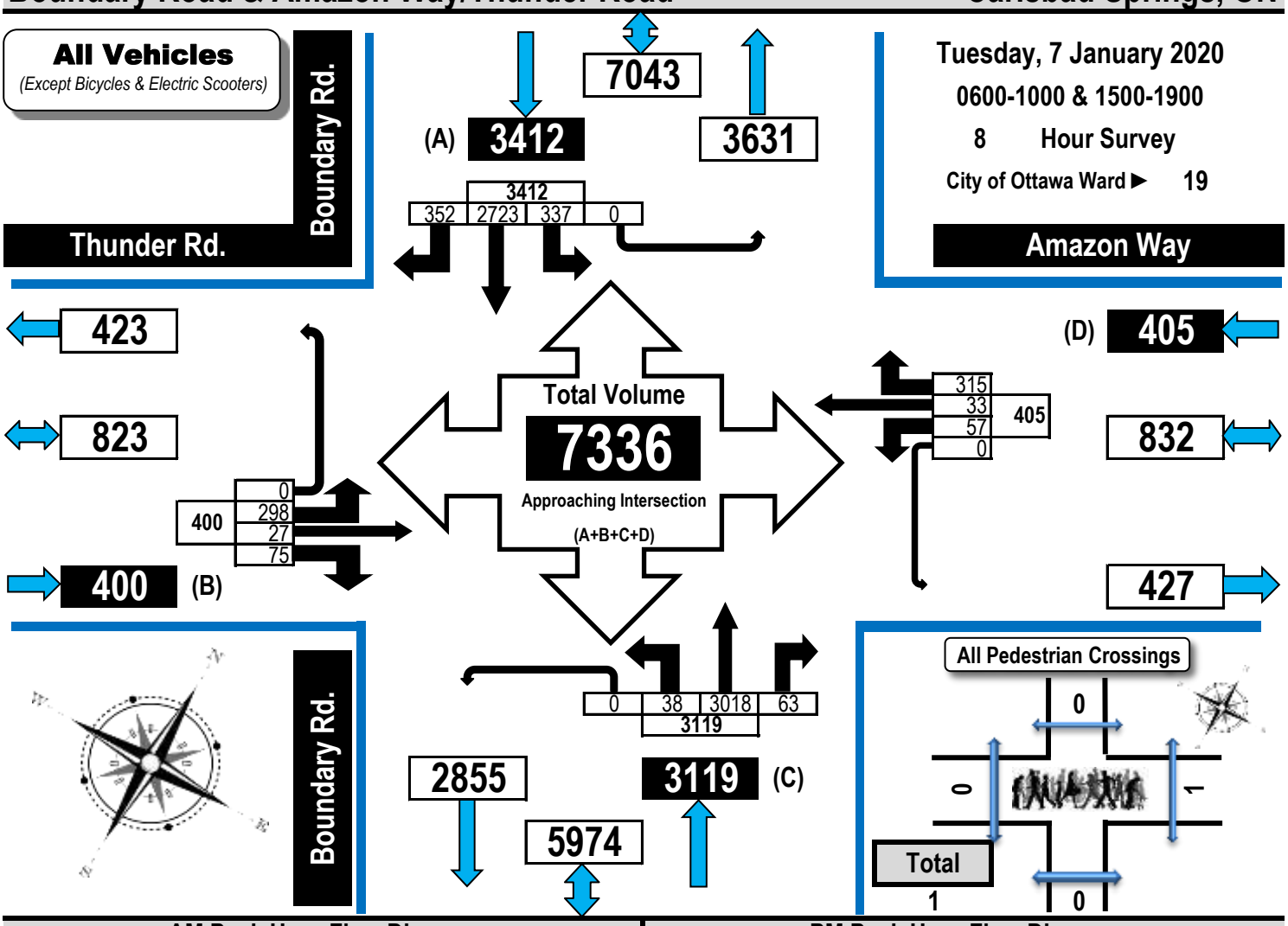
# Turning Movement Count
## Summary, AM and PM Peak Hour Flow Diagrams

Automobiles, Taxis, Light Trucks, Vans, SUV's, Motorcycles, Heavy Trucks, Buses, and School Buses

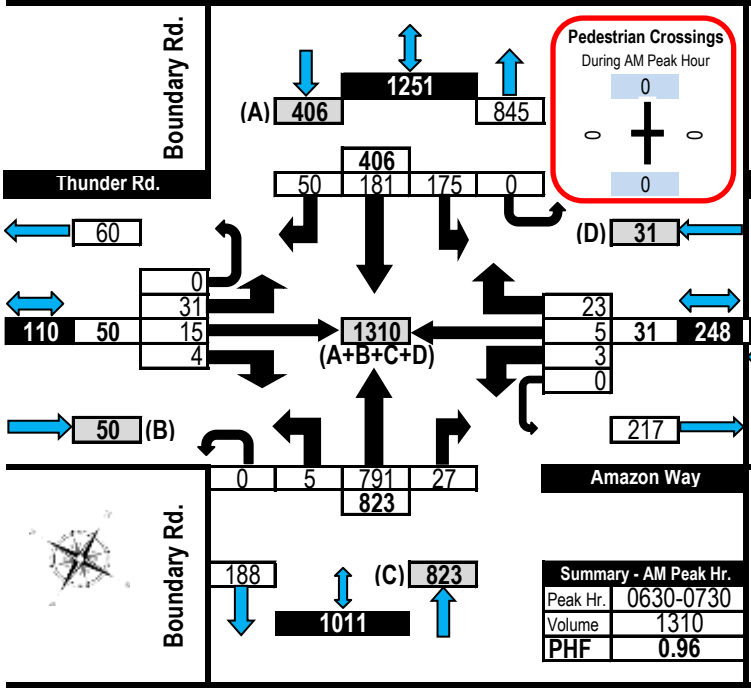
## Boundary Road & Amazon Way/Thunder Road — Carlsbad Springs, ON

**All Vehicles**
*(Except Bicycles & Electric Scooters)*

**Tuesday, 7 January 2020**
**0600-1000 & 1500-1900**
**8 Hour Survey**
**City of Ottawa Ward ▶ 19**

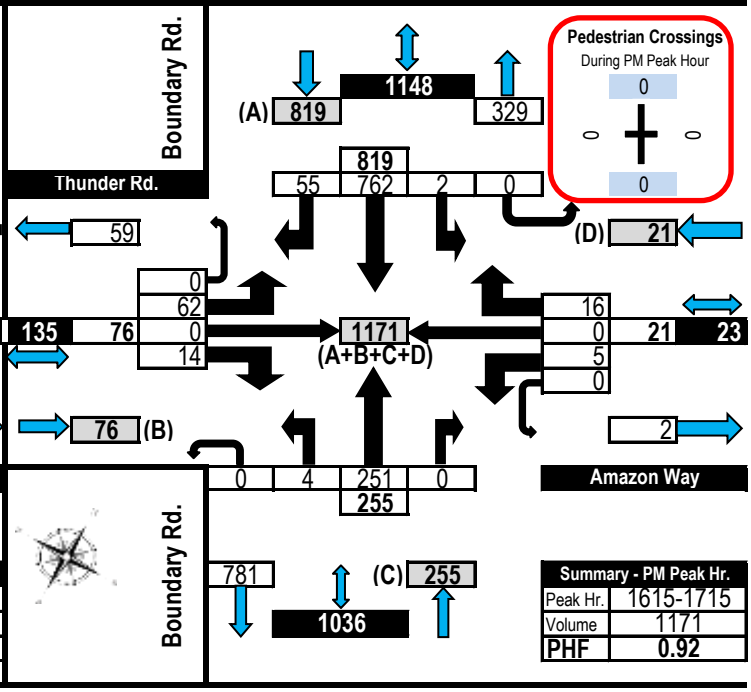



## AM Peak Hour Flow Diagram




| Summary - AM Peak Hr. | |
|---|---|
| Peak Hr. | 0630-0730 |
| Volume | 1310 |
| PHF | 0.96 |

## PM Peak Hour Flow Diagram



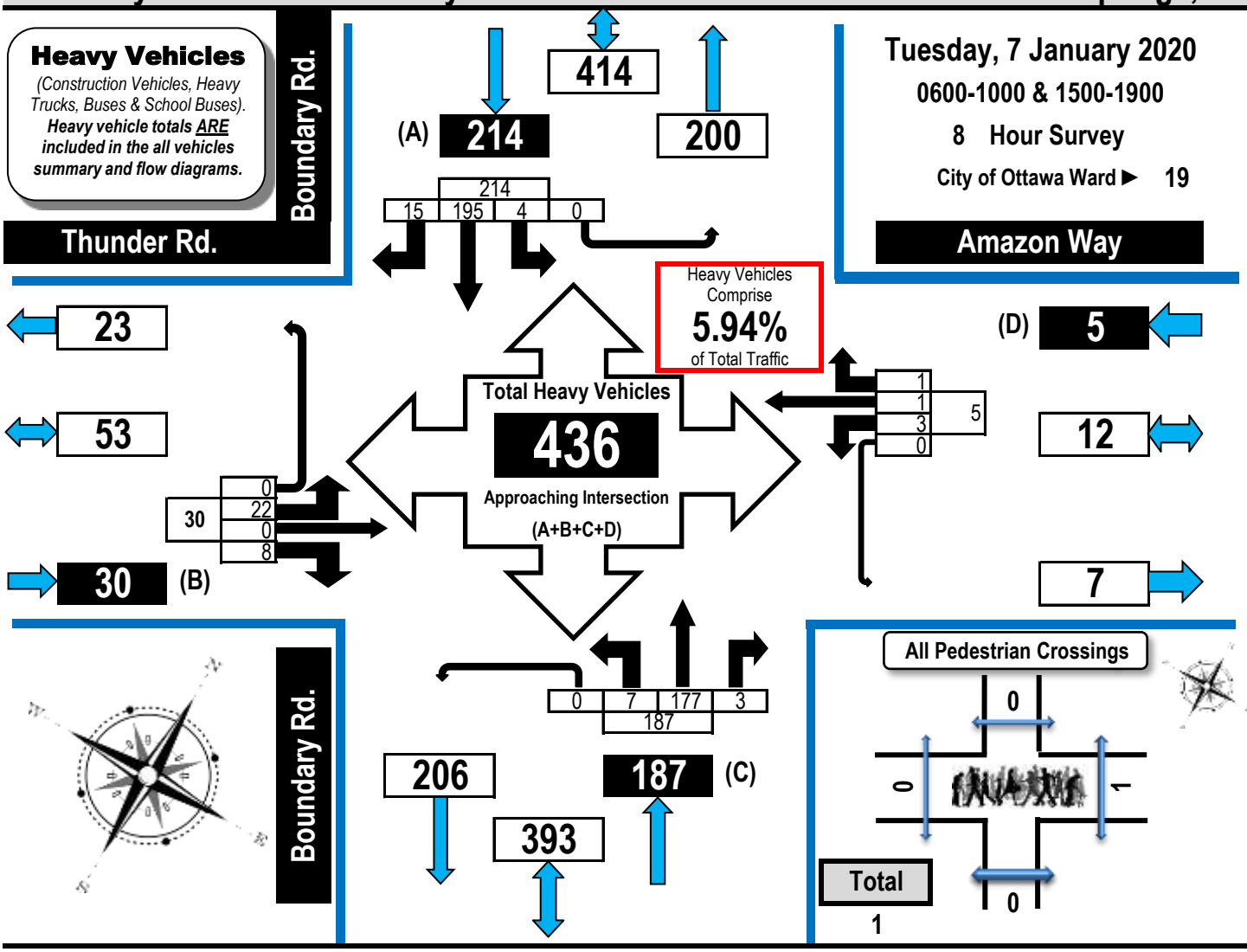

| Summary - PM Peak Hr. | |
|---|---|
| Peak Hr. | 1615-1715 |
| Volume | 1171 |
| PHF | 0.92 |

# Turning Movement Count
## Heavy Vehicle Summary
## Flow Diagram

## Boundary Road & Amazon Way/Thunder Road — Carlsbad Springs, ON

**Heavy Vehicles**
*(Construction Vehicles, Heavy Trucks, Buses & School Buses).*
***Heavy vehicle totals ARE included in the all vehicles summary and flow diagrams.***

Tuesday, 7 January 2020
0600-1000 & 1500-1900
8 Hour Survey
City of Ottawa Ward ► 19









| | Thunder Rd. Eastbound | | | | | Amazon Way Westbound | | | | | Boundary Rd. Northbound | | | | | Boundary Rd. Southbound | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Time Period | LT | ST | RT | UT | S. Tot | LT | ST | RT | UT | S. Tot | LT | ST | RT | UT | S. Tot | LT | ST | RT | UT | S. Tot | G.Tot. |
| 0600-0700 | 1 | 0 | 0 | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 1 | 19 | 0 | 0 | 20 | 0 | 23 | 0 | 0 | 23 | 44 |
| 0700-0800 | 2 | 0 | 1 | 0 | 3 | 0 | 0 | 0 | 0 | 0 | 1 | 22 | 0 | 0 | 23 | 0 | 28 | 4 | 0 | 32 | 58 |
| 0800-0900 | 8 | 0 | 2 | 0 | 10 | 0 | 0 | 1 | 0 | 1 | 3 | 30 | 1 | 0 | 34 | 1 | 33 | 5 | 0 | 39 | 84 |
| 0900-1000 | 2 | 0 | 1 | 0 | 3 | 0 | 1 | 0 | 0 | 1 | 1 | 37 | 0 | 0 | 38 | 1 | 19 | 2 | 0 | 22 | 64 |
| 1500-1600 | 2 | 0 | 3 | 0 | 5 | 1 | 0 | 0 | 0 | 1 | 0 | 14 | 2 | 0 | 16 | 1 | 27 | 2 | 0 | 30 | 52 |
| 1600-1700 | 4 | 0 | 0 | 0 | 4 | 2 | 0 | 0 | 0 | 2 | 1 | 22 | 0 | 0 | 23 | 1 | 34 | 0 | 0 | 35 | 64 |
| 1700-1800 | 2 | 0 | 1 | 0 | 3 | 0 | 0 | 0 | 0 | 0 | 0 | 23 | 0 | 0 | 23 | 0 | 20 | 1 | 0 | 21 | 47 |
| 1800-1900 | 1 | 0 | 0 | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 10 | 0 | 0 | 10 | 0 | 11 | 1 | 0 | 12 | 23 |
| Totals | 22 | 0 | 8 | 0 | 30 | 3 | 1 | 1 | 0 | 5 | 7 | 177 | 3 | 0 | 187 | 4 | 195 | 15 | 0 | 214 | 436 |

ACCURATE TRUSTED TRAFFIC DATA

# Turning Movement Count
## Summary Report Including AM, OFF Peak, PM, Evening Peak Hours, and PHF

**Automobiles, Taxis, Light Trucks, Vans, SUV's, Motorcycles, Heavy Trucks, Buses, and School Buses**

## Boundary Road & Amazon Way/Thunder Road — Carlsbad Springs, ON

**Survey Date:** Tuesday, 7 January 2020 **Start Time:** 0600 **AADT Factor:** 1.1

**Weather AM:** Overcast - 4° C **Survey Duration:** 8 Hrs. **Survey Hours:** 0600-1000 & 1500-1900

**Weather PM:** Cloudy - 1° C **Surveyor(s):** Carmody

| | Thunder Rd. (Eastbound) | | | | | Amazon Way (Westbound) | | | | | | Boundary Rd. (Northbound) | | | | | Boundary Rd. (Southbound) | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Time Period | LT | ST | RT | UT | E/B Tot | LT | ST | RT | UT | W/B Tot | Street Total | LT | ST | RT | UT | N/B Tot | LT | ST | RT | UT | S/B Tot | Street Total | Grand Total |
| 0600-0700 | 29 | 5 | 3 | 0 | **37** | 10 | 4 | 78 | 0 | **92** | **129** | 7 | 670 | 18 | 0 | **695** | 131 | 163 | 56 | 0 | **350** | **1045** | **1174** |
| 0700-0800 | 30 | 10 | 3 | 0 | **43** | 1 | 3 | 14 | 0 | **18** | **61** | 3 | 724 | 15 | 0 | **742** | 87 | 193 | 42 | 0 | **322** | **1064** | **1125** |
| 0800-0900 | 33 | 5 | 4 | 0 | **42** | 1 | 1 | 3 | 0 | **5** | **47** | 7 | 469 | 6 | 0 | **482** | 18 | 170 | 33 | 0 | **221** | **703** | **750** |
| 0900-1000 | 24 | 0 | 6 | 0 | **30** | 0 | 2 | 5 | 0 | **7** | **37** | 4 | 306 | 2 | 0 | **312** | 3 | 122 | 15 | 0 | **140** | **452** | **489** |
| 1500-1600 | 49 | 0 | 11 | 0 | **60** | 5 | 4 | 15 | 0 | **24** | **84** | 4 | 217 | 6 | 0 | **227** | 8 | 557 | 58 | 0 | **623** | **850** | **934** |
| 1600-1700 | 59 | 0 | 19 | 0 | **78** | 6 | 0 | 14 | 0 | **20** | **98** | 9 | 237 | 0 | 0 | **246** | 2 | 745 | 65 | 0 | **812** | **1058** | **1156** |
| 1700-1800 | 55 | 1 | 15 | 0 | **71** | 11 | 4 | 67 | 0 | **82** | **153** | 1 | 255 | 5 | 0 | **261** | 16 | 509 | 49 | 0 | **574** | **835** | **988** |
| 1800-1900 | 19 | 6 | 14 | 0 | **39** | 23 | 15 | 119 | 0 | **157** | **196** | 3 | 140 | 11 | 0 | **154** | 72 | 264 | 34 | 0 | **370** | **524** | **720** |
| Totals | 298 | 27 | 75 | 0 | 400 | 57 | 33 | 315 | 0 | 405 | 805 | 38 | 3018 | 63 | 0 | 3119 | 337 | 2723 | 352 | 0 | 3412 | 6531 | 7336 |

**Expansion factors are applied exclusively to standard weekday 8-hour turning movement counts conducted during the hours of 0700h - 1000h, 1130h - 1330h and 1500h - 1800h**

**AM Peak Hour Factor ➡ 0.96** — Highest Hourly Vehicle Volume Between 0500h & 1000h

| AM Peak Hr | LT | ST | RT | UT | TOT | LT | ST | RT | UT | TOT | S.TOT | LT | ST | RT | UT | TOT | LT | ST | RT | UT | TOT | S.TOT | G.TOT |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 0630-0730 | 31 | 15 | 4 | 0 | **50** | 3 | 5 | 23 | 0 | **31** | **81** | 5 | 791 | 27 | 0 | **823** | 175 | 181 | 50 | 0 | **406** | **1229** | **1310** |

**OFF Peak Hour Factor ➡ N/A** — Highest Hourly Vehicle Volume Between 1000h & 1500h

| OFF Peak Hr | LT | ST | RT | UT | TOT | LT | ST | RT | UT | TOT | S.TOT | LT | ST | RT | UT | TOT | LT | ST | RT | UT | TOT | S.TOT | G.TOT |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| N/A | 0 | 0 | 0 | 0 | **0** | 0 | 0 | 0 | 0 | **0** | **0** | 0 | 0 | 0 | 0 | **0** | 0 | 0 | 0 | 0 | **0** | **0** | **0** |

**PM Peak Hour Factor ➡ 0.92** — Highest Hourly Vehicle Volume Between 1500h & 1900h

| PM Peak Hr | LT | ST | RT | UT | TOT | LT | ST | RT | UT | TOT | S.TOT | LT | ST | RT | UT | TOT | LT | ST | RT | UT | TOT | S.TOT | G.TOT |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 1615-1715 | 62 | 0 | 14 | 0 | **76** | 5 | 0 | 16 | 0 | **21** | **97** | 4 | 251 | 0 | 0 | **255** | 2 | 762 | 55 | 0 | **819** | **1074** | **1171** |

**EVNG Peak Hour Factor ➡ N/A** — Highest Hourly Vehicle Volume Between 1900h & 0000h

| EVNG Pk Hr | LT | ST | RT | UT | TOT | LT | ST | RT | UT | TOT | S.TOT | LT | ST | RT | UT | TOT | LT | ST | RT | UT | TOT | S.TOT | G.TOT |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| N/A | 0 | 0 | 0 | 0 | **0** | 0 | 0 | 0 | 0 | **0** | **0** | 0 | 0 | 0 | 0 | **0** | 0 | 0 | 0 | 0 | **0** | **0** | **0** |

**Comments:**

Much of the traffic, including the majority of the heavy vehicles, to and from Thunder Road is associated with the Petro Canada gas station on the southwest corner. The heavy vehicle total includes 29 school buses and 7 private buses. There were no bicycles observed during this traffic count.

**Notes:**

1. Includes all vehicle types except bicycles and electric scooters.
2. When expansion and AADT factors are applied, the results will differ slightly due to rounding.

ACCURATE TRUSTED TRAFFIC DATA

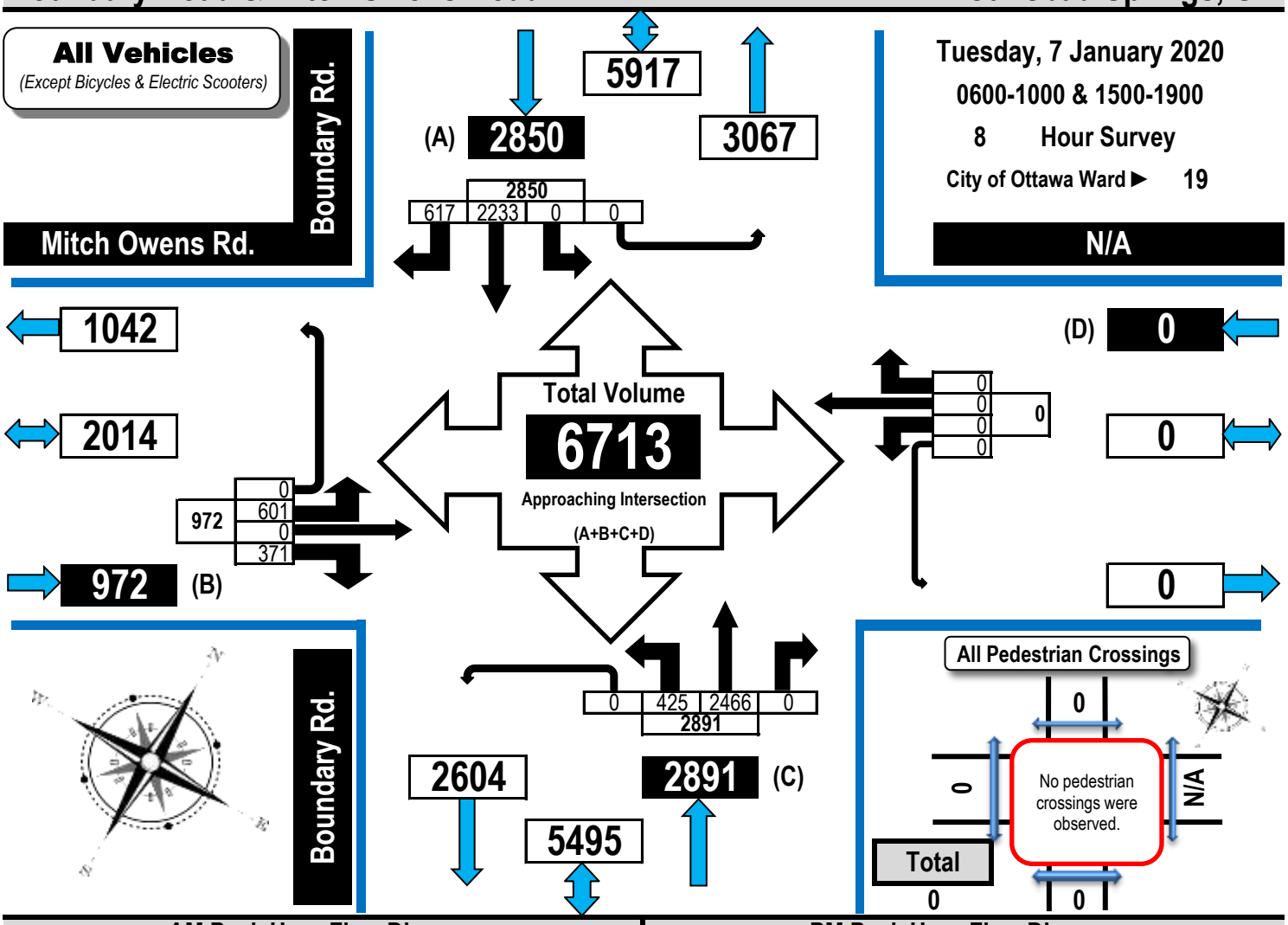
# Turning Movement Count
## Summary, AM and PM Peak Hour Flow Diagrams

Automobiles, Taxis, Light Trucks, Vans, SUV's, Motorcycles, Heavy Trucks, Buses, and School Buses

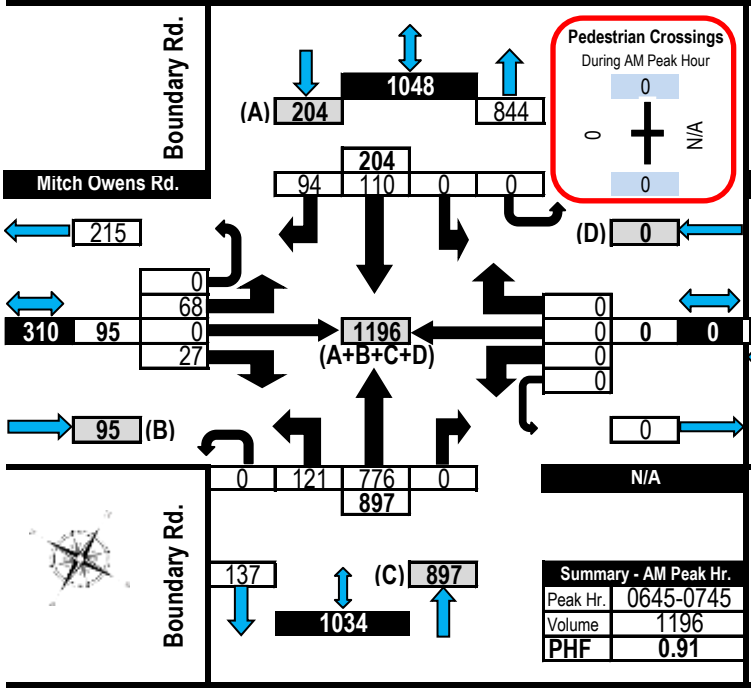
## Boundary Road & Mitch Owens Road — Carlsbad Springs, ON

**All Vehicles**
*(Except Bicycles & Electric Scooters)*

Tuesday, 7 January 2020
0600-1000 & 1500-1900
8 Hour Survey
City of Ottawa Ward ▶ 19

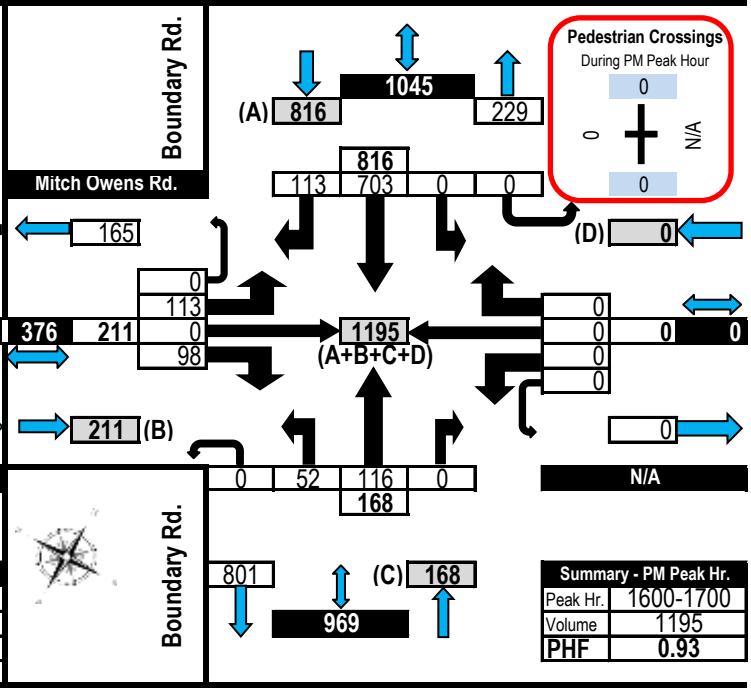



## AM Peak Hour Flow Diagram




| Summary - AM Peak Hr. | |
|---|---|
| Peak Hr. | 0645-0745 |
| Volume | 1196 |
| PHF | 0.91 |

## PM Peak Hour Flow Diagram




| Summary - PM Peak Hr. | |
|---|---|
| Peak Hr. | 1600-1700 |
| Volume | 1195 |
| PHF | 0.93 |

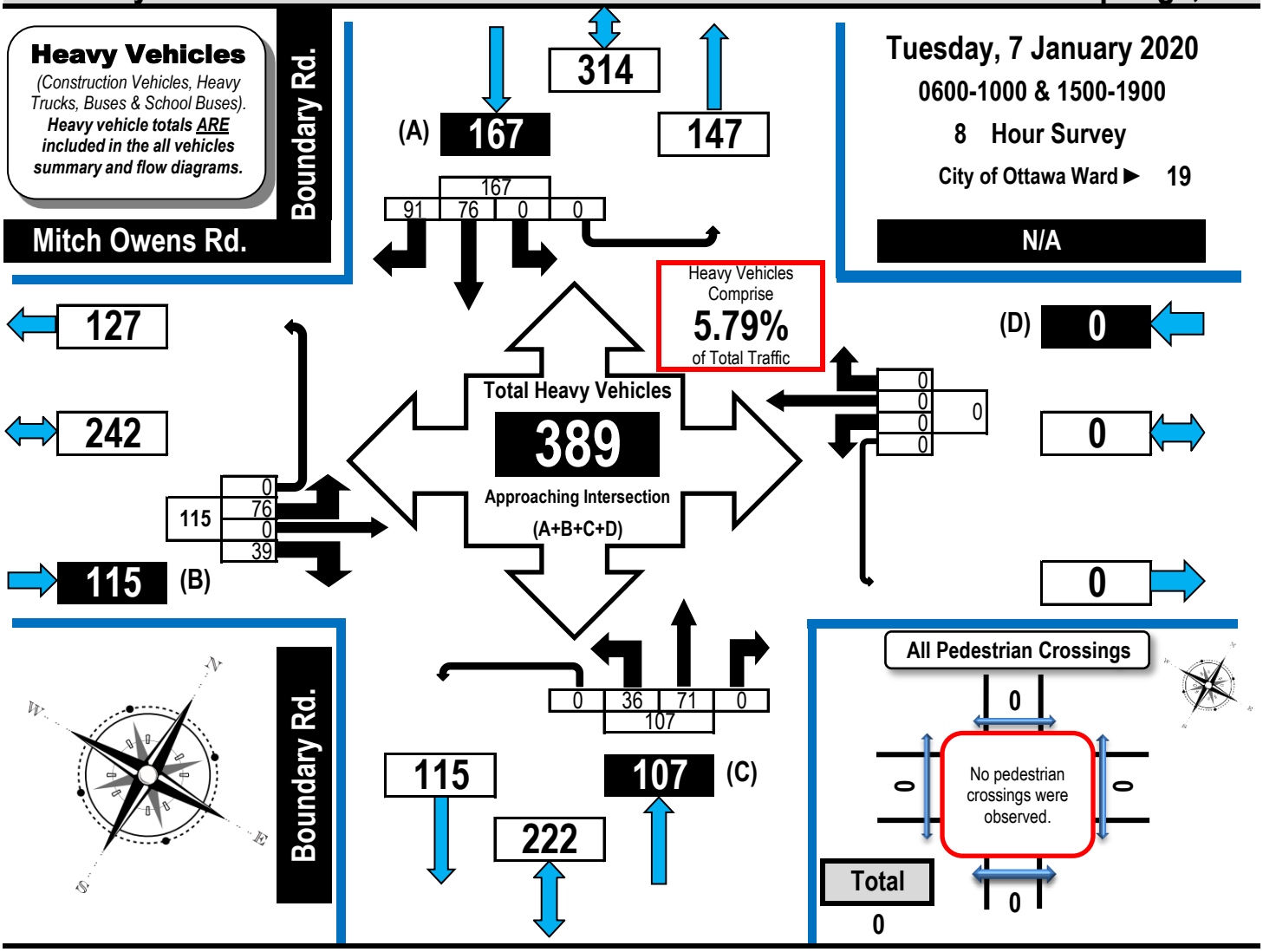
ACCURATE TRUSTED TRAFFIC DATA

# Turning Movement Count
## Heavy Vehicle Summary
## Flow Diagram

## Boundary Road & Mitch Owens Road — Carlsbad Springs, ON

**Heavy Vehicles**
*(Construction Vehicles, Heavy Trucks, Buses & School Buses).*
***Heavy vehicle totals ARE included in the all vehicles summary and flow diagrams.***

Tuesday, 7 January 2020
0600-1000 & 1500-1900
8 Hour Survey
City of Ottawa Ward ► 19









| | Mitch Owens Rd. Eastbound | | | | | N/A Westbound | | | | | Boundary Rd. Northbound | | | | | Boundary Rd. Southbound | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Time Period | LT | ST | RT | UT | S. Tot | LT | ST | RT | UT | S. Tot | LT | ST | RT | UT | S. Tot | LT | ST | RT | UT | S. Tot | G.Tot. |
| 0600-0700 | 6 | 0 | 6 | 0 | 12 | 0 | 0 | 0 | 0 | 0 | 4 | 12 | 0 | 0 | 16 | 0 | 4 | 6 | 0 | 10 | 38 |
| 0700-0800 | 8 | 0 | 4 | 0 | 12 | 0 | 0 | 0 | 0 | 0 | 10 | 10 | 0 | 0 | 20 | 0 | 15 | 16 | 0 | 31 | 63 |
| 0800-0900 | 12 | 0 | 6 | 0 | 18 | 0 | 0 | 0 | 0 | 0 | 7 | 18 | 0 | 0 | 25 | 0 | 8 | 17 | 0 | 25 | 68 |
| 0900-1000 | 21 | 0 | 4 | 0 | 25 | 0 | 0 | 0 | 0 | 0 | 3 | 10 | 0 | 0 | 13 | 0 | 9 | 14 | 0 | 23 | 61 |
| 1500-1600 | 4 | 0 | 11 | 0 | 15 | 0 | 0 | 0 | 0 | 0 | 5 | 5 | 0 | 0 | 10 | 0 | 18 | 12 | 0 | 30 | 55 |
| 1600-1700 | 15 | 0 | 6 | 0 | 21 | 0 | 0 | 0 | 0 | 0 | 4 | 5 | 0 | 0 | 9 | 0 | 10 | 14 | 0 | 24 | 54 |
| 1700-1800 | 5 | 0 | 2 | 0 | 7 | 0 | 0 | 0 | 0 | 0 | 2 | 7 | 0 | 0 | 9 | 0 | 10 | 10 | 0 | 20 | 36 |
| 1800-1900 | 5 | 0 | 0 | 0 | 5 | 0 | 0 | 0 | 0 | 0 | 1 | 4 | 0 | 0 | 5 | 0 | 2 | 2 | 0 | 4 | 14 |
| Totals | 76 | 0 | 39 | 0 | 115 | 0 | 0 | 0 | 0 | 0 | 36 | 71 | 0 | 0 | 107 | 0 | 76 | 91 | 0 | 167 | 389 |

ACCURATE TRUSTED TRAFFIC DATA

# Turning Movement Count
## Summary Report Including AM, OFF Peak, PM, Evening Peak Hours, and PHF

**Automobiles, Taxis, Light Trucks, Vans, SUV's, Motorcycles, Heavy Trucks, Buses, and School Buses**

## Boundary Road & Mitch Owens Road — Carlsbad Springs, ON

**Survey Date:** Tuesday, 7 January 2020 **Start Time:** 0600 **AADT Factor:** 1.1

**Weather AM:** Overcast - 4° C **Survey Duration:** 8 Hrs. **Survey Hours:** 0600-1000 & 1500-1900

**Weather PM:** Cloudy - 1° C **Surveyor(s):** Carmody

| | Mitch Owens Rd. | | | | | N/A | | | | | | Boundary Rd. | | | | | Boundary Rd. | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | Eastbound | | | | | Westbound | | | | | | Northbound | | | | | Southbound | | | | | | |
| Time Period | LT | ST | RT | UT | E/B Tot | LT | ST | RT | UT | W/B Tot | Street Total | LT | ST | RT | UT | N/B Tot | LT | ST | RT | UT | S/B Tot | Street Total | Grand Total |
| 0600-0700 | 51 | 0 | 28 | 0 | **79** | 0 | 0 | 0 | 0 | **0** | **79** | 81 | 670 | 0 | 0 | **751** | 0 | 57 | 88 | 0 | **145** | **896** | **975** |
| 0700-0800 | 63 | 0 | 19 | 0 | **82** | 0 | 0 | 0 | 0 | **0** | **82** | 118 | 681 | 0 | 0 | **799** | 0 | 115 | 95 | 0 | **210** | **1009** | **1091** |
| 0800-0900 | 80 | 0 | 30 | 0 | **110** | 0 | 0 | 0 | 0 | **0** | **110** | 52 | 412 | 0 | 0 | **464** | 0 | 92 | 75 | 0 | **167** | **631** | **741** |
| 0900-1000 | 58 | 0 | 16 | 0 | **74** | 0 | 0 | 0 | 0 | **0** | **74** | 29 | 239 | 0 | 0 | **268** | 0 | 67 | 48 | 0 | **115** | **383** | **457** |
| 1500-1600 | 75 | 0 | 74 | 0 | **149** | 0 | 0 | 0 | 0 | **0** | **149** | 45 | 125 | 0 | 0 | **170** | 0 | 488 | 66 | 0 | **554** | **724** | **873** |
| 1600-1700 | 113 | 0 | 98 | 0 | **211** | 0 | 0 | 0 | 0 | **0** | **211** | 52 | 116 | 0 | 0 | **168** | 0 | 703 | 113 | 0 | **816** | **984** | **1195** |
| 1700-1800 | 113 | 0 | 74 | 0 | **187** | 0 | 0 | 0 | 0 | **0** | **187** | 30 | 128 | 0 | 0 | **158** | 0 | 459 | 75 | 0 | **534** | **692** | **879** |
| 1800-1900 | 48 | 0 | 32 | 0 | **80** | 0 | 0 | 0 | 0 | **0** | **80** | 18 | 95 | 0 | 0 | **113** | 0 | 252 | 57 | 0 | **309** | **422** | **502** |
| Totals | **601** | **0** | **371** | **0** | **972** | **0** | **0** | **0** | **0** | **0** | **972** | **425** | **2466** | **0** | **0** | **2891** | **0** | **2233** | **617** | **0** | **2850** | **5741** | **6713** |

**Expansion factors are applied exclusively to standard weekday 8-hour turning movement counts conducted during the hours of 0700h - 1000h, 1130h - 1330h and 1500h - 1800h**

**AM Peak Hour Factor ➡ 0.91** — Highest Hourly Vehicle Volume Between 0500h & 1000h

| AM Peak Hr | LT | ST | RT | UT | TOT | LT | ST | RT | UT | TOT | S.TOT | LT | ST | RT | UT | TOT | LT | ST | RT | UT | TOT | S.TOT | G.TOT |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 0645-0745 | 68 | 0 | 27 | 0 | **95** | 0 | 0 | 0 | 0 | **0** | **95** | 121 | 776 | 0 | 0 | **897** | 0 | 110 | 94 | 0 | **204** | **1101** | **1196** |

**OFF Peak Hour Factor ➡ N/A** — Highest Hourly Vehicle Volume Between 1000h & 1500h

| OFF Peak Hr | LT | ST | RT | UT | TOT | LT | ST | RT | UT | TOT | S.TOT | LT | ST | RT | UT | TOT | LT | ST | RT | UT | TOT | S.TOT | G.TOT |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| N/A | 0 | 0 | 0 | 0 | **0** | 0 | 0 | 0 | 0 | **0** | **0** | 0 | 0 | 0 | 0 | **0** | 0 | 0 | 0 | 0 | **0** | **0** | **0** |

**PM Peak Hour Factor ➡ 0.93** — Highest Hourly Vehicle Volume Between 1500h & 1900h

| PM Peak Hr | LT | ST | RT | UT | TOT | LT | ST | RT | UT | TOT | S.TOT | LT | ST | RT | UT | TOT | LT | ST | RT | UT | TOT | S.TOT | G.TOT |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 1600-1700 | 113 | 0 | 98 | 0 | **211** | 0 | 0 | 0 | 0 | **0** | **211** | 52 | 116 | 0 | 0 | **168** | 0 | 703 | 113 | 0 | **816** | **984** | **1195** |

**EVNG Peak Hour Factor ➡ N/A** — Highest Hourly Vehicle Volume Between 1900h & 0000h

| EVNG Pk Hr | LT | ST | RT | UT | TOT | LT | ST | RT | UT | TOT | S.TOT | LT | ST | RT | UT | TOT | LT | ST | RT | UT | TOT | S.TOT | G.TOT |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| N/A | 0 | 0 | 0 | 0 | **0** | 0 | 0 | 0 | 0 | **0** | **0** | 0 | 0 | 0 | 0 | **0** | 0 | 0 | 0 | 0 | **0** | **0** | **0** |

**Comments:**

Large heavy vehicles cannot complete their turns without driving into adjacent lanes. The lack of a northbound left-turn lane results in some northbound drivers using the shoulder to pass vehicles waiting to turn. Some southbound drivers pass southbound heavy vehicles turning right onto Mitch Owens Road as the heavy vehicle turns from the southbound through lane.

**Notes:**

1. Includes all vehicle types except bicycles and electric scooters.
2. When expansion and AADT factors are applied, the results will differ slightly due to rounding.

# APPENDIX D

## Collision Data

# City Operations - Transportation Services

## Collision Details Report - Public Version

**From:** January 1, 2014 **To:** December 31, 2018

**Location:** BOUNDARY RD @ HWY 417 BOUNDARY IC96R15

**Traffic Control:** No control **Total Collisions:** 3

| Date/Day/Time | Environment | Impact Type | Classification | Surface Cond'n | Veh. Dir | Vehicle Manoeuver | Vehicle type | First Event | No. Ped |
|---|---|---|---|---|---|---|---|---|---|
| 2016-May-01, Sun,22:14 | Rain | SMV other | P.D. only | Wet | North | Turning left | Automobile, station wagon | Ran off road | |
| 2016-Nov-13, Sun,11:05 | Clear | Rear end | P.D. only | Dry | North | Going ahead | Automobile, station wagon | Other motor vehicle | |
| | | | | | North | Turning left | Automobile, station wagon | Other motor vehicle | |
| 2018-Mar-22, Thu,14:00 | Clear | Rear end | Non-fatal injury | Dry | North | Turning left | Automobile, station wagon | Other motor vehicle | |
| | | | | | North | Turning left | Automobile, station wagon | Other motor vehicle | |

**Location:** BOUNDARY RD @ HWY 417 BOUNDARY IC96R16

**Traffic Control:** No control **Total Collisions:** 1

| Date/Day/Time | Environment | Impact Type | Classification | Surface Cond'n | Veh. Dir | Vehicle Manoeuver | Vehicle type | First Event | No. Ped |
|---|---|---|---|---|---|---|---|---|---|
| 2015-Sep-12, Sat,11:19 | Rain | Rear end | P.D. only | Wet | North | Going ahead | Pick-up truck | Other motor vehicle | |
| | | | | | North | Turning right | Pick-up truck | Other motor vehicle | |

**Location:** BOUNDARY RD @ HWY 417 BOUNDARY IC96R51

**Traffic Control:** Stop sign **Total Collisions:** 7

| Date/Day/Time | Environment | Impact Type | Classification | Surface Cond'n | Veh. Dir | Vehicle Manoeuver | Vehicle type | First Event | No. Ped |
|---|---|---|---|---|---|---|---|---|---|

| | | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| 2014-Jun-21, Sat,23:06 | Clear | Rear end | P.D. only | Dry | North | Going ahead | Unknown | Other motor vehicle |
| | | | | | North | Going ahead | Automobile, station wagon | Other motor vehicle |
| 2014-Aug-22, Fri,16:15 | Clear | Rear end | P.D. only | Dry | East | Going ahead | Automobile, station wagon | Other motor vehicle |
| | | | | | East | Slowing or stopping | Automobile, station wagon | Other motor vehicle |
| 2015-May-27, Wed,18:10 | Clear | Rear end | P.D. only | Dry | East | Going ahead | Automobile, station wagon | Other motor vehicle |
| | | | | | East | Going ahead | Pick-up truck | Other motor vehicle |
| 2017-Oct-04, Wed,00:19 | Rain | Angle | Fatal injury | Wet | East | Turning right | Automobile, station wagon | Other motor vehicle |
| | | | | | South | Going ahead | Automobile, station wagon | Other motor vehicle |
| | | | | | North | Going ahead | Automobile, station wagon | Other motor vehicle |
| 2017-Nov-08, Wed,10:30 | Clear | Sideswipe | P.D. only | Dry | East | Turning right | Automobile, station wagon | Other motor vehicle |
| | | | | | East | Turning right | Truck and trailer | Other motor vehicle |
| 2018-Sep-06, Thu,15:10 | Clear | Angle | P.D. only | Dry | East | Turning left | Automobile, station wagon | Other motor vehicle |
| | | | | | North | Going ahead | Automobile, station wagon | Other motor vehicle |
| 2018-Apr-11, Wed,17:10 | Clear | Rear end | P.D. only | Dry | East | Going ahead | Automobile, station wagon | Other motor vehicle |
| | | | | | East | Slowing or stopping | Automobile, station wagon | Other motor vehicle |

**Location:** BOUNDARY RD @ HWY 417 BOUNDARY IC96R61

**Traffic Control:** Stop sign

**Total Collisions:** 2

| Date/Day/Time | Environment | Impact Type | Classification | Surface Cond'n | Veh. Dir | Vehicle Manoeuver | Vehicle type | First Event | No. Ped |
|---|---|---|---|---|---|---|---|---|---|
| 2015-May-02, Sat,02:58 | Clear | SMV other | P.D. only | Dry | South | Going ahead | Pick-up truck | Pole (sign, parking meter) | |
| 2015-Feb-15, Sun,15:20 | Clear | Rear end | P.D. only | Dry | West | Going ahead | Pick-up truck | Other motor vehicle | |
| | | | | | West | Stopped | Automobile, station wagon | Other motor vehicle | |

**Location:** BOUNDARY RD @ MITCH OWENS RD

**Traffic Control:** Stop sign

**Total Collisions:** 18

| Date/Day/Time | Environment | Impact Type | Classification | Surface Cond'n | Veh. Dir | Vehicle Manoeuver | Vehicle type | First Event | No. Ped |
|---|---|---|---|---|---|---|---|---|---|
| 2014-Feb-03, Mon,21:45 | Clear | SMV other | P.D. only | Dry | North | Going ahead | Pick-up truck | Animal - wild | |
| 2014-Mar-29, Sat,10:14 | Clear | SMV other | P.D. only | Dry | East | Going ahead | Automobile, station wagon | Ran off road | |
| 2014-Nov-08, Sat,02:00 | Clear | SMV other | P.D. only | Dry | East | Turning right | Pick-up truck | Ran off road | |
| 2014-Sep-27, Sat,08:57 | Clear | SMV other | P.D. only | Dry | East | Going ahead | Pick-up truck | Fence/noice barrier | |
| 2015-Feb-25, Wed,16:28 | Clear | Angle | P.D. only | Dry | East | Going ahead | Delivery van | Other motor vehicle | |
| | | | | | South | Going ahead | Automobile, station wagon | Other motor vehicle | |
| 2016-Jun-18, Sat,14:34 | Clear | Angle | P.D. only | Dry | East | Turning left | Passenger van | Other motor vehicle | |
| | | | | | South | Going ahead | Automobile, station wagon | Other motor vehicle | |

| | | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| 2015-Oct-30, Fri,17:16 | Clear | Rear end | Non-fatal injury | Dry | North | Going ahead | Delivery van | Other motor vehicle |
| | | | | | North | Turning left | Automobile, station wagon | Other motor vehicle |
| 2015-Oct-13, Tue,11:34 | Rain | SMV other | P.D. only | Wet | North | Overtaking | Automobile, station wagon | Skidding/sliding |
| 2015-Oct-19, Mon,07:35 | Clear | Angle | P.D. only | Dry | East | Turning left | Automobile, station wagon | Other motor vehicle |
| | | | | | North | Turning left | Automobile, station wagon | Other motor vehicle |
| 2016-Jan-17, Sun,17:07 | Snow | SMV other | P.D. only | Loose snow | South | Going ahead | Automobile, station wagon | Ditch |
| 2016-Jan-01, Fri,12:28 | Snow | Angle | P.D. only | Wet | East | Turning left | Delivery van | Other motor vehicle |
| | | | | | South | Going ahead | Automobile, station wagon | Other motor vehicle |
| 2016-Aug-18, Thu,17:57 | Clear | Angle | P.D. only | Dry | East | Turning left | Pick-up truck | Other motor vehicle |
| | | | | | South | Going ahead | Automobile, station wagon | Other motor vehicle |
| 2016-Nov-08, Tue,17:42 | Clear | Angle | P.D. only | Dry | East | Turning left | Automobile, station wagon | Other motor vehicle |
| | | | | | North | Going ahead | Automobile, station wagon | Other motor vehicle |
| 2016-Nov-25, Fri,16:38 | Fog, mist, smoke, dust | Rear end | Non-fatal injury | Wet | North | Going ahead | Pick-up truck | Other motor vehicle |

| | | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| | | | | | North | Turning left | Automobile, station wagon | Other motor vehicle |
| 2017-Jun-01, Thu,17:20 | Clear | Angle | P.D. only | Dry | East | Turning left | Automobile, station wagon | Other motor vehicle |
| | | | | | South | Going ahead | Automobile, station wagon | Other motor vehicle |
| 2017-Jun-09, Fri,09:25 | Clear | SMV other | P.D. only | Dry | South | Going ahead | Automobile, station wagon | Skidding/sliding |
| 2018-Dec-02, Sun,22:30 | Fog, mist, smoke, dust | Rear end | Non-fatal injury | Dry | East | Going ahead | Automobile, station wagon | Other motor vehicle |
| | | | | | East | Slowing or stopping | Automobile, station wagon | Other motor vehicle |
| 2018-Dec-21, Fri,19:00 | Fog, mist, smoke, dust | SMV other | P.D. only | Ice | South | Going ahead | Automobile, station wagon | Skidding/sliding |

**Location:** BOUNDARY RD @ NINTH LINE RD

**Traffic Control:** Stop sign

**Total Collisions:** 2

| Date/Day/Time | Environment | Impact Type | Classification | Surface Cond'n | Veh. Dir | Vehicle Manoeuver | Vehicle type | First Event | No. Ped |
|---|---|---|---|---|---|---|---|---|---|
| 2017-Sep-06, Wed,15:07 | Clear | Turning movement | P.D. only | Dry | North | Turning left | Automobile, station wagon | Other motor vehicle | |
| | | | | | South | Slowing or stopping | Automobile, station wagon | Other motor vehicle | |
| 2017-Feb-13, Mon,15:44 | Snow | Turning movement | P.D. only | Loose snow | North | Turning left | Automobile, station wagon | Other motor vehicle | |
| | | | | | North | Going ahead | Automobile, station wagon | Other motor vehicle | |

# APPENDIX E

## NCR Survey Data

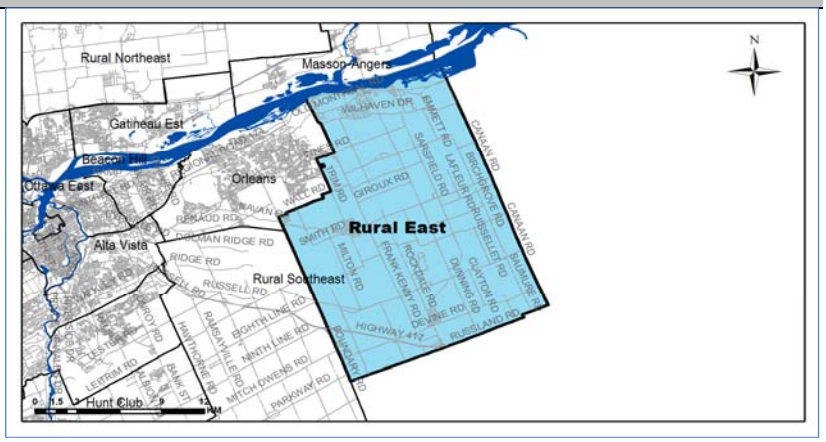
# Rural East

## Demographic Characteristics

| | | | |
|---|---|---|---|
| Population | 11,420 | Actively Travelled | 9,090 |
| Employed Population | 5,480 | Number of Vehicles | 9,320 |
| Households | 4,090 | Area (km$^2$) | 287.5 |

| Occupation Status (age 5+) | Male | Female | Total |
|---|---|---|---|
| Full Time Employed | 2,850 | 2,180 | 5,040 |
| Part Time Employed | 90 | 360 | 450 |
| Student | 1,280 | 1,320 | 2,600 |
| Retiree | 1,010 | 1,020 | 2,030 |
| Unemployed | 130 | 100 | 240 |
| Homemaker | 0 | 400 | 400 |
| Other | 50 | 90 | 150 |
| Total: | 5,410 | 5,480 | 10,900 |

| Traveller Characteristics | Male | Female | Total |
|---|---|---|---|
| Transit Pass Holders | 500 | 490 | 990 |
| Licensed Drivers | 4,450 | 4,410 | 8,850 |
| Telecommuters | 0 | 80 | 80 |
| Trips made by residents | 13,710 | 14,700 | 28,410 |



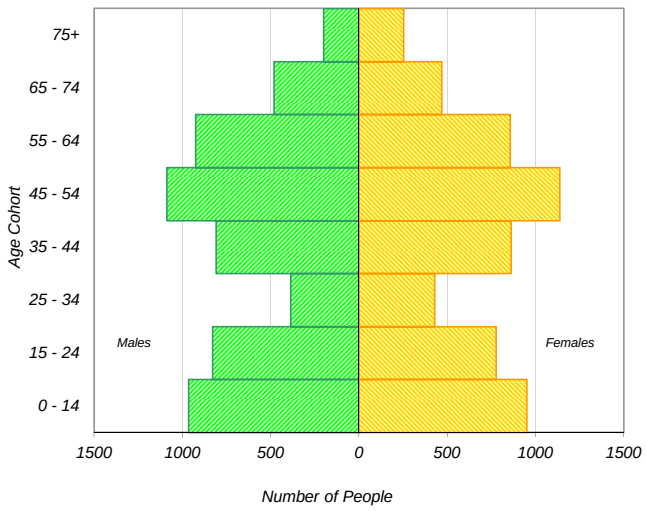

| Household Size | | |
|---|---|---|
| 1 person | 580 | 14% |
| 2 persons | 1,280 | 31% |
| 3 persons | 780 | 19% |
| 4 persons | 990 | 24% |
| 5+ persons | 460 | 11% |
| Total: | 4,090 | 100% |

| Households by Vehicle Availability | | |
|---|---|---|
| 0 vehicles | 60 | 1% |
| 1 vehicle | 810 | 20% |
| 2 vehicles | 1,820 | 44% |
| 3 vehicles | 910 | 22% |
| 4+ vehicles | 490 | 12% |
| Total: | 4,090 | 100% |

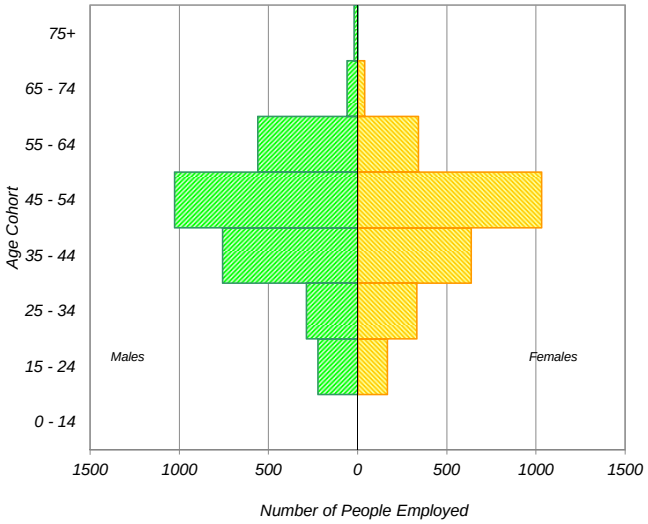
| Selected Indicators | |
|---|---|
| Daily Trips per Person (age 5+) | 2.61 |
| Vehicles per Person | 0.82 |
| Number of Persons per Household | 2.79 |
| Daily Trips per Household | 6.95 |
| Vehicles per Household | 2.28 |
| Workers per Household | 1.34 |
| Population Density (Pop/km2) | 40 |

| Households by Dwelling Type | | |
|---|---|---|
| Single-detached | 3,270 | 80% |
| Semi-detached | 270 | 7% |
| Townhouse | 220 | 5% |
| Apartment/Condo | 330 | 8% |
| Total: | 4,090 | 100% |

*Population*




*Employed Population*

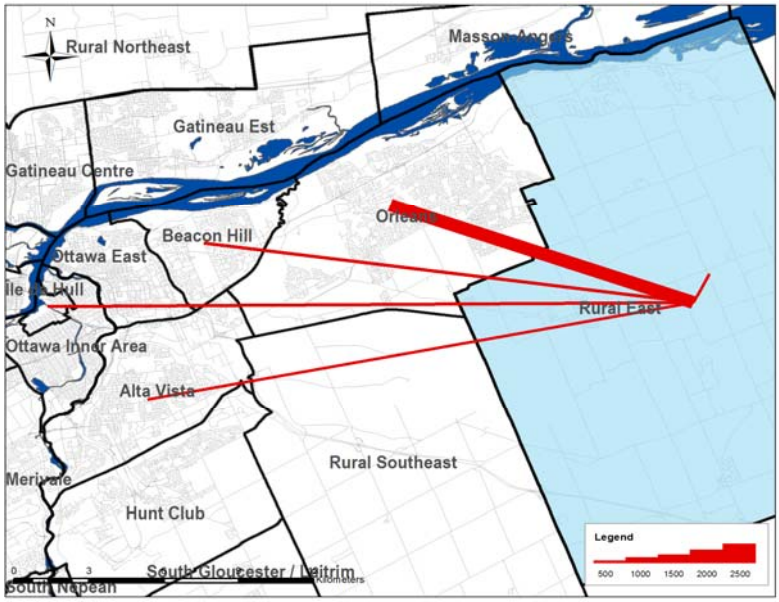



* In 2005 data was only collected for household members aged 11+ therefore these results cannot be compared to the 2011 data.

# Travel Patterns

## Top Five Destinations of Trips from Rural East

**AM Peak Period**




## Summary of Trips to and from Rural East

**AM Peak Period (6:30 - 8:59)**

| Districts | Destinations of Trips From District | % Total | Origins of Trips To District | % Total |
|---|---|---|---|---|
| Ottawa Centre | 450 | 8% | 0 | 0% |
| Ottawa Inner Area | 250 | 5% | 70 | 3% |
| Ottawa East | 160 | 3% | 70 | 3% |
| Beacon Hill | 350 | 7% | 60 | 2% |
| Alta Vista | 430 | 8% | 110 | 4% |
| Hunt Club | 140 | 3% | 50 | 2% |
| Merivale | 340 | 6% | 10 | 0% |
| Ottawa West | 60 | 1% | 40 | 2% |
| Bayshore / Cedarview | 50 | 1% | 20 | 1% |
| Orléans | 1,970 | 37% | 1,000 | 38% |
| Rural East | 820 | 15% | 820 | 31% |
| Rural Southeast | 30 | 1% | 170 | 6% |
| South Gloucester / Leitrim | 10 | 0% | 0 | 0% |
| South Nepean | 60 | 1% | 20 | 1% |
| Rural Southwest | 20 | 0% | 0 | 0% |
| Kanata / Stittsvile | 30 | 1% | 100 | 4% |
| Rural West | 0 | 0% | 0 | 0% |
| Île de Hull | 70 | 1% | 10 | 0% |
| Hull Périphérie | 30 | 1% | 10 | 0% |
| Plateau | 0 | 0% | 0 | 0% |
| Aylmer | 0 | 0% | 30 | 1% |
| Rural Northwest | 0 | 0% | 0 | 0% |
| Pointe Gatineau | 0 | 0% | 30 | 1% |
| Gatineau Est | 0 | 0% | 20 | 1% |
| Rural Northeast | 40 | 1% | 0 | 0% |
| Buckingham / Masson-Angers | 0 | 0% | 0 | 0% |
| Ontario Sub-Total: | 5,170 | 97% | 2,540 | 96% |
| Québec Sub-Total: | 140 | 3% | 100 | 4% |
| Total: | 5,310 | 100% | 2,640 | 100% |

## Trips by Trip Purpose

| 24 Hours | From District | | To District | | Within District | |
|---|---|---|---|---|---|---|
| Work or related | 3,600 | 27% | 1,100 | 8% | 710 | 19% |
| School | 1,590 | 12% | 790 | 6% | 320 | 9% |
| Shopping | 1,460 | 11% | 300 | 2% | 90 | 2% |
| Leisure | 1,290 | 10% | 1,160 | 9% | 410 | 11% |
| Medical | 480 | 4% | 90 | 1% | 0 | 0% |
| Pick-up / drive passenger | 1,150 | 9% | 580 | 4% | 350 | 9% |
| Return Home | 3,120 | 23% | 8,900 | 67% | 1,620 | 43% |
| Other | 670 | 5% | 460 | 3% | 250 | 7% |
| Total: | 13,360 | 100% | 13,380 | 100% | 3,750 | 100% |

| AM Peak (06:30 - 08:59) | From District | | To District | | Within District | |
|---|---|---|---|---|---|---|
| Work or related | 2,280 | 51% | 660 | 36% | 270 | 33% |
| School | 1,370 | 30% | 740 | 41% | 310 | 38% |
| Shopping | 70 | 2% | 0 | 0% | 0 | 0% |
| Leisure | 70 | 2% | 100 | 5% | 10 | 1% |
| Medical | 120 | 3% | 40 | 2% | 0 | 0% |
| Pick-up / drive passenger | 380 | 8% | 50 | 3% | 120 | 15% |
| Return Home | 30 | 1% | 130 | 7% | 70 | 9% |
| Other | 180 | 4% | 100 | 5% | 40 | 5% |
| Total: | 4,500 | 100% | 1,820 | 100% | 820 | 100% |

| PM Peak (15:30 - 17:59) | From District | | To District | | Within District | |
|---|---|---|---|---|---|---|
| Work or related | 60 | 3% | 90 | 2% | 60 | 9% |
| School | 10 | 0% | 0 | 0% | 0 | 0% |
| Shopping | 180 | 8% | 20 | 0% | 30 | 5% |
| Leisure | 250 | 11% | 340 | 8% | 110 | 17% |
| Medical | 120 | 5% | 30 | 1% | 0 | 0% |
| Pick-up / drive passenger | 250 | 11% | 150 | 4% | 40 | 6% |
| Return Home | 1,290 | 58% | 3,510 | 85% | 400 | 61% |
| Other | 60 | 3% | 10 | 0% | 20 | 3% |
| Total: | 2,220 | 100% | 4,150 | 100% | 660 | 100% |

| Peak Period (%) | Total: | % of 24 Hours | Within District (%) |
|---|---|---|---|
| 24 Hours | 30,490 | | 12% |
| AM Peak Period | 7,140 | 23% | 11% |
| PM Peak Period | 7,030 | 23% | 9% |

## Trips by Primary Travel Mode

| 24 Hours | From District | | To District | | Within District | |
|---|---|---|---|---|---|---|
| Auto Driver | 8,560 | 64% | 8,540 | 64% | 2,210 | 59% |
| Auto Passenger | 2,530 | 19% | 2,660 | 20% | 650 | 17% |
| Transit | 1,210 | 9% | 1,220 | 9% | 20 | 1% |
| Bicycle | 30 | 0% | 30 | 0% | 100 | 3% |
| Walk | 20 | 0% | 20 | 0% | 440 | 12% |
| Other | 1,000 | 7% | 920 | 7% | 330 | 9% |
| Total: | 13,350 | 100% | 13,390 | 100% | 3,750 | 100% |

| AM Peak (06:30 - 08:59) | From District | | To District | | Within District | |
|---|---|---|---|---|---|---|
| Auto Driver | 2,510 | 56% | 830 | 46% | 400 | 49% |
| Auto Passenger | 750 | 17% | 240 | 13% | 170 | 21% |
| Transit | 420 | 9% | 550 | 30% | 10 | 1% |
| Bicycle | 0 | 0% | 20 | 1% | 10 | 1% |
| Walk | 0 | 0% | 20 | 1% | 70 | 9% |
| Other | 810 | 18% | 150 | 8% | 160 | 20% |
| Total: | 4,490 | 100% | 1,810 | 100% | 820 | 100% |

| PM Peak (15:30 - 17:59) | From District | | To District | | Within District | |
|---|---|---|---|---|---|---|
| Auto Driver | 1,280 | 58% | 2,770 | 67% | 360 | 55% |
| Auto Passenger | 390 | 18% | 730 | 18% | 150 | 23% |
| Transit | 420 | 19% | 440 | 11% | 10 | 2% |
| Bicycle | 10 | 0% | 10 | 0% | 10 | 2% |
| Walk | 20 | 1% | 0 | 0% | 60 | 9% |
| Other | 100 | 5% | 210 | 5% | 70 | 11% |
| Total: | 2,220 | 100% | 4,160 | 100% | 660 | 100% |

| Avg Vehicle Occupancy | From District | To District | Within District |
|---|---|---|---|
| 24 Hours | 1.30 | 1.31 | 1.29 |
| AM Peak Period | 1.30 | 1.29 | 1.43 |
| PM Peak Period | 1.30 | 1.26 | 1.42 |

| Transit Modal Split | From District | To District | Within District |
|---|---|---|---|
| 24 Hours | 10% | 10% | 1% |
| AM Peak Period | 11% | 34% | 2% |
| PM Peak Period | 20% | 11% | 2% |

# Rural Southeast

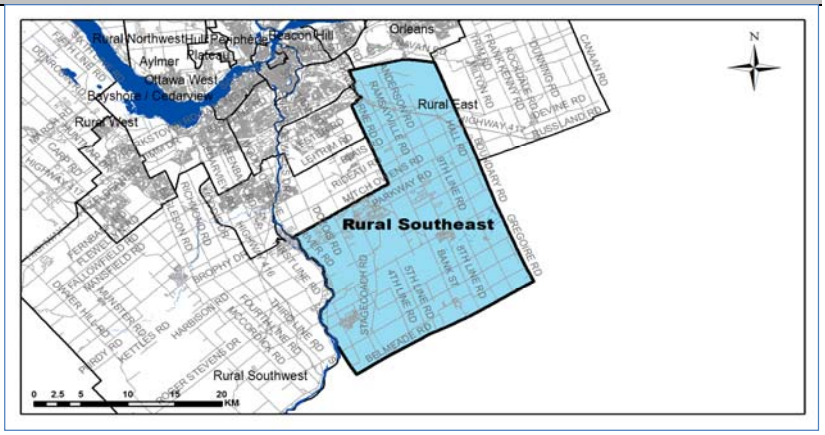
## Demographic Characteristics

| | | | |
|---|---|---|---|
| Population | 26,840 | Actively Travelled | 21,350 |
| Employed Population | 13,620 | Number of Vehicles | 19,650 |
| Households | 9,320 | Area (km$^2$) | 508.6 |

| Occupation Status (age 5+) | Male | Female | Total |
|---|---|---|---|
| Full Time Employed | 6,760 | 5,460 | 12,230 |
| Part Time Employed | 310 | 1,080 | 1,390 |
| Student | 3,300 | 2,860 | 6,160 |
| Retiree | 2,000 | 2,150 | 4,150 |
| Unemployed | 230 | 190 | 420 |
| Homemaker | 10 | 610 | 630 |
| Other | 200 | 290 | 490 |
| Total: | 12,820 | 12,640 | 25,460 |

| Traveller Characteristics | Male | Female | Total |
|---|---|---|---|
| Transit Pass Holders | 590 | 700 | 1,290 |
| Licensed Drivers | 10,120 | 10,110 | 20,230 |
| Telecommuters | 10 | 80 | 100 |
| Trips made by residents | 32,130 | 35,050 | 67,170 |

| Selected Indicators | |
|---|---|
| Daily Trips per Person (age 5+) | 2.64 |
| Vehicles per Person | 0.73 |
| Number of Persons per Household | 2.88 |
| Daily Trips per Household | 7.21 |
| Vehicles per Household | 2.11 |
| Workers per Household | 1.46 |
| Population Density (Pop/km2) | 50 |

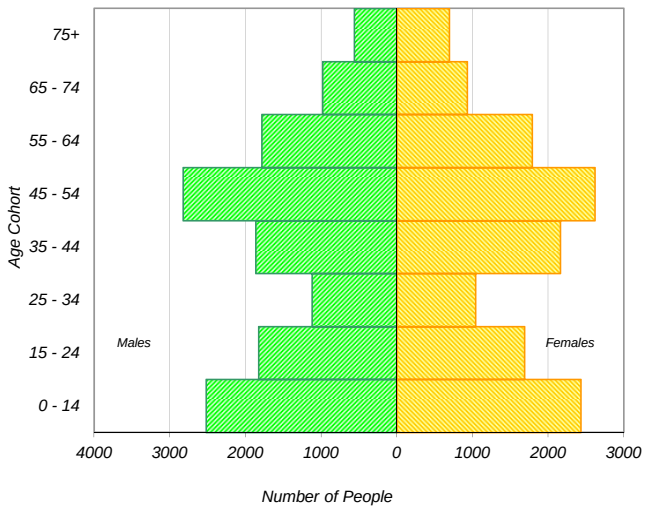



| Household Size | | |
|---|---|---|
| 1 person | 1,210 | 13% |
| 2 persons | 3,390 | 36% |
| 3 persons | 1,730 | 19% |
| 4 persons | 2,120 | 23% |
| 5+ persons | 880 | 9% |
| Total: | 9,320 | 100% |

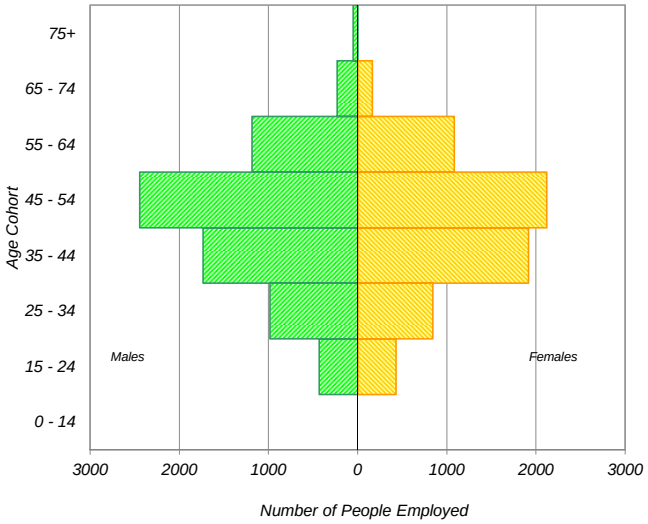
| Households by Vehicle Availability | | |
|---|---|---|
| 0 vehicles | 200 | 2% |
| 1 vehicle | 1,760 | 19% |
| 2 vehicles | 5,180 | 56% |
| 3 vehicles | 1,470 | 16% |
| 4+ vehicles | 710 | 8% |
| Total: | 9,320 | 100% |

| Households by Dwelling Type | | |
|---|---|---|
| Single-detached | 9,020 | 97% |
| Semi-detached | 70 | 1% |
| Townhouse | 140 | 2% |
| Apartment/Condo | 90 | 1% |
| Total: | 9,320 | 100% |

*Population*




*Employed Population*

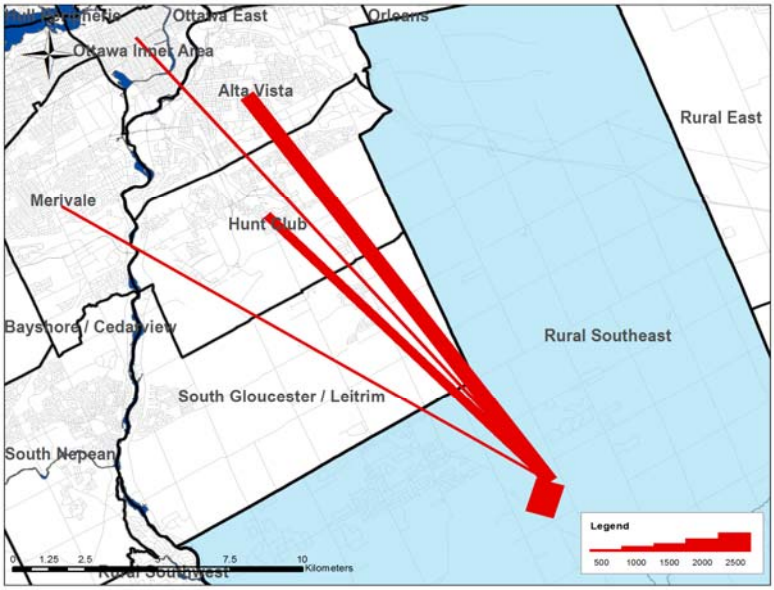



* In 2005 data was only collected for household members aged 11$^+$ therefore these results cannot be compared to the 2011 data.

# Travel Patterns

## Top Five Destinations of Trips from Rural Southeast

**AM Peak Period**




## Summary of Trips to and from Rural Southeast

| AM Peak Period (6:30 - 8:59) Districts | Destinations of Trips From District | % Total | Origins of Trips To District | % Total |
|---|---|---|---|---|
| Ottawa Centre | 690 | 5% | 20 | 0% |
| Ottawa Inner Area | 830 | 6% | 60 | 1% |
| Ottawa East | 260 | 2% | 40 | 1% |
| Beacon Hill | 480 | 4% | 10 | 0% |
| Alta Vista | 1,550 | 12% | 140 | 2% |
| Hunt Club | 1,210 | 9% | 190 | 3% |
| Merivale | 960 | 7% | 10 | 0% |
| Ottawa West | 190 | 1% | 50 | 1% |
| Bayshore / Cedarview | 180 | 1% | 40 | 1% |
| Orléans | 290 | 2% | 70 | 1% |
| Rural East | 170 | 1% | 30 | 0% |
| Rural Southeast | 4,440 | 33% | 4,440 | 73% |
| South Gloucester / Leitrim | 570 | 4% | 210 | 3% |
| South Nepean | 580 | 4% | 250 | 4% |
| Rural Southwest | 520 | 4% | 390 | 6% |
| Kanata / Stittsvile | 260 | 2% | 50 | 1% |
| Rural West | 0 | 0% | 20 | 0% |
| Île de Hull | 110 | 1% | 0 | 0% |
| Hull Périphérie | 0 | 0% | 30 | 0% |
| Plateau | 0 | 0% | 0 | 0% |
| Aylmer | 0 | 0% | 0 | 0% |
| Rural Northwest | 0 | 0% | 0 | 0% |
| Pointe Gatineau | 0 | 0% | 0 | 0% |
| Gatineau Est | 0 | 0% | 0 | 0% |
| Rural Northeast | 0 | 0% | 70 | 1% |
| Buckingham / Masson-Angers | 0 | 0% | 0 | 0% |
| Ontario Sub-Total: | 13,180 | 99% | 6,020 | 98% |
| Québec Sub-Total: | 110 | 1% | 100 | 2% |
| Total: | 13,290 | 100% | 6,120 | 100% |

## Trips by Trip Purpose

| 24 Hours | From District | | To District | | Within District | |
|---|---|---|---|---|---|---|
| Work or related | 7,950 | 34% | 1,470 | 6% | 2,180 | 13% |
| School | 2,360 | 10% | 440 | 2% | 2,570 | 16% |
| Shopping | 2,600 | 11% | 490 | 2% | 620 | 4% |
| Leisure | 2,230 | 9% | 1,950 | 8% | 1,270 | 8% |
| Medical | 850 | 4% | 300 | 1% | 130 | 1% |
| Pick-up / drive passenger | 2,180 | 9% | 810 | 3% | 1,170 | 7% |
| Return Home | 3,780 | 16% | 17,300 | 74% | 7,300 | 45% |
| Other | 1,580 | 7% | 670 | 3% | 1,110 | 7% |
| Total: | 23,530 | 100% | 23,430 | 100% | 16,350 | 100% |

| AM Peak (06:30 - 08:59) | From District | | To District | | Within District | |
|---|---|---|---|---|---|---|
| Work or related | 4,930 | 56% | 710 | 42% | 1,000 | 23% |
| School | 1,870 | 21% | 380 | 22% | 2,280 | 51% |
| Shopping | 270 | 3% | 30 | 2% | 30 | 1% |
| Leisure | 140 | 2% | 130 | 8% | 130 | 3% |
| Medical | 260 | 3% | 20 | 1% | 10 | 0% |
| Pick-up / drive passenger | 800 | 9% | 140 | 8% | 380 | 9% |
| Return Home | 160 | 2% | 170 | 10% | 230 | 5% |
| Other | 440 | 5% | 120 | 7% | 370 | 8% |
| Total: | 8,870 | 100% | 1,700 | 100% | 4,430 | 100% |

| PM Peak (15:30 - 17:59) | From District | | To District | | Within District | |
|---|---|---|---|---|---|---|
| Work or related | 220 | 8% | 60 | 1% | 170 | 5% |
| School | 50 | 2% | 20 | 0% | 0 | 0% |
| Shopping | 450 | 16% | 160 | 2% | 110 | 3% |
| Leisure | 530 | 19% | 590 | 7% | 240 | 7% |
| Medical | 70 | 2% | 70 | 1% | 0 | 0% |
| Pick-up / drive passenger | 390 | 14% | 350 | 4% | 210 | 6% |
| Return Home | 830 | 29% | 6,970 | 84% | 2,670 | 75% |
| Other | 320 | 11% | 120 | 1% | 150 | 4% |
| Total: | 2,860 | 100% | 8,340 | 100% | 3,550 | 100% |

| Peak Period (%) | Total: | % of 24 Hours | Within District (%) |
|---|---|---|---|
| 24 Hours | 63,310 | | 26% |
| AM Peak Period | 15,000 | 24% | 30% |
| PM Peak Period | 14,750 | 23% | 24% |

## Trips by Primary Travel Mode

| 24 Hours | From District | | To District | | Within District | |
|---|---|---|---|---|---|---|
| Auto Driver | 16,890 | 72% | 16,830 | 72% | 7,750 | 47% |
| Auto Passenger | 4,160 | 18% | 4,250 | 18% | 2,670 | 16% |
| Transit | 970 | 4% | 960 | 4% | 40 | 0% |
| Bicycle | 50 | 0% | 20 | 0% | 0 | 0% |
| Walk | 30 | 0% | 40 | 0% | 1,630 | 10% |
| Other | 1,460 | 6% | 1,320 | 6% | 4,260 | 26% |
| Total: | 23,560 | 100% | 23,420 | 100% | 16,350 | 100% |

| AM Peak (06:30 - 08:59) | From District | | To District | | Within District | |
|---|---|---|---|---|---|---|
| Auto Driver | 5,960 | 67% | 1,170 | 69% | 1,550 | 35% |
| Auto Passenger | 1,270 | 14% | 150 | 9% | 530 | 12% |
| Transit | 530 | 6% | 0 | 0% | 20 | 0% |
| Bicycle | 20 | 0% | 0 | 0% | 0 | 0% |
| Walk | 0 | 0% | 30 | 2% | 400 | 9% |
| Other | 1,070 | 12% | 350 | 21% | 1,940 | 44% |
| Total: | 8,850 | 100% | 1,700 | 100% | 4,440 | 100% |

| PM Peak (15:30 - 17:59) | From District | | To District | | Within District | |
|---|---|---|---|---|---|---|
| Auto Driver | 1,830 | 64% | 6,110 | 73% | 1,530 | 43% |
| Auto Passenger | 860 | 30% | 1,450 | 17% | 640 | 18% |
| Transit | 90 | 3% | 430 | 5% | 20 | 1% |
| Bicycle | 0 | 0% | 0 | 0% | 0 | 0% |
| Walk | 0 | 0% | 0 | 0% | 310 | 9% |
| Other | 100 | 3% | 340 | 4% | 1,040 | 29% |
| Total: | 2,880 | 100% | 8,330 | 100% | 3,540 | 100% |

| Avg Vehicle Occupancy | From District | To District | Within District |
|---|---|---|---|
| 24 Hours | 1.25 | 1.25 | 1.34 |
| AM Peak Period | 1.21 | 1.13 | 1.34 |
| PM Peak Period | 1.47 | 1.24 | 1.42 |

| Transit Modal Split | From District | To District | Within District |
|---|---|---|---|
| 24 Hours | 4% | 4% | 0% |
| AM Peak Period | 7% | 0% | 1% |
| PM Peak Period | 3% | 5% | 1% |

# APPENDIX F

## Trip Distribution Analysis

**EMPLOYEE TRIP DISTRIBUTION ANALYSIS**

| District | Trips entering district (am) | % Total |
|---|---|---|
| Ottawa Inner Area | 130 | 1% |
| Ottawa East | 110 | 1% |
| Beacon Hill | 60 | 1% |
| Alta Vista | 250 | 3% |
| Hunt Club | 240 | 3% |
| Ottawa West | 90 | 1% |
| Bayshore / Cedarview | 60 | 1% |
| Orleans | 1070 | 12% |
| Rural East | 820 | 9% |
| Rural Southeast | 4570 | 52% |
| South Gloucester / Leitrim | 210 | 2% |
| South Nepean | 270 | 3% |
| Rural Southwest | 390 | 4% |
| Kanata / Stittsvile | 150 | 2% |
| Ile de Hull | 10 | 0% |
| Hull Periphere | 10 | 0% |
| Alymer | 30 | 0% |
| Pointe Gatineau | 30 | 0% |
| Gatineau Est | 20 | 0% |
| Rural Northeast | 70 | 1% |
| Quebec | 200 | 2% |
| | 8790 | 100% |

| Arriving From: | Route | Total % | Rounded % |
|---|---|---|---|
| Highway 417 (West) | | | |
| Highway 417 (West) | Highway 417 (West) | 24% | 25% |
| Highway 417 (West) | Highway 417 (East) | 17% | 15% |
| Highway 417 (West) | Boundary Road (North) | 18% | 20% |
| Highway 417 (West) | Mitch Owens Road (West) | 5% | 5% |
| Highway 417 (West) | Boundary Road (South) | 36% | 35% |
| Highway 417 (West) | | | |
| Boundary Road (North) | | | |
| Highway 417 (East) | | | |
| *10% Highway 417 (West), 5% Highway 417 (East), 5% Boundary Road (North), 32% Boundary Road (South)* | | | |
| Mitch Owens Road (West) | | | |
| Mitch Owens Road (West) | | | |
| Boundary Road (South) | | | |
| Highway 417 (West) | | | |
| Highway 417 (West) | | | |
| Highway 417 (West) | | | |
| Highway 417 (West) | | | |
| Highway 417 (West) | | | |
| Highway 417 (West) | | | |
| Boundary Road (North) | | | |
| Highway 417 (East) | | | |

# APPENDIX G

## Growth Rate Analysis

**Highway 417 and Boundary Road Interchange** *MTO Data*

| Year | AADT | Year-to-Year Increase | Average Increase |
|---|---|---|---|
| 2012 | 44200 | -6.56% | 0.19% |
| 2013 | 41300 | 2.66% | |
| 2014 | 42400 | 2.36% | |
| 2015 | 43400 | 2.30% | |
| 2016 | 44400 | | |

| Year | SADT | Year-to-Year Increase | Average Increase |
|---|---|---|---|
| 2012 | 65,000 | -4.62% | 0.66% |
| 2013 | 62,000 | 2.42% | |
| 2014 | 63,500 | 2.52% | |
| 2015 | 65,100 | 2.30% | |
| 2016 | 66,600 | | |

# APPENDIX H

## CRRRC TIS Excerpts

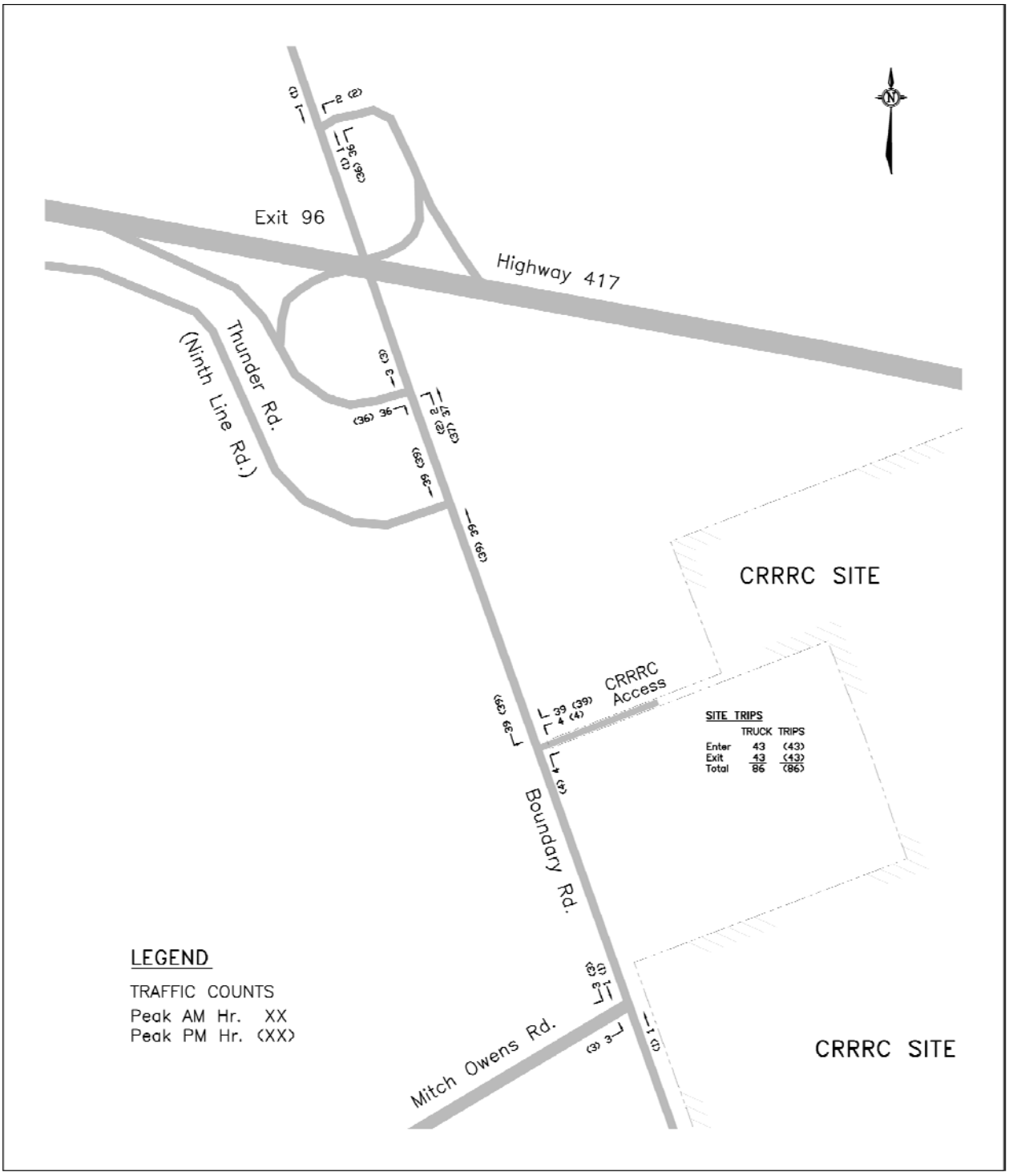



*Figure 3.1: Weekday Peak AM and PM Hour Site Generated Trips*

# 4.0 FUTURE TRAFFIC VOLUMES

This Addendum has assumed an annual compounded growth rate of 2 percent as discussed in the TIS. The growth rate was applied to all lane movements shown in the traffic counts presented in Figure 2.1 for the weekday peak AM and PM hour. Figure 4.1 shows the expected 2022 background traffic, which would represent traffic five years beyond build out from growth outside the immediate area.

The East Gateway Properties truck transfer terminal is proposed to be located on the east side of Boundary Road north of the CRRRC Site. The truck transfer terminal will have an access that will form the east access to the intersection of Boundary Road and Thunder Road. It is understood that the terminal facility expects build out by the year 2026. For the expected background traffic at the year 2027, which represents ten years beyond opening of the CRRRC Site, this Addendum has increased the existing traffic (Figure 2.1) at a 2 percent compounded rate to the year 2027, and added the expected traffic from the truck transfer terminal. The volume and distribution of trips from the proposed terminal were determined from the Transportation Impact Study report dated October 2014 for 5341 Boundary Road Transport prepared by Dillon Consulting Limited (Dillon). The Dillon TIS examined both a “Low Building Coverage” and a “High Building Coverage” scenario. As discussed at the meeting of April 22, 2015, this Addendum has utilized the traffic associated with the average of both scenarios and added the expected terminal trips to the 2027 background traffic, which is shown in Figure 4.2.

The expected total traffic volumes at the year 2022, which are shown in Figure 4.3, were determined by the addition of the expected background traffic of Figure 4.1 and the expected Site generated trips of Figure 3.1. For the expected 2027 total traffic shown in Figure 4.4, the 2027 background traffic (Figure 4.2) was added to the Site generated trips (Figure 3.1).

## 4.1 Traffic Analysis

The following are the results of the intersection analysis at the year 2022 (5 years beyond CRRRC Site opening), and at the year 2027 (10 years beyond opening), including the East Gateway Properties truck transfer terminal trips.

Boundary Road and CRRRC Site Access

A left turn lane warrant analysis was conducted at the Site access using the procedure documented in the MTO publication, *Geometric Design Standards for Ontario Highways*. The analysis utilized the expected 2027 traffic and a design speed of 90 km/h. (80 km./h. posted speed) at the access. The warrant analysis, which is presented in the Appendix as Exhibit 5, determined that a southbound left turn lane with 25 m for passenger car storage was required during the both the peak AM and PM hour. Utilizing a passenger car equivalent for heavy vehicles of 2.0 as documented in the MTO publication, the required length of the southbound left turn lane at the CRRRC truck access would therefore be 50 m. The following is the recommended lane configuration:

# APPENDIX I

## Vehicle Turning Analysis

THUNDER ROAD

NEW PRIVATE ROAD

426 AUTO SPACES

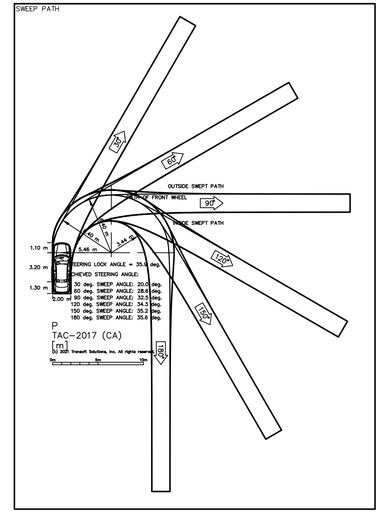
OFFIC

5 0m 5 10 15 20

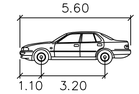
SCALE: 1:250

DRAFT

FOR DISCUSSION PURPOSES ONLY




VEHICLE PROFILE




P

| | meters |
|---|---|
| Width | : 2.00 |
| Track | : 2.00 |
| Lock to Lock Time | : 6.0 |
| Steering Angle | : 35.9 |

| No. | ISSUE | DATE: MM/DD/YYYY |
|---|---|---|
| 0 | ISSUED FOR INTERNAL REVIEW | 02/17/2021 |
| 1 | ISSUED FOR REVIEW | 03/10/2021 |

Project

THUNDER ROAD & BOUNDARY ROAD
CITY OF OTTAWA

Drawing

PASSENGER CAR TURNING ANALYSIS
BUILDING 1


CROZIER
CONSULTING ENGINEERS
THE HARBOUREDGE BUILDING,
40 HURON STREET, SUITE 301,
COLLINGWOOD, ON L9Y 4R3
705 446-3510 T
705 446-3520 F
WWW.CFCROZIER.CA
INFO@CFCROZIER.CA


| | | | |
|---|---|---|---|
| Drawn By: S.K. | Design By: | Project: | 1909-5772 |
| Check By: D.L. | Check By: | Scale: 1:250 | Drawing: TT 01 |

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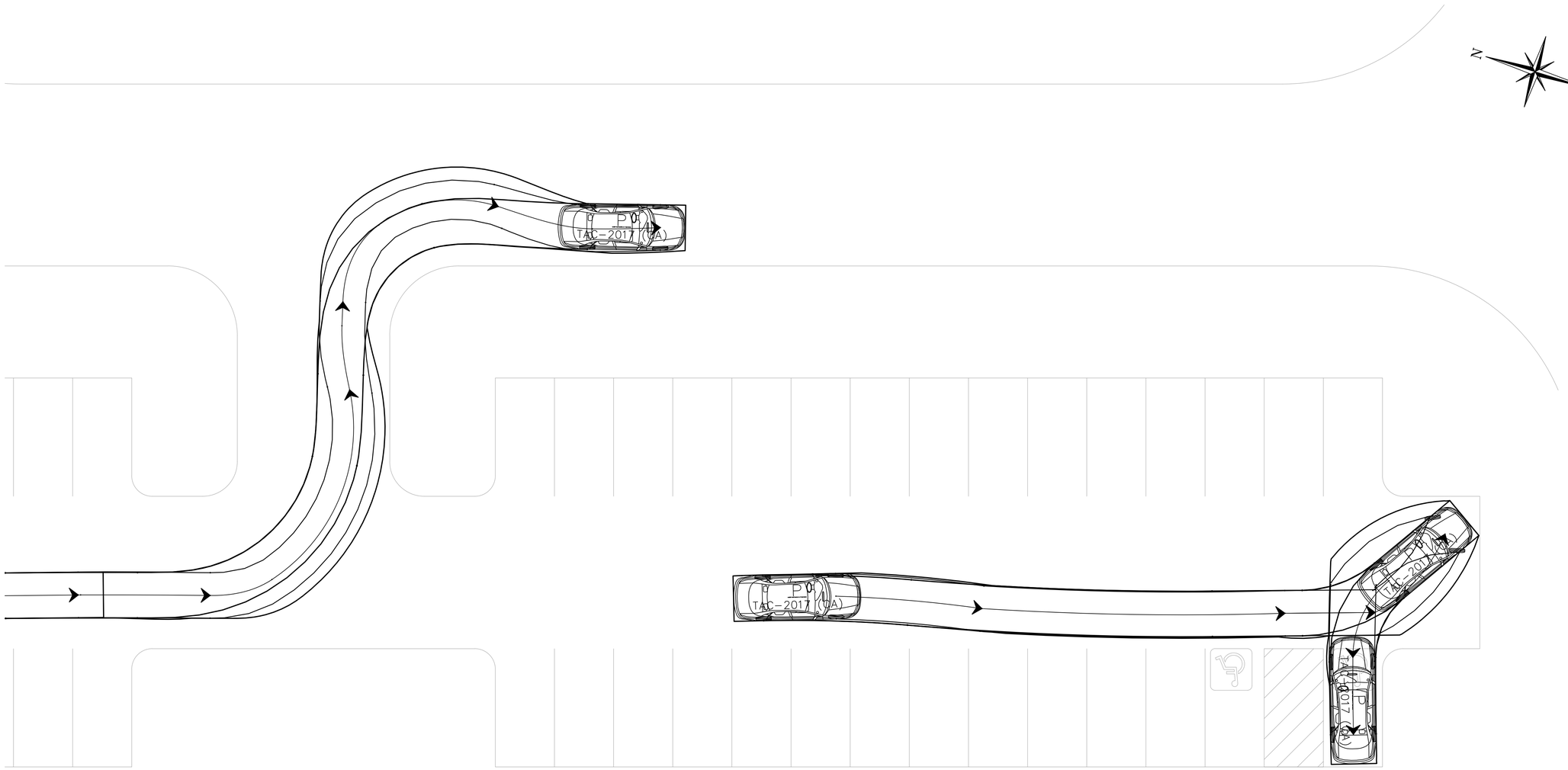
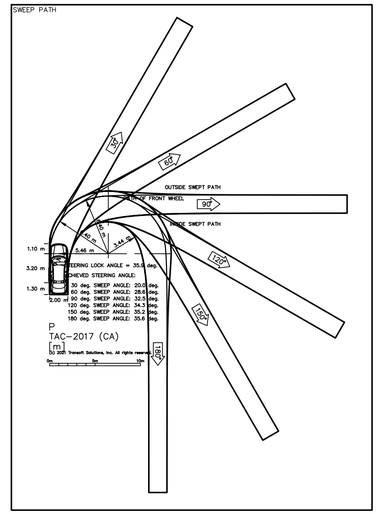
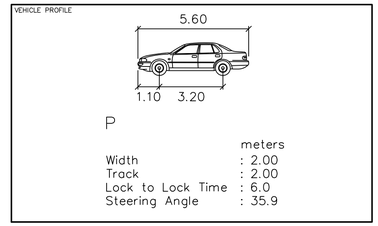



DRAFT
FOR DISCUSSION PURPOSES ONLY

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OFFICE

2 0m 2 4 6 8
SCALE: 1:100

Project
THUNDER ROAD & BOUNDARY ROAD
CITY OF OTTAWA

Drawing
PASSENGER CAR TURNING ANALYSIS
BUILDING 1


CROZIER
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THE HARBOUREDGE BUILDING,
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COLLINGWOOD, ON L9Y 4R3
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| Drawn By | S.K. | Design By | | Project | 1909-5772 |
|---|---|---|---|---|---|
| Check By | D.L. | Check By | | Scale 1:100 | Drawing TT 01.1 |

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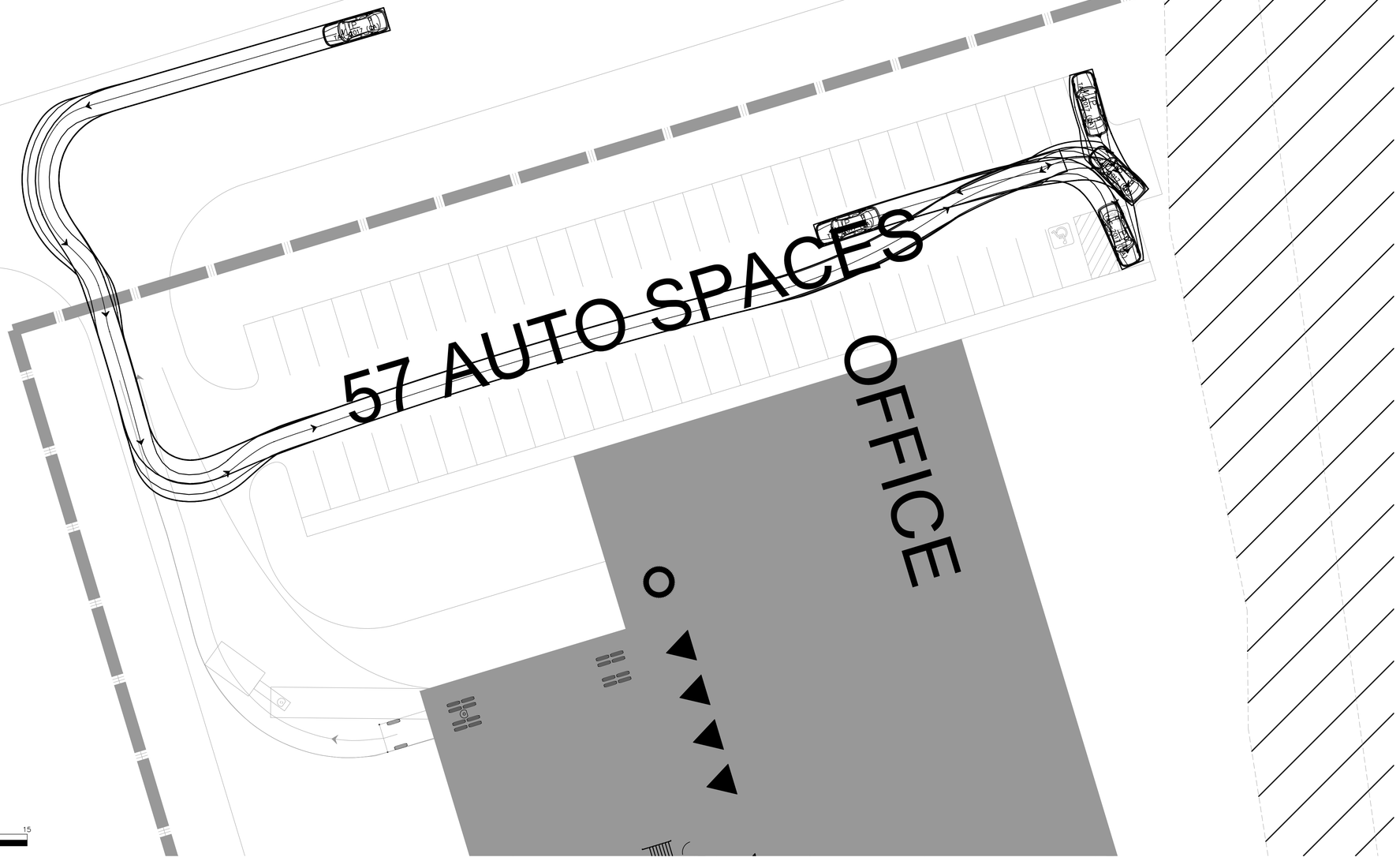
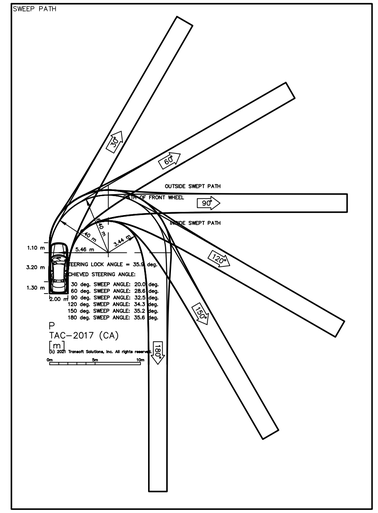
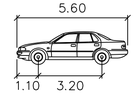



VEHICLE PROFILE

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| | meters |
|---|---|
| Width | : 2.00 |
| Track | : 2.00 |
| Lock to Lock Time | : 6.0 |
| Steering Angle | : 35.9 |

| No. | ISSUE | DATE: MM/DD/YYYY |
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Project

THUNDER ROAD & BOUNDARY ROAD
CITY OF OTTAWA

Drawing

PASSENGER CAR TURNING ANALYSIS
BUILDING 2


CROZIER
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THE HARBOUREDGE BUILDING,
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| Drawn By | Design By | Project | |
|---|---|---|---|
| S.K. | | | 1909-5772 |
| Check By | Check By | Scale | Drawing |
| D.L. | | 1:200 | TT 02 |

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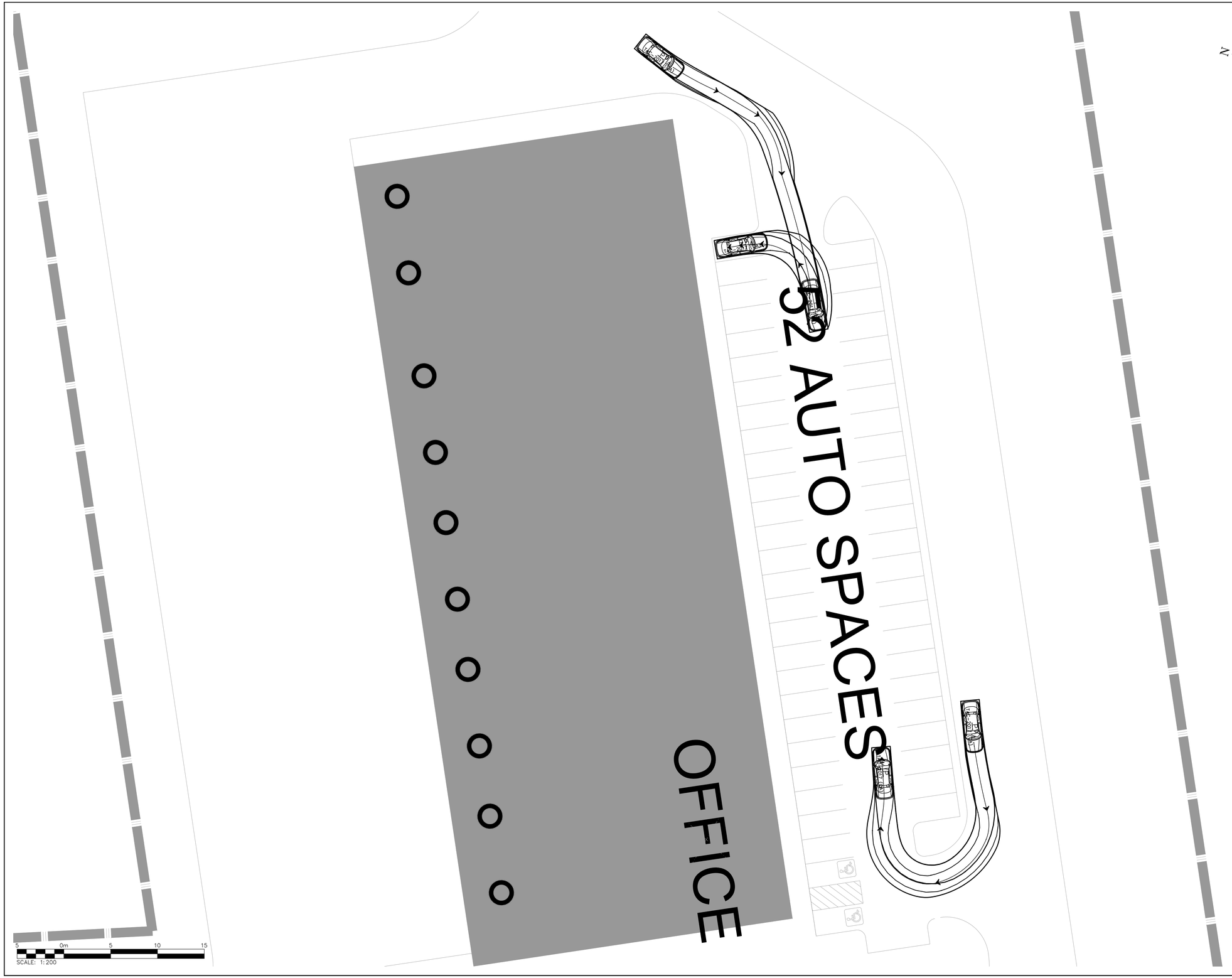


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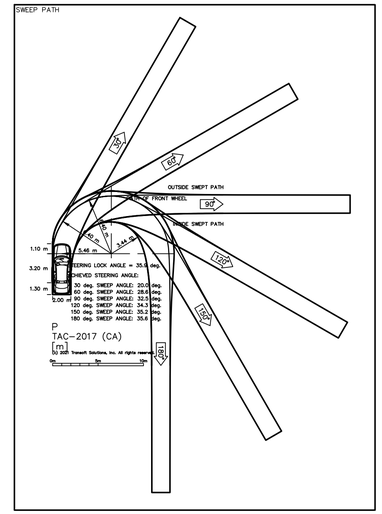
FOR DISCUSSION PURPOSES ONLY

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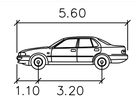


P

| | meters |
|---|---|
| Width | : 2.00 |
| Track | : 2.00 |
| Lock to Lock Time | : 6.0 |
| Steering Angle | : 35.9 |

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Project
THUNDER ROAD & BOUNDARY ROAD
CITY OF OTTAWA

Drawing
PASSENGER CAR TURNING ANALYSIS
BUILDING 3

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| Drawn By | Design By | Project | |
|---|---|---|---|
| S.K. | | | 1909-5772 |
| Check By | Check By | Scale | Drawing |
| D.L | | 1:200 | TT 03 |

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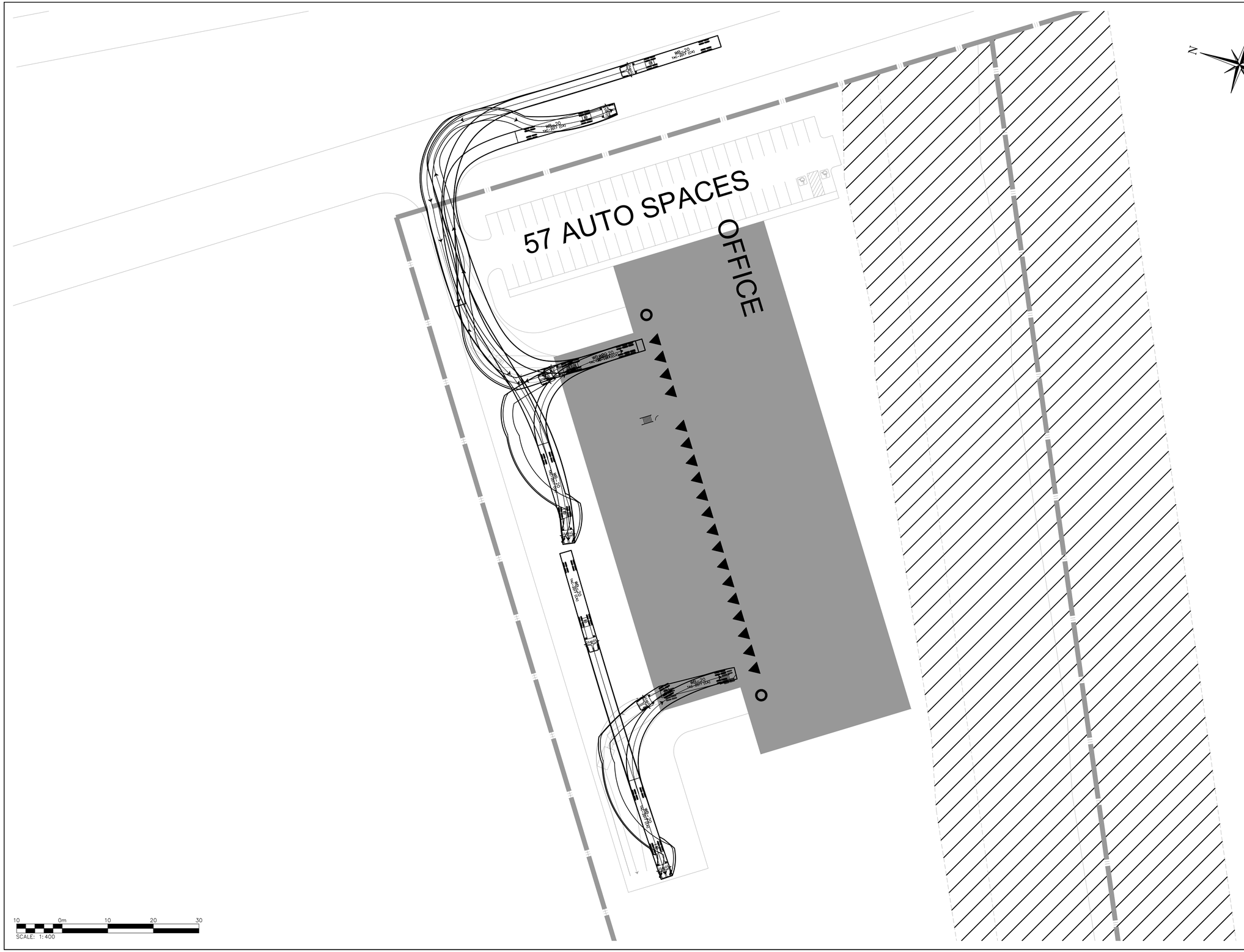


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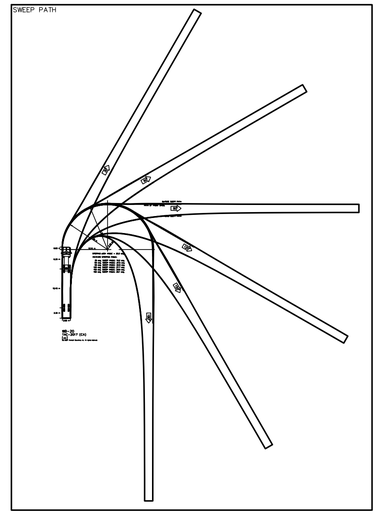
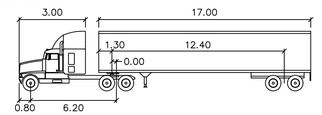
SWEEP PATH



VEHICLE PROFILE




WB-20

meters

| | | | |
|---|---|---|---|
| Tractor Width | : 2.60 | Lock to Lock Time | : 6.0 |
| Trailer Width | : 2.60 | Steering Angle | : 28.2 |
| Tractor Track | : 2.60 | Articulating Angle | : 70.0 |
| Trailer Track | : 2.60 | | |

| No. | ISSUE | DATE: MM/DD/YYYY |
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Project

THUNDER ROAD & BOUNDARY ROAD
CITY OF OTTAWA

Drawing

WB-20 TURNING ANALYSIS
BUILDING 2

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705 446-3520 F
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| | | | |
|---|---|---|---|
| Drawn By: S.K. | Design By: | Project: | 1909-5772 |
| Check By: D.L. | Check By: | Scale: 1:400 | Drawing: TT 04 |

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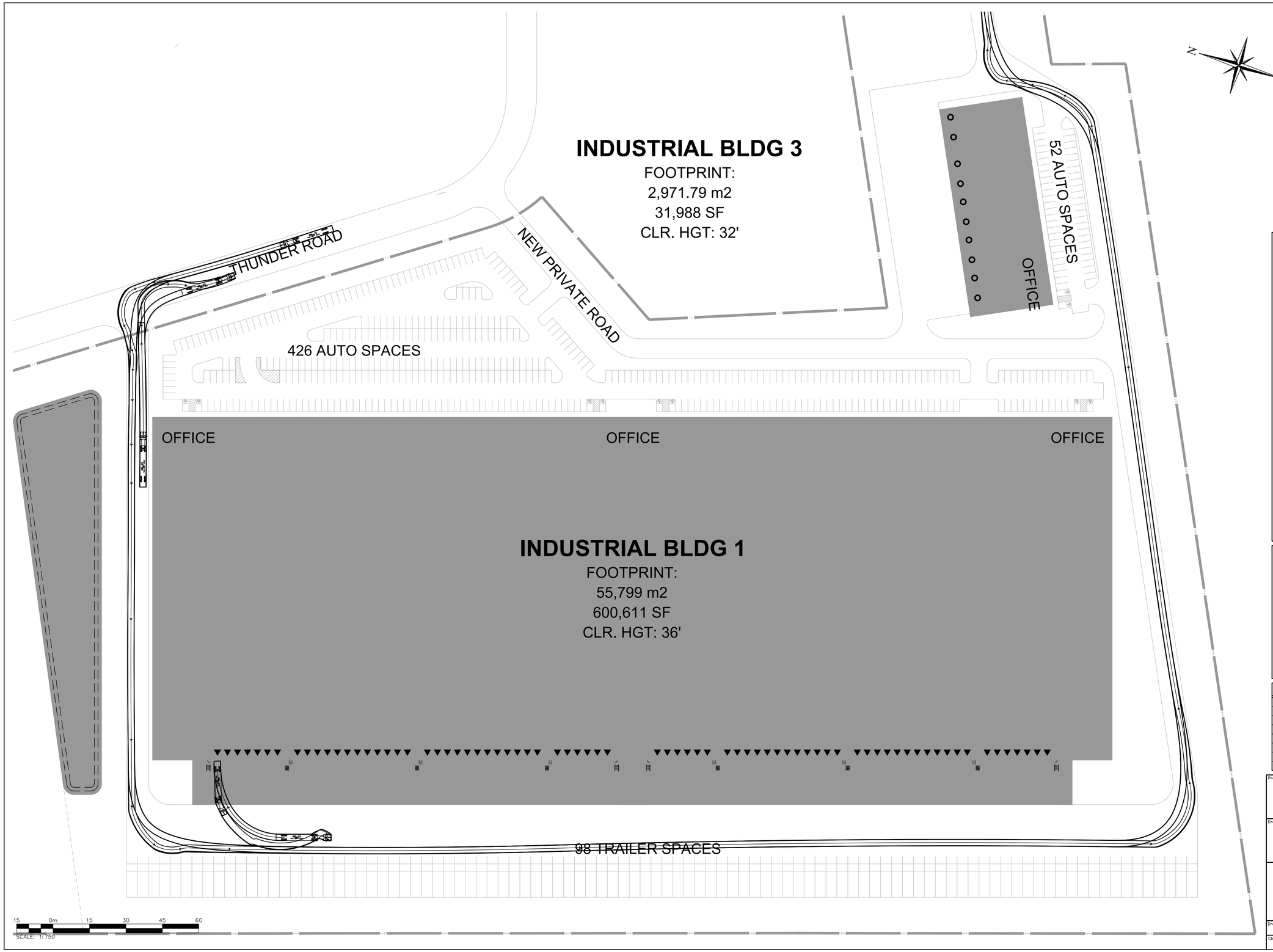
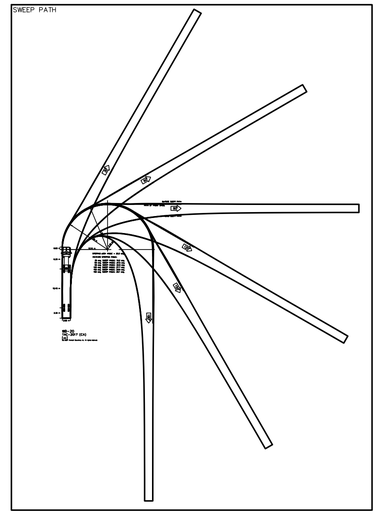
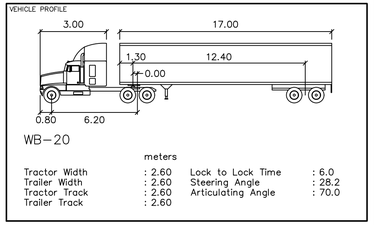



DRAFT
FOR DISCUSSION PURPOSES ONLY




meters

| | | | |
|---|---|---|---|
| Tractor Width | : 2.60 | Lock to Lock Time | : 6.0 |
| Trailer Width | : 2.60 | Steering Angle | : 28.2 |
| Tractor Track | : 2.60 | Articulating Angle | : 70.0 |
| Trailer Track | : 2.60 | | |

| No. | ISSUE | DATE: MM/DD/YYYY |
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Project
THUNDER ROAD & BOUNDARY ROAD
CITY OF OTTAWA

Drawing
WB-20 TURNING ANALYSIS
BUILDING 1


CROZIER
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| Drawn By | Design By | Project | |
|---|---|---|---|
| S.K. | | 1909-5772 | |
| Check By | Check By | Scale | Drawing |
| D.L. | | 1:750 | TT 05 |

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BOUNDARY ROAD

THUNDER ROAD

NEW PRIVATE ROAD

426 AUTO SPACES

52 AUTO SPACES

OFFICE

## INDUSTRIAL BLDG 3

FOOTPRINT:
2,971.79 m2
31,988 SF
CLR. HGT: 32'

OFFICE OFFICE OFFICE

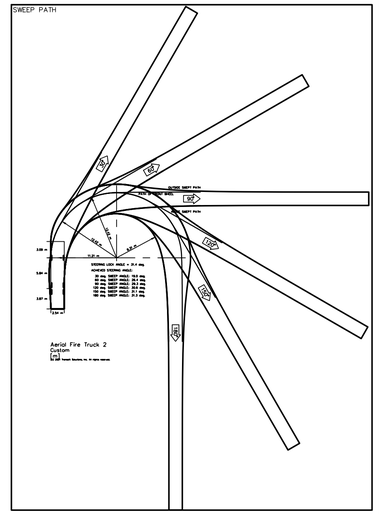
## INDUSTRIAL BLDG 1

FOOTPRINT:
55,799 m2
600,611 SF
CLR. HGT: 36'

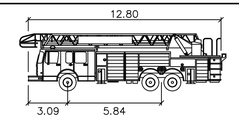
0m 15 30 45 60
SCALE: 1:750

**DRAFT**
FOR DISCUSSION PURPOSES ONLY

SWEEP PATH




VEHICLE PROFILE




Aerial Fire Truck 2

| | meters |
|---|---|
| Width | : 2.54 |
| Track | : 2.54 |
| Lock to Lock Time | : 6.0 |
| Steering Angle | : 31.4 |

| No. | ISSUE | DATE: MM/DD/YYYY |
|---|---|---|
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Project
THUNDER ROAD & BOUNDARY ROAD
CITY OF OTTAWA

Drawing
FIRE TRUCK TURNING ANALYSIS
BUILDING 1

CROZIER CONSULTING ENGINEERS
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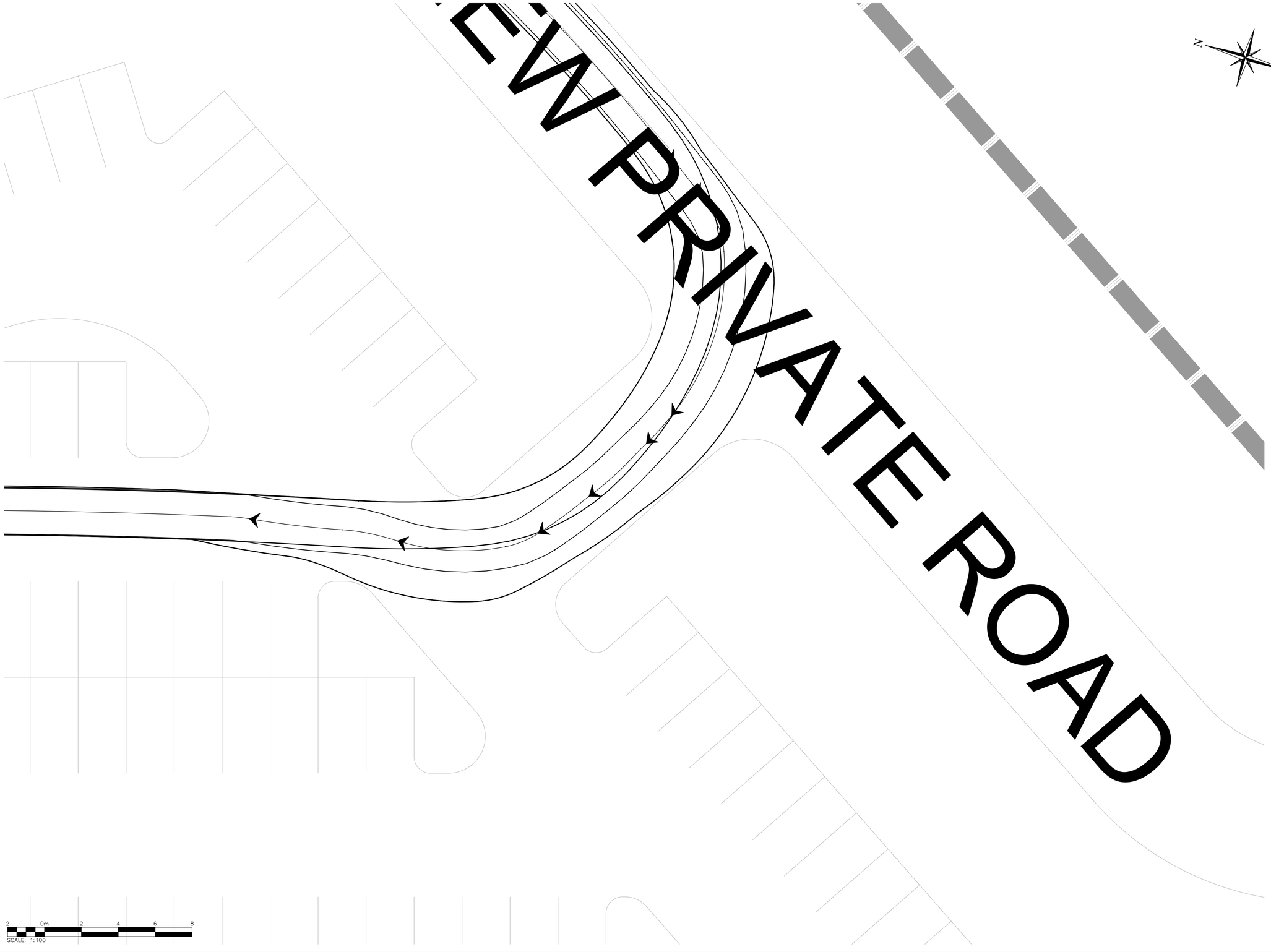
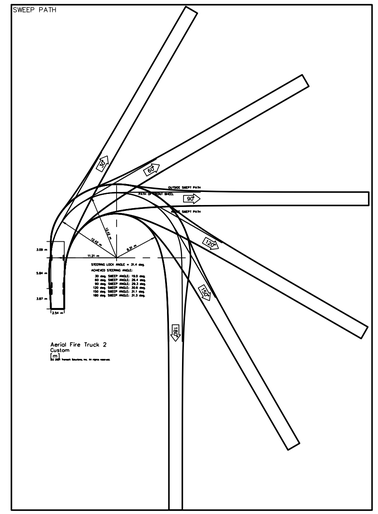
| Drawn By | Design By | Project | |
|---|---|---|---|
| S.K. | | | 1909-5772 |
| Check By | Check By | Scale | Drawing |
| D.L. | | 1:750 | TT 06 |




DRAFT
FOR DISCUSSION PURPOSES ONLY

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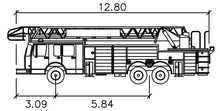


Aerial Fire Truck 2

| | meters |
|---|---|
| Width | : 2.54 |
| Track | : 2.54 |
| Lock to Lock Time | : 6.0 |
| Steering Angle | : 31.4 |

| No. | ISSUE | DATE: MM/DD/YYYY |
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Project
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705 446-3520 F
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| Drawn By | Design By | Project | |
|---|---|---|---|
| S.K. | | 1909–5772 | |
| Check By | Check By | Scale | Drawing |
| D.L. | | 1:100 | TT 06.1 |

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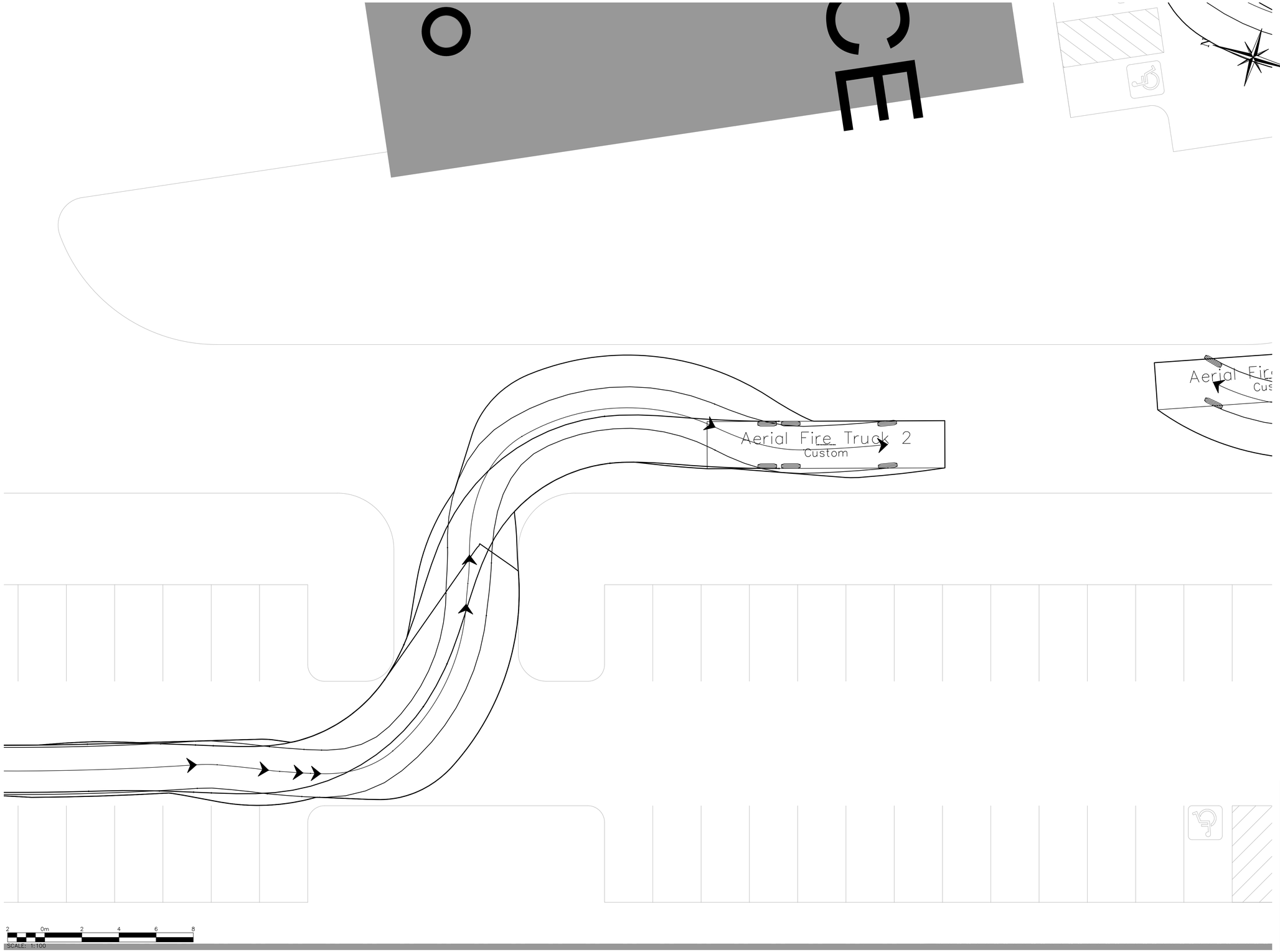
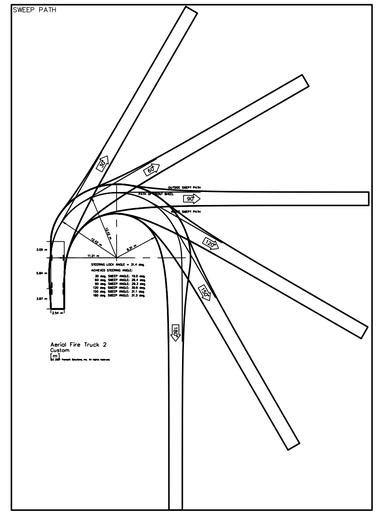
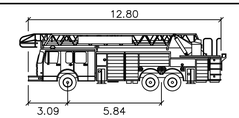



DRAFT
FOR DISCUSSION PURPOSES ONLY




VEHICLE PROFILE




Aerial Fire Truck 2

| | meters |
|---|---|
| Width | : 2.54 |
| Track | : 2.54 |
| Lock to Lock Time | : 6.0 |
| Steering Angle | : 31.4 |

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Project

THUNDER ROAD & BOUNDARY ROAD
CITY OF OTTAWA

Drawing

FIRE TRUCK TURNING ANALYSIS
BUILDING 1

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705 446-3510 T
705 446-3520 F
WWW.CFCROZIER.CA
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| Drawn By | Design By | Project | |
|---|---|---|---|
| S.K. | | | 1909-5772 |
| Check By | Check By | Scale | Drawing |
| D.L. | | 1:100 | TT 06.2 |

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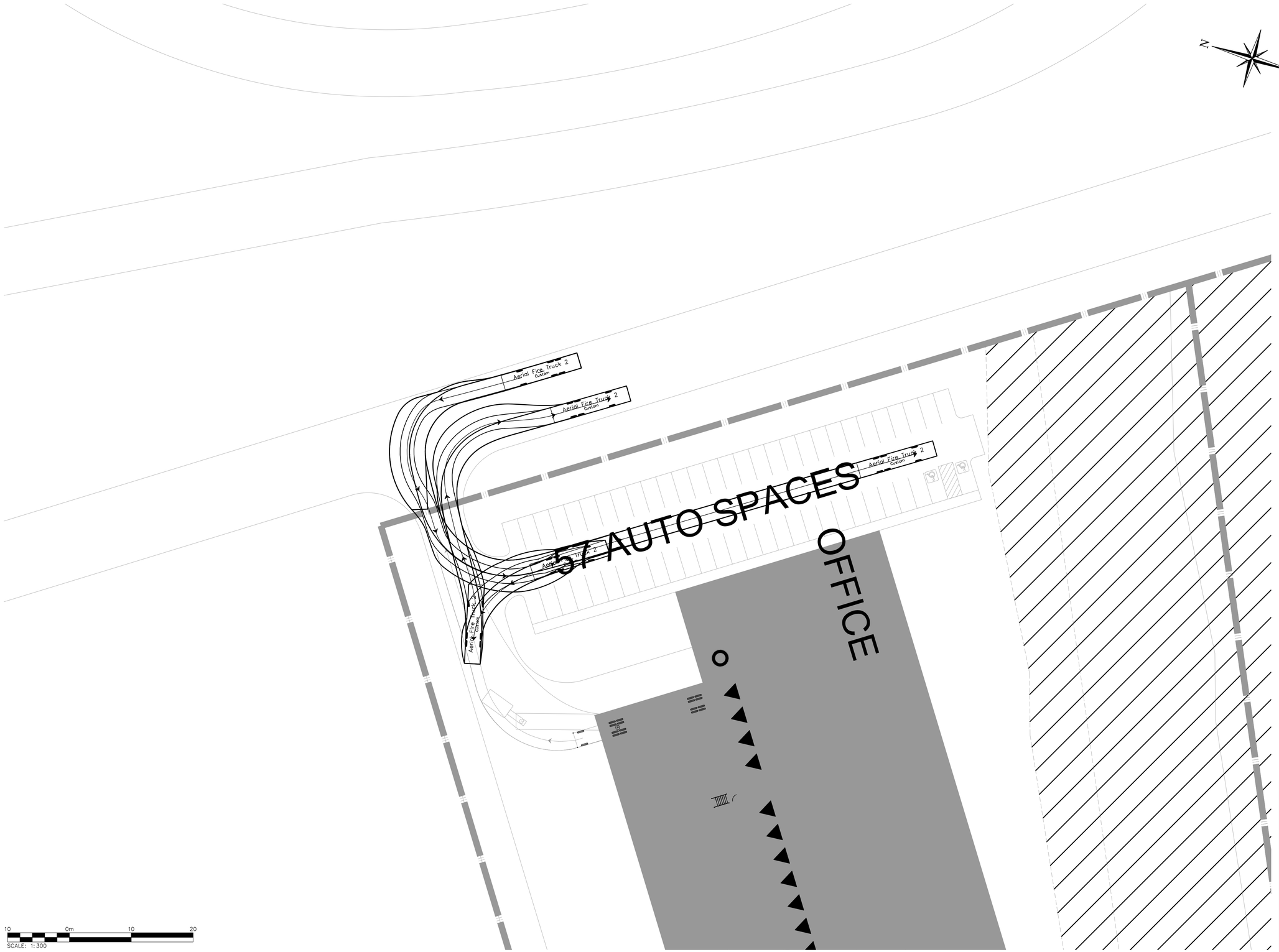
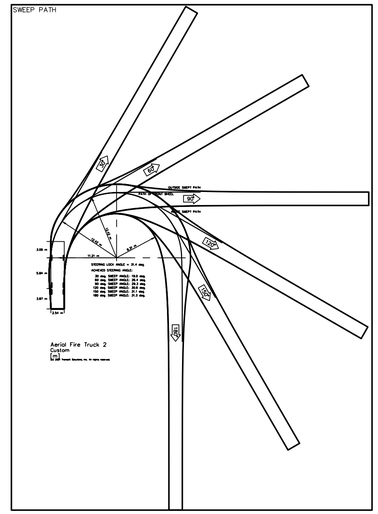
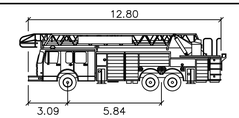



SWEEP PATH




VEHICLE PROFILE




Aerial Fire Truck 2

| | meters |
|---|---|
| Width | : 2.54 |
| Track | : 2.54 |
| Lock to Lock Time | : 6.0 |
| Steering Angle | : 31.4 |

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CITY OF OTTAWA

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705 446-3520 F
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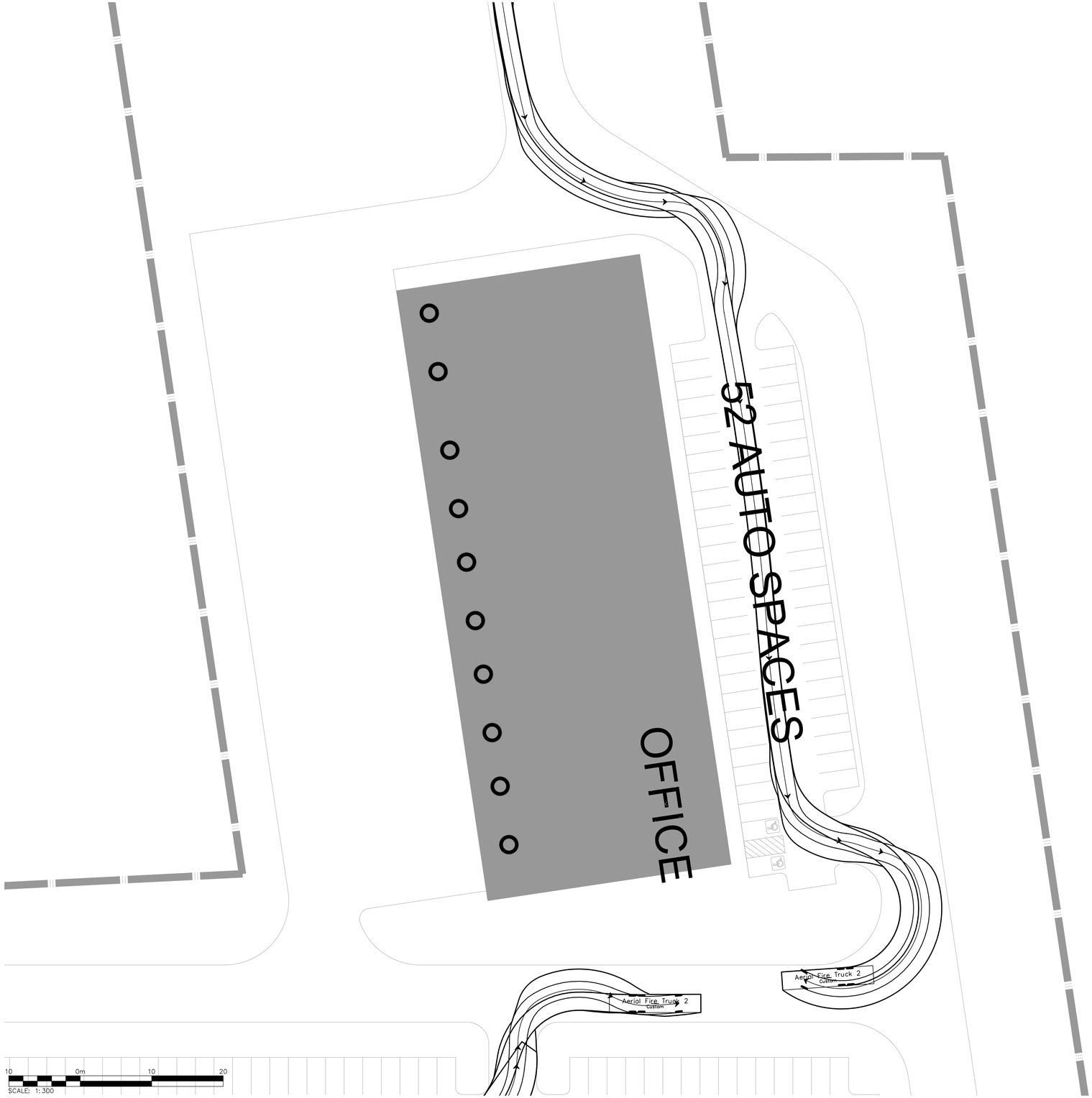
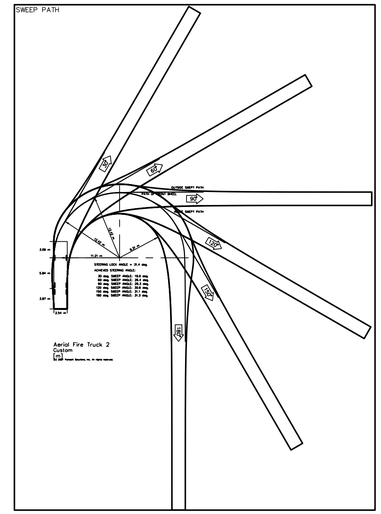
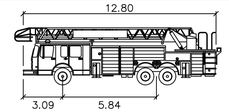
| Drawn By | Design By | Project | |
|---|---|---|---|
| S.K. | | | 1909-5772 |
| Check By | Check By | Scale | Drawing |
| D.L. | | 1:300 | TT 07 |




DRAFT
FOR DISCUSSION PURPOSES ONLY




VEHICLE PROFILE




Aerial Fire Truck 2

meters

| | |
|---|---|
| Width | : 2.54 |
| Track | : 2.54 |
| Lock to Lock Time | : 6.0 |
| Steering Angle | : 31.4 |

| No. | ISSUE | DATE: MM/DD/YYYY |
|---|---|---|
| 0 | ISSUED FOR INTERNAL REVIEW | 02/17/2021 |
| 1 | ISSUED FOR REVIEW | 03/10/2021 |

Project

THUNDER ROAD & BOUNDARY ROAD
CITY OF OTTAWA

Drawing

FIRE TRUCK TURNING ANALYSIS
BUILDING 3

CROZIER
CONSULTING ENGINEERS
THE HARBOUREDGE BUILDING,
40 HURON STREET, SUITE 301,
COLLINGWOOD, ON L9Y 4R3
705 446-3510 T
705 446-3520 F
WWW.CFCROZIER.CA
INFO@CFCROZIER.CA

| Drawn By | Design By | Project | |
|---|---|---|---|
| S.K. | | | 1909-5772 |
| Check By | Check By | Scale | Drawing |
| D.L. | | 1:300 | TT 08 |

J:\1900\1909-Avenue 31\5772-Thunder Rd\CAD\Traffic\Sheets\5772_TT305_1.dwg, TT 08, 2021-03-10 2:58:26 PM, skerr

# APPENDIX J

## Signal Warrant Analysis Worksheets

# Canadian Traffic Signal Warrant Analysis

**Main Street** — **Boundary Road**

**Side Street** — **South Amazon Access / Site Access**

**Date:** March 10, 2021

**City:** City of Ottawa

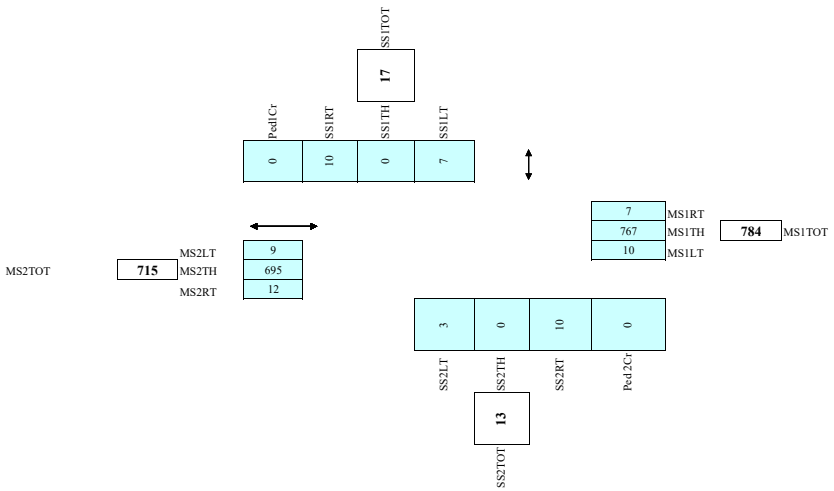
| | | | | | |
|---|---|---|---|---|---|
| MainStreet1Lanes | (#) | 1 | Distance to next signal | (m) | 165 |
| MainStreet2Lanes | (#) | 1 | Elementary School | (y/n) | n |
| MainStreet LT Lanes | (#) | 1 | Senior's Complex | (y/n) | n |
| SideStreet1Lanes | (#) | 1 | Pathway to School | (y/n) | n |
| SideStreet2Lanes | (#) | 1 | Metro Area Population | (#) | 994,837 |
| MainStreetSpeedLimit | (km/h) | 80 | Side Street Bus Route | (y/n) | n |
| MainStreetTrucks/Buses | (%) | 30.0% | Side Street Trucks | (%) | 40.0% |
| Refuge Width on Median | (m) | 0.0 | T or 1-Way Intersection | (y/n) | n |
| | | | Central Business District | (y/n) | n |

| | | | | | |
|---|---|---|---|---|---|
| Vm = | **1,499** | (MainSt Vol Total) | Cs = | **0.900** | (Int SpacingFactor) |
| Vs = | **17** | (SideSt Vol Highest) | Cmt = | **1.150** | (MainStTruckFactor) |
| Pc = | **0** | Peds Crossing Main | Cv = | **1.100** | (SpeedFactor) |
| K1 = | **1,400** | veh/veh const | Cp = | **1.000** | (PopDemoFactor) |
| K2 = | **5,000** | veh/ped const | Csb = | **1.000** | (SideStBusFactor) |
| L = | **3.0** | TotalMainStLanes | Cst = | **1.050** | (SideStTruckFactor) |
| F = | **1.000** | (PedDemoFactor) | Vmx = | **784** | (MainStHighest) |
| Vm1 = | **1,499** | (MainStVeh-Veh#) | Vm2 = | **1,499** | (MainStVeh-Ped#) |
| Cvp = | **1.139** | (product of Cs,Cmt,Cv,Cp) | Cbt = | **1.050** | (maximum of Csb,Cst) |
| Ct1 = | **1.000** | T Int / one way Factor | | | |

| | MS1LT | MS1TH | MS1RT | MS2LT | MS2TH | MS2RT | SS1LT | SS1TH | SS1RT | SS2LT | SS2TH | SS2RT | PedC1 | PedC2 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 7:00 - 8:00 | 15 | 1161 | 7 | 1 | 297 | 16 | 7 | 0 | 4 | 1 | 0 | 5 | 0 | 0 |
| 8:00 - 9:00 | 15 | 1161 | 7 | 1 | 297 | 16 | 7 | 0 | 4 | 1 | 0 | 5 | 0 | 0 |
| 11:00 - 12:00 | 15 | 1161 | 7 | 1 | 297 | 16 | 7 | 0 | 4 | 1 | 0 | 5 | 0 | 0 |
| 12:00 - 13:00 | 5 | 373 | 7 | 16 | 1093 | 7 | 7 | 0 | 15 | 4 | 0 | 15 | 0 | 0 |
| 16:00 - 17:00 | 5 | 373 | 7 | 16 | 1093 | 7 | 7 | 0 | 15 | 4 | 0 | 15 | 0 | 0 |
| 17:00 - 18:00 | 5 | 373 | 7 | 16 | 1093 | 7 | 7 | 0 | 15 | 4 | 0 | 15 | 0 | 0 |
| Average | 10 | 767 | 7 | 9 | 695 | 12 | 7 | 0 | 10 | 3 | 0 | 10 | 0 | 0 |

*** Enter the hourly turning movement counts averaged over the peak six hours of a typical week day

*** Enter the peak pedestrian volume crossing the main street averaged over the same hours




**W = [Ct1xCbt(Vm1 x Vs)/K1 + (F(Vm2 x Pc)L)/K2] x Cvp**

**W =** **21** **21** **0**

**Not Warranted - Vs<75** ***Veh*** ***Ped***

| Roadway, Vehicle and Pedestrian Factors | | | Range Min | @ | Max | @ |
|---|---|---|---|---|---|---|
| **Cs =** | (Int SpacingFactor) | | 0.90 | <200 m | 1.10 | isolated |
| **Cmt =** | (MainStTruckFactor) | | 1.00 | <5% | 1.15 | >20% |
| **Cv =** | (SpeedFactor) | | 1.00 | <60 km/h | 1.10 | >80 km/h |
| **Cp =** | (PopDemoFactor) | | 1.00 | >250,000 | 1.20 | <10,000 |
| **Csb =** | (SideStBusFactor) | | 1.00 | no | 1.05 | yes |
| **Cst =** | (SideStTruckFactor) | | 1.00 | <10% | 1.05 | >10% |
| **F =** | (Ped DemoFactor) | | | | | |
| | (max of ) | Elementary School | 1.20 | | | |
| | | Seniors Complex | 1.10 | | | |
| | | Path to School | 1.10 | | | |

***Explanation of Factors:***

**Cbt =** 1.05 if the side street either is a bus route, or has more than 10% trucks, otherwise = 1.00.
(it is assumed that these two factors only affect the side street vehicles trying to cross the main street, not the pedestrians)

**Ci =** the product of the other 4 geographic factors
(Cs = intersection spacing, Cmt = main street truck, Cv = Speed, Cp = Population)

**Vm1 =** the main street volume - either the total of the two approaches or the highest single approach
(if the median is >=10.0 metres) (averaged over 6 peak hours)

**Vm2 =** the main street volume - either the total of the two approaches or the highest single approach
(if the median is >=6.0 metres) (averaged over 6 peak hours)

**Vs =** the highest side street approach volume (averaged over 6 peak hours)
*** note: it has been determined that Vs must be > 75 for signals to be considered ***

**F =** Pedestrian demographic factor - the maximum of the 3 individual pedestrian demographic factors

**Pc =** the total pedestrian volume crossing the mainstreet
(averaged over 6 peak hours)

**L =** number of lanes that the pedestrians have to cross
(only half the street if the median is >=5.0 metres)

**Kv =** Vehicle - Vehicle denominator constant
(Kv = 1,100 if L<=3, Kv = 1,400 if L >3)

**Kp =** Vehicle - Pedestrian denominator constant
(Kp = 2,000 if L<=3, Kp = 5,000 if L >3)

# Canadian Traffic Signal Warrant Analysis

**Main Street** — **Thunder Raod**

**Side Street** — **Site Access A**

**Date:** March 10, 2021

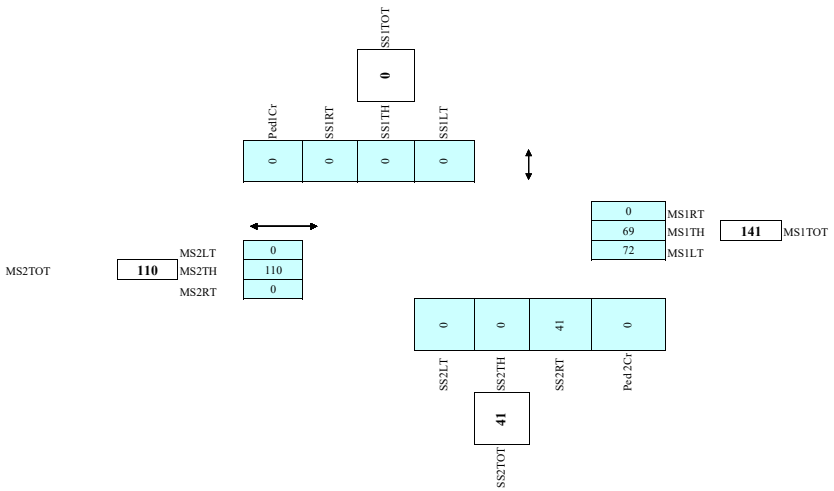
**City:** City of Ottawa

| | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| MainStreet1Lanes | (#) | 1 | Distance to next signal | (m) | 100 | Vm = | **251** | (MainSt Vol Total) | Cs = | **0.900** | (Int SpacingFactor) |
| MainStreet2Lanes | (#) | 1 | Elementary School | (y/n) | n | Vs = | **41** | (SideSt Vol Highest) | Cmt = | **1.150** | (MainStTruckFactor) |
| MainStreet LT Lanes | (#) | 0 | Senior's Complex | (y/n) | n | Pc = | **0** | Peds Crossing Main | Cv = | **1.000** | (SpeedFactor) |
| SideStreet1Lanes | (#) | 0 | Pathway to School | (y/n) | n | K1 = | **1,100** | veh/veh const | Cp = | **1.000** | (PopDemoFactor) |
| SideStreet2Lanes | (#) | 1 | Metro Area Population | (#) | 994,837 | K2 = | **2,000** | veh/ped const | Csb = | **1.000** | (SideStBusFactor) |
| MainStreetSpeedLimit | (km/h) | 60 | Side Street Bus Route | (y/n) | n | L = | **2.0** | TotalMainStLanes | Cst = | **1.050** | (SideStTruckFactor) |
| MainStreetTrucks/Buses | (%) | 30.0% | Side Street Trucks | (%) | 40.0% | F = | **1.000** | (PedDemoFactor) | Vmx = | **141** | (MainStHighest) |
| Refuge Width on Median | (m) | 0.0 | T or 1-Way Intersection | (y/n) | y | Vm1 = | **251** | (MainStVeh-Veh#) | Vm2 = | **251** | (MainStVeh-Ped#) |
| | | | Central Business District | (y/n) | n | Cvp = | **1.035** | (product of Cs,Cmt,Cv,Cp) | Cbt = | **1.050** | (maximum of Csb,Cst) |
| | | | | | | Ct1 = | **0.667** | T Int / one way Factor | | | |

| | MS1LT | MS1TH | MS1RT | MS2LT | MS2TH | MS2RT | SS1LT | SS1TH | SS1RT | SS2LT | SS2TH | SS2RT | PedC1 | PedC2 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 7:00 - 8:00 | 51 | 119 | 0 | 0 | 78 | 0 | 0 | 0 | 0 | 0 | 0 | 19 | 0 | 0 |
| 8:00 - 9:00 | 51 | 119 | 0 | 0 | 78 | 0 | 0 | 0 | 0 | 0 | 0 | 19 | 0 | 0 |
| 11:00 - 12:00 | 51 | 119 | 0 | 0 | 78 | 0 | 0 | 0 | 0 | 0 | 0 | 19 | 0 | 0 |
| 12:00 - 13:00 | 93 | 19 | 0 | 0 | 141 | 0 | 0 | 0 | 0 | 0 | 0 | 62 | 0 | 0 |
| 16:00 - 17:00 | 93 | 19 | 0 | 0 | 141 | 0 | 0 | 0 | 0 | 0 | 0 | 62 | 0 | 0 |
| 17:00 - 18:00 | 93 | 19 | 0 | 0 | 141 | 0 | 0 | 0 | 0 | 0 | 0 | 62 | 0 | 0 |
| Average | 72 | 69 | 0 | 0 | 110 | 0 | 0 | 0 | 0 | 0 | 0 | 41 | 0 | 0 |

***** Enter the hourly turning movement counts averaged over the peak six hours of a typical week day**

***** Enter the peak pedestrian volume crossing the main street averaged over the same hours**




**W = [Ct1xCbt(Vm1 x Vs)/K1 + (F(Vm2 x Pc)L)/K2] x Cvp**

**W =** 7 7 0

**Not Warranted - Vs<75** *Veh* *Ped*

| Roadway, Vehicle and Pedestrian Factors | | | Range | | | |
|---|---|---|---|---|---|---|
| | | | Min | @ | Max | @ |
| **Cs =** | (Int SpacingFactor) | | 0.90 | <200 m | 1.10 | isolated |
| **Cmt =** | (MainStTruckFactor) | | 1.00 | <5% | 1.15 | >20% |
| **Cv =** | (SpeedFactor) | | 1.00 | <60 km/h | 1.10 | >80 km/h |
| **Cp =** | (PopDemoFactor) | | 1.00 | >250,000 | 1.20 | <10,000 |
| **Csb =** | (SideStBusFactor) | | 1.00 | no | 1.05 | yes |
| **Cst =** | (SideStTruckFactor) | | 1.00 | <10% | 1.05 | >10% |
| **F =** | (Ped DemoFactor) | | | | | |
| | (max of ) | Elementary School | 1.20 | | | |
| | | Seniors Complex | 1.10 | | | |
| | | Path to School | 1.10 | | | |

***Explanation of Factors:***

**Cbt =** 1.05 if the side street either is a bus route, or has more than 10% trucks, otherwise = 1.00.
(it is assumed that these two factors only affect the side street vehicles trying to cross the main street, not the pedestrians)

**Ci =** the product of the other 4 geographic factors
(Cs = intersection spacing, Cmt = main street truck, Cv = Speed, Cp = Population)

**Vm1 =** the main street volume - either the total of the two approaches or the highest single approach
(if the median is >=10.0 metres) (averaged over 6 peak hours)

**Vm2 =** the main street volume - either the total of the two approaches or the highest single approach
(if the median is >=6.0 metres) (averaged over 6 peak hours)

**Vs =** the highest side street approach volume (averaged over 6 peak hours)
*** note: it has been determined that Vs must be > 75 for signals to be considered ***

**F =** Pedestrian demographic factor - the maximum of the 3 individual pedestrian demographic factors

**Pc =** the total pedestrian volume crossing the mainstreet
(averaged over 6 peak hours)

**L =** number of lanes that the pedestrians have to cross
(only half the street if the median is >=5.0 metres)

**Kv =** Vehicle - Vehicle denominator constant
(Kv = 1,100 if L<=3, Kv = 1,400 if L >3)

**Kp =** Vehicle - Pedestrian denominator constant
(Kp = 2,000 if L<=3, Kp = 5,000 if L >3)

# Canadian Traffic Signal Warrant Analysis

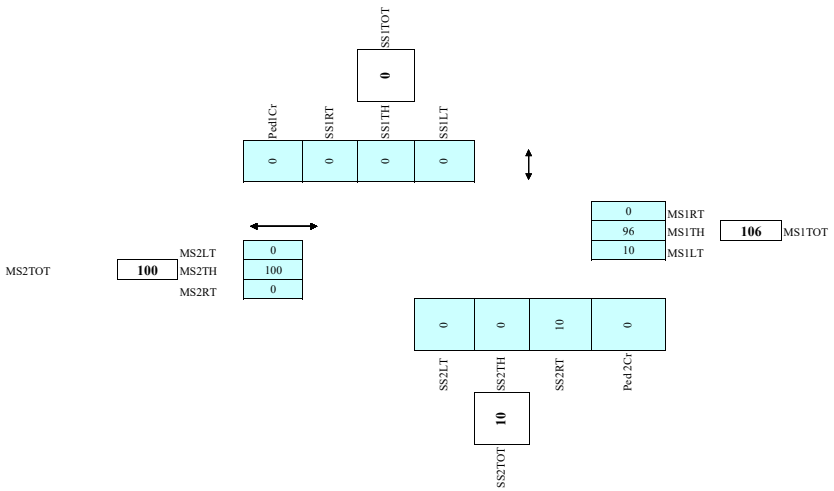
| | | |
|---|---|---|
| **Main Street** | **Thunder Raod** | **Date:** **March 10, 2021** |
| **Side Street** | **Site Access B** | **City:** **City of Ottawa** |

| | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| MainStreet1Lanes | (#) | 1 | Distance to next signal | (m) | 100 | Vm = | **206** | (MainSt Vol Total) | Cs = **0.900** (Int SpacingFactor) |
| MainStreet2Lanes | (#) | 1 | Elementary School | (y/n) | n | Vs = | **10** | (SideSt Vol Highest) | Cmt = **1.150** (MainStTruckFactor) |
| MainStreet LT Lanes | (#) | 0 | Senior's Complex | (y/n) | n | Pc = | **0** | Peds Crossing Main | Cv = **1.000** (SpeedFactor) |
| SideStreet1Lanes | (#) | 0 | Pathway to School | (y/n) | n | K1 = | **1,100** | veh/veh const | Cp = **1.000** (PopDemoFactor) |
| SideStreet2Lanes | (#) | 1 | Metro Area Population | (#) | 994,837 | K2 = | **2,000** | veh/ped const | Csb = **1.000** (SideStBusFactor) |
| MainStreetSpeedLimit | (km/h) | 60 | Side Street Bus Route | (y/n) | n | L = | **2.0** | TotalMainStLanes | Cst = **1.050** (SideStTruckFactor) |
| MainStreetTrucks/Buses | (%) | 30.0% | Side Street Trucks | (%) | 40.0% | F = | **1.000** | (PedDemoFactor) | Vmx = **106** (MainStHighest) |
| Refuge Width on Median | (m) | 0.0 | T or 1-Way Intersection | (y/n) | y | Vm1 = | **206** | (MainStVeh-Veh#) | Vm2 = **206** (MainStVeh-Ped#) |
| | | | Central Business District | (y/n) | n | Cvp = | **1.035** | (product of Cs,Cmt,Cv,Cp) | Cbt = **1.050** (maximum of Csb,Cst) |
| | | | | | | Ct1 = | **0.667** | T Int / one way Factor | |

| | MS1LT | MS1TH | MS1RT | MS2LT | MS2TH | MS2RT | SS1LT | SS1TH | SS1RT | SS2LT | SS2TH | SS2RT | PedC1 | PedC2 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 7:00 - 8:00 | 15 | 104 | 0 | 0 | 74 | 0 | 0 | 0 | 0 | 0 | 0 | 4 | 0 | 0 |
| 8:00 - 9:00 | 15 | 104 | 0 | 0 | 74 | 0 | 0 | 0 | 0 | 0 | 0 | 4 | 0 | 0 |
| 11:00 - 12:00 | 15 | 104 | 0 | 0 | 74 | 0 | 0 | 0 | 0 | 0 | 0 | 4 | 0 | 0 |
| 12:00 - 13:00 | 5 | 88 | 0 | 0 | 126 | 0 | 0 | 0 | 0 | 0 | 0 | 15 | 0 | 0 |
| 16:00 - 17:00 | 5 | 88 | 0 | 0 | 126 | 0 | 0 | 0 | 0 | 0 | 0 | 15 | 0 | 0 |
| 17:00 - 18:00 | 5 | 88 | 0 | 0 | 126 | 0 | 0 | 0 | 0 | 0 | 0 | 15 | 0 | 0 |
| Average | 10 | 96 | 0 | 0 | 100 | 0 | 0 | 0 | 0 | 0 | 0 | 10 | 0 | 0 |

***** Enter the hourly turning movement counts averaged over the peak six hours of a typical week day**

***** Enter the peak pedestrian volume crossing the main street averaged over the same hours**




**W = [Ct1xCbt(Vm1 x Vs)/K1 + (F(Vm2 x Pc)L)/K2] x Cvp**

**W =** **1** **1** **0**

**Not Warranted - Vs<75** ***Veh*** ***Ped***

| **Roadway, Vehicle and Pedestrian Factors** | | | **Range** | | | |
|---|---|---|---|---|---|---|
| | | | **Min** | **@** | **Max** | **@** |
| **Cs =** | (Int SpacingFactor) | | 0.90 | <200 m | 1.10 | isolated |
| **Cmt =** | (MainStTruckFactor) | | 1.00 | <5% | 1.15 | >20% |
| **Cv =** | (SpeedFactor) | | 1.00 | <60 km/h | 1.10 | >80 km/h |
| **Cp =** | (PopDemoFactor) | | 1.00 | >250,000 | 1.20 | <10,000 |
| **Csb =** | (SideStBusFactor) | | 1.00 | no | 1.05 | yes |
| **Cst =** | (SideStTruckFactor) | | 1.00 | <10% | 1.05 | >10% |
| **F =** | (Ped DemoFactor) | | | | | |
| | (max of ) | Elementary School | 1.20 | | | |
| | | Seniors Complex | 1.10 | | | |
| | | Path to School | 1.10 | | | |

***Explanation of Factors:***

**Cbt =** 1.05 if the side street either is a bus route, or has more than 10% trucks, otherwise = 1.00.
(it is assumed that these two factors only affect the side street vehicles trying to cross the main street, not the pedestrians)

**Ci =** the product of the other 4 geographic factors
(Cs = intersection spacing, Cmt = main street truck, Cv = Speed, Cp = Population)

**Vm1 =** the main street volume - either the total of the two approaches or the highest single approach
(if the median is >=10.0 metres) (averaged over 6 peak hours)

**Vm2 =** the main street volume - either the total of the two approaches or the highest single approach
(if the median is >=6.0 metres) (averaged over 6 peak hours)

**Vs =** the highest side street approach volume (averaged over 6 peak hours)
*** note: it has been determined that Vs must be > 75 for signals to be considered ***

**F =** Pedestrian demographic factor - the maximum of the 3 individual pedestrian demographic factors

**Pc =** the total pedestrian volume crossing the mainstreet
(averaged over 6 peak hours)

**L =** number of lanes that the pedestrians have to cross
(only half the street if the median is >=5.0 metres)

**Kv =** Vehicle - Vehicle denominator constant
(Kv = 1,100 if L<=3, Kv = 1,400 if L >3)

**Kp =** Vehicle - Pedestrian denominator constant
(Kp = 2,000 if L<=3, Kp = 5,000 if L >3)

# Canadian Traffic Signal Warrant Analysis

**Main Street** | **Thunder Raod**

**Side Street** | **Site Access C**

**Date:** March 10, 2021

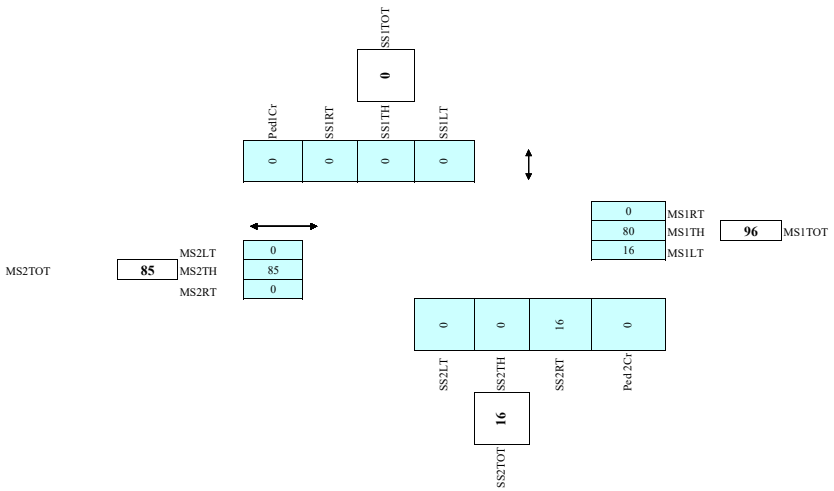
**City:** City of Ottawa

| | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| MainStreet1Lanes | (#) | 1 | Distance to next signal | (m) | 100 | Vm = | **181** | (MainSt Vol Total) | Cs = | **0.900** | (Int SpacingFactor) |
| MainStreet2Lanes | (#) | 1 | Elementary School | (y/n) | n | Vs = | **16** | (SideSt Vol Highest) | Cmt = | **1.150** | (MainStTruckFactor) |
| MainStreet LT Lanes | (#) | 0 | Senior's Complex | (y/n) | n | Pc = | **0** | Peds Crossing Main | Cv = | **1.000** | (SpeedFactor) |
| SideStreet1Lanes | (#) | 0 | Pathway to School | (y/n) | n | K1 = | **1,100** | veh/veh const | Cp = | **1.000** | (PopDemoFactor) |
| SideStreet2Lanes | (#) | 1 | Metro Area Population | (#) | 994,837 | K2 = | **2,000** | veh/ped const | Csb = | **1.000** | (SideStBusFactor) |
| MainStreetSpeedLimit | (km/h) | 60 | Side Street Bus Route | (y/n) | n | L = | **2.0** | TotalMainStLanes | Cst = | **1.050** | (SideStTruckFactor) |
| MainStreetTrucks/Buses | (%) | 30.0% | Side Street Trucks | (%) | 40.0% | F = | **1.000** | (PedDemoFactor) | Vmx = | **96** | (MainStHighest) |
| Refuge Width on Median | (m) | 0.0 | T or 1-Way Intersection | (y/n) | y | Vm1 = | **181** | (MainStVeh-Veh#) | Vm2 = | **181** | (MainStVeh-Ped#) |
| | | | Central Business District | (y/n) | n | Cvp = | **1.035** | (product of Cs,Cmt,Cv,Cp) | Cbt = | **1.050** | (maximum of Csb,Cst) |
| | | | | | | Ct1 = | **0.667** | T Int / one way Factor | | | |

| | MS1LT | MS1TH | MS1RT | MS2LT | MS2TH | MS2RT | SS1LT | SS1TH | SS1RT | SS2LT | SS2TH | SS2RT | PedC1 | PedC2 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 7:00 - 8:00 | 23 | 81 | 0 | 0 | 67 | 0 | 0 | 0 | 0 | 0 | 0 | 7 | 0 | 0 |
| 8:00 - 9:00 | 23 | 81 | 0 | 0 | 67 | 0 | 0 | 0 | 0 | 0 | 0 | 7 | 0 | 0 |
| 11:00 - 12:00 | 23 | 81 | 0 | 0 | 67 | 0 | 0 | 0 | 0 | 0 | 0 | 7 | 0 | 0 |
| 12:00 - 13:00 | 9 | 79 | 0 | 0 | 102 | 0 | 0 | 0 | 0 | 0 | 0 | 24 | 0 | 0 |
| 16:00 - 17:00 | 9 | 79 | 0 | 0 | 102 | 0 | 0 | 0 | 0 | 0 | 0 | 24 | 0 | 0 |
| 17:00 - 18:00 | 9 | 79 | 0 | 0 | 102 | 0 | 0 | 0 | 0 | 0 | 0 | 24 | 0 | 0 |
| Average | 16 | 80 | 0 | 0 | 85 | 0 | 0 | 0 | 0 | 0 | 0 | 16 | 0 | 0 |

***** Enter the hourly turning movement counts averaged over the peak six hours of a typical week day**

***** Enter the peak pedestrian volume crossing the main street averaged over the same hours**




**W = [Ct1xCbt(Vm1 x Vs)/K1 + (F(Vm2 x Pc)L)/K2] x Cvp**

**W =** 2 2 0

**Not Warranted - Vs<75** *Veh* *Ped*

| Roadway, Vehicle and Pedestrian Factors | | | Range | | | |
|---|---|---|---|---|---|---|
| | | | Min | @ | Max | @ |
| **Cs =** | (Int SpacingFactor) | | 0.90 | <200 m | 1.10 | isolated |
| **Cmt =** | (MainStTruckFactor) | | 1.00 | <5% | 1.15 | >20% |
| **Cv =** | (SpeedFactor) | | 1.00 | <60 km/h | 1.10 | >80 km/h |
| **Cp =** | (PopDemoFactor) | | 1.00 | >250,000 | 1.20 | <10,000 |
| **Csb =** | (SideStBusFactor) | | 1.00 | no | 1.05 | yes |
| **Cst =** | (SideStTruckFactor) | | 1.00 | <10% | 1.05 | >10% |
| **F =** | (Ped DemoFactor) | | | | | |
| | (max of ) | Elementary School | 1.20 | | | |
| | | Seniors Complex | 1.10 | | | |
| | | Path to School | 1.10 | | | |

***Explanation of Factors:***

**Cbt =** 1.05 if the side street either is a bus route, or has more than 10% trucks, otherwise = 1.00.
(it is assumed that these two factors only affect the side street vehicles trying to cross the main street, not the pedestrians)

**Ci =** the product of the other 4 geographic factors
(Cs = intersection spacing, Cmt = main street truck, Cv = Speed, Cp = Population)

**Vm1 =** the main street volume - either the total of the two approaches or the highest single approach
(if the median is >=10.0 metres) (averaged over 6 peak hours)

**Vm2 =** the main street volume - either the total of the two approaches or the highest single approach
(if the median is >=6.0 metres) (averaged over 6 peak hours)

**Vs =** the highest side street approach volume (averaged over 6 peak hours)
*** note: it has been determined that Vs must be > 75 for signals to be considered ***

**F =** Pedestrian demographic factor - the maximum of the 3 individual pedestrian demographic factors

**Pc =** the total pedestrian volume crossing the mainstreet
(averaged over 6 peak hours)

**L =** number of lanes that the pedestrians have to cross
(only half the street if the median is >=5.0 metres)

**Kv =** Vehicle - Vehicle denominator constant
(Kv = 1,100 if L<=3, Kv = 1,400 if L >3)

**Kp =** Vehicle - Pedestrian denominator constant
(Kp = 2,000 if L<=3, Kp = 5,000 if L >3)

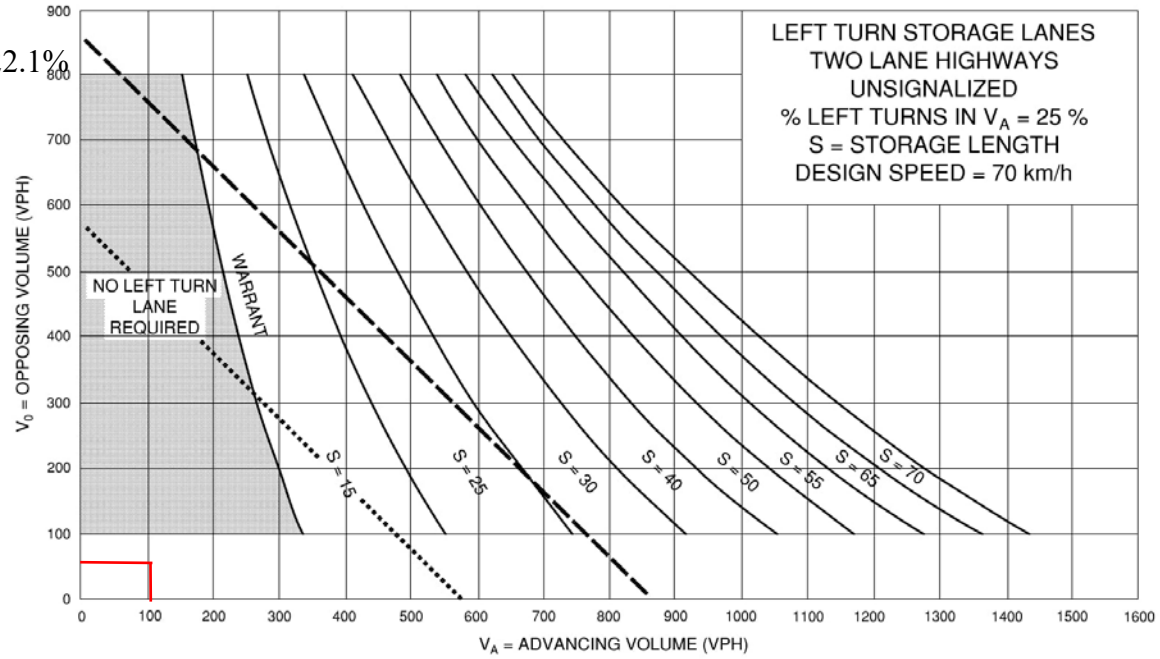
# APPENDIX K

## Left-Turn Lane Warrant Analysis Worksheets

AM PEAK - Site Access C:

**Exhibit 9A-13**

VA = 104 veh/hr
VL = 23 veh/hr
% LT in VA = 22.1%
VO = 67 veh/hr
REQ = 0 metres



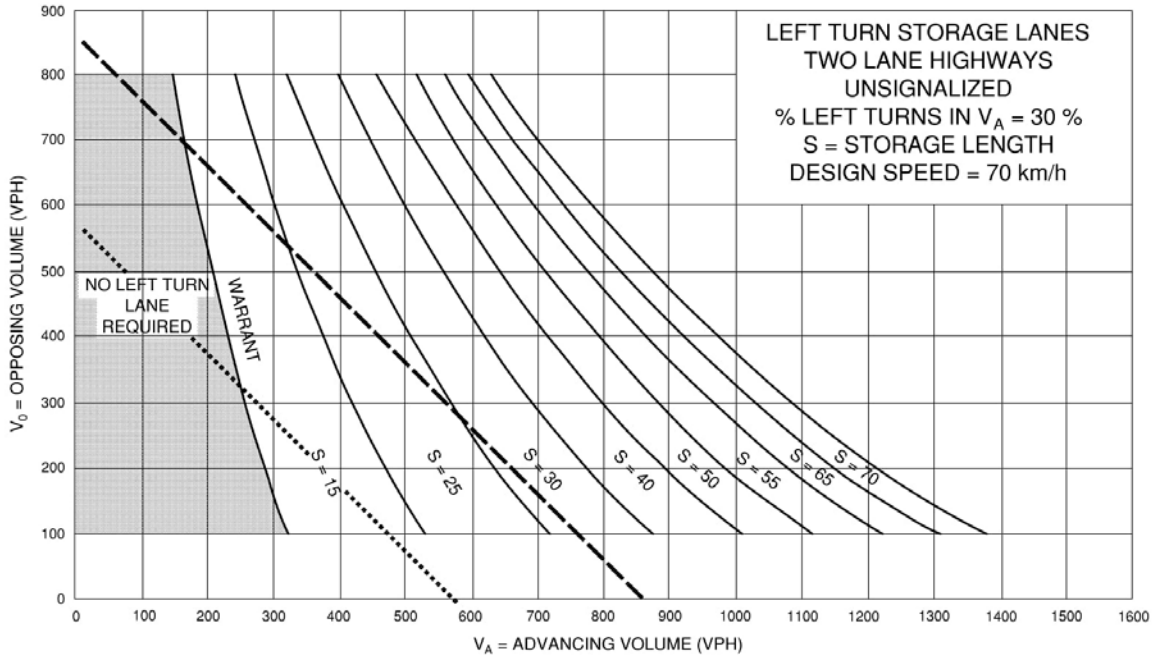
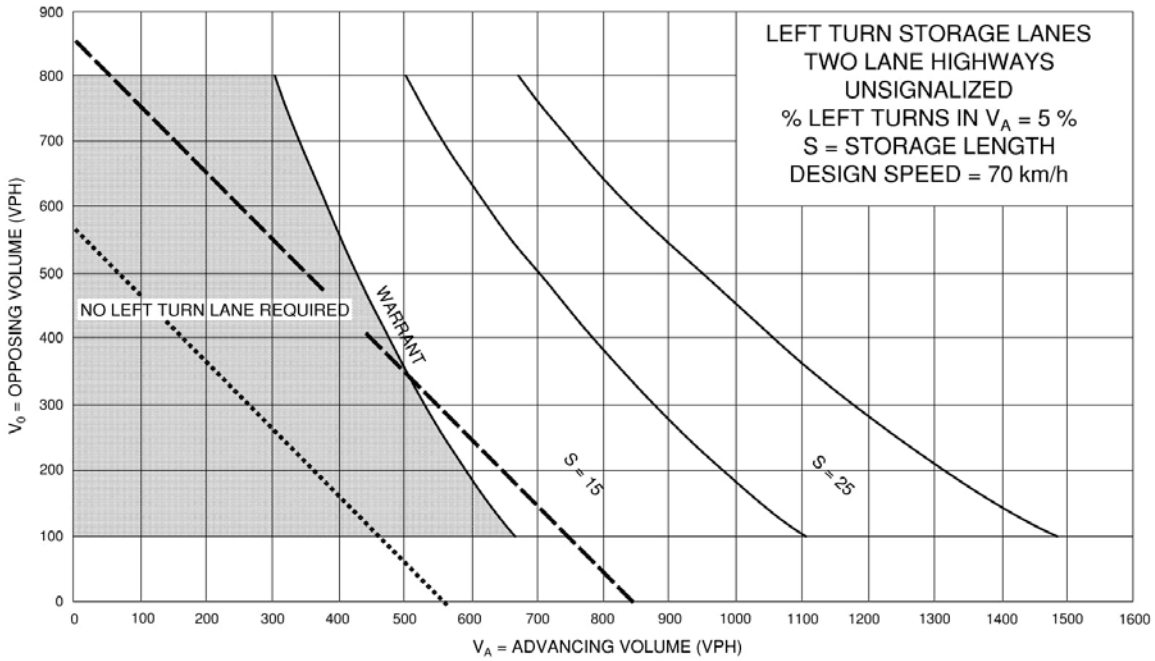
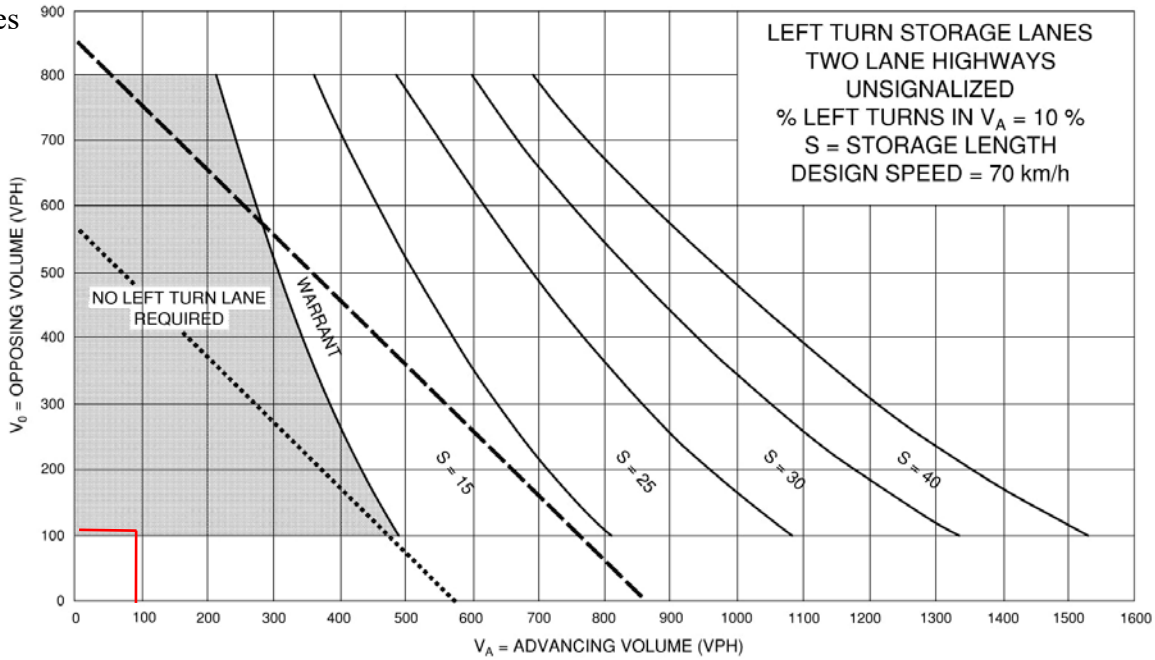



**Exhibit 9A-11**




PM PEAK - Site Access C:

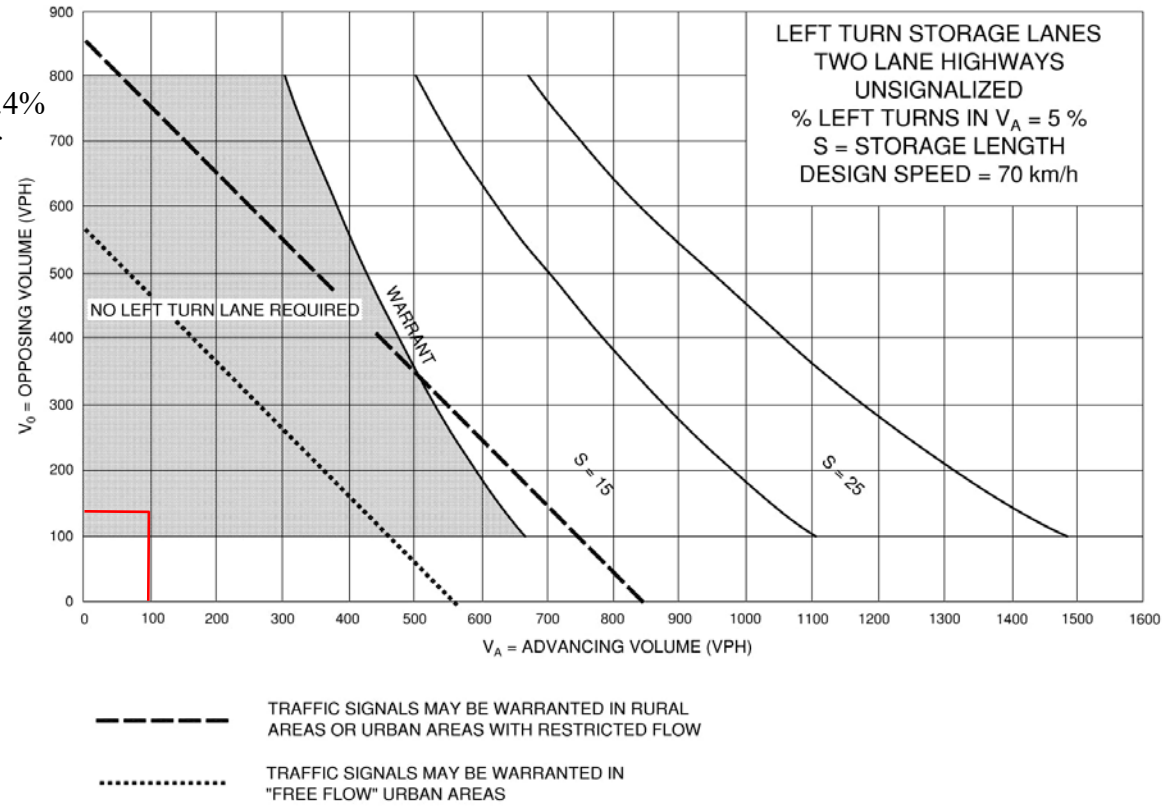
VA = 88 veh/hr
VL = 9 veh/hr
% LT in VA = 10.23%
VO = 102 veh/hr
REQ = 0 metres



PM PEAK - Site Access B:

**Exhibit 9A-11**

VA = 93 veh/hr
VL = 5 veh/hr
% LT in VA = 5.4%
VO = 126 veh/hr
REQ = 0 metres




AM PEAK - Site Access B:

VA = 119 veh/hr
VL = 159 veh/hr
% LT in VA = 12.6%
VO = 74 veh/hr
REQ = 0 metres

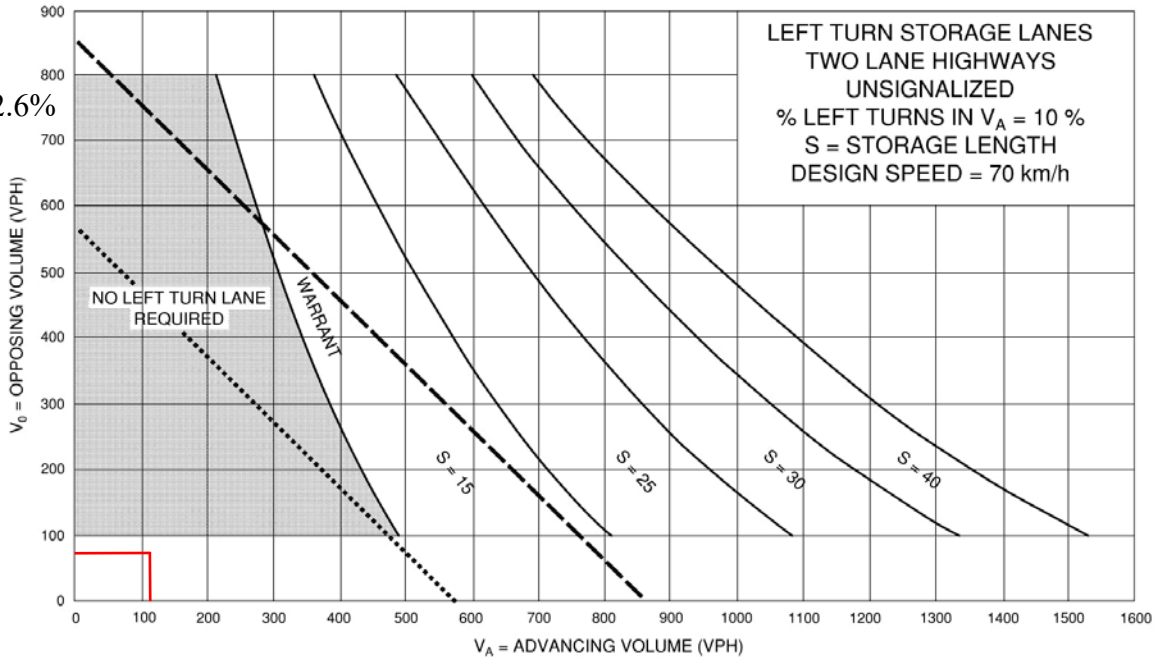
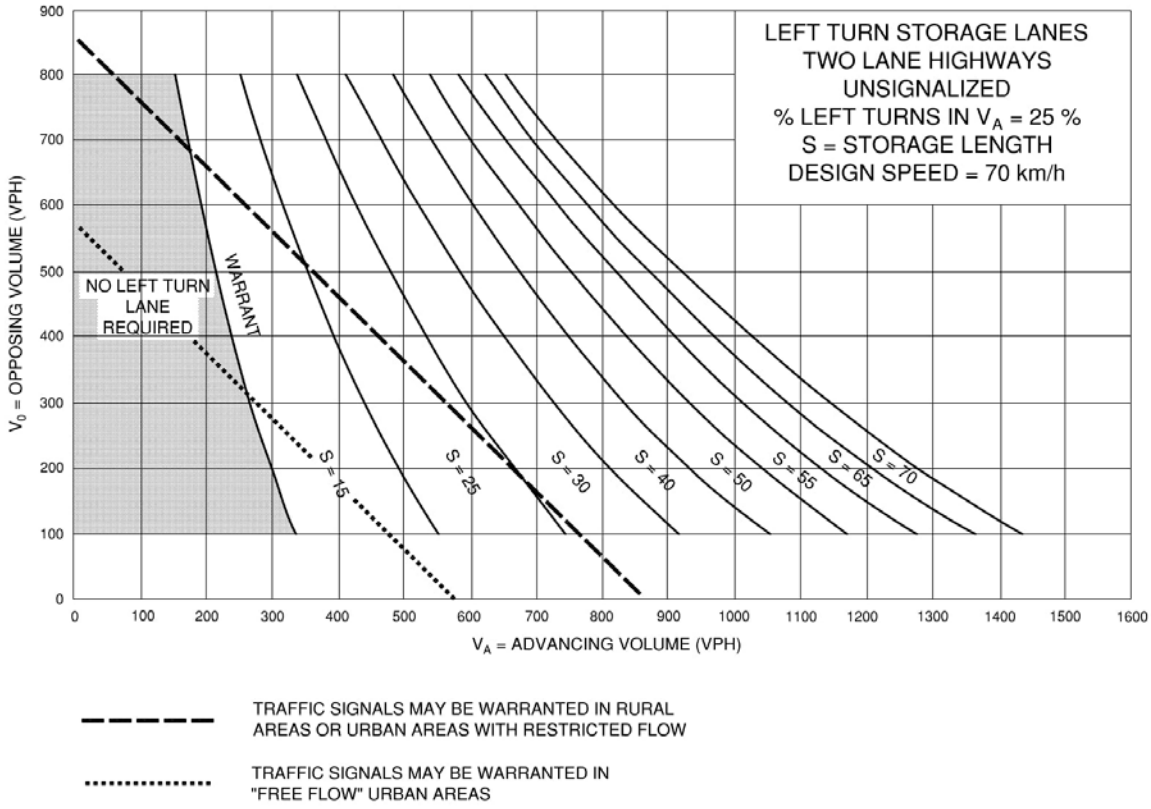
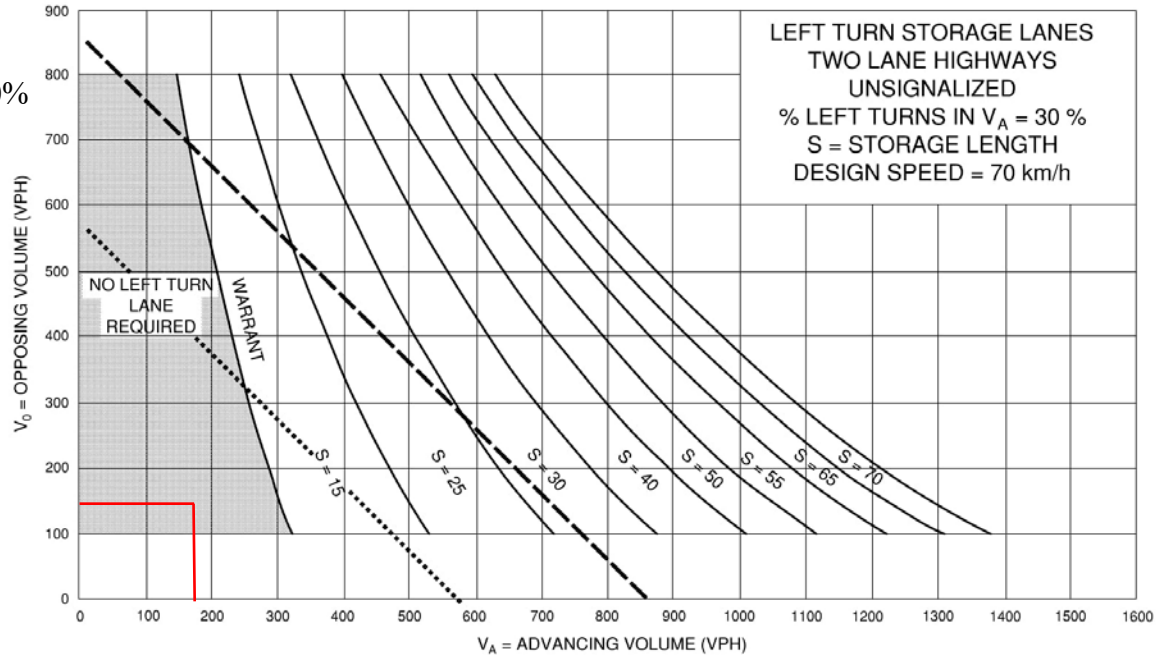


**Exhibit 9A-13**




AM PEAK - Site Access A:

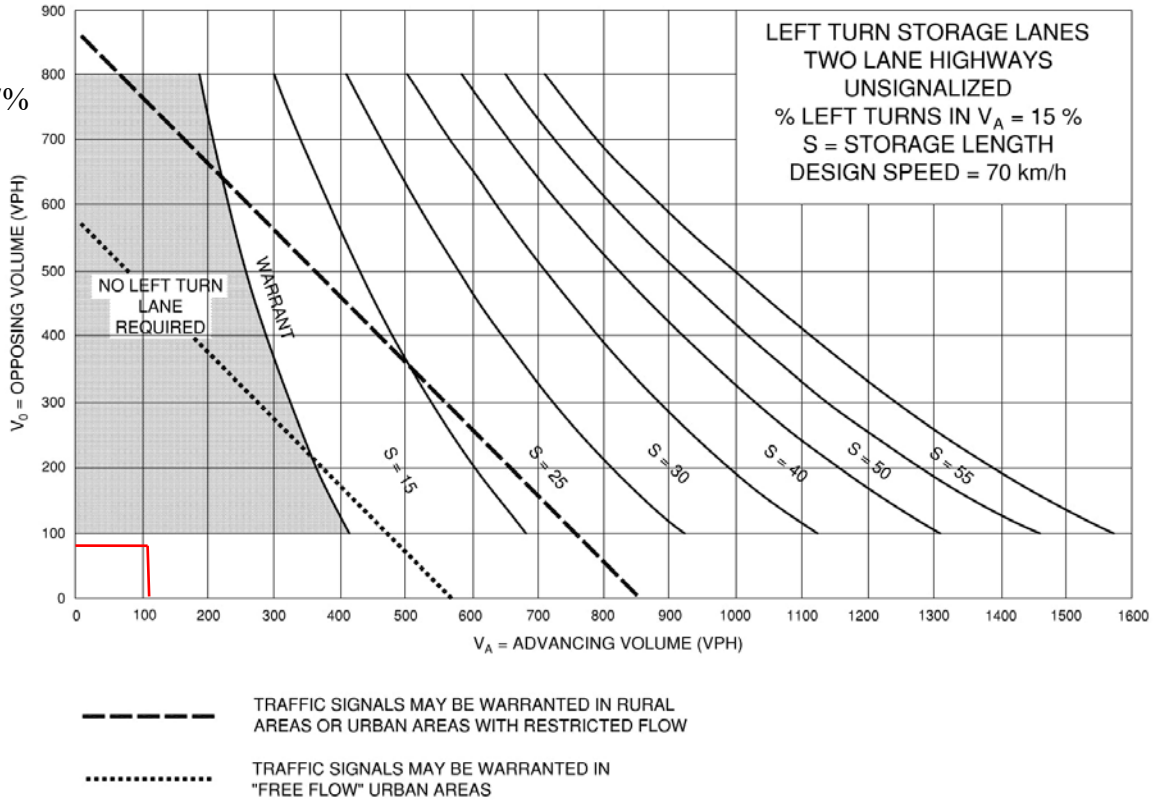
VA = 170 veh/hr
VL = 51 veh/hr
% LT in VA = 30%
VO = 141 veh/hr
REQ = 0 metres

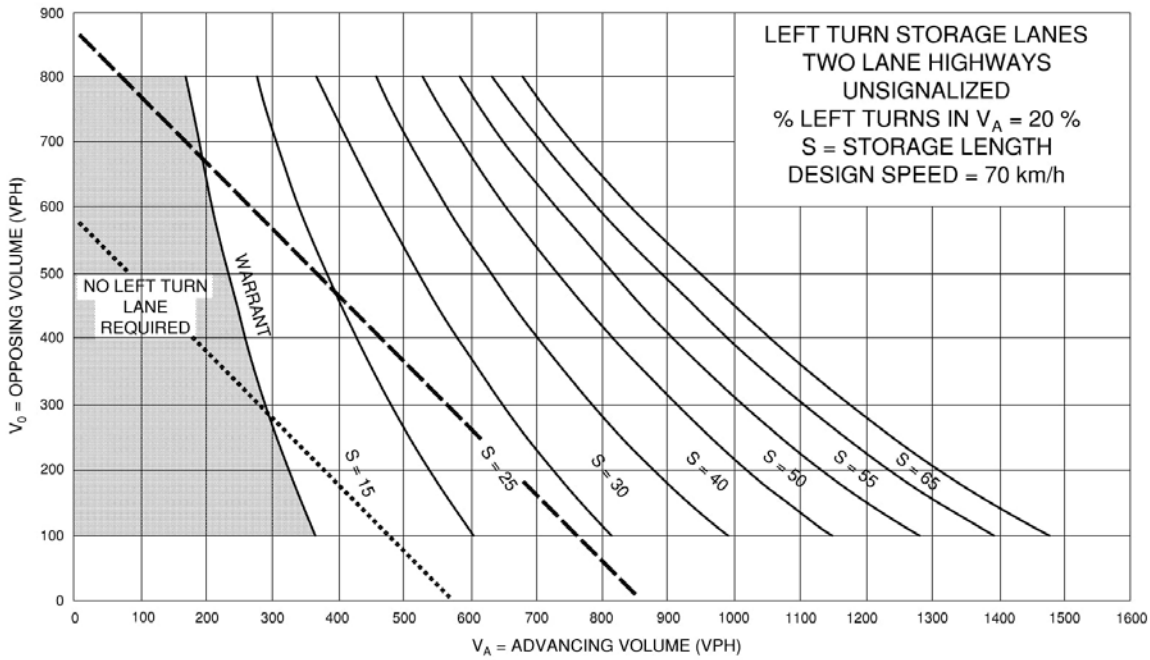


PM PEAK - Site Access A:

**Exhibit 9A-12**

VA = 112 veh/hr
VL = 19 veh/hr
% LT in VA = 17%
VO = 78 veh/hr
REQ = 0 metres



# APPENDIX L

## Level of Service Definitions

Level of Service Definitions

Two-Way Stop Controlled Intersections

| Level of Service | Control Delay per Vehicle (seconds) | Interpretation |
|---|---|---|
| A | ≤ 10 | EXCELLENT. Large and frequent gaps in traffic on the main roadway. Queuing on the minor street is rare. |
| B | > 10 and ≤ 15 | VERY GOOD. Many gaps exist in traffic on the main roadway. Queuing on the minor street is minimal. |
| C | > 15 and ≤ 25 | GOOD. Fewer gaps exist in traffic on the main roadway. Delay on minor approach becomes more noticeable. |
| D | > 25 and ≤ 35 | FAIR. Infrequent and shorter gaps in traffic on the main roadway. Queue lengths develop on the minor street. |
| E | > 35 and ≤ 50 | POOR. Very infrequent gaps in traffic on the main roadway. Queue lengths become noticeable. |
| F | > 50 | UNSATISFACTORY. Very few gaps in traffic on the main roadway. Excessive delay with significant queue lengths on the minor street. |

Adapted from Highway Capacity Manual 2000, Transportation Research Board

Level of Service Definitions

Signalized Intersections

| Level of Service | Control Delay per Vehicle (seconds) | Interpretation |
|---|---|---|
| A | ≤ 10 | EXCELLENT. Extremely favourable progression with most vehicles arriving during the green phase. Most vehicles do not stop and short cycle lengths may contribute to low delay. |
| B | > 10 and ≤ 20 | VERY GOOD. Very good progression and/or short cycle lengths with slightly more vehicles stopping than LOS "A" causing slightly higher levels of average delay. |
| C | > 20 and ≤ 35 | GOOD. Fair progression and longer cycle lengths lead to a greater number of vehicles stopping than LOS "B". |
| D | > 35 and ≤ 55 | FAIR. Congestion becomes noticeable with higher average delays resulting from a combination of long cycle lengths, high volume-to-capacity ratios and unfavourable progression. |
| E | > 55 and ≤ 80 | POOR. Lengthy delays values are indicative of poor progression, long cycle lengths and high volume-to-capacity ratios. Individual cycle failures are common with individual movement failures also common. |
| F | > 80 | UNSATISFACTORY. Indicative of oversaturated conditions with vehicular demand greater than the capacity of the intersection. |

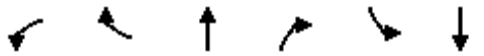
Adapted from Highway Capacity Manual 2000, Transportation Research Board

# APPENDIX M

## Detailed Capacity Analysis Worksheets

| Lane Group | WBL | WBR | NBT | NBR | SBL | SBT |
|---|---|---|---|---|---|---|
| Lane Configurations | | | | | | |
| Traffic Volume (vph) | 108 | 28 | 85 | 743 | 70 | 91 |
| Future Volume (vph) | 108 | 28 | 85 | 743 | 70 | 91 |
| Ideal Flow (vphpl) | 1800 | 1800 | 1800 | 1800 | 1800 | 1800 |
| Lane Width (m) | 4.5 | 4.5 | 3.5 | 3.5 | 3.5 | 3.5 |
| Storage Length (m) | 0.0 | 10.0 | | 0.0 | 0.0 | |
| Storage Lanes | 1 | 0 | | 0 | 0 | |
| Taper Length (m) | 7.5 | | | | 7.5 | |
| Lane Util. Factor | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| Frt | 0.972 | | 0.879 | | | |
| Flt Protected | 0.962 | | | | | 0.979 |
| Satd. Flow (prot) | 1746 | 0 | 1529 | 0 | 0 | 1582 |
| Flt Permitted | 0.962 | | | | | 0.979 |
| Satd. Flow (perm) | 1746 | 0 | 1529 | 0 | 0 | 1582 |
| Link Speed (k/h) | 40 | | 80 | | | 80 |
| Link Distance (m) | 155.0 | | 545.7 | | | 134.1 |
| Travel Time (s) | 14.0 | | 24.6 | | | 6.0 |
| Peak Hour Factor | 0.90 | 0.90 | 0.90 | 0.90 | 0.90 | 0.90 |
| Heavy Vehicles (%) | 4% | 14% | 14% | 1% | 9% | 11% |
| Adj. Flow (vph) | 120 | 31 | 94 | 826 | 78 | 101 |
| Shared Lane Traffic (%) | | | | | | |
| Lane Group Flow (vph) | 151 | 0 | 920 | 0 | 0 | 179 |
| Enter Blocked Intersection | No | No | No | No | No | No |
| Lane Alignment | Left | Right | Left | Right | Left | Left |
| Median Width(m) | 4.5 | | 0.0 | | | 0.0 |
| Link Offset(m) | 0.0 | | 0.0 | | | 0.0 |
| Crosswalk Width(m) | 4.8 | | 4.8 | | | 4.8 |
| Two way Left Turn Lane | | | | | | |
| Headway Factor | 0.95 | 0.95 | 1.09 | 1.09 | 1.09 | 1.09 |
| Turning Speed (k/h) | 25 | 15 | | 15 | 25 | |
| Sign Control | Stop | | Free | | | Free |

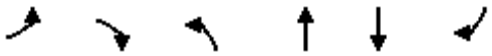
| Intersection Summary | | | |
|---|---|---|---|
| Area Type: | Other | | |
| Control Type: Unsignalized | | | |
| Intersection Capacity Utilization 80.4% | | ICU Level of Service D | |
| Analysis Period (min) 15 | | | |



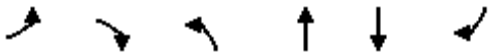
| Movement | WBL | WBR | NBT | NBR | SBL | SBT |
|---|---|---|---|---|---|---|
| Lane Configurations | | | | | | |
| Traffic Volume (veh/h) | 108 | 28 | 85 | 743 | 70 | 91 |
| Future Volume (Veh/h) | 108 | 28 | 85 | 743 | 70 | 91 |
| Sign Control | Stop | | Free | | | Free |
| Grade | 0% | | 0% | | | 0% |
| Peak Hour Factor | 0.90 | 0.90 | 0.90 | 0.90 | 0.90 | 0.90 |
| Hourly flow rate (vph) | 120 | 31 | 94 | 826 | 78 | 101 |
| 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 | 764 | 507 | | | 920 | |
| vC1, stage 1 conf vol | | | | | | |
| vC2, stage 2 conf vol | | | | | | |
| vCu, unblocked vol | 764 | 507 | | | 920 | |
| tC, single (s) | 6.4 | 6.3 | | | 4.2 | |
| tC, 2 stage (s) | | | | | | |
| tF (s) | 3.5 | 3.4 | | | 2.3 | |
| p0 queue free % | 63 | 94 | | | 89 | |
| cM capacity (veh/h) | 329 | 542 | | | 714 | |

| Direction, Lane # | WB 1 | NB 1 | SB 1 |
|---|---|---|---|
| Volume Total | 151 | 920 | 179 |
| Volume Left | 120 | 0 | 78 |
| Volume Right | 31 | 826 | 0 |
| cSH | 358 | 1700 | 714 |
| Volume to Capacity | 0.42 | 0.54 | 0.11 |
| Queue Length 95th (m) | 16.3 | 0.0 | 2.9 |
| Control Delay (s) | 22.2 | 0.0 | 5.3 |
| Lane LOS | C | | A |
| Approach Delay (s) | 22.2 | 0.0 | 5.3 |
| Approach LOS | C | | |

| Intersection Summary | | | |
|---|---|---|---|
| Average Delay | | 3.5 | |
| Intersection Capacity Utilization | | 80.4% | ICU Level of Service D |
| Analysis Period (min) | | 15 | |



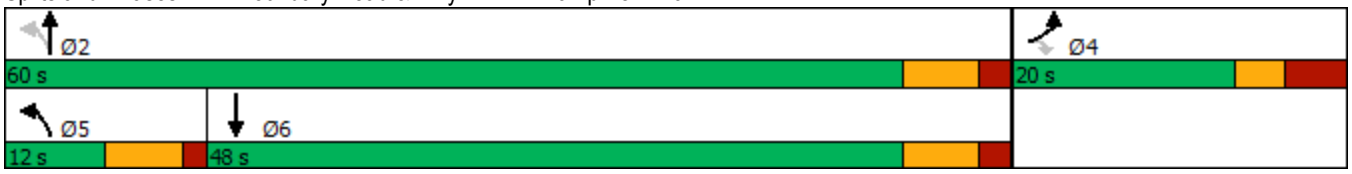
| Lane Group | EBL | EBR | NBL | NBT | SBT | SBR |
|---|---|---|---|---|---|---|
| Lane Configurations | | | | | | |
| Traffic Volume (vph) | 16 | 233 | 29 | 816 | 173 | 8 |
| Future Volume (vph) | 16 | 233 | 29 | 816 | 173 | 8 |
| Ideal Flow (vphpl) | 1800 | 1800 | 1800 | 1800 | 1800 | 1800 |
| Lane Width (m) | 3.5 | 3.3 | 3.5 | 3.5 | 3.5 | 3.5 |
| Storage Length (m) | 0.0 | 25.0 | 50.0 | | | 0.0 |
| Storage Lanes | 1 | 1 | 1 | | | 0 |
| Taper Length (m) | 7.5 | | 75.0 | | | |
| Lane Util. Factor | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| Frt | | 0.850 | | | 0.994 | |
| Flt Protected | 0.950 | | 0.950 | | | |
| Satd. Flow (prot) | 1291 | 1395 | 1291 | 1745 | 1593 | 0 |
| Flt Permitted | 0.950 | | 0.543 | | | |
| Satd. Flow (perm) | 1291 | 1395 | 738 | 1745 | 1593 | 0 |
| Right Turn on Red | | Yes | | | | Yes |
| Satd. Flow (RTOR) | | 259 | | | 4 | |
| Link Speed (k/h) | 40 | | | 80 | 80 | |
| Link Distance (m) | 154.2 | | | 243.1 | 545.7 | |
| Travel Time (s) | 13.9 | | | 10.9 | 24.6 | |
| Peak Hour Factor | 0.90 | 0.90 | 0.90 | 0.90 | 0.90 | 0.90 |
| Heavy Vehicles (%) | 31% | 6% | 31% | 2% | 11% | 13% |
| Adj. Flow (vph) | 18 | 259 | 32 | 907 | 192 | 9 |
| Shared Lane Traffic (%) | | | | | | |
| Lane Group Flow (vph) | 18 | 259 | 32 | 907 | 201 | 0 |
| Enter Blocked Intersection | No | No | No | No | No | No |
| Lane Alignment | Left | Right | Left | Left | Left | Right |
| Median Width(m) | 3.5 | | | 3.5 | 3.5 | |
| Link Offset(m) | 0.0 | | | 0.0 | 0.0 | |
| Crosswalk Width(m) | 4.8 | | | 4.8 | 4.8 | |
| Two way Left Turn Lane | | | | | | |
| Headway Factor | 1.09 | 1.12 | 1.09 | 1.09 | 1.09 | 1.09 |
| Turning Speed (k/h) | 25 | 15 | 25 | | | 15 |
| Number of Detectors | 1 | 1 | 1 | 2 | 2 | |
| Detector Template | Left | Right | Left | Thru | Thru | |
| Leading Detector (m) | 2.0 | 2.0 | 2.0 | 10.0 | 10.0 | |
| Trailing Detector (m) | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | |
| Detector 1 Position(m) | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | |
| Detector 1 Size(m) | 2.0 | 2.0 | 2.0 | 0.6 | 0.6 | |
| Detector 1 Type | Cl+Ex | Cl+Ex | Cl+Ex | Cl+Ex | Cl+Ex | |
| Detector 1 Channel | | | | | | |
| Detector 1 Extend (s) | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | |
| Detector 1 Queue (s) | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | |
| Detector 1 Delay (s) | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | |
| Detector 2 Position(m) | | | | 9.4 | 9.4 | |
| Detector 2 Size(m) | | | | 0.6 | 0.6 | |
| Detector 2 Type | | | | Cl+Ex | Cl+Ex | |
| Detector 2 Channel | | | | | | |
| Detector 2 Extend (s) | | | | 0.0 | 0.0 | |
| Turn Type | Prot | Perm | pm+pt | NA | NA | |

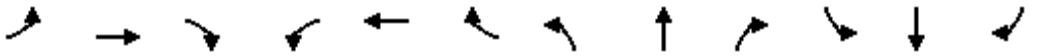


| Lane Group | EBL | EBR | NBL | NBT | SBT | SBR |
|---|---|---|---|---|---|---|
| Protected Phases | 4 | | 5 | 2 | 6 | |
| Permitted Phases | | 4 | 2 | | | |
| Detector Phase | 4 | 4 | 5 | 2 | 6 | |
| Switch Phase | | | | | | |
| Minimum Initial (s) | 7.0 | 7.0 | 7.0 | 35.0 | 35.0 | |
| Minimum Split (s) | 17.8 | 17.8 | 13.0 | 41.6 | 41.6 | |
| Total Split (s) | 20.0 | 20.0 | 12.0 | 60.0 | 48.0 | |
| Total Split (%) | 25.0% | 25.0% | 15.0% | 75.0% | 60.0% | |
| Maximum Green (s) | 13.2 | 13.2 | 6.0 | 53.4 | 41.4 | |
| Yellow Time (s) | 3.0 | 3.0 | 4.6 | 4.6 | 4.6 | |
| All-Red Time (s) | 3.8 | 3.8 | 1.4 | 2.0 | 2.0 | |
| Lost Time Adjust (s) | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | |
| Total Lost Time (s) | 6.8 | 6.8 | 6.0 | 6.6 | 6.6 | |
| Lead/Lag | | | Lead | | Lag | |
| Lead-Lag Optimize? | | | Yes | | Yes | |
| Vehicle Extension (s) | 3.0 | 3.0 | 3.0 | 3.0 | 3.0 | |
| Recall Mode | None | None | None | Min | Min | |
| Walk Time (s) | 5.0 | 5.0 | | 0.0 | 7.0 | |
| Flash Dont Walk (s) | 6.0 | 6.0 | | 0.0 | 21.0 | |
| Pedestrian Calls (#/hr) | 0 | 0 | | 0 | 0 | |
| Act Effct Green (s) | 8.5 | 8.5 | 41.5 | 40.9 | 36.8 | |
| Actuated g/C Ratio | 0.13 | 0.13 | 0.66 | 0.65 | 0.58 | |
| v/c Ratio | 0.10 | 0.63 | 0.06 | 0.80 | 0.22 | |
| Control Delay | 28.3 | 12.0 | 4.2 | 15.0 | 8.6 | |
| Queue Delay | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | |
| Total Delay | 28.3 | 12.0 | 4.2 | 15.0 | 8.6 | |
| LOS | C | B | A | B | A | |
| Approach Delay | 13.0 | | | 14.6 | 8.6 | |
| Approach LOS | B | | | B | A | |
| Queue Length 50th (m) | 1.7 | 0.0 | 1.0 | 60.6 | 7.2 | |
| Queue Length 95th (m) | 8.4 | 20.5 | 4.1 | 141.6 | 28.7 | |
| Internal Link Dist (m) | 130.2 | | | 219.1 | 521.7 | |
| Turn Bay Length (m) | | 25.0 | 50.0 | | | |
| Base Capacity (vph) | 276 | 502 | 539 | 1511 | 1071 | |
| Starvation Cap Reductn | 0 | 0 | 0 | 0 | 0 | |
| Spillback Cap Reductn | 0 | 0 | 0 | 0 | 0 | |
| Storage Cap Reductn | 0 | 0 | 0 | 0 | 0 | |
| Reduced v/c Ratio | 0.07 | 0.52 | 0.06 | 0.60 | 0.19 | |

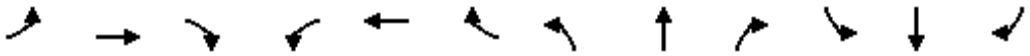
| Intersection Summary | | | |
|---|---|---|---|
| Area Type: | Other | | |
| Cycle Length: 80 | | | |
| Actuated Cycle Length: 63.1 | | | |
| Natural Cycle: 75 | | | |
| Control Type: Semi Act-Uncoord | | | |
| Maximum v/c Ratio: 0.80 | | | |
| Intersection Signal Delay: 13.5 | | Intersection LOS: B | |
| Intersection Capacity Utilization 62.3% | | ICU Level of Service B | |
| Analysis Period (min) 15 | | | |

Splits and Phases: 2: Boundary Road & Hwy 417 EB Ramp Terminal





| Lane Group | EBL | EBT | EBR | WBL | WBT | WBR | NBL | NBT | NBR | SBL | SBT | SBR |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Lane Configurations | | | | | | | | | | | | |
| Traffic Volume (vph) | 31 | 15 | 4 | 3 | 5 | 23 | 5 | 791 | 27 | 175 | 181 | 50 |
| Future Volume (vph) | 31 | 15 | 4 | 3 | 5 | 23 | 5 | 791 | 27 | 175 | 181 | 50 |
| Ideal Flow (vphpl) | 1800 | 1800 | 1800 | 1800 | 1800 | 1800 | 1800 | 1800 | 1800 | 1800 | 1800 | 1800 |
| Lane Width (m) | 3.5 | 3.5 | 3.5 | 3.5 | 3.5 | 3.5 | 3.3 | 3.5 | 3.3 | 3.3 | 3.5 | 3.5 |
| Storage Length (m) | 0.0 | | 0.0 | 0.0 | | 0.0 | 35.0 | | 7.5 | 100.0 | | 0.0 |
| Storage Lanes | 0 | | 0 | 0 | | 1 | 1 | | 1 | 1 | | 0 |
| Taper Length (m) | 7.5 | | | 7.5 | | | 45.0 | | | 75.0 | | |
| Lane Util. Factor | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| Frt | | 0.990 | | | | 0.850 | | | 0.850 | | 0.967 | |
| Flt Protected | | 0.970 | | | 0.984 | | 0.950 | | | 0.950 | | |
| Satd. Flow (prot) | 0 | 1620 | 0 | 0 | 1752 | 1513 | 1378 | 1728 | 1479 | 1653 | 1517 | 0 |
| Flt Permitted | | 0.806 | | | 0.867 | | 0.600 | | | 0.142 | | |
| Satd. Flow (perm) | 0 | 1346 | 0 | 0 | 1543 | 1513 | 870 | 1728 | 1479 | 247 | 1517 | 0 |
| Right Turn on Red | | | Yes | | | Yes | | | Yes | | | Yes |
| Satd. Flow (RTOR) | | 3 | | | | 100 | | | 96 | | 32 | |
| Link Speed (k/h) | | 60 | | | 20 | | | 80 | | | 80 | |
| Link Distance (m) | | 642.8 | | | 170.6 | | | 174.7 | | | 243.1 | |
| Travel Time (s) | | 38.6 | | | 30.7 | | | 7.9 | | | 10.9 | |
| Peak Hour Factor | 0.90 | 0.90 | 0.90 | 0.90 | 0.90 | 0.90 | 0.90 | 0.90 | 0.90 | 0.90 | 0.90 | 0.90 |
| Heavy Vehicles (%) | 6% | 0% | 25% | 0% | 0% | 0% | 20% | 3% | 0% | 0% | 15% | 8% |
| Adj. Flow (vph) | 34 | 17 | 4 | 3 | 6 | 26 | 6 | 879 | 30 | 194 | 201 | 56 |
| Shared Lane Traffic (%) | | | | | | | | | | | | |
| Lane Group Flow (vph) | 0 | 55 | 0 | 0 | 9 | 26 | 6 | 879 | 30 | 194 | 257 | 0 |
| Enter Blocked Intersection | No | No | No | No | No | No | No | No | No | No | No | No |
| Lane Alignment | Left | Left | Right | Left | Left | Right | Left | Left | Right | Left | Left | Right |
| Median Width(m) | | 0.0 | | | 0.0 | | | 3.5 | | | 3.5 | |
| Link Offset(m) | | 0.0 | | | 0.0 | | | 0.0 | | | 0.0 | |
| Crosswalk Width(m) | | 4.8 | | | 4.8 | | | 4.8 | | | 4.8 | |
| Two way Left Turn Lane | | | | | | | | | | | | |
| Headway Factor | 1.09 | 1.09 | 1.09 | 1.09 | 1.09 | 1.09 | 1.12 | 1.09 | 1.12 | 1.12 | 1.09 | 1.09 |
| Turning Speed (k/h) | 25 | | 15 | 25 | | 15 | 25 | | 15 | 25 | | 15 |
| Number of Detectors | 1 | 2 | | 1 | 2 | 1 | 1 | 2 | 1 | 1 | 2 | |
| Detector Template | Left | Thru | | Left | Thru | Right | Left | Thru | Right | Left | Thru | |
| Leading Detector (m) | 2.0 | 10.0 | | 2.0 | 10.0 | 2.0 | 2.0 | 10.0 | 2.0 | 2.0 | 10.0 | |
| Trailing Detector (m) | 0.0 | 0.0 | | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | |
| Detector 1 Position(m) | 0.0 | 0.0 | | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | |
| Detector 1 Size(m) | 2.0 | 0.6 | | 2.0 | 0.6 | 2.0 | 2.0 | 0.6 | 2.0 | 2.0 | 0.6 | |
| Detector 1 Type | Cl+Ex | Cl+Ex | | Cl+Ex | Cl+Ex | Cl+Ex | Cl+Ex | Cl+Ex | Cl+Ex | Cl+Ex | Cl+Ex | |
| Detector 1 Channel | | | | | | | | | | | | |
| Detector 1 Extend (s) | 0.0 | 0.0 | | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | |
| Detector 1 Queue (s) | 0.0 | 0.0 | | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | |
| Detector 1 Delay (s) | 0.0 | 0.0 | | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | |
| Detector 2 Position(m) | | 9.4 | | | 9.4 | | | 9.4 | | | 9.4 | |
| Detector 2 Size(m) | | 0.6 | | | 0.6 | | | 0.6 | | | 0.6 | |
| Detector 2 Type | | Cl+Ex | | | Cl+Ex | | | Cl+Ex | | | Cl+Ex | |
| Detector 2 Channel | | | | | | | | | | | | |
| Detector 2 Extend (s) | | 0.0 | | | 0.0 | | | 0.0 | | | 0.0 | |
| Turn Type | Perm | NA | | Perm | NA | Perm | Perm | NA | Perm | pm+pt | NA | |

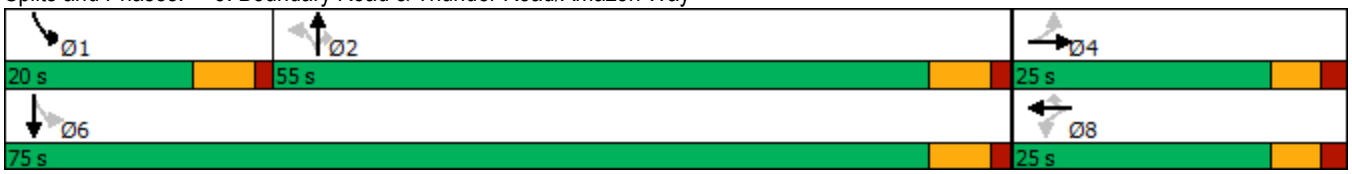


| Lane Group | EBL | EBT | EBR | WBL | WBT | WBR | NBL | NBT | NBR | SBL | SBT | SBR |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Protected Phases | | 4 | | | 8 | | | 2 | | 1 | 6 | |
| Permitted Phases | 4 | | | 8 | | 8 | 2 | | 2 | 6 | | |
| Detector Phase | 4 | 4 | | 8 | 8 | 8 | 2 | 2 | 2 | 1 | 6 | |
| Switch Phase | | | | | | | | | | | | |
| Minimum Initial (s) | 7.0 | 7.0 | | 7.0 | 7.0 | 7.0 | 20.0 | 20.0 | 20.0 | 7.0 | 20.0 | |
| Minimum Split (s) | 24.8 | 24.8 | | 24.8 | 24.8 | 24.8 | 26.2 | 26.2 | 26.2 | 13.0 | 26.2 | |
| Total Split (s) | 25.0 | 25.0 | | 25.0 | 25.0 | 25.0 | 55.0 | 55.0 | 55.0 | 20.0 | 75.0 | |
| Total Split (%) | 25.0% | 25.0% | | 25.0% | 25.0% | 25.0% | 55.0% | 55.0% | 55.0% | 20.0% | 75.0% | |
| Maximum Green (s) | 19.2 | 19.2 | | 19.2 | 19.2 | 19.2 | 48.8 | 48.8 | 48.8 | 14.0 | 68.8 | |
| Yellow Time (s) | 3.7 | 3.7 | | 3.7 | 3.7 | 3.7 | 4.6 | 4.6 | 4.6 | 4.6 | 4.6 | |
| All-Red Time (s) | 2.1 | 2.1 | | 2.1 | 2.1 | 2.1 | 1.6 | 1.6 | 1.6 | 1.4 | 1.6 | |
| Lost Time Adjust (s) | | 0.0 | | | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | |
| Total Lost Time (s) | | 5.8 | | | 5.8 | 5.8 | 6.2 | 6.2 | 6.2 | 6.0 | 6.2 | |
| Lead/Lag | | | | | | | Lag | Lag | Lag | Lead | | |
| Lead-Lag Optimize? | | | | | | | Yes | Yes | Yes | Yes | | |
| Vehicle Extension (s) | 3.0 | 3.0 | | 3.0 | 3.0 | 3.0 | 3.0 | 3.0 | 3.0 | 3.0 | 3.0 | |
| Recall Mode | None | None | | None | None | None | Min | Min | Min | None | Min | |
| Walk Time (s) | 7.0 | 7.0 | | 7.0 | 7.0 | 7.0 | 7.0 | 7.0 | 7.0 | | 7.0 | |
| Flash Dont Walk (s) | 12.0 | 12.0 | | 12.0 | 12.0 | 12.0 | 10.0 | 10.0 | 10.0 | | 10.0 | |
| Pedestrian Calls (#/hr) | 0 | 0 | | 0 | 0 | 0 | 0 | 0 | 0 | | 0 | |
| Act Effct Green (s) | | 9.0 | | | 9.0 | 9.0 | 50.2 | 50.2 | 50.2 | 67.0 | 69.7 | |
| Actuated g/C Ratio | | 0.11 | | | 0.11 | 0.11 | 0.61 | 0.61 | 0.61 | 0.82 | 0.85 | |
| v/c Ratio | | 0.37 | | | 0.05 | 0.10 | 0.01 | 0.83 | 0.03 | 0.51 | 0.20 | |
| Control Delay | | 42.0 | | | 36.4 | 0.8 | 10.2 | 25.2 | 0.1 | 9.5 | 2.8 | |
| Queue Delay | | 0.0 | | | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | |
| Total Delay | | 42.0 | | | 36.4 | 0.8 | 10.2 | 25.2 | 0.1 | 9.5 | 2.8 | |
| LOS | | D | | | D | A | B | C | A | A | A | |
| Approach Delay | | 42.0 | | | 10.0 | | | 24.3 | | | 5.7 | |
| Approach LOS | | D | | | A | | | C | | | A | |
| Queue Length 50th (m) | | 8.6 | | | 1.4 | 0.0 | 0.4 | 125.1 | 0.0 | 7.1 | 8.6 | |
| Queue Length 95th (m) | | 20.9 | | | 6.1 | 0.0 | 2.5 | #243.6 | 0.0 | 23.4 | 18.6 | |
| Internal Link Dist (m) | | 618.8 | | | 146.6 | | | 150.7 | | | 219.1 | |
| Turn Bay Length (m) | | | | | | | 35.0 | | 7.5 | 100.0 | | |
| Base Capacity (vph) | | 322 | | | 367 | 436 | 532 | 1057 | 942 | 446 | 1298 | |
| Starvation Cap Reductn | | 0 | | | 0 | 0 | 0 | 0 | 0 | 0 | 0 | |
| Spillback Cap Reductn | | 0 | | | 0 | 0 | 0 | 0 | 0 | 0 | 0 | |
| Storage Cap Reductn | | 0 | | | 0 | 0 | 0 | 0 | 0 | 0 | 0 | |
| Reduced v/c Ratio | | 0.17 | | | 0.02 | 0.06 | 0.01 | 0.83 | 0.03 | 0.43 | 0.20 | |

| Intersection Summary | | | |
|---|---|---|---|
| Area Type: | Other | | |
| Cycle Length: 100 | | | |
| Actuated Cycle Length: 82 | | | |
| Natural Cycle: 90 | | | |
| Control Type: Semi Act-Uncoord | | | |
| Maximum v/c Ratio: 0.83 | | | |
| Intersection Signal Delay: 18.9 | | Intersection LOS: B | |
| Intersection Capacity Utilization 78.7% | | ICU Level of Service D | |
| Analysis Period (min) 15 | | | |

# 95th percentile volume exceeds capacity, queue may be longer.
Queue shown is maximum after two cycles.

Splits and Phases: 3: Boundary Road & Thunder Road/Amazon Way



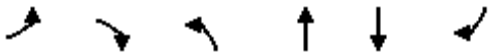
| Lane Group | WBL | WBR | NBT | NBR | SBL | SBT |
|---|---|---|---|---|---|---|
| Lane Configurations | | | | | | |
| Traffic Volume (vph) | 5 | 3 | 820 | 5 | 1 | 187 |
| Future Volume (vph) | 5 | 3 | 820 | 5 | 1 | 187 |
| Ideal Flow (vphpl) | 1800 | 1800 | 1800 | 1800 | 1800 | 1800 |
| Lane Width (m) | 3.6 | 3.6 | 3.5 | 3.5 | 3.5 | 3.5 |
| Storage Length (m) | 0.0 | 0.0 | | 0.0 | 70.0 | |
| Storage Lanes | 1 | 0 | | 0 | 1 | |
| Taper Length (m) | 7.5 | | | | 45.0 | |
| Lane Util. Factor | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| Frt | 0.955 | | 0.999 | | | |
| Flt Protected | 0.968 | | | | 0.950 | |
| Satd. Flow (prot) | 832 | 0 | 1732 | 0 | 846 | 1561 |
| Flt Permitted | 0.968 | | | | 0.950 | |
| Satd. Flow (perm) | 832 | 0 | 1732 | 0 | 846 | 1561 |
| Link Speed (k/h) | 20 | | 80 | | | 80 |
| Link Distance (m) | 151.5 | | 1150.2 | | | 174.7 |
| Travel Time (s) | 27.3 | | 51.8 | | | 7.9 |
| Peak Hour Factor | 0.90 | 0.90 | 0.90 | 0.90 | 0.90 | 0.90 |
| Heavy Vehicles (%) | 100% | 100% | 2% | 100% | 100% | 14% |
| Adj. Flow (vph) | 6 | 3 | 911 | 6 | 1 | 208 |
| Shared Lane Traffic (%) | | | | | | |
| Lane Group Flow (vph) | 9 | 0 | 917 | 0 | 1 | 208 |
| Enter Blocked Intersection | No | No | No | No | No | No |
| Lane Alignment | Left | Right | Left | Right | Left | Left |
| Median Width(m) | 3.6 | | 3.5 | | | 3.5 |
| Link Offset(m) | 0.0 | | 0.0 | | | 0.0 |
| Crosswalk Width(m) | 4.8 | | 4.8 | | | 4.8 |
| Two way Left Turn Lane | | | | | | |
| Headway Factor | 1.07 | 1.07 | 1.09 | 1.09 | 1.09 | 1.09 |
| Turning Speed (k/h) | 25 | 15 | | 15 | 25 | |
| Sign Control | Stop | | Free | | | Free |

| Intersection Summary | | | |
|---|---|---|---|
| Area Type: | Other | | |
| Control Type: Unsignalized | | | |
| Intersection Capacity Utilization 55.9% | | ICU Level of Service B | |
| Analysis Period (min) 15 | | | |

| Movement | WBL | WBR | NBT | NBR | SBL | SBT |
|---|---|---|---|---|---|---|
| Lane Configurations | | | | | | |
| Traffic Volume (veh/h) | 5 | 3 | 820 | 5 | 1 | 187 |
| Future Volume (Veh/h) | 5 | 3 | 820 | 5 | 1 | 187 |
| Sign Control | Stop | | Free | | | Free |
| Grade | 0% | | 0% | | | 0% |
| Peak Hour Factor | 0.90 | 0.90 | 0.90 | 0.90 | 0.90 | 0.90 |
| Hourly flow rate (vph) | 6 | 3 | 911 | 6 | 1 | 208 |
| Pedestrians | | | | | | |
| Lane Width (m) | | | | | | |
| Walking Speed (m/s) | | | | | | |
| Percent Blockage | | | | | | |
| Right turn flare (veh) | | | | | | |
| Median type | | | None | | | None |
| Median storage veh) | | | | | | |
| Upstream signal (m) | | | | | | 175 |
| pX, platoon unblocked | | | | | | |
| vC, conflicting volume | 1124 | 914 | | | 917 | |
| vC1, stage 1 conf vol | | | | | | |
| vC2, stage 2 conf vol | | | | | | |
| vCu, unblocked vol | 1124 | 914 | | | 917 | |
| tC, single (s) | 7.4 | 7.2 | | | 5.1 | |
| tC, 2 stage (s) | | | | | | |
| tF (s) | 4.4 | 4.2 | | | 3.1 | |
| p0 queue free % | 96 | 99 | | | 100 | |
| cM capacity (veh/h) | 149 | 224 | | | 458 | |

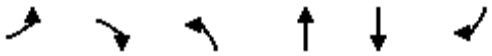
| Direction, Lane # | WB 1 | NB 1 | SB 1 | SB 2 |
|---|---|---|---|---|
| Volume Total | 9 | 917 | 1 | 208 |
| Volume Left | 6 | 0 | 1 | 0 |
| Volume Right | 3 | 6 | 0 | 0 |
| cSH | 168 | 1700 | 458 | 1700 |
| Volume to Capacity | 0.05 | 0.54 | 0.00 | 0.12 |
| Queue Length 95th (m) | 1.3 | 0.0 | 0.1 | 0.0 |
| Control Delay (s) | 27.7 | 0.0 | 12.9 | 0.0 |
| Lane LOS | D | | B | |
| Approach Delay (s) | 27.7 | 0.0 | 0.1 | |
| Approach LOS | D | | | |

| Intersection Summary | | | |
|---|---|---|---|
| Average Delay | 0.2 | | |
| Intersection Capacity Utilization | 55.9% | ICU Level of Service | B |
| Analysis Period (min) | 15 | | |



| Lane Group | EBL | EBR | NBL | NBT | SBT | SBR |
|---|---|---|---|---|---|---|
| Lane Configurations | | | | | | |
| Traffic Volume (vph) | 68 | 27 | 121 | 776 | 110 | 94 |
| Future Volume (vph) | 68 | 27 | 121 | 776 | 110 | 94 |
| Ideal Flow (vphpl) | 1800 | 1800 | 1800 | 1800 | 1800 | 1800 |
| Lane Width (m) | 3.3 | 3.3 | 3.5 | 3.5 | 3.5 | 3.5 |
| Storage Length (m) | 25.0 | 0.0 | 0.0 | | | 30.0 |
| Storage Lanes | 1 | 1 | 0 | | | 1 |
| Taper Length (m) | 47.5 | | 7.5 | | | |
| Lane Util. Factor | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| Frt | | 0.850 | | | | 0.850 |
| Flt Protected | 0.950 | | | 0.993 | | |
| Satd. Flow (prot) | 1476 | 1286 | 0 | 1734 | 1561 | 1293 |
| Flt Permitted | 0.950 | | | 0.993 | | |
| Satd. Flow (perm) | 1476 | 1286 | 0 | 1734 | 1561 | 1293 |
| Link Speed (k/h) | 80 | | | 80 | 80 | |
| Link Distance (m) | 180.5 | | | 135.8 | 1150.2 | |
| Travel Time (s) | 8.1 | | | 6.1 | 51.8 | |
| Peak Hour Factor | 0.90 | 0.90 | 0.90 | 0.90 | 0.90 | 0.90 |
| Heavy Vehicles (%) | 12% | 15% | 8% | 1% | 14% | 17% |
| Adj. Flow (vph) | 76 | 30 | 134 | 862 | 122 | 104 |
| Shared Lane Traffic (%) | | | | | | |
| Lane Group Flow (vph) | 76 | 30 | 0 | 996 | 122 | 104 |
| Enter Blocked Intersection | No | No | No | No | No | No |
| Lane Alignment | Left | Right | Left | Left | Left | Right |
| Median Width(m) | 3.3 | | | 0.0 | 0.0 | |
| Link Offset(m) | 0.0 | | | 0.0 | 0.0 | |
| Crosswalk Width(m) | 4.8 | | | 4.8 | 4.8 | |
| Two way Left Turn Lane | | | | | | |
| Headway Factor | 1.12 | 1.12 | 1.09 | 1.09 | 1.09 | 1.09 |
| Turning Speed (k/h) | 25 | 15 | 25 | | | 15 |
| Sign Control | Stop | | | Free | Free | |

| Intersection Summary | | | |
|---|---|---|---|
| Area Type: | Other | | |
| Control Type: Unsignalized | | | |
| Intersection Capacity Utilization 67.5% | | ICU Level of Service C | |
| Analysis Period (min) 15 | | | |



| Movement | EBL | EBR | NBL | NBT | SBT | SBR |
|---|---|---|---|---|---|---|
| Lane Configurations | | | | | | |
| Traffic Volume (veh/h) | 68 | 27 | 121 | 776 | 110 | 94 |
| Future Volume (Veh/h) | 68 | 27 | 121 | 776 | 110 | 94 |
| Sign Control | Stop | | | Free | Free | |
| Grade | 0% | | | 0% | 0% | |
| Peak Hour Factor | 0.90 | 0.90 | 0.90 | 0.90 | 0.90 | 0.90 |
| Hourly flow rate (vph) | 76 | 30 | 134 | 862 | 122 | 104 |
| 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 | 1252 | 122 | 226 | | | |
| vC1, stage 1 conf vol | | | | | | |
| vC2, stage 2 conf vol | | | | | | |
| vCu, unblocked vol | 1252 | 122 | 226 | | | |
| tC, single (s) | 6.5 | 6.4 | 4.2 | | | |
| tC, 2 stage (s) | | | | | | |
| tF (s) | 3.6 | 3.4 | 2.3 | | | |
| p0 queue free % | 53 | 97 | 90 | | | |
| cM capacity (veh/h) | 163 | 895 | 1308 | | | |

| Direction, Lane # | EB 1 | EB 2 | NB 1 | SB 1 | SB 2 |
|---|---|---|---|---|---|
| Volume Total | 76 | 30 | 996 | 122 | 104 |
| Volume Left | 76 | 0 | 134 | 0 | 0 |
| Volume Right | 0 | 30 | 0 | 0 | 104 |
| cSH | 163 | 895 | 1308 | 1700 | 1700 |
| Volume to Capacity | 0.47 | 0.03 | 0.10 | 0.07 | 0.06 |
| Queue Length 95th (m) | 17.5 | 0.8 | 2.7 | 0.0 | 0.0 |
| Control Delay (s) | 45.1 | 9.2 | 2.5 | 0.0 | 0.0 |
| Lane LOS | E | A | A | | |
| Approach Delay (s) | 34.9 | | 2.5 | 0.0 | |
| Approach LOS | D | | | | |

| Intersection Summary | | | |
|---|---|---|---|
| Average Delay | 4.7 | | |
| Intersection Capacity Utilization | 67.5% | ICU Level of Service | C |
| Analysis Period (min) | 15 | | |

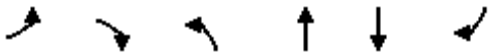
| Lane Group | WBL | WBR | NBT | NBR | SBL | SBT |
|---|---|---|---|---|---|---|
| Lane Configurations | | | | | | |
| Traffic Volume (vph) | 42 | 1 | 130 | 224 | 22 | 108 |
| Future Volume (vph) | 42 | 1 | 130 | 224 | 22 | 108 |
| Ideal Flow (vphpl) | 1800 | 1800 | 1800 | 1800 | 1800 | 1800 |
| Lane Width (m) | 4.5 | 4.5 | 3.5 | 3.5 | 3.5 | 3.5 |
| Storage Length (m) | 0.0 | 10.0 | | 0.0 | 0.0 | |
| Storage Lanes | 1 | 0 | | 0 | 0 | |
| Taper Length (m) | 7.5 | | | | 7.5 | |
| Lane Util. Factor | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| Frt | 0.997 | | 0.914 | | | |
| Flt Protected | 0.953 | | | | | 0.992 |
| Satd. Flow (prot) | 1586 | 0 | 1563 | 0 | 0 | 1630 |
| Flt Permitted | 0.953 | | | | | 0.992 |
| Satd. Flow (perm) | 1586 | 0 | 1563 | 0 | 0 | 1630 |
| Link Speed (k/h) | 40 | | 80 | | | 80 |
| Link Distance (m) | 155.0 | | 545.7 | | | 134.1 |
| Travel Time (s) | 14.0 | | 24.6 | | | 6.0 |
| Peak Hour Factor | 0.90 | 0.90 | 0.90 | 0.90 | 0.90 | 0.90 |
| Heavy Vehicles (%) | 19% | 0% | 6% | 3% | 5% | 9% |
| Adj. Flow (vph) | 47 | 1 | 144 | 249 | 24 | 120 |
| Shared Lane Traffic (%) | | | | | | |
| Lane Group Flow (vph) | 48 | 0 | 393 | 0 | 0 | 144 |
| Enter Blocked Intersection | No | No | No | No | No | No |
| Lane Alignment | Left | Right | Left | Right | Left | Left |
| Median Width(m) | 4.5 | | 0.0 | | | 0.0 |
| Link Offset(m) | 0.0 | | 0.0 | | | 0.0 |
| Crosswalk Width(m) | 4.8 | | 4.8 | | | 4.8 |
| Two way Left Turn Lane | | | | | | |
| Headway Factor | 0.95 | 0.95 | 1.09 | 1.09 | 1.09 | 1.09 |
| Turning Speed (k/h) | 25 | 15 | | 15 | 25 | |
| Sign Control | Stop | | Free | | | Free |

| Intersection Summary | | | |
|---|---|---|---|
| Area Type: | Other | | |
| Control Type: Unsignalized | | | |
| Intersection Capacity Utilization 35.9% | | ICU Level of Service A | |
| Analysis Period (min) 15 | | | |

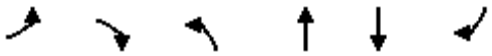
| Movement | WBL | WBR | NBT | NBR | SBL | SBT |
|---|---|---|---|---|---|---|
| Lane Configurations | | | | | | |
| Traffic Volume (veh/h) | 42 | 1 | 130 | 224 | 22 | 108 |
| Future Volume (Veh/h) | 42 | 1 | 130 | 224 | 22 | 108 |
| Sign Control | Stop | | Free | | | Free |
| Grade | 0% | | 0% | | | 0% |
| Peak Hour Factor | 0.90 | 0.90 | 0.90 | 0.90 | 0.90 | 0.90 |
| Hourly flow rate (vph) | 47 | 1 | 144 | 249 | 24 | 120 |
| 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 | 436 | 268 | | | 393 | |
| vC1, stage 1 conf vol | | | | | | |
| vC2, stage 2 conf vol | | | | | | |
| vCu, unblocked vol | 436 | 268 | | | 393 | |
| tC, single (s) | 6.6 | 6.2 | | | 4.1 | |
| tC, 2 stage (s) | | | | | | |
| tF (s) | 3.7 | 3.3 | | | 2.2 | |
| p0 queue free % | 91 | 100 | | | 98 | |
| cM capacity (veh/h) | 535 | 775 | | | 1149 | |

| Direction, Lane # | WB 1 | NB 1 | SB 1 |
|---|---|---|---|
| Volume Total | 48 | 393 | 144 |
| Volume Left | 47 | 0 | 24 |
| Volume Right | 1 | 249 | 0 |
| cSH | 539 | 1700 | 1149 |
| Volume to Capacity | 0.09 | 0.23 | 0.02 |
| Queue Length 95th (m) | 2.3 | 0.0 | 0.5 |
| Control Delay (s) | 12.3 | 0.0 | 1.5 |
| Lane LOS | B | | A |
| Approach Delay (s) | 12.3 | 0.0 | 1.5 |
| Approach LOS | B | | |

| Intersection Summary | | | |
|---|---|---|---|
| Average Delay | 1.4 | | |
| Intersection Capacity Utilization | 35.9% | ICU Level of Service | A |
| Analysis Period (min) | 15 | | |



| Lane Group | EBL | EBR | NBL | NBT | SBT | SBR |
|---|---|---|---|---|---|---|
| Lane Configurations | | | | | | |
| Traffic Volume (vph) | 70 | 631 | 133 | 196 | 188 | 15 |
| Future Volume (vph) | 70 | 631 | 133 | 196 | 188 | 15 |
| Ideal Flow (vphpl) | 1800 | 1800 | 1800 | 1800 | 1800 | 1800 |
| Lane Width (m) | 3.5 | 3.3 | 3.5 | 3.5 | 3.5 | 3.5 |
| Storage Length (m) | 0.0 | 25.0 | 50.0 | | | 0.0 |
| Storage Lanes | 1 | 1 | 1 | | | 0 |
| Taper Length (m) | 7.5 | | 75.0 | | | |
| Lane Util. Factor | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| Frt | | 0.850 | | | 0.990 | |
| Flt Protected | 0.950 | | 0.950 | | | |
| Satd. Flow (prot) | 1551 | 1436 | 1537 | 1664 | 1592 | 0 |
| Flt Permitted | 0.950 | | 0.527 | | | |
| Satd. Flow (perm) | 1551 | 1436 | 853 | 1664 | 1592 | 0 |
| Right Turn on Red | | Yes | | | | Yes |
| Satd. Flow (RTOR) | | 674 | | | 7 | |
| Link Speed (k/h) | 40 | | | 80 | 80 | |
| Link Distance (m) | 154.2 | | | 243.1 | 545.7 | |
| Travel Time (s) | 13.9 | | | 10.9 | 24.6 | |
| Peak Hour Factor | 0.90 | 0.90 | 0.90 | 0.90 | 0.90 | 0.90 |
| Heavy Vehicles (%) | 9% | 3% | 10% | 7% | 11% | 7% |
| Adj. Flow (vph) | 78 | 701 | 148 | 218 | 209 | 17 |
| Shared Lane Traffic (%) | | | | | | |
| Lane Group Flow (vph) | 78 | 701 | 148 | 218 | 226 | 0 |
| Enter Blocked Intersection | No | No | No | No | No | No |
| Lane Alignment | Left | Right | Left | Left | Left | Right |
| Median Width(m) | 3.5 | | | 3.5 | 3.5 | |
| Link Offset(m) | 0.0 | | | 0.0 | 0.0 | |
| Crosswalk Width(m) | 4.8 | | | 4.8 | 4.8 | |
| Two way Left Turn Lane | | | | | | |
| Headway Factor | 1.09 | 1.12 | 1.09 | 1.09 | 1.09 | 1.09 |
| Turning Speed (k/h) | 25 | 15 | 25 | | | 15 |
| Number of Detectors | 1 | 1 | 1 | 2 | 2 | |
| Detector Template | Left | Right | Left | Thru | Thru | |
| Leading Detector (m) | 2.0 | 2.0 | 2.0 | 10.0 | 10.0 | |
| Trailing Detector (m) | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | |
| Detector 1 Position(m) | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | |
| Detector 1 Size(m) | 2.0 | 2.0 | 2.0 | 0.6 | 0.6 | |
| Detector 1 Type | Cl+Ex | Cl+Ex | Cl+Ex | Cl+Ex | Cl+Ex | |
| Detector 1 Channel | | | | | | |
| Detector 1 Extend (s) | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | |
| Detector 1 Queue (s) | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | |
| Detector 1 Delay (s) | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | |
| Detector 2 Position(m) | | | | 9.4 | 9.4 | |
| Detector 2 Size(m) | | | | 0.6 | 0.6 | |
| Detector 2 Type | | | | Cl+Ex | Cl+Ex | |
| Detector 2 Channel | | | | | | |
| Detector 2 Extend (s) | | | | 0.0 | 0.0 | |
| Turn Type | Prot | Perm | pm+pt | NA | NA | |

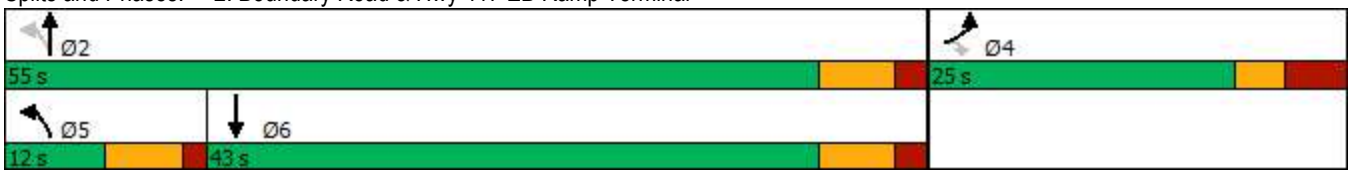


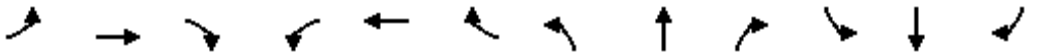
| Lane Group | EBL | EBR | NBL | NBT | SBT | SBR |
|---|---|---|---|---|---|---|
| Protected Phases | 4 | | 5 | 2 | 6 | |
| Permitted Phases | | 4 | 2 | | | |
| Detector Phase | 4 | 4 | 5 | 2 | 6 | |
| Switch Phase | | | | | | |
| Minimum Initial (s) | 7.0 | 7.0 | 7.0 | 35.0 | 35.0 | |
| Minimum Split (s) | 23.0 | 23.0 | 13.0 | 41.6 | 41.6 | |
| Total Split (s) | 25.0 | 25.0 | 12.0 | 55.0 | 43.0 | |
| Total Split (%) | 31.3% | 31.3% | 15.0% | 68.8% | 53.8% | |
| Maximum Green (s) | 18.2 | 18.2 | 6.0 | 48.4 | 36.4 | |
| Yellow Time (s) | 3.0 | 3.0 | 4.6 | 4.6 | 4.6 | |
| All-Red Time (s) | 3.8 | 3.8 | 1.4 | 2.0 | 2.0 | |
| Lost Time Adjust (s) | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | |
| Total Lost Time (s) | 6.8 | 6.8 | 6.0 | 6.6 | 6.6 | |
| Lead/Lag | | | Lead | | Lag | |
| Lead-Lag Optimize? | | | Yes | | Yes | |
| Vehicle Extension (s) | 3.0 | 3.0 | 3.0 | 3.0 | 3.0 | |
| Recall Mode | None | None | None | Min | Min | |
| Walk Time (s) | 7.0 | 7.0 | | 0.0 | 7.0 | |
| Flash Dont Walk (s) | 5.0 | 5.0 | | 0.0 | 21.0 | |
| Pedestrian Calls (#/hr) | 0 | 0 | | 0 | 0 | |
| Act Effct Green (s) | 12.1 | 12.1 | 47.8 | 47.2 | 35.2 | |
| Actuated g/C Ratio | 0.17 | 0.17 | 0.66 | 0.65 | 0.48 | |
| v/c Ratio | 0.30 | 0.88 | 0.24 | 0.20 | 0.29 | |
| Control Delay | 29.0 | 17.0 | 6.8 | 6.6 | 13.3 | |
| Queue Delay | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | |
| Total Delay | 29.0 | 17.0 | 6.8 | 6.6 | 13.3 | |
| LOS | C | B | A | A | B | |
| Approach Delay | 18.2 | | | 6.7 | 13.3 | |
| Approach LOS | B | | | A | B | |
| Queue Length 50th (m) | 9.9 | 3.3 | 6.5 | 10.3 | 17.2 | |
| Queue Length 95th (m) | 21.3 | #66.1 | 17.0 | 24.7 | 37.2 | |
| Internal Link Dist (m) | 130.2 | | | 219.1 | 521.7 | |
| Turn Bay Length (m) | | 25.0 | 50.0 | | | |
| Base Capacity (vph) | 389 | 865 | 616 | 1111 | 803 | |
| Starvation Cap Reductn | 0 | 0 | 0 | 0 | 0 | |
| Spillback Cap Reductn | 0 | 0 | 0 | 0 | 0 | |
| Storage Cap Reductn | 0 | 0 | 0 | 0 | 0 | |
| Reduced v/c Ratio | 0.20 | 0.81 | 0.24 | 0.20 | 0.28 | |

| Intersection Summary | | | |
|---|---|---|---|
| Area Type: | Other | | |
| Cycle Length: 80 | | | |
| Actuated Cycle Length: 72.8 | | | |
| Natural Cycle: 80 | | | |
| Control Type: Semi Act-Uncoord | | | |
| Maximum v/c Ratio: 0.88 | | | |
| Intersection Signal Delay: 14.3 | | Intersection LOS: B | |
| Intersection Capacity Utilization 81.6% | | ICU Level of Service D | |
| Analysis Period (min) 15 | | | |

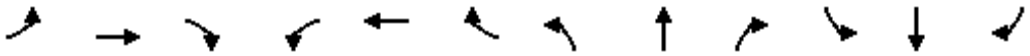
# 95th percentile volume exceeds capacity, queue may be longer.
Queue shown is maximum after two cycles.

Splits and Phases: 2: Boundary Road & Hwy 417 EB Ramp Terminal





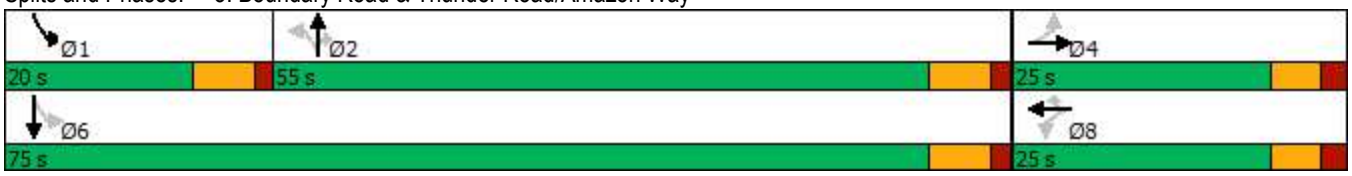
| Lane Group | EBL | EBT | EBR | WBL | WBT | WBR | NBL | NBT | NBR | SBL | SBT | SBR |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Lane Configurations | | | | | | | | | | | | |
| Traffic Volume (vph) | 62 | 0 | 14 | 5 | 0 | 16 | 4 | 251 | 0 | 2 | 762 | 55 |
| Future Volume (vph) | 62 | 0 | 14 | 5 | 0 | 16 | 4 | 251 | 0 | 2 | 762 | 55 |
| Ideal Flow (vphpl) | 1800 | 1800 | 1800 | 1800 | 1800 | 1800 | 1800 | 1800 | 1800 | 1800 | 1800 | 1800 |
| Lane Width (m) | 3.5 | 3.5 | 3.5 | 3.5 | 3.5 | 3.5 | 3.3 | 3.5 | 3.3 | 3.3 | 3.5 | 3.5 |
| Storage Length (m) | 0.0 | | 0.0 | 0.0 | | 0.0 | 35.0 | | 7.5 | 100.0 | | 0.0 |
| Storage Lanes | 0 | | 0 | 0 | | 1 | 1 | | 1 | 1 | | 0 |
| Taper Length (m) | 7.5 | | | 7.5 | | | 45.0 | | | 75.0 | | |
| Lane Util. Factor | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| Frt | | 0.975 | | | | 0.850 | | | | | 0.990 | |
| Flt Protected | | 0.961 | | | 0.950 | | 0.950 | | | 0.950 | | |
| Satd. Flow (prot) | 0 | 1590 | 0 | 0 | 1208 | 1513 | 1322 | 1633 | 1740 | 1102 | 1699 | 0 |
| Flt Permitted | | 0.762 | | | 0.856 | | 0.287 | | | 0.509 | | |
| Satd. Flow (perm) | 0 | 1261 | 0 | 0 | 1088 | 1513 | 400 | 1633 | 1740 | 590 | 1699 | 0 |
| Right Turn on Red | | | Yes | | | Yes | | | Yes | | | Yes |
| Satd. Flow (RTOR) | | 100 | | | | 100 | | | | | 8 | |
| Link Speed (k/h) | | 60 | | | 20 | | | 80 | | | 80 | |
| Link Distance (m) | | 642.8 | | | 170.6 | | | 174.7 | | | 243.1 | |
| Travel Time (s) | | 38.6 | | | 30.7 | | | 7.9 | | | 10.9 | |
| Peak Hour Factor | 0.90 | 0.90 | 0.90 | 0.90 | 0.90 | 0.90 | 0.90 | 0.90 | 0.90 | 0.90 | 0.90 | 0.90 |
| Heavy Vehicles (%) | 6% | 0% | 0% | 40% | 0% | 0% | 25% | 9% | 0% | 50% | 4% | 0% |
| Adj. Flow (vph) | 69 | 0 | 16 | 6 | 0 | 18 | 4 | 279 | 0 | 2 | 847 | 61 |
| Shared Lane Traffic (%) | | | | | | | | | | | | |
| Lane Group Flow (vph) | 0 | 85 | 0 | 0 | 6 | 18 | 4 | 279 | 0 | 2 | 908 | 0 |
| Enter Blocked Intersection | No | No | No | No | No | No | No | No | No | No | No | No |
| Lane Alignment | Left | Left | Right | Left | Left | Right | Left | Left | Right | Left | Left | Right |
| Median Width(m) | | 0.0 | | | 0.0 | | | 3.5 | | | 3.5 | |
| Link Offset(m) | | 0.0 | | | 0.0 | | | 0.0 | | | 0.0 | |
| Crosswalk Width(m) | | 4.8 | | | 4.8 | | | 4.8 | | | 4.8 | |
| Two way Left Turn Lane | | | | | | | | | | | | |
| Headway Factor | 1.09 | 1.09 | 1.09 | 1.09 | 1.09 | 1.09 | 1.12 | 1.09 | 1.12 | 1.12 | 1.09 | 1.09 |
| Turning Speed (k/h) | 25 | | 15 | 25 | | 15 | 25 | | 15 | 25 | | 15 |
| Number of Detectors | 1 | 2 | | 1 | 2 | 1 | 1 | 2 | 1 | 1 | 2 | |
| Detector Template | Left | Thru | | Left | Thru | Right | Left | Thru | Right | Left | Thru | |
| Leading Detector (m) | 2.0 | 10.0 | | 2.0 | 10.0 | 2.0 | 2.0 | 10.0 | 2.0 | 2.0 | 10.0 | |
| Trailing Detector (m) | 0.0 | 0.0 | | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | |
| Detector 1 Position(m) | 0.0 | 0.0 | | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | |
| Detector 1 Size(m) | 2.0 | 0.6 | | 2.0 | 0.6 | 2.0 | 2.0 | 0.6 | 2.0 | 2.0 | 0.6 | |
| Detector 1 Type | Cl+Ex | Cl+Ex | | Cl+Ex | Cl+Ex | Cl+Ex | Cl+Ex | Cl+Ex | Cl+Ex | Cl+Ex | Cl+Ex | |
| Detector 1 Channel | | | | | | | | | | | | |
| Detector 1 Extend (s) | 0.0 | 0.0 | | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | |
| Detector 1 Queue (s) | 0.0 | 0.0 | | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | |
| Detector 1 Delay (s) | 0.0 | 0.0 | | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | |
| Detector 2 Position(m) | | 9.4 | | | 9.4 | | | 9.4 | | | 9.4 | |
| Detector 2 Size(m) | | 0.6 | | | 0.6 | | | 0.6 | | | 0.6 | |
| Detector 2 Type | | Cl+Ex | | | Cl+Ex | | | Cl+Ex | | | Cl+Ex | |
| Detector 2 Channel | | | | | | | | | | | | |
| Detector 2 Extend (s) | | 0.0 | | | 0.0 | | | 0.0 | | | 0.0 | |
| Turn Type | Perm | NA | | Perm | NA | Perm | Perm | NA | Perm | pm+pt | NA | |



| Lane Group | EBL | EBT | EBR | WBL | WBT | WBR | NBL | NBT | NBR | SBL | SBT | SBR |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Protected Phases | | 4 | | | 8 | | | 2 | | 1 | 6 | |
| Permitted Phases | 4 | | | 8 | | 8 | 2 | | 2 | 6 | | |
| Detector Phase | 4 | 4 | | 8 | 8 | 8 | 2 | 2 | 2 | 1 | 6 | |
| Switch Phase | | | | | | | | | | | | |
| Minimum Initial (s) | 7.0 | 7.0 | | 7.0 | 7.0 | 7.0 | 20.0 | 20.0 | 20.0 | 7.0 | 20.0 | |
| Minimum Split (s) | 24.8 | 24.8 | | 24.8 | 24.8 | 24.8 | 26.2 | 26.2 | 26.2 | 13.0 | 26.2 | |
| Total Split (s) | 25.0 | 25.0 | | 25.0 | 25.0 | 25.0 | 55.0 | 55.0 | 55.0 | 20.0 | 75.0 | |
| Total Split (%) | 25.0% | 25.0% | | 25.0% | 25.0% | 25.0% | 55.0% | 55.0% | 55.0% | 20.0% | 75.0% | |
| Maximum Green (s) | 19.2 | 19.2 | | 19.2 | 19.2 | 19.2 | 48.8 | 48.8 | 48.8 | 14.0 | 68.8 | |
| Yellow Time (s) | 3.7 | 3.7 | | 3.7 | 3.7 | 3.7 | 4.6 | 4.6 | 4.6 | 4.6 | 4.6 | |
| All-Red Time (s) | 2.1 | 2.1 | | 2.1 | 2.1 | 2.1 | 1.6 | 1.6 | 1.6 | 1.4 | 1.6 | |
| Lost Time Adjust (s) | | 0.0 | | | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | |
| Total Lost Time (s) | | 5.8 | | | 5.8 | 5.8 | 6.2 | 6.2 | 6.2 | 6.0 | 6.2 | |
| Lead/Lag | | | | | | | Lag | Lag | Lag | Lead | | |
| Lead-Lag Optimize? | | | | | | | Yes | Yes | Yes | Yes | | |
| Vehicle Extension (s) | 3.0 | 3.0 | | 3.0 | 3.0 | 3.0 | 3.0 | 3.0 | 3.0 | 3.0 | 3.0 | |
| Recall Mode | None | None | | None | None | None | Min | Min | Min | None | Min | |
| Walk Time (s) | 7.0 | 7.0 | | 7.0 | 7.0 | 7.0 | 7.0 | 7.0 | 7.0 | | 7.0 | |
| Flash Dont Walk (s) | 12.0 | 12.0 | | 12.0 | 12.0 | 12.0 | 10.0 | 10.0 | 10.0 | | 10.0 | |
| Pedestrian Calls (#/hr) | 0 | 0 | | 0 | 0 | 0 | 0 | 0 | 0 | | 0 | |
| Act Effct Green (s) | | 7.7 | | | 7.7 | 7.7 | 40.3 | 40.3 | | 40.7 | 42.2 | |
| Actuated g/C Ratio | | 0.13 | | | 0.13 | 0.13 | 0.70 | 0.70 | | 0.71 | 0.74 | |
| v/c Ratio | | 0.33 | | | 0.04 | 0.06 | 0.01 | 0.24 | | 0.00 | 0.72 | |
| Control Delay | | 9.6 | | | 27.0 | 0.4 | 6.2 | 6.3 | | 3.0 | 10.6 | |
| Queue Delay | | 0.0 | | | 0.0 | 0.0 | 0.0 | 0.0 | | 0.0 | 0.3 | |
| Total Delay | | 9.6 | | | 27.0 | 0.4 | 6.2 | 6.3 | | 3.0 | 10.9 | |
| LOS | | A | | | C | A | A | A | | A | B | |
| Approach Delay | | 9.6 | | | 7.1 | | | 6.3 | | | 10.8 | |
| Approach LOS | | A | | | A | | | A | | | B | |
| Queue Length 50th (m) | | 0.0 | | | 0.5 | 0.0 | 0.1 | 9.8 | | 0.1 | 55.9 | |
| Queue Length 95th (m) | | 10.2 | | | 4.3 | 0.0 | 1.6 | 36.0 | | 0.6 | 114.0 | |
| Internal Link Dist (m) | | 618.8 | | | 146.6 | | | 150.7 | | | 219.1 | |
| Turn Bay Length (m) | | | | | | | 35.0 | | | 100.0 | | |
| Base Capacity (vph) | | 507 | | | 382 | 596 | 342 | 1397 | | 550 | 1658 | |
| Starvation Cap Reductn | | 0 | | | 0 | 0 | 0 | 0 | | 0 | 249 | |
| Spillback Cap Reductn | | 0 | | | 0 | 0 | 0 | 0 | | 0 | 0 | |
| Storage Cap Reductn | | 0 | | | 0 | 0 | 0 | 0 | | 0 | 0 | |
| Reduced v/c Ratio | | 0.17 | | | 0.02 | 0.03 | 0.01 | 0.20 | | 0.00 | 0.64 | |

| Intersection Summary | | | |
|---|---|---|---|
| Area Type: | Other | | |
| Cycle Length: 100 | | | |
| Actuated Cycle Length: 57.2 | | | |
| Natural Cycle: 80 | | | |
| Control Type: Semi Act-Uncoord | | | |
| Maximum v/c Ratio: 0.72 | | | |
| Intersection Signal Delay: 9.7 | | Intersection LOS: A | |
| Intersection Capacity Utilization 67.0% | | ICU Level of Service C | |
| Analysis Period (min) 15 | | | |

Splits and Phases: 3: Boundary Road & Thunder Road/Amazon Way



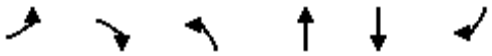
| Lane Group | WBL | WBR | NBT | NBR | SBL | SBT |
|---|---|---|---|---|---|---|
| Lane Configurations | | | | | | |
| Traffic Volume (vph) | 5 | 11 | 244 | 5 | 12 | 769 |
| Future Volume (vph) | 5 | 11 | 244 | 5 | 12 | 769 |
| Ideal Flow (vphpl) | 1800 | 1800 | 1800 | 1800 | 1800 | 1800 |
| Lane Width (m) | 3.6 | 3.6 | 3.5 | 3.5 | 3.5 | 3.5 |
| Storage Length (m) | 0.0 | 0.0 | | 0.0 | 70.0 | |
| Storage Lanes | 1 | 0 | | 0 | 1 | |
| Taper Length (m) | 7.5 | | | | 45.0 | |
| Lane Util. Factor | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| Frt | 0.910 | | 0.997 | | | |
| Flt Protected | 0.984 | | | | 0.950 | |
| Satd. Flow (prot) | 806 | 0 | 1643 | 0 | 846 | 1745 |
| Flt Permitted | 0.984 | | | | 0.950 | |
| Satd. Flow (perm) | 806 | 0 | 1643 | 0 | 846 | 1745 |
| Link Speed (k/h) | 20 | | 80 | | | 80 |
| Link Distance (m) | 151.5 | | 1150.2 | | | 174.7 |
| Travel Time (s) | 27.3 | | 51.8 | | | 7.9 |
| Peak Hour Factor | 0.90 | 0.90 | 0.90 | 0.90 | 0.90 | 0.90 |
| Heavy Vehicles (%) | 100% | 100% | 6% | 100% | 100% | 2% |
| Adj. Flow (vph) | 6 | 12 | 271 | 6 | 13 | 854 |
| Shared Lane Traffic (%) | | | | | | |
| Lane Group Flow (vph) | 18 | 0 | 277 | 0 | 13 | 854 |
| Enter Blocked Intersection | No | No | No | No | No | No |
| Lane Alignment | Left | Right | Left | Right | Left | Left |
| Median Width(m) | 3.6 | | 3.5 | | | 3.5 |
| Link Offset(m) | 0.0 | | 0.0 | | | 0.0 |
| Crosswalk Width(m) | 4.8 | | 4.8 | | | 4.8 |
| Two way Left Turn Lane | | | | | | |
| Headway Factor | 1.07 | 1.07 | 1.09 | 1.09 | 1.09 | 1.09 |
| Turning Speed (k/h) | 25 | 15 | | 15 | 25 | |
| Sign Control | Stop | | Free | | | Free |

| Intersection Summary | | | |
|---|---|---|---|
| Area Type: | Other | | |
| Control Type: Unsignalized | | | |
| Intersection Capacity Utilization 52.7% | | ICU Level of Service A | |
| Analysis Period (min) 15 | | | |

| Movement | WBL | WBR | NBT | NBR | SBL | SBT |
|---|---|---|---|---|---|---|
| Lane Configurations | | | | | | |
| Traffic Volume (veh/h) | 5 | 11 | 244 | 5 | 12 | 769 |
| Future Volume (Veh/h) | 5 | 11 | 244 | 5 | 12 | 769 |
| Sign Control | Stop | | Free | | | Free |
| Grade | 0% | | 0% | | | 0% |
| Peak Hour Factor | 0.90 | 0.90 | 0.90 | 0.90 | 0.90 | 0.90 |
| Hourly flow rate (vph) | 6 | 12 | 271 | 6 | 13 | 854 |
| Pedestrians | | | | | | |
| Lane Width (m) | | | | | | |
| Walking Speed (m/s) | | | | | | |
| Percent Blockage | | | | | | |
| Right turn flare (veh) | | | | | | |
| Median type | | | None | | | None |
| Median storage veh) | | | | | | |
| Upstream signal (m) | | | | | | 175 |
| pX, platoon unblocked | 0.66 | | | | | |
| vC, conflicting volume | 1154 | 274 | | | 277 | |
| vC1, stage 1 conf vol | | | | | | |
| vC2, stage 2 conf vol | | | | | | |
| vCu, unblocked vol | 975 | 274 | | | 277 | |
| tC, single (s) | 7.4 | 7.2 | | | 5.1 | |
| tC, 2 stage (s) | | | | | | |
| tF (s) | 4.4 | 4.2 | | | 3.1 | |
| p0 queue free % | 95 | 98 | | | 99 | |
| cM capacity (veh/h) | 123 | 579 | | | 882 | |

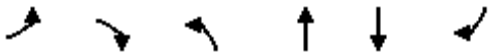
| Direction, Lane # | WB 1 | NB 1 | SB 1 | SB 2 |
|---|---|---|---|---|
| Volume Total | 18 | 277 | 13 | 854 |
| Volume Left | 6 | 0 | 13 | 0 |
| Volume Right | 12 | 6 | 0 | 0 |
| cSH | 258 | 1700 | 882 | 1700 |
| Volume to Capacity | 0.07 | 0.16 | 0.01 | 0.50 |
| Queue Length 95th (m) | 1.8 | 0.0 | 0.4 | 0.0 |
| Control Delay (s) | 20.0 | 0.0 | 9.1 | 0.0 |
| Lane LOS | C | | A | |
| Approach Delay (s) | 20.0 | 0.0 | 0.1 | |
| Approach LOS | C | | | |

| Intersection Summary | | | |
|---|---|---|---|
| Average Delay | 0.4 | | |
| Intersection Capacity Utilization | 52.7% | ICU Level of Service | A |
| Analysis Period (min) | 15 | | |



| Lane Group | EBL | EBR | NBL | NBT | SBT | SBR |
|---|---|---|---|---|---|---|
| Lane Configurations | | | | | | |
| Traffic Volume (vph) | 113 | 98 | 52 | 116 | 703 | 113 |
| Future Volume (vph) | 113 | 98 | 52 | 116 | 703 | 113 |
| Ideal Flow (vphpl) | 1800 | 1800 | 1800 | 1800 | 1800 | 1800 |
| Lane Width (m) | 3.3 | 3.3 | 3.5 | 3.5 | 3.5 | 3.5 |
| Storage Length (m) | 25.0 | 0.0 | 0.0 | | | 30.0 |
| Storage Lanes | 1 | 1 | 0 | | | 1 |
| Taper Length (m) | 47.5 | | 7.5 | | | |
| Lane Util. Factor | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| Frt | | 0.850 | | | | 0.850 |
| Flt Protected | 0.950 | | | 0.985 | | |
| Satd. Flow (prot) | 1463 | 1395 | 0 | 1666 | 1762 | 1351 |
| Flt Permitted | 0.950 | | | 0.985 | | |
| Satd. Flow (perm) | 1463 | 1395 | 0 | 1666 | 1762 | 1351 |
| Link Speed (k/h) | 80 | | | 80 | 80 | |
| Link Distance (m) | 180.5 | | | 135.8 | 1150.2 | |
| Travel Time (s) | 8.1 | | | 6.1 | 51.8 | |
| Peak Hour Factor | 0.90 | 0.90 | 0.90 | 0.90 | 0.90 | 0.90 |
| Heavy Vehicles (%) | 13% | 6% | 8% | 4% | 1% | 12% |
| Adj. Flow (vph) | 126 | 109 | 58 | 129 | 781 | 126 |
| Shared Lane Traffic (%) | | | | | | |
| Lane Group Flow (vph) | 126 | 109 | 0 | 187 | 781 | 126 |
| Enter Blocked Intersection | No | No | No | No | No | No |
| Lane Alignment | Left | Right | Left | Left | Left | Right |
| Median Width(m) | 3.3 | | | 0.0 | 0.0 | |
| Link Offset(m) | 0.0 | | | 0.0 | 0.0 | |
| Crosswalk Width(m) | 4.8 | | | 4.8 | 4.8 | |
| Two way Left Turn Lane | | | | | | |
| Headway Factor | 1.12 | 1.12 | 1.09 | 1.09 | 1.09 | 1.09 |
| Turning Speed (k/h) | 25 | 15 | 25 | | | 15 |
| Sign Control | Stop | | | Free | Free | |

| Intersection Summary | | | |
|---|---|---|---|
| Area Type: | Other | | |
| Control Type: Unsignalized | | | |
| Intersection Capacity Utilization 65.1% | | ICU Level of Service C | |
| Analysis Period (min) 15 | | | |



| Movement | EBL | EBR | NBL | NBT | SBT | SBR |
|---|---|---|---|---|---|---|
| Lane Configurations | | | | | | |
| Traffic Volume (veh/h) | 113 | 98 | 52 | 116 | 703 | 113 |
| Future Volume (Veh/h) | 113 | 98 | 52 | 116 | 703 | 113 |
| Sign Control | Stop | | | Free | Free | |
| Grade | 0% | | | 0% | 0% | |
| Peak Hour Factor | 0.90 | 0.90 | 0.90 | 0.90 | 0.90 | 0.90 |
| Hourly flow rate (vph) | 126 | 109 | 58 | 129 | 781 | 126 |
| 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 | 1026 | 781 | 907 | | | |
| vC1, stage 1 conf vol | | | | | | |
| vC2, stage 2 conf vol | | | | | | |
| vCu, unblocked vol | 1026 | 781 | 907 | | | |
| tC, single (s) | 6.5 | 6.3 | 4.2 | | | |
| tC, 2 stage (s) | | | | | | |
| tF (s) | 3.6 | 3.4 | 2.3 | | | |
| p0 queue free % | 45 | 72 | 92 | | | |
| cM capacity (veh/h) | 228 | 389 | 726 | | | |

| Direction, Lane # | EB 1 | EB 2 | NB 1 | SB 1 | SB 2 |
|---|---|---|---|---|---|
| Volume Total | 126 | 109 | 187 | 781 | 126 |
| Volume Left | 126 | 0 | 58 | 0 | 0 |
| Volume Right | 0 | 109 | 0 | 0 | 126 |
| cSH | 228 | 389 | 726 | 1700 | 1700 |
| Volume to Capacity | 0.55 | 0.28 | 0.08 | 0.46 | 0.07 |
| Queue Length 95th (m) | 24.0 | 9.1 | 2.1 | 0.0 | 0.0 |
| Control Delay (s) | 38.6 | 17.8 | 3.8 | 0.0 | 0.0 |
| Lane LOS | E | C | A | | |
| Approach Delay (s) | 29.0 | | 3.8 | 0.0 | |
| Approach LOS | D | | | | |

| Intersection Summary | | | |
|---|---|---|---|
| Average Delay | 5.7 | | |
| Intersection Capacity Utilization | 65.1% | ICU Level of Service | C |
| Analysis Period (min) | 15 | | |

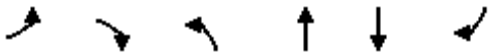
| Lane Group | WBL | WBR | NBT | NBR | SBL | SBT |
|---|---|---|---|---|---|---|
| Lane Configurations | | | | | | |
| Traffic Volume (vph) | 121 | 31 | 95 | 856 | 77 | 101 |
| Future Volume (vph) | 121 | 31 | 95 | 856 | 77 | 101 |
| Ideal Flow (vphpl) | 1800 | 1800 | 1800 | 1800 | 1800 | 1800 |
| Lane Width (m) | 4.5 | 4.5 | 3.5 | 3.5 | 3.5 | 3.5 |
| Storage Length (m) | 0.0 | 10.0 | | 0.0 | 0.0 | |
| Storage Lanes | 1 | 0 | | 0 | 0 | |
| Taper Length (m) | 7.5 | | | | 7.5 | |
| Lane Util. Factor | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| Frt | 0.972 | | 0.878 | | | |
| Flt Protected | 0.962 | | | | | 0.979 |
| Satd. Flow (prot) | 1746 | 0 | 1528 | 0 | 0 | 1582 |
| Flt Permitted | 0.962 | | | | | 0.979 |
| Satd. Flow (perm) | 1746 | 0 | 1528 | 0 | 0 | 1582 |
| Link Speed (k/h) | 40 | | 80 | | | 80 |
| Link Distance (m) | 155.0 | | 545.7 | | | 134.1 |
| Travel Time (s) | 14.0 | | 24.6 | | | 6.0 |
| Peak Hour Factor | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| Heavy Vehicles (%) | 4% | 14% | 14% | 1% | 9% | 11% |
| Adj. Flow (vph) | 121 | 31 | 95 | 856 | 77 | 101 |
| Shared Lane Traffic (%) | | | | | | |
| Lane Group Flow (vph) | 152 | 0 | 951 | 0 | 0 | 178 |
| Enter Blocked Intersection | No | No | No | No | No | No |
| Lane Alignment | Left | Right | Left | Right | Left | Left |
| Median Width(m) | 4.5 | | 0.0 | | | 0.0 |
| Link Offset(m) | 0.0 | | 0.0 | | | 0.0 |
| Crosswalk Width(m) | 4.8 | | 4.8 | | | 4.8 |
| Two way Left Turn Lane | | | | | | |
| Headway Factor | 0.95 | 0.95 | 1.09 | 1.09 | 1.09 | 1.09 |
| Turning Speed (k/h) | 25 | 15 | | 15 | 25 | |
| Sign Control | Stop | | Free | | | Free |

| Intersection Summary | | | |
|---|---|---|---|
| Area Type: | Other | | |
| Control Type: Unsignalized | | | |
| Intersection Capacity Utilization 90.3% | | ICU Level of Service E | |
| Analysis Period (min) 15 | | | |

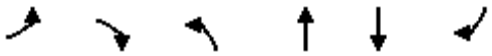
| Movement | WBL | WBR | NBT | NBR | SBL | SBT |
|---|---|---|---|---|---|---|
| Lane Configurations | | | | | | |
| Traffic Volume (veh/h) | 121 | 31 | 95 | 856 | 77 | 101 |
| Future Volume (Veh/h) | 121 | 31 | 95 | 856 | 77 | 101 |
| Sign Control | Stop | | Free | | | Free |
| Grade | 0% | | 0% | | | 0% |
| Peak Hour Factor | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| Hourly flow rate (vph) | 121 | 31 | 95 | 856 | 77 | 101 |
| 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 | 778 | 523 | | | 951 | |
| vC1, stage 1 conf vol | | | | | | |
| vC2, stage 2 conf vol | | | | | | |
| vCu, unblocked vol | 778 | 523 | | | 951 | |
| tC, single (s) | 6.4 | 6.3 | | | 4.2 | |
| tC, 2 stage (s) | | | | | | |
| tF (s) | 3.5 | 3.4 | | | 2.3 | |
| p0 queue free % | 62 | 94 | | | 89 | |
| cM capacity (veh/h) | 322 | 531 | | | 695 | |

| Direction, Lane # | WB 1 | NB 1 | SB 1 |
|---|---|---|---|
| Volume Total | 152 | 951 | 178 |
| Volume Left | 121 | 0 | 77 |
| Volume Right | 31 | 856 | 0 |
| cSH | 350 | 1700 | 695 |
| Volume to Capacity | 0.43 | 0.56 | 0.11 |
| Queue Length 95th (m) | 17.0 | 0.0 | 3.0 |
| Control Delay (s) | 22.9 | 0.0 | 5.4 |
| Lane LOS | C | | A |
| Approach Delay (s) | 22.9 | 0.0 | 5.4 |
| Approach LOS | C | | |

| Intersection Summary | | | |
|---|---|---|---|
| Average Delay | 3.5 | | |
| Intersection Capacity Utilization | 90.3% | ICU Level of Service | E |
| Analysis Period (min) | 15 | | |



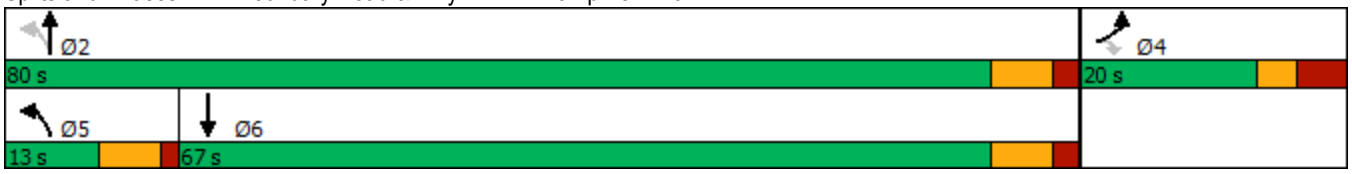
| Lane Group | EBL | EBR | NBL | NBT | SBT | SBR |
|---|---|---|---|---|---|---|
| Lane Configurations | | | | | | |
| Traffic Volume (vph) | 18 | 293 | 34 | 938 | 194 | 9 |
| Future Volume (vph) | 18 | 293 | 34 | 938 | 194 | 9 |
| Ideal Flow (vphpl) | 1800 | 1800 | 1800 | 1800 | 1800 | 1800 |
| Lane Width (m) | 3.5 | 3.3 | 3.5 | 3.5 | 3.5 | 3.5 |
| Storage Length (m) | 0.0 | 25.0 | 50.0 | | | 0.0 |
| Storage Lanes | 1 | 1 | 1 | | | 0 |
| Taper Length (m) | 7.5 | | 75.0 | | | |
| Lane Util. Factor | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| Frt | | 0.850 | | | 0.994 | |
| Flt Protected | 0.950 | | 0.950 | | | |
| Satd. Flow (prot) | 1291 | 1395 | 1291 | 1745 | 1593 | 0 |
| Flt Permitted | 0.950 | | 0.547 | | | |
| Satd. Flow (perm) | 1291 | 1395 | 743 | 1745 | 1593 | 0 |
| Right Turn on Red | | Yes | | | | Yes |
| Satd. Flow (RTOR) | | 293 | | | 4 | |
| Link Speed (k/h) | 40 | | | 80 | 80 | |
| Link Distance (m) | 154.2 | | | 243.1 | 545.7 | |
| Travel Time (s) | 13.9 | | | 10.9 | 24.6 | |
| Peak Hour Factor | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| Heavy Vehicles (%) | 31% | 6% | 31% | 2% | 11% | 13% |
| Adj. Flow (vph) | 18 | 293 | 34 | 938 | 194 | 9 |
| Shared Lane Traffic (%) | | | | | | |
| Lane Group Flow (vph) | 18 | 293 | 34 | 938 | 203 | 0 |
| Enter Blocked Intersection | No | No | No | No | No | No |
| Lane Alignment | Left | Right | Left | Left | Left | Right |
| Median Width(m) | 3.5 | | | 3.5 | 3.5 | |
| Link Offset(m) | 0.0 | | | 0.0 | 0.0 | |
| Crosswalk Width(m) | 4.8 | | | 4.8 | 4.8 | |
| Two way Left Turn Lane | | | | | | |
| Headway Factor | 1.09 | 1.12 | 1.09 | 1.09 | 1.09 | 1.09 |
| Turning Speed (k/h) | 25 | 15 | 25 | | | 15 |
| Number of Detectors | 1 | 1 | 1 | 2 | 2 | |
| Detector Template | Left | Right | Left | Thru | Thru | |
| Leading Detector (m) | 2.0 | 2.0 | 2.0 | 10.0 | 10.0 | |
| Trailing Detector (m) | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | |
| Detector 1 Position(m) | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | |
| Detector 1 Size(m) | 2.0 | 2.0 | 2.0 | 0.6 | 0.6 | |
| Detector 1 Type | Cl+Ex | Cl+Ex | Cl+Ex | Cl+Ex | Cl+Ex | |
| Detector 1 Channel | | | | | | |
| Detector 1 Extend (s) | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | |
| Detector 1 Queue (s) | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | |
| Detector 1 Delay (s) | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | |
| Detector 2 Position(m) | | | | 9.4 | 9.4 | |
| Detector 2 Size(m) | | | | 0.6 | 0.6 | |
| Detector 2 Type | | | | Cl+Ex | Cl+Ex | |
| Detector 2 Channel | | | | | | |
| Detector 2 Extend (s) | | | | 0.0 | 0.0 | |
| Turn Type | Prot | Perm | pm+pt | NA | NA | |

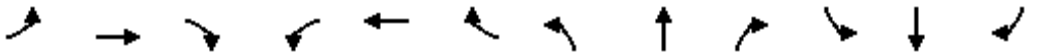


| Lane Group | EBL | EBR | NBL | NBT | SBT | SBR |
|---|---|---|---|---|---|---|
| Protected Phases | 4 | | 5 | 2 | 6 | |
| Permitted Phases | | 4 | 2 | | | |
| Detector Phase | 4 | 4 | 5 | 2 | 6 | |
| Switch Phase | | | | | | |
| Minimum Initial (s) | 7.0 | 7.0 | 7.0 | 35.0 | 35.0 | |
| Minimum Split (s) | 17.8 | 17.8 | 13.0 | 41.6 | 41.6 | |
| Total Split (s) | 20.0 | 20.0 | 13.0 | 80.0 | 67.0 | |
| Total Split (%) | 20.0% | 20.0% | 13.0% | 80.0% | 67.0% | |
| Maximum Green (s) | 13.2 | 13.2 | 7.0 | 73.4 | 60.4 | |
| Yellow Time (s) | 3.0 | 3.0 | 4.6 | 4.6 | 4.6 | |
| All-Red Time (s) | 3.8 | 3.8 | 1.4 | 2.0 | 2.0 | |
| Lost Time Adjust (s) | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | |
| Total Lost Time (s) | 6.8 | 6.8 | 6.0 | 6.6 | 6.6 | |
| Lead/Lag | | | Lead | | Lag | |
| Lead-Lag Optimize? | | | Yes | | Yes | |
| Vehicle Extension (s) | 3.0 | 3.0 | 3.0 | 3.0 | 3.0 | |
| Recall Mode | None | None | None | Min | Min | |
| Walk Time (s) | 5.0 | 5.0 | | 0.0 | 7.0 | |
| Flash Dont Walk (s) | 6.0 | 6.0 | | 0.0 | 21.0 | |
| Pedestrian Calls (#/hr) | 0 | 0 | | 0 | 0 | |
| Act Effct Green (s) | 8.5 | 8.5 | 44.2 | 43.6 | 39.3 | |
| Actuated g/C Ratio | 0.13 | 0.13 | 0.67 | 0.66 | 0.59 | |
| v/c Ratio | 0.11 | 0.67 | 0.06 | 0.82 | 0.21 | |
| Control Delay | 32.1 | 13.2 | 3.9 | 15.1 | 8.2 | |
| Queue Delay | 0.0 | 0.0 | 0.0 | 0.6 | 0.0 | |
| Total Delay | 32.1 | 13.2 | 3.9 | 15.7 | 8.2 | |
| LOS | C | B | A | B | A | |
| Approach Delay | 14.3 | | | 15.3 | 8.2 | |
| Approach LOS | B | | | B | A | |
| Queue Length 50th (m) | 1.7 | 0.0 | 1.1 | 65.1 | 7.3 | |
| Queue Length 95th (m) | 9.5 | 24.7 | 4.0 | 145.1 | 28.7 | |
| Internal Link Dist (m) | 130.2 | | | 219.1 | 521.7 | |
| Turn Bay Length (m) | | 25.0 | 50.0 | | | |
| Base Capacity (vph) | 269 | 522 | 557 | 1669 | 1435 | |
| Starvation Cap Reductn | 0 | 0 | 0 | 360 | 0 | |
| Spillback Cap Reductn | 0 | 0 | 0 | 0 | 0 | |
| Storage Cap Reductn | 0 | 0 | 0 | 0 | 0 | |
| Reduced v/c Ratio | 0.07 | 0.56 | 0.06 | 0.72 | 0.14 | |

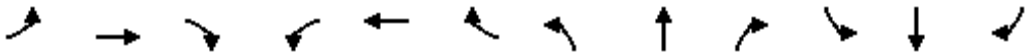
| Intersection Summary | | | |
|---|---|---|---|
| Area Type: | Other | | |
| Cycle Length: 100 | | | |
| Actuated Cycle Length: 66.1 | | | |
| Natural Cycle: 75 | | | |
| Control Type: Semi Act-Uncoord | | | |
| Maximum v/c Ratio: 0.82 | | | |
| Intersection Signal Delay: 14.1 | | Intersection LOS: B | |
| Intersection Capacity Utilization 69.1% | | ICU Level of Service C | |
| Analysis Period (min) 15 | | | |

Splits and Phases: 2: Boundary Road & Hwy 417 EB Ramp Terminal





| Lane Group | EBL | EBT | EBR | WBL | WBT | WBR | NBL | NBT | NBR | SBL | SBT | SBR |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Lane Configurations | | | | | | | | | | | | |
| Traffic Volume (vph) | 34 | 17 | 4 | 3 | 6 | 25 | 6 | 912 | 30 | 193 | 239 | 55 |
| Future Volume (vph) | 34 | 17 | 4 | 3 | 6 | 25 | 6 | 912 | 30 | 193 | 239 | 55 |
| Ideal Flow (vphpl) | 1800 | 1800 | 1800 | 1800 | 1800 | 1800 | 1800 | 1800 | 1800 | 1800 | 1800 | 1800 |
| Lane Width (m) | 3.5 | 3.5 | 3.5 | 3.5 | 3.5 | 3.5 | 3.3 | 3.5 | 3.3 | 3.3 | 3.5 | 3.5 |
| Storage Length (m) | 0.0 | | 0.0 | 0.0 | | 0.0 | 35.0 | | 7.5 | 100.0 | | 0.0 |
| Storage Lanes | 0 | | 0 | 0 | | 1 | 1 | | 1 | 1 | | 0 |
| Taper Length (m) | 7.5 | | | 7.5 | | | 45.0 | | | 75.0 | | |
| Lane Util. Factor | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| Frt | | 0.990 | | | | 0.850 | | | 0.850 | | 0.972 | |
| Flt Protected | | 0.970 | | | 0.984 | | 0.950 | | | 0.950 | | |
| Satd. Flow (prot) | 0 | 1620 | 0 | 0 | 1752 | 1513 | 1378 | 1728 | 1479 | 1653 | 1522 | 0 |
| Flt Permitted | | 0.806 | | | 0.872 | | 0.580 | | | 0.128 | | |
| Satd. Flow (perm) | 0 | 1346 | 0 | 0 | 1552 | 1513 | 841 | 1728 | 1479 | 223 | 1522 | 0 |
| Right Turn on Red | | | Yes | | | Yes | | | Yes | | | Yes |
| Satd. Flow (RTOR) | | 3 | | | | 100 | | | 96 | | 27 | |
| Link Speed (k/h) | | 60 | | | 20 | | | 80 | | | 80 | |
| Link Distance (m) | | 642.8 | | | 170.6 | | | 174.7 | | | 243.1 | |
| Travel Time (s) | | 38.6 | | | 30.7 | | | 7.9 | | | 10.9 | |
| Peak Hour Factor | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| Heavy Vehicles (%) | 6% | 0% | 25% | 0% | 0% | 0% | 20% | 3% | 0% | 0% | 15% | 8% |
| Adj. Flow (vph) | 34 | 17 | 4 | 3 | 6 | 25 | 6 | 912 | 30 | 193 | 239 | 55 |
| Shared Lane Traffic (%) | | | | | | | | | | | | |
| Lane Group Flow (vph) | 0 | 55 | 0 | 0 | 9 | 25 | 6 | 912 | 30 | 193 | 294 | 0 |
| Enter Blocked Intersection | No | No | No | No | No | No | No | No | No | No | No | No |
| Lane Alignment | Left | Left | Right | Left | Left | Right | Left | Left | Right | Left | Left | Right |
| Median Width(m) | | 0.0 | | | 0.0 | | | 3.5 | | | 3.5 | |
| Link Offset(m) | | 0.0 | | | 0.0 | | | 0.0 | | | 0.0 | |
| Crosswalk Width(m) | | 4.8 | | | 4.8 | | | 4.8 | | | 4.8 | |
| Two way Left Turn Lane | | | | | | | | | | | | |
| Headway Factor | 1.09 | 1.09 | 1.09 | 1.09 | 1.09 | 1.09 | 1.12 | 1.09 | 1.12 | 1.12 | 1.09 | 1.09 |
| Turning Speed (k/h) | 25 | | 15 | 25 | | 15 | 25 | | 15 | 25 | | 15 |
| Number of Detectors | 1 | 2 | | 1 | 2 | 1 | 1 | 2 | 1 | 1 | 2 | |
| Detector Template | Left | Thru | | Left | Thru | Right | Left | Thru | Right | Left | Thru | |
| Leading Detector (m) | 2.0 | 10.0 | | 2.0 | 10.0 | 2.0 | 2.0 | 10.0 | 2.0 | 2.0 | 10.0 | |
| Trailing Detector (m) | 0.0 | 0.0 | | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | |
| Detector 1 Position(m) | 0.0 | 0.0 | | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | |
| Detector 1 Size(m) | 2.0 | 0.6 | | 2.0 | 0.6 | 2.0 | 2.0 | 0.6 | 2.0 | 2.0 | 0.6 | |
| Detector 1 Type | Cl+Ex | Cl+Ex | | Cl+Ex | Cl+Ex | Cl+Ex | Cl+Ex | Cl+Ex | Cl+Ex | Cl+Ex | Cl+Ex | |
| Detector 1 Channel | | | | | | | | | | | | |
| Detector 1 Extend (s) | 0.0 | 0.0 | | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | |
| Detector 1 Queue (s) | 0.0 | 0.0 | | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | |
| Detector 1 Delay (s) | 0.0 | 0.0 | | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | |
| Detector 2 Position(m) | | 9.4 | | | 9.4 | | | 9.4 | | | 9.4 | |
| Detector 2 Size(m) | | 0.6 | | | 0.6 | | | 0.6 | | | 0.6 | |
| Detector 2 Type | | Cl+Ex | | | Cl+Ex | | | Cl+Ex | | | Cl+Ex | |
| Detector 2 Channel | | | | | | | | | | | | |
| Detector 2 Extend (s) | | 0.0 | | | 0.0 | | | 0.0 | | | 0.0 | |
| Turn Type | Perm | NA | | Perm | NA | Perm | Perm | NA | Perm | pm+pt | NA | |

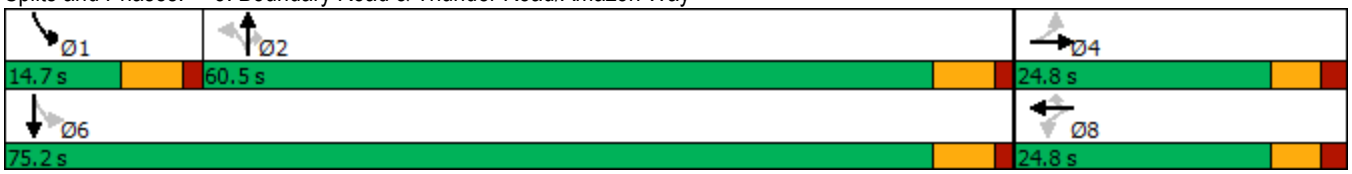


| Lane Group | EBL | EBT | EBR | WBL | WBT | WBR | NBL | NBT | NBR | SBL | SBT | SBR |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Protected Phases | | 4 | | | 8 | | | 2 | | 1 | 6 | |
| Permitted Phases | 4 | | | 8 | | 8 | 2 | | 2 | 6 | | |
| Detector Phase | 4 | 4 | | 8 | 8 | 8 | 2 | 2 | 2 | 1 | 6 | |
| Switch Phase | | | | | | | | | | | | |
| Minimum Initial (s) | 7.0 | 7.0 | | 7.0 | 7.0 | 7.0 | 20.0 | 20.0 | 20.0 | 7.0 | 20.0 | |
| Minimum Split (s) | 24.8 | 24.8 | | 24.8 | 24.8 | 24.8 | 26.2 | 26.2 | 26.2 | 13.0 | 26.2 | |
| Total Split (s) | 24.8 | 24.8 | | 24.8 | 24.8 | 24.8 | 60.5 | 60.5 | 60.5 | 14.7 | 75.2 | |
| Total Split (%) | 24.8% | 24.8% | | 24.8% | 24.8% | 24.8% | 60.5% | 60.5% | 60.5% | 14.7% | 75.2% | |
| Maximum Green (s) | 19.0 | 19.0 | | 19.0 | 19.0 | 19.0 | 54.3 | 54.3 | 54.3 | 8.7 | 69.0 | |
| Yellow Time (s) | 3.7 | 3.7 | | 3.7 | 3.7 | 3.7 | 4.6 | 4.6 | 4.6 | 4.6 | 4.6 | |
| All-Red Time (s) | 2.1 | 2.1 | | 2.1 | 2.1 | 2.1 | 1.6 | 1.6 | 1.6 | 1.4 | 1.6 | |
| Lost Time Adjust (s) | | 0.0 | | | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | |
| Total Lost Time (s) | | 5.8 | | | 5.8 | 5.8 | 6.2 | 6.2 | 6.2 | 6.0 | 6.2 | |
| Lead/Lag | | | | | | | Lag | Lag | Lag | Lead | | |
| Lead-Lag Optimize? | | | | | | | Yes | Yes | Yes | Yes | | |
| Vehicle Extension (s) | 3.0 | 3.0 | | 3.0 | 3.0 | 3.0 | 3.0 | 3.0 | 3.0 | 3.0 | 3.0 | |
| Recall Mode | None | None | | None | None | None | Min | Min | Min | None | Min | |
| Walk Time (s) | 7.0 | 7.0 | | 7.0 | 7.0 | 7.0 | 7.0 | 7.0 | 7.0 | | 7.0 | |
| Flash Dont Walk (s) | 12.0 | 12.0 | | 12.0 | 12.0 | 12.0 | 10.0 | 10.0 | 10.0 | | 10.0 | |
| Pedestrian Calls (#/hr) | 0 | 0 | | 0 | 0 | 0 | 0 | 0 | 0 | | 0 | |
| Act Effct Green (s) | | 9.2 | | | 9.2 | 9.2 | 50.5 | 50.5 | 50.5 | 65.7 | 67.3 | |
| Actuated g/C Ratio | | 0.11 | | | 0.11 | 0.11 | 0.61 | 0.61 | 0.61 | 0.79 | 0.81 | |
| v/c Ratio | | 0.36 | | | 0.05 | 0.10 | 0.01 | 0.87 | 0.03 | 0.59 | 0.24 | |
| Control Delay | | 43.0 | | | 36.7 | 0.8 | 8.0 | 26.3 | 0.1 | 14.9 | 3.4 | |
| Queue Delay | | 0.0 | | | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | |
| Total Delay | | 43.0 | | | 36.7 | 0.8 | 8.0 | 26.3 | 0.1 | 14.9 | 3.4 | |
| LOS | | D | | | D | A | A | C | A | B | A | |
| Approach Delay | | 43.0 | | | 10.3 | | | 25.4 | | | 8.0 | |
| Approach LOS | | D | | | B | | | C | | | A | |
| Queue Length 50th (m) | | 9.0 | | | 1.5 | 0.0 | 0.4 | 126.4 | 0.0 | 7.1 | 10.6 | |
| Queue Length 95th (m) | | 21.0 | | | 6.2 | 0.0 | 2.1 | #237.8 | 0.0 | #29.3 | 22.1 | |
| Internal Link Dist (m) | | 618.8 | | | 146.6 | | | 150.7 | | | 219.1 | |
| Turn Bay Length (m) | | | | | | | 35.0 | | 7.5 | 100.0 | | |
| Base Capacity (vph) | | 321 | | | 368 | 435 | 569 | 1171 | 1033 | 330 | 1240 | |
| Starvation Cap Reductn | | 0 | | | 0 | 0 | 0 | 0 | 0 | 0 | 0 | |
| Spillback Cap Reductn | | 0 | | | 0 | 0 | 0 | 0 | 0 | 0 | 0 | |
| Storage Cap Reductn | | 0 | | | 0 | 0 | 0 | 0 | 0 | 0 | 0 | |
| Reduced v/c Ratio | | 0.17 | | | 0.02 | 0.06 | 0.01 | 0.78 | 0.03 | 0.58 | 0.24 | |

| Intersection Summary | | | |
|---|---|---|---|
| Area Type: | Other | | |
| Cycle Length: 100 | | | |
| Actuated Cycle Length: 83.3 | | | |
| Natural Cycle: 90 | | | |
| Control Type: Semi Act-Uncoord | | | |
| Maximum v/c Ratio: 0.87 | | | |
| Intersection Signal Delay: 20.1 | | Intersection LOS: C | |
| Intersection Capacity Utilization 86.8% | | ICU Level of Service E | |
| Analysis Period (min) 15 | | | |

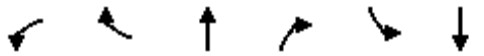
# 95th percentile volume exceeds capacity, queue may be longer.
Queue shown is maximum after two cycles.

Splits and Phases: 3: Boundary Road & Thunder Road/Amazon Way



| Lane Group | WBL | WBR | NBT | NBR | SBL | SBT |
|---|---|---|---|---|---|---|
| Lane Configurations | | | | | | |
| Traffic Volume (vph) | 6 | 3 | 944 | 6 | 1 | 245 |
| Future Volume (vph) | 6 | 3 | 944 | 6 | 1 | 245 |
| Ideal Flow (vphpl) | 1800 | 1800 | 1800 | 1800 | 1800 | 1800 |
| Lane Width (m) | 3.6 | 3.6 | 3.5 | 3.5 | 3.5 | 3.5 |
| Storage Length (m) | 0.0 | 0.0 | | 0.0 | 70.0 | |
| Storage Lanes | 1 | 0 | | 0 | 1 | |
| Taper Length (m) | 7.5 | | | | 45.0 | |
| Lane Util. Factor | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| Frt | 0.955 | | 0.999 | | | |
| Flt Protected | 0.968 | | | | 0.950 | |
| Satd. Flow (prot) | 832 | 0 | 1750 | 0 | 846 | 1589 |
| Flt Permitted | 0.968 | | | | 0.950 | |
| Satd. Flow (perm) | 832 | 0 | 1750 | 0 | 846 | 1589 |
| Link Speed (k/h) | 20 | | 80 | | | 80 |
| Link Distance (m) | 151.5 | | 1150.2 | | | 174.7 |
| Travel Time (s) | 27.3 | | 51.8 | | | 7.9 |
| Peak Hour Factor | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| Heavy Vehicles (%) | 100% | 100% | 1% | 100% | 100% | 12% |
| Adj. Flow (vph) | 6 | 3 | 944 | 6 | 1 | 245 |
| Shared Lane Traffic (%) | | | | | | |
| Lane Group Flow (vph) | 9 | 0 | 950 | 0 | 1 | 245 |
| Enter Blocked Intersection | No | No | No | No | No | No |
| Lane Alignment | Left | Right | Left | Right | Left | Left |
| Median Width(m) | 3.6 | | 3.5 | | | 3.5 |
| Link Offset(m) | 0.0 | | 0.0 | | | 0.0 |
| Crosswalk Width(m) | 4.8 | | 4.8 | | | 4.8 |
| Two way Left Turn Lane | | | | | | |
| Headway Factor | 1.07 | 1.07 | 1.09 | 1.09 | 1.09 | 1.09 |
| Turning Speed (k/h) | 25 | 15 | | 15 | 25 | |
| Sign Control | Stop | | Free | | | Free |

| Intersection Summary | | | |
|---|---|---|---|
| Area Type: | Other | | |
| Control Type: Unsignalized | | | |
| Intersection Capacity Utilization 62.8% | | ICU Level of Service B | |
| Analysis Period (min) 15 | | | |



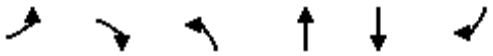
| Movement | WBL | WBR | NBT | NBR | SBL | SBT |
|---|---|---|---|---|---|---|
| Lane Configurations | | | | | | |
| Traffic Volume (veh/h) | 6 | 3 | 944 | 6 | 1 | 245 |
| Future Volume (Veh/h) | 6 | 3 | 944 | 6 | 1 | 245 |
| Sign Control | Stop | | Free | | | Free |
| Grade | 0% | | 0% | | | 0% |
| Peak Hour Factor | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| Hourly flow rate (vph) | 6 | 3 | 944 | 6 | 1 | 245 |
| Pedestrians | | | | | | |
| Lane Width (m) | | | | | | |
| Walking Speed (m/s) | | | | | | |
| Percent Blockage | | | | | | |
| Right turn flare (veh) | | | | | | |
| Median type | | | None | | | None |
| Median storage veh) | | | | | | |
| Upstream signal (m) | | | | | | 175 |
| pX, platoon unblocked | 1.00 | | | | | |
| vC, conflicting volume | 1194 | 947 | | | 950 | |
| vC1, stage 1 conf vol | | | | | | |
| vC2, stage 2 conf vol | | | | | | |
| vCu, unblocked vol | 1194 | 947 | | | 950 | |
| tC, single (s) | 7.4 | 7.2 | | | 5.1 | |
| tC, 2 stage (s) | | | | | | |
| tF (s) | 4.4 | 4.2 | | | 3.1 | |
| p0 queue free % | 95 | 99 | | | 100 | |
| cM capacity (veh/h) | 133 | 213 | | | 443 | |

| Direction, Lane # | WB 1 | NB 1 | SB 1 | SB 2 |
|---|---|---|---|---|
| Volume Total | 9 | 950 | 1 | 245 |
| Volume Left | 6 | 0 | 1 | 0 |
| Volume Right | 3 | 6 | 0 | 0 |
| cSH | 152 | 1700 | 443 | 1700 |
| Volume to Capacity | 0.06 | 0.56 | 0.00 | 0.14 |
| Queue Length 95th (m) | 1.5 | 0.0 | 0.1 | 0.0 |
| Control Delay (s) | 30.1 | 0.0 | 13.2 | 0.0 |
| Lane LOS | D | | B | |
| Approach Delay (s) | 30.1 | 0.0 | 0.1 | |
| Approach LOS | D | | | |

| Intersection Summary | | | |
|---|---|---|---|
| Average Delay | 0.2 | | |
| Intersection Capacity Utilization | 62.8% | ICU Level of Service | B |
| Analysis Period (min) | 15 | | |

| Lane Group | EBL | EBR | NBL | NBT | SBT | SBR |
|---|---|---|---|---|---|---|
| Lane Configurations | | | | | | |
| Traffic Volume (vph) | 78 | 30 | 134 | 858 | 122 | 107 |
| Future Volume (vph) | 78 | 30 | 134 | 858 | 122 | 107 |
| Ideal Flow (vphpl) | 1800 | 1800 | 1800 | 1800 | 1800 | 1800 |
| Lane Width (m) | 3.3 | 3.3 | 3.5 | 3.5 | 3.5 | 3.5 |
| Storage Length (m) | 25.0 | 0.0 | 0.0 | | | 30.0 |
| Storage Lanes | 1 | 1 | 0 | | | 1 |
| Taper Length (m) | 47.5 | | 7.5 | | | |
| Lane Util. Factor | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| Frt | | 0.850 | | | | 0.850 |
| Flt Protected | 0.950 | | | 0.993 | | |
| Satd. Flow (prot) | 1476 | 1286 | 0 | 1734 | 1561 | 1293 |
| Flt Permitted | 0.950 | | | 0.993 | | |
| Satd. Flow (perm) | 1476 | 1286 | 0 | 1734 | 1561 | 1293 |
| Link Speed (k/h) | 80 | | | 80 | 80 | |
| Link Distance (m) | 180.5 | | | 135.8 | 1150.2 | |
| Travel Time (s) | 8.1 | | | 6.1 | 51.8 | |
| Peak Hour Factor | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| Heavy Vehicles (%) | 12% | 15% | 8% | 1% | 14% | 17% |
| Adj. Flow (vph) | 78 | 30 | 134 | 858 | 122 | 107 |
| Shared Lane Traffic (%) | | | | | | |
| Lane Group Flow (vph) | 78 | 30 | 0 | 992 | 122 | 107 |
| Enter Blocked Intersection | No | No | No | No | No | No |
| Lane Alignment | Left | Right | Left | Left | Left | Right |
| Median Width(m) | 3.3 | | | 0.0 | 0.0 | |
| Link Offset(m) | 0.0 | | | 0.0 | 0.0 | |
| Crosswalk Width(m) | 4.8 | | | 4.8 | 4.8 | |
| Two way Left Turn Lane | | | | | | |
| Headway Factor | 1.12 | 1.12 | 1.09 | 1.09 | 1.09 | 1.09 |
| Turning Speed (k/h) | 25 | 15 | 25 | | | 15 |
| Sign Control | Stop | | | Free | Free | |

| Intersection Summary | | | |
|---|---|---|---|
| Area Type: | Other | | |
| Control Type: Unsignalized | | | |
| Intersection Capacity Utilization 76.8% | | ICU Level of Service D | |
| Analysis Period (min) 15 | | | |



| Movement | EBL | EBR | NBL | NBT | SBT | SBR |
|---|---|---|---|---|---|---|
| Lane Configurations | | | | | | |
| Traffic Volume (veh/h) | 78 | 30 | 134 | 858 | 122 | 107 |
| Future Volume (Veh/h) | 78 | 30 | 134 | 858 | 122 | 107 |
| Sign Control | Stop | | | Free | Free | |
| Grade | 0% | | | 0% | 0% | |
| Peak Hour Factor | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| Hourly flow rate (vph) | 78 | 30 | 134 | 858 | 122 | 107 |
| 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 | 1248 | 122 | 229 | | | |
| vC1, stage 1 conf vol | | | | | | |
| vC2, stage 2 conf vol | | | | | | |
| vCu, unblocked vol | 1248 | 122 | 229 | | | |
| tC, single (s) | 6.5 | 6.4 | 4.2 | | | |
| tC, 2 stage (s) | | | | | | |
| tF (s) | 3.6 | 3.4 | 2.3 | | | |
| p0 queue free % | 52 | 97 | 90 | | | |
| cM capacity (veh/h) | 164 | 895 | 1304 | | | |

| Direction, Lane # | EB 1 | EB 2 | NB 1 | SB 1 | SB 2 |
|---|---|---|---|---|---|
| Volume Total | 78 | 30 | 992 | 122 | 107 |
| Volume Left | 78 | 0 | 134 | 0 | 0 |
| Volume Right | 0 | 30 | 0 | 0 | 107 |
| cSH | 164 | 895 | 1304 | 1700 | 1700 |
| Volume to Capacity | 0.48 | 0.03 | 0.10 | 0.07 | 0.06 |
| Queue Length 95th (m) | 18.0 | 0.8 | 2.7 | 0.0 | 0.0 |
| Control Delay (s) | 45.6 | 9.2 | 2.5 | 0.0 | 0.0 |
| Lane LOS | E | A | A | | |
| Approach Delay (s) | 35.4 | | 2.5 | 0.0 | |
| Approach LOS | E | | | | |

| Intersection Summary | | | | |
|---|---|---|---|---|
| Average Delay | 4.8 | | | |
| Intersection Capacity Utilization | 76.8% | ICU Level of Service | D | |
| Analysis Period (min) | 15 | | | |

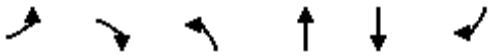
| Lane Group | WBL | WBR | NBT | NBR | SBL | SBT |
|---|---|---|---|---|---|---|
| Lane Configurations | | | | | | |
| Traffic Volume (vph) | 48 | 1 | 145 | 283 | 24 | 120 |
| Future Volume (vph) | 48 | 1 | 145 | 283 | 24 | 120 |
| Ideal Flow (vphpl) | 1800 | 1800 | 1800 | 1800 | 1800 | 1800 |
| Lane Width (m) | 4.5 | 4.5 | 3.5 | 3.5 | 3.5 | 3.5 |
| Storage Length (m) | 0.0 | 10.0 | | 0.0 | 0.0 | |
| Storage Lanes | 1 | 0 | | 0 | 0 | |
| Taper Length (m) | 7.5 | | | | 7.5 | |
| Lane Util. Factor | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| Frt | 0.997 | | 0.911 | | | |
| Flt Protected | 0.953 | | | | | 0.992 |
| Satd. Flow (prot) | 1586 | 0 | 1559 | 0 | 0 | 1630 |
| Flt Permitted | 0.953 | | | | | 0.992 |
| Satd. Flow (perm) | 1586 | 0 | 1559 | 0 | 0 | 1630 |
| Link Speed (k/h) | 40 | | 80 | | | 80 |
| Link Distance (m) | 155.0 | | 545.7 | | | 134.1 |
| Travel Time (s) | 14.0 | | 24.6 | | | 6.0 |
| Peak Hour Factor | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| Heavy Vehicles (%) | 19% | 0% | 6% | 3% | 5% | 9% |
| Adj. Flow (vph) | 48 | 1 | 145 | 283 | 24 | 120 |
| Shared Lane Traffic (%) | | | | | | |
| Lane Group Flow (vph) | 49 | 0 | 428 | 0 | 0 | 144 |
| Enter Blocked Intersection | No | No | No | No | No | No |
| Lane Alignment | Left | Right | Left | Right | Left | Left |
| Median Width(m) | 4.5 | | 0.0 | | | 0.0 |
| Link Offset(m) | 0.0 | | 0.0 | | | 0.0 |
| Crosswalk Width(m) | 4.8 | | 4.8 | | | 4.8 |
| Two way Left Turn Lane | | | | | | |
| Headway Factor | 0.95 | 0.95 | 1.09 | 1.09 | 1.09 | 1.09 |
| Turning Speed (k/h) | 25 | 15 | | 15 | 25 | |
| Sign Control | Stop | | Free | | | Free |

| Intersection Summary | | | |
|---|---|---|---|
| Area Type: | Other | | |
| Control Type: Unsignalized | | | |
| Intersection Capacity Utilization 38.3% | | ICU Level of Service A | |
| Analysis Period (min) 15 | | | |

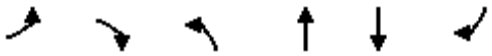
| Movement | WBL | WBR | NBT | NBR | SBL | SBT |
|---|---|---|---|---|---|---|
| Lane Configurations | | | | | | |
| Traffic Volume (veh/h) | 48 | 1 | 145 | 283 | 24 | 120 |
| Future Volume (Veh/h) | 48 | 1 | 145 | 283 | 24 | 120 |
| Sign Control | Stop | | Free | | | Free |
| Grade | 0% | | 0% | | | 0% |
| Peak Hour Factor | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| Hourly flow rate (vph) | 48 | 1 | 145 | 283 | 24 | 120 |
| 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 | 454 | 286 | | | 428 | |
| vC1, stage 1 conf vol | | | | | | |
| vC2, stage 2 conf vol | | | | | | |
| vCu, unblocked vol | 454 | 286 | | | 428 | |
| tC, single (s) | 6.6 | 6.2 | | | 4.1 | |
| tC, 2 stage (s) | | | | | | |
| tF (s) | 3.7 | 3.3 | | | 2.2 | |
| p0 queue free % | 91 | 100 | | | 98 | |
| cM capacity (veh/h) | 522 | 757 | | | 1116 | |

| Direction, Lane # | WB 1 | NB 1 | SB 1 |
|---|---|---|---|
| Volume Total | 49 | 428 | 144 |
| Volume Left | 48 | 0 | 24 |
| Volume Right | 1 | 283 | 0 |
| cSH | 525 | 1700 | 1116 |
| Volume to Capacity | 0.09 | 0.25 | 0.02 |
| Queue Length 95th (m) | 2.5 | 0.0 | 0.5 |
| Control Delay (s) | 12.6 | 0.0 | 1.5 |
| Lane LOS | B | | A |
| Approach Delay (s) | 12.6 | 0.0 | 1.5 |
| Approach LOS | B | | |

| Intersection Summary | | | |
|---|---|---|---|
| Average Delay | 1.3 | | |
| Intersection Capacity Utilization | 38.3% | ICU Level of Service | A |
| Analysis Period (min) | 15 | | |



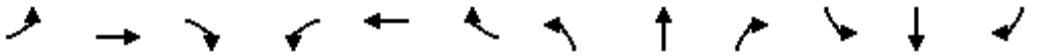
| Lane Group | EBL | EBR | NBL | NBT | SBT | SBR |
|---|---|---|---|---|---|---|
| Lane Configurations | | | | | | |
| Traffic Volume (vph) | 77 | 733 | 149 | 253 | 211 | 17 |
| Future Volume (vph) | 77 | 733 | 149 | 253 | 211 | 17 |
| Ideal Flow (vphpl) | 1800 | 1800 | 1800 | 1800 | 1800 | 1800 |
| Lane Width (m) | 3.5 | 3.3 | 3.5 | 3.5 | 3.5 | 3.5 |
| Storage Length (m) | 0.0 | 25.0 | 50.0 | | | 0.0 |
| Storage Lanes | 1 | 1 | 1 | | | 0 |
| Taper Length (m) | 7.5 | | 75.0 | | | |
| Lane Util. Factor | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| Frt | | 0.850 | | | 0.990 | |
| Flt Protected | 0.950 | | 0.950 | | | |
| Satd. Flow (prot) | 1551 | 1436 | 1537 | 1664 | 1592 | 0 |
| Flt Permitted | 0.950 | | 0.528 | | | |
| Satd. Flow (perm) | 1551 | 1436 | 854 | 1664 | 1592 | 0 |
| Right Turn on Red | | Yes | | | | Yes |
| Satd. Flow (RTOR) | | 610 | | | 5 | |
| Link Speed (k/h) | 40 | | | 80 | 80 | |
| Link Distance (m) | 154.2 | | | 243.1 | 545.7 | |
| Travel Time (s) | 13.9 | | | 10.9 | 24.6 | |
| Peak Hour Factor | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| Heavy Vehicles (%) | 9% | 3% | 10% | 7% | 11% | 7% |
| Adj. Flow (vph) | 77 | 733 | 149 | 253 | 211 | 17 |
| Shared Lane Traffic (%) | | | | | | |
| Lane Group Flow (vph) | 77 | 733 | 149 | 253 | 228 | 0 |
| Enter Blocked Intersection | No | No | No | No | No | No |
| Lane Alignment | Left | Right | Left | Left | Left | Right |
| Median Width(m) | 3.5 | | | 3.5 | 3.5 | |
| Link Offset(m) | 0.0 | | | 0.0 | 0.0 | |
| Crosswalk Width(m) | 4.8 | | | 4.8 | 4.8 | |
| Two way Left Turn Lane | | | | | | |
| Headway Factor | 1.09 | 1.12 | 1.09 | 1.09 | 1.09 | 1.09 |
| Turning Speed (k/h) | 25 | 15 | 25 | | | 15 |
| Number of Detectors | 1 | 1 | 1 | 2 | 2 | |
| Detector Template | Left | Right | Left | Thru | Thru | |
| Leading Detector (m) | 2.0 | 2.0 | 2.0 | 10.0 | 10.0 | |
| Trailing Detector (m) | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | |
| Detector 1 Position(m) | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | |
| Detector 1 Size(m) | 2.0 | 2.0 | 2.0 | 0.6 | 0.6 | |
| Detector 1 Type | Cl+Ex | Cl+Ex | Cl+Ex | Cl+Ex | Cl+Ex | |
| Detector 1 Channel | | | | | | |
| Detector 1 Extend (s) | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | |
| Detector 1 Queue (s) | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | |
| Detector 1 Delay (s) | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | |
| Detector 2 Position(m) | | | | 9.4 | 9.4 | |
| Detector 2 Size(m) | | | | 0.6 | 0.6 | |
| Detector 2 Type | | | | Cl+Ex | Cl+Ex | |
| Detector 2 Channel | | | | | | |
| Detector 2 Extend (s) | | | | 0.0 | 0.0 | |
| Turn Type | Prot | Perm | pm+pt | NA | NA | |



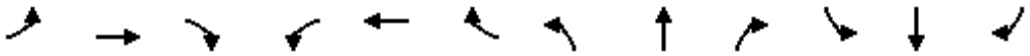
| Lane Group | EBL | EBR | NBL | NBT | SBT | SBR |
|---|---|---|---|---|---|---|
| Protected Phases | 4 | | 5 | 2 | 6 | |
| Permitted Phases | | 4 | 2 | | | |
| Detector Phase | 4 | 4 | 5 | 2 | 6 | |
| Switch Phase | | | | | | |
| Minimum Initial (s) | 7.0 | 7.0 | 7.0 | 35.0 | 35.0 | |
| Minimum Split (s) | 23.0 | 23.0 | 13.0 | 41.6 | 41.6 | |
| Total Split (s) | 44.0 | 44.0 | 13.0 | 56.0 | 43.0 | |
| Total Split (%) | 44.0% | 44.0% | 13.0% | 56.0% | 43.0% | |
| Maximum Green (s) | 37.2 | 37.2 | 7.0 | 49.4 | 36.4 | |
| Yellow Time (s) | 3.0 | 3.0 | 4.6 | 4.6 | 4.6 | |
| All-Red Time (s) | 3.8 | 3.8 | 1.4 | 2.0 | 2.0 | |
| Lost Time Adjust (s) | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | |
| Total Lost Time (s) | 6.8 | 6.8 | 6.0 | 6.6 | 6.6 | |
| Lead/Lag | | | Lead | | Lag | |
| Lead-Lag Optimize? | | | Yes | | Yes | |
| Vehicle Extension (s) | 3.0 | 3.0 | 3.0 | 3.0 | 3.0 | |
| Recall Mode | None | None | None | Min | Min | |
| Walk Time (s) | 7.0 | 7.0 | | 0.0 | 7.0 | |
| Flash Dont Walk (s) | 5.0 | 5.0 | | 0.0 | 21.0 | |
| Pedestrian Calls (#/hr) | 0 | 0 | | 0 | 0 | |
| Act Effct Green (s) | 19.0 | 19.0 | 49.6 | 49.0 | 35.7 | |
| Actuated g/C Ratio | 0.23 | 0.23 | 0.61 | 0.60 | 0.44 | |
| v/c Ratio | 0.21 | 0.91 | 0.26 | 0.25 | 0.33 | |
| Control Delay | 24.3 | 22.5 | 11.2 | 11.2 | 19.3 | |
| Queue Delay | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | |
| Total Delay | 24.3 | 22.5 | 11.2 | 11.2 | 19.3 | |
| LOS | C | C | B | B | B | |
| Approach Delay | 22.7 | | | 11.2 | 19.3 | |
| Approach LOS | C | | | B | B | |
| Queue Length 50th (m) | 10.0 | 16.6 | 9.3 | 17.2 | 22.4 | |
| Queue Length 95th (m) | 20.2 | 75.0 | 28.2 | 47.2 | 54.5 | |
| Internal Link Dist (m) | 130.2 | | | 219.1 | 521.7 | |
| Turn Bay Length (m) | | 25.0 | 50.0 | | | |
| Base Capacity (vph) | 721 | 994 | 578 | 1027 | 726 | |
| Starvation Cap Reductn | 0 | 0 | 0 | 0 | 0 | |
| Spillback Cap Reductn | 0 | 0 | 0 | 0 | 0 | |
| Storage Cap Reductn | 0 | 0 | 0 | 0 | 0 | |
| Reduced v/c Ratio | 0.11 | 0.74 | 0.26 | 0.25 | 0.31 | |

| Intersection Summary | | | |
|---|---|---|---|
| Area Type: | Other | | |
| Cycle Length: 100 | | | |
| Actuated Cycle Length: 81.6 | | | |
| Natural Cycle: 80 | | | |
| Control Type: Semi Act-Uncoord | | | |
| Maximum v/c Ratio: 0.91 | | | |
| Intersection Signal Delay: 18.9 | | Intersection LOS: B | |
| Intersection Capacity Utilization 88.2% | | ICU Level of Service E | |
| Analysis Period (min) 15 | | | |

Splits and Phases: 2: Boundary Road & Hwy 417 EB Ramp Terminal



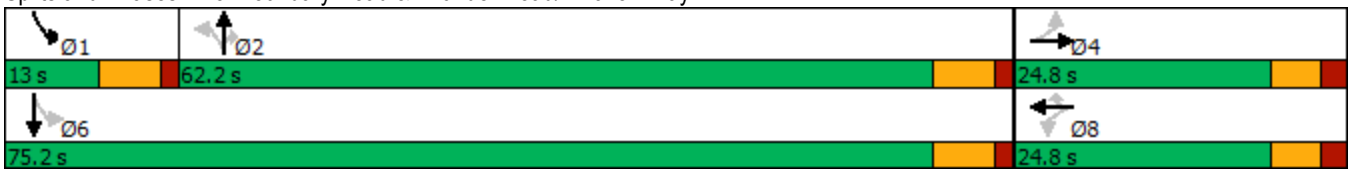
| Lane Group | EBL | EBT | EBR | WBL | WBT | WBR | NBL | NBT | NBR | SBL | SBT | SBR |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Lane Configurations | | | | | | | | | | | | |
| Traffic Volume (vph) | 68 | 0 | 15 | 6 | 0 | 18 | 4 | 316 | 0 | 2 | 880 | 61 |
| Future Volume (vph) | 68 | 0 | 15 | 6 | 0 | 18 | 4 | 316 | 0 | 2 | 880 | 61 |
| Ideal Flow (vphpl) | 1800 | 1800 | 1800 | 1800 | 1800 | 1800 | 1800 | 1800 | 1800 | 1800 | 1800 | 1800 |
| Lane Width (m) | 3.5 | 3.5 | 3.5 | 3.5 | 3.5 | 3.5 | 3.3 | 3.5 | 3.3 | 3.3 | 3.5 | 3.5 |
| Storage Length (m) | 0.0 | | 0.0 | 0.0 | | 0.0 | 35.0 | | 7.5 | 100.0 | | 0.0 |
| Storage Lanes | 0 | | 0 | 0 | | 1 | 1 | | 1 | 1 | | 0 |
| Taper Length (m) | 7.5 | | | 7.5 | | | 45.0 | | | 75.0 | | |
| Lane Util. Factor | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| Frt | | 0.976 | | | | 0.850 | | | | | 0.990 | |
| Flt Protected | | 0.961 | | | 0.950 | | 0.950 | | | 0.950 | | |
| Satd. Flow (prot) | 0 | 1591 | 0 | 0 | 1208 | 1513 | 1322 | 1633 | 1740 | 1102 | 1699 | 0 |
| Flt Permitted | | 0.761 | | | 0.854 | | 0.270 | | | 0.496 | | |
| Satd. Flow (perm) | 0 | 1260 | 0 | 0 | 1086 | 1513 | 376 | 1633 | 1740 | 575 | 1699 | 0 |
| Right Turn on Red | | | Yes | | | Yes | | | Yes | | | Yes |
| Satd. Flow (RTOR) | | 100 | | | | 100 | | | | | 8 | |
| Link Speed (k/h) | | 60 | | | 20 | | | 80 | | | 80 | |
| Link Distance (m) | | 642.8 | | | 170.6 | | | 174.7 | | | 243.1 | |
| Travel Time (s) | | 38.6 | | | 30.7 | | | 7.9 | | | 10.9 | |
| Peak Hour Factor | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| Heavy Vehicles (%) | 6% | 0% | 0% | 40% | 0% | 0% | 25% | 9% | 0% | 50% | 4% | 0% |
| Adj. Flow (vph) | 68 | 0 | 15 | 6 | 0 | 18 | 4 | 316 | 0 | 2 | 880 | 61 |
| Shared Lane Traffic (%) | | | | | | | | | | | | |
| Lane Group Flow (vph) | 0 | 83 | 0 | 0 | 6 | 18 | 4 | 316 | 0 | 2 | 941 | 0 |
| Enter Blocked Intersection | No | No | No | No | No | No | No | No | No | No | No | No |
| Lane Alignment | Left | Left | Right | Left | Left | Right | Left | Left | Right | Left | Left | Right |
| Median Width(m) | | 0.0 | | | 0.0 | | | 3.5 | | | 3.5 | |
| Link Offset(m) | | 0.0 | | | 0.0 | | | 0.0 | | | 0.0 | |
| Crosswalk Width(m) | | 4.8 | | | 4.8 | | | 4.8 | | | 4.8 | |
| Two way Left Turn Lane | | | | | | | | | | | | |
| Headway Factor | 1.09 | 1.09 | 1.09 | 1.09 | 1.09 | 1.09 | 1.12 | 1.09 | 1.12 | 1.12 | 1.09 | 1.09 |
| Turning Speed (k/h) | 25 | | 15 | 25 | | 15 | 25 | | 15 | 25 | | 15 |
| Number of Detectors | 1 | 2 | | 1 | 2 | 1 | 1 | 2 | 1 | 1 | 2 | |
| Detector Template | Left | Thru | | Left | Thru | Right | Left | Thru | Right | Left | Thru | |
| Leading Detector (m) | 2.0 | 10.0 | | 2.0 | 10.0 | 2.0 | 2.0 | 10.0 | 2.0 | 2.0 | 10.0 | |
| Trailing Detector (m) | 0.0 | 0.0 | | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | |
| Detector 1 Position(m) | 0.0 | 0.0 | | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | |
| Detector 1 Size(m) | 2.0 | 0.6 | | 2.0 | 0.6 | 2.0 | 2.0 | 0.6 | 2.0 | 2.0 | 0.6 | |
| Detector 1 Type | Cl+Ex | Cl+Ex | | Cl+Ex | Cl+Ex | Cl+Ex | Cl+Ex | Cl+Ex | Cl+Ex | Cl+Ex | Cl+Ex | |
| Detector 1 Channel | | | | | | | | | | | | |
| Detector 1 Extend (s) | 0.0 | 0.0 | | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | |
| Detector 1 Queue (s) | 0.0 | 0.0 | | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | |
| Detector 1 Delay (s) | 0.0 | 0.0 | | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | |
| Detector 2 Position(m) | | 9.4 | | | 9.4 | | | 9.4 | | | 9.4 | |
| Detector 2 Size(m) | | 0.6 | | | 0.6 | | | 0.6 | | | 0.6 | |
| Detector 2 Type | | Cl+Ex | | | Cl+Ex | | | Cl+Ex | | | Cl+Ex | |
| Detector 2 Channel | | | | | | | | | | | | |
| Detector 2 Extend (s) | | 0.0 | | | 0.0 | | | 0.0 | | | 0.0 | |
| Turn Type | Perm | NA | | Perm | NA | Perm | Perm | NA | Perm | pm+pt | NA | |



| Lane Group | EBL | EBT | EBR | WBL | WBT | WBR | NBL | NBT | NBR | SBL | SBT | SBR |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Protected Phases | | 4 | | | 8 | | | 2 | | 1 | 6 | |
| Permitted Phases | 4 | | | 8 | | 8 | 2 | | 2 | 6 | | |
| Detector Phase | 4 | 4 | | 8 | 8 | 8 | 2 | 2 | 2 | 1 | 6 | |
| Switch Phase | | | | | | | | | | | | |
| Minimum Initial (s) | 7.0 | 7.0 | | 7.0 | 7.0 | 7.0 | 20.0 | 20.0 | 20.0 | 7.0 | 20.0 | |
| Minimum Split (s) | 24.8 | 24.8 | | 24.8 | 24.8 | 24.8 | 26.2 | 26.2 | 26.2 | 13.0 | 26.2 | |
| Total Split (s) | 24.8 | 24.8 | | 24.8 | 24.8 | 24.8 | 62.2 | 62.2 | 62.2 | 13.0 | 75.2 | |
| Total Split (%) | 24.8% | 24.8% | | 24.8% | 24.8% | 24.8% | 62.2% | 62.2% | 62.2% | 13.0% | 75.2% | |
| Maximum Green (s) | 19.0 | 19.0 | | 19.0 | 19.0 | 19.0 | 56.0 | 56.0 | 56.0 | 7.0 | 69.0 | |
| Yellow Time (s) | 3.7 | 3.7 | | 3.7 | 3.7 | 3.7 | 4.6 | 4.6 | 4.6 | 4.6 | 4.6 | |
| All-Red Time (s) | 2.1 | 2.1 | | 2.1 | 2.1 | 2.1 | 1.6 | 1.6 | 1.6 | 1.4 | 1.6 | |
| Lost Time Adjust (s) | | 0.0 | | | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | |
| Total Lost Time (s) | | 5.8 | | | 5.8 | 5.8 | 6.2 | 6.2 | 6.2 | 6.0 | 6.2 | |
| Lead/Lag | | | | | | | Lag | Lag | Lag | Lead | | |
| Lead-Lag Optimize? | | | | | | | Yes | Yes | Yes | Yes | | |
| Vehicle Extension (s) | 3.0 | 3.0 | | 3.0 | 3.0 | 3.0 | 3.0 | 3.0 | 3.0 | 3.0 | 3.0 | |
| Recall Mode | None | None | | None | None | None | Min | Min | Min | None | Min | |
| Walk Time (s) | 7.0 | 7.0 | | 7.0 | 7.0 | 7.0 | 7.0 | 7.0 | 7.0 | | 7.0 | |
| Flash Dont Walk (s) | 12.0 | 12.0 | | 12.0 | 12.0 | 12.0 | 10.0 | 10.0 | 10.0 | | 10.0 | |
| Pedestrian Calls (#/hr) | 0 | 0 | | 0 | 0 | 0 | 0 | 0 | 0 | | 0 | |
| Act Effct Green (s) | | 7.7 | | | 7.7 | 7.7 | 42.8 | 42.8 | | 43.0 | 44.6 | |
| Actuated g/C Ratio | | 0.13 | | | 0.13 | 0.13 | 0.72 | 0.72 | | 0.72 | 0.75 | |
| v/c Ratio | | 0.33 | | | 0.04 | 0.06 | 0.01 | 0.27 | | 0.00 | 0.74 | |
| Control Delay | | 9.7 | | | 29.0 | 0.4 | 5.8 | 6.1 | | 3.0 | 10.7 | |
| Queue Delay | | 0.0 | | | 0.0 | 0.0 | 0.0 | 0.0 | | 0.0 | 0.4 | |
| Total Delay | | 9.7 | | | 29.0 | 0.4 | 5.8 | 6.1 | | 3.0 | 11.1 | |
| LOS | | A | | | C | A | A | A | | A | B | |
| Approach Delay | | 9.7 | | | 7.6 | | | 6.1 | | | 11.1 | |
| Approach LOS | | A | | | A | | | A | | | B | |
| Queue Length 50th (m) | | 0.0 | | | 0.5 | 0.0 | 0.1 | 11.3 | | 0.1 | 60.4 | |
| Queue Length 95th (m) | | 10.0 | | | 4.6 | 0.0 | 1.6 | 40.3 | | 0.5 | 120.2 | |
| Internal Link Dist (m) | | 618.8 | | | 146.6 | | | 150.7 | | | 219.1 | |
| Turn Bay Length (m) | | | | | | | 35.0 | | | 100.0 | | |
| Base Capacity (vph) | | 489 | | | 365 | 575 | 340 | 1476 | | 481 | 1644 | |
| Starvation Cap Reductn | | 0 | | | 0 | 0 | 0 | 0 | | 0 | 278 | |
| Spillback Cap Reductn | | 0 | | | 0 | 0 | 0 | 0 | | 0 | 0 | |
| Storage Cap Reductn | | 0 | | | 0 | 0 | 0 | 0 | | 0 | 0 | |
| Reduced v/c Ratio | | 0.17 | | | 0.02 | 0.03 | 0.01 | 0.21 | | 0.00 | 0.69 | |

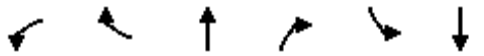
| Intersection Summary | | | |
|---|---|---|---|
| Area Type: | Other | | |
| Cycle Length: 100 | | | |
| Actuated Cycle Length: 59.5 | | | |
| Natural Cycle: 80 | | | |
| Control Type: Semi Act-Uncoord | | | |
| Maximum v/c Ratio: 0.74 | | | |
| Intersection Signal Delay: 9.8 | | Intersection LOS: A | |
| Intersection Capacity Utilization 74.4% | | ICU Level of Service D | |
| Analysis Period (min) 15 | | | |

Splits and Phases: 3: Boundary Road & Thunder Road/Amazon Way



| Lane Group | WBL | WBR | NBT | NBR | SBL | SBT |
|---|---|---|---|---|---|---|
| Lane Configurations | | | | | | |
| Traffic Volume (vph) | 6 | 12 | 308 | 6 | 13 | 888 |
| Future Volume (vph) | 6 | 12 | 308 | 6 | 13 | 888 |
| Ideal Flow (vphpl) | 1800 | 1800 | 1800 | 1800 | 1800 | 1800 |
| Lane Width (m) | 3.6 | 3.6 | 3.5 | 3.5 | 3.5 | 3.5 |
| Storage Length (m) | 0.0 | 0.0 | | 0.0 | 70.0 | |
| Storage Lanes | 1 | 0 | | 0 | 1 | |
| Taper Length (m) | 7.5 | | | | 45.0 | |
| Lane Util. Factor | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| Frt | 0.910 | | 0.997 | | | |
| Flt Protected | 0.984 | | | | 0.950 | |
| Satd. Flow (prot) | 806 | 0 | 1661 | 0 | 846 | 1745 |
| Flt Permitted | 0.984 | | | | 0.950 | |
| Satd. Flow (perm) | 806 | 0 | 1661 | 0 | 846 | 1745 |
| Link Speed (k/h) | 20 | | 80 | | | 80 |
| Link Distance (m) | 151.5 | | 1150.2 | | | 174.7 |
| Travel Time (s) | 27.3 | | 51.8 | | | 7.9 |
| Peak Hour Factor | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| Heavy Vehicles (%) | 100% | 100% | 5% | 100% | 100% | 2% |
| Adj. Flow (vph) | 6 | 12 | 308 | 6 | 13 | 888 |
| Shared Lane Traffic (%) | | | | | | |
| Lane Group Flow (vph) | 18 | 0 | 314 | 0 | 13 | 888 |
| Enter Blocked Intersection | No | No | No | No | No | No |
| Lane Alignment | Left | Right | Left | Right | Left | Left |
| Median Width(m) | 3.6 | | 3.5 | | | 3.5 |
| Link Offset(m) | 0.0 | | 0.0 | | | 0.0 |
| Crosswalk Width(m) | 4.8 | | 4.8 | | | 4.8 |
| Two way Left Turn Lane | | | | | | |
| Headway Factor | 1.07 | 1.07 | 1.09 | 1.09 | 1.09 | 1.09 |
| Turning Speed (k/h) | 25 | 15 | | 15 | 25 | |
| Sign Control | Stop | | Free | | | Free |

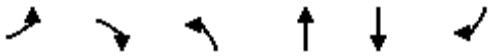
| Intersection Summary | | | |
|---|---|---|---|
| Area Type: | Other | | |
| Control Type: Unsignalized | | | |
| Intersection Capacity Utilization 59.3% | | ICU Level of Service B | |
| Analysis Period (min) 15 | | | |



| Movement | WBL | WBR | NBT | NBR | SBL | SBT |
|---|---|---|---|---|---|---|
| Lane Configurations | | | | | | |
| Traffic Volume (veh/h) | 6 | 12 | 308 | 6 | 13 | 888 |
| Future Volume (Veh/h) | 6 | 12 | 308 | 6 | 13 | 888 |
| Sign Control | Stop | | Free | | | Free |
| Grade | 0% | | 0% | | | 0% |
| Peak Hour Factor | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| Hourly flow rate (vph) | 6 | 12 | 308 | 6 | 13 | 888 |
| Pedestrians | | | | | | |
| Lane Width (m) | | | | | | |
| Walking Speed (m/s) | | | | | | |
| Percent Blockage | | | | | | |
| Right turn flare (veh) | | | | | | |
| Median type | | | None | | | None |
| Median storage veh) | | | | | | |
| Upstream signal (m) | | | | | | 175 |
| pX, platoon unblocked | 0.64 | | | | | |
| vC, conflicting volume | 1225 | 311 | | | 314 | |
| vC1, stage 1 conf vol | | | | | | |
| vC2, stage 2 conf vol | | | | | | |
| vCu, unblocked vol | 1069 | 311 | | | 314 | |
| tC, single (s) | 7.4 | 7.2 | | | 5.1 | |
| tC, 2 stage (s) | | | | | | |
| tF (s) | 4.4 | 4.2 | | | 3.1 | |
| p0 queue free % | 94 | 98 | | | 98 | |
| cM capacity (veh/h) | 102 | 549 | | | 849 | |

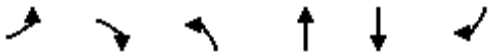
| Direction, Lane # | WB 1 | NB 1 | SB 1 | SB 2 |
|---|---|---|---|---|
| Volume Total | 18 | 314 | 13 | 888 |
| Volume Left | 6 | 0 | 13 | 0 |
| Volume Right | 12 | 6 | 0 | 0 |
| cSH | 224 | 1700 | 849 | 1700 |
| Volume to Capacity | 0.08 | 0.18 | 0.02 | 0.52 |
| Queue Length 95th (m) | 2.1 | 0.0 | 0.4 | 0.0 |
| Control Delay (s) | 22.5 | 0.0 | 9.3 | 0.0 |
| Lane LOS | C | | A | |
| Approach Delay (s) | 22.5 | 0.0 | 0.1 | |
| Approach LOS | C | | | |

| Intersection Summary | | | |
|---|---|---|---|
| Average Delay | 0.4 | | |
| Intersection Capacity Utilization | 59.3% | ICU Level of Service | B |
| Analysis Period (min) | 15 | | |



| Lane Group | EBL | EBR | NBL | NBT | SBT | SBR |
|---|---|---|---|---|---|---|
| Lane Configurations | | | | | | |
| Traffic Volume (vph) | 128 | 108 | 57 | 129 | 777 | 128 |
| Future Volume (vph) | 128 | 108 | 57 | 129 | 777 | 128 |
| Ideal Flow (vphpl) | 1800 | 1800 | 1800 | 1800 | 1800 | 1800 |
| Lane Width (m) | 3.3 | 3.3 | 3.5 | 3.5 | 3.5 | 3.5 |
| Storage Length (m) | 25.0 | 0.0 | 0.0 | | | 30.0 |
| Storage Lanes | 1 | 1 | 0 | | | 1 |
| Taper Length (m) | 47.5 | | 7.5 | | | |
| Lane Util. Factor | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| Frt | | 0.850 | | | | 0.850 |
| Flt Protected | 0.950 | | | 0.985 | | |
| Satd. Flow (prot) | 1463 | 1395 | 0 | 1666 | 1762 | 1351 |
| Flt Permitted | 0.950 | | | 0.985 | | |
| Satd. Flow (perm) | 1463 | 1395 | 0 | 1666 | 1762 | 1351 |
| Link Speed (k/h) | 80 | | | 80 | 80 | |
| Link Distance (m) | 180.5 | | | 135.8 | 1150.2 | |
| Travel Time (s) | 8.1 | | | 6.1 | 51.8 | |
| Peak Hour Factor | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| Heavy Vehicles (%) | 13% | 6% | 8% | 4% | 1% | 12% |
| Adj. Flow (vph) | 128 | 108 | 57 | 129 | 777 | 128 |
| Shared Lane Traffic (%) | | | | | | |
| Lane Group Flow (vph) | 128 | 108 | 0 | 186 | 777 | 128 |
| Enter Blocked Intersection | No | No | No | No | No | No |
| Lane Alignment | Left | Right | Left | Left | Left | Right |
| Median Width(m) | 3.3 | | | 0.0 | 0.0 | |
| Link Offset(m) | 0.0 | | | 0.0 | 0.0 | |
| Crosswalk Width(m) | 4.8 | | | 4.8 | 4.8 | |
| Two way Left Turn Lane | | | | | | |
| Headway Factor | 1.12 | 1.12 | 1.09 | 1.09 | 1.09 | 1.09 |
| Turning Speed (k/h) | 25 | 15 | 25 | | | 15 |
| Sign Control | Stop | | | Free | Free | |

| Intersection Summary | | | |
|---|---|---|---|
| Area Type: | Other | | |
| Control Type: Unsignalized | | | |
| Intersection Capacity Utilization | 71.1% | ICU Level of Service | C |
| Analysis Period (min) | 15 | | |



| Movement | EBL | EBR | NBL | NBT | SBT | SBR |
|---|---|---|---|---|---|---|
| Lane Configurations | | | | | | |
| Traffic Volume (veh/h) | 128 | 108 | 57 | 129 | 777 | 128 |
| Future Volume (Veh/h) | 128 | 108 | 57 | 129 | 777 | 128 |
| Sign Control | Stop | | | Free | Free | |
| Grade | 0% | | | 0% | 0% | |
| Peak Hour Factor | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| Hourly flow rate (vph) | 128 | 108 | 57 | 129 | 777 | 128 |
| 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 | 1020 | 777 | 905 | | | |
| vC1, stage 1 conf vol | | | | | | |
| vC2, stage 2 conf vol | | | | | | |
| vCu, unblocked vol | 1020 | 777 | 905 | | | |
| tC, single (s) | 6.5 | 6.3 | 4.2 | | | |
| tC, 2 stage (s) | | | | | | |
| tF (s) | 3.6 | 3.4 | 2.3 | | | |
| p0 queue free % | 44 | 72 | 92 | | | |
| cM capacity (veh/h) | 231 | 391 | 727 | | | |

| Direction, Lane # | EB 1 | EB 2 | NB 1 | SB 1 | SB 2 |
|---|---|---|---|---|---|
| Volume Total | 128 | 108 | 186 | 777 | 128 |
| Volume Left | 128 | 0 | 57 | 0 | 0 |
| Volume Right | 0 | 108 | 0 | 0 | 128 |
| cSH | 231 | 391 | 727 | 1700 | 1700 |
| Volume to Capacity | 0.56 | 0.28 | 0.08 | 0.46 | 0.08 |
| Queue Length 95th (m) | 24.2 | 8.9 | 2.0 | 0.0 | 0.0 |
| Control Delay (s) | 38.5 | 17.7 | 3.8 | 0.0 | 0.0 |
| Lane LOS | E | C | A | | |
| Approach Delay (s) | 29.0 | | 3.8 | 0.0 | |
| Approach LOS | D | | | | |

| Intersection Summary | | | |
|---|---|---|---|
| Average Delay | 5.7 | | |
| Intersection Capacity Utilization | 71.1% | ICU Level of Service | C |
| Analysis Period (min) | 15 | | |

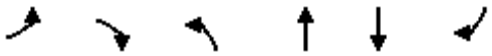
| Lane Group | WBL | WBR | NBT | NBR | SBL | SBT |
|---|---|---|---|---|---|---|
| Lane Configurations | | | | | | |
| Traffic Volume (vph) | 134 | 34 | 105 | 942 | 85 | 112 |
| Future Volume (vph) | 134 | 34 | 105 | 942 | 85 | 112 |
| Ideal Flow (vphpl) | 1800 | 1800 | 1800 | 1800 | 1800 | 1800 |
| Lane Width (m) | 4.5 | 4.5 | 3.5 | 3.5 | 3.5 | 3.5 |
| Storage Length (m) | 0.0 | 10.0 | | 0.0 | 0.0 | |
| Storage Lanes | 1 | 0 | | 0 | 0 | |
| Taper Length (m) | 7.5 | | | | 7.5 | |
| Lane Util. Factor | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| Frt | 0.973 | | 0.879 | | | |
| Flt Protected | 0.962 | | | | | 0.979 |
| Satd. Flow (prot) | 1748 | 0 | 1529 | 0 | 0 | 1582 |
| Flt Permitted | 0.962 | | | | | 0.979 |
| Satd. Flow (perm) | 1748 | 0 | 1529 | 0 | 0 | 1582 |
| Link Speed (k/h) | 40 | | 80 | | | 80 |
| Link Distance (m) | 155.0 | | 545.7 | | | 134.1 |
| Travel Time (s) | 14.0 | | 24.6 | | | 6.0 |
| Peak Hour Factor | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| Heavy Vehicles (%) | 4% | 14% | 14% | 1% | 9% | 11% |
| Adj. Flow (vph) | 134 | 34 | 105 | 942 | 85 | 112 |
| Shared Lane Traffic (%) | | | | | | |
| Lane Group Flow (vph) | 168 | 0 | 1047 | 0 | 0 | 197 |
| Enter Blocked Intersection | No | No | No | No | No | No |
| Lane Alignment | Left | Right | Left | Right | Left | Left |
| Median Width(m) | 4.5 | | 0.0 | | | 0.0 |
| Link Offset(m) | 0.0 | | 0.0 | | | 0.0 |
| Crosswalk Width(m) | 4.8 | | 4.8 | | | 4.8 |
| Two way Left Turn Lane | | | | | | |
| Headway Factor | 0.95 | 0.95 | 1.09 | 1.09 | 1.09 | 1.09 |
| Turning Speed (k/h) | 25 | 15 | | 15 | 25 | |
| Sign Control | Stop | | Free | | | Free |

| Intersection Summary | | | |
|---|---|---|---|
| Area Type: | Other | | |
| Control Type: Unsignalized | | | |
| Intersection Capacity Utilization 98.5% | | ICU Level of Service F | |
| Analysis Period (min) 15 | | | |

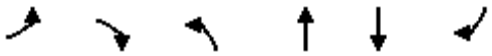
| Movement | WBL | WBR | NBT | NBR | SBL | SBT |
|---|---|---|---|---|---|---|
| Lane Configurations | | | | | | |
| Traffic Volume (veh/h) | 134 | 34 | 105 | 942 | 85 | 112 |
| Future Volume (Veh/h) | 134 | 34 | 105 | 942 | 85 | 112 |
| Sign Control | Stop | | Free | | | Free |
| Grade | 0% | | 0% | | | 0% |
| Peak Hour Factor | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| Hourly flow rate (vph) | 134 | 34 | 105 | 942 | 85 | 112 |
| 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 | 858 | 576 | | | 1047 | |
| vC1, stage 1 conf vol | | | | | | |
| vC2, stage 2 conf vol | | | | | | |
| vCu, unblocked vol | 858 | 576 | | | 1047 | |
| tC, single (s) | 6.4 | 6.3 | | | 4.2 | |
| tC, 2 stage (s) | | | | | | |
| tF (s) | 3.5 | 3.4 | | | 2.3 | |
| p0 queue free % | 52 | 93 | | | 87 | |
| cM capacity (veh/h) | 281 | 495 | | | 638 | |

| Direction, Lane # | WB 1 | NB 1 | SB 1 |
|---|---|---|---|
| Volume Total | 168 | 1047 | 197 |
| Volume Left | 134 | 0 | 85 |
| Volume Right | 34 | 942 | 0 |
| cSH | 308 | 1700 | 638 |
| Volume to Capacity | 0.54 | 0.62 | 0.13 |
| Queue Length 95th (m) | 24.5 | 0.0 | 3.7 |
| Control Delay (s) | 29.8 | 0.0 | 5.9 |
| Lane LOS | D | | A |
| Approach Delay (s) | 29.8 | 0.0 | 5.9 |
| Approach LOS | D | | |

| Intersection Summary | | | |
|---|---|---|---|
| Average Delay | 4.4 | | |
| Intersection Capacity Utilization | 98.5% | ICU Level of Service | F |
| Analysis Period (min) | 15 | | |



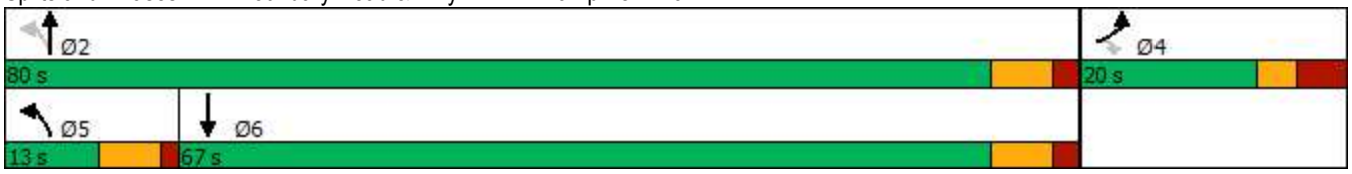
| Lane Group | EBL | EBR | NBL | NBT | SBT | SBR |
|---|---|---|---|---|---|---|
| Lane Configurations | | | | | | |
| Traffic Volume (vph) | 20 | 320 | 37 | 1032 | 214 | 10 |
| Future Volume (vph) | 20 | 320 | 37 | 1032 | 214 | 10 |
| Ideal Flow (vphpl) | 1800 | 1800 | 1800 | 1800 | 1800 | 1800 |
| Lane Width (m) | 3.5 | 3.3 | 3.5 | 3.5 | 3.5 | 3.5 |
| Storage Length (m) | 0.0 | 25.0 | 50.0 | | | 0.0 |
| Storage Lanes | 1 | 1 | 1 | | | 0 |
| Taper Length (m) | 7.5 | | 75.0 | | | |
| Lane Util. Factor | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| Frt | | 0.850 | | | 0.994 | |
| Flt Protected | 0.950 | | 0.950 | | | |
| Satd. Flow (prot) | 1291 | 1395 | 1291 | 1745 | 1593 | 0 |
| Flt Permitted | 0.950 | | 0.543 | | | |
| Satd. Flow (perm) | 1291 | 1395 | 738 | 1745 | 1593 | 0 |
| Right Turn on Red | | Yes | | | | Yes |
| Satd. Flow (RTOR) | | 320 | | | 4 | |
| Link Speed (k/h) | 40 | | | 80 | 80 | |
| Link Distance (m) | 154.2 | | | 243.1 | 545.7 | |
| Travel Time (s) | 13.9 | | | 10.9 | 24.6 | |
| Peak Hour Factor | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| Heavy Vehicles (%) | 31% | 6% | 31% | 2% | 11% | 13% |
| Adj. Flow (vph) | 20 | 320 | 37 | 1032 | 214 | 10 |
| Shared Lane Traffic (%) | | | | | | |
| Lane Group Flow (vph) | 20 | 320 | 37 | 1032 | 224 | 0 |
| Enter Blocked Intersection | No | No | No | No | No | No |
| Lane Alignment | Left | Right | Left | Left | Left | Right |
| Median Width(m) | 3.5 | | | 3.5 | 3.5 | |
| Link Offset(m) | 0.0 | | | 0.0 | 0.0 | |
| Crosswalk Width(m) | 4.8 | | | 4.8 | 4.8 | |
| Two way Left Turn Lane | | | | | | |
| Headway Factor | 1.09 | 1.12 | 1.09 | 1.09 | 1.09 | 1.09 |
| Turning Speed (k/h) | 25 | 15 | 25 | | | 15 |
| Number of Detectors | 1 | 1 | 1 | 2 | 2 | |
| Detector Template | Left | Right | Left | Thru | Thru | |
| Leading Detector (m) | 2.0 | 2.0 | 2.0 | 10.0 | 10.0 | |
| Trailing Detector (m) | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | |
| Detector 1 Position(m) | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | |
| Detector 1 Size(m) | 2.0 | 2.0 | 2.0 | 0.6 | 0.6 | |
| Detector 1 Type | Cl+Ex | Cl+Ex | Cl+Ex | Cl+Ex | Cl+Ex | |
| Detector 1 Channel | | | | | | |
| Detector 1 Extend (s) | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | |
| Detector 1 Queue (s) | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | |
| Detector 1 Delay (s) | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | |
| Detector 2 Position(m) | | | | 9.4 | 9.4 | |
| Detector 2 Size(m) | | | | 0.6 | 0.6 | |
| Detector 2 Type | | | | Cl+Ex | Cl+Ex | |
| Detector 2 Channel | | | | | | |
| Detector 2 Extend (s) | | | | 0.0 | 0.0 | |
| Turn Type | Prot | Perm | pm+pt | NA | NA | |

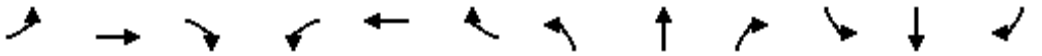


| Lane Group | EBL | EBR | NBL | NBT | SBT | SBR |
|---|---|---|---|---|---|---|
| Protected Phases | 4 | | 5 | 2 | 6 | |
| Permitted Phases | | 4 | 2 | | | |
| Detector Phase | 4 | 4 | 5 | 2 | 6 | |
| Switch Phase | | | | | | |
| Minimum Initial (s) | 7.0 | 7.0 | 7.0 | 35.0 | 35.0 | |
| Minimum Split (s) | 17.8 | 17.8 | 13.0 | 41.6 | 41.6 | |
| Total Split (s) | 20.0 | 20.0 | 13.0 | 80.0 | 67.0 | |
| Total Split (%) | 20.0% | 20.0% | 13.0% | 80.0% | 67.0% | |
| Maximum Green (s) | 13.2 | 13.2 | 7.0 | 73.4 | 60.4 | |
| Yellow Time (s) | 3.0 | 3.0 | 4.6 | 4.6 | 4.6 | |
| All-Red Time (s) | 3.8 | 3.8 | 1.4 | 2.0 | 2.0 | |
| Lost Time Adjust (s) | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | |
| Total Lost Time (s) | 6.8 | 6.8 | 6.0 | 6.6 | 6.6 | |
| Lead/Lag | | | Lead | | Lag | |
| Lead-Lag Optimize? | | | Yes | | Yes | |
| Vehicle Extension (s) | 3.0 | 3.0 | 3.0 | 3.0 | 3.0 | |
| Recall Mode | None | None | None | Min | Min | |
| Walk Time (s) | 5.0 | 5.0 | | 0.0 | 7.0 | |
| Flash Dont Walk (s) | 6.0 | 6.0 | | 0.0 | 21.0 | |
| Pedestrian Calls (#/hr) | 0 | 0 | | 0 | 0 | |
| Act Effct Green (s) | 8.7 | 8.7 | 48.0 | 47.3 | 43.2 | |
| Actuated g/C Ratio | 0.12 | 0.12 | 0.68 | 0.67 | 0.62 | |
| v/c Ratio | 0.12 | 0.71 | 0.07 | 0.88 | 0.23 | |
| Control Delay | 35.4 | 14.1 | 3.7 | 18.9 | 7.8 | |
| Queue Delay | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | |
| Total Delay | 35.4 | 14.1 | 3.7 | 18.9 | 7.8 | |
| LOS | D | B | A | B | A | |
| Approach Delay | 15.4 | | | 18.4 | 7.8 | |
| Approach LOS | B | | | B | A | |
| Queue Length 50th (m) | 2.2 | 0.0 | 1.2 | 81.1 | 8.2 | |
| Queue Length 95th (m) | 10.9 | 27.3 | 4.2 | 183.1 | 31.3 | |
| Internal Link Dist (m) | 130.2 | | | 219.1 | 521.7 | |
| Turn Bay Length (m) | | 25.0 | 50.0 | | | |
| Base Capacity (vph) | 256 | 533 | 562 | 1626 | 1388 | |
| Starvation Cap Reductn | 0 | 0 | 0 | 27 | 0 | |
| Spillback Cap Reductn | 0 | 0 | 0 | 0 | 0 | |
| Storage Cap Reductn | 0 | 0 | 0 | 0 | 0 | |
| Reduced v/c Ratio | 0.08 | 0.60 | 0.07 | 0.65 | 0.16 | |

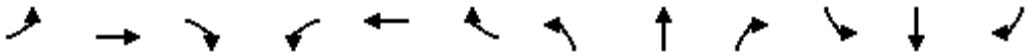
| Intersection Summary | | | |
|---|---|---|---|
| Area Type: | Other | | |
| Cycle Length: 100 | | | |
| Actuated Cycle Length: 70.2 | | | |
| Natural Cycle: 75 | | | |
| Control Type: Semi Act-Uncoord | | | |
| Maximum v/c Ratio: 0.88 | | | |
| Intersection Signal Delay: 16.3 | | Intersection LOS: B | |
| Intersection Capacity Utilization 74.3% | | ICU Level of Service D | |
| Analysis Period (min) 15 | | | |

Splits and Phases: 2: Boundary Road & Hwy 417 EB Ramp Terminal





| Lane Group | EBL | EBT | EBR | WBL | WBT | WBR | NBL | NBT | NBR | SBL | SBT | SBR |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Lane Configurations | | | | | | | | | | | | |
| Traffic Volume (vph) | 38 | 18 | 5 | 4 | 6 | 28 | 6 | 1003 | 33 | 213 | 260 | 61 |
| Future Volume (vph) | 38 | 18 | 5 | 4 | 6 | 28 | 6 | 1003 | 33 | 213 | 260 | 61 |
| Ideal Flow (vphpl) | 1800 | 1800 | 1800 | 1800 | 1800 | 1800 | 1800 | 1800 | 1800 | 1800 | 1800 | 1800 |
| Lane Width (m) | 3.5 | 3.5 | 3.5 | 3.5 | 3.5 | 3.5 | 3.3 | 3.5 | 3.3 | 3.3 | 3.5 | 3.5 |
| Storage Length (m) | 0.0 | | 0.0 | 0.0 | | 0.0 | 35.0 | | 7.5 | 100.0 | | 0.0 |
| Storage Lanes | 0 | | 0 | 0 | | 1 | 1 | | 1 | 1 | | 0 |
| Taper Length (m) | 7.5 | | | 7.5 | | | 45.0 | | | 75.0 | | |
| Lane Util. Factor | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| Frt | | 0.989 | | | | 0.850 | | | 0.850 | | 0.971 | |
| Flt Protected | | 0.970 | | | 0.980 | | 0.950 | | | 0.950 | | |
| Satd. Flow (prot) | 0 | 1614 | 0 | 0 | 1744 | 1513 | 1378 | 1728 | 1479 | 1653 | 1521 | 0 |
| Flt Permitted | | 0.805 | | | 0.854 | | 0.566 | | | 0.086 | | |
| Satd. Flow (perm) | 0 | 1340 | 0 | 0 | 1520 | 1513 | 821 | 1728 | 1479 | 150 | 1521 | 0 |
| Right Turn on Red | | | Yes | | | Yes | | | Yes | | | Yes |
| Satd. Flow (RTOR) | | 4 | | | | 100 | | | 96 | | 27 | |
| Link Speed (k/h) | | 60 | | | 20 | | | 80 | | | 80 | |
| Link Distance (m) | | 642.8 | | | 170.6 | | | 174.7 | | | 243.1 | |
| Travel Time (s) | | 38.6 | | | 30.7 | | | 7.9 | | | 10.9 | |
| Peak Hour Factor | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| Heavy Vehicles (%) | 6% | 0% | 25% | 0% | 0% | 0% | 20% | 3% | 0% | 0% | 15% | 8% |
| Adj. Flow (vph) | 38 | 18 | 5 | 4 | 6 | 28 | 6 | 1003 | 33 | 213 | 260 | 61 |
| Shared Lane Traffic (%) | | | | | | | | | | | | |
| Lane Group Flow (vph) | 0 | 61 | 0 | 0 | 10 | 28 | 6 | 1003 | 33 | 213 | 321 | 0 |
| Enter Blocked Intersection | No | No | No | No | No | No | No | No | No | No | No | No |
| Lane Alignment | Left | Left | Right | Left | Left | Right | Left | Left | Right | Left | Left | Right |
| Median Width(m) | | 0.0 | | | 0.0 | | | 3.5 | | | 3.5 | |
| Link Offset(m) | | 0.0 | | | 0.0 | | | 0.0 | | | 0.0 | |
| Crosswalk Width(m) | | 4.8 | | | 4.8 | | | 4.8 | | | 4.8 | |
| Two way Left Turn Lane | | | | | | | | | | | | |
| Headway Factor | 1.09 | 1.09 | 1.09 | 1.09 | 1.09 | 1.09 | 1.12 | 1.09 | 1.12 | 1.12 | 1.09 | 1.09 |
| Turning Speed (k/h) | 25 | | 15 | 25 | | 15 | 25 | | 15 | 25 | | 15 |
| Number of Detectors | 1 | 2 | | 1 | 2 | 1 | 1 | 2 | 1 | 1 | 2 | |
| Detector Template | Left | Thru | | Left | Thru | Right | Left | Thru | Right | Left | Thru | |
| Leading Detector (m) | 2.0 | 10.0 | | 2.0 | 10.0 | 2.0 | 2.0 | 10.0 | 2.0 | 2.0 | 10.0 | |
| Trailing Detector (m) | 0.0 | 0.0 | | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | |
| Detector 1 Position(m) | 0.0 | 0.0 | | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | |
| Detector 1 Size(m) | 2.0 | 0.6 | | 2.0 | 0.6 | 2.0 | 2.0 | 0.6 | 2.0 | 2.0 | 0.6 | |
| Detector 1 Type | Cl+Ex | Cl+Ex | | Cl+Ex | Cl+Ex | Cl+Ex | Cl+Ex | Cl+Ex | Cl+Ex | Cl+Ex | Cl+Ex | |
| Detector 1 Channel | | | | | | | | | | | | |
| Detector 1 Extend (s) | 0.0 | 0.0 | | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | |
| Detector 1 Queue (s) | 0.0 | 0.0 | | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | |
| Detector 1 Delay (s) | 0.0 | 0.0 | | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | |
| Detector 2 Position(m) | | 9.4 | | | 9.4 | | | 9.4 | | | 9.4 | |
| Detector 2 Size(m) | | 0.6 | | | 0.6 | | | 0.6 | | | 0.6 | |
| Detector 2 Type | | Cl+Ex | | | Cl+Ex | | | Cl+Ex | | | Cl+Ex | |
| Detector 2 Channel | | | | | | | | | | | | |
| Detector 2 Extend (s) | | 0.0 | | | 0.0 | | | 0.0 | | | 0.0 | |
| Turn Type | Perm | NA | | Perm | NA | Perm | Perm | NA | Perm | pm+pt | NA | |

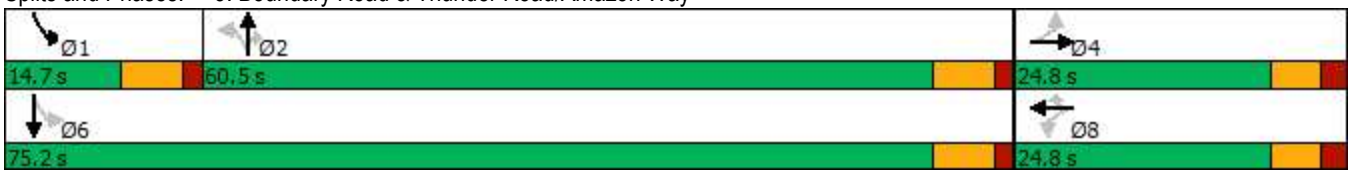


| Lane Group | EBL | EBT | EBR | WBL | WBT | WBR | NBL | NBT | NBR | SBL | SBT | SBR |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Protected Phases | | 4 | | | 8 | | | 2 | | 1 | 6 | |
| Permitted Phases | 4 | | | 8 | | 8 | 2 | | 2 | 6 | | |
| Detector Phase | 4 | 4 | | 8 | 8 | 8 | 2 | 2 | 2 | 1 | 6 | |
| Switch Phase | | | | | | | | | | | | |
| Minimum Initial (s) | 7.0 | 7.0 | | 7.0 | 7.0 | 7.0 | 20.0 | 20.0 | 20.0 | 7.0 | 20.0 | |
| Minimum Split (s) | 24.8 | 24.8 | | 24.8 | 24.8 | 24.8 | 26.2 | 26.2 | 26.2 | 13.0 | 26.2 | |
| Total Split (s) | 24.8 | 24.8 | | 24.8 | 24.8 | 24.8 | 60.5 | 60.5 | 60.5 | 14.7 | 75.2 | |
| Total Split (%) | 24.8% | 24.8% | | 24.8% | 24.8% | 24.8% | 60.5% | 60.5% | 60.5% | 14.7% | 75.2% | |
| Maximum Green (s) | 19.0 | 19.0 | | 19.0 | 19.0 | 19.0 | 54.3 | 54.3 | 54.3 | 8.7 | 69.0 | |
| Yellow Time (s) | 3.7 | 3.7 | | 3.7 | 3.7 | 3.7 | 4.6 | 4.6 | 4.6 | 4.6 | 4.6 | |
| All-Red Time (s) | 2.1 | 2.1 | | 2.1 | 2.1 | 2.1 | 1.6 | 1.6 | 1.6 | 1.4 | 1.6 | |
| Lost Time Adjust (s) | | 0.0 | | | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | |
| Total Lost Time (s) | | 5.8 | | | 5.8 | 5.8 | 6.2 | 6.2 | 6.2 | 6.0 | 6.2 | |
| Lead/Lag | | | | | | | Lag | Lag | Lag | Lead | | |
| Lead-Lag Optimize? | | | | | | | Yes | Yes | Yes | Yes | | |
| Vehicle Extension (s) | 3.0 | 3.0 | | 3.0 | 3.0 | 3.0 | 3.0 | 3.0 | 3.0 | 3.0 | 3.0 | |
| Recall Mode | None | None | | None | None | None | Min | Min | Min | None | Min | |
| Walk Time (s) | 7.0 | 7.0 | | 7.0 | 7.0 | 7.0 | 7.0 | 7.0 | 7.0 | | 7.0 | |
| Flash Dont Walk (s) | 12.0 | 12.0 | | 12.0 | 12.0 | 12.0 | 10.0 | 10.0 | 10.0 | | 10.0 | |
| Pedestrian Calls (#/hr) | 0 | 0 | | 0 | 0 | 0 | 0 | 0 | 0 | | 0 | |
| Act Effct Green (s) | | 9.4 | | | 9.4 | 9.4 | 54.7 | 54.7 | 54.7 | 69.7 | 70.9 | |
| Actuated g/C Ratio | | 0.11 | | | 0.11 | 0.11 | 0.62 | 0.62 | 0.62 | 0.79 | 0.81 | |
| v/c Ratio | | 0.41 | | | 0.06 | 0.11 | 0.01 | 0.93 | 0.03 | 0.79 | 0.26 | |
| Control Delay | | 44.6 | | | 36.7 | 0.9 | 8.3 | 34.2 | 0.1 | 39.2 | 3.6 | |
| Queue Delay | | 0.0 | | | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | |
| Total Delay | | 44.6 | | | 36.7 | 0.9 | 8.3 | 34.2 | 0.1 | 39.2 | 3.6 | |
| LOS | | D | | | D | A | A | C | A | D | A | |
| Approach Delay | | 44.6 | | | 10.3 | | | 33.0 | | | 17.8 | |
| Approach LOS | | D | | | B | | | C | | | B | |
| Queue Length 50th (m) | | 9.9 | | | 1.7 | 0.0 | 0.4 | 158.6 | 0.0 | 17.8 | 12.3 | |
| Queue Length 95th (m) | | 22.4 | | | 6.5 | 0.0 | 2.2 | #279.3 | 0.0 | #61.1 | 25.5 | |
| Internal Link Dist (m) | | 618.8 | | | 146.6 | | | 150.7 | | | 219.1 | |
| Turn Bay Length (m) | | | | | | | 35.0 | | 7.5 | 100.0 | | |
| Base Capacity (vph) | | 294 | | | 330 | 407 | 509 | 1073 | 955 | 268 | 1231 | |
| Starvation Cap Reductn | | 0 | | | 0 | 0 | 0 | 0 | 0 | 0 | 0 | |
| Spillback Cap Reductn | | 0 | | | 0 | 0 | 0 | 0 | 0 | 0 | 0 | |
| Storage Cap Reductn | | 0 | | | 0 | 0 | 0 | 0 | 0 | 0 | 0 | |
| Reduced v/c Ratio | | 0.21 | | | 0.03 | 0.07 | 0.01 | 0.93 | 0.03 | 0.79 | 0.26 | |

| Intersection Summary | | | |
|---|---|---|---|
| Area Type: | Other | | |
| Cycle Length: 100 | | | |
| Actuated Cycle Length: 88 | | | |
| Natural Cycle: 110 | | | |
| Control Type: Semi Act-Uncoord | | | |
| Maximum v/c Ratio: 0.93 | | | |
| Intersection Signal Delay: 28.0 | | Intersection LOS: C | |
| Intersection Capacity Utilization 93.4% | | ICU Level of Service F | |
| Analysis Period (min) 15 | | | |

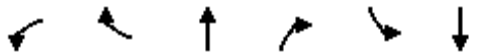
# 95th percentile volume exceeds capacity, queue may be longer.
Queue shown is maximum after two cycles.

Splits and Phases: 3: Boundary Road & Thunder Road/Amazon Way



| Lane Group | WBL | WBR | NBT | NBR | SBL | SBT |
|---|---|---|---|---|---|---|
| Lane Configurations | | | | | | |
| Traffic Volume (vph) | 6 | 4 | 1039 | 6 | 1 | 267 |
| Future Volume (vph) | 6 | 4 | 1039 | 6 | 1 | 267 |
| Ideal Flow (vphpl) | 1800 | 1800 | 1800 | 1800 | 1800 | 1800 |
| Lane Width (m) | 3.6 | 3.6 | 3.5 | 3.5 | 3.5 | 3.5 |
| Storage Length (m) | 0.0 | 0.0 | | 0.0 | 70.0 | |
| Storage Lanes | 1 | 0 | | 0 | 1 | |
| Taper Length (m) | 7.5 | | | | 45.0 | |
| Lane Util. Factor | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| Frt | 0.946 | | 0.999 | | | |
| Flt Protected | 0.971 | | | | 0.950 | |
| Satd. Flow (prot) | 827 | 0 | 1751 | 0 | 846 | 1589 |
| Flt Permitted | 0.971 | | | | 0.950 | |
| Satd. Flow (perm) | 827 | 0 | 1751 | 0 | 846 | 1589 |
| Link Speed (k/h) | 20 | | 80 | | | 80 |
| Link Distance (m) | 151.5 | | 1150.2 | | | 174.7 |
| Travel Time (s) | 27.3 | | 51.8 | | | 7.9 |
| Peak Hour Factor | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| Heavy Vehicles (%) | 100% | 100% | 1% | 100% | 100% | 12% |
| Adj. Flow (vph) | 6 | 4 | 1039 | 6 | 1 | 267 |
| Shared Lane Traffic (%) | | | | | | |
| Lane Group Flow (vph) | 10 | 0 | 1045 | 0 | 1 | 267 |
| Enter Blocked Intersection | No | No | No | No | No | No |
| Lane Alignment | Left | Right | Left | Right | Left | Left |
| Median Width(m) | 3.6 | | 3.5 | | | 3.5 |
| Link Offset(m) | 0.0 | | 0.0 | | | 0.0 |
| Crosswalk Width(m) | 4.8 | | 4.8 | | | 4.8 |
| Two way Left Turn Lane | | | | | | |
| Headway Factor | 1.07 | 1.07 | 1.09 | 1.09 | 1.09 | 1.09 |
| Turning Speed (k/h) | 25 | 15 | | 15 | 25 | |
| Sign Control | Stop | | Free | | | Free |

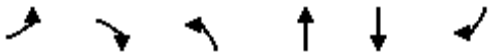
| Intersection Summary | | | |
|---|---|---|---|
| Area Type: | Other | | |
| Control Type: Unsignalized | | | |
| Intersection Capacity Utilization 68.1% | | ICU Level of Service C | |
| Analysis Period (min) 15 | | | |



| Movement | WBL | WBR | NBT | NBR | SBL | SBT |
|---|---|---|---|---|---|---|
| Lane Configurations | | | | | | |
| Traffic Volume (veh/h) | 6 | 4 | 1039 | 6 | 1 | 267 |
| Future Volume (Veh/h) | 6 | 4 | 1039 | 6 | 1 | 267 |
| Sign Control | Stop | | Free | | | Free |
| Grade | 0% | | 0% | | | 0% |
| Peak Hour Factor | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| Hourly flow rate (vph) | 6 | 4 | 1039 | 6 | 1 | 267 |
| Pedestrians | | | | | | |
| Lane Width (m) | | | | | | |
| Walking Speed (m/s) | | | | | | |
| Percent Blockage | | | | | | |
| Right turn flare (veh) | | | | | | |
| Median type | | | None | | | None |
| Median storage veh) | | | | | | |
| Upstream signal (m) | | | | | | 175 |
| pX, platoon unblocked | 0.99 | | | | | |
| vC, conflicting volume | 1311 | 1042 | | | 1045 | |
| vC1, stage 1 conf vol | | | | | | |
| vC2, stage 2 conf vol | | | | | | |
| vCu, unblocked vol | 1309 | 1042 | | | 1045 | |
| tC, single (s) | 7.4 | 7.2 | | | 5.1 | |
| tC, 2 stage (s) | | | | | | |
| tF (s) | 4.4 | 4.2 | | | 3.1 | |
| p0 queue free % | 95 | 98 | | | 100 | |
| cM capacity (veh/h) | 110 | 184 | | | 401 | |

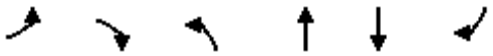
| Direction, Lane # | WB 1 | NB 1 | SB 1 | SB 2 |
|---|---|---|---|---|
| Volume Total | 10 | 1045 | 1 | 267 |
| Volume Left | 6 | 0 | 1 | 0 |
| Volume Right | 4 | 6 | 0 | 0 |
| cSH | 131 | 1700 | 401 | 1700 |
| Volume to Capacity | 0.08 | 0.61 | 0.00 | 0.16 |
| Queue Length 95th (m) | 2.0 | 0.0 | 0.1 | 0.0 |
| Control Delay (s) | 34.7 | 0.0 | 14.0 | 0.0 |
| Lane LOS | D | | B | |
| Approach Delay (s) | 34.7 | 0.0 | 0.1 | |
| Approach LOS | D | | | |

| Intersection Summary | | | |
|---|---|---|---|
| Average Delay | 0.3 | | |
| Intersection Capacity Utilization | 68.1% | ICU Level of Service | C |
| Analysis Period (min) | 15 | | |



| Lane Group | EBL | EBR | NBL | NBT | SBT | SBR |
|---|---|---|---|---|---|---|
| Lane Configurations | | | | | | |
| Traffic Volume (vph) | 86 | 33 | 147 | 947 | 135 | 118 |
| Future Volume (vph) | 86 | 33 | 147 | 947 | 135 | 118 |
| Ideal Flow (vphpl) | 1800 | 1800 | 1800 | 1800 | 1800 | 1800 |
| Lane Width (m) | 3.3 | 3.3 | 3.5 | 3.5 | 3.5 | 3.5 |
| Storage Length (m) | 25.0 | 0.0 | 0.0 | | | 30.0 |
| Storage Lanes | 1 | 1 | 0 | | | 1 |
| Taper Length (m) | 47.5 | | 7.5 | | | |
| Lane Util. Factor | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| Frt | | 0.850 | | | | 0.850 |
| Flt Protected | 0.950 | | | 0.993 | | |
| Satd. Flow (prot) | 1476 | 1286 | 0 | 1734 | 1561 | 1293 |
| Flt Permitted | 0.950 | | | 0.993 | | |
| Satd. Flow (perm) | 1476 | 1286 | 0 | 1734 | 1561 | 1293 |
| Link Speed (k/h) | 80 | | | 80 | 80 | |
| Link Distance (m) | 180.5 | | | 135.8 | 1150.2 | |
| Travel Time (s) | 8.1 | | | 6.1 | 51.8 | |
| Peak Hour Factor | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| Heavy Vehicles (%) | 12% | 15% | 8% | 1% | 14% | 17% |
| Adj. Flow (vph) | 86 | 33 | 147 | 947 | 135 | 118 |
| Shared Lane Traffic (%) | | | | | | |
| Lane Group Flow (vph) | 86 | 33 | 0 | 1094 | 135 | 118 |
| Enter Blocked Intersection | No | No | No | No | No | No |
| Lane Alignment | Left | Right | Left | Left | Left | Right |
| Median Width(m) | 3.3 | | | 0.0 | 0.0 | |
| Link Offset(m) | 0.0 | | | 0.0 | 0.0 | |
| Crosswalk Width(m) | 4.8 | | | 4.8 | 4.8 | |
| Two way Left Turn Lane | | | | | | |
| Headway Factor | 1.12 | 1.12 | 1.09 | 1.09 | 1.09 | 1.09 |
| Turning Speed (k/h) | 25 | 15 | 25 | | | 15 |
| Sign Control | Stop | | | Free | Free | |

| Intersection Summary | | | |
|---|---|---|---|
| Area Type: | Other | | |
| Control Type: Unsignalized | | | |
| Intersection Capacity Utilization 83.7% | | ICU Level of Service E | |
| Analysis Period (min) 15 | | | |



| Movement | EBL | EBR | NBL | NBT | SBT | SBR |
|---|---|---|---|---|---|---|
| Lane Configurations | | | | | | |
| Traffic Volume (veh/h) | 86 | 33 | 147 | 947 | 135 | 118 |
| Future Volume (Veh/h) | 86 | 33 | 147 | 947 | 135 | 118 |
| Sign Control | Stop | | | Free | Free | |
| Grade | 0% | | | 0% | 0% | |
| Peak Hour Factor | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| Hourly flow rate (vph) | 86 | 33 | 147 | 947 | 135 | 118 |
| 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 | 1376 | 135 | 253 | | | |
| vC1, stage 1 conf vol | | | | | | |
| vC2, stage 2 conf vol | | | | | | |
| vCu, unblocked vol | 1376 | 135 | 253 | | | |
| tC, single (s) | 6.5 | 6.4 | 4.2 | | | |
| tC, 2 stage (s) | | | | | | |
| tF (s) | 3.6 | 3.4 | 2.3 | | | |
| p0 queue free % | 36 | 96 | 88 | | | |
| cM capacity (veh/h) | 135 | 880 | 1278 | | | |

| Direction, Lane # | EB 1 | EB 2 | NB 1 | SB 1 | SB 2 |
|---|---|---|---|---|---|
| Volume Total | 86 | 33 | 1094 | 135 | 118 |
| Volume Left | 86 | 0 | 147 | 0 | 0 |
| Volume Right | 0 | 33 | 0 | 0 | 118 |
| cSH | 135 | 880 | 1278 | 1700 | 1700 |
| Volume to Capacity | 0.64 | 0.04 | 0.12 | 0.08 | 0.07 |
| Queue Length 95th (m) | 27.2 | 0.9 | 3.1 | 0.0 | 0.0 |
| Control Delay (s) | 70.0 | 9.2 | 2.9 | 0.0 | 0.0 |
| Lane LOS | F | A | A | | |
| Approach Delay (s) | 53.1 | | 2.9 | 0.0 | |
| Approach LOS | F | | | | |

| Intersection Summary | | | |
|---|---|---|---|
| Average Delay | 6.5 | | |
| Intersection Capacity Utilization | 83.7% | ICU Level of Service | E |
| Analysis Period (min) | 15 | | |

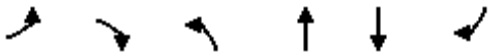
| Lane Group | WBL | WBR | NBT | NBR | SBL | SBT |
|---|---|---|---|---|---|---|
| Lane Configurations | | | | | | |
| Traffic Volume (vph) | 53 | 1 | 159 | 309 | 27 | 133 |
| Future Volume (vph) | 53 | 1 | 159 | 309 | 27 | 133 |
| Ideal Flow (vphpl) | 1800 | 1800 | 1800 | 1800 | 1800 | 1800 |
| Lane Width (m) | 4.5 | 4.5 | 3.5 | 3.5 | 3.5 | 3.5 |
| Storage Length (m) | 0.0 | 10.0 | | 0.0 | 0.0 | |
| Storage Lanes | 1 | 0 | | 0 | 0 | |
| Taper Length (m) | 7.5 | | | | 7.5 | |
| Lane Util. Factor | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| Frt | 0.997 | | 0.911 | | | |
| Flt Protected | 0.953 | | | | | 0.992 |
| Satd. Flow (prot) | 1586 | 0 | 1559 | 0 | 0 | 1630 |
| Flt Permitted | 0.953 | | | | | 0.992 |
| Satd. Flow (perm) | 1586 | 0 | 1559 | 0 | 0 | 1630 |
| Link Speed (k/h) | 40 | | 80 | | | 80 |
| Link Distance (m) | 155.0 | | 545.7 | | | 134.1 |
| Travel Time (s) | 14.0 | | 24.6 | | | 6.0 |
| Peak Hour Factor | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| Heavy Vehicles (%) | 19% | 0% | 6% | 3% | 5% | 9% |
| Adj. Flow (vph) | 53 | 1 | 159 | 309 | 27 | 133 |
| Shared Lane Traffic (%) | | | | | | |
| Lane Group Flow (vph) | 54 | 0 | 468 | 0 | 0 | 160 |
| Enter Blocked Intersection | No | No | No | No | No | No |
| Lane Alignment | Left | Right | Left | Right | Left | Left |
| Median Width(m) | 4.5 | | 0.0 | | | 0.0 |
| Link Offset(m) | 0.0 | | 0.0 | | | 0.0 |
| Crosswalk Width(m) | 4.8 | | 4.8 | | | 4.8 |
| Two way Left Turn Lane | | | | | | |
| Headway Factor | 0.95 | 0.95 | 1.09 | 1.09 | 1.09 | 1.09 |
| Turning Speed (k/h) | 25 | 15 | | 15 | 25 | |
| Sign Control | Stop | | Free | | | Free |

| Intersection Summary | | | |
|---|---|---|---|
| Area Type: | Other | | |
| Control Type: Unsignalized | | | |
| Intersection Capacity Utilization | 41.8% | ICU Level of Service | A |
| Analysis Period (min) | 15 | | |

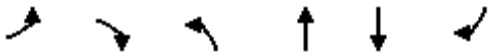
| Movement | WBL | WBR | NBT | NBR | SBL | SBT |
|---|---|---|---|---|---|---|
| Lane Configurations | | | | | | |
| Traffic Volume (veh/h) | 53 | 1 | 159 | 309 | 27 | 133 |
| Future Volume (Veh/h) | 53 | 1 | 159 | 309 | 27 | 133 |
| Sign Control | Stop | | Free | | | Free |
| Grade | 0% | | 0% | | | 0% |
| Peak Hour Factor | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| Hourly flow rate (vph) | 53 | 1 | 159 | 309 | 27 | 133 |
| 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 | 500 | 314 | | | 468 | |
| vC1, stage 1 conf vol | | | | | | |
| vC2, stage 2 conf vol | | | | | | |
| vCu, unblocked vol | 500 | 314 | | | 468 | |
| tC, single (s) | 6.6 | 6.2 | | | 4.1 | |
| tC, 2 stage (s) | | | | | | |
| tF (s) | 3.7 | 3.3 | | | 2.2 | |
| p0 queue free % | 89 | 100 | | | 97 | |
| cM capacity (veh/h) | 488 | 732 | | | 1078 | |

| Direction, Lane # | WB 1 | NB 1 | SB 1 |
|---|---|---|---|
| Volume Total | 54 | 468 | 160 |
| Volume Left | 53 | 0 | 27 |
| Volume Right | 1 | 309 | 0 |
| cSH | 491 | 1700 | 1078 |
| Volume to Capacity | 0.11 | 0.28 | 0.03 |
| Queue Length 95th (m) | 2.9 | 0.0 | 0.6 |
| Control Delay (s) | 13.2 | 0.0 | 1.6 |
| Lane LOS | B | | A |
| Approach Delay (s) | 13.2 | 0.0 | 1.6 |
| Approach LOS | B | | |

| Intersection Summary | | | |
|---|---|---|---|
| Average Delay | 1.4 | | |
| Intersection Capacity Utilization | 41.8% | ICU Level of Service | A |
| Analysis Period (min) | 15 | | |



| Lane Group | EBL | EBR | NBL | NBT | SBT | SBR |
|---|---|---|---|---|---|---|
| Lane Configurations | | | | | | |
| Traffic Volume (vph) | 85 | 805 | 164 | 276 | 232 | 18 |
| Future Volume (vph) | 85 | 805 | 164 | 276 | 232 | 18 |
| Ideal Flow (vphpl) | 1800 | 1800 | 1800 | 1800 | 1800 | 1800 |
| Lane Width (m) | 3.5 | 3.3 | 3.5 | 3.5 | 3.5 | 3.5 |
| Storage Length (m) | 0.0 | 25.0 | 50.0 | | | 0.0 |
| Storage Lanes | 1 | 1 | 1 | | | 0 |
| Taper Length (m) | 7.5 | | 75.0 | | | |
| Lane Util. Factor | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| Frt | | 0.850 | | | 0.990 | |
| Flt Protected | 0.950 | | 0.950 | | | |
| Satd. Flow (prot) | 1551 | 1436 | 1537 | 1664 | 1592 | 0 |
| Flt Permitted | 0.950 | | 0.485 | | | |
| Satd. Flow (perm) | 1551 | 1436 | 785 | 1664 | 1592 | 0 |
| Right Turn on Red | | Yes | | | | Yes |
| Satd. Flow (RTOR) | | 579 | | | 4 | |
| Link Speed (k/h) | 40 | | | 80 | 80 | |
| Link Distance (m) | 154.2 | | | 243.1 | 545.7 | |
| Travel Time (s) | 13.9 | | | 10.9 | 24.6 | |
| Peak Hour Factor | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| Heavy Vehicles (%) | 9% | 3% | 10% | 7% | 11% | 7% |
| Adj. Flow (vph) | 85 | 805 | 164 | 276 | 232 | 18 |
| Shared Lane Traffic (%) | | | | | | |
| Lane Group Flow (vph) | 85 | 805 | 164 | 276 | 250 | 0 |
| Enter Blocked Intersection | No | No | No | No | No | No |
| Lane Alignment | Left | Right | Left | Left | Left | Right |
| Median Width(m) | 3.5 | | | 3.5 | 3.5 | |
| Link Offset(m) | 0.0 | | | 0.0 | 0.0 | |
| Crosswalk Width(m) | 4.8 | | | 4.8 | 4.8 | |
| Two way Left Turn Lane | | | | | | |
| Headway Factor | 1.09 | 1.12 | 1.09 | 1.09 | 1.09 | 1.09 |
| Turning Speed (k/h) | 25 | 15 | 25 | | | 15 |
| Number of Detectors | 1 | 1 | 1 | 2 | 2 | |
| Detector Template | Left | Right | Left | Thru | Thru | |
| Leading Detector (m) | 2.0 | 2.0 | 2.0 | 10.0 | 10.0 | |
| Trailing Detector (m) | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | |
| Detector 1 Position(m) | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | |
| Detector 1 Size(m) | 2.0 | 2.0 | 2.0 | 0.6 | 0.6 | |
| Detector 1 Type | Cl+Ex | Cl+Ex | Cl+Ex | Cl+Ex | Cl+Ex | |
| Detector 1 Channel | | | | | | |
| Detector 1 Extend (s) | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | |
| Detector 1 Queue (s) | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | |
| Detector 1 Delay (s) | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | |
| Detector 2 Position(m) | | | | 9.4 | 9.4 | |
| Detector 2 Size(m) | | | | 0.6 | 0.6 | |
| Detector 2 Type | | | | Cl+Ex | Cl+Ex | |
| Detector 2 Channel | | | | | | |
| Detector 2 Extend (s) | | | | 0.0 | 0.0 | |
| Turn Type | Prot | Perm | pm+pt | NA | NA | |

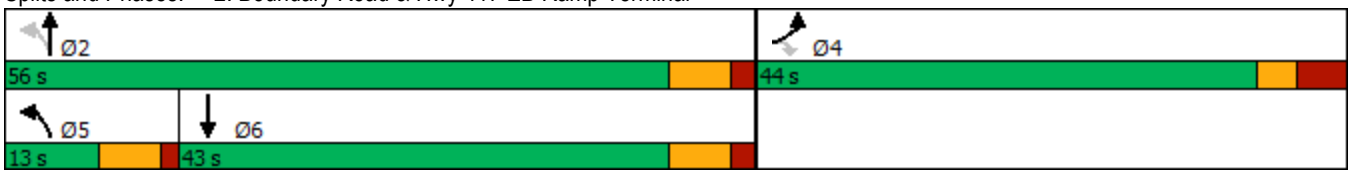


| Lane Group | EBL | EBR | NBL | NBT | SBT | SBR |
|---|---|---|---|---|---|---|
| Protected Phases | 4 | | 5 | 2 | 6 | |
| Permitted Phases | | 4 | 2 | | | |
| Detector Phase | 4 | 4 | 5 | 2 | 6 | |
| Switch Phase | | | | | | |
| Minimum Initial (s) | 7.0 | 7.0 | 7.0 | 35.0 | 35.0 | |
| Minimum Split (s) | 23.0 | 23.0 | 13.0 | 41.6 | 41.6 | |
| Total Split (s) | 44.0 | 44.0 | 13.0 | 56.0 | 43.0 | |
| Total Split (%) | 44.0% | 44.0% | 13.0% | 56.0% | 43.0% | |
| Maximum Green (s) | 37.2 | 37.2 | 7.0 | 49.4 | 36.4 | |
| Yellow Time (s) | 3.0 | 3.0 | 4.6 | 4.6 | 4.6 | |
| All-Red Time (s) | 3.8 | 3.8 | 1.4 | 2.0 | 2.0 | |
| Lost Time Adjust (s) | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | |
| Total Lost Time (s) | 6.8 | 6.8 | 6.0 | 6.6 | 6.6 | |
| Lead/Lag | | | Lead | | Lag | |
| Lead-Lag Optimize? | | | Yes | | Yes | |
| Vehicle Extension (s) | 3.0 | 3.0 | 3.0 | 3.0 | 3.0 | |
| Recall Mode | None | None | None | Min | Min | |
| Walk Time (s) | 7.0 | 7.0 | | 0.0 | 7.0 | |
| Flash Dont Walk (s) | 5.0 | 5.0 | | 0.0 | 21.0 | |
| Pedestrian Calls (#/hr) | 0 | 0 | | 0 | 0 | |
| Act Effct Green (s) | 28.0 | 28.0 | 49.3 | 48.7 | 35.5 | |
| Actuated g/C Ratio | 0.31 | 0.31 | 0.55 | 0.54 | 0.39 | |
| v/c Ratio | 0.18 | 0.95 | 0.34 | 0.31 | 0.40 | |
| Control Delay | 22.0 | 30.7 | 15.0 | 14.9 | 24.2 | |
| Queue Delay | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | |
| Total Delay | 22.0 | 30.7 | 15.0 | 14.9 | 24.2 | |
| LOS | C | C | B | B | C | |
| Approach Delay | 29.8 | | | 14.9 | 24.2 | |
| Approach LOS | C | | | B | C | |
| Queue Length 50th (m) | 11.1 | 46.0 | 17.4 | 31.7 | 36.4 | |
| Queue Length 95th (m) | 21.8 | #143.3 | 30.9 | 51.7 | 60.1 | |
| Internal Link Dist (m) | 130.2 | | | 219.1 | 521.7 | |
| Turn Bay Length (m) | | 25.0 | 50.0 | | | |
| Base Capacity (vph) | 648 | 937 | 488 | 923 | 653 | |
| Starvation Cap Reductn | 0 | 0 | 0 | 0 | 0 | |
| Spillback Cap Reductn | 0 | 0 | 0 | 0 | 0 | |
| Storage Cap Reductn | 0 | 0 | 0 | 0 | 0 | |
| Reduced v/c Ratio | 0.13 | 0.86 | 0.34 | 0.30 | 0.38 | |

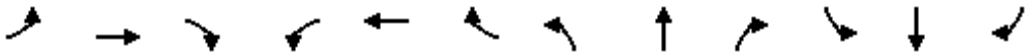
| Intersection Summary | | | |
|---|---|---|---|
| Area Type: | Other | | |
| Cycle Length: 100 | | | |
| Actuated Cycle Length: 90.3 | | | |
| Natural Cycle: 90 | | | |
| Control Type: Semi Act-Uncoord | | | |
| Maximum v/c Ratio: 0.95 | | | |
| Intersection Signal Delay: 24.8 | | Intersection LOS: C | |
| Intersection Capacity Utilization 92.9% | | ICU Level of Service F | |
| Analysis Period (min) 15 | | | |

# 95th percentile volume exceeds capacity, queue may be longer.
Queue shown is maximum after two cycles.

Splits and Phases: 2: Boundary Road & Hwy 417 EB Ramp Terminal



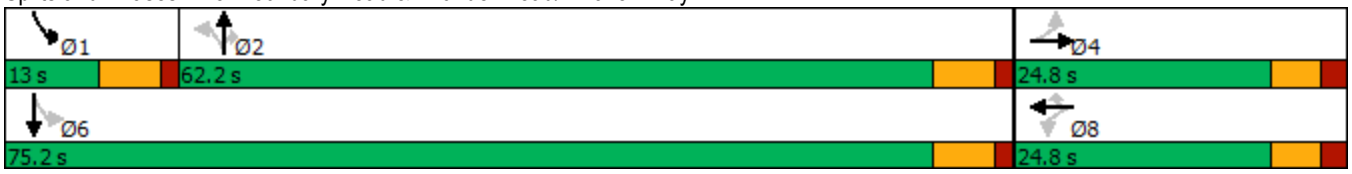
| Lane Group | EBL | EBT | EBR | WBL | WBT | WBR | NBL | NBT | NBR | SBL | SBT | SBR |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Lane Configurations | | | | | | | | | | | | |
| Traffic Volume (vph) | 76 | 0 | 17 | 6 | 0 | 20 | 5 | 345 | 0 | 2 | 968 | 67 |
| Future Volume (vph) | 76 | 0 | 17 | 6 | 0 | 20 | 5 | 345 | 0 | 2 | 968 | 67 |
| Ideal Flow (vphpl) | 1800 | 1800 | 1800 | 1800 | 1800 | 1800 | 1800 | 1800 | 1800 | 1800 | 1800 | 1800 |
| Lane Width (m) | 3.5 | 3.5 | 3.5 | 3.5 | 3.5 | 3.5 | 3.3 | 3.5 | 3.3 | 3.3 | 3.5 | 3.5 |
| Storage Length (m) | 0.0 | | 0.0 | 0.0 | | 0.0 | 35.0 | | 7.5 | 100.0 | | 0.0 |
| Storage Lanes | 0 | | 0 | 0 | | 1 | 1 | | 1 | 1 | | 0 |
| Taper Length (m) | 7.5 | | | 7.5 | | | 45.0 | | | 75.0 | | |
| Lane Util. Factor | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| Frt | | 0.975 | | | | 0.850 | | | | | 0.990 | |
| Flt Protected | | 0.961 | | | 0.950 | | 0.950 | | | 0.950 | | |
| Satd. Flow (prot) | 0 | 1590 | 0 | 0 | 1208 | 1513 | 1322 | 1633 | 1740 | 1102 | 1699 | 0 |
| Flt Permitted | | 0.761 | | | 0.809 | | 0.226 | | | 0.493 | | |
| Satd. Flow (perm) | 0 | 1259 | 0 | 0 | 1029 | 1513 | 315 | 1633 | 1740 | 572 | 1699 | 0 |
| Right Turn on Red | | | Yes | | | Yes | | | Yes | | | Yes |
| Satd. Flow (RTOR) | | 100 | | | | 100 | | | | | 8 | |
| Link Speed (k/h) | | 60 | | | 20 | | | 80 | | | 80 | |
| Link Distance (m) | | 642.8 | | | 170.6 | | | 174.7 | | | 243.1 | |
| Travel Time (s) | | 38.6 | | | 30.7 | | | 7.9 | | | 10.9 | |
| Peak Hour Factor | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| Heavy Vehicles (%) | 6% | 0% | 0% | 40% | 0% | 0% | 25% | 9% | 0% | 50% | 4% | 0% |
| Adj. Flow (vph) | 76 | 0 | 17 | 6 | 0 | 20 | 5 | 345 | 0 | 2 | 968 | 67 |
| Shared Lane Traffic (%) | | | | | | | | | | | | |
| Lane Group Flow (vph) | 0 | 93 | 0 | 0 | 6 | 20 | 5 | 345 | 0 | 2 | 1035 | 0 |
| Enter Blocked Intersection | No | No | No | No | No | No | No | No | No | No | No | No |
| Lane Alignment | Left | Left | Right | Left | Left | Right | Left | Left | Right | Left | Left | Right |
| Median Width(m) | | 0.0 | | | 0.0 | | | 3.5 | | | 3.5 | |
| Link Offset(m) | | 0.0 | | | 0.0 | | | 0.0 | | | 0.0 | |
| Crosswalk Width(m) | | 4.8 | | | 4.8 | | | 4.8 | | | 4.8 | |
| Two way Left Turn Lane | | | | | | | | | | | | |
| Headway Factor | 1.09 | 1.09 | 1.09 | 1.09 | 1.09 | 1.09 | 1.12 | 1.09 | 1.12 | 1.12 | 1.09 | 1.09 |
| Turning Speed (k/h) | 25 | | 15 | 25 | | 15 | 25 | | 15 | 25 | | 15 |
| Number of Detectors | 1 | 2 | | 1 | 2 | 1 | 1 | 2 | 1 | 1 | 2 | |
| Detector Template | Left | Thru | | Left | Thru | Right | Left | Thru | Right | Left | Thru | |
| Leading Detector (m) | 2.0 | 10.0 | | 2.0 | 10.0 | 2.0 | 2.0 | 10.0 | 2.0 | 2.0 | 10.0 | |
| Trailing Detector (m) | 0.0 | 0.0 | | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | |
| Detector 1 Position(m) | 0.0 | 0.0 | | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | |
| Detector 1 Size(m) | 2.0 | 0.6 | | 2.0 | 0.6 | 2.0 | 2.0 | 0.6 | 2.0 | 2.0 | 0.6 | |
| Detector 1 Type | Cl+Ex | Cl+Ex | | Cl+Ex | Cl+Ex | Cl+Ex | Cl+Ex | Cl+Ex | Cl+Ex | Cl+Ex | Cl+Ex | |
| Detector 1 Channel | | | | | | | | | | | | |
| Detector 1 Extend (s) | 0.0 | 0.0 | | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | |
| Detector 1 Queue (s) | 0.0 | 0.0 | | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | |
| Detector 1 Delay (s) | 0.0 | 0.0 | | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | |
| Detector 2 Position(m) | | 9.4 | | | 9.4 | | | 9.4 | | | 9.4 | |
| Detector 2 Size(m) | | 0.6 | | | 0.6 | | | 0.6 | | | 0.6 | |
| Detector 2 Type | | Cl+Ex | | | Cl+Ex | | | Cl+Ex | | | Cl+Ex | |
| Detector 2 Channel | | | | | | | | | | | | |
| Detector 2 Extend (s) | | 0.0 | | | 0.0 | | | 0.0 | | | 0.0 | |
| Turn Type | Perm | NA | | Perm | NA | Perm | Perm | NA | Perm | pm+pt | NA | |



| Lane Group | EBL | EBT | EBR | WBL | WBT | WBR | NBL | NBT | NBR | SBL | SBT | SBR |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Protected Phases | | 4 | | | 8 | | | 2 | | 1 | 6 | |
| Permitted Phases | 4 | | | 8 | | 8 | 2 | | 2 | 6 | | |
| Detector Phase | 4 | 4 | | 8 | 8 | 8 | 2 | 2 | 2 | 1 | 6 | |
| Switch Phase | | | | | | | | | | | | |
| Minimum Initial (s) | 7.0 | 7.0 | | 7.0 | 7.0 | 7.0 | 20.0 | 20.0 | 20.0 | 7.0 | 20.0 | |
| Minimum Split (s) | 24.8 | 24.8 | | 24.8 | 24.8 | 24.8 | 26.2 | 26.2 | 26.2 | 13.0 | 26.2 | |
| Total Split (s) | 24.8 | 24.8 | | 24.8 | 24.8 | 24.8 | 62.2 | 62.2 | 62.2 | 13.0 | 75.2 | |
| Total Split (%) | 24.8% | 24.8% | | 24.8% | 24.8% | 24.8% | 62.2% | 62.2% | 62.2% | 13.0% | 75.2% | |
| Maximum Green (s) | 19.0 | 19.0 | | 19.0 | 19.0 | 19.0 | 56.0 | 56.0 | 56.0 | 7.0 | 69.0 | |
| Yellow Time (s) | 3.7 | 3.7 | | 3.7 | 3.7 | 3.7 | 4.6 | 4.6 | 4.6 | 4.6 | 4.6 | |
| All-Red Time (s) | 2.1 | 2.1 | | 2.1 | 2.1 | 2.1 | 1.6 | 1.6 | 1.6 | 1.4 | 1.6 | |
| Lost Time Adjust (s) | | 0.0 | | | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | |
| Total Lost Time (s) | | 5.8 | | | 5.8 | 5.8 | 6.2 | 6.2 | 6.2 | 6.0 | 6.2 | |
| Lead/Lag | | | | | | | Lag | Lag | Lag | Lead | | |
| Lead-Lag Optimize? | | | | | | | Yes | Yes | Yes | Yes | | |
| Vehicle Extension (s) | 3.0 | 3.0 | | 3.0 | 3.0 | 3.0 | 3.0 | 3.0 | 3.0 | 3.0 | 3.0 | |
| Recall Mode | None | None | | None | None | None | Min | Min | Min | None | Min | |
| Walk Time (s) | 7.0 | 7.0 | | 7.0 | 7.0 | 7.0 | 7.0 | 7.0 | 7.0 | | 7.0 | |
| Flash Dont Walk (s) | 12.0 | 12.0 | | 12.0 | 12.0 | 12.0 | 10.0 | 10.0 | 10.0 | | 10.0 | |
| Pedestrian Calls (#/hr) | 0 | 0 | | 0 | 0 | 0 | 0 | 0 | 0 | | 0 | |
| Act Effct Green (s) | | 8.0 | | | 8.0 | 8.0 | 50.6 | 50.6 | | 50.7 | 52.5 | |
| Actuated g/C Ratio | | 0.12 | | | 0.12 | 0.12 | 0.75 | 0.75 | | 0.75 | 0.78 | |
| v/c Ratio | | 0.39 | | | 0.05 | 0.07 | 0.02 | 0.28 | | 0.00 | 0.78 | |
| Control Delay | | 12.8 | | | 34.2 | 0.6 | 5.6 | 5.7 | | 2.5 | 11.8 | |
| Queue Delay | | 0.0 | | | 0.0 | 0.0 | 0.0 | 0.0 | | 0.0 | 0.0 | |
| Total Delay | | 12.8 | | | 34.2 | 0.6 | 5.6 | 5.7 | | 2.5 | 11.8 | |
| LOS | | B | | | C | A | A | A | | A | B | |
| Approach Delay | | 12.8 | | | 8.3 | | | 5.7 | | | 11.8 | |
| Approach LOS | | B | | | A | | | A | | | B | |
| Queue Length 50th (m) | | 0.0 | | | 0.7 | 0.0 | 0.1 | 12.6 | | 0.1 | 75.9 | |
| Queue Length 95th (m) | | 12.9 | | | 4.8 | 0.0 | 1.8 | 45.1 | | 0.6 | 163.5 | |
| Internal Link Dist (m) | | 618.8 | | | 146.6 | | | 150.7 | | | 219.1 | |
| Turn Bay Length (m) | | | | | | | 35.0 | | | 100.0 | | |
| Base Capacity (vph) | | 451 | | | 311 | 528 | 258 | 1341 | | 490 | 1590 | |
| Starvation Cap Reductn | | 0 | | | 0 | 0 | 0 | 0 | | 0 | 17 | |
| Spillback Cap Reductn | | 0 | | | 0 | 0 | 0 | 0 | | 0 | 0 | |
| Storage Cap Reductn | | 0 | | | 0 | 0 | 0 | 0 | | 0 | 0 | |
| Reduced v/c Ratio | | 0.21 | | | 0.02 | 0.04 | 0.02 | 0.26 | | 0.00 | 0.66 | |

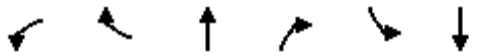
| Intersection Summary | | | |
|---|---|---|---|
| Area Type: | Other | | |
| Cycle Length: 100 | | | |
| Actuated Cycle Length: 67.2 | | | |
| Natural Cycle: 90 | | | |
| Control Type: Semi Act-Uncoord | | | |
| Maximum v/c Ratio: 0.78 | | | |
| Intersection Signal Delay: 10.4 | | Intersection LOS: B | |
| Intersection Capacity Utilization 80.3% | | ICU Level of Service D | |
| Analysis Period (min) 15 | | | |

Splits and Phases: 3: Boundary Road & Thunder Road/Amazon Way



| Lane Group | WBL | WBR | NBT | NBR | SBL | SBT |
|---|---|---|---|---|---|---|
| Lane Configurations | | | | | | |
| Traffic Volume (vph) | 6 | 13 | 336 | 6 | 15 | 976 |
| Future Volume (vph) | 6 | 13 | 336 | 6 | 15 | 976 |
| Ideal Flow (vphpl) | 1800 | 1800 | 1800 | 1800 | 1800 | 1800 |
| Lane Width (m) | 3.6 | 3.6 | 3.5 | 3.5 | 3.5 | 3.5 |
| Storage Length (m) | 0.0 | 0.0 | | 0.0 | 70.0 | |
| Storage Lanes | 1 | 0 | | 0 | 1 | |
| Taper Length (m) | 7.5 | | | | 45.0 | |
| Lane Util. Factor | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| Frt | 0.908 | | 0.998 | | | |
| Flt Protected | 0.984 | | | | 0.950 | |
| Satd. Flow (prot) | 804 | 0 | 1665 | 0 | 846 | 1745 |
| Flt Permitted | 0.984 | | | | 0.950 | |
| Satd. Flow (perm) | 804 | 0 | 1665 | 0 | 846 | 1745 |
| Link Speed (k/h) | 20 | | 80 | | | 80 |
| Link Distance (m) | 151.5 | | 1150.2 | | | 174.7 |
| Travel Time (s) | 27.3 | | 51.8 | | | 7.9 |
| Peak Hour Factor | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| Heavy Vehicles (%) | 100% | 100% | 5% | 100% | 100% | 2% |
| Adj. Flow (vph) | 6 | 13 | 336 | 6 | 15 | 976 |
| Shared Lane Traffic (%) | | | | | | |
| Lane Group Flow (vph) | 19 | 0 | 342 | 0 | 15 | 976 |
| Enter Blocked Intersection | No | No | No | No | No | No |
| Lane Alignment | Left | Right | Left | Right | Left | Left |
| Median Width(m) | 3.6 | | 3.5 | | | 3.5 |
| Link Offset(m) | 0.0 | | 0.0 | | | 0.0 |
| Crosswalk Width(m) | 4.8 | | 4.8 | | | 4.8 |
| Two way Left Turn Lane | | | | | | |
| Headway Factor | 1.07 | 1.07 | 1.09 | 1.09 | 1.09 | 1.09 |
| Turning Speed (k/h) | 25 | 15 | | 15 | 25 | |
| Sign Control | Stop | | Free | | | Free |

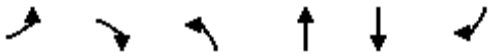
| Intersection Summary | | | |
|---|---|---|---|
| Area Type: | Other | | |
| Control Type: Unsignalized | | | |
| Intersection Capacity Utilization 64.2% | | ICU Level of Service C | |
| Analysis Period (min) 15 | | | |



| Movement | WBL | WBR | NBT | NBR | SBL | SBT |
|---|---|---|---|---|---|---|
| Lane Configurations | | | | | | |
| Traffic Volume (veh/h) | 6 | 13 | 336 | 6 | 15 | 976 |
| Future Volume (Veh/h) | 6 | 13 | 336 | 6 | 15 | 976 |
| Sign Control | Stop | | Free | | | Free |
| Grade | 0% | | 0% | | | 0% |
| Peak Hour Factor | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| Hourly flow rate (vph) | 6 | 13 | 336 | 6 | 15 | 976 |
| Pedestrians | | | | | | |
| Lane Width (m) | | | | | | |
| Walking Speed (m/s) | | | | | | |
| Percent Blockage | | | | | | |
| Right turn flare (veh) | | | | | | |
| Median type | | | None | | | None |
| Median storage veh) | | | | | | |
| Upstream signal (m) | | | | | | 175 |
| pX, platoon unblocked | 0.56 | | | | | |
| vC, conflicting volume | 1345 | 339 | | | 342 | |
| vC1, stage 1 conf vol | | | | | | |
| vC2, stage 2 conf vol | | | | | | |
| vCu, unblocked vol | 1225 | 339 | | | 342 | |
| tC, single (s) | 7.4 | 7.2 | | | 5.1 | |
| tC, 2 stage (s) | | | | | | |
| tF (s) | 4.4 | 4.2 | | | 3.1 | |
| p0 queue free % | 91 | 98 | | | 98 | |
| cM capacity (veh/h) | 70 | 527 | | | 826 | |

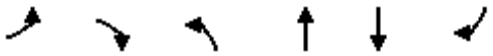
| Direction, Lane # | WB 1 | NB 1 | SB 1 | SB 2 |
|---|---|---|---|---|
| Volume Total | 19 | 342 | 15 | 976 |
| Volume Left | 6 | 0 | 15 | 0 |
| Volume Right | 13 | 6 | 0 | 0 |
| cSH | 173 | 1700 | 826 | 1700 |
| Volume to Capacity | 0.11 | 0.20 | 0.02 | 0.57 |
| Queue Length 95th (m) | 2.9 | 0.0 | 0.4 | 0.0 |
| Control Delay (s) | 28.4 | 0.0 | 9.4 | 0.0 |
| Lane LOS | D | | A | |
| Approach Delay (s) | 28.4 | 0.0 | 0.1 | |
| Approach LOS | D | | | |

| Intersection Summary | | | |
|---|---|---|---|
| Average Delay | 0.5 | | |
| Intersection Capacity Utilization | 64.2% | ICU Level of Service | C |
| Analysis Period (min) | 15 | | |



| Lane Group | EBL | EBR | NBL | NBT | SBT | SBR |
|---|---|---|---|---|---|---|
| Lane Configurations | | | | | | |
| Traffic Volume (vph) | 141 | 119 | 63 | 142 | 858 | 141 |
| Future Volume (vph) | 141 | 119 | 63 | 142 | 858 | 141 |
| Ideal Flow (vphpl) | 1800 | 1800 | 1800 | 1800 | 1800 | 1800 |
| Lane Width (m) | 3.3 | 3.3 | 3.5 | 3.5 | 3.5 | 3.5 |
| Storage Length (m) | 25.0 | 0.0 | 0.0 | | | 30.0 |
| Storage Lanes | 1 | 1 | 0 | | | 1 |
| Taper Length (m) | 47.5 | | 7.5 | | | |
| Lane Util. Factor | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| Frt | | 0.850 | | | | 0.850 |
| Flt Protected | 0.950 | | | 0.985 | | |
| Satd. Flow (prot) | 1463 | 1395 | 0 | 1666 | 1762 | 1351 |
| Flt Permitted | 0.950 | | | 0.985 | | |
| Satd. Flow (perm) | 1463 | 1395 | 0 | 1666 | 1762 | 1351 |
| Link Speed (k/h) | 80 | | | 80 | 80 | |
| Link Distance (m) | 180.5 | | | 135.8 | 1150.2 | |
| Travel Time (s) | 8.1 | | | 6.1 | 51.8 | |
| Peak Hour Factor | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| Heavy Vehicles (%) | 13% | 6% | 8% | 4% | 1% | 12% |
| Adj. Flow (vph) | 141 | 119 | 63 | 142 | 858 | 141 |
| Shared Lane Traffic (%) | | | | | | |
| Lane Group Flow (vph) | 141 | 119 | 0 | 205 | 858 | 141 |
| Enter Blocked Intersection | No | No | No | No | No | No |
| Lane Alignment | Left | Right | Left | Left | Left | Right |
| Median Width(m) | 3.3 | | | 0.0 | 0.0 | |
| Link Offset(m) | 0.0 | | | 0.0 | 0.0 | |
| Crosswalk Width(m) | 4.8 | | | 4.8 | 4.8 | |
| Two way Left Turn Lane | | | | | | |
| Headway Factor | 1.12 | 1.12 | 1.09 | 1.09 | 1.09 | 1.09 |
| Turning Speed (k/h) | 25 | 15 | 25 | | | 15 |
| Sign Control | Stop | | | Free | Free | |

| Intersection Summary | | | |
|---|---|---|---|
| Area Type: | Other | | |
| Control Type: Unsignalized | | | |
| Intersection Capacity Utilization 77.5% | | ICU Level of Service D | |
| Analysis Period (min) 15 | | | |



| Movement | EBL | EBR | NBL | NBT | SBT | SBR |
|---|---|---|---|---|---|---|
| Lane Configurations | | | | | | |
| Traffic Volume (veh/h) | 141 | 119 | 63 | 142 | 858 | 141 |
| Future Volume (Veh/h) | 141 | 119 | 63 | 142 | 858 | 141 |
| Sign Control | Stop | | | Free | Free | |
| Grade | 0% | | | 0% | 0% | |
| Peak Hour Factor | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| Hourly flow rate (vph) | 141 | 119 | 63 | 142 | 858 | 141 |
| 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 | 1126 | 858 | 999 | | | |
| vC1, stage 1 conf vol | | | | | | |
| vC2, stage 2 conf vol | | | | | | |
| vCu, unblocked vol | 1126 | 858 | 999 | | | |
| tC, single (s) | 6.5 | 6.3 | 4.2 | | | |
| tC, 2 stage (s) | | | | | | |
| tF (s) | 3.6 | 3.4 | 2.3 | | | |
| p0 queue free % | 28 | 66 | 91 | | | |
| cM capacity (veh/h) | 195 | 351 | 670 | | | |

| Direction, Lane # | EB 1 | EB 2 | NB 1 | SB 1 | SB 2 |
|---|---|---|---|---|---|
| Volume Total | 141 | 119 | 205 | 858 | 141 |
| Volume Left | 141 | 0 | 63 | 0 | 0 |
| Volume Right | 0 | 119 | 0 | 0 | 141 |
| cSH | 195 | 351 | 670 | 1700 | 1700 |
| Volume to Capacity | 0.72 | 0.34 | 0.09 | 0.50 | 0.08 |
| Queue Length 95th (m) | 37.0 | 11.7 | 2.5 | 0.0 | 0.0 |
| Control Delay (s) | 60.4 | 20.5 | 4.1 | 0.0 | 0.0 |
| Lane LOS | F | C | A | | |
| Approach Delay (s) | 42.1 | | 4.1 | 0.0 | |
| Approach LOS | E | | | | |

| Intersection Summary | | | |
|---|---|---|---|
| Average Delay | 8.1 | | |
| Intersection Capacity Utilization | 77.5% | ICU Level of Service | D |
| Analysis Period (min) | 15 | | |

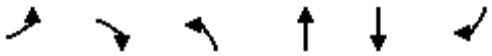
| Lane Group | WBL | WBR | NBT | NBR | SBL | SBT |
|---|---|---|---|---|---|---|
| Lane Configurations | | | | | | |
| Traffic Volume (vph) | 147 | 38 | 115 | 1036 | 94 | 123 |
| Future Volume (vph) | 147 | 38 | 115 | 1036 | 94 | 123 |
| Ideal Flow (vphpl) | 1800 | 1800 | 1800 | 1800 | 1800 | 1800 |
| Lane Width (m) | 4.5 | 4.5 | 3.5 | 3.5 | 3.5 | 3.5 |
| Storage Length (m) | 0.0 | 10.0 | | 0.0 | 0.0 | |
| Storage Lanes | 1 | 0 | | 0 | 0 | |
| Taper Length (m) | 7.5 | | | | 7.5 | |
| Lane Util. Factor | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| Frt | 0.972 | | 0.878 | | | |
| Flt Protected | 0.962 | | | | | 0.979 |
| Satd. Flow (prot) | 1746 | 0 | 1528 | 0 | 0 | 1582 |
| Flt Permitted | 0.962 | | | | | 0.979 |
| Satd. Flow (perm) | 1746 | 0 | 1528 | 0 | 0 | 1582 |
| Link Speed (k/h) | 40 | | 80 | | | 80 |
| Link Distance (m) | 155.0 | | 545.7 | | | 134.1 |
| Travel Time (s) | 14.0 | | 24.6 | | | 6.0 |
| Peak Hour Factor | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| Heavy Vehicles (%) | 4% | 14% | 14% | 1% | 9% | 11% |
| Adj. Flow (vph) | 147 | 38 | 115 | 1036 | 94 | 123 |
| Shared Lane Traffic (%) | | | | | | |
| Lane Group Flow (vph) | 185 | 0 | 1151 | 0 | 0 | 217 |
| Enter Blocked Intersection | No | No | No | No | No | No |
| Lane Alignment | Left | Right | Left | Right | Left | Left |
| Median Width(m) | 4.5 | | 0.0 | | | 0.0 |
| Link Offset(m) | 0.0 | | 0.0 | | | 0.0 |
| Crosswalk Width(m) | 4.8 | | 4.8 | | | 4.8 |
| Two way Left Turn Lane | | | | | | |
| Headway Factor | 0.95 | 0.95 | 1.09 | 1.09 | 1.09 | 1.09 |
| Turning Speed (k/h) | 25 | 15 | | 15 | 25 | |
| Sign Control | Stop | | Free | | | Free |

| Intersection Summary | | | |
|---|---|---|---|
| Area Type: | Other | | |
| Control Type: Unsignalized | | | |
| Intersection Capacity Utilization 107.3% | | ICU Level of Service G | |
| Analysis Period (min) 15 | | | |

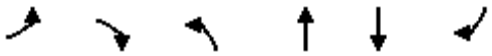
| Movement | WBL | WBR | NBT | NBR | SBL | SBT |
|---|---|---|---|---|---|---|
| Lane Configurations | | | | | | |
| Traffic Volume (veh/h) | 147 | 38 | 115 | 1036 | 94 | 123 |
| Future Volume (Veh/h) | 147 | 38 | 115 | 1036 | 94 | 123 |
| Sign Control | Stop | | Free | | | Free |
| Grade | 0% | | 0% | | | 0% |
| Peak Hour Factor | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| Hourly flow rate (vph) | 147 | 38 | 115 | 1036 | 94 | 123 |
| 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 | 944 | 633 | | | 1151 | |
| vC1, stage 1 conf vol | | | | | | |
| vC2, stage 2 conf vol | | | | | | |
| vCu, unblocked vol | 944 | 633 | | | 1151 | |
| tC, single (s) | 6.4 | 6.3 | | | 4.2 | |
| tC, 2 stage (s) | | | | | | |
| tF (s) | 3.5 | 3.4 | | | 2.3 | |
| p0 queue free % | 39 | 92 | | | 84 | |
| cM capacity (veh/h) | 242 | 459 | | | 582 | |

| Direction, Lane # | WB 1 | NB 1 | SB 1 |
|---|---|---|---|
| Volume Total | 185 | 1151 | 217 |
| Volume Left | 147 | 0 | 94 |
| Volume Right | 38 | 1036 | 0 |
| cSH | 268 | 1700 | 582 |
| Volume to Capacity | 0.69 | 0.68 | 0.16 |
| Queue Length 95th (m) | 37.0 | 0.0 | 4.6 |
| Control Delay (s) | 43.8 | 0.0 | 6.6 |
| Lane LOS | E | | A |
| Approach Delay (s) | 43.8 | 0.0 | 6.6 |
| Approach LOS | E | | |

| Intersection Summary | | | |
|---|---|---|---|
| Average Delay | 6.1 | | |
| Intersection Capacity Utilization | 107.3% | ICU Level of Service | G |
| Analysis Period (min) | 15 | | |



| Lane Group | EBL | EBR | NBL | NBT | SBT | SBR |
|---|---|---|---|---|---|---|
| Lane Configurations | | | | | | |
| Traffic Volume (vph) | 22 | 350 | 41 | 1135 | 236 | 11 |
| Future Volume (vph) | 22 | 350 | 41 | 1135 | 236 | 11 |
| Ideal Flow (vphpl) | 1800 | 1800 | 1800 | 1800 | 1800 | 1800 |
| Lane Width (m) | 3.5 | 3.3 | 3.5 | 3.5 | 3.5 | 3.5 |
| Storage Length (m) | 0.0 | 25.0 | 50.0 | | | 0.0 |
| Storage Lanes | 1 | 1 | 1 | | | 0 |
| Taper Length (m) | 7.5 | | 75.0 | | | |
| Lane Util. Factor | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| Frt | | 0.850 | | | 0.994 | |
| Flt Protected | 0.950 | | 0.950 | | | |
| Satd. Flow (prot) | 1291 | 1395 | 1291 | 1745 | 1593 | 0 |
| Flt Permitted | 0.950 | | 0.539 | | | |
| Satd. Flow (perm) | 1291 | 1395 | 732 | 1745 | 1593 | 0 |
| Right Turn on Red | | Yes | | | | Yes |
| Satd. Flow (RTOR) | | 350 | | | 4 | |
| Link Speed (k/h) | 40 | | | 80 | 80 | |
| Link Distance (m) | 154.2 | | | 243.1 | 545.7 | |
| Travel Time (s) | 13.9 | | | 10.9 | 24.6 | |
| Peak Hour Factor | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| Heavy Vehicles (%) | 31% | 6% | 31% | 2% | 11% | 13% |
| Adj. Flow (vph) | 22 | 350 | 41 | 1135 | 236 | 11 |
| Shared Lane Traffic (%) | | | | | | |
| Lane Group Flow (vph) | 22 | 350 | 41 | 1135 | 247 | 0 |
| Enter Blocked Intersection | No | No | No | No | No | No |
| Lane Alignment | Left | Right | Left | Left | Left | Right |
| Median Width(m) | 3.5 | | | 3.5 | 3.5 | |
| Link Offset(m) | 0.0 | | | 0.0 | 0.0 | |
| Crosswalk Width(m) | 4.8 | | | 4.8 | 4.8 | |
| Two way Left Turn Lane | | | | | | |
| Headway Factor | 1.09 | 1.12 | 1.09 | 1.09 | 1.09 | 1.09 |
| Turning Speed (k/h) | 25 | 15 | 25 | | | 15 |
| Number of Detectors | 1 | 1 | 1 | 2 | 2 | |
| Detector Template | Left | Right | Left | Thru | Thru | |
| Leading Detector (m) | 2.0 | 2.0 | 2.0 | 10.0 | 10.0 | |
| Trailing Detector (m) | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | |
| Detector 1 Position(m) | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | |
| Detector 1 Size(m) | 2.0 | 2.0 | 2.0 | 0.6 | 0.6 | |
| Detector 1 Type | Cl+Ex | Cl+Ex | Cl+Ex | Cl+Ex | Cl+Ex | |
| Detector 1 Channel | | | | | | |
| Detector 1 Extend (s) | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | |
| Detector 1 Queue (s) | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | |
| Detector 1 Delay (s) | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | |
| Detector 2 Position(m) | | | | 9.4 | 9.4 | |
| Detector 2 Size(m) | | | | 0.6 | 0.6 | |
| Detector 2 Type | | | | Cl+Ex | Cl+Ex | |
| Detector 2 Channel | | | | | | |
| Detector 2 Extend (s) | | | | 0.0 | 0.0 | |
| Turn Type | Prot | Perm | pm+pt | NA | NA | |

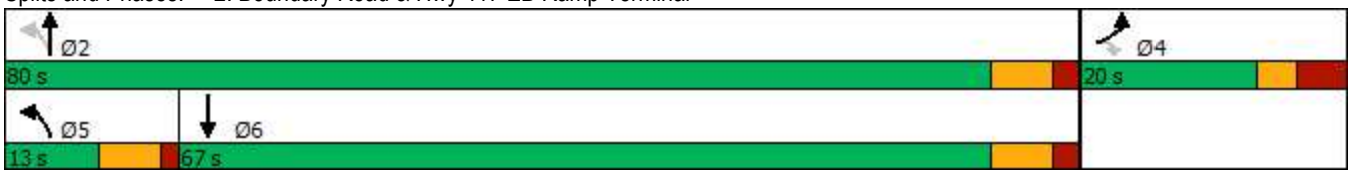


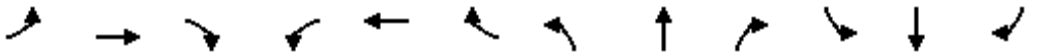
| Lane Group | EBL | EBR | NBL | NBT | SBT | SBR |
|---|---|---|---|---|---|---|
| Protected Phases | 4 | | 5 | 2 | 6 | |
| Permitted Phases | | 4 | 2 | | | |
| Detector Phase | 4 | 4 | 5 | 2 | 6 | |
| Switch Phase | | | | | | |
| Minimum Initial (s) | 7.0 | 7.0 | 7.0 | 35.0 | 35.0 | |
| Minimum Split (s) | 17.8 | 17.8 | 13.0 | 41.6 | 41.6 | |
| Total Split (s) | 20.0 | 20.0 | 13.0 | 80.0 | 67.0 | |
| Total Split (%) | 20.0% | 20.0% | 13.0% | 80.0% | 67.0% | |
| Maximum Green (s) | 13.2 | 13.2 | 7.0 | 73.4 | 60.4 | |
| Yellow Time (s) | 3.0 | 3.0 | 4.6 | 4.6 | 4.6 | |
| All-Red Time (s) | 3.8 | 3.8 | 1.4 | 2.0 | 2.0 | |
| Lost Time Adjust (s) | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | |
| Total Lost Time (s) | 6.8 | 6.8 | 6.0 | 6.6 | 6.6 | |
| Lead/Lag | | | Lead | | Lag | |
| Lead-Lag Optimize? | | | Yes | | Yes | |
| Vehicle Extension (s) | 3.0 | 3.0 | 3.0 | 3.0 | 3.0 | |
| Recall Mode | None | None | None | Min | Min | |
| Walk Time (s) | 5.0 | 5.0 | | 0.0 | 7.0 | |
| Flash Dont Walk (s) | 6.0 | 6.0 | | 0.0 | 21.0 | |
| Pedestrian Calls (#/hr) | 0 | 0 | | 0 | 0 | |
| Act Effct Green (s) | 9.0 | 9.0 | 56.1 | 55.5 | 48.6 | |
| Actuated g/C Ratio | 0.11 | 0.11 | 0.71 | 0.71 | 0.62 | |
| v/c Ratio | 0.15 | 0.75 | 0.07 | 0.92 | 0.25 | |
| Control Delay | 39.7 | 15.5 | 3.5 | 23.3 | 8.5 | |
| Queue Delay | 0.0 | 0.0 | 0.0 | 0.1 | 0.0 | |
| Total Delay | 39.7 | 15.5 | 3.5 | 23.3 | 8.5 | |
| LOS | D | B | A | C | A | |
| Approach Delay | 17.0 | | | 22.6 | 8.5 | |
| Approach LOS | B | | | C | A | |
| Queue Length 50th (m) | 3.1 | 0.0 | 1.3 | 104.3 | 17.5 | |
| Queue Length 95th (m) | 11.5 | 29.2 | 4.5 | #290.5 | 34.5 | |
| Internal Link Dist (m) | 130.2 | | | 219.1 | 521.7 | |
| Turn Bay Length (m) | | 25.0 | 50.0 | | | |
| Base Capacity (vph) | 228 | 534 | 575 | 1557 | 1262 | |
| Starvation Cap Reductn | 0 | 0 | 0 | 20 | 0 | |
| Spillback Cap Reductn | 0 | 0 | 0 | 0 | 0 | |
| Storage Cap Reductn | 0 | 0 | 0 | 0 | 0 | |
| Reduced v/c Ratio | 0.10 | 0.66 | 0.07 | 0.74 | 0.20 | |

| Intersection Summary | | | |
|---|---|---|---|
| Area Type: | Other | | |
| Cycle Length: 100 | | | |
| Actuated Cycle Length: 78.6 | | | |
| Natural Cycle: 90 | | | |
| Control Type: Semi Act-Uncoord | | | |
| Maximum v/c Ratio: 0.92 | | | |
| Intersection Signal Delay: 19.5 | | Intersection LOS: B | |
| Intersection Capacity Utilization 80.1% | | ICU Level of Service D | |
| Analysis Period (min) 15 | | | |

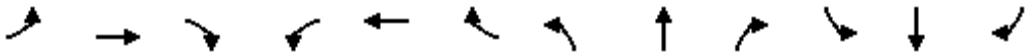
# 95th percentile volume exceeds capacity, queue may be longer.
Queue shown is maximum after two cycles.

Splits and Phases: 2: Boundary Road & Hwy 417 EB Ramp Terminal





| Lane Group | EBL | EBT | EBR | WBL | WBT | WBR | NBL | NBT | NBR | SBL | SBT | SBR |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Lane Configurations | | | | | | | | | | | | |
| Traffic Volume (vph) | 42 | 20 | 5 | 4 | 7 | 31 | 7 | 1104 | 36 | 236 | 283 | 67 |
| Future Volume (vph) | 42 | 20 | 5 | 4 | 7 | 31 | 7 | 1104 | 36 | 236 | 283 | 67 |
| Ideal Flow (vphpl) | 1800 | 1800 | 1800 | 1800 | 1800 | 1800 | 1800 | 1800 | 1800 | 1800 | 1800 | 1800 |
| Lane Width (m) | 3.5 | 3.5 | 3.5 | 3.5 | 3.5 | 3.5 | 3.3 | 3.5 | 3.3 | 3.3 | 3.5 | 3.5 |
| Storage Length (m) | 0.0 | | 0.0 | 0.0 | | 0.0 | 35.0 | | 7.5 | 100.0 | | 0.0 |
| Storage Lanes | 0 | | 0 | 0 | | 1 | 1 | | 1 | 1 | | 0 |
| Taper Length (m) | 7.5 | | | 7.5 | | | 45.0 | | | 75.0 | | |
| Lane Util. Factor | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| Frt | | 0.990 | | | | 0.850 | | | 0.850 | | 0.971 | |
| Flt Protected | | 0.970 | | | 0.982 | | 0.950 | | | 0.950 | | |
| Satd. Flow (prot) | 0 | 1618 | 0 | 0 | 1748 | 1513 | 1378 | 1728 | 1479 | 1653 | 1521 | 0 |
| Flt Permitted | | 0.803 | | | 0.868 | | 0.551 | | | 0.066 | | |
| Satd. Flow (perm) | 0 | 1340 | 0 | 0 | 1545 | 1513 | 799 | 1728 | 1479 | 115 | 1521 | 0 |
| Right Turn on Red | | | Yes | | | Yes | | | Yes | | | Yes |
| Satd. Flow (RTOR) | | 4 | | | | 100 | | | 96 | | 27 | |
| Link Speed (k/h) | | 60 | | | 20 | | | 80 | | | 80 | |
| Link Distance (m) | | 642.8 | | | 170.6 | | | 174.7 | | | 243.1 | |
| Travel Time (s) | | 38.6 | | | 30.7 | | | 7.9 | | | 10.9 | |
| Peak Hour Factor | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| Heavy Vehicles (%) | 6% | 0% | 25% | 0% | 0% | 0% | 20% | 3% | 0% | 0% | 15% | 8% |
| Adj. Flow (vph) | 42 | 20 | 5 | 4 | 7 | 31 | 7 | 1104 | 36 | 236 | 283 | 67 |
| Shared Lane Traffic (%) | | | | | | | | | | | | |
| Lane Group Flow (vph) | 0 | 67 | 0 | 0 | 11 | 31 | 7 | 1104 | 36 | 236 | 350 | 0 |
| Enter Blocked Intersection | No | No | No | No | No | No | No | No | No | No | No | No |
| Lane Alignment | Left | Left | Right | Left | Left | Right | Left | Left | Right | Left | Left | Right |
| Median Width(m) | | 0.0 | | | 0.0 | | | 3.5 | | | 3.5 | |
| Link Offset(m) | | 0.0 | | | 0.0 | | | 0.0 | | | 0.0 | |
| Crosswalk Width(m) | | 4.8 | | | 4.8 | | | 4.8 | | | 4.8 | |
| Two way Left Turn Lane | | | | | | | | | | | | |
| Headway Factor | 1.09 | 1.09 | 1.09 | 1.09 | 1.09 | 1.09 | 1.12 | 1.09 | 1.12 | 1.12 | 1.09 | 1.09 |
| Turning Speed (k/h) | 25 | | 15 | 25 | | 15 | 25 | | 15 | 25 | | 15 |
| Number of Detectors | 1 | 2 | | 1 | 2 | 1 | 1 | 2 | 1 | 1 | 2 | |
| Detector Template | Left | Thru | | Left | Thru | Right | Left | Thru | Right | Left | Thru | |
| Leading Detector (m) | 2.0 | 10.0 | | 2.0 | 10.0 | 2.0 | 2.0 | 10.0 | 2.0 | 2.0 | 10.0 | |
| Trailing Detector (m) | 0.0 | 0.0 | | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | |
| Detector 1 Position(m) | 0.0 | 0.0 | | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | |
| Detector 1 Size(m) | 2.0 | 0.6 | | 2.0 | 0.6 | 2.0 | 2.0 | 0.6 | 2.0 | 2.0 | 0.6 | |
| Detector 1 Type | Cl+Ex | Cl+Ex | | Cl+Ex | Cl+Ex | Cl+Ex | Cl+Ex | Cl+Ex | Cl+Ex | Cl+Ex | Cl+Ex | |
| Detector 1 Channel | | | | | | | | | | | | |
| Detector 1 Extend (s) | 0.0 | 0.0 | | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | |
| Detector 1 Queue (s) | 0.0 | 0.0 | | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | |
| Detector 1 Delay (s) | 0.0 | 0.0 | | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | |
| Detector 2 Position(m) | | 9.4 | | | 9.4 | | | 9.4 | | | 9.4 | |
| Detector 2 Size(m) | | 0.6 | | | 0.6 | | | 0.6 | | | 0.6 | |
| Detector 2 Type | | Cl+Ex | | | Cl+Ex | | | Cl+Ex | | | Cl+Ex | |
| Detector 2 Channel | | | | | | | | | | | | |
| Detector 2 Extend (s) | | 0.0 | | | 0.0 | | | 0.0 | | | 0.0 | |
| Turn Type | Perm | NA | | Perm | NA | Perm | Perm | NA | Perm | pm+pt | NA | |



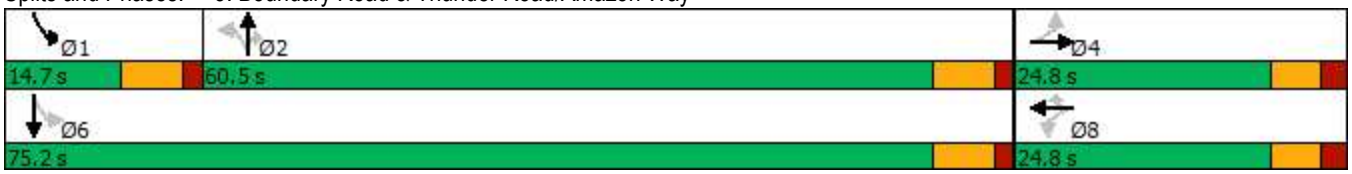
| Lane Group | EBL | EBT | EBR | WBL | WBT | WBR | NBL | NBT | NBR | SBL | SBT | SBR |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Protected Phases | | 4 | | | 8 | | | 2 | | 1 | 6 | |
| Permitted Phases | 4 | | | 8 | | 8 | 2 | | 2 | 6 | | |
| Detector Phase | 4 | 4 | | 8 | 8 | 8 | 2 | 2 | 2 | 1 | 6 | |
| Switch Phase | | | | | | | | | | | | |
| Minimum Initial (s) | 7.0 | 7.0 | | 7.0 | 7.0 | 7.0 | 20.0 | 20.0 | 20.0 | 7.0 | 20.0 | |
| Minimum Split (s) | 24.8 | 24.8 | | 24.8 | 24.8 | 24.8 | 26.2 | 26.2 | 26.2 | 13.0 | 26.2 | |
| Total Split (s) | 24.8 | 24.8 | | 24.8 | 24.8 | 24.8 | 60.5 | 60.5 | 60.5 | 14.7 | 75.2 | |
| Total Split (%) | 24.8% | 24.8% | | 24.8% | 24.8% | 24.8% | 60.5% | 60.5% | 60.5% | 14.7% | 75.2% | |
| Maximum Green (s) | 19.0 | 19.0 | | 19.0 | 19.0 | 19.0 | 54.3 | 54.3 | 54.3 | 8.7 | 69.0 | |
| Yellow Time (s) | 3.7 | 3.7 | | 3.7 | 3.7 | 3.7 | 4.6 | 4.6 | 4.6 | 4.6 | 4.6 | |
| All-Red Time (s) | 2.1 | 2.1 | | 2.1 | 2.1 | 2.1 | 1.6 | 1.6 | 1.6 | 1.4 | 1.6 | |
| Lost Time Adjust (s) | | 0.0 | | | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | |
| Total Lost Time (s) | | 5.8 | | | 5.8 | 5.8 | 6.2 | 6.2 | 6.2 | 6.0 | 6.2 | |
| Lead/Lag | | | | | | | Lag | Lag | Lag | Lead | | |
| Lead-Lag Optimize? | | | | | | | Yes | Yes | Yes | Yes | | |
| Vehicle Extension (s) | 3.0 | 3.0 | | 3.0 | 3.0 | 3.0 | 3.0 | 3.0 | 3.0 | 3.0 | 3.0 | |
| Recall Mode | None | None | | None | None | None | Min | Min | Min | None | Min | |
| Walk Time (s) | 7.0 | 7.0 | | 7.0 | 7.0 | 7.0 | 7.0 | 7.0 | 7.0 | | 7.0 | |
| Flash Dont Walk (s) | 12.0 | 12.0 | | 12.0 | 12.0 | 12.0 | 10.0 | 10.0 | 10.0 | | 10.0 | |
| Pedestrian Calls (#/hr) | 0 | 0 | | 0 | 0 | 0 | 0 | 0 | 0 | | 0 | |
| Act Effct Green (s) | | 9.8 | | | 9.8 | 9.8 | 54.7 | 54.7 | 54.7 | 69.7 | 71.0 | |
| Actuated g/C Ratio | | 0.11 | | | 0.11 | 0.11 | 0.62 | 0.62 | 0.62 | 0.79 | 0.80 | |
| v/c Ratio | | 0.44 | | | 0.06 | 0.12 | 0.01 | 1.03 | 0.04 | 0.97 | 0.29 | |
| Control Delay | | 45.3 | | | 36.5 | 1.0 | 8.6 | 57.1 | 0.1 | 77.2 | 3.9 | |
| Queue Delay | | 0.0 | | | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | |
| Total Delay | | 45.3 | | | 36.5 | 1.0 | 8.6 | 57.1 | 0.1 | 77.2 | 3.9 | |
| LOS | | D | | | D | A | A | E | A | E | A | |
| Approach Delay | | 45.3 | | | 10.3 | | | 55.0 | | | 33.4 | |
| Approach LOS | | D | | | B | | | D | | | C | |
| Queue Length 50th (m) | | 11.0 | | | 1.9 | 0.0 | 0.5 | ~225.3 | 0.0 | ~28.4 | 14.2 | |
| Queue Length 95th (m) | | 24.2 | | | 7.0 | 0.0 | 2.5 | #324.6 | 0.0 | #83.1 | 29.4 | |
| Internal Link Dist (m) | | 618.8 | | | 146.6 | | | 150.7 | | | 219.1 | |
| Turn Bay Length (m) | | | | | | | 35.0 | | 7.5 | 100.0 | | |
| Base Capacity (vph) | | 293 | | | 334 | 405 | 494 | 1068 | 951 | 243 | 1226 | |
| Starvation Cap Reductn | | 0 | | | 0 | 0 | 0 | 0 | 0 | 0 | 0 | |
| Spillback Cap Reductn | | 0 | | | 0 | 0 | 0 | 0 | 0 | 0 | 0 | |
| Storage Cap Reductn | | 0 | | | 0 | 0 | 0 | 0 | 0 | 0 | 0 | |
| Reduced v/c Ratio | | 0.23 | | | 0.03 | 0.08 | 0.01 | 1.03 | 0.04 | 0.97 | 0.29 | |

| Intersection Summary | | | |
|---|---|---|---|
| Area Type: | Other | | |
| Cycle Length: 100 | | | |
| Actuated Cycle Length: 88.4 | | | |
| Natural Cycle: 140 | | | |
| Control Type: Semi Act-Uncoord | | | |
| Maximum v/c Ratio: 1.03 | | | |
| Intersection Signal Delay: 46.7 | | Intersection LOS: D | |
| Intersection Capacity Utilization 100.7% | | ICU Level of Service G | |
| Analysis Period (min) 15 | | | |

~ Volume exceeds capacity, queue is theoretically infinite.
Queue shown is maximum after two cycles.

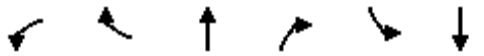
# 95th percentile volume exceeds capacity, queue may be longer.
Queue shown is maximum after two cycles.

Splits and Phases: 3: Boundary Road & Thunder Road/Amazon Way



| Lane Group | WBL | WBR | NBT | NBR | SBL | SBT |
|---|---|---|---|---|---|---|
| Lane Configurations | | | | | | |
| Traffic Volume (vph) | 7 | 4 | 1143 | 7 | 1 | 291 |
| Future Volume (vph) | 7 | 4 | 1143 | 7 | 1 | 291 |
| Ideal Flow (vphpl) | 1800 | 1800 | 1800 | 1800 | 1800 | 1800 |
| Lane Width (m) | 3.6 | 3.6 | 3.5 | 3.5 | 3.5 | 3.5 |
| Storage Length (m) | 0.0 | 0.0 | | 0.0 | 70.0 | |
| Storage Lanes | 1 | 0 | | 0 | 1 | |
| Taper Length (m) | 7.5 | | | | 45.0 | |
| Lane Util. Factor | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| Frt | 0.951 | | 0.999 | | | |
| Flt Protected | 0.969 | | | | 0.950 | |
| Satd. Flow (prot) | 829 | 0 | 1750 | 0 | 846 | 1589 |
| Flt Permitted | 0.969 | | | | 0.950 | |
| Satd. Flow (perm) | 829 | 0 | 1750 | 0 | 846 | 1589 |
| Link Speed (k/h) | 20 | | 80 | | | 80 |
| Link Distance (m) | 151.5 | | 1150.2 | | | 174.7 |
| Travel Time (s) | 27.3 | | 51.8 | | | 7.9 |
| Peak Hour Factor | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| Heavy Vehicles (%) | 100% | 100% | 1% | 100% | 100% | 12% |
| Adj. Flow (vph) | 7 | 4 | 1143 | 7 | 1 | 291 |
| Shared Lane Traffic (%) | | | | | | |
| Lane Group Flow (vph) | 11 | 0 | 1150 | 0 | 1 | 291 |
| Enter Blocked Intersection | No | No | No | No | No | No |
| Lane Alignment | Left | Right | Left | Right | Left | Left |
| Median Width(m) | 3.6 | | 3.5 | | | 3.5 |
| Link Offset(m) | 0.0 | | 0.0 | | | 0.0 |
| Crosswalk Width(m) | 4.8 | | 4.8 | | | 4.8 |
| Two way Left Turn Lane | | | | | | |
| Headway Factor | 1.07 | 1.07 | 1.09 | 1.09 | 1.09 | 1.09 |
| Turning Speed (k/h) | 25 | 15 | | 15 | 25 | |
| Sign Control | Stop | | Free | | | Free |

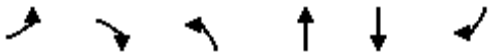
| Intersection Summary | | | |
|---|---|---|---|
| Area Type: | Other | | |
| Control Type: Unsignalized | | | |
| Intersection Capacity Utilization 73.9% | | ICU Level of Service D | |
| Analysis Period (min) 15 | | | |



| Movement | WBL | WBR | NBT | NBR | SBL | SBT |
|---|---|---|---|---|---|---|
| Lane Configurations | | | | | | |
| Traffic Volume (veh/h) | 7 | 4 | 1143 | 7 | 1 | 291 |
| Future Volume (Veh/h) | 7 | 4 | 1143 | 7 | 1 | 291 |
| Sign Control | Stop | | Free | | | Free |
| Grade | 0% | | 0% | | | 0% |
| Peak Hour Factor | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| Hourly flow rate (vph) | 7 | 4 | 1143 | 7 | 1 | 291 |
| Pedestrians | | | | | | |
| Lane Width (m) | | | | | | |
| Walking Speed (m/s) | | | | | | |
| Percent Blockage | | | | | | |
| Right turn flare (veh) | | | | | | |
| Median type | | | None | | | None |
| Median storage veh) | | | | | | |
| Upstream signal (m) | | | | | | 175 |
| pX, platoon unblocked | 0.98 | | | | | |
| vC, conflicting volume | 1440 | 1146 | | | 1150 | |
| vC1, stage 1 conf vol | | | | | | |
| vC2, stage 2 conf vol | | | | | | |
| vCu, unblocked vol | 1438 | 1146 | | | 1150 | |
| tC, single (s) | 7.4 | 7.2 | | | 5.1 | |
| tC, 2 stage (s) | | | | | | |
| tF (s) | 4.4 | 4.2 | | | 3.1 | |
| p0 queue free % | 92 | 97 | | | 100 | |
| cM capacity (veh/h) | 88 | 157 | | | 359 | |

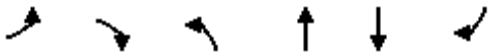
| Direction, Lane # | WB 1 | NB 1 | SB 1 | SB 2 |
|---|---|---|---|---|
| Volume Total | 11 | 1150 | 1 | 291 |
| Volume Left | 7 | 0 | 1 | 0 |
| Volume Right | 4 | 7 | 0 | 0 |
| cSH | 105 | 1700 | 359 | 1700 |
| Volume to Capacity | 0.10 | 0.68 | 0.00 | 0.17 |
| Queue Length 95th (m) | 2.7 | 0.0 | 0.1 | 0.0 |
| Control Delay (s) | 43.2 | 0.0 | 15.1 | 0.0 |
| Lane LOS | E | | C | |
| Approach Delay (s) | 43.2 | 0.0 | 0.1 | |
| Approach LOS | E | | | |

| Intersection Summary | | | |
|---|---|---|---|
| Average Delay | 0.3 | | |
| Intersection Capacity Utilization | 73.9% | ICU Level of Service | D |
| Analysis Period (min) | 15 | | |



| Lane Group | EBL | EBR | NBL | NBT | SBT | SBR |
|---|---|---|---|---|---|---|
| Lane Configurations | | | | | | |
| Traffic Volume (vph) | 95 | 36 | 163 | 1045 | 149 | 130 |
| Future Volume (vph) | 95 | 36 | 163 | 1045 | 149 | 130 |
| Ideal Flow (vphpl) | 1800 | 1800 | 1800 | 1800 | 1800 | 1800 |
| Lane Width (m) | 3.3 | 3.3 | 3.5 | 3.5 | 3.5 | 3.5 |
| Storage Length (m) | 25.0 | 0.0 | 0.0 | | | 30.0 |
| Storage Lanes | 1 | 1 | 0 | | | 1 |
| Taper Length (m) | 47.5 | | 7.5 | | | |
| Lane Util. Factor | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| Frt | | 0.850 | | | | 0.850 |
| Flt Protected | 0.950 | | | 0.993 | | |
| Satd. Flow (prot) | 1476 | 1286 | 0 | 1734 | 1561 | 1293 |
| Flt Permitted | 0.950 | | | 0.993 | | |
| Satd. Flow (perm) | 1476 | 1286 | 0 | 1734 | 1561 | 1293 |
| Link Speed (k/h) | 80 | | | 80 | 80 | |
| Link Distance (m) | 180.5 | | | 135.8 | 1150.2 | |
| Travel Time (s) | 8.1 | | | 6.1 | 51.8 | |
| Peak Hour Factor | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| Heavy Vehicles (%) | 12% | 15% | 8% | 1% | 14% | 17% |
| Adj. Flow (vph) | 95 | 36 | 163 | 1045 | 149 | 130 |
| Shared Lane Traffic (%) | | | | | | |
| Lane Group Flow (vph) | 95 | 36 | 0 | 1208 | 149 | 130 |
| Enter Blocked Intersection | No | No | No | No | No | No |
| Lane Alignment | Left | Right | Left | Left | Left | Right |
| Median Width(m) | 3.3 | | | 0.0 | 0.0 | |
| Link Offset(m) | 0.0 | | | 0.0 | 0.0 | |
| Crosswalk Width(m) | 4.8 | | | 4.8 | 4.8 | |
| Two way Left Turn Lane | | | | | | |
| Headway Factor | 1.12 | 1.12 | 1.09 | 1.09 | 1.09 | 1.09 |
| Turning Speed (k/h) | 25 | 15 | 25 | | | 15 |
| Sign Control | Stop | | | Free | Free | |

| Intersection Summary | | | |
|---|---|---|---|
| Area Type: | Other | | |
| Control Type: Unsignalized | | | |
| Intersection Capacity Utilization 91.4% | | ICU Level of Service F | |
| Analysis Period (min) 15 | | | |



| Movement | EBL | EBR | NBL | NBT | SBT | SBR |
|---|---|---|---|---|---|---|
| Lane Configurations | | | | | | |
| Traffic Volume (veh/h) | 95 | 36 | 163 | 1045 | 149 | 130 |
| Future Volume (Veh/h) | 95 | 36 | 163 | 1045 | 149 | 130 |
| Sign Control | Stop | | | Free | Free | |
| Grade | 0% | | | 0% | 0% | |
| Peak Hour Factor | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| Hourly flow rate (vph) | 95 | 36 | 163 | 1045 | 149 | 130 |
| 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 | 1520 | 149 | 279 | | | |
| vC1, stage 1 conf vol | | | | | | |
| vC2, stage 2 conf vol | | | | | | |
| vCu, unblocked vol | 1520 | 149 | 279 | | | |
| tC, single (s) | 6.5 | 6.4 | 4.2 | | | |
| tC, 2 stage (s) | | | | | | |
| tF (s) | 3.6 | 3.4 | 2.3 | | | |
| p0 queue free % | 12 | 96 | 87 | | | |
| cM capacity (veh/h) | 108 | 864 | 1250 | | | |

| Direction, Lane # | EB 1 | EB 2 | NB 1 | SB 1 | SB 2 |
|---|---|---|---|---|---|
| Volume Total | 95 | 36 | 1208 | 149 | 130 |
| Volume Left | 95 | 0 | 163 | 0 | 0 |
| Volume Right | 0 | 36 | 0 | 0 | 130 |
| cSH | 108 | 864 | 1250 | 1700 | 1700 |
| Volume to Capacity | 0.88 | 0.04 | 0.13 | 0.09 | 0.08 |
| Queue Length 95th (m) | 41.8 | 1.0 | 3.6 | 0.0 | 0.0 |
| Control Delay (s) | 130.0 | 9.3 | 3.6 | 0.0 | 0.0 |
| Lane LOS | F | A | A | | |
| Approach Delay (s) | 96.8 | | 3.6 | 0.0 | |
| Approach LOS | F | | | | |

| Intersection Summary | | | |
|---|---|---|---|
| Average Delay | 10.5 | | |
| Intersection Capacity Utilization | 91.4% | ICU Level of Service | F |
| Analysis Period (min) | 15 | | |

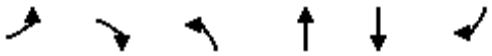
| Lane Group | WBL | WBR | NBT | NBR | SBL | SBT |
|---|---|---|---|---|---|---|
| Lane Configurations | | | | | | |
| Traffic Volume (vph) | 59 | 1 | 176 | 337 | 30 | 146 |
| Future Volume (vph) | 59 | 1 | 176 | 337 | 30 | 146 |
| Ideal Flow (vphpl) | 1800 | 1800 | 1800 | 1800 | 1800 | 1800 |
| Lane Width (m) | 4.5 | 4.5 | 3.5 | 3.5 | 3.5 | 3.5 |
| Storage Length (m) | 0.0 | 10.0 | | 0.0 | 0.0 | |
| Storage Lanes | 1 | 0 | | 0 | 0 | |
| Taper Length (m) | 7.5 | | | | 7.5 | |
| Lane Util. Factor | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| Frt | 0.998 | | 0.911 | | | |
| Flt Protected | 0.953 | | | | | 0.992 |
| Satd. Flow (prot) | 1587 | 0 | 1559 | 0 | 0 | 1630 |
| Flt Permitted | 0.953 | | | | | 0.992 |
| Satd. Flow (perm) | 1587 | 0 | 1559 | 0 | 0 | 1630 |
| Link Speed (k/h) | 40 | | 80 | | | 80 |
| Link Distance (m) | 155.0 | | 545.7 | | | 134.1 |
| Travel Time (s) | 14.0 | | 24.6 | | | 6.0 |
| Peak Hour Factor | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| Heavy Vehicles (%) | 19% | 0% | 6% | 3% | 5% | 9% |
| Adj. Flow (vph) | 59 | 1 | 176 | 337 | 30 | 146 |
| Shared Lane Traffic (%) | | | | | | |
| Lane Group Flow (vph) | 60 | 0 | 513 | 0 | 0 | 176 |
| Enter Blocked Intersection | No | No | No | No | No | No |
| Lane Alignment | Left | Right | Left | Right | Left | Left |
| Median Width(m) | 4.5 | | 0.0 | | | 0.0 |
| Link Offset(m) | 0.0 | | 0.0 | | | 0.0 |
| Crosswalk Width(m) | 4.8 | | 4.8 | | | 4.8 |
| Two way Left Turn Lane | | | | | | |
| Headway Factor | 0.95 | 0.95 | 1.09 | 1.09 | 1.09 | 1.09 |
| Turning Speed (k/h) | 25 | 15 | | 15 | 25 | |
| Sign Control | Stop | | Free | | | Free |

| Intersection Summary | | | |
|---|---|---|---|
| Area Type: | Other | | |
| Control Type: Unsignalized | | | |
| Intersection Capacity Utilization | 45.4% | ICU Level of Service | A |
| Analysis Period (min) | 15 | | |

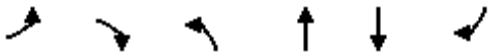
| Movement | WBL | WBR | NBT | NBR | SBL | SBT |
|---|---|---|---|---|---|---|
| Lane Configurations | | | | | | |
| Traffic Volume (veh/h) | 59 | 1 | 176 | 337 | 30 | 146 |
| Future Volume (Veh/h) | 59 | 1 | 176 | 337 | 30 | 146 |
| Sign Control | Stop | | Free | | | Free |
| Grade | 0% | | 0% | | | 0% |
| Peak Hour Factor | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| Hourly flow rate (vph) | 59 | 1 | 176 | 337 | 30 | 146 |
| 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 | 550 | 344 | | | 513 | |
| vC1, stage 1 conf vol | | | | | | |
| vC2, stage 2 conf vol | | | | | | |
| vCu, unblocked vol | 550 | 344 | | | 513 | |
| tC, single (s) | 6.6 | 6.2 | | | 4.1 | |
| tC, 2 stage (s) | | | | | | |
| tF (s) | 3.7 | 3.3 | | | 2.2 | |
| p0 queue free % | 87 | 100 | | | 97 | |
| cM capacity (veh/h) | 454 | 703 | | | 1037 | |

| Direction, Lane # | WB 1 | NB 1 | SB 1 |
|---|---|---|---|
| Volume Total | 60 | 513 | 176 |
| Volume Left | 59 | 0 | 30 |
| Volume Right | 1 | 337 | 0 |
| cSH | 457 | 1700 | 1037 |
| Volume to Capacity | 0.13 | 0.30 | 0.03 |
| Queue Length 95th (m) | 3.6 | 0.0 | 0.7 |
| Control Delay (s) | 14.1 | 0.0 | 1.7 |
| Lane LOS | B | | A |
| Approach Delay (s) | 14.1 | 0.0 | 1.7 |
| Approach LOS | B | | |

| Intersection Summary | | | |
|---|---|---|---|
| Average Delay | 1.5 | | |
| Intersection Capacity Utilization | 45.4% | ICU Level of Service | A |
| Analysis Period (min) | 15 | | |



| Lane Group | EBL | EBR | NBL | NBT | SBT | SBR |
|---|---|---|---|---|---|---|
| Lane Configurations | | | | | | |
| Traffic Volume (vph) | 94 | 885 | 181 | 301 | 256 | 20 |
| Future Volume (vph) | 94 | 885 | 181 | 301 | 256 | 20 |
| Ideal Flow (vphpl) | 1800 | 1800 | 1800 | 1800 | 1800 | 1800 |
| Lane Width (m) | 3.5 | 3.3 | 3.5 | 3.5 | 3.5 | 3.5 |
| Storage Length (m) | 0.0 | 25.0 | 50.0 | | | 0.0 |
| Storage Lanes | 1 | 1 | 1 | | | 0 |
| Taper Length (m) | 7.5 | | 75.0 | | | |
| Lane Util. Factor | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| Frt | | 0.850 | | | 0.990 | |
| Flt Protected | 0.950 | | 0.950 | | | |
| Satd. Flow (prot) | 1551 | 1436 | 1537 | 1664 | 1592 | 0 |
| Flt Permitted | 0.950 | | 0.433 | | | |
| Satd. Flow (perm) | 1551 | 1436 | 701 | 1664 | 1592 | 0 |
| Right Turn on Red | | Yes | | | | Yes |
| Satd. Flow (RTOR) | | 545 | | | 4 | |
| Link Speed (k/h) | 40 | | | 80 | 80 | |
| Link Distance (m) | 154.2 | | | 243.1 | 545.7 | |
| Travel Time (s) | 13.9 | | | 10.9 | 24.6 | |
| Peak Hour Factor | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| Heavy Vehicles (%) | 9% | 3% | 10% | 7% | 11% | 7% |
| Adj. Flow (vph) | 94 | 885 | 181 | 301 | 256 | 20 |
| Shared Lane Traffic (%) | | | | | | |
| Lane Group Flow (vph) | 94 | 885 | 181 | 301 | 276 | 0 |
| Enter Blocked Intersection | No | No | No | No | No | No |
| Lane Alignment | Left | Right | Left | Left | Left | Right |
| Median Width(m) | 3.5 | | | 3.5 | 3.5 | |
| Link Offset(m) | 0.0 | | | 0.0 | 0.0 | |
| Crosswalk Width(m) | 4.8 | | | 4.8 | 4.8 | |
| Two way Left Turn Lane | | | | | | |
| Headway Factor | 1.09 | 1.12 | 1.09 | 1.09 | 1.09 | 1.09 |
| Turning Speed (k/h) | 25 | 15 | 25 | | | 15 |
| Number of Detectors | 1 | 1 | 1 | 2 | 2 | |
| Detector Template | Left | Right | Left | Thru | Thru | |
| Leading Detector (m) | 2.0 | 2.0 | 2.0 | 10.0 | 10.0 | |
| Trailing Detector (m) | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | |
| Detector 1 Position(m) | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | |
| Detector 1 Size(m) | 2.0 | 2.0 | 2.0 | 0.6 | 0.6 | |
| Detector 1 Type | Cl+Ex | Cl+Ex | Cl+Ex | Cl+Ex | Cl+Ex | |
| Detector 1 Channel | | | | | | |
| Detector 1 Extend (s) | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | |
| Detector 1 Queue (s) | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | |
| Detector 1 Delay (s) | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | |
| Detector 2 Position(m) | | | | 9.4 | 9.4 | |
| Detector 2 Size(m) | | | | 0.6 | 0.6 | |
| Detector 2 Type | | | | Cl+Ex | Cl+Ex | |
| Detector 2 Channel | | | | | | |
| Detector 2 Extend (s) | | | | 0.0 | 0.0 | |
| Turn Type | Prot | Perm | pm+pt | NA | NA | |



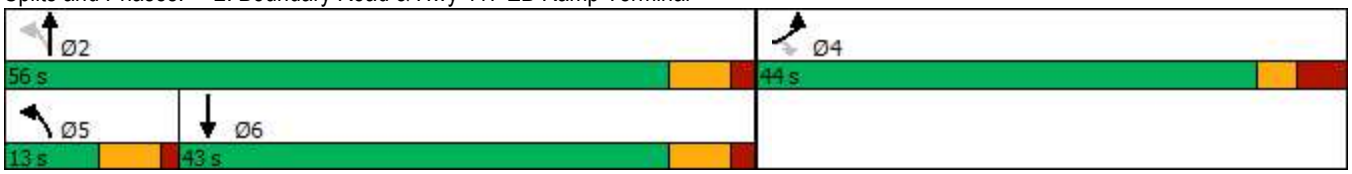
| Lane Group | EBL | EBR | NBL | NBT | SBT | SBR |
|---|---|---|---|---|---|---|
| Protected Phases | 4 | | 5 | 2 | 6 | |
| Permitted Phases | | 4 | 2 | | | |
| Detector Phase | 4 | 4 | 5 | 2 | 6 | |
| Switch Phase | | | | | | |
| Minimum Initial (s) | 7.0 | 7.0 | 7.0 | 35.0 | 35.0 | |
| Minimum Split (s) | 23.0 | 23.0 | 13.0 | 41.6 | 41.6 | |
| Total Split (s) | 44.0 | 44.0 | 13.0 | 56.0 | 43.0 | |
| Total Split (%) | 44.0% | 44.0% | 13.0% | 56.0% | 43.0% | |
| Maximum Green (s) | 37.2 | 37.2 | 7.0 | 49.4 | 36.4 | |
| Yellow Time (s) | 3.0 | 3.0 | 4.6 | 4.6 | 4.6 | |
| All-Red Time (s) | 3.8 | 3.8 | 1.4 | 2.0 | 2.0 | |
| Lost Time Adjust (s) | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | |
| Total Lost Time (s) | 6.8 | 6.8 | 6.0 | 6.6 | 6.6 | |
| Lead/Lag | | | Lead | | Lag | |
| Lead-Lag Optimize? | | | Yes | | Yes | |
| Vehicle Extension (s) | 3.0 | 3.0 | 3.0 | 3.0 | 3.0 | |
| Recall Mode | None | None | None | Min | Min | |
| Walk Time (s) | 7.0 | 7.0 | | 0.0 | 7.0 | |
| Flash Dont Walk (s) | 5.0 | 5.0 | | 0.0 | 21.0 | |
| Pedestrian Calls (#/hr) | 0 | 0 | | 0 | 0 | |
| Act Effct Green (s) | 37.2 | 37.2 | 48.6 | 48.0 | 35.0 | |
| Actuated g/C Ratio | 0.38 | 0.38 | 0.49 | 0.49 | 0.35 | |
| v/c Ratio | 0.16 | 1.00 | 0.45 | 0.37 | 0.49 | |
| Control Delay | 21.3 | 44.9 | 18.6 | 17.5 | 28.0 | |
| Queue Delay | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | |
| Total Delay | 21.3 | 44.9 | 18.6 | 17.5 | 28.0 | |
| LOS | C | D | B | B | C | |
| Approach Delay | 42.7 | | | 17.9 | 28.0 | |
| Approach LOS | D | | | B | C | |
| Queue Length 50th (m) | 12.3 | ~92.8 | 20.1 | 36.4 | 42.0 | |
| Queue Length 95th (m) | 23.7 | #189.1 | 34.1 | 56.9 | 67.0 | |
| Internal Link Dist (m) | 130.2 | | | 219.1 | 521.7 | |
| Turn Bay Length (m) | | 25.0 | 50.0 | | | |
| Base Capacity (vph) | 585 | 881 | 404 | 833 | 590 | |
| Starvation Cap Reductn | 0 | 0 | 0 | 0 | 0 | |
| Spillback Cap Reductn | 0 | 0 | 0 | 0 | 0 | |
| Storage Cap Reductn | 0 | 0 | 0 | 0 | 0 | |
| Reduced v/c Ratio | 0.16 | 1.00 | 0.45 | 0.36 | 0.47 | |

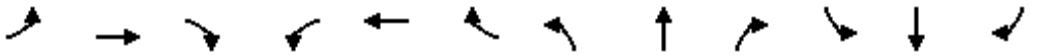
| Intersection Summary | | | |
|---|---|---|---|
| Area Type: | Other | | |
| Cycle Length: 100 | | | |
| Actuated Cycle Length: 98.6 | | | |
| Natural Cycle: 90 | | | |
| Control Type: Semi Act-Uncoord | | | |
| Maximum v/c Ratio: 1.00 | | | |
| Intersection Signal Delay: 33.5 | | Intersection LOS: C | |
| Intersection Capacity Utilization 98.2% | | ICU Level of Service F | |
| Analysis Period (min) 15 | | | |

~ Volume exceeds capacity, queue is theoretically infinite.
Queue shown is maximum after two cycles.

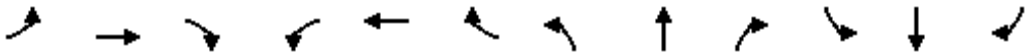
# 95th percentile volume exceeds capacity, queue may be longer.
Queue shown is maximum after two cycles.

Splits and Phases: 2: Boundary Road & Hwy 417 EB Ramp Terminal





| Lane Group | EBL | EBT | EBR | WBL | WBT | WBR | NBL | NBT | NBR | SBL | SBT | SBR |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Lane Configurations | | | | | | | | | | | | |
| Traffic Volume (vph) | 83 | 0 | 19 | 7 | 0 | 22 | 5 | 377 | 0 | 3 | 1065 | 74 |
| Future Volume (vph) | 83 | 0 | 19 | 7 | 0 | 22 | 5 | 377 | 0 | 3 | 1065 | 74 |
| Ideal Flow (vphpl) | 1800 | 1800 | 1800 | 1800 | 1800 | 1800 | 1800 | 1800 | 1800 | 1800 | 1800 | 1800 |
| Lane Width (m) | 3.5 | 3.5 | 3.5 | 3.5 | 3.5 | 3.5 | 3.3 | 3.5 | 3.3 | 3.3 | 3.5 | 3.5 |
| Storage Length (m) | 0.0 | | 0.0 | 0.0 | | 0.0 | 35.0 | | 7.5 | 100.0 | | 0.0 |
| Storage Lanes | 0 | | 0 | 0 | | 1 | 1 | | 1 | 1 | | 0 |
| Taper Length (m) | 7.5 | | | 7.5 | | | 45.0 | | | 75.0 | | |
| Lane Util. Factor | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| Frt | | 0.975 | | | | 0.850 | | | | | 0.990 | |
| Flt Protected | | 0.961 | | | 0.950 | | 0.950 | | | 0.950 | | |
| Satd. Flow (prot) | 0 | 1590 | 0 | 0 | 1208 | 1513 | 1322 | 1633 | 1740 | 1102 | 1699 | 0 |
| Flt Permitted | | 0.761 | | | 0.785 | | 0.188 | | | 0.486 | | |
| Satd. Flow (perm) | 0 | 1259 | 0 | 0 | 998 | 1513 | 262 | 1633 | 1740 | 564 | 1699 | 0 |
| Right Turn on Red | | | Yes | | | Yes | | | Yes | | | Yes |
| Satd. Flow (RTOR) | | 100 | | | | 100 | | | | | 8 | |
| Link Speed (k/h) | | 60 | | | 20 | | | 80 | | | 80 | |
| Link Distance (m) | | 642.8 | | | 170.6 | | | 174.7 | | | 243.1 | |
| Travel Time (s) | | 38.6 | | | 30.7 | | | 7.9 | | | 10.9 | |
| Peak Hour Factor | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| Heavy Vehicles (%) | 6% | 0% | 0% | 40% | 0% | 0% | 25% | 9% | 0% | 50% | 4% | 0% |
| Adj. Flow (vph) | 83 | 0 | 19 | 7 | 0 | 22 | 5 | 377 | 0 | 3 | 1065 | 74 |
| Shared Lane Traffic (%) | | | | | | | | | | | | |
| Lane Group Flow (vph) | 0 | 102 | 0 | 0 | 7 | 22 | 5 | 377 | 0 | 3 | 1139 | 0 |
| Enter Blocked Intersection | No | No | No | No | No | No | No | No | No | No | No | No |
| Lane Alignment | Left | Left | Right | Left | Left | Right | Left | Left | Right | Left | Left | Right |
| Median Width(m) | | 0.0 | | | 0.0 | | | 3.5 | | | 3.5 | |
| Link Offset(m) | | 0.0 | | | 0.0 | | | 0.0 | | | 0.0 | |
| Crosswalk Width(m) | | 4.8 | | | 4.8 | | | 4.8 | | | 4.8 | |
| Two way Left Turn Lane | | | | | | | | | | | | |
| Headway Factor | 1.09 | 1.09 | 1.09 | 1.09 | 1.09 | 1.09 | 1.12 | 1.09 | 1.12 | 1.12 | 1.09 | 1.09 |
| Turning Speed (k/h) | 25 | | 15 | 25 | | 15 | 25 | | 15 | 25 | | 15 |
| Number of Detectors | 1 | 2 | | 1 | 2 | 1 | 1 | 2 | 1 | 1 | 2 | |
| Detector Template | Left | Thru | | Left | Thru | Right | Left | Thru | Right | Left | Thru | |
| Leading Detector (m) | 2.0 | 10.0 | | 2.0 | 10.0 | 2.0 | 2.0 | 10.0 | 2.0 | 2.0 | 10.0 | |
| Trailing Detector (m) | 0.0 | 0.0 | | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | |
| Detector 1 Position(m) | 0.0 | 0.0 | | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | |
| Detector 1 Size(m) | 2.0 | 0.6 | | 2.0 | 0.6 | 2.0 | 2.0 | 0.6 | 2.0 | 2.0 | 0.6 | |
| Detector 1 Type | Cl+Ex | Cl+Ex | | Cl+Ex | Cl+Ex | Cl+Ex | Cl+Ex | Cl+Ex | Cl+Ex | Cl+Ex | Cl+Ex | |
| Detector 1 Channel | | | | | | | | | | | | |
| Detector 1 Extend (s) | 0.0 | 0.0 | | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | |
| Detector 1 Queue (s) | 0.0 | 0.0 | | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | |
| Detector 1 Delay (s) | 0.0 | 0.0 | | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | |
| Detector 2 Position(m) | | 9.4 | | | 9.4 | | | 9.4 | | | 9.4 | |
| Detector 2 Size(m) | | 0.6 | | | 0.6 | | | 0.6 | | | 0.6 | |
| Detector 2 Type | | Cl+Ex | | | Cl+Ex | | | Cl+Ex | | | Cl+Ex | |
| Detector 2 Channel | | | | | | | | | | | | |
| Detector 2 Extend (s) | | 0.0 | | | 0.0 | | | 0.0 | | | 0.0 | |
| Turn Type | Perm | NA | | Perm | NA | Perm | Perm | NA | Perm | pm+pt | NA | |

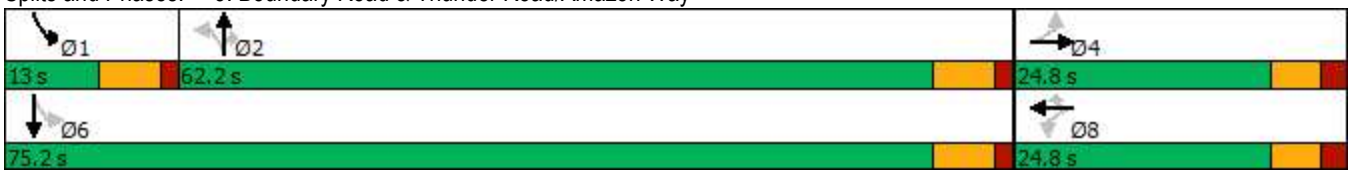


| Lane Group | EBL | EBT | EBR | WBL | WBT | WBR | NBL | NBT | NBR | SBL | SBT | SBR |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Protected Phases | | 4 | | | 8 | | | 2 | | 1 | 6 | |
| Permitted Phases | 4 | | | 8 | | 8 | 2 | | 2 | 6 | | |
| Detector Phase | 4 | 4 | | 8 | 8 | 8 | 2 | 2 | 2 | 1 | 6 | |
| Switch Phase | | | | | | | | | | | | |
| Minimum Initial (s) | 7.0 | 7.0 | | 7.0 | 7.0 | 7.0 | 20.0 | 20.0 | 20.0 | 7.0 | 20.0 | |
| Minimum Split (s) | 24.8 | 24.8 | | 24.8 | 24.8 | 24.8 | 26.2 | 26.2 | 26.2 | 13.0 | 26.2 | |
| Total Split (s) | 24.8 | 24.8 | | 24.8 | 24.8 | 24.8 | 62.2 | 62.2 | 62.2 | 13.0 | 75.2 | |
| Total Split (%) | 24.8% | 24.8% | | 24.8% | 24.8% | 24.8% | 62.2% | 62.2% | 62.2% | 13.0% | 75.2% | |
| Maximum Green (s) | 19.0 | 19.0 | | 19.0 | 19.0 | 19.0 | 56.0 | 56.0 | 56.0 | 7.0 | 69.0 | |
| Yellow Time (s) | 3.7 | 3.7 | | 3.7 | 3.7 | 3.7 | 4.6 | 4.6 | 4.6 | 4.6 | 4.6 | |
| All-Red Time (s) | 2.1 | 2.1 | | 2.1 | 2.1 | 2.1 | 1.6 | 1.6 | 1.6 | 1.4 | 1.6 | |
| Lost Time Adjust (s) | | 0.0 | | | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | |
| Total Lost Time (s) | | 5.8 | | | 5.8 | 5.8 | 6.2 | 6.2 | 6.2 | 6.0 | 6.2 | |
| Lead/Lag | | | | | | | Lag | Lag | Lag | Lead | | |
| Lead-Lag Optimize? | | | | | | | Yes | Yes | Yes | Yes | | |
| Vehicle Extension (s) | 3.0 | 3.0 | | 3.0 | 3.0 | 3.0 | 3.0 | 3.0 | 3.0 | 3.0 | 3.0 | |
| Recall Mode | None | None | | None | None | None | Min | Min | Min | None | Min | |
| Walk Time (s) | 7.0 | 7.0 | | 7.0 | 7.0 | 7.0 | 7.0 | 7.0 | 7.0 | | 7.0 | |
| Flash Dont Walk (s) | 12.0 | 12.0 | | 12.0 | 12.0 | 12.0 | 10.0 | 10.0 | 10.0 | | 10.0 | |
| Pedestrian Calls (#/hr) | 0 | 0 | | 0 | 0 | 0 | 0 | 0 | 0 | | 0 | |
| Act Effct Green (s) | | 8.3 | | | 8.3 | 8.3 | 64.3 | 64.3 | | 64.9 | 66.6 | |
| Actuated g/C Ratio | | 0.10 | | | 0.10 | 0.10 | 0.79 | 0.79 | | 0.80 | 0.82 | |
| v/c Ratio | | 0.47 | | | 0.07 | 0.09 | 0.02 | 0.29 | | 0.01 | 0.82 | |
| Control Delay | | 16.6 | | | 38.1 | 0.7 | 5.8 | 5.4 | | 2.7 | 13.8 | |
| Queue Delay | | 0.0 | | | 0.0 | 0.0 | 0.0 | 0.0 | | 0.0 | 0.6 | |
| Total Delay | | 16.6 | | | 38.1 | 0.7 | 5.8 | 5.4 | | 2.7 | 14.4 | |
| LOS | | B | | | D | A | A | A | | A | B | |
| Approach Delay | | 16.6 | | | 9.8 | | | 5.4 | | | 14.4 | |
| Approach LOS | | B | | | A | | | A | | | B | |
| Queue Length 50th (m) | | 0.3 | | | 1.2 | 0.0 | 0.1 | 14.2 | | 0.1 | 99.3 | |
| Queue Length 95th (m) | | 15.2 | | | 5.3 | 0.0 | 1.9 | 51.6 | | 0.8 | #277.2 | |
| Internal Link Dist (m) | | 618.8 | | | 146.6 | | | 150.7 | | | 219.1 | |
| Turn Bay Length (m) | | | | | | | 35.0 | | | 100.0 | | |
| Base Capacity (vph) | | 380 | | | 241 | 442 | 206 | 1286 | | 496 | 1402 | |
| Starvation Cap Reductn | | 0 | | | 0 | 0 | 0 | 0 | | 0 | 61 | |
| Spillback Cap Reductn | | 0 | | | 0 | 0 | 0 | 0 | | 0 | 0 | |
| Storage Cap Reductn | | 0 | | | 0 | 0 | 0 | 0 | | 0 | 0 | |
| Reduced v/c Ratio | | 0.27 | | | 0.03 | 0.05 | 0.02 | 0.29 | | 0.01 | 0.85 | |

| Intersection Summary | | | |
|---|---|---|---|
| Area Type: | Other | | |
| Cycle Length: 100 | | | |
| Actuated Cycle Length: 81.6 | | | |
| Natural Cycle: 90 | | | |
| Control Type: Semi Act-Uncoord | | | |
| Maximum v/c Ratio: 0.82 | | | |
| Intersection Signal Delay: 12.3 | | Intersection LOS: B | |
| Intersection Capacity Utilization 86.6% | | ICU Level of Service E | |
| Analysis Period (min) 15 | | | |

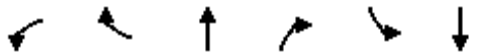
# 95th percentile volume exceeds capacity, queue may be longer.
Queue shown is maximum after two cycles.

Splits and Phases: 3: Boundary Road & Thunder Road/Amazon Way



| Lane Group | WBL | WBR | NBT | NBR | SBL | SBT |
|---|---|---|---|---|---|---|
| Lane Configurations | | | | | | |
| Traffic Volume (vph) | 7 | 15 | 367 | 7 | 16 | 1074 |
| Future Volume (vph) | 7 | 15 | 367 | 7 | 16 | 1074 |
| Ideal Flow (vphpl) | 1800 | 1800 | 1800 | 1800 | 1800 | 1800 |
| Lane Width (m) | 3.6 | 3.6 | 3.5 | 3.5 | 3.5 | 3.5 |
| Storage Length (m) | 0.0 | 0.0 | | 0.0 | 70.0 | |
| Storage Lanes | 1 | 0 | | 0 | 1 | |
| Taper Length (m) | 7.5 | | | | 45.0 | |
| Lane Util. Factor | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| Frt | 0.908 | | 0.997 | | | |
| Flt Protected | 0.984 | | | | 0.950 | |
| Satd. Flow (prot) | 804 | 0 | 1662 | 0 | 846 | 1745 |
| Flt Permitted | 0.984 | | | | 0.950 | |
| Satd. Flow (perm) | 804 | 0 | 1662 | 0 | 846 | 1745 |
| Link Speed (k/h) | 20 | | 80 | | | 80 |
| Link Distance (m) | 151.5 | | 1150.2 | | | 174.7 |
| Travel Time (s) | 27.3 | | 51.8 | | | 7.9 |
| Peak Hour Factor | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| Heavy Vehicles (%) | 100% | 100% | 5% | 100% | 100% | 2% |
| Adj. Flow (vph) | 7 | 15 | 367 | 7 | 16 | 1074 |
| Shared Lane Traffic (%) | | | | | | |
| Lane Group Flow (vph) | 22 | 0 | 374 | 0 | 16 | 1074 |
| Enter Blocked Intersection | No | No | No | No | No | No |
| Lane Alignment | Left | Right | Left | Right | Left | Left |
| Median Width(m) | 3.6 | | 3.5 | | | 3.5 |
| Link Offset(m) | 0.0 | | 0.0 | | | 0.0 |
| Crosswalk Width(m) | 4.8 | | 4.8 | | | 4.8 |
| Two way Left Turn Lane | | | | | | |
| Headway Factor | 1.07 | 1.07 | 1.09 | 1.09 | 1.09 | 1.09 |
| Turning Speed (k/h) | 25 | 15 | | 15 | 25 | |
| Sign Control | Stop | | Free | | | Free |

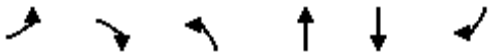
| Intersection Summary | | | |
|---|---|---|---|
| Area Type: | Other | | |
| Control Type: Unsignalized | | | |
| Intersection Capacity Utilization 69.7% | | ICU Level of Service C | |
| Analysis Period (min) 15 | | | |



| Movement | WBL | WBR | NBT | NBR | SBL | SBT |
|---|---|---|---|---|---|---|
| Lane Configurations | | | | | | |
| Traffic Volume (veh/h) | 7 | 15 | 367 | 7 | 16 | 1074 |
| Future Volume (Veh/h) | 7 | 15 | 367 | 7 | 16 | 1074 |
| Sign Control | Stop | | Free | | | Free |
| Grade | 0% | | 0% | | | 0% |
| Peak Hour Factor | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| Hourly flow rate (vph) | 7 | 15 | 367 | 7 | 16 | 1074 |
| Pedestrians | | | | | | |
| Lane Width (m) | | | | | | |
| Walking Speed (m/s) | | | | | | |
| Percent Blockage | | | | | | |
| Right turn flare (veh) | | | | | | |
| Median type | | | None | | | None |
| Median storage veh) | | | | | | |
| Upstream signal (m) | | | | | | 175 |
| pX, platoon unblocked | 0.24 | | | | | |
| vC, conflicting volume | 1476 | 370 | | | 374 | |
| vC1, stage 1 conf vol | | | | | | |
| vC2, stage 2 conf vol | | | | | | |
| vCu, unblocked vol | 1401 | 370 | | | 374 | |
| tC, single (s) | 7.4 | 7.2 | | | 5.1 | |
| tC, 2 stage (s) | | | | | | |
| tF (s) | 4.4 | 4.2 | | | 3.1 | |
| p0 queue free % | 69 | 97 | | | 98 | |
| cM capacity (veh/h) | 22 | 503 | | | 800 | |

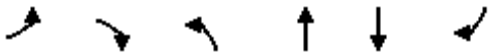
| Direction, Lane # | WB 1 | NB 1 | SB 1 | SB 2 |
|---|---|---|---|---|
| Volume Total | 22 | 374 | 16 | 1074 |
| Volume Left | 7 | 0 | 16 | 0 |
| Volume Right | 15 | 7 | 0 | 0 |
| cSH | 64 | 1700 | 800 | 1700 |
| Volume to Capacity | 0.34 | 0.22 | 0.02 | 0.63 |
| Queue Length 95th (m) | 10.1 | 0.0 | 0.5 | 0.0 |
| Control Delay (s) | 88.1 | 0.0 | 9.6 | 0.0 |
| Lane LOS | F | | A | |
| Approach Delay (s) | 88.1 | 0.0 | 0.1 | |
| Approach LOS | F | | | |

| Intersection Summary | | | |
|---|---|---|---|
| Average Delay | 1.4 | | |
| Intersection Capacity Utilization | 69.7% | ICU Level of Service | C |
| Analysis Period (min) | 15 | | |



| Lane Group | EBL | EBR | NBL | NBT | SBT | SBR |
|---|---|---|---|---|---|---|
| Lane Configurations | | | | | | |
| Traffic Volume (vph) | 155 | 132 | 70 | 157 | 947 | 155 |
| Future Volume (vph) | 155 | 132 | 70 | 157 | 947 | 155 |
| Ideal Flow (vphpl) | 1800 | 1800 | 1800 | 1800 | 1800 | 1800 |
| Lane Width (m) | 3.3 | 3.3 | 3.5 | 3.5 | 3.5 | 3.5 |
| Storage Length (m) | 25.0 | 0.0 | 0.0 | | | 30.0 |
| Storage Lanes | 1 | 1 | 0 | | | 1 |
| Taper Length (m) | 47.5 | | 7.5 | | | |
| Lane Util. Factor | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| Frt | | 0.850 | | | | 0.850 |
| Flt Protected | 0.950 | | | 0.985 | | |
| Satd. Flow (prot) | 1463 | 1395 | 0 | 1666 | 1762 | 1351 |
| Flt Permitted | 0.950 | | | 0.985 | | |
| Satd. Flow (perm) | 1463 | 1395 | 0 | 1666 | 1762 | 1351 |
| Link Speed (k/h) | 80 | | | 80 | 80 | |
| Link Distance (m) | 180.5 | | | 135.8 | 1150.2 | |
| Travel Time (s) | 8.1 | | | 6.1 | 51.8 | |
| Peak Hour Factor | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| Heavy Vehicles (%) | 13% | 6% | 8% | 4% | 1% | 12% |
| Adj. Flow (vph) | 155 | 132 | 70 | 157 | 947 | 155 |
| Shared Lane Traffic (%) | | | | | | |
| Lane Group Flow (vph) | 155 | 132 | 0 | 227 | 947 | 155 |
| Enter Blocked Intersection | No | No | No | No | No | No |
| Lane Alignment | Left | Right | Left | Left | Left | Right |
| Median Width(m) | 3.3 | | | 0.0 | 0.0 | |
| Link Offset(m) | 0.0 | | | 0.0 | 0.0 | |
| Crosswalk Width(m) | 4.8 | | | 4.8 | 4.8 | |
| Two way Left Turn Lane | | | | | | |
| Headway Factor | 1.12 | 1.12 | 1.09 | 1.09 | 1.09 | 1.09 |
| Turning Speed (k/h) | 25 | 15 | 25 | | | 15 |
| Sign Control | Stop | | | Free | Free | |

| Intersection Summary | | | |
|---|---|---|---|
| Area Type: | Other | | |
| Control Type: Unsignalized | | | |
| Intersection Capacity Utilization 84.5% | | ICU Level of Service E | |
| Analysis Period (min) 15 | | | |



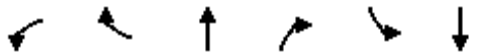
| Movement | EBL | EBR | NBL | NBT | SBT | SBR |
|---|---|---|---|---|---|---|
| Lane Configurations | | | | | | |
| Traffic Volume (veh/h) | 155 | 132 | 70 | 157 | 947 | 155 |
| Future Volume (Veh/h) | 155 | 132 | 70 | 157 | 947 | 155 |
| Sign Control | Stop | | | Free | Free | |
| Grade | 0% | | | 0% | 0% | |
| Peak Hour Factor | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| Hourly flow rate (vph) | 155 | 132 | 70 | 157 | 947 | 155 |
| 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 | 1244 | 947 | 1102 | | | |
| vC1, stage 1 conf vol | | | | | | |
| vC2, stage 2 conf vol | | | | | | |
| vCu, unblocked vol | 1244 | 947 | 1102 | | | |
| tC, single (s) | 6.5 | 6.3 | 4.2 | | | |
| tC, 2 stage (s) | | | | | | |
| tF (s) | 3.6 | 3.4 | 2.3 | | | |
| p0 queue free % | 4 | 58 | 89 | | | |
| cM capacity (veh/h) | 162 | 311 | 612 | | | |

| Direction, Lane # | EB 1 | EB 2 | NB 1 | SB 1 | SB 2 |
|---|---|---|---|---|---|
| Volume Total | 155 | 132 | 227 | 947 | 155 |
| Volume Left | 155 | 0 | 70 | 0 | 0 |
| Volume Right | 0 | 132 | 0 | 0 | 155 |
| cSH | 162 | 311 | 612 | 1700 | 1700 |
| Volume to Capacity | 0.96 | 0.42 | 0.11 | 0.56 | 0.09 |
| Queue Length 95th (m) | 57.7 | 16.2 | 3.1 | 0.0 | 0.0 |
| Control Delay (s) | 116.4 | 24.8 | 4.6 | 0.0 | 0.0 |
| Lane LOS | F | C | A | | |
| Approach Delay (s) | 74.3 | | 4.6 | 0.0 | |
| Approach LOS | F | | | | |

| Intersection Summary | | | | |
|---|---|---|---|---|
| Average Delay | 13.8 | | | |
| Intersection Capacity Utilization | 84.5% | ICU Level of Service | E | |
| Analysis Period (min) | 15 | | | |

| Lane Group | WBL | WBR | NBT | NBR | SBL | SBT |
|---|---|---|---|---|---|---|
| Lane Configurations | | | | | | |
| Traffic Volume (vph) | 149 | 31 | 101 | 870 | 77 | 121 |
| Future Volume (vph) | 149 | 31 | 101 | 870 | 77 | 121 |
| Ideal Flow (vphpl) | 1800 | 1800 | 1800 | 1800 | 1800 | 1800 |
| Lane Width (m) | 4.5 | 4.5 | 3.5 | 3.5 | 3.5 | 3.5 |
| Storage Length (m) | 0.0 | 10.0 | | 0.0 | 0.0 | |
| Storage Lanes | 1 | 0 | | 0 | 0 | |
| Taper Length (m) | 7.5 | | | | 7.5 | |
| Lane Util. Factor | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| Frt | 0.977 | | 0.879 | | | |
| Flt Protected | 0.960 | | | | | 0.981 |
| Satd. Flow (prot) | 1693 | 0 | 1517 | 0 | 0 | 1602 |
| Flt Permitted | 0.960 | | | | | 0.981 |
| Satd. Flow (perm) | 1693 | 0 | 1517 | 0 | 0 | 1602 |
| Link Speed (k/h) | 40 | | 80 | | | 80 |
| Link Distance (m) | 155.0 | | 545.7 | | | 134.1 |
| Travel Time (s) | 14.0 | | 24.6 | | | 6.0 |
| Peak Hour Factor | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| Heavy Vehicles (%) | 9% | 13% | 13% | 2% | 9% | 9% |
| Adj. Flow (vph) | 149 | 31 | 101 | 870 | 77 | 121 |
| Shared Lane Traffic (%) | | | | | | |
| Lane Group Flow (vph) | 180 | 0 | 971 | 0 | 0 | 198 |
| Enter Blocked Intersection | No | No | No | No | No | No |
| Lane Alignment | Left | Right | Left | Right | Left | Left |
| Median Width(m) | 4.5 | | 0.0 | | | 0.0 |
| Link Offset(m) | 0.0 | | 0.0 | | | 0.0 |
| Crosswalk Width(m) | 4.8 | | 4.8 | | | 4.8 |
| Two way Left Turn Lane | | | | | | |
| Headway Factor | 0.95 | 0.95 | 1.09 | 1.09 | 1.09 | 1.09 |
| Turning Speed (k/h) | 25 | 15 | | 15 | 25 | |
| Sign Control | Stop | | Free | | | Free |

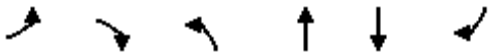
| Intersection Summary | | | |
|---|---|---|---|
| Area Type: | Other | | |
| Control Type: Unsignalized | | | |
| Intersection Capacity Utilization 94.2% | | ICU Level of Service F | |
| Analysis Period (min) 15 | | | |



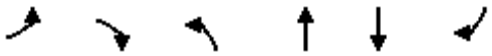
| Movement | WBL | WBR | NBT | NBR | SBL | SBT |
|---|---|---|---|---|---|---|
| Lane Configurations | | | | | | |
| Traffic Volume (veh/h) | 149 | 31 | 101 | 870 | 77 | 121 |
| Future Volume (Veh/h) | 149 | 31 | 101 | 870 | 77 | 121 |
| Sign Control | Stop | | Free | | | Free |
| Grade | 0% | | 0% | | | 0% |
| Peak Hour Factor | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| Hourly flow rate (vph) | 149 | 31 | 101 | 870 | 77 | 121 |
| 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 | 811 | 536 | | | 971 | |
| vC1, stage 1 conf vol | | | | | | |
| vC2, stage 2 conf vol | | | | | | |
| vCu, unblocked vol | 811 | 536 | | | 971 | |
| tC, single (s) | 6.5 | 6.3 | | | 4.2 | |
| tC, 2 stage (s) | | | | | | |
| tF (s) | 3.6 | 3.4 | | | 2.3 | |
| p0 queue free % | 51 | 94 | | | 89 | |
| cM capacity (veh/h) | 301 | 524 | | | 683 | |

| Direction, Lane # | WB 1 | NB 1 | SB 1 |
|---|---|---|---|
| Volume Total | 180 | 971 | 198 |
| Volume Left | 149 | 0 | 77 |
| Volume Right | 31 | 870 | 0 |
| cSH | 325 | 1700 | 683 |
| Volume to Capacity | 0.55 | 0.57 | 0.11 |
| Queue Length 95th (m) | 25.4 | 0.0 | 3.0 |
| Control Delay (s) | 29.0 | 0.0 | 5.1 |
| Lane LOS | D | | A |
| Approach Delay (s) | 29.0 | 0.0 | 5.1 |
| Approach LOS | D | | |

| Intersection Summary | | | |
|---|---|---|---|
| Average Delay | | 4.6 | |
| Intersection Capacity Utilization | | 94.2% | ICU Level of Service F |
| Analysis Period (min) | | 15 | |



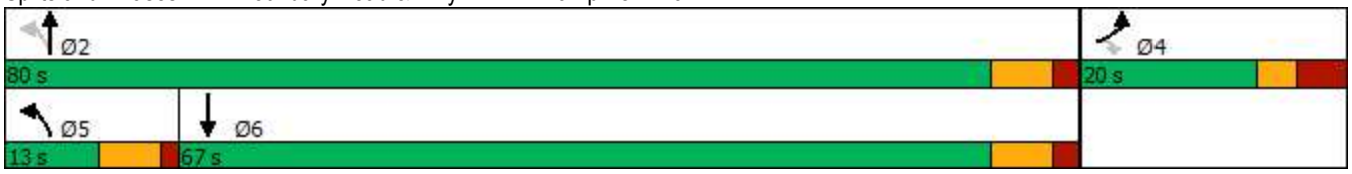
| Lane Group | EBL | EBR | NBL | NBT | SBT | SBR |
|---|---|---|---|---|---|---|
| Lane Configurations | | | | | | |
| Traffic Volume (vph) | 18 | 334 | 41 | 957 | 240 | 9 |
| Future Volume (vph) | 18 | 334 | 41 | 957 | 240 | 9 |
| Ideal Flow (vphpl) | 1800 | 1800 | 1800 | 1800 | 1800 | 1800 |
| Lane Width (m) | 3.5 | 3.3 | 3.5 | 3.5 | 3.5 | 3.5 |
| Storage Length (m) | 0.0 | 25.0 | 50.0 | | | 0.0 |
| Storage Lanes | 1 | 1 | 1 | | | 0 |
| Taper Length (m) | 7.5 | | 75.0 | | | |
| Lane Util. Factor | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| Frt | | 0.850 | | | 0.995 | |
| Flt Protected | 0.950 | | 0.950 | | | |
| Satd. Flow (prot) | 1271 | 1332 | 1311 | 1728 | 1582 | 0 |
| Flt Permitted | 0.950 | | 0.527 | | | |
| Satd. Flow (perm) | 1271 | 1332 | 727 | 1728 | 1582 | 0 |
| Right Turn on Red | | Yes | | | | Yes |
| Satd. Flow (RTOR) | | 334 | | | 3 | |
| Link Speed (k/h) | 40 | | | 80 | 80 | |
| Link Distance (m) | 154.2 | | | 243.1 | 545.7 | |
| Travel Time (s) | 13.9 | | | 10.9 | 24.6 | |
| Peak Hour Factor | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| Heavy Vehicles (%) | 33% | 11% | 29% | 3% | 12% | 11% |
| Adj. Flow (vph) | 18 | 334 | 41 | 957 | 240 | 9 |
| Shared Lane Traffic (%) | | | | | | |
| Lane Group Flow (vph) | 18 | 334 | 41 | 957 | 249 | 0 |
| Enter Blocked Intersection | No | No | No | No | No | No |
| Lane Alignment | Left | Right | Left | Left | Left | Right |
| Median Width(m) | 3.5 | | | 3.5 | 3.5 | |
| Link Offset(m) | 0.0 | | | 0.0 | 0.0 | |
| Crosswalk Width(m) | 4.8 | | | 4.8 | 4.8 | |
| Two way Left Turn Lane | | | | | | |
| Headway Factor | 1.09 | 1.12 | 1.09 | 1.09 | 1.09 | 1.09 |
| Turning Speed (k/h) | 25 | 15 | 25 | | | 15 |
| Number of Detectors | 1 | 1 | 1 | 2 | 2 | |
| Detector Template | Left | Right | Left | Thru | Thru | |
| Leading Detector (m) | 2.0 | 2.0 | 2.0 | 10.0 | 10.0 | |
| Trailing Detector (m) | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | |
| Detector 1 Position(m) | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | |
| Detector 1 Size(m) | 2.0 | 2.0 | 2.0 | 0.6 | 0.6 | |
| Detector 1 Type | Cl+Ex | Cl+Ex | Cl+Ex | Cl+Ex | Cl+Ex | |
| Detector 1 Channel | | | | | | |
| Detector 1 Extend (s) | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | |
| Detector 1 Queue (s) | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | |
| Detector 1 Delay (s) | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | |
| Detector 2 Position(m) | | | | 9.4 | 9.4 | |
| Detector 2 Size(m) | | | | 0.6 | 0.6 | |
| Detector 2 Type | | | | Cl+Ex | Cl+Ex | |
| Detector 2 Channel | | | | | | |
| Detector 2 Extend (s) | | | | 0.0 | 0.0 | |
| Turn Type | Prot | Perm | pm+pt | NA | NA | |

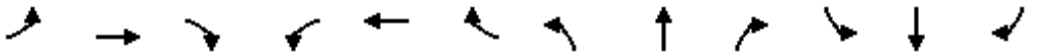


| Lane Group | EBL | EBR | NBL | NBT | SBT | SBR |
|---|---|---|---|---|---|---|
| Protected Phases | 4 | | 5 | 2 | 6 | |
| Permitted Phases | | 4 | 2 | | | |
| Detector Phase | 4 | 4 | 5 | 2 | 6 | |
| Switch Phase | | | | | | |
| Minimum Initial (s) | 7.0 | 7.0 | 7.0 | 35.0 | 35.0 | |
| Minimum Split (s) | 17.8 | 17.8 | 13.0 | 41.6 | 41.6 | |
| Total Split (s) | 20.0 | 20.0 | 13.0 | 80.0 | 67.0 | |
| Total Split (%) | 20.0% | 20.0% | 13.0% | 80.0% | 67.0% | |
| Maximum Green (s) | 13.2 | 13.2 | 7.0 | 73.4 | 60.4 | |
| Yellow Time (s) | 3.0 | 3.0 | 4.6 | 4.6 | 4.6 | |
| All-Red Time (s) | 3.8 | 3.8 | 1.4 | 2.0 | 2.0 | |
| Lost Time Adjust (s) | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | |
| Total Lost Time (s) | 6.8 | 6.8 | 6.0 | 6.6 | 6.6 | |
| Lead/Lag | | | Lead | | Lag | |
| Lead-Lag Optimize? | | | Yes | | Yes | |
| Vehicle Extension (s) | 3.0 | 3.0 | 3.0 | 3.0 | 3.0 | |
| Recall Mode | None | None | None | Min | Min | |
| Walk Time (s) | 5.0 | 5.0 | | 0.0 | 7.0 | |
| Flash Dont Walk (s) | 6.0 | 6.0 | | 0.0 | 21.0 | |
| Pedestrian Calls (#/hr) | 0 | 0 | | 0 | 0 | |
| Act Effct Green (s) | 8.8 | 8.8 | 48.1 | 47.5 | 40.5 | |
| Actuated g/C Ratio | 0.13 | 0.13 | 0.68 | 0.68 | 0.58 | |
| v/c Ratio | 0.11 | 0.73 | 0.07 | 0.82 | 0.27 | |
| Control Delay | 34.8 | 14.8 | 3.8 | 15.2 | 9.7 | |
| Queue Delay | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | |
| Total Delay | 34.8 | 14.8 | 3.8 | 15.2 | 9.7 | |
| LOS | C | B | A | B | A | |
| Approach Delay | 15.9 | | | 14.7 | 9.7 | |
| Approach LOS | B | | | B | A | |
| Queue Length 50th (m) | 2.3 | 0.0 | 1.3 | 69.0 | 17.7 | |
| Queue Length 95th (m) | 10.1 | 28.8 | 4.5 | 152.2 | 35.1 | |
| Internal Link Dist (m) | 130.2 | | | 219.1 | 521.7 | |
| Turn Bay Length (m) | | 25.0 | 50.0 | | | |
| Base Capacity (vph) | 249 | 529 | 558 | 1638 | 1366 | |
| Starvation Cap Reductn | 0 | 0 | 0 | 29 | 0 | |
| Spillback Cap Reductn | 0 | 0 | 0 | 0 | 0 | |
| Storage Cap Reductn | 0 | 0 | 0 | 0 | 0 | |
| Reduced v/c Ratio | 0.07 | 0.63 | 0.07 | 0.59 | 0.18 | |

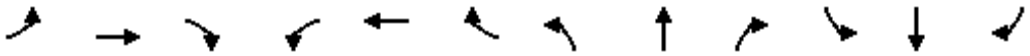
| Intersection Summary | | | |
|---|---|---|---|
| Area Type: | Other | | |
| Cycle Length: 100 | | | |
| Actuated Cycle Length: 70.3 | | | |
| Natural Cycle: 75 | | | |
| Control Type: Semi Act-Uncoord | | | |
| Maximum v/c Ratio: 0.82 | | | |
| Intersection Signal Delay: 14.2 | | Intersection LOS: B | |
| Intersection Capacity Utilization 70.2% | | ICU Level of Service C | |
| Analysis Period (min) 15 | | | |

Splits and Phases: 2: Boundary Road & Hwy 417 EB Ramp Terminal





| Lane Group | EBL | EBT | EBR | WBL | WBT | WBR | NBL | NBT | NBR | SBL | SBT | SBR |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Lane Configurations | | | | | | | | | | | | |
| Traffic Volume (vph) | 59 | 17 | 10 | 3 | 6 | 25 | 24 | 913 | 30 | 193 | 255 | 126 |
| Future Volume (vph) | 59 | 17 | 10 | 3 | 6 | 25 | 24 | 913 | 30 | 193 | 255 | 126 |
| Ideal Flow (vphpl) | 1800 | 1800 | 1800 | 1800 | 1800 | 1800 | 1800 | 1800 | 1800 | 1800 | 1800 | 1800 |
| Lane Width (m) | 3.5 | 3.5 | 3.5 | 3.5 | 3.5 | 3.5 | 3.3 | 3.5 | 3.3 | 3.3 | 3.5 | 3.5 |
| Storage Length (m) | 0.0 | | 15.0 | 0.0 | | 0.0 | 35.0 | | 7.5 | 100.0 | | 35.0 |
| Storage Lanes | 0 | | 0 | 0 | | 1 | 1 | | 1 | 1 | | 0 |
| Taper Length (m) | 7.5 | | | 7.5 | | | 45.0 | | | 75.0 | | |
| Lane Util. Factor | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| Frt | | 0.984 | | | | 0.850 | | | 0.850 | | 0.950 | |
| Flt Protected | | 0.967 | | | 0.984 | | 0.950 | | | 0.950 | | |
| Satd. Flow (prot) | 0 | 1529 | 0 | 0 | 1752 | 1513 | 1589 | 1728 | 1479 | 1653 | 1445 | 0 |
| Flt Permitted | | 0.790 | | | 0.887 | | 0.536 | | | 0.115 | | |
| Satd. Flow (perm) | 0 | 1249 | 0 | 0 | 1579 | 1513 | 897 | 1728 | 1479 | 200 | 1445 | 0 |
| Right Turn on Red | | | Yes | | | Yes | | | Yes | | | Yes |
| Satd. Flow (RTOR) | | 6 | | | | 100 | | | 96 | | 57 | |
| Link Speed (k/h) | | 60 | | | 20 | | | 80 | | | 80 | |
| Link Distance (m) | | 198.6 | | | 170.6 | | | 174.7 | | | 243.1 | |
| Travel Time (s) | | 11.9 | | | 30.7 | | | 7.9 | | | 10.9 | |
| Peak Hour Factor | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| Heavy Vehicles (%) | 14% | 0% | 10% | 0% | 0% | 0% | 4% | 3% | 0% | 0% | 16% | 19% |
| Adj. Flow (vph) | 59 | 17 | 10 | 3 | 6 | 25 | 24 | 913 | 30 | 193 | 255 | 126 |
| Shared Lane Traffic (%) | | | | | | | | | | | | |
| Lane Group Flow (vph) | 0 | 86 | 0 | 0 | 9 | 25 | 24 | 913 | 30 | 193 | 381 | 0 |
| Enter Blocked Intersection | No | No | No | No | No | No | No | No | No | No | No | No |
| Lane Alignment | Left | Left | Right | Left | Left | Right | Left | Left | Right | Left | Left | Right |
| Median Width(m) | | 0.0 | | | 0.0 | | | 3.5 | | | 3.5 | |
| Link Offset(m) | | 0.0 | | | 0.0 | | | 0.0 | | | 0.0 | |
| Crosswalk Width(m) | | 4.8 | | | 4.8 | | | 4.8 | | | 4.8 | |
| Two way Left Turn Lane | | | | | | | | | | | | |
| Headway Factor | 1.09 | 1.09 | 1.09 | 1.09 | 1.09 | 1.09 | 1.12 | 1.09 | 1.12 | 1.12 | 1.09 | 1.09 |
| Turning Speed (k/h) | 25 | | 15 | 25 | | 15 | 25 | | 15 | 25 | | 15 |
| Number of Detectors | 1 | 2 | | 1 | 2 | 1 | 1 | 2 | 1 | 1 | 2 | |
| Detector Template | Left | Thru | | Left | Thru | Right | Left | Thru | Right | Left | Thru | |
| Leading Detector (m) | 2.0 | 10.0 | | 2.0 | 10.0 | 2.0 | 2.0 | 10.0 | 2.0 | 2.0 | 10.0 | |
| Trailing Detector (m) | 0.0 | 0.0 | | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | |
| Detector 1 Position(m) | 0.0 | 0.0 | | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | |
| Detector 1 Size(m) | 2.0 | 0.6 | | 2.0 | 0.6 | 2.0 | 2.0 | 0.6 | 2.0 | 2.0 | 0.6 | |
| Detector 1 Type | Cl+Ex | Cl+Ex | | Cl+Ex | Cl+Ex | Cl+Ex | Cl+Ex | Cl+Ex | Cl+Ex | Cl+Ex | Cl+Ex | |
| Detector 1 Channel | | | | | | | | | | | | |
| Detector 1 Extend (s) | 0.0 | 0.0 | | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | |
| Detector 1 Queue (s) | 0.0 | 0.0 | | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | |
| Detector 1 Delay (s) | 0.0 | 0.0 | | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | |
| Detector 2 Position(m) | | 9.4 | | | 9.4 | | | 9.4 | | | 9.4 | |
| Detector 2 Size(m) | | 0.6 | | | 0.6 | | | 0.6 | | | 0.6 | |
| Detector 2 Type | | Cl+Ex | | | Cl+Ex | | | Cl+Ex | | | Cl+Ex | |
| Detector 2 Channel | | | | | | | | | | | | |
| Detector 2 Extend (s) | | 0.0 | | | 0.0 | | | 0.0 | | | 0.0 | |
| Turn Type | Perm | NA | | Perm | NA | Perm | Perm | NA | Perm | pm+pt | NA | |

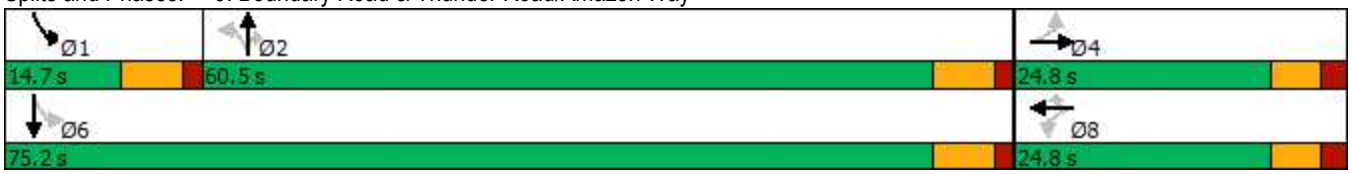


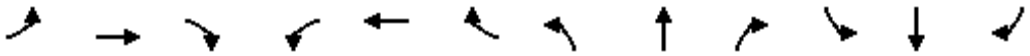
| Lane Group | EBL | EBT | EBR | WBL | WBT | WBR | NBL | NBT | NBR | SBL | SBT | SBR |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Protected Phases | | 4 | | | 8 | | | 2 | | 1 | 6 | |
| Permitted Phases | 4 | | | 8 | | 8 | 2 | | 2 | 6 | | |
| Detector Phase | 4 | 4 | | 8 | 8 | 8 | 2 | 2 | 2 | 1 | 6 | |
| Switch Phase | | | | | | | | | | | | |
| Minimum Initial (s) | 7.0 | 7.0 | | 7.0 | 7.0 | 7.0 | 20.0 | 20.0 | 20.0 | 7.0 | 20.0 | |
| Minimum Split (s) | 24.8 | 24.8 | | 24.8 | 24.8 | 24.8 | 26.2 | 26.2 | 26.2 | 13.0 | 26.2 | |
| Total Split (s) | 24.8 | 24.8 | | 24.8 | 24.8 | 24.8 | 60.5 | 60.5 | 60.5 | 14.7 | 75.2 | |
| Total Split (%) | 24.8% | 24.8% | | 24.8% | 24.8% | 24.8% | 60.5% | 60.5% | 60.5% | 14.7% | 75.2% | |
| Maximum Green (s) | 19.0 | 19.0 | | 19.0 | 19.0 | 19.0 | 54.3 | 54.3 | 54.3 | 8.7 | 69.0 | |
| Yellow Time (s) | 3.7 | 3.7 | | 3.7 | 3.7 | 3.7 | 4.6 | 4.6 | 4.6 | 4.6 | 4.6 | |
| All-Red Time (s) | 2.1 | 2.1 | | 2.1 | 2.1 | 2.1 | 1.6 | 1.6 | 1.6 | 1.4 | 1.6 | |
| Lost Time Adjust (s) | | 0.0 | | | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | |
| Total Lost Time (s) | | 5.8 | | | 5.8 | 5.8 | 6.2 | 6.2 | 6.2 | 6.0 | 6.2 | |
| Lead/Lag | | | | | | | Lag | Lag | Lag | Lead | | |
| Lead-Lag Optimize? | | | | | | | Yes | Yes | Yes | Yes | | |
| Vehicle Extension (s) | 3.0 | 3.0 | | 3.0 | 3.0 | 3.0 | 3.0 | 3.0 | 3.0 | 3.0 | 3.0 | |
| Recall Mode | None | None | | None | None | None | Min | Min | Min | None | Min | |
| Walk Time (s) | 7.0 | 7.0 | | 7.0 | 7.0 | 7.0 | 7.0 | 7.0 | 7.0 | | 7.0 | |
| Flash Dont Walk (s) | 12.0 | 12.0 | | 12.0 | 12.0 | 12.0 | 10.0 | 10.0 | 10.0 | | 10.0 | |
| Pedestrian Calls (#/hr) | 0 | 0 | | 0 | 0 | 0 | 0 | 0 | 0 | | 0 | |
| Act Effct Green (s) | | 11.5 | | | 11.5 | 11.5 | 50.5 | 50.5 | 50.5 | 65.8 | 67.6 | |
| Actuated g/C Ratio | | 0.13 | | | 0.13 | 0.13 | 0.59 | 0.59 | 0.59 | 0.77 | 0.79 | |
| v/c Ratio | | 0.50 | | | 0.04 | 0.09 | 0.05 | 0.90 | 0.03 | 0.63 | 0.33 | |
| Control Delay | | 45.9 | | | 35.1 | 0.6 | 9.5 | 30.7 | 0.1 | 20.1 | 4.5 | |
| Queue Delay | | 0.0 | | | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | |
| Total Delay | | 45.9 | | | 35.1 | 0.6 | 9.5 | 30.7 | 0.1 | 20.1 | 4.5 | |
| LOS | | D | | | D | A | A | C | A | C | A | |
| Approach Delay | | 45.9 | | | 9.7 | | | 29.2 | | | 9.8 | |
| Approach LOS | | D | | | A | | | C | | | A | |
| Queue Length 50th (m) | | 14.3 | | | 1.5 | 0.0 | 1.8 | 137.3 | 0.0 | 8.3 | 16.0 | |
| Queue Length 95th (m) | | 29.4 | | | 6.0 | 0.0 | 6.0 | #256.8 | 0.0 | #41.9 | 35.6 | |
| Internal Link Dist (m) | | 174.6 | | | 146.6 | | | 150.7 | | | 219.1 | |
| Turn Bay Length (m) | | | | | | | 35.0 | | 7.5 | 100.0 | | |
| Base Capacity (vph) | | 296 | | | 369 | 430 | 596 | 1147 | 1014 | 309 | 1153 | |
| Starvation Cap Reductn | | 0 | | | 0 | 0 | 0 | 0 | 0 | 0 | 0 | |
| Spillback Cap Reductn | | 0 | | | 0 | 0 | 0 | 0 | 0 | 0 | 0 | |
| Storage Cap Reductn | | 0 | | | 0 | 0 | 0 | 0 | 0 | 0 | 0 | |
| Reduced v/c Ratio | | 0.29 | | | 0.02 | 0.06 | 0.04 | 0.80 | 0.03 | 0.62 | 0.33 | |

| Intersection Summary | | | |
|---|---|---|---|
| Area Type: | Other | | |
| Cycle Length: 100 | | | |
| Actuated Cycle Length: 85.6 | | | |
| Natural Cycle: 90 | | | |
| Control Type: Semi Act-Uncoord | | | |
| Maximum v/c Ratio: 0.90 | | | |
| Intersection Signal Delay: 22.9 | | Intersection LOS: C | |
| Intersection Capacity Utilization 88.7% | | ICU Level of Service E | |
| Analysis Period (min) 15 | | | |

# 95th percentile volume exceeds capacity, queue may be longer.
Queue shown is maximum after two cycles.

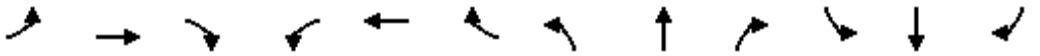
Splits and Phases: 3: Boundary Road & Thunder Road/Amazon Way





| Lane Group | EBL | EBT | EBR | WBL | WBT | WBR | NBL | NBT | NBR | SBL | SBT | SBR |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Lane Configurations | | | | | | | | | | | | |
| Traffic Volume (vph) | 1 | 0 | 5 | 6 | 0 | 3 | 15 | 962 | 6 | 1 | 251 | 16 |
| Future Volume (vph) | 1 | 0 | 5 | 6 | 0 | 3 | 15 | 962 | 6 | 1 | 251 | 16 |
| Ideal Flow (vphpl) | 1800 | 1800 | 1800 | 1800 | 1800 | 1800 | 1800 | 1800 | 1800 | 1800 | 1800 | 1800 |
| Lane Width (m) | 3.5 | 3.5 | 3.5 | 3.5 | 3.5 | 3.5 | 3.5 | 3.5 | 3.5 | 3.5 | 3.5 | 3.6 |
| Storage Length (m) | 0.0 | | 0.0 | 0.0 | | 0.0 | 15.0 | | 0.0 | 70.0 | | 0.0 |
| Storage Lanes | 0 | | 0 | 0 | | 0 | 1 | | 0 | 1 | | 0 |
| Taper Length (m) | 7.5 | | | 7.5 | | | 45.0 | | | 45.0 | | |
| Lane Util. Factor | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| Frt | | 0.887 | | | 0.955 | | | 0.999 | | | 0.991 | |
| Flt Protected | | 0.992 | | | 0.968 | | 0.950 | | | 0.950 | | |
| Satd. Flow (prot) | 0 | 1566 | 0 | 0 | 823 | 0 | 1691 | 1750 | 0 | 846 | 1585 | 0 |
| Flt Permitted | | 0.992 | | | 0.968 | | 0.950 | | | 0.950 | | |
| Satd. Flow (perm) | 0 | 1566 | 0 | 0 | 823 | 0 | 1691 | 1750 | 0 | 846 | 1585 | 0 |
| Link Speed (k/h) | | 50 | | | 20 | | | 80 | | | 80 | |
| Link Distance (m) | | 105.7 | | | 151.5 | | | 1150.2 | | | 174.7 | |
| Travel Time (s) | | 7.6 | | | 27.3 | | | 51.8 | | | 7.9 | |
| Peak Hour Factor | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| Heavy Vehicles (%) | 0% | 0% | 0% | 100% | 0% | 100% | 0% | 1% | 100% | 100% | 12% | 0% |
| Adj. Flow (vph) | 1 | 0 | 5 | 6 | 0 | 3 | 15 | 962 | 6 | 1 | 251 | 16 |
| Shared Lane Traffic (%) | | | | | | | | | | | | |
| Lane Group Flow (vph) | 0 | 6 | 0 | 0 | 9 | 0 | 15 | 968 | 0 | 1 | 267 | 0 |
| Enter Blocked Intersection | No | No | No | No | No | No | No | No | No | No | No | No |
| Lane Alignment | Left | Left | Right | Left | Left | Right | Left | Left | Right | Left | Left | Right |
| Median Width(m) | | 0.0 | | | 0.0 | | | 3.5 | | | 3.5 | |
| Link Offset(m) | | 0.0 | | | 0.0 | | | 0.0 | | | 0.0 | |
| Crosswalk Width(m) | | 4.8 | | | 4.8 | | | 4.8 | | | 4.8 | |
| Two way Left Turn Lane | | | | | | | | | | | | |
| Headway Factor | 1.09 | 1.09 | 1.09 | 1.09 | 1.09 | 1.09 | 1.09 | 1.09 | 1.09 | 1.09 | 1.09 | 1.07 |
| Turning Speed (k/h) | 25 | | 15 | 25 | | 15 | 25 | | 15 | 25 | | 15 |
| Sign Control | | Stop | | | Stop | | | Free | | | Free | |

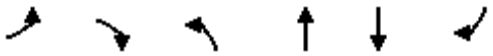
| Intersection Summary | | | |
|---|---|---|---|
| Area Type: | Other | | |
| Control Type: Unsignalized | | | |
| Intersection Capacity Utilization | 63.8% | ICU Level of Service | B |
| Analysis Period (min) | 15 | | |



| Movement | EBL | EBT | EBR | WBL | WBT | WBR | NBL | NBT | NBR | SBL | SBT | SBR |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Lane Configurations | | | | | | | | | | | | |
| Traffic Volume (veh/h) | 1 | 0 | 5 | 6 | 0 | 3 | 15 | 962 | 6 | 1 | 251 | 16 |
| Future Volume (Veh/h) | 1 | 0 | 5 | 6 | 0 | 3 | 15 | 962 | 6 | 1 | 251 | 16 |
| Sign Control | | Stop | | | Stop | | | Free | | | Free | |
| Grade | | 0% | | | 0% | | | 0% | | | 0% | |
| Peak Hour Factor | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| Hourly flow rate (vph) | 1 | 0 | 5 | 6 | 0 | 3 | 15 | 962 | 6 | 1 | 251 | 16 |
| Pedestrians | | | | | | | | | | | | |
| Lane Width (m) | | | | | | | | | | | | |
| Walking Speed (m/s) | | | | | | | | | | | | |
| Percent Blockage | | | | | | | | | | | | |
| Right turn flare (veh) | | | | | | | | | | | | |
| Median type | | | | | | | | None | | | None | |
| Median storage veh) | | | | | | | | | | | | |
| Upstream signal (m) | | | | | | | | | | | 175 | |
| pX, platoon unblocked | | | | | | | | | | | | |
| vC, conflicting volume | 1256 | 1259 | 259 | 1253 | 1264 | 965 | 267 | | | 968 | | |
| vC1, stage 1 conf vol | | | | | | | | | | | | |
| vC2, stage 2 conf vol | | | | | | | | | | | | |
| vCu, unblocked vol | 1256 | 1259 | 259 | 1253 | 1264 | 965 | 267 | | | 968 | | |
| tC, single (s) | 7.1 | 6.5 | 6.2 | 8.1 | 6.5 | 7.2 | 4.1 | | | 5.1 | | |
| tC, 2 stage (s) | | | | | | | | | | | | |
| tF (s) | 3.5 | 4.0 | 3.3 | 4.4 | 4.0 | 4.2 | 2.2 | | | 3.1 | | |
| p0 queue free % | 99 | 100 | 99 | 94 | 100 | 99 | 99 | | | 100 | | |
| cM capacity (veh/h) | 146 | 170 | 785 | 94 | 169 | 207 | 1308 | | | 434 | | |

| Direction, Lane # | EB 1 | WB 1 | NB 1 | NB 2 | SB 1 | SB 2 |
|---|---|---|---|---|---|---|
| Volume Total | 6 | 9 | 15 | 968 | 1 | 267 |
| Volume Left | 1 | 6 | 15 | 0 | 1 | 0 |
| Volume Right | 5 | 3 | 0 | 6 | 0 | 16 |
| cSH | 454 | 115 | 1308 | 1700 | 434 | 1700 |
| Volume to Capacity | 0.01 | 0.08 | 0.01 | 0.57 | 0.00 | 0.16 |
| Queue Length 95th (m) | 0.3 | 2.0 | 0.3 | 0.0 | 0.1 | 0.0 |
| Control Delay (s) | 13.0 | 39.0 | 7.8 | 0.0 | 13.3 | 0.0 |
| Lane LOS | B | E | A | | B | |
| Approach Delay (s) | 13.0 | 39.0 | 0.1 | | 0.0 | |
| Approach LOS | B | E | | | | |

| Intersection Summary | | | | |
|---|---|---|---|---|
| Average Delay | 0.4 | | | |
| Intersection Capacity Utilization | 63.8% | ICU Level of Service | B | |
| Analysis Period (min) | 15 | | | |



| Lane Group | EBL | EBR | NBL | NBT | SBT | SBR |
|---|---|---|---|---|---|---|
| Lane Configurations | | | | | | |
| Traffic Volume (vph) | 83 | 30 | 134 | 886 | 131 | 108 |
| Future Volume (vph) | 83 | 30 | 134 | 886 | 131 | 108 |
| Ideal Flow (vphpl) | 1800 | 1800 | 1800 | 1800 | 1800 | 1800 |
| Lane Width (m) | 3.3 | 3.3 | 3.5 | 3.5 | 3.5 | 3.5 |
| Storage Length (m) | 25.0 | 0.0 | 0.0 | | | 30.0 |
| Storage Lanes | 1 | 1 | 0 | | | 1 |
| Taper Length (m) | 47.5 | | 7.5 | | | |
| Lane Util. Factor | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| Frt | | 0.850 | | | | 0.850 |
| Flt Protected | 0.950 | | | 0.993 | | |
| Satd. Flow (prot) | 1489 | 1264 | 0 | 1734 | 1575 | 1293 |
| Flt Permitted | 0.950 | | | 0.993 | | |
| Satd. Flow (perm) | 1489 | 1264 | 0 | 1734 | 1575 | 1293 |
| Link Speed (k/h) | 80 | | | 80 | 80 | |
| Link Distance (m) | 180.5 | | | 135.8 | 1150.2 | |
| Travel Time (s) | 8.1 | | | 6.1 | 51.8 | |
| Peak Hour Factor | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| Heavy Vehicles (%) | 11% | 17% | 8% | 1% | 13% | 17% |
| Adj. Flow (vph) | 83 | 30 | 134 | 886 | 131 | 108 |
| Shared Lane Traffic (%) | | | | | | |
| Lane Group Flow (vph) | 83 | 30 | 0 | 1020 | 131 | 108 |
| Enter Blocked Intersection | No | No | No | No | No | No |
| Lane Alignment | Left | Right | Left | Left | Left | Right |
| Median Width(m) | 3.3 | | | 3.5 | 3.5 | |
| Link Offset(m) | 0.0 | | | 0.0 | 0.0 | |
| Crosswalk Width(m) | 4.8 | | | 4.8 | 4.8 | |
| Two way Left Turn Lane | | | | | | |
| Headway Factor | 1.12 | 1.12 | 1.09 | 1.09 | 1.09 | 1.09 |
| Turning Speed (k/h) | 25 | 15 | 25 | | | 15 |
| Sign Control | Stop | | | Free | Free | |

| Intersection Summary | | | |
|---|---|---|---|
| Area Type: | Other | | |
| Control Type: Unsignalized | | | |
| Intersection Capacity Utilization 79.2% | | ICU Level of Service D | |
| Analysis Period (min) 15 | | | |

| Movement | EBL | EBR | NBL | NBT | SBT | SBR |
|---|---|---|---|---|---|---|
| Lane Configurations | | | | | | |
| Traffic Volume (veh/h) | 83 | 30 | 134 | 886 | 131 | 108 |
| Future Volume (Veh/h) | 83 | 30 | 134 | 886 | 131 | 108 |
| Sign Control | Stop | | | Free | Free | |
| Grade | 0% | | | 0% | 0% | |
| Peak Hour Factor | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| Hourly flow rate (vph) | 83 | 30 | 134 | 886 | 131 | 108 |
| 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 | 1285 | 131 | 239 | | | |
| vC1, stage 1 conf vol | | | | | | |
| vC2, stage 2 conf vol | | | | | | |
| vCu, unblocked vol | 1285 | 131 | 239 | | | |
| tC, single (s) | 6.5 | 6.4 | 4.2 | | | |
| tC, 2 stage (s) | | | | | | |
| tF (s) | 3.6 | 3.5 | 2.3 | | | |
| p0 queue free % | 47 | 97 | 90 | | | |
| cM capacity (veh/h) | 156 | 880 | 1293 | | | |

| Direction, Lane # | EB 1 | EB 2 | NB 1 | SB 1 | SB 2 |
|---|---|---|---|---|---|
| Volume Total | 83 | 30 | 1020 | 131 | 108 |
| Volume Left | 83 | 0 | 134 | 0 | 0 |
| Volume Right | 0 | 30 | 0 | 0 | 108 |
| cSH | 156 | 880 | 1293 | 1700 | 1700 |
| Volume to Capacity | 0.53 | 0.03 | 0.10 | 0.08 | 0.06 |
| Queue Length 95th (m) | 21.2 | 0.8 | 2.8 | 0.0 | 0.0 |
| Control Delay (s) | 51.7 | 9.2 | 2.6 | 0.0 | 0.0 |
| Lane LOS | F | A | A | | |
| Approach Delay (s) | 40.4 | | 2.6 | 0.0 | |
| Approach LOS | E | | | | |

| Intersection Summary | | | |
|---|---|---|---|
| Average Delay | 5.3 | | |
| Intersection Capacity Utilization | 79.2% | ICU Level of Service | D |
| Analysis Period (min) | 15 | | |

| Lane Group | EBT | EBR | WBL | WBT | NBL | NBR |
|---|---|---|---|---|---|---|
| Lane Configurations | | | | | | |
| Traffic Volume (vph) | 66 | 0 | 51 | 105 | 0 | 19 |
| Future Volume (vph) | 66 | 0 | 51 | 105 | 0 | 19 |
| Ideal Flow (vphpl) | 1800 | 1800 | 1800 | 1800 | 1800 | 1800 |
| Lane Width (m) | 3.5 | 3.5 | 3.5 | 3.5 | 3.5 | 3.5 |
| Lane Util. Factor | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| Frt | | | | | 0.865 | |
| Flt Protected | | | | 0.984 | | |
| Satd. Flow (prot) | 1589 | 0 | 0 | 1508 | 1466 | 0 |
| Flt Permitted | | | | 0.984 | | |
| Satd. Flow (perm) | 1589 | 0 | 0 | 1508 | 1466 | 0 |
| Link Speed (k/h) | 60 | | | 50 | 50 | |
| Link Distance (m) | 163.7 | | | 198.6 | 103.6 | |
| Travel Time (s) | 9.8 | | | 14.3 | 7.5 | |
| Peak Hour Factor | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| Heavy Vehicles (%) | 12% | 0% | 0% | 24% | 0% | 5% |
| Adj. Flow (vph) | 66 | 0 | 51 | 105 | 0 | 19 |
| Shared Lane Traffic (%) | | | | | | |
| Lane Group Flow (vph) | 66 | 0 | 0 | 156 | 19 | 0 |
| Enter Blocked Intersection | No | No | No | No | No | No |
| Lane Alignment | Left | Right | Left | Left | Left | Right |
| Median Width(m) | 0.0 | | | 0.0 | 3.5 | |
| Link Offset(m) | 0.0 | | | 0.0 | 0.0 | |
| Crosswalk Width(m) | 4.8 | | | 4.8 | 4.8 | |
| Two way Left Turn Lane | | | | | | |
| Headway Factor | 1.09 | 1.09 | 1.09 | 1.09 | 1.09 | 1.09 |
| Turning Speed (k/h) | | 15 | 25 | | 25 | 15 |
| Sign Control | Free | | | Free | Stop | |

| Intersection Summary | | | |
|---|---|---|---|
| Area Type: | Other | | |
| Control Type: Unsignalized | | | |
| Intersection Capacity Utilization 25.5% | | ICU Level of Service A | |
| Analysis Period (min) 15 | | | |

| Movement | EBT | EBR | WBL | WBT | NBL | NBR |
|---|---|---|---|---|---|---|
| Lane Configurations | | | | | | |
| Traffic Volume (veh/h) | 66 | 0 | 51 | 105 | 0 | 19 |
| Future Volume (Veh/h) | 66 | 0 | 51 | 105 | 0 | 19 |
| Sign Control | Free | | | Free | Stop | |
| Grade | 0% | | | 0% | 0% | |
| Peak Hour Factor | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| Hourly flow rate (vph) | 66 | 0 | 51 | 105 | 0 | 19 |
| Pedestrians | | | | | | |
| Lane Width (m) | | | | | | |
| Walking Speed (m/s) | | | | | | |
| Percent Blockage | | | | | | |
| Right turn flare (veh) | | | | | | |
| Median type | None | | | None | | |
| Median storage veh) | | | | | | |
| Upstream signal (m) | | | | 199 | | |
| pX, platoon unblocked | | | | | | |
| vC, conflicting volume | | | 66 | | 273 | 66 |
| vC1, stage 1 conf vol | | | | | | |
| vC2, stage 2 conf vol | | | | | | |
| vCu, unblocked vol | | | 66 | | 273 | 66 |
| tC, single (s) | | | 4.1 | | 6.4 | 6.2 |
| tC, 2 stage (s) | | | | | | |
| tF (s) | | | 2.2 | | 3.5 | 3.3 |
| p0 queue free % | | | 97 | | 100 | 98 |
| cM capacity (veh/h) | | | 1549 | | 697 | 989 |

| Direction, Lane # | EB 1 | WB 1 | NB 1 |
|---|---|---|---|
| Volume Total | 66 | 156 | 19 |
| Volume Left | 0 | 51 | 0 |
| Volume Right | 0 | 0 | 19 |
| cSH | 1700 | 1549 | 989 |
| Volume to Capacity | 0.04 | 0.03 | 0.02 |
| Queue Length 95th (m) | 0.0 | 0.8 | 0.5 |
| Control Delay (s) | 0.0 | 2.6 | 8.7 |
| Lane LOS | | A | A |
| Approach Delay (s) | 0.0 | 2.6 | 8.7 |
| Approach LOS | | | A |

| Intersection Summary | | | |
|---|---|---|---|
| Average Delay | 2.4 | | |
| Intersection Capacity Utilization | 25.5% | ICU Level of Service | A |
| Analysis Period (min) | 15 | | |

| Lane Group | EBT | EBR | WBL | WBT | NBL | NBR |
|---|---|---|---|---|---|---|
| Lane Configurations | | | | | | |
| Traffic Volume (vph) | 62 | 0 | 15 | 90 | 0 | 4 |
| Future Volume (vph) | 62 | 0 | 15 | 90 | 0 | 4 |
| Ideal Flow (vphpl) | 1800 | 1800 | 1800 | 1800 | 1800 | 1800 |
| Lane Width (m) | 3.5 | 3.5 | 3.5 | 3.5 | 3.5 | 3.5 |
| Lane Util. Factor | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| Frt | | | | | 0.865 | |
| Flt Protected | | | | 0.993 | | |
| Satd. Flow (prot) | 1679 | 0 | 0 | 1429 | 770 | 0 |
| Flt Permitted | | | | 0.993 | | |
| Satd. Flow (perm) | 1679 | 0 | 0 | 1429 | 770 | 0 |
| Link Speed (k/h) | 60 | | | 50 | 50 | |
| Link Distance (m) | 185.0 | | | 163.7 | 105.8 | |
| Travel Time (s) | 11.1 | | | 11.8 | 7.6 | |
| Peak Hour Factor | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| Heavy Vehicles (%) | 6% | 0% | 100% | 11% | 0% | 100% |
| Adj. Flow (vph) | 62 | 0 | 15 | 90 | 0 | 4 |
| Shared Lane Traffic (%) | | | | | | |
| Lane Group Flow (vph) | 62 | 0 | 0 | 105 | 4 | 0 |
| Enter Blocked Intersection | No | No | No | No | No | No |
| Lane Alignment | Left | Right | Left | Left | Left | Right |
| Median Width(m) | 0.0 | | | 0.0 | 3.5 | |
| Link Offset(m) | 0.0 | | | 0.0 | 0.0 | |
| Crosswalk Width(m) | 4.8 | | | 4.8 | 4.8 | |
| Two way Left Turn Lane | | | | | | |
| Headway Factor | 1.09 | 1.09 | 1.09 | 1.09 | 1.09 | 1.09 |
| Turning Speed (k/h) | | 15 | 25 | | 25 | 15 |
| Sign Control | Free | | | Free | Stop | |

| Intersection Summary | | | |
|---|---|---|---|
| Area Type: | Other | | |
| Control Type: Unsignalized | | | |
| Intersection Capacity Utilization 22.5% | | ICU Level of Service A | |
| Analysis Period (min) 15 | | | |

| Movement | EBT | EBR | WBL | WBT | NBL | NBR |
|---|---|---|---|---|---|---|
| Lane Configurations | | | | | | |
| Traffic Volume (veh/h) | 62 | 0 | 15 | 90 | 0 | 4 |
| Future Volume (Veh/h) | 62 | 0 | 15 | 90 | 0 | 4 |
| Sign Control | Free | | | Free | Stop | |
| Grade | 0% | | | 0% | 0% | |
| Peak Hour Factor | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| Hourly flow rate (vph) | 62 | 0 | 15 | 90 | 0 | 4 |
| Pedestrians | | | | | | |
| Lane Width (m) | | | | | | |
| Walking Speed (m/s) | | | | | | |
| Percent Blockage | | | | | | |
| Right turn flare (veh) | | | | | | |
| Median type | None | | | None | | |
| Median storage veh) | | | | | | |
| Upstream signal (m) | | | | 362 | | |
| pX, platoon unblocked | | | | | | |
| vC, conflicting volume | | | 62 | | 182 | 62 |
| vC1, stage 1 conf vol | | | | | | |
| vC2, stage 2 conf vol | | | | | | |
| vCu, unblocked vol | | | 62 | | 182 | 62 |
| tC, single (s) | | | 5.1 | | 6.4 | 7.2 |
| tC, 2 stage (s) | | | | | | |
| tF (s) | | | 3.1 | | 3.5 | 4.2 |
| p0 queue free % | | | 99 | | 100 | 99 |
| cM capacity (veh/h) | | | 1092 | | 801 | 785 |

| Direction, Lane # | EB 1 | WB 1 | NB 1 |
|---|---|---|---|
| Volume Total | 62 | 105 | 4 |
| Volume Left | 0 | 15 | 0 |
| Volume Right | 0 | 0 | 4 |
| cSH | 1700 | 1092 | 785 |
| Volume to Capacity | 0.04 | 0.01 | 0.01 |
| Queue Length 95th (m) | 0.0 | 0.3 | 0.1 |
| Control Delay (s) | 0.0 | 1.3 | 9.6 |
| Lane LOS | | A | A |
| Approach Delay (s) | 0.0 | 1.3 | 9.6 |
| Approach LOS | | | A |

| Intersection Summary | | | |
|---|---|---|---|
| Average Delay | 1.0 | | |
| Intersection Capacity Utilization | 22.5% | ICU Level of Service | A |
| Analysis Period (min) | 15 | | |

| Lane Group | EBT | EBR | WBL | WBT | NBL | NBR |
|---|---|---|---|---|---|---|
| Lane Configurations | | | | | | |
| Traffic Volume (vph) | 55 | 0 | 23 | 67 | 0 | 7 |
| Future Volume (vph) | 55 | 0 | 23 | 67 | 0 | 7 |
| Ideal Flow (vphpl) | 1800 | 1800 | 1800 | 1800 | 1800 | 1800 |
| Lane Width (m) | 3.5 | 3.5 | 3.5 | 3.5 | 3.5 | 3.5 |
| Lane Util. Factor | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| Frt | | | | | 0.865 | |
| Flt Protected | | | | 0.987 | | |
| Satd. Flow (prot) | 1695 | 0 | 0 | 1585 | 1351 | 0 |
| Flt Permitted | | | | 0.987 | | |
| Satd. Flow (perm) | 1695 | 0 | 0 | 1585 | 1351 | 0 |
| Link Speed (k/h) | 60 | | | 50 | 50 | |
| Link Distance (m) | 95.5 | | | 185.0 | 109.7 | |
| Travel Time (s) | 5.7 | | | 13.3 | 7.9 | |
| Peak Hour Factor | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| Heavy Vehicles (%) | 5% | 0% | 22% | 7% | 0% | 14% |
| Adj. Flow (vph) | 55 | 0 | 23 | 67 | 0 | 7 |
| Shared Lane Traffic (%) | | | | | | |
| Lane Group Flow (vph) | 55 | 0 | 0 | 90 | 7 | 0 |
| Enter Blocked Intersection | No | No | No | No | No | No |
| Lane Alignment | Left | Right | Left | Left | Left | Right |
| Median Width(m) | 0.0 | | | 0.0 | 3.5 | |
| Link Offset(m) | 0.0 | | | 0.0 | 0.0 | |
| Crosswalk Width(m) | 4.8 | | | 4.8 | 4.8 | |
| Two way Left Turn Lane | | | | | | |
| Headway Factor | 1.09 | 1.09 | 1.09 | 1.09 | 1.09 | 1.09 |
| Turning Speed (k/h) | | 15 | 25 | | 25 | 15 |
| Sign Control | Free | | | Free | Stop | |

| Intersection Summary | | | |
|---|---|---|---|
| Area Type: | Other | | |
| Control Type: Unsignalized | | | |
| Intersection Capacity Utilization | 21.7% | ICU Level of Service | A |
| Analysis Period (min) | 15 | | |

| Movement | EBT | EBR | WBL | WBT | NBL | NBR |
|---|---|---|---|---|---|---|
| Lane Configurations | | | | | | |
| Traffic Volume (veh/h) | 55 | 0 | 23 | 67 | 0 | 7 |
| Future Volume (Veh/h) | 55 | 0 | 23 | 67 | 0 | 7 |
| Sign Control | Free | | | Free | Stop | |
| Grade | 0% | | | 0% | 0% | |
| Peak Hour Factor | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| Hourly flow rate (vph) | 55 | 0 | 23 | 67 | 0 | 7 |
| 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 | | | 55 | | 168 | 55 |
| vC1, stage 1 conf vol | | | | | | |
| vC2, stage 2 conf vol | | | | | | |
| vCu, unblocked vol | | | 55 | | 168 | 55 |
| tC, single (s) | | | 4.3 | | 6.4 | 6.3 |
| tC, 2 stage (s) | | | | | | |
| tF (s) | | | 2.4 | | 3.5 | 3.4 |
| p0 queue free % | | | 98 | | 100 | 99 |
| cM capacity (veh/h) | | | 1431 | | 814 | 979 |

| Direction, Lane # | EB 1 | WB 1 | NB 1 |
|---|---|---|---|
| Volume Total | 55 | 90 | 7 |
| Volume Left | 0 | 23 | 0 |
| Volume Right | 0 | 0 | 7 |
| cSH | 1700 | 1431 | 979 |
| Volume to Capacity | 0.03 | 0.02 | 0.01 |
| Queue Length 95th (m) | 0.0 | 0.4 | 0.2 |
| Control Delay (s) | 0.0 | 2.0 | 8.7 |
| Lane LOS | | A | A |
| Approach Delay (s) | 0.0 | 2.0 | 8.7 |
| Approach LOS | | | A |

| Intersection Summary | | | |
|---|---|---|---|
| Average Delay | 1.6 | | |
| Intersection Capacity Utilization | 21.7% | ICU Level of Service | A |
| Analysis Period (min) | 15 | | |

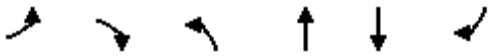
| Lane Group | WBL | WBR | NBT | NBR | SBL | SBT |
|---|---|---|---|---|---|---|
| Lane Configurations | | | | | | |
| Traffic Volume (vph) | 58 | 1 | 165 | 324 | 24 | 126 |
| Future Volume (vph) | 58 | 1 | 165 | 324 | 24 | 126 |
| Ideal Flow (vphpl) | 1800 | 1800 | 1800 | 1800 | 1800 | 1800 |
| Lane Width (m) | 4.5 | 4.5 | 3.5 | 3.5 | 3.5 | 3.5 |
| Storage Length (m) | 0.0 | 10.0 | | 0.0 | 0.0 | |
| Storage Lanes | 1 | 0 | | 0 | 0 | |
| Taper Length (m) | 7.5 | | | | 7.5 | |
| Lane Util. Factor | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| Frt | 0.998 | | 0.911 | | | |
| Flt Protected | 0.953 | | | | | 0.992 |
| Satd. Flow (prot) | 1548 | 0 | 1525 | 0 | 0 | 1632 |
| Flt Permitted | 0.953 | | | | | 0.992 |
| Satd. Flow (perm) | 1548 | 0 | 1525 | 0 | 0 | 1632 |
| Link Speed (k/h) | 40 | | 80 | | | 80 |
| Link Distance (m) | 155.0 | | 545.7 | | | 134.1 |
| Travel Time (s) | 14.0 | | 24.6 | | | 6.0 |
| Peak Hour Factor | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| Heavy Vehicles (%) | 22% | 0% | 5% | 7% | 4% | 9% |
| Adj. Flow (vph) | 58 | 1 | 165 | 324 | 24 | 126 |
| Shared Lane Traffic (%) | | | | | | |
| Lane Group Flow (vph) | 59 | 0 | 489 | 0 | 0 | 150 |
| Enter Blocked Intersection | No | No | No | No | No | No |
| Lane Alignment | Left | Right | Left | Right | Left | Left |
| Median Width(m) | 4.5 | | 0.0 | | | 0.0 |
| Link Offset(m) | 0.0 | | 0.0 | | | 0.0 |
| Crosswalk Width(m) | 4.8 | | 4.8 | | | 4.8 |
| Two way Left Turn Lane | | | | | | |
| Headway Factor | 0.95 | 0.95 | 1.09 | 1.09 | 1.09 | 1.09 |
| Turning Speed (k/h) | 25 | 15 | | 15 | 25 | |
| Sign Control | Stop | | Free | | | Free |

| Intersection Summary | | | |
|---|---|---|---|
| Area Type: | Other | | |
| Control Type: Unsignalized | | | |
| Intersection Capacity Utilization | 40.3% | ICU Level of Service | A |
| Analysis Period (min) | 15 | | |

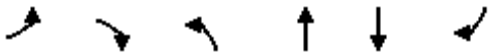
| Movement | WBL | WBR | NBT | NBR | SBL | SBT |
|---|---|---|---|---|---|---|
| Lane Configurations | | | | | | |
| Traffic Volume (veh/h) | 58 | 1 | 165 | 324 | 24 | 126 |
| Future Volume (Veh/h) | 58 | 1 | 165 | 324 | 24 | 126 |
| Sign Control | Stop | | Free | | | Free |
| Grade | 0% | | 0% | | | 0% |
| Peak Hour Factor | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| Hourly flow rate (vph) | 58 | 1 | 165 | 324 | 24 | 126 |
| 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 | 501 | 327 | | | 489 | |
| vC1, stage 1 conf vol | | | | | | |
| vC2, stage 2 conf vol | | | | | | |
| vCu, unblocked vol | 501 | 327 | | | 489 | |
| tC, single (s) | 6.6 | 6.2 | | | 4.1 | |
| tC, 2 stage (s) | | | | | | |
| tF (s) | 3.7 | 3.3 | | | 2.2 | |
| p0 queue free % | 88 | 100 | | | 98 | |
| cM capacity (veh/h) | 484 | 719 | | | 1064 | |

| Direction, Lane # | WB 1 | NB 1 | SB 1 |
|---|---|---|---|
| Volume Total | 59 | 489 | 150 |
| Volume Left | 58 | 0 | 24 |
| Volume Right | 1 | 324 | 0 |
| cSH | 487 | 1700 | 1064 |
| Volume to Capacity | 0.12 | 0.29 | 0.02 |
| Queue Length 95th (m) | 3.3 | 0.0 | 0.6 |
| Control Delay (s) | 13.4 | 0.0 | 1.5 |
| Lane LOS | B | | A |
| Approach Delay (s) | 13.4 | 0.0 | 1.5 |
| Approach LOS | B | | |

| Intersection Summary | | | |
|---|---|---|---|
| Average Delay | 1.5 | | |
| Intersection Capacity Utilization | 40.3% | ICU Level of Service | A |
| Analysis Period (min) | 15 | | |



| Lane Group | EBL | EBR | NBL | NBT | SBT | SBR |
|---|---|---|---|---|---|---|
| Lane Configurations | | | | | | |
| Traffic Volume (vph) | 77 | 748 | 178 | 312 | 230 | 17 |
| Future Volume (vph) | 77 | 748 | 178 | 312 | 230 | 17 |
| Ideal Flow (vphpl) | 1800 | 1800 | 1800 | 1800 | 1800 | 1800 |
| Lane Width (m) | 3.5 | 3.3 | 3.5 | 3.5 | 3.5 | 3.5 |
| Storage Length (m) | 0.0 | 25.0 | 50.0 | | | 0.0 |
| Storage Lanes | 1 | 1 | 1 | | | 0 |
| Taper Length (m) | 7.5 | | 75.0 | | | |
| Lane Util. Factor | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| Frt | | 0.850 | | | 0.991 | |
| Flt Protected | 0.950 | | 0.950 | | | |
| Satd. Flow (prot) | 1551 | 1422 | 1496 | 1604 | 1581 | 0 |
| Flt Permitted | 0.950 | | 0.501 | | | |
| Satd. Flow (perm) | 1551 | 1422 | 789 | 1604 | 1581 | 0 |
| Right Turn on Red | | Yes | | | | Yes |
| Satd. Flow (RTOR) | | 582 | | | 4 | |
| Link Speed (k/h) | 40 | | | 80 | 80 | |
| Link Distance (m) | 154.2 | | | 243.1 | 545.7 | |
| Travel Time (s) | 13.9 | | | 10.9 | 24.6 | |
| Peak Hour Factor | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| Heavy Vehicles (%) | 9% | 4% | 13% | 11% | 12% | 6% |
| Adj. Flow (vph) | 77 | 748 | 178 | 312 | 230 | 17 |
| Shared Lane Traffic (%) | | | | | | |
| Lane Group Flow (vph) | 77 | 748 | 178 | 312 | 247 | 0 |
| Enter Blocked Intersection | No | No | No | No | No | No |
| Lane Alignment | Left | Right | Left | Left | Left | Right |
| Median Width(m) | 3.5 | | | 3.5 | 3.5 | |
| Link Offset(m) | 0.0 | | | 0.0 | 0.0 | |
| Crosswalk Width(m) | 4.8 | | | 4.8 | 4.8 | |
| Two way Left Turn Lane | | | | | | |
| Headway Factor | 1.09 | 1.12 | 1.09 | 1.09 | 1.09 | 1.09 |
| Turning Speed (k/h) | 25 | 15 | 25 | | | 15 |
| Number of Detectors | 1 | 1 | 1 | 2 | 2 | |
| Detector Template | Left | Right | Left | Thru | Thru | |
| Leading Detector (m) | 2.0 | 2.0 | 2.0 | 10.0 | 10.0 | |
| Trailing Detector (m) | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | |
| Detector 1 Position(m) | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | |
| Detector 1 Size(m) | 2.0 | 2.0 | 2.0 | 0.6 | 0.6 | |
| Detector 1 Type | Cl+Ex | Cl+Ex | Cl+Ex | Cl+Ex | Cl+Ex | |
| Detector 1 Channel | | | | | | |
| Detector 1 Extend (s) | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | |
| Detector 1 Queue (s) | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | |
| Detector 1 Delay (s) | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | |
| Detector 2 Position(m) | | | | 9.4 | 9.4 | |
| Detector 2 Size(m) | | | | 0.6 | 0.6 | |
| Detector 2 Type | | | | Cl+Ex | Cl+Ex | |
| Detector 2 Channel | | | | | | |
| Detector 2 Extend (s) | | | | 0.0 | 0.0 | |
| Turn Type | Prot | Perm | pm+pt | NA | NA | |

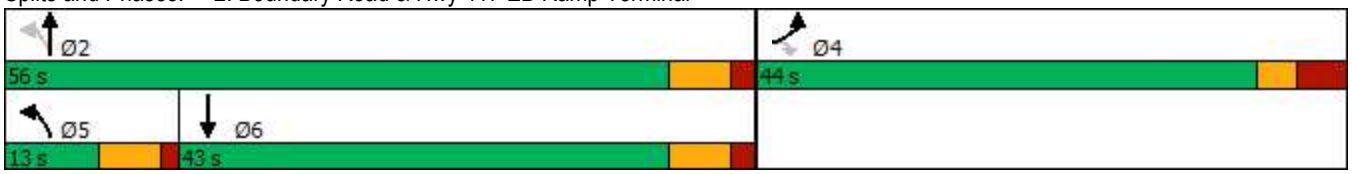


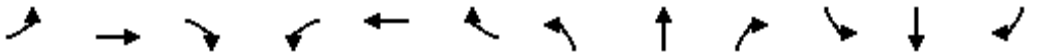
| Lane Group | EBL | EBR | NBL | NBT | SBT | SBR |
|---|---|---|---|---|---|---|
| Protected Phases | 4 | | 5 | 2 | 6 | |
| Permitted Phases | | 4 | 2 | | | |
| Detector Phase | 4 | 4 | 5 | 2 | 6 | |
| Switch Phase | | | | | | |
| Minimum Initial (s) | 7.0 | 7.0 | 7.0 | 35.0 | 35.0 | |
| Minimum Split (s) | 23.0 | 23.0 | 13.0 | 41.6 | 41.6 | |
| Total Split (s) | 44.0 | 44.0 | 13.0 | 56.0 | 43.0 | |
| Total Split (%) | 44.0% | 44.0% | 13.0% | 56.0% | 43.0% | |
| Maximum Green (s) | 37.2 | 37.2 | 7.0 | 49.4 | 36.4 | |
| Yellow Time (s) | 3.0 | 3.0 | 4.6 | 4.6 | 4.6 | |
| All-Red Time (s) | 3.8 | 3.8 | 1.4 | 2.0 | 2.0 | |
| Lost Time Adjust (s) | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | |
| Total Lost Time (s) | 6.8 | 6.8 | 6.0 | 6.6 | 6.6 | |
| Lead/Lag | | | Lead | | Lag | |
| Lead-Lag Optimize? | | | Yes | | Yes | |
| Vehicle Extension (s) | 3.0 | 3.0 | 3.0 | 3.0 | 3.0 | |
| Recall Mode | None | None | None | Min | Min | |
| Walk Time (s) | 7.0 | 7.0 | | 0.0 | 7.0 | |
| Flash Dont Walk (s) | 5.0 | 5.0 | | 0.0 | 21.0 | |
| Pedestrian Calls (#/hr) | 0 | 0 | | 0 | 0 | |
| Act Effct Green (s) | 22.7 | 22.7 | 49.6 | 49.0 | 35.7 | |
| Actuated g/C Ratio | 0.27 | 0.27 | 0.58 | 0.57 | 0.42 | |
| v/c Ratio | 0.19 | 0.93 | 0.34 | 0.34 | 0.37 | |
| Control Delay | 22.9 | 25.8 | 13.7 | 13.7 | 22.0 | |
| Queue Delay | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | |
| Total Delay | 22.9 | 25.8 | 13.7 | 13.7 | 22.0 | |
| LOS | C | C | B | B | C | |
| Approach Delay | 25.5 | | | 13.7 | 22.0 | |
| Approach LOS | C | | | B | C | |
| Queue Length 50th (m) | 10.0 | 26.9 | 14.1 | 27.6 | 28.7 | |
| Queue Length 95th (m) | 20.2 | #107.0 | 33.7 | 60.0 | 59.6 | |
| Internal Link Dist (m) | 130.2 | | | 219.1 | 521.7 | |
| Turn Bay Length (m) | | 25.0 | 50.0 | | | |
| Base Capacity (vph) | 689 | 955 | 517 | 946 | 689 | |
| Starvation Cap Reductn | 0 | 0 | 0 | 0 | 0 | |
| Spillback Cap Reductn | 0 | 0 | 0 | 0 | 0 | |
| Storage Cap Reductn | 0 | 0 | 0 | 0 | 0 | |
| Reduced v/c Ratio | 0.11 | 0.78 | 0.34 | 0.33 | 0.36 | |

| Intersection Summary | | | |
|---|---|---|---|
| Area Type: | Other | | |
| Cycle Length: 100 | | | |
| Actuated Cycle Length: 85.4 | | | |
| Natural Cycle: 80 | | | |
| Control Type: Semi Act-Uncoord | | | |
| Maximum v/c Ratio: 0.93 | | | |
| Intersection Signal Delay: 21.2 | | Intersection LOS: C | |
| Intersection Capacity Utilization 89.2% | | ICU Level of Service E | |
| Analysis Period (min) 15 | | | |

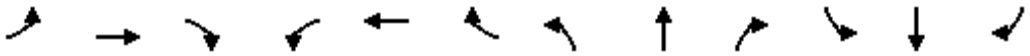
# 95th percentile volume exceeds capacity, queue may be longer.
Queue shown is maximum after two cycles.

Splits and Phases: 2: Boundary Road & Hwy 417 EB Ramp Terminal





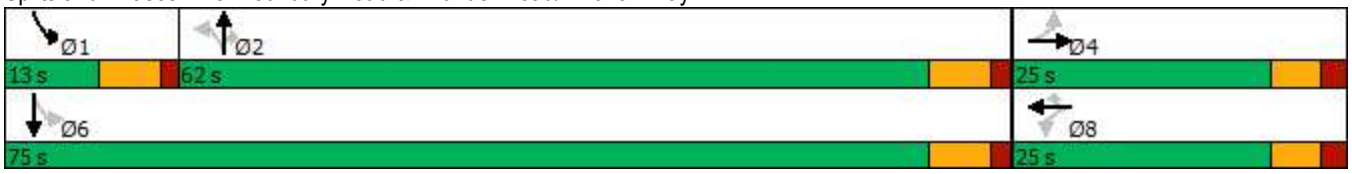
| Lane Group | EBL | EBT | EBR | WBL | WBT | WBR | NBL | NBT | NBR | SBL | SBT | SBR |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Lane Configurations | | | | | | | | | | | | |
| Traffic Volume (vph) | 151 | 0 | 34 | 6 | 0 | 18 | 10 | 320 | 0 | 2 | 887 | 87 |
| Future Volume (vph) | 151 | 0 | 34 | 6 | 0 | 18 | 10 | 320 | 0 | 2 | 887 | 87 |
| Ideal Flow (vphpl) | 1800 | 1800 | 1800 | 1800 | 1800 | 1800 | 1800 | 1800 | 1800 | 1800 | 1800 | 1800 |
| Lane Width (m) | 3.5 | 3.5 | 3.5 | 3.5 | 3.5 | 3.5 | 3.3 | 3.5 | 3.3 | 3.3 | 3.5 | 3.5 |
| Storage Length (m) | 0.0 | | 15.0 | 0.0 | | 0.0 | 35.0 | | 7.5 | 100.0 | | 35.0 |
| Storage Lanes | 0 | | 0 | 0 | | 1 | 1 | | 1 | 1 | | 0 |
| Taper Length (m) | 7.5 | | | 7.5 | | | 45.0 | | | 75.0 | | |
| Lane Util. Factor | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| Frt | | 0.975 | | | | 0.850 | | | | | 0.987 | |
| Flt Protected | | 0.961 | | | 0.950 | | 0.950 | | | 0.950 | | |
| Satd. Flow (prot) | 0 | 1444 | 0 | 0 | 1271 | 1513 | 1503 | 1633 | 1740 | 1102 | 1684 | 0 |
| Flt Permitted | | 0.761 | | | 0.729 | | 0.205 | | | 0.495 | | |
| Satd. Flow (perm) | 0 | 1143 | 0 | 0 | 976 | 1513 | 324 | 1633 | 1740 | 574 | 1684 | 0 |
| Right Turn on Red | | | Yes | | | Yes | | | Yes | | | Yes |
| Satd. Flow (RTOR) | | 100 | | | | 100 | | | | | 11 | |
| Link Speed (k/h) | | 60 | | | 20 | | | 80 | | | 80 | |
| Link Distance (m) | | 198.6 | | | 170.6 | | | 174.7 | | | 243.1 | |
| Travel Time (s) | | 11.9 | | | 30.7 | | | 7.9 | | | 10.9 | |
| Peak Hour Factor | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| Heavy Vehicles (%) | 19% | 0% | 0% | 33% | 0% | 0% | 10% | 9% | 0% | 50% | 4% | 8% |
| Adj. Flow (vph) | 151 | 0 | 34 | 6 | 0 | 18 | 10 | 320 | 0 | 2 | 887 | 87 |
| Shared Lane Traffic (%) | | | | | | | | | | | | |
| Lane Group Flow (vph) | 0 | 185 | 0 | 0 | 6 | 18 | 10 | 320 | 0 | 2 | 974 | 0 |
| Enter Blocked Intersection | No | No | No | No | No | No | No | No | No | No | No | No |
| Lane Alignment | Left | Left | Right | Left | Left | Right | Left | Left | Right | Left | Left | Right |
| Median Width(m) | | 0.0 | | | 0.0 | | | 3.5 | | | 3.5 | |
| Link Offset(m) | | 0.0 | | | 0.0 | | | 0.0 | | | 0.0 | |
| Crosswalk Width(m) | | 4.8 | | | 4.8 | | | 4.8 | | | 4.8 | |
| Two way Left Turn Lane | | | | | | | | | | | | |
| Headway Factor | 1.09 | 1.09 | 1.09 | 1.09 | 1.09 | 1.09 | 1.12 | 1.09 | 1.12 | 1.12 | 1.09 | 1.09 |
| Turning Speed (k/h) | 25 | | 15 | 25 | | 15 | 25 | | 15 | 25 | | 15 |
| Number of Detectors | 1 | 2 | | 1 | 2 | 1 | 1 | 2 | 1 | 1 | 2 | |
| Detector Template | Left | Thru | | Left | Thru | Right | Left | Thru | Right | Left | Thru | |
| Leading Detector (m) | 2.0 | 10.0 | | 2.0 | 10.0 | 2.0 | 2.0 | 10.0 | 2.0 | 2.0 | 10.0 | |
| Trailing Detector (m) | 0.0 | 0.0 | | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | |
| Detector 1 Position(m) | 0.0 | 0.0 | | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | |
| Detector 1 Size(m) | 2.0 | 0.6 | | 2.0 | 0.6 | 2.0 | 2.0 | 0.6 | 2.0 | 2.0 | 0.6 | |
| Detector 1 Type | Cl+Ex | Cl+Ex | | Cl+Ex | Cl+Ex | Cl+Ex | Cl+Ex | Cl+Ex | Cl+Ex | Cl+Ex | Cl+Ex | |
| Detector 1 Channel | | | | | | | | | | | | |
| Detector 1 Extend (s) | 0.0 | 0.0 | | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | |
| Detector 1 Queue (s) | 0.0 | 0.0 | | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | |
| Detector 1 Delay (s) | 0.0 | 0.0 | | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | |
| Detector 2 Position(m) | | 9.4 | | | 9.4 | | | 9.4 | | | 9.4 | |
| Detector 2 Size(m) | | 0.6 | | | 0.6 | | | 0.6 | | | 0.6 | |
| Detector 2 Type | | Cl+Ex | | | Cl+Ex | | | Cl+Ex | | | Cl+Ex | |
| Detector 2 Channel | | | | | | | | | | | | |
| Detector 2 Extend (s) | | 0.0 | | | 0.0 | | | 0.0 | | | 0.0 | |
| Turn Type | Perm | NA | | Perm | NA | Perm | Perm | NA | Perm | pm+pt | NA | |

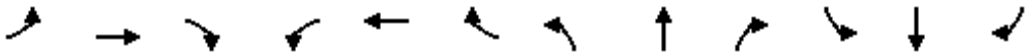


| Lane Group | EBL | EBT | EBR | WBL | WBT | WBR | NBL | NBT | NBR | SBL | SBT | SBR |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Protected Phases | | 4 | | | 8 | | | 2 | | 1 | 6 | |
| Permitted Phases | 4 | | | 8 | | 8 | 2 | | 2 | 6 | | |
| Detector Phase | 4 | 4 | | 8 | 8 | 8 | 2 | 2 | 2 | 1 | 6 | |
| Switch Phase | | | | | | | | | | | | |
| Minimum Initial (s) | 7.0 | 7.0 | | 7.0 | 7.0 | 7.0 | 20.0 | 20.0 | 20.0 | 7.0 | 20.0 | |
| Minimum Split (s) | 24.8 | 24.8 | | 24.8 | 24.8 | 24.8 | 26.2 | 26.2 | 26.2 | 13.0 | 26.2 | |
| Total Split (s) | 25.0 | 25.0 | | 25.0 | 25.0 | 25.0 | 62.0 | 62.0 | 62.0 | 13.0 | 75.0 | |
| Total Split (%) | 25.0% | 25.0% | | 25.0% | 25.0% | 25.0% | 62.0% | 62.0% | 62.0% | 13.0% | 75.0% | |
| Maximum Green (s) | 19.2 | 19.2 | | 19.2 | 19.2 | 19.2 | 55.8 | 55.8 | 55.8 | 7.0 | 68.8 | |
| Yellow Time (s) | 3.7 | 3.7 | | 3.7 | 3.7 | 3.7 | 4.6 | 4.6 | 4.6 | 4.6 | 4.6 | |
| All-Red Time (s) | 2.1 | 2.1 | | 2.1 | 2.1 | 2.1 | 1.6 | 1.6 | 1.6 | 1.4 | 1.6 | |
| Lost Time Adjust (s) | | 0.0 | | | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | |
| Total Lost Time (s) | | 5.8 | | | 5.8 | 5.8 | 6.2 | 6.2 | 6.2 | 6.0 | 6.2 | |
| Lead/Lag | | | | | | | Lag | Lag | Lag | Lead | | |
| Lead-Lag Optimize? | | | | | | | Yes | Yes | Yes | Yes | | |
| Vehicle Extension (s) | 3.0 | 3.0 | | 3.0 | 3.0 | 3.0 | 3.0 | 3.0 | 3.0 | 3.0 | 3.0 | |
| Recall Mode | None | None | | None | None | None | Min | Min | Min | None | Min | |
| Walk Time (s) | 7.0 | 7.0 | | 7.0 | 7.0 | 7.0 | 7.0 | 7.0 | 7.0 | | 7.0 | |
| Flash Dont Walk (s) | 12.0 | 12.0 | | 12.0 | 12.0 | 12.0 | 10.0 | 10.0 | 10.0 | | 10.0 | |
| Pedestrian Calls (#/hr) | 0 | 0 | | 0 | 0 | 0 | 0 | 0 | 0 | | 0 | |
| Act Effct Green (s) | | 12.1 | | | 12.1 | 12.1 | 45.5 | 45.5 | | 47.6 | 47.4 | |
| Actuated g/C Ratio | | 0.17 | | | 0.17 | 0.17 | 0.63 | 0.63 | | 0.66 | 0.65 | |
| v/c Ratio | | 0.68 | | | 0.04 | 0.05 | 0.05 | 0.31 | | 0.00 | 0.88 | |
| Control Delay | | 29.8 | | | 32.2 | 0.3 | 8.4 | 8.4 | | 4.5 | 21.6 | |
| Queue Delay | | 0.0 | | | 0.0 | 0.0 | 0.0 | 0.0 | | 0.0 | 0.0 | |
| Total Delay | | 29.8 | | | 32.2 | 0.3 | 8.4 | 8.4 | | 4.5 | 21.6 | |
| LOS | | C | | | C | A | A | A | | A | C | |
| Approach Delay | | 29.8 | | | 8.3 | | | 8.4 | | | 21.6 | |
| Approach LOS | | C | | | A | | | A | | | C | |
| Queue Length 50th (m) | | 10.5 | | | 0.7 | 0.0 | 0.4 | 15.5 | | 0.1 | 88.7 | |
| Queue Length 95th (m) | | 39.7 | | | 4.6 | 0.0 | 3.6 | 52.3 | | 0.8 | 203.2 | |
| Internal Link Dist (m) | | 174.6 | | | 146.6 | | | 150.7 | | | 219.1 | |
| Turn Bay Length (m) | | | | | | | 35.0 | | | 100.0 | | |
| Base Capacity (vph) | | 400 | | | 281 | 507 | 263 | 1325 | | 431 | 1491 | |
| Starvation Cap Reductn | | 0 | | | 0 | 0 | 0 | 0 | | 0 | 17 | |
| Spillback Cap Reductn | | 0 | | | 0 | 0 | 0 | 0 | | 0 | 0 | |
| Storage Cap Reductn | | 0 | | | 0 | 0 | 0 | 0 | | 0 | 0 | |
| Reduced v/c Ratio | | 0.46 | | | 0.02 | 0.04 | 0.04 | 0.24 | | 0.00 | 0.66 | |

| Intersection Summary | | | |
|---|---|---|---|
| Area Type: | Other | | |
| Cycle Length: 100 | | | |
| Actuated Cycle Length: 72.6 | | | |
| Natural Cycle: 80 | | | |
| Control Type: Semi Act-Uncoord | | | |
| Maximum v/c Ratio: 0.88 | | | |
| Intersection Signal Delay: 19.5 | | Intersection LOS: B | |
| Intersection Capacity Utilization 82.5% | | ICU Level of Service E | |
| Analysis Period (min) 15 | | | |

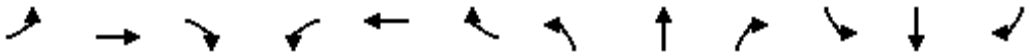
Splits and Phases: 3: Boundary Road & Thunder Road/Amazon Way





| Lane Group | EBL | EBT | EBR | WBL | WBT | WBR | NBL | NBT | NBR | SBL | SBT | SBR |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Lane Configurations | | | | | | | | | | | | |
| Traffic Volume (vph) | 4 | 0 | 15 | 6 | 0 | 12 | 5 | 314 | 6 | 13 | 907 | 7 |
| Future Volume (vph) | 4 | 0 | 15 | 6 | 0 | 12 | 5 | 314 | 6 | 13 | 907 | 7 |
| Ideal Flow (vphpl) | 1800 | 1800 | 1800 | 1800 | 1800 | 1800 | 1800 | 1800 | 1800 | 1800 | 1800 | 1800 |
| Lane Width (m) | 3.5 | 3.5 | 3.5 | 3.5 | 3.5 | 3.5 | 3.5 | 3.5 | 3.5 | 3.5 | 3.5 | 3.6 |
| Storage Length (m) | 0.0 | | 0.0 | 0.0 | | 0.0 | 15.0 | | 0.0 | 70.0 | | 0.0 |
| Storage Lanes | 0 | | 0 | 0 | | 0 | 1 | | 0 | 1 | | 0 |
| Taper Length (m) | 7.5 | | | 7.5 | | | 45.0 | | | 45.0 | | |
| Lane Util. Factor | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| Frt | | 0.893 | | | 0.910 | | | 0.997 | | | 0.999 | |
| Flt Protected | | 0.990 | | | 0.984 | | 0.950 | | | 0.950 | | |
| Satd. Flow (prot) | 0 | 1574 | 0 | 0 | 797 | 0 | 1691 | 1662 | 0 | 846 | 1744 | 0 |
| Flt Permitted | | 0.990 | | | 0.984 | | 0.950 | | | 0.950 | | |
| Satd. Flow (perm) | 0 | 1574 | 0 | 0 | 797 | 0 | 1691 | 1662 | 0 | 846 | 1744 | 0 |
| Link Speed (k/h) | | 50 | | | 20 | | | 80 | | | 80 | |
| Link Distance (m) | | 105.7 | | | 151.5 | | | 1150.2 | | | 174.7 | |
| Travel Time (s) | | 7.6 | | | 27.3 | | | 51.8 | | | 7.9 | |
| Peak Hour Factor | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| Heavy Vehicles (%) | 0% | 0% | 0% | 100% | 0% | 100% | 0% | 5% | 100% | 100% | 2% | 0% |
| Adj. Flow (vph) | 4 | 0 | 15 | 6 | 0 | 12 | 5 | 314 | 6 | 13 | 907 | 7 |
| Shared Lane Traffic (%) | | | | | | | | | | | | |
| Lane Group Flow (vph) | 0 | 19 | 0 | 0 | 18 | 0 | 5 | 320 | 0 | 13 | 914 | 0 |
| Enter Blocked Intersection | No | No | No | No | No | No | No | No | No | No | No | No |
| Lane Alignment | Left | Left | Right | Left | Left | Right | Left | Left | Right | Left | Left | Right |
| Median Width(m) | | 0.0 | | | 0.0 | | | 3.5 | | | 3.5 | |
| Link Offset(m) | | 0.0 | | | 0.0 | | | 0.0 | | | 0.0 | |
| Crosswalk Width(m) | | 4.8 | | | 4.8 | | | 4.8 | | | 4.8 | |
| Two way Left Turn Lane | | | | | | | | | | | | |
| Headway Factor | 1.09 | 1.09 | 1.09 | 1.09 | 1.09 | 1.09 | 1.09 | 1.09 | 1.09 | 1.09 | 1.09 | 1.07 |
| Turning Speed (k/h) | 25 | | 15 | 25 | | 15 | 25 | | 15 | 25 | | 15 |
| Sign Control | | Stop | | | Stop | | | Free | | | Free | |

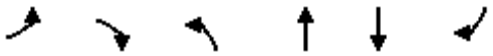
| Intersection Summary | | | |
|---|---|---|---|
| Area Type: | Other | | |
| Control Type: Unsignalized | | | |
| Intersection Capacity Utilization | 60.8% | ICU Level of Service | B |
| Analysis Period (min) | 15 | | |



| Movement | EBL | EBT | EBR | WBL | WBT | WBR | NBL | NBT | NBR | SBL | SBT | SBR |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Lane Configurations | | | | | | | | | | | | |
| Traffic Volume (veh/h) | 4 | 0 | 15 | 6 | 0 | 12 | 5 | 314 | 6 | 13 | 907 | 7 |
| Future Volume (Veh/h) | 4 | 0 | 15 | 6 | 0 | 12 | 5 | 314 | 6 | 13 | 907 | 7 |
| Sign Control | | Stop | | | Stop | | | Free | | | Free | |
| Grade | | 0% | | | 0% | | | 0% | | | 0% | |
| Peak Hour Factor | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| Hourly flow rate (vph) | 4 | 0 | 15 | 6 | 0 | 12 | 5 | 314 | 6 | 13 | 907 | 7 |
| Pedestrians | | | | | | | | | | | | |
| Lane Width (m) | | | | | | | | | | | | |
| Walking Speed (m/s) | | | | | | | | | | | | |
| Percent Blockage | | | | | | | | | | | | |
| Right turn flare (veh) | | | | | | | | | | | | |
| Median type | | | | | | | | None | | | None | |
| Median storage veh) | | | | | | | | | | | | |
| Upstream signal (m) | | | | | | | | | | | 175 | |
| pX, platoon unblocked | 0.55 | 0.55 | 0.55 | 0.55 | 0.55 | | 0.55 | | | | | |
| vC, conflicting volume | 1272 | 1266 | 910 | 1275 | 1267 | 317 | 914 | | | 320 | | |
| vC1, stage 1 conf vol | | | | | | | | | | | | |
| vC2, stage 2 conf vol | | | | | | | | | | | | |
| vCu, unblocked vol | 1086 | 1075 | 426 | 1090 | 1076 | 317 | 433 | | | 320 | | |
| tC, single (s) | 7.1 | 6.5 | 6.2 | 8.1 | 6.5 | 7.2 | 4.1 | | | 5.1 | | |
| tC, 2 stage (s) | | | | | | | | | | | | |
| tF (s) | 3.5 | 4.0 | 3.3 | 4.4 | 4.0 | 4.2 | 2.2 | | | 3.1 | | |
| p0 queue free % | 96 | 100 | 96 | 91 | 100 | 98 | 99 | | | 98 | | |
| cM capacity (veh/h) | 103 | 119 | 347 | 66 | 119 | 544 | 625 | | | 844 | | |

| Direction, Lane # | EB 1 | WB 1 | NB 1 | NB 2 | SB 1 | SB 2 |
|---|---|---|---|---|---|---|
| Volume Total | 19 | 18 | 5 | 320 | 13 | 914 |
| Volume Left | 4 | 6 | 5 | 0 | 13 | 0 |
| Volume Right | 15 | 12 | 0 | 6 | 0 | 7 |
| cSH | 232 | 159 | 625 | 1700 | 844 | 1700 |
| Volume to Capacity | 0.08 | 0.11 | 0.01 | 0.19 | 0.02 | 0.54 |
| Queue Length 95th (m) | 2.1 | 3.0 | 0.2 | 0.0 | 0.4 | 0.0 |
| Control Delay (s) | 21.9 | 30.5 | 10.8 | 0.0 | 9.3 | 0.0 |
| Lane LOS | C | D | B | | A | |
| Approach Delay (s) | 21.9 | 30.5 | 0.2 | | 0.1 | |
| Approach LOS | C | D | | | | |

| Intersection Summary | | | | |
|---|---|---|---|---|
| Average Delay | 0.9 | | | |
| Intersection Capacity Utilization | 60.8% | ICU Level of Service | B | |
| Analysis Period (min) | 15 | | | |



| Lane Group | EBL | EBR | NBL | NBT | SBT | SBR |
|---|---|---|---|---|---|---|
| Lane Configurations | | | | | | |
| Traffic Volume (vph) | 129 | 108 | 57 | 140 | 805 | 133 |
| Future Volume (vph) | 129 | 108 | 57 | 140 | 805 | 133 |
| Ideal Flow (vphpl) | 1800 | 1800 | 1800 | 1800 | 1800 | 1800 |
| Lane Width (m) | 3.3 | 3.3 | 3.5 | 3.5 | 3.5 | 3.5 |
| Storage Length (m) | 25.0 | 0.0 | 0.0 | | | 30.0 |
| Storage Lanes | 1 | 1 | 0 | | | 1 |
| Taper Length (m) | 47.5 | | 7.5 | | | |
| Lane Util. Factor | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| Frt | | 0.850 | | | | 0.850 |
| Flt Protected | 0.950 | | | 0.986 | | |
| Satd. Flow (prot) | 1463 | 1395 | 0 | 1664 | 1762 | 1363 |
| Flt Permitted | 0.950 | | | 0.986 | | |
| Satd. Flow (perm) | 1463 | 1395 | 0 | 1664 | 1762 | 1363 |
| Link Speed (k/h) | 80 | | | 80 | 80 | |
| Link Distance (m) | 180.5 | | | 135.8 | 1150.2 | |
| Travel Time (s) | 8.1 | | | 6.1 | 51.8 | |
| Peak Hour Factor | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| Heavy Vehicles (%) | 13% | 6% | 9% | 4% | 1% | 11% |
| Adj. Flow (vph) | 129 | 108 | 57 | 140 | 805 | 133 |
| Shared Lane Traffic (%) | | | | | | |
| Lane Group Flow (vph) | 129 | 108 | 0 | 197 | 805 | 133 |
| Enter Blocked Intersection | No | No | No | No | No | No |
| Lane Alignment | Left | Right | Left | Left | Left | Right |
| Median Width(m) | 3.3 | | | 3.5 | 3.5 | |
| Link Offset(m) | 0.0 | | | 0.0 | 0.0 | |
| Crosswalk Width(m) | 4.8 | | | 4.8 | 4.8 | |
| Two way Left Turn Lane | | | | | | |
| Headway Factor | 1.12 | 1.12 | 1.09 | 1.09 | 1.09 | 1.09 |
| Turning Speed (k/h) | 25 | 15 | 25 | | | 15 |
| Sign Control | Stop | | | Free | Free | |

| Intersection Summary | | | |
|---|---|---|---|
| Area Type: | Other | | |
| Control Type: Unsignalized | | | |
| Intersection Capacity Utilization 73.4% | | ICU Level of Service D | |
| Analysis Period (min) 15 | | | |

| Movement | EBL | EBR | NBL | NBT | SBT | SBR |
|---|---|---|---|---|---|---|
| Lane Configurations | | | | | | |
| Traffic Volume (veh/h) | 129 | 108 | 57 | 140 | 805 | 133 |
| Future Volume (Veh/h) | 129 | 108 | 57 | 140 | 805 | 133 |
| Sign Control | Stop | | | Free | Free | |
| Grade | 0% | | | 0% | 0% | |
| Peak Hour Factor | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| Hourly flow rate (vph) | 129 | 108 | 57 | 140 | 805 | 133 |
| 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 | 1059 | 805 | 938 | | | |
| vC1, stage 1 conf vol | | | | | | |
| vC2, stage 2 conf vol | | | | | | |
| vCu, unblocked vol | 1059 | 805 | 938 | | | |
| tC, single (s) | 6.5 | 6.3 | 4.2 | | | |
| tC, 2 stage (s) | | | | | | |
| tF (s) | 3.6 | 3.4 | 2.3 | | | |
| p0 queue free % | 41 | 71 | 92 | | | |
| cM capacity (veh/h) | 218 | 376 | 703 | | | |

| Direction, Lane # | EB 1 | EB 2 | NB 1 | SB 1 | SB 2 |
|---|---|---|---|---|---|
| Volume Total | 129 | 108 | 197 | 805 | 133 |
| Volume Left | 129 | 0 | 57 | 0 | 0 |
| Volume Right | 0 | 108 | 0 | 0 | 133 |
| cSH | 218 | 376 | 703 | 1700 | 1700 |
| Volume to Capacity | 0.59 | 0.29 | 0.08 | 0.47 | 0.08 |
| Queue Length 95th (m) | 26.8 | 9.3 | 2.1 | 0.0 | 0.0 |
| Control Delay (s) | 43.1 | 18.4 | 3.7 | 0.0 | 0.0 |
| Lane LOS | E | C | A | | |
| Approach Delay (s) | 31.8 | | 3.7 | 0.0 | |
| Approach LOS | D | | | | |

| Intersection Summary | | | |
|---|---|---|---|
| Average Delay | 6.0 | | |
| Intersection Capacity Utilization | 73.4% | ICU Level of Service | D |
| Analysis Period (min) | 15 | | |

| Lane Group | EBT | EBR | WBL | WBT | NBL | NBR |
|---|---|---|---|---|---|---|
| Lane Configurations | | | | | | |
| Traffic Volume (vph) | 122 | 0 | 19 | 79 | 0 | 62 |
| Future Volume (vph) | 122 | 0 | 19 | 79 | 0 | 62 |
| Ideal Flow (vphpl) | 1800 | 1800 | 1800 | 1800 | 1800 | 1800 |
| Lane Width (m) | 3.5 | 3.5 | 3.5 | 3.5 | 3.5 | 3.5 |
| Lane Util. Factor | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| Frt | | | | | 0.865 | |
| Flt Protected | | | | 0.990 | | |
| Satd. Flow (prot) | 1483 | 0 | 0 | 1631 | 1426 | 0 |
| Flt Permitted | | | | 0.990 | | |
| Satd. Flow (perm) | 1483 | 0 | 0 | 1631 | 1426 | 0 |
| Link Speed (k/h) | 60 | | | 50 | 50 | |
| Link Distance (m) | 163.7 | | | 198.6 | 103.6 | |
| Travel Time (s) | 9.8 | | | 14.3 | 7.5 | |
| Peak Hour Factor | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| Heavy Vehicles (%) | 20% | 0% | 0% | 10% | 0% | 8% |
| Adj. Flow (vph) | 122 | 0 | 19 | 79 | 0 | 62 |
| Shared Lane Traffic (%) | | | | | | |
| Lane Group Flow (vph) | 122 | 0 | 0 | 98 | 62 | 0 |
| Enter Blocked Intersection | No | No | No | No | No | No |
| Lane Alignment | Left | Right | Left | Left | Left | Right |
| Median Width(m) | 0.0 | | | 0.0 | 3.5 | |
| Link Offset(m) | 0.0 | | | 0.0 | 0.0 | |
| Crosswalk Width(m) | 4.8 | | | 4.8 | 4.8 | |
| Two way Left Turn Lane | | | | | | |
| Headway Factor | 1.09 | 1.09 | 1.09 | 1.09 | 1.09 | 1.09 |
| Turning Speed (k/h) | | 15 | 25 | | 25 | 15 |
| Sign Control | Free | | | Free | Stop | |

| Intersection Summary | | | |
|---|---|---|---|
| Area Type: | Other | | |
| Control Type: Unsignalized | | | |
| Intersection Capacity Utilization 26.3% | | ICU Level of Service A | |
| Analysis Period (min) 15 | | | |

| Movement | EBT | EBR | WBL | WBT | NBL | NBR |
|---|---|---|---|---|---|---|
| Lane Configurations | | | | | | |
| Traffic Volume (veh/h) | 122 | 0 | 19 | 79 | 0 | 62 |
| Future Volume (Veh/h) | 122 | 0 | 19 | 79 | 0 | 62 |
| Sign Control | Free | | | Free | Stop | |
| Grade | 0% | | | 0% | 0% | |
| Peak Hour Factor | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| Hourly flow rate (vph) | 122 | 0 | 19 | 79 | 0 | 62 |
| Pedestrians | | | | | | |
| Lane Width (m) | | | | | | |
| Walking Speed (m/s) | | | | | | |
| Percent Blockage | | | | | | |
| Right turn flare (veh) | | | | | | |
| Median type | None | | | None | | |
| Median storage veh) | | | | | | |
| Upstream signal (m) | | | | 199 | | |
| pX, platoon unblocked | | | | | | |
| vC, conflicting volume | | | 122 | | 239 | 122 |
| vC1, stage 1 conf vol | | | | | | |
| vC2, stage 2 conf vol | | | | | | |
| vCu, unblocked vol | | | 122 | | 239 | 122 |
| tC, single (s) | | | 4.1 | | 6.4 | 6.3 |
| tC, 2 stage (s) | | | | | | |
| tF (s) | | | 2.2 | | 3.5 | 3.4 |
| p0 queue free % | | | 99 | | 100 | 93 |
| cM capacity (veh/h) | | | 1478 | | 744 | 913 |

| Direction, Lane # | EB 1 | WB 1 | NB 1 |
|---|---|---|---|
| Volume Total | 122 | 98 | 62 |
| Volume Left | 0 | 19 | 0 |
| Volume Right | 0 | 0 | 62 |
| cSH | 1700 | 1478 | 913 |
| Volume to Capacity | 0.07 | 0.01 | 0.07 |
| Queue Length 95th (m) | 0.0 | 0.3 | 1.7 |
| Control Delay (s) | 0.0 | 1.5 | 9.2 |
| Lane LOS | | A | A |
| Approach Delay (s) | 0.0 | 1.5 | 9.2 |
| Approach LOS | | | A |

| Intersection Summary | | | |
|---|---|---|---|
| Average Delay | 2.6 | | |
| Intersection Capacity Utilization | 26.3% | ICU Level of Service | A |
| Analysis Period (min) | 15 | | |

| Lane Group | EBT | EBR | WBL | WBT | NBL | NBR |
|---|---|---|---|---|---|---|
| Lane Configurations | | | | | | |
| Traffic Volume (vph) | 107 | 0 | 5 | 74 | 0 | 15 |
| Future Volume (vph) | 107 | 0 | 5 | 74 | 0 | 15 |
| Ideal Flow (vphpl) | 1800 | 1800 | 1800 | 1800 | 1800 | 1800 |
| Lane Width (m) | 3.5 | 3.5 | 3.5 | 3.5 | 3.5 | 3.5 |
| Lane Util. Factor | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| Frt | | | | | 0.865 | |
| Flt Protected | | | | 0.997 | | |
| Satd. Flow (prot) | 1648 | 0 | 0 | 1612 | 770 | 0 |
| Flt Permitted | | | | 0.997 | | |
| Satd. Flow (perm) | 1648 | 0 | 0 | 1612 | 770 | 0 |
| Link Speed (k/h) | 60 | | | 50 | 50 | |
| Link Distance (m) | 185.0 | | | 163.7 | 105.8 | |
| Travel Time (s) | 11.1 | | | 11.8 | 7.6 | |
| Peak Hour Factor | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| Heavy Vehicles (%) | 8% | 0% | 100% | 4% | 0% | 100% |
| Adj. Flow (vph) | 107 | 0 | 5 | 74 | 0 | 15 |
| Shared Lane Traffic (%) | | | | | | |
| Lane Group Flow (vph) | 107 | 0 | 0 | 79 | 15 | 0 |
| Enter Blocked Intersection | No | No | No | No | No | No |
| Lane Alignment | Left | Right | Left | Left | Left | Right |
| Median Width(m) | 0.0 | | | 0.0 | 3.5 | |
| Link Offset(m) | 0.0 | | | 0.0 | 0.0 | |
| Crosswalk Width(m) | 4.8 | | | 4.8 | 4.8 | |
| Two way Left Turn Lane | | | | | | |
| Headway Factor | 1.09 | 1.09 | 1.09 | 1.09 | 1.09 | 1.09 |
| Turning Speed (k/h) | | 15 | 25 | | 25 | 15 |
| Sign Control | Free | | | Free | Stop | |

| Intersection Summary | | | |
|---|---|---|---|
| Area Type: | Other | | |
| Control Type: Unsignalized | | | |
| Intersection Capacity Utilization | 18.4% | ICU Level of Service | A |
| Analysis Period (min) | 15 | | |

| Movement | EBT | EBR | WBL | WBT | NBL | NBR |
|---|---|---|---|---|---|---|
| Lane Configurations | | | | | | |
| Traffic Volume (veh/h) | 107 | 0 | 5 | 74 | 0 | 15 |
| Future Volume (Veh/h) | 107 | 0 | 5 | 74 | 0 | 15 |
| Sign Control | Free | | | Free | Stop | |
| Grade | 0% | | | 0% | 0% | |
| Peak Hour Factor | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| Hourly flow rate (vph) | 107 | 0 | 5 | 74 | 0 | 15 |
| Pedestrians | | | | | | |
| Lane Width (m) | | | | | | |
| Walking Speed (m/s) | | | | | | |
| Percent Blockage | | | | | | |
| Right turn flare (veh) | | | | | | |
| Median type | None | | | None | | |
| Median storage veh) | | | | | | |
| Upstream signal (m) | | | | 362 | | |
| pX, platoon unblocked | | | | | | |
| vC, conflicting volume | | | 107 | | 191 | 107 |
| vC1, stage 1 conf vol | | | | | | |
| vC2, stage 2 conf vol | | | | | | |
| vCu, unblocked vol | | | 107 | | 191 | 107 |
| tC, single (s) | | | 5.1 | | 6.4 | 7.2 |
| tC, 2 stage (s) | | | | | | |
| tF (s) | | | 3.1 | | 3.5 | 4.2 |
| p0 queue free % | | | 100 | | 100 | 98 |
| cM capacity (veh/h) | | | 1045 | | 799 | 736 |

| Direction, Lane # | EB 1 | WB 1 | NB 1 |
|---|---|---|---|
| Volume Total | 107 | 79 | 15 |
| Volume Left | 0 | 5 | 0 |
| Volume Right | 0 | 0 | 15 |
| cSH | 1700 | 1045 | 736 |
| Volume to Capacity | 0.06 | 0.00 | 0.02 |
| Queue Length 95th (m) | 0.0 | 0.1 | 0.5 |
| Control Delay (s) | 0.0 | 0.6 | 10.0 |
| Lane LOS | | A | A |
| Approach Delay (s) | 0.0 | 0.6 | 10.0 |
| Approach LOS | | | A |

| Intersection Summary | | | |
|---|---|---|---|
| Average Delay | 1.0 | | |
| Intersection Capacity Utilization | 18.4% | ICU Level of Service | A |
| Analysis Period (min) | 15 | | |

| Lane Group | EBT | EBR | WBL | WBT | NBL | NBR |
|---|---|---|---|---|---|---|
| Lane Configurations | | | | | | |
| Traffic Volume (vph) | 83 | 0 | 9 | 65 | 0 | 24 |
| Future Volume (vph) | 83 | 0 | 9 | 65 | 0 | 24 |
| Ideal Flow (vphpl) | 1800 | 1800 | 1800 | 1800 | 1800 | 1800 |
| Lane Width (m) | 3.5 | 3.5 | 3.5 | 3.5 | 3.5 | 3.5 |
| Lane Util. Factor | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| Frt | | | | | 0.865 | |
| Flt Protected | | | | 0.994 | | |
| Satd. Flow (prot) | 1695 | 0 | 0 | 1694 | 1272 | 0 |
| Flt Permitted | | | | 0.994 | | |
| Satd. Flow (perm) | 1695 | 0 | 0 | 1694 | 1272 | 0 |
| Link Speed (k/h) | 60 | | | 50 | 50 | |
| Link Distance (m) | 95.5 | | | 185.0 | 109.7 | |
| Travel Time (s) | 5.7 | | | 13.3 | 7.9 | |
| Peak Hour Factor | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| Heavy Vehicles (%) | 5% | 0% | 22% | 2% | 0% | 21% |
| Adj. Flow (vph) | 83 | 0 | 9 | 65 | 0 | 24 |
| Shared Lane Traffic (%) | | | | | | |
| Lane Group Flow (vph) | 83 | 0 | 0 | 74 | 24 | 0 |
| Enter Blocked Intersection | No | No | No | No | No | No |
| Lane Alignment | Left | Right | Left | Left | Left | Right |
| Median Width(m) | 0.0 | | | 0.0 | 3.5 | |
| Link Offset(m) | 0.0 | | | 0.0 | 0.0 | |
| Crosswalk Width(m) | 4.8 | | | 4.8 | 4.8 | |
| Two way Left Turn Lane | | | | | | |
| Headway Factor | 1.09 | 1.09 | 1.09 | 1.09 | 1.09 | 1.09 |
| Turning Speed (k/h) | | 15 | 25 | | 25 | 15 |
| Sign Control | Free | | | Free | Stop | |

| Intersection Summary | | | |
|---|---|---|---|
| Area Type: | Other | | |
| Control Type: Unsignalized | | | |
| Intersection Capacity Utilization 20.8% | | ICU Level of Service A | |
| Analysis Period (min) 15 | | | |

| Movement | EBT | EBR | WBL | WBT | NBL | NBR |
|---|---|---|---|---|---|---|
| Lane Configurations | | | | | | |
| Traffic Volume (veh/h) | 83 | 0 | 9 | 65 | 0 | 24 |
| Future Volume (Veh/h) | 83 | 0 | 9 | 65 | 0 | 24 |
| Sign Control | Free | | | Free | Stop | |
| Grade | 0% | | | 0% | 0% | |
| Peak Hour Factor | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| Hourly flow rate (vph) | 83 | 0 | 9 | 65 | 0 | 24 |
| 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 | | | 83 | | 166 | 83 |
| vC1, stage 1 conf vol | | | | | | |
| vC2, stage 2 conf vol | | | | | | |
| vCu, unblocked vol | | | 83 | | 166 | 83 |
| tC, single (s) | | | 4.3 | | 6.4 | 6.4 |
| tC, 2 stage (s) | | | | | | |
| tF (s) | | | 2.4 | | 3.5 | 3.5 |
| p0 queue free % | | | 99 | | 100 | 97 |
| cM capacity (veh/h) | | | 1397 | | 824 | 926 |

| Direction, Lane # | EB 1 | WB 1 | NB 1 |
|---|---|---|---|
| Volume Total | 83 | 74 | 24 |
| Volume Left | 0 | 9 | 0 |
| Volume Right | 0 | 0 | 24 |
| cSH | 1700 | 1397 | 926 |
| Volume to Capacity | 0.05 | 0.01 | 0.03 |
| Queue Length 95th (m) | 0.0 | 0.2 | 0.6 |
| Control Delay (s) | 0.0 | 1.0 | 9.0 |
| Lane LOS | | A | A |
| Approach Delay (s) | 0.0 | 1.0 | 9.0 |
| Approach LOS | | | A |

| Intersection Summary | | | |
|---|---|---|---|
| Average Delay | 1.6 | | |
| Intersection Capacity Utilization | 20.8% | ICU Level of Service | A |
| Analysis Period (min) | 15 | | |

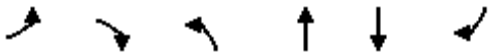
| Lane Group | WBL | WBR | NBT | NBR | SBL | SBT |
|---|---|---|---|---|---|---|
| Lane Configurations | | | | | | |
| Traffic Volume (vph) | 162 | 34 | 111 | 956 | 85 | 132 |
| Future Volume (vph) | 162 | 34 | 111 | 956 | 85 | 132 |
| Ideal Flow (vphpl) | 1800 | 1800 | 1800 | 1800 | 1800 | 1800 |
| Lane Width (m) | 4.5 | 4.5 | 3.5 | 3.5 | 3.5 | 3.5 |
| Storage Length (m) | 0.0 | 10.0 | | 0.0 | 0.0 | |
| Storage Lanes | 1 | 0 | | 0 | 0 | |
| Taper Length (m) | 7.5 | | | | 7.5 | |
| Lane Util. Factor | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| Frt | 0.977 | | 0.879 | | | |
| Flt Protected | 0.960 | | | | | 0.981 |
| Satd. Flow (prot) | 1700 | 0 | 1529 | 0 | 0 | 1602 |
| Flt Permitted | 0.960 | | | | | 0.981 |
| Satd. Flow (perm) | 1700 | 0 | 1529 | 0 | 0 | 1602 |
| Link Speed (k/h) | 40 | | 80 | | | 80 |
| Link Distance (m) | 155.0 | | 545.7 | | | 134.1 |
| Travel Time (s) | 14.0 | | 24.6 | | | 6.0 |
| Peak Hour Factor | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| Heavy Vehicles (%) | 8% | 15% | 14% | 1% | 9% | 9% |
| Adj. Flow (vph) | 162 | 34 | 111 | 956 | 85 | 132 |
| Shared Lane Traffic (%) | | | | | | |
| Lane Group Flow (vph) | 196 | 0 | 1067 | 0 | 0 | 217 |
| Enter Blocked Intersection | No | No | No | No | No | No |
| Lane Alignment | Left | Right | Left | Right | Left | Left |
| Median Width(m) | 4.5 | | 0.0 | | | 0.0 |
| Link Offset(m) | 0.0 | | 0.0 | | | 0.0 |
| Crosswalk Width(m) | 4.8 | | 4.8 | | | 4.8 |
| Two way Left Turn Lane | | | | | | |
| Headway Factor | 0.95 | 0.95 | 1.09 | 1.09 | 1.09 | 1.09 |
| Turning Speed (k/h) | 25 | 15 | | 15 | 25 | |
| Sign Control | Stop | | Free | | | Free |

| Intersection Summary | | | |
|---|---|---|---|
| Area Type: | Other | | |
| Control Type: Unsignalized | | | |
| Intersection Capacity Utilization 102.4% | | ICU Level of Service G | |
| Analysis Period (min) 15 | | | |

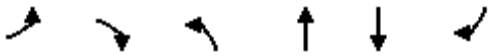
| Movement | WBL | WBR | NBT | NBR | SBL | SBT |
|---|---|---|---|---|---|---|
| Lane Configurations | | | | | | |
| Traffic Volume (veh/h) | 162 | 34 | 111 | 956 | 85 | 132 |
| Future Volume (Veh/h) | 162 | 34 | 111 | 956 | 85 | 132 |
| Sign Control | Stop | | Free | | | Free |
| Grade | 0% | | 0% | | | 0% |
| Peak Hour Factor | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| Hourly flow rate (vph) | 162 | 34 | 111 | 956 | 85 | 132 |
| 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 | 891 | 589 | | | 1067 | |
| vC1, stage 1 conf vol | | | | | | |
| vC2, stage 2 conf vol | | | | | | |
| vCu, unblocked vol | 891 | 589 | | | 1067 | |
| tC, single (s) | 6.5 | 6.4 | | | 4.2 | |
| tC, 2 stage (s) | | | | | | |
| tF (s) | 3.6 | 3.4 | | | 2.3 | |
| p0 queue free % | 39 | 93 | | | 86 | |
| cM capacity (veh/h) | 264 | 485 | | | 627 | |

| Direction, Lane # | WB 1 | NB 1 | SB 1 |
|---|---|---|---|
| Volume Total | 196 | 1067 | 217 |
| Volume Left | 162 | 0 | 85 |
| Volume Right | 34 | 956 | 0 |
| cSH | 287 | 1700 | 627 |
| Volume to Capacity | 0.68 | 0.63 | 0.14 |
| Queue Length 95th (m) | 36.9 | 0.0 | 3.7 |
| Control Delay (s) | 40.9 | 0.0 | 5.6 |
| Lane LOS | E | | A |
| Approach Delay (s) | 40.9 | 0.0 | 5.6 |
| Approach LOS | E | | |

| Intersection Summary | | | |
|---|---|---|---|
| Average Delay | 6.2 | | |
| Intersection Capacity Utilization | 102.4% | ICU Level of Service | G |
| Analysis Period (min) | 15 | | |



| Lane Group | EBL | EBR | NBL | NBT | SBT | SBR |
|---|---|---|---|---|---|---|
| Lane Configurations | | | | | | |
| Traffic Volume (vph) | 20 | 361 | 44 | 1051 | 260 | 10 |
| Future Volume (vph) | 20 | 361 | 44 | 1051 | 260 | 10 |
| Ideal Flow (vphpl) | 1800 | 1800 | 1800 | 1800 | 1800 | 1800 |
| Lane Width (m) | 3.5 | 3.3 | 3.5 | 3.5 | 3.5 | 3.5 |
| Storage Length (m) | 0.0 | 25.0 | 50.0 | | | 0.0 |
| Storage Lanes | 1 | 1 | 1 | | | 0 |
| Taper Length (m) | 7.5 | | 75.0 | | | |
| Lane Util. Factor | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| Frt | | 0.850 | | | 0.995 | |
| Flt Protected | 0.950 | | 0.950 | | | |
| Satd. Flow (prot) | 1301 | 1345 | 1331 | 1745 | 1582 | 0 |
| Flt Permitted | 0.950 | | 0.521 | | | |
| Satd. Flow (perm) | 1301 | 1345 | 730 | 1745 | 1582 | 0 |
| Right Turn on Red | | Yes | | | | Yes |
| Satd. Flow (RTOR) | | 361 | | | 3 | |
| Link Speed (k/h) | 40 | | | 80 | 80 | |
| Link Distance (m) | 154.2 | | | 243.1 | 545.7 | |
| Travel Time (s) | 13.9 | | | 10.9 | 24.6 | |
| Peak Hour Factor | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| Heavy Vehicles (%) | 30% | 10% | 27% | 2% | 12% | 10% |
| Adj. Flow (vph) | 20 | 361 | 44 | 1051 | 260 | 10 |
| Shared Lane Traffic (%) | | | | | | |
| Lane Group Flow (vph) | 20 | 361 | 44 | 1051 | 270 | 0 |
| Enter Blocked Intersection | No | No | No | No | No | No |
| Lane Alignment | Left | Right | Left | Left | Left | Right |
| Median Width(m) | 3.5 | | | 3.5 | 3.5 | |
| Link Offset(m) | 0.0 | | | 0.0 | 0.0 | |
| Crosswalk Width(m) | 4.8 | | | 4.8 | 4.8 | |
| Two way Left Turn Lane | | | | | | |
| Headway Factor | 1.09 | 1.12 | 1.09 | 1.09 | 1.09 | 1.09 |
| Turning Speed (k/h) | 25 | 15 | 25 | | | 15 |
| Number of Detectors | 1 | 1 | 1 | 2 | 2 | |
| Detector Template | Left | Right | Left | Thru | Thru | |
| Leading Detector (m) | 2.0 | 2.0 | 2.0 | 10.0 | 10.0 | |
| Trailing Detector (m) | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | |
| Detector 1 Position(m) | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | |
| Detector 1 Size(m) | 2.0 | 2.0 | 2.0 | 0.6 | 0.6 | |
| Detector 1 Type | Cl+Ex | Cl+Ex | Cl+Ex | Cl+Ex | Cl+Ex | |
| Detector 1 Channel | | | | | | |
| Detector 1 Extend (s) | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | |
| Detector 1 Queue (s) | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | |
| Detector 1 Delay (s) | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | |
| Detector 2 Position(m) | | | | 9.4 | 9.4 | |
| Detector 2 Size(m) | | | | 0.6 | 0.6 | |
| Detector 2 Type | | | | Cl+Ex | Cl+Ex | |
| Detector 2 Channel | | | | | | |
| Detector 2 Extend (s) | | | | 0.0 | 0.0 | |
| Turn Type | Prot | Perm | pm+pt | NA | NA | |

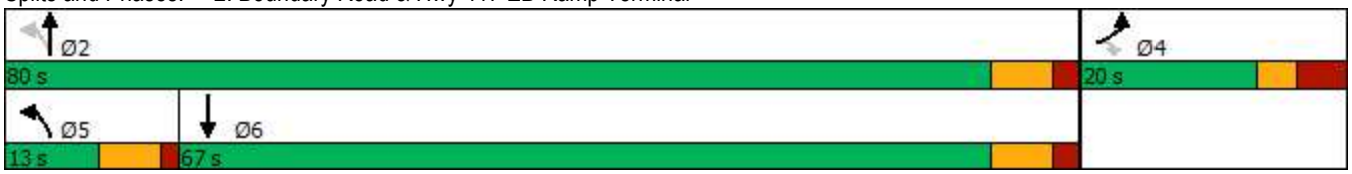


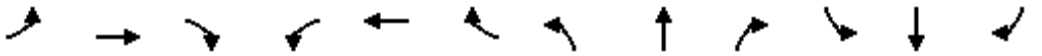
| Lane Group | EBL | EBR | NBL | NBT | SBT | SBR |
|---|---|---|---|---|---|---|
| Protected Phases | 4 | | 5 | 2 | 6 | |
| Permitted Phases | | 4 | 2 | | | |
| Detector Phase | 4 | 4 | 5 | 2 | 6 | |
| Switch Phase | | | | | | |
| Minimum Initial (s) | 7.0 | 7.0 | 7.0 | 35.0 | 35.0 | |
| Minimum Split (s) | 17.8 | 17.8 | 13.0 | 41.6 | 41.6 | |
| Total Split (s) | 20.0 | 20.0 | 13.0 | 80.0 | 67.0 | |
| Total Split (%) | 20.0% | 20.0% | 13.0% | 80.0% | 67.0% | |
| Maximum Green (s) | 13.2 | 13.2 | 7.0 | 73.4 | 60.4 | |
| Yellow Time (s) | 3.0 | 3.0 | 4.6 | 4.6 | 4.6 | |
| All-Red Time (s) | 3.8 | 3.8 | 1.4 | 2.0 | 2.0 | |
| Lost Time Adjust (s) | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | |
| Total Lost Time (s) | 6.8 | 6.8 | 6.0 | 6.6 | 6.6 | |
| Lead/Lag | | | Lead | | Lag | |
| Lead-Lag Optimize? | | | Yes | | Yes | |
| Vehicle Extension (s) | 3.0 | 3.0 | 3.0 | 3.0 | 3.0 | |
| Recall Mode | None | None | None | Min | Min | |
| Walk Time (s) | 5.0 | 5.0 | | 0.0 | 7.0 | |
| Flash Dont Walk (s) | 6.0 | 6.0 | | 0.0 | 21.0 | |
| Pedestrian Calls (#/hr) | 0 | 0 | | 0 | 0 | |
| Act Effct Green (s) | 9.0 | 9.0 | 50.6 | 50.0 | 43.1 | |
| Actuated g/C Ratio | 0.12 | 0.12 | 0.69 | 0.68 | 0.59 | |
| v/c Ratio | 0.12 | 0.75 | 0.08 | 0.88 | 0.29 | |
| Control Delay | 36.9 | 15.3 | 3.7 | 19.3 | 9.5 | |
| Queue Delay | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | |
| Total Delay | 36.9 | 15.3 | 3.7 | 19.4 | 9.5 | |
| LOS | D | B | A | B | A | |
| Approach Delay | 16.5 | | | 18.7 | 9.5 | |
| Approach LOS | B | | | B | A | |
| Queue Length 50th (m) | 2.5 | 0.0 | 1.4 | 84.7 | 19.6 | |
| Queue Length 95th (m) | 10.9 | #31.3 | 4.7 | 193.5 | 38.3 | |
| Internal Link Dist (m) | 130.2 | | | 219.1 | 521.7 | |
| Turn Bay Length (m) | | 25.0 | 50.0 | | | |
| Base Capacity (vph) | 248 | 548 | 566 | 1599 | 1324 | |
| Starvation Cap Reductn | 0 | 0 | 0 | 26 | 0 | |
| Spillback Cap Reductn | 0 | 0 | 0 | 0 | 0 | |
| Storage Cap Reductn | 0 | 0 | 0 | 0 | 0 | |
| Reduced v/c Ratio | 0.08 | 0.66 | 0.08 | 0.67 | 0.20 | |

| Intersection Summary | | | |
|---|---|---|---|
| Area Type: | Other | | |
| Cycle Length: 100 | | | |
| Actuated Cycle Length: 73.2 | | | |
| Natural Cycle: 80 | | | |
| Control Type: Semi Act-Uncoord | | | |
| Maximum v/c Ratio: 0.88 | | | |
| Intersection Signal Delay: 16.8 | | Intersection LOS: B | |
| Intersection Capacity Utilization 75.4% | | ICU Level of Service D | |
| Analysis Period (min) 15 | | | |

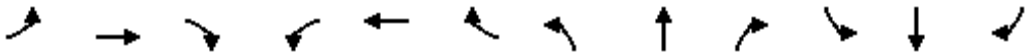
# 95th percentile volume exceeds capacity, queue may be longer.
Queue shown is maximum after two cycles.

Splits and Phases: 2: Boundary Road & Hwy 417 EB Ramp Terminal





| Lane Group | EBL | EBT | EBR | WBL | WBT | WBR | NBL | NBT | NBR | SBL | SBT | SBR |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Lane Configurations | | | | | | | | | | | | |
| Traffic Volume (vph) | 63 | 18 | 11 | 4 | 6 | 28 | 24 | 1004 | 33 | 213 | 276 | 132 |
| Future Volume (vph) | 63 | 18 | 11 | 4 | 6 | 28 | 24 | 1004 | 33 | 213 | 276 | 132 |
| Ideal Flow (vphpl) | 1800 | 1800 | 1800 | 1800 | 1800 | 1800 | 1800 | 1800 | 1800 | 1800 | 1800 | 1800 |
| Lane Width (m) | 3.5 | 3.5 | 3.5 | 3.5 | 3.5 | 3.5 | 3.3 | 3.5 | 3.3 | 3.3 | 3.5 | 3.5 |
| Storage Length (m) | 0.0 | | 15.0 | 0.0 | | 0.0 | 35.0 | | 7.5 | 100.0 | | 35.0 |
| Storage Lanes | 0 | | 0 | 0 | | 1 | 1 | | 1 | 1 | | 0 |
| Taper Length (m) | 7.5 | | | 7.5 | | | 45.0 | | | 75.0 | | |
| Lane Util. Factor | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| Frt | | 0.984 | | | | 0.850 | | | 0.850 | | 0.951 | |
| Flt Protected | | 0.967 | | | 0.980 | | 0.950 | | | 0.950 | | |
| Satd. Flow (prot) | 0 | 1540 | 0 | 0 | 1744 | 1513 | 1589 | 1728 | 1479 | 1653 | 1447 | 0 |
| Flt Permitted | | 0.789 | | | 0.883 | | 0.523 | | | 0.072 | | |
| Satd. Flow (perm) | 0 | 1257 | 0 | 0 | 1572 | 1513 | 875 | 1728 | 1479 | 125 | 1447 | 0 |
| Right Turn on Red | | | Yes | | | Yes | | | Yes | | | Yes |
| Satd. Flow (RTOR) | | 6 | | | | 100 | | | 96 | | 56 | |
| Link Speed (k/h) | | 60 | | | 20 | | | 80 | | | 80 | |
| Link Distance (m) | | 198.6 | | | 170.6 | | | 174.7 | | | 243.1 | |
| Travel Time (s) | | 11.9 | | | 30.7 | | | 7.9 | | | 10.9 | |
| Peak Hour Factor | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| Heavy Vehicles (%) | 13% | 0% | 9% | 0% | 0% | 0% | 4% | 3% | 0% | 0% | 16% | 19% |
| Adj. Flow (vph) | 63 | 18 | 11 | 4 | 6 | 28 | 24 | 1004 | 33 | 213 | 276 | 132 |
| Shared Lane Traffic (%) | | | | | | | | | | | | |
| Lane Group Flow (vph) | 0 | 92 | 0 | 0 | 10 | 28 | 24 | 1004 | 33 | 213 | 408 | 0 |
| Enter Blocked Intersection | No | No | No | No | No | No | No | No | No | No | No | No |
| Lane Alignment | Left | Left | Right | Left | Left | Right | Left | Left | Right | Left | Left | Right |
| Median Width(m) | | 0.0 | | | 0.0 | | | 3.5 | | | 3.5 | |
| Link Offset(m) | | 0.0 | | | 0.0 | | | 0.0 | | | 0.0 | |
| Crosswalk Width(m) | | 4.8 | | | 4.8 | | | 4.8 | | | 4.8 | |
| Two way Left Turn Lane | | | | | | | | | | | | |
| Headway Factor | 1.09 | 1.09 | 1.09 | 1.09 | 1.09 | 1.09 | 1.12 | 1.09 | 1.12 | 1.12 | 1.09 | 1.09 |
| Turning Speed (k/h) | 25 | | 15 | 25 | | 15 | 25 | | 15 | 25 | | 15 |
| Number of Detectors | 1 | 2 | | 1 | 2 | 1 | 1 | 2 | 1 | 1 | 2 | |
| Detector Template | Left | Thru | | Left | Thru | Right | Left | Thru | Right | Left | Thru | |
| Leading Detector (m) | 2.0 | 10.0 | | 2.0 | 10.0 | 2.0 | 2.0 | 10.0 | 2.0 | 2.0 | 10.0 | |
| Trailing Detector (m) | 0.0 | 0.0 | | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | |
| Detector 1 Position(m) | 0.0 | 0.0 | | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | |
| Detector 1 Size(m) | 2.0 | 0.6 | | 2.0 | 0.6 | 2.0 | 2.0 | 0.6 | 2.0 | 2.0 | 0.6 | |
| Detector 1 Type | Cl+Ex | Cl+Ex | | Cl+Ex | Cl+Ex | Cl+Ex | Cl+Ex | Cl+Ex | Cl+Ex | Cl+Ex | Cl+Ex | |
| Detector 1 Channel | | | | | | | | | | | | |
| Detector 1 Extend (s) | 0.0 | 0.0 | | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | |
| Detector 1 Queue (s) | 0.0 | 0.0 | | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | |
| Detector 1 Delay (s) | 0.0 | 0.0 | | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | |
| Detector 2 Position(m) | | 9.4 | | | 9.4 | | | 9.4 | | | 9.4 | |
| Detector 2 Size(m) | | 0.6 | | | 0.6 | | | 0.6 | | | 0.6 | |
| Detector 2 Type | | Cl+Ex | | | Cl+Ex | | | Cl+Ex | | | Cl+Ex | |
| Detector 2 Channel | | | | | | | | | | | | |
| Detector 2 Extend (s) | | 0.0 | | | 0.0 | | | 0.0 | | | 0.0 | |
| Turn Type | Perm | NA | | Perm | NA | Perm | Perm | NA | Perm | pm+pt | NA | |

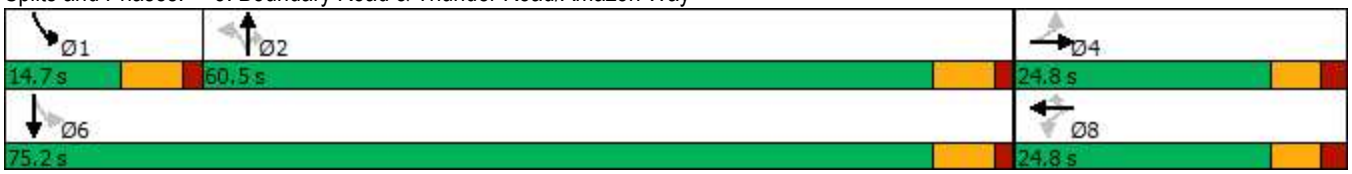


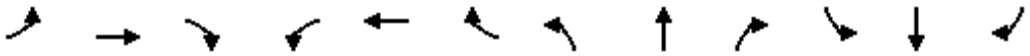
| Lane Group | EBL | EBT | EBR | WBL | WBT | WBR | NBL | NBT | NBR | SBL | SBT | SBR |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Protected Phases | | 4 | | | 8 | | | 2 | | 1 | 6 | |
| Permitted Phases | 4 | | | 8 | | 8 | 2 | | 2 | 6 | | |
| Detector Phase | 4 | 4 | | 8 | 8 | 8 | 2 | 2 | 2 | 1 | 6 | |
| Switch Phase | | | | | | | | | | | | |
| Minimum Initial (s) | 7.0 | 7.0 | | 7.0 | 7.0 | 7.0 | 20.0 | 20.0 | 20.0 | 7.0 | 20.0 | |
| Minimum Split (s) | 24.8 | 24.8 | | 24.8 | 24.8 | 24.8 | 26.2 | 26.2 | 26.2 | 13.0 | 26.2 | |
| Total Split (s) | 24.8 | 24.8 | | 24.8 | 24.8 | 24.8 | 60.5 | 60.5 | 60.5 | 14.7 | 75.2 | |
| Total Split (%) | 24.8% | 24.8% | | 24.8% | 24.8% | 24.8% | 60.5% | 60.5% | 60.5% | 14.7% | 75.2% | |
| Maximum Green (s) | 19.0 | 19.0 | | 19.0 | 19.0 | 19.0 | 54.3 | 54.3 | 54.3 | 8.7 | 69.0 | |
| Yellow Time (s) | 3.7 | 3.7 | | 3.7 | 3.7 | 3.7 | 4.6 | 4.6 | 4.6 | 4.6 | 4.6 | |
| All-Red Time (s) | 2.1 | 2.1 | | 2.1 | 2.1 | 2.1 | 1.6 | 1.6 | 1.6 | 1.4 | 1.6 | |
| Lost Time Adjust (s) | | 0.0 | | | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | |
| Total Lost Time (s) | | 5.8 | | | 5.8 | 5.8 | 6.2 | 6.2 | 6.2 | 6.0 | 6.2 | |
| Lead/Lag | | | | | | | Lag | Lag | Lag | Lead | | |
| Lead-Lag Optimize? | | | | | | | Yes | Yes | Yes | Yes | | |
| Vehicle Extension (s) | 3.0 | 3.0 | | 3.0 | 3.0 | 3.0 | 3.0 | 3.0 | 3.0 | 3.0 | 3.0 | |
| Recall Mode | None | None | | None | None | None | Min | Min | Min | None | Min | |
| Walk Time (s) | 7.0 | 7.0 | | 7.0 | 7.0 | 7.0 | 7.0 | 7.0 | 7.0 | | 7.0 | |
| Flash Dont Walk (s) | 12.0 | 12.0 | | 12.0 | 12.0 | 12.0 | 10.0 | 10.0 | 10.0 | | 10.0 | |
| Pedestrian Calls (#/hr) | 0 | 0 | | 0 | 0 | 0 | 0 | 0 | 0 | | 0 | |
| Act Effct Green (s) | | 11.7 | | | 11.7 | 11.7 | 54.8 | 54.8 | 54.8 | 69.8 | 71.1 | |
| Actuated g/C Ratio | | 0.13 | | | 0.13 | 0.13 | 0.61 | 0.61 | 0.61 | 0.77 | 0.79 | |
| v/c Ratio | | 0.55 | | | 0.05 | 0.10 | 0.05 | 0.96 | 0.04 | 0.87 | 0.35 | |
| Control Delay | | 47.7 | | | 35.0 | 0.7 | 9.8 | 40.1 | 0.1 | 55.4 | 4.8 | |
| Queue Delay | | 0.0 | | | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | |
| Total Delay | | 47.7 | | | 35.0 | 0.7 | 9.8 | 40.1 | 0.1 | 55.4 | 4.8 | |
| LOS | | D | | | C | A | A | D | A | E | A | |
| Approach Delay | | 47.7 | | | 9.7 | | | 38.2 | | | 22.2 | |
| Approach LOS | | D | | | A | | | D | | | C | |
| Queue Length 50th (m) | | 15.4 | | | 1.7 | 0.0 | 1.8 | 172.4 | 0.0 | 23.0 | 18.2 | |
| Queue Length 95th (m) | | 31.1 | | | 6.3 | 0.0 | 6.1 | #299.7 | 0.0 | #72.9 | 40.6 | |
| Internal Link Dist (m) | | 174.6 | | | 146.6 | | | 150.7 | | | 219.1 | |
| Turn Bay Length (m) | | | | | | | 35.0 | | 7.5 | 100.0 | | |
| Base Capacity (vph) | | 271 | | | 333 | 399 | 530 | 1047 | 934 | 244 | 1150 | |
| Starvation Cap Reductn | | 0 | | | 0 | 0 | 0 | 0 | 0 | 0 | 0 | |
| Spillback Cap Reductn | | 0 | | | 0 | 0 | 0 | 0 | 0 | 0 | 0 | |
| Storage Cap Reductn | | 0 | | | 0 | 0 | 0 | 0 | 0 | 0 | 0 | |
| Reduced v/c Ratio | | 0.34 | | | 0.03 | 0.07 | 0.05 | 0.96 | 0.04 | 0.87 | 0.35 | |

| Intersection Summary | | | |
|---|---|---|---|
| Area Type: | Other | | |
| Cycle Length: 100 | | | |
| Actuated Cycle Length: 90.4 | | | |
| Natural Cycle: 110 | | | |
| Control Type: Semi Act-Uncoord | | | |
| Maximum v/c Ratio: 0.96 | | | |
| Intersection Signal Delay: 32.6 | | Intersection LOS: C | |
| Intersection Capacity Utilization 95.3% | | ICU Level of Service F | |
| Analysis Period (min) 15 | | | |

# 95th percentile volume exceeds capacity, queue may be longer.
Queue shown is maximum after two cycles.

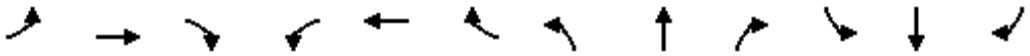
Splits and Phases: 3: Boundary Road & Thunder Road/Amazon Way





| Lane Group | EBL | EBT | EBR | WBL | WBT | WBR | NBL | NBT | NBR | SBL | SBT | SBR |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Lane Configurations | | | | | | | | | | | | |
| Traffic Volume (vph) | 1 | 0 | 5 | 6 | 0 | 4 | 15 | 1057 | 6 | 1 | 273 | 16 |
| Future Volume (vph) | 1 | 0 | 5 | 6 | 0 | 4 | 15 | 1057 | 6 | 1 | 273 | 16 |
| Ideal Flow (vphpl) | 1800 | 1800 | 1800 | 1800 | 1800 | 1800 | 1800 | 1800 | 1800 | 1800 | 1800 | 1800 |
| Lane Width (m) | 3.5 | 3.5 | 3.5 | 3.5 | 3.5 | 3.5 | 3.5 | 3.5 | 3.5 | 3.5 | 3.5 | 3.6 |
| Storage Length (m) | 0.0 | | 0.0 | 0.0 | | 0.0 | 15.0 | | 0.0 | 70.0 | | 0.0 |
| Storage Lanes | 0 | | 0 | 0 | | 0 | 1 | | 0 | 1 | | 0 |
| Taper Length (m) | 7.5 | | | 7.5 | | | 45.0 | | | 45.0 | | |
| Lane Util. Factor | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| Frt | | 0.887 | | | 0.946 | | | 0.999 | | | 0.992 | |
| Flt Protected | | 0.992 | | | 0.971 | | 0.950 | | | 0.950 | | |
| Satd. Flow (prot) | 0 | 1566 | 0 | 0 | 818 | 0 | 1691 | 1751 | 0 | 846 | 1586 | 0 |
| Flt Permitted | | 0.992 | | | 0.971 | | 0.950 | | | 0.950 | | |
| Satd. Flow (perm) | 0 | 1566 | 0 | 0 | 818 | 0 | 1691 | 1751 | 0 | 846 | 1586 | 0 |
| Link Speed (k/h) | | 50 | | | 20 | | | 80 | | | 80 | |
| Link Distance (m) | | 105.7 | | | 151.5 | | | 1150.2 | | | 174.7 | |
| Travel Time (s) | | 7.6 | | | 27.3 | | | 51.8 | | | 7.9 | |
| Peak Hour Factor | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| Heavy Vehicles (%) | 0% | 0% | 0% | 100% | 0% | 100% | 0% | 1% | 100% | 100% | 12% | 0% |
| Adj. Flow (vph) | 1 | 0 | 5 | 6 | 0 | 4 | 15 | 1057 | 6 | 1 | 273 | 16 |
| Shared Lane Traffic (%) | | | | | | | | | | | | |
| Lane Group Flow (vph) | 0 | 6 | 0 | 0 | 10 | 0 | 15 | 1063 | 0 | 1 | 289 | 0 |
| Enter Blocked Intersection | No | No | No | No | No | No | No | No | No | No | No | No |
| Lane Alignment | Left | Left | Right | Left | Left | Right | Left | Left | Right | Left | Left | Right |
| Median Width(m) | | 0.0 | | | 0.0 | | | 3.5 | | | 3.5 | |
| Link Offset(m) | | 0.0 | | | 0.0 | | | 0.0 | | | 0.0 | |
| Crosswalk Width(m) | | 4.8 | | | 4.8 | | | 4.8 | | | 4.8 | |
| Two way Left Turn Lane | | | | | | | | | | | | |
| Headway Factor | 1.09 | 1.09 | 1.09 | 1.09 | 1.09 | 1.09 | 1.09 | 1.09 | 1.09 | 1.09 | 1.09 | 1.07 |
| Turning Speed (k/h) | 25 | | 15 | 25 | | 15 | 25 | | 15 | 25 | | 15 |
| Sign Control | | Stop | | | Stop | | | Free | | | Free | |

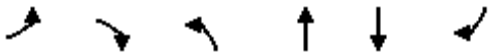
| Intersection Summary | | | |
|---|---|---|---|
| Area Type: | Other | | |
| Control Type: Unsignalized | | | |
| Intersection Capacity Utilization | 69.1% | ICU Level of Service | C |
| Analysis Period (min) | 15 | | |



| Movement | EBL | EBT | EBR | WBL | WBT | WBR | NBL | NBT | NBR | SBL | SBT | SBR |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Lane Configurations | | | | | | | | | | | | |
| Traffic Volume (veh/h) | 1 | 0 | 5 | 6 | 0 | 4 | 15 | 1057 | 6 | 1 | 273 | 16 |
| Future Volume (Veh/h) | 1 | 0 | 5 | 6 | 0 | 4 | 15 | 1057 | 6 | 1 | 273 | 16 |
| Sign Control | | Stop | | | Stop | | | Free | | | Free | |
| Grade | | 0% | | | 0% | | | 0% | | | 0% | |
| Peak Hour Factor | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| Hourly flow rate (vph) | 1 | 0 | 5 | 6 | 0 | 4 | 15 | 1057 | 6 | 1 | 273 | 16 |
| Pedestrians | | | | | | | | | | | | |
| Lane Width (m) | | | | | | | | | | | | |
| Walking Speed (m/s) | | | | | | | | | | | | |
| Percent Blockage | | | | | | | | | | | | |
| Right turn flare (veh) | | | | | | | | | | | | |
| Median type | | | | | | | | None | | | None | |
| Median storage veh) | | | | | | | | | | | | |
| Upstream signal (m) | | | | | | | | | | | 175 | |
| pX, platoon unblocked | | | | | | | | | | | | |
| vC, conflicting volume | 1374 | 1376 | 281 | 1370 | 1381 | 1060 | 289 | | | 1063 | | |
| vC1, stage 1 conf vol | | | | | | | | | | | | |
| vC2, stage 2 conf vol | | | | | | | | | | | | |
| vCu, unblocked vol | 1374 | 1376 | 281 | 1370 | 1381 | 1060 | 289 | | | 1063 | | |
| tC, single (s) | 7.1 | 6.5 | 6.2 | 8.1 | 6.5 | 7.2 | 4.1 | | | 5.1 | | |
| tC, 2 stage (s) | | | | | | | | | | | | |
| tF (s) | 3.5 | 4.0 | 3.3 | 4.4 | 4.0 | 4.2 | 2.2 | | | 3.1 | | |
| p0 queue free % | 99 | 100 | 99 | 92 | 100 | 98 | 99 | | | 100 | | |
| cM capacity (veh/h) | 120 | 144 | 763 | 76 | 143 | 179 | 1284 | | | 393 | | |

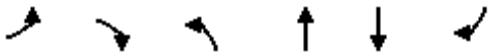
| Direction, Lane # | EB 1 | WB 1 | NB 1 | NB 2 | SB 1 | SB 2 |
|---|---|---|---|---|---|---|
| Volume Total | 6 | 10 | 15 | 1063 | 1 | 289 |
| Volume Left | 1 | 6 | 15 | 0 | 1 | 0 |
| Volume Right | 5 | 4 | 0 | 6 | 0 | 16 |
| cSH | 403 | 99 | 1284 | 1700 | 393 | 1700 |
| Volume to Capacity | 0.01 | 0.10 | 0.01 | 0.63 | 0.00 | 0.17 |
| Queue Length 95th (m) | 0.4 | 2.6 | 0.3 | 0.0 | 0.1 | 0.0 |
| Control Delay (s) | 14.1 | 45.5 | 7.8 | 0.0 | 14.2 | 0.0 |
| Lane LOS | B | E | A | | B | |
| Approach Delay (s) | 14.1 | 45.5 | 0.1 | | 0.0 | |
| Approach LOS | B | E | | | | |

| Intersection Summary | | | | |
|---|---|---|---|---|
| Average Delay | 0.5 | | | |
| Intersection Capacity Utilization | 69.1% | ICU Level of Service | C | |
| Analysis Period (min) | 15 | | | |



| Lane Group | EBL | EBR | NBL | NBT | SBT | SBR |
|---|---|---|---|---|---|---|
| Lane Configurations | | | | | | |
| Traffic Volume (vph) | 91 | 33 | 147 | 975 | 144 | 119 |
| Future Volume (vph) | 91 | 33 | 147 | 975 | 144 | 119 |
| Ideal Flow (vphpl) | 1800 | 1800 | 1800 | 1800 | 1800 | 1800 |
| Lane Width (m) | 3.3 | 3.3 | 3.5 | 3.5 | 3.5 | 3.5 |
| Storage Length (m) | 25.0 | 0.0 | 0.0 | | | 30.0 |
| Storage Lanes | 1 | 1 | 0 | | | 1 |
| Taper Length (m) | 47.5 | | 7.5 | | | |
| Lane Util. Factor | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| Frt | | 0.850 | | | | 0.850 |
| Flt Protected | 0.950 | | | 0.993 | | |
| Satd. Flow (prot) | 1489 | 1286 | 0 | 1734 | 1575 | 1293 |
| Flt Permitted | 0.950 | | | 0.993 | | |
| Satd. Flow (perm) | 1489 | 1286 | 0 | 1734 | 1575 | 1293 |
| Link Speed (k/h) | 80 | | | 80 | 80 | |
| Link Distance (m) | 180.5 | | | 135.8 | 1150.2 | |
| Travel Time (s) | 8.1 | | | 6.1 | 51.8 | |
| Peak Hour Factor | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| Heavy Vehicles (%) | 11% | 15% | 8% | 1% | 13% | 17% |
| Adj. Flow (vph) | 91 | 33 | 147 | 975 | 144 | 119 |
| Shared Lane Traffic (%) | | | | | | |
| Lane Group Flow (vph) | 91 | 33 | 0 | 1122 | 144 | 119 |
| Enter Blocked Intersection | No | No | No | No | No | No |
| Lane Alignment | Left | Right | Left | Left | Left | Right |
| Median Width(m) | 3.3 | | | 3.5 | 3.5 | |
| Link Offset(m) | 0.0 | | | 0.0 | 0.0 | |
| Crosswalk Width(m) | 4.8 | | | 4.8 | 4.8 | |
| Two way Left Turn Lane | | | | | | |
| Headway Factor | 1.12 | 1.12 | 1.09 | 1.09 | 1.09 | 1.09 |
| Turning Speed (k/h) | 25 | 15 | 25 | | | 15 |
| Sign Control | Stop | | | Free | Free | |

| Intersection Summary | | | |
|---|---|---|---|
| Area Type: | Other | | |
| Control Type: Unsignalized | | | |
| Intersection Capacity Utilization 86.1% | | ICU Level of Service E | |
| Analysis Period (min) 15 | | | |



| Movement | EBL | EBR | NBL | NBT | SBT | SBR |
|---|---|---|---|---|---|---|
| Lane Configurations | | | | | | |
| Traffic Volume (veh/h) | 91 | 33 | 147 | 975 | 144 | 119 |
| Future Volume (Veh/h) | 91 | 33 | 147 | 975 | 144 | 119 |
| Sign Control | Stop | | | Free | Free | |
| Grade | 0% | | | 0% | 0% | |
| Peak Hour Factor | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| Hourly flow rate (vph) | 91 | 33 | 147 | 975 | 144 | 119 |
| 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 | 1413 | 144 | 263 | | | |
| vC1, stage 1 conf vol | | | | | | |
| vC2, stage 2 conf vol | | | | | | |
| vCu, unblocked vol | 1413 | 144 | 263 | | | |
| tC, single (s) | 6.5 | 6.4 | 4.2 | | | |
| tC, 2 stage (s) | | | | | | |
| tF (s) | 3.6 | 3.4 | 2.3 | | | |
| p0 queue free % | 29 | 96 | 88 | | | |
| cM capacity (veh/h) | 128 | 870 | 1267 | | | |

| Direction, Lane # | EB 1 | EB 2 | NB 1 | SB 1 | SB 2 |
|---|---|---|---|---|---|
| Volume Total | 91 | 33 | 1122 | 144 | 119 |
| Volume Left | 91 | 0 | 147 | 0 | 0 |
| Volume Right | 0 | 33 | 0 | 0 | 119 |
| cSH | 128 | 870 | 1267 | 1700 | 1700 |
| Volume to Capacity | 0.71 | 0.04 | 0.12 | 0.08 | 0.07 |
| Queue Length 95th (m) | 31.7 | 0.9 | 3.1 | 0.0 | 0.0 |
| Control Delay (s) | 82.7 | 9.3 | 3.0 | 0.0 | 0.0 |
| Lane LOS | F | A | A | | |
| Approach Delay (s) | 63.2 | | 3.0 | 0.0 | |
| Approach LOS | F | | | | |

| Intersection Summary | | | |
|---|---|---|---|
| Average Delay | 7.4 | | |
| Intersection Capacity Utilization | 86.1% | ICU Level of Service | E |
| Analysis Period (min) | 15 | | |

| Lane Group | EBT | EBR | WBL | WBT | NBL | NBR |
|---|---|---|---|---|---|---|
| Lane Configurations | | | | | | |
| Traffic Volume (vph) | 72 | 0 | 51 | 111 | 0 | 19 |
| Future Volume (vph) | 72 | 0 | 51 | 111 | 0 | 19 |
| Ideal Flow (vphpl) | 1800 | 1800 | 1800 | 1800 | 1800 | 1800 |
| Lane Width (m) | 3.5 | 3.5 | 3.5 | 3.5 | 3.5 | 3.5 |
| Lane Util. Factor | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| Frt | | | | | 0.865 | |
| Flt Protected | | | | 0.985 | | |
| Satd. Flow (prot) | 1604 | 0 | 0 | 1515 | 1466 | 0 |
| Flt Permitted | | | | 0.985 | | |
| Satd. Flow (perm) | 1604 | 0 | 0 | 1515 | 1466 | 0 |
| Link Speed (k/h) | 60 | | | 50 | 50 | |
| Link Distance (m) | 163.7 | | | 198.6 | 103.6 | |
| Travel Time (s) | 9.8 | | | 14.3 | 7.5 | |
| Peak Hour Factor | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| Heavy Vehicles (%) | 11% | 0% | 0% | 23% | 0% | 5% |
| Adj. Flow (vph) | 72 | 0 | 51 | 111 | 0 | 19 |
| Shared Lane Traffic (%) | | | | | | |
| Lane Group Flow (vph) | 72 | 0 | 0 | 162 | 19 | 0 |
| Enter Blocked Intersection | No | No | No | No | No | No |
| Lane Alignment | Left | Right | Left | Left | Left | Right |
| Median Width(m) | 0.0 | | | 0.0 | 3.5 | |
| Link Offset(m) | 0.0 | | | 0.0 | 0.0 | |
| Crosswalk Width(m) | 4.8 | | | 4.8 | 4.8 | |
| Two way Left Turn Lane | | | | | | |
| Headway Factor | 1.09 | 1.09 | 1.09 | 1.09 | 1.09 | 1.09 |
| Turning Speed (k/h) | | 15 | 25 | | 25 | 15 |
| Sign Control | Free | | | Free | Stop | |

| Intersection Summary | | | |
|---|---|---|---|
| Area Type: | Other | | |
| Control Type: Unsignalized | | | |
| Intersection Capacity Utilization 25.8% | | ICU Level of Service A | |
| Analysis Period (min) 15 | | | |

| Movement | EBT | EBR | WBL | WBT | NBL | NBR |
|---|---|---|---|---|---|---|
| Lane Configurations | | | | | | |
| Traffic Volume (veh/h) | 72 | 0 | 51 | 111 | 0 | 19 |
| Future Volume (Veh/h) | 72 | 0 | 51 | 111 | 0 | 19 |
| Sign Control | Free | | | Free | Stop | |
| Grade | 0% | | | 0% | 0% | |
| Peak Hour Factor | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| Hourly flow rate (vph) | 72 | 0 | 51 | 111 | 0 | 19 |
| Pedestrians | | | | | | |
| Lane Width (m) | | | | | | |
| Walking Speed (m/s) | | | | | | |
| Percent Blockage | | | | | | |
| Right turn flare (veh) | | | | | | |
| Median type | None | | | None | | |
| Median storage veh) | | | | | | |
| Upstream signal (m) | | | | 199 | | |
| pX, platoon unblocked | | | | | | |
| vC, conflicting volume | | | 72 | | 285 | 72 |
| vC1, stage 1 conf vol | | | | | | |
| vC2, stage 2 conf vol | | | | | | |
| vCu, unblocked vol | | | 72 | | 285 | 72 |
| tC, single (s) | | | 4.1 | | 6.4 | 6.2 |
| tC, 2 stage (s) | | | | | | |
| tF (s) | | | 2.2 | | 3.5 | 3.3 |
| p0 queue free % | | | 97 | | 100 | 98 |
| cM capacity (veh/h) | | | 1541 | | 686 | 982 |

| Direction, Lane # | EB 1 | WB 1 | NB 1 |
|---|---|---|---|
| Volume Total | 72 | 162 | 19 |
| Volume Left | 0 | 51 | 0 |
| Volume Right | 0 | 0 | 19 |
| cSH | 1700 | 1541 | 982 |
| Volume to Capacity | 0.04 | 0.03 | 0.02 |
| Queue Length 95th (m) | 0.0 | 0.8 | 0.5 |
| Control Delay (s) | 0.0 | 2.5 | 8.7 |
| Lane LOS | | A | A |
| Approach Delay (s) | 0.0 | 2.5 | 8.7 |
| Approach LOS | | | A |

| Intersection Summary | | | |
|---|---|---|---|
| Average Delay | 2.3 | | |
| Intersection Capacity Utilization | 25.8% | ICU Level of Service | A |
| Analysis Period (min) | 15 | | |

| Lane Group | EBT | EBR | WBL | WBT | NBL | NBR |
|---|---|---|---|---|---|---|
| Lane Configurations | | | | | | |
| Traffic Volume (vph) | 68 | 0 | 15 | 96 | 0 | 4 |
| Future Volume (vph) | 68 | 0 | 15 | 96 | 0 | 4 |
| Ideal Flow (vphpl) | 1800 | 1800 | 1800 | 1800 | 1800 | 1800 |
| Lane Width (m) | 3.5 | 3.5 | 3.5 | 3.5 | 3.5 | 3.5 |
| Lane Util. Factor | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| Frt | | | | | 0.865 | |
| Flt Protected | | | | 0.993 | | |
| Satd. Flow (prot) | 1679 | 0 | 0 | 1437 | 770 | 0 |
| Flt Permitted | | | | 0.993 | | |
| Satd. Flow (perm) | 1679 | 0 | 0 | 1437 | 770 | 0 |
| Link Speed (k/h) | 60 | | | 50 | 50 | |
| Link Distance (m) | 185.0 | | | 163.7 | 105.8 | |
| Travel Time (s) | 11.1 | | | 11.8 | 7.6 | |
| Peak Hour Factor | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| Heavy Vehicles (%) | 6% | 0% | 100% | 11% | 0% | 100% |
| Adj. Flow (vph) | 68 | 0 | 15 | 96 | 0 | 4 |
| Shared Lane Traffic (%) | | | | | | |
| Lane Group Flow (vph) | 68 | 0 | 0 | 111 | 4 | 0 |
| Enter Blocked Intersection | No | No | No | No | No | No |
| Lane Alignment | Left | Right | Left | Left | Left | Right |
| Median Width(m) | 0.0 | | | 0.0 | 3.5 | |
| Link Offset(m) | 0.0 | | | 0.0 | 0.0 | |
| Crosswalk Width(m) | 4.8 | | | 4.8 | 4.8 | |
| Two way Left Turn Lane | | | | | | |
| Headway Factor | 1.09 | 1.09 | 1.09 | 1.09 | 1.09 | 1.09 |
| Turning Speed (k/h) | | 15 | 25 | | 25 | 15 |
| Sign Control | Free | | | Free | Stop | |

| Intersection Summary | | | |
|---|---|---|---|
| Area Type: | Other | | |
| Control Type: Unsignalized | | | |
| Intersection Capacity Utilization 22.9% | | ICU Level of Service A | |
| Analysis Period (min) 15 | | | |

| Movement | EBT | EBR | WBL | WBT | NBL | NBR |
|---|---|---|---|---|---|---|
| Lane Configurations | | | | | | |
| Traffic Volume (veh/h) | 68 | 0 | 15 | 96 | 0 | 4 |
| Future Volume (Veh/h) | 68 | 0 | 15 | 96 | 0 | 4 |
| Sign Control | Free | | | Free | Stop | |
| Grade | 0% | | | 0% | 0% | |
| Peak Hour Factor | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| Hourly flow rate (vph) | 68 | 0 | 15 | 96 | 0 | 4 |
| Pedestrians | | | | | | |
| Lane Width (m) | | | | | | |
| Walking Speed (m/s) | | | | | | |
| Percent Blockage | | | | | | |
| Right turn flare (veh) | | | | | | |
| Median type | None | | | None | | |
| Median storage veh) | | | | | | |
| Upstream signal (m) | | | | 362 | | |
| pX, platoon unblocked | | | | | | |
| vC, conflicting volume | | | 68 | | 194 | 68 |
| vC1, stage 1 conf vol | | | | | | |
| vC2, stage 2 conf vol | | | | | | |
| vCu, unblocked vol | | | 68 | | 194 | 68 |
| tC, single (s) | | | 5.1 | | 6.4 | 7.2 |
| tC, 2 stage (s) | | | | | | |
| tF (s) | | | 3.1 | | 3.5 | 4.2 |
| p0 queue free % | | | 99 | | 100 | 99 |
| cM capacity (veh/h) | | | 1086 | | 788 | 778 |

| Direction, Lane # | EB 1 | WB 1 | NB 1 |
|---|---|---|---|
| Volume Total | 68 | 111 | 4 |
| Volume Left | 0 | 15 | 0 |
| Volume Right | 0 | 0 | 4 |
| cSH | 1700 | 1086 | 778 |
| Volume to Capacity | 0.04 | 0.01 | 0.01 |
| Queue Length 95th (m) | 0.0 | 0.3 | 0.1 |
| Control Delay (s) | 0.0 | 1.2 | 9.6 |
| Lane LOS | | A | A |
| Approach Delay (s) | 0.0 | 1.2 | 9.6 |
| Approach LOS | | | A |

| Intersection Summary | | | |
|---|---|---|---|
| Average Delay | 1.0 | | |
| Intersection Capacity Utilization | 22.9% | ICU Level of Service | A |
| Analysis Period (min) | 15 | | |

| Lane Group | EBT | EBR | WBL | WBT | NBL | NBR |
|---|---|---|---|---|---|---|
| Lane Configurations | | | | | | |
| Traffic Volume (vph) | 61 | 0 | 23 | 73 | 0 | 7 |
| Future Volume (vph) | 61 | 0 | 23 | 73 | 0 | 7 |
| Ideal Flow (vphpl) | 1800 | 1800 | 1800 | 1800 | 1800 | 1800 |
| Lane Width (m) | 3.5 | 3.5 | 3.5 | 3.5 | 3.5 | 3.5 |
| Lane Util. Factor | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| Frt | | | | | 0.865 | |
| Flt Protected | | | | 0.988 | | |
| Satd. Flow (prot) | 1695 | 0 | 0 | 1579 | 1351 | 0 |
| Flt Permitted | | | | 0.988 | | |
| Satd. Flow (perm) | 1695 | 0 | 0 | 1579 | 1351 | 0 |
| Link Speed (k/h) | 60 | | | 50 | 50 | |
| Link Distance (m) | 95.5 | | | 185.0 | 109.7 | |
| Travel Time (s) | 5.7 | | | 13.3 | 7.9 | |
| Peak Hour Factor | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| Heavy Vehicles (%) | 5% | 0% | 22% | 8% | 0% | 14% |
| Adj. Flow (vph) | 61 | 0 | 23 | 73 | 0 | 7 |
| Shared Lane Traffic (%) | | | | | | |
| Lane Group Flow (vph) | 61 | 0 | 0 | 96 | 7 | 0 |
| Enter Blocked Intersection | No | No | No | No | No | No |
| Lane Alignment | Left | Right | Left | Left | Left | Right |
| Median Width(m) | 0.0 | | | 0.0 | 3.5 | |
| Link Offset(m) | 0.0 | | | 0.0 | 0.0 | |
| Crosswalk Width(m) | 4.8 | | | 4.8 | 4.8 | |
| Two way Left Turn Lane | | | | | | |
| Headway Factor | 1.09 | 1.09 | 1.09 | 1.09 | 1.09 | 1.09 |
| Turning Speed (k/h) | | 15 | 25 | | 25 | 15 |
| Sign Control | Free | | | Free | Stop | |

| Intersection Summary | | | |
|---|---|---|---|
| Area Type: | Other | | |
| Control Type: Unsignalized | | | |
| Intersection Capacity Utilization 22.1% | | ICU Level of Service A | |
| Analysis Period (min) 15 | | | |

| Movement | EBT | EBR | WBL | WBT | NBL | NBR |
|---|---|---|---|---|---|---|
| Lane Configurations | | | | | | |
| Traffic Volume (veh/h) | 61 | 0 | 23 | 73 | 0 | 7 |
| Future Volume (Veh/h) | 61 | 0 | 23 | 73 | 0 | 7 |
| Sign Control | Free | | | Free | Stop | |
| Grade | 0% | | | 0% | 0% | |
| Peak Hour Factor | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| Hourly flow rate (vph) | 61 | 0 | 23 | 73 | 0 | 7 |
| 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 | | | 61 | | 180 | 61 |
| vC1, stage 1 conf vol | | | | | | |
| vC2, stage 2 conf vol | | | | | | |
| vCu, unblocked vol | | | 61 | | 180 | 61 |
| tC, single (s) | | | 4.3 | | 6.4 | 6.3 |
| tC, 2 stage (s) | | | | | | |
| tF (s) | | | 2.4 | | 3.5 | 3.4 |
| p0 queue free % | | | 98 | | 100 | 99 |
| cM capacity (veh/h) | | | 1424 | | 801 | 971 |

| Direction, Lane # | EB 1 | WB 1 | NB 1 |
|---|---|---|---|
| Volume Total | 61 | 96 | 7 |
| Volume Left | 0 | 23 | 0 |
| Volume Right | 0 | 0 | 7 |
| cSH | 1700 | 1424 | 971 |
| Volume to Capacity | 0.04 | 0.02 | 0.01 |
| Queue Length 95th (m) | 0.0 | 0.4 | 0.2 |
| Control Delay (s) | 0.0 | 1.9 | 8.7 |
| Lane LOS | | A | A |
| Approach Delay (s) | 0.0 | 1.9 | 8.7 |
| Approach LOS | | | A |

| Intersection Summary | | | |
|---|---|---|---|
| Average Delay | 1.5 | | |
| Intersection Capacity Utilization | 22.1% | ICU Level of Service | A |
| Analysis Period (min) | 15 | | |

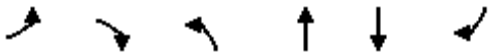
| Lane Group | WBL | WBR | NBT | NBR | SBL | SBT |
|---|---|---|---|---|---|---|
| Lane Configurations | | | | | | |
| Traffic Volume (vph) | 63 | 1 | 179 | 350 | 27 | 139 |
| Future Volume (vph) | 63 | 1 | 179 | 350 | 27 | 139 |
| Ideal Flow (vphpl) | 1800 | 1800 | 1800 | 1800 | 1800 | 1800 |
| Lane Width (m) | 4.5 | 4.5 | 3.5 | 3.5 | 3.5 | 3.5 |
| Storage Length (m) | 0.0 | 10.0 | | 0.0 | 0.0 | |
| Storage Lanes | 1 | 0 | | 0 | 0 | |
| Taper Length (m) | 7.5 | | | | 7.5 | |
| Lane Util. Factor | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| Frt | 0.998 | | 0.911 | | | |
| Flt Protected | 0.953 | | | | | 0.992 |
| Satd. Flow (prot) | 1548 | 0 | 1520 | 0 | 0 | 1632 |
| Flt Permitted | 0.953 | | | | | 0.992 |
| Satd. Flow (perm) | 1548 | 0 | 1520 | 0 | 0 | 1632 |
| Link Speed (k/h) | 40 | | 80 | | | 80 |
| Link Distance (m) | 155.0 | | 545.7 | | | 134.1 |
| Travel Time (s) | 14.0 | | 24.6 | | | 6.0 |
| Peak Hour Factor | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| Heavy Vehicles (%) | 22% | 0% | 6% | 7% | 4% | 9% |
| Adj. Flow (vph) | 63 | 1 | 179 | 350 | 27 | 139 |
| Shared Lane Traffic (%) | | | | | | |
| Lane Group Flow (vph) | 64 | 0 | 529 | 0 | 0 | 166 |
| Enter Blocked Intersection | No | No | No | No | No | No |
| Lane Alignment | Left | Right | Left | Right | Left | Left |
| Median Width(m) | 4.5 | | 0.0 | | | 0.0 |
| Link Offset(m) | 0.0 | | 0.0 | | | 0.0 |
| Crosswalk Width(m) | 4.8 | | 4.8 | | | 4.8 |
| Two way Left Turn Lane | | | | | | |
| Headway Factor | 0.95 | 0.95 | 1.09 | 1.09 | 1.09 | 1.09 |
| Turning Speed (k/h) | 25 | 15 | | 15 | 25 | |
| Sign Control | Stop | | Free | | | Free |

| Intersection Summary | | | |
|---|---|---|---|
| Area Type: | Other | | |
| Control Type: Unsignalized | | | |
| Intersection Capacity Utilization | 43.0% | ICU Level of Service | A |
| Analysis Period (min) | 15 | | |

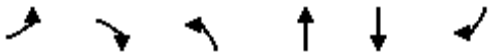
| Movement | WBL | WBR | NBT | NBR | SBL | SBT |
|---|---|---|---|---|---|---|
| Lane Configurations | | | | | | |
| Traffic Volume (veh/h) | 63 | 1 | 179 | 350 | 27 | 139 |
| Future Volume (Veh/h) | 63 | 1 | 179 | 350 | 27 | 139 |
| Sign Control | Stop | | Free | | | Free |
| Grade | 0% | | 0% | | | 0% |
| Peak Hour Factor | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| Hourly flow rate (vph) | 63 | 1 | 179 | 350 | 27 | 139 |
| 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 | 547 | 354 | | | 529 | |
| vC1, stage 1 conf vol | | | | | | |
| vC2, stage 2 conf vol | | | | | | |
| vCu, unblocked vol | 547 | 354 | | | 529 | |
| tC, single (s) | 6.6 | 6.2 | | | 4.1 | |
| tC, 2 stage (s) | | | | | | |
| tF (s) | 3.7 | 3.3 | | | 2.2 | |
| p0 queue free % | 86 | 100 | | | 97 | |
| cM capacity (veh/h) | 453 | 694 | | | 1028 | |

| Direction, Lane # | WB 1 | NB 1 | SB 1 |
|---|---|---|---|
| Volume Total | 64 | 529 | 166 |
| Volume Left | 63 | 0 | 27 |
| Volume Right | 1 | 350 | 0 |
| cSH | 456 | 1700 | 1028 |
| Volume to Capacity | 0.14 | 0.31 | 0.03 |
| Queue Length 95th (m) | 3.9 | 0.0 | 0.6 |
| Control Delay (s) | 14.2 | 0.0 | 1.6 |
| Lane LOS | B | | A |
| Approach Delay (s) | 14.2 | 0.0 | 1.6 |
| Approach LOS | B | | |

| Intersection Summary | | | |
|---|---|---|---|
| Average Delay | 1.5 | | |
| Intersection Capacity Utilization | 43.0% | ICU Level of Service | A |
| Analysis Period (min) | 15 | | |



| Lane Group | EBL | EBR | NBL | NBT | SBT | SBR |
|---|---|---|---|---|---|---|
| Lane Configurations | | | | | | |
| Traffic Volume (vph) | 85 | 820 | 193 | 335 | 251 | 18 |
| Future Volume (vph) | 85 | 820 | 193 | 335 | 251 | 18 |
| Ideal Flow (vphpl) | 1800 | 1800 | 1800 | 1800 | 1800 | 1800 |
| Lane Width (m) | 3.5 | 3.3 | 3.5 | 3.5 | 3.5 | 3.5 |
| Storage Length (m) | 0.0 | 25.0 | 50.0 | | | 0.0 |
| Storage Lanes | 1 | 1 | 1 | | | 0 |
| Taper Length (m) | 7.5 | | 75.0 | | | |
| Lane Util. Factor | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| Frt | | 0.850 | | | 0.991 | |
| Flt Protected | 0.950 | | 0.950 | | | |
| Satd. Flow (prot) | 1551 | 1422 | 1496 | 1618 | 1581 | 0 |
| Flt Permitted | 0.950 | | 0.454 | | | |
| Satd. Flow (perm) | 1551 | 1422 | 715 | 1618 | 1581 | 0 |
| Right Turn on Red | | Yes | | | | Yes |
| Satd. Flow (RTOR) | | 552 | | | 4 | |
| Link Speed (k/h) | 40 | | | 80 | 80 | |
| Link Distance (m) | 154.2 | | | 243.1 | 545.7 | |
| Travel Time (s) | 13.9 | | | 10.9 | 24.6 | |
| Peak Hour Factor | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| Heavy Vehicles (%) | 9% | 4% | 13% | 10% | 12% | 6% |
| Adj. Flow (vph) | 85 | 820 | 193 | 335 | 251 | 18 |
| Shared Lane Traffic (%) | | | | | | |
| Lane Group Flow (vph) | 85 | 820 | 193 | 335 | 269 | 0 |
| Enter Blocked Intersection | No | No | No | No | No | No |
| Lane Alignment | Left | Right | Left | Left | Left | Right |
| Median Width(m) | 3.5 | | | 3.5 | 3.5 | |
| Link Offset(m) | 0.0 | | | 0.0 | 0.0 | |
| Crosswalk Width(m) | 4.8 | | | 4.8 | 4.8 | |
| Two way Left Turn Lane | | | | | | |
| Headway Factor | 1.09 | 1.12 | 1.09 | 1.09 | 1.09 | 1.09 |
| Turning Speed (k/h) | 25 | 15 | 25 | | | 15 |
| Number of Detectors | 1 | 1 | 1 | 2 | 2 | |
| Detector Template | Left | Right | Left | Thru | Thru | |
| Leading Detector (m) | 2.0 | 2.0 | 2.0 | 10.0 | 10.0 | |
| Trailing Detector (m) | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | |
| Detector 1 Position(m) | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | |
| Detector 1 Size(m) | 2.0 | 2.0 | 2.0 | 0.6 | 0.6 | |
| Detector 1 Type | Cl+Ex | Cl+Ex | Cl+Ex | Cl+Ex | Cl+Ex | |
| Detector 1 Channel | | | | | | |
| Detector 1 Extend (s) | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | |
| Detector 1 Queue (s) | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | |
| Detector 1 Delay (s) | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | |
| Detector 2 Position(m) | | | | 9.4 | 9.4 | |
| Detector 2 Size(m) | | | | 0.6 | 0.6 | |
| Detector 2 Type | | | | Cl+Ex | Cl+Ex | |
| Detector 2 Channel | | | | | | |
| Detector 2 Extend (s) | | | | 0.0 | 0.0 | |
| Turn Type | Prot | Perm | pm+pt | NA | NA | |

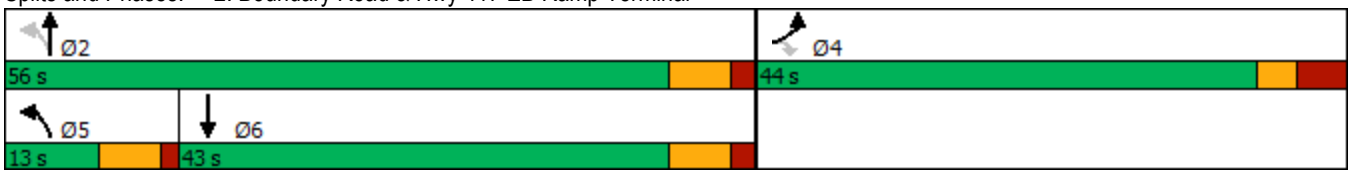


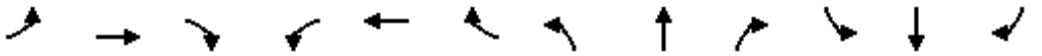
| Lane Group | EBL | EBR | NBL | NBT | SBT | SBR |
|---|---|---|---|---|---|---|
| Protected Phases | 4 | | 5 | 2 | 6 | |
| Permitted Phases | | 4 | 2 | | | |
| Detector Phase | 4 | 4 | 5 | 2 | 6 | |
| Switch Phase | | | | | | |
| Minimum Initial (s) | 7.0 | 7.0 | 7.0 | 35.0 | 35.0 | |
| Minimum Split (s) | 23.0 | 23.0 | 13.0 | 41.6 | 41.6 | |
| Total Split (s) | 44.0 | 44.0 | 13.0 | 56.0 | 43.0 | |
| Total Split (%) | 44.0% | 44.0% | 13.0% | 56.0% | 43.0% | |
| Maximum Green (s) | 37.2 | 37.2 | 7.0 | 49.4 | 36.4 | |
| Yellow Time (s) | 3.0 | 3.0 | 4.6 | 4.6 | 4.6 | |
| All-Red Time (s) | 3.8 | 3.8 | 1.4 | 2.0 | 2.0 | |
| Lost Time Adjust (s) | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | |
| Total Lost Time (s) | 6.8 | 6.8 | 6.0 | 6.6 | 6.6 | |
| Lead/Lag | | | Lead | | Lag | |
| Lead-Lag Optimize? | | | Yes | | Yes | |
| Vehicle Extension (s) | 3.0 | 3.0 | 3.0 | 3.0 | 3.0 | |
| Recall Mode | None | None | None | Min | Min | |
| Walk Time (s) | 7.0 | 7.0 | | 0.0 | 7.0 | |
| Flash Dont Walk (s) | 5.0 | 5.0 | | 0.0 | 21.0 | |
| Pedestrian Calls (#/hr) | 0 | 0 | | 0 | 0 | |
| Act Effct Green (s) | 32.2 | 32.2 | 48.9 | 48.3 | 35.2 | |
| Actuated g/C Ratio | 0.34 | 0.34 | 0.52 | 0.51 | 0.37 | |
| v/c Ratio | 0.16 | 0.97 | 0.45 | 0.40 | 0.45 | |
| Control Delay | 21.4 | 34.3 | 17.9 | 17.2 | 26.3 | |
| Queue Delay | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | |
| Total Delay | 21.4 | 34.3 | 17.9 | 17.2 | 26.3 | |
| LOS | C | C | B | B | C | |
| Approach Delay | 33.1 | | | 17.5 | 26.3 | |
| Approach LOS | C | | | B | C | |
| Queue Length 50th (m) | 11.1 | 60.5 | 21.7 | 42.0 | 40.8 | |
| Queue Length 95th (m) | 21.8 | #159.1 | 36.4 | 64.7 | 65.4 | |
| Internal Link Dist (m) | 130.2 | | | 219.1 | 521.7 | |
| Turn Bay Length (m) | | 25.0 | 50.0 | | | |
| Base Capacity (vph) | 618 | 898 | 430 | 856 | 619 | |
| Starvation Cap Reductn | 0 | 0 | 0 | 0 | 0 | |
| Spillback Cap Reductn | 0 | 0 | 0 | 0 | 0 | |
| Storage Cap Reductn | 0 | 0 | 0 | 0 | 0 | |
| Reduced v/c Ratio | 0.14 | 0.91 | 0.45 | 0.39 | 0.43 | |

| Intersection Summary | | | |
|---|---|---|---|
| Area Type: | Other | | |
| Cycle Length: 100 | | | |
| Actuated Cycle Length: 94 | | | |
| Natural Cycle: 90 | | | |
| Control Type: Semi Act-Uncoord | | | |
| Maximum v/c Ratio: 0.97 | | | |
| Intersection Signal Delay: 27.2 | | Intersection LOS: C | |
| Intersection Capacity Utilization 93.9% | | ICU Level of Service F | |
| Analysis Period (min) 15 | | | |

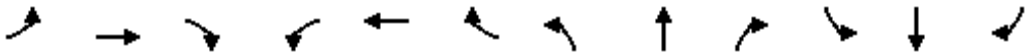
# 95th percentile volume exceeds capacity, queue may be longer.
Queue shown is maximum after two cycles.

Splits and Phases: 2: Boundary Road & Hwy 417 EB Ramp Terminal





| Lane Group | EBL | EBT | EBR | WBL | WBT | WBR | NBL | NBT | NBR | SBL | SBT | SBR |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Lane Configurations | | | | | | | | | | | | |
| Traffic Volume (vph) | 159 | 0 | 36 | 6 | 0 | 20 | 11 | 349 | 0 | 2 | 975 | 93 |
| Future Volume (vph) | 159 | 0 | 36 | 6 | 0 | 20 | 11 | 349 | 0 | 2 | 975 | 93 |
| Ideal Flow (vphpl) | 1800 | 1800 | 1800 | 1800 | 1800 | 1800 | 1800 | 1800 | 1800 | 1800 | 1800 | 1800 |
| Lane Width (m) | 3.5 | 3.5 | 3.5 | 3.5 | 3.5 | 3.5 | 3.3 | 3.5 | 3.3 | 3.3 | 3.5 | 3.5 |
| Storage Length (m) | 0.0 | | 15.0 | 0.0 | | 0.0 | 35.0 | | 7.5 | 100.0 | | 35.0 |
| Storage Lanes | 0 | | 0 | 0 | | 1 | 1 | | 1 | 1 | | 0 |
| Taper Length (m) | 7.5 | | | 7.5 | | | 45.0 | | | 75.0 | | |
| Lane Util. Factor | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| Frt | | 0.975 | | | | 0.850 | | | | | 0.987 | |
| Flt Protected | | 0.961 | | | 0.950 | | 0.950 | | | 0.950 | | |
| Satd. Flow (prot) | 0 | 1444 | 0 | 0 | 1271 | 1513 | 1517 | 1633 | 1740 | 1102 | 1684 | 0 |
| Flt Permitted | | 0.762 | | | 0.742 | | 0.162 | | | 0.482 | | |
| Satd. Flow (perm) | 0 | 1145 | 0 | 0 | 993 | 1513 | 259 | 1633 | 1740 | 559 | 1684 | 0 |
| Right Turn on Red | | | Yes | | | Yes | | | Yes | | | Yes |
| Satd. Flow (RTOR) | | 100 | | | | 100 | | | | | 11 | |
| Link Speed (k/h) | | 60 | | | 20 | | | 80 | | | 80 | |
| Link Distance (m) | | 198.6 | | | 170.6 | | | 174.7 | | | 243.1 | |
| Travel Time (s) | | 11.9 | | | 30.7 | | | 7.9 | | | 10.9 | |
| Peak Hour Factor | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| Heavy Vehicles (%) | 19% | 0% | 0% | 33% | 0% | 0% | 9% | 9% | 0% | 50% | 4% | 8% |
| Adj. Flow (vph) | 159 | 0 | 36 | 6 | 0 | 20 | 11 | 349 | 0 | 2 | 975 | 93 |
| Shared Lane Traffic (%) | | | | | | | | | | | | |
| Lane Group Flow (vph) | 0 | 195 | 0 | 0 | 6 | 20 | 11 | 349 | 0 | 2 | 1068 | 0 |
| Enter Blocked Intersection | No | No | No | No | No | No | No | No | No | No | No | No |
| Lane Alignment | Left | Left | Right | Left | Left | Right | Left | Left | Right | Left | Left | Right |
| Median Width(m) | | 0.0 | | | 0.0 | | | 3.5 | | | 3.5 | |
| Link Offset(m) | | 0.0 | | | 0.0 | | | 0.0 | | | 0.0 | |
| Crosswalk Width(m) | | 4.8 | | | 4.8 | | | 4.8 | | | 4.8 | |
| Two way Left Turn Lane | | | | | | | | | | | | |
| Headway Factor | 1.09 | 1.09 | 1.09 | 1.09 | 1.09 | 1.09 | 1.12 | 1.09 | 1.12 | 1.12 | 1.09 | 1.09 |
| Turning Speed (k/h) | 25 | | 15 | 25 | | 15 | 25 | | 15 | 25 | | 15 |
| Number of Detectors | 1 | 2 | | 1 | 2 | 1 | 1 | 2 | 1 | 1 | 2 | |
| Detector Template | Left | Thru | | Left | Thru | Right | Left | Thru | Right | Left | Thru | |
| Leading Detector (m) | 2.0 | 10.0 | | 2.0 | 10.0 | 2.0 | 2.0 | 10.0 | 2.0 | 2.0 | 10.0 | |
| Trailing Detector (m) | 0.0 | 0.0 | | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | |
| Detector 1 Position(m) | 0.0 | 0.0 | | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | |
| Detector 1 Size(m) | 2.0 | 0.6 | | 2.0 | 0.6 | 2.0 | 2.0 | 0.6 | 2.0 | 2.0 | 0.6 | |
| Detector 1 Type | Cl+Ex | Cl+Ex | | Cl+Ex | Cl+Ex | Cl+Ex | Cl+Ex | Cl+Ex | Cl+Ex | Cl+Ex | Cl+Ex | |
| Detector 1 Channel | | | | | | | | | | | | |
| Detector 1 Extend (s) | 0.0 | 0.0 | | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | |
| Detector 1 Queue (s) | 0.0 | 0.0 | | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | |
| Detector 1 Delay (s) | 0.0 | 0.0 | | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | |
| Detector 2 Position(m) | | 9.4 | | | 9.4 | | | 9.4 | | | 9.4 | |
| Detector 2 Size(m) | | 0.6 | | | 0.6 | | | 0.6 | | | 0.6 | |
| Detector 2 Type | | Cl+Ex | | | Cl+Ex | | | Cl+Ex | | | Cl+Ex | |
| Detector 2 Channel | | | | | | | | | | | | |
| Detector 2 Extend (s) | | 0.0 | | | 0.0 | | | 0.0 | | | 0.0 | |
| Turn Type | Perm | NA | | Perm | NA | Perm | Perm | NA | Perm | pm+pt | NA | |

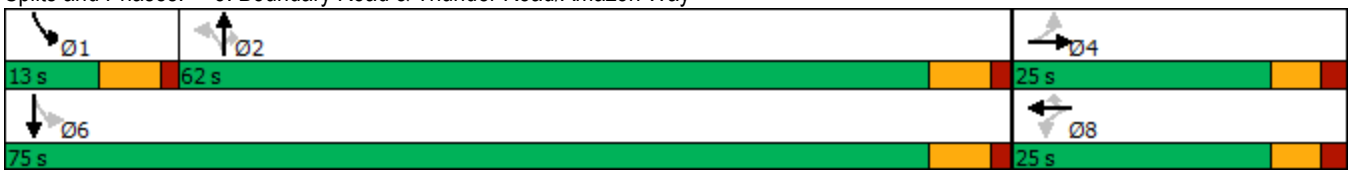


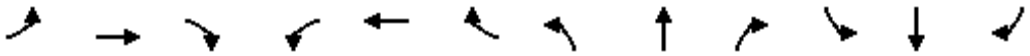
| Lane Group | EBL | EBT | EBR | WBL | WBT | WBR | NBL | NBT | NBR | SBL | SBT | SBR |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Protected Phases | | 4 | | | 8 | | | 2 | | 1 | 6 | |
| Permitted Phases | 4 | | | 8 | | 8 | 2 | | 2 | 6 | | |
| Detector Phase | 4 | 4 | | 8 | 8 | 8 | 2 | 2 | 2 | 1 | 6 | |
| Switch Phase | | | | | | | | | | | | |
| Minimum Initial (s) | 7.0 | 7.0 | | 7.0 | 7.0 | 7.0 | 20.0 | 20.0 | 20.0 | 7.0 | 20.0 | |
| Minimum Split (s) | 24.8 | 24.8 | | 24.8 | 24.8 | 24.8 | 26.2 | 26.2 | 26.2 | 13.0 | 26.2 | |
| Total Split (s) | 25.0 | 25.0 | | 25.0 | 25.0 | 25.0 | 62.0 | 62.0 | 62.0 | 13.0 | 75.0 | |
| Total Split (%) | 25.0% | 25.0% | | 25.0% | 25.0% | 25.0% | 62.0% | 62.0% | 62.0% | 13.0% | 75.0% | |
| Maximum Green (s) | 19.2 | 19.2 | | 19.2 | 19.2 | 19.2 | 55.8 | 55.8 | 55.8 | 7.0 | 68.8 | |
| Yellow Time (s) | 3.7 | 3.7 | | 3.7 | 3.7 | 3.7 | 4.6 | 4.6 | 4.6 | 4.6 | 4.6 | |
| All-Red Time (s) | 2.1 | 2.1 | | 2.1 | 2.1 | 2.1 | 1.6 | 1.6 | 1.6 | 1.4 | 1.6 | |
| Lost Time Adjust (s) | | 0.0 | | | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | |
| Total Lost Time (s) | | 5.8 | | | 5.8 | 5.8 | 6.2 | 6.2 | 6.2 | 6.0 | 6.2 | |
| Lead/Lag | | | | | | | Lag | Lag | Lag | Lead | | |
| Lead-Lag Optimize? | | | | | | | Yes | Yes | Yes | Yes | | |
| Vehicle Extension (s) | 3.0 | 3.0 | | 3.0 | 3.0 | 3.0 | 3.0 | 3.0 | 3.0 | 3.0 | 3.0 | |
| Recall Mode | None | None | | None | None | None | Min | Min | Min | None | Min | |
| Walk Time (s) | 7.0 | 7.0 | | 7.0 | 7.0 | 7.0 | 7.0 | 7.0 | 7.0 | | 7.0 | |
| Flash Dont Walk (s) | 12.0 | 12.0 | | 12.0 | 12.0 | 12.0 | 10.0 | 10.0 | 10.0 | | 10.0 | |
| Pedestrian Calls (#/hr) | 0 | 0 | | 0 | 0 | 0 | 0 | 0 | 0 | | 0 | |
| Act Effct Green (s) | | 13.1 | | | 13.1 | 13.1 | 54.2 | 54.2 | | 56.6 | 56.4 | |
| Actuated g/C Ratio | | 0.16 | | | 0.16 | 0.16 | 0.66 | 0.66 | | 0.69 | 0.69 | |
| v/c Ratio | | 0.73 | | | 0.04 | 0.06 | 0.06 | 0.32 | | 0.00 | 0.92 | |
| Control Delay | | 35.8 | | | 33.8 | 0.3 | 9.0 | 8.4 | | 4.5 | 26.1 | |
| Queue Delay | | 0.0 | | | 0.0 | 0.0 | 0.0 | 0.0 | | 0.0 | 0.3 | |
| Total Delay | | 35.8 | | | 33.8 | 0.3 | 9.0 | 8.4 | | 4.5 | 26.4 | |
| LOS | | D | | | C | A | A | A | | A | C | |
| Approach Delay | | 35.8 | | | 8.1 | | | 8.4 | | | 26.3 | |
| Approach LOS | | D | | | A | | | A | | | C | |
| Queue Length 50th (m) | | 16.5 | | | 1.0 | 0.0 | 0.5 | 19.6 | | 0.1 | 127.2 | |
| Queue Length 95th (m) | | 43.3 | | | 4.6 | 0.0 | 4.0 | 57.8 | | 0.8 | #286.5 | |
| Internal Link Dist (m) | | 174.6 | | | 146.6 | | | 150.7 | | | 219.1 | |
| Turn Bay Length (m) | | | | | | | 35.0 | | | 100.0 | | |
| Base Capacity (vph) | | 358 | | | 245 | 450 | 196 | 1238 | | 433 | 1396 | |
| Starvation Cap Reductn | | 0 | | | 0 | 0 | 0 | 0 | | 0 | 47 | |
| Spillback Cap Reductn | | 0 | | | 0 | 0 | 0 | 0 | | 0 | 0 | |
| Storage Cap Reductn | | 0 | | | 0 | 0 | 0 | 0 | | 0 | 0 | |
| Reduced v/c Ratio | | 0.54 | | | 0.02 | 0.04 | 0.06 | 0.28 | | 0.00 | 0.79 | |

| Intersection Summary | | | |
|---|---|---|---|
| Area Type: | Other | | |
| Cycle Length: 100 | | | |
| Actuated Cycle Length: 82.2 | | | |
| Natural Cycle: 90 | | | |
| Control Type: Semi Act-Uncoord | | | |
| Maximum v/c Ratio: 0.92 | | | |
| Intersection Signal Delay: 23.3 | | Intersection LOS: C | |
| Intersection Capacity Utilization 88.4% | | ICU Level of Service E | |
| Analysis Period (min) 15 | | | |

# 95th percentile volume exceeds capacity, queue may be longer.
Queue shown is maximum after two cycles.

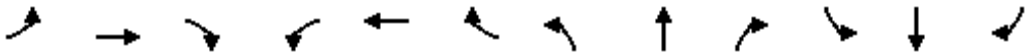
Splits and Phases: 3: Boundary Road & Thunder Road/Amazon Way





| Lane Group | EBL | EBT | EBR | WBL | WBT | WBR | NBL | NBT | NBR | SBL | SBT | SBR |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Lane Configurations | | | | | | | | | | | | |
| Traffic Volume (vph) | 4 | 0 | 15 | 6 | 0 | 13 | 5 | 342 | 6 | 15 | 995 | 7 |
| Future Volume (vph) | 4 | 0 | 15 | 6 | 0 | 13 | 5 | 342 | 6 | 15 | 995 | 7 |
| Ideal Flow (vphpl) | 1800 | 1800 | 1800 | 1800 | 1800 | 1800 | 1800 | 1800 | 1800 | 1800 | 1800 | 1800 |
| Lane Width (m) | 3.5 | 3.5 | 3.5 | 3.5 | 3.5 | 3.5 | 3.5 | 3.5 | 3.5 | 3.5 | 3.5 | 3.6 |
| Storage Length (m) | 0.0 | | 0.0 | 0.0 | | 0.0 | 15.0 | | 0.0 | 70.0 | | 0.0 |
| Storage Lanes | 0 | | 0 | 0 | | 0 | 1 | | 0 | 1 | | 0 |
| Taper Length (m) | 7.5 | | | 7.5 | | | 45.0 | | | 45.0 | | |
| Lane Util. Factor | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| Frt | | 0.893 | | | 0.908 | | | 0.997 | | | 0.999 | |
| Flt Protected | | 0.990 | | | 0.984 | | 0.950 | | | 0.950 | | |
| Satd. Flow (prot) | 0 | 1574 | 0 | 0 | 795 | 0 | 1691 | 1664 | 0 | 846 | 1744 | 0 |
| Flt Permitted | | 0.990 | | | 0.984 | | 0.950 | | | 0.950 | | |
| Satd. Flow (perm) | 0 | 1574 | 0 | 0 | 795 | 0 | 1691 | 1664 | 0 | 846 | 1744 | 0 |
| Link Speed (k/h) | | 50 | | | 20 | | | 80 | | | 80 | |
| Link Distance (m) | | 105.7 | | | 151.5 | | | 1150.2 | | | 174.7 | |
| Travel Time (s) | | 7.6 | | | 27.3 | | | 51.8 | | | 7.9 | |
| Peak Hour Factor | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| Heavy Vehicles (%) | 0% | 0% | 0% | 100% | 0% | 100% | 0% | 5% | 100% | 100% | 2% | 0% |
| Adj. Flow (vph) | 4 | 0 | 15 | 6 | 0 | 13 | 5 | 342 | 6 | 15 | 995 | 7 |
| Shared Lane Traffic (%) | | | | | | | | | | | | |
| Lane Group Flow (vph) | 0 | 19 | 0 | 0 | 19 | 0 | 5 | 348 | 0 | 15 | 1002 | 0 |
| Enter Blocked Intersection | No | No | No | No | No | No | No | No | No | No | No | No |
| Lane Alignment | Left | Left | Right | Left | Left | Right | Left | Left | Right | Left | Left | Right |
| Median Width(m) | | 0.0 | | | 0.0 | | | 3.5 | | | 3.5 | |
| Link Offset(m) | | 0.0 | | | 0.0 | | | 0.0 | | | 0.0 | |
| Crosswalk Width(m) | | 4.8 | | | 4.8 | | | 4.8 | | | 4.8 | |
| Two way Left Turn Lane | | | | | | | | | | | | |
| Headway Factor | 1.09 | 1.09 | 1.09 | 1.09 | 1.09 | 1.09 | 1.09 | 1.09 | 1.09 | 1.09 | 1.09 | 1.07 |
| Turning Speed (k/h) | 25 | | 15 | 25 | | 15 | 25 | | 15 | 25 | | 15 |
| Sign Control | | Stop | | | Stop | | | Free | | | Free | |

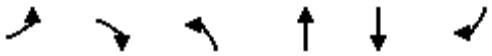
| Intersection Summary | | | |
|---|---|---|---|
| Area Type: | Other | | |
| Control Type: Unsignalized | | | |
| Intersection Capacity Utilization | 65.7% | ICU Level of Service | C |
| Analysis Period (min) | 15 | | |



| Movement | EBL | EBT | EBR | WBL | WBT | WBR | NBL | NBT | NBR | SBL | SBT | SBR |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Lane Configurations | | | | | | | | | | | | |
| Traffic Volume (veh/h) | 4 | 0 | 15 | 6 | 0 | 13 | 5 | 342 | 6 | 15 | 995 | 7 |
| Future Volume (Veh/h) | 4 | 0 | 15 | 6 | 0 | 13 | 5 | 342 | 6 | 15 | 995 | 7 |
| Sign Control | | Stop | | | Stop | | | Free | | | Free | |
| Grade | | 0% | | | 0% | | | 0% | | | 0% | |
| Peak Hour Factor | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| Hourly flow rate (vph) | 4 | 0 | 15 | 6 | 0 | 13 | 5 | 342 | 6 | 15 | 995 | 7 |
| Pedestrians | | | | | | | | | | | | |
| Lane Width (m) | | | | | | | | | | | | |
| Walking Speed (m/s) | | | | | | | | | | | | |
| Percent Blockage | | | | | | | | | | | | |
| Right turn flare (veh) | | | | | | | | | | | | |
| Median type | | | | | | | | None | | | None | |
| Median storage veh) | | | | | | | | | | | | |
| Upstream signal (m) | | | | | | | | | | | 175 | |
| pX, platoon unblocked | 0.45 | 0.45 | 0.45 | 0.45 | 0.45 | | 0.45 | | | | | |
| vC, conflicting volume | 1394 | 1386 | 998 | 1395 | 1387 | 345 | 1002 | | | 348 | | |
| vC1, stage 1 conf vol | | | | | | | | | | | | |
| vC2, stage 2 conf vol | | | | | | | | | | | | |
| vCu, unblocked vol | 1262 | 1247 | 381 | 1266 | 1248 | 345 | 389 | | | 348 | | |
| tC, single (s) | 7.1 | 6.5 | 6.2 | 8.1 | 6.5 | 7.2 | 4.1 | | | 5.1 | | |
| tC, 2 stage (s) | | | | | | | | | | | | |
| tF (s) | 3.5 | 4.0 | 3.3 | 4.4 | 4.0 | 4.2 | 2.2 | | | 3.1 | | |
| p0 queue free % | 94 | 100 | 95 | 85 | 100 | 98 | 99 | | | 98 | | |
| cM capacity (veh/h) | 63 | 76 | 301 | 39 | 76 | 522 | 529 | | | 821 | | |

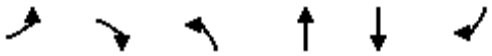
| Direction, Lane # | EB 1 | WB 1 | NB 1 | NB 2 | SB 1 | SB 2 |
|---|---|---|---|---|---|---|
| Volume Total | 19 | 19 | 5 | 348 | 15 | 1002 |
| Volume Left | 4 | 6 | 5 | 0 | 15 | 0 |
| Volume Right | 15 | 13 | 0 | 6 | 0 | 7 |
| cSH | 168 | 106 | 529 | 1700 | 821 | 1700 |
| Volume to Capacity | 0.11 | 0.18 | 0.01 | 0.20 | 0.02 | 0.59 |
| Queue Length 95th (m) | 3.0 | 5.0 | 0.2 | 0.0 | 0.4 | 0.0 |
| Control Delay (s) | 29.1 | 46.2 | 11.9 | 0.0 | 9.5 | 0.0 |
| Lane LOS | D | E | B | | A | |
| Approach Delay (s) | 29.1 | 46.2 | 0.2 | | 0.1 | |
| Approach LOS | D | E | | | | |

| Intersection Summary | | | | |
|---|---|---|---|---|
| Average Delay | 1.2 | | | |
| Intersection Capacity Utilization | 65.7% | ICU Level of Service | C | |
| Analysis Period (min) | 15 | | | |



| Lane Group | EBL | EBR | NBL | NBT | SBT | SBR |
|---|---|---|---|---|---|---|
| Lane Configurations | | | | | | |
| Traffic Volume (vph) | 142 | 119 | 63 | 153 | 886 | 146 |
| Future Volume (vph) | 142 | 119 | 63 | 153 | 886 | 146 |
| Ideal Flow (vphpl) | 1800 | 1800 | 1800 | 1800 | 1800 | 1800 |
| Lane Width (m) | 3.3 | 3.3 | 3.5 | 3.5 | 3.5 | 3.5 |
| Storage Length (m) | 25.0 | 0.0 | 0.0 | | | 30.0 |
| Storage Lanes | 1 | 1 | 0 | | | 1 |
| Taper Length (m) | 47.5 | | 7.5 | | | |
| Lane Util. Factor | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| Frt | | 0.850 | | | | 0.850 |
| Flt Protected | 0.950 | | | 0.986 | | |
| Satd. Flow (prot) | 1463 | 1395 | 0 | 1669 | 1762 | 1351 |
| Flt Permitted | 0.950 | | | 0.986 | | |
| Satd. Flow (perm) | 1463 | 1395 | 0 | 1669 | 1762 | 1351 |
| Link Speed (k/h) | 80 | | | 80 | 80 | |
| Link Distance (m) | 180.5 | | | 135.8 | 1150.2 | |
| Travel Time (s) | 8.1 | | | 6.1 | 51.8 | |
| Peak Hour Factor | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| Heavy Vehicles (%) | 13% | 6% | 8% | 4% | 1% | 12% |
| Adj. Flow (vph) | 142 | 119 | 63 | 153 | 886 | 146 |
| Shared Lane Traffic (%) | | | | | | |
| Lane Group Flow (vph) | 142 | 119 | 0 | 216 | 886 | 146 |
| Enter Blocked Intersection | No | No | No | No | No | No |
| Lane Alignment | Left | Right | Left | Left | Left | Right |
| Median Width(m) | 3.3 | | | 3.5 | 3.5 | |
| Link Offset(m) | 0.0 | | | 0.0 | 0.0 | |
| Crosswalk Width(m) | 4.8 | | | 4.8 | 4.8 | |
| Two way Left Turn Lane | | | | | | |
| Headway Factor | 1.12 | 1.12 | 1.09 | 1.09 | 1.09 | 1.09 |
| Turning Speed (k/h) | 25 | 15 | 25 | | | 15 |
| Sign Control | Stop | | | Free | Free | |

| Intersection Summary | | | |
|---|---|---|---|
| Area Type: | Other | | |
| Control Type: Unsignalized | | | |
| Intersection Capacity Utilization 79.7% | | ICU Level of Service D | |
| Analysis Period (min) 15 | | | |



| Movement | EBL | EBR | NBL | NBT | SBT | SBR |
|---|---|---|---|---|---|---|
| Lane Configurations | | | | | | |
| Traffic Volume (veh/h) | 142 | 119 | 63 | 153 | 886 | 146 |
| Future Volume (Veh/h) | 142 | 119 | 63 | 153 | 886 | 146 |
| Sign Control | Stop | | | Free | Free | |
| Grade | 0% | | | 0% | 0% | |
| Peak Hour Factor | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| Hourly flow rate (vph) | 142 | 119 | 63 | 153 | 886 | 146 |
| 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 | 1165 | 886 | 1032 | | | |
| vC1, stage 1 conf vol | | | | | | |
| vC2, stage 2 conf vol | | | | | | |
| vCu, unblocked vol | 1165 | 886 | 1032 | | | |
| tC, single (s) | 6.5 | 6.3 | 4.2 | | | |
| tC, 2 stage (s) | | | | | | |
| tF (s) | 3.6 | 3.4 | 2.3 | | | |
| p0 queue free % | 23 | 65 | 90 | | | |
| cM capacity (veh/h) | 184 | 338 | 651 | | | |

| Direction, Lane # | EB 1 | EB 2 | NB 1 | SB 1 | SB 2 |
|---|---|---|---|---|---|
| Volume Total | 142 | 119 | 216 | 886 | 146 |
| Volume Left | 142 | 0 | 63 | 0 | 0 |
| Volume Right | 0 | 119 | 0 | 0 | 146 |
| cSH | 184 | 338 | 651 | 1700 | 1700 |
| Volume to Capacity | 0.77 | 0.35 | 0.10 | 0.52 | 0.09 |
| Queue Length 95th (m) | 40.9 | 12.4 | 2.6 | 0.0 | 0.0 |
| Control Delay (s) | 70.0 | 21.3 | 4.1 | 0.0 | 0.0 |
| Lane LOS | F | C | A | | |
| Approach Delay (s) | 47.8 | | 4.1 | 0.0 | |
| Approach LOS | E | | | | |

| Intersection Summary | | | |
|---|---|---|---|
| Average Delay | 8.9 | | |
| Intersection Capacity Utilization | 79.7% | ICU Level of Service | D |
| Analysis Period (min) | 15 | | |

| Lane Group | EBT | EBR | WBL | WBT | NBL | NBR |
|---|---|---|---|---|---|---|
| Lane Configurations | | | | | | |
| Traffic Volume (vph) | 132 | 0 | 19 | 86 | 0 | 62 |
| Future Volume (vph) | 132 | 0 | 19 | 86 | 0 | 62 |
| Ideal Flow (vphpl) | 1800 | 1800 | 1800 | 1800 | 1800 | 1800 |
| Lane Width (m) | 3.5 | 3.5 | 3.5 | 3.5 | 3.5 | 3.5 |
| Lane Util. Factor | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| Frt | | | | | 0.865 | |
| Flt Protected | | | | 0.991 | | |
| Satd. Flow (prot) | 1496 | 0 | 0 | 1643 | 1426 | 0 |
| Flt Permitted | | | | 0.991 | | |
| Satd. Flow (perm) | 1496 | 0 | 0 | 1643 | 1426 | 0 |
| Link Speed (k/h) | 60 | | | 50 | 50 | |
| Link Distance (m) | 163.7 | | | 198.6 | 103.6 | |
| Travel Time (s) | 9.8 | | | 14.3 | 7.5 | |
| Peak Hour Factor | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| Heavy Vehicles (%) | 19% | 0% | 0% | 9% | 0% | 8% |
| Adj. Flow (vph) | 132 | 0 | 19 | 86 | 0 | 62 |
| Shared Lane Traffic (%) | | | | | | |
| Lane Group Flow (vph) | 132 | 0 | 0 | 105 | 62 | 0 |
| Enter Blocked Intersection | No | No | No | No | No | No |
| Lane Alignment | Left | Right | Left | Left | Left | Right |
| Median Width(m) | 0.0 | | | 0.0 | 3.5 | |
| Link Offset(m) | 0.0 | | | 0.0 | 0.0 | |
| Crosswalk Width(m) | 4.8 | | | 4.8 | 4.8 | |
| Two way Left Turn Lane | | | | | | |
| Headway Factor | 1.09 | 1.09 | 1.09 | 1.09 | 1.09 | 1.09 |
| Turning Speed (k/h) | | 15 | 25 | | 25 | 15 |
| Sign Control | Free | | | Free | Stop | |

| Intersection Summary | | | |
|---|---|---|---|
| Area Type: | Other | | |
| Control Type: Unsignalized | | | |
| Intersection Capacity Utilization 27.3% | | ICU Level of Service A | |
| Analysis Period (min) 15 | | | |

| Movement | EBT | EBR | WBL | WBT | NBL | NBR |
|---|---|---|---|---|---|---|
| Lane Configurations | | | | | | |
| Traffic Volume (veh/h) | 132 | 0 | 19 | 86 | 0 | 62 |
| Future Volume (Veh/h) | 132 | 0 | 19 | 86 | 0 | 62 |
| Sign Control | Free | | | Free | Stop | |
| Grade | 0% | | | 0% | 0% | |
| Peak Hour Factor | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| Hourly flow rate (vph) | 132 | 0 | 19 | 86 | 0 | 62 |
| Pedestrians | | | | | | |
| Lane Width (m) | | | | | | |
| Walking Speed (m/s) | | | | | | |
| Percent Blockage | | | | | | |
| Right turn flare (veh) | | | | | | |
| Median type | None | | | None | | |
| Median storage veh) | | | | | | |
| Upstream signal (m) | | | | 199 | | |
| pX, platoon unblocked | | | | | | |
| vC, conflicting volume | | | 132 | | 256 | 132 |
| vC1, stage 1 conf vol | | | | | | |
| vC2, stage 2 conf vol | | | | | | |
| vCu, unblocked vol | | | 132 | | 256 | 132 |
| tC, single (s) | | | 4.1 | | 6.4 | 6.3 |
| tC, 2 stage (s) | | | | | | |
| tF (s) | | | 2.2 | | 3.5 | 3.4 |
| p0 queue free % | | | 99 | | 100 | 93 |
| cM capacity (veh/h) | | | 1466 | | 728 | 902 |

| Direction, Lane # | EB 1 | WB 1 | NB 1 |
|---|---|---|---|
| Volume Total | 132 | 105 | 62 |
| Volume Left | 0 | 19 | 0 |
| Volume Right | 0 | 0 | 62 |
| cSH | 1700 | 1466 | 902 |
| Volume to Capacity | 0.08 | 0.01 | 0.07 |
| Queue Length 95th (m) | 0.0 | 0.3 | 1.8 |
| Control Delay (s) | 0.0 | 1.4 | 9.3 |
| Lane LOS | | A | A |
| Approach Delay (s) | 0.0 | 1.4 | 9.3 |
| Approach LOS | | | A |

| Intersection Summary | | | |
|---|---|---|---|
| Average Delay | 2.4 | | |
| Intersection Capacity Utilization | 27.3% | ICU Level of Service | A |
| Analysis Period (min) | 15 | | |

| Lane Group | EBT | EBR | WBL | WBT | NBL | NBR |
|---|---|---|---|---|---|---|
| Lane Configurations | | | | | | |
| Traffic Volume (vph) | 117 | 0 | 5 | 81 | 0 | 15 |
| Future Volume (vph) | 117 | 0 | 5 | 81 | 0 | 15 |
| Ideal Flow (vphpl) | 1800 | 1800 | 1800 | 1800 | 1800 | 1800 |
| Lane Width (m) | 3.5 | 3.5 | 3.5 | 3.5 | 3.5 | 3.5 |
| Lane Util. Factor | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| Frt | | | | | 0.865 | |
| Flt Protected | | | | 0.997 | | |
| Satd. Flow (prot) | 1633 | 0 | 0 | 1619 | 770 | 0 |
| Flt Permitted | | | | 0.997 | | |
| Satd. Flow (perm) | 1633 | 0 | 0 | 1619 | 770 | 0 |
| Link Speed (k/h) | 60 | | | 50 | 50 | |
| Link Distance (m) | 185.0 | | | 163.7 | 105.8 | |
| Travel Time (s) | 11.1 | | | 11.8 | 7.6 | |
| Peak Hour Factor | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| Heavy Vehicles (%) | 9% | 0% | 100% | 4% | 0% | 100% |
| Adj. Flow (vph) | 117 | 0 | 5 | 81 | 0 | 15 |
| Shared Lane Traffic (%) | | | | | | |
| Lane Group Flow (vph) | 117 | 0 | 0 | 86 | 15 | 0 |
| Enter Blocked Intersection | No | No | No | No | No | No |
| Lane Alignment | Left | Right | Left | Left | Left | Right |
| Median Width(m) | 0.0 | | | 0.0 | 3.5 | |
| Link Offset(m) | 0.0 | | | 0.0 | 0.0 | |
| Crosswalk Width(m) | 4.8 | | | 4.8 | 4.8 | |
| Two way Left Turn Lane | | | | | | |
| Headway Factor | 1.09 | 1.09 | 1.09 | 1.09 | 1.09 | 1.09 |
| Turning Speed (k/h) | | 15 | 25 | | 25 | 15 |
| Sign Control | Free | | | Free | Stop | |

| Intersection Summary | | | |
|---|---|---|---|
| Area Type: | Other | | |
| Control Type: Unsignalized | | | |
| Intersection Capacity Utilization | 18.8% | ICU Level of Service | A |
| Analysis Period (min) | 15 | | |

| Movement | EBT | EBR | WBL | WBT | NBL | NBR |
|---|---|---|---|---|---|---|
| Lane Configurations | | | | | | |
| Traffic Volume (veh/h) | 117 | 0 | 5 | 81 | 0 | 15 |
| Future Volume (Veh/h) | 117 | 0 | 5 | 81 | 0 | 15 |
| Sign Control | Free | | | Free | Stop | |
| Grade | 0% | | | 0% | 0% | |
| Peak Hour Factor | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| Hourly flow rate (vph) | 117 | 0 | 5 | 81 | 0 | 15 |
| Pedestrians | | | | | | |
| Lane Width (m) | | | | | | |
| Walking Speed (m/s) | | | | | | |
| Percent Blockage | | | | | | |
| Right turn flare (veh) | | | | | | |
| Median type | None | | | None | | |
| Median storage veh) | | | | | | |
| Upstream signal (m) | | | | 362 | | |
| pX, platoon unblocked | | | | | | |
| vC, conflicting volume | | | 117 | | 208 | 117 |
| vC1, stage 1 conf vol | | | | | | |
| vC2, stage 2 conf vol | | | | | | |
| vCu, unblocked vol | | | 117 | | 208 | 117 |
| tC, single (s) | | | 5.1 | | 6.4 | 7.2 |
| tC, 2 stage (s) | | | | | | |
| tF (s) | | | 3.1 | | 3.5 | 4.2 |
| p0 queue free % | | | 100 | | 100 | 98 |
| cM capacity (veh/h) | | | 1034 | | 781 | 726 |

| Direction, Lane # | EB 1 | WB 1 | NB 1 |
|---|---|---|---|
| Volume Total | 117 | 86 | 15 |
| Volume Left | 0 | 5 | 0 |
| Volume Right | 0 | 0 | 15 |
| cSH | 1700 | 1034 | 726 |
| Volume to Capacity | 0.07 | 0.00 | 0.02 |
| Queue Length 95th (m) | 0.0 | 0.1 | 0.5 |
| Control Delay (s) | 0.0 | 0.5 | 10.1 |
| Lane LOS | | A | B |
| Approach Delay (s) | 0.0 | 0.5 | 10.1 |
| Approach LOS | | | B |

| Intersection Summary | | | |
|---|---|---|---|
| Average Delay | 0.9 | | |
| Intersection Capacity Utilization | 18.8% | ICU Level of Service | A |
| Analysis Period (min) | 15 | | |

| Lane Group | EBT | EBR | WBL | WBT | NBL | NBR |
|---|---|---|---|---|---|---|
| Lane Configurations | | | | | | |
| Traffic Volume (vph) | 93 | 0 | 9 | 72 | 0 | 24 |
| Future Volume (vph) | 93 | 0 | 9 | 72 | 0 | 24 |
| Ideal Flow (vphpl) | 1800 | 1800 | 1800 | 1800 | 1800 | 1800 |
| Lane Width (m) | 3.5 | 3.5 | 3.5 | 3.5 | 3.5 | 3.5 |
| Lane Util. Factor | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| Frt | | | | | 0.865 | |
| Flt Protected | | | | 0.994 | | |
| Satd. Flow (prot) | 1695 | 0 | 0 | 1712 | 1272 | 0 |
| Flt Permitted | | | | 0.994 | | |
| Satd. Flow (perm) | 1695 | 0 | 0 | 1712 | 1272 | 0 |
| Link Speed (k/h) | 60 | | | 50 | 50 | |
| Link Distance (m) | 95.5 | | | 185.0 | 109.7 | |
| Travel Time (s) | 5.7 | | | 13.3 | 7.9 | |
| Peak Hour Factor | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| Heavy Vehicles (%) | 5% | 0% | 22% | 1% | 0% | 21% |
| Adj. Flow (vph) | 93 | 0 | 9 | 72 | 0 | 24 |
| Shared Lane Traffic (%) | | | | | | |
| Lane Group Flow (vph) | 93 | 0 | 0 | 81 | 24 | 0 |
| Enter Blocked Intersection | No | No | No | No | No | No |
| Lane Alignment | Left | Right | Left | Left | Left | Right |
| Median Width(m) | 0.0 | | | 0.0 | 3.5 | |
| Link Offset(m) | 0.0 | | | 0.0 | 0.0 | |
| Crosswalk Width(m) | 4.8 | | | 4.8 | 4.8 | |
| Two way Left Turn Lane | | | | | | |
| Headway Factor | 1.09 | 1.09 | 1.09 | 1.09 | 1.09 | 1.09 |
| Turning Speed (k/h) | | 15 | 25 | | 25 | 15 |
| Sign Control | Free | | | Free | Stop | |

| Intersection Summary | | | |
|---|---|---|---|
| Area Type: | Other | | |
| Control Type: Unsignalized | | | |
| Intersection Capacity Utilization | 21.2% | ICU Level of Service | A |
| Analysis Period (min) | 15 | | |

| Movement | EBT | EBR | WBL | WBT | NBL | NBR |
|---|---|---|---|---|---|---|
| Lane Configurations | | | | | | |
| Traffic Volume (veh/h) | 93 | 0 | 9 | 72 | 0 | 24 |
| Future Volume (Veh/h) | 93 | 0 | 9 | 72 | 0 | 24 |
| Sign Control | Free | | | Free | Stop | |
| Grade | 0% | | | 0% | 0% | |
| Peak Hour Factor | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| Hourly flow rate (vph) | 93 | 0 | 9 | 72 | 0 | 24 |
| 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 | | | 93 | | 183 | 93 |
| vC1, stage 1 conf vol | | | | | | |
| vC2, stage 2 conf vol | | | | | | |
| vCu, unblocked vol | | | 93 | | 183 | 93 |
| tC, single (s) | | | 4.3 | | 6.4 | 6.4 |
| tC, 2 stage (s) | | | | | | |
| tF (s) | | | 2.4 | | 3.5 | 3.5 |
| p0 queue free % | | | 99 | | 100 | 97 |
| cM capacity (veh/h) | | | 1385 | | 806 | 914 |

| Direction, Lane # | EB 1 | WB 1 | NB 1 |
|---|---|---|---|
| Volume Total | 93 | 81 | 24 |
| Volume Left | 0 | 9 | 0 |
| Volume Right | 0 | 0 | 24 |
| cSH | 1700 | 1385 | 914 |
| Volume to Capacity | 0.05 | 0.01 | 0.03 |
| Queue Length 95th (m) | 0.0 | 0.2 | 0.6 |
| Control Delay (s) | 0.0 | 0.9 | 9.0 |
| Lane LOS | | A | A |
| Approach Delay (s) | 0.0 | 0.9 | 9.0 |
| Approach LOS | | | A |

| Intersection Summary | | | |
|---|---|---|---|
| Average Delay | 1.5 | | |
| Intersection Capacity Utilization | 21.2% | ICU Level of Service | A |
| Analysis Period (min) | 15 | | |

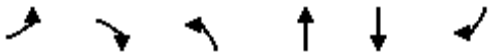
| Lane Group | WBL | WBR | NBT | NBR | SBL | SBT |
|---|---|---|---|---|---|---|
| Lane Configurations | | | | | | |
| Traffic Volume (vph) | 175 | 38 | 121 | 1050 | 94 | 143 |
| Future Volume (vph) | 175 | 38 | 121 | 1050 | 94 | 143 |
| Ideal Flow (vphpl) | 1800 | 1800 | 1800 | 1800 | 1800 | 1800 |
| Lane Width (m) | 4.5 | 4.5 | 3.5 | 3.5 | 3.5 | 3.5 |
| Storage Length (m) | 0.0 | 10.0 | | 0.0 | 0.0 | |
| Storage Lanes | 1 | 0 | | 0 | 0 | |
| Taper Length (m) | 7.5 | | | | 7.5 | |
| Lane Util. Factor | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| Frt | 0.976 | | 0.879 | | | |
| Flt Protected | 0.961 | | | | | 0.981 |
| Satd. Flow (prot) | 1705 | 0 | 1530 | 0 | 0 | 1593 |
| Flt Permitted | 0.961 | | | | | 0.981 |
| Satd. Flow (perm) | 1705 | 0 | 1530 | 0 | 0 | 1593 |
| Link Speed (k/h) | 40 | | 80 | | | 80 |
| Link Distance (m) | 155.0 | | 545.7 | | | 134.1 |
| Travel Time (s) | 14.0 | | 24.6 | | | 6.0 |
| Peak Hour Factor | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| Heavy Vehicles (%) | 8% | 13% | 13% | 1% | 9% | 10% |
| Adj. Flow (vph) | 175 | 38 | 121 | 1050 | 94 | 143 |
| Shared Lane Traffic (%) | | | | | | |
| Lane Group Flow (vph) | 213 | 0 | 1171 | 0 | 0 | 237 |
| Enter Blocked Intersection | No | No | No | No | No | No |
| Lane Alignment | Left | Right | Left | Right | Left | Left |
| Median Width(m) | 4.5 | | 0.0 | | | 0.0 |
| Link Offset(m) | 0.0 | | 0.0 | | | 0.0 |
| Crosswalk Width(m) | 4.8 | | 4.8 | | | 4.8 |
| Two way Left Turn Lane | | | | | | |
| Headway Factor | 0.95 | 0.95 | 1.09 | 1.09 | 1.09 | 1.09 |
| Turning Speed (k/h) | 25 | 15 | | 15 | 25 | |
| Sign Control | Stop | | Free | | | Free |

| Intersection Summary | | | |
|---|---|---|---|
| Area Type: | Other | | |
| Control Type: Unsignalized | | | |
| Intersection Capacity Utilization 111.3% | | ICU Level of Service H | |
| Analysis Period (min) 15 | | | |

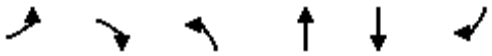
| Movement | WBL | WBR | NBT | NBR | SBL | SBT |
|---|---|---|---|---|---|---|
| Lane Configurations | | | | | | |
| Traffic Volume (veh/h) | 175 | 38 | 121 | 1050 | 94 | 143 |
| Future Volume (Veh/h) | 175 | 38 | 121 | 1050 | 94 | 143 |
| Sign Control | Stop | | Free | | | Free |
| Grade | 0% | | 0% | | | 0% |
| Peak Hour Factor | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| Hourly flow rate (vph) | 175 | 38 | 121 | 1050 | 94 | 143 |
| 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 | 977 | 646 | | | 1171 | |
| vC1, stage 1 conf vol | | | | | | |
| vC2, stage 2 conf vol | | | | | | |
| vCu, unblocked vol | 977 | 646 | | | 1171 | |
| tC, single (s) | 6.5 | 6.3 | | | 4.2 | |
| tC, 2 stage (s) | | | | | | |
| tF (s) | 3.6 | 3.4 | | | 2.3 | |
| p0 queue free % | 23 | 92 | | | 84 | |
| cM capacity (veh/h) | 227 | 453 | | | 572 | |

| Direction, Lane # | WB 1 | NB 1 | SB 1 |
|---|---|---|---|
| Volume Total | 213 | 1171 | 237 |
| Volume Left | 175 | 0 | 94 |
| Volume Right | 38 | 1050 | 0 |
| cSH | 249 | 1700 | 572 |
| Volume to Capacity | 0.86 | 0.69 | 0.16 |
| Queue Length 95th (m) | 55.8 | 0.0 | 4.7 |
| Control Delay (s) | 68.5 | 0.0 | 6.3 |
| Lane LOS | F | | A |
| Approach Delay (s) | 68.5 | 0.0 | 6.3 |
| Approach LOS | F | | |

| Intersection Summary | | | |
|---|---|---|---|
| Average Delay | 9.9 | | |
| Intersection Capacity Utilization | 111.3% | ICU Level of Service | H |
| Analysis Period (min) | 15 | | |



| Lane Group | EBL | EBR | NBL | NBT | SBT | SBR |
|---|---|---|---|---|---|---|
| Lane Configurations | | | | | | |
| Traffic Volume (vph) | 22 | 391 | 48 | 1154 | 282 | 11 |
| Future Volume (vph) | 22 | 391 | 48 | 1154 | 282 | 11 |
| Ideal Flow (vphpl) | 1800 | 1800 | 1800 | 1800 | 1800 | 1800 |
| Lane Width (m) | 3.5 | 3.3 | 3.5 | 3.5 | 3.5 | 3.5 |
| Storage Length (m) | 0.0 | 25.0 | 50.0 | | | 0.0 |
| Storage Lanes | 1 | 1 | 1 | | | 0 |
| Taper Length (m) | 7.5 | | 75.0 | | | |
| Lane Util. Factor | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| Frt | | 0.850 | | | 0.995 | |
| Flt Protected | 0.950 | | 0.950 | | | |
| Satd. Flow (prot) | 1281 | 1357 | 1311 | 1745 | 1583 | 0 |
| Flt Permitted | 0.950 | | 0.519 | | | |
| Satd. Flow (perm) | 1281 | 1357 | 716 | 1745 | 1583 | 0 |
| Right Turn on Red | | Yes | | | | Yes |
| Satd. Flow (RTOR) | | 391 | | | 4 | |
| Link Speed (k/h) | 40 | | | 80 | 80 | |
| Link Distance (m) | 154.2 | | | 243.1 | 545.7 | |
| Travel Time (s) | 13.9 | | | 10.9 | 24.6 | |
| Peak Hour Factor | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| Heavy Vehicles (%) | 32% | 9% | 29% | 2% | 12% | 9% |
| Adj. Flow (vph) | 22 | 391 | 48 | 1154 | 282 | 11 |
| Shared Lane Traffic (%) | | | | | | |
| Lane Group Flow (vph) | 22 | 391 | 48 | 1154 | 293 | 0 |
| Enter Blocked Intersection | No | No | No | No | No | No |
| Lane Alignment | Left | Right | Left | Left | Left | Right |
| Median Width(m) | 3.5 | | | 3.5 | 3.5 | |
| Link Offset(m) | 0.0 | | | 0.0 | 0.0 | |
| Crosswalk Width(m) | 4.8 | | | 4.8 | 4.8 | |
| Two way Left Turn Lane | | | | | | |
| Headway Factor | 1.09 | 1.12 | 1.09 | 1.09 | 1.09 | 1.09 |
| Turning Speed (k/h) | 25 | 15 | 25 | | | 15 |
| Number of Detectors | 1 | 1 | 1 | 2 | 2 | |
| Detector Template | Left | Right | Left | Thru | Thru | |
| Leading Detector (m) | 2.0 | 2.0 | 2.0 | 10.0 | 10.0 | |
| Trailing Detector (m) | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | |
| Detector 1 Position(m) | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | |
| Detector 1 Size(m) | 2.0 | 2.0 | 2.0 | 0.6 | 0.6 | |
| Detector 1 Type | Cl+Ex | Cl+Ex | Cl+Ex | Cl+Ex | Cl+Ex | |
| Detector 1 Channel | | | | | | |
| Detector 1 Extend (s) | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | |
| Detector 1 Queue (s) | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | |
| Detector 1 Delay (s) | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | |
| Detector 2 Position(m) | | | | 9.4 | 9.4 | |
| Detector 2 Size(m) | | | | 0.6 | 0.6 | |
| Detector 2 Type | | | | Cl+Ex | Cl+Ex | |
| Detector 2 Channel | | | | | | |
| Detector 2 Extend (s) | | | | 0.0 | 0.0 | |
| Turn Type | Prot | Perm | pm+pt | NA | NA | |

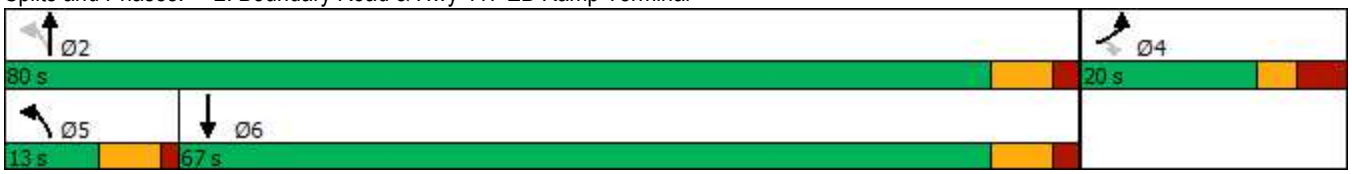


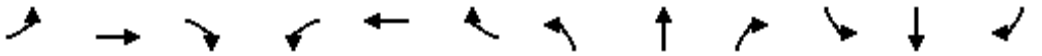
| Lane Group | EBL | EBR | NBL | NBT | SBT | SBR |
|---|---|---|---|---|---|---|
| Protected Phases | 4 | | 5 | 2 | 6 | |
| Permitted Phases | | 4 | 2 | | | |
| Detector Phase | 4 | 4 | 5 | 2 | 6 | |
| Switch Phase | | | | | | |
| Minimum Initial (s) | 7.0 | 7.0 | 7.0 | 35.0 | 35.0 | |
| Minimum Split (s) | 17.8 | 17.8 | 13.0 | 41.6 | 41.6 | |
| Total Split (s) | 20.0 | 20.0 | 13.0 | 80.0 | 67.0 | |
| Total Split (%) | 20.0% | 20.0% | 13.0% | 80.0% | 67.0% | |
| Maximum Green (s) | 13.2 | 13.2 | 7.0 | 73.4 | 60.4 | |
| Yellow Time (s) | 3.0 | 3.0 | 4.6 | 4.6 | 4.6 | |
| All-Red Time (s) | 3.8 | 3.8 | 1.4 | 2.0 | 2.0 | |
| Lost Time Adjust (s) | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | |
| Total Lost Time (s) | 6.8 | 6.8 | 6.0 | 6.6 | 6.6 | |
| Lead/Lag | | | Lead | | Lag | |
| Lead-Lag Optimize? | | | Yes | | Yes | |
| Vehicle Extension (s) | 3.0 | 3.0 | 3.0 | 3.0 | 3.0 | |
| Recall Mode | None | None | None | Min | Min | |
| Walk Time (s) | 5.0 | 5.0 | | 0.0 | 7.0 | |
| Flash Dont Walk (s) | 6.0 | 6.0 | | 0.0 | 21.0 | |
| Pedestrian Calls (#/hr) | 0 | 0 | | 0 | 0 | |
| Act Effct Green (s) | 9.2 | 9.2 | 57.6 | 57.0 | 50.1 | |
| Actuated g/C Ratio | 0.11 | 0.11 | 0.72 | 0.71 | 0.62 | |
| v/c Ratio | 0.15 | 0.78 | 0.08 | 0.93 | 0.30 | |
| Control Delay | 40.0 | 16.5 | 3.6 | 24.9 | 9.0 | |
| Queue Delay | 0.0 | 0.0 | 0.0 | 0.1 | 0.0 | |
| Total Delay | 40.0 | 16.5 | 3.6 | 25.0 | 9.0 | |
| LOS | D | B | A | C | A | |
| Approach Delay | 17.7 | | | 24.1 | 9.0 | |
| Approach LOS | B | | | C | A | |
| Queue Length 50th (m) | 3.3 | 0.0 | 1.5 | 109.4 | 21.6 | |
| Queue Length 95th (m) | 11.5 | #34.6 | 5.0 | #298.7 | 41.7 | |
| Internal Link Dist (m) | 130.2 | | | 219.1 | 521.7 | |
| Turn Bay Length (m) | | 25.0 | 50.0 | | | |
| Base Capacity (vph) | 221 | 558 | 568 | 1536 | 1225 | |
| Starvation Cap Reductn | 0 | 0 | 0 | 34 | 0 | |
| Spillback Cap Reductn | 0 | 0 | 0 | 0 | 0 | |
| Storage Cap Reductn | 0 | 0 | 0 | 0 | 0 | |
| Reduced v/c Ratio | 0.10 | 0.70 | 0.08 | 0.77 | 0.24 | |

| Intersection Summary | | | |
|---|---|---|---|
| Area Type: | Other | | |
| Cycle Length: 100 | | | |
| Actuated Cycle Length: 80.3 | | | |
| Natural Cycle: 90 | | | |
| Control Type: Semi Act-Uncoord | | | |
| Maximum v/c Ratio: 0.93 | | | |
| Intersection Signal Delay: 20.4 | | Intersection LOS: C | |
| Intersection Capacity Utilization 81.1% | | ICU Level of Service D | |
| Analysis Period (min) 15 | | | |

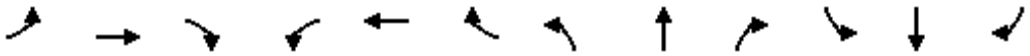
# 95th percentile volume exceeds capacity, queue may be longer.
Queue shown is maximum after two cycles.

Splits and Phases: 2: Boundary Road & Hwy 417 EB Ramp Terminal





| Lane Group | EBL | EBT | EBR | WBL | WBT | WBR | NBL | NBT | NBR | SBL | SBT | SBR |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Lane Configurations | | | | | | | | | | | | |
| Traffic Volume (vph) | 67 | 20 | 11 | 4 | 7 | 31 | 25 | 1105 | 36 | 236 | 299 | 138 |
| Future Volume (vph) | 67 | 20 | 11 | 4 | 7 | 31 | 25 | 1105 | 36 | 236 | 299 | 138 |
| Ideal Flow (vphpl) | 1800 | 1800 | 1800 | 1800 | 1800 | 1800 | 1800 | 1800 | 1800 | 1800 | 1800 | 1800 |
| Lane Width (m) | 3.5 | 3.5 | 3.5 | 3.5 | 3.5 | 3.5 | 3.3 | 3.5 | 3.3 | 3.3 | 3.5 | 3.5 |
| Storage Length (m) | 0.0 | | 15.0 | 0.0 | | 0.0 | 35.0 | | 7.5 | 100.0 | | 35.0 |
| Storage Lanes | 0 | | 0 | 0 | | 1 | 1 | | 1 | 1 | | 0 |
| Taper Length (m) | 7.5 | | | 7.5 | | | 45.0 | | | 75.0 | | |
| Lane Util. Factor | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| Frt | | 0.985 | | | | 0.850 | | | 0.850 | | 0.953 | |
| Flt Protected | | 0.967 | | | 0.982 | | 0.950 | | | 0.950 | | |
| Satd. Flow (prot) | 0 | 1543 | 0 | 0 | 1748 | 1513 | 1589 | 1728 | 1479 | 1653 | 1463 | 0 |
| Flt Permitted | | 0.789 | | | 0.896 | | 0.509 | | | 0.066 | | |
| Satd. Flow (perm) | 0 | 1259 | 0 | 0 | 1595 | 1513 | 852 | 1728 | 1479 | 115 | 1463 | 0 |
| Right Turn on Red | | | Yes | | | Yes | | | Yes | | | Yes |
| Satd. Flow (RTOR) | | 6 | | | | 100 | | | 96 | | 54 | |
| Link Speed (k/h) | | 60 | | | 20 | | | 80 | | | 80 | |
| Link Distance (m) | | 198.6 | | | 170.6 | | | 174.7 | | | 243.1 | |
| Travel Time (s) | | 11.9 | | | 30.7 | | | 7.9 | | | 10.9 | |
| Peak Hour Factor | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| Heavy Vehicles (%) | 13% | 0% | 9% | 0% | 0% | 0% | 4% | 3% | 0% | 0% | 15% | 18% |
| Adj. Flow (vph) | 67 | 20 | 11 | 4 | 7 | 31 | 25 | 1105 | 36 | 236 | 299 | 138 |
| Shared Lane Traffic (%) | | | | | | | | | | | | |
| Lane Group Flow (vph) | 0 | 98 | 0 | 0 | 11 | 31 | 25 | 1105 | 36 | 236 | 437 | 0 |
| Enter Blocked Intersection | No | No | No | No | No | No | No | No | No | No | No | No |
| Lane Alignment | Left | Left | Right | Left | Left | Right | Left | Left | Right | Left | Left | Right |
| Median Width(m) | | 0.0 | | | 0.0 | | | 3.5 | | | 3.5 | |
| Link Offset(m) | | 0.0 | | | 0.0 | | | 0.0 | | | 0.0 | |
| Crosswalk Width(m) | | 4.8 | | | 4.8 | | | 4.8 | | | 4.8 | |
| Two way Left Turn Lane | | | | | | | | | | | | |
| Headway Factor | 1.09 | 1.09 | 1.09 | 1.09 | 1.09 | 1.09 | 1.12 | 1.09 | 1.12 | 1.12 | 1.09 | 1.09 |
| Turning Speed (k/h) | 25 | | 15 | 25 | | 15 | 25 | | 15 | 25 | | 15 |
| Number of Detectors | 1 | 2 | | 1 | 2 | 1 | 1 | 2 | 1 | 1 | 2 | |
| Detector Template | Left | Thru | | Left | Thru | Right | Left | Thru | Right | Left | Thru | |
| Leading Detector (m) | 2.0 | 10.0 | | 2.0 | 10.0 | 2.0 | 2.0 | 10.0 | 2.0 | 2.0 | 10.0 | |
| Trailing Detector (m) | 0.0 | 0.0 | | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | |
| Detector 1 Position(m) | 0.0 | 0.0 | | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | |
| Detector 1 Size(m) | 2.0 | 0.6 | | 2.0 | 0.6 | 2.0 | 2.0 | 0.6 | 2.0 | 2.0 | 0.6 | |
| Detector 1 Type | Cl+Ex | Cl+Ex | | Cl+Ex | Cl+Ex | Cl+Ex | Cl+Ex | Cl+Ex | Cl+Ex | Cl+Ex | Cl+Ex | |
| Detector 1 Channel | | | | | | | | | | | | |
| Detector 1 Extend (s) | 0.0 | 0.0 | | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | |
| Detector 1 Queue (s) | 0.0 | 0.0 | | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | |
| Detector 1 Delay (s) | 0.0 | 0.0 | | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | |
| Detector 2 Position(m) | | 9.4 | | | 9.4 | | | 9.4 | | | 9.4 | |
| Detector 2 Size(m) | | 0.6 | | | 0.6 | | | 0.6 | | | 0.6 | |
| Detector 2 Type | | Cl+Ex | | | Cl+Ex | | | Cl+Ex | | | Cl+Ex | |
| Detector 2 Channel | | | | | | | | | | | | |
| Detector 2 Extend (s) | | 0.0 | | | 0.0 | | | 0.0 | | | 0.0 | |
| Turn Type | Perm | NA | | Perm | NA | Perm | Perm | NA | Perm | pm+pt | NA | |



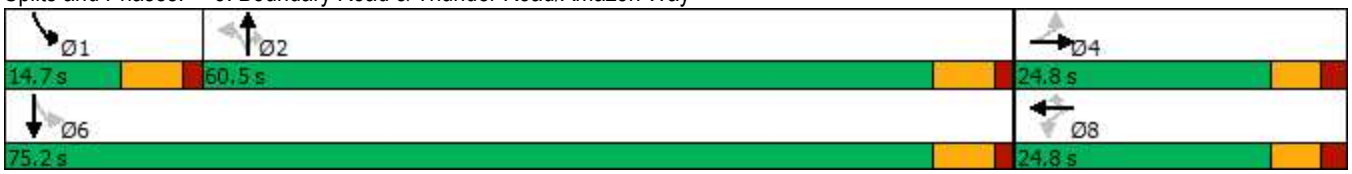
| Lane Group | EBL | EBT | EBR | WBL | WBT | WBR | NBL | NBT | NBR | SBL | SBT | SBR |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Protected Phases | | 4 | | | 8 | | | 2 | | 1 | 6 | |
| Permitted Phases | 4 | | | 8 | | 8 | 2 | | 2 | 6 | | |
| Detector Phase | 4 | 4 | | 8 | 8 | 8 | 2 | 2 | 2 | 1 | 6 | |
| Switch Phase | | | | | | | | | | | | |
| Minimum Initial (s) | 7.0 | 7.0 | | 7.0 | 7.0 | 7.0 | 20.0 | 20.0 | 20.0 | 7.0 | 20.0 | |
| Minimum Split (s) | 24.8 | 24.8 | | 24.8 | 24.8 | 24.8 | 26.2 | 26.2 | 26.2 | 13.0 | 26.2 | |
| Total Split (s) | 24.8 | 24.8 | | 24.8 | 24.8 | 24.8 | 60.5 | 60.5 | 60.5 | 14.7 | 75.2 | |
| Total Split (%) | 24.8% | 24.8% | | 24.8% | 24.8% | 24.8% | 60.5% | 60.5% | 60.5% | 14.7% | 75.2% | |
| Maximum Green (s) | 19.0 | 19.0 | | 19.0 | 19.0 | 19.0 | 54.3 | 54.3 | 54.3 | 8.7 | 69.0 | |
| Yellow Time (s) | 3.7 | 3.7 | | 3.7 | 3.7 | 3.7 | 4.6 | 4.6 | 4.6 | 4.6 | 4.6 | |
| All-Red Time (s) | 2.1 | 2.1 | | 2.1 | 2.1 | 2.1 | 1.6 | 1.6 | 1.6 | 1.4 | 1.6 | |
| Lost Time Adjust (s) | | 0.0 | | | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | |
| Total Lost Time (s) | | 5.8 | | | 5.8 | 5.8 | 6.2 | 6.2 | 6.2 | 6.0 | 6.2 | |
| Lead/Lag | | | | | | | Lag | Lag | Lag | Lead | | |
| Lead-Lag Optimize? | | | | | | | Yes | Yes | Yes | Yes | | |
| Vehicle Extension (s) | 3.0 | 3.0 | | 3.0 | 3.0 | 3.0 | 3.0 | 3.0 | 3.0 | 3.0 | 3.0 | |
| Recall Mode | None | None | | None | None | None | Min | Min | Min | None | Min | |
| Walk Time (s) | 7.0 | 7.0 | | 7.0 | 7.0 | 7.0 | 7.0 | 7.0 | 7.0 | | 7.0 | |
| Flash Dont Walk (s) | 12.0 | 12.0 | | 12.0 | 12.0 | 12.0 | 10.0 | 10.0 | 10.0 | | 10.0 | |
| Pedestrian Calls (#/hr) | 0 | 0 | | 0 | 0 | 0 | 0 | 0 | 0 | | 0 | |
| Act Effct Green (s) | | 12.1 | | | 12.1 | 12.1 | 54.8 | 54.8 | 54.8 | 69.9 | 71.2 | |
| Actuated g/C Ratio | | 0.13 | | | 0.13 | 0.13 | 0.60 | 0.60 | 0.60 | 0.77 | 0.78 | |
| v/c Ratio | | 0.57 | | | 0.05 | 0.11 | 0.05 | 1.06 | 0.04 | 1.00 | 0.38 | |
| Control Delay | | 48.5 | | | 34.8 | 0.7 | 10.0 | 67.1 | 0.1 | 84.7 | 5.2 | |
| Queue Delay | | 0.0 | | | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | |
| Total Delay | | 48.5 | | | 34.8 | 0.7 | 10.0 | 67.1 | 0.1 | 84.7 | 5.2 | |
| LOS | | D | | | C | A | A | E | A | F | A | |
| Approach Delay | | 48.5 | | | 9.7 | | | 63.8 | | | 33.1 | |
| Approach LOS | | D | | | A | | | E | | | C | |
| Queue Length 50th (m) | | 16.6 | | | 1.9 | 0.0 | 1.9 | ~238.2 | 0.0 | ~32.7 | 21.0 | |
| Queue Length 95th (m) | | 32.9 | | | 6.8 | 0.0 | 6.3 | #347.4 | 0.0 | #88.3 | 46.2 | |
| Internal Link Dist (m) | | 174.6 | | | 146.6 | | | 150.7 | | | 219.1 | |
| Turn Bay Length (m) | | | | | | | 35.0 | | 7.5 | 100.0 | | |
| Base Capacity (vph) | | 270 | | | 336 | 398 | 514 | 1043 | 930 | 237 | 1158 | |
| Starvation Cap Reductn | | 0 | | | 0 | 0 | 0 | 0 | 0 | 0 | 0 | |
| Spillback Cap Reductn | | 0 | | | 0 | 0 | 0 | 0 | 0 | 0 | 0 | |
| Storage Cap Reductn | | 0 | | | 0 | 0 | 0 | 0 | 0 | 0 | 0 | |
| Reduced v/c Ratio | | 0.36 | | | 0.03 | 0.08 | 0.05 | 1.06 | 0.04 | 1.00 | 0.38 | |

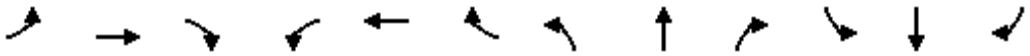
| Intersection Summary | | | |
|---|---|---|---|
| Area Type: | Other | | |
| Cycle Length: 100 | | | |
| Actuated Cycle Length: 90.8 | | | |
| Natural Cycle: 140 | | | |
| Control Type: Semi Act-Uncoord | | | |
| Maximum v/c Ratio: 1.06 | | | |
| Intersection Signal Delay: 51.4 | | Intersection LOS: D | |
| Intersection Capacity Utilization 102.6% | | ICU Level of Service G | |
| Analysis Period (min) 15 | | | |

~ Volume exceeds capacity, queue is theoretically infinite.
Queue shown is maximum after two cycles.

# 95th percentile volume exceeds capacity, queue may be longer.
Queue shown is maximum after two cycles.

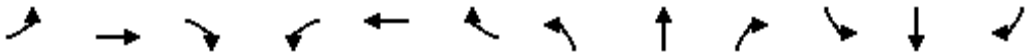
Splits and Phases: 3: Boundary Road & Thunder Road/Amazon Way





| Lane Group | EBL | EBT | EBR | WBL | WBT | WBR | NBL | NBT | NBR | SBL | SBT | SBR |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Lane Configurations | | | | | | | | | | | | |
| Traffic Volume (vph) | 1 | 0 | 5 | 7 | 0 | 4 | 15 | 1161 | 7 | 1 | 297 | 16 |
| Future Volume (vph) | 1 | 0 | 5 | 7 | 0 | 4 | 15 | 1161 | 7 | 1 | 297 | 16 |
| Ideal Flow (vphpl) | 1800 | 1800 | 1800 | 1800 | 1800 | 1800 | 1800 | 1800 | 1800 | 1800 | 1800 | 1800 |
| Lane Width (m) | 3.5 | 3.5 | 3.5 | 3.5 | 3.5 | 3.5 | 3.5 | 3.5 | 3.5 | 3.5 | 3.5 | 3.6 |
| Storage Length (m) | 0.0 | | 0.0 | 0.0 | | 0.0 | 15.0 | | 0.0 | 70.0 | | 0.0 |
| Storage Lanes | 0 | | 0 | 0 | | 0 | 1 | | 0 | 1 | | 0 |
| Taper Length (m) | 7.5 | | | 7.5 | | | 45.0 | | | 45.0 | | |
| Lane Util. Factor | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| Frt | | 0.887 | | | 0.951 | | | 0.999 | | | 0.992 | |
| Flt Protected | | 0.992 | | | 0.969 | | 0.950 | | | 0.950 | | |
| Satd. Flow (prot) | 0 | 1566 | 0 | 0 | 820 | 0 | 1691 | 1750 | 0 | 846 | 1585 | 0 |
| Flt Permitted | | 0.992 | | | 0.969 | | 0.950 | | | 0.950 | | |
| Satd. Flow (perm) | 0 | 1566 | 0 | 0 | 820 | 0 | 1691 | 1750 | 0 | 846 | 1585 | 0 |
| Link Speed (k/h) | | 50 | | | 20 | | | 80 | | | 80 | |
| Link Distance (m) | | 105.7 | | | 151.5 | | | 1150.2 | | | 174.7 | |
| Travel Time (s) | | 7.6 | | | 27.3 | | | 51.8 | | | 7.9 | |
| Peak Hour Factor | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| Heavy Vehicles (%) | 0% | 0% | 0% | 100% | 0% | 100% | 0% | 1% | 100% | 100% | 12% | 0% |
| Adj. Flow (vph) | 1 | 0 | 5 | 7 | 0 | 4 | 15 | 1161 | 7 | 1 | 297 | 16 |
| Shared Lane Traffic (%) | | | | | | | | | | | | |
| Lane Group Flow (vph) | 0 | 6 | 0 | 0 | 11 | 0 | 15 | 1168 | 0 | 1 | 313 | 0 |
| Enter Blocked Intersection | No | No | No | No | No | No | No | No | No | No | No | No |
| Lane Alignment | Left | Left | Right | Left | Left | Right | Left | Left | Right | Left | Left | Right |
| Median Width(m) | | 0.0 | | | 0.0 | | | 3.5 | | | 3.5 | |
| Link Offset(m) | | 0.0 | | | 0.0 | | | 0.0 | | | 0.0 | |
| Crosswalk Width(m) | | 4.8 | | | 4.8 | | | 4.8 | | | 4.8 | |
| Two way Left Turn Lane | | | | | | | | | | | | |
| Headway Factor | 1.09 | 1.09 | 1.09 | 1.09 | 1.09 | 1.09 | 1.09 | 1.09 | 1.09 | 1.09 | 1.09 | 1.07 |
| Turning Speed (k/h) | 25 | | 15 | 25 | | 15 | 25 | | 15 | 25 | | 15 |
| Sign Control | | Stop | | | Stop | | | Free | | | Free | |

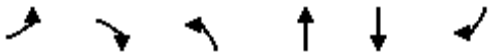
| Intersection Summary | | | |
|---|---|---|---|
| Area Type: | Other | | |
| Control Type: Unsignalized | | | |
| Intersection Capacity Utilization | 74.9% | ICU Level of Service | D |
| Analysis Period (min) | 15 | | |



| Movement | EBL | EBT | EBR | WBL | WBT | WBR | NBL | NBT | NBR | SBL | SBT | SBR |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Lane Configurations | | | | | | | | | | | | |
| Traffic Volume (veh/h) | 1 | 0 | 5 | 7 | 0 | 4 | 15 | 1161 | 7 | 1 | 297 | 16 |
| Future Volume (Veh/h) | 1 | 0 | 5 | 7 | 0 | 4 | 15 | 1161 | 7 | 1 | 297 | 16 |
| Sign Control | | Stop | | | Stop | | | Free | | | Free | |
| Grade | | 0% | | | 0% | | | 0% | | | 0% | |
| Peak Hour Factor | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| Hourly flow rate (vph) | 1 | 0 | 5 | 7 | 0 | 4 | 15 | 1161 | 7 | 1 | 297 | 16 |
| Pedestrians | | | | | | | | | | | | |
| Lane Width (m) | | | | | | | | | | | | |
| Walking Speed (m/s) | | | | | | | | | | | | |
| Percent Blockage | | | | | | | | | | | | |
| Right turn flare (veh) | | | | | | | | | | | | |
| Median type | | | | | | | | None | | | None | |
| Median storage veh) | | | | | | | | | | | | |
| Upstream signal (m) | | | | | | | | | | | 175 | |
| pX, platoon unblocked | | | | | | | | | | | | |
| vC, conflicting volume | 1502 | 1505 | 305 | 1498 | 1510 | 1164 | 313 | | | 1168 | | |
| vC1, stage 1 conf vol | | | | | | | | | | | | |
| vC2, stage 2 conf vol | | | | | | | | | | | | |
| vCu, unblocked vol | 1502 | 1505 | 305 | 1498 | 1510 | 1164 | 313 | | | 1168 | | |
| tC, single (s) | 7.1 | 6.5 | 6.2 | 8.1 | 6.5 | 7.2 | 4.1 | | | 5.1 | | |
| tC, 2 stage (s) | | | | | | | | | | | | |
| tF (s) | 3.5 | 4.0 | 3.3 | 4.4 | 4.0 | 4.2 | 2.2 | | | 3.1 | | |
| p0 queue free % | 99 | 100 | 99 | 88 | 100 | 97 | 99 | | | 100 | | |
| cM capacity (veh/h) | 97 | 121 | 740 | 60 | 120 | 153 | 1259 | | | 352 | | |

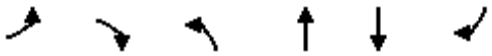
| Direction, Lane # | EB 1 | WB 1 | NB 1 | NB 2 | SB 1 | SB 2 |
|---|---|---|---|---|---|---|
| Volume Total | 6 | 11 | 15 | 1168 | 1 | 313 |
| Volume Left | 1 | 7 | 15 | 0 | 1 | 0 |
| Volume Right | 5 | 4 | 0 | 7 | 0 | 16 |
| cSH | 352 | 77 | 1259 | 1700 | 352 | 1700 |
| Volume to Capacity | 0.02 | 0.14 | 0.01 | 0.69 | 0.00 | 0.18 |
| Queue Length 95th (m) | 0.4 | 3.8 | 0.3 | 0.0 | 0.1 | 0.0 |
| Control Delay (s) | 15.4 | 59.3 | 7.9 | 0.0 | 15.3 | 0.0 |
| Lane LOS | C | F | A | | C | |
| Approach Delay (s) | 15.4 | 59.3 | 0.1 | | 0.0 | |
| Approach LOS | C | F | | | | |

| Intersection Summary | | | | |
|---|---|---|---|---|
| Average Delay | 0.6 | | | |
| Intersection Capacity Utilization | 74.9% | ICU Level of Service | D | |
| Analysis Period (min) | 15 | | | |



| Lane Group | EBL | EBR | NBL | NBT | SBT | SBR |
|---|---|---|---|---|---|---|
| Lane Configurations | | | | | | |
| Traffic Volume (vph) | 100 | 36 | 163 | 1073 | 158 | 131 |
| Future Volume (vph) | 100 | 36 | 163 | 1073 | 158 | 131 |
| Ideal Flow (vphpl) | 1800 | 1800 | 1800 | 1800 | 1800 | 1800 |
| Lane Width (m) | 3.3 | 3.3 | 3.5 | 3.5 | 3.5 | 3.5 |
| Storage Length (m) | 25.0 | 0.0 | 0.0 | | | 30.0 |
| Storage Lanes | 1 | 1 | 0 | | | 1 |
| Taper Length (m) | 47.5 | | 7.5 | | | |
| Lane Util. Factor | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| Frt | | 0.850 | | | | 0.850 |
| Flt Protected | 0.950 | | | 0.993 | | |
| Satd. Flow (prot) | 1489 | 1297 | 0 | 1734 | 1575 | 1293 |
| Flt Permitted | 0.950 | | | 0.993 | | |
| Satd. Flow (perm) | 1489 | 1297 | 0 | 1734 | 1575 | 1293 |
| Link Speed (k/h) | 80 | | | 80 | 80 | |
| Link Distance (m) | 180.5 | | | 135.8 | 1150.2 | |
| Travel Time (s) | 8.1 | | | 6.1 | 51.8 | |
| Peak Hour Factor | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| Heavy Vehicles (%) | 11% | 14% | 8% | 1% | 13% | 17% |
| Adj. Flow (vph) | 100 | 36 | 163 | 1073 | 158 | 131 |
| Shared Lane Traffic (%) | | | | | | |
| Lane Group Flow (vph) | 100 | 36 | 0 | 1236 | 158 | 131 |
| Enter Blocked Intersection | No | No | No | No | No | No |
| Lane Alignment | Left | Right | Left | Left | Left | Right |
| Median Width(m) | 3.3 | | | 3.5 | 3.5 | |
| Link Offset(m) | 0.0 | | | 0.0 | 0.0 | |
| Crosswalk Width(m) | 4.8 | | | 4.8 | 4.8 | |
| Two way Left Turn Lane | | | | | | |
| Headway Factor | 1.12 | 1.12 | 1.09 | 1.09 | 1.09 | 1.09 |
| Turning Speed (k/h) | 25 | 15 | 25 | | | 15 |
| Sign Control | Stop | | | Free | Free | |

| Intersection Summary | | | |
|---|---|---|---|
| Area Type: | Other | | |
| Control Type: Unsignalized | | | |
| Intersection Capacity Utilization 93.7% | | ICU Level of Service F | |
| Analysis Period (min) 15 | | | |



| Movement | EBL | EBR | NBL | NBT | SBT | SBR |
|---|---|---|---|---|---|---|
| Lane Configurations | | | | | | |
| Traffic Volume (veh/h) | 100 | 36 | 163 | 1073 | 158 | 131 |
| Future Volume (Veh/h) | 100 | 36 | 163 | 1073 | 158 | 131 |
| Sign Control | Stop | | | Free | Free | |
| Grade | 0% | | | 0% | 0% | |
| Peak Hour Factor | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| Hourly flow rate (vph) | 100 | 36 | 163 | 1073 | 158 | 131 |
| 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 | 1557 | 158 | 289 | | | |
| vC1, stage 1 conf vol | | | | | | |
| vC2, stage 2 conf vol | | | | | | |
| vCu, unblocked vol | 1557 | 158 | 289 | | | |
| tC, single (s) | 6.5 | 6.3 | 4.2 | | | |
| tC, 2 stage (s) | | | | | | |
| tF (s) | 3.6 | 3.4 | 2.3 | | | |
| p0 queue free % | 3 | 96 | 87 | | | |
| cM capacity (veh/h) | 103 | 857 | 1239 | | | |

| Direction, Lane # | EB 1 | EB 2 | NB 1 | SB 1 | SB 2 |
|---|---|---|---|---|---|
| Volume Total | 100 | 36 | 1236 | 158 | 131 |
| Volume Left | 100 | 0 | 163 | 0 | 0 |
| Volume Right | 0 | 36 | 0 | 0 | 131 |
| cSH | 103 | 857 | 1239 | 1700 | 1700 |
| Volume to Capacity | 0.97 | 0.04 | 0.13 | 0.09 | 0.08 |
| Queue Length 95th (m) | 47.7 | 1.1 | 3.6 | 0.0 | 0.0 |
| Control Delay (s) | 158.6 | 9.4 | 3.7 | 0.0 | 0.0 |
| Lane LOS | F | A | A | | |
| Approach Delay (s) | 119.1 | | 3.7 | 0.0 | |
| Approach LOS | F | | | | |

| Intersection Summary | | | |
|---|---|---|---|
| Average Delay | 12.5 | | |
| Intersection Capacity Utilization | 93.7% | ICU Level of Service | F |
| Analysis Period (min) | 15 | | |

| Lane Group | EBT | EBR | WBL | WBT | NBL | NBR |
|---|---|---|---|---|---|---|
| Lane Configurations | | | | | | |
| Traffic Volume (vph) | 78 | 0 | 51 | 119 | 0 | 19 |
| Future Volume (vph) | 78 | 0 | 51 | 119 | 0 | 19 |
| Ideal Flow (vphpl) | 1800 | 1800 | 1800 | 1800 | 1800 | 1800 |
| Lane Width (m) | 3.5 | 3.5 | 3.5 | 3.5 | 3.5 | 3.5 |
| Lane Util. Factor | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| Frt | | | | | 0.865 | |
| Flt Protected | | | | 0.985 | | |
| Satd. Flow (prot) | 1589 | 0 | 0 | 1519 | 1466 | 0 |
| Flt Permitted | | | | 0.985 | | |
| Satd. Flow (perm) | 1589 | 0 | 0 | 1519 | 1466 | 0 |
| Link Speed (k/h) | 60 | | | 50 | 50 | |
| Link Distance (m) | 163.7 | | | 198.6 | 103.6 | |
| Travel Time (s) | 9.8 | | | 14.3 | 7.5 | |
| Peak Hour Factor | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| Heavy Vehicles (%) | 12% | 0% | 0% | 22% | 0% | 5% |
| Adj. Flow (vph) | 78 | 0 | 51 | 119 | 0 | 19 |
| Shared Lane Traffic (%) | | | | | | |
| Lane Group Flow (vph) | 78 | 0 | 0 | 170 | 19 | 0 |
| Enter Blocked Intersection | No | No | No | No | No | No |
| Lane Alignment | Left | Right | Left | Left | Left | Right |
| Median Width(m) | 0.0 | | | 0.0 | 3.5 | |
| Link Offset(m) | 0.0 | | | 0.0 | 0.0 | |
| Crosswalk Width(m) | 4.8 | | | 4.8 | 4.8 | |
| Two way Left Turn Lane | | | | | | |
| Headway Factor | 1.09 | 1.09 | 1.09 | 1.09 | 1.09 | 1.09 |
| Turning Speed (k/h) | | 15 | 25 | | 25 | 15 |
| Sign Control | Free | | | Free | Stop | |

| Intersection Summary | | | |
|---|---|---|---|
| Area Type: | Other | | |
| Control Type: Unsignalized | | | |
| Intersection Capacity Utilization 26.3% | | ICU Level of Service A | |
| Analysis Period (min) 15 | | | |

| Movement | EBT | EBR | WBL | WBT | NBL | NBR |
|---|---|---|---|---|---|---|
| Lane Configurations | | | | | | |
| Traffic Volume (veh/h) | 78 | 0 | 51 | 119 | 0 | 19 |
| Future Volume (Veh/h) | 78 | 0 | 51 | 119 | 0 | 19 |
| Sign Control | Free | | | Free | Stop | |
| Grade | 0% | | | 0% | 0% | |
| Peak Hour Factor | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| Hourly flow rate (vph) | 78 | 0 | 51 | 119 | 0 | 19 |
| Pedestrians | | | | | | |
| Lane Width (m) | | | | | | |
| Walking Speed (m/s) | | | | | | |
| Percent Blockage | | | | | | |
| Right turn flare (veh) | | | | | | |
| Median type | None | | | None | | |
| Median storage veh) | | | | | | |
| Upstream signal (m) | | | | 199 | | |
| pX, platoon unblocked | | | | | | |
| vC, conflicting volume | | | 78 | | 299 | 78 |
| vC1, stage 1 conf vol | | | | | | |
| vC2, stage 2 conf vol | | | | | | |
| vCu, unblocked vol | | | 78 | | 299 | 78 |
| tC, single (s) | | | 4.1 | | 6.4 | 6.2 |
| tC, 2 stage (s) | | | | | | |
| tF (s) | | | 2.2 | | 3.5 | 3.3 |
| p0 queue free % | | | 97 | | 100 | 98 |
| cM capacity (veh/h) | | | 1533 | | 673 | 974 |

| Direction, Lane # | EB 1 | WB 1 | NB 1 |
|---|---|---|---|
| Volume Total | 78 | 170 | 19 |
| Volume Left | 0 | 51 | 0 |
| Volume Right | 0 | 0 | 19 |
| cSH | 1700 | 1533 | 974 |
| Volume to Capacity | 0.05 | 0.03 | 0.02 |
| Queue Length 95th (m) | 0.0 | 0.8 | 0.5 |
| Control Delay (s) | 0.0 | 2.4 | 8.8 |
| Lane LOS | | A | A |
| Approach Delay (s) | 0.0 | 2.4 | 8.8 |
| Approach LOS | | | A |

| Intersection Summary | | | |
|---|---|---|---|
| Average Delay | 2.2 | | |
| Intersection Capacity Utilization | 26.3% | ICU Level of Service | A |
| Analysis Period (min) | 15 | | |

| Lane Group | EBT | EBR | WBL | WBT | NBL | NBR |
|---|---|---|---|---|---|---|
| Lane Configurations | | | | | | |
| Traffic Volume (vph) | 74 | 0 | 15 | 104 | 0 | 4 |
| Future Volume (vph) | 74 | 0 | 15 | 104 | 0 | 4 |
| Ideal Flow (vphpl) | 1800 | 1800 | 1800 | 1800 | 1800 | 1800 |
| Lane Width (m) | 3.5 | 3.5 | 3.5 | 3.5 | 3.5 | 3.5 |
| Lane Util. Factor | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| Frt | | | | | 0.865 | |
| Flt Protected | | | | 0.994 | | |
| Satd. Flow (prot) | 1664 | 0 | 0 | 1448 | 770 | 0 |
| Flt Permitted | | | | 0.994 | | |
| Satd. Flow (perm) | 1664 | 0 | 0 | 1448 | 770 | 0 |
| Link Speed (k/h) | 60 | | | 50 | 50 | |
| Link Distance (m) | 185.0 | | | 163.7 | 105.8 | |
| Travel Time (s) | 11.1 | | | 11.8 | 7.6 | |
| Peak Hour Factor | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| Heavy Vehicles (%) | 7% | 0% | 100% | 11% | 0% | 100% |
| Adj. Flow (vph) | 74 | 0 | 15 | 104 | 0 | 4 |
| Shared Lane Traffic (%) | | | | | | |
| Lane Group Flow (vph) | 74 | 0 | 0 | 119 | 4 | 0 |
| Enter Blocked Intersection | No | No | No | No | No | No |
| Lane Alignment | Left | Right | Left | Left | Left | Right |
| Median Width(m) | 0.0 | | | 0.0 | 3.5 | |
| Link Offset(m) | 0.0 | | | 0.0 | 0.0 | |
| Crosswalk Width(m) | 4.8 | | | 4.8 | 4.8 | |
| Two way Left Turn Lane | | | | | | |
| Headway Factor | 1.09 | 1.09 | 1.09 | 1.09 | 1.09 | 1.09 |
| Turning Speed (k/h) | | 15 | 25 | | 25 | 15 |
| Sign Control | Free | | | Free | Stop | |

| Intersection Summary | | | |
|---|---|---|---|
| Area Type: | Other | | |
| Control Type: Unsignalized | | | |
| Intersection Capacity Utilization 23.3% | | ICU Level of Service A | |
| Analysis Period (min) 15 | | | |

| Movement | EBT | EBR | WBL | WBT | NBL | NBR |
|---|---|---|---|---|---|---|
| Lane Configurations | | | | | | |
| Traffic Volume (veh/h) | 74 | 0 | 15 | 104 | 0 | 4 |
| Future Volume (Veh/h) | 74 | 0 | 15 | 104 | 0 | 4 |
| Sign Control | Free | | | Free | Stop | |
| Grade | 0% | | | 0% | 0% | |
| Peak Hour Factor | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| Hourly flow rate (vph) | 74 | 0 | 15 | 104 | 0 | 4 |
| Pedestrians | | | | | | |
| Lane Width (m) | | | | | | |
| Walking Speed (m/s) | | | | | | |
| Percent Blockage | | | | | | |
| Right turn flare (veh) | | | | | | |
| Median type | None | | | None | | |
| Median storage veh) | | | | | | |
| Upstream signal (m) | | | | 362 | | |
| pX, platoon unblocked | | | | | | |
| vC, conflicting volume | | | 74 | | 208 | 74 |
| vC1, stage 1 conf vol | | | | | | |
| vC2, stage 2 conf vol | | | | | | |
| vCu, unblocked vol | | | 74 | | 208 | 74 |
| tC, single (s) | | | 5.1 | | 6.4 | 7.2 |
| tC, 2 stage (s) | | | | | | |
| tF (s) | | | 3.1 | | 3.5 | 4.2 |
| p0 queue free % | | | 99 | | 100 | 99 |
| cM capacity (veh/h) | | | 1079 | | 774 | 772 |

| Direction, Lane # | EB 1 | WB 1 | NB 1 |
|---|---|---|---|
| Volume Total | 74 | 119 | 4 |
| Volume Left | 0 | 15 | 0 |
| Volume Right | 0 | 0 | 4 |
| cSH | 1700 | 1079 | 772 |
| Volume to Capacity | 0.04 | 0.01 | 0.01 |
| Queue Length 95th (m) | 0.0 | 0.3 | 0.1 |
| Control Delay (s) | 0.0 | 1.2 | 9.7 |
| Lane LOS | | A | A |
| Approach Delay (s) | 0.0 | 1.2 | 9.7 |
| Approach LOS | | | A |

| Intersection Summary | | | |
|---|---|---|---|
| Average Delay | 0.9 | | |
| Intersection Capacity Utilization | 23.3% | ICU Level of Service | A |
| Analysis Period (min) | 15 | | |

| Lane Group | EBT | EBR | WBL | WBT | NBL | NBR |
|---|---|---|---|---|---|---|
| Lane Configurations | | | | | | |
| Traffic Volume (vph) | 67 | 0 | 23 | 81 | 0 | 7 |
| Future Volume (vph) | 67 | 0 | 23 | 81 | 0 | 7 |
| Ideal Flow (vphpl) | 1800 | 1800 | 1800 | 1800 | 1800 | 1800 |
| Lane Width (m) | 3.5 | 3.5 | 3.5 | 3.5 | 3.5 | 3.5 |
| Lane Util. Factor | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| Frt | | | | | 0.865 | |
| Flt Protected | | | | 0.989 | | |
| Satd. Flow (prot) | 1679 | 0 | 0 | 1596 | 1351 | 0 |
| Flt Permitted | | | | 0.989 | | |
| Satd. Flow (perm) | 1679 | 0 | 0 | 1596 | 1351 | 0 |
| Link Speed (k/h) | 60 | | | 50 | 50 | |
| Link Distance (m) | 95.5 | | | 185.0 | 109.7 | |
| Travel Time (s) | 5.7 | | | 13.3 | 7.9 | |
| Peak Hour Factor | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| Heavy Vehicles (%) | 6% | 0% | 22% | 7% | 0% | 14% |
| Adj. Flow (vph) | 67 | 0 | 23 | 81 | 0 | 7 |
| Shared Lane Traffic (%) | | | | | | |
| Lane Group Flow (vph) | 67 | 0 | 0 | 104 | 7 | 0 |
| Enter Blocked Intersection | No | No | No | No | No | No |
| Lane Alignment | Left | Right | Left | Left | Left | Right |
| Median Width(m) | 0.0 | | | 0.0 | 3.5 | |
| Link Offset(m) | 0.0 | | | 0.0 | 0.0 | |
| Crosswalk Width(m) | 4.8 | | | 4.8 | 4.8 | |
| Two way Left Turn Lane | | | | | | |
| Headway Factor | 1.09 | 1.09 | 1.09 | 1.09 | 1.09 | 1.09 |
| Turning Speed (k/h) | | 15 | 25 | | 25 | 15 |
| Sign Control | Free | | | Free | Stop | |

| Intersection Summary | | | |
|---|---|---|---|
| Area Type: | Other | | |
| Control Type: Unsignalized | | | |
| Intersection Capacity Utilization 22.5% | | ICU Level of Service A | |
| Analysis Period (min) 15 | | | |

| Movement | EBT | EBR | WBL | WBT | NBL | NBR |
|---|---|---|---|---|---|---|
| Lane Configurations | | | | | | |
| Traffic Volume (veh/h) | 67 | 0 | 23 | 81 | 0 | 7 |
| Future Volume (Veh/h) | 67 | 0 | 23 | 81 | 0 | 7 |
| Sign Control | Free | | | Free | Stop | |
| Grade | 0% | | | 0% | 0% | |
| Peak Hour Factor | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| Hourly flow rate (vph) | 67 | 0 | 23 | 81 | 0 | 7 |
| 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 | | | 67 | | 194 | 67 |
| vC1, stage 1 conf vol | | | | | | |
| vC2, stage 2 conf vol | | | | | | |
| vCu, unblocked vol | | | 67 | | 194 | 67 |
| tC, single (s) | | | 4.3 | | 6.4 | 6.3 |
| tC, 2 stage (s) | | | | | | |
| tF (s) | | | 2.4 | | 3.5 | 3.4 |
| p0 queue free % | | | 98 | | 100 | 99 |
| cM capacity (veh/h) | | | 1416 | | 786 | 964 |

| Direction, Lane # | EB 1 | WB 1 | NB 1 |
|---|---|---|---|
| Volume Total | 67 | 104 | 7 |
| Volume Left | 0 | 23 | 0 |
| Volume Right | 0 | 0 | 7 |
| cSH | 1700 | 1416 | 964 |
| Volume to Capacity | 0.04 | 0.02 | 0.01 |
| Queue Length 95th (m) | 0.0 | 0.4 | 0.2 |
| Control Delay (s) | 0.0 | 1.8 | 8.8 |
| Lane LOS | | A | A |
| Approach Delay (s) | 0.0 | 1.8 | 8.8 |
| Approach LOS | | | A |

| Intersection Summary | | | |
|---|---|---|---|
| Average Delay | 1.4 | | |
| Intersection Capacity Utilization | 22.5% | ICU Level of Service | A |
| Analysis Period (min) | 15 | | |

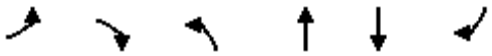
| Lane Group | WBL | WBR | NBT | NBR | SBL | SBT |
|---|---|---|---|---|---|---|
| Lane Configurations | | | | | | |
| Traffic Volume (vph) | 69 | 1 | 196 | 378 | 30 | 152 |
| Future Volume (vph) | 69 | 1 | 196 | 378 | 30 | 152 |
| Ideal Flow (vphpl) | 1800 | 1800 | 1800 | 1800 | 1800 | 1800 |
| Lane Width (m) | 4.5 | 4.5 | 3.5 | 3.5 | 3.5 | 3.5 |
| Storage Length (m) | 0.0 | 10.0 | | 0.0 | 0.0 | |
| Storage Lanes | 1 | 0 | | 0 | 0 | |
| Taper Length (m) | 7.5 | | | | 7.5 | |
| Lane Util. Factor | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| Frt | 0.998 | | 0.911 | | | |
| Flt Protected | 0.953 | | | | | 0.992 |
| Satd. Flow (prot) | 1548 | 0 | 1520 | 0 | 0 | 1625 |
| Flt Permitted | 0.953 | | | | | 0.992 |
| Satd. Flow (perm) | 1548 | 0 | 1520 | 0 | 0 | 1625 |
| Link Speed (k/h) | 40 | | 80 | | | 80 |
| Link Distance (m) | 155.0 | | 545.7 | | | 134.1 |
| Travel Time (s) | 14.0 | | 24.6 | | | 6.0 |
| Peak Hour Factor | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| Heavy Vehicles (%) | 22% | 0% | 6% | 7% | 7% | 9% |
| Adj. Flow (vph) | 69 | 1 | 196 | 378 | 30 | 152 |
| Shared Lane Traffic (%) | | | | | | |
| Lane Group Flow (vph) | 70 | 0 | 574 | 0 | 0 | 182 |
| Enter Blocked Intersection | No | No | No | No | No | No |
| Lane Alignment | Left | Right | Left | Right | Left | Left |
| Median Width(m) | 4.5 | | 0.0 | | | 0.0 |
| Link Offset(m) | 0.0 | | 0.0 | | | 0.0 |
| Crosswalk Width(m) | 4.8 | | 4.8 | | | 4.8 |
| Two way Left Turn Lane | | | | | | |
| Headway Factor | 0.95 | 0.95 | 1.09 | 1.09 | 1.09 | 1.09 |
| Turning Speed (k/h) | 25 | 15 | | 15 | 25 | |
| Sign Control | Stop | | Free | | | Free |

| Intersection Summary | | | |
|---|---|---|---|
| Area Type: | Other | | |
| Control Type: Unsignalized | | | |
| Intersection Capacity Utilization | 46.3% | ICU Level of Service | A |
| Analysis Period (min) | 15 | | |

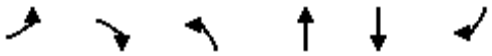
| Movement | WBL | WBR | NBT | NBR | SBL | SBT |
|---|---|---|---|---|---|---|
| Lane Configurations | | | | | | |
| Traffic Volume (veh/h) | 69 | 1 | 196 | 378 | 30 | 152 |
| Future Volume (Veh/h) | 69 | 1 | 196 | 378 | 30 | 152 |
| Sign Control | Stop | | Free | | | Free |
| Grade | 0% | | 0% | | | 0% |
| Peak Hour Factor | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| Hourly flow rate (vph) | 69 | 1 | 196 | 378 | 30 | 152 |
| 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 | 597 | 385 | | | 574 | |
| vC1, stage 1 conf vol | | | | | | |
| vC2, stage 2 conf vol | | | | | | |
| vCu, unblocked vol | 597 | 385 | | | 574 | |
| tC, single (s) | 6.6 | 6.2 | | | 4.2 | |
| tC, 2 stage (s) | | | | | | |
| tF (s) | 3.7 | 3.3 | | | 2.3 | |
| p0 queue free % | 84 | 100 | | | 97 | |
| cM capacity (veh/h) | 421 | 667 | | | 975 | |

| Direction, Lane # | WB 1 | NB 1 | SB 1 |
|---|---|---|---|
| Volume Total | 70 | 574 | 182 |
| Volume Left | 69 | 0 | 30 |
| Volume Right | 1 | 378 | 0 |
| cSH | 423 | 1700 | 975 |
| Volume to Capacity | 0.17 | 0.34 | 0.03 |
| Queue Length 95th (m) | 4.7 | 0.0 | 0.8 |
| Control Delay (s) | 15.2 | 0.0 | 1.7 |
| Lane LOS | C | | A |
| Approach Delay (s) | 15.2 | 0.0 | 1.7 |
| Approach LOS | C | | |

| Intersection Summary | | | |
|---|---|---|---|
| Average Delay | 1.7 | | |
| Intersection Capacity Utilization | 46.3% | ICU Level of Service | A |
| Analysis Period (min) | 15 | | |



| Lane Group | EBL | EBR | NBL | NBT | SBT | SBR |
|---|---|---|---|---|---|---|
| Lane Configurations | | | | | | |
| Traffic Volume (vph) | 94 | 900 | 210 | 360 | 275 | 20 |
| Future Volume (vph) | 94 | 900 | 210 | 360 | 275 | 20 |
| Ideal Flow (vphpl) | 1800 | 1800 | 1800 | 1800 | 1800 | 1800 |
| Lane Width (m) | 3.5 | 3.3 | 3.5 | 3.5 | 3.5 | 3.5 |
| Storage Length (m) | 0.0 | 25.0 | 50.0 | | | 0.0 |
| Storage Lanes | 1 | 1 | 1 | | | 0 |
| Taper Length (m) | 7.5 | | 75.0 | | | |
| Lane Util. Factor | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| Frt | | 0.850 | | | 0.991 | |
| Flt Protected | 0.950 | | 0.950 | | | |
| Satd. Flow (prot) | 1551 | 1422 | 1496 | 1618 | 1582 | 0 |
| Flt Permitted | 0.950 | | 0.412 | | | |
| Satd. Flow (perm) | 1551 | 1422 | 649 | 1618 | 1582 | 0 |
| Right Turn on Red | | Yes | | | | Yes |
| Satd. Flow (RTOR) | | 520 | | | 4 | |
| Link Speed (k/h) | 40 | | | 80 | 80 | |
| Link Distance (m) | 154.2 | | | 243.1 | 545.7 | |
| Travel Time (s) | 13.9 | | | 10.9 | 24.6 | |
| Peak Hour Factor | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| Heavy Vehicles (%) | 9% | 4% | 13% | 10% | 12% | 5% |
| Adj. Flow (vph) | 94 | 900 | 210 | 360 | 275 | 20 |
| Shared Lane Traffic (%) | | | | | | |
| Lane Group Flow (vph) | 94 | 900 | 210 | 360 | 295 | 0 |
| Enter Blocked Intersection | No | No | No | No | No | No |
| Lane Alignment | Left | Right | Left | Left | Left | Right |
| Median Width(m) | 3.5 | | | 3.5 | 3.5 | |
| Link Offset(m) | 0.0 | | | 0.0 | 0.0 | |
| Crosswalk Width(m) | 4.8 | | | 4.8 | 4.8 | |
| Two way Left Turn Lane | | | | | | |
| Headway Factor | 1.09 | 1.12 | 1.09 | 1.09 | 1.09 | 1.09 |
| Turning Speed (k/h) | 25 | 15 | 25 | | | 15 |
| Number of Detectors | 1 | 1 | 1 | 2 | 2 | |
| Detector Template | Left | Right | Left | Thru | Thru | |
| Leading Detector (m) | 2.0 | 2.0 | 2.0 | 10.0 | 10.0 | |
| Trailing Detector (m) | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | |
| Detector 1 Position(m) | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | |
| Detector 1 Size(m) | 2.0 | 2.0 | 2.0 | 0.6 | 0.6 | |
| Detector 1 Type | Cl+Ex | Cl+Ex | Cl+Ex | Cl+Ex | Cl+Ex | |
| Detector 1 Channel | | | | | | |
| Detector 1 Extend (s) | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | |
| Detector 1 Queue (s) | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | |
| Detector 1 Delay (s) | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | |
| Detector 2 Position(m) | | | | 9.4 | 9.4 | |
| Detector 2 Size(m) | | | | 0.6 | 0.6 | |
| Detector 2 Type | | | | Cl+Ex | Cl+Ex | |
| Detector 2 Channel | | | | | | |
| Detector 2 Extend (s) | | | | 0.0 | 0.0 | |
| Turn Type | Prot | Perm | pm+pt | NA | NA | |



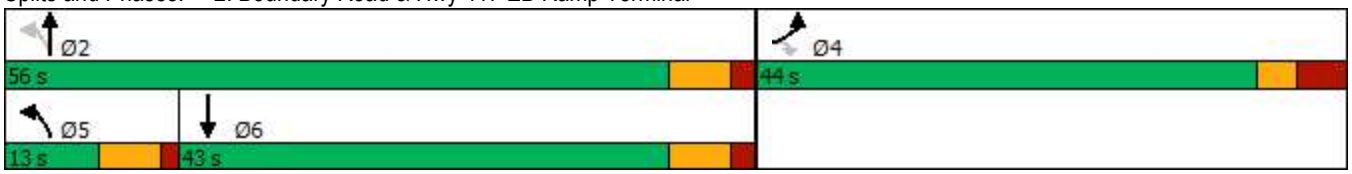
| Lane Group | EBL | EBR | NBL | NBT | SBT | SBR |
|---|---|---|---|---|---|---|
| Protected Phases | 4 | | 5 | 2 | 6 | |
| Permitted Phases | | 4 | 2 | | | |
| Detector Phase | 4 | 4 | 5 | 2 | 6 | |
| Switch Phase | | | | | | |
| Minimum Initial (s) | 7.0 | 7.0 | 7.0 | 35.0 | 35.0 | |
| Minimum Split (s) | 23.0 | 23.0 | 13.0 | 41.6 | 41.6 | |
| Total Split (s) | 44.0 | 44.0 | 13.0 | 56.0 | 43.0 | |
| Total Split (%) | 44.0% | 44.0% | 13.0% | 56.0% | 43.0% | |
| Maximum Green (s) | 37.2 | 37.2 | 7.0 | 49.4 | 36.4 | |
| Yellow Time (s) | 3.0 | 3.0 | 4.6 | 4.6 | 4.6 | |
| All-Red Time (s) | 3.8 | 3.8 | 1.4 | 2.0 | 2.0 | |
| Lost Time Adjust (s) | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | |
| Total Lost Time (s) | 6.8 | 6.8 | 6.0 | 6.6 | 6.6 | |
| Lead/Lag | | | Lead | | Lag | |
| Lead-Lag Optimize? | | | Yes | | Yes | |
| Vehicle Extension (s) | 3.0 | 3.0 | 3.0 | 3.0 | 3.0 | |
| Recall Mode | None | None | None | Min | Min | |
| Walk Time (s) | 7.0 | 7.0 | | 0.0 | 7.0 | |
| Flash Dont Walk (s) | 5.0 | 5.0 | | 0.0 | 21.0 | |
| Pedestrian Calls (#/hr) | 0 | 0 | | 0 | 0 | |
| Act Effct Green (s) | 37.2 | 37.2 | 48.6 | 48.0 | 35.0 | |
| Actuated g/C Ratio | 0.38 | 0.38 | 0.49 | 0.49 | 0.35 | |
| v/c Ratio | 0.16 | 1.05 | 0.55 | 0.46 | 0.52 | |
| Control Delay | 21.3 | 58.3 | 21.6 | 19.1 | 28.9 | |
| Queue Delay | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | |
| Total Delay | 21.3 | 58.3 | 21.6 | 19.1 | 28.9 | |
| LOS | C | E | C | B | C | |
| Approach Delay | 54.8 | | | 20.0 | 28.9 | |
| Approach LOS | D | | | C | C | |
| Queue Length 50th (m) | 12.3 | ~127.1 | 23.9 | 45.9 | 45.7 | |
| Queue Length 95th (m) | 23.7 | #203.5 | 39.7 | 70.5 | 72.2 | |
| Internal Link Dist (m) | 130.2 | | | 219.1 | 521.7 | |
| Turn Bay Length (m) | | 25.0 | 50.0 | | | |
| Base Capacity (vph) | 585 | 860 | 380 | 810 | 586 | |
| Starvation Cap Reductn | 0 | 0 | 0 | 0 | 0 | |
| Spillback Cap Reductn | 0 | 0 | 0 | 0 | 0 | |
| Storage Cap Reductn | 0 | 0 | 0 | 0 | 0 | |
| Reduced v/c Ratio | 0.16 | 1.05 | 0.55 | 0.44 | 0.50 | |

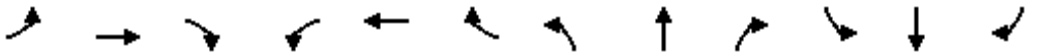
| Intersection Summary | | | |
|---|---|---|---|
| Area Type: | Other | | |
| Cycle Length: 100 | | | |
| Actuated Cycle Length: 98.6 | | | |
| Natural Cycle: 100 | | | |
| Control Type: Semi Act-Uncoord | | | |
| Maximum v/c Ratio: 1.05 | | | |
| Intersection Signal Delay: 40.0 | | Intersection LOS: D | |
| Intersection Capacity Utilization 99.2% | | ICU Level of Service F | |
| Analysis Period (min) 15 | | | |

~ Volume exceeds capacity, queue is theoretically infinite.
Queue shown is maximum after two cycles.

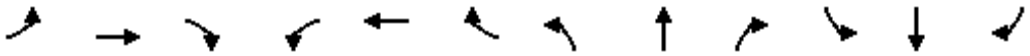
# 95th percentile volume exceeds capacity, queue may be longer.
Queue shown is maximum after two cycles.

Splits and Phases: 2: Boundary Road & Hwy 417 EB Ramp Terminal





| Lane Group | EBL | EBT | EBR | WBL | WBT | WBR | NBL | NBT | NBR | SBL | SBT | SBR |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Lane Configurations | | | | | | | | | | | | |
| Traffic Volume (vph) | 166 | 0 | 38 | 7 | 0 | 22 | 11 | 381 | 0 | 3 | 1072 | 100 |
| Future Volume (vph) | 166 | 0 | 38 | 7 | 0 | 22 | 11 | 381 | 0 | 3 | 1072 | 100 |
| Ideal Flow (vphpl) | 1800 | 1800 | 1800 | 1800 | 1800 | 1800 | 1800 | 1800 | 1800 | 1800 | 1800 | 1800 |
| Lane Width (m) | 3.5 | 3.5 | 3.5 | 3.5 | 3.5 | 3.5 | 3.3 | 3.5 | 3.3 | 3.3 | 3.5 | 3.5 |
| Storage Length (m) | 0.0 | | 15.0 | 0.0 | | 0.0 | 35.0 | | 7.5 | 100.0 | | 0.0 |
| Storage Lanes | 0 | | 0 | 0 | | 1 | 1 | | 1 | 1 | | 0 |
| Taper Length (m) | 7.5 | | | 7.5 | | | 45.0 | | | 75.0 | | |
| Lane Util. Factor | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| Frt | | 0.975 | | | | 0.850 | | | | | 0.987 | |
| Flt Protected | | 0.961 | | | 0.950 | | 0.950 | | | 0.950 | | |
| Satd. Flow (prot) | 0 | 1455 | 0 | 0 | 1183 | 1513 | 1517 | 1633 | 1740 | 990 | 1685 | 0 |
| Flt Permitted | | 0.761 | | | 0.761 | | 0.121 | | | 0.471 | | |
| Satd. Flow (perm) | 0 | 1152 | 0 | 0 | 947 | 1513 | 193 | 1633 | 1740 | 491 | 1685 | 0 |
| Right Turn on Red | | | Yes | | | Yes | | | Yes | | | Yes |
| Satd. Flow (RTOR) | | 100 | | | | 100 | | | | | 11 | |
| Link Speed (k/h) | | 60 | | | 20 | | | 80 | | | 80 | |
| Link Distance (m) | | 198.6 | | | 170.6 | | | 174.7 | | | 243.1 | |
| Travel Time (s) | | 11.9 | | | 30.7 | | | 7.9 | | | 10.9 | |
| Peak Hour Factor | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| Heavy Vehicles (%) | 18% | 0% | 0% | 43% | 0% | 0% | 9% | 9% | 0% | 67% | 4% | 7% |
| Adj. Flow (vph) | 166 | 0 | 38 | 7 | 0 | 22 | 11 | 381 | 0 | 3 | 1072 | 100 |
| Shared Lane Traffic (%) | | | | | | | | | | | | |
| Lane Group Flow (vph) | 0 | 204 | 0 | 0 | 7 | 22 | 11 | 381 | 0 | 3 | 1172 | 0 |
| Enter Blocked Intersection | No | No | No | No | No | No | No | No | No | No | No | No |
| Lane Alignment | Left | Left | Right | Left | Left | Right | Left | Left | Right | Left | Left | Right |
| Median Width(m) | | 0.0 | | | 0.0 | | | 3.5 | | | 3.5 | |
| Link Offset(m) | | 0.0 | | | 0.0 | | | 0.0 | | | 0.0 | |
| Crosswalk Width(m) | | 4.8 | | | 4.8 | | | 4.8 | | | 4.8 | |
| Two way Left Turn Lane | | | | | | | | | | | | |
| Headway Factor | 1.09 | 1.09 | 1.09 | 1.09 | 1.09 | 1.09 | 1.12 | 1.09 | 1.12 | 1.12 | 1.09 | 1.09 |
| Turning Speed (k/h) | 25 | | 15 | 25 | | 15 | 25 | | 15 | 25 | | 15 |
| Number of Detectors | 1 | 2 | | 1 | 2 | 1 | 1 | 2 | 1 | 1 | 2 | |
| Detector Template | Left | Thru | | Left | Thru | Right | Left | Thru | Right | Left | Thru | |
| Leading Detector (m) | 2.0 | 10.0 | | 2.0 | 10.0 | 2.0 | 2.0 | 10.0 | 2.0 | 2.0 | 10.0 | |
| Trailing Detector (m) | 0.0 | 0.0 | | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | |
| Detector 1 Position(m) | 0.0 | 0.0 | | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | |
| Detector 1 Size(m) | 2.0 | 0.6 | | 2.0 | 0.6 | 2.0 | 2.0 | 0.6 | 2.0 | 2.0 | 0.6 | |
| Detector 1 Type | Cl+Ex | Cl+Ex | | Cl+Ex | Cl+Ex | Cl+Ex | Cl+Ex | Cl+Ex | Cl+Ex | Cl+Ex | Cl+Ex | |
| Detector 1 Channel | | | | | | | | | | | | |
| Detector 1 Extend (s) | 0.0 | 0.0 | | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | |
| Detector 1 Queue (s) | 0.0 | 0.0 | | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | |
| Detector 1 Delay (s) | 0.0 | 0.0 | | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | |
| Detector 2 Position(m) | | 9.4 | | | 9.4 | | | 9.4 | | | 9.4 | |
| Detector 2 Size(m) | | 0.6 | | | 0.6 | | | 0.6 | | | 0.6 | |
| Detector 2 Type | | Cl+Ex | | | Cl+Ex | | | Cl+Ex | | | Cl+Ex | |
| Detector 2 Channel | | | | | | | | | | | | |
| Detector 2 Extend (s) | | 0.0 | | | 0.0 | | | 0.0 | | | 0.0 | |
| Turn Type | Perm | NA | | Perm | NA | Perm | Perm | NA | Perm | pm+pt | NA | |

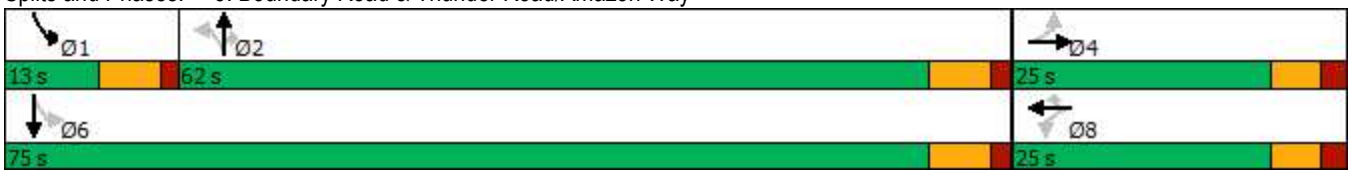


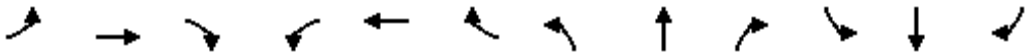
| Lane Group | EBL | EBT | EBR | WBL | WBT | WBR | NBL | NBT | NBR | SBL | SBT | SBR |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Protected Phases | | 4 | | | 8 | | | 2 | | 1 | 6 | |
| Permitted Phases | 4 | | | 8 | | 8 | 2 | | 2 | 6 | | |
| Detector Phase | 4 | 4 | | 8 | 8 | 8 | 2 | 2 | 2 | 1 | 6 | |
| Switch Phase | | | | | | | | | | | | |
| Minimum Initial (s) | 7.0 | 7.0 | | 7.0 | 7.0 | 7.0 | 20.0 | 20.0 | 20.0 | 7.0 | 20.0 | |
| Minimum Split (s) | 24.8 | 24.8 | | 24.8 | 24.8 | 24.8 | 26.2 | 26.2 | 26.2 | 13.0 | 26.2 | |
| Total Split (s) | 25.0 | 25.0 | | 25.0 | 25.0 | 25.0 | 62.0 | 62.0 | 62.0 | 13.0 | 75.0 | |
| Total Split (%) | 25.0% | 25.0% | | 25.0% | 25.0% | 25.0% | 62.0% | 62.0% | 62.0% | 13.0% | 75.0% | |
| Maximum Green (s) | 19.2 | 19.2 | | 19.2 | 19.2 | 19.2 | 55.8 | 55.8 | 55.8 | 7.0 | 68.8 | |
| Yellow Time (s) | 3.7 | 3.7 | | 3.7 | 3.7 | 3.7 | 4.6 | 4.6 | 4.6 | 4.6 | 4.6 | |
| All-Red Time (s) | 2.1 | 2.1 | | 2.1 | 2.1 | 2.1 | 1.6 | 1.6 | 1.6 | 1.4 | 1.6 | |
| Lost Time Adjust (s) | | 0.0 | | | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | |
| Total Lost Time (s) | | 5.8 | | | 5.8 | 5.8 | 6.2 | 6.2 | 6.2 | 6.0 | 6.2 | |
| Lead/Lag | | | | | | | Lag | Lag | Lag | Lead | | |
| Lead-Lag Optimize? | | | | | | | Yes | Yes | Yes | Yes | | |
| Vehicle Extension (s) | 3.0 | 3.0 | | 3.0 | 3.0 | 3.0 | 3.0 | 3.0 | 3.0 | 3.0 | 3.0 | |
| Recall Mode | None | None | | None | None | None | Min | Min | Min | None | Min | |
| Walk Time (s) | 7.0 | 7.0 | | 7.0 | 7.0 | 7.0 | 7.0 | 7.0 | 7.0 | | 7.0 | |
| Flash Dont Walk (s) | 12.0 | 12.0 | | 12.0 | 12.0 | 12.0 | 10.0 | 10.0 | 10.0 | | 10.0 | |
| Pedestrian Calls (#/hr) | 0 | 0 | | 0 | 0 | 0 | 0 | 0 | 0 | | 0 | |
| Act Effct Green (s) | | 14.0 | | | 14.0 | 14.0 | 66.5 | 66.5 | | 69.2 | 69.0 | |
| Actuated g/C Ratio | | 0.15 | | | 0.15 | 0.15 | 0.70 | 0.70 | | 0.73 | 0.73 | |
| v/c Ratio | | 0.80 | | | 0.05 | 0.07 | 0.08 | 0.33 | | 0.01 | 0.96 | |
| Control Delay | | 43.3 | | | 34.3 | 0.5 | 10.0 | 8.2 | | 4.7 | 31.7 | |
| Queue Delay | | 0.0 | | | 0.0 | 0.0 | 0.0 | 0.0 | | 0.0 | 6.2 | |
| Total Delay | | 43.3 | | | 34.3 | 0.5 | 10.0 | 8.2 | | 4.7 | 37.9 | |
| LOS | | D | | | C | A | A | A | | A | D | |
| Approach Delay | | 43.3 | | | 8.6 | | | 8.3 | | | 37.8 | |
| Approach LOS | | D | | | A | | | A | | | D | |
| Queue Length 50th (m) | | 19.4 | | | 1.2 | 0.0 | 0.6 | 23.1 | | 0.2 | 177.1 | |
| Queue Length 95th (m) | | #50.4 | | | 5.2 | 0.0 | 4.3 | 64.3 | | 1.0 | #332.9 | |
| Internal Link Dist (m) | | 174.6 | | | 146.6 | | | 150.7 | | | 219.1 | |
| Turn Bay Length (m) | | | | | | | 35.0 | | | 100.0 | | |
| Base Capacity (vph) | | 313 | | | 191 | 386 | 135 | 1143 | | 394 | 1226 | |
| Starvation Cap Reductn | | 0 | | | 0 | 0 | 0 | 0 | | 0 | 48 | |
| Spillback Cap Reductn | | 0 | | | 0 | 0 | 0 | 0 | | 0 | 0 | |
| Storage Cap Reductn | | 0 | | | 0 | 0 | 0 | 0 | | 0 | 0 | |
| Reduced v/c Ratio | | 0.65 | | | 0.04 | 0.06 | 0.08 | 0.33 | | 0.01 | 0.99 | |

| Intersection Summary | | | |
|---|---|---|---|
| Area Type: | Other | | |
| Cycle Length: 100 | | | |
| Actuated Cycle Length: 95 | | | |
| Natural Cycle: 100 | | | |
| Control Type: Semi Act-Uncoord | | | |
| Maximum v/c Ratio: 0.96 | | | |
| Intersection Signal Delay: 31.6 | | Intersection LOS: C | |
| Intersection Capacity Utilization 94.8% | | ICU Level of Service F | |
| Analysis Period (min) 15 | | | |

# 95th percentile volume exceeds capacity, queue may be longer.
Queue shown is maximum after two cycles.

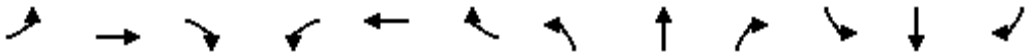
Splits and Phases: 3: Boundary Road & Thunder Road/Amazon Way





| Lane Group | EBL | EBT | EBR | WBL | WBT | WBR | NBL | NBT | NBR | SBL | SBT | SBR |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Lane Configurations | | | | | | | | | | | | |
| Traffic Volume (vph) | 4 | 0 | 15 | 7 | 0 | 15 | 5 | 373 | 7 | 16 | 1093 | 7 |
| Future Volume (vph) | 4 | 0 | 15 | 7 | 0 | 15 | 5 | 373 | 7 | 16 | 1093 | 7 |
| Ideal Flow (vphpl) | 1800 | 1800 | 1800 | 1800 | 1800 | 1800 | 1800 | 1800 | 1800 | 1800 | 1800 | 1800 |
| Lane Width (m) | 3.5 | 3.5 | 3.5 | 3.5 | 3.5 | 3.5 | 3.5 | 3.5 | 3.5 | 3.5 | 3.5 | 3.6 |
| Storage Length (m) | 0.0 | | 0.0 | 0.0 | | 0.0 | 15.0 | | 0.0 | 70.0 | | 0.0 |
| Storage Lanes | 0 | | 0 | 0 | | 0 | 1 | | 0 | 1 | | 0 |
| Taper Length (m) | 7.5 | | | 7.5 | | | 45.0 | | | 45.0 | | |
| Lane Util. Factor | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| Frt | | 0.893 | | | 0.908 | | | 0.997 | | | 0.999 | |
| Flt Protected | | 0.990 | | | 0.984 | | 0.950 | | | 0.950 | | |
| Satd. Flow (prot) | 0 | 1574 | 0 | 0 | 795 | 0 | 1691 | 1662 | 0 | 846 | 1744 | 0 |
| Flt Permitted | | 0.990 | | | 0.984 | | 0.950 | | | 0.950 | | |
| Satd. Flow (perm) | 0 | 1574 | 0 | 0 | 795 | 0 | 1691 | 1662 | 0 | 846 | 1744 | 0 |
| Link Speed (k/h) | | 50 | | | 20 | | | 80 | | | 80 | |
| Link Distance (m) | | 105.7 | | | 151.5 | | | 1150.2 | | | 174.7 | |
| Travel Time (s) | | 7.6 | | | 27.3 | | | 51.8 | | | 7.9 | |
| Peak Hour Factor | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| Heavy Vehicles (%) | 0% | 0% | 0% | 100% | 0% | 100% | 0% | 5% | 100% | 100% | 2% | 0% |
| Adj. Flow (vph) | 4 | 0 | 15 | 7 | 0 | 15 | 5 | 373 | 7 | 16 | 1093 | 7 |
| Shared Lane Traffic (%) | | | | | | | | | | | | |
| Lane Group Flow (vph) | 0 | 19 | 0 | 0 | 22 | 0 | 5 | 380 | 0 | 16 | 1100 | 0 |
| Enter Blocked Intersection | No | No | No | No | No | No | No | No | No | No | No | No |
| Lane Alignment | Left | Left | Right | Left | Left | Right | Left | Left | Right | Left | Left | Right |
| Median Width(m) | | 0.0 | | | 0.0 | | | 3.5 | | | 3.5 | |
| Link Offset(m) | | 0.0 | | | 0.0 | | | 0.0 | | | 0.0 | |
| Crosswalk Width(m) | | 4.8 | | | 4.8 | | | 4.8 | | | 4.8 | |
| Two way Left Turn Lane | | | | | | | | | | | | |
| Headway Factor | 1.09 | 1.09 | 1.09 | 1.09 | 1.09 | 1.09 | 1.09 | 1.09 | 1.09 | 1.09 | 1.09 | 1.07 |
| Turning Speed (k/h) | 25 | | 15 | 25 | | 15 | 25 | | 15 | 25 | | 15 |
| Sign Control | | Stop | | | Stop | | | Free | | | Free | |

| Intersection Summary | | | |
|---|---|---|---|
| Area Type: | Other | | |
| Control Type: Unsignalized | | | |
| Intersection Capacity Utilization | 71.2% | ICU Level of Service | C |
| Analysis Period (min) | 15 | | |



| Movement | EBL | EBT | EBR | WBL | WBT | WBR | NBL | NBT | NBR | SBL | SBT | SBR |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Lane Configurations | | | | | | | | | | | | |
| Traffic Volume (veh/h) | 4 | 0 | 15 | 7 | 0 | 15 | 5 | 373 | 7 | 16 | 1093 | 7 |
| Future Volume (Veh/h) | 4 | 0 | 15 | 7 | 0 | 15 | 5 | 373 | 7 | 16 | 1093 | 7 |
| Sign Control | | Stop | | | Stop | | | Free | | | Free | |
| Grade | | 0% | | | 0% | | | 0% | | | 0% | |
| Peak Hour Factor | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| Hourly flow rate (vph) | 4 | 0 | 15 | 7 | 0 | 15 | 5 | 373 | 7 | 16 | 1093 | 7 |
| Pedestrians | | | | | | | | | | | | |
| Lane Width (m) | | | | | | | | | | | | |
| Walking Speed (m/s) | | | | | | | | | | | | |
| Percent Blockage | | | | | | | | | | | | |
| Right turn flare (veh) | | | | | | | | | | | | |
| Median type | | | | | | | | None | | | None | |
| Median storage veh) | | | | | | | | | | | | |
| Upstream signal (m) | | | | | | | | | | | 175 | |
| pX, platoon unblocked | 0.29 | 0.29 | 0.29 | 0.29 | 0.29 | | 0.29 | | | | | |
| vC, conflicting volume | 1526 | 1518 | 1096 | 1526 | 1518 | 376 | 1100 | | | 380 | | |
| vC1, stage 1 conf vol | | | | | | | | | | | | |
| vC2, stage 2 conf vol | | | | | | | | | | | | |
| vCu, unblocked vol | 1592 | 1564 | 101 | 1592 | 1564 | 376 | 113 | | | 380 | | |
| tC, single (s) | 7.1 | 6.5 | 6.2 | 8.1 | 6.5 | 7.2 | 4.1 | | | 5.1 | | |
| tC, 2 stage (s) | | | | | | | | | | | | |
| tF (s) | 3.5 | 4.0 | 3.3 | 4.4 | 4.0 | 4.2 | 2.2 | | | 3.1 | | |
| p0 queue free % | 83 | 100 | 95 | 49 | 100 | 97 | 99 | | | 98 | | |
| cM capacity (veh/h) | 24 | 31 | 277 | 14 | 31 | 499 | 429 | | | 795 | | |

| Direction, Lane # | EB 1 | WB 1 | NB 1 | NB 2 | SB 1 | SB 2 |
|---|---|---|---|---|---|---|
| Volume Total | 19 | 22 | 5 | 380 | 16 | 1100 |
| Volume Left | 4 | 7 | 5 | 0 | 16 | 0 |
| Volume Right | 15 | 15 | 0 | 7 | 0 | 7 |
| cSH | 86 | 41 | 429 | 1700 | 795 | 1700 |
| Volume to Capacity | 0.22 | 0.54 | 0.01 | 0.22 | 0.02 | 0.65 |
| Queue Length 95th (m) | 6.2 | 15.4 | 0.3 | 0.0 | 0.5 | 0.0 |
| Control Delay (s) | 58.5 | 168.7 | 13.5 | 0.0 | 9.6 | 0.0 |
| Lane LOS | F | F | B | | A | |
| Approach Delay (s) | 58.5 | 168.7 | 0.2 | | 0.1 | |
| Approach LOS | F | F | | | | |

| Intersection Summary | | | | |
|---|---|---|---|---|
| Average Delay | 3.3 | | | |
| Intersection Capacity Utilization | 71.2% | ICU Level of Service | C | |
| Analysis Period (min) | 15 | | | |

| Lane Group | EBL | EBR | NBL | NBT | SBT | SBR |
|---|---|---|---|---|---|---|
| Lane Configurations | | | | | | |
| Traffic Volume (vph) | 156 | 132 | 70 | 168 | 975 | 160 |
| Future Volume (vph) | 156 | 132 | 70 | 168 | 975 | 160 |
| Ideal Flow (vphpl) | 1800 | 1800 | 1800 | 1800 | 1800 | 1800 |
| Lane Width (m) | 3.3 | 3.3 | 3.5 | 3.5 | 3.5 | 3.5 |
| Storage Length (m) | 25.0 | 0.0 | 0.0 | | | 30.0 |
| Storage Lanes | 1 | 1 | 0 | | | 1 |
| Taper Length (m) | 47.5 | | 7.5 | | | |
| Lane Util. Factor | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| Frt | | 0.850 | | | | 0.850 |
| Flt Protected | 0.950 | | | 0.986 | | |
| Satd. Flow (prot) | 1463 | 1395 | 0 | 1664 | 1762 | 1351 |
| Flt Permitted | 0.950 | | | 0.986 | | |
| Satd. Flow (perm) | 1463 | 1395 | 0 | 1664 | 1762 | 1351 |
| Link Speed (k/h) | 80 | | | 80 | 80 | |
| Link Distance (m) | 180.5 | | | 135.8 | 1150.2 | |
| Travel Time (s) | 8.1 | | | 6.1 | 51.8 | |
| Peak Hour Factor | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| Heavy Vehicles (%) | 13% | 6% | 9% | 4% | 1% | 12% |
| Adj. Flow (vph) | 156 | 132 | 70 | 168 | 975 | 160 |
| Shared Lane Traffic (%) | | | | | | |
| Lane Group Flow (vph) | 156 | 132 | 0 | 238 | 975 | 160 |
| Enter Blocked Intersection | No | No | No | No | No | No |
| Lane Alignment | Left | Right | Left | Left | Left | Right |
| Median Width(m) | 3.3 | | | 3.5 | 3.5 | |
| Link Offset(m) | 0.0 | | | 0.0 | 0.0 | |
| Crosswalk Width(m) | 4.8 | | | 4.8 | 4.8 | |
| Two way Left Turn Lane | | | | | | |
| Headway Factor | 1.12 | 1.12 | 1.09 | 1.09 | 1.09 | 1.09 |
| Turning Speed (k/h) | 25 | 15 | 25 | | | 15 |
| Sign Control | Stop | | | Free | Free | |

| Intersection Summary | | | |
|---|---|---|---|
| Area Type: | Other | | |
| Control Type: Unsignalized | | | |
| Intersection Capacity Utilization 86.7% | | ICU Level of Service E | |
| Analysis Period (min) 15 | | | |

| Movement | EBL | EBR | NBL | NBT | SBT | SBR |
|---|---|---|---|---|---|---|
| Lane Configurations | | | | | | |
| Traffic Volume (veh/h) | 156 | 132 | 70 | 168 | 975 | 160 |
| Future Volume (Veh/h) | 156 | 132 | 70 | 168 | 975 | 160 |
| Sign Control | Stop | | | Free | Free | |
| Grade | 0% | | | 0% | 0% | |
| Peak Hour Factor | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| Hourly flow rate (vph) | 156 | 132 | 70 | 168 | 975 | 160 |
| 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 | 1283 | 975 | 1135 | | | |
| vC1, stage 1 conf vol | | | | | | |
| vC2, stage 2 conf vol | | | | | | |
| vCu, unblocked vol | 1283 | 975 | 1135 | | | |
| tC, single (s) | 6.5 | 6.3 | 4.2 | | | |
| tC, 2 stage (s) | | | | | | |
| tF (s) | 3.6 | 3.4 | 2.3 | | | |
| p0 queue free % | 0 | 56 | 88 | | | |
| cM capacity (veh/h) | 152 | 300 | 591 | | | |

| Direction, Lane # | EB 1 | EB 2 | NB 1 | SB 1 | SB 2 |
|---|---|---|---|---|---|
| Volume Total | 156 | 132 | 238 | 975 | 160 |
| Volume Left | 156 | 0 | 70 | 0 | 0 |
| Volume Right | 0 | 132 | 0 | 0 | 160 |
| cSH | 152 | 300 | 591 | 1700 | 1700 |
| Volume to Capacity | 1.02 | 0.44 | 0.12 | 0.57 | 0.09 |
| Queue Length 95th (m) | 63.1 | 17.1 | 3.2 | 0.0 | 0.0 |
| Control Delay (s) | 138.6 | 26.1 | 4.6 | 0.0 | 0.0 |
| Lane LOS | F | D | A | | |
| Approach Delay (s) | 87.1 | | 4.6 | 0.0 | |
| Approach LOS | F | | | | |

| Intersection Summary | | | |
|---|---|---|---|
| Average Delay | 15.8 | | |
| Intersection Capacity Utilization | 86.7% | ICU Level of Service | E |
| Analysis Period (min) | 15 | | |

| Lane Group | EBT | EBR | WBL | WBT | NBL | NBR |
|---|---|---|---|---|---|---|
| Lane Configurations | | | | | | |
| Traffic Volume (vph) | 141 | 0 | 19 | 93 | 0 | 62 |
| Future Volume (vph) | 141 | 0 | 19 | 93 | 0 | 62 |
| Ideal Flow (vphpl) | 1800 | 1800 | 1800 | 1800 | 1800 | 1800 |
| Lane Width (m) | 3.5 | 3.5 | 3.5 | 3.5 | 3.5 | 3.5 |
| Lane Util. Factor | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| Frt | | | | | 0.865 | |
| Flt Protected | | | | 0.992 | | |
| Satd. Flow (prot) | 1508 | 0 | 0 | 1643 | 1426 | 0 |
| Flt Permitted | | | | 0.992 | | |
| Satd. Flow (perm) | 1508 | 0 | 0 | 1643 | 1426 | 0 |
| Link Speed (k/h) | 60 | | | 60 | 50 | |
| Link Distance (m) | 163.7 | | | 198.6 | 103.6 | |
| Travel Time (s) | 9.8 | | | 11.9 | 7.5 | |
| Peak Hour Factor | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| Heavy Vehicles (%) | 18% | 0% | 0% | 9% | 0% | 8% |
| Adj. Flow (vph) | 141 | 0 | 19 | 93 | 0 | 62 |
| Shared Lane Traffic (%) | | | | | | |
| Lane Group Flow (vph) | 141 | 0 | 0 | 112 | 62 | 0 |
| Enter Blocked Intersection | No | No | No | No | No | No |
| Lane Alignment | Left | Right | Left | Left | Left | Right |
| Median Width(m) | 0.0 | | | 0.0 | 3.5 | |
| Link Offset(m) | 0.0 | | | 0.0 | 0.0 | |
| Crosswalk Width(m) | 4.8 | | | 4.8 | 4.8 | |
| Two way Left Turn Lane | | | | | | |
| Headway Factor | 1.09 | 1.09 | 1.09 | 1.09 | 1.09 | 1.09 |
| Turning Speed (k/h) | | 15 | 25 | | 25 | 15 |
| Sign Control | Free | | | Free | Stop | |

| Intersection Summary | | | |
|---|---|---|---|
| Area Type: | Other | | |
| Control Type: Unsignalized | | | |
| Intersection Capacity Utilization 28.2% | | ICU Level of Service A | |
| Analysis Period (min) 15 | | | |

| Movement | EBT | EBR | WBL | WBT | NBL | NBR |
|---|---|---|---|---|---|---|
| Lane Configurations | | | | | | |
| Traffic Volume (veh/h) | 141 | 0 | 19 | 93 | 0 | 62 |
| Future Volume (Veh/h) | 141 | 0 | 19 | 93 | 0 | 62 |
| Sign Control | Free | | | Free | Stop | |
| Grade | 0% | | | 0% | 0% | |
| Peak Hour Factor | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| Hourly flow rate (vph) | 141 | 0 | 19 | 93 | 0 | 62 |
| Pedestrians | | | | | | |
| Lane Width (m) | | | | | | |
| Walking Speed (m/s) | | | | | | |
| Percent Blockage | | | | | | |
| Right turn flare (veh) | | | | | | |
| Median type | None | | | None | | |
| Median storage veh) | | | | | | |
| Upstream signal (m) | | | | 199 | | |
| pX, platoon unblocked | | | | | | |
| vC, conflicting volume | | | 141 | | 272 | 141 |
| vC1, stage 1 conf vol | | | | | | |
| vC2, stage 2 conf vol | | | | | | |
| vCu, unblocked vol | | | 141 | | 272 | 141 |
| tC, single (s) | | | 4.1 | | 6.4 | 6.3 |
| tC, 2 stage (s) | | | | | | |
| tF (s) | | | 2.2 | | 3.5 | 3.4 |
| p0 queue free % | | | 99 | | 100 | 93 |
| cM capacity (veh/h) | | | 1455 | | 712 | 891 |

| Direction, Lane # | EB 1 | WB 1 | NB 1 |
|---|---|---|---|
| Volume Total | 141 | 112 | 62 |
| Volume Left | 0 | 19 | 0 |
| Volume Right | 0 | 0 | 62 |
| cSH | 1700 | 1455 | 891 |
| Volume to Capacity | 0.08 | 0.01 | 0.07 |
| Queue Length 95th (m) | 0.0 | 0.3 | 1.8 |
| Control Delay (s) | 0.0 | 1.4 | 9.3 |
| Lane LOS | | A | A |
| Approach Delay (s) | 0.0 | 1.4 | 9.3 |
| Approach LOS | | | A |

| Intersection Summary | | | |
|---|---|---|---|
| Average Delay | 2.3 | | |
| Intersection Capacity Utilization | 28.2% | ICU Level of Service | A |
| Analysis Period (min) | 15 | | |

| Lane Group | EBT | EBR | WBL | WBT | NBL | NBR |
|---|---|---|---|---|---|---|
| Lane Configurations | | | | | | |
| Traffic Volume (vph) | 126 | 0 | 5 | 88 | 0 | 15 |
| Future Volume (vph) | 126 | 0 | 5 | 88 | 0 | 15 |
| Ideal Flow (vphpl) | 1800 | 1800 | 1800 | 1800 | 1800 | 1800 |
| Lane Width (m) | 3.5 | 3.5 | 3.5 | 3.5 | 3.5 | 3.5 |
| Lane Util. Factor | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| Frt | | | | | 0.865 | |
| Flt Protected | | | | 0.997 | | |
| Satd. Flow (prot) | 1648 | 0 | 0 | 1640 | 770 | 0 |
| Flt Permitted | | | | 0.997 | | |
| Satd. Flow (perm) | 1648 | 0 | 0 | 1640 | 770 | 0 |
| Link Speed (k/h) | 60 | | | 60 | 50 | |
| Link Distance (m) | 185.0 | | | 163.7 | 105.8 | |
| Travel Time (s) | 11.1 | | | 9.8 | 7.6 | |
| Peak Hour Factor | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| Heavy Vehicles (%) | 8% | 0% | 100% | 3% | 0% | 100% |
| Adj. Flow (vph) | 126 | 0 | 5 | 88 | 0 | 15 |
| Shared Lane Traffic (%) | | | | | | |
| Lane Group Flow (vph) | 126 | 0 | 0 | 93 | 15 | 0 |
| Enter Blocked Intersection | No | No | No | No | No | No |
| Lane Alignment | Left | Right | Left | Left | Left | Right |
| Median Width(m) | 0.0 | | | 0.0 | 3.5 | |
| Link Offset(m) | 0.0 | | | 0.0 | 0.0 | |
| Crosswalk Width(m) | 4.8 | | | 4.8 | 4.8 | |
| Two way Left Turn Lane | | | | | | |
| Headway Factor | 1.09 | 1.09 | 1.09 | 1.09 | 1.09 | 1.09 |
| Turning Speed (k/h) | | 15 | 25 | | 25 | 15 |
| Sign Control | Free | | | Free | Stop | |

| Intersection Summary | | | |
|---|---|---|---|
| Area Type: | Other | | |
| Control Type: Unsignalized | | | |
| Intersection Capacity Utilization | 19.2% | ICU Level of Service | A |
| Analysis Period (min) | 15 | | |

| Movement | EBT | EBR | WBL | WBT | NBL | NBR |
|---|---|---|---|---|---|---|
| Lane Configurations | | | | | | |
| Traffic Volume (veh/h) | 126 | 0 | 5 | 88 | 0 | 15 |
| Future Volume (Veh/h) | 126 | 0 | 5 | 88 | 0 | 15 |
| Sign Control | Free | | | Free | Stop | |
| Grade | 0% | | | 0% | 0% | |
| Peak Hour Factor | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| Hourly flow rate (vph) | 126 | 0 | 5 | 88 | 0 | 15 |
| Pedestrians | | | | | | |
| Lane Width (m) | | | | | | |
| Walking Speed (m/s) | | | | | | |
| Percent Blockage | | | | | | |
| Right turn flare (veh) | | | | | | |
| Median type | None | | | None | | |
| Median storage veh) | | | | | | |
| Upstream signal (m) | | | | 362 | | |
| pX, platoon unblocked | | | | | | |
| vC, conflicting volume | | | 126 | | 224 | 126 |
| vC1, stage 1 conf vol | | | | | | |
| vC2, stage 2 conf vol | | | | | | |
| vCu, unblocked vol | | | 126 | | 224 | 126 |
| tC, single (s) | | | 5.1 | | 6.4 | 7.2 |
| tC, 2 stage (s) | | | | | | |
| tF (s) | | | 3.1 | | 3.5 | 4.2 |
| p0 queue free % | | | 100 | | 100 | 98 |
| cM capacity (veh/h) | | | 1025 | | 765 | 716 |

| Direction, Lane # | EB 1 | WB 1 | NB 1 |
|---|---|---|---|
| Volume Total | 126 | 93 | 15 |
| Volume Left | 0 | 5 | 0 |
| Volume Right | 0 | 0 | 15 |
| cSH | 1700 | 1025 | 716 |
| Volume to Capacity | 0.07 | 0.00 | 0.02 |
| Queue Length 95th (m) | 0.0 | 0.1 | 0.5 |
| Control Delay (s) | 0.0 | 0.5 | 10.1 |
| Lane LOS | | A | B |
| Approach Delay (s) | 0.0 | 0.5 | 10.1 |
| Approach LOS | | | B |

| Intersection Summary | | | |
|---|---|---|---|
| Average Delay | 0.8 | | |
| Intersection Capacity Utilization | 19.2% | ICU Level of Service | A |
| Analysis Period (min) | 15 | | |

| Lane Group | EBT | EBR | WBL | WBT | NBL | NBR |
|---|---|---|---|---|---|---|
| Lane Configurations | | | | | | |
| Traffic Volume (vph) | 102 | 0 | 9 | 79 | 0 | 24 |
| Future Volume (vph) | 102 | 0 | 9 | 79 | 0 | 24 |
| Ideal Flow (vphpl) | 1800 | 1800 | 1800 | 1800 | 1800 | 1800 |
| Lane Width (m) | 3.5 | 3.5 | 3.5 | 3.5 | 3.5 | 3.5 |
| Lane Util. Factor | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| Frt | | | | | 0.865 | |
| Flt Protected | | | | 0.995 | | |
| Satd. Flow (prot) | 1695 | 0 | 0 | 1717 | 1272 | 0 |
| Flt Permitted | | | | 0.995 | | |
| Satd. Flow (perm) | 1695 | 0 | 0 | 1717 | 1272 | 0 |
| Link Speed (k/h) | 60 | | | 60 | 50 | |
| Link Distance (m) | 95.5 | | | 185.0 | 109.7 | |
| Travel Time (s) | 5.7 | | | 11.1 | 7.9 | |
| Peak Hour Factor | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| Heavy Vehicles (%) | 5% | 0% | 22% | 1% | 0% | 21% |
| Adj. Flow (vph) | 102 | 0 | 9 | 79 | 0 | 24 |
| Shared Lane Traffic (%) | | | | | | |
| Lane Group Flow (vph) | 102 | 0 | 0 | 88 | 24 | 0 |
| Enter Blocked Intersection | No | No | No | No | No | No |
| Lane Alignment | Left | Right | Left | Left | Left | Right |
| Median Width(m) | 0.0 | | | 0.0 | 3.5 | |
| Link Offset(m) | 0.0 | | | 0.0 | 0.0 | |
| Crosswalk Width(m) | 4.8 | | | 4.8 | 4.8 | |
| Two way Left Turn Lane | | | | | | |
| Headway Factor | 1.09 | 1.09 | 1.09 | 1.09 | 1.09 | 1.09 |
| Turning Speed (k/h) | | 15 | 25 | | 25 | 15 |
| Sign Control | Free | | | Free | Stop | |

| Intersection Summary | | | |
|---|---|---|---|
| Area Type: | Other | | |
| Control Type: Unsignalized | | | |
| Intersection Capacity Utilization 21.6% | | ICU Level of Service A | |
| Analysis Period (min) 15 | | | |

| Movement | EBT | EBR | WBL | WBT | NBL | NBR |
|---|---|---|---|---|---|---|
| Lane Configurations | | | | | | |
| Traffic Volume (veh/h) | 102 | 0 | 9 | 79 | 0 | 24 |
| Future Volume (Veh/h) | 102 | 0 | 9 | 79 | 0 | 24 |
| Sign Control | Free | | | Free | Stop | |
| Grade | 0% | | | 0% | 0% | |
| Peak Hour Factor | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| Hourly flow rate (vph) | 102 | 0 | 9 | 79 | 0 | 24 |
| 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 | | | 102 | | 199 | 102 |
| vC1, stage 1 conf vol | | | | | | |
| vC2, stage 2 conf vol | | | | | | |
| vCu, unblocked vol | | | 102 | | 199 | 102 |
| tC, single (s) | | | 4.3 | | 6.4 | 6.4 |
| tC, 2 stage (s) | | | | | | |
| tF (s) | | | 2.4 | | 3.5 | 3.5 |
| p0 queue free % | | | 99 | | 100 | 97 |
| cM capacity (veh/h) | | | 1374 | | 789 | 904 |

| Direction, Lane # | EB 1 | WB 1 | NB 1 |
|---|---|---|---|
| Volume Total | 102 | 88 | 24 |
| Volume Left | 0 | 9 | 0 |
| Volume Right | 0 | 0 | 24 |
| cSH | 1700 | 1374 | 904 |
| Volume to Capacity | 0.06 | 0.01 | 0.03 |
| Queue Length 95th (m) | 0.0 | 0.2 | 0.7 |
| Control Delay (s) | 0.0 | 0.8 | 9.1 |
| Lane LOS | | A | A |
| Approach Delay (s) | 0.0 | 0.8 | 9.1 |
| Approach LOS | | | A |

| Intersection Summary | | | |
|---|---|---|---|
| Average Delay | 1.4 | | |
| Intersection Capacity Utilization | 21.6% | ICU Level of Service | A |
| Analysis Period (min) | 15 | | |

# FIGURES

# THUNDER ROAD & BOUNDARY ROAD
# CITY OF OTTAWA

## SITE LOCATION PLAN

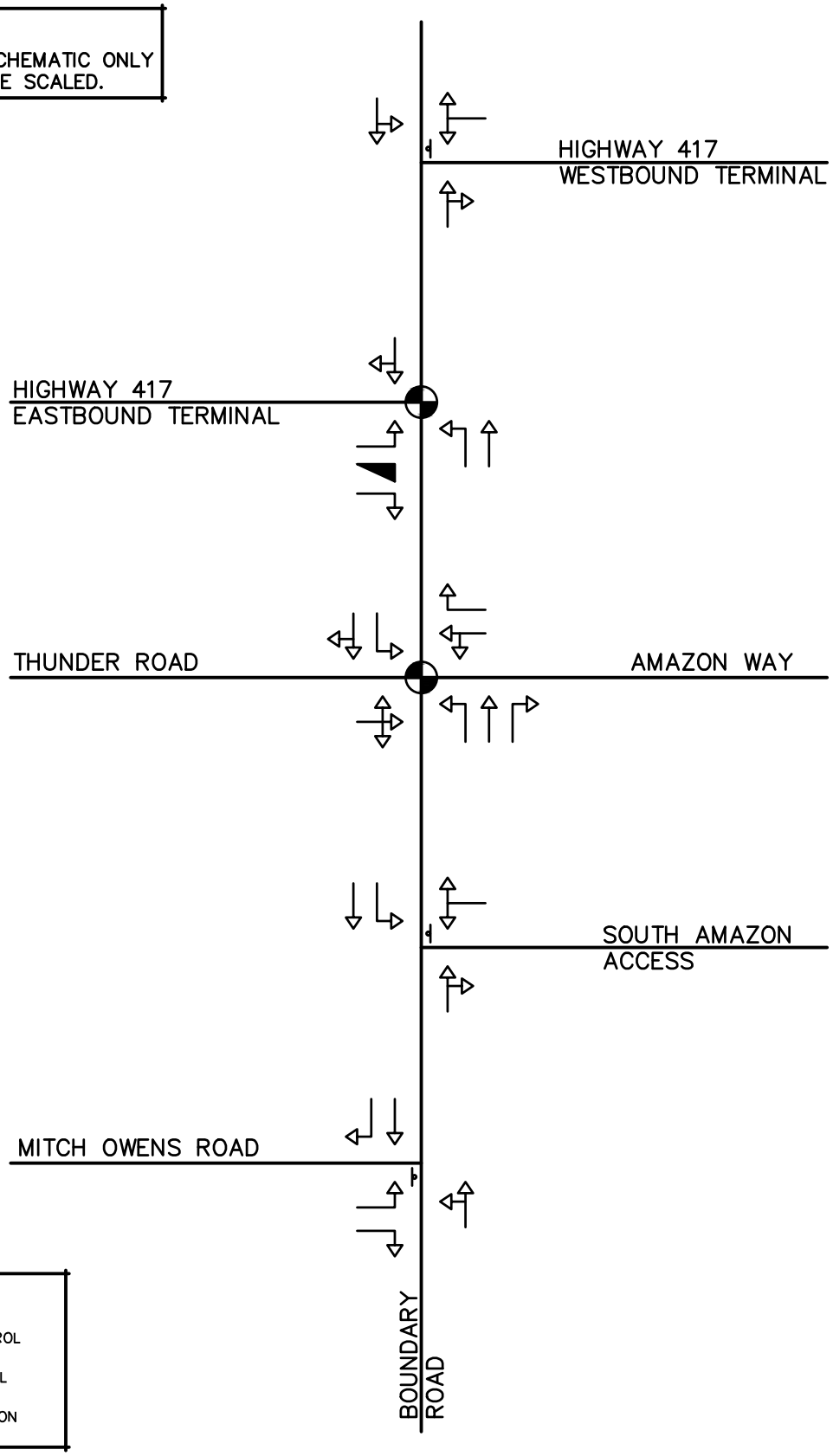
CROZIER & ASSOCIATES Consulting Engineers

2800 High Point Drive
Suite 100
Milton, ON L9T 6P4
905 875-0026 T
905 875-4915 F
www.cfcrozier.ca

| Drawn | Design | Project No. | |
|---|---|---|---|
| T.D.S. | T.D.S. | | 1909–5772 |
| Check | Check | Scale | Dwg. |
| D.L. | D.L. | N.T.S | FIG. 01 |

J:\1900\1909-Avenue 31\5772-Thunder Rd\CAD\Traffic\Sheets\5772_T302.dwg, FIG 01, 2021-03-22 10:56:16 AM, skerr

NOTE:
THIS FIGURE IS SCHEMATIC ONLY AND IS NOT TO BE SCALED.




# THUNDER ROAD & BOUNDARY ROAD
# CITY OF OTTAWA

## BOUNDARY ROAD NETWORK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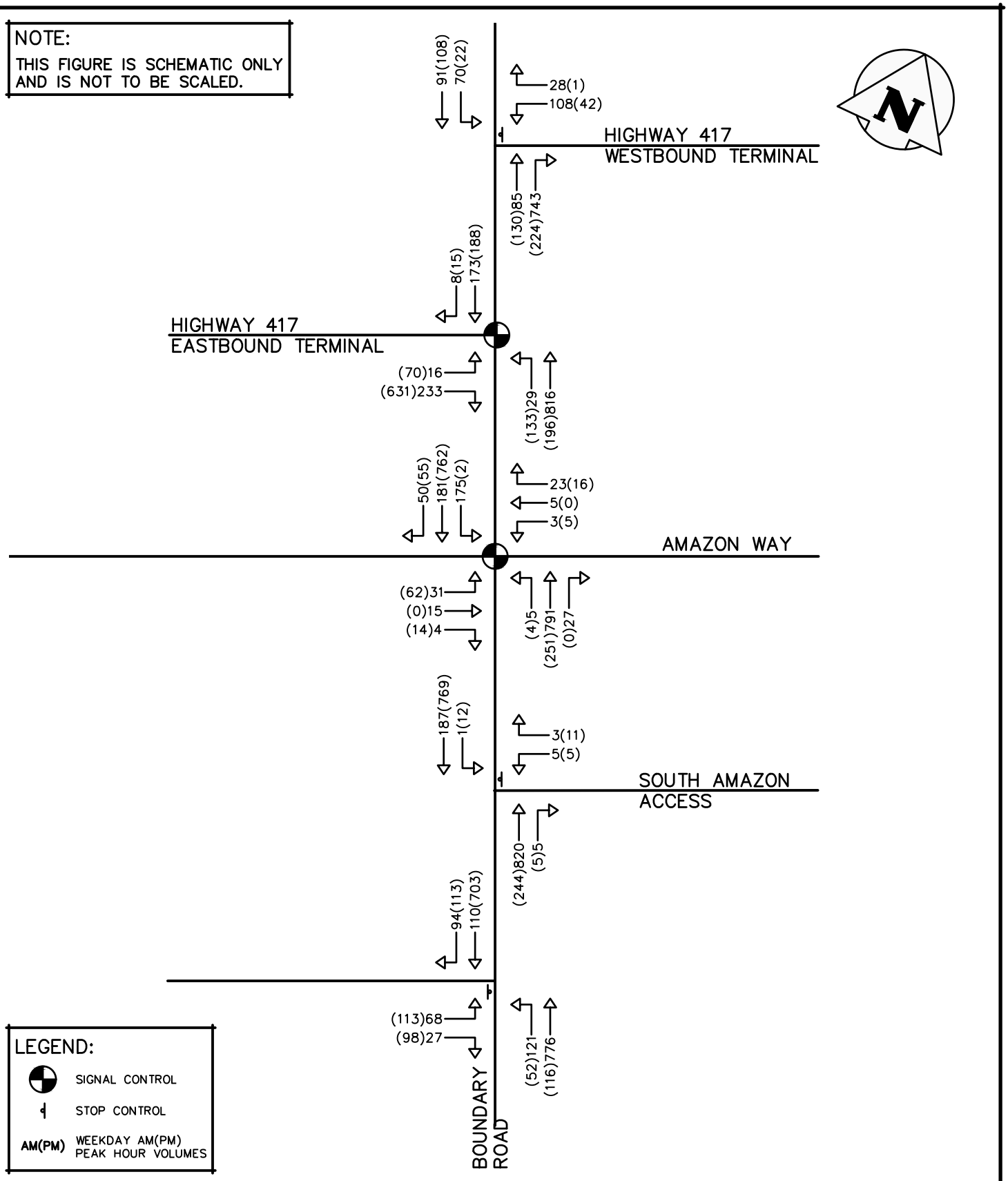
| Drawn | Design | Project No. | |
|---|---|---|---|
| T.D.S. | D.L. | | 1909–5772 |
| Check | Check | Scale | Dwg. |
| T.D.S. | D.L. | N.T.S | FIG. 02 |




# THUNDER ROAD & BOUNDARY ROAD
# CITY OF OTTAWA

## 2020 EXISTING TRAFFIC VOLUMES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| Drawn | Design | Project No. | |
|---|---|---|---|
| S.K. | S.K. | | 1909–5772 |
| Check | Check | Scale | Dwg. |
| D.L. | D.L. | N.T.S | FIG. 03 |

J:\1900\1909-Avenue 31\5772-Thunder Rd\CAD\Traffic\Sheets\5772_T302.dwg, FIG 02, 2021-03-22 10:56:20 AM, skerr

NOTE:
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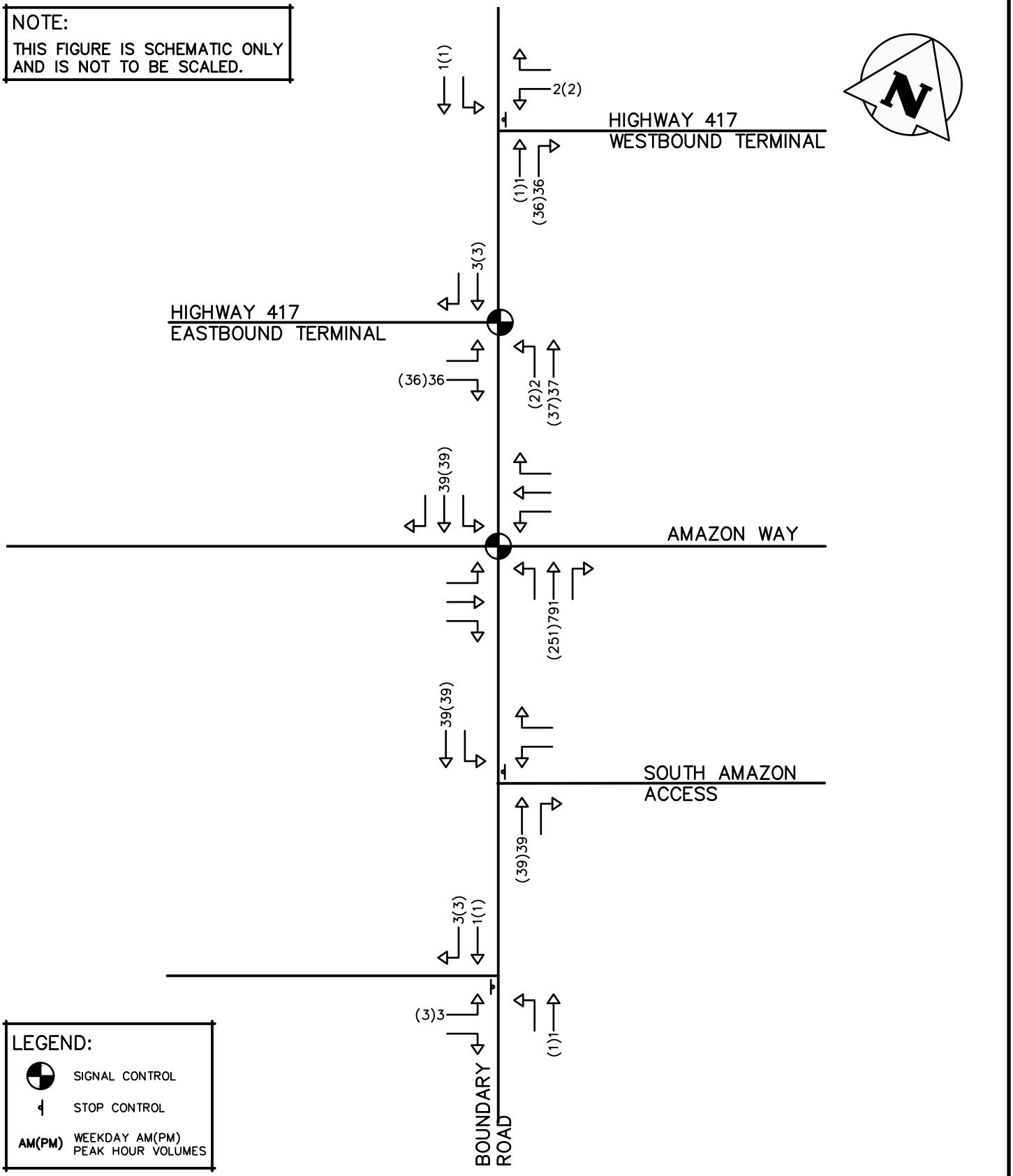


LEGEND:

- SIGNAL CONTROL
- STOP CONTROL
- AM(PM) WEEKDAY AM(PM) PEAK HOUR VOLUMES

# THUNDER ROAD & BOUNDARY ROAD
# CITY OF OTTAWA

## CRRC BACKGROUND TRIP ASSIGNMENT


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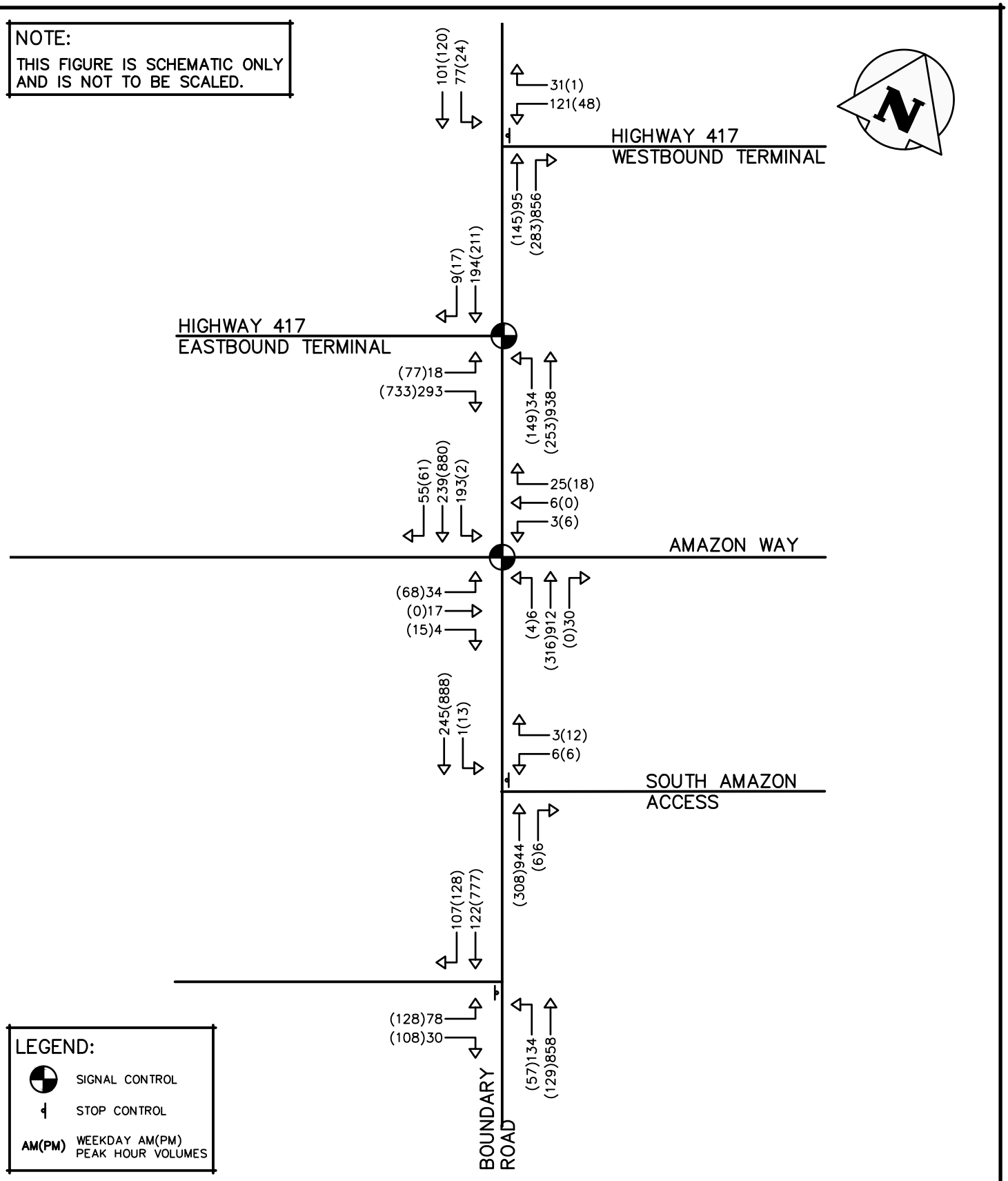
| Drawn | Design | Project No. | |
|---|---|---|---|
| S.K. | S.K. | | 1909–5772 |
| Check | Check | Scale | Dwg. |
| D.L. | D.L. | N.T.S | FIG. 04 |

J:\1900\1909-Avenue 31\5772-Thunder Rd\CAD\Traffic\Sheets\5772_T302.dwg, FIG 03, 2021-03-22 10:56:25 AM, skerr




# THUNDER ROAD & BOUNDARY ROAD
# CITY OF OTTAWA

## 2025 FUTURE BACKGROUND TRAFFIC VOLUMES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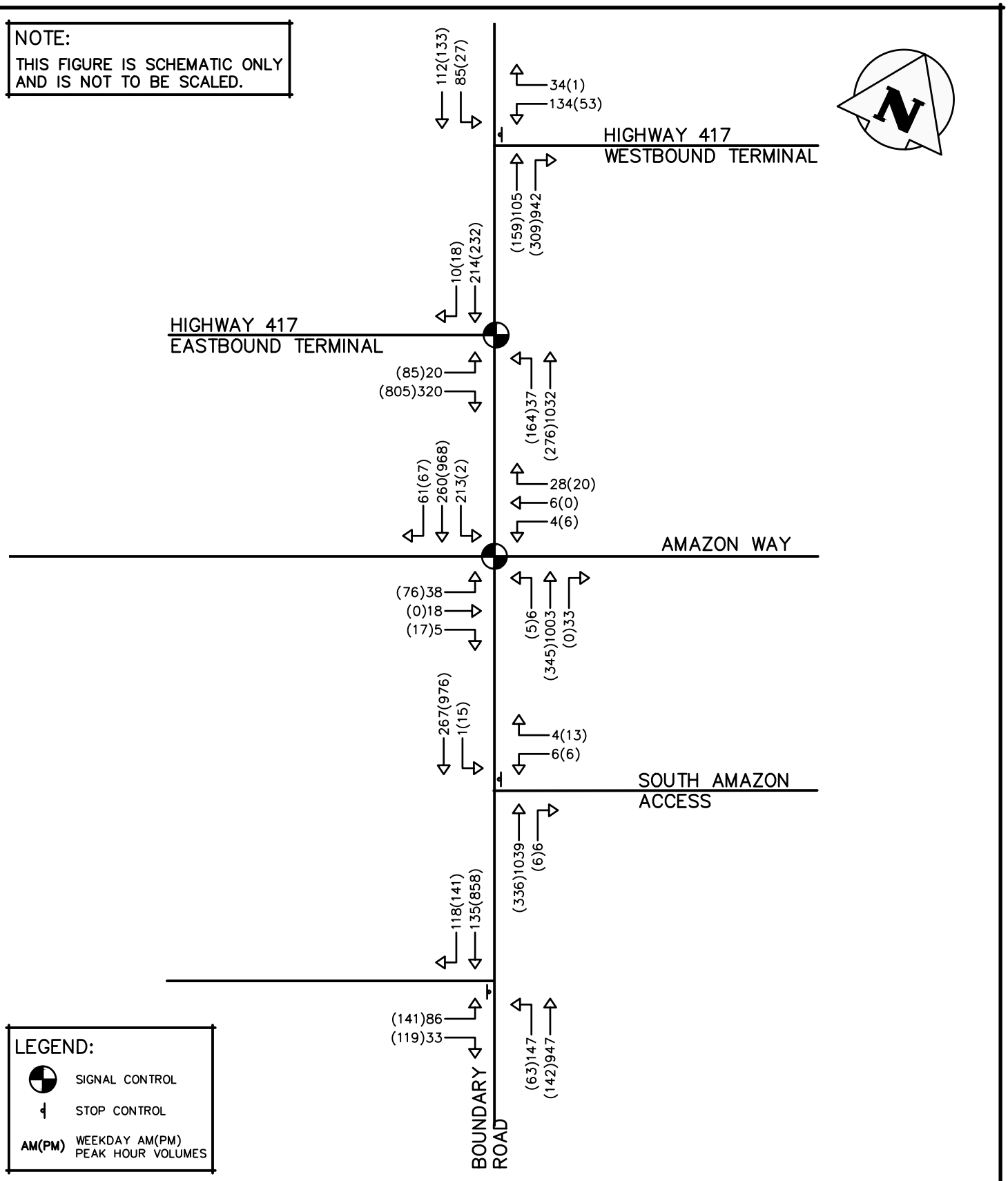
| Drawn | Design | Project No. | |
|---|---|---|---|
| S.K. | S.K. | 1909–5772 | |
| Check | Check | Scale | Dwg. |
| D.L. | D.L. | N.T.S | FIG. 05 |

J:\1900\1909-Avenue 31\5772-Thunder Rd\CAD\Traffic\Sheets\5772_T302.dwg, FIG 04, 2021-03-22 10:56:30 AM, skerr




# THUNDER ROAD & BOUNDARY ROAD
# CITY OF OTTAWA

## 2030 FUTURE BACKGROUND TRAFFIC VOLUMES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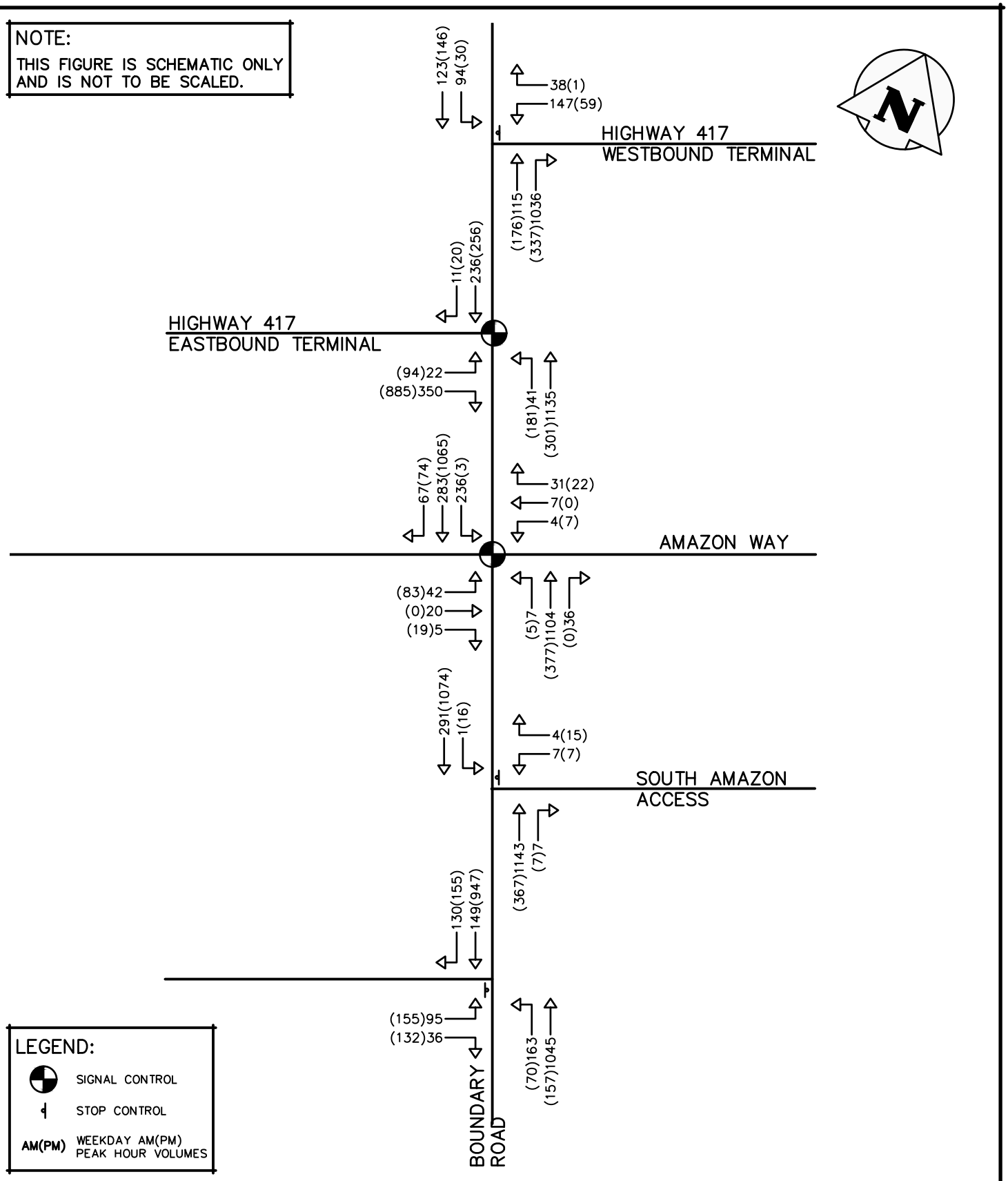
| Drawn | Design | Project No. | |
|---|---|---|---|
| S.K. | S.K. | | 1909–5772 |
| Check | Check | Scale | Dwg. |
| D.L. | D.L. | N.T.S | FIG. 06 |

J:\1900\1909-Avenue 31\5772-Thunder Rd\CAD\Traffic\Sheets\5772_T302.dwg, FIG 05, 2021-03-22 10:56:35 AM, skerr




# THUNDER ROAD & BOUNDARY ROAD
# CITY OF OTTAWA

## 2035 FUTURE BACKGROUND TRAFFIC VOLUMES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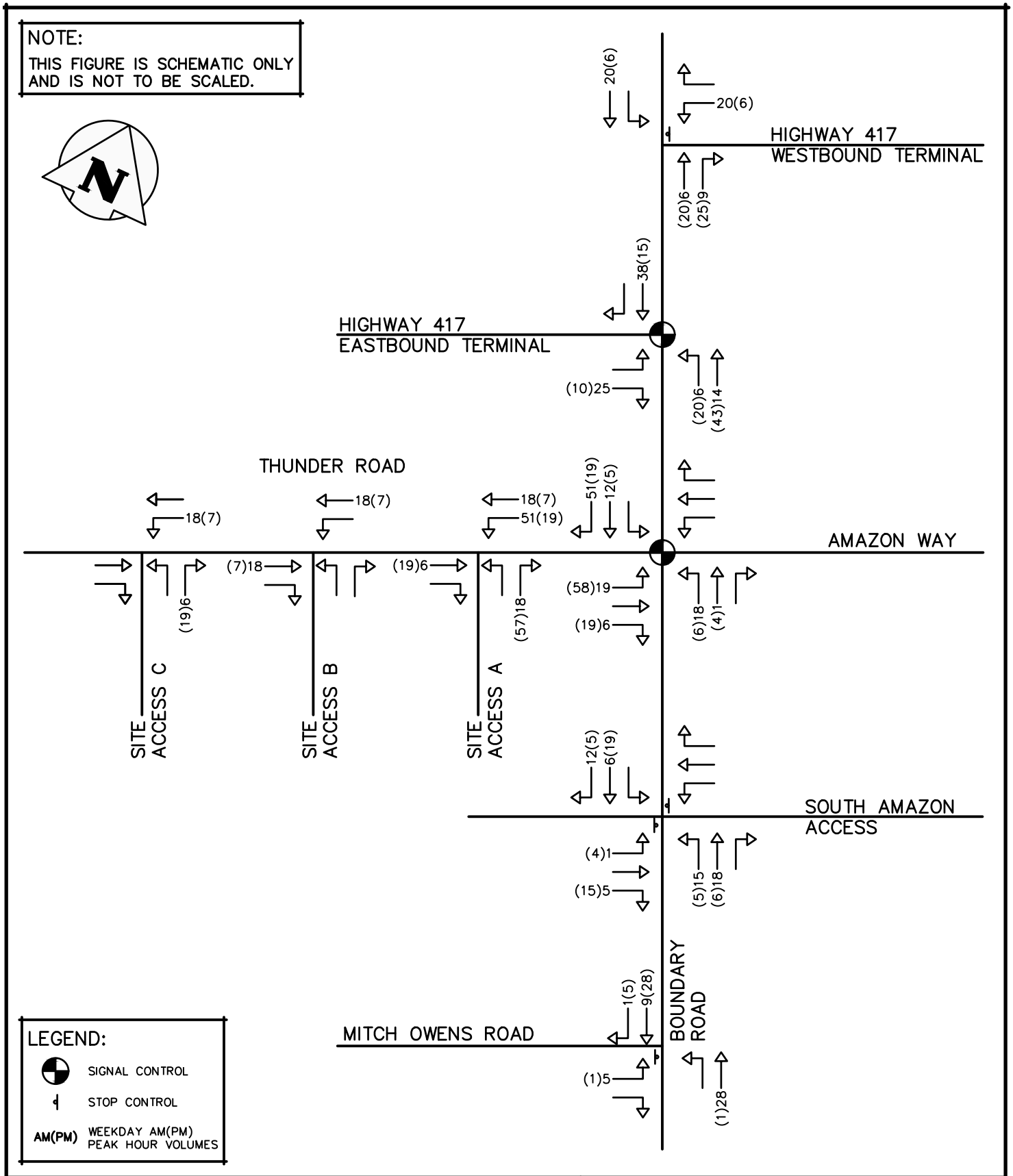
| Drawn | Design | Project No. | |
|---|---|---|---|
| S.K. | S.K. | | 1909–5772 |
| Check | Check | Scale | Dwg. |
| D.L. | D.L. | N.T.S | FIG. 07 |

J:\1900\1909-Avenue 31\5772-Thunder Rd\CAD\Traffic\Sheets\5772_T302.dwg, FIG 06, 2021-03-22 10:56:40 AM, skerr




# THUNDER ROAD & BOUNDARY ROAD
# CITY OF OTTAWA

## SITE TRIP ASSIGNMENT – EMPLOYEES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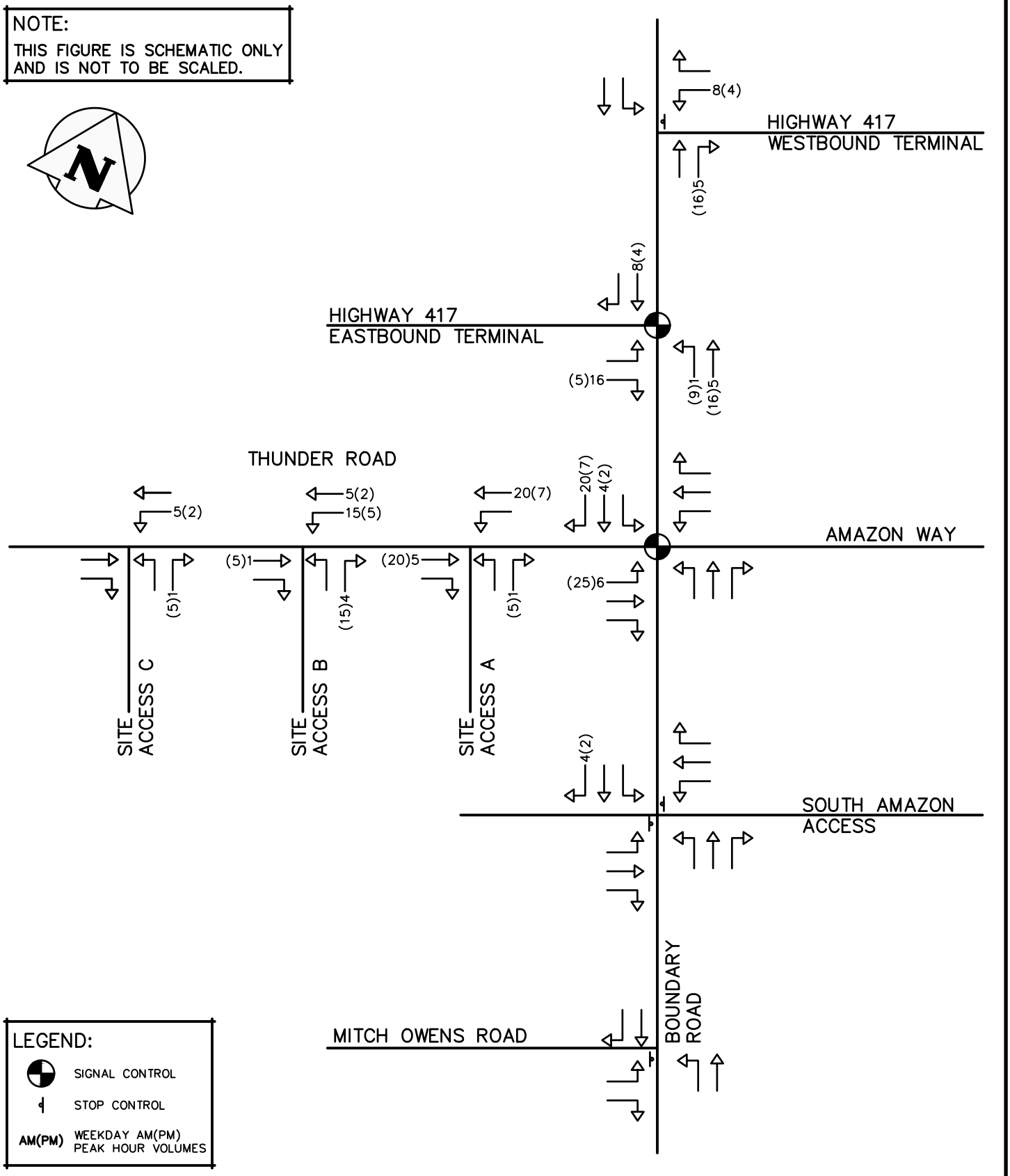
| Drawn | Design | Project No. | |
|---|---|---|---|
| S.K. | S.K. | | 1909–5772 |
| Check | Check | Scale | Dwg. |
| D.L. | D.L. | N.T.S | FIG. 08 |

J:\1900\1909-Avenue 31\5772-Thunder Rd\CAD\Traffic\Sheets\5772_T302.dwg, FIG 07, 2021-03-22 10:56:45 AM, skerr




# THUNDER ROAD & BOUNDARY ROAD
# CITY OF OTTAWA

## SITE TRIP ASSIGNMENT – TRUCKS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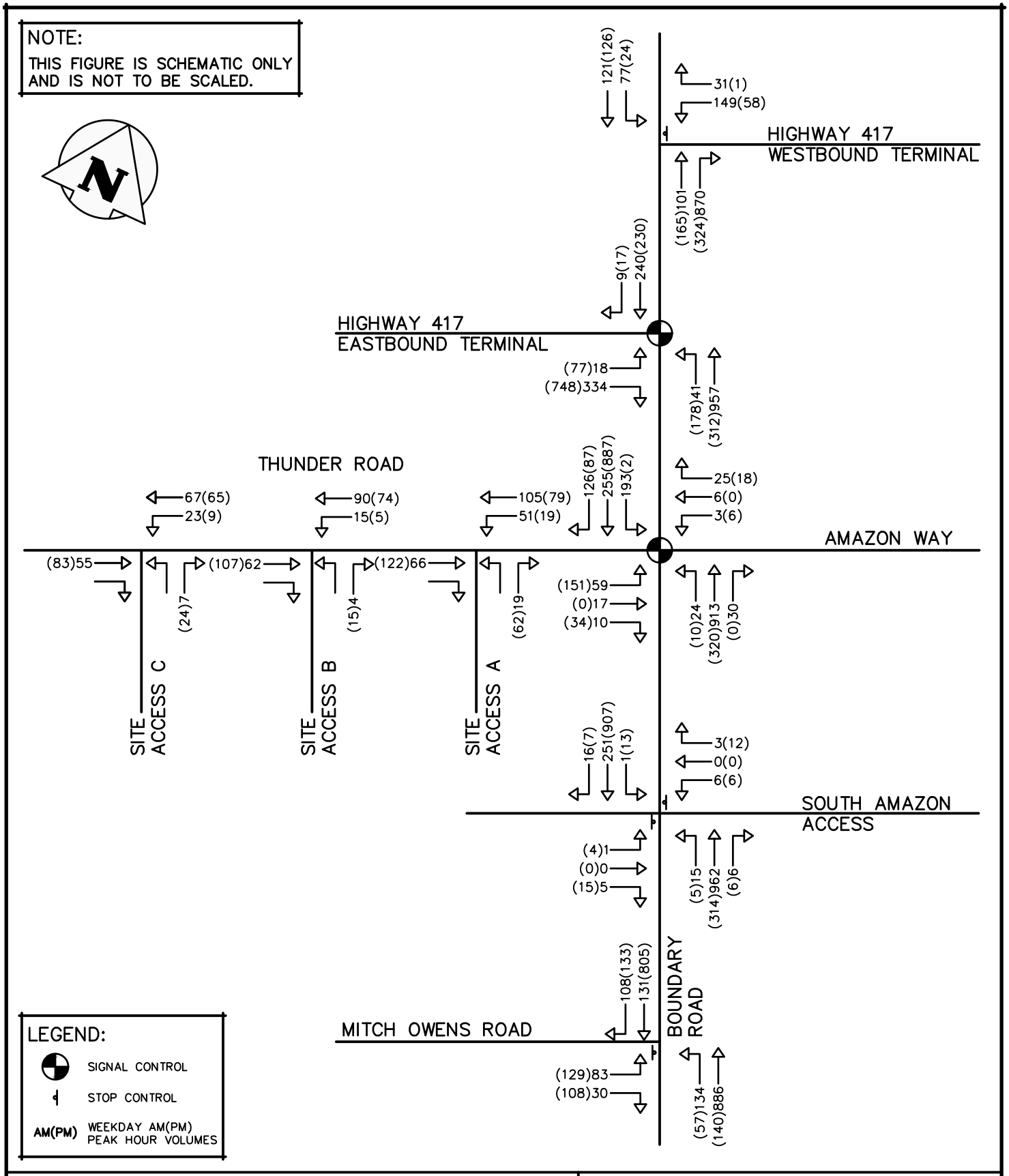
| Drawn | Design | Project No. | |
|---|---|---|---|
| S.K. | S.K. | 1909–5772 | |
| Check | Check | Scale | Dwg. |
| D.L. | D.L. | N.T.S | FIG. 09 |




# THUNDER ROAD & BOUNDARY ROAD
# CITY OF OTTAWA

## 2025 FUTURE TOTAL TRAFFIC VOLUMES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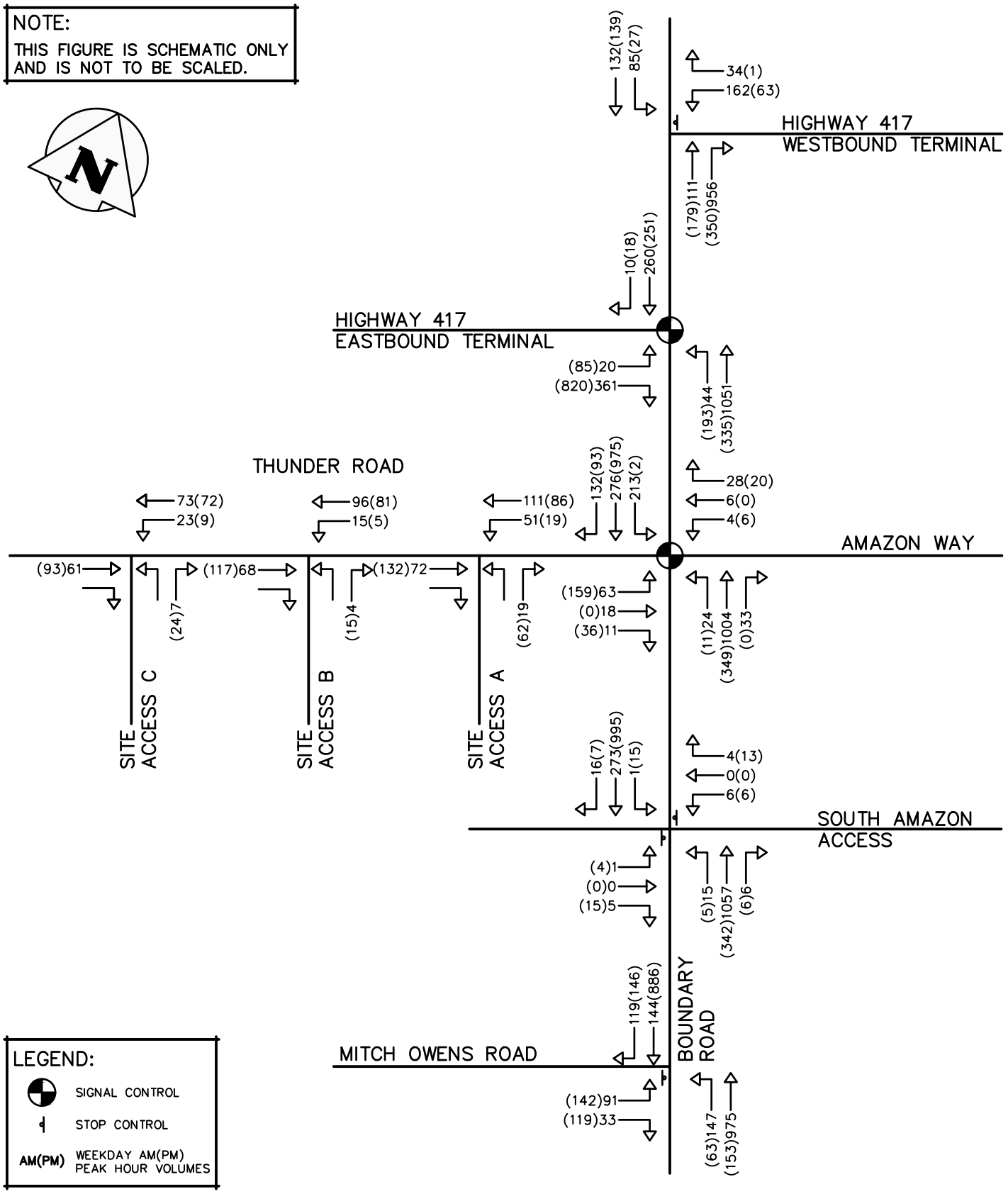
| Drawn | Design | Project No. | |
|---|---|---|---|
| S.K. | S.K. | | 1909–5772 |
| Check | Check | Scale | Dwg. |
| D.L. | D.L. | N.T.S | FIG. 10 |

J:\1900\1909-Avenue 31\5772-Thunder Rd\CAD\Traffic\Sheets\5772_T302.dwg, FIG 09, 2021-03-22 10:56:55 AM, skerr




# THUNDER ROAD & BOUNDARY ROAD
# CITY OF OTTAWA

## 2030 FUTURE TOTAL TRAFFIC VOLUMES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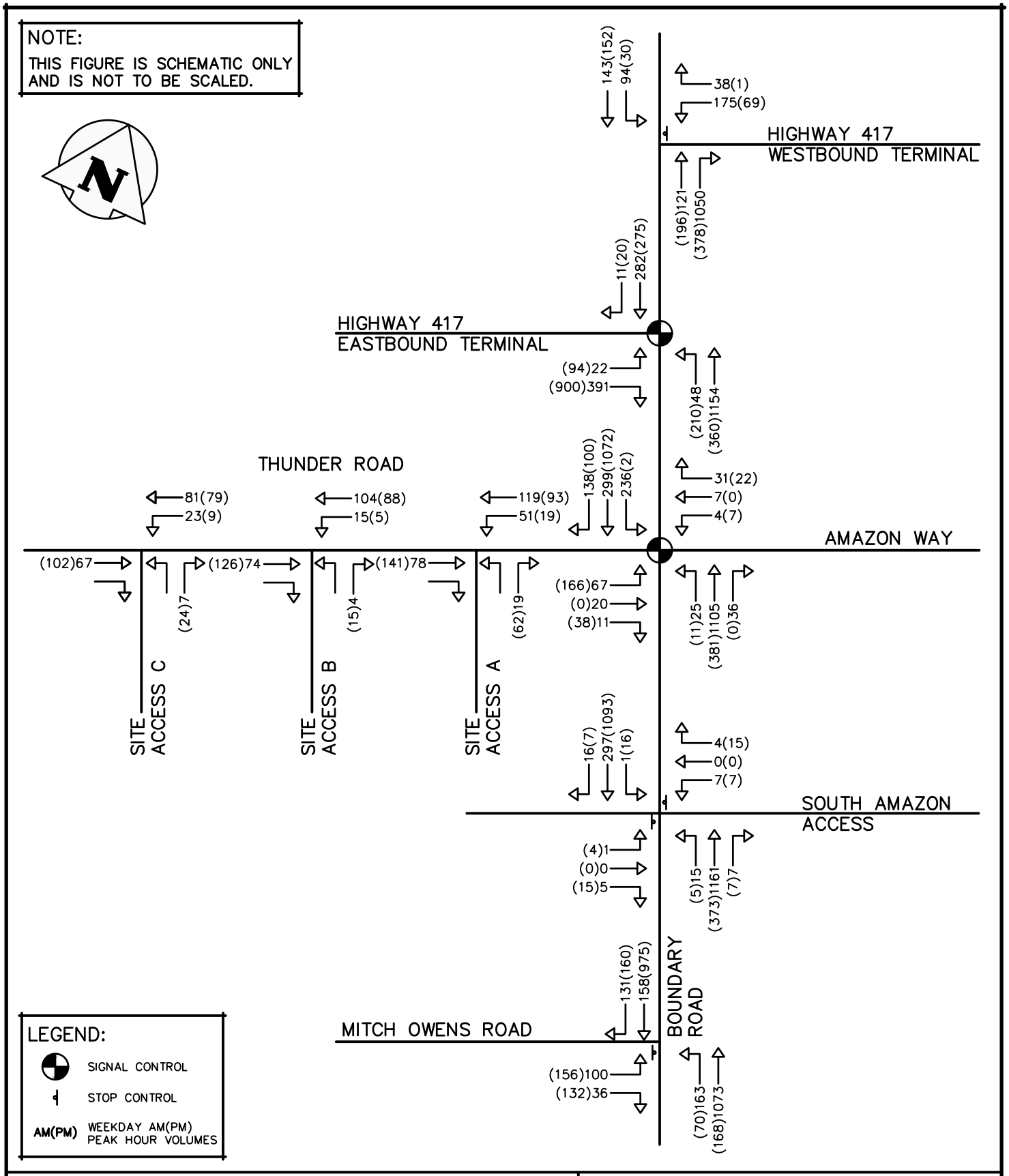
| Drawn | Design | Project No. | |
|---|---|---|---|
| S.K. | S.K. | | 1909–5772 |
| Check | Check | Scale | Dwg. |
| D.L. | D.L. | N.T.S | FIG. 11 |

J:\1900\1909-Avenue 31\5772-Thunder Rd\CAD\Traffic\Sheets\5772_T302.dwg, FIG 10, 2021-03-22 10:57:00 AM, skerr




# THUNDER ROAD & BOUNDARY ROAD
# CITY OF OTTAWA

## 2035 FUTURE TOTAL TRAFFIC VOLUMES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| Drawn | Design | Project No. | |
|---|---|---|---|
| S.K. | S.K. | | 1909–5772 |
| Check | Check | Scale | Dwg. |
| D.L. | D.L. | N.T.S | FIG. 12 |

J:\1900\1909-Avenue 31\5772-Thunder Rd\CAD\Traffic\Sheets\5772_T302.dwg, FIG 11, 2021-03-22 10:57:05 AM, skerr